

Preliminary (Stage 1) Alternatives Analysis Report Methylene Chloride-Containing Paint or Varnish Removers

Prepared for
Halogenated Solvents Industry Alliance
Responsible Entity Group
3033 Wilson Boulevard, Suite 700
Arlington, VA 22201

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GRADIENT

www.gradientcorp.com
600 Stewart Street, Suite 1900
Seattle, WA 98101
206-267-2920

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Abbreviations

AA	Alternatives Analysis
ASTM	American Society for Testing and Materials
CPSC	US Consumer Product Safety Commission
DCM	Dichloromethane
DMSO	Dimethyl Sulfoxide
DTSC	California Dept. of Toxic Substances Control
FHSA	Federal Hazardous Substances Act
GPC	Global Product Classification
HSDB	National Library of Medicine's Hazardous Substance Data Base
IRTA	Institute for Research and Technical Assistance
LCA	Life Cycle Assessment
LVP-VOC	Low Vapor Pressure Volatile Organic Compounds
NESHAP	National Emission Standards for Hazardous Air Pollutants
NMP	N-Methyl Pyrrolidone
PAA	Preliminary Alternatives Analysis
PPE	Personal Protective Equipment
RE	Responsible Entity
SCP	Safer Consumer Products
SDS	Safety Data Sheet
TURI	Toxics Use Reduction Institute
US EPA	US Environmental Protection Agency
VOC	Volatile Organic Compound

Executive Summary

This Preliminary (Stage 1) Alternatives Analysis (PAA) report was prepared on behalf of a responsible entity group comprising some, but not all, manufacturers of methylene chloride-based paint and varnish removers who have sold this product in California in the 12 months prior to the effective date of the rule designating these materials as priority products. Some intend to continue sale of this product in California, consistent with proposed federal regulations limiting sale of such products to commercial users. This Stage 1 AA was based on readily available information and sought to determine whether there are good candidate alternatives to the priority product that should be considered in greater depth to determine if they are suitable alternatives that do not result in regrettable substitutions. The overall conclusion is that there are potential alternatives that are suitable to carry forward into a Stage 2 AA.

As required by the SCP regulation, the following is a summary of information contained in each section of the report:

- Section 1 identifies the persons who oversaw preparation of this report.
- Section 2 identifies the responsible entities submitting this report and addresses how they will be submitting the required supply chain information.
- Section 3 identifies the priority product (methylene chloride-based paint and varnish removers), identifies the chemical of concern (methylene chloride) and identifies the function of the chemical in the priority product (separating paint or other surface coatings from an underlying substrate). It also discusses that there are no mandated performance requirements of the priority product, but that speed of removal (30 minutes is a commonly cited time frame) and not damaging the underlying substrate are common expectations of the marketplace. It is also noted that the REs are unaware of any studies that have investigated how the products are used by purchasers in California, and that use will be highly job and situation specific. The REs estimate that use could range from 30 minutes to several hours per day with the lower end most applicable to occasional home users and the upper end most applicable to commercial users. Section 3 also provides some sales volume estimates for California for the 12 months prior to the adoption of the rule designating the priority product; although data are limited, sales may have been in the range of 45,000 to 120,000 gallons for the year. Note that the upcoming federal ban of sale of these products to consumers will significantly reduce these sales volumes. Section 3 also describes the legal requirements and standards for the priority product: notable examples include the National Emission Standards for Hazardous Air Pollutants, the California Air Resources Board (CARB) limits for volatile organic carbon content in paint remover products, and package labeling requirements promulgated by the US Consumer Product Safety Commission (CPSC) pertaining to instructions for proper use of the product. Section 3 concludes with a discussion of how the function of methylene chloride in the priority product is necessary and simple removal is not possible. Any new chemical substitute must have similar functional properties.
- Section 4 begins with a discussion of the REs approach to performing the Stage 1 AA and notes that performance and cost will be included as part of Stage 1, as allowed by the SCP regulations. Next follows a review of prior AAs conducted for these products. The various studies employed different methodologies and reached different conclusions regarding the suitability of different alternatives. Notably, none would have been sufficient to meet all of the DTSCs requirements under the SCP for a Stage 1 AA. Section 4 next discusses paint removal methods that are

considered outside the scope of this AA, including sanding, pressure washing and heat based methods, and why these are not considered suitable alternatives for study. The section then discusses an approach to binning the large number of different products identified into product groups, which allows for a more transparent and manageable AA. The 8 product groups identified were:

Group 1 - Methylene chloride-based paint removers ($\geq 60\%$ methylene chloride)

Group 2- Methylene chloride-based paint removers ($\leq 45\%$ methylene chloride)

Group 3 - Acetone/Toluene/Methanol-based products

Group 4 - Dibasic ester-based products

Group 5 - Benzyl alcohol-based products

Group 6 - Products based on caustics (*e.g.*, calcium hydroxide)

Group 7 - Other product formulations without methylene chloride not fitting into Groups 1-6

Group 8 - The UMass Lowell formulation

Section 4 concludes with a discussion of factors that were considered relevant to this Stage 1 AA. It includes a discussion of a conceptual exposure model which shows how individuals and environmental targets may be exposed to chemical paint removers. It also describes the approach taken to address life cycle questions and the results as to the relevance of each life cycle aspect noted in the SCP regulations to the evaluation of the different alternatives. We concluded that packaging, transport/distribution, waste generation, and reuse/recycling potential would likely be similar for all alternatives but that the other life cycle phases could be different for some products, particularly if the product is used in a manner inconsistent with the manufacturer's instructions and applicable laws (*e.g.*, improper discharge to surface water bodies or soil).

- Section 5 begins with a review of health hazard information. We describe the approach taken to obtain data on hazard of the key ingredients of each product group. We primarily used European Chemicals Agency (ECHA) dossiers and the Globally Harmonized System of Classification and Labeling (GHS) classifications. For health hazard endpoints where such data were not available, we consulted other sources such as government lists of chemicals with global warming or ozone depletion potential or status as a regulated water or air pollutant. To quantitatively evaluate hazard, we computed human health, ecological health, and physical/chemical hazard scores by adapting a scoring system called the Chemical Scoring Index (CSI). This system takes into account not only hazard classification but also the percentage of chemical in a product. Based on this hazard scoring approach, Groups 4, 5 and 6 appear to have the most desirable hazard profiles. The least desirable hazard profile is associated with Group 2 which has the highest human health hazard score and the second highest physical hazard score. For groups 1 and 8, the key tradeoff lies between the reported carcinogenicity and modeled persistence of methylene chloride and the lack of carcinogenicity data and inherent flammability of some of the ingredients in the Group 8.

Section 5 continues with a review of relative exposure information. Based on a tabulation of physical and chemical properties, the potential for exposure of each product group is assessed in terms of potential for inhalation exposure, dermal exposure and exposure *via* air, water and soil/sediment pathways. Overall, the evaluation suggests that most product groups likely offer advantages relative to the priority products (Groups 1 and 2) in terms of inhalation and air pathway exposures but are similar in terms of other pathways. The caustic products likely also have a potential for more aqueous pathway exposure.

Section 5 next discussed the evaluation of performance. Six different paint remover performance studies are described, each of which involved different paint types, different substrates and different testing methods. The advantages and disadvantages of each study are noted. Overall, we found that Group 2 and Group 3 products were overall less effective than Group 1 products, although performance was comparable for a limited number of situations. Groups 4, 6, and 7 all performed poorly compared to Group 1, although data for some groups were limited. Group 5 gave variable results; in some studies performance was comparable to Group 1 while in others it was poor. The Group 8 product has no actual data but similar formulations showed performance that was equivalent or only slightly less effective than Group 1.

Section 5 concludes with a discussion of product cost. Although some cost data were found, these were judged to be somewhat inconsistent and of limited use for the Stage 1 AA.

- Section 6 presents the conclusions of the Stage 1 AA. It describes how a narrative decision making approach was used to evaluate the different product groups across the hazard, relative exposure and performance categories. Using this approach, it appears that there is at least one possible alternative to methylene chloride-based paint removers, the Lowell formulation, although product performance data are limited at this time. Although this product is flammable, its overall hazard scores were lower than those of the priority products, and it appears to have lower relative exposure potential for the inhalation and air pathways; performance of similar Lowell formulations have been roughly comparable to the priority product. There are a number of questions concerning the formulation that will need to be studied further in Stage 2. Group 5 products (benzyl alcohol-based) are preferable to the priority product in terms of hazard and relative exposure potential. However, their performance has been reported inconsistently, ranging from comparable to the priority product to very poor performance. Benzyl alcohol-based products could be included in the Stage 2 AA, but only if a way of explaining and resolving these performance discrepancies can be found.
- Section 7 presents the proposed Work plan for the Stage 2 AA and the proposed schedule for completing the work in the allowed 1 year time frame.
- Section 8 discusses uncertainties encountered in carrying out the work and the potential implications these may have for the results.
- Section 9 presents the report references.
- Appendices are provided for the report which provide some of the supporting data.

1 Preparer Information

Preparer Information:

First Name	Faye
Last Name	Graul ¹
Job Title	Executive Director
Company	Halogenated Solvents Industry Alliance
Email	fgraul@hsia.org
Phone	703-875-0683
Address	3033 Wilson Boulevard, Suite 700, Arlington, VA 22201

Responsible Entities Information:

First Name	TJ
Last Name	Vestal
Company	WM Barr Co., Inc.
Business Type	Manufacturer
Email	tj.vestal@wmbarr.com
Phone	901-288-9172
Website	www.wmbarr.com
Address	6750 Lenox Center Court, Suite 200, Memphis, TN 38115

¹ Submitting on behalf of a RE group comprised of the responsible entities listed here.

First Name	Robin
Last Name	Le Sage
Company	Recochem, Inc.
Business Type	Manufacturer
Email	rlesage@recochem.com
Phone	905-878-5544 ext 23004
Website	www.recochem.com
Address	8725 Holgate Crescent, Milton, Ontario, Canada, L9T 5G7

First Name	Bob
Last Name	Feyh
Company	Green Products Co.
Business Type	Manufacturer
Email	bobfeyh@sbcglobal.net
Phone	510-235-9667
Website	www.greenproductsco.net
Address	810 Market Avenue, Richmond, CA 94801-1325

First Name	Valeri
Last Name	Lennon
Company	Benco Sales, Inc.
Business Type	Manufacturer
Email	vlennon@bencosales.com
Phone	931-484-9578
Website	www.bencosales.com
Address	123 Stout Drive, Crossville, TN 38555

First Name	Tom
Last Name	Keith
Company	Sansher Corporation
Business Type	Manufacturer
Email	Sanshercorp@comcast.net
Phone	260-484-2000
Website	www.dadseasyspray.com
Address	8005 North Clinton Street, Fort Wayne, IN 46825

First Name	Mark
Last Name	Monique
Company	Savogran
Business Type	Former DCM paint stripper manufacturer, funder of phase 1 assessment
Email	mmonique@savogran.com
Phone	800-225-9872
Website	www.savogran.com
Address	PO Box 130, 259 Lenox Street, Norwood, MA 02062

First Name	Stephen
Last Name	Craig
Company	Packaging Service Company
Business Type	Former DCM paint stripper manufacturer, funder of phase 1 assessment
Email	Stephen_Craig@packserv.com
Phone	281-485-1458
Website	N/A
Address	1904 Mykawa Road, Pearland, TX 77584

Certification and Signatures

Certification of the Preliminary AA Report is included in Appendix A.

2 Responsible Entity and Supply Chain Information

Manufacturer(s) and Consortium Participants:

First Name	TJ
Last Name	Vestal
Company	WM Barr Co., Inc.
Business Type	Manufacturer
Email	tj.vestal@wmbarr.com
Phone	901-288-9172
Website	www.wmbarr.com
Headquarters Address	6750 Lenox Center Court, Suite 200, Memphis, TN 38115

First Name	Robin
Last Name	Le Sage
Company	Recochem, Inc.
Business Type	Manufacturer
Email	rlesage@recochem.com
Phone	905-878-5544
Website	www.recochem.com
Headquarters Address	8725 Holgate Crescent, Milton, Ontario, Canada, L9T 5G7

First Name	Guy
Last Name	Woods
Company	Green Products Co.
Business Type	Manufacturer
Email	greenpro@sbcglobal.net
Phone	510-235-9667
Website	www.greenproductsco.net
Headquarters Address	810 Market Avenue, Richmond, VA 94801-1325

First Name	Valeri
Last Name	Lennon
Company	Benco Sales, Inc.
Business Type	Manufacturer
Email	vlennon@bencosales.com
Phone	931-484-9578
Website	www.bencosales.com
Headquarters Address	123 Stout Drive, Crossville, TN 38555

First Name	Tom
Last Name	Keith
Company	Sansher Corporation
Business Type	Manufacturer
Email	Sanshercorp@comcast.net
Phone	260-484-2000
Website	www.dadseasyspray.com
Headquarters Address	8005 North Clinton Street, Fort Wayne, IN 46825

First Name	Mark
Last Name	Monique
Company	Savogran
Business Type	Former DCM paint stripper manufacturer, funder of phase 1 assessment
Email	mmonique@savogran.com
Phone	800-225-9872
Website	www.savogran.com
Headquarters Address	PO Box 130, 259 Lenox Street, Norwood, MA 02062

First Name	Stephen
Last Name	Craig
Company	Packaging Service Company
Business Type	Former DCM paint stripper manufacturer, funder of phase 1 assessment
Email	Stephen_Craig@packserv.com
Phone	281-485-1458
Website	N/A
Headquarters Address	1904 Mykawa Road, Pearland, TX 77584

Manufacturer(s), Importer(s), and/or Distributor(s) Listed on the Priority Products' Labels:

These data are regarded as confidential business information (CBI) by some of the responsible entities (RE). A separate Appendix B will be submitted by each RE and marked as CBI, as appropriate.

Purchasers of Priority Products:

These data are regarded as CBI by some of the REs. A separate Appendix B will be submitted by each RE and marked as CBI, as appropriate.

Manufacturer(s) and/or Importer(s) Retail Sales Outlets:

Not applicable. The manufacturers of the priority products do not have their own retail sales outlets.

3 Priority Product Information

3.1 Priority Product Made by Responsible Entities Participating in This Alternatives Analysis Report

This RE group comprises some, but not all, manufacturers of methylene chloride-based paint and varnish removers² who have sold this product in California in the months prior to the effective date of the rule designating these materials as priority products. Some intend to continue sale of this product in California, consistent with proposed federal regulations limiting sale of such products to commercial users. Products made by these REs that contain methylene chloride and that were sold in the state in the 12 months prior to the effective date of the rule are shown in Table 3.1. Safety Data Sheets (SDS) for these products are included in Appendix C.

Table 3.1 Methylene Chloride-containing Paint and Varnish Remover Products Made by Responsible Entities Participating in this Alternatives Analysis and Sold in California in 2018

Formulator Name	Name
Benco	B1 Industrial Paint Remover (Liquid)
Benco	B4 Industrial Semi-paste Paint Remover
Benco	B2 Industrial Liquid Paint Remover
Benco	B7 Industrial Paint Remover (liquid)
Benco	B6 Aircraft Stripper
Benco	B14 Industrial Powdercoat Remover – Liquid
Benco	B15 Industrial Powder Coat remover – Semi Paste
Benco	B17 Advanced Industrial Powder Coat remover - Liquid
Green Products Co	Green's Liquid Paint, Varnish & Lacquer Remover
Green Products Co	Green's Premium Semi-Paste Paint Varnish Lacquer Remover
Recochem	Zip Strip Industrial paint and finish remover
Recochem	Zip Strip Premium paint and finish remover
Recochem	Zip Strip Contractors Plus paint and finish remover
Sansher Corp	Dad's Easy Spray Professional Strength
Sansher Corp	Dad's Easy Spray Contractor Grade
Sansher Corp	KBS Coatings KBS Strip
Sansher Corp	Glaze N Seal Paint and Coating Stripper
WM Barr	Jasco/Bix Varnish & Stain Remover Quart
WM Barr	Jasco Fiberglass Paint Remover Gallon
WM Barr	Jasco Premium Paint & Epoxy Remover Quart, gallon & 5 Gallon
WM Barr	Jasco Premium Remover 17 oz aerosol

² California Dept. of Toxic Substances Control (DTSC) has described the priority product as "methylene chloride paint and varnish strippers" and "methylene chloride paint and varnish remover." For simplicity's sake, the priority product is referred to in this document as methylene chloride-based paint remover (DTSC, 2016).

Formulator Name	Name
WM Barr	Jasco Premium Sprayable Stripper
WM Barr	Klean Strip Adhesive Remover Quart & Gallon
WM Barr	Aircraft Fiberglass Paint Remover Gallon
WM Barr	Aircraft Low Odor Remover Gallon
WM Barr	Aircraft Remover 18 oz aerosol
WM Barr	Aircraft Paint Remover for Flexible Plastic 18 oz aerosol
WM Barr	Aircraft Remover Quart & Gallon
WM Barr	Klean Strip Klean Kutter Quart
WM Barr	Naked Gun Spray Gun Paint Remover Gallon & 5 Gallon
WM Barr	Naked Gun Spray Gun Paint Remover Kit ³
WM Barr	Aircraft Peeler 18 oz aerosol
WM Barr	Klean Strip Sprayable Quart & gallon
WM Barr	Klean Strip Premium Stripper Quart & gallon
WM Barr	Klean Strip Premium Stripper 18 oz aerosol
WM Barr	Klean Strip Strip X Quart & Gallon
WM Barr	KWIK Liquid No Wash 5 Gallon
WM Barr	KWIK Marine Remover
WM Barr	Master Pro Metal Stripper for O'Reilly's Gallon

3.2 Chemical(s) of Concern for the Priority Product

The chemical of concern for the priority product is methylene chloride (also called dichloromethane, DCM, MeCl, CAS Number 75-09-2).

3.3 Function of the Priority Product

The function of the priority product is to separate paint, varnish, and other finishes or coatings from an underlying substrate so that the finish or coating can be readily removed with less effort than friction-based methods (*e.g.*, sanding).

3.4 Key Performance Requirements for the Priority Product

As noted above, chemical paint removers separate coatings and finishes from substrates. Three key performance requirements for the priority product and any replacement products are as follows:

- The product must be effective at separating the coating or finish from the substrate (*i.e.*, use of the product eliminates or substantially reduces the need for sanding or other manual methods of paint removal).
- The product must work relatively quickly. Although there are no established performance standards for these products with respect to time of action, a review of multiple consumer review websites and references makes clear the expectation that this type of product will work in a short

³ As noted in Appendix C, this product appears to be equipment to use with the Naked Gun Paint Remover but does not appear to contain the actual paint remover. It may therefore not be a separate priority product.

time frame, often cited as less than 30 minutes (Elsevier. 2019, and see examples in Appendix D). A key reason why consumers purchase and use these products is that these products decrease the time required to remove surface coatings (*e.g.*, potentially from days to minutes).

- The product must not harm the underlying substrate, causing loss of detail or surface degradation or interfering with the ability to apply a new coating or finish.

Most consumers use paint removers for refinishing antique furniture or for updating wood features (doors, frames, moldings, cabinets, *etc.*). In the latter scenario, these items have often times been painted and repainted many times, resulting in multiple layers of paint of different chemistry types. Paint removers are also used to help with restoration in the automotive, aerospace, and marine sectors. In these commercial applications, rapid removal of paint may be even more critical, particularly in large operations where multiple pieces are being treated simultaneously or in a series (IRTA, 2006). Data on the frequency, level, and duration of potential exposure are generally lacking because use patterns will vary by job type, paint type, and user characteristics (*e.g.*, single home Do-It-Yourself project, hobbyist, commercial worker). One RE noted for commercial users that "most facilities perform stripping operations on 1-2 days per week, from 2-4 hours per day. The remainder of the week is spent on repair and refinishing operations." Other REs agreed this is consistent with their knowledge of product use. For nonprofessionals, the time would vary based on the size of project. Based on their knowledge and experience, the REs estimate for a single piece of furniture with a simple design (*i.e.*, lacking carved decoration), the time of product use could be 30-40 minutes (to apply the remover, let it sit, and scrape off the paint residue). However, if the remover has much slower action (*e.g.*, must be left on for many hours), the job may take longer, although the time of active involvement with the paint remover may be similar. For larger or more complex pieces of furniture, the residue removal portion could be more substantial, perhaps as much as an hour and a half.

We conducted a literature search to determine if data were available concerning the conditions under which paint remover use typically occurs. We could identify no surveys or other pertinent information that described paint removal operations in California facilities at the current time. It is the REs understanding that in many commercial paint removal facilities (*e.g.*, furniture refinishers), paint remover is sprayed onto the product while it sits in a container, and the excess paint remover is captured and stored for subsequent use. Such facilities typically have exhaust ventilation near the paint removal activity. In addition, various directions during use advise on the use of appropriate hand, eye, and respiratory protection during paint removal activities (*e.g.*, CalDPH, 2013).

Considering the range of applications, there are a range of paint chemistries and substrates (*e.g.*, wood, metal, automotive) a user may encounter when using these products. Typical paint chemistries include latex, urethane, polyurethane, polyester powder coatings, 1-part epoxy, 2-part epoxy, enamel (alkyd type), lacquer, varnish, and shellac. Latex has recently been adopted by the paint industry as the product of choice. While easy to remove, consumers will not likely encounter this paint type when stripping older items. Alkyd paints have historically been the most prevalent and, according to the REs, are very difficult to remove. The resin in the paint dries *via* oxidation when exposed to ambient air after the solvents have evaporated from the paint. This oxidation reaction irreversibly cross-links polymers within the paint, hardening the resin. The alkyd paint continues to form cross-linking bonds as the paint ages, making older paint even more difficult to remove.

3.5 Volume of Sales in California

Accurate information on the volume of sales of the priority product in California are difficult to obtain. The REs may have data on national sales, but these are hard to apportion to the California market alone

because the REs may sell to national retailers or distributors. One RE estimated that it sells approximately 1,000 to 2,500 gallons per month to the California market, which would equate to 12,000 to 30,000 gallons per year. A second RE estimated its California sales at 8,400 gallons per year. A study by the Institute for Research and Technical Assistance (IRTA, 2006) provided estimates for paint remover usage by furniture refinishing operations in California according to facility size (actual data for the Southwest Coast Basin, doubled to account for the state as a whole). If we aggregate the estimates across the different facility categories, we find that annual usage in the state was between 38,000 and 112,000 gallons per year. One might expect this number to increase in line with the increase in state population size, which was 9% between 2006 and 2016 (PPIC, 2017). Note that the data of the Institute for Research and Technical Assistance (IRTA) were for paint removers in general, not specifically those containing methylene chloride, although methylene chloride-based products might be expected to account for the bulk of this commercial usage.

3.6 Legal Requirements and Standards Relevant to the Priority Product

There are no legal requirements specifying the composition or performance of the priority product. There is an American Society for Testing and Materials (ASTM) testing methodology to assess paint removal performance (ASTM D 6189), but this is neither a mandatory nor a voluntary compliance standard (ASTM, 2014). There is also a military standard for removal of "paint, epoxy, polysulfide, and polyurethane systems" (MIL-R-81294D) and a series of SAE standards for various types of paint removers (*e.g.*, SAE AMS 1374, 1376B, 1375, 1377), this is roughly 45,000 to 120,000 gallons. For the Stage 1 AA, these standards were not reviewed because they do not appear to be specific to the priority product. It is possible that any new alternative would need to be tested to determine if it meets these standards but we found no indication this has occurred. This would be evaluated further as part of Stage 2.

Methylene chloride-based paint removers are subject to a National Emission Standards for Hazardous Air Pollutants (NESHAP) regulation when used in certain commercial applications (*e.g.*, automotive body shops) (US EPA, 2008). The regulation requires certain equipment and performance practices designed to reduce emissions. Non-commercial applications are exempt from this regulation.

Methylene chloride-based paint removers are subject to the labeling requirements of California's Proposition 65, which requires that products containing chemicals listed by the State have a specific warning label unless the concentration of chemical at issue is below a "safe harbor limit." Any alternative paint remover that contains a Proposition 65-listed chemical would also potentially be required to have a warning label. In addition, the California Air Resources Board specifies total volatile organic carbon (VOC) limits for a range of products, including "Paint Remover or Stripper." Under CCR 94509, such products may have at most 50% VOC content by weight (CARB, c. 2019). Certain low vapor pressure volatile organic compounds (LVP-VOCs) are exempt from the calculation of total VOC content, but methylene chloride is not one of these chemicals.

As with many chemical-containing products, paint removers (including but not limited to those containing methylene chloride) are subject to the labeling requirements of the Federal Hazardous Substances Act (FHSA). This requires that ingredients be specified and hazards of those ingredients (*i.e.*, toxicity, flammability) be noted on product labeling if the ingredients meet certain threshold requirements (CPSC, 2019). Since 1987, methylene chloride-based paint removers have also been subject to a supplemental requirement to warn of the potential carcinogenicity of methylene chloride (CPSC, 2018). Moreover, in 2018, in response to a request made by the Halogenated Solvents Industry Alliance, the US Consumer Product Safety Commission (CPSC) added to the labeling requirements, changing the recommended warning label to state: "WARNING: INHALATION OF VAPOR VERY HARMFUL,

VAPOR CAN KILL YOU IN ENCLOSED AREAS, EYE AND SKIN IRRITANT. Read All Cautions on Back" and with the back panel stating: "WARNING Contains Methylene Chloride. INHALATION OF VAPOR CAN KILL YOU. DO NOT USE IN ENCLOSED AREAS, such as bathrooms, basements, or closets. SYMPTOMS MAY NOT BE NOTICEABLE" (CPSC, 2018).

3.7 Role of the Chemical of Concern in the Priority Product

As noted above, chemical paint removers like the priority product separate paint or other finishes from an underlying substrate. Such products are composed of a mixture of solvents, additives, and sometimes an activating agent. In order to be effective, the solvent must be able to penetrate multiple layers of paint and be soluble enough in the hardened paint to cause it to swell, breaking the bond of the paint to the substrate. The rate of movement of the solvent from the paint remover into the paint layer is affected by the size of the solvent molecule, as well as the polarity of the molecule. Smaller, nonpolar molecules like methylene chloride exhibit higher diffusion rates into the coating as compared with molecules that are larger and strongly polar. Any replacement for methylene chloride would need to exhibit similar properties. There are other paint removers that act by degrading or weakening the surface coating (*e.g.*, caustics), but these are generally not good substitutes in all cases because they also have a significant potential to damage the underlying substrate.

3.8 Necessity of the Chemical of Concern or Replacement Chemicals

As noted above, solvents that are capable of penetrating layers of surface coating are a fundamental component of chemical paint removers. A product formulated without methylene chloride or a very similarly performing solvent would be nonfunctional. Thus, simple removal of the chemical of concern without replacement is not an option.

4 Scoping, Identification of Possible Alternatives and Relevant Factors

4.1 Philosophy Concerning the Preliminary (Stage 1) AA Report

As conceived by Gradient and the RE consortium, the goal of Stage 1 of an AA is to answer the question: Are there seemingly viable alternatives to the priority products that should be given a more in-depth consideration, or can we be reasonably certain there are no viable alternatives, such that an in-depth AA would be impossible (*i.e.*, due to lack of sufficient information)? Stage 1 of an AA is based on readily available information. The aim is not to definitively identify an alternative to the priority products but rather to determine whether there are likely alternatives that warrant more in-depth evaluation before a final conclusion can be drawn. We believe this approach is consistent with the California Safer Consumer Products (SCP) regulations (DTSC, 2013). Other important elements of Stage 1 include identifying requirements (legal or otherwise) for the product and identifying the function of the chemical of concern in the product to determine whether the chemical can simply be eliminated from the product.

4.2 Optional Relevant Factors Included in the Stage 1 AA

The SCP regulations do not list performance or cost as required considerations (*i.e.*, relevant factors) for the Stage 1 AA but rather include them as required for Stage 2. However, the SCP regulations (§ 69505.5 (e)) do allow responsible entities to include additional factors that they deem relevant to the AA at their discretion (DTSC, 2013). This RE group maintains that performance is a critical element of an AA at the initial stage because an alternative that has unacceptable performance (*i.e.*, performs poorly compared to the current product by a reasonable metric related to consumer needs or expectations) is not going to be a viable alternative (*i.e.*, consumers will not purchase it) and should therefore not be considered further. Thus, performance is included as a relevant factor in this Stage 1 AA report. Likewise, the cost of the alternative is an important consideration for any consumer product. The California Department of Toxic Substances Control (DTSC) cannot expect that consumers would willingly pay substantially more for an alternative (*e.g.*, more than twice the current cost); this would likely lead to illicit purchase and use which could create its own issues. Thus, this Stage 1 AA report considers the cost of alternatives to the extent that such data are available.

4.3 Review of Prior AAs for Methylene Chloride-based Paint Removers

In conducting the current AA, we consulted a number of prior evaluations that considered alternatives to methylene chloride-based paint removers. There is uncertainty whether some of these can be considered AAs at all or just studies of individual AA components (*e.g.*, performance). We identified four evaluations that either had the characteristics of an AA or claimed to be an AA. None of the evaluations would meet all of the requirements for a Stage 1 AA under the SCP regulation, as described by DTSC. We reviewed each of these and summarize them below. These studies (and other studies of specific AA components) are also referenced in later parts of this document where they provide supporting or alternative information.

As noted earlier, IRTA conducted an assessment for DTSC looking for low-VOC, low toxicity alternatives to methylene chloride-based paint removers (IRTA, 2006). The work was largely devoted to performance testing with relatively brief assessment of hazard (qualitative, non-tabular) and cost (based on only a few products). A unique strength of this study is that performance testing was carried out on-site at two commercial furniture refinishing firms and an on-site kitchen remodel. Testing at the two commercial furniture refinishing firms involved both commercial and consumer (*i.e.*, likely residential) products. Testing of different products was typically carried out side-by-side on the same material which gives good information on relative performance. Several types of substrates were tested, including wood and metal, and involved different paint types (latex, enamel, shellac, lacquer). On the negative side, the types of products evaluated were quite limited: those based on methylene chloride, N-methyl pyrrolidone (NMP), and benzyl alcohol. The assessment of performance was sometimes semi-quantitative (*i.e.*, % removed in a given time frame, number of paint coats removed in a given time frame) and sometimes very qualitative (*i.e.*, did the applicator consider the product effective?). The results indicate that benzyl alcohol products were as effective as methylene chloride-based products except for cases where multiple layers of paint were present (in such cases methylene chloride products removed more layers in a given time frame). In terms of cost, the authors reported that costs for benzyl alcohol and methylene chloride-based products were similar for commercial users, under the assumption that half as much benzyl alcohol would be used based on its lower vapor pressure. They also determined the cost of benzyl alcohol products would be less for consumers, based on a per gallon cost comparison of one benzyl alcohol product and two methylene chloride products. Based on a very qualitative toxicity review, they concluded benzyl alcohol-based paint removers would be less hazardous.

BizNGO (Jacobs *et al.*, 2015) reported on an assessment of possible alternatives to methylene chloride-based paint removers. The work was described as a "how to" illustration for meeting the objectives of the SCP program. The assessment focused on 11 chemicals that could replace the paint removal action of methylene chloride rather than on specific products or product formulations. That being said, the chemicals evaluated were consistent with certain product groupings (*e.g.*, formic acid, sodium hydroxide which are caustics, or acetone, methanol, and toluene which are frequently used in combination in some products). The work used the GreenScreen™ hazard evaluation system to compare chemical hazards but did not address all of the various hazard endpoints required by the SCP regulations. GreenScreen employs a "benchmarking" system wherein human health, ecological, and physical/chemical scores are weighted using a proprietary scheme and combined to give one of four benchmark values (1 = avoid to 4 = preferred). Using this scheme, methylene chloride, methanol, and toluene were scored benchmark 1, whereas all other possible solvents were scored benchmark 2 (with the exception of DMSO which was scored benchmark 3). The report concluded with a list of nine alternative solvents that would be further examined in a theoretical Stage 2 SCP AA. The evaluation did not address performance or cost of these alternatives which the authors indicated would be considered in Stage 2. Regarding relevant life cycle stages, the authors noted a number of potential concerns but indicated these would be addressed in Stage 2.

The Toxics Use Reduction Institute at the University of Massachusetts at Lowell (TURI) conducted an evaluation of different alternatives to methylene chloride as a paint remover (TURI, 2017). Like the IRTA (2006) evaluation, the primary focus of this work was on performance, including testing the performance of several TURI developed formulations. Testing was conducted with wood, metal, and masonry using an adaptation of ASTM D6189, which specifies the preparation of coating coupons for testing paint removal efficacy. Fourteen different products were tested with the "primary components" given as variously methylene chloride, methyl acetate, acetone, benzyl alcohol, NMP, or dibasic esters. The products with methyl acetate as the primary component were TURI formulations whereas the other products were commercial products. Performance was assessed based on the percent of substrate that was exposed over various time frames (up to 376 minutes for

some products). In general, methylene chloride-based products performed best in short duration tests, followed closely by several TURI formulations (*e.g.*, 90 to 97% removal *versus* 70-78% removal when applied for 7 to 8 minutes). Other products were markedly less effective over these time frames. For some paint types (*e.g.*, shellac, lacquer, polyurethane), at least one Lowell formulation achieved comparable performance as the methylene chloride-based products studied. Again, products with different chemistries gave very poor performance, including benzyl alcohol-based products which were found to be effective in the IRTA study. Similar to the BizNGO work, TURI used GreenScreen to evaluate the various chemicals used in the products. They concluded that "all of the paint strippers that do not contain methylene chloride are likely to be safer than the methylene chloride-based strippers" (TURI, 2017). They noted they had not looked at the potential hazards of the formulated product blends. In terms of cost, they noted it was difficult to estimate costs for chemicals that would be purchased in bulk but indicated that the chemicals in the best performing TURI products might cost 34% more than their target cost of \$0.70 per pound (implied to be the cost of methylene chloride in products based on that chemical).

The Bren School of Environmental Science and Management at the University of California, Santa Barbara (UCSB) conducted a quantitative alternatives analysis case study of alternative paint removers (Burns *et al.*, 2016). The work was performed for the DTSC with the goal of informing "a responsible entity when writing the AA report". The work is highly technical and quantitative in nature. The products evaluated included one methylene chloride-based paint stripper, a benzyl alcohol-based product, and a dibasic ester-based product (based on dimethyl adipate). Sanding was also considered as a "process alternative," rather than "chemical alternative." The authors specified a "functional unit" for the product, which was defined as removal of 95% of one layer of acrylic paint from a 1 m² hard wood board over a three-hour period. The basis for this metric is unclear. For each alternative, the authors then derived a "reference flow" (in units of g/m²), defined as the "quantified amount of the product(s), including product parts, necessary for a specific product system to deliver the performance described by the functional unit" (Burns *et al.*, 2016). Performance was considered in the definition of a functional unit but not actually evaluated across the three products. No performance testing was carried out, although the study employed "time to work" values, with methylene chloride being the fastest (15 minutes), and dimethyl adipate being the slowest (45 minutes), although the source of this data is unclear. Human health exposure and hazard, and ecological impacts were also evaluated, although only to the extent that standard exposure values were available (*i.e.*, reference doses, occupational exposure limits); where values were not available for a chemical, these were not evaluated. It appears that only a few of the hazard endpoints covered by the SCP regulation were included. The cost of all chemical ingredients was scaled to the ingredient's presence in the product formulation. This was feasible as only single products were evaluated rather than general classes of products (*e.g.*, benzyl alcohol-based strippers). Costs were then scaled to 500,000 functional units. Unlike the other reports discussed above, particular aspects of the product life cycle were evaluated, specifically the "upstream," use and end-of-life stages. The authors do not select a preferred alternative but rather suggest their results "provide a foundation of information with which alternatives could be compared," and suggest responsible entities could use the study results to identify "key factors to consider in the second phase AA study" (Burns *et al.*, 2016).

4.4 Scoping: Alternatives Outside the Scope of This AA Report

The first element of an AA involves scoping, or determining the range of alternatives that will and will not be considered in the AA. The current AA is focused on alternatives to methylene chloride-containing paint removers (the priority product). Different materials (both paint type and substrate type) create differing degrees of difficulty in finish removal, and thus manufacturers typically make a range of

products to address these differences. There are various categories of products that can be used for this purpose:

- Solid abrasive methods (*e.g.*, sanding, scraping, grinding, sandblasting);
- Pressure washing (*i.e.*, high pressure aqueous systems);
- Heating (heat guns or electric heaters); and
- Chemical removers.

DTSC has defined the current priority product as being within Global Product Classification (GPC) brick code 10002501 which covers chemical substances used for paint removal but not other methods of paint removal (DTSC, 2016, p. 3). DTSC's AA Guide (DTSC, 2017) indicates that responsible entities are not required to consider alternatives which fall outside their business manufacturing model (DTSC, 2017, p. 26). The SCP regulations also encourage DTSC to consider the "practical capacity" of the RE to carry out a regulatory action that DTSC may require, such as the mandating of an alternative technology (DTSC, 2013). This AA report, prepared and submitted by a group of chemical paint remover formulators and ingredient suppliers, views mechanical, pressure-based, and heat-based paint removal technologies as outside their manufacturing business model and as technologies which they have no practical capacity to produce. These technologies are therefore considered outside the scope of the analysis. However, in the interest of completeness and transparency, a qualitative discussion of these alternatives and why they are likely not suitable replacements for methylene chloride-based paint removers is provided below.

4.4.1 Mechanical Methods

Mechanical methods can be divided into manual methods (hand sanding, scraping) and power-assisted methods (sanding and grinding using electrical equipment or use of high-pressure abrasives such as blasting sand). Manual methods can be extremely time intensive, can result in the removal of fine detail from materials such as wood, and can result in exposure to wood dust, metal dust, and fine paint particulate (a potential concern if old paint contains additives such as lead). Note that wood dust and several metals are California Proposition 65-listed carcinogens. Time is a key limitation of manual methods; the time required to carry out paint removal on a large project (or multiple large projects) makes this technology impractical as a widespread substitute for methylene chloride-based paint removers.

Power-assisted methods are less time intensive compared to manual methods but have the same (or perhaps greater) problems in terms of unintentional removal of fine detail and generation of airborne dust that may result in hazardous chemical exposures. Protection from dust requires Personal Protective Equipment (PPE) (*i.e.*, respirators or face masks) which may not be reliably used in nonprofessional situations. Such methods are also impractical for fine detail work, and sandblasting is impractical except on the largest scale projects.

4.4.2 Pressure Washers

Pressure washing technology involves projecting a stream of water at high pressure (several thousand psi) to scour paint from the substrate. The key advantage is the relatively quick removal time. Proper use of this high-pressure technology requires the use of PPE (eye protection, gloves, steel toed boots, and possibly a respirator). It may also generate a large volume of waste water which would have to be managed. It obviously must be used outdoors and would be problematic for more delicate materials.

4.4.3 Heat-based Methods

Several types of equipment are involved in this method: heat guns and lower temperature infrared heaters. Heat guns use an electric heat source to generate hot air at temperatures ranging from 600 to 1200 °F. The heat volatilizes chemicals present in the paint, softening it and making it easier to scrape off the surface of the substrate. The advantages of a heat gun are that it can remove paint very quickly and will not harm surface detail (however, if the product is used incorrectly, the surface may char). The key disadvantages of heat guns are the extremely high temperatures involved which can result in burn injuries and create a risk of fire, particularly when flammable material may be present (*e.g.*, wood dust, rags). At their highest setting, heat guns may also volatilize chemicals present in paint (*e.g.*, lead), leading to respiratory exposure.

Some relatively lower heat tools (*i.e.*, infrared paint removers) are also available; they typically reach temperatures of 400 to 600 °F. The lower temperature prevents volatilization of some chemicals (*e.g.*, lead) but still poses a burn and fire hazard. These products reportedly may not work on all types of paint (*e.g.*, shellac or milk paint) or substrates (*e.g.*, porous materials).

4.4.4 Summary

Note that the risks for some of these technologies (burn injuries with heat guns, aquatic waste generation with pressure washing) involve categories of hazard that are not relevant to chemical removers. Including these technologies in the AA would make it difficult to compare the potential impacts of different alternatives. Moreover, the ability of the responsible entities to characterize these technologies in terms of hazard, exposure, performance, and cost is limited because it is not in their business model. Finally, as noted above, these technologies are not in any way technically or financially feasible alternatives that could be adopted by this RE group as replacement products. Therefore, these technologies are not included within the scope of the AA, which focuses only on chemical technologies.

4.5 Initial Identification of Alternatives

Once the scope of the AA has been identified, the next critical step is to gather information on possible alternatives. To conduct an informative AA, one needs to consider not only those products made by the responsible entities involved in this particular effort but also other products that are available as these may be possible alternatives. To obtain information about potential alternatives to the priority product, we first gathered SDS information on all products made by the responsible entities involved in this AA. We also searched websites of major retailers (*e.g.*, Amazon.com, HomeDepot.com, Lowes.com) to get a broader sense of paint stripping products that are currently available. We next conducted an online literature search using terms such as "paint remover," "paint stripper," "paint and varnish removal," and "finish removal" combined with "alternatives." We also reviewed DTSC's technical document related to the listing of the priority product and reviewed several prior evaluations of alternatives to methylene chloride-based paint strippers (*e.g.*, Jacobs *et al.*, 2015). Finally, we queried members of the RE group, asking that they provide information on any alternative technologies they were aware of that currently exist, are under development, or have been tried in the past. Note that some of our searches did identify pure chemicals (*e.g.*, toluene, xylene) which are sold as solvents and could be used as paint removers among many other uses. However, these products are not formulated for this purpose and widening the field to any pure chemical that might be mentioned as a possible paint remover would quickly become unworkable. Through these various approaches outlined above, we identified approximately 60 different paint remover products (containing methylene chloride or not) sold by the responsible entities engaged in this AA. We also identified a number of additional products (containing methylene chloride or not),

produced by other manufacturers or parties that were identified *via* the online product search. We also identified an alternative formulation developed by TURI (the Lowell formulation) that has recently become available on the market.

4.6 Rationale for Product Grouping

One of DTSC's stated goals is for the AA to be transparent (*e.g.*, clear regarding assumptions made, decision criteria used) (DTSC, 2017, p. 6). As noted above, we identified a very large number of paint removers (containing methylene chloride or not) that are currently available. Comparing all of these products across all of relevant factors would make for a highly complicated assessment that would likely fail at transparency. Moreover, based on SDS information, many of the products have very similar formulations, differing only by slight percentages of active ingredients or perhaps the inclusion of other chemicals at low concentration (*e.g.*, < 5%). It would make little sense to compare and contrast highly similar products; performance data are not available for every product and such a large array of options would needlessly complicate the AA. A review of product formulation data we gathered shows that all paint remover products can be grouped into eight different categories based on their key ingredients:

1. Methylene chloride-based paint removers ($\geq 60\%$ methylene chloride)⁴
2. Methylene chloride-based paint removers ($\leq 45\%$ methylene chloride)
3. Acetone/Toluene/Methanol-based products⁵
4. Dibasic ester-based products
5. Benzyl alcohol-based products
6. Products based on caustics (*e.g.*, calcium hydroxide)
7. Other product formulations without methylene chloride not fitting into Groups 1-6
8. The Lowell formulation (dioxolane, dimethyl sulfoxide [DMSO], methyl acetate)

The determination of what constitutes a "key" ingredient for purposes of product grouping requires some subjective judgment. As noted above, each RE has formulations that are largely similar but may contain small amounts (*e.g.*, < 5%, often < 1%) of additional chemicals which may contribute slightly to the paint removing action. Other than water in some aqueous formulations, there are no "inert" ingredients. We have defined the key ingredient or ingredients as those which constitute the bulk of the paint remover (*e.g.*, > 10%) and appear to be common to a set of products.

Groups 1 and 2 are the current priority product, differing in their methylene chloride content and the presence of other chemicals (*e.g.*, acetone, toluene, and methanol in Group 2). Groups 3 through 6 represent products with different sets of key ingredients and with corresponding differences in hazard, exposure potential, performance, and cost. The Lowell formulation is given its own category because its ingredients do not appear in common with any other paint remover formulation, and it has separate performance tests (discussed in Section 5). The miscellaneous category (Group 7) contains a few

⁴ One product, Klean-Strip Naked Gun Spray Gun Paint Remover is a distinct formulation comprised of 30-60% methylene chloride and hydrotreated light distillate petroleum as the primary ingredients. This product is specifically intended for cleaning spray gun equipment (<http://www.kleanstrip.com/product/naked-gun-spray-gun-paint-remover>) and not other types of surfaces. It therefore has a highly specific and unique use unrelated to the intended application of all of the other priority products under review. Certainly no performance studies were located which would address this use. It therefore does not fall exactly into Groups 1 or 2. That being said, the general conclusions of the PAA might be applicable to this product.

⁵ Or equivalent, *e.g.*, another ketone substituted for acetone, aromatic hydrocarbons substituted for toluene.

products without methylene chloride that differ from all other formulations. Note that DTSC has indicated that products containing NMP should be excluded as possible alternatives, and thus such products are not included in the AA report and are not discussed further (DTSC, 2016).

These categories are not novel to this AA; several have been used to assess paint removers in the past (Krier, 1992; TURI, 2017) and are also referred to by the CPSC (2013).⁶ Use of these product groupings makes for a manageable and transparent way to assess paint remover alternatives across a range of criteria. In the final (Stage 2) AA (if applicable), these categories should be reconsidered to be sure they are still relevant.

4.7 Relevant Factors

We have considered the possibly relevant factors listed in the SCP regulation, § 69505.5 (c) (DTSC, 2013). Based on our tabulated data (discussed in Section 5) and current knowledge of the properties of the different alternatives we have identified, we have determined which factors make a material difference among the priority product and any alternatives such that it is important for the decisions reached in the Stage 1 AA. The conclusions we have reached are provided in Table 4.1.

4.8 Relevant Exposure Pathways

We have considered the exposure pathway-related factors listed in Table 3-2C of the DTSC AA Guide (DTSC, 2017) (which are consistent with those listed in the SCP regulation, § 69505.5 (c) (3)) (DTSC, 2013). Based on our current knowledge of the properties of the different alternatives we have identified, we have determined which exposure pathway-related factors make a material difference among the priority product and any alternatives. The conclusions we have reached are described in Table 4.2.

4.8.1 Conceptual Model for Product Life Cycle

In terms of the priority product, across the various life cycle stages (*e.g.*, manufacturing, processing, distribution, industrial use, commercial use, disposal), exposure of methylene chloride to workers, occupational nonusers, consumers, or bystanders *via* inhalation routes and/or dermal routes are possible. However, due to the phaseout of sales of methylene chloride-based paint removers and the intended federal ban on noncommercial sales (US EPA, 2019a), exposure of nonprofessional consumers is unlikely.

Figure 4.1 shows the conceptual model for the life cycle of the priority product and indicates how people or environmental receptors/media might be exposed to chemicals contained in the products. Due to the physical chemical properties of methylene chloride (*e.g.*, vapor pressure, half-life in air), inhalation exposures to vapor are considered the most likely exposure route. However, there is also potential for dermal exposures (based on molecular weights and log Kow values), assuming individuals do not wear appropriate gloves and/or accidentally spill the product on exposed skin. Dermal exposures would be concurrent with inhalation exposures. Oral exposures *via* transfer of methylene chloride from hand to mouth is expected to be negligible due to the combination of dermal absorption and volatilization (leading to inhalation exposure). Solid arrows in the figure indicate pathways that are considered complete.

⁶ We note that Jacobs *et al.* (2015) looked at individual chemical substitutes for methylene chloride as a solvent whereas we are looking at alternative formulations/products. Critically, Jacobs *et al.* did not consider performance, presumably because tests of individual chemicals might not be predictive of the effectiveness of actual product formulations and because such data are lacking.

Potential adverse ecological impacts are shown with dashed arrows because such impacts would require improper management or disposal of the product (e.g., discharge to storm drains or soil) which is inconsistent with the manufacturers instructions and likely applicable regulations. Flammability is included here as a possibility because some formulations with lower concentrations of methylene chloride may be flammable. Figure 4.2 shows the conceptual model for the life cycle of the possible alternatives.

4.9 Life Cycle Segments

Consistent with the qualitative and screening level nature of the Stage 1 AA, we approached life cycle considerations from the perspective of what is readily known or understood about the alternatives without engaging in extensive analysis. A Stage 2 AA would involve a more detailed effort at substantiating and potentially quantifying life cycle differences among the different products under review. Based on conversations with DTSC, we relied only on freely available tools listed in Appendix 7-2 of the AA guide (DTSC, 2017). Table 4.3 summarizes the freely available life cycle assessment (LCA) models listed in this appendix along with a brief description of our findings. In general, most programs offered limited product, material, or chemical specific-data relevant for paint removal applications. LCA tools specializing in building materials (e.g., Athena,⁷ Bees⁸) are primarily focused on virgin paint products with limited if any mention to paint removal products and applications. Several other programs were focused on industries not relevant to the priority product such as transportation (CA GREET 2.0,⁹ GHGenius 3.15,¹⁰ GREET 2016¹¹), or waste management (EASEWASTE, MSW-DST,¹² and WaRM¹³). Ultimately some LCA data were identified from the Tool for Reduction and Assessment of Chemicals and Other Environmental Impacts (TRACI¹⁴) for most of the chemicals under review here (except for the caustics). Rather than conduct a de novo analysis of this LCA data, we relied upon previous assessments of this same data set, such as that conducted by Burns *et al.* (2016) at UCSB. We also reviewed the alternatives analysis by BizNGO (Jacobs *et al.*, 2015), though this report indicates no life cycle impacts were considered at the time, and any LCA considerations would be evaluated and incorporated into a Stage 2 AA. Our findings are summarized in greater detail below.

4.9.1 Raw Materials Extraction

A review of the manufacturing process information for the key ingredients in the priority products and alternatives reported in the Hazardous Substances Data Bank (HSDB) (Table 4.4) indicates that most are based on chemicals which are likely produced from petroleum-based feedstocks. The production of methylene chloride and several other chemicals among the alternatives also involves chlorine (typically from seawater or brine), while another involves ammonia and several involve mineral acids. These inorganically derived raw materials may have a different environmental impact than fossil fuel derived raw materials. Based on our review, none of the alternatives is based on recycled inputs, so all will likely involve some degree of impact from raw materials extraction, although we could find no data that would quantify this. No quantitative data on raw material extraction was evaluated in the Burns *et al.* (2016) study. There may be possible differences among products, but data are currently lacking to state this with certainty.

⁷ <http://www.athenasmi.org/>

⁸ <http://www.bfrl.nist.gov/oae/software/bees/>

⁹ <https://www.arb.ca.gov/fuels/lcfs/ca-greet/ca-greet.htm>

¹⁰ <http://www.ghgenius.ca/>

¹¹ <https://greet.es.anl.gov/>

¹² <https://mswdst.rti.org/>

¹³ <http://www.epa.gov/warm>

¹⁴ <https://www.epa.gov/chemical-research/tool-reduction-and-assessment-chemicals-and-other-environmental-impacts-traci>

4.9.2 Resource Inputs and Other Resource Consumption

Based on materials we have reviewed, we found no information indicating that the inputs of other resources (*e.g.*, water, energy) differs materially among the priority product and the alternatives. None appear to involve particularly energy-intensive processes (*e.g.*, aluminum smelting) or water-intensive processes (*e.g.*, fabric dyeing) as part of their life cycle. However, we found no data on relative inputs of energy, water, or other resources for these chemicals. No quantitative data for this life cycle stage was evaluated in the Burns *et al.* (2016) study. Thus, differences between alternatives may exist, but the available data do not allow a firm conclusion to be drawn.

4.9.3 Intermediate Materials Processes

Our review of chemical manufacturing processes (Table 4.4) indicates a number of intermediates in the production of the key chemicals of interest. We did not find information on the full synthesis pathway for each chemical (and some chemicals have multiple pathways reported with no indication of which are commercially most significant). It is clear that intermediates will differ among the alternatives. However the REs note that production occurs as part of closed process and thus release of the intermediates during production is unlikely. No quantitative data for this life cycle stage was evaluated in the Burns *et al.* (2016) study. Again, it is possible that material differences exist among the different alternatives, but data are inadequate to reach a clear determination.

4.9.4 Manufacture

Based on the information reviewed, there is some indication that the manufacturing phase would differ materially among the priority products and the alternatives. Clearly, as shown in Table 4.4, different manufacturing processes exist. Nonetheless, all alternatives are produced from chemical feedstocks, and all would be produced in facilities that must adhere to occupational exposure standards. We note that the Burns *et al.* (2016) study used TRACI 2.1 normalization factors to quantify potential impacts during manufacturing as described below.

4.9.4.1 Public Health Impacts

The UCSB study authors concluded methylene chloride and benzyl alcohol releases during manufacturing had medium impact on public health, with low to medium uncertainty. In contrast, the authors found that dimethyl adipate had low impacts with medium uncertainty associated with greater variability in the available data (*e.g.*, high standard deviations around estimates of central tendency for public health related effects) (Burns *et al.*, 2016).

4.9.4.2 Air Quality Impacts

The potential for urban smog formation and stratospheric ozone depletion from the manufacturing phase were considered by the UCSB group. Methylene chloride was assigned a high impact with low uncertainty, while benzyl alcohol and dimethyl adipate had medium impact with medium uncertainty attributed to high standard deviations (Burns *et al.*, 2016).

4.9.4.3 Water Quality Impacts

The UCSB study also evaluated water quality impacts during the manufacturing phase. Both benzyl alcohol and methylene chloride-based removers were determined to have medium impacts on acidification, while dimethyl adipate had low impacts. Benzyl alcohol also reported medium impacts on eutrophication, while methylene chloride and dimethyl adipate reported low impacts for this endpoint (Burns *et al.*, 2016).

4.9.4.4 Ecological Impacts

Only dimethyl adipate was determined to pose impacts for this endpoint (medium impact), with medium uncertainty due to high standard deviation (Burns *et al.*, 2016).

4.9.5 Packaging

In the prior AAs and LCA tools we investigated, we found no information suggesting material differences among the priority products and the various alternatives in terms of the type of packaging that would be used. Based on their experience of the marketplace, the REs note that all products are packaged in small volume metal or plastic (polypropylene, polystyrene) containers for consumer use and larger metal drums for commercial use. There is no expectation that switching to an alternative product would require either more or less packaging. No quantitative data for this life cycle stage was evaluated in the Burns *et al.* (2016) study.

4.9.6 Transportation/Distribution

The prior AAs and LCA tools we investigated were unable to provide information as to whether transportation impacts (*e.g.*, from chemical suppliers to formulators; from formulators to retail outlets) would be different among the priority products or any of the alternatives under consideration. The REs, who have working knowledge of all of the product groups under consideration, note that the alternatives do not offer substantially higher efficacy at reduced weight/volume (*e.g.*, none are sold in super concentrated form as are some laundry detergents). Nor do they eliminate a transportation step in the supply chain (*e.g.*, if suppliers sold directly to retailers). Based on the RE's knowledge of supply chains, all alternatives are produced from commercial chemicals that are readily sourced. For example, based on the product formations, it is not the case that a given alternative involves a chemical that can only be obtained overseas where another can be sourced in-state. Thus transport/distribution impacts are not believed to be materially different. This would need to be revisited in more detail if we proceed to Stage 2. We note that no quantitative data for this life cycle stage was evaluated in the Burns *et al.* (2016) study.

4.9.7 Use

Use is one area where the potential alternatives may have significant differences. Some have higher vapor pressures and air half-lives and thus are more likely to result in volatilization and inhalation exposure (although some manufacturers add waxes to reduce volatilization to improve performance). Some alternatives are flammable which presents a fire hazard if use occurs near flame sources (again, some manufacturers have stated that additives are present to reduce volatilization and minimize flammability risk). Still other alternatives contain chemicals with greater or lesser skin penetration

potential (*e.g.*, based on log *k_{ow}*, molecular weight), which would significantly affect exposure potential and possibly health hazard.

The Burns *et al.* (2016) study used TRACI 2.1 normalization factors to quantify potential impacts during product use.

4.9.7.1 Public Health Impacts

The Burns *et al.* (2016) study determined carcinogenic risk to humans associated with methylene chloride to be small, though the hazard index suggested a high impact (*e.g.*, potential for chronic toxicity) during the use phase. Human health impacts associated with benzyl alcohol were determined to be low. Dimethyl adipate could potentially pose low or high impact on public health depending on how a reference dose was calculated, and therefore any determination would inherently have high uncertainty.

4.9.7.2 Air Quality Impacts

The UCSB authors stated that air quality was not considered to be a relevant factor at this life cycle stage due to low predicted concentrations. Furthermore, emissions during the use phase "quickly become 'end-of-life' as these products dissipate into the atmosphere" (Burns *et al.*, 2016).

4.9.7.3 Soil/Water Quality and Ecological Impacts

The Burns *et al.* (2016) study authors determined the use of these chemicals in this application are likely to have very low release levels to soil or water during the use phase (fate calculations predicted very low concentrations in these media), and therefore are not likely to have significant impacts (Burns *et al.*, 2016).

4.9.8 Operation and Maintenance

This aspect is not relevant to this AA as the product is used for a brief period of time and then disposed of. It is not put in place and operated for a period of time which might involve low level continuous emissions or require periodic maintenance. No quantitative data for this life cycle stage was evaluated in the Burns *et al.* (2016) study.

4.9.9 Waste Generation and Management

During the production phase of the priority product, waste generation is minimized to limit the generation of hazardous waste. As all the alternatives also are based on chemicals that have hazardous properties (various degrees of toxicity, flammability, and/or corrosivity), waste management requirements should not differ materially among the alternatives. During the use phase, all removed paint residue should be properly disposed of as household hazardous waste (or commercial hazardous waste if used commercially). This would be particularly true if the paint removed were lead-based paint. Use of the alternatives could significantly change the characteristics or volume of paint waste if the products perform less effectively and require multiple applications of product to achieve the same effect. No quantitative data for this life cycle stage was evaluated in the Burns *et al.* (2016) study.

4.9.10 Reuse and Recycling

Among the alternatives considered, we found no information in any prior AA reviewed or in discussions with REs which indicated that reuse or recycling is possible to any significant extent with any of the alternatives. Based on information from the REs, one can apply used methylene chloride-based paint remover to additional surfaces with minimal loss of function, which may not be true for all alternatives. However, the extent to which users actually do this is unknown. The Burns *et al.* (2016) study considered this life cycle stage to be irrelevant to the case of paint removers due to the high volatility of chemical components and thus "practically impossible to recover after use."

4.9.11 End-of-life Disposal

All chemical paint removers would have to be properly disposed of as household hazardous waste (or commercial hazardous waste if used commercially). There may be differences in how different waste streams are managed (assuming these can be and are separated), but this is beyond the scope of the Stage 1 AA. If products are improperly disposed of (disregarding the manufacturer's instructions as well as applicable regulations), there may be differences in terms of environmental mobility as some alternatives are more water soluble than others, whereas other may be more likely to adhere to soils based on their log K_{oc}/lipid solubility (Table 5.14). However, none of the products under consideration are bioaccumulative (see Table 5.14). That being said, we note that the Burns *et al.* (2016) study used TRACI 2.1 normalization factors to quantify potential impacts during end-of-life disposal. Study authors reported low ambient concentrations for all chemicals evaluated for impacts related to public health, air quality, soil and water quality, ecological impacts, and waste/end-of-life impacts, suggesting this life cycle stage may not be a relevant factor (Burns *et al.*, 2016).

5 Comparison of Alternatives

5.1 Hazard

It should be noted that hazard refers to a chemical's inherent potential to produce an adverse effect. Hazard does not consider exposure, something which is essential to estimate health risk. The SCP regulations (and alternative assessment in general) do not permit the determination of risk (*i.e.*, combining estimates of dose and exposure to determine the likelihood of an adverse exposure) in making the decision of selecting alternative products. It is important when reviewing chemical hazard data on products that the indication of a high hazard does not necessarily equate to an actual health risk. Risk and hazard are different concepts.

We collected information on chemical composition from SDSs of the priority products as well as other representative products where SDS information was readily available. This product composition information is provided in Appendix E. For each product group, we then identified key ingredients from that group to screen these chemicals for potential hazards (*i.e.*, relevant factors). Key ingredients were those that constituted the majority of the volume of the product (*e.g.*, ingredients present at >10%) and were representative of that group's type of chemistry.

We then evaluated the hazards of the key ingredients. The basis for all hazard classifications are shown in Table 5.1. The results of the hazard scoring are shown in Tables 5.2 through 5.4, separated into human health, ecological health and physical/chemical hazards, respectively.

For many of the hazards, data were taken from the European Chemicals Agency (ECHA) dossier and correspond to Globally Harmonized System of Classification and Labeling (GHS) hazard classifications. We also examined whether the chemical was listed on California's Proposition 65 as a carcinogenic or reproductive health hazard. In deriving the GHS classification values, we first considered the classifications listed in the dossier, giving preference to harmonized classifications where available. We then compared the results to those of a 3rd party evaluator and resolved inconsistencies by looking at the actual underlying study data reported in the dossier. In some cases, classifications were stated in the dossier without the benefit of supporting studies (*e.g.*, for carcinogenicity) and we changed these classifications to data gap (DG). For terrestrial toxicity, the ECHA dossiers typically have data gaps, although for a few chemicals, there were studies suggesting low potential to affect terrestrial biota (these were scored 'low'). Unfortunately, the ECHA dossiers do not list all the hazard endpoints required by the SCP regulations. To address these factors we reviewed the US National Library of Medicine's HSDB files for each of the chemicals to determine if these other types of hazards were mentioned. In these cases, we scored a health endpoint as "D" if it was discussed as a potential hazard of the chemical and as "nd" if there was no discussion of this hazard in the HSDB profile. HSDB is simply an information aggregator, and study findings are not screened for reliability (*e.g.*, as to methods used, sample size), so this is a fairly gross approach but we believe it is appropriate for Stage 1 AA. We are unaware of any hazard scoring or summarizing system that addresses these additional toxicity concerns in a systematic manner that is widely accepted by the toxicology community. The relevance of these hazards for viable candidate alternatives would be explored in greater depth (*e.g.*, by looking at actual studies and comparing doses at which toxicity occurred) as part of a possible Stage 2 AA. There are also a number of additional hazard concerns required by the SCP regulation that are not classified in the ECHA dossiers. These were addressed as follows:

- Bioaccumulative potential. Chemicals were designated as bioaccumulative if they possess a log kow value greater than 3.0, consistent with ECHA guidance (ECHA, 2014).
- Persistence. Chemicals were designated as persistent based on their half life in water, soil and sediment according to the scheme adopted by the National Industrial Chemicals Notification and Assessment Scheme (NICNAS) in Australia. Under this scheme, chemicals with a half-life in water of more than 2 months or a half-life in soil or sediment greater than 6 months are classified as persistent. Half-life data were obtained from EpiSuite (see Table 5.14) and calculations for the chemicals of interest are shown in Table 5.5.
- Ozone Depletion Potential (ODP). Chemicals that are listed on the US EP's list of ozone depleting substances (US EPA, 2019b) were scored 'yes'.
- Direct Global Warming Contributor. Chemicals listed as global warming contributors in the IPCC 5th Technical Report (IPCC, 2013) were scored 'yes'. Note that this refers to the potential of the chemical itself to contribute to global climate change and not emissions of other greenhouse gases during the chemical's lifecycle (those are addressed in Table 4.1).
- Flammability – Chemicals listed in the ECHA dossier as flammable liquids were scored according to their categorization (Category 1, 2 or 3). All key ingredients in the products are liquids at normal temperature and pressure.
- VOC Contributing To Tropospheric Ozone Formation. To assess potential for contribution to tropospheric ozone formation, we screen the chemicals of interest against the criteria spelled out in 40 CFR § 51.100(s) which states that VOCs are any organic compound which is not specifically excluded from the designation and "participates in atmospheric photochemical reactions" (notably, methylene chloride is excluded from this designation). In addition, chemicals exempted by the California Air Resources Board (CARB) from California VOC regulations as low vapor pressure VOCs (CARB, 2019a).
- Whether chemicals are regulated as a California Toxic Air Contaminant (TAC). We reviewed the California Office of Health Hazard Assessment (OEHHA) list of such chemicals and scored those on the list as "yes."
- Whether chemicals have maximum contaminant levels (MCLs), Public Health Goals (PHGs), notification levels, or are California Clean Water Act Pollutants or Priority Pollutants. We consulted the appropriate agency lists of such contaminants and scored chemicals appearing on the list as "yes."

To meet the SCP requirement for an easily understood matrix of hazards, the hazard classifications in Tables 5.3 to 5.5 were color coded using the following scheme:

- For hazards obtained from the ECHA dossier, GHS category (cat) 1 hazards were coded red, cat 2 hazards were coded orange, cat 3 hazards were coded yellow, cat 4 hazards were coded light green and 'not classified' status was coded darker green.¹⁵ The only exception to this was for irritation, where the REs felt that cat 2 irritation was not comparable to cat 2 carcinogenicity, so these were color coded yellow.
- Endocrine activity was evaluated by comparison to the European Commission Candidate List of Potential priority compounds for evaluation of endocrine activity (BKH Consulting Engineers, 2000). Chemicals on the list were scored "yes" and color coded yellow, chemicals not on the list were scored "no" and color coded darker green.

¹⁵ Not classified indicates that the effect did not occur or occurred at a concentration above the GHS classification criteria.

- Chemicals found to be bioaccumulative or persistent were color coded orange, otherwise they were coded darker green.
- None of the key ingredient chemicals was found to be ozone depleting so these were all coded darker green.
- In terms of global climate change impact, all key ingredient chemicals have GWPs of zero except for methylene chloride, which has a GWP of 9. This was color coded light green because current efforts to address global climate change chemicals are focused on substituting chemicals with GWPs in the thousands with alternatives with GWPs less than 150 (CARB, 2019). A GWP of 9 is therefore considered of marginal concern.
- For Potential for Tropospheric Ozone Formation, chemicals that are classified as exempt from regulation were color coded darker green whereas those classified as being contributors to the effect were color coded orange.
- Data gaps were color coded grey.

The results shown in Table 5.3 to 5.5 are qualitative in nature (or semi qualitative if one considers the underlying GHS classification, where applicable). To quantitatively score hazards of key ingredients in the different product groups we used a variation of the Chemical Scoring Index (CSI). The CSI is a largely GHS-based tool for ranking the hazards of chemical ingredients in products (Verslycke *et al.*, 2014). The CSI considers not only the hazard but also the percentage of each chemical that occurs in the product formulation. These two pieces of information are combined using a scoring matrix to arrive at a total hazard score for the chemicals in the product. The CSI is heavily focused on acute toxicity hazards so some modifications to the procedure were required. These consisted of the following:

- We included more scores for different categories of chronic organ toxicity (corresponding to Target Organ Toxicity, Repeated Exposure under GHS),
- We moved endocrine hazard from the ecological toxicity to human health toxicity,
- We separated eye and skin irritation to be consistent with the SCP toxicity categories,
- We separated skin and respiratory sensitization from "sensitizer" to be consistent with the SCP toxicity categories,
- We included a "penalty" score for chemicals that have data gaps that is greater for more severe effects (*e.g.*, carcinogenicity vs irritation) and for higher concentration ranges.

Where the CSI publication gave numerical scoring values for an endpoint, we used those scores. Where new endpoints were created, we employed scores that were consistent with similar endpoints (*e.g.*, we used the same scoring used for "irritation" for the new eye and skin irritation categories). Consistent with Tables 5.2 to 5.4, a separate scoring matrix was created for each group of hazards. These scoring matrices are shown in Tables 5.6 to 5.8. In this approach, we did not include health hazards and endpoints that did not have GHS scores (those evaluated *via* HSDB) or regulatory limits (*e.g.*, MCLs); we have assumed these should already be reflected in the GHS categorizations (*e.g.*, systemic organ toxicity single and repeat dose).

To obtain concentration data, we looked at each product group and calculated the average concentration of the key ingredient(s) in that group, as shown in Table 5.9. We initially considered using the maximum concentration across the group for each ingredient but this lead to implausible products with contents greater than 100% (*e.g.*, 70% methanol, 80% acetone, 60% toluene) and would likely give false estimates

of the hazard for that group. For group 7 (other), products generally contain different primary ingredients and so the maximum value and number of products containing the ingredient is noted.

We then applied the scoring matrix to each of the groups. The results are shown in Tables 5.10 to 5.12. In Table 5.10 (human health hazards) it is apparent that Group 2 (<45% methylene chloride with acetone-toluene-methanol) has the highest hazard with Group 1 (> 60% methylene chloride) being somewhat less. The Proposition 65 listings for methylene chloride as a carcinogen and methanol as a developmental toxicant contribute substantially to these scores. The lowest hazard score are in Groups 5 (benzyl alcohol) and Group 5 (caustics). The other groups fall in between. For Group 7 (other products), the results are a range because not all ingredients in this group are in the same products. For Group 8 (the Lowell formulation), we developed two scores based on the rapid and essentially complete metabolism of methyl acetate to methanol reported in the ECHA dossier for methyl acetate. The conversion of this chemical to methanol has implications for carcinogenicity (possibly converting a data gap to not classified) and developmental toxicity (possibly changing not classified to Prop65). This issue would be explored in greater detail in Stage 2. Note that regulatory limits (*e.g.*, TACs, MCLs) only apply to Group 1 and 2 products, which also have the highest hazard.

In looking at Table 5.11 (ecological health hazards), we see that Group 1 and 2 products (those containing methylene chloride) have the highest scores while Group 5 (benzyl alcohol) and Group 8 (the Lowell product) have the lowest scores, with the other products in between. The key factor here are both acute aquatic toxicity and persistence. Note that the persistence of methylene chloride is based on modeling alone. The ECHA dossier for methylene chloride contains study data suggesting a lower half-life in soil that would indicate a lack of persistence. Examining this further in Stage 2 would be appropriate.

In table 5.12, we see that flammability is a significant differentiator, with Group 3 (ATM products) and Group 8 having the highest score, followed by Group 2 (which also contains ATM). The non-flammable dibasic esters and caustics have the lowest scores. Note that flammable products may have waxes other additives that can reduce vapor pressure and thus flammability at the formulation level (as compared to individual ingredient concerns); for example this has been evaluated for the Lowell product (Ranellone and Dembsey, 2018). Because we could not determine the extent to which this occurs in all products (*i.e.*, formulation level flammability testing is not readily available for all products, SDS information may be conservatively based on ingredients), we did not evaluate this in the Stage 1 AA but it should be evaluated in Stage 2.

The overall results of the hazard evaluation are showing in Table 5.13. Overall, in terms of hazard alone, Groups 4 (dibasic esters), 5 (benzyl alcohol) and 6 (caustics) appear to have the most desirable hazard profiles. The least desirable hazard profile is associated with Group 2 which has the highest human health hazard score and the second highest physical hazard score. For groups 1 and 8, the key tradeoff lies between the reported carcinogenicity and modeled persistence of methylene chloride and the lack of carcinogenicity data and inherent flammability of some of the ingredients in the Group 8.

It is worth noting a subclass of Group 1 priority products have a slightly different chemical formulation, and are comprised of > 50% methylene chloride, phenol (CAS No. 108-95-2) and formic acid (CAS No. 64-18-6), at typical percent concentrations of 60%, 16% and 16% respectively (see SDSs for Benco products B14, B15 and B17 in Appendix C). Including these chemicals in Group 1 would require we assess two different typical formulations, which would make results harder to explain. Formally evaluating these as a separate group would not be of value because we found no data on their performance to allow a conclusion on their suitability as replacements (refer to Section 5.3). To be clear that not including them does not lead to an erroneous finding, we reviewed GHS classifications for these compounds (data not shown in Tables, refer to relevant ECHA dossiers). Neither chemical was classified for any physiochemical or ecological hazards. Phenol is classified as category 3 for acute oral, dermal

and inhalation toxicity, category 1B for skin irritation/corrosion, category 2 for germ cell mutagenicity, and category 2 for target organ toxicity – repeated exposure. Formic acid is only classified for skin irritation/corrosion (category 1A). Applying our human health hazard evaluation approach described above, the overall group score based on this chemical composition was 190, which is only slightly lower than the group score of 200 for the Group 1 composition representative of the majority of products in this group (*i.e.*, methylene chloride, methanol and 2-butoxyethanol). We therefore concluded the more conservative (*i.e.*, higher hazard score) chemical composition formulation to be suitable moving forward with our analysis.

5.2 Relative Exposure Potential

To understand how exposure could vary among the different product groups (and to support the determination of relevant factors), we gathered data for the various physical and chemical properties of the key ingredients, consistent with the requirements of the SCP regulation. The gathered data are shown in Tables 5.14a, 5.14b, 5.14c, and 5.14d (the tables are separated to make viewing easier). Data were obtained from a number of sources, including EpiSuite, HSDB, and the National Library of Medicine's PubChem database. EpiSuite was the predominant source, and EpiSuite output files are included as Appendix F.

Consistent with DTSC suggestions, we then used relevant parameters from Table 5.14 to assess exposure potential across a number of exposure pathways:

- direct exposure via inhalation,
- direct exposure via dermal contact,
- indirect exposure via air pathways (*e.g.*, if the product evaporates and travels in the air to affected persons, wild-life or other environmental media),
- indirect exposure via water pathways (*e.g.*, if the product is inappropriately discharged to water and travels *via* surface water or groundwater to affected persons, wild-life or other environmental media), and
- indirect exposure via soil or sediment pathways (*e.g.*, if the product is inappropriately discharged to soil or sediment and comes in contact with affected persons, wild-life or other environmental media).

The results of the evaluation are shown for each product group in Table 5.15. Color coding was assigned to the results for each group, ranging from red (substantially greater exposure potential versus the priority product) to green (substantially lower exposure potential versus the priority product). These scores are relatively subjective as no published methodology is available to differentiate a combination of physical chemical properties in terms of their meaning for exposure potential (*e.g.*, how significant are differences in low *kow* values of 1.25, 0.35 and -1.35?, are water solubility differences of an order of magnitude significant in terms of environmental impact?). We also did not assign an overall exposure potential score because factors that influence one exposure pathway (*e.g.*, air) have the opposite effect on others (*e.g.*, water), and we felt it was inappropriate to value one pathway over another.

As shown in Table 5.15, Groups 2 and 3 products (those based on lower methylene chloride content with and without acetone, toluene and methanol) have a similar exposure potential compared to Group 1. Group 4 products (based on dibasic esters) are judged to offer lower exposure potential for inhalation and the air pathway due to their lower volatility and shorter atmospheric half-life with other pathways being similar to the priority product. Group 5 products (based on benzyl alcohol) are considered to offer

substantially lower exposure potential for inhalation and the air pathway due to their much lower volatility and shorter atmospheric half-life with other pathways being similar to the priority product. Group 6 products (based on caustics) likely have substantially lower exposure potential for inhalation and the air pathway due to lack of measurable vapor pressure. They may have more significant aqueous impacts given the very high water solubility and effect on pH. Their impact on dermal exposure is complicated; they are unlikely to penetrate intact skin due to their negligible lipid solubility but can damage skin, rendering it much more permeable. Thus, the dermal exposure potential is of a different character. Group 7 products (based on other chemistries) are again judged to offer lower exposure potential for inhalation and the air pathway due to their lower volatility and shorter atmospheric half-life with other pathways being similar to the priority product. Finally, the Group 8 product (the Lowell formulation) also likely has slightly lower exposure potential for inhalation and the air pathway due to lower volatility (although the predominant ingredient, methyl acetate has a vapor pressure of a similar magnitude as methylene chloride). The water and soil/sediment pathways are expected to be similar based on factors such as water solubility and environmental half-lives in water and soil. With respect to dermal exposure, the Group 8 product contains DMSO, which is a known skin penetration enhancer (OECD, 2010), which can facilitate absorption of other chemicals through the skin. The extent to which this is likely to occur with use of this product is uncertain and should be explored further.

As detailed above in section 5.1, a subclass of Group 1 priority products have a slightly different chemical formulation, and are comprised of > 50% methylene chloride, phenol (CAS No. 108-95-2) and formic acid (CAS No. 64-18-6), at typical percent concentrations of 60%, 16% and 16% respectively (see SDSs for Benco products B14, B15 and B17 in Appendix C). The physicochemical properties most relevant for exposure pathways are relatively consistent as compared with the primary constituents for the Group 1 category (*i.e.*, methylene chloride, methanol and 2-butoxyethanol). In particular, vapor pressure is greater than 0.1 mm Hg at 25 ° C for all four compounds. Furthermore, log Kow for formic acid and methanol (-0.54 and -0.77 respectively) are both between -1 and 0, and for phenol and 2-butoxyethanol (1.46 and 0.83 respectively) are between 0 and 2. Water solubility for all four chemicals is also greater than 10,000 mg/L. Half lives for water and soil as predicted by EpiSuite are equivalent for formic acid, methanol, and 2-butoxyethanol (208 and 416 hours for water and soil respectively), though phenol is slightly more persistent (360 and 720 hours for water and soil respectively). Taken together, we do not expect this chemical formulation to pose a significantly different exposure profile than the formulation currently defined as Group 1.

Overall, certain product groups likely offer advantages relative to the priority product in terms of inhalation and air pathway exposures but are similar in terms of other pathways. The caustic products likely also have a potential for more aqueous pathway impacts.

5.3 Performance

To look for relative performance data for the various product groups we conducted online searches using terms such as "paint stripper performance," "paint stripper comparisons," "paint stripper differences," and "paint stripper effectiveness" as well as analogous searching using the term "paint remover." We also asked RE representatives if they were aware of any published or unpublished performance studies. We uncovered several sources of information on product performance, all of which employed variable methodologies.¹⁶ The studies evaluated (provided in Appendix G) were the following:

¹⁶ Some studies included evaluation of products that are excluded from consideration (*e.g.*, NMP-based products) or products whose composition was not reported and could not be identified. These were excluded from consideration and not shown in the data tables.

- An assessment conducted by IRTA (2006) for DTSC looking for low-VOC, low toxicity alternatives to methylene chloride-based paint strippers. Performance testing was carried out on-site at two commercial furniture refinishing firms and an on-site kitchen remodel. Testing at the two commercial furniture refinishing firms involved both commercial and consumer (*i.e.*, likely residential) products. Testing of different products was typically carried out side-by-side on the same material. Several types of substrates were tested, including wood and metal, and involved different paint types (latex, enamel, shellac, lacquer). The assessment of performance was sometimes semi-quantitative (*i.e.*, % removed in a given time frame, number of paint coats removed in a given time frame) and sometimes very qualitative (*i.e.*, did the applicator consider the product effective). A key advantage of this report is the consideration of different types of application (commercial, DIY consumer). Disadvantages include the use of inconsistent performance criteria (*i.e.*, sometimes qualitative, sometimes based on time required, sometimes based on percent removed) and the consideration of relatively few paint remover types (*i.e.*, Groups 1, 2, and 5). The data for this study are shown in Table 5.16.
- A *Wood Magazine* article from 1992 that compared the effectiveness of 59 different types of paint strippers on different types of paint (stain, varnish, polyurethane, shellac, lacquer, enamel, and latex) (Krier, 1992). Three thin coats of finish were applied to oak plywood and then baked on. Stripper products were left on the finished surface for the manufacturer's recommended time. Performance scores were awarded based on four different factors including 1) length of time until product dries (3-5 minutes, about 30 minutes, or 1 hour); 2) minimum time to soften the finish/paint (0-15 minutes, 15 minutes-1 hour, over 1 hour); 3) ease of removing the stripper before applying a wash (quick removal with rag only, quick removal with a spatula followed by a rag, cannot be picked up with a spatula but can be scraped, slippery and inconsistent globs making for a difficult cleanup); and 4) amount of residue remaining after cleanup and wash (complete removal, second application of stripper required, some sanding required to remove residue, and little effect on finish). A key advantage of this report is the large number of products studied, covering several of the product groups. In addition, all products were tested using the same approach, and the results were presented in a clear manner. Disadvantages include the age of the study and the fact that it comes from a non-peer reviewed publication. The data for this study are shown in Table 5.17.
- Tests conducted by the US Army Research Laboratory (ARL, 2006) that looked at paint stripper effectiveness on several military approved, chemically resistant paint types. Aluminum alloy 2024-T3 was coated with Alodine 600 chromate pretreatment. Cold rolled steel plates were zinc phosphated prior to painting. Panels to be treated with solvent-borne CARC MIL-C-5039 or MIL-C-46168 were treated with epoxy primer, MIL-C-53022B. Other panels treated with water-borne CARC MIL-DTL-64159 Type I or Type II were primed with MIL-P-53030. Multiple coating applications were used to achieve the final coating thickness. Panels were then tested in either an immersion or manual stripping experiment. In the immersion stripping experiment, panels were immersed in the stripper product contained within stainless steel "mini" vats heated in a hot water tank within the recommended temperature range. After 30 minutes, the panels were removed and immediately rinsed with deionized water. For the manual stripping experiment, stripper product was applied to the panel using a 2-inch paintbrush and left for a dwell time depending on the total paint thickness (which varied from 6 to 10 mm dependent on the CARC). Dwell time was determined according to a factor of 45 minutes per each 3 mm of paint. Panels were then scraped using a plastic scraper and rinsed with deionized water. The metric was the percent of four layers removed in each test. Key advantages of this report are the fact that it contains a good description of methods and uses a consistent metric of performance. Disadvantages include the limited number of paint products studied (Group 1, Group 5, and 1 product for Group 7) and the limited number of paint types included (chemically resistant coatings that may not be in common use). The data for this study are shown in Table 5.18.

- Tests conducted by TURI (2017) which examined epoxy, shellac, lacquer, polyurethane, varnish, oil, latex, and a mixed paint application. Testing was conducted with wood, metal, and masonry using an adaptation of ASTM D6189, which specifies the preparation of coating coupons for testing paint removal efficacy. Fourteen different products were tested with the "primary components" given variously as methylene chloride, methyl acetate, acetone, benzyl alcohol, NMP, or dibasic esters. The products with methyl acetate as the primary component were TURI formulations, whereas the other products were commercial products. Performance was assessed based on percent of substrate that was exposed over various time frames (up to 376 minutes for some products). Key advantages of this report are the fact that it was authored by a government agency, contains a good description of methods, and uses a consistent metric of performance. A limitation is that it did not address all of the product groups of interest (Groups 1, 2, 4, and 5 only). Significantly, the TURI formulations tested are not those that proceeded to commercialization (Group 8, Lowell formulation), which replaces thiophene with 1,3-dioxolane. It is our understanding that testing of this product was underway but was not available prior to the July 1 due date for the PAA. The data for the TURI study are shown in Table 5.19.
- A study conducted by WM Barr & Company (2019) that evaluated several different paint types (alkyd, epoxy, automotive paint), including some with multiple layers, and examined effectiveness over different application times (*e.g.*, 3, 6, and 15 minutes). Both newly applied and aged paint were evaluated. The test method was based on ASTM D-6189 with slight modifications: 12 x 8 inch panels were treated with five coats of alkyd paint, aged up to one year, and solvents and paint removers were applied with a pipette rather than following manufacturer's instructions. For the one-month aged test, sanded birch plywood was cut into 12 x 8 inch panels. Each of the five paint layers (alkyd paints) or three layers (epoxy paints) were allowed four hours at ambient conditions to dry, and then left in a laboratory oven at 50 °C overnight. After the last layer of paint was applied, the panels were aged for 30 days at 50 °C in the laboratory. The hood of a 2006 Chevrolet Impala SS (approximately nine years old at the time of testing) was purchased with factory paint intact. The hood was cleaned with a damp cloth and used for testing without any further modifications. The performance metric used was the number of paint layers removed. Key advantages of this report are the wide range of paint types studied (groups 1, 2, 3, 4, 5, and 6), the use of a consistent performance metric, the evaluation of different times, and the consideration of aged paint. Disadvantages include the fact that the study is not published in the peer-reviewed literature. The data for the TURI study are shown in Table 5.20.
- Studies by Recochem that evaluated different paint types and substrates (polyurethane, alkyd, or water-based paint on wood; 'metal paint' on either a metal table or drawer), and also looked at different time frames (Recochem Corp., 2019). These tests were also a modified version of ASTM D6189. Wood panels were coated on one side with primer using a paint brush and allowed to dry overnight at room temperature. Each layer of paint was applied ensuring a uniform thickness with a paint brush and allowed to dry for 24 hours at room temperature. The finished panel was then left at room temperature for 48 hours, and then at 53 °C for 72 hours. Panels were prepared with either polyurethane-, alkyd-, or water-based paint products. Old painted metal furniture parts were also tested. Stripper products were applied to test panels with a plastic pipette. Stripper was then removed with a paper towel after either 15 minutes or 30 minutes. Panel surfaces were then scraped with a plastic scraper and visually documented with pictures for further evaluation. The performance metric used was the number of paint layers removed in the allotted time. Key advantages of this report are the use of a consistent performance metric and the evaluation of different times. Disadvantages include the limited number of paint products evaluated (the intent of the study appears to have been an internal evaluation of a new formulation, not a broad evaluation of alternative paint removers) and the fact that the study is not published in the peer-reviewed literature. The data for the study are shown in Table 5.21.

The overall findings of the six studies are summarized in Table 5.22. Given the differences test methodology, paint types, substrates, and product groups, combining these studies in a quantitative manner would be inappropriate. Instead, we summarize each study's overall findings in narrative form and assign a color coded conclusion ranging from red (much less effective, inferior performance versus the priority product) to green (equivalent performance to priority product). The data reviewed clearly show that high concentration methylene chloride-based paint strippers (Group 1) typically gave the best performance compared to any other alternative across all paint types tested. Group 2 products (lower methylene chloride content) consistently performed slightly less well. Group 3 products (acetone, toluene, methanol based-products) performed less well than Group 1, although the WM Barr study had some variable results. Groups 4, 6, and 7 (products using DBE, caustics, other chemical) all performed poorly compared to Group 1, although data for some groups was limited. Group 5 (benzyl alcohol-based products) gave variable results; performance was judged comparable to the priority product for many applications in the IRTA and US Army studies but poor compared to the priority product in the TURI, WM Barr and Recochem studies. The Group 8 product (the Lowell formulation) has no actual data but testing by TURI (the developer of the formulation) showed that similar formulations had performance that was similar to only slightly less effective than the priority product, depending on paint type.¹⁷ Overall, the available performance data suggest that the Lowell formulation (Group 8) may be a possible alternative for the priority product. Benzyl alcohol products (Group 5) may have some value, although the inconsistent test results would need to be resolved. The overall conclusion on performance is that there is one possible alternative with performance that shows promise and should be carried forward to Stage 2 (Group 8), and a second alternative (Group 5) with inconsistent results that should be looked at more carefully before inclusion in Stage 2.

5.4 Cost

We attempted to get reasonably current quantitative data on product cost from retail websites. However, the recent US EPA ruling banned the sale of methylene chloride-based products to consumers, and therefore pricing information of methylene chloride paint removers is no longer available for comparison against potential alternatives. The *Wood Magazine* study (1996) does include data for all of the products evaluated. When put on a consistent per ounce basis (Table 5.23), it suggests that Group 2 and 3 products (*i.e.*, those containing low methylene chloride content, acetone, toluene, and methanol or only acetone, toluene and methanol) are least expensive and Group 1, 4 and 6 products (those containing high methylene chloride content, benzyl alcohol, or caustics) are relatively similar in price. This study is quite old however and likely does not reflect realistic prices. Data for the caustics were also based on only two products with highly variable results (\$0.52 and \$0.17 per ounce). The IRTA (2006) study reported that benzyl alcohol based products would have similar costs for commercial users and about 40 percent less for consumers (although this was based on a single benzyl alcohol product). The TURI (2017) report also examined costs and reported that the Lowell formulations which appeared to be most effective (numbers 4 and 9) would have a somewhat higher cost *versus* methylene chloride based products. We also discussed costs with the REs who have direct knowledge of costs of their own and competitors products on the market. From these discussions we gathered that methylene chloride-containing products (Groups 1 and 2) and acetone-toluene-methanol-based products (Group 3) products are roughly equivalent with regards to cost. The REs expect that benzyl alcohol-based products (Group 5), dimethylformamide-based

¹⁷ The Lowell formulations appear to have been quite effective but again have not been tested against as many different paint types and substrates as the priority product. Conversations with TURI representatives have indicated that the actual Group 8 product (current Lowell formulation) has equivalent to better performance than the initial formulations (Cohen, 2019). TURI representatives have indicated that testing is underway on this product (including testing on automotive and boat paint), but the results were not obtained in time for incorporation in this AA report before the July 1 submission date (Cohen, 2019). This report would be obtained as part of Stage 2.

products (Group 7, other), and the Lowell formulation (Group 8) likely cost more than double the price of methylene chloride-based products. The primary ingredients for caustics (*e.g.*, caustic soda, Group 6) may be on the lower end with regards to cost. However, the REs indicated that thickened caustic products (*i.e.*, pastes) may be two to three times more expensive than methylene chloride-based products. Overall, data on cost are not reliable enough to establish potential alternatives as part of this Stage 1 analysis; additional cost information will be gathered and evaluated further in Stage 2.

6 Conclusions of Stage 1 AA

6.1 Potential Alternatives to Priority Product

The final results of the PAA are shown in Table 5.24. Given that the information developed in the PAA is a mix of quantitatively and qualitative information, a numerical scoring of alternatives was not conducted. Rather, a narrative approach was taken, in which the results of the hazard, exposure and performance evaluations are summarized, given a qualitative color coded score, and the qualitatively evaluated to determine whether the product constitutes a likely reasonable alternative. A narrative approach is a common and credible method for identifying alternatives (Malloy et al. 2017) and is appropriate for Stage 1. Based on the analysis shown in Table 5.24, it appears that there is at least one *possible* alternative to methylene chloride-based paint removers, although the readily available data do not allow for a definitive determination at this time that this is an acceptable substitute. Prior iterations of the Lowell formulation have been tested on some but not all of the paint types and substrates where methylene chloride is highly effective. On those where it has been tested, the prior Lowell product has performed nearly as well, and we have been told that the current version of the product has even better performance (but this is not substantiated). The Lowell formulation also does not contain methylene chloride and contains no components that are SCP chemicals of concern. The Lowell product is flammable. The Lowell formulation also contains DMSO, a very high skin penetrating substance, and the significance of this property requires further consideration. This product will be studied further in Stage 2.

As shown in Table 5.24, Group 5 products (benzyl alcohol-based) are preferable to the priority product in terms of hazard and relative exposure potential. Their performance has been reported inconsistently, with some studies showing they are as effective as the priority product while others show very poor performance. These products could potentially be included in Stage 2, although it may be more efficient to try to understand the differences in reported performance prior to conducting the Stage 2 AA to see if these could be eliminated as an early screening step (thereby streamlining the actual AA).

6.2 Alternatives to be Eliminated from Further Consideration

Group 3 alternatives (those based on acetone, toluene, and methanol) should not be carried forward. Although these are highly effective for some coating/substrate combinations, these products do not perform as well on the more difficult coatings/substrates that the priority product handles well. They also have a similar qualitative exposure potential as the priority product and similar or higher hazard scores (e.g., for flammability). Groups 4 and 6 (dibasic esters and caustics) should not be carried forward due to their limited performance potential, despite their lower hazard and relative exposure potential. These products are effective on certain paint types and will remain on the market but would not function as replacements for the priority product. The final group (Group 7) should not be carried forward due to a lack of performance data and similar hazard scores compared to the priority product.

6.3 Decision Concerning Abridged AA or Stage 2 AA

The conclusion of this Stage 1 AA is that possible alternatives to the priority product, methylene chloride-based paint removers, do exist and are worth additional study (*i.e.*, engaging in Stage 2). However, a more detailed examination of these alternatives is required in order to comfortably state whether there are suitable alternatives that would not result in regrettable substitutions.

7 Work Plan For Stage 2 AA

7.1 Tasks for Stage 2 AA and Final AA Report

The procedure for completing Stage 2 is outlined in the SCP regulations. The specific tasks we would undertake would be the following:

- Obtain DTSC approval on Stage 1 AA report;
- Review any DTSC comments on the approved PAA and have a discussion with DTSC how these might be addressed in Stage 2;
- Confirm that no new candidate alternatives have become available since the time of the Stage 1 submission; if these are available, we will determine their suitability for including in the analysis;
- Revisit relevant factors for alternatives carried forward, as these could change;
- Perform a more in-depth evaluation of hazard and exposure potential, looking into specific relevant data sources to allow for a more quantitative comparison of alternatives;
- Revisit the conceptual model to see if it requires revision for the reduced set of alternatives;
- Update the literature search to be sure the most current information is available on product performance (contact TURI and other parties regarding the status of test results);
- Work with a life cycle consultant to evaluate potential life cycle impacts of various alternatives at a deeper level;
- Attempt to quantify the economic impacts of the priority product and alternatives;
- Use the sequential, simultaneous, or hybrid framework to evaluate alternatives and come to a decision;
- Prepare Stage 2 AA report;
- Include self-evaluation described in chapter 11 of DTSC's AA Guide (DTSC, 2017);
- If necessary, schedule calls with DTSC at the 3, 6 and 9-month time point to discuss any issues that arise; and
- Give DTSC 2 months' notice if we require an extension or expect to complete the Stage 2 AA on time.

7.2 Proposed Implementation Schedule

The SCP regulation requires an implementation schedule be submitted as part of the Stage 1 report. The following schedule is offered to comply with that requirement. However, the schedule is tentative and for information purposes only. Given the unique nature of this first SCP AA, we reserve the right to adjust and modify this schedule as needs arise. The only required timing is that the Stage 2 AA report be submitted one year after DTSC approval of the Stage 1 AA report.

Table 7.1 Proposed Implementation Schedule

Action Item	Scheduled Completion Date
DTSC indicates acceptance of Stage 1	30 days from October 28, 2019
	<u>All times below are after DTSC acceptance of Stage 1</u>
Update alternatives search	week 3
Update performance database, determine if newer data are available	week 4
Revisit relevant factors for Stage 2 in light of reduced alternative set	week 6
Revisit conceptual model in light of reduced alternative set	week 6
Initiate more in-depth hazard and exposure factor review	week 8
Engage with life cycle consultant, start life cycle thinking-related tasks	week 8
Develop approach to address economic impact requirements, identify search strategy, contingency plans if data are lacking	week 10
Data gathering for hazard, exposure, performance, life cycle, and economics impact phase	weeks 12 to 20
Data review/tabulation for hazard, exposure, performance, life cycle, and economics impact phase	weeks 20 to 30
Discuss progress/outstanding questions with DTSC	week 30
Explore decision frameworks	week 30 to 32
Initial decision using appropriate decision framework	week 33
Internal review of initial decision, QC by larger group	week 34
Prepare final AA report	weeks 34 to 45
Report review by group	weeks 45 to 48
Revise final AA report, final edits	weeks 48 to 51
Submit final AA report to DTSC	week 52

8 Uncertainty Analysis

There are a number of possible sources of uncertainty that were encountered in conducting this PAA for methylene chloride-containing paint or varnish removers. These are summarized below:

Product Volume Data. There is uncertainty because, as noted earlier, many REs typically sell directly to distributors with a national business profile who may then sell the product to third parties. The REs have made a good faith effort to provide estimates of the volume of the product sold in the State of California to the best of their ability. The extent to which the volume estimates may be more or less than actual would not have an impact on the conclusions of the PAA.

Product Use Data. There is uncertainty because we could not identify a specific study that assessed how individuals use chemical paint removers. This is not surprising given that the use is fairly straightforward (apply, wait, remove, repeat if necessary). The REs have attempted to describe how they understand the product is being used (or should be used) to the best of their ability. The extent to which described use patterns may be different from actual should not affect the conclusions of the PAA. It is hard to imagine a change in use substantial enough to alter the key exposure pathways (*e.g.*, to require including the ingestion route of exposure).

Identification of Potential Alternatives. We identified alternatives based on a literature review. It is possible that alternative formulations exist that we did not identify. However, our review included several recent reports (*e.g.*, TURI, 2017; Jacobs et al., 2015) which should have allowed us to capture the current state of knowledge. Moreover the product groups we evaluated are consistent with prior studies. Had we missed an alternative, we would need to have data on its chemical composition, hazards and performance in order for it to have had a significant impact on our conclusions. We consider the likelihood of such an occurrence to be very low. Nonetheless, a search for possible alternatives (largely to identify any that have emerged after this report is submitted) will be conducted at the start of Stage 2.

Grouping of Products. Our decision to bin various products into groups required the averaging of individual product chemical concentrations and also a focus on “key ingredients” rather than each ingredient in a product. As a result, there may be some products in a group that have higher concentrations of certain chemicals and thus higher hazards, exposure potential and potentially different performance. However, as noted in Section 4.6, our goal is to determine if there are suitable alternative product chemistries rather than specific products. It would be impractical to evaluate each and every product on the market, particularly when data on the performance of some products would be lacking. Moreover, the goal of the SCP program should not be to identify one particular manufacturer’s product as “safer” but to recommend a product formulation as “safer”; identifying a specific product as preferable would be inconsistent with the rapidly changing nature of the consumer product world, where manufacturers frequently modify product design or formulation. Our use of a grouping approach also caused us to exclude a few products containing methylene chloride from the full analysis because they had somewhat different composition (*e.g.*, methylene chloride and phenol). We did however describe how the potential impact of this choice on our final decision would be minimal in Sections 5.1 and 5.2.

Life Cycle Considerations. We attempted to identify important life cycle concerns related to the priority products and the possible alternatives by looking at freely available LCA models identified in the DTSC’s AA Guide (DTSC, 2017) and at readily available information on product manufacture, to understand chemical precursors and possible raw materials. We did not conduct an LCA, which is not required under

the SCP guidance. It is possible that a more in depth look at the life cycle of the chemicals of interest would suggest other or different life cycle impacts, which could affect the decision of what alternatives to carry forward to Stage 2. That will be undertaken as part of Stage 2 where the number of alternatives being considered will have been refined.

Hazard Evaluation, Data for Certain Health Effects. In evaluating some of the health hazards of the key ingredients in the products (*i.e.*, those not addressed in the ECHA dossiers, such as ototoxicity, kidney toxicity, epigenetic toxicity) we took a qualitative approach and looked through HSDB files to see if a particular type of toxicity was noted for a chemical. It is possible that a more in-depth literature review might identify a study which reported one of these effects. However, such a review would be extremely time consuming for all of the key chemicals addressed in this PAA and would be inappropriate for Stage 1. We are aware of no data source providing scores or summaries for each of the health hazards at issue, nor has DTSC identified one. We also assumed, in our quantitative scoring, that these endpoints were covered by the GHS systemic target organ toxicity (STOT) single and repeat dose categories.

Hazard Evaluation, Use of CSI-Like Scoring Approach. We adapted the CSI evaluation system to provide quantitative scores of hazard endpoints. Although we retained the scoring values cited in the method that was published in a peer reviewed journal, we also needed to make certain modifications to meet the requirements of the SCP program. Other scoring values could have been applied and this may have led to different conclusions about hazard. For example, had we weighted flammability more highly, that would have adversely affected the hazard score of the Lowell formulation. Even so, it is likely this product would have been selected as a candidate for evaluation in Stage 2. We also averaged the percent composition of key ingredients across the products in conducting the weighting. We considered using the maximum percentage in any product but this led to implausible concentrations (more than 100%) that we believed likely would incorrectly indicate the actual product group hazard.

Hazard Evaluation, Penalizing for Data Gaps. For chemicals where test data were lacking, we assigned a data gap and used a penalty score in the quantitative evaluation. In some cases, we could have filled in the data gap using professional judgment or read-across methods. For example, there are data gaps for the dibasic esters and sodium hydroxide for carcinogenicity, and it may be reasonable to assume that these are unlikely to be carcinogenic. We were concerned, however, that opening up the door to expert judgment or use of other tools to address data gaps could become complicated; other studies or tools may exist that suggest different findings, and these would need to be assessed and defended. This would be more reasonable in Stage 2, where the number of alternatives is more limited. Looking at the results of the hazard evaluation, it is unlikely the assigning of data gaps had a significant effect on Stage 1 conclusions.

Relative Exposure Potential, Use of Secondary Data Sources. In compiling the list of physical/chemical factors shown in Table 5.14, we relied on secondary data sources such as EpiSuite, HSDB and Pubchem. Had we looked at specific study data, we may have found differing information, which could have led to different conclusions about relevant exposure pathways, persistence or bioaccumulation (all of which are based on Table 5.14 data). However, the difference in physical or chemical values would have to be substantial in order to cause a change in the conclusion for any of these categories and such a change, while possible, would not be very likely. Use of the secondary sources is consistent with the philosophy of a Stage 1 PAA. More in-depth evaluation would be part of a Stage 2 AA.

Performance. As noted earlier, there is no specified test method for evaluating paint remover performance. As a result, each of the studies identified in Section 5.3 used different methodologies. We generally weighted the results of each study equally in drawing the conclusions shown in Table 5.22, although the studies were different in a number of ways (*e.g.*, author organization, level of detail provided, and number of product groups studied). Unfortunately no one study appeared superior (*e.g.*, the

Wood Magazine study evaluated the most paint types in a systematic way but is old and not peer reviewed, the IRTA study only evaluated a few product groups). Had we excluded certain studies, we would have formed a more conclusive opinion on Group 5 (benzyl alcohol), depending on which studies were excluded. Since only one study evaluated the Lowell formulation (the study by TURI), excluding it would have meant that product would not have been identified as a product to carry forward to Stage 2. We believe that considering the studies comprehensively was appropriate and maximized the information used for decision making.

9 References

American Society for Testing and Materials (ASTM). 2014. "Standard Practice for Evaluating the Efficiency of Chemical Removers for Organic Coatings." ASTM D 6189 - 97 (2014), 2p.

BKH Consulting Engineers (Delft, The Netherlands); TNO Nutrition and Food Research (Zeist, The Netherlands) November 10, 2000. "Towards the establishment of a priority list of substances for further evaluation of their role in endocrine disruption - preparation of a candidate list of substances as a basis for priority setting." Annex 10 – List of 564 substances with their selection criteria. Report to European Commission DG ENV. M0355008/1786q/10/11/00. 12p.

Bob Vila. 2019. "Buyer's guide: Paint Strippers." Accessed on October 23, 2019 at <https://www.bobvila.com/articles/best-paint-stripper/>.

Burns, L; Magnuson, K; Geyer, R; Keller, AA; Chamberlain, J; Meier, C; Yu, Y. 2016. "Pilot Study to support Alternatives Analysis: Evaluating Alternatives to Methylene Chloride in Paint Stripper." Report to California Dept. of Toxic Substances Control (CalDTSC). 167p. Accessed on October 16, 2019 at https://dtsc.ca.gov/wp-content/uploads/sites/31/2018/10/DTSC_Final_Quant_AA_pilot_UCSB-1.pdf.

California Air Resources Board (CARB). c. 2019. "LVP-VOC Research" Accessed on October 28, 2019 at <https://ww2.arb.ca.gov/our-work/programs/consumer-products-program/lvp-voc-research>

California Air Resources Board (CARB). 2019. "High-GWP refrigerants." Accessed on October 25, 2019 at <https://ww2.arb.ca.gov/resources/documents/high-gwp-refrigerants>.

California Dept. of Public Health (CalDPH). 2013. "Minimum personal protective equipment required for paint stripping." Occupational Health Branch. 2p., May. Accessed on October 24, 2019 at <https://www.cdph.ca.gov/Programs/CCDCPHP/DEODC/OHB/CDPH%20Document%20Library/PPEChart.pdf>.

California Dept. of Toxic Substances Control (DTSC). 2013. "Safer Consumer Products." 22 CCR 55. 72p. Accessed on June 20, 2019 at <https://dtsc.ca.gov/wp-content/uploads/sites/31/2018/07/SCP-Final-Regs-Text-10-01-2013.pdf>.

California Dept. of Toxic Substances Control (DTSC). 2016. "Summary of Technical Information and Scientific Conclusions for Designating Paint or Varnish Strippers Containing Methylene Chloride as a Priority Product (Revision)." Safer Consumer Products Program. 21p., October. Accessed on June 12, 2019 at https://dtsc.ca.gov/wp-content/uploads/sites/31/2018/10/Paint_Stripper_Summary_of_Technical_Information_final_draft_July-2017.pdf.

California Dept. of Toxic Substances Control (DTSC). 2017. "Alternatives Analysis Guide (Version 1.0)." Safer Products and Workplaces Program. 235p., June. Accessed on May 13, 2019 at https://dtsc.ca.gov/wp-content/uploads/sites/31/2016/01/AA-Guide-Version-1-0_June-2017.pdf.

Cohen, JM. [Gradient]. 2019. "Summary of May 2, 2019 call with Greg Morose (TURI UMass Lowell) (Draft)." 2p., May 2.

Elsevier. 2019. "ScienceDirect Topics: Paint strippers." Elsevier. Accessed on October 23, 2019 at <https://www.sciencedirect.com/topics/engineering/paint-stripper>.

Institute for Research and Technical Assistance (IRTA). 2006. "Methylene Chloride Consumer Product Paint Strippers: Low-VOC, Low Toxicity Alternatives." Report to California Dept. of Toxic Substances Control (CalDTSC). 47p., May.

Intergovernmental Panel on Climate Change (IPCC). 2013. "Climate Change 2013: The Physical Science Basis, Working Group I Contribution to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change." (eds.: Stocker, TF; Qin, D; Plattner, GK; Tignor, M; Allen, SK; Boschung, J; Nauels, A; Xia, Y; Bex, V; Midgley, PM), Cambridge University Press, Cambridge, UK. 1552p.

Jacobs, M; Wang, B; Rossi, MS. 2015. "Alternatives to Methylene Chloride in Paint and Varnish Strippers: Availability of Safer Alternatives & Requirements for Meeting Stage 1 of the California Safer Consumer Products Regulations." Report to BizNGO. 44p., October 27.

Krier, B. 1992. "Getting under the surface of today's finish removers." *Better Homes and Gardens: Wood* (53):54-59.

Luxury Home Stuff. 2019. "Best paint stripper for wood (October 2019) - top 8 picks & reviews." Accessed on October 23, 2019 at <https://www.luxuryhomestuff.com/best-paint-stripper/>.

Malloy, TF; Zaunbrecher, VM; Batteate, CM; Blake, A; Carroll, WF Jr; Corbett, CJ; Hansen, SF; Lempert, RJ; Linkov, I; McFadden, R; Moran, KD; Olivetti, E; Ostrom, NK; Romero, M; Schoenung, JM; Seager, TP; Sinsheimer, P; Thayer, KA. 201. "Advancing Alternative Analysis: Integration of Decision Science." *Environ Health Perspect.* 125(6):066001. doi: 10.1289/EHP483.

National Library of Medicine (NLM). 2005 - 2018. "Hazardous Substances Data Bank (HSDB) records." Accessed on June 17, 2019 at <https://toxnet.nlm.nih.gov/>

Organisation for Economic Co-operation and Development (OECD). 2010. "OECD Guidance Notes on Dermal Absorption (Draft)." 53p., October 22. Accessed on October 23, 2019 at <http://www.oecd.org/chemicalsafety/testing/46257610.pdf>.

Public Policy Institute of California (PPIC). 2017. "California's population." March. Accessed on October 23, 2019 at <https://www.ppic.org/publication/californias-population/>.

Ranellone, RT; Dembsey NA. 2018. "Fire Hazard Evaluation for Removal Products on a Test Surface." Worcester Polytechnic Institute, Department of Fire Protection Engineering. 19 p., August 30.

Recochem Corp. 2019. "Comparative Study, First and Second Generation PVRs." 16p., April 12.

University of Massachusetts, Lowell, Toxics Use Reduction Institute (TURI). 2017. "Assessment of Safer and Effective Alternatives to Methylene Chloride for Paint Stripping Products." TURI Report 2017-102, 24p., June.

US Army Research Laboratory (ARL). 2006. "Performance Evaluation of Hap-Free Paint Strippers vs. Methylene-Chloride-Based Strippers for Removing Army Chemical Agent Resistant Coatings (CARC)." ARL-TR-3823, 42p., June.

US Consumer Product Safety Commission (CPSC). 2013. "What You Should Know About Using Paint Strippers." 009509 R042013, 6p. Accessed on June 20, 2019 at <https://www.cpsc.gov/s3fs-public/423%20Paint%20Stripper%20Publication.pdf>.

US Consumer Product Safety Commission (CPSC). 2018. "Labeling of certain household products containing methylene chloride; Supplemental guidance." *Fed. Reg.* 83(55):12254-12259. 16 CFR II, March 21. Accessed on June 20, 2019 at <https://www.govinfo.gov/content/pkg/FR-2018-03-21/pdf/2018-05580.pdf>.

US Consumer Product Safety Commission (CPSC). 2019. "Federal Hazardous Substances Act (FHSA) Requirements." Accessed on June 20, 2019 at <https://www.cpsc.gov/Business--Manufacturing/Business-Education/Business-Guidance/FHSA-Requirements>.

US EPA. 2008. "National Emission Standards for Hazardous Air Pollutants: Paint Stripping and Miscellaneous Surface Coating Operations at Area Sources; Final Rule." January 9. *Federal Register* 73(6):1738-1767.

US EPA. 2019a. "Methylene chloride; Regulation of paint and coating removal for consumer use under TSCA Section 6(a) (Final rule)." *Fed. Reg.* 84(59):11420-11436. 40 CFR 751. March 27. Accessed on June 26, 2019 at https://www.regulations.gov/document?D=EPA_FRDOC_0001-23648.

US EPA. 2019b. "Ozone-Depleting Substances." July 31. Accessed on June 20, 2019 at <https://www.epa.gov/ozone-layer-protection/ozone-depleting-substances>.

US EPA. 2019c "EPI Suite™ - Estimation Program Interface." March 12. Accessed on June 20, 2019 at <https://www.epa.gov/tsca-screening-tools/epi-suite-estimation-program-interface>.

Verslycke, T; Reid, K; Bowers, T; Thakali, S; Lewis, A; Sanders, J; Tuck, D. 2014. "The Chemistry Scoring Index (CSI): A hazard-based scoring and ranking tool for chemicals and products used in the oil and gas industry." *Sustainability* 6:3993-4009. doi: 10.3390/su6073993. Accessed on July 07, 2014 at <http://www.mdpi.com/2071-1050/6/7/3993>.

WM Barr & Co., Inc. 2019. "Results of Paint Remover testing of layers of Alkyd and Epoxy removed at given times [Results of paint remover testing for DTSC]." 2p.

Wood Magazine. 1992. "Getting under the surface of today's finish removers." *Wood Magazine*. 3:54-59.

Figures

**Figure 4.1 Conceptual Exposure Model:
DCM in Paint or Varnish Removers**

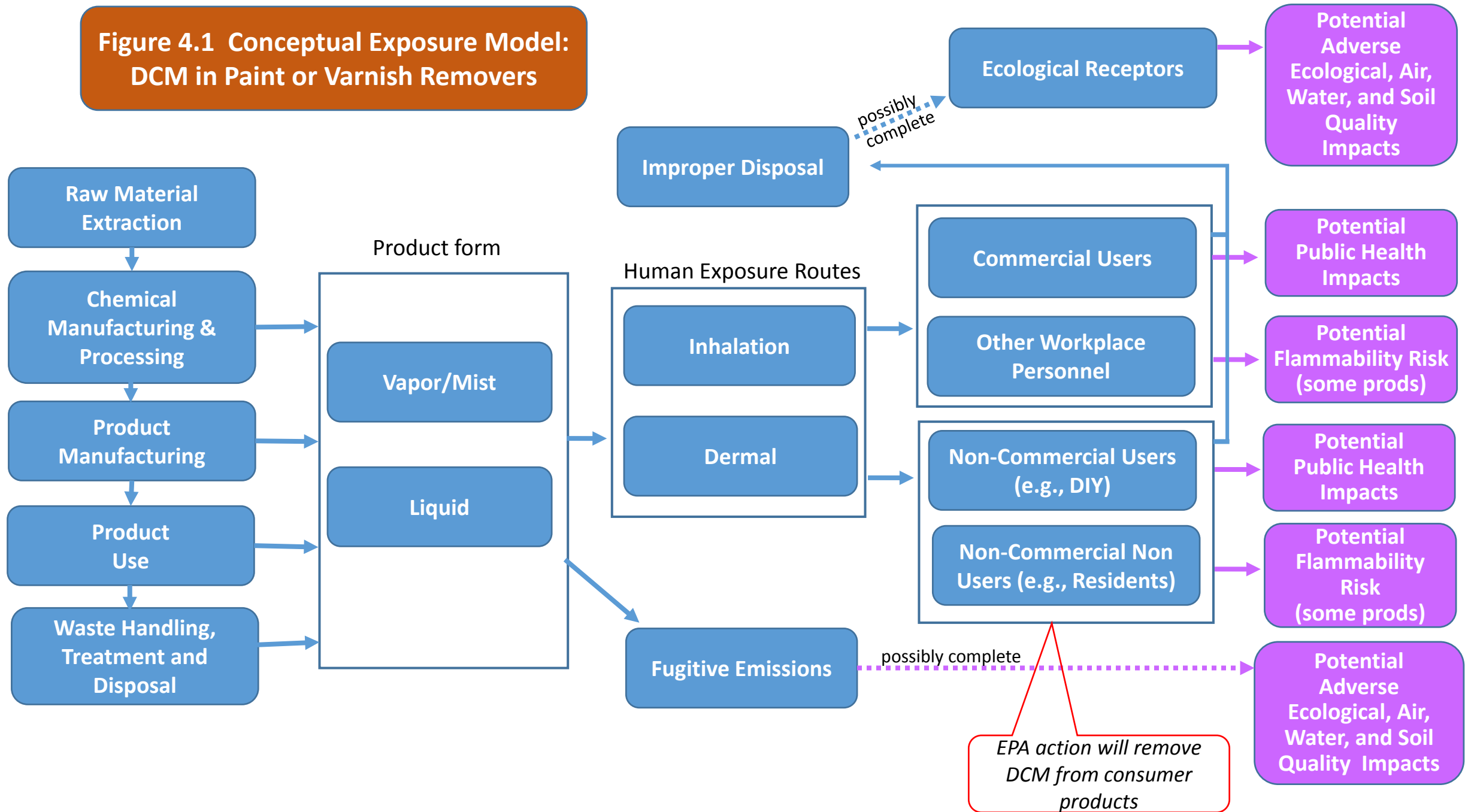
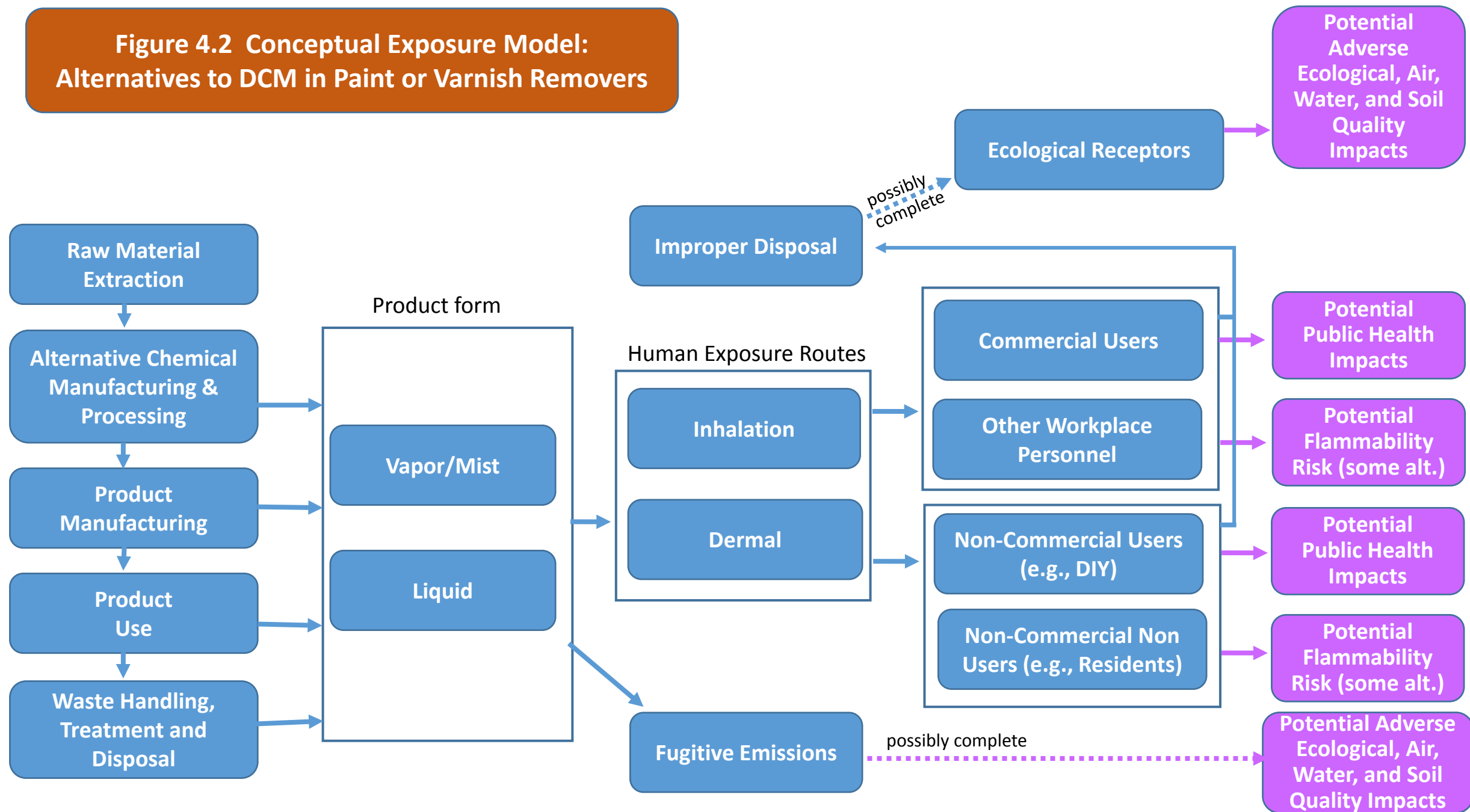


**Figure 4.2 Conceptual Exposure Model:
Alternatives to DCM in Paint or Varnish Removers**



Tables

Table 4.1 Consideration of Potentially Relevant Factors Identified in SCP Regulation

Category	Factor That is Relevant if Materially Different Among Possible Alternatives	Relevant?	Basis
Life cycle segments	Raw material extraction	Possibly but data are lacking	No data were located which would allow quantification of differential impacts. Many of the products are likely to be derived from fossil fuel sources (Table 4.4), which would imply similar raw materials extraction impacts, although caustic products are derived from inorganic sources which may have different, if not necessarily less significant, impacts. No data were found relating to out resource inputs need to produce the products under study. Intermediates during production are different (Table 4.4), although we found no data to quantify the relative importance of different synthesis pathways. All reactive intermediates are likely produced at facilities that follow applicable health and safety regulations. No quantitative data for these life cycle stages was evaluated in the UCSB study (Burns <i>et al.</i> , 2016).
	Resource inputs and other resource consumption		
	Intermediate materials production processes		
	Product manufacture	Yes	One would expect differences in potential chemical exposures and hazards for workers during manufacturing/formulation. The UCSB study determined this life cycle stage as a possible relevant factor due to differential impacts identified for public health, air quality, water quality, and ecological impacts, across the three stripper products evaluated (methylene chloride-, benzyl alcohol-, and dimethyl adipate-based), as well as sanding (Burns <i>et al.</i> , 2016).
	Packaging	No	Prior AAs that were reviewed as well as the expert opinion of the REs gives no indication of material differences in terms of packaging, transport or distribution. Will likely be similar among all products. No quantitative data for these life cycle stages was evaluated in the UCSB study (Burns <i>et al.</i> , 2016).
	Transportation during and between all segments	No	
	Distribution	No	
	Use	Yes	Differing performance may affect the use pattern, <i>e.g.</i> , the amount needed for equivalent performance, the exposure potential, <i>etc.</i> Differences in chemical properties (<i>e.g.</i> , vapor pressure and log <i>kow</i>) suggest potential differences in exposure. Furthermore, the UCSB study identifies impacts to public health at this life cycle stage to be different across the three stripper products evaluated (methylene chloride-, benzyl alcohol-, and dimethyl adipate- based) (Burns <i>et al.</i> , 2016)..
	Operation and maintenance	NA	Not applicable to this product type. No sustained use would be expected for the products. No quantitative data for this life cycle stage was evaluated in the UCSB study (Burns <i>et al.</i> , 2016).

Category	Factor That is Relevant if Materially Different Among Possible Alternatives	Relevant?	Basis
	Waste generation and management	No	Waste paint would need to be disposed of similarly. All waste paint would have hazardous chemical residues. There are no good data on waste generation during manufacture, but there is no indication this would be materially different among the products. No quantitative data for this life cycle stage was evaluated in the UCSB study (Burns <i>et al.</i> , 2016).
	Reuse and recycling	No	Products do not appear different in terms of reuse/recycling potential. In reviewing prior AAs and in discussions with RE representatives there was no indication that significant reuse/recycling occurs in a way that could be quantified. The UCSB study considered this life cycle stage to be irrelevant because the products are "practically impossible to recover after use," specifically for the three stripper products evaluated (methylene chloride-, benzyl alcohol-, and dimethyl adipate- based) (Burns <i>et al.</i> , 2016).
	End-of-life disposal	Possibly	All products would be disposed of as hazardous materials if unused. Although improper disposal would be against manufacturer recommendations and applicable laws, if improper disposal occurs (<i>e.g.</i> , down the drain, to a solid waste landfill) differences among the products in terms of water solubility and lipid solubility could affect the ultimate impact. However, the UCSB study reported low ambient concentrations for all chemicals evaluated for impacts related to public health, air quality, soil and water quality, ecological impacts, and waste/end-of-life impacts, suggesting this life cycle stage may not be a relevant factor (Burns <i>et al.</i> , 2016).

Category	Factor That is Relevant if Materially Different Among Possible Alternatives	Relevant?	Basis
Adverse air quality impacts	Would it bring any changes to emissions of California Toxic Air Contaminants (e.g., Benzene, Cr (VI))?	Yes	Some products have such chemicals (e.g., methylene chloride) while others (e.g., caustics) do not. See Table 5.2 for a comparison.
	CO ₂ emissions	No	We have found not data indicating that CO ₂ emissions across the product life cycle will be a material differentiator among the products. Detailed CO ₂ production data related to energy consumption across the life-cycle were not located. Based on review of manufacturing, CO ₂ is not a feedstock or reported by-product for any of the chemicals under review (see Table 4.4). As noted above, the transportation and distribution stages of the life cycle are not expected to differ among the alternatives.
	HFC emissions	No	HFCs are not believed to be involved in the life cycle of these products. Furthermore, based on review of reported manufacturing processes, HFCs are involved in the production of the chemicals under review (see Table 4.4).
	Methane emissions	No	Methane emissions are not expected to be part of the life cycle of these products. Furthermore, based on review of reported manufacturing processes, methane is not involved in the production of any of the chemicals under review (see Table 4.4).
	Nitrogen fluoride emissions	No	Nitrogen fluorides are not believed to be involved in the life cycle of these products. Furthermore, based on review of reported manufacturing processes, nitrogen fluoride is not involved in the production of any of the chemicals under review (see Table 4.4).
	Nitrous oxide emissions	No	NO is not believed to be involved in the life cycle of these products. Furthermore, based on review of reported manufacturing processes, nitrous oxide is not involved in the production of any of the chemicals under review (see Table 4.4). As noted above, the transportation and distribution stages of the life cycle are not expected to differ among the alternatives.
	Perfluorocarbon emissions	No	Based on our review of product manufacturing processes, PFCs are not believed to be involved in the life cycle of these products. Furthermore, based on review of reported manufacturing processes, PFCs are not involved in the production of any of the chemicals under review (see Table 4.4).
	Sulfur hexafluoride emissions	No	Based on our review of product manufacturing processes, SF ₆ is not believed to be involved in the life cycle of these products. Furthermore, based on review of reported manufacturing processes, SF ₆ is not involved in the production of any of the chemicals under review (see Table 4.4).

Category	Factor That is Relevant if Materially Different Among Possible Alternatives	Relevant?	Basis
	Other global warming gas emissions	No	All are produced industrially; based on review of reported manufacturing processes, potent global warming gases are not involved in the production of any of the chemicals under review (see Table 4.4).CO ₂ emissions are likely dominated by the transport phase which will be similar among products
	Nitrogen oxide emissions	No	NOx is not believed to be involved in the life cycle of these products. Based on review of reported manufacturing processes, NOx are not involved in the production of most of the chemicals under review (see Table 4.4).Manufacture of DMSO is reported to involve nitrogen dioxide but the extent to which this produces emissions is not known. As noted above, the transportation and distribution stages of the life cycle are not expected to differ among the alternatives.
	Particulate matter emissions	Possibly	Based on review of reported manufacturing processes, particulate matter is not noted to be involved in the manufacture of any of the chemicals under review (see Table 4.4). Particulate matter could be produced during mining activities but how this might differ among the products under review is unknown. As noted above, the transportation and distribution stages of the life cycle are not expected to differ among the alternatives.
	Ozone depleting substances	No	Based on our review of product manufacturing processes, none of the products are believed contain chemicals with significant ozone depletion potential. The ODP of methylene chloride is 0.4% the ODP of CFC 11, and methylene chloride is not listed as an ODS by US EPA ^b .
	Sulfur dioxide emissions	Possibly	SOx are not believed to be involved in the life cycle of these products. Furthermore, based on review of reported manufacturing processes, sulfur dioxide is not involved in the production of any of the chemicals under review (see Table 4.4). At least one chemical, DMSO, involves sulfur chemistry but the possibility of sulfur dioxide emissions is not stated. As noted above, the transportation and distribution stages of the life cycle are not expected to differ among the alternatives.
	Would it bring any changes to emissions of compounds that might lead to tropospheric ozone production?	Yes	Some alternatives contain chemicals that could contribute to tropospheric ozone production. Refer to Table 5.2.

Category	Factor That is Relevant if Materially Different Among Possible Alternatives	Relevant?	Basis
Adverse ecological impacts	Would the product, its constituents, or its likely breakdown products have any acute or chronic toxicity to impact aquatic, avian, or terrestrial animal or plant organisms or microbes?	Unlikely but possible	Ecological exposures are unlikely, these products are not used in a manner that would lead to ecological effects (<i>i.e.</i> , not washed into stormwater or surface water, not used on land surface, <i>etc.</i>). In general the UCSB study found ecological impacts to not be a relevant factor due to very low release levels to soil and water across most life cycle stages, specifically for the three stripper products evaluated (methylene chloride-, benzyl alcohol-, and dimethyl adipate- based) (Burns <i>et al.</i> , 2016). However, the dimethyl adipate stripper was found to pose medium ecological impacts, though this conclusion had medium uncertainty attributed to high standard deviation around the central tendency values used to quantify this endpoint. Overall, we judged these unlikely but possible.
	Would it bring changes in population size, reduction in biodiversity, or changes in ecological communities?	No	We found no information suggesting this effect would occur. Moreover, it depends on the chemicals having ecological toxicity, which above is described as unlikely but possible. Whether the unlikely toxicity would be substantial enough to affect these concerns appears even more remote.
	Would it bring changes to abilities of an endangered or threatened species to survive or reproduce?	No	
	Would it bring changes to deterioration or loss of environmentally sensitive habitats?	No	
	Would it bring changes that contribute to or cause vegetation contamination or damage?	No	We found no information suggesting this effect would occur. No other AAs we reviewed described this as a potential concern.
	Would it bring adverse effects on environments that have been designated as impaired by a California State of federal regulatory agency?	No	We have no reason to believe there will be differential impacts across the alternatives being evaluated.
	Would it result in biological or chemical contamination of soils?	No	All products would be disposed of as hazardous materials if unused. Although improper disposal would be against manufacturer recommendations and applicable laws, if improper disposal occurs (<i>e.g.</i> , down the drain, to a solid waste landfill) differences among the products in terms of water solubility and lipid solubility could affect the ultimate impact. However, the UCSB study reported low ambient concentrations for all chemicals evaluated for impacts related to public health, air quality, soil and water quality, ecological impacts, and waste/end-of-life impacts, suggesting this life cycle stage may not be a relevant factor (Burns <i>et al.</i> , 2016).

Category	Factor That is Relevant if Materially Different Among Possible Alternatives	Relevant?	Basis
	Any other adverse effects, as defined in section 69401.2(a), for environmental hazard traits and endpoints specified in article 4 of chapter 54 as follows: - domesticated animal toxicity - eutrophication - impairment of waste management organisms - loss of genetic diversity (including biodiversity) - phytotoxicity - wildlife developmental impairment - wildlife growth impairment - wildlife reproductive impairment - wildlife survival impairment - evidence for environmental hazard traits (<i>i.e.</i> from standard aquatic and terrestrial toxicity testing, research-based investigations, mechanistic evidence from cell-based or whole organism-based assays showing perturbations of known physiological, biochemical or other pathways, or evidence from quantitative structure activity relationship programs).	Possibly	We looked in HSDB and found no additional evidence supporting a material difference across the various alternatives for these environmental hazard traits. However, there are slight differences in acute aquatic toxicity across the chemicals under review. We therefore consider these factors to possibly warrant further review in Stage 2.

Category	Factor That is Relevant if Materially Different Among Possible Alternatives	Relevant?	Basis
Adverse soil quality impacts	Would it impact soil compaction or other soil structure changes?	No	None of the alternatives are believed to have any of these effects; the product will not be used in a manner that affects these soil characteristics. Whether other aspects of the lifecycle (e.g., raw materials extraction) could cause such effects in ways that differ materially among the products is unknown. As described above, the UCSB study reported low soil concentrations for the three paint remover products evaluated (methylene chloride-, benzyl alcohol-, and dimethyl adipate- based), and therefore soil impacts were not considered a relevant factor (Burns <i>et al.</i> , 2016).
	Would it impact soil erosion?	No	
	Would it cause loss of organic matter in soil?	No	
	Would it cause soil sealing?	No	
Adverse water quality impacts	Would the product be expected to directly enter the municipal storm sewer systems (e.g., car wash detergents)?	Possibly	If managed correctly, this will not occur. Federal and state regulations would prohibit disposal to stormwater for all products. If used incorrectly and against manufacturer instructions, it is possible that the products could be improperly discharged to storm sewer systems. This potential should not differ among the products, however (except that products with less recognized hazards might be improperly discharged more frequently).
	Would it bring any increase in biological oxygen demand within the water system?	No	None of the products appear to be materially different in terms of these parameters. We see no information among the physical/chemical properties of these products that would suggest significant impacts on these parameters should they be improperly disposed of in water systems.
	Would it bring any increase in chemical oxygen demand within the water system?	No	
	Would it bring any increase in temperature of water systems?	No	
	Would it bring any increase in total dissolved solids in water systems?	No	
	Increase in CA CWA priority pollutants	Yes	Methylene chloride (Groups 1 and 2) and toluene (Group 3) have MCLs. Thus these values are relevant to the decision making process. However, use of these products would only have a material impact on "adverse water quality impacts" if the products are used in improper ways.
	Increase in CA CWA pollutants	Yes	
	Increase in chemicals with drinking water MCLs	Yes	
	Increase in chemicals with drinking water notification levels	No	None of the key ingredients in the alternatives have Drinking Water Notification Levels.
	Increase in chemicals with drinking water public health goals	Yes	Methylene chloride (Groups 1 and 2) and toluene (Group 3) have MCLs. Thus these values are relevant to the decision making process. However, use of these products would only have a material impact on "adverse water quality impacts" if the products are used in improper ways.
	Exceedance of a standard relating to the protection of the environment	No	To our knowledge, use of one of the products will not require intentional exceedance of such a standard.

Category	Factor That is Relevant if Materially Different Among Possible Alternatives	Relevant?	Basis
Public health impacts	Carcinogenicity	Yes	Some but not all products have chemicals with these properties (see Table 5.2).
	Developmental toxicity	Yes	
	Reproductive toxicity	Yes	
	Cardiovascular toxicity	Possibly	Review of HSDB data (Table 5.2) suggests this differs among products but this should be further confirmed in Stage 2.
	Dermatotoxicity	Yes	Many products have chemicals with this property (irritancy), but the extent appears to differ.
	Endocrine toxicity	Yes	One of the products has chemicals with this properties (see Table 5.2)
	Epigenetic toxicity	No	No data were found indicating these properties were pertinent to the products (see Table 5.2)
	Genotoxicity	No	This property does not appear pertinent to the products (see Table 5.2)
	Hematotoxicity	Possibly	Review of HSDB data (Table 5.2) suggests this differs among products but this should be further confirmed in Stage 2.
	Hepatotoxicity and digestive system toxicity	Possibly	
	Immunotoxicity	Possibly	
	Musculoskeletal toxicity	Possibly	
	Nephrotoxicity	Possibly	
	Neurodevelopmental toxicity	Possibly	
	Neurotoxicity	Possibly	
	Ocular toxicity	Yes	Some but not all products have chemicals with these properties (see Table 5.2).
	Ototoxicity	Possibly	Review of HSDB data (Table 5.2) suggests this differs among products but this should be further confirmed in Stage 2.
	Reactivity in biological systems ^c	No	No data were found indicating these properties were pertinent to the products (see Table 5.2)
	Respiratory toxicity	Possibly	RRreview of HSDB data (Table 5.2) suggests this differs among products but this should be further confirmed in Stage 2.
	Exceedance of an enforceable California or federal standard related to public health	No	To our knowledge, use of one of the products will not require intentional exceedance of such a standard.
Waste and end-of-life effects	Would it bring any change to the volume or mass of the waste materials and byproducts generated during the life cycle?	Yes	Less effective products could require more applications of the product to achieve the same performance, thus increasing waste material.

Category	Factor That is Relevant if Materially Different Among Possible Alternatives	Relevant?	Basis
	Would it need any special handling to mitigate adverse impacts resulted from the waste materials generated during the life cycle?	No	All products would have to be disposed of as hazardous waste. Chemical waste generated during production of all products would also be managed as hazardous waste.
	Effects on solid waste or wastewater disposal or treatment	No	It is likely that all products would have to be disposed of as hazardous waste at end of life.
	Effects on discharge(s) or disposal(s) to storm drains or sewers adversely affecting wastewater or stormwater treatment facilities?	Possibly	All products are very unlikely to be disposed of <i>via</i> stormwater/waste water systems. If such discharge were to occur, factors such as water solubility and volatility that differ among the products could lead to differences in effects.
	Release to the environment	Yes	The products differ in terms of several key physical/chemical parameters that could impact their environmental mobility (<i>e.g.</i>, vapor pressure, water solubility, log <i>k_{ow}</i>, Henry's Law constant). These factors could be significant at different life cycle stages. The UCSB study (Burns <i>et al.</i>, 2016) used TRACI 2.1 normalization factors to quantify potential impacts during end-of-life disposal. Study authors reported low ambient concentrations for all chemicals evaluated for impacts related to public health, air quality, soil and water quality, ecological impacts, and waste/end-of-life impacts, suggesting this life cycle stage may not be a relevant factor (Burns <i>et al.</i>, 2016).
Environmental fate	Aerobic and anaerobic half-lives of the product, its constituents, or its likely breakdown products?	No	The hydrolysis half-lives and general environmental half-lives of the products differ which could affect environmental fate. However, the REs position is that products are unlikely to be discharged to soil, surface water, or groundwater During typical and expected use, disposal or during manufacture. Thus, this factor is not relevant. This is supported by the UCSB study findings (see above).
	Aqueous hydrolysis half-life of the product, its constituents, or its likely breakdown products?	No	
	Atmospheric oxidation rate	Yes	There are differences in the atmospheric lifetime of different chemicals in the products.
	Bioaccumulation of the product, its constituents, or its likely breakdown products?	No	None of the chemicals appears to meet the criterion for bioaccumulation used in the AA.
	Mobility in environmental media	Yes	The products have chemicals with different properties related to environmental mobility (<i>e.g.</i> , vapor pressure, water solubility).

Category	Factor That is Relevant if Materially Different Among Possible Alternatives	Relevant?	Basis
	Persistence	Yes	Some chemicals are rated as having higher persistence based on half-lives in water, soil and sediment.
	Photodegradation	Yes	There are differences in photodegradation potential of different chemicals in the products.

Category	Factor That is Relevant if Materially Different Among Possible Alternatives	Relevant?	Basis
Materials and resource consumption	Impacts on consumption of renewable resources, including energy and raw materials, throughout the life cycle?	No	To the extent that data are available, no alternatives are based on renewable materials. All <u>could</u> be produced <i>via</i> renewable energy, but there is no information indicating this is currently the case.
	Impacts on consumption of nonrenewable resources, including petroleum, coal, metals, minerals, and other finite resources, throughout the life cycle?	No	All alternatives are produced from either fossil fuel-based chemicals or inorganic salts and there is no data indicating they are derived from recycling/recovered materials. It is possible that dibasic esters are at least partially derived from renewable sources but no data were found to confirm this either way. Other life cycle stage impacts (transportation, disposal) on consumption of nonrenewable resources should be similar. In general, data are lacking to address this question.
Physical chemical hazards	Do the product or the alternatives exhibit oxidizing properties that facilitate combustion?	No	None of the products exhibit this property.
	Do the product or the alternatives exhibit explosivity?	No	None of the products exhibit this property.
	Do the product or the alternatives exhibit flammability?	Yes	Some products have flammable ingredients while others do not.
Physico-chemical properties	Do the product and alternatives have different physical states?	No	All products can be applied in various forms (gels, pastes, sprays) so this is not a material difference among products.
	Molecular weight	Yes	Molecular weight could impact dermal exposure.
	Density	No	This property does not appear to differ significantly among the alternatives.
	Vapor pressure	Yes	Products differ in the vapor pressures of their ingredients which could be a relevant factor for exposure.
	Melting point	No	These factors are not relevant to any decision criteria (<i>i.e.</i> , hazard, exposure, performance, <i>etc.</i>). All key chemicals are used as liquids in the products.
	Boiling point	No	
	Water solubility	Possibly	As products are not likely to impact water resources as part of their normal use. Should such occur, then differences in water solubility may be significant.
	Lipid solubility	Possibly	Lipid solubility could be important in terms of dermal exposure and mobility between soil and water.
	Octanol-water partition coefficient (Kow)	Possibly	As products are not likely to be used in a way that enters the environment as part of their normal use, this should not be relevant. Should improper use or management occur where they are discharged to the environment occur, then differences in this parameter may be significant.
	Octanol-air partition coefficient		
	Organic carbon partition coefficient		
	Diffusivity in air and water		

Category	Factor That is Relevant if Materially Different Among Possible Alternatives	Relevant?	Basis
	Henry's law constant		
	Sorption coefficient for soil and sediment		
	Redox potential	No	Not expected to be a significant differentiator. Organic chemicals do not possess this property, and inorganic chemicals used are not significant redox agents (<i>i.e.</i> , in terms of being their defining property).
	Photolysis rates	Yes	Products all have a relatively short half-life in air, which is likely dominated by photolysis.
	Hydrolysis rates	Possibly	Should improper use or management occur where they are discharged to the environment occur, then differences in this parameter may be significant.
	Dissociation constants	Possibly	
	Reactivity including electrophilicity	No	Products are all chemically reactive as part of their function. To perform adequately they must be similarly reactive so this is not materially different among the products.
Product function and performance	Are there material differences in terms of the useful life of the product?	No	Product and alternatives have no practical shelf life limit.
	Are there material differences in terms of the function and performance of the product?	Yes	Not all alternatives perform the same; some may be limited to certain uses/substrates.
	Are there material differences in terms of the functional acceptability of the product?	No	Only functionally acceptable alternatives are being considered.
	Are there material differences in terms of the technical feasibility of the product?	No	Only technically feasible alternatives are being considered.
Economic impacts	Will the product and its alternatives have a different cost to consumers or other users?	Yes	Initial information suggests cost will be an important differentiator among products.

Notes:

CWA = Clean Water Act; CFC = Chlorofluorocarbon; CO₂ = Carbon Dioxide; Cr (VI) = Hexavalent Chromium; DMSO = Dimethyl Sulfoxide; GWP = Global Warming Potential; HFC = Hydrofluorocarbon; MCL = Maximum Contaminant Level; NO = Nitrous Oxide; NO_x = Nitrogen Oxide; ODS = Ozone Depleting Substance; ODP = Ozone Depletion Potential; PFC = Perfluorocarbon; PHG = Public Health Goal; RE = Responsible Entity; SCP = Safer Consumer Products; SF6 = Sulfur Hexafluoride; SO_x = Sulfur Dioxide; USCB = University of California, Santa Barbara; US EPA = US Environmental Protection Agency.

(a) For ease of reference, the term "products" is used here to refer to the priority product and its possible alternatives.

(b) US EPA, 2018.

(c) Any chemical can be reactive in biological systems (*e.g.*, water, oxygen). We interpret this to mean reactivity in some way not captured by the other health-related factors and having an effect that is harmful.

Table 4.2 Life Cycle Elements Considered in Evaluating Potential Exposures

Category	Element	Relevant?	Basis
Chemical quantity information	Would it change the quantities of the Chemical(s) of Concern or alternative replacement chemicals necessary to manufacture the product?	No	The product is a solvent-based material; the same volume of whatever solvent chemical is selected will be required.
	Would it change the quantities of the Chemical(s) of Concern or alternative replacement chemicals placed into the stream of commerce in California?	No	
Market presence of product	Would it change statewide sales of the product by volume?	No	Volumes of raw ingredients may change, but the volume of the actual product is unlikely to change substantially. Products that require consumers to purchase substantially more of the product for an equivalent performance are unlikely to be viable.
	Would it change statewide sales of the product by number of units?	No	
	Would it change the intended product use(s), and types and age groups of targeted customer base(s)?	No	The product and alternatives would have similar life cycle components and would be used the same way by the same groups.
Occurrence or potential occurrence of exposure	Will there be a difference in occurrence or potential occurrence of exposure to Candidate Chemicals in the product?	Yes	Some alternatives also contain candidate chemicals while others do not.
Household and workplace presence	Will the product be used in the home?	Yes	Methylene chloride-based paint removers will not be sold to nonprofessionals; other paint removers will be sold to nonprofessional DIYers who may use the product at home (in workshops, in the garage).
	Will the product be used in the workplace?	Yes	All paint removers can be expected to be used in workplaces.
Potential exposure	Are there differences in the manufacturing, use, storage, transportation, waste, or end-of-life management of the product and alternatives?	Yes	Use is expected to be different in terms of exposure potential; other life cycle elements may be relatively similar (e.g., production, transportation, waste management, etc.).
	Is the product manufactured, stored, or transported through California but not used in California?	No	The product is used in California.
	Is the product an intermediate product used to manufacture an exempted product?	No	The product is not an intermediate.
	Does the product have household use?	Yes	See above.
	Does the product have recreational use?	No	This is not a recreational product.
	Are there sensitive subpopulations that use the product and alternatives?	Yes	Sensitive populations include children, the elderly, and pregnant women. The latter two may use the product but are not the primary users.
	Is the product used in homes?	Yes	See above.

Category	Element	Relevant?	Basis
	Is the product used in schools?	Yes	Potentially used in schools by workers.
	Is the product used in workplaces?	Yes	See above.
	Is the product used in other unusual locations?	No	None are known to the responsible entities involved in this effort.
	Is there a difference in the frequency, extent, level, and duration of exposure potential for the product and its alternatives during use?	Yes	Some alternatives may require longer or multiple uses to achieve the same performance.
	Is there a difference in the frequency, extent, level, and duration of exposure potential for the product and its alternatives at end of life?	No	Products should all be disposed of <i>via</i> the same process.
	Is there a difference in how the candidate chemical is contained within the product and its alternatives?	No	All products are part of a multi-chemical liquid blend.
	Is there a difference in terms of engineering and administrative controls to reduce exposure among the product and its alternatives?	Yes	Methylene chloride paint removers are now prohibited for sale to nonprofessionals. All other paint removers can be sold to the general public. Methylene chloride paint removers have additional warning labels on the product that are not required for alternatives.
	Is there a difference in the potential of the candidate chemical and degradation products to release into, accumulate in, and persist in the environment?	No	This is not believed to be materially different among the products.

Notes:

DIY = Do-It-Yourself.

Table 4.3 Review of Freely Available LCA Models Noted in DTSC AA Guide

LCA Models (freely available)	Relevance to Current AA
Athena	Review of LCA data sets used as the source data for Athena Impact Estimator for Buildings does not include materials or chemicals related to paint removal. Rather, data are focused mainly on building and pavement materials (<i>e.g.</i> , concrete, gypsum, steel, cement, PVC, asphalt, <i>etc.</i>). Review of the Impact Estimator User Manual indicates maintenance of painted surfaces (<i>e.g.</i> , repainting, a process where paint removal may come into play) is only "partially" supported. Paint products are listed in Table 3 "IE4B product LCI database," but no further information is provided to indicate paint removal materials or chemicals are included. The user manual for the Pavement LCA program and Ecocalculator User Guides make no mention of paint or paint removal products.
Bees	Paint removal products and associated chemicals not evaluated in the "interiors", "interior finishes," "wall finishes to interior walls" product subcategory. Only virgin, reprocessed, or consolidated latex paint products are evaluated.
CA GREET 2.0	Not relevant - LCA models are specific for transportation products, namely vehicle fuel (ethanol, natural gas, jet fuel, <i>etc.</i>).
EASEWASTE	Not specific or relevant for the current AA. The EASEWASTE model focuses on waste generation, collection, treatment, disposal, and transport.
EIO-LCA	Paint and varnish removers are included in some modules (namely, the "paint and coating manufacturing" modules), but output is not reported on chemical-by-chemical basis so comparisons of potential alternative formulations are not possible.
GHGenius 3.15	This model is primarily focused on transportation fuels in Canada, and is therefore not considered relevant for the current AA.
GREET 2016 revision1	This model is primarily focused on various vehicle and fuel combinations, and is therefore not considered relevant for the current AA.
MSW-DST	This model focuses on evaluating cost and environmental aspects associated with specific strategies for managing municipal solid waste. Paint removal product formulation or chemical ingredients are not individually evaluated and therefore this model is not considered relevant for the current AA.
NREL U.S. Life cycle Inventory	While some life cycle information is reported related to paints and coatings, which is said to include paint and varnish removers, no information specific for the chemicals under review was identified in this database.
TRACI	Quantitative life cycle data for almost all of the chemicals under review (not including any of the caustics) were identified in the TRACI database. Model was used to evaluate paint removers and results summarized in the UCSB study (Burns <i>et al.</i> , 2016).
WaRM	This model was developed to help solid waste planner to track and report green house gas emissions reductions, energy savings, and economic impacts associated with various waste management practices. Therefore it is not considered relevant for our purposes.

Notes:

AA = Alternatives Assessment; DTSC = California Dept. of Toxic Substances Control; LCA = Life Cycle Assessment; UCSB = University of California, Santa Barbara.

Table 4.4 Manufacturing Information for
Priority Product and Alternative Chemicals

	DCM (CAS 75-09-2)	2-Butoxyethanol (CAS 111-76-2)	Acetone (CAS 67-64-1)	Methanol (CAS 67-56-1)	Toluene (CAS 108-88-3)	Dimethyl glutarate (CAS 1119-40-0)	Dimethyl succinate (CAS 106-65-0)	Dimethyl adipate (CAS 627-93-0)	Benzyl alcohol (CAS 100-51-6)	Sodium hydroxide (CAS 1310-73-2)
Product Group ->	1 and 2	1	2 and 3	1, 2 and 3	2 and 3	4	4	4	5	6
Production Process	Methylene chloride is produced by first reacting hydrogen chloride and methanol to give methyl chloride. Excess methyl chloride is then mixed with chlorine , resulting in methylene chloride, chloroform, and carbon tetrachloride as coproducts. Hydrogen chloride is produced by the direct reaction of hydrogen and chlorine, by reaction of metal chlorides and acids, and as a by-product from many chemical manufacturing processes such as chlorinated hydrocarbons. Methanol is produced by catalytic conversion of carbon monoxide and hydrogen.	2-Butoxyethanol is produced by reaction of ethylene oxide with a suitable alcohol and various catalysts (not specified), or by reacting ethylene chlorohydrin and ethylene glycol with sodium hydroxide and dialkyl sulfide. Ethylene oxide is produced by the oxidation of ethylene in air or oxygen with a silver catalyst, or the action of an alkali on ethylene chlorohydrin. Ethylene chlorohydrin is made from ethylene by the action of a hypochlorite. Ethylene glycol is produced from the hydrolysis of ethylene oxide. Sodium hydroxide is produced industrially by the electrolysis of sodium chloride, yielding sodium hydroxide solution, chlorine, and hydrogen.	Acetone is mainly produced worldwide as a coproduct of cumene oxidation. Cumene is produced from propene (propane content >5%) and benzene, on a fixed bed of polyphosphoric acid on a silica support.	Methanol is produced by catalytic conversion of carbon monoxide and hydrogen.	Toluene is mainly extracted from crude petroleum distillates, as products from the pyrolysis of hydrocarbons (steam cracking), or as products from the pyrolysis of coal, lignite, etc.	Dimethyl glutarate is produced via esterification of methanol and glutaric acid. Glutaric acid is manufactured from the oxidation of cyclopentanone).	Dimethyl succinate is produced by esterification of succinic acid in benzene solution in the presence of concentrated sulfuric acid. Succinic acid appears to have many possible synthesis pathways.	Dimethyl adipate is manufactured by the esterification of adipic acid with methanol. Adipic acid is produced via oxidation of cyclohexane, cyclohexanol, or cyclohexanone with air or nitric acid .	Benzyl alcohol is produced via hydrolysis of benzyl chloride, or from benzaldehyde. Benzyl chloride is formed by passing chlorine over toluene. Benzaldehyde is formed via oxidation of toluene.	Sodium hydroxide is produced industrially by the electrolysis of sodium chloride, yielding sodium hydroxide solution, chlorine, and hydrogen.
Precursor Fossil Fuel Based?	Yes. Carbon monoxide is derived from "producer gas" that is obtained from coal or natural gas.	Yes, in part, ethylene is typically derived from natural gas.	Yes, both benzene and propene would be typically derived from fossil fuel materials.	Yes. Methanol is produced from carbon monoxide which is derived from "producer gas" that is obtained from coal or natural gas.	Yes, as noted above, toluene is typically produced from fossil fuel sources.	Yes, in part. Methanol is produced from carbon monoxide which is derived from "producer gas" that is obtained from coal or natural gas.	Unclear. The alcohol could be produced from bio-based sources or alternatively from petroleum feedstocks.	Unclear, cyclohexane and related compounds are likely produced via fossil fuels. Unclear if bio-based feedstocks could be/are used.	Yes, toluene is typically obtained form fossil fuel based sources.	No. Produced via hydrolysis of sodium chloride.
Other notable chemicals involved in production	Chlorine, acids	Chlorine, Sodium hydroxide (possibly)	Phosphoric acid				Sulfuric acid	Nitric acid	Chlorine	

Notes:
DCM = Dichloromethane (Methylene Chloride); DMSO = Dimethyl Sulfoxide.
Source: National Library of Medicine, Hazardous substance data bank.

Table 4.4 Manufacturing Information for
Priority Product and Alternative Chemicals

	Calcium hydroxide (CAS 1305-62-0)	Potassium hydroxide (CAS 1310-58-3)	Magnesium hydroxide (CAS 1309-42-8)	Dimethyl formamide (CAS 68-12-2)	Dimethyl carbonate (CAS 616-38-6)	Cyclohexanone (CAS 108-94-1)	1,3-Dioxolane (CAS 646-06-0)	DMSO (CAS 67-68-5)	Methyl acetate (CAS 79-20-9)
Product Group ->	6	6	6	7	7	7	8	8	8
Production Process	Calcium hydroxide is formed by adding water to calcium oxide (lime).	Potassium hydroxide is produced industrially by the electrolysis of potassium chloride.	Magnesium hydroxide is formed from magnesium chloride or sulfate and sodium hydroxide.	Dimethyl formamide is produced by reacting carbon monoxide with N,N-dimethylamine. Dimethylamines are commercially produced by reacting methanol with ammonia over an amorphous silica-alumina catalyst.	Dimethyl carbonate is produced via the reaction of methanol and phosgene or methyl chloroformate in the presence of concentrated sodium hydroxide. Phosgene is produced by reacting carbon monoxide with chlorine gas. Aliphatic chloroformic esters (e.g. , chloroformate) are produced by reacting the alcohol with phosgene.	Cyclohexanone is produced by catalytic hydrogenation of phenol, or by oxidation of cyclohexane. Cyclohexane is obtained in the distillation of petroleum. Phenol is mostly produced in the US by the oxidation of cumene.	1,3-Dioxolane is produced by reacting ethylene glycol with carbonyl compounds (e.g. formaldehyde). Ethylene glycol is produced from the hydrolysis of ethylene oxide. Formaldehyde is prepared by oxidation of methanol.	DMSO is produced by the oxidation of dimethyl sulfide and oxygen or nitrogen dioxide. Dimethyl sulfide is obtained by distilling potassium methyl sulfate with concentrated aqueous potassium sulfide.	Methyl acetate is produced from methanol and acetic acid in the presence of sulfuric acid. Acetic acid is made by methanol carbonylation, acetaldehyde oxidation, butane/naphtha oxidation, or methyl acetate carbonylation. Sulfuric acid is produced from sulfur, pyrite, hydrogen sulfide, or sulfur-containing smelter gases.
Precursor Fossil Fuel Based?	No. Produced from lime.	No. Produced via hydrolysis of potassium chloride.	No, formed from chloride or sulfate salts.	Yes, carbon monoxide appears to be a base product. This is produced from producer gas which is obtained from coal or natural gas.	Yes, in part. Methanol and phosgene are produced from carbon monoxide which is obtained via coal or natural gas.	Yes, base products appear to be derived from fossil fuel-based precursors.	Yes, both methanol (via carbon monoxide and producer gas) and ethylene oxide (via ethylene) appear to be fossil fuel derived.	No.	Possibly. Several of the feedstocks appear likely to be fossil fuel derived.
Other notable chemicals involved in production			Sodium hydroxide	Ammonia	Chlorine		Formaldehyde (possibly)	Dimethyl sulfide	Sulfuric acid

Notes:
DCM = Dichloromethane (Methylene Chloride); DMSO = Dimethyl Sulfoxide.
Source: National Library of Medicine, Hazardous substance data bank.

Table 5.1 Sources of Hazard Information Used in Tables 5.2 to 5.4

Hazard Concern	Source	Notes
Acute Mammalian Toxicity	ECHA dossier, GHS classification and study data/Proposition 65 list	Based on GHS classification listed in ECHA dossier assuming data in dossier support classification. Proposition 65 list checked for carcinogens or reproductive toxicants.
Carcinogenicity		
Eye Irritation/Corrosion		
Skin Irritation/Corrosion		
Mutagenicity		
Target Organ Toxicity – Single Exposure		
Target Organ Toxicity – Repeated Exposure		
Reproductive Toxicity		
Developmental Toxicity		
Sensitizer – Respiration		
Sensitizer – Skin		
Neurotoxicity	HSDB review	Text reviewed to determine if health effect was cited. Scored D if discussed in the document, nd if not discussed.
Respiratory Toxicity		
Cardiovascular Toxicity		
Epigenetic Toxicity		
Hematotoxicity		
Reactive in Biol Systems		
Hepatotoxicity/Digestive System Toxicity		
Immunotoxicity		
Musculoskeletal Toxicity		
Nephrotoxicity		
Ototoxicity		
Aquatic Toxicity – Acute	ECHA dossier, GHS classification and study data	Based on GHS classification listed in ECHA dossier assuming data in dossier support classification.
Aquatic Toxicity – Chronic		
Terrestrial Toxicity	ECHA dossier study data	
Endocrine Activity	EU list of candidate chemicals	Candidate chemicals for evaluation to establish a priority list.
Bioaccumulative	EpiSuite	Calculated from low Kow (log Kow > 4).
Persistent	EpiSuite	Based on NICNAS criteria using water, soil, and sediment half-life.
Ozone Depleting Substance (ODS)	US EPA list of ODSs	
Direct Global Warming Contributor	IPCC Report 5 list of GWP values	
Flammable Liquid	ECHA dossier, GHS classification	
VOC Contributing to Tropospheric Ozone Formation	US EPA and CARB lists	If listed as exempt, scored "No, exempt," otherwise scored "Yes" if an organic compound.
Status as a California Air Toxics Contaminant	OEHHA Current List of Toxic Air Contaminants	
Existence of an MCL, PHG, Notification Level or CA CWA Pollutant or Priority Pollutant	Relevant Agency websites.	

Notes:

CARB= California Air Resources Board; ECHA = European Chemicals Agency; GHS = Globally Harmonized System; HSDB = Hazardous Substances Data Bank; IPCC = Intergovernmental Panel on Climate Change; NICNAS = National Industrial Chemicals Notification and Assessment Scheme; US EPA = United States Environmental Protection Agency; VOC = Volatile Organic Compound.

Table 5.2 Data for Relevant Factors – Human Health

Product Group	DCM and Potential Replacement	Acute Mammalian Toxicity	Carcinogenicity	Eye Irritation/ Corrosion	Skin Irritation/ Corrosion	Germ Cell Mutagenicity	Target Organ Toxicity – Single Exposure	Target Organ Toxicity – Repeated Exposure	Reproductive Toxicity	Developmental Toxicity (incl. neuro- developmental)	Sensitizer – Respiration	Sensitizer – Skin	Candidate Endocrine Active Chemical	California Toxic Air Contaminant	MCL	Public Health Goals	California Clean Water Act Priority Pollutants	California Clean Water Act Pollutants	Drinking Water Notification Levels
1	DCM (CAS 75-09-2)	Oral/ Dermal/Inhalation: Not Classified	Cat 2/Prop65	Cat 2	Cat 2	Not Classified	Cat 3	Not Classified	Not Classified	Not Classified	DG	Not Classified	No	Yes	Yes	Yes	Yes	Yes	No
	Methanol (CAS 67-56-1)	Oral: Cat 3 Dermal: Cat 3 Inhalation: Cat 3	Not Classified	Not Classified	Not Classified	Not Classified	Cat 1	Not Classified	Not Classified	Prop65	DG	Not Classified	No	No	No	No	No	No	No
	2-Butoxyethanol (CAS 111-76-2)	Oral: Cat 4 Dermal: Not Classified Inhalation: Not Classified	Not Classified	Cat 2	Cat 2	Not Classified	Not Classified	Not Classified	Not Classified	Not Classified	DG	Not Classified	No	No	No	No	No	No	No
2	DCM (CAS 75-09-2)	Oral/ Dermal/Inhalation: Not Classified	Cat 2/Prop65	Cat 2	Cat 2	Not Classified	Cat 3	Not Classified	Not Classified	Not Classified	DG	Not Classified	No	Yes	Yes	Yes	Yes	Yes	No
	Acetone (CAS 67-64-1)	Oral/ Dermal/Inhalation: Not Classified	Not Classified	Cat 2	Not Classified	Not Classified	Cat 3	Not Classified	Not Classified	Not Classified	DG	Not Classified	No	No	No	No	No	No	No
	Methanol (CAS 67-56-1)	Oral: Cat 3 Dermal: Cat 3 Inhalation: Cat 3	Not Classified	Not Classified	Not Classified	Not Classified	Cat 1	Not Classified	Not Classified	Prop65	DG	Not Classified	No	No	No	No	No	No	No
	Toluene (CAS 108-88-3)	Oral/ Dermal/Inhalation: Not Classified	Not Classified	Not Classified	Cat 2	Not Classified	Cat 3	Cat 2	Not Classified	Cat 2/Prop65	DG	Not Classified	No	No	Yes	Yes	Yes	Yes	No
3	Acetone (CAS 67-64-1)	Oral/ Dermal/Inhalation: Not Classified	Not Classified	Cat 2	Not Classified	Not Classified	Cat 3	Not Classified	Not Classified	Not Classified	DG	Not Classified	No	No	No	No	No	No	No
	Methanol (CAS 67-56-1)	Oral: Cat 3 Dermal: Cat 3 Inhalation: Cat 3	Not Classified	Not Classified	Not Classified	Not Classified	Cat 1	Not Classified	Not Classified	Prop65	DG	Not Classified	No	No	No	No	No	No	No
	Toluene (CAS 108-88-3)	Oral/ Dermal/Inhalation: Not Classified	Not Classified	Not Classified	Cat 2	Not Classified	Cat 3	Cat 2	Not Classified	Cat 2/Prop65	DG	Not Classified	No	No	Yes	Yes	Yes	Yes	No
4	Dimethyl glutarate (CAS 1119-40-0)	Oral/ Dermal/Inhalation: Not Classified	DG	Not Classified	Not Classified	Not Classified	Not Classified	Not Classified	Not Classified	Not Classified	DG	Not Classified	No	No	No	No	No	No	No
	Dimethyl succinate (CAS 106-65-0)	Oral/ Dermal/Inhalation: Not Classified	DG	Not Classified	Not Classified	Not Classified	Not Classified	Not Classified	Not Classified	Not Classified	DG	Not Classified	No	No	No	No	No	No	No
	Dimethyl adipate (CAS 627-93-0)	Oral/ Dermal/Inhalation: Not Classified	DG	Not Classified	Not Classified	Not Classified	Not Classified	Not Classified	Not Classified	Not Classified	DG	Not Classified	No	No	No	No	No	No	No
5	Benzyl alcohol (CAS 100-51-6)	Oral: Cat 4 Dermal: DG Inhalation: Cat 4	Not Classified	Cat 2	Not Classified	Not Classified	Not Classified	Not Classified	Not Classified	Not Classified	DG	Not Classified	No	No	No	No	No	No	No
6	Sodium hydroxide (CAS 1310-73-2)	Oral/ Dermal/Inhalation: Not Classified	DG	Cat 1**	Cat 1A**	Not Classified	Not Classified	Not Classified	Not Classified	Not Classified	DG	Not Classified	No	No	No	No	No	No	No
	Magnesium hydroxide (CAS 1309-42-8)	Not Classified	Not Classified	Not Classified	Not Classified	Not Classified	Not Classified	Not Classified	Not Classified	Not Classified	DG	Not Classified	No	No	No	No	No	No	No
	Potassium hydroxide (CAS 1310-58-3)	Oral: Cat 4 Dermal: Not Classified Inhalation: Not Classified	Not Classified	Cat 1**	Cat 1A**	Not Classified	Not Classified	Not Classified	Not Classified	Not Classified	DG	Not Classified	No	No	No	No	No	No	No
	Calcium hydroxide (CAS 1305-62-0)	Oral/ Dermal/Inhalation: Not Classified	Not Classified	Cat 1**	Cat 2**	Not Classified	Cat 3	Not Classified	Not Classified	Not Classified	DG	Not classified	No	No	No	No	No	No	No
7	2-(Methoxymethylethoxy) propanol (CAS 34590-94-8)	Not Classified	Not Classified***	Not Classified	Not Classified	Not Classified	Not Classified	Not Classified	Not Classified***	Not Classified		Not classified	No	No	No	No	No	No	No
	Acetone (CAS 67-64-1)	Oral/ Dermal/Inhalation: Not Classified	Not Classified	Cat 2	Not Classified	Not Classified	Cat 3	Not Classified	Not Classified	Not Classified	DG	Not Classified	No	No	No	No	No	No	No
	Cyclohexanone (CAS 108-94-1)	Oral: Cat 4 Dermal: Cat 4 Inhalation: Cat 4	Not Classified	Cat 1	Cat 2	Not Classified	Not Classified	Not Classified	Not Classified	Not Classified	DG	Not Classified	No	No	No	No	No	No	No
	Dimethyl carbonate (CAS 616-38-6)	Oral/ Dermal/Inhalation: Not Classified	DG	Not Classified	Not Classified	Not Classified	Not Classified	Not Classified	Not Classified	Not Classified	DG	Not Classified	No	No	No	No	No	No	No
	Dimethyl formamide (CAS 68-12-2)	Oral: Not Classified Dermal: Cat 4 Inhalation: Cat 4	Prop65	Cat 2	Not Classified	Not Classified	Not Classified	Not Classified	Cat 1B	Cat 1B	DG	Not Classified	Yes	No	No	No	No	No	No
	Methyl acetate (CAS 79-20-9)	Oral/ Dermal/Inhalation: Not Classified	DG***	Cat 2	Not Classified	Not Classified	Cat 3	Not Classified	Not Classified	Prop65?****	DG	Not Classified	No	No	No	No	No	No	No
8	1,3-Dioxolane (CAS 646-06-0)	Oral/ Dermal/Inhalation: Not Classified	Not Classified	Cat 2	Not Classified	Not Classified	Cat 3*	Not Classified	Not Classified	1B	DG	Not Classified	No	No	No	No	No	No	No
	DMSO (CAS 67-68-5)	Oral/ Dermal/Inhalation: Not Classified	DG	Not Classified	Not Classified	Not Classified	Not Classified	Not Classified	Not Classified	Not Classified	DG	Not Classified	No	No	No	No	No	No	No
	Methyl acetate (CAS 79-20-9)	Oral/ Dermal/Inhalation: Not Classified	DG****	Cat 2	Not Classified	Not Classified	Cat 3	Not Classified	Not Classified	Prop65?****	DG	Not Classified	No	No	No	No	No	No	No
Potentially Relevant Factor?		yes	yes	yes	yes	no	yes	yes	yes	yes	no	no	yes	yes	yes	yes	yes	yes	no

Table 5.2 Data for Relevant Factors – Human Health

Product Group	DCM and Potential Replacement	Neurotoxicity	Develop- mental Neurotoxicity	Respiratory Toxicity	Cardiovascular Toxicity	Epigenetic Toxicity	Hematotoxicity	Reactive in Biol Systems	Hepatotoxicity/ Digestive System Toxicity	Immunotoxicity	Musculoskeletal Toxicity	Nephrotoxicity	Ototoxicity
1	DCM (CAS 75-09-2)	D	D	D	D	nd	D	nd	D	nd	nd	D	D
	Methanol (CAS 67-56-1)	D	D	D	D	nd	D	nd	D	nd	nd	D	nd
	2-Butoxyethanol (CAS 111-76-2)	D	nd	D	D	nd	D	nd	D	D	D	D	nd
2	DCM (CAS 75-09-2)	D	D	D	D	nd	D	nd	D	nd	nd	D	D
	Acetone (CAS 67-64-1)	D	D	D	nd	nd	D	nd	D	D	nd	D	nd
	Methanol (CAS 67-56-1)	D	D	D	D	nd	D	nd	D	nd	nd	D	nd
	Toluene (CAS 108-88-3)	D	nd	D	D	nd	nd	nd	D	D	nd	D	nd
3	Acetone (CAS 67-64-1)	D	D	D	nd	nd	D	nd	D	D	nd	D	nd
	Methanol (CAS 67-56-1)	D	D	D	D	nd	D	nd	D	nd	nd	D	nd
	Toluene (CAS 108-88-3)	D	nd	D	D	nd	nd	nd	D	D	nd	D	nd
4	Dimethyl glutarate (CAS 1119-40-0)	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
	Dimethyl succinate (CAS 106-65-0)	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
	Dimethyl adipate (CAS 627-93-0)	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
5	Benzyl alcohol (CAS 100-51-6)	D	D	D	nd	nd	nd	nd	nd	nd	D	nd	nd
6	Sodium hydroxide (CAS 1310-73-2)	nd	nd	D	nd	nd	nd	nd	nd	nd	nd	nd	nd
	Magnesium hydroxide (CAS 1309-42-8)	D	nd	D	nd	nd	nd	nd	nd	nd	nd	nd	nd
	Potassium hydroxide (CAS 1310-58-3)	nd	nd	D	nd	nd	nd	nd	D	nd	nd	nd	D
	Calcium hydroxide (CAS 1305-62-0)	D	nd	D	nd	nd	nd	nd	D	nd	nd	D	nd
7	2-(Methoxymethylethoxy) propanol (CAS 34590-94-8)	D	nd	D	nd	nd	nd	nd	D	nd	nd	nd	nd
	Acetone (CAS 67-64-1)	D	D	D	nd	nd	D	nd	D	D	nd	D	nd
	Cyclohexanone (CAS 108-94-1)	D	D	D	nd	nd	nd	nd	D	nd	nd	D	nd
	Dimethyl carbonate (CAS 616-38-6)	nd	D	nd	nd	nd	nd	nd	nd	D	nd	nd	nd
	Dimethyl formamide (CAS 68-12-2)	nd	nd	D	D	nd	nd	nd	D	D	nd	D	nd
	Methyl acetate (CAS 79-20-9)	D	D	D	nd	nd	D	nd	nd	nd	nd	nd	nd
8	1,3-Dioxolane (CAS 646-06-0)	D	D	D	nd	nd	nd	nd	D	D	nd	D	nd
	DMSO (CAS 67-68-5)	D	D	nd	nd	nd	D	nd	D	D	nd	nd	nd
	Methyl acetate (CAS 79-20-9)	D	D	D	nd	nd	D	nd	nd	nd	nd	nd	nd
Potentially Relevant Factor?		Possibly	Possibly	Possibly	Possibly	Possibly	Possibly	no	Possibly	Possibly	Possibly	Possibly	Possibly

Notes:
D = discussed as a potential hazard; DCM = Dichloromethane (Methylene Chloride); DG = Data Gap; DMSO = Dimethyl Sulfoxide; nd = not discussed as a potential hazard.
Possibly - based on HSDB information, would need to be examined in greater detail in Stage 2.
Group 7 products contain a range of chemistries, chemicals which are the predominant chemicals are shown but are not present in all products.
* Central nervous system effects occur although at very high doses in the relevant study.
** Irritant effects are highly dependent on concentration and appear pH mediated.
*** Based on studies of very close surrogate propylene glycol (the key ingredient is also called dipropylene glycol).
**** The ECHA dossier notes the methyl acetate is rapidly and completely converted in the body to methanol, which is a Prop65-listed reproductive toxicant (although methyl acetate is not). Similarly, methanol is listed as "not classified" for carcinogenicity. Methyl acetate was evaluated using best and worst case assumptions.

Table 5.3 Data for Relevant Factors – Ecological Health

Product Group	DCM and Potential Replacement Ingredient(s) for DCM	Aquatic Toxicity – Acute	Aquatic Toxicity – Chronic	Terrestrial Toxicity	Bioaccumulative (Kow > 4)	Persistent
1	DCM (CAS 75-09-2)	Cat 3	Not Classified	DG	No	Yes
	Methanol (CAS 67-56-1)	Not Classified	Not Classified	Low	No	No
	2-Butoxyethanol (CAS 111-76-2)	Not Classified	Not Classified	DG	No	No
2	DCM (CAS 75-09-2)	Cat 3	Not Classified	DG	No	No
	Acetone (CAS 67-64-1)	Not Classified	Not Classified	Low	No	No
	Methanol (CAS 67-56-1)	Not Classified	Not Classified	Low	No	No
	Toluene (CAS 108-88-3)	Not Classified	Cat 2	DG	No	No
3	Acetone (CAS 67-64-1)	Not Classified	Not Classified	Low	No	No
	Methanol (CAS 67-56-1)	Not Classified	Not Classified	Low	No	No
	Toluene (CAS 108-88-3)	Not Classified	Cat 2	DG	No	No
4	Dimethyl glutarate (CAS 1119-40-0)	Cat 3	Not Classified	DG	No	No
	Dimethyl succinate (CAS 106-65-0)	Cat 3	Not Classified	DG	No	No
	Dimethyl adipate (CAS 627-93-0)	Cat 3	Not Classified	DG	No	No
5	Benzyl alcohol (CAS 100-51-6)	Not Classified	Not Classified	DG	No	No
6	Sodium hydroxide (CAS 1310-73-2)	Cat 3	Not Classified	DG	No	No
	Magnesium hydroxide (CAS 1309-42-8)	Not Classified	Not Classified	DG	No	No
	Potassium hydroxide (CAS 1310-58-3)	Cat 3	Not Classified	DG	No	No
	Calcium hydroxide (CAS 1305-62-0)	Cat 3	Not Classified	Low	No	No
7	2-(Methoxymethylethoxy) propanol (CAS 34590-94-8)	Not Classified	Not Classified	DG	No	No
	Acetone (CAS 67-64-1)	Not Classified	Not Classified	Low	No	No
	Cyclohexanone (CAS 108-94-1)	Not Classified	Not Classified	DG	No	No
	Dimethyl carbonate (CAS 616-38-6)	Not Classified	Not Classified	DG	No	No
	Dimethyl formamide (CAS 68-12-2)	Not Classified	Not Classified	DG	No	No
	Methyl acetate (CAS 79-20-9)	Not Classified	Not Classified	DG	No	No
8	1,3-Dioxolane (CAS 646-06-0)	Cat 3	Not Classified	DG	No	No
	DMSO (CAS 67-68-5)	Not Classified	Not Classified	Low	No	No
	Methyl acetate (CAS 79-20-9)	Not Classified	Not Classified	DG	No	No
	Potentially Relevant Factor?	yes	yes	no	no	no

Notes:

DCM = Dichloromethane (Methylene Chloride); DG = Data Gap; DMSO = Dimethyl Sulfoxide.

Group 7 products contain a range of chemistries, chemicals which are the predominant chemicals are shown but are not present in all products.

Table 5.4 Data For Relevant Factors – Physical/Chemical Hazards

Product Group	DCM and Potential Replacement	Ozone Depleting Substance	Direct Global Warming Contributor	Flammable Liquid	VOC Contributing to Tropospheric Ozone Formation
1	DCM (CAS 75-09-2)	No	Yes, GWP = 9*	Not Classified	No, exempt**
	Methanol (CAS 67-56-1)	No	No	Cat 2	Yes
	2-Butoxyethanol (CAS 111-76-2)	No	No	Not Classified	Yes
2	DCM (CAS 75-09-2)	No	Yes, GWP = 9*	Not Classified	No, exempt**
	Acetone (CAS 67-64-1)	No	No	Cat 2	No, exempt**
	Methanol (CAS 67-56-1)	No	No	Cat 2	Yes
	Toluene (CAS 108-88-3)	No	No	Cat 2	Yes
3	Acetone (CAS 67-64-1)	No	No	Cat 2	No, exempt**
	Methanol (CAS 67-56-1)	No	No	Cat 2	Yes
	Toluene (CAS 108-88-3)	No	No	Cat 2	Yes
4	Dimethyl glutarate (CAS 1119-40-0)	No	No	Not Classified	No, exempt***
	Dimethyl succinate (CAS 106-65-0)	No	No	Not Classified	No, exempt**
	Dimethyl adipate (CAS 627-93-0)	No	No	Not Classified	No, exempt**
5	Benzyl alcohol (CAS 100-51-6)	No	No	Not Classified	Yes
6	Sodium hydroxide (CAS 1310-73-2)	No	No	Not Classified	No, inorganic
	Magnesium hydroxide (CAS 1309-42-8)	No	No	Not Classified	No, inorganic
	Potassium hydroxide (CAS 1310-58-3)	No	No	Not Classified	No, inorganic
	Calcium hydroxide (CAS 1305-62-0)	No	No	Not Classified	No, inorganic
7	2-(Methoxymethylethoxy) propanol (CAS 34590-94-8)	No	No	Not Classified	Yes
	Acetone (CAS 67-64-1)	No	No	Cat 2	No, exempt**
	Cyclohexanone (CAS 108-94-1)	No	No	Cat 3	Yes
	Dimethyl carbonate (CAS 616-38-6)	No	No	Cat 2	No, exempt**
	Dimethyl formamide (CAS 68-12-2)	No	No	Cat 3	Yes
	Methyl acetate (CAS 79-20-9)	No	No	Cat 2	No, exempt**
8	1,3-Dioxolane (CAS 646-06-0)	No	No	Cat 2	Yes
	DMSO (CAS 67-68-5)	No	No	Not Classified	Yes
	Methyl acetate (CAS 79-20-9)	No	No	Cat 2	No, exempt**
	Potentially Relevant Factor?	No	no	yes	yes

Notes:

DCM Dichloromethane (Methylene Chloride); DMSO = Dimethyl Sulfoxide; GWP = Global Warming Potential; VOC = Volatile Organic Compound.

Group 7 products contain a range of chemistries, chemicals which are the predominant chemicals are shown but are not present in all products.

* Considered negligible; greenhouse gases targeted for elimination typically have GWP > 150.

** Exempt under federal regulations.

*** Exempt under California Air Resources Board regulations as low vapor pressure VOCs.

Table 5.5 Determination of Persistence Classification Using NICNAS Criteria

Compound	Half-life Hour			Half-life Months			Persistent?
	Water	Soil	Sediment	Water	Soil	Sediment	
1,3-Dioxolane	360	720	3,240	0.50	1.00	4.50	No
2-(Methoxymethylethoxy) propanol	360	720	3,240				
2-Butoxyethanol	208	416	1,870	0.29	0.58	2.60	No
Acetone	360	720	3,240	0.50	1.00	4.50	No
Benzyl alcohol	360	720	3,240	0.50	1.00	4.50	No
Cyclohexanone	360	720	3,240	0.50	1.00	4.50	No
DCM	900	1,800	8,100	1.25	2.50	11.25	Yes
Dimethyl adipate	360	720	3,240	0.50	1.00	4.50	No
Dimethyl carbonate	360	720	3,240	0.50	1.00	4.50	No
Dimethyl formamide	360	720	3,240	0.50	1.00	4.50	No
Dimethyl glutarate	360	720	3,240	0.50	1.00	4.50	No
Dimethyl succinate	360	720	3,240	0.50	1.00	4.50	No
DMSO	360	720	3,240	0.50	1.00	4.50	No
Methanol	208	416	1,873	0.29	0.58	2.60	No
Methyl acetate	360	720	3,240	0.50	1.00	4.50	No
Toluene	360	720	3,240	0.50	1.00	4.50	No

Notes:

DCM = Dichloromethane (Methylene Chloride); DMSO = Dimethyl Sulfoxide.

Half-life data taken from EpiSuite. Refer to table 5.14.

Persistence classification is based on National Industrial Chemicals Notification and Assessment Scheme (NICNAS) criteria which classify chemicals as persistent if the half-life of the chemical in water is greater than two months, or that its half-life in soil is greater than six months, or that its half-life in sediment is greater than six months.

Table 5.6 Typical Concentrations of Key Ingredients in Paint Remover Products

Group	Key Ingredients	Typical Concentration
1	DCM	75%
	Methanol	10%
	2-Butoxyethanol	5%
2	DCM	30%
	Acetone	20%
	Methanol	20%
	Toluene	20%
3	Acetone	40%
	Toluene	25%
	Methanol	20%
4	Dimethyl glutarate	25%
	Dimethyl succinate	15%
	Dimethyl adipate	15%
5	Benzyl alcohol	40%
6	Sodium hydroxide	9%
	Magnesium hydroxide	15%
	Potassium hydroxide	Not disclosed
	Calcium hydroxide	20%
7	2 Methoxmethylethoxypropanol	up to 60% (1 product)
	Acetone	up to 60% (1 product)
	Cyclohexanone	up to 30% (1 product)
	Dimethyl formamide	up to 44% (2 products)
	Methyl acetate	up to 40% (1 product)
8	1,3-Dioxolane	20%
	DMSO	20%
	Methyl acetate	60%

Notes:

DCM = Dichloromethane (Methylene Chloride); DMSO = Dimethyl Sulfoxide.

Table 5.7 Scoring Matrix – Human Health Endpoints

Hazard Endpoint	Classification	Concentration in Product			
		< 10%	10-29%	30-59%	60-100%
Carcinogenicity	Cat 1	100	100	100	100
	Cat 2/Prop65	75	75	75	75
	Data gap	25	25	50	50
Acute Toxicity	Cat 1	75	75	100	100
	Cat 2	50	50	75	75
	Cat 3	10	25	50	50
	Cat 4	5	5	10	10
	Data gap	5	10	25	50
Mutagenicity	Cat 1	50	50	50	50
	Cat 2	25	25	25	25
	Data gap	25	25	50	50
Reproductive Toxicity	Cat 1	50	50	50	50
	Cat 2/Prop65	25	25	25	25
	Data gap	25	25	50	50
Developmental Toxicity	Cat 1	50	50	50	50
	Cat 2/Prop65	25	25	25	25
	Data gap	25	25	50	50
Endocrine	EU priority list	25	25	25	25
	Data gap	NA	NA	NA	NA
Systemic toxicity/organ toxicity Single Dose	Cat 1	25	25	50	50
	Cat 2	10	10	25	25
	Cat 3	5	5	15	15
	Cat 4	0	0	5	5
	Data gap	5	10	25	50
Systemic toxicity/organ toxicity Repeated Dose	Cat 1	25	25	50	50
	Cat 2	10	10	25	25
	Cat 3	5	5	15	15
	Cat 4	0	0	5	5
	Data gap	5	10	25	50
Skin sensitizer	Cat 1/2	25	25	50	50
Respiratory sensitizer	Cat 1/2	25	25	50	50
	Data gap	0	0	0	0
Eye Irritant	Cat 1	5	10	25	25
	Cat 2	5	5	10	10
	Data gap	5	10	25	50
Skin irritant	Cat 2	5	10	25	25
	Cat 2	5	5	10	10
	Data gap	5	10	25	50
Not required to be classified		0	0	0	0

Notes:

NA = Not Applicable.

Table 5.8 Scoring Matrix – Ecological Health Endpoints

Hazard Endpoint	Classification	Concentration in Product			
		< 10%	10-29%	30-59%	60-100%
Acute Aquatic Toxicity	Cat 1	25	50	75	100
	Cat 2	10	25	50	75
	Cat 3	5	10	25	50
	Data gap	10	25	50	75
Chronic Aquatic Toxicity	Cat 1	25	50	75	100
	Cat 2	10	25	50	75
	Cat 3	5	10	25	50
	Data gap	10	25	50	75
Terrestrial Toxicity	Yes/No	25	50	75	100
	Data gap	0	0	0	0
Bioaccumulative	Yes/No	50	50	50	50
	Data gap	NA, calculable from log kow			
Persistent	Yes/No	50	50	50	50
	Data gap	NA, calculable from Pchem data			
Not required to be classified		0	0	0	0

Notes:

NA = Not Applicable.

Table 5.9 Scoring Matrix – Physical/Chemical Hazards

Hazard Endpoint	Classification	Concentration in Product			
		< 10%	10-29%	30-59%	60-100%
Ozone Depletion Potential	Yes	50	50	50	50
Direct Global Warming Contributor	Yes	10	25	50	75
Flammable Liquid	Cat 1	25	50	75	100
	Cat 2	10	25	50	75
	Cat 3	5	10	25	50
VOC Contributing to Tropospheric Ozone Formation	Yes	10	25	50	75
	Data gap	25	25	25	25
"No" for any category		0	0	0	0

Notes:

VOC = Volatile Organic Compound.

Table 5.10 Scoring Comparison of Human Health Hazards

Product Group	DCM and Potential Replacement Ingredient(s) for DCM	Typical Percentage Range in Product (% by weight)	Score	Human Health											
				Acute Mammalian Toxicity	Carcinogenicity	Eye Irritation/Corrosion	Skin Irritation/Corrosion	Germ Cell Mutagenicity	Target Organ Toxicity – Single Exposure	Target Organ Toxicity – Repeated Exposure	Reproductive Toxicity	Developmental Toxicity	Sensitizer – Respiration	Sensitizer – Skin	Candidate Endocrine Active Chemical
1	DCM (CAS 75-09-2)	75		Oral/ Dermal/Inhalation: Not Classified	Cat 2/Prop65	Cat 2	Cat 2	Not Classified	Cat 3	Not Classified	Not Classified	Not Classified	DG	Not Classified	No
	Score ->		110	0	75	10	10	0	15	0	0	0	0	0	0
	Methanol (CAS 67-56-1)	10		Oral: Cat 3 Dermal: Cat 3 Inhalation: Cat 3	Not Classified	Not Classified (study)	Not Classified (study)	Not Classified (study)	Cat 1	Not Classified	Not Classified	Prop65	DG	Not Classified	No
	Score ->		75	25	0	0	0	0	25	0	0	25	0	0	0
	2-Butoxyethanol (CAS 111-76-2)	5		Oral: Cat 4 Dermal: Not Classified Inhalation: Not Classified	Not Classified	Cat 2	Cat 2	Not Classified	Not Classified	Not Classified	Not Classified	Not Classified	DG	Not Classified	No
	Score ->		15	5	0	5	5	0	0	0	0	0	0	0	0
	Total group human health score->		200												
2	DCM (CAS 75-09-2)	30		Oral/ Dermal/Inhalation: Not Classified	Cat 2/Prop65	Cat 2	Cat 2	Not Classified	Cat 3	Not Classified	Not Classified	Not Classified	DG	Not Classified	No
	Score ->		110	0	75	10	10	0	15	0	0	0	0	0	0
	Acetone (CAS 67-64-1)	20		Oral/ Dermal/Inhalation: Not Classified	Not Classified	Cat 2	Not Classified	Not Classified	Cat 3	Not Classified	Not Classified	Not Classified	DG	Not Classified	No
	Score ->		10	0	0	5	0	0	5	0	0	0	0	0	0
	Methanol (CAS 67-56-1)	20		Oral: Cat 3 Dermal: Cat 3 Inhalation: Cat 3	Not Classified	Not Classified (study)	Not Classified (study)	Not Classified (study)	Cat 1	Not Classified	Not Classified	Prop65	DG	Not Classified	No
	Score ->		100	25	0	0	0	0	25	0	0	50	0	0	0
	Toluene (CAS 108-88-3)	20		Oral/ Dermal/Inhalation: Not Classified	Not Classified	Not Classified	Cat 2	Not Classified	Cat 3	Cat 2	Not Classified	Cat 2/Prop65	DG	Not Classified	No
	Score ->		45	0	0	0	5	0	5	10	0	25	0	0	0
	Total group human health score->		265												
3	Acetone (CAS 67-64-1)	40		Oral/ Dermal/Inhalation: Not Classified	Not Classified	Cat 2	Not Classified	Not Classified	Cat 3	Not Classified	Not Classified	Not Classified	DG	Not Classified	No
	Score ->		25	0	0	10	0	0	15	0	0	0	0	0	0
	Methanol (CAS 67-56-1)	25		Oral: Cat 3 Dermal: Cat 3 Inhalation: Cat 3	Not Classified	Not Classified (study)	Not Classified (study)	Not Classified (study)	Cat 1	Not Classified	Not Classified	Prop65	DG	Not Classified	No
	Score ->		75	25	0	0	0	0	25	0	0	25	0	0	0
	Toluene (CAS 108-88-3)	20		Oral/ Dermal/Inhalation: Not Classified	Not Classified	Not Classified	Cat 2	Not Classified	Cat 3	Cat 2	Not Classified	Cat 2/Prop65	DG	Not Classified	No
	Score ->		45	0	0	0	5	0	5	10	0	25	0	0	0
	Total group human health score->		145												
4	Dimethyl glutarate (CAS 1119-40-0)	25		Oral/ Dermal/Inhalation: Not Classified	DG	Not Classified	Not Classified	Not Classified	Not Classified	Not Classified	Not Classified (study)	Not Classified (study)	DG	Not Classified	No
	Score ->		25	0	25	0	0	0	0	0	0	0	0	0	0
	Dimethyl succinate (CAS 106-65-0)	15		Oral/ Dermal/Inhalation: Not Classified	DG	Not Classified	Not Classified	Not Classified	Not Classified	Not Classified	Not Classified	Not Classified	DG	Not Classified	No
	Score ->		25	0	25	0	0	0	0	0	0	0	0	0	0
	Dimethyl adipate (CAS 627-93-0)	15		Oral/ Dermal/Inhalation: Not Classified	DG	Not Classified	Not Classified	Not Classified	Not Classified	Not Classified	Not Classified	Not Classified	DG	Not Classified	No
	Score ->		25	0	25	0	0	0	0	0	0	0	0	0	0
	Total group human health score->		75												
5	Benzyl alcohol (CAS 100-51-6)	40		Oral: Cat 4 Dermal: DG Inhalation: Cat 4	Not Classified	Cat 2	Not Classified	Not Classified	Not Classified	Not Classified	Not Classified	Not Classified	DG	Not Classified	No
	Score ->		20	10	0	10	0	0	0	0	0	0	0	0	0
	Total group human health score->		20												

Product Group	DCM and Potential Replacement Ingredient(s) for DCM	Typical Percentage Range in Product (% by weight)	Score	Human Health											
				Acute Mammalian Toxicity	Carcinogenicity	Eye Irritation/Corrosion	Skin Irritation/Corrosion	Germ Cell Mutagenicity	Target Organ Toxicity – Single Exposure	Target Organ Toxicity – Repeated Exposure	Reproductive Toxicity	Developmental Toxicity	Sensitizer – Respiration	Sensitizer – Skin	Candidate Endocrine Active Chemical
6	Sodium hydroxide (CAS 1310-73-2)	9		Oral/ Dermal/Inhalation: Not Classified	DG	Cat 1**	Cat 1A**	Not Classified	Not Classified	Not Classified	Not Classified	Not Classified	DG	Not Classified	No
	Score ->		35	0	25	5	5	0	0	0	0	0	0	0	0
	Magnesium hydroxide (CAS 1309-42-8)	15		Not Classified	Not Classified	Not Classified	Not Classified	Not Classified	Not Classified	Not Classified	Not Classified	Not Classified	DG	Not Classified	No
	Score ->		0	0	0	0	0	0	0	0	0	0	0	0	0
	Potassium hydroxide (CAS 1310-58-3)	nd		Oral: Cat 4 Dermal: Not Classified Inhalation: Not Classified	Not Classified	Cat 1**	Cat 1A**	Not Classified	Not Classified	Not Classified	Not Classified	Not Classified	DG	Not Classified	No
	Score ->														
	Calcium hydroxide (CAS 1305-62-0)	20		Oral/ Dermal/Inhalation: Not Classified	Not Classified	Cat 1**	Cat 2**	Not Classified (study)	Cat 3	Not Classified	Not Classified	Not Classified	DG	Not classified (study)	No
	Score ->		20	0	0	10	5	0	5	0	0	0	0	0	0
	Total group human health score->		30												
7	2-(Methoxymethylethoxy) propanol (CAS 34590-94-8)	varies (up to 60%)		Not Classified	Not Classified [§]	Not Classified	Not Classified	Not Classified	Not Classified	Not Classified	Not Classified***	Not Classified	DG	Not classified	No
	Score ->		10	0	0	10	0	0	0	0	0	0	0	0	0
	Acetone (CAS 67-64-1)	varies (up to 60%)		Oral/ Dermal/Inhalation: Not Classified	Not Classified	Cat 2	Not Classified	Not Classified	Cat 3	Not Classified	Not Classified	Not Classified	DG	Not Classified	No
	Score ->		20	0	0	5	0	0	15	0	0	0	0	0	0
	Cyclohexanone (CAS 108-94-1)	varies (up to 30%)		Oral/ Dermal/Inhalation: Not Classified	Not Classified	Cat 1**	Cat 2**	Not Classified (study)	Cat 3	Not Classified	Not Classified	Not Classified	DG	Not classified (study)	No
	Score ->		40	0	0	25	10	0	5	0	0	0	0	0	0
	Dimethyl carbonate (CAS 616-38-6)	varies (up to 60%)		Oral: Cat 4 Dermal: Not Classified Inhalation: Not Classified	DG	Cat 1**	Cat 1A**	Not Classified	Not Classified	Not Classified	Not Classified	Not Classified	DG	Not Classified	No
	Score ->		110	10	50	25	25	0	0	0	0	0	0	0	0
	Dimethyl formamide (CAS 68-12-2)	varies (up to 44%)		Oral: Not Classified Dermal: Cat 4 Inhalation: Cat 4	Prop65	Cat 2	Not Classified	Not Classified	Not Classified	Not Classified	Cat 1B	Cat 1B	DG	Not Classified	Yes
	Score ->		125	0	75	25	10	0	15	0	0	0	0	0	0
	Methyl acetate (CAS 79-20-9)	varies (up to 40%)		Oral/ Dermal/Inhalation: Not Classified	DG***	Cat 2	Not Classified	Not Classified	Cat 3	Not Classified	Not Classified	Prop65***	DG	Not Classified	No
	Score ->		100 or 25	0	50 or 0	10	0	0	15	0	0	25 or 0	0	0	0
	Group human health score range****->		10 to 225****												
8	1,3-Dioxolane (CAS 646-06-0)	20		Oral/ Dermal/Inhalation: Not Classified	Not Classified	Cat 2	Not Classified	Not Classified	Cat 3*	Not Classified	Not Classified	1B	DG	Not Classified	No
	Score ->		60	0	0	5	0	0	5	0	0	50	0	0	0
	DMSO (CAS 67-68-5)	20		Oral/ Dermal/Inhalation: Not Classified	DG	Not Classified	Not Classified	Not Classified	Not Classified	Not Classified	Not Classified	Not Classified	DG	Not Classified	No
	Score ->		25	0	25	0	0	0	0	0	0	0	0	0	0
	Methyl acetate (CAS 79-20-9)	60		Oral/ Dermal/Inhalation: Not Classified	DG***	Cat 2	Not Classified	Not Classified	Cat 3	Not Classified	Not Classified	Prop65***	DG	Not Classified	No
	Score ->		100 or 25	0	50 or 0	10	0	0	15	0	0	25 or 0	0	0	0
	Total group human health score->		185 or 110***												

Notes:
DCM = Dichloromethane (Methylene Chloride); DG = Data Gap; DMSO = Dimethyl Sulfoxide.
Group 7 products contain a range of chemistries, chemicals which are the predominant chemicals are shown but are not present in all products.
* Central nervous system effects occur although at very high doses in the relevant study.
** Irritant effects are highly dependent on concentration and appear pH mediated.
*** The ECHA dossier notes the methyl acetate is rapidly and completely converted in the body to methanol, which is a Prop65 listed substance (although methyl acetate is not). Evaluated both as Prop65 and Not Classified. Based on this metabolism, the dossier also argues not classified for carcinogenicity rather than data gap.
**** One group 7 product contains up to 40% methyl acetate and dimethyl formamide, which would yield a maximum score of 250.
§ Based on a carcinogenicity study of the very similar propylene glycol methyl ether (the chemical of interest is dipropylene glycol methyl ether).

Table 5.11 Scoring Comparison of Ecological Health Hazards

Product Group	DCM and Potential Replacement Ingredient(s) for DCM	Typical Percentage Range in Product (% by weight)	Score	Aquatic Toxicity – Acute	Aquatic Toxicity – Chronic	Terrestrial Toxicity	Bioaccumulative (Kow > 4)	Persistent
1	DCM (CAS 75-09-2)	75		Cat 3	Not Classified	DG	No	Yes
	Score ->		100	50	0	0	0	50
	Methanol (CAS 67-56-1)	10		Not Classified	Not Classified	Low	No	No
	Score ->		0	0	0	0	0	0
	2-Butoxyethanol (CAS 111-76-2)	5		Not Classified	Not Classified	DG	No	No
	Score ->		0	0	0	0	0	0
	Total group human health score->		100					
2	DCM (CAS 75-09-2)	30		Cat 3	Not Classified	DG	No	Yes
	Score ->		75	25	0	0	0	50
	Acetone (CAS 67-64-1)	15		Not Classified	Not Classified	Low	No	No
	Score ->		0	0	0	0	0	0
	Methanol (CAS 67-56-1)	25		Not Classified	Not Classified	Low	No	No
	Score ->		0	0	0	0	0	0
	Toluene (CAS 108-88-3)	20		Not Classified	Cat 2	DG	No	No
	Score ->		25	0	25	0	0	0
	Total group human health score->		100					
3	Acetone (CAS 67-64-1)	40		Not Classified	Not Classified	Low	No	No
	Score ->		0	0	0	0	0	0
	Methanol (CAS 67-56-1)	25		Not Classified	Not Classified	Low	No	No
	Score ->		0	0	0	0	0	0
	Toluene (CAS 108-88-3)	20		Not Classified	Cat 2	DG	No	No
	Score ->		25	0	25	0	0	0
	Total group human health score->		25					
4	Dimethyl glutarate (CAS 1119-40-0)	25		Cat 3	Not Classified	DG	No	No
	Score ->		10	10	0	0	0	0
	Dimethyl succinate (CAS 106-65-0)	15		Cat 3	Not Classified	DG	No	No
	Score ->		10	10	0	0	0	0
	Dimethyl adipate (CAS 627-93-0)	15		Cat 3	Not Classified	DG	No	No
	Score ->		25	25	0	0	0	0
	Total group human health score->		45					
5	Benzyl alcohol (CAS 100-51-6)	40		Not Classified	Not Classified	DG	No	No
	Score ->		0	0	0	0	0	0
	Total group human health score->		0					
6	Sodium hydroxide (CAS 1310-73-2)	9		Cat 3	Not Classified	DG	No	No
	Score ->		5	5	0	0	0	0
	Magnesium hydroxide (CAS 1309-42-8)	15		Not Classified	Not Classified	DG	No	No
	Score ->		0	0	0	0	0	0
	Potassium hydroxide (CAS 1310-58-3)	nd		Cat 3	Not Classified	DG	No	No
	Score ->							
	Calcium hydroxide (CAS 1305-62-0)	20		Cat 3	Not Classified	Low	No	No
	Score ->		10	10	0		0	0
	Total group human health score->		15					

Product Group	DCM and Potential Replacement Ingredient(s) for DCM	Typical Percentage Range in Product (% by weight)	Score	Aquatic Toxicity – Acute	Aquatic Toxicity – Chronic	Terrestrial Toxicity	Bioaccumulative (Kow > 4)	Persistent
7	2-(Methoxymethylethoxy) propanol (CAS 34590-94-8)	varies (up to 60%)		Not Classified	Not Classified	DG	No	No
			0	0	0	0	0	0
	Acetone (CAS 67-64-1)	varies (up to 60%)		Not Classified	Not Classified	Low	No	No
	Score ->		0	0	0	0	0	0
	Cyclohexanone (CAS 108-94-1)	varies (up to 30%)		Not Classified	Not Classified	DG	No	No
	Score ->		0	0	0	0	0	0
	Dimethyl carbonate (CAS 616-38-6)	varies (up to 60%)		Not Classified	Not Classified	DG	No	No
	Score ->		0	0	0	0	0	0
	Dimethyl formamide (CAS 68-12-2)	varies (up to 44%)		Not Classified	Not Classified	DG	No	No
	Score ->		0	0	0	0	0	0
8	Methyl acetate (CAS 79-20-9)	varies (up to 40%)		Not Classified	Not Classified	DG	No	No
	Score ->		0	0	0	0	0	0
	Group human health score range->		0					
	1,3-Dioxolane (CAS 646-06-0)	20		Cat 3	Not Classified	DG	No	No
	Score ->		10	10	0	0	0	0
	DMSO (CAS 67-68-5)	20		Not Classified	Not Classified	Low	No	No
	Score ->		0	0	0	0	0	0
	Methyl acetate (CAS 79-20-9)	60		Not Classified	Not Classified	DG	No	No
	Score ->		0	0	0	0	0	0
	Total group human health score->		10					

Notes:
DCM= Dichloromethane (Methylene Chloride); DG = Data Gap; DMSO = Dimethyl Sulfoxide; nd = not discussed as a potential hazard.
Group 7 products contain a range of chemistries, chemicals which are the predominant chemicals are shown but are not present in all products.

Table 5.12 Scoring Comparison of Physical/Chemical Hazards

Product Group	DCM and Potential Replacement Ingredient(s) for DCM	Typical Percentage Range in Product (% by weight)	Score	Ozone Depleting Substance	Direct Global Warming Contributor	Flammable Liquid	CAA VOC Contributing to Tropospheric Ozone Formation
1	DCM (CAS 75-09-2)	75		No	Yes, GWP = 9*	Not Classified	No, exempt
	Score ->		0	0	0	0	0
	Methanol (CAS 67-56-1)	10		No	No	Cat 2	Yes
	Score ->		50	0	0	25	25
	2-Butoxyethanol (CAS 111-76-2)	5		No	No	Not Classified	Yes
	Score ->		35	0	0	25	10
	Total group human health score->		85				
2	DCM (CAS 75-09-2)	30		No	Yes, GWP = 9*	Not Classified	No, exempt
	Score ->		0	0	0	0	0
	Acetone (CAS 67-64-1)	20		No	No	Cat 2	No, exempt
	Score ->		25	0	0	25	0
	Methanol (CAS 67-56-1)	20		No	No	Cat 2	Yes
	Score ->		50	0	0	25	25
	Toluene (CAS 108-88-3)	20		No	No	Cat 2	Yes
	Score ->		50	0	0	25	25
	Total group human health score->		125				
3	Acetone (CAS 67-64-1)	40		No	No	Cat 2	No, exempt
	Score ->		50	0	0	50	0
	Methanol (CAS 67-56-1)	25		No	No	Cat 2	Yes
	Score ->		50	0	0	25	25
	Toluene (CAS 108-88-3)	20		No	No	Cat 2	Yes
	Score ->		50	0	0	25	25
	Total group human health score->		150				
4	Dimethyl glutarate (CAS 1119-40-0)	20		No	No	Not Classified	No, exempt***
	Score ->		0	0	0	0	0
	Dimethyl succinate (CAS 106-65-0)	15		No	No	Not Classified	No, exempt**
	Score ->		0	0	0	0	0
	Dimethyl adipate (CAS 627-93-0)	15		No	No	Not Classified	No, exempt**
	Score ->		0	0	0	0	0
	Total group human health score->		0				
5	Benzyl alcohol (CAS 100-51-6)	40		No	No	Not Classified	Yes
	Score ->		50	0	0	0	50
	Total group human health score->		50				
6	Sodium hydroxide (CAS 1310-73-2)	9		No	No	Not Classified	No, inorganic
	Score ->		0	0	0	0	0
	Magnesium hydroxide (CAS 1309-42-8)	15		No	No	Not Classified	No, inorganic
	Score ->		0	0	0	0	0
	Potassium hydroxide (CAS 1310-58-3)	nd		No	No	Not Classified	No, inorganic
	Score ->		0	0	0	0	0
	Calcium hydroxide (CAS 1305-62-0)	20		No	No	Not Classified	No, inorganic
	Total group human health score->		0				
7	2-(Methoxymethylethoxy) propanol (CAS 34590-94-8)	varies (up to 44%)		No	No	Not Classified	Yes
	Score ->		50	0	0	0	50
	Acetone (CAS 67-64-1)	varies (up to 60%)		No	No	Cat 2	No, exempt**
	Score ->		150			75	75
	Cyclohexanone (CAS 108-94-1)	varies (up to 30%)		No	No	Cat 3	Yes
	Score ->		75	0	0	25	50
	Dimethyl carbonate (CAS 616-38-6)	varies (up to 60%)		No	No	Cat 2	No, exempt
	Score ->		150	0	0	75	75
	Dimethyl formamide (CAS 68-12-2)	varies (up to 44%)		No	No	Cat 3	Yes
	Score ->		75	0	0	25	50
	Methyl acetate (CAS 79-20-9)	varies (up to 40%)		No	No	Cat 2	No, exempt
	Score ->		50	0	0	50	0
	Total group human health score->		varies				

Product Group	DCM and Potential Replacement Ingredient(s) for DCM	Typical Percentage Range in Product (% by weight)	Score	Ozone Depleting Substance	Direct Global Warming Contributor	Flammable Liquid	CAA VOC Contributing to Tropospheric Ozone Formation
8	1,3-Dioxolane (CAS 646-06-0)	20		No	No	Cat 2	Yes
	Score ->		50	0		25	25
	DMSO (CAS 67-68-5)	20		No	No	Not Classified	Yes
	Score ->		25	0	0	0	25
	Methyl acetate (CAS 79-20-9)	60		No	No	Cat 2	No, exempt
	Score ->		75	0	0	75	0
	Total group human health score->		150				

Notes:
CAA = Clean Air Act; DCM= Dichloromethane (Methylene Chloride); DMSO = Dimethyl Sulfoxide; GWP = Global Warming Potential; nd = not discussed as a potential hazard; VOC = Volatile Organic Compound.
Group 7 products contain a range of chemistries, chemicals which are the predominant chemicals are shown but are not present in all products.

Table 5.13 Scoring Comparison of Product Groups

Product Group	Description	Human Health Hazard Score	Ecological Hazard Score	Physical/Chemical Hazard Score
1	Priority Product (>60% DCM)	200	100	85
2	Priority Product (<45% DCM)	265	100	125
3	Acetone/Toluene/Methanol	145	25	150
4	Dibasic esters	75	45	0
5	Benzyl alcohol	20	0	50
6	Caustics	30	15	0
7	Other	Varies, 10-225*	0	Varies, 50-150*
8	Lowell Formulation	110 or 185	10	10

Notes:

DCM = Dichloromethane (Methylene Chloride).

Group 7 products contain a range of chemistries, chemicals which are the predominant chemicals are shown but are not present in all products.

*Depending on the specific product.

Table 5.14a Physical Chemical Properties for Key Ingredients in Priority Products and Possible Alternatives

Product Group	Key Ingredient (s)	SMILES	Molecular Weight	Molecular Weight Reference	Density at 20 °C (g/cm ³)	Density Reference	Melting Point	Melting Point Reference	Boiling Point (°C at 1 atm)	Boiling Point Reference
1	DCM (CAS 75-09-2)	C(Cl)Cl	84.93	EPI Suite	1.33	Experimental value cited by HSDB	-95	Experimental value, EPI Suite	40	Experimental value, EPI Suite
	2-Butoxyethanol (CAS 111-76-2)	C(OCCO)CCC	118.8	EPI Suite	0.90	Experimental value cited by HSDB	-74.8	Experimental value, EPI Suite	168.4	Experimental value, EPI Suite
2	DCM (CAS 75-09-2)	C(Cl)Cl	84.93	EPI Suite	1.33	Experimental value cited by HSDB	-95	Experimental value, EPI Suite	40	Experimental value, EPI Suite
	Acetone (CAS 67-64-1)	O=C(C)C	58.08	EPI Suite	0.78	Experimental value cited by HSDB	-98.3	Experimental value, EPI Suite	55.5	Experimental value, EPI Suite
	Methanol (CAS 67-56-1)	OC	32.04	EPI Suite	0.79	Experimental value cited by	-97.6	Experimental value, EPI Suite	64.7	Experimental value, EPI Suite
	Toluene (CAS 108-88-3)	c(cccc1)(c1)C	92.14	EPI Suite	0.86	Experimental value cited by HSDB	-94.9	Experimental value, EPI Suite	110.6	Experimental value, EPI Suite
3	Acetone (CAS 67-64-1)	O=C(C)C	58.08	EPI Suite	0.78	Experimental value cited by HSDB	-98.3	Experimental value, EPI Suite	55.5	Experimental value, EPI Suite
	Methanol (CAS 67-56-1)	OC	32.04	EPI Suite	0.79	Experimental value cited by	-97.6	Experimental value, EPI Suite	64.7	Experimental value, EPI Suite
	Toluene (CAS 108-88-3)	c(cccc1)(c1)C	92.14	EPI Suite	0.86	Experimental value cited by HSDB	-94.9	Experimental value, EPI Suite	110.6	Experimental value, EPI Suite
4	Dimethyl glutarate (CAS 1119-40-0)	O=C(OC)CCCC(=O)OC	160.17	EPI Suite	1.09	Experimental value cited by HSDB	-42.5	Experimental value, EPI Suite	214	Experimental value, EPI Suite
	Dimethyl succinate (CAS 106-65-0)	O=C(OC)CCC(=O)OC	146.14	EPI Suite	1.12	Experimental value cited by HSDB	19	Experimental value, EPI Suite	196.4	Experimental value, EPI Suite
	Dimethyl adipate (CAS 627-93-0)	O=C(OC)CCCCC(=O)OC	174.2	EPI Suite	1.06	Experimental value cited by HSDB	10.3	Experimental value, EPI Suite	186	MPBPVP v1.43 estimate, via
5	Benzyl alcohol (CAS 100-51-6)	OCc(cccc1)c1	108.14	EPI Suite	1.04	Experimental value cited by HSDB	-15.2	Experimental value, EPI Suite	205.3	Experimental value, EPI Suite
6	Sodium hydroxide (CAS 1310-73-2)	[O-].[Na+]	40	EPI Suite	2.13	Experimental value cited by HSDB	318	Experimental value, EPI Suite	1,388	Experimental value as cited on
	Calcium hydroxide (CAS 1305-62-0)	[Ca](O)O	74.09	EPI Suite	2.20	Experimental value cited by HSDB	1,076	Experimental value cited by HSDB	Not applicable	
	Potassium hydroxide (CAS 1310-58-3)	[K]O	56.11	EPI Suite	2.04	Experimental value cited by HSDB	380	Experimental value cited by HSDB	1,327	Experimental value as cited on
	Magnesium hydroxide (CAS 1309-42-8)	O[Mg]O	58.32	EPI Suite	2.36	Experimental value cited by HSDB	350	Experimental value cited by HSDB	Not applicable	
7	2-(Methoxymethylethoxy) propanol (CAS 34590-94-8)	CC(CO)OC(C)COC(C)COC	206.28	EPI Suite		Experimental value cited by HSDB	25.41	Experimental value, EPI Suite	261.49	Experimental value, EPI Suite
	Acetone (CAS 67-64-1)	O=C(C)C	58.08	EPI Suite	0.78	Experimental value cited by HSDB	-98.3	Experimental value, EPI Suite	55.5	Experimental value, EPI Suite
	Cyclohexanone (CAS 108-94-1)	O=C(CCCC1)C1	98.15	EPI Suite	0.95	Experimental value cited by HSDB	-31	Experimental value, EPI Suite	155.4	Experimental value, EPI Suite
	Dimethyl carbonate (CAS 616-38-6)	O=C(OC)OC	90.08	EPI Suite	1.06	Experimental value cited by HSDB	3	Experimental value, EPI Suite	90.5	Experimental value, EPI Suite
	Dimethyl formamide (CAS 68-12-2)	O=CN(C)C	73.1	EPI Suite	0.95	Experimental value cited by	-60.4	Experimental value, EPI Suite	153	Experimental value, EPI Suite
	Methyl acetate (CAS 79-20-9)	O=C(OC)C	74.08	EPI Suite	0.93	Experimental value cited by HSDB	-98	Experimental value, EPI Suite	92	Experimental value, EPI Suite
8	1,3-Dioxolane (CAS 646-06-0)	O(CCO1)C1	74.08	EPI Suite	1.06	Experimental value cited by HSDB	-95	Experimental value, EPI Suite	78	Experimental value, EPI Suite
	DMSO (CAS 67-68-5)	O=S(C)C	78.13	EPI Suite	1.10	Experimental value cited by HSDB	18.5	Experimental value, EPI Suite	189	Experimental value, EPI Suite
	Methyl acetate (CAS 79-20-9)	O=C(OC)C	74.08	EPI Suite	0.93	Experimental value cited by HSDB	-98	Experimental value, EPI Suite	92	Experimental value, EPI Suite
Relevant Exposure Pathway/Media			Dermal		None		None		Air/Inhalation	

Notes:
Values in bold are experimentally determined.
DCM = Dichloromethane (Methylene Chloride); DMSO = Dimethyl Sulfoxide; NA = Half-life in air is not applicable to this nonvolatile chemical. STP = Standard Temperature and Pressure.

Table 5.14a Physical Chemical Properties for Key Ingredients in Priority Products and Possible Alternatives

Product Group	Key Ingredient (s)	Physical State at STP	Physical State Reference	Vapor Pressure (mm Hg at 25 deg C)	Vapor Pressure Reference	Water Solubility (mg/L)	Water Solubility Reference
1	DCM (CAS 75-09-2)	Liquid	Based on melting and boiling points	435	Experimental value, EPI Suite	13000	Experimental value, EPI Suite
	2-Butoxyethanol (CAS 111-76-2)	Liquid	Based on melting and boiling points	0.88	Experimental value, EPI Suite	1.00E+06	Experimental value, EPI Suite
2	DCM (CAS 75-09-2)	Liquid	Based on melting and boiling points	435	Experimental value, EPI Suite	13000	Experimental value, EPI Suite
	Acetone (CAS 67-64-1)	Liquid	Based on melting and boiling points	232	Experimental value, EPI Suite	1.00E+06	Experimental value, EPI Suite
	Methanol (CAS 67-56-1)	Liquid	Based on melting and boiling points	127	Experimental value, EPI Suite	1.00E+06	Experimental value, EPI Suite
	Toluene (CAS 108-88-3)	Liquid	Based on melting and boiling points	28.4	Experimental value, EPI Suite	526	Experimental value, EPI Suite
3	Acetone (CAS 67-64-1)	Liquid	Based on melting and boiling points	232	Experimental value, EPI Suite	1.00E+06	Experimental value, EPI Suite
	Methanol (CAS 67-56-1)	Liquid	Based on melting and boiling points	127	Experimental value, EPI Suite	1.00E+06	Experimental value, EPI Suite
	Toluene (CAS 108-88-3)	Liquid	Based on melting and boiling points	28.4	Experimental value, EPI Suite	526	Experimental value, EPI Suite
4	Dimethyl glutarate (CAS 1119-40-0)	Liquid	Based on melting and boiling points	1.80E-01	Experimental value, EPI Suite	5.90E+04	Experimental value, EPI Suite
	Dimethyl succinate (CAS 106-65-0)	Liquid	Based on melting and boiling points	4.10E-01	Experimental value, EPI Suite	2.50E+04	Experimental value, EPI Suite
	Dimethyl adipate (CAS 627-93-0)	Liquid	Based on melting and boiling points	6.04E-02	Experimental value, EPI Suite	6,000	Experimental value, EPI Suite
5	Benzyl alcohol (CAS 100-51-6)	Liquid	Based on melting and boiling points	0.094	Experimental value, EPI Suite	4.29E+04	Experimental value as cited in EPI
6	Sodium hydroxide (CAS 1310-73-2)	Solid	Based on melting and boiling points	1.82E-21	Experimental value, EPI Suite	1.11E+06	Experimental value cited by HSDB
	Calcium hydroxide (CAS 1305-62-0)	Solid	Evaluated based on melting point	DG		1,730	Experimental value cited by HSDB
	Potassium hydroxide (CAS 1310-58-3)	Solid	Based on melting and boiling points	1.00E+00	Experimental value cited by	1.21E+06	Experimental value cited by HSDB
	Magnesium hydroxide (CAS 1309-42-8)	Solid	Based on melting and boiling points	DG		9.00E+00	Experimental value cited by HSDB
7	2-(Methoxymethylethoxy) propanol (CAS 34590-94-8)	Liquid	Based on melting and boiling points	5.30E-03	Experimental value, EPI Suite	1.00E+06	Experimental value, EPI Suite
	Acetone (CAS 67-64-1)	Liquid	Based on melting and boiling points	232	Experimental value, EPI Suite	1.00E+06	Experimental value, EPI Suite
	Cyclohexanone (CAS 108-94-1)	Liquid	Based on melting and boiling points	4.33	Experimental value, EPI Suite	2.50E+04	Experimental value, EPI Suite
	Dimethyl carbonate (CAS 616-38-6)	Liquid	Based on melting and boiling points	55.4	Experimental value, EPI Suite	84,977	WATERNT v1.01 estimate, as cited
	Dimethyl formamide (CAS 68-12-2)	Liquid	Based on melting and boiling points	3.87	Experimental value, EPI Suite	1.00E+06	Experimental value, EPI Suite
	Methyl acetate (CAS 79-20-9)	Liquid	Based on melting and boiling points	216	Experimental value, EPI Suite	2.43E+05	Experimental value, EPI Suite
8	1,3-Dioxolane (CAS 646-06-0)	Liquid	Based on melting and boiling points	79	Experimental value, EPI Suite	1.00E+06	Experimental value, EPI Suite
	DMSO (CAS 67-68-5)	Liquid	Based on melting and boiling points	0.61	Experimental value, EPI Suite	1.00E+06	Experimental value, EPI Suite
	Methyl acetate (CAS 79-20-9)	Liquid	Based on melting and boiling points	216	Experimental value, EPI Suite	2.43E+05	Experimental value, EPI Suite
Relevant Exposure Pathway/Media		All		Air/Inhalation		Water	

Notes:
Values in bold are experimentally determined.
DCM = Dichloromethane (Methylene Chloride); DMSO = Dimethyl Sulfoxide; NA = Half-life in air is not applicable to this nonvolatile chemical. STP = Standard Temperature and Pressure.

Table 5.14b Physical Chemical Properties for Key Ingredients in Priority Products and Possible Alternatives

Product Group	Key Ingredient (s)	Log K _{ow}	Log K _{ow} Reference	Log K _{oa}	Log K _{oa} Reference	Log K _{oc}	Log K _{oc} Reference
1	DCM (CAS 75-09-2)	1.25	Experimental value, EPI Suite	2.27	Experimental value, EPI Suite	1.337	KOCWIN v2.00 estimate using MCI method, cited by EpiSuite
	2-Butoxyethanol (CAS 111-76-2)	0.83	Experimental value, EPI Suite	5.014	KOAWIN v1.10 estimate, as cited by	0.451	KOCWIN v2.00 estimate using MCI method, cited by EpiSuite
2	DCM (CAS 75-09-2)	1.25	Experimental value, EPI Suite	2.27	Experimental value, EPI Suite	1.337	KOCWIN v2.00 estimate using MCI method, cited by EpiSuite
	Acetone (CAS 67-64-1)	-0.24	Experimental value, EPI Suite	2.31	Experimental value, EPI Suite	0.374	KOCWIN v2.00 estimate using MCI method, cited by EpiSuite
	Methanol (CAS 67-56-1)	-0.77	Experimental value, EPI Suite	2.88	Experimental value, EPI Suite	0	KOCWIN v2.00 estimate using MCI method, cited by EpiSuite
	Toluene (CAS 108-88-3)	2.73	Experimental value, EPI Suite	3.31	Experimental value, EPI Suite	2.369	KOCWIN v2.00 estimate using MCI method, cited by EpiSuite
3	Acetone (CAS 67-64-1)	-0.24	Experimental value, EPI Suite	2.31	Experimental value, EPI Suite	0.374	KOCWIN v2.00 estimate using MCI method, cited by EpiSuite
	Methanol (CAS 67-56-1)	-0.77	Experimental value, EPI Suite	2.88	Experimental value, EPI Suite	0	KOCWIN v2.00 estimate using MCI method, cited by EpiSuite
	Toluene (CAS 108-88-3)	2.73	Experimental value, EPI Suite	3.31	Experimental value, EPI Suite	2.369	KOCWIN v2.00 estimate using MCI method, cited by EpiSuite
4	Dimethyl glutarate (CAS 1119-40-0)	0.62	Experimental value, EPI Suite	5.2	KOAWIN v1.10 estimate, as cited by	1	KOCWIN v2.00 estimate using MCI method, cited by EpiSuite
	Dimethyl succinate (CAS 106-65-0)	0.35	Experimental value, EPI Suite	4.995	KOAWIN v1.10 estimate, as cited by	1	KOCWIN v2.00 estimate using MCI method, cited by EpiSuite
	Dimethyl adipate (CAS 627-93-0)	1.03	Experimental value, EPI Suite	5.055	KOAWIN v1.10 estimate, as cited by	1	KOCWIN v2.00 estimate using MCI method, cited by EpiSuite
5	Benzyl alcohol (CAS 100-51-6)	1.1	Experimental value, EPI Suite	5.961	KOAWIN v1.10 estimate, as cited by	1.332	KOCWIN v2.00 estimate using MCI method, cited by EpiSuite
6	Sodium hydroxide (CAS 1310-73-2)	Not applicable		Not applicable		Not applicable	
	Calcium hydroxide (CAS 1305-62-0)	Not applicable		Not applicable		Not applicable	
	Potassium hydroxide (CAS 1310-58-3)	Not applicable		Not applicable		Not applicable	
	Magnesium hydroxide (CAS 1309-42-8)	Not applicable		Not applicable		Not applicable	
7	2-(Methoxymethylethoxy) propanol (CAS 34590-94-8)	-0.2	Experimental value, EPI Suite	8.816	KOAWIN v1.10 estimate, as cited by EpiSuite	1	KOCWIN v2.00 estimate using MCI method, cited by EpiSuite
	Acetone (CAS 67-64-1)	-0.24	Experimental value, EPI Suite	2.31	Experimental value, EPI Suite	0.374	KOCWIN v2.00 estimate using MCI method, cited by EpiSuite
	Cyclohexanone (CAS 108-94-1)	0.81	Experimental value, EPI Suite	4.244	KOAWIN v1.10 estimate, as cited by	1.24	KOCWIN v2.00 estimate using MCI method, cited by EpiSuite
	Dimethyl carbonate (CAS 616-38-6)	0.23	KOWWIN v1.67 estimate, cited by	1.826	KOAWIN v1.10 estimate, as cited by	0.459	KOCWIN v2.00 estimate using MCI method, cited by EpiSuite
	Dimethyl formamide (CAS 68-12-2)	-1.01	Experimental value, EPI Suite	4.38	Experimental value, EPI Suite	0	KOCWIN v2.00 estimate using MCI method, cited by EpiSuite
	Methyl acetate (CAS 79-20-9)	0.18	Experimental value, EPI Suite	2.31	Experimental value, EPI Suite	0.486	KOCWIN v2.00 estimate using MCI method, cited by EpiSuite
8	1,3-Dioxolane (CAS 646-06-0)	-0.37	Experimental value, EPI Suite	2.629	KOAWIN v1.10 estimate, as cited by	0.16	KOCWIN v2.00 estimate using MCI method, cited by EpiSuite
	DMSO (CAS 67-68-5)	-1.35	Experimental value, EPI Suite	4.96	Experimental value, EPI Suite	0.319	KOCWIN v2.00 estimate using MCI method, cited by EpiSuite
	Methyl acetate (CAS 79-20-9)	0.18	Experimental value, EPI Suite	2.31	Experimental value, EPI Suite	0.486	KOCWIN v2.00 estimate using MCI method, cited by EpiSuite
Relevant Exposure Pathway/Media		Dermal		Air		Soil/Sediment	

Notes:

EpiSuite (US EPA, 2019c),

HSDB - Hazardous Substance Data Bank (NLM, 2019).

Values in bold are experimentally determined.

DCM = Dichloromethane (Methylene Chloride); DMSO = Dimethyl Sulfoxide.

The SCP regulations also list lipid solubility and sorption coefficient for soil and sediment (Kd) as required values. Lipid solubility is not typically reported but is inferred by the low Kow. Kd is typically reported for metals, we found little and inconsistent data for these low molecular weight organic compounds.

Table 5.14b Physical Chemical Properties for Key Ingredients in Priority Products and Possible Alternatives

Product Group	Key Ingredient (s)	Henry's Law Constant (K _H)	K _H Reference
1	DCM (CAS 75-09-2)	3.25E-03	Experimental value, EPI Suite
	2-Butoxyethanol (CAS 111-76-2)	1.60E-06	Experimental value, EPI Suite
2	DCM (CAS 75-09-2)	3.25E-03	Experimental value, EPI Suite
	Acetone (CAS 67-64-1)	3.50E-05	Experimental value, EPI Suite
	Methanol (CAS 67-56-1)	4.55E-06	Experimental value, EPI Suite
	Toluene (CAS 108-88-3)	6.64E-03	Experimental value, EPI Suite
3	Acetone (CAS 67-64-1)	3.50E-05	Experimental value, EPI Suite
	Methanol (CAS 67-56-1)	4.55E-06	Experimental value, EPI Suite
	Toluene (CAS 108-88-3)	6.64E-03	Experimental value, EPI Suite
4	Dimethyl glutarate (CAS 1119-40-0)	6.43E-07	Experimental value, EPI Suite
	Dimethyl succinate (CAS 106-65-0)	5.54E-07	HENRYWIN v3.20 estimate using
	Dimethyl adipate (CAS 627-93-0)	2.31E-06	Experimental value, EPI Suite
5	Benzyl alcohol (CAS 100-51-6)	3.37E-07	Experimental value, EPI Suite
8	Sodium hydroxide (CAS 1310-73-2)	Not applicable	
	Calcium hydroxide (CAS 1305-62-0)	Not applicable	
	Potassium hydroxide (CAS 1310-58-3)	Not applicable	
	Magnesium hydroxide (CAS 1309-42-8)	Not applicable	
7	2-(Methoxymethylethoxy) propanol (CAS 34590-94-8)	7.35E-09	Experimental value, EPI Suite
	Acetone (CAS 67-64-1)	3.50E-05	Experimental value, EPI Suite
	Cyclohexanone (CAS 108-94-1)	9.00E-06	Experimental value, EPI Suite
	Dimethyl carbonate (CAS 616-38-6)	6.20E-04	HENRYWIN v3.20 estimate using
	Dimethyl formamide (CAS 68-12-2)	7.39E-08	Experimental value cited by HSDB
	Methyl acetate (CAS 79-20-9)	1.15E-04	Experimental value, EPI Suite
8	1,3-Dioxolane (CAS 646-06-0)	2.45E-05	Experimental value, EPI Suite
	DMSO (CAS 67-68-5)	1.51E-09	Experimental value, EPI Suite
	Methyl acetate (CAS 79-20-9)	1.15E-04	Experimental value, EPI Suite
Relevant Exposure Pathway/Media		Air/Water	

Notes:

EpiSuite (US EPA, 2019c),

HSDB - Hazardous Substance Data Bank (NLM, 2019).

Values in bold are experimentally determined.

DCM = Dichloromethane (Methylene Chloride); DMSO = Dimethyl Sulfoxide.

The SCP regulations also list lipid solubility and sorption coefficient for soil and sediment (Kd) as required values. Lipid solubility is not typically reported but is inferred by the low Kow. Kd is typically reported for metals, we found little and inconsistent data for these low molecular weight organic compounds.

Table 5.14c Physical Chemical Properties for Key Ingredients in Priority Products and Possible Alternatives

Product Group	Key Ingredient (s)	Dissociation Constant (pKa)	Dissociation Constant Reference	Environmental Half Life In Air (Days)	Environmental Half Life Reference	Hydrolysis Half Life (days)	Hydrolysis Half Life Reference
1	DCM (CAS 75-09-2)	DG		160	Predicted value cited by HSDB	>=547.5	Experimental value cited by HSDB
	2-Butoxyethanol (CAS 111-76-2)	DG		0.625	Predicted value cited by HSDB	Compound lacks functional groups that hydrolyze under environmental conditions	Hazardous Substances Data Bank (HSDB)
2	DCM (CAS 75-09-2)	DG		160	Predicted value cited by HSDB	>=547.5	Experimental value cited by HSDB
	Acetone (CAS 67-64-1)	20	Experimental value cited by HSDB	89	Predicted value cited by HSDB	Compound lacks functional groups that hydrolyze under environmental conditions	Hazardous Substances Data Bank (HSDB)
	Methanol (CAS 67-56-1)	15.3	Experimental value cited by HSDB	17	Predicted value cited by HSDB	Compound lacks functional groups that hydrolyze under environmental conditions	Hazardous Substances Data Bank (HSDB)
	Toluene (CAS 108-88-3)	DG		2	Predicted value cited by HSDB	Compound lacks functional groups that hydrolyze under environmental conditions	Hazardous Substances Data Bank (HSDB)
3	Acetone (CAS 67-64-1)	20	Experimental value cited by HSDB	89	Predicted value cited by HSDB	Compound lacks functional groups that hydrolyze under environmental conditions	Hazardous Substances Data Bank (HSDB)
	Methanol (CAS 67-56-1)	15.3	Experimental value cited by HSDB	17	Predicted value cited by HSDB	Compound lacks functional groups that hydrolyze under environmental conditions	Hazardous Substances Data Bank (HSDB)
	Toluene (CAS 108-88-3)	DG		2	Predicted value cited by HSDB	Compound lacks functional groups that hydrolyze under environmental conditions	Hazardous Substances Data Bank (HSDB)
4	Dimethyl glutarate (CAS 1119-40-0)	DG		DG		DG	
	Dimethyl succinate (CAS 106-65-0)	DG		14	Predicted value cited by HSDB	85 d at pH 8, 839.5 d at pH 7	Hazardous Substances Data Bank (HSDB)
	Dimethyl adipate (CAS 627-93-0)	DG		4	Predicted value cited by HSDB	730 d at pH 7, 60 d at pH 8	Hazardous Substances Data Bank (HSDB)
5	Benzyl alcohol (CAS 100-51-6)	15.4	Experimental value cited by HSDB	0.7	Predicted value cited by HSDB	Compound lacks functional groups that hydrolyze under environmental conditions	
6	Sodium hydroxide (CAS 1310-73-2)	Completely dissociated		DG		DG	
	Calcium hydroxide (CAS 1305-62-0)	DG		DG		DG	
	Potassium hydroxide (CAS 1310-58-3)	Completely dissociated		DG		DG	
	Magnesium hydroxide (CAS 1309-42-8)	DG		DG		DG	
7	2-(Methoxymethylethoxy) propanol (CAS 34590-94-8)	DG		0.3	Estimated value, EPI Suite	DG	
	Acetone (CAS 67-64-1)	20	Experimental value cited by HSDB	89	Predicted value cited by HSDB	Compound lacks functional groups that hydrolyze under environmental conditions	Hazardous Substances Data Bank (HSDB)
	Cyclohexanone (CAS 108-94-1)	DG		1.3	Predicted value cited by HSDB	Compound is resistant to hydrolysis	Hazardous Substances Data Bank (HSDB)
	Dimethyl carbonate (CAS 616-38-6)	DG		24.6	Predicted value cited by HSDB	DG	
	Dimethyl formamide (CAS 68-12-2)	-30	Experimental value cited by HSDB	0.8	Predicted value cited by HSDB	Very large because neutral hydrolysis rate constants for amides are <10-9/sec under environmental conditions	Hazardous Substances Data Bank (HSDB)
	Methyl acetate (CAS 79-20-9)	DG		41	Predicted value cited by HSDB	620.5 d at pH 7, 63 d at pH8	Hazardous Substances Data Bank (HSDB)
8	1,3-Dioxolane (CAS 646-06-0)	DG		1.5	Predicted value cited by HSDB	Compound lacks functional groups that hydrolyze under environmental conditions	Hazardous Substances Data Bank (HSDB)
	DMSO (CAS 67-68-5)	35.1	Experimental value cited by HSDB	0.2	Predicted value cited by HSDB	Compound is stable to hydrolysis in water	Hazardous Substances Data Bank (HSDB)
	Methyl acetate (CAS 79-20-9)	DG		41	Predicted value cited by HSDB	620.5 d at pH 7, 63 d at pH8	Hazardous Substances Data Bank (HSDB)
Relevant Exposure Pathway/Media		Water		Air/Inhalation		Water	

Notes:
Values in bold are experimentally determined.
DCM = Dichloromethane (Methylene Chloride); DMSO = Dimethyl Sulfoxide.

Table 5.14c Physical Chemical Properties for Key Ingredients in Priority Products and Possible Alternatives

Product Group	Key Ingredient (s)	Photolysis Half-Life (days)	Reference for Photolysis Rate Constant
1	DCM (CAS 75-09-2)	DG	
	2-Butoxyethanol (CAS 111-76-2)	Compound lacks functional groups that photolyze under environmental conditions	
2	DCM (CAS 75-09-2)	DG	
	Acetone (CAS 67-64-1)	10-80	Experimental value cited by HSDB
	Methanol (CAS 67-56-1)	Compound lacks functional groups that photolyze under environmental conditions	
	Toluene (CAS 108-88-3)	Compound lacks functional groups that photolyze under environmental conditions	
3	Acetone (CAS 67-64-1)	10-80	Experimental value cited by HSDB
	Methanol (CAS 67-56-1)	Compound lacks functional groups that photolyze under environmental conditions	
	Toluene (CAS 108-88-3)	Compound lacks functional groups that photolyze under environmental conditions	
4	Dimethyl glutarate (CAS 1119-40-0)	DG	
	Dimethyl succinate (CAS 106-65-0)	DG	
	Dimethyl adipate (CAS 627-93-0)	DG	
5	Benzyl alcohol (CAS 100-51-6)	Compound lacks functional groups that photolyze under environmental conditions	
6	Sodium hydroxide (CAS 1310-73-2)	DG	
	Calcium hydroxide (CAS 1305-62-0)	DG	
	Potassium hydroxide (CAS 1310-58-3)	DG	
	Magnesium hydroxide (CAS 1309-42-8)	DG	
7	2-(Methoxymethylethoxy) propanol (CAS 34590-94-8)	DG	
	Acetone (CAS 67-64-1)	10-80	Experimental value cited by HSDB
	Cyclohexanone (CAS 108-94-1)	4.3	Experimental value cited by HSDB
	Dimethyl carbonate (CAS 616-38-6)	Compound lacks functional groups that photolyze under environmental conditions	
	Dimethyl formamide (CAS 68-12-2)	DG	
	Methyl acetate (CAS 79-20-9)	Compound lacks functional groups that photolyze under environmental conditions	
8	1,3-Dioxolane (CAS 646-06-0)	DG	
	DMSO (CAS 67-68-5)	Compound lacks functional groups that photolyze under environmental conditions	
	Methyl acetate (CAS 79-20-9)	Compound lacks functional groups that photolyze under environmental conditions	
Relevant Exposure Pathway/Media		Air/Inhalation	

Notes:
Values in bold are experimentally determined.
DCM = Dichloromethane (Methylene Chloride); DMSO = Dimethyl Sulfoxide.

Table 5.14d Physical Chemical Properties for Key Ingredients in Priority Products and Possible Alternatives

Product Group	Key Ingredient (s)	Standard Reduction Potential (V)	Electrophilicity Index	Air Diffusion Coefficient (Diffusivity) (cm ² /s)	Water Diffusion Coefficient (Diffusivity) (cm ² /s)
1	DCM (CAS 75-09-2)	DG	DG	Chemical is a liquid	DG
	2-Butoxyethanol (CAS 111-76-2)	DG	DG	Chemical is a liquid	DG
2	DCM (CAS 75-09-2)	DG	DG	Chemical is a liquid	DG
	Acetone (CAS 67-64-1)	DG	DG	Chemical is a liquid	DG
	Methanol (CAS 67-56-1)	DG	DG	Chemical is a liquid	DG
	Toluene (CAS 108-88-3)	DG	DG	Chemical is a liquid	DG
3	Acetone (CAS 67-64-1)	DG	DG	Chemical is a liquid	DG
	Methanol (CAS 67-56-1)	DG	DG	Chemical is a liquid	DG
	Toluene (CAS 108-88-3)	DG	DG	Chemical is a liquid	DG
4	Dimethyl glutarate (CAS 1119-40-0)	DG	DG	Chemical is a liquid	DG
	Dimethyl succinate (CAS 106-65-0)	DG	DG	Chemical is a liquid	DG
	Dimethyl adipate (CAS 627-93-0)	DG	DG	Chemical is a liquid	DG
5	Benzyl alcohol (CAS 100-51-6)	DG	DG	Chemical is a liquid	DG
6	Sodium hydroxide (CAS 1310-73-2)	DG	DG	Chemical is a liquid	Chemical is a solid
	Calcium hydroxide (CAS 1305-62-0)	DG	DG	Chemical is a liquid	Chemical is a solid
	Potassium hydroxide (CAS 1310-58-3)	DG	DG	Chemical is a liquid	Chemical is a solid
	Magnesium hydroxide (CAS 1309-42-8)	DG	DG	Chemical is a liquid	Chemical is a solid
7	2-(Methoxymethylethoxy) propanol (CAS 34590-94-8)	DG	DG	Chemical is a liquid	DG
	Acetone (CAS 67-64-1)	DG	DG	Chemical is a liquid	DG
	Cyclohexanone (CAS 108-94-1)	DG	DG	Chemical is a liquid	DG
	Dimethyl carbonate (CAS 616-38-6)	DG	DG	Chemical is a liquid	DG
	Dimethyl formamide (CAS 68-12-2)	DG	DG	Chemical is a liquid	DG
	Methyl acetate (CAS 79-20-9)	DG	DG	Chemical is a liquid	DG
8	1,3-Dioxolane (CAS 646-06-0)	DG	DG	Chemical is a liquid	DG
	DMSO (CAS 67-68-5)	DG	DG	Chemical is a liquid	DG
	Methyl acetate (CAS 79-20-9)	DG	DG	Chemical is a liquid	DG
Relevant Exposure Pathway/Media		Unclear	Unclear	Air/Inhalation	Water

Notes:

Values in bold are experimentally determined.

DCM = Dichloromethane (Methylene Chloride); DG = Data Gap; DMSO = Dimethyl Sulfoxide; NA = Half-life in air is not applicable to this nonvolatile chemical; VOC = Volatile Organic Compound.

Table 5.14e Physical Chemical Properties for Key Ingredients in Priority Products and Possible Alternatives

Product Group	Key Ingredient (s)	Environmental Half-life in Air (hr)	Air Half-life Reference	Environmental Half-life in Water (hr)	Water Half-life Reference	Environmental Half-life in soil (hr)	Soil Half-life Reference	Environmental Half-life in sediment (hr)	Sediment Half-life Reference
1	DCM (CAS 75-09-2)	1,810	Predicted value, EPI Suite	900	Predicted value, EPI Suite	1,800	Predicted value, EPI Suite	8,100	Predicted value, EPI Suite
	2-Butoxyethanol (CAS 111-76-2)	14	Predicted value, EPI Suite	208	Predicted value, EPI Suite	416	Predicted value, EPI Suite	1,870	Predicted value, EPI Suite
2	DCM (CAS 75-09-2)	1,810	Predicted value, EPI Suite	900	Predicted value, EPI Suite	1,800	Predicted value, EPI Suite	8,100	Predicted value, EPI Suite
	Acetone (CAS 67-64-1)	1,170	Predicted value, EPI Suite	360	Predicted value, EPI Suite	720	Predicted value, EPI Suite	3,240	Predicted value, EPI Suite
	Methanol (CAS 67-56-1)	272	Predicted value, EPI Suite	208	Predicted value, EPI Suite	416	Predicted value, EPI Suite	1,873	Predicted value, EPI Suite
	Toluene (CAS 108-88-3)	43	Predicted value, EPI Suite	360	Predicted value, EPI Suite	720	Predicted value, EPI Suite	3,240	Predicted value, EPI Suite
3	Acetone (CAS 67-64-1)	1,170	Predicted value, EPI Suite	360	Predicted value, EPI Suite	720	Predicted value, EPI Suite	3,240	Predicted value, EPI Suite
	Methanol (CAS 67-56-1)	272	Predicted value, EPI Suite	208	Predicted value, EPI Suite	416	Predicted value, EPI Suite	1,873	Predicted value, EPI Suite
	Toluene (CAS 108-88-3)	43	Predicted value, EPI Suite	360	Predicted value, EPI Suite	720	Predicted value, EPI Suite	3,240	Predicted value, EPI Suite
4	Dimethyl glutarate (CAS 1119-40-0)	78	Predicted value, EPI Suite	360	Predicted value, EPI Suite	720	Predicted value, EPI Suite	3,240	Predicted value, EPI Suite
	Dimethyl succinate (CAS 106-65-0)	183	Predicted value, EPI Suite	360	Predicted value, EPI Suite	720	Predicted value, EPI Suite	3,240	Predicted value, EPI Suite
	Dimethyl adipate (CAS 627-93-0)	31	Predicted value, EPI Suite	360	Predicted value, EPI Suite	720	Predicted value, EPI Suite	3,240	Predicted value, EPI Suite
5	Benzyl alcohol (CAS 100-51-6)	11	Predicted value, EPI Suite	360	Predicted value, EPI Suite	720	Predicted value, EPI Suite	3,240	Predicted value, EPI Suite
6	Sodium hydroxide (CAS 1310-73-2)	NA		NA		NA		NA	
	Calcium hydroxide (CAS 1305-62-0)	NA		NA		NA		NA	
	Potassium hydroxide (CAS 1310-58-3)	NA		NA		NA		NA	
	Magnesium hydroxide (CAS 1309-42-8)	NA		NA		NA		NA	
7	2-(Methoxymethylethoxy) propanol (CAS 34590-94-8)	4.06	Predicted value, EPI Suite	360	Predicted value, EPI Suite	720	Predicted value, EPI Suite	3,240	Predicted value, EPI Suite
	Acetone (CAS 67-64-1)	1,170	Predicted value, EPI Suite	360	Predicted value, EPI Suite	720	Predicted value, EPI Suite	3,240	Predicted value, EPI Suite
	Cyclohexanone (CAS 108-94-1)	40	Predicted value, EPI Suite	360	Predicted value, EPI Suite	720	Predicted value, EPI Suite	3,240	Predicted value, EPI Suite
	Dimethyl carbonate (CAS 616-38-6)	828	Predicted value, EPI Suite	360	Predicted value, EPI Suite	720	Predicted value, EPI Suite	3,240	Predicted value, EPI Suite
	Dimethyl formamide (CAS 68-12-2)	15	Predicted value, EPI Suite	360	Predicted value, EPI Suite	720	Predicted value, EPI Suite	3,240	Predicted value, EPI Suite
	Methyl acetate (CAS 79-20-9)	208	Predicted value, EPI Suite	360	Predicted value, EPI Suite	720	Predicted value, EPI Suite	3,240	Predicted value, EPI Suite
8	1,3-Dioxolane (CAS 646-06-0)	23	Predicted value, EPI Suite	360	Predicted value, EPI Suite	720	Predicted value, EPI Suite	3,240	Predicted value, EPI Suite
	DMSO (CAS 67-68-5)	208	Predicted value, EPI Suite	360	Predicted value, EPI Suite	720	Predicted value, EPI Suite	3,240	Predicted value, EPI Suite
	Methyl acetate (CAS 79-20-9)	208	Predicted value, EPI Suite	360	Predicted value, EPI Suite	720	Predicted value, EPI Suite	3,240	Predicted value, EPI Suite
Relevant Exposure Pathway/Media		Air		Water		Soil		Sediment	

Notes:

Values in bold are experimentally determined.

DCM = Dichloromethane (Methylene Chloride); DMSO = Dimethyl Sulfoxide; NA = Half-life in air is not applicable to this nonvolatile chemical.

NA - These ionic substances are non-volatile so their air half life is irrelevant. They would dissociate in water and soil pore water so their half life in water would either be minute (for the ionic compound) or infinite (for the constituent ions).

Table 5.15 Assessment of Relative Exposure Potential Based on Physical/Chemical Properties

Product Group	Potential Human Inhalation Exposure During Manufacturing, Use, and Disposal	Potential Human Dermal Exposure During Manufacturing, Use, and Disposal	Potential For Effects <i>via</i> Air Pathways	Potential For Effects <i>via</i> Water Pathways	Potential For Effects <i>via</i> Soil Pathways
	(Related Properties: Boiling point, vapor pressure, Log koa)	(Related Properties: Log kow, molecular weight)	(Related properties: Vapor pressure, air half-life, photolysis half-life)	(Related properties: Water solubility, dissociation constant, hydrolysis half-life, half-life in water)	(Related properties: Log Koc, soil and sediment half-lives)
1	Base Case (primary key ingredient: DCM)				
2	Product contains DCM at a lower concentration. Other key ingredients in this group have lower but still substantial vapor pressures. Log Koa values are similar to DCM. <u>Potential</u> : similar	Product still contains DCM but at a lower concentration. The molecular weights of the other key ingredients are generally similar to DCM, the log kow of methanol and acetone is less than that of DCM but that of toluene is higher. <u>Potential</u> : similar	Product contains DCM at a lower concentration. The vapor pressures and air half-lives of the other key ingredients are somewhat lower than for DCM. There are data gaps for photolysis half-life. <u>Potential</u> : similar	Product contains DCM at a lower concentration. Two of the other key ingredients are much more soluble than DCM. None of the compounds are expected to hydrolyze, and they have similar estimated half-lives in water. <u>Potential</u> : similar	The environmental half-lives in soil and sediment of the other key ingredients are not significantly different from DCM. The log koc values range from above to below that of DCM. <u>Potential</u> : similar
3	Product contains key ingredients with lower vapor pressures than methylene chloride, although they are still quite volatile. Log Koa values are similar to DCM. <u>Potential</u> : similar	The molecular weights of the key ingredients are generally similar to DCM, the log kow of methanol and acetone is less than that of DCM but that of toluene is higher. <u>Potential</u> : similar	The vapor pressures and air half-lives of the key ingredients are somewhat lower than for DCM. There are data gaps for photolysis half-life. <u>Potential</u> : similar	The key ingredients straddle the solubility range of DCM. None of the compounds are expected to hydrolyze, and they have similar estimated half-lives in water. <u>Potential</u> : similar	The environmental half-lives in soil and sediment of the other key ingredients are not significantly different from DCM. The log koc values range from above to below that of DCM. <u>Potential</u> : similar.
4	Significantly reduced due to vapor pressures several orders of magnitude lower. Log Koa values are notably higher suggesting less air exposure. <u>Potential</u> : significantly less	Molecular weights are somewhat higher than the priority product. The log kow values are somewhat less. <u>Potential</u> : similar	The vapor pressures and air half-lives of the key ingredients (where known) are lower than for DCM. There are data gaps for photolysis half-life. <u>Potential</u> : somewhat less	The key ingredients straddle the solubility range of DCM. These chemicals may undergo hydrolysis unlike DCM. They have similar estimated half-lives in water. <u>Potential</u> : similar	The environmental half-lives in soil and sediment and log koc of the other key ingredients are not significantly different from DCM. <u>Potential</u> : similar
5	Significantly reduced due to vapor pressures several orders of magnitude lower. Log Koa value is notably higher suggesting less air exposure. <u>Potential</u> : significantly less	The molecular weight and log kow of the key ingredient (benzyl alcohol) are similar to those of DCM. <u>Potential</u> : similar	The vapor pressures and air half-lives of the key ingredient are substantially lower than for DCM. There are data gaps for photolysis half-life. <u>Potential</u> : significantly less	The key ingredient has similar water solubility as DCM. Neither compound is expected to hydrolyze or dissociate in water under normal conditions. Their estimated half-lives in water are similar. <u>Potential</u> : similar	The environmental half-lives in soil and sediment of the other key ingredients are not significantly different from DCM. The log koc value is very similar to that of DCM. <u>Potential</u> : similar

Product Group	Potential Human Inhalation Exposure During Manufacturing, Use, and Disposal	Potential Human Dermal Exposure During Manufacturing, Use, and Disposal	Potential For Effects <i>via</i> Air Pathways	Potential For Effects <i>via</i> Water Pathways	Potential For Effects <i>via</i> Soil Pathways
	(Related Properties: Boiling point, vapor pressure, Log koa)	(Related Properties: Log kow, molecular weight)	(Related properties: Vapor pressure, air half-life, photolysis half-life)	(Related properties: Water solubility, dissociation constant, hydrolysis half-life, half-life in water)	(Related properties: Log Koc, soil and sediment half-lives)
6	Negligible vapor pressures for these ionic compounds. Inhalation exposure is unlikely. <u>Potential</u> : significantly less	The key ingredients are ionic and would have very limited dermal permeability. The products are corrosive and could damage skin which could increase exposure to other substances. <u>Potential</u> : different	The key ingredients are generally non-volatile so air pathways are not relevant. <u>Potential</u> : significantly less	These key ingredients generally have substantially higher water solubilities than DCM. They typically undergo complete dissociation in water to their constituent ions. <u>Potential</u> : significantly greater	The environmental half-lives in soil and sediment of the other key ingredients are not significantly different from DCM. As inorganics, these have no Koc value. <u>Potential</u> : similar
7	Somewhat reduced due to vapor pressures several orders of magnitude lower than priority product, but group composition is highly variable. Log Koa values are above and below DCM. <u>Potential</u> : variable	The group is variable but molecular weights and log kow values are not markedly dissimilar from DCM. <u>Potential</u> : similar	While values range, the vapor pressures and air half-lives of the key ingredient are substantially lower than for DCM. There are data gaps for photolysis half-life. <u>Potential</u> : significantly less	Water solubilities are similar to or higher than that of DCM. Dissociation and hydrolysis are expected to be low and thus not different from DCM. The estimated half-life in water is similar to that of DCM. <u>Potential</u> : similar	The environmental half-lives in soil and sediment of the other key ingredients are not significantly different from DCM. The log koc values range from above to below that of DCM. <u>Potential</u> : similar
8	Slightly reduced relative to the priority product although the major ingredient has a vapor pressure of the same order of magnitude. Log Koa values are similar to Priority Product. <u>Potential</u> : somewhat less	The molecular weights of the key ingredients are similar to those of DCM. The log kow values are lower than DCM, suggesting lesser dermal absorption. However DMSO is a known penetration enhancer so this should be considered further. <u>Potential</u> : uncertain	The vapor pressures and air half-lives of the major key ingredient (methyl acetate) are somewhat less than for DCM. The other ingredients have lower values. There are data gaps for photolysis half-life. <u>Potential</u> : somewhat less	Water solubilities are higher than for DCM. Dissociation and hydrolysis are expected to be low and thus not different from DCM. The estimated half-life in water is similar to that of DCM. Thus not expected to be significantly different. <u>Potential</u> : similar	The environmental half-lives in soil and sediment of the other key ingredients are not significantly different from DCM. The log koc values are somewhat less than that of DCM. <u>Potential</u> : similar

Notes:

DCM = Dichloromethane; DMSO = Dimethyl Sulfoxide; Koc = Organic Carbon Partition Coefficient; Kow = Octanol Water Partition Coefficient.

Color coding: Yellow – similar to priority product in terms of relative exposure, light green – somewhat less exposure potential, dark green – significantly less exposure potential, orange – significantly greater exposure potential, gray – variable or uncertain in comparison.

Table 5.16 Paint Remover Performance Data Reported by IRTA (2006)

Data Collected at Furniture Refinishing Facilities

Group	Name	Large firm 1	Large firm 2
		Substrates: Wood drawers, lacquer coating, mirror frame, shellac coating, door shellac coating	Substrates: Wood with lacquer drawer, dental cabinet with latex, wood door with enamel, wood drawer with varnish, door with varnish
1	B7	5 min	All but the dental cabinet "effectively"
1	B94	no data	Removed varnish and lacquer coating "easily", slower on enamel panel, effective on latex an dental drawer
5	B96	15 min	As fast as B7 on enamel coating, varnish and lacquer removed "easily", fastest action on dental drawer with latex
5	B73	not as effective	not tested

Notes:
Color coding: qualitative based on comments. Green - best performance, yellow - inferior performance.

Group	Name	Bed rail, shellac 3 min		Book Shelf with Lacquer	Chair 2 coats of enamel	"Panel" 5 enamel coats				Dental drawer with 3 latex coats	
		Percent Removed in 3 min	Percent Removed in 6 min	Min until "stripped"	Percent removed in 30 min	Coats removed in 15 min	Coats removed in 30 min	Coats removed in 45 min	Coats removed in 180 min	Coats removed in 15 min	Coats removed in 180 min
1	B4	90	100	1	95	3	4	4	4.2	0.5	3
5	B95	100	100	1	50	1	2	2.3	4.2	0	2.5
5	B74	90	100	2	100	0	0	1	4	0	0.3
5	B95A	85	95	1	100	1	2	2	2.5	0	1.2
5	B74A	70	75	not stripped	100	0	0	1	2.5	0	0

Notes:
Color coding: green - removed 90% or the maximum number of coats; yellow - more than 60% removed or at least 2 coats; orange - 0-60% removed or 1 layer; red - no removal or < 1 coat removed.

Data collected with On-Site Remodeling Contractors

Group	Name	Substrates: Wood cabinets and drawers
1 (presumably	Lifteeze	"a little cleaner" "a little faster", "best and most effective"
5	B95	"more effective" "a little faster than B74, "almost as effective" as lifteeze
5	B74	"not as good" as B95

Notes:
Color coding: qualitative based on comments. Green - best performance, yellow - inferior performance.

Data Collecting Using Consumer Products

Group	Name	Substrate: Wood panel with lacquer	Green Metal Panel with Epoxy Primer and Polyurethane Top Coat	
		Minutes to strip	Hr to Strip Topcoat	Hr to strip primer
1	Kleanstrip Brushable Stripper	10	5.5	20
	B4	20	5.5	5.5
2	Bix stripper	10	5.5	5.5
5	Ben's NuTech	non effective	5.5	5.5

Notes:
Color coding: green - fastest time; yellow - twice the fastest time; orange - >3 times the fastest time, red - no removal.

Table 5.17 Paint Remover Performance Data Reported in Wood Magazine (1992)

Group	Product	Score Based on Residue Remaining After Application, Scrape and Wash						
		Stain	Varnish	Polyurethane	Shellac	Lacquer	Enamel, Paint	Latex Paint
1	Behlen Master Fire-Fly	G	G	G	E	E	G	G
	Bix Spray-On Stripper	G	G	G	G	G	G	G
	Bix Tuff-Job	G	G	G	G	G	G	G
	Dad's Easy Spray	E	E	E	E	E	E	E
	Formby's Paint Remover	G	G	G	E	E	G	G
	Jasco Liquid Paint Remover	E	G	E	G	G	E	G
	Jasco Premium	E	E	E	E	E	E	E
	Jasco Speedomatic	E	E	E	E	E	E	E
	Klean Strip KS-3	G	E	E	E	E	G	G
	Klean Strip Non-Flammable Sprayable	E	E	E	E	E	E	E
	Minuteman Bright Strip	G	E	E	E	E	E	E
	Jasco Paint and Varnish Remover	G	G	E	G	G	G	G
	Jasco Ultra Speed	G	G	E	G	E	G	G
	Parks Pro Stripper	G	G	E	G	E	G	G
	Red Devil No. 122	G	E	E	G	E	G	G
	Savogran H2OFF	G	G	G	G	E	G	G
	Savogran Superstrip	G	E	E	G	G	G	G
	Sunnyside Premium	G	G	E	G	G	G	G
	Zar Paint and Varnish Remover	G	G	G	E	E	G	G
	Zip-Strip Non Flammable	E	E	E	E	E	E	E
	Zip Strip Water Rinsable	E	E	E	E	E	G	G
2	Bix Quick Strip	G	G	G	G	G	G	G
	Formby's Aerosol Paint Remover	F	G	G	G	G	F	F
	Klean Strip Klean Cutter	E	E	E	G	G	G	G
	Jasco Liquid Stripper	G	G	G	G	G	E	E
	Parks Liquid Strip	E	G	G	G	G	G	G
	Red Devil No. 99	G	G	G	G	G	G	G
	Red Devil No. 77	G	G	G	E	E	G	G
	Savogran Kutzit	G	G	G	G	G	G	G
	Savogran Strypeeze	G	G	G	G	G	F	F
	Sunnyside Liquid	G	G	G	G	G	G	G
	Zar Furniture Refinisher	G	G	G	G	G	E	E
	Zip-Strip Furniture Refinisher	G	G	G	G	G	G	G

Group	Product	Score Based on Residue Remaining After Application, Scrape and Wash						
		Stain	Varnish	Polyurethane	Shellac	Lacquer	Enamel, Paint	Latex Paint
3	Behlen Master Furniture Refinisher	F	F	F	F	G	F	F
	Bix Stripper	F	F	F	F	F	G	G
	Formby's Furniture Refinisher	F	F	F	F	F	F	F
	Jasco Furniture Refinisher	F	F	F	F	F	F	F
	Klean Strip Liquid Paint Remover	F	F	F	F	F	F	F
	Klean Strip Semi-Paste Paint Remover	F	G	F	G	G	G	F
	Jasco Furniture Refinisher	F	F	F	F	F	F	F
	Parks Furniture Refinisher	F	F	F	F	F	F	F
	Parks No Drip Strip	F	G	F	G	F	G	G
	Savogran Finishoff	F	G	F	G	F	G	F
	Sunnyside Heavy-Bodied	F	G	F	F	F	G	G
	UGL Raizoff	F	F	F	F	F	F	F
4	Klean Strip Easy Off	E	F	F	F	F	G	F
	Peel Away 6	G	E	E	E	G	G	G
	Savogran Strypsafer	E	F	F	F	F	G	F
	3M Safest Stripper	E	F	F	F	F	G	F
6	Behlen Master PDE	P	F	F	G	P	E	P
	Peelaway 1	P	F	F	G	P	G	G

Notes:

Only data for removers consistent with product groups shown (*e.g.* , no NMP containing remover results shown).

Three thin coats of finish applied to an oak plywood panel and then baked on.

E - Excellent, complete removal; G - Good, some sanding required; F - Fair, second application needed; P - Poor, little effect on finish .

Color coding: green - E, yellow - G, orange - G, red - P.

The article used an opposite color scheme where excellent (E) was coded red and poor (P) was coded green.

Table 5.18 Paint Remover Performance Data Reported by the US Army (2006)

		Percent of Four Layer Paint Material Removed								
Group	Product	Immersion Experiment					Manual Experiment			
		Phosphated Steel Substrate			Chromated Aluminum Substrate		Phosphated Steel Substrate		Chromated Aluminum Substrate	
		Paint: 53039	Paint: 46168	Paint: 64159	Paint: 64159	Paint: 46168	Paint: 64159	Paint: 46168	Paint: 64159	Paint: 46168
1	West Penetone NPX	100%, all layers	100%, all layers	100%, all layers	100%, all layers	100%, all layers				
	DCM/water	90%, all layers		100%, two layers only						
	Crest Strip #28						36%, three layers only	100%, top layer, 4%, second layer	75%, 3 layers, 49%, primer	100%, top layer 58%, all other layers
5	K-Chem Strip III	100%, all layers	100%, all layers	100%, all layers	100%, all layers	100%, all layers				
	Solvent Kleene D-Zolve 15-33LO	<5, all layers	100%, all layers	37%, all layers	17%, all layers	53%, all layers	0%	35%, one layer only		16%, one layer only
	Solvent Kleene D-Zolve 298	90%, three layers, 66%, primer	100%, all layers	100%, all layers	100%, all layers	93%, all layers				
	Chemetall Oakite Ardrox 2865									
	Solvent Kleene D-Zolve 3703									
	Solvent Kleen D-Zolve 1220GEL						0%	0%	0%	0%
	Chemetall Oakite Ardrox 2865						0%	99%, one layer only	0%	84%, one layer only
	Dorado 5051						0%	68%, one layer only	0%	21%, one layer only
7	Solvent Kleene D-Zolve 3703 (DMF)						0%	82%, one layer only	0%	18%, one layer only

Notes:

DMF = Dimethylformamide.

All substrates had an epoxy primer over which three layers of the specified paint were applied.

Only data for removers consistent with product groups shown (I, no NMP containing remover results shown).

All values were read off of bar charts provided in the report.

Color coding: green - removed all or nearly all layers, yellow - removed part of multiple layers, orange - removed top layer only, red - removed no paint.

Gray shading = remover not tested for this material.

MIL-DTL-64159 is a water-borne, polyurethane-based, chemical agent resistant paint. MIL-DTL-53039D and MIL-C-46168 are solvent-borne, polyurethane-based, chemical agent resistant paints.

Table 5.19 Paint Remover Performance Data Reported by TURI (2017)

			Percent of Substrate Exposed										Steel Coupons		Masonry Coupons
			Wood Coupons												
Group	Product	Paint Type	Epoxy	Shellac	Lacquer	Polyurethane	Varnish	Oil	Latex	Mixed	Percent Removed	Dwell time (min)			
		Initial application time (min)	20	8	10	10	20	25	2	20					
		Second application time (min)	10	na	na	na	12	10	na	15					
1	Savogran Super Strip		95	75	95	85	85	90	80	90	100	5	97		
	WM Barr KleanStrip		95	70	85	85	85	95	85	85	100	3.5	95		
2	Savogran Strypeeze		80	65	75	95	85	5	85	85	85	6	90		
4	Motsenbocker LiftOff		0	0	0	0	0	0	0	0	40	288	0		
	EZ Strip Paint and Varnish Stripper		0	0	0	0	0	0	0	0	30	296	0		
5	Dumond Peel Away 7		0	0	0	0	0	0	0	0	25	360	0		
	Dumond Smart Strip		0	0	0	0	0	0	0	0	50	181	0		
	Eco Safety Prod EcoFast		0	0	0	0	0	0	0	0	60	376	1		
UMASS Lowell Products	Formulation #4*		80	70	95	95	80	70	70	60	100	15	78		
	Formulation B		85	50	60	65	75	75	80	65	70	23	78		
	Formulation F		75	20	65	70	80	75	60	70	55	30	70		
	Formulation #9		90	0	95	60	95	50	15	75	not tested		not tested		

Notes:

* Closest in composition to the Lowell Formulation evaluated in this document.

Only data for removers consistent with product groups shown (e.g., no NMP containing remover results shown).

All substrates had a primer over which 3 layers of the specified paint were applied. The Mixed substrate had 6 layers of different finished over the primer.

Wood substrates had the paint remover applied for an initial period and the surface was scraped and then the remover was reapplied a second time if necessary.

Wood and Masonry color coding: green - removed 90% or more, yellow - removed more than 60%, orange - removed 0 to 60%, red - removed no paint.

Steel color coding: green - removed 90% or more in <15 minutes, yellow - removed 70% or more in <30 minutes, orange, removed 50% or more in 60 minutes, red - removed less than 50% or took more than 60 minutes.

Table 5.20 Paint Remover Performance Data Reported by WM Barr (2017)

Group	Product	Number of Paint Layers Removed																	
		New Panel, Alkyd (5 layers)					New Panel, Epoxy (3 layers)			Aged Panel, Alkyd (5 layers)						Automotive Coating (3 layers)			
		5 min	15 min	30 min	60 min	4 hr	15 min	30 min	60 min	5 min	15 min	30 min	60 min	4 hr	24 hr	15 min	30 min	60 min	4 hr
1	Klean Strip Premium Stripper	5	5	5	5	5	2	2	2	0	5	5	5	nd	nd	2	2	2	2
	Klean Strip Aircraft Remover	5	5	5	5	5	2	2	2	Not Tested						3	3	3	3
2	Klean Strip Strip-X Stripper	0	5	5	5	5	0	0	2	0	0	0	5	nd	nd	2	2	2	2
3	WM Barr Experimental Paint Remover A	0	0	0	5	5	0	0	0	0	0	0	5	nd	nd	0	2	2	2
	WM Barr Experimental Paint Remover C	5	5	5	5	5	0	0	0	0	0	0	5	nd	nd	0	2	2	2
4	Motsenbocker Lift Off Paint and Varnish	0	0	0	0	0	0	0	0	nd	nd	0	0	0	0	Not Tested			
	WM Barr Experimental Paint Remover E	0	0	0	0	0	0	0	0	Not Tested						0	0	0	0
	EZ Strip Paint and Varnish Stripper	0	0	0	0	0	0	0	0	nd	nd	0	0	0	0	Not Tested			
	Packaging Service Co. Crown Paint Strip Next	0	0	0	0	5	0	0	0	nd	nd	0	0	0	0	Not Tested			
	TSW9 Plasti-master	0	0	1	1	4	0	0	0	Not Tested						Not Tested			
	D-Zolve 1012 power coating remover	0	1	2	2	5	0	0	0	Not Tested						0	0	0	0
		0	0	0	0	5	0	0	0	Not Tested						0	0	0	0
5	DuraPrep prep 400 overspray remover	0	0	0	0	5	0	0	0	Not Tested						0	0	0	0
	D-Zolve 15-33R (aircraft)*	0	0	0	0	0	0	0	0	Not Tested						0	0	0	0
	WM Barr Experimental Paint Remover D	0	0	0	0	0	0	0	0	Not Tested						0	0	0	0
	Dumond Smart Strip	0	0	0	0	0	0	0	0	nd	nd	0	0	0	5	Not Tested			
	Dumond Smart Strip Pro	0	0	0	0	0	0	0	0	nd	nd	0	0	0	5	Not Tested			
	PPG DuraPrep 200 Coating Remover	0	0	0	0	5	0	0	0	Not Tested						0	0	0	0
	PPG DuraPrep 240 Industrial Coating Remover	0	0	0	0	5	0	0	0	Not Tested						0	0	0	0
6	Dumond Peel Away 1	0	0	1	3	5	0	0	0	nd	nd	0	0	5	5	Not Tested			
	TSW3G(gel) Mason-master	0	0	1	1	4	0	0	0	Not Tested						Not Tested			

Notes:

nd - no data, measurements not carried out before an effect was expected or after an effect was observed.

Only data for removers consistent with product groups shown (e.g., no NMP containing remover results shown).

Color coding: green - all layers removed in 30 minutes or less; yellow, most layers removed in 60 minutes or less; orange - removal takes 4 hours or more; red - no layers removed.

Steel color coding: green - removed 90% or more in <15 minutes, yellow - removed 70% or more in <30 minutes, orange, removed 50% or more in 60 minutes, red - removed less than 50% or took more than 60 minutes.

Table 5.21 Paint Remover Performance Data Reported by RecoChem (2019)

Group	Product	Number of Paint Layers Removed					Degree of Paint Removal		
		Wood Panel					Metal Table		Metal Drawer
		Polyurethane Paint (4 layers)		Alkyd Paint (4 layers)		Water Based Paint (4 layers)	Metal Paint		Metal Paint
		15 min	30 min	15 min	30 min	15 min	15 min	30 min	30 min
1	Klean Strip	2	2	4 (partial)	4	4	none	complete	partial
	Heirloom*	2	2	4	4	not tested	not tested	not tested	complete
1 or 2	D-Super**	2 (partial)	2 (partial)	4 (partial)	4	3	complete	complete	complete
4	EZ-Strip	0		0	1 (partial)	1 (partial)	none	none	none
	Safest Stripper	0	0	0	0	0	none	none	none
5	Smart Strip	0	0	0	1 (partial)	1 (partial)	none	none	partial

Notes:

DCM = Dichloromethane; NMP = N-methyl pyrrolidone.

Only data for removers consistent with product groups shown (e.g., no NMP containing remover results shown).

* Believe to contain DCM because current SDS state it has been newly reformulated to not contain DCM.

** Exact DCM content could not be verified.

Wood coupons contained a primer layer and 3 additional paint layers. Metal parts were old parts with existing paint (number of layers not specified).

Wood color coding: green - 4 layers removed, yellow - 2-3 layers removed, orange - 1 layer removed, red - removed no paint.

Steel color coding: green - removed 90% or more in <15 minutes, yellow - removed 70% or more in <30 minutes, orange, removed 50% or more in 60 minutes, red - removed less than 50% or took more than 60 minutes.

Table 5.22 Summary of Paint Remover Performance Data

Product Group	IRTA, 2006	Wood Magazine, 1992	US Army 2006	TURI, 2017	WM Barr, 2017	RecoChem, 2019	Overall Conclusion on Performance
1	Base case						
2	Not Studied	Equivalent time to "soften" but judged less effective in removal	Not Studied	Generally appeared somewhat inferior (based on 1 product).	Similar performance although data are limited (based on 1 product).	Similar performance although data are limited (based on 1 product studied).	Somewhat less effective
3	Not Studied	Equivalent time to "soften" but clearly judged less effective in removal (based on 12 products studied).	Not Studied	Not Studied	Performance ranges from similar to clearly inferior depending on paint type (based on 2 products).	Not Studied	Clearly less effective in most cases
4	Not Studied	Significantly longer time to "soften" (60 minutes), performance judged equivalent for some paint types, clearly inferior for others (based on 12 products studied).	Not Studied	Clearly inferior performance (based on 2 products).	Performance is clearly inferior across a number of categories (based on 6 products).	Performance is clearly inferior across a number of categories (based on 2 products studied).	Clearly much less effective
5	As effective for some uses but not for certain cases (based on 1-4 products depending on	Not Studied	Performance judged equivalent for some paint types, clearly inferior for others (based on 3-4 products depending on test).	Clearly inferior performance (based on 3 products).	Performance is clearly inferior across a number of categories (based on 7 products studied).	Performance is clearly inferior across a number of categories although data are limited ((based on 1 product studied).	Variable and difficult to reconcile results, likely due to test differences. Equivalent to clearly inferior performance.
6	Not Studied	Significantly longer time to "soften" (60 minutes), performance typically judged fair to poor (based on 2 products studied).	Not Studied	Not Studied	Performance is clearly inferior across a number of categories (based on 2 products studied).	Not Studied	Clearly much less effective, although data are limited.
7	Not Studied	Not Studied	Clearly inferior performance, although data are very limited (based on 1 product).	Not Studied	Not Studied	Not Studied	Much less effective, although data are extremely limited.
8	Not Studied	Not Studied	Not Studied	Similar to slightly inferior performance depending on paint type	Not Studied	Not Studied	Similar to slightly inferior performance depending on paint type for a close formulation. No data on actual formulation.

Notes:

Color coding: green - similar performance to priority product, yellow - somewhat less effective, orange - significantly less effective, red - poor or generally ineffective.

Gradation shading denotes cases where performance data are mixed or inconsistent.

Table 5.23 Paint Remover Cost Data Reported in Wood Magazine (1992)

Group	Product	Price	Unit	Price per ounce	Group Costs	
1	Behlen Master Fire-Fly	\$8.95	15 oz	\$0.60	Average	\$0.32
	Bix Spray-On Stripper	\$9.82	15 oz	\$0.65		
	Bix Tuff-Job	\$7.63	quart	\$0.24		
	Dad's Easy Spray	\$8.99	15 oz	\$0.60		
	Formby's Paint Remover	\$9.98	quart	\$0.31		
	Jasco Liquid Paint Remover	\$6.49	quart	\$0.20		
	Jasco Premium	\$7.49	quart	\$0.23		
	Jasco Speedomatic	\$6.89	quart	\$0.22		
	Klean Strip KS-3	\$8.74	quart	\$0.27		
	Klean Strip Non-Flammable Sprayable	\$10.99	15 oz	\$0.73		
	Minuteman Bright Strip	\$19.95	gallon	\$0.16		
	Nasco Paint and Varnish Remover	\$6.99	quart	\$0.22		
	Nasco Ultra Speed	\$7.99	quart	\$0.25		
	Parks Pro Stripper	\$8.99	quart	\$0.28		
	Red Devil No. 122	\$7.89	quart	\$0.25		
	Savogran H2OFF	\$8.87	quart	\$0.28		
	Savogran Superstrip	\$8.42	quart	\$0.26		
	Sunnyside Premium	\$6.35	quart	\$0.20		
	Zar Paint and Varnish Remover	\$7.65	quart	\$0.24		
	Zip-Strip Non Flammable	\$8.53	quart	\$0.27		
	Zip Strip Water Rinsable	\$8.98	quart	\$0.28	Std Deviation	\$0.17
2	Bix Quick Strip	\$5.86	quart	\$0.18	Average	\$0.22
	Formby's Aerosol Paint Remover	\$7.87	15 oz	\$0.52		
	Klean Strip Klean Cutter	\$6.36	quart	\$0.20		
	Nasco Liquid Stripper	\$5.99	quart	\$0.19		
	Parks Liquid Strip	\$5.99	quart	\$0.19		
	Red Devil No. 99	\$5.93	quart	\$0.19		
	Red Devil No. 77	\$5.93	quart	\$0.19		
	Savogran Kutzit	\$6.24	quart	\$0.20		
	Savogran Strypeeze	\$7.16	quart	\$0.22		
	Sunnyside Liquid	\$4.70	quart	\$0.15		
	Zar Furniture Refinisher	\$7.94	quart	\$0.25		
	Zip-Strip Furniture Refinisher	\$5.73	quart	\$0.18	Std Deviation	\$0.10
3	Behlen Master Furniture Refinisher	\$6.79	quart	\$0.21	Average	\$0.22
	Bix Stripper	\$6.94	quart	\$0.22		
	Formby's Furniture Refinisher	\$13.89	quart	\$0.43		
	Jasco Furniture Refinisher	\$6.99	quart	\$0.22		
	Klean Strip Liquid Paint Remover	\$6.04	quart	\$0.19		
	Klean Strip Semi-Paste Paint Remover	\$7.25	quart	\$0.23		
	Nasco Furniture Refinisher	\$3.99	quart	\$0.12		
	Parks Furniture Refinisher	\$5.99	quart	\$0.19		
	Parks No Drip Strip	\$6.69	quart	\$0.21		
	Savogran Finishoff	\$6.94	quart	\$0.22		
	Sunnyside Heavy-Bodied	\$5.25	quart	\$0.16		
	UGL Raizoff	\$6.33	quart	\$0.20	Std Deviation	\$0.07

Group	Product	Price	Unit	Price per ounce	Group Costs
4	Klean Strip Easy Off	\$8.64	quart	\$0.27	Average \$0.29 Std Deviation \$0.08
	Peel Away 6	\$45.00	gallon	\$0.35	
	Savogran Strypsafer	\$11.13	quart	\$0.35	
	3M Safest Stripper	\$5.99	quart	\$0.19	
6	Behlen Master PDE	\$8.39	pound	\$0.52	Average \$0.35
	Peelaway 1	\$21.99	gallon	\$0.17	Std Deviation \$0.25

Notes:

Only data for removers consistent with product groups shown (*e.g.* , no NMP containing remover results shown).

Table 5.24 Preliminary Alternative Analysis Conclusions

Product Group	Description	Hazard			Performance	Relative Exposure Potential	Conclusions of PAA
		Human Health Hazard	Ecological Hazard	Physical/Chemical Hazards			
1	Priority Product (>60% DCM)	Base Case (200)	Base Case (100)	Base Case (85)	Base Case	Base Case	
2	Priority Product (<45% DCM)	Higher (265)	Similar (100)	Higher (125)	Somewhat less effective	Similar	These products would not be good substitutes for the priority product as the hazards are similar or higher, the exposure potential is similar, and the performance is somewhat reduced. Overall, not good candidates to carry over to Stage 2.
3	Acetone/Toluene/Methanol	Lower (145)	Substantially Lower (25)	Higher (150)	Clearly less effective in most cases	Similar	These products would not be good substitutes for the priority product in terms of physical hazard, although the health hazard is reduced. The exposure potential is similar, but their performance is clearly inferior to the priority products. Overall, not good candidates to carry over to Stage 2.
4	Dibasic esters	Substantially Lower (75)	Substantially Lower (45)	Substantially lower (0)	Clearly much less effective	Lower exposure potential <i>via</i> air, similar for other pathways	Despite good hazard scores and reduced exposure potential for some pathways, inferior performance of these products leads to dropping this group from further consideration.
5	Benzyl alcohol	Substantially Lower (20)	Substantially lower (0))	Similar (50)	Variable and difficult to reconcile results, likely due to test differences. Equivalent to clearly inferior performance.	Lower exposure potential <i>via</i> air, similar for other pathways	Hazard scores are substantially lower than the priority product, and there is an indication of reduced exposure potential. However, performance is reported to be highly inconsistent, with some studies showing similar performance to the priority product and others showing very poor performance. Consider carrying to Stage 2 if the performance discrepancies can be resolved.
6	Caustics	Substantially Lower (30)	Substantially Lower (15)	Substantially Lower (0)	Clearly much less effective, although data are limited.	Lower exposure potential <i>via</i> air, potentially greater exposure <i>via</i> water, similar potential for soil/sediment	Despite good hazard scores and reduced exposure potential for some pathways, the inferior performance of these products in all of the performance studies leads to dropping this group from further consideration.
7	Other	Varies, 110-225	Substantially lower (0))	Varies, 50-150	No reliable data to evaluate performance	Lower exposure potential <i>via</i> air, similar for other pathways	Hazard score is variable across the category, and exposure potential may be better for some products, but the absence of data to determine whether the products work leads to dropping this group from further consideration.
8	Lowell Formulation	Lower 110 or 185	Substantially Lower (10)	Higher (150)	Similar to slightly inferior performance depending on paint type for a close formulation. No data on actual formulation.	Lower exposure potential <i>via</i> air, similar for other pathways	There is reduced human health and ecological hazard relative to the priority product. Increased flammability could be a trade off, but this should be explored (<i>e.g.</i> , the impacts of additives that reduce vapor pressure). Performance for similar products is nearly as good, but performance data on the current formulation are needed.

Notes:
DCM = Dichloromethane; PAA = Preliminary Alternatives Assessment.
For Hazard scores, numbers in parenthesis are scores derived using the CSI-based scoring approach. For Group 8, the two scores for human health hazard reflect uncertainties in the data.
Gradient in shading indicates a clear conclusion could not be reached and the judgment could be either of the two colors based on available data.

Appendix A

Certification Statement

Certification and Signatures

"I certify that this document and all attachments were prepared or compiled under my direction or supervision to assure that qualified personnel properly gathered and evaluated the information submitted. Based on my inquiry of the person(s) directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that submitting false information or statements is a violation of law."

Responsible Entity Signature Loye Shaul Date 10-29-19
[Insert Full Name]

Responsible Entity Signature _____ Date _____
[Insert Full Name]

Appendix C

**Safety Data Sheets for Priority Products Produced by Responsible
Entities Involved in This AA Report**

Benco

Benco Priority Product Notification versus Safety Data Sheets

Priority Product Notification		Safety Data Sheet	
Product			
Benco Paint Removers			
Assembled Product Name			
Benco B1 Industrial Paint Remover (Liquid)		B1 Industrial Paint Remover	
Benco B4 Industrial Semi-paste Paint Remover		B4 Industrial Paint Remover	
Benco B2 Industrial Liquid Paint Remover		B2 Industrial Paint Remover	
Benco B7 Industrial Paint remover (liquid)		B7 Industrial Paint Remover	
Benco B6 Aircraft Stripper		B6 Industrial Paint Remover	
Benco B14 Industrial Powdercoat Remover – Liquid		B14 Industrial Paint Remover	
Benco B15 Industrial Powder Coat remover – Semi Paste		B15 Industrial Paint Remover	
Benco B17 Advanced Industrial Powder Coat remover - Liquid		B17 Industrial Paint Remover	

SAFETY DATA SHEET

Section 1, Identification

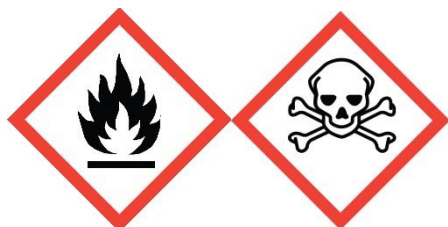
Product Identifier: B1 Industrial Paint Remover
Synonyms: B1
CAS No.: None - mixture
Manufacture Stock Number: B1
Intended Use: Paint and Finish Removal
Manufacturer: Benco Sales, Inc.
123 Stout Drive
Crossville, TN 38555
931-484-9578
Emergency Phone: 800-535-5053
Information Phone: 931-484-9578
Fax: 931-484-7614

Section 2, Hazards Identification

Classification: GHS-US Classification

Signal Word: WARNING!

Pictogram:



Hazard Statements: Skin irritation (Category 2), H315

Eye irritation (Category 2A), H319

Carcinogenicity (Category 2). H351

Single target organ toxicity – single exposure (Category 3), Respiratory

System, Central Nervous System, H335, H336 Specific target organ toxicity – repeated exposure, Inhalation (Category 2), Central Nervous System, H373

Precautionary Statements:

H315 Causes Skin irritation, burns

H319 Causes serious eye irritation, burns

H335 May cause respiratory irritation

H336 May cause drowsiness or dizziness

H351 Suspected of causing cancer

H373 May cause damage to organs (central nervous system) through prolonged or repeated exposure if inhaled.

Prevention:

P201 Obtain specific instructions before use.

P202 Do not use until safety precautions have been read and understood.

P260 Do not breathe fumes.

P264 Wash skin thoroughly after handling.

P271 Use out of doors or in well ventilated areas.

P280 Wear protective gloves/eye protection/face protection.

P302&P352 If on skin: Wash off with plenty of soap and water.

P304&P340 If inhaled: Get to fresh air

P305&P351&P338 If in eyes: Wash with water for several minutes – get medical attention.

P362 Take off contaminated clothing and wash before reuse.

Storage: **P403&P233 Store in a well ventilated area out of direct sunlight. Keep container closed.**

Disposal: **Dispose of waste contents/container at an approved facility.**

Hazards not Otherwise Classified: None

Section 3, Composition/Information on Ingredients

CAS No.	Ingredient Name	PEL(OSHA)	TWA (OSHA)	Weight Percentage
75-09-2	Dichloromethane	25 ppm	25 ppm	20-30
67-56-1	Methanol	200 ppm	200 ppm	20-30
111-76-2	2-Butoxyethanol	50 ppm	50 ppm	2-5
67-64-1	Acetone	1000 ppm	1000 ppm	15-25
108-88-3	Toluene	300 ppm	300 ppm	12-20

Occupational exposure limits, if available, are listed in section 8

Section 4, First Aid Measures

Eye: Flush with large amounts of water, lifting upper and lower lids. Get medical attention.

Ingestion: Call Physician, poison control center, or hospital emergency room. Never give anything by Mouth to an unconscious person.

Skin: Thoroughly wash exposed area with soap & water. Remove contaminated clothing Wash contaminated clothing before reuse.

Inhalation: If affected, remove individual to fresh air. If breathing is difficult, administer respiration. Keep person warm, quiet, and get medical attention.

Section 5, Fire Fighting Measures

Suitable Extinguishing Media: Water spray, alcohol-resistant foam, dry chemical, or carbon dioxide

Unsuitable Extinguishing Media: no data available

Fire Fighting Instructions: Self-contained breathing apparatus with a full face piece operated in Pressure demand or other positive pressure mode.

Section 6, Accidental Release Measures

Emergency Procedures: Use personal protective equipment. Avoid breathing vapors. Ensure Adequate ventilation. Evacuate personnel to safe areas.

Personal Protective Equipment: See section 8

Environmental Precautions: Prevent further leakage or spillage if safe to do so.

Methods for Containment: Soak up with inert absorbent material and dispose of as Hazardous waste. Keep in suitable closed containers for disposal.

Reference to Other sections: Section 8, Exposure Controls and Personal Protection

Section 7, Handling and Storage

Handling: Avoid contact with skin and eyes. Avoid inhalation of vapors or mists.

Storage: Store in a cool, dry, well ventilated space out of direct sunlight.

Section 8, Exposure Controls and Personal Protection

Occupational Exposure Limits: See Section 3.

Appropriate Engineering Controls: Ventilation: Controlling airborne concentrations below the ACGIH TLV exposure guideline is recommended. ADGIH TWA is 50ppm. OSHA PEL is 25 ppm 8 hour TWA, and a STEL is 125 ppm. This rule also establishes an Action Level of 12.5 ppm. Use only with adequate ventilation. Local exhaust ventilation is necessary for most applications. Lethal concentrations may exist in areas with poor ventilation. Contact Benco for further information. Medical monitoring is also required by OSHA for applications that exceed the Action Level of 12.5ppm. Contact Benco at 800-632-3626 for assistance and instructions on air monitoring.

Personal Protective Equipment: Splash goggles / Face Shield, Chemical resistant gloves, Chemical resistant apron and proper foot protections.

Hand Protection: Wear appropriate safety gloves

Eye Protection: Use safety glasses. Where contact is likely, use chemical splash goggles.

Skin and Body Protection: Avoid contact with skin and avoid breathing vapors. Do not eat, drink, or smoke in work area. Wash hands prior to eating, drinking, or using restroom. Any clothing or shoes that have been contaminated should be removed immediately and thoroughly and laundered before wearing again.

Respiratory Protection: Atmospheric levels should be maintained below the exposure guideline. If this level is exceeded, use an approved air supplied respirator. For emergency and other conditions where the exposure guideline may be greatly exceeded, use an approved positive pressure self-contained breathing apparatus.

Other Protective Information: Safety shower and Eyewash Station should be available in work area.

Section 9, Physical and Chemical Properties

Physical State: Liquid

Appearance: Light in color

Odor: Odor of Toluene and Acetone

pH: 10-12

Boiling Point: 104-135

Density: 10 lbs. / gallon

Vapor Density: 2.12 (Air = 1)

Specific Gravity: .96

Percent Volatile: 97%

VOC Emission Content: 349 grams

Flash Point: 15 Deg F

Auto-ignition Temperature: Not Determined

Section 10, Stability and Reactivity

Reactivity: No data available

Chemical Stability: Stable under recommended storage conditions

Possibility of Hazardous Reactions: No data available

Conditions to Avoid: Heat, flame, and sparks. Exposure to sunlight.

Incompatible Materials: Alkali metals, aluminum, strong oxidizing agents, strong acids.

Hazardous Decomposition Products: Open flames and welding arcs can cause thermal decomposition with the evolution of hydrogen chloride and very small amounts of phosgene and chlorine.

Section 11, Toxicological Information

Information on Toxicological Affects: LD50 Oral – Rat >2,000 mg/kg

Respiratory or Skin Sensitization: LC50 inhalation – rat 52,000mg/m3 Skin irritation and eye irritation on contact

Carcinogenic: Limited evidence of carcinogenicity in animal studies

IARC 2B: Possible carcinogenic to humans.

OSHA: OSHA specifically regulated carcinogen (dichloromethane)

Reproductive Toxicity: no data available

Symptoms/Injuries after Inhalation: Dichloromethane is metabolized in the body producing carbon monoxide which increased and sustains carboxyhemoglobin levels in the blood, reducing oxygen-carrying capacity of the blood. Acts as a simple asphyxiant by displacing air – anesthetic affects. Difficulty in breathing, headaches, dizziness.

Symptoms/Injuries after Eye Contact: Redness , blurred vision, tears, burns on extended contact.

Symptoms/Injuries after Ingestion: Gastrointestinal irritation, central nervous system depression, abdominal pain.

Section 12, Ecological Information

Keep Out of Water Ways.

Section 13, Disposal

Dispose of in accordance with local, regional, national and international regulations.

Section 14, Transportation Information

UN Number: 1263

UN Number (DOT): UN1263

UN Proper Shipping Name: UN1263, Paint Related Material, 3, PGII

DOT Classification: 3

Hazard Classification: Flammable

Hazard Labels: Flammable

Packing Group: Group II

Section 15, Regulatory Information

Materials Listed on the United States TSCA (Toxic Substance Control Act) Inventory.

State and Local Regulations:

Section 16, Other Information

Revision Date: March 9, 2017

Other Information: This document has been prepared in accordance with the SDS requirements of the OSHA Hazard Communication Standard 29 CFR 1910.1200.

NFPA health hazards: 2

NFPA fire Hazards: 3

NFPA Reactivity: 0

HMIS III Rating:

Health: 3

Flammability: 3

Physical: 0

Special Precautions to be Taken in Handling & Storage: Exercise reasonable care and caution. Avoid breathing vapors. Store in a cool place out of direct sunlight. Concentrated vapors of this product are heavier than air and will collect in low areas such as pits and degreasers, storage tanks, and other confined areas. Do not enter those areas where vapors of this product are suspected unless special breathing apparatus is used and an observer is present for assistance. Not intended for use on bathtubs, bathrooms, or enclosed areas.

Do not pressure product out of container with air. When opening bung, open bung partially and vent any accumulated pressure before removing bung completely. Empty product containers may contain liquid or vapor residues of this product. All precautions suggested in this Data Sheet apply to empty containers also. Empty containers are property of Benco Sales, Inc. and should not be sold to individuals or other parties. Do not repackage this product for resale. Any product purchased for resale must have this SDS attached to each container and must be in original container. If each container does not have and SDS, call Benco at 800-632-3626.

Do not remove or deface labels off containers.

This information is based on our knowledge and is intended to describe the product for the purposes of health, safety and environmental requirements only. It should not be construed as guaranteeing any specific property of the product.

SAFETY DATA SHEET

Section 1, Identification

Product Identifier: B4 Industrial Paint Remover
Synonyms: B4
CAS No.: None - mixture
Manufacture Stock B4
Number:
Intended Use: Paint and Finish Removal
Manufacturer: Benco Sales, Inc.
123 Stout Drive
Crossville, TN 38555
931-484-9578
Emergency Phone: 800-535-5053 INFOTRAC
Information Phone: 931-484-9578
Fax: 931-484-7614

Section 2, Hazards Identification

Classification: GHS-US Classification

Signal Word: Warning

Pictogram:



Hazard Statements: Skin irritation (Category 2), H315

Eye irritation (Category 2A), H319

Carcinogenicity (Category 2). H351

Single target organ toxicity – single exposure (Category 3), Respiratory

System, Central Nervous System, H335, H336 Specific target organ toxicity – repeated exposure, Inhalation (Category 2), Central Nervous System, H373

Precautionary Statements:

H315 Causes Skin irritation, burns

H319 Causes serious eye irritation, burns

H335 May cause respiratory irritation

H336 May cause drowsiness or dizziness

H351 Suspected of causing cancer

H373 May cause damage to organs (central nervous system) through prolonged or repeated exposure if inhaled.

Prevention:

P201 Obtain specific instructions before use.

P202 Do not use until safety precautions have been read and understood.

P260 Do not breathe fumes.

P264 Wash skin thoroughly after handling.

P271 Use out of doors or in well ventilated areas.

P280 Wear protective gloves/eye protection/face protection.

P302&P352 If on skin: Wash off with plenty of soap and water.

P304&P340 If inhaled: Get to fresh air

P305&P351&P338 If in eyes: Wash with water for several minutes – get medical attention.

P362 Take off contaminated clothing and wash before reuse.

Storage: P403&P233 Store in a well ventilated area out of direct sunlight. Keep container closed.
Disposal: Dispose of waste contents/container at an approved facility.

Hazards not Otherwise Classified: None

Section 3, Composition/Information on Ingredients

CAS No.	Ingredient Name	PEL(OSHA)	TWA (OSHA)	Weight Percentage
75-09-2	Dichloromethane	25 ppm	25 ppm	70-80
67-56-1	Methanol	200 ppm	200 ppm	5-15
111-76-2	2-Butoxyethanol	50 ppm	50 ppm	1-10
141-43-5	Ethanolamine	6 ppm	3 ppm	1-5

Occupational exposure limits, if available, are listed in section 8

Section 4, First Aid Measures

Eye: Flush with large amounts of water, lifting upper and lower lids. Get medical attention.
Ingestion: Call Physician, poison control center, or hospital emergency room. Never give anything by Mouth to an unconscious person.
Skin: Thoroughly wash exposed area with soap & water. Remove contaminated clothing Wash contaminated clothing before reuse.
Inhalation: If affected, remove individual to fresh air. If breathing is difficult, administer respiration. Keep person warm, quiet, and get medical attention.

Section 5, Fire Fighting Measures

Suitable Extinguishing Media: Water spray, alcohol-resistant foam, dry chemical, or carbon dioxide
Unsuitable Extinguishing Media: no data available
Fire Fighting Instructions: Self-contained breathing apparatus with a full face piece operated in Pressure demand or other positive pressure mode.

Section 6, Accidental Release Measures

Emergency Procedures: Use personal protective equipment. Avoid breathing vapors. Ensure Adequate ventilation. Evacuate personnel to safe areas.
Personal Protective Equipment: See section 8
Environmental Precautions: Prevent further leakage or spillage if safe to do so.
Methods for Containment: Soak up with inert absorbent material and dispose of as Hazardous waste. Keep in suitable closed containers for disposal.
Reference to Other sections: Section 8, Exposure Controls and Personal Protection

Section 7, Handling and Storage

Handling: Avoid contact with skin and eyes. Avoid inhalation of vapors or mists.
Storage: Store in a cool, dry, well ventilated space out of direct sunlight.

Section 8, Exposure Controls and Personal Protection

Occupational Exposure Limits: See Section 3.

Appropriate Engineering Controls: Ventilation: Controlling airborne concentrations below the ACGIH TLV exposure guideline is recommended. ADGIH TWA is 50ppm. OSHA PEL is 25 ppm 8 hour TWA, and a STEL is 125 ppm. This rule also establishes an Action Level of 12.5 ppm. Use only with adequate ventilation. Local exhaust ventilation is necessary for most applications. Lethal concentrations may exist in areas with poor ventilation. Contact Benco for further information. Medical monitoring is also required by OSHA for applications that exceed the Action Level of 12.5ppm. Contact Benco at 800-632-3626 for assistance and instructions on air monitoring.

Personal Protective Equipment: Splash goggles / Face Shield, Chemical resistant gloves, Chemical resistant apron and proper foot protections.

Hand Protection: Wear appropriate safety gloves

Eye Protection: Use safety glasses. Where contact is likely, use chemical splash goggles.

Skin and Body Protection: Avoid contact with skin and avoid breathing vapors. Do not eat, drink, or smoke in work area. Wash hands prior to eating, drinking, or using restroom. Any clothing or shoes that have been contaminated should be removed immediately and thoroughly and laundered before wearing again.

Respiratory Protection: Atmospheric levels should be maintained below the exposure guideline. If this level is exceeded, use an approved air supplied respirator. For emergency and other conditions where the exposure guideline may be greatly exceeded, use an approved positive pressure self-contained breathing apparatus.

Other Protective Information: Safety shower and Eyewash Station should be available in work area.

Section 9, Physical and Chemical Properties

Physical State: Liquid

Appearance: Light in color

Odor: Typical Methylene chloride odor

pH: 10-12

Boiling Point: 104 (Initial)

Density: 10 lbs./gal.

Vapor Density: 2.93 (Air = 1)

Specific Gravity: 1.190

Percent Volatile: >95.0%

VOC Emission Content: 154.7 grams/liter

Flash Point: None to boiling point

Auto-ignition Temperature: Not Determined

Section 10, Stability and Reactivity

Reactivity: No data available

Chemical Stability: Stable under recommended storage conditions

Possibility of Hazardous Reactions: No data available

Conditions to Avoid: Heat, flame, and sparks. Exposure to sunlight.

Incompatible Materials: Alkali metals, aluminum, strong oxidizing agents, strong acids.

Hazardous Decomposition Products: Open flames and welding arcs can cause thermal decomposition with the evolution of hydrogen chloride and very small amounts of phosgene and chlorine.

Section 11, Toxicological Information

Information on Toxicological Affects: LD50 Oral – Rat >2,000 mg/kg

Respiratory or Skin Sensitization: LC50 inhalation – rat 52,000mg/m³ Skin irritation and eye irritation on contact

Carcinogenic: Limited evidence of carcinogenicity in animal studies

IARC 2B: Possible carcinogenic to humans.

OSHA: OSHA specifically regulated carcinogen (dichloromethane)

Reproductive Toxicity: no data available

Symptoms/Injuries after Inhalation: Dichloromethane is metabolized in the body producing carbon monoxide which increased and sustains carboxyhemoglobin levels in the blood, reducing oxygen-carrying capacity of the blood. Acts as a simple asphyxiant by displacing air – anesthetic affects. Difficulty in breathing, headaches, dizziness.

Symptoms/Injuries after Eye Contact: Redness, blurred vision, tears, burns on extended contact.

Symptoms/Injuries after Ingestion: Gastrointestinal irritation, central nervous system depression, abdominal pain.

Section 12, Ecological Information

Keep Out of Water Ways.

Section 13, Disposal

Dispose of in accordance with local, regional, national and international regulations.

Section 14, Transportation Information

UN Number: 3066

UN Number (DOT): UN3066

UN Proper Shipping Name: UN3066, Paint Related Material, 8, PGII

DOT Classification: 8

Hazard Classification: Corrosive

Hazard Labels: Corrosive

Packing Group: Group II

Section 15, Regulatory Information

Materials Listed on the United States TSCA (Toxic Substance Control Act) Inventory.

State and Local Regulations:

Section 16, Other Information

Revision Date:

Other Information: This document has been prepared in accordance with the SDS requirements of the OSHA Hazard Communication Standard 29 CFR 1910.1200.

NFPA health hazards: 2

NFPA fire Hazards: 1

NFPA Reactivity: 0

HMIS III Rating:

Health: 3

Flammability: 1

Physical: 0

Special Precautions to be Taken in Handling & Storage: Exercise reasonable care and caution. Avoid breathing vapors. Store in a cool place out of direct sunlight. Concentrated vapors of this product are heavier than air and will collect in low areas such as pits and degreasers, storage tanks, and other confined areas. Do not enter those areas where vapors of this product are suspected unless special breathing apparatus is used and an observer is present for assistance. Not intended for use on bathtubs, bathrooms, or enclosed areas.

Do not pressure product out of container with air. When opening bung, open bung partially and vent any accumulated pressure before removing bung completely. Empty product containers may contain liquid or vapor residues of this product. All precautions suggested in this Data Sheet apply to empty containers also. Empty containers are property of Benco Sales, Inc. and should not be sold to individuals or other parties. Do not repackage this product for resale. Any product purchased for resale must have this SDS attached to each container and must be in original container. If each container does not have and SDS, call Benco at 800-632-3626.

Do not remove or deface labels off containers.

This information is based on our knowledge and is intended to describe the product for the purposes of health, safety and environmental requirements only. It should not be construed as guaranteeing any specific property of the product.

SAFETY DATA SHEET

Section 1, Identification

Product Identifier: B2 Industrial Paint Remover
Synonyms: B2
CAS No.: None - mixture
Manufacture Stock Number: B2
Intended Use: Paint and Finish Removal
Manufacturer: Benco Sales, Inc.
123 Stout Drive
Crossville, TN 38555
931-484-9578
Emergency Phone: 800-535-5053
Information Phone: 931-484-9578

"This chemical product is not and cannot be distributed in commerce (as defined in TSCA section 3(5)) or processed (as defined in TSCA Section 3(13)) for consumer paint and coating removal."

Section 2, Hazards Identification

Classification: GHS-US Classification

Signal Word: Warning

Pictogram:



Hazard Statements: Skin irritation (Category 2), H315

Eye irritation (Category 2A), H319

Carcinogenicity (Category 2). H351

Single target organ toxicity – single exposure (Category 3), Respiratory

System, Central Nervous System, H335, H336 Specific target organ toxicity – repeated exposure, Inhalation (Category 2), Central Nervous System, H373

Precautionary Statements:

H315 Causes Skin irritation, burns

H319 Causes serious eye irritation, burns

H335 May cause respiratory irritation

H336 May cause drowsiness or dizziness

H351 Suspected of causing cancer

H373 May cause damage to organs (central nervous system) through prolonged or repeated exposure if inhaled.

Prevention:

P201 Obtain specific instructions before use.

P202 Do not use until safety precautions have been read and understood.

P260 Do not breathe fumes.

P264 Wash skin thoroughly after handling.

P271 Use out of doors or in well ventilated areas.

P280 Wear protective gloves/eye protection/face protection.

P302&P352 If on skin: Wash off with plenty of soap and water.

P304&P340 If inhaled: Get to fresh air

P305&P351&P338 If in eyes: Wash with water for several minutes – get medical attention.

P362 Take off contaminated clothing and wash before reuse.

Storage: P403&P233 Store in a well-ventilated area out of direct sunlight. Keep container closed.

Disposal: Dispose of waste contents/container at an approved facility.

Hazards not Otherwise Classified: None

Section 3, Composition/Information on Ingredients

CAS No.	Ingredient Name	PEL(OSHA)	TWA (OSHA)	Weight Percentage
75-09-2	Dichloromethane	25 ppm	25 ppm	75-85
67-56-1	Methanol	200 ppm	200 ppm	8-15
111-76-2	2-Butoxyethanol	50 ppm	50 ppm	1-10
64742-95-6	Aromatic Hydrocarbon	300 ppm	300 ppm	1-3

Occupational exposure limits, if available, are listed in section 8

Section 4, First Aid Measures

Eye: Flush with large amounts of water, lifting upper and lower lids. Get medical attention.

Ingestion: Call Physician, poison control center, or hospital emergency room. Never give anything by Mouth to an unconscious person.

Skin: Thoroughly wash exposed area with soap & water. Remove contaminated clothing Wash contaminated clothing before reuse.

Inhalation: If affected, remove individual to fresh air. If breathing is difficult, administer respiration. Keep person warm, quiet, and get medical attention.

Section 5, Fire Fighting Measures

Suitable Extinguishing Media: Water spray, alcohol-resistant foam, dry chemical, or carbon dioxide

Unsuitable Extinguishing Media: no data available

Fire Fighting Instructions: Self-contained breathing apparatus with a full-face piece operated in Pressure demand or other positive pressure mode.

Section 6, Accidental Release Measures

Emergency Procedures: Use personal protective equipment. Avoid breathing vapors. Ensure Adequate ventilation. Evacuate personnel to safe areas.

Personal Protective Equipment: See section 8

Environmental Precautions: Prevent further leakage or spillage if safe to do so.

Methods for Containment: Soak up with inert absorbent material and dispose of as Hazardous waste. Keep in suitable closed containers for disposal.

Reference to Other sections: Section 8, Exposure Controls and Personal Protection

Section 7, Handling and Storage

Handling: Avoid contact with skin and eyes. Avoid inhalation of vapors or mists.

Storage: Store in a cool, dry, well ventilated space out of direct sunlight.

Section 8, Exposure Controls and Personal Protection

Occupational Exposure Limits: See Section 3.

Appropriate Engineering Controls: Ventilation: Controlling airborne concentrations below the ACGIH TLV exposure guideline is recommended. ADGIH TWA is 50ppm. OSHA PEL is 25 ppm 8-hour TWA, and a STEL is 125 ppm. This rule also establishes an Action Level of 12.5 ppm. Use only with adequate ventilation. Local exhaust ventilation is necessary for most applications. Lethal concentrations may exist in areas with poor ventilation. Contact Benco for further information. Medical monitoring is also required by OSHA for applications that exceed the Action Level of 12.5ppm. Contact Benco at 800-632-3626 for assistance and instructions on air monitoring.

Personal Protective Equipment: Splash goggles / Face Shield, Chemical resistant gloves, Chemical resistant apron and proper foot protections.

Hand Protection: Wear appropriate safety gloves

Eye Protection: Use safety glasses. Where contact is likely, use chemical splash goggles.

Skin and Body Protection: Avoid contact with skin and avoid breathing vapors. Do not eat, drink, or smoke in work area. Wash hands prior to eating, drinking, or using restroom. Any clothing or shoes that have been contaminated should be removed immediately and thoroughly and laundered before wearing again.

Respiratory Protection: Atmospheric levels should be maintained below the exposure guideline. If this level is exceeded, use an approved air supplied respirator. For emergency and other conditions where the exposure guideline may be greatly exceeded, use an approved positive pressure self-contained breathing apparatus.

Other Protective Information: Safety shower and Eyewash Station should be available in work area.

Section 9, Physical and Chemical Properties

Physical State: Liquid

Appearance: Light in color

Odor: Typical Methylene chloride odor

pH: 10-12

Boiling Point: 104 (Initial)

Density: 10 lbs. / gallon

Vapor Density: 2.93 (Air = 1)

Specific Gravity: 1.190

Percent Volatile: >95%

VOC Emission Content: 118.27 grams

Flash Point: None

Auto-ignition Temperature: Not Determined

Section 10, Stability and Reactivity

Reactivity: No data available

Chemical Stability: Stable under recommended storage conditions

Possibility of Hazardous Reactions: No data available

Conditions to Avoid: Heat, flame, and sparks. Exposure to sunlight.

Incompatible Materials: Alkali metals, aluminum, strong oxidizing agents, strong acids.

Hazardous Decomposition Products: Open flames and welding arcs can cause thermal decomposition with the evolution of hydrogen chloride and very small amounts of phosgene and chlorine.

Section 11, Toxicological Information

Information on Toxicological Affects: LD50 Oral – Rat >2,000 mg/kg

Respiratory or Skin Sensitization: LC50 inhalation – rat 52,000mg/m3 Skin irritation and eye irritation on contact

Carcinogenic: Limited evidence of carcinogenicity in animal studies

IARC 2B: Possible carcinogenic to humans.

OSHA: OSHA specifically regulated carcinogen (dichloromethane)

Reproductive Toxicity: no data available

Symptoms/Injuries after Inhalation: Dichloromethane is metabolized in the body producing carbon monoxide which increased and sustains carboxyhemoglobin levels in the blood, reducing oxygen-carrying capacity of the blood. Acts as a simple asphyxiant by displacing air – anesthetic affects. Difficulty in breathing, headaches, dizziness.

Symptoms/Injuries after Eye Contact: Redness, blurred vision, tears, burns on extended contact.

Symptoms/Injuries after Ingestion: Gastrointestinal irritation, central nervous system depression, abdominal pain.

Section 12, Ecological Information

Keep Out of Water Ways.

Section 13, Disposal

Dispose of in accordance with local, regional, national and international regulations.

Section 14, Transportation Information

UN Number: 3066

UN Number (DOT): UN3066

UN Proper Shipping Name: UN3066, Paint Related Material, 8, PGII

DOT Classification: 8

Hazard Classification: Corrosive

Hazard Labels: Corrosive

Packing Group: Group II

Section 15, Regulatory Information

Materials Listed on the United States TSCA (Toxic Substance Control Act) Inventory.

State and Local Regulations:

"This chemical product is and cannot be distributed in commerce (as defined in TSCA section 3(5)) or processed (as defined in TSCA Section 3(13)) for consumer paint and coating removal."

Section 16, Other Information

Revision Date: May 18, 2019

Other Information: This document has been prepared in accordance with the SDS requirements of the OSHA Hazard Communication Standard 29 CFR 1910.1200.

NFPA health hazards: 2

NFPA fire Hazards: 1

NFPA Reactivity: 0

HMIS III Rating:

Health: 3

Flammability: 1

Physical: 0

Special Precautions to be Taken in Handling & Storage: Exercise reasonable care and caution. Avoid breathing vapors. Store in a cool place out of direct sunlight. Concentrated vapors of this product are heavier than air and will collect in low areas such as pits and degreasers, storage tanks, and other confined areas. Do not enter those areas where vapors of this product are suspected unless special breathing apparatus is used, and an observer is present for assistance. Not intended for use on bathtubs, bathrooms, or enclosed areas.

Do not pressure product out of container with air. When opening bung, open bung partially and vent any accumulated pressure before removing bung completely. Empty product containers may contain liquid or vapor residues of this product. All precautions suggested in this Data Sheet apply to empty containers also. Empty containers are property of Benco Sales, Inc. and should not be sold to individuals or other parties. Do not repackage this product for resale. Any product purchased for resale must have this SDS attached to each container and must be in original container. If each container does not have an SDS, call Benco at 800-632-3626.

Do not remove or deface labels off containers.

This information is based on our knowledge and is intended to describe the product for the purposes of health, safety and environmental requirements only. It should not be construed as guaranteeing any specific property of the product.

SAFETY DATA SHEET

Section 1, Identification

Product Identifier: B7 Industrial Paint Remover
Synonyms: B7
CAS No.: None - mixture
Manufacture Stock Number: B7
Intended Use: Paint and Finish Removal
Manufacturer: Benco Sales, Inc.
123 Stout Drive
Crossville, TN 38555
931-484-9578
Emergency Phone: 800-535-5053 INFOTRAC
Information Phone: 931-484-9578
Fax: 931-484-7614

Section 2, Hazards Identification

Classification: GHS-US Classification

Signal Word: Warning

Pictogram:



Hazard Statements: Skin irritation (Category 2), H315

Eye irritation (Category 2A), H319

Carcinogenicity (Category 2). H351

Single target organ toxicity – single exposure (Category 3), Respiratory

System, Central Nervous System, H335, H336 Specific target organ toxicity – repeated exposure, Inhalation (Category 2), Central Nervous System, H373

Precautionary Statements:

H315 Causes Skin irritation, burns

H319 Causes serious eye irritation, burns

H335 May cause respiratory irritation

H336 May cause drowsiness or dizziness

H351 Suspected of causing cancer

H373 May cause damage to organs (central nervous system) through prolonged or repeated exposure if inhaled.

Prevention:

P201 Obtain specific instructions before use.

P202 Do not use until safety precautions have been read and understood.

P260 Do not breathe fumes.

P264 Wash skin thoroughly after handling.

P271 Use out of doors or in well ventilated areas.

P280 Wear protective gloves/eye protection/face protection.

P302&P352 If on skin: Wash off with plenty of soap and water.

P304&P340 If inhaled: Get to fresh air

P305&P351&P338 If in eyes: Wash with water for several minutes – get medical attention.

P362 Take off contaminated clothing and wash before reuse.

Storage: P403&P233 Store in a well ventilated area out of direct sunlight. Keep container closed.

Disposal: Dispose of waste contents/container at an approved facility.

Hazards not Otherwise Classified: None

Section 3, Composition/Information on Ingredients

CAS No.	Ingredient Name	PEL(OSHA)	TWA (OSHA)	Weight Percentage
75-09-2	Dichloromethane	25 ppm	25 ppm	70-80
67-56-1	Methanol		200 ppm	200 ppm 5-15
111-76-2	2-Butoxyethanol	50 ppm	50 ppm	1-10
34591-94-8	2-Methoxymethylethoxpropanol	25 ppm	25 ppm	1-3
	Biodegradable Wetting Agent & Wax	NA	NA	1-5

Occupational exposure limits, if available, are listed in section 8

Section 4, First Aid Measures

Eye: Flush with large amounts of water, lifting upper and lower lids. Get medical attention.

Ingestion: Call Physician, poison control center, or hospital emergency room. Never give anything by Mouth to an unconscious person.

Skin: Thoroughly wash exposed area with soap & water. Remove contaminated clothing Wash contaminated clothing before reuse.

Inhalation: If affected, remove individual to fresh air. If breathing is difficult, administer respiration. Keep person warm, quiet, and get medical attention.

Section 5, Fire Fighting Measures

Suitable Extinguishing Media: Water spray, alcohol-resistant foam, dry chemical, or carbon dioxide

Unsuitable Extinguishing Media: no data available

Fire Fighting Instructions: Self-contained breathing apparatus with a full face piece operated in Pressure demand or other positive pressure mode.

Section 6, Accidental Release Measures

Emergency Procedures: Use personal protective equipment. Avoid breathing vapors. Ensure Adequate ventilation. Evacuate personnel to safe areas.

Personal Protective Equipment: See section 8

Environmental Precautions: Prevent further leakage or spillage if safe to do so.

Methods for Containment: Soak up with inert absorbent material and dispose of as Hazardous waste. Keep in suitable closed containers for disposal.

Reference to Other sections: Section 8, Exposure Controls and Personal Protection

Section 7, Handling and Storage

Handling: Avoid contact with skin and eyes. Avoid inhalation of vapors or mists.

Storage: Store in a cool, dry, well ventilated space out of direct sunlight.

Section 8, Exposure Controls and Personal Protection

Occupational Exposure Limits: See Section 3.

Appropriate Engineering Controls: Ventilation: Controlling airborne concentrations below the ACGIH TLV exposure guideline is recommended. ADGIH TWA is 50ppm. OSHA PEL is 25 ppm 8 hour TWA, and a STEL is 125 ppm. This rule also establishes an Action Level of 12.5 ppm. Use only with adequate ventilation. Local exhaust ventilation is necessary for most applications. Lethal concentrations may exist in areas with poor ventilation. Contact Benco for further information. Medical monitoring is also required by OSHA for applications that exceed the Action Level of 12.5ppm. Contact Benco at 800-632-3626 for assistance and instructions on air monitoring.

Personal Protective Equipment: Splash goggles / Face Shield, Chemical resistant gloves, Chemical resistant apron and proper foot protections.

Hand Protection: Wear appropriate safety gloves

Eye Protection: Use safety glasses. Where contact is likely, use chemical splash goggles.

Skin and Body Protection: Avoid contact with skin and avoid breathing vapors. Do not eat, drink, or smoke in work area. Wash hands prior to eating, drinking, or using restroom. Any clothing or shoes that have been contaminated should be removed immediately and thoroughly and laundered before wearing again.

Respiratory Protection: Atmospheric levels should be maintained below the exposure guideline. If this level is exceeded, use an approved air supplied respirator. For emergency and other conditions where the exposure guideline may be greatly exceeded, use an approved positive pressure self-contained breathing apparatus.

Other Protective Information: Safety shower and Eyewash Station should be available in work area.

Section 9, Physical and Chemical Properties

Physical State: Liquid

Appearance: Light in color

Odor: Typical Methylene chloride odor

pH: 10-12

Boiling Point: 104 (Initial)

Density: 10 lbs. / gallon

Vapor Density: 2.93 (Air = 1)

Specific Gravity: 1.20

Percent Volatile: >97%

VOC Emission Content: 219 grams/liter (1.8 lbs./gal)

Flash Point: None

Auto-ignition Temperature: Not Determined

Section 10, Stability and Reactivity

Reactivity: No data available

Chemical Stability: Stable under recommended storage conditions

Possibility of Hazardous Reactions: No data available

Conditions to Avoid: Heat, flame, and sparks. Exposure to sunlight.

Incompatible Materials: Alkali metals, aluminum, strong oxidizing agents, strong acids.

Hazardous Decomposition Products: Open flames and welding arcs can cause thermal decomposition with the evolution of hydrogen chloride and very small amounts of phosgene and chlorine.

Section 11, Toxicological Information

Information on Toxicological Affects: LD50 Oral – Rat >2,000 mg/kg

Respiratory or Skin Sensitization: LC50 inhalation – rat 52,000mg/m³ Skin irritation and eye irritation on contact

Carcinogenic: Limited evidence of carcinogenicity in animal studies

IARC 2B: Possible carcinogenic to humans.

OSHA: OSHA specifically regulated carcinogen (dichloromethane)

Reproductive Toxicity: no data available

Symptoms/Injuries after Inhalation: Dichloromethane is metabolized in the body producing carbon monoxide which increased and sustains carboxyhemoglobin levels in the blood, reducing oxygen-carrying capacity of the blood. Acts as a simple asphyxiant by displacing air – anesthetic affects. Difficulty in breathing, headaches, dizziness.

Symptoms/Injuries after Eye Contact: Redness, blurred vision, tears, burns on extended contact.

Symptoms/Injuries after Ingestion: Gastrointestinal irritation, central nervous system depression, abdominal pain.

Section 12, Ecological Information

Keep Out of Water Ways.

Section 13, Disposal

Dispose of in accordance with local, regional, national and international regulations.

Section 14, Transportation Information

UN Number: 3066

UN Number (DOT): UN3066

UN Proper Shipping Name: UN3066, Paint Related Material, 8,PGII

DOT Classification: 8

Hazard Classification: Corrosive

Hazard Labels: Corrosive

Packing Group: Group II

Section 15, Regulatory Information

Materials Listed on the United States TSCA (Toxic Substance Control Act) Inventory.

State and Local Regulations:

Section 16, Other Information

Revision Date:

Other Information: This document has been prepared in accordance with the SDS requirements of the
OSHA Hazard Communication Standard 29 CFR 1910.1200.

NFPA health hazards: 2

NFPA fire Hazards: 1

NFPA Reactivity: 0

HMIS III Rating:

Health: 3

Flammability: 1

Physical: 0

Special Precautions to be Taken in Handling & Storage: Exercise reasonable care and caution. Avoid breathing vapors. Store in a cool place out of direct sunlight. Concentrated vapors of this product are heavier than air and will collect in low areas such as pits and degreasers, storage tanks, and other confined areas. Do not enter those areas where vapors of this product are suspected unless special breathing apparatus is used and an observer is present for assistance. Not intended for use on bathtubs, bathrooms, or enclosed areas.

Do not pressure product out of container with air. When opening bung, open bung partially and vent any accumulated pressure before removing bung completely. Empty product containers may contain liquid or vapor residues of this product. All precautions suggested in this Data Sheet apply to empty containers also. Empty containers are property of Benco Sales, Inc. and should not be sold to individuals or other parties. Do not repackage this product for resale. Any product purchased for resale must have this SDS attached to each container and must be in original container. If each container does not have and SDS, call Benco at 800-632-3626.

Do not remove or deface labels off containers.

This information is based on our knowledge and is intended to describe the product for the purposes of health, safety and environmental requirements only. It should not be construed as guaranteeing any specific property of the product.

SAFETY DATA SHEET

Section 1, Identification

Product Identifier: B6 Industrial Paint Remover
Synonyms: B6
CAS No.: None - mixture
Manufacture Stock Number: B6
Intended Use: Paint and Finish Removal
Manufacturer: Benco Sales, Inc.
123 Stout Drive
Crossville, TN 38555
931-484-9578
Emergency Phone: 800-535-5053 INFOTRAC
Information Phone: 931-484-9578
Fax: 931-484-7614

Section 2, Hazards Identification

Classification: GHS-US Classification

Signal Word: Warning

Pictogram:



Hazard Statements: Skin irritation (Category 2), H315

Eye irritation (Category 2A), H319

Carcinogenicity (Category 2), H351

Single target organ toxicity – single exposure (Category 3), Respiratory

System, Central Nervous System, H335, H336 Specific target organ toxicity – repeated exposure, Inhalation (Category 2), Central Nervous System, H373

Precautionary Statements:

H315 Causes Skin irritation, burns

H319 Causes serious eye irritation, burns

H335 May cause respiratory irritation

H336 May cause drowsiness or dizziness

H351 Suspected of causing cancer

H373 May cause damage to organs (central nervous system) through prolonged or repeated exposure if inhaled.

Prevention:

P201 Obtain specific instructions before use.

P202 Do not use until safety precautions have been read and understood.

P260 Do not breathe fumes.

P264 Wash skin thoroughly after handling.

P271 Use out of doors or in well ventilated areas.

P280 Wear protective gloves/eye protection/face protection.

P302&P352 If on skin: Wash off with plenty of soap and water.

P304&P340 If inhaled: Get to fresh air

P305&P351&P338 If in eyes: Wash with water for several minutes – get medical attention.

P362 Take off contaminated clothing and wash before reuse.

Storage: P403&P233 Store in a well ventilated area out of direct sunlight. Keep container closed.

Disposal: Dispose of waste contents/container at an approved facility.

Hazards not Otherwise Classified: None

Section 3, Composition/Information on Ingredients

CAS No.	Ingredient Name	PEL(OSHA)	TWA (OSHA)	Weight Percentage
75-09-2	Dichloromethane	25 ppm	25 ppm	70-85
67-56-1	Methanol		200 ppm	200 ppm 8-15
111-76-2	2-Butoxyethanol	50 ppm	25 ppm	1-10
34591-94-8	2-Methoxymethylethoxpropanol	25 ppm	25 ppm	1-10
	Ammonium Hydroxide	50 ppm	50 ppm	2-4

Occupational exposure limits, if available, are listed in section 8

Section 4, First Aid Measures

Eye: Flush with large amounts of water, lifting upper and lower lids. Get medical attention.

Ingestion: Call Physician, poison control center, or hospital emergency room. Never give anything by Mouth to an unconscious person.

Skin: Thoroughly wash exposed area with soap & water. Remove contaminated clothing Wash contaminated clothing before reuse.

Inhalation: If affected, remove individual to fresh air. If breathing is difficult, administer respiration. Keep person warm, quiet, and get medical attention.

Section 5, Fire Fighting Measures

Suitable Extinguishing Media: Water spray, alcohol-resistant foam, dry chemical, or carbon dioxide

Unsuitable Extinguishing Media: no data available

Fire Fighting Instructions: Self-contained breathing apparatus with a full face piece operated in Pressure demand or other positive pressure mode.

Section 6, Accidental Release Measures

Emergency Procedures: Use personal protective equipment. Avoid breathing vapors. Ensure Adequate ventilation. Evacuate personnel to safe areas.

Personal Protective Equipment: See section 8

Environmental Precautions: Prevent further leakage or spillage if safe to do so.

Methods for Containment: Soak up with inert absorbent material and dispose of as Hazardous waste. Keep in suitable closed containers for disposal.

Reference to Other sections: Section 8, Exposure Controls and Personal Protection

Section 7, Handling and Storage

Handling: Avoid contact with skin and eyes. Avoid inhalation of vapors or mists.

Storage: Store in a cool, dry, well ventilated space out of direct sunlight.

Section 8, Exposure Controls and Personal Protection

Occupational Exposure Limits: See Section 3.

Appropriate Engineering Controls: Ventilation: Controlling airborne concentrations below the ACGIH TLV exposure guideline is recommended. ADGIH TWA is 50ppm. OSHA PEL is 25 ppm 8 hour TWA, and a STEL is 125 ppm. This rule also establishes an Action Level of 12.5 ppm. Use only with adequate ventilation. Local exhaust ventilation is necessary for most applications. Lethal concentrations may exist in areas with poor ventilation. Contact Benco for further information. Medical monitoring is also required by OSHA for applications that exceed the Action Level of 12.5ppm. Contact Benco at 800-632-3626 for assistance and instructions on air monitoring.

Personal Protective Equipment: Splash goggles / Face Shield, Chemical resistant gloves, Chemical resistant apron and proper foot protections.

Hand Protection: Wear appropriate safety gloves

Eye Protection: Use safety glasses. Where contact is likely, use chemical splash goggles.

Skin and Body Protection: Avoid contact with skin and avoid breathing vapors. Do not eat, drink, or smoke in work area. Wash hands prior to eating, drinking, or using restroom. Any clothing or shoes that have been contaminated should be removed immediately and thoroughly and laundered before wearing again.

Respiratory Protection: Atmospheric levels should be maintained below the exposure guideline. If this level is exceeded, use an approved air supplied respirator. For emergency and other conditions where the exposure guideline may be greatly exceeded, use an approved positive pressure self-contained breathing apparatus.

Other Protective Information: Safety shower and Eyewash Station should be available in work area.

Section 9, Physical and Chemical Properties

Physical State: Liquid

Appearance: Light in color

Odor: Typical Methylene chloride, Ammonia

pH: 10-12

Boiling Point: 104 (Initial)

Density: 10 lbs. / gallon

Vapor Density: 2.93 (Air = 1)

Specific Gravity: 1.190

Percent Volatile: >95.0%

VOC Emission Content: 111.78 grams/liter

Flash Point: None

Auto-ignition Temperature: Not Determined

Section 10, Stability and Reactivity

Reactivity: No data available

Chemical Stability: Stable under recommended storage conditions

Possibility of Hazardous Reactions: No data available

Conditions to Avoid: Heat, flame, and sparks. Exposure to sunlight.

Incompatible Materials: Alkali metals, aluminum, strong oxidizing agents, strong acids.

Hazardous Decomposition Products: Open flames and welding arcs can cause thermal decomposition with the evolution of hydrogen chloride and very small amounts of phosgene and chlorine.

Section 11, Toxicological Information

Information on Toxicological Affects: LD50 Oral – Rat >2,000 mg/kg

Respiratory or Skin Sensitization: LC50 inhalation – rat 52,000mg/m³ Skin irritation and eye irritation on contact

Carcinogenic: Limited evidence of carcinogenicity in animal studies

IARC 2B: Possible carcinogenic to humans.

OSHA: OSHA specifically regulated carcinogen (dichloromethane)

Reproductive Toxicity: no data available

Symptoms/Injuries after Inhalation: Dichloromethane is metabolized in the body producing carbon monoxide which increased and sustains carboxyhemoglobin levels in the blood, reducing oxygen-carrying capacity of the blood. Acts as a simple asphyxiant by displacing air – anesthetic affects. Difficulty in breathing, headaches, dizziness.

Symptoms/Injuries after Eye Contact: Redness, blurred vision, tears, burns on extended contact.

Symptoms/Injuries after Ingestion: Gastrointestinal irritation, central nervous system depression, abdominal pain.

Section 12, Ecological Information

Keep Out of Water Ways.

Section 13, Disposal

Dispose of in accordance with local, regional, national and international regulations.

Section 14, Transportation Information

UN Number: 3066

UN Number (DOT): UN3066

UN Proper Shipping Name: UN3066, Paint Related Material, 8,PGII

DOT Classification: 8

Hazard Classification: Corrosive

Hazard Labels: Corrosive

Packing Group: Group II

Section 15, Regulatory Information

Materials Listed on the United States TSCA (Toxic Substance Control Act) Inventory.

State and Local Regulations:

Section 16, Other Information

Revision Date: March 9, 2017

Other Information: This document has been prepared in accordance with the SDS requirements of the OSHA Hazard Communication Standard 29 CFR 1910.1200.

NFPA health hazards: 2

NFPA fire Hazards: 1

NFPA Reactivity: 0

HMIS III Rating:

Health: 3

Flammability: 1

Physical: 0

Special Precautions to be Taken in Handling & Storage: Exercise reasonable care and caution. Avoid breathing vapors. Store in a cool place out of direct sunlight. Concentrated vapors of this product are heavier than air and will collect in low areas such as pits and degreasers, storage tanks, and other confined areas. Do not enter those areas where vapors of this product are suspected unless special breathing apparatus is used and an observer is present for assistance. Not intended for use on bathtubs, bathrooms, or enclosed areas.

Do not pressure product out of container with air. When opening bung, open bung partially and vent any accumulated pressure before removing bung completely. Empty product containers may contain liquid or vapor residues of this product. All precautions suggested in this Data Sheet apply to empty containers also. Empty containers are property of Benco Sales, Inc. and should not be sold to individuals or other parties. Do not repackage this product for resale. Any product purchased for resale must have this SDS attached to each container and must be in original container. If each container does not have and SDS, call Benco at 800-632-3626.

Do not remove or deface labels off containers.

This information is based on our knowledge and is intended to describe the product for the purposes of health, safety and environmental requirements only. It should not be construed as guaranteeing any specific property of the product.

SAFETY DATA SHEET

Section 1, Identification

Product Identifier: B14 Industrial Paint Remover
Synonyms: B14
CAS No.: None - mixture
Manufacture Stock Number: B14
Intended Use: Paint and Finish Removal
Manufacturer: Benco Sales, Inc.
123 Stout Drive
Crossville, TN 38555
931-484-9578
Emergency Phone: 800-535-5053 INFOTRAC
Information Phone: 931-484-9578
Fax: 931-484-7614

Section 2, Hazards Identification

Classification: GHS-US Classification

Signal Word: Warning

Pictogram:



Hazard Statements: Skin irritation (Category 2), H315
Eye irritation (Category 2A), H319
Carcinogenicity (Category 2), H351
Single target organ toxicity – single exposure (Category 3), Respiratory System, Central Nervous System, H335, H336 Specific target organ toxicity – repeated exposure, Inhalation (Category 2), Central Nervous System, H373

Precautionary Statements:

H315 Causes Skin irritation, burns
H319 Causes serious eye irritation, burns
H335 May cause respiratory irritation
H336 May cause drowsiness or dizziness
H351 Suspected of causing cancer
H373 May cause damage to organs (central nervous system) through prolonged or repeated exposure if inhaled.

Prevention:

P201 Obtain specific instructions before use.
P202 Do not use until safety precautions have been read and understood.
P260 Do not breathe fumes.
P264 Wash skin thoroughly after handling.
P271 Use out of doors or in well ventilated areas.
P280 Wear protective gloves/eye protection/face protection.
P302&P352 If on skin: Wash off with plenty of soap and water.
P304&P340 If inhaled: Get to fresh air
P305&P351&P338 If in eyes: Wash with water for several minutes – get medical attention.

P362 Take off contaminated clothing and wash before reuse.

Storage: P403&P233 Store in a well ventilated area out of direct sunlight. Keep container closed.

Disposal: Dispose of waste contents/container at an approved facility.

Hazards not Otherwise Classified: None

Section 3, Composition/Information on Ingredients

CAS No.	Ingredient Name	PEL(OSHA)	TWA (OSHA)	Weight Percentage
75-09-2	Dichloromethane	25 ppm	25 ppm	55-65
108-95-2	Phenol	5 ppm	5 ppm	12-20
64-18-6	Formic Acid	5 ppm	5 ppm	12-20

Occupational exposure limits, if available, are listed in section 8

Section 4, First Aid Measures

Eye: Flush with large amounts of water, lifting upper and lower lids. Get medical attention.

Ingestion: Call Physician, poison control center, or hospital emergency room. Never give anything by Mouth to an unconscious person.

Skin: Thoroughly wash exposed area with soap & water. Remove contaminated clothing Wash contaminated clothing before reuse.

Inhalation: If affected, remove individual to fresh air. If breathing is difficult, administer respiration. Keep person warm, quiet, and get medical attention.

Section 5, Fire Fighting Measures

Suitable Extinguishing Media: Water spray, alcohol-resistant foam, dry chemical, or carbon dioxide

Unsuitable Extinguishing Media: no data available

Fire Fighting Instructions: Self-contained breathing apparatus with a full face piece operated in Pressure demand or other positive pressure mode.

Section 6, Accidental Release Measures

Emergency Procedures: Use personal protective equipment. Avoid breathing vapors. Ensure Adequate ventilation. Evacuate personnel to safe areas.

Personal Protective Equipment: See section 8

Environmental Precautions: Prevent further leakage or spillage if safe to do so.

Methods for Containment: Soak up with inert absorbent material and dispose of as Hazardous waste. Keep in suitable closed containers for disposal.

Reference to Other sections: Section 8, Exposure Controls and Personal Protection

Section 7, Handling and Storage

Handling: Avoid contact with skin and eyes. Avoid inhalation of vapors or mists.

Storage: Store in a cool, dry, well ventilated space out of direct sunlight.

Section 8, Exposure Controls and Personal Protection

Occupational Exposure Limits: See Section 3.

Appropriate Engineering Controls: Ventilation: Controlling airborne concentrations below the ACGIH TLV exposure guideline is recommended. ADGIH TWA is 50ppm. OSHA PEL is 25 ppm 8 hour TWA, and a STEL is 125 ppm. This rule also establishes an Action Level of

12.5 ppm. Use only with adequate ventilation. Local exhaust ventilation is necessary for most applications. Lethal concentrations may exist in areas with poor ventilation. Contact Benco for further information. Medical monitoring is also required by OSHA for applications that exceed the Action Level of 12.5ppm. Contact Benco at 800-632-3626 for assistance and instructions on air monitoring.

Personal Protective Equipment: Splash goggles / Face Shield, Chemical resistant gloves, Chemical resistant apron and proper foot protections.

Hand Protection: Wear appropriate safety gloves

Eye Protection: Use safety glasses. Where contact is likely, use chemical splash goggles.

Skin and Body Protection: Avoid contact with skin and avoid breathing vapors. Do not eat, drink, or smoke in work area. Wash hands prior to eating, drinking, or using restroom. Any clothing or shoes that have been contaminated should be removed immediately and thoroughly and laundered before wearing again.

Respiratory Protection: Atmospheric levels should be maintained below the exposure guideline. If this level is exceeded, use an approved air supplied respirator. For emergency and other conditions where the exposure guideline may be greatly exceeded, use an approved positive pressure self-contained breathing apparatus.

Other Protective Information: Safety shower and Eyewash Station should be available in work area.

Section 9, Physical and Chemical Properties

Physical State: Liquid

Appearance: Light in color

Odor: Typical Methylene Chloride and Formic Acid Odor

pH:

Boiling Point: 104 (Initial)

Density: 10 lbs. / gallon

Vapor Density: 2.93 (Air = 1)

Specific Gravity: 1.195

Percent Volatile: >95.0%

VOC Emission Content: 191.22 grams/liter

Flash Point: None

Auto-ignition Temperature: Not Determined

Section 10, Stability and Reactivity

Reactivity: No data available

Chemical Stability: Stable under recommended storage conditions

Possibility of Hazardous Reactions: No data available

Conditions to Avoid: Heat, flame, and sparks. Exposure to sunlight.

Incompatible Materials: Alkali metals, aluminum, strong oxidizing agents, strong acids.

Hazardous Decomposition Products: Open flames and welding arcs can cause thermal decomposition with the evolution of hydrogen chloride and very small amounts of phosgene and chlorine.

Section 11, Toxicological Information

Information on Toxicological Affects: LD50 Oral – Rat >2,000 mg/kg

Respiratory or Skin Sensitization: LC50 inhalation – rat 52,000mg/m3 Skin irritation and eye irritation on contact

Carcinogenic: Limited evidence of carcinogenicity in animal studies

IARC 2B: Possible carcinogenic to humans.

OSHA: OSHA specifically regulated carcinogen (dichloromethane)

Reproductive Toxicity: no data available

Symptoms/Injuries after Inhalation: Dichloromethane is metabolized in the body producing carbon monoxide which increased and sustains carboxyhemoglobin levels in the blood, reducing oxygen-carrying capacity of the blood. Acts as a simple asphyxiant by displacing air – anesthetic affects. Difficulty in breathing, headaches, dizziness.

Symptoms/Injuries after Eye Contact: Redness, blurred vision, tears, burns on extended contact.

Symptoms/Injuries after Ingestion: Gastrointestinal irritation, central nervous system depression, abdominal pain.

Section 12, Ecological Information

Keep Out of Water Ways.

Section 13, Disposal

Dispose of in accordance with local, regional, national and international regulations.

Section 14, Transportation Information

UN Number: 3066

UN Number (DOT): UN3066

UN Proper Shipping Name: UN3066, Paint Related Material, 8, PGII

DOT Classification: 8

Hazard Classification: Corrosive

Hazard Labels: Corrosive

Packing Group: Group II

Section 15, Regulatory Information

Materials Listed on the United States TSCA (Toxic Substance Control Act) Inventory.

State and Local Regulations:

Section 16, Other Information

Revision Date: March 9, 2017

Other Information: This document has been prepared in accordance with the SDS requirements of the OSHA Hazard Communication Standard 29 CFR 1910.1200.

NFPA health hazards: 2

NFPA fire Hazards: 1

NFPA Reactivity: 0

HMIS III Rating:

Health: 3

Flammability: 1

Physical: 0

Special Precautions to be Taken in Handling & Storage: Exercise reasonable care and caution. Avoid breathing vapors. Store in a cool place out of direct sunlight. Concentrated vapors of this product are heavier than air and will collect in low areas such as pits and degreasers, storage tanks, and other confined areas. Do not enter those areas where vapors of this product are suspected unless special breathing apparatus is used and an observer is present for assistance. Not intended for use on bathtubs, bathrooms, or enclosed areas.

Do not pressure product out of container with air. When opening bung, open bung partially and vent any accumulated pressure before removing bung completely. Empty product containers may contain liquid or vapor residues of this product. All precautions suggested in this Data Sheet apply to empty containers also. Empty containers are property of Benco Sales, Inc. and should not be sold to individuals or other parties. Do not repackage this product for resale. Any product purchased for resale must have this SDS attached to each container and must be in original container. If each container does not have and SDS, call Benco at 800-632-3626.

Do not remove or deface labels off containers.

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SAFETY DATA SHEET

Section 1, Identification

Product Identifier: B15 Industrial Paint Remover
Synonyms: B15
CAS No.: None - mixture
Manufacture Stock Number: B15
Intended Use: Paint and Finish Removal
Manufacturer: Benco Sales, Inc.
123 Stout Drive
Crossville, TN 38555
931-484-9578
Emergency Phone: 800-535-5053 INFOTRAC
Information Phone: 931-484-9578
Fax: 931-484-7614

Section 2, Hazards Identification

Classification: GHS-US Classification

Signal Word: Warning

Pictogram:



Hazard Statements: Skin irritation (Category 2), H315
Eye irritation (Category 2A), H319
Carcinogenicity (Category 2), H351
Single target organ toxicity – single exposure (Category 3), Respiratory System, Central Nervous System, H335, H336 Specific target organ toxicity – repeated exposure, Inhalation (Category 2), Central Nervous System, H373

Precautionary Statements:

H315 Causes Skin irritation, burns
H319 Causes serious eye irritation, burns
H335 May cause respiratory irritation
H336 May cause drowsiness or dizziness
H351 Suspected of causing cancer
H373 May cause damage to organs (central nervous system) through prolonged or repeated exposure if inhaled.

Prevention:

P201 Obtain specific instructions before use.
P202 Do not use until safety precautions have been read and understood.
P260 Do not breathe fumes.
P264 Wash skin thoroughly after handling.
P271 Use out of doors or in well ventilated areas.
P280 Wear protective gloves/eye protection/face protection.
P302&P352 If on skin: Wash off with plenty of soap and water.
P304&P340 If inhaled: Get to fresh air
P305&P351&P338 If in eyes: Wash with water for several minutes – get medical attention.

P362 Take off contaminated clothing and wash before reuse.

Storage: P403&P233 Store in a well ventilated area out of direct sunlight. Keep container closed.

Disposal: Dispose of waste contents/container at an approved facility.

Hazards not Otherwise Classified: None

Section 3, Composition/Information on Ingredients

CAS No.	Ingredient Name	PEL(OSHA)	TWA (OSHA)	Weight Percentage
75-09-2	Dichloromethane	25 ppm	25 ppm	55-65
108-95-2	Phenol	5 ppm	5 ppm	12-20
64-18-6	Formic Acid	5 ppm	5 ppm	12-20

Occupational exposure limits, if available, are listed in section 8

Section 4, First Aid Measures

Eye: Flush with large amounts of water, lifting upper and lower lids. Get medical attention.

Ingestion: Call Physician, poison control center, or hospital emergency room. Never give anything by Mouth to an unconscious person.

Skin: Thoroughly wash exposed area with soap & water. Remove contaminated clothing Wash contaminated clothing before reuse.

Inhalation: If affected, remove individual to fresh air. If breathing is difficult, administer respiration. Keep person warm, quiet, and get medical attention.

Section 5, Fire Fighting Measures

Suitable Extinguishing Media: Water spray, alcohol-resistant foam, dry chemical, or carbon dioxide

Unsuitable Extinguishing Media: no data available

Fire Fighting Instructions: Self-contained breathing apparatus with a full face piece operated in Pressure demand or other positive pressure mode.

Section 6, Accidental Release Measures

Emergency Procedures: Use personal protective equipment. Avoid breathing vapors. Ensure Adequate ventilation. Evacuate personnel to safe areas.

Personal Protective Equipment: See section 8

Environmental Precautions: Prevent further leakage or spillage if safe to do so.

Methods for Containment: Soak up with inert absorbent material and dispose of as Hazardous waste. Keep in suitable closed containers for disposal.

Reference to Other sections: Section 8, Exposure Controls and Personal Protection

Section 7, Handling and Storage

Handling: Avoid contact with skin and eyes. Avoid inhalation of vapors or mists.

Storage: Store in a cool, dry, well ventilated space out of direct sunlight.

Section 8, Exposure Controls and Personal Protection

Occupational Exposure Limits: See Section 3.

Appropriate Engineering Controls: Ventilation: Controlling airborne concentrations below the ACGIH TLV exposure guideline is recommended. ADGIH TWA is 50ppm. OSHA PEL is 25 ppm 8 hour TWA, and a STEL is 125 ppm. This rule also establishes an Action Level of

12.5 ppm. Use only with adequate ventilation. Local exhaust ventilation is necessary for most applications. Lethal concentrations may exist in areas with poor ventilation. Contact Benco for further information. Medical monitoring is also required by OSHA for applications that exceed the Action Level of 12.5ppm. Contact Benco at 800-632-3626 for assistance and instructions on air monitoring.

Personal Protective Equipment: Splash goggles / Face Shield, Chemical resistant gloves, Chemical resistant apron and proper foot protections.

Hand Protection: Wear appropriate safety gloves

Eye Protection: Use safety glasses. Where contact is likely, use chemical splash goggles.

Skin and Body Protection: Avoid contact with skin and avoid breathing vapors. Do not eat, drink, or smoke in work area. Wash hands prior to eating, drinking, or using restroom. Any clothing or shoes that have been contaminated should be removed immediately and thoroughly and laundered before wearing again.

Respiratory Protection: Atmospheric levels should be maintained below the exposure guideline. If this level is exceeded, use an approved air supplied respirator. For emergency and other conditions where the exposure guideline may be greatly exceeded, use an approved positive pressure self-contained breathing apparatus.

Other Protective Information: Safety shower and Eyewash Station should be available in work area.

Section 9, Physical and Chemical Properties

Physical State: Liquid

Appearance: Light in color

Odor: Typical Methylene Chloride and Formic Acid odor

pH: 1 - 2

Boiling Point: 104 (Initial)

Density: 10 lbs. / gallon

Vapor Density: 2.93 (Air = 1)

Specific Gravity: 1.195

Percent Volatile: >95.0%

VOC Emission Content: 191.22 grams/liter

Flash Point: None

Auto-ignition Temperature: Not Determined

Section 10, Stability and Reactivity

Reactivity: No data available

Chemical Stability: Stable under recommended storage conditions

Possibility of Hazardous Reactions: No data available

Conditions to Avoid: Heat, flame, and sparks. Exposure to sunlight.

Incompatible Materials: Alkali metals, aluminum, strong oxidizing agents, strong acids.

Hazardous Decomposition Products: Open flames and welding arcs can cause thermal decomposition with the evolution of hydrogen chloride and very small amounts of phosgene and chlorine.

Section 11, Toxicological Information

Information on Toxicological Affects: LD50 Oral – Rat >2,000 mg/kg

Respiratory or Skin Sensitization: LC50 inhalation – rat 52,000mg/m3 Skin irritation and eye irritation on contact

Carcinogenic: Limited evidence of carcinogenicity in animal studies

IARC 2B: Possible carcinogenic to humans.

OSHA: OSHA specifically regulated carcinogen (dichloromethane)

Reproductive Toxicity: no data available

Symptoms/Injuries after Inhalation: Dichloromethane is metabolized in the body producing carbon monoxide which increased and sustains carboxyhemoglobin levels in the blood, reducing oxygen-carrying capacity of the blood. Acts as a simple asphyxiant by displacing air – anesthetic affects. Difficulty in breathing, headaches, dizziness.

Symptoms/Injuries after Eye Contact: Redness, blurred vision, tears, burns on extended contact.

Symptoms/Injuries after Ingestion: Gastrointestinal irritation, central nervous system depression, abdominal pain.

Section 12, Ecological Information

Keep Out of Water Ways.

Section 13, Disposal

Dispose of in accordance with local, regional, national and international regulations.

Section 14, Transportation Information

UN Number: 3066

UN Number (DOT): UN3066

UN Proper Shipping Name: UN3066, Paint Related Material, 8, PGII

DOT Classification: 8

Hazard Classification: Corrosive

Hazard Labels: Corrosive

Packing Group: Group II

Section 15, Regulatory Information

Materials Listed on the United States TSCA (Toxic Substance Control Act) Inventory.

State and Local Regulations:

Section 16, Other Information

Revision Date: March 9, 2017

Other Information: This document has been prepared in accordance with the SDS requirements of the
OSHA Hazard Communication Standard 29 CFR 1910.1200.

NFPA health hazards: 2

NFPA fire Hazards: 1

NFPA Reactivity: 0

HMIS III Rating:

Health: 3

Flammability: 1

Physical: 0

Special Precautions to be Taken in Handling & Storage: Exercise reasonable care and caution. Avoid breathing vapors. Store in a cool place out of direct sunlight. Concentrated vapors of this product are heavier than air and will collect in low areas such as pits and degreasers, storage tanks, and other confined areas. Do not enter those areas where vapors of this product are suspected unless special breathing apparatus is used and an observer is present for assistance. Not intended for use on bathtubs, bathrooms, or enclosed areas.

Do not pressure product out of container with air. When opening bung, open bung partially and vent any accumulated pressure before removing bung completely. Empty product containers may contain liquid or vapor residues of this product. All precautions suggested in this Data Sheet apply to empty containers also. Empty containers are property of Benco Sales, Inc. and should not be sold to individuals or other parties. Do not repackage this product for resale. Any product purchased for resale must have this SDS attached to each container and must be in original container. If each container does not have an SDS, call Benco at 800-632-3626.

Do not remove or deface labels off containers.

This information is based on our knowledge and is intended to describe the product for the purposes of health, safety and environmental requirements only. It should not be construed as guaranteeing any specific property of the product.

SAFETY DATA SHEET

Section 1, Identification

Product Identifier: B17 Industrial Paint Remover
Synonyms: B17
CAS No.: None - mixture
Manufacture Stock Number: B17
Intended Use: Paint and Finish Removal
Manufacturer: Benco Sales, Inc.
123 Stout Drive
Crossville, TN 38555
931-484-9578
Emergency Phone: 800-535-5053 INFOTRAC
Information Phone: 931-484-9578
Fax: 931-484-7614

Section 2, Hazards Identification

Classification: GHS-US Classification

Signal Word: Warning

Pictogram:



Hazard Statements: Skin irritation (Category 2), H315

Eye irritation (Category 2A), H319

Carcinogenicity (Category 2), H351

Single target organ toxicity – single exposure (Category 3), Respiratory

System, Central Nervous System, H335, H336 Specific target organ toxicity – repeated exposure, Inhalation (Category 2), Central Nervous System, H373

Precautionary Statements:

H315 Causes Skin irritation, burns

H319 Causes serious eye irritation, burns

H335 May cause respiratory irritation

H336 May cause drowsiness or dizziness

H351 Suspected of causing cancer

H373 May cause damage to organs (central nervous system) through prolonged or repeated exposure if inhaled.

Prevention:

P201 Obtain specific instructions before use.

P202 Do not use until safety precautions have been read and understood.

P260 Do not breathe fumes.

P264 Wash skin thoroughly after handling.

P271 Use out of doors or in well ventilated areas.

P280 Wear protective gloves/eye protection/face protection.

P302&P352 If on skin: Wash off with plenty of soap and water.

P304&P340 If inhaled: Get to fresh air

P305&P351&P338 If in eyes: Wash with water for several minutes – get medical attention.

P362 Take off contaminated clothing and wash before reuse.

Storage: P403&P233 Store in a well ventilated area out of direct sunlight. Keep container closed.

Disposal: Dispose of waste contents/container at an approved facility.

Hazards not Otherwise Classified: None

Section 3, Composition/Information on Ingredients

CAS No.	Ingredient Name	PEL(OSHA)	TWA (OSHA)	Weight Percentage
75-09-2	Dichloromethane	25 ppm	25 ppm	55-65
108-95-2	Phenol	5 ppm	5 ppm	12-20
64-18-6	Formic Acid	5 ppm	5 ppm	12-20
7664-39-3	Hydrofluoric Acid	3 ppm	3 ppm	1-5

Occupational exposure limits, if available, are listed in section 8

Section 4, First Aid Measures

Eye: Flush with large amounts of water, lifting upper and lower lids. Get medical attention.

Ingestion: Call Physician, poison control center, or hospital emergency room. Never give anything by Mouth to an unconscious person.

Skin: Thoroughly wash exposed area with soap & water. Remove contaminated clothing Wash contaminated clothing before reuse.

Inhalation: If affected, remove individual to fresh air. If breathing is difficult, administer respiration. Keep person warm, quiet, and get medical attention.

Section 5, Fire Fighting Measures

Suitable Extinguishing Media: Water spray, alcohol-resistant foam, dry chemical, or carbon dioxide

Unsuitable Extinguishing Media: no data available

Fire Fighting Instructions: Self-contained breathing apparatus with a full face piece operated in Pressure demand or other positive pressure mode.

Section 6, Accidental Release Measures

Emergency Procedures: Use personal protective equipment. Avoid breathing vapors. Ensure Adequate ventilation. Evacuate personnel to safe areas.

Personal Protective Equipment: See section 8

Environmental Precautions: Prevent further leakage or spillage if safe to do so.

Methods for Containment: Soak up with inert absorbent material and dispose of as Hazardous waste. Keep in suitable closed containers for disposal.

Reference to Other sections: Section 8, Exposure Controls and Personal Protection

Section 7, Handling and Storage

Handling: Avoid contact with skin and eyes. Avoid inhalation of vapors or mists.

Storage: Store in a cool, dry, well ventilated space out of direct sunlight.

Section 8, Exposure Controls and Personal Protection

Occupational Exposure Limits: See Section 3.

Appropriate Engineering Controls: Ventilation: Controlling airborne concentrations below the ACGIH TLV exposure guideline is recommended. ADGIH TWA is 50ppm. OSHA PEL is 25 ppm 8 hour TWA, and a STEL is 125 ppm. This rule also establishes an Action Level of

12.5 ppm. Use only with adequate ventilation. Local exhaust ventilation is necessary for most applications. Lethal concentrations may exist in areas with poor ventilation. Contact Benco for further information. Medical monitoring is also required by OSHA for applications that exceed the Action Level of 12.5ppm. Contact Benco at 800-632-3626 for assistance and instructions on air monitoring.

Personal Protective Equipment: Splash goggles / Face Shield, Chemical resistant gloves, Chemical resistant apron and proper foot protections.

Hand Protection: Wear appropriate safety gloves

Eye Protection: Use safety glasses. Where contact is likely, use chemical splash goggles.

Skin and Body Protection: Avoid contact with skin and avoid breathing vapors. Do not eat, drink, or smoke in work area. Wash hands prior to eating, drinking, or using restroom. Any clothing or shoes that have been contaminated should be removed immediately and thoroughly and laundered before wearing again.

Respiratory Protection: Atmospheric levels should be maintained below the exposure guideline. If this level is exceeded, use an approved air supplied respirator. For emergency and other conditions where the exposure guideline may be greatly exceeded, use an approved positive pressure self-contained breathing apparatus.

Other Protective Information: Safety shower and Eyewash Station should be available in work area.

Section 9, Physical and Chemical Properties

Physical State: Liquid

Appearance: Light in color

Odor: Typical Methylene Chloride and Acid odor

pH: 1 - 2

Boiling Point: 104F (Initial)

Density: 10 lbs. / gallon

Vapor Density: 2.93 (Air = 1)

Specific Gravity: 1.195

Percent Volatile: >95.0%

VOC Emission Content: 176 grams/liter

Flash Point: None

Auto-ignition Temperature: Not Determined

Section 10, Stability and Reactivity

Reactivity: No data available

Chemical Stability: Stable under recommended storage conditions

Possibility of Hazardous Reactions: No data available

Conditions to Avoid: Heat, flame, and sparks. Exposure to sunlight.

Incompatible Materials: Alkali metals, aluminum, strong oxidizing agents, strong acids.

Hazardous Decomposition Products: Open flames and welding arcs can cause thermal decomposition with the evolution of hydrogen chloride and very small amounts of phosgene and chlorine.

Section 11, Toxicological Information

Information on Toxicological Affects: LD50 Oral – Rat >2,000 mg/kg

Respiratory or Skin Sensitization: LC50 inhalation – rat 52,000mg/m3 Skin irritation and eye irritation on contact

Carcinogenic: Limited evidence of carcinogenicity in animal studies

IARC 2B: Possible carcinogenic to humans.

OSHA: OSHA specifically regulated carcinogen (dichloromethane)

Reproductive Toxicity: no data available

Symptoms/Injuries after Inhalation: Dichloromethane is metabolized in the body producing carbon monoxide which increased and sustains carboxyhemoglobin levels in the blood, reducing oxygen-carrying capacity of the blood. Acts as a simple asphyxiant by displacing air – anesthetic affects. Difficulty in breathing, headaches, dizziness.

Symptoms/Injuries after Eye Contact: Redness, blurred vision, tears, burns on extended contact.

Symptoms/Injuries after Ingestion: Gastrointestinal irritation, central nervous system depression, abdominal pain.

Section 12, Ecological Information

Keep Out of Water Ways.

Section 13, Disposal

Dispose of in accordance with local, regional, national and international regulations.

Section 14, Transportation Information

UN Number: 3066

UN Number (DOT): UN3066

UN Proper Shipping Name: UN3066, Paint Related Material, 8,PGII

DOT Classification: 8

Hazard Classification: Corrosive

Hazard Labels: Corrosive

Packing Group: Group II

Section 15, Regulatory Information

Materials Listed on the United States TSCA (Toxic Substance Control Act) Inventory.

State and Local Regulations:

Section 16, Other Information

Revision Date:

Other Information: This document has been prepared in accordance with the SDS requirements of the
OSHA Hazard Communication Standard 29 CFR 1910.1200.

NFPA health hazards: 2

NFPA fire Hazards: 1

NFPA Reactivity: 0

HMIS III Rating:

Health: 3

Flammability: 1

Physical: 0

Special Precautions to be Taken in Handling & Storage: Exercise reasonable care and caution. Avoid breathing vapors. Store in a cool place out of direct sunlight. Concentrated vapors of this product are heavier than air and will collect in low areas such as pits and degreasers, storage tanks, and other confined areas. Do not enter those areas where vapors of this product are suspected unless special breathing apparatus is used and an observer is present for assistance. Not intended for use on bathtubs, bathrooms, or enclosed areas.

Do not pressure product out of container with air. When opening bung, open bung partially and vent any accumulated pressure before removing bung completely. Empty product containers may contain liquid or vapor residues of this product. All precautions suggested in this Data Sheet apply to empty containers also. Empty containers are property of Benco Sales, Inc. and should not be sold to individuals or other parties. Do not repackage this product for resale. Any product purchased for resale must have this SDS attached to each container and must be in original container. If each container does not have and SDS, call Benco at 800-632-3626.

Do not remove or deface labels off containers.

This information is based on our knowledge and is intended to describe the product for the purposes of health, safety and environmental requirements only. It should not be construed as guaranteeing any specific property of the product.

Green Products Co.

Green Products Co. Priority Product Notification versus Safety Data Sheets

Priority Product Notification	Safety Data Sheet
Green's Liquid Paint Varnish & Lacquer Remover	Green's Liquid Paint, Varnish & Lacquer Remover
Green's Premium Semi-Paste Paint Varnish Lacquer Remover	Green's Semi-Paste Paint Remover

810 Market Avenue
Richmond, CA 94801

Green Products Company Safety Data Sheet

Effective Date:
November 1, 2013

SECTION 1 - IDENTIFICATION

PRODUCT NAME: Green's Liquid Paint, Varnish & Lacquer Remover
GENERAL ID: Compound Lacquer, Paint, and Varnish Removing Liquid

MANUFACTURER: Green Products Company
810 Market Avenue
Richmond, CA 94801
United States
www.coppergreen.com
510-235-9667

Emergency Contact : INFOTRAC 800-535-5053

Product Restrictions: Do not use on linoleum, asphalt, tile, plastic surfaces or fiberglass. Do not use in areas where vapors can accumulate and concentrate such as basements, bathrooms, bathtubs, and small enclosed areas.

SECTION 2 HAZARD(S)

HAZARD CLASS: UN1263, Flammable Liquid, 3, PGII, NAERG#127



DANGER

Flammable liquid and vapor. Vapor harmful. May be fatal or cause blindness if swallowed. Harmful if inhaled or absorbed through skin. Causes eye burns. Causes skin and respiratory tract irritation.

SECTION 3 - COMPOSITION/INFORMATION ON INGREDIENTS

INGREDIENT	% (BY VOL)	ACGIH(TLV)
Chlorinated Hydrocarbons (Methylene Chloride) (CAS# 000075.09-2)	10-30	50 ppm

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Aromatic Hydrocarbons	10-30	200 ppm
Ketone	10-30	1000 ppm
Alcohol	10-30	200 ppm

The specific chemical identity and/or exact percentage (concentration) of composition has been withheld as a trade secret.

SECTION	4	—	FIRST-AID
MEASURES			

IF ON SKIN: Thoroughly wash exposed area with soap and water. Remove contaminated clothing. Launder clothing before re-use.

IF IN EYES: Flush with large amounts of water, lifting upper and lower lids occasionally; SEEK MEDICAL ATTENTION IMMEDIATELY.

IF SWALLOWED: Call a physician, emergency room or poison control center IMMEDIATELY for instructions to induce vomiting.

IF INHALED: If affected, remove to fresh air. If breathing is difficult, administer oxygen. If breathing has stopped, give artificial respiration. Keep person warm and quiet, and SEEK MEDICAL ATTENTION. Do not give stimulants. Epinephrine or ephedrine may adversely affect the heart with fatal results.

SECTION 5 – FIRE-FIGHTING MEASURES

Flashpoint: 25F

Extinguishing Media: Regulate foam or water fog, or carbon dioxide, carbon monoxide, hydrogen chloride, phosgene, nitrogen compounds, various hydrocarbons.

Firefighting Procedures: Self-contained breathing apparatus with a full facepiece operated in pressure-demand or other positive pressure mode.

Special Fire & Explosion Hazard: **DANGEROUS FIRE HAZARD WHEN EXPOSED TO HEAT, SPARK OR FLAME!** Vapors are heavier than air and may travel along the ground or may be moved by ventilation and ignited by pilot lights, other flames, sparks, heaters, smoking, electric motors, electrical outlets or other ignition sources at locations distant from material handling point. Never use a welding or cutting torch on or near the drum (even if empty) because product or residue can ignite explosively.

SECTION 6 – ACCIDENTAL RELEASE MEASURES

For a small release: Absorb liquid on paper, vermiculite, floor absorbent material and transfer to hood.

For a large release: Eliminate all ignition sources (flares, flames, pilot lights, electrical sparks, etc.). Persons not wearing protective equipment should be excluded from area of spill until cleanup has been completed. Stop spill source, dike area of spill to prevent spreading. Pump liquid to salvage tank. Remaining liquid may be taken up on sand, clay, earth, floor absorbent or other absorbent material and shoveled into containers.

Water disposal method:

For small release: Allow volatile portion to evaporate in hood. Allow sufficient time for vapors to completely clear the hood ductwork. Destroy remaining material by burning in an iron pan.

For large release: Destroy by liquid incineration with off-gas scrubber. Material collected on absorbent material may be deposited in a posted toxic substance landfill in accordance with local, state, and federal regulations.

SECTION 7 – HANDLING AND STORAGE

Store product in cool, dry area away from electrical outlets & pilot lights. Make sure cap is tightly closed.

This product contains chemicals known to the State of California to cause cancer. Contains Methylene Chloride, Methanol & Mineral Spirits. Methylene Chloride has been shown to cause cancer in certain laboratory animals. DANGER POISON! MAY BE FATAL OR CAUSE BLINDNESS IF SWALLOWED. SKIN AND EYE IRRITANT. USE ONLY WITH ADEQUATE VENTILATION TO PREVENT BUILDUP OF VAPORS. Do not use in areas where vapors can accumulate and concentrate such as basements, bathrooms, bathtubs, and small enclosed areas. Whenever possible use outdoors in an open air area. If using indoors, open all windows and doors and maintain cross ventilation of moving fresh air across the work area. If strong odor is noticed or you experience slight dizziness – STOP – ventilation is inadequate. Leave the area immediately. Contact with flame or hot surfaces may produce toxic gases. Clean up rags, papers and all waste promptly. If work area is not well ventilated, DO NOT USE THIS PRODUCT. If properly used, an “organic vapor” respirator may offer additional protection.

SECTION 8 - EXPOSURE CONTROLS/PERSONAL PROTECTION

RESPIRATORY PROTECTION: If TLV of any component of the product is exceeded, a NIOSH\MESA jointly approved self-contained breathing apparatus with a full face piece operated in pressure demand or other positive pressure mode is advised; however, OSHA regulations also permit other NIOSH\MESA respirators under specific conditions. (See your safety equipment supplier.)

VENTILATION: Provide sufficient mechanical (general) and/or local exhaust ventilation to maintain exposure below the TLVs of components.

PROTECTIVE GLOVES: Wear resistant gloves such as: polyvinyl alcohol, natural rubber, etc.

EYE PROTECTION: Chemical splash goggles in compliance with OSHA regulations are advised; however, OSHA regulations also permit other type of safety glasses. (See your safety equipment supplier)

SECTION 9 - PHYSICAL AND CHEMICAL PROPERTIES

Appearance	For Product	Clear liquid
Boiling Point	For Product	232.00 Deg F
Vapor Pressure	For Product	335.00 mm Hg@ 65.00 Deg F
Specific Vapor Density		Greater than air
Specific Gravity		.96
Percent Volatile		73%

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VOC*

2.64 lbs\per gallon of paint remover
or 316 grams per liter
Slower than ether

Evaporation Rate
All other information not available

SECTION 10 – STABILITY AND REACTIVITY

Hazardous Polymerization: Cannot occur

Stability: Stable

Incompatibility: Avoid contact with strong oxidizing agents, strong alkalis, and strong mineral acids.

SECTION 11 – TOXICOLOGICAL INFORMATION

Effects of overexposure:

EYES: Can cause severe irritation, redness, tearing, blurred vision.

SKIN: Prolonged or repeated contact can cause skin irritation, even a burn.

BREATHING: Excessive inhalation of vapors can cause nasal and respiratory irritation, dizziness, weakness, fatigue, nausea, headache, possible loss of consciousness, central nervous system depression, and even asphyxiation.

SWALLOWING: Can cause gastrointestinal irritation, nausea, vomiting, diarrhea, blindness, and death.

Aspiration of material into lungs can cause chemical pneumonitis, which can be fatal.

Warning: This product contains a chemical, which is known to the State of California to cause cancer in some laboratory animals. Risk to your health depends on level and duration of exposure. Use with adequate ventilation. Avoid contact with skin.

SECTION 12 – ECOLOGICAL INFORMATION

Environmental Toxicity:

No environmental studies have been conducted on the product. The following are known component data:

Toluene (108-88-3): Freshwater Algae Data = 96 Hr EC50 *Selenastrum capricornutum*: >433 mg/L;
Freshwater Fish

Species Data = 96 Hr LC50 *Pimephales promelas*: 25 mg/L [flow-through] (1 day old); 96 Hr LC50 *Oncorhynchus mykiss*: 24.0 mg/L [flow-through]; 96 Hr LC50 *Lepomis macrochirus*: 24.0 mg/L [static]; 96 Hr LC50 *Lepomis macrochirus*: 13 mg/L [static]; Microtox Data = 30 min EC50 *photobacterium phosphoreum*: 19.7 mg/L; 48 Hr EC50

Water flea Data: 11.3 mg/L; 48 Hr EC50 water flea: 310 mg/L; 48 Hr RC50 *Daphnia magna*: 11.3 mg/L

Methanol (67-56-1): Freshwater Fish Species Data = 96 Hr LC50 *Pimephales promelas*: 28100 mg/L [flow-through]; 96 Hr LC50 *Oncorhynchus mykiss*: 13200 mg/L; Microtox Data = 5 min EC50 *photobacterium phosphoreum*: 43000 mg/L; 15 min EC50 *photobacterium phosphoreum*: 40000 mg/L; 25 min EC50

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photobacterium phosphoreum: 39000mg/L

Methylene Chloride (75-09-2): Freshwater Algae Data = 96 Hr EC50 *Selenastrum capricornutum*: >660 mg/L; Freshwater Fish Species Data = 96 Hr LC50 *Pimephales promelas*: 193 mg/L [flow-through]; 96 Hr LC50 *Pimephales promelas*: 310 mg/L [static]; 96 Hr LC50 *Oncorhynchus mykiss*: 10.95 mg/L [flow-through]; 96 Hr LC50 *Lepomis macrochirus*: 193 mg/L [static]; 96 Hr LC50 *Lepomis macrochirus*: 193 mg/L [flow-through]; Microtox Data = 24 Hr EC50 *Nitrosomonas*: 1 mg/L; 15 min EC50 *Photobacterium phosphoreum*: 2.88 mg/L; Water flea data = 48 Hr EC50 water flea: 140 mg/L [static]

Acetone (67-64-1): Freshwater Fish Species Data = 96 Hr LC50 *Oncorhynchus mykiss*: 5540 mg/L [static]; 96 Hr LC50 *Pimephales promelas*: 6210 mg/L [flow-through]; 96 Hr LC50 *Lepomis macrochirus*: 8300 mg/L [static]; Microtox Data = 15 min EC50 *photobacterium phosphoreum*: 14500 mg/L; Water flea data = 48 Hr EC50 water flea: 0.0039 mg/L; 48 Hr EC50 Water flea: 12700 mg/L [static]; 48 Hr EC50 *Daphnia magna*: 12600 mg/L

Environmental Fate: No data available

SECTION 13 – DISPOSAL CONSIDERATIONS

Containers of this material may be hazardous when emptied. Since emptied containers retain product residues (vapor, liquid, and/or solid), all hazard precautions given in this data sheet must be observed. Overexposure to components has apparently been found to cause the following in laboratory animals: liver abnormalities, lung damage, kidney damage, spleen damage, eye damage, brain damage, and central nervous system damage.

Do not pour waste down drains, sewers, or onto the ground where they may pollute the ground water. Contact your local health department for instructions on dealing with waste.

SECTION 14 – TRANSPORT INFORMATION

DOMESTIC (Land, D.O.T.)

Proper shipping name: Paint Related Materials
Hazard Class: 3
UN/NA: UN1263
Packing Group: II

SECTION 15 – REGULATORY INFORMATION

US EPA SARA Title III

Hazardous Components (chemical name)	CAS #	Sec.302 (EHS)	Sec. 304 RQ	Sec.313 (TRI)	Sec. 110
Toluene {Benzene, Methyl-, Toluol}	108-88-3	No	Yes 1000 lbs	Yes	Yes
Methanol {Methyl alcohol; Carbinol; Wood alcohol}	67-56-1	No	Yes 5000 lbs	Yes	No
Dichloromethane {Methylene Chloride}	75-09-2	No	Yes 1000 lbs	Yes	Yes

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Acetone 67-64-1 No Yes 5000 lbs Yes Yes

SARA (Superfund Amendments and Reauthorization Act of 1986) Lists:

Sec.302 EPA SARA Title III Section 302 Extremely hazardous Chemical with TPQ.

*indicates 10000 LB TPQ if not volatile.

Sec.304: EPA SARA Title III Section 304: CERCLA Reportable + Sec.302 with Reportable Quantity.

** indicates statutory RQ

Sec.313: EPA SARA Title III Section 313 Toxic Release Inventory. Note: -Cat indicates a member of a chemical category.

Sec.110: EPA SARA 110 Superfund Site Priority Contaminant List

EPA Hazard Categories:

This material meets the EPA 'Hazard Categories' defined for SARA Title III Sections 311/312 as indicated:

☒ YES ☐ NO Acute (immediate) Health Hazard

☒ YES ☐ NO Chronic (delayed) Health Hazard

☒ YES ☐ NO Fire Hazard

☐ YES ☒ NO Sudden Release of Pressure Hazard

☐ YES ☒ NO Reactive Hazard

SECTION 16 – OTHER INFORMATION

The information accumulated herein is believed to be accurate but is not warranted to be whether originating with Green Products Company or not.

Responsibility for any damage to person or property in the use of this material rests with the purchaser.

Created on: January 31, 2011

Last revised: April 27, 2015

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Effective Date:
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SECTION 1 - IDENTIFICATION

Material Name: Green's Semi-Paste Paint Remover
Product Description: Compound, Lacquer, Paint, Varnish removing liquid
Manufacturer: Green Products Company
810 Market Avenue
Richmond, CA 94801
www.coppergreen.com
510-235-9667
Emergency No. 800-535-5053

SECTION 2 HAZARD(S)
IDENTIFICATION

HAZARD CLASS: UN1263, Flammable Liquid, 3, PGII, NAERG#127



Danger

May cause genetic defects. May cause cancer. Causes damage to organs. May cause drowsiness or dizziness. Obtain special instructions before use. Do not handle until all safety precautions have been read and understood. Use personal protective equipment as required. Do not breathe gas/mist/vapors/spray. Wash hands thoroughly after handling. Do not eat, drink or smoke when using this product. Avoid breathing gas/mist/vapors/spray. Use only outdoors or in a well-ventilated area.
If exposed or concerned : Get medical attention/advice.
If exposed: Call a POISON CENTER or doctor/physician.
Specific treatment see label.
If inhaled: Remove victim to fresh air and keep at rest in a position comfortable for breathing.
Call a POISON CENTER/doctor if you feel unwell.
Store locked up. Dispose of contents/container according to local, state and federal regulations. Store container tightly closed in well-ventilated place - if product is as volatile as to generate hazardous atmosphere.

Potential health effects:

INHALATION ACUTE EXPOSURE EFFECTS: Vapor harmful. May cause upper respiratory tract irritation and central nervous system depression with symptoms such as confusion, lightheadedness, nausea, vomiting, headache, drowsiness and fatigue. Mist and vapor can irritate the throat and lungs. Causes formation of carbon monoxide in blood which may affect the cardiovascular system and central nervous system. Continued exposure may cause unconsciousness and even death. Intentional misuse of this product by deliberately concentrating and inhaling vapors can be harmful or fatal. Concurrent exposure to

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carbon monoxide, smoking, and physical activity may increase the level of carboxyhemoglobin levels in the blood resulting in additive effects. This product is a simple asphyxiate.

SKIN CONTACT ACUTE EXPOSURE EFFECTS: This product is a skin irritant. Product may be absorbed through the skin. Harmful if absorbed through the skin. Effects may range from mild irritation to severe pain, and possibly burns, depending on the intensity of contact. Prolonged or repeated contact may dry the skin and cause irritation. Symptoms include redness, itching, burning, drying and cracking of the skin, and skin burns.

EYE CONTACT ACUTE EXPOSURE EFFECTS: This material is an eye irritant. Vapors may irritate the eyes. Contact may cause tearing, redness, a stinging or burning feeling, swelling and blurred vision.

INGESTION ACUTE EXPOSURE EFFECTS: Poison. May be fatal or cause blindness if swallowed. May cause nausea or vomiting. Aspiration hazard. This material may be aspirated into the lungs during vomiting. If vomiting results in aspiration, chemical pneumonia could occur. It can be readily absorbed by the stomach and intestinal tract. Absorption through the gastrointestinal tract may produce central nervous system depression and systemic effects. Swallowing this material may irritate the mucous membranes of the mouth, throat, and esophagus. May cause cyanosis

CHRONIC EXPOSURE EFFECTS: Reports have associated repeated and prolonged overexposure to solvents with neurological and other physiological damage. Prolonged skin contact may cause irritation, redness, swelling, and possible tissue destruction. Prolonged or repeated contact can cause dermatitis. Prolonged skin contact may result in absorption of a harmful amount of this material. May cause liver damage. May cause cancer based on animal data.

Target Organ:

Blood, central nervous system, liver, skin, cardiovascular system, eyes, respiratory system, lungs.

MEDICAL CONDITIONS GENERALLY AGGRAVATED BY EXPOSURE:

Heart of cardiovascular disorders. Kidney disorders, liver disorders, central nervous system disorders, respiratory system (including asthma and other breathing disorders), skin disorders and allergies. Alcohol may enhance the toxic effects of methylene chloride exposure. May cross the placenta. May be excreted in breast milk.

SECTION 3 - COMPOSITION/INFORMATION ON INGREDIENTS

<u>INGREDIENT</u>	<u>% (by VOL)</u>	<u>TLV</u>
Chlorinated Hydrocarbons	69-79	100 ppm
Paraffins (including naphthenes)	5.5-15.5	125 ppm
Alcohol	7-17	200 ppm
Aromatics	>1	100 ppm

<u>SECTION</u>	<u>4</u>	<u>—</u>	<u>FIRST-AID</u>
<u>MEASURES</u>			

FIRST AID:

If on skin: Thoroughly wash exposed area with soap and water. Remove contaminate clothing. Launder clothing before re-use.

If in eyes: Flush with large amounts of water, lifting upper and lower lids occasionally. SEEK MEDICAL ATTENTION IMMEDIATELY!

If swallowed: Call physician, emergency room or poison control IMMEDIATELY for instructions to induce vomiting. If medical advice is not immediately available, induce vomiting using syrup of ipecac or a spoon. Cover eyes to exclude light. Get medical attention at once. Keep person warm and quiet.

If inhaled: If affected, remove to fresh air. If breathing is difficult, administer oxygen. If breathing has stopped, give artificial respiration. Keep person warm and quiet and SEEK MEDICAL ATTENTION. Do not give stimulants. Epinephrine or ephedrine may adversely affect the heart with fatal results.

SECTION 5 – FIRE-FIGHTING MEASURES

Flashpoint: 73 Deg F

Extinguishing Media: Regular foam or water fog, or carbon dioxide, or dry chemical.

Hazardous decomposition Products: May form toxic materials: carbon dioxide, carbon monoxide, hydrogen chloride, phosgene, nitrogen compounds, various hydrocarbons.

Firefighting Procedures: Self-contained breathing apparatus with a full face piece operated in pressure-demand or other positive pressure mode.

Special Fire and Explosion Hazards: Vapors are heavier than air and may travel along the ground or may be moved by ventilation and ignited by pilot lights, other flames, sparks, heaters, smoking, electric motors or other ignition sources at locations distant from material handling point. Never use a welding or cutting torch on or near a drum (even empty) because product or residue can ignite explosively.

SECTION 6 – ACCIDENTAL RELEASE MEASURES

In Case of Material Release or Spill:

For Small Spill: Absorb liquid on paper, vermiculite, floor absorbent, or other absorbent material and transfer to hood.

For Large Spill: Eliminate all ignition sources (flares, flames, pilot lights, electrical sparks, etc). Persons not wearing protective equipment should be excluded from area of spill until clean-up has been completed. Stop spill source, dike area of spill to prevent spreading. Pump liquid into salvage tank. Remaining liquid may be taken up on sand, clay, earth, floor absorbent, or other absorbent material and shoveled into containers.

Water Disposal Method:

For Small Spill: Allow volatile portion to evaporate into hood. Allow sufficient time for vapors to completely clear hood duct work. Destroy remaining material by burning in an iron pan.

For Large Spill: Destroy by liquid incineration with off-gas scrubber. Material collected on absorbent material may be deposited in a posted toxic substance landfill in accordance with local, state, and federal regulations.

SECTION 7 – HANDLING AND STORAGE

Store tightly sealed can in a cool, dry area away from all ignition sources such as flares, flames, pilot lights, electrical sparks, etc. Containers of this material may be hazardous when emptied since emptied containers retain product residues (vapor, liquid, and/or solid). Emptied containers should also be kept in a cool, dry area until proper disposal can be arranged.

SECTION 8 - EXPOSURE CONTROLS/PERSONAL PROTECTION

Respiratory Protection: If TLV of any component of the product is exceeded, a NIOSH/MESA jointly approved self-contained breathing apparatus with a full face piece operated in pressure demand or other positive pressure mode is advised; however, OSHA regulations also permit other NIOSH/MESA respirators under specific conditions. (See your safety equipment supplier)

Ventilation: Provide sufficient mechanical (general) and/or local exhaust ventilation to maintain exposure below TLVs of components.

Protective Gloves: Wear resistant gloves such as: polyvinyl alcohol, natural rubber, etc.

Eye Protection: Chemical splash goggles in compliance with OSHA regulations are advised; however, OSHA regulations also permit other types of safety glasses. (See you safety equipment supplier)

SECTION 9 - PHYSICAL AND CHEMICAL PROPERTIES

Appearance	Cloudy white semi-paste finish remover
Odor	Viscous opaque to clear
Boiling Point	For Product 102.00 – 104.00 Deg F
Evaporation Rate	Slower than ether
Vapor Pressure	For Product 340.00 mm Hg @ 68.00 Deg F
Flashpoint	73 Deg F
Specific Vapor Density	Heavier than air
Specific Gravity	1.1
Relative Density	1.170 +/-0.0001 (9.76 lbs/gal)
Percent Volatile	97.62 +/- 0.08
Auto-ignition Temperature	23%
VOC	1.57 lbs per gallon of paint remover Or 188 grams per liter

All other information not available

SECTION 10 - STABILITY AND REACTIVITY

Hazardous Polymerization: Cannot occur

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Effective Date:
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Stability: Stable

Incompatibility: Avoid contact with strong oxidizing agents, strong alkalis, and strong mineral acids

SECTION	11	—	TOXICOLOGICAL
INFORMATION			

Effects of overexposure:

EYES: Can cause severe irritation, redness, tearing, blurred vision.

SKIN: Prolonged or repeated contact can cause irritation, defatting or dermatitis.

BREATHING: Excessive inhalation of vapors can cause nasal and respiratory irritation, dizziness, weakness, fatigue, nausea, headache, possible unconsciousness, central nervous system depression, and even asphyxiation.

SWALLOWING: Can cause gastrointestinal irritation, nausea, vomiting, diarrhea, blindness, and death.

Aspiration of material into lungs can cause chemical pneumonitis, which can be fatal.

Overexposure to components has apparently been found to cause the following effects in laboratory animals: liver abnormalities, lung damage, kidney damage, spleen damage, eye damage, brain damage, and central nervous system damage.

Cancer hazard: This product contains methylene chloride, which has shown to cause cancer in some laboratory animals. Risk to your health depends on the level and duration of exposure. Use with adequate ventilation. Avoid contact with skin.

SECTION	12	—	ECOLOGICAL
INFORMATION			

No information available for this product as a whole.

SECTION	13	—	DISPOSAL
CONSIDERATIONS			

Dispose of in accordance with applicable local, state, and federal regulations.

Keep out of bodies of water.

SECTION 14 – TRANSPORT INFORMATION

LAND TRANSPORT (US DOT):

DOT Proper Shipping Name: Paint Related Material

DOT Hazard Class: 3

UN/NA Number: UN1263

Packing Group: II

SPECIAL PRECAUTIONS: No information available

810 Market Avenue
Richmond, CA 94801

Green Products Company
Safety Data Sheet

Effective Date:
November 1, 2013

SECTION 15 – REGULATORY INFORMATION

No information available for this product as a whole.

SECTION	16	–	OTHER
INFORMATION			

The information accumulated herein is believed to be accurate but is not warranted to be whether originating with Green Products Company or not.

Revision Date: April 28, 2015

Recochem

Recochem Priority Product Notification versus Safety Data Sheets

Priority Product Notification	Safety Data Sheet
Zip Strip Industrial paint and finish remover	Industrial Zip Strip
Zip Strip Premium paint and finish remover	Paint and Varnish Remover and Stripper
Zip Strip Contractors Plus paint and finish remover	Zip-Strip Contractors Plus 88000

Industrial Zip Strip

SECTION 1. IDENTIFICATION

Product Identifier	Industrial Zip Strip
Other Means of Identification	33-621ZIP, 33-621ZIPEXP, 33-624ZIP, 33-624ZIPEXP, 33-628ZIPEXP
Recommended Use	Please refer to Product label.
Restrictions on Use	None known.
Manufacturer / Supplier	Recochem Inc., 850 Montee de Liesse, Montreal, QC, H4T 1P4, Compliance and Regulatory Department, 905-878-5544, www.recochem.com
Emergency Phone No.	CANUTEC, 613-996-6666, 24 Hours
SDS No.	01290021

SECTION 2. HAZARDS IDENTIFICATION

GHS Classification

Flammable liquid - Category 3; Acute toxicity (Oral) - Category 3; Acute toxicity (Dermal) - Category 3; Acute toxicity (Inhalation) - Category 3; Skin corrosion/irritation - Category 1A; Germ cell mutagenicity - Category 1B; Carcinogenicity - Category 1B; Reproductive Toxicity - Category 2; Specific target organ toxicity (single exposure) - Category 3; Specific target organ toxicity (repeated exposure) - Category 2; Aspiration hazard - Category 1

GHS Label Elements



Signal Word:
Danger

Hazard Statement(s):

H226	Flammable liquid and vapour.
H301	Toxic if swallowed.
H311	Toxic in contact with skin.
H331	Toxic if inhaled.
H304	May be fatal if swallowed and enters airways.
H314	Causes severe skin burns and eye damage.
H335	May cause respiratory irritation.
H336	May cause drowsiness or dizziness.
H340	May cause genetic defects.
H350	May cause cancer.
H361	Suspected of damaging fertility or the unborn child.
H373	May cause damage to organs (nervous system) through prolonged or repeated exposure if inhaled.
H373	May cause damage to organs (blood, liver) through prolonged or repeated exposure if swallowed.

Precautionary Statement(s):

Prevention:

Product Identifier:	Industrial Zip Strip
SDS No.:	01290021
Date of Preparation:	October 26, 2015

P201 Obtain special instructions before use.
P202 Do not handle until all safety precautions have been read and understood.
P210 Keep away from heat, sparks, open flames, and hot surfaces. – No smoking.
P233 Keep container tightly closed.
P240 Ground/bond container and receiving equipment.
P241 Use explosion-proof electrical, ventilating, lighting, and other equipment.
P242 Use only non-sparking tools.
P243 Take precautionary measures against static discharge.
P260 Do not breathe fume, mist, vapours, spray.
P264 Wash hands and skin thoroughly after handling.
P270 Do not eat, drink or smoke when using this product.
P271 Use only outdoors or in a well-ventilated area.
P280 Wear protective gloves/protective clothing/eye protection/face protection.

Response:

P301 + P330 + P331 IF SWALLOWED: Rinse mouth. Do NOT induce vomiting.
P310 Immediately call a POISON CENTRE/doctor.
P303 + P361 + P353 IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water/shower.
P311 Call a POISON CENTRE/doctor.
P361 + P364 Take off immediately all contaminated clothing and wash it before reuse.
P304 + P340 IF INHALED: Remove person to fresh air and keep comfortable for breathing.
P311 Call a POISON CENTRE/doctor.
P305 + P351 + P338 IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
P311 Call a POISON CENTRE/doctor.
P308 + P313 IF exposed or concerned: Get medical advice/attention.
P314 Get medical advice/attention if you feel unwell.
P370 + P378 In case of fire: Use appropriate foam, carbon dioxide, dry chemical powder, water spray or fog to extinguish.

Storage:

Store in a well ventilated place. Keep cool. Keep container tightly closed. Store locked up.

Disposal:

Dispose of contents/container in accordance with applicable regional, national and local laws and regulations.

Other Hazards

None known.

SECTION 3. COMPOSITION/INFORMATION ON INGREDIENTS

Mixture:

Chemical Name	CAS No.	%	Other Identifiers
Methylene chloride	75-09-2	60-100	
Methanol	67-56-1	7-13	
Alcohols, C6-12, ethoxylated, liquids	68439-45-2	1-5	
Hydrotreated kerosene	64742-47-8	1-5	
1,2-Epoxybutane	106-88-7	0.1-1	
Tetrachloroethylene	127-18-4	0.1-1	
Propylene Oxide	75-56-9	0.1-1	

Notes

Product Identifier: Industrial Zip Strip
SDS No.: 01290021
Date of Preparation: October 26, 2015

The specific chemical identity and/or exact percentage of composition (concentration) has been withheld as a trade secret.

SECTION 4. FIRST-AID MEASURES

First-aid Measures

Inhalation

Take precautions to ensure your own safety before attempting rescue (e.g. wear appropriate protective equipment). Remove source of exposure or move to fresh air. Keep at rest in a position comfortable for breathing. DO NOT move about unnecessarily. Symptoms of pulmonary edema may be delayed. If breathing has stopped, trained personnel should begin rescue breathing. If the heart has stopped, trained personnel should start cardiopulmonary resuscitation (CPR) or automated external defibrillation (AED). Avoid mouth-to-mouth contact by using a barrier device. Immediately call a Poison Centre or doctor.

Skin Contact

Take off immediately contaminated clothing, shoes and leather goods (e.g. watchbands, belts). Quickly and gently blot or brush away excess chemical. Immediately wash gently and thoroughly with lukewarm, gently flowing water and mild soap for 15-20 minutes. Call a Poison Centre or doctor if you feel unwell or are concerned.

Eye Contact

Avoid direct contact. Wear chemical protective gloves if necessary. Quickly and gently blot or brush chemical off the face. Immediately rinse the contaminated eye(s) with lukewarm, gently flowing water for at least 30 minutes, while holding the eyelid(s) open. Remove contact lenses, if present and easy to do. Take care not to rinse contaminated water into the unaffected eye or onto the face. If eye irritation persists, get medical advice/attention. Immediately call a Poison Centre or doctor.

Ingestion

Never give anything by mouth if victim is rapidly losing consciousness, or is unconscious or convulsing. Do not induce vomiting. If vomiting occurs naturally, lie on your side in the recovery position. Rinse mouth with water again. If breathing has stopped, trained personnel should immediately begin rescue breathing. If the heart has stopped, trained personnel should start cardiopulmonary resuscitation (CPR) or automated external defibrillation (AED). Avoid mouth-to-mouth contact by using a barrier device. Immediately call a Poison Centre or doctor. Treatment is urgently required.

Most Important Symptoms and Effects, Acute and Delayed

No specific treatment. Treat symptomatically. Contact poison treatment specialist immediately if large quantities have been ingested or inhaled.

Immediate Medical Attention and Special Treatment

Target Organs

Skin, blood, liver, kidneys.

Special Instructions

No specific treatment. Treat symptomatically. Contact poison treatment specialist immediately if large quantities have been ingested or inhaled.

Medical Conditions Aggravated by Exposure

None known.

SECTION 5. FIRE-FIGHTING MEASURES

Extinguishing Media

Suitable Extinguishing Media

Carbon dioxide, dry chemical powder, appropriate foam, water spray or fog.

Unsuitable Extinguishing Media

None known.

Specific Hazards Arising from the Chemical

Flammable liquid and vapour. Can ignite at room temperature. Releases vapour that can form explosive mixture with

air. Can be ignited by static discharge. Can accumulate static charge by flow, splashing or agitation. See Section 9 (Physical and Chemical Properties) for flash point and explosive limits. May accumulate in hazardous amounts in low-lying areas especially inside confined spaces, resulting in a fire and/or health hazard. Closed containers may rupture violently when heated releasing contents.

In a fire, the following hazardous materials may be generated: very toxic, flammable formaldehyde; corrosive chlorine; very toxic carbon monoxide, carbon dioxide; irritating chemicals; toxic chemicals.

Special Protective Equipment and Precautions for Fire-fighters

Review Section 6 (Accidental Release Measures) for important information on responding to leaks/spills.

See Skin Protection in Section 8 (Exposure Controls/Personal Protection) for advice on suitable chemical protective materials.

SECTION 6. ACCIDENTAL RELEASE MEASURES

Personal Precautions, Protective Equipment, and Emergency Procedures

Evacuate the area immediately. Isolate the hazard area. Keep out unnecessary and unprotected personnel. Evacuate downwind locations. Use the personal protective equipment recommended in Section 8 of this safety data sheet. Eliminate all ignition sources. Use grounded, explosion-proof equipment. May accumulate in hazardous amounts in low-lying areas especially inside confined spaces, if ventilation is not sufficient. Distant ignition and flashback are possible.

Environmental Precautions

Do not allow into any sewer, on the ground or into any waterway.

Methods and Materials for Containment and Cleaning Up

Stop leak if without risk. Move containers from spill area. Approach release from upwind. Prevent entry into sewers, water courses, basements or confined areas. Wash spillages into an effluent treatment plant or proceed as follows. Contain and collect spillage with non-combustible, absorbent material e.g. sand, earth, vermiculite or diatomaceous earth and place in container for disposal according to local regulations (see section 13). Use spark-proof tools and explosion-proof equipment. Dispose of via a licensed waste disposal contractor. Contaminated absorbent material may pose the same hazard as the spilled product. Note: see section 1 for emergency contact information and section 13 for waste disposal.

SECTION 7. HANDLING AND STORAGE

Precautions for Safe Handling

Put on appropriate personal protective equipment (see section 8). Eating, drinking and smoking should be prohibited in areas where this material is handled, stored and processed. Workers should wash hands and face before eating, drinking and smoking. Do not ingest. Avoid contact with eyes, skin and clothing. Avoid breathing vapour or mist. Use only with adequate ventilation. Wear appropriate respirator when ventilation is inadequate. Do not enter storage areas and confined spaces unless adequately ventilated. Keep in the original container or an approved alternative made from a compatible material, kept tightly closed when not in use. Store and use away from heat, sparks, open flame or any other ignition source. Use explosion-proof electrical (ventilating, lighting and material handling) equipment. Use non-sparking tools. Take precautionary measures against electrostatic discharges. To avoid fire or explosion, dissipate static electricity during transfer by grounding and bonding containers and equipment before transferring material. Empty containers retain product residue and can be hazardous. Do not reuse container.

Conditions for Safe Storage

Store in accordance with local regulations. Store in a segregated and approved area. Store in original container protected from direct sunlight in a dry, cool and well-ventilated area, away from incompatible materials (see section 10) and food and drink. Eliminate all ignition sources. Separate from oxidizing materials. Keep container tightly closed and sealed until ready for use. Containers that have been opened must be carefully resealed and kept upright to prevent leakage. Do not store in unlabeled containers. Use appropriate containment to avoid environmental contamination.

SECTION 8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Control Parameters

Chemical Name	ACGIH TLV®		OSHA PEL		AIHA WEEL	
	TWA	STEL	TWA	Ceiling	8-hr TWA	TWA
Alcohols, C6-12, ethoxylated, liquids	Not established	Not established	Not established	Not established		
Methanol	200 ppm	250 ppm	200 ppm	250 ppm		
Methylene chloride	50 ppm A3	Not established	25 ppm	125 ppm		
Hydrotreated kerosene	200 mg/m3 A3	Not established	Not established	Not established		
1,2-Epoxybutane	Not established	Not established	Not established	Not established		
Tetrachloroethylene	Not established	Not established	Not established	Not established		
Propylene Oxide	Not established	Not established	Not established	Not established		

Appropriate Engineering Controls

Do not allow product to accumulate in the air in work or storage areas, or in confined spaces. Use local exhaust ventilation, if general ventilation is not adequate to control amount in the air. Use non-sparking ventilation systems, approved explosion-proof equipment and intrinsically safe electrical systems in areas where this product is used and stored. Control static electricity discharges which includes bonding of equipment to ground. Use only non-combustible, compatible materials for walls, floors, ventilation system, air cleaning devices, pallets, shelving. Provide eyewash and safety shower if contact or splash hazard exists.

Individual Protection Measures**Eye/Face Protection**

Wear chemical safety goggles and face shield when contact is possible.

Skin Protection

Wear chemical protective clothing e.g. gloves, aprons, boots.
Suitable materials are: natural rubber.

Respiratory Protection

Wear a NIOSH approved air-purifying respirator with an appropriate cartridge.

SECTION 9. PHYSICAL AND CHEMICAL PROPERTIES**Basic Physical and Chemical Properties**

Appearance	Milky white.
Odour	Chlorinated Hydrocarbon
Odour Threshold	Not available
pH	Not applicable
Melting Point/Freezing Point	Not available (melting); Not available (freezing)
Initial Boiling Point/Range	> 40 °C (104 °F)
Flash Point	Not applicable
Evaporation Rate	Not available
Flammability (solid, gas)	Not applicable
Upper/Lower Flammability or Explosive Limit	Not applicable (upper); Not applicable (lower)
Vapour Pressure	266.3 mm Hg (35.5 kPa) at 20 °C
Vapour Density (air = 1)	2.9
Relative Density (water = 1)	1.19

Product Identifier: Industrial Zip Strip
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Solubility	Soluble in water; Soluble in all proportions in common organic solvents.
Partition Coefficient, n-Octanol/Water (Log Kow)	Not available
Auto-ignition Temperature	Not available
Decomposition Temperature	Not available
Viscosity	Not available (kinematic); Not available (dynamic)
Other Information	
Physical State	Liquid
Molecular Weight	Not applicable

SECTION 10. STABILITY AND REACTIVITY

Reactivity

None known.

Chemical Stability

Normally stable.

Possibility of Hazardous Reactions

Decomposes in the presence of water. See "Hazardous Decomposition Products".

Conditions to Avoid

Prolonged exposure to high temperatures. Open flames, sparks, static discharge, heat and other ignition sources. Water, moisture or humidity.

Incompatible Materials

Strong oxidizing agents (e.g. perchloric acid), strong acids (e.g. hydrochloric acid).

Hazardous Decomposition Products

Very toxic carbon monoxide, carbon dioxide; corrosive hydrogen chloride; corrosive phosgene; corrosive chlorine; very toxic, flammable formaldehyde.

SECTION 11. TOXICOLOGICAL INFORMATION

Likely Routes of Exposure

Skin contact; inhalation; ingestion.

Acute Toxicity

Chemical Name	LC50	LD50 (oral)	LD50 (dermal)
Alcohols, C6-12, ethoxylated, liquids	Not available	Not available	Not available
Methanol	83867.5 mg/m ³ (rat) (4-hour exposure)	5628 mg/kg (rat)	15800 mg/kg (rabbit)
Methylene chloride	17365-20375 ppm (mouse) (4-hour exposure)	1400 mg/kg (female rat)	> 2000 mg/kg (rabbit)
Hydrotreated kerosene	> 5 mg/L (rat) (4-hour exposure)	> 5000 mg/kg (rat)	> 2000 mg/kg (rabbit)
1,2-Epoxybutane		500 mg/kg (rat)	2100 mg/kg (rabbit)
Tetrachloroethylene	2613 ppm (mouse) (4-hour exposure)	2600 mg/kg (rat)	> 3245 mg/kg (rabbit)
Propylene Oxide	1740 ppm (mouse) (4-hour exposure)	380 mg/kg (rat)	1.5 ml/kg bw (rabbit)

LC50: Not applicable.

LD50 (oral): Not applicable.

Product Identifier: Industrial Zip Strip
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LD50 (dermal): Not applicable.

Skin Corrosion/Irritation

Human experience and animal tests show skin corrosion. (Methylene chloride)

Serious Eye Damage/Irritation

Contact causes severe burns with redness, swelling, pain and blurred vision. Permanent damage including blindness can result. The vapour also irritates or burns the eyes. Permanent damage including blindness can result. (Methylene chloride)

STOT (Specific Target Organ Toxicity) - Single Exposure

Inhalation

May be harmful based on human experience and animal tests. At high concentrations depression of the central nervous system. Symptoms may include headache, nausea, dizziness, drowsiness and confusion. A severe exposure can cause unconsciousness. (Methylene chloride)

Toxic, can cause death based on human experience and animal tests. At high concentrations depression of the central nervous system. Symptoms may include headache, nausea, dizziness, drowsiness and confusion. A severe exposure can cause unconsciousness. (Methylene chloride)

May be harmful based on human experience and animal tests. Nose and throat irritation. Toxic, can cause death based on human experience and animal tests. Decreased ability of the blood to carry oxygen. (Methylene chloride)

Harmful based on human experience and animal tests. Depression of the central nervous system. Symptoms may include headache, nausea, dizziness, drowsiness and confusion. A severe exposure can cause unconsciousness. (Methanol)

Skin Absorption

Not harmful based on limited evidence. (Methylene chloride)

Harmful based on human experience and animal tests. Can cause effects as described for inhalation. (Methanol)

Ingestion

Toxic, can cause death based on human experience. Severe irritation or burns to the mouth, throat and stomach. Permanent damage can result. (Methylene chloride)

Toxic, can cause death based on human experience and animal tests. depression of the central nervous system, impaired vision and blindness. In some cases, there may be delayed effects on the nervous system. Symptoms may include headache, nausea, vomiting, dizziness, drowsiness and confusion. A severe exposure may cause stomach pain, muscle pain, difficult breathing and coma. Vision can be impaired and permanent blindness can result. There may be other permanent effects on the nervous system e.g. tremor, seizures. (Methanol)

Aspiration Hazard

Can cause lung damage if aspirated based on human experience. Death can result.

STOT (Specific Target Organ Toxicity) - Repeated Exposure

May cause Following skin contact and/or if swallowed: dermatitis. (Hydrotreated kerosene). (Methylene chloride). (Methanol)

May cause If inhaled: effects similar to STOT (Specific Target Organ Toxicity) - Single Exposure, as described above, harmful effects on the heart. (Methylene chloride)

May cause If inhaled and/or following skin contact: at high concentrations effects on the central nervous system. (Methylene chloride). (Methanol)

May cause If inhaled: at high concentrations harmful effects on the kidneys, harmful effects on the liver. (Methylene chloride)

Cause If inhaled, following skin contact and/or if swallowed: visual disturbances, cataracts, opacities. (Methanol)

Respiratory and/or Skin Sensitization

Not known to be a respiratory sensitizer.

Human experience shows an allergic skin reaction (skin sensitization) in rare cases following exposure at work.

Carcinogenicity

Chemical Name	IARC	ACGIH®	NTP	OSHA
Alcohols, C6-12, ethoxylated, liquids	Not Listed	Not designated	Not Listed	Not Listed
Methanol	Not Listed	Not designated	Not Listed	Not Listed

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Methylene chloride	Group 2A	A3	Reasonably anticipated	Listed
Hydrotreated kerosene	Group 3	A3	Not Listed	Listed
1,2-Epoxybutane	Group 2B	Not designated	Not Listed	Not Listed
Tetrachloroethylene	Group 2A	A3	Reasonably anticipated	Not Listed
Propylene Oxide	Group 2B	A3	Reasonably anticipated	Not Listed

Key to Abbreviations

Group 2A = Probably carcinogenic to humans.

Group 3 = Not classifiable as to its carcinogenicity to humans.

A3 = Animal carcinogen.

Reasonably anticipated = Reasonably anticipated human carcinogen.

Reproductive Toxicity

Development of Offspring

Studies in people show effects on the unborn child. However, these effects are only seen with significant toxicity in the mothers. Has been associated with: decreased weight. (Methylene chloride)

Conclusions cannot be drawn from the limited studies available. May harm the unborn child. Has been associated with: miscarriage. (Methylene chloride)

Animal studies show effects on the offspring. (Methanol).

Sexual Function and Fertility

May cause effects on sexual function and/or fertility based on limited evidence. Male and female sterility. (Methylene chloride)

Effects on or via Lactation

Can transfer to mother's milk.

Germ Cell Mutagenicity

Causes mutagenicity in non-reproductive (somatic) cells in tests using live animals. Conclusions cannot be drawn from the limited studies available. If inhaled. (Methylene chloride)

Interactive Effects

No information was located.

SECTION 12. ECOLOGICAL INFORMATION

Toxicity

Acute Aquatic Toxicity

Chemical Name	LC50 Fish	EC50 Crustacea	ErC50 Aquatic Plants	ErC50 Algae
Alcohols, C6-12, ethoxylated, liquids	Not available	Not available		
Methanol	15400 mg/L (Lepomis macrochirus (bluegill); 96-hour)	10000 mg/L (Daphnia magna (water flea); 48-hour)		
Methylene chloride	193 mg/L (Pimephales promelas (fathead minnow); 96-hour)	1682 mg/L (Daphnia magna (water flea); 48-hour)		
Hydrotreated kerosene	2.2 mg/L (Lepomis macrochirus (bluegill); 96-hour)	Not available		

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1,2-Epoxybutane	Not available	Not available		
Tetrachloroethylene	13 mg/L (Lepomis macrochirus (bluegill); 96-hour; static)	18 mg/L (Daphnia magna (water flea); 48-hour; static)		
Propylene Oxide	170 mg/L (Goldfish; 24 hr)	Not available		

Chronic Aquatic Toxicity

Chemical Name	NOEC Fish	EC50 Fish	NOEC Crustacea	EC50 Crustacea
Alcohols, C6-12, ethoxylated, liquids	Not available		Not available	
Methanol	7900 mg/L (Lepomis macrochirus (bluegill); 200-hrs)			
Methylene chloride	Not available		Not available	
Hydrotreated kerosene	Not available		Not available	
1,2-Epoxybutane	Not available		Not available	
Tetrachloroethylene	Not available		Not available	
Propylene Oxide	Not available		Not available	

Persistence and Degradability

No information was located.

Bioaccumulative Potential

No information was located.

Mobility in Soil

No information was located.

Other Adverse Effects

There is no information available.

SECTION 13. DISPOSAL CONSIDERATIONS

Disposal Methods

The generation of waste should be avoided or minimized wherever possible. Empty containers or liners may retain some product residues. This material and its container must be disposed of in a safe way. Dispose of surplus and non-recyclable products via a licensed waste disposal contractor. Disposal of this product, solutions and any by-products should at all times comply with the requirements of environmental protection and waste disposal legislation and any regional local authority requirements. Avoid dispersal of spilled material and runoff and contact with soil, waterways, drains and sewers.

SECTION 14. TRANSPORT INFORMATION

Regulation	UN No.	Proper Shipping Name	Transport Hazard Class(es)	Packing Group
Canadian TDG	2810	TOXIC LIQUID, ORGANIC, N.O.S. (Methanol, Dichloromethane)	6.1	III
US DOT	2810	TOXIC LIQUID, ORGANIC, N.O.S. (Methanol, Dichloromethane)	6.1	III

Environmental Hazards Marine Pollutant (Hydrotreated kerosene)

Special Precautions Please note: In containers of 5 L (5Kg) capacity or less this product is classified as a "Limited

Product Identifier: Industrial Zip Strip

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for User Quantities""Consumer Commodity" under TDG regulations.
In containers of 5 L (5Kg) capacity or less this product is classified as a "Consumer Commodity" under DOT regulations.

Transport in Bulk According to Annex II of MARPOL 73/78 and the IBC Code

Not applicable

SECTION 15. REGULATORY INFORMATION

Safety, Health and Environmental Regulations

Canada

Domestic Substances List (DSL) / Non-Domestic Substances List (NDSL)

All ingredients are listed on the DSL/NDSL.

USA

Toxic Substances Control Act (TSCA) Section 8(b)

All ingredients are listed on the TSCA Inventory.

Additional USA Regulatory Lists

California Proposition 65: WARNING: This product contains chemicals known to the State of California to cause cancer.

WARNING: This product contains chemicals known to the State of California to cause Reproductive Toxicity.

SECTION 16. OTHER INFORMATION

SDS Prepared By Compliance and Regulatory Department

Phone No. 905-878-5544

Date of Preparation October 26, 2015

Additional Information We are committed to uphold the Industry Consumer Ingredient Communication Voluntary Initiative.

Please send us your request by visiting our website at www.recochem.com.

Ingredients present (intentionally added ingredients) at a concentration of greater than one percent (1%) shall be listed in descending order of predominance. Ingredients present at a concentration of not more than one percent shall be listed but may be disclosed without respect to order of predominance.

Disclaimer

Notice to reader: To the best of our knowledge, the information contained herein is accurate. However, neither the above named supplier nor any of its subsidiaries assumes any liability whatsoever for the accuracy or completeness of the information contained herein. Final determination of suitability of any material is the sole responsibility of the user. All materials may present unknown hazards and should be used with caution. Although certain hazards are described herein, we cannot guarantee that these are the only hazards that exist.

Product Identifier: Industrial Zip Strip

SDS No.: 01290021

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Date of Preparation: October 26, 2015

Paint and Varnish Remover and Stripper

SECTION 1. IDENTIFICATION

Product Identifier	Paint and Varnish Remover and Stripper
Other Means of Identification	33-631POR, 33-631ZIPEXP, 33-634ZIPEXP, 33-639ZIPEXP
Other Identification	POR-15 Strip
Recommended Use	Please refer to Product label.
Restrictions on Use	None known.
Manufacturer/Supplier Identifier	Recochem Inc., 850 Montee de Liesse, Montreal, QC, H4T 1P4, Compliance and Regulatory Department, 905-878-5544, www.recochem.com
Emergency Phone No.	CANUTEC, 613-996-6666, 24 Hours
SDS No.	1905

SECTION 2. HAZARD IDENTIFICATION

Classification

Flammable liquid - Category 3; Acute toxicity (Oral) - Category 4; Skin corrosion - Category 1B; Carcinogenicity - Category 1B; Reproductive toxicity - Category 1B; Reproductive toxicity - Effects on or via lactation; Specific target organ toxicity (single exposure) - Category 1; Specific target organ toxicity (single exposure) - Category 3; Specific target organ toxicity (repeated exposure) - Category 1; Aspiration hazard - Category 1

Label Elements



Signal Word:
Danger

Hazard Statement(s):

H226	Flammable liquid and vapour.
H302	Harmful if swallowed.
H304	May be fatal if swallowed and enters airways.
H314	Causes severe skin burns and eye damage.
H335	May cause respiratory irritation.
H336	May cause drowsiness or dizziness.
H350	May cause cancer.
H360	May damage fertility or the unborn child.
H362	May cause harm to breast-fed children.
H370	Causes damage to organs.
H372	Causes damage to organs through prolonged or repeated exposure.

Precautionary Statement(s):

Product Identifier: Paint and Varnish Remover and Stripper - Ver. 1
 Date of Preparation: March 19, 2018
 Date of Last Revision:

SDS No.: 1905

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Prevention:

P201 Obtain special instructions before use.
P202 Do not handle until all safety precautions have been read and understood.
P210 Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking.
P233 Keep container tightly closed.
P240 Ground and bond container and receiving equipment.
P241 Use explosion-proof electrical, ventilating, and lighting equipment.
P241 Use explosion-proof equipment.
P242 Use only non-sparking tools.
P243 Take precautionary measures against static discharge.
P260 Do not breathe fume, mist, vapours, spray.
P263 Avoid contact during pregnancy and while nursing.
P264 Wash hands and skin thoroughly after handling.
P270 Do not eat, drink or smoke when using this product.
P271 Use only outdoors or in a well-ventilated area. protective gloves
protective clothing
eye protection
face protection

Response:

P301 + P310 IF SWALLOWED: Immediately call a POISON CENTRE or doctor.
P330 Rinse mouth.
P331 Do NOT induce vomiting.
P303 + P361 + P353 IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water or shower.
P312 Call a POISON CENTRE or doctor if you feel unwell.
P363 Wash contaminated clothing before reuse.
P304 + P340 IF INHALED: Remove person to fresh air and keep comfortable for breathing.
P312 Call a POISON CENTRE or doctor if you feel unwell.
P305 + P351 + P338 IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
P312 Call a POISON CENTRE or doctor if you feel unwell.
P370 + P378 In case of fire: Use appropriate foam, carbon dioxide, dry chemical powder, water spray or fog to extinguish.

Storage:

Store in a well ventilated place. Keep cool. Keep container tightly closed. Store locked up.

Disposal:

Dispose of contents/container in accordance with applicable regional, national and local laws and regulations.

Other Hazards

None known.

SECTION 3. COMPOSITION/INFORMATION ON INGREDIENTS

Mixture:

Chemical Name	CAS No.	%	Other Identifiers	Other Names
Methylene chloride	75-09-2	60-100		
Methanol	67-56-1	7-13		
Toluene	108-88-3	5-10		
Alcohols, C6-12, ethoxylated, liquids	68439-45-2	1-5		

Notes

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Use of Generic SDS:

If the concentration or actual concentration range of an ingredient of a particular hazardous product in the series is different from the concentration or actual concentration range disclosed for the rest of the series, either the concentration or the actual concentration range must be indicated beside that ingredient under item 3 (Composition/Information on ingredients) of the SDS. Furthermore, if any other specific information element(s) (such as flash point, numerical measure of toxicity, etc.) for a particular hazardous product in the series differs from that of the other products in the series (without affecting the classification), the information element relevant to that hazardous product must be disclosed on the SDS with an indication to which hazardous product each relates.

Source: Health Canada - Technical Guidance on the Requirements of the Hazardous Products Act and the Hazardous Products Regulations WHMIS 2015 Supplier Requirements - pg 117

SECTION 4. FIRST-AID MEASURES

First-aid Measures

Inhalation

Take precautions to ensure your own safety before attempting rescue (e.g. wear appropriate protective equipment). Remove source of exposure or move to fresh air. Keep at rest in a position comfortable for breathing. DO NOT move about unnecessarily. Symptoms of pulmonary edema may be delayed. If breathing has stopped, trained personnel should begin rescue breathing. If the heart has stopped, trained personnel should start cardiopulmonary resuscitation (CPR) or automated external defibrillation (AED). Avoid mouth-to-mouth contact by using a barrier device. Immediately call a Poison Centre or doctor.

Skin Contact

Avoid direct contact. Wear chemical protective clothing if necessary. Take off immediately contaminated clothing, shoes and leather goods (e.g. watchbands, belts). Immediately rinse with lukewarm, gently flowing water for 15-20 minutes. Call a Poison Centre or doctor if you feel unwell. Thoroughly clean clothing, shoes and leather goods before reuse or dispose of safely.

Eye Contact

Avoid direct contact. Wear chemical protective gloves if necessary. Immediately rinse the contaminated eye(s) with lukewarm, gently flowing water for at least 30 minutes, while holding the eyelid(s) open. Remove contact lenses, if present and easy to do. Take care not to rinse contaminated water into the unaffected eye or onto the face. Immediately call a Poison Centre or doctor.

Ingestion

Do not induce vomiting. Rinse mouth with water. Never give anything by mouth if person is rapidly losing consciousness, or is unconscious or convulsing. Do not induce vomiting. If vomiting occurs naturally, lie on your side in the recovery position. Rinse mouth with water again. If breathing has stopped, trained personnel should immediately begin rescue breathing. If the heart has stopped, trained personnel should start cardiopulmonary resuscitation (CPR) or automated external defibrillation (AED). Avoid mouth-to-mouth contact by using a barrier device. Immediately call a Poison Centre or doctor. Specific treatment is required.

First-aid Comments

If exposed or concerned, get medical advice or attention.

Most Important Symptoms and Effects, Acute and Delayed

No specific treatment. Treat symptomatically. Contact poison treatment specialist immediately if large quantities have been ingested or inhaled.

Immediate Medical Attention and Special Treatment

Target Organs

Blood, auditory (hearing) system, eyes, kidneys, liver, nervous system, skin.

Special Instructions

Acute exposure to methanol, either through ingestion or breathing high airborne concentrations can result in symptoms appearing between 40 minutes and 72 hours after exposure. Symptoms and signs are usually limited to CNS, eyes and gastrointestinal tract. Because of the initial CNS's effects of headache, vertigo, lethargy and confusion, there may be an impression of ethanol intoxication. Blurred vision, decreased acuity and photophobia are common complaints. Treatment with ipecac or lavage is indicated in any patient presenting within two hours of

ingestion. A profound metabolic acidosis occurs in severe poisoning and serum bicarbonate levels are a more accurate measure of severity than serum methanol levels. Treatment protocols are available from most major hospitals and early collaboration with appropriate hospitals is recommended.

Medical Conditions Aggravated by Exposure

Blood conditions, dermatitis, eye conditions, kidney conditions, liver conditions, nervous system conditions, skin conditions.

SECTION 5. FIRE-FIGHTING MEASURES

Extinguishing Media

Suitable Extinguishing Media

Carbon dioxide, dry chemical powder, appropriate foam, water spray or fog.

Unsuitable Extinguishing Media

None known.

Specific Hazards Arising from the Product

Flammable liquid and vapour. Can ignite at room temperature. Releases vapour that can form explosive mixture with air. Can be ignited by static discharge. Can accumulate static charge by flow, splashing or agitation. May travel a considerable distance to a source of ignition and flash back to a leak or open container. See Section 9 (Physical and Chemical Properties) for flash point and explosive limits. May accumulate in hazardous amounts in low-lying areas especially inside confined spaces, resulting in a fire hazard. Closed containers may rupture violently when heated releasing contents.

In a fire, the following hazardous materials may be generated: very toxic carbon monoxide, carbon dioxide; corrosive phosgene; corrosive chlorine; very toxic, flammable formaldehyde; corrosive hydrogen chloride.

Special Protective Equipment and Precautions for Fire-fighters

Review Section 6 (Accidental Release Measures) for important information on responding to leaks/spills.

See Skin Protection in Section 8 (Exposure Controls/Personal Protection) for advice on suitable chemical protective materials.

SECTION 6. ACCIDENTAL RELEASE MEASURES

Personal Precautions, Protective Equipment, and Emergency Procedures

Evacuate the area immediately. Isolate the hazard area. Keep out unnecessary and unprotected personnel. Evacuate downwind locations. Do not touch damaged containers or spilled product unless wearing appropriate protective equipment. Use the personal protective equipment recommended in Section 8 of this safety data sheet. Increase ventilation to area or move leaking container to a well-ventilated and secure area. Eliminate all ignition sources. Use grounded, explosion-proof equipment. May accumulate in hazardous amounts in low-lying areas especially inside confined spaces, if ventilation is not sufficient. Distant ignition and flashback are possible.

Environmental Precautions

Do not allow into any sewer, on the ground or into any waterway.

Methods and Materials for Containment and Cleaning Up

Stop leak if without risk. Move containers from spill area. Approach release from upwind. Prevent entry into sewers, water courses, basements or confined areas. Wash spillages into an effluent treatment plant or proceed as follows. Contain and collect spillage with non-combustible, absorbent material e.g. sand, earth, vermiculite or diatomaceous earth and place in container for disposal according to local regulations (see section 13). Use spark-proof tools and explosion-proof equipment. Dispose of via a licensed waste disposal contractor. Contaminated absorbent material may pose the same hazard as the spilled product. Note: see section 1 for emergency contact information and section 13 for waste disposal.

SECTION 7. HANDLING AND STORAGE

Precautions for Safe Handling

Put on appropriate personal protective equipment (see section 8). Eating, drinking and smoking should be prohibited in areas where this material is handled, stored and processed. Workers should wash hands and face before eating, drinking and smoking. Do not ingest. Avoid contact with eyes, skin and clothing. Avoid breathing vapour or mist. Use

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only with adequate ventilation. Wear appropriate respirator when ventilation is inadequate. Do not enter storage areas and confined spaces unless adequately ventilated. Keep in the original container or an approved alternative made from a compatible material, kept tightly closed when not in use. Store and use away from heat, sparks, open flame or any other ignition source. Use explosion-proof electrical (ventilating, lighting and material handling) equipment. Use non-sparking tools. Take precautionary measures against electrostatic discharges. To avoid fire or explosion, dissipate static electricity during transfer by grounding and bonding containers and equipment before transferring material. Empty containers retain product residue and can be hazardous. Do not reuse container.

Conditions for Safe Storage

Store in accordance with local regulations. Store in a segregated and approved area. Store in original container protected from direct sunlight in a dry, cool and well-ventilated area, away from incompatible materials (see section 10) and food and drink. Eliminate all ignition sources. Separate from oxidizing materials. Keep container tightly closed and sealed until ready for use. Containers that have been opened must be carefully resealed and kept upright to prevent leakage. Do not store in unlabeled containers. Use appropriate containment to avoid environmental contamination.

SECTION 8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Control Parameters

Chemical Name	ACGIH TLV®		OSHA PEL		AIHA WEEL	
	TWA	STEL	TWA	Ceiling	8-hr TWA	TWA
Alcohols, C6-12, ethoxylated, liquids	Not established	Not established	Not established	Not established		
Methanol	200 ppm	250 ppm	200 ppm	250 ppm		
Methylene chloride	50 ppm A3	Not established	25 ppm	125 ppm		
Toluene	20 ppm A4	Not established	100 ppm	150 ppm		

Appropriate Engineering Controls

For large scale use of this product: use local exhaust ventilation, if general ventilation is not adequate to control amount in the air. Use non-sparking ventilation systems, approved explosion-proof equipment and intrinsically safe electrical systems in areas where this product is used and stored. Control static electricity discharges which includes bonding of equipment to ground. Use only non-combustible, compatible materials for walls, floors, ventilation system, air cleaning devices, pallets, shelving. Provide eyewash and safety shower if contact or splash hazard exists.

Individual Protection Measures

Eye/Face Protection

Wear chemical safety goggles and face shield when contact is possible.

Skin Protection

Wear chemical protective clothing e.g. gloves, aprons, boots.

Suitable materials are: thick natural rubber.

Respiratory Protection

Wear a NIOSH approved air-purifying respirator with an appropriate cartridge.

SECTION 9. PHYSICAL AND CHEMICAL PROPERTIES

Basic Physical and Chemical Properties

Appearance	Available in these colours: Clear, Yellow, Gold, Red, Blue, Green, Amber, Pink, Orange, Purple, White, Brown, Grey.
Odour	Chlorinated Hydrocarbon
Odour Threshold	Not available
pH	Not available
Melting Point/Freezing Point	Not available (melting); Not available (freezing)
Initial Boiling Point/Range	Not available
Flash Point	45 °C (113 °F) (closed cup)

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Evaporation Rate	Not available
Flammability (solid, gas)	Not applicable
Upper/Lower Flammability or Explosive Limit	Not available (upper); Not available (lower)
Vapour Pressure	Not available
Vapour Density (air = 1)	Not available
Relative Density (water = 1)	1.19 at 20 °C
Solubility	Not available in water; Not available (in other liquids)
Partition Coefficient, n-Octanol/Water (Log Kow)	Not available
Auto-ignition Temperature	Not available
Decomposition Temperature	Not available
Viscosity	Not available (kinematic); Not available (dynamic)
Other Information	
Physical State	Liquid
Molecular Weight	Not applicable

SECTION 10. STABILITY AND REACTIVITY

Reactivity

None known.

Chemical Stability

Normally stable.

Possibility of Hazardous Reactions

None known.

Conditions to Avoid

Open flames, sparks, static discharge, heat and other ignition sources. Sunlight. Temperatures above 45.0 °C (113.0 °F)

Incompatible Materials

Reacts explosively with: strong oxidizing agents (e.g. perchloric acid). Nitric acid.

Hazardous Decomposition Products

Very toxic carbon monoxide, carbon dioxide; corrosive hydrogen chloride; corrosive phosgene; corrosive chlorine; very toxic, flammable formaldehyde; very toxic, flammable aldehydes.

SECTION 11. TOXICOLOGICAL INFORMATION

Likely Routes of Exposure

Skin contact; eye contact; inhalation.

Acute Toxicity

Chemical Name	LC50	LD50 (oral)	LD50 (dermal)
Alcohols, C6-12, ethoxylated, liquids	Not available	5100 mg/kg (rat)	Not available
Methanol	64000 ppm (rat) (4-hour exposure)	143 mg/kg Human - Male	15800 mg/kg (rabbit)
Methylene chloride	17365-20375 ppm (mouse) (4-hour exposure)	1400 mg/kg (female rat)	> 2000 mg/kg (rabbit)
Toluene	12500-28800 mg/m3 (rat) (4-hour exposure)	> 5580 mg/kg (rat)	12125 mg/kg (rabbit)

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Inhalation ATE: 17,281 mg/L

Oral ATE: 755.91 mg/kg

Dermal ATE: 2,287 mg/kg

Skin Corrosion/Irritation

Animal tests show moderate or severe irritation.

Repeated or prolonged exposure can irritate or burn the skin.

Serious Eye Damage/Irritation

Human experience and animal tests show serious eye irritation. The vapour also irritates the eyes.

STOT (Specific Target Organ Toxicity) - Single Exposure

Inhalation

May cause depression of the central nervous system. Symptoms may include headache, nausea, dizziness, drowsiness and confusion. A severe exposure can cause unconsciousness.

May cause decreased ability of the blood to carry oxygen.

Skin Absorption

May be harmful based on human experience and animal tests. Can cause effects as described for inhalation.

Ingestion

Toxic, can cause death based on human experience and animal tests. depression of the central nervous system, impaired vision and blindness. In some cases, there may be delayed effects on the nervous system. Symptoms may include headache, nausea, vomiting, dizziness, drowsiness and confusion. A severe exposure may cause stomach pain, muscle pain, difficult breathing and coma. Vision can be impaired and permanent blindness can result. There may be other permanent effects on the nervous system e.g. tremor, seizures.

May cause severe irritation or burns to the mouth, throat and stomach. Permanent damage can result.

May cause harmful effects on the kidneys, harmful effects on the liver.

Aspiration Hazard

May be drawn into the lungs (aspirated) if swallowed or vomited. Can cause lung damage if aspirated based on human experience. Death can result.

STOT (Specific Target Organ Toxicity) - Repeated Exposure

May cause damage to organs based on studies in people. If inhaled: effects on the central nervous system.

May cause Following skin contact: dermatitis. Symptoms may include dry, red, cracked skin (dermatitis).

May cause If inhaled and/or following skin contact: decreased ability of blood to carry oxygen.

May cause If inhaled, following skin contact and/or if swallowed: harmful effects on the kidneys, harmful effects on the liver.

May cause If inhaled, following skin contact and/or if swallowed: visual disturbances, cataracts, opacities.

May cause If inhaled: harmful effects on the hearing (auditory) system. Exposure to this chemical and loud noise may cause greater hearing loss than expected from noise exposure alone.

Respiratory and/or Skin Sensitization

Not known to be a respiratory sensitizer. Not known to be a skin sensitizer.

Carcinogenicity

Chemical Name	IARC	ACGIH®	NTP	OSHA
Alcohols, C6-12, ethoxylated, liquids	Not Listed	Not designated	Not Listed	Not Listed
Methanol	Not Listed	Not designated	Not Listed	Not Listed
Methylene chloride	Group 2A	A3	Reasonably anticipated	Listed
Toluene	Group 3	A4	Not Listed	Not Listed

Key to Abbreviations

Group 2A = Probably carcinogenic to humans.

A3 = Animal carcinogen.

A4 = Not classifiable as a human carcinogen.

Group 3 = Not classifiable as to its carcinogenicity to humans.

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Reasonably anticipated = Reasonably anticipated human carcinogen.

Reproductive Toxicity

Development of Offspring

May cause effects on the unborn child based on limited evidence. If inhaled: has been associated with: miscarriage. (Methylene chloride)

Studies in people show effects on the unborn child. If inhaled and/or swallowed: known to cause: decreased weight. Teratogenic(external, soft tissue and skeletal defects). (Methanol)

Animal studies show effects on the offspring. If inhaled: known to cause: decreased weight, long-lasting behavioural changes, hearing loss, miscarriage. (Toluene)

Sexual Function and Fertility

May cause effects on sexual function and/or fertility based on limited evidence. Has been associated with: if inhaled and/or following skin contact: reduced male fertility. (Methylene chloride)

Effects on or via Lactation

No information was located.

Germ Cell Mutagenicity

Conclusions cannot be drawn from the limited studies available. (Methylene chloride). (Methanol). (Toluene)

Interactive Effects

No information was located.

SECTION 12. ECOLOGICAL INFORMATION

This section is not required by WHMIS.

This section is not required by OSHA HCS 2012.

Persistence and Degradability

No information was located.

Bioaccumulative Potential

No information was located.

Mobility in Soil

No information was located.

Other Adverse Effects

There is no information available.

SECTION 13. DISPOSAL CONSIDERATIONS

Disposal Methods

The generation of waste should be avoided or minimized wherever possible. Empty containers or liners may retain some product residues. This material and its container must be disposed of in a safe way. Dispose of surplus and non-recyclable products via a licensed waste disposal contractor. Disposal of this product, solutions and any by-products should at all times comply with the requirements of environmental protection and waste disposal legislation and any regional local authority requirements. Avoid dispersal of spilled material and runoff and contact with soil, waterways, drains and sewers.

SECTION 14. TRANSPORT INFORMATION

Regulation	UN No.	Proper Shipping Name	Transport Hazard Class(es)	Packing Group
Canadian TDG	1263	PAINT RELATED MATERIAL	3	III
US DOT	1263	PAINT RELATED MATERIAL	3	III

Special Precautions Please note: In containers of 5 L (5Kg) capacity or less this product is classified as a "Limited Quantities""Consumer Commodity" under TDG regulations.
In containers of 5 L (5Kg) capacity or less this product is classified as a "Consumer

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Commodity" under DOT regulations.

Transport in Bulk According to Annex II of MARPOL 73/78 and the IBC Code

Not applicable

Proof of Dangerous Goods Classification

Date of Classification March 19, 2018

Classification 3 PG III

Classification Method Flashpoint as per Section 9

SECTION 15. REGULATORY INFORMATION

Safety, Health and Environmental Regulations

Canada

Domestic Substances List (DSL) / Non-Domestic Substances List (NDSL)

All ingredients are listed on the DSL/NDSL.

USA

Toxic Substances Control Act (TSCA) Section 8(b)

All ingredients are listed on the TSCA Inventory.

Additional USA Regulatory Lists

California Proposition 65: WARNING: Cancer - www.P65Warnings.ca.gov/product.

Custom Regulatory 1

Consumer Product Safety Improvement Act of 2008 General Conformity Certification

The Supplier identified in Section 1 of this MSDS has evaluated this product and certifies it to be labeled and packaged in compliance with the applicable provisions of the Federal Hazardous Substance Act as stated in 16 CFR 1500 and enforced by the Consumer Product Safety Commission, and where applicable the products that require Child Resistant Closures are packaged in accordance with the Poison Prevention Packaging Act as stated in 16 CFR 1700 and enforced by the Consumer Product Safety Commission. All closures have been tested in accordance with the latest protocols. No other testing is required to certify compliance with the above. The date of manufacture is stamped on the product container.

SECTION 16. OTHER INFORMATION

SDS Prepared By Compliance and Regulatory Department

Phone No. 905-878-5544

Date of Preparation March 19, 2018

Additional Information We are committed to uphold the Industry Consumer Ingredient Communication Voluntary Initiative.
Please send us your request by visiting our website at www.recochem.com.

Ingredients present (intentionally added ingredients) at a concentration of greater than one percent (1%) shall be listed in descending order of predominance. Ingredients present at a concentration of not more than one percent shall be listed but may be disclosed without respect to order of predominance.

Disclaimer

Notice to reader: To the best of our knowledge, the information contained herein is accurate. However, neither the above named supplier nor any of its subsidiaries assumes any liability whatsoever for the accuracy or completeness of the information contained herein. Final determination of suitability of any material is the sole responsibility of the user. All materials may present unknown hazards and should be used with caution. Although certain hazards are described herein, we cannot guarantee that these are the only hazards that exist.

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Material Safety Data Sheet

WHMIS (Pictograms)	WHMIS (Classification)	Personal protective equipment
 	Class B-2: Flammable liquid Class D-1B: Material causing immediate and serious toxic effects (Toxic).	    

Section 1. Product and Company Identification

Product name / Trade name	Zip-Strip Contractors Plus 88000	Associated Product's Item Code	33-641ZIPEXP
Synonym	Not available.	CAS #	Not applicable.
Chemical family	Solvent.	Validation date	Jan. 10 2015
Chemical formula	Not applicable.	Print date	Jan. 13 2015
Manufacturer/Supplier	Recochem Inc. 850 Montee de Liesse Montreal, Quebec H4T 1P4 (514) 341-3550 www.recochem.com	In case of emergency	Recochem Inc. Communications and Regulatory Affairs Department (905) 878-5544
Material uses	Not available.		

Section 2. Hazards identification

Emergency Overview	DANGER ! EXTREMELY FLAMMABLE LIQUID AND VAPOR. FLAMMABLE. VAPOR MAY CAUSE FLASH FIRE. MAY BE HARMFUL IF SWALLOWED. CONTAINS MATERIAL THAT MAY CAUSE TARGET ORGAN DAMAGE, BASED ON ANIMAL DATA. CANCER HAZARD - CONTAINS MATERIAL WHICH CAN CAUSE CANCER. Extremely flammable liquid. Harmful if swallowed. Keep away from heat, sparks and flame. Avoid exposure - obtain special instructions before use. Do not breathe vapor or mist. Do not ingest. Avoid contact with eyes, skin and clothing. Contains material that may cause target organ damage, based on animal data. Contains material which can cause cancer. Risk of cancer depends on duration and level of exposure. Use only with adequate ventilation. Keep container tightly closed and sealed until ready for use. Wash thoroughly after handling.
Potential Acute Health Effects	See section 11 for more detailed information on health effects and symptoms. Extremely hazardous by the following route of exposure: of ingestion. Very hazardous by the following route of exposure: of skin contact (corrosive, irritant), of eye contact (irritant, corrosive). Hazardous by the following route of exposure: of inhalation (lung irritant). Severe over-exposure can result in death. Inflammation of the eye is characterized by redness, watering and itching. Skin inflammation is characterized by itching, scaling, reddening or, occasionally, blistering.
Note to Physician	Acute exposure to methanol, either through ingestion or breathing high airborne concentrations can result in symptoms appearing between 40 minutes and 72 hours after exposure. Symptoms and signs are usually limited to CNS, eyes and gastrointestinal tract. Because of the initial CNS's effects of headache, vertigo, lethargy and confusion, there may be an impression of ethanol intoxication. Blurred vision, decreased acuity and photophobia are common complaints. Treatment with ipecac or lavage is indicated in any patient presenting within two hours of ingestion. A profound metabolic acidosis occurs in severe poisoning and serum bicarbonate levels are a more accurate measure of severity than serum methanol levels. Treatment protocols are available from most major hospitals and early collaboration with appropriate hospitals is recommended.

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**Section 3. Composition, information on ingredients****Canada**

Name	CAS number	Conc. (% w/w)
Dichloromethane.	75-09-2	30 - 45
methanol	67-56-1	29 - 37
toluene	108-88-3	12 - 19
acetone	67-64-1	1 - 5

There are no ingredients present which, within the current knowledge of the supplier and in the concentrations applicable, are classified as hazardous to health or the environment and hence require reporting in this section.

Section 4. First aid measures

Eye contact	Immediately flush eyes with plenty of water for at least 20 minutes, occasionally lifting the upper and lower eyelids. Check for and remove any contact lenses. Get medical attention if irritation occurs.
Skin contact	Flush contaminated skin with plenty of water. Remove contaminated clothing and shoes. Wash contaminated clothing thoroughly with water before removing it, or wear gloves. Continue to rinse for at least 20 minutes. Get medical attention. Wash clothing before reuse. Clean shoes thoroughly before reuse.
Inhalation	Get medical attention immediately. Move exposed person to fresh air. If it is suspected that fumes are still present, the rescuer should wear an appropriate mask or self-contained breathing apparatus. Keep person warm and at rest. If not breathing, if breathing is irregular or if respiratory arrest occurs, provide artificial respiration or oxygen by trained personnel. It may be dangerous to the person providing aid to give mouth-to-mouth resuscitation. If unconscious, place in recovery position and get medical attention immediately. Maintain an open airway. Loosen tight clothing such as a collar, tie, belt or waistband.
Ingestion	See sections 2 and 15 for details. Get medical attention immediately. Wash out mouth with water. Remove dentures if any. Move exposed person to fresh air. Keep person warm and at rest. If material has been swallowed and the exposed person is conscious, give small quantities of water to drink. Stop if the exposed person feels sick as vomiting may be dangerous. Do not induce vomiting unless directed to do so by medical personnel. If vomiting occurs, the head should be kept low so that vomit does not enter the lungs. Never give anything by mouth to an unconscious person. If unconscious, place in recovery position and get medical attention immediately. Maintain an open airway. Loosen tight clothing such as a collar, tie, belt or waistband.
Notes to physician	No specific treatment. Treat symptomatically. Contact poison treatment specialist immediately if large quantities have been ingested or inhaled.

Section 5. Fire-fighting measures

Products of combustion	Decomposition products may include the following materials: carbon oxides halogenated compounds carbonyl halides
Fire-fighting media and instructions	Use dry chemical, CO ₂ , water spray (fog) or foam.
Fire Hazards	Not available.
Explosion Hazards	Not available.

Continued on next page

**Section 6. Accidental release measures**

Small spill and leak	Stop leak if without risk. Move containers from spill area. Dilute with water and mop up if water-soluble or absorb with an inert dry material and place in an appropriate waste disposal container. Use spark-proof tools and explosion-proof equipment. Dispose of via a licensed waste disposal contractor.
Large spill and leak	Stop leak if without risk. Move containers from spill area. Approach release from upwind. Prevent entry into sewers, water courses, basements or confined areas. Wash spillages into an effluent treatment plant or proceed as follows. Contain and collect spillage with non-combustible, absorbent material e.g. sand, earth, vermiculite or diatomaceous earth and place in container for disposal according to local regulations (see section 13). Use spark-proof tools and explosion-proof equipment. Dispose of via a licensed waste disposal contractor. Contaminated absorbent material may pose the same hazard as the spilled product. Note: see section 1 for emergency contact information and section 13 for waste disposal.

Section 7. Handling and Storage

Handling	Put on appropriate personal protective equipment (see section 8). Eating, drinking and smoking should be prohibited in areas where this material is handled, stored and processed. Workers should wash hands and face before eating, drinking and smoking. Do not get in eyes or on skin or clothing. Do not breathe vapor or mist. Do not ingest. Use only with adequate ventilation. Wear appropriate respirator when ventilation is inadequate. Do not enter storage areas and confined spaces unless adequately ventilated. Keep in the original container or an approved alternative made from a compatible material, kept tightly closed when not in use. Store and use away from heat, sparks, open flame or any other ignition source. Use explosion-proof electrical (ventilating, lighting and material handling) equipment. Use non-sparking tools. Take precautionary measures against electrostatic discharges. To avoid fire or explosion, dissipate static electricity during transfer by grounding and bonding containers and equipment before transferring material. Empty containers retain product residue and can be hazardous. Do not reuse container.
Storage	Store in accordance with local regulations. Store in a segregated and approved area. Store in original container protected from direct sunlight in a dry, cool and well-ventilated area, away from incompatible materials (see section 10) and food and drink. Eliminate all ignition sources. Separate from oxidizing materials. Keep container tightly closed and sealed until ready for use. Containers that have been opened must be carefully resealed and kept upright to prevent leakage. Do not store in unlabeled containers. Use appropriate containment to avoid environmental contamination.

Section 8. Exposure controls/personal protection

Engineering controls	Use only with adequate ventilation. Use process enclosures, local exhaust ventilation or other engineering controls to keep worker exposure to airborne contaminants below any recommended or statutory limits. The engineering controls also need to keep gas, vapor or dust concentrations below any lower explosive limits. Use explosion-proof ventilation equipment.
Personal protection	Eyes Safety eyewear complying with an approved standard should be used when a risk assessment indicates this is necessary to avoid exposure to liquid splashes, mists, gases or dusts. Recommended: safety glasses with side-shields face shield Body Personal protective equipment for the body should be selected based on the task being performed and the risks involved and should be approved by a specialist before handling this product. Recommended: safety apron Respiratory Use a properly fitted, air-purifying or air-fed respirator complying with an approved standard if a risk assessment indicates this is necessary. Respirator selection must be based on known or anticipated exposure levels, the hazards of the product and the safe working limits of the selected respirator. Hands

Continued on next page



Chemical-resistant, impervious gloves complying with an approved standard should be worn at all times when handling chemical products if a risk assessment indicates this is necessary.

>8 hours (breakthrough time): natural rubber (latex)

United States

Product name

Exposure limits

Dichloromethane.

ACGIH TLV (United States, 1/2007).

TWA: 50 ppm 8 hour(s).

TWA: 174 mg/m³ 8 hour(s).

OSHA PEL 1989 (United States, 3/1989).

STEL: 125 ppm 15 minute(s).

TWA: 25 ppm 8 hour(s).

OSHA PEL Z2 (United States, 11/2006).

STEL: 125 ppm 15 minute(s).

TWA: 25 ppm 8 hour(s).

methanol

ACGIH TLV (United States, 1/2007). Skin

TWA: 200 ppm 8 hour(s).

TWA: 262 mg/m³ 8 hour(s).

STEL: 250 ppm 15 minute(s).

STEL: 328 mg/m³ 15 minute(s).

OSHA PEL 1989 (United States, 3/1989). Skin

TWA: 200 ppm 8 hour(s).

TWA: 260 mg/m³ 8 hour(s).

STEL: 250 ppm 15 minute(s).

STEL: 325 mg/m³ 15 minute(s).

NIOSH REL (United States, 12/2001). Skin

TWA: 200 ppm 10 hour(s).

TWA: 260 mg/m³ 10 hour(s).

STEL: 250 ppm 15 minute(s).

STEL: 325 mg/m³ 15 minute(s).

OSHA PEL (United States, 11/2006).

TWA: 200 ppm 8 hour(s).

TWA: 260 mg/m³ 8 hour(s).

toluene

OSHA PEL 1989 (United States, 3/1989).

TWA: 100 ppm 8 hour(s).

TWA: 375 mg/m³ 8 hour(s).

STEL: 150 ppm 15 minute(s).

STEL: 560 mg/m³ 15 minute(s).

OSHA PEL Z2 (United States, 11/2006).

TWA: 200 ppm 8 hour(s).

CEIL: 300 ppm

AMP: 500 ppm 10 minute(s).

NIOSH REL (United States, 12/2001).

TWA: 100 ppm 10 hour(s).

TWA: 375 mg/m³ 10 hour(s).

STEL: 150 ppm 15 minute(s).

STEL: 560 mg/m³ 15 minute(s).

ACGIH TLV (United States, 1/2007).

TWA: 20 ppm 8 hour(s).

acetone

ACGIH TLV (United States, 1/2007).

TWA: 500 ppm 8 hour(s).



TWA: 1188 mg/m³ 8 hour(s).
 STEL: 750 ppm 15 minute(s).
 STEL: 1782 mg/m³ 15 minute(s).

OSHA PEL 1989 (United States, 3/1989).

TWA: 750 ppm 8 hour(s).
 TWA: 1800 mg/m³ 8 hour(s).
 STEL: 1000 ppm 15 minute(s).
 STEL: 2400 mg/m³ 15 minute(s).

NIOSH REL (United States, 12/2001).

TWA: 250 ppm 10 hour(s).
 TWA: 590 mg/m³ 10 hour(s).

OSHA PEL (United States, 11/2006).

TWA: 1000 ppm 8 hour(s).
 TWA: 2400 mg/m³ 8 hour(s).

Canada**Occupational exposure limits**

No exposure limit value known.

Section 9. Physical and chemical properties

Physical State and Appearance	Liquid. [Viscous liquid.]	Odour	Ketone-like.
Molecular weight	Not applicable.	Taste	Not available.
pH	Not applicable	Colour	Pink.
Boiling/condensation point	40 to 110°C (104 to 230°F)	Volatility	98.3% (w/w)
Melting/freezing point	Not available.	Evaporation rate	Not available.
Relative density	0.856	Odour Threshold	Not available.
Vapor pressure	7.2 kPa (54 mm Hg)	Viscosity	Not available.
Vapour Density	>1 [Air = 1]	Solubility	Easily soluble in the following materials: cold water, hot water, methanol, diethyl ether, n-octanol and acetone.
VOC content	440 (g/l).	Other Properties	Not available.
The product is:	Flammable.		
Auto-ignition temperature	Not available.		
Flash point	Open cup: -7°C (19.4°F)		
Flammable limits	Lower: 2.6%		
Fire hazards in the presence of various substances	Extremely flammable in the presence of the following materials or conditions: heat. Highly flammable in the presence of the following materials or conditions: open flames, sparks and static discharge. Non-flammable in the presence of the following materials or conditions: shocks and mechanical impacts.		

Continued on next page



Section 10. Stability and reactivity

Stability	The product is stable. Under normal conditions of storage and use, hazardous polymerization will not occur.
Conditions of instability	Not available.
Incompatibility with various substances	Reactive or incompatible with the following materials: oxidizing materials and acids. Slightly reactive or incompatible with the following materials: alkalis.
Hazardous decomposition products	Under normal conditions of storage and use, hazardous decomposition products should not be produced.

Section 11. Toxicological Information

Canada

Acute toxicity

Product/ingredient name	Result	Species	Dose	Exposure
Conclusion/Summary	Not available.			

Chronic toxicity

Conclusion/Summary	Not available.

Carcinogenicity

Conclusion/Summary	Not available.

Classification

Product/ingredient name	ACGIH	IARC	EPA	NIOSH	NTP	OSHA
Dichloromethane.	A3	2B	-	+	Possible	+
methanol	A5	4	-	-	-	None.
toluene	A4	3	-	-	-	-
acetone	A4	-	-	-	-	-

Mutagenicity

Conclusion/Summary	: Not available.

Teratogenicity

Conclusion/Summary	: Not available.

Reproductive Toxicity

Conclusion/Summary	: Not available.

Section 12. Ecological information

For accidental discharges into the environment, see Section 6: "Accidental Release Measures" for suggested instructions.

Ecotoxicity	: No known significant effects or critical hazards.

Canada

Aquatic ecotoxicity

Conclusion/Summary	: Not available.

Biodegradability

Conclusion/Summary	: Not available.

Continued on next page

Section 13. Disposal considerations

Waste information

The generation of waste should be avoided or minimized wherever possible. Dispose of surplus and non-recyclable products via a licensed waste disposal contractor. Disposal of this product, solutions and any by-products should at all times comply with the requirements of environmental protection and waste disposal legislation and any regional local authority requirements. Avoid dispersal of spilled material and runoff and contact with soil, waterways, drains and sewers.

Disposal should be in accordance with applicable regional, national and local laws and regulations.

Section 14. Transport information

Canada TDG Classification

Class Class 3: Flammable liquid.

Subsidiary class -

Proper Shipping Name (Canada) TDG Paint related material solution. Marine pollutant

UN number 1263

Packing Group II

Special provisions In containers of 5 L (5Kg) capacity or less this product is classified as a "Limited quantity" "Consumer Commodity" under TDG regulations.


IMDG Classification

Class Class 3: Flammable liquid.

Subsidiary class -

Proper Shipping Name IMDG Paint related material solution

UN number 1263

Packing Group II

Marine pollutant Not available.

Special provisions Remarks
In containers of 5 L (5Kg) capacity or less this product is classified as a "Consumer Commodity" under IMDG regulations.


United States DOT (Classification)

Class Class 3: Flammable liquid.

Subsidiary class -

Proper Shipping Name (United States) DOT Paint related material solution. Marine pollutant

UN number 1263

Packing Group II

Special provisions In containers of 1 L (1Kg) this product is qualified as a "consumer commodity" ORM-D under DOT



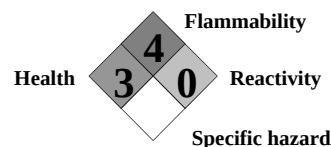
Continued on next page

**International Air
Transport Association
(IATA)**

For air shipment classification and associated regulations, please refer to the latest edition of IATA Dangerous Goods Regulations.

Section 15. Regulatory information**WHMIS Classification
(Canada)**Class B-2: Flammable liquid
Class D-1B: Material causing immediate and serious toxic effects
(Toxic).**Canada Domestic
Substances List (DSL)
Status****Canada inventory:** All components are listed or exempted.**HCS Classification
(U.S.A.)**Flammable liquid
Carcinogen
Target organ effects**U.S.A. Regulatory Lists****United States inventory (TSCA 8b):** All components are listed or exempted.**Hazardous Material
Information System
(U.S.A.)**

Health	3
Flammability	4
Reactivity	0
Personal protection	E

**National Fire
Protection
Association
(U.S.A.)****Section 16. Other information**

Validated and verified by Compliance and Technical Information Manager Jan. 10 2015 ph.# 905-878-5544.

Printed Jan. 13 2015

Notice to reader

To the best of our knowledge, the information contained herein is accurate. However, neither the above named supplier nor any of its subsidiaries assumes any liability whatsoever for the accuracy or completeness of the information contained herein.

Final determination of suitability of any material is the sole responsibility of the user. All materials may present unknown hazards and should be used with caution. Although certain hazards are described herein, we cannot guarantee that these are the only hazards that exist.

MSDS are available at www.recochem.com

Sansher Corp.

Sansher Corp. Priority Product Notification versus Safety Data Sheets

Priority Product Notification	Safety Data Sheet
Dad's Easy Spray Professional Strength	Dad's Easy Spray Paint, Stain & Varnish Remover
Dad's Easy Spray Contractor Grade	Dad's Easy Spray Paint, Stain & Varnish Remover, Contractor Grade
KBS Coatings KBS Strip	KBS Strip
Glaze N Seal Paint and Coating Stripper	Glaze 'N Seal Paint and Coating Stripper



MATERIAL SAFETY DATA SHEET

Dad's Easy Spray® Paint, Stain & Varnish Remover Professional Strength

SECTION 1 IDENTIFICATION

Product Name: Dad's Easy Spray® Paint, Stain & Varnish Remover

Manufacturer: Sansher Corporation
8005 North Clinton Street
Fort Wayne, IN 46825
(260) 484-2000
Email: info@dadseasyspray.com

Emergency Phone: 800-535-5053
1-352-323-3500 (Outside the US)

MSDS Date of Preparation: 1/10/13
MSDS Number SAN 004

SECTION 2: HAZARDS IDENTIFICATION

EMERGENCY OVERVIEW

FLAMMABLE VAPORS DANGEROUS VAPORS POISON

Flammable Vapor. Due to the unique chemical composition of this product, the liquid portion is nonflammable, however, due to methanol; vapors in a closely confined, non-ventilated area could flash. Causes eye and skin irritation. Inhalation of vapors or mist may cause respiratory irritation and central nervous system effects such as headache, dizziness, drowsiness, nausea and unconsciousness. Harmful or fatal and may cause blindness if swallowed. Overexposure may cause heart, liver, kidney, blood system and nervous system damage. Methylene chloride is converted to carbon monoxide in the body which may worsen heart disease. May cause cancer based on animal data. This product contains methylene chloride which is suspected of causing cancer. The risk of cancer depends on the level and duration of exposure.

SECTION 3 PRODUCT COMPONENTS

INGREDIENTS	CAS#	WT.%
Methylene Chloride (Dichloromethane)	75-09-2	70-80
Methanol	67-56-1	5-10
2-Butoxyethanol	111-76-2	5-10

Note: 29 CFR 1910.1052 is the OSHA regulation on Occupational Exposure to Methylene Chloride. Assure compliance with these regulations.

SECTION 4 EMERGENCY and FIRST AID PROCEDURES

EYE CONTACT: Immediately flush eye with water for at least 15 minutes, holding eyelids open to assure the eye is thoroughly flushed. Get immediate medical attention.

SKIN CONTACT: Immediately wash with soap and water for several minutes. Remove contaminated clothing and shoes. Wash contaminated clothing before reuse. Discard or thoroughly clean contaminated shoes. Get medical attention if irritation persists.

Dad's Easy Spray® Paint , Stain & Varnish Remover
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INHALATION: Remove victim to fresh air. If breathing has stopped give artificial respiration. If breathing is difficult have qualified personnel administer oxygen. Get immediate medical attention.

INGESTION: Immediately call a physician or poison control center for assistance. . Do not induce vomiting unless directed to by medical personnel. Never give anything by mouth to a person who is unconscious or convulsing. Get immediate medical attention.

SECTION 5 FIRE and EXPLOSION HAZARD DATA

EXTINGUISHING MEDIA: Use dry chemical, carbon dioxide, alcohol foam to extinguish fire.

SPECIAL FIREFIGHTING PROCEDURES: Firefighters should wear full emergency equipment and NIOSH approved positive pressure self-contained breathing apparatus. Cool fire exposed containers with water.

UNUSUAL FIRE AND EXPLOSION HAZARDS: This product is flammable and may form explosive mixtures with air in confined or poorly ventilated areas. Vapors are heavier than air and will travel along surfaces to remote ignition sources and flash back. Closed containers may explode if exposed to extreme heat. Decomposition products are toxic.

SECTION 6 ACCIDENTAL RELEASE MEASURES

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED: Evacuate spill area and keep unprotected personnel away. Remove all sources of ignition. Ventilate area with explosion proof equipment. Wear appropriate protective clothing as described in Section 8. Absorb with inert absorbent. Place in a suitable container for disposal. Avoid contamination of soil, surface water and ground water. Do not flush to sewer! Report releases as required by local, state and federal authorities.

SECTION 7 HANDLING and STORAGE

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORING: Protect containers from physical damage. Store in a cool, well ventilated area away from ignition sources and incompatible materials.

Avoid contact with eyes, skin and clothing. Avoid breathing vapors. Use only with appropriate protective equipment and adequate ventilation. Immediately remove and launder contaminated clothing before re-use. Wash thoroughly after handling and before eating, drinking, smoking or using toilet facilities. Avoid use where carbon monoxide may be present (i.e. garages, loading docks). Keep away from heat, direct sunlight and all sources of ignition.

Refer to OSHA 1910.1052 for requirements for handling and use of methylene chloride.

OTHER PRECAUTIONS: Empty containers retain product residues. Follow all MSDS precautions in handling empty containers.

SECTION 8 EXPOSURE CONTROLS and PERSONAL PROTECTION

Exposure Guidelines:

INGREDIENTS

Methylene Chloride
(Dichloromethane)

CAS#

75-09-2

EXPOSURE LIMITS

25 ppm TWA OSHA PEL
125 ppm STEL OSHA PEL
50 ppm TWA ACGIH LTV

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Methanol	67-56-1	200 ppm TWA OSHA PEL 200 ppm TWA ACGIH TLV 250 ppm STEL ACGIH TLV
2-Butoxyethanol	111-76-2	50 ppm , skin TWA OSHA PEL 20 ppm TWA ACGIH TLV

RESPIRATORY PROTECTION: If the exposure limits are exceeded a NIOSH approved full facepiece supplied air respirator or self-contained breathing apparatus should be used. Selection and use of respiratory equipment must be in accordance with OSHA 1910.134, 1910.1052 and good industrial hygiene practice.

VENTILATION: Use with adequate ventilation (equivalent to outdoors) to maintain exposures below the occupational exposure limits. Use explosion proof equipment where required. Open doors and use fans to achieve good air movement. If possible, use local exhaust to remove vapors.

GLOVES: Wear impervious gloves. Contact glove supplier to determine correct glove for this product.

PROTECTIVE CLOTHING: Impervious apron, boots and other clothing are recommended if needed to prevent contact or if splashing is possible.

EYE PROTECTION: Chemical safety goggles recommended.

OTHER PROTECTIVE EQUIPMENT: For operations where contact can occur, eye washing facilities should be available.

SECTION 9 PHYSICAL and CHEMICAL PROPERTIES

APPEARANCE AND ODOR: Opaque liquid, low characteristic odor.

BOILING POINT (@ 760 mmHg): 104°F (methylene chloride)

SPECIFIC GRAVITY (H₂O=1): 1.16

VAPOR PRESSURE (@ 20°C mm Hg): 350

EVAPORATION RATE (Butyl alcohol = 1): 14.5

COEFFICIENT OF WATER/OIL: Not determined

FLASH POINT: 75.7°F (24.3°C) *

FLAMMABLE LIMITS: (vol % in air) LEL 1.1% (2-butoxyethanol)

AUTOIGNITION TEMPERATURE: Not available

MELTING POINT: Not determined

VAPOR DENSITY (AIR=1): 2.93

SOLUBILITY IN WATER: Rinseable

pH: N/A

METHOD: ASTM D-3278-96 Method B

UEL: 36% (methanol)

SECTION 10 STABILITY and REACTIVITY

STABILITY: This material is stable.

CONDITIONS TO AVOID: Avoid contact with open flames, electric arc and other hot surfaces which can cause thermal decomposition. Contact with moisture may yield trichloroacetic acid and hydrochloric acid.

INCOMPATIBILITY: Strong oxidizing agents, caustics, nitric acid, chemically active metals, including aluminum, magnesium, potassium and sodium.

HAZARDOUS DECOMPOSITION PRODUCTS: Thermal decomposition may yield carbon monoxide, carbon dioxide, hydrogen chloride and phosgene.

HAZARDOUS POLYMERIZATION: Will not occur.

SECTION 11 TOXICOLOGICAL INFORMATION

Dad's Easy Spray® Paint , Stain & Varnish Remover
Professional Strength

INHALATION: Inhalation of vapors or mists may cause mucous membrane and respiratory irritation and central nervous system depression with symptoms of headache, dizziness, giddiness, intoxication, tingling, numbness and shooting pains in the hands and arms, nausea, incoordination, drunkenness, stupor, irregular heartbeat. Overexposure may cause cardiac sensitization and increased risk of cardiac arrest, blurred vision, blindness, adverse effects on the lungs, liver, kidney, nervous system and other internal organs, coma or death. Carboxyhemoglobin levels can be elevated in persons exposed to methylene chloride causing stress on the cardiovascular system. Alcohol consumption may increase adverse effects.

SKIN CONTACT: Prolonged or repeated contact may cause severe irritation or burns, drying, defatting of the skin and dermatitis. The liquid may be absorbed through the skin causing effects similar to those described under inhalation and ingestion.

EYE CONTACT: Vapors or mists may cause irritation, redness, tearing and swelling. Direct contact may cause corneal damage.

INGESTION: Ingestion may cause mucous membrane and gastrointestinal irritation, visual disturbances and nervous system depression with symptoms of headache, dizziness, nausea, vomiting, weakness, fatigue, leg cramps, restlessness, confusion, drunken behavior, narcosis, and unconsciousness. Alcohol consumed before or after exposure may increase adverse effects. Aspiration into the lungs during ingestion or vomiting may cause serious lung damage which may be fatal. Methanol is very slowly eliminated from the body. Ingestion of methanol may cause nervous system effects, blurred vision, changes in color perception, blindness, coma and death.

CHRONIC EFFECTS OF OVEREXPOSURE: Prolonged occupational overexposure may cause effects on vision and damage to the kidneys, liver, lungs and cardiovascular system. Prolonged intentional abuse may damage many organ systems including central and peripheral nervous systems, vision, liver, kidneys, lymphoid system, heart and blood. Methylene chloride has been shown to cause reproductive toxicity and/or birth defects only at doses that produce significant toxicity in the parent animal.

MEDICAL CONDITIONS AGGRAVATED BY EXPOSURE: Individuals with chronic respiratory, heart or skin diseases may be at increased risk from exposure to this material.

CARCINOGEN STATUS: Methylene chloride has been listed as "possibly carcinogenic to humans" (Group 2B) by IARC, "reasonably anticipated to be a human carcinogen" (R) by NTP, "confirmed animal carcinogen with unknown relevance to humans" (A3) by ACGIH and as a carcinogen by OSHA.

MUTAGENICITY: Methylene chloride and methanol have been shown to cause mutagenicity in some test systems.

SENSITIZATION: None of the components are known to cause sensitization in animals or humans.

REPRODUCTIVE EFFECTS: Methylene chloride and methanol have been shown to cause reproductive toxicity and/or birth defects only at doses that produce significant toxicity in the parent animal.

ACUTE TOXICITY DATA:

Methylene Chloride: Oral rat LD50 1600 mg/kg; Inhalation mouse LC50 86 mg/L/4 hr; Skin rat LD50>2000 mg/kg.

Methanol: Oral rat LD50 5628 mg/kg; Inhalation rat LC50 64,000 ppm/4 hr; Skin rabbit 15,800 mg/kg

2-Butoxyethanol: Oral rat LD50 1.48 g/kg; Skin rabbit LD50 400 mg/kg; Inhalation rat LC50 450 pp/4 hr

SECTION 12: ECOLOGICAL INFORMATION

Dad's Easy Spray® Paint , Stain & Varnish Remover
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Methylene Chloride: 96 hr LC50 Pimephales promelas (fathead minnows) 196 mg/L; LC50 daphnia magna 480 mg/L

Methanol: 96 hr LC50 Lepomis macrochirus (Bluegill) 15,400 mg/L; 48 hr LC50 Ceriodaphnia dubia 11 mg/L

2-Butoxyethanol: 96 hr LC50 Cyprinodon variegatus (Sheepshead minnow) 116 mg/L; 96 hr LC50 grass shrimp 5.4 mg/L

SECTION 13: DISPOSAL INFORMATION

WASTE DISPOSAL METHOD: Dispose in accordance with all local, state and federal regulations.

SECTION 14: TRANSPORTATION INFORMATION

DOT SHIPPING NAME: UN1992, Flammable liquid, toxic n.o.s. (Methanol, Dichloromethane) 3 (6.1), PGIII

DOT HAZARD CLASSIFICATION: Class 3 (6.1)

DOT LABELS REQUIRED (49CFR172.101): Flammable Liquid, Toxic

UN NUMBER: UN 1992

For packages less than 5 liter or smaller, gross mass 30 kg or less may be re-classed as ORM-D and can be shipped by ground until 1/1/2014. After that date, this product can be shipped as Limited Quantity.

SECTION 15: REGULATORY INFORMATION

OSHA HAZARD CLASSIFICATION: Irritant, toxic, flammable, carcinogen, target organ effects

EPA SARA 302: This product does not contain chemicals regulated under SARA Section 302.

EPA SARA 311 HAZARD CLASSIFICATION: Acute health, Chronic Health, Fire Hazard

EPA SARA 313: This product contains the following chemicals regulated under SARA Title III, section 313:

Methylene Chloride	75-09-2	70-80%
Methanol	67-56-1	5-10%
2-Butoxyethanol	111-76-2	5-10%
(glycol ethers)		

CERCLA: This product has a Reportable Quantity (RQ) of 1250 lbs. based on the RQ for methylene chloride of 1000 lbs. Releases above the RQ must be reported to the National Response Center. Many states have more stringent release reporting requirements. Report spills required under federal, state and local regulations.

WHMIS CLASSIFICATION: Class B – Division 2 (Flammable liquid); Class D - Division 1B (Toxic material causing immediate and serious toxic effects); Class D - Division 2A (Very toxic material causing other toxic effects)

TOXIC SUBSTANCES CONTROL ACT: All of the components of this product are listed on the TSCA inventory.

CALIFORNIA PROPOSITION 65: This product contains methylene chloride which is known to the State of California to cause cancer.

SECTION 16: OTHER INFORMATION

NFPA Rating: Health: 3 Fire: 3 Instability: 0

* Due to the unique chemical composition of this product, the liquid portion is nonflammable, however, due to methanol; vapors in a closely confined, non-ventilated area could flash.

NOTICE: Sansher Corporation warrants that the information given within to be true and makes no other warranties. The suitability of this product to the project shall solely up to the user.



**Dad's Easy Spray® Paint,
Stain & Varnish Remover,
Contractor Grade**

Date Prepared: 08/26/2019

SAFETY DATA SHEET

Section 1 – Chemical Product and Company Identification

Product/Chemical Name: Dad's Easy Spray® Paint, Stain & Varnish Remover, Contractor Grade

CAS Number: Mixture

General Use: Paint Remover. This chemical/product is not and cannot be distributed in commerce (as defined in TSCA section 3(5)) or processed (as defined in TSCA section 3(13)) for consumer paint or coating removal.

Manufacturer: Sansher Corporation
8005 North Clinton Street
Fort Wayne, IN 46825
(260) 484-2000
info@dadseasyspray.com

Emergency Telephone Number: 800-535-5053
1-352-323-3500 (Outside the US)

Section 2 – Hazards Identification

GHS / HAZCOM 2012 Classification:

Health	Physical
Skin Irritation Category 2 Eye Irritation Category 2A Carcinogenicity Category 1A Specific Target Organ Toxicity – Single Exposure Category 1 Specific Target Organ Toxicity – Single Exposure Category 3 (Respiratory, Central Nervous System) Specific Target Organ Toxicity – Repeat Exposure Category 2	Flammable Liquid Category 3

Label Elements



Danger!

Flammable liquid and vapor.

Causes skin irritation.

Causes serious eye irritation.

May cause respiratory irritation.

May cause drowsiness or dizziness.

May cause cancer.

Causes damage to central nervous system and optic nerve.

May cause damage to central nervous system, blood and liver through prolonged or repeated exposure.



**Dad's Easy Spray® Paint,
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Date Prepared: 08/26/2019

Prevention:

Obtain special instructions before use.
Do not handle until all safety precautions have been read and understood.
Keep away from heat, sparks, open flames and hot surfaces. No smoking.
Keep container tightly closed.
Ground or bond container and receiving equipment.
Use explosion-proof electrical, ventilation and lighting equipment.
Use only non-sparking tools.
Take precautionary measures against static discharge.
Wash thoroughly after handling.
Do not breathe mists, vapors or spray.
Do not eat, drink or smoke when using this product.
Use only outdoors or in a well-ventilated area.
Wear protective gloves, eye protection and face protection.

Response:

In case of fire: Use dry chemical, carbon dioxide, alcohol foam to extinguish.
IF exposed or concerned: Call a POISON CENTER
IF ON SKIN: Wash with plenty of soap and water.
If skin irritation occurs: Get medical attention.
Take off contaminated clothing and wash it before reuse.
IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
If eye irritation persists: Get medical attention.
IF INHALED: Remove person to fresh air and keep comfortable for breathing.
Call a POISON CENTER if you feel unwell.

Storage:

Store in a well-ventilated place. Keep cool.
Store locked up.

Disposal:

Dispose of contents or container in accordance with local or national regulations.

Section 3 - Composition / Information on Ingredients

Components	CAS Number	Amount
Methylene Chloride (Dichloromethane)	75-09-2	70-85
Methanol	67-56-1	5-10
2-Butoxyethanol	111-76-2	5-10
Ammonia	7664-41-7	<1

Note: 29 CFR 1910.1052 is the OSHA regulation on Occupational Exposure to Methylene Chloride.
Assure compliance with these regulations.

Section 4 – First Aid Measures

Eye Contact: Immediately flush eye with water for at least 15 minutes, holding eyelids open to assure the eye is thoroughly flushed. Get medical attention.

Skin Contact: Immediately wash with soap and water for several minutes. Remove contaminated clothing and shoes. Wash contaminated clothing before reuse. Discard or thoroughly clean contaminated shoes. Get medical attention if irritation persists.

Inhalation: Remove victim to fresh air. If breathing has stopped give artificial respiration. If breathing is difficult have qualified personnel administer oxygen. Get immediate medical attention.

Ingestion: Immediately call a physician or poison control center for assistance. Do not induce vomiting unless directed to by medical personnel. Never give anything by mouth to a person who is unconscious or convulsing. Get immediate medical attention.

Most important symptoms and effects, acute and delayed:

Causes eye and skin irritation. Inhalation of vapors or mist may cause respiratory irritation and central nervous system effects such as headache, dizziness, drowsiness, nausea and unconsciousness. Harmful or fatal and may cause blindness if swallowed. Overexposure may cause heart, liver, kidney, blood system and nervous system damage. Methylene chloride is converted to carbon monoxide in the body which may worsen heart disease. May cause cancer based on animal data. This product contains methylene chloride which is suspected of causing cancer. The risk of cancer depends on the level and duration of exposure.

Indication of immediate medical attention and special treatment, if needed: If product is swallowed, immediately call poison control center for assistance.

Section 5 – Fire-Fighting Measures

Suitable (and Unsuitable) Extinguishing Media: Use dry chemical, carbon dioxide, alcohol foam to extinguish fire.

Specific Hazards Arising from the Chemical: Due to the unique chemical composition of this product, the liquid portion is nonflammable, however, due to methanol; vapors in a closely confined, non-ventilated area could flash. Vapors form explosive mixtures with air in confined or poorly ventilated areas. Vapors are heavier than air and will travel along surfaces to remote ignition sources and flash back. Closed containers may explode if exposed to extreme heat. Decomposition products are toxic.

Special Protective Equipment and Precautions for Fire-fighters: Firefighters should wear full emergency equipment and NIOSH approved positive pressure self-contained breathing apparatus. Cool fire exposed containers with water.

Section 6 – Accidental Release Measures

Personal precautions, Protective equipment, and Emergency procedures:

Evacuate spill area and keep unprotected personnel away. Remove all sources of ignition. Ventilate



Dad's Easy Spray® Paint, Stain & Varnish Remover, Contractor Grade

Date Prepared: 08/26/2019

area with explosion proof equipment. Wear appropriate protective clothing.

Methods and Materials for Containment and Cleaning up:

Absorb with inert absorbent. Please in a suitable container for disposal. Avoid contamination of soil, surface water and ground water. Do not flush to sewer! Report releases as required by local, state and federal authorities.

Section 7 – Handling and Storage

Precautions for Safe Handling: Avoid contact with eyes, skin and clothing. Avoid breathing vapors. Use only with appropriate protective equipment and adequate ventilation. Immediately remove and launder contaminated clothing before re-use. Wash thoroughly after handling and before eating, drinking, smoking or using toilet facilities. Avoid use where carbon monoxide may be present (i.e. garages, loading docks). Keep away from heat, direct sunlight and all sources of ignition.

Refer to OSHA 1910.1052 for requirements for handling and use of methylene chloride.

OTHER PRECAUTIONS: Empty containers retain product residues. Follow all SDS precautions in handling empty containers.

Conditions for Safe Storage, Including any Incompatibilities: Protect containers from physical damage. Store in a cool, well ventilated area away from ignition sources and incompatible materials.

Section 8 – Exposure Controls / Personal Protection

Exposure Guidelines:

Component	Exposure Limits
Methylene Chloride (Dichloromethane)	25 ppm TWA OSHA PEL 125 ppm STEL OSHA PEL 50 ppm TWA ACGIH TLV
Methanol	200 ppm TWA OSHA PEL 200 ppm TWA ACGIH TLV 250 ppm STEL ACGIH TLV
2-Butoxyethanol	50 ppm , skin TWA OSHA PEL 20 ppm TWA ACGIH TLV
Ammonia	50 ppm TWA OSHA PEL 25 ppm TWA ACGIH TLV 35 ppm STEL ACGIH TLV

Appropriate Engineering Controls: Use with adequate ventilation (equivalent to outdoors) to maintain exposures below the occupational exposure limits. Use explosion proof equipment where required. Open doors and use fans to achieve good air movement. If possible, use local exhaust to remove vapors.



**Dad's Easy Spray® Paint,
Stain & Varnish Remover,
Contractor Grade**

Date Prepared: 08/26/2019

Personal Protective Equipment:

Respiratory protection: If the exposure limits are exceeded a NIOSH approved full facepiece supplied air respirator or self-contained breathing apparatus should be used. Selection and use of respiratory equipment must be in accordance with OSHA 1910.134, 1910.1052 and good industrial hygiene practice.

Hand protection: Wear impervious gloves. Contact glove supplier to determine correct glove for this product.

Eye Protection: Chemical safety goggles recommended.

Skin Protection: Impervious apron, boots and other clothing are recommended if needed to prevent contact or if splashing is possible.

Other protective equipment or clothing: or operations where contact can occur, eye washing facilities should be available.

Hygiene measures: Avoid contact with eyes, skin and clothing. Wash thoroughly after use. Handle in accordance with good industrial hygiene and safety.

Section 9 – Physical and Chemical Properties

Appearance:	Opaque Liquid	Odor:	Low Characteristic
Odor Threshold:	0.92 ppm (methylene chloride)	Ph:	Not available
Melting/Freezing Point:	Not available	Boiling Point/Range:	104°F (39.8°C)
Flash Point:	75.7°F (24.3°C) ASTM D-3278-96 Method B*	Evaporation Rate:	14.5
Flammability: (Solid, Gas)	Not applicable	Flammability Limits:	LEL: 1.1% (2-butoxyethanol) UEL: 36% (methanol)
Vapor Pressure:	350 @ 20°C mm Hg	Vapor Density:	2.93
Relative Density:	1.16	Solubilities:	Rinseable (in water)
Partition Coefficient: (N-Octanol/Water)	Not determined	Autoignition Temperature:	Not determined
Decomposition Temperature:	Not determined	Viscosity:	Not determined

* Due to the unique chemical composition of this product, the liquid portion is nonflammable, however, due to methanol; vapors in a closely confined, non-ventilated area could flash

Section 10 – Stability and Reactivity

Reactivity: None known.

Chemical Stability: This material is stable.



**Dad's Easy Spray® Paint,
Stain & Varnish Remover,
Contractor Grade**

Date Prepared: 08/26/2019

Possibility of Hazardous Reactions: Contact with moisture may yield trichloroacetic acid and hydrochloric acid.

Conditions to avoid: Avoid contact with open flames, electric arc and other hot surfaces which can cause thermal decomposition.

Incompatible Materials: Strong oxidizing agents, caustics, nitric acid, chemically active metals, including aluminum, magnesium, potassium and sodium.

Hazardous decomposition products: Thermal decomposition may yield carbon monoxide, carbon dioxide, hydrogen chloride and phosgene.

Section 11 – Toxicological Information

Potential Health Effects:

Acute Hazards:

Inhalation: Inhalation of vapors or mists may cause mucous membrane and respiratory irritation and central nervous system depression with symptoms of headache, dizziness, giddiness, intoxication, tingling, numbness and shooting pains in the hands and arms, nausea, incoordination, drunkenness, stupor, irregular heartbeat. Overexposure may cause cardiac sensitization and increased risk of cardiac arrest, blurred vision, blindness, adverse effects on the lungs, liver, kidney, nervous system and other internal organs, coma or death. Carboxyhemoglobin levels can be elevated in persons exposed to methylene chloride causing stress on the cardiovascular system. Alcohol consumption may increase adverse effects.

Skin Contact: Prolonged or repeated contact may cause severe irritation or burns, drying, defatting of the skin and dermatitis. The liquid may be absorbed through the skin causing effects similar to those described under inhalation and ingestion.

Eye Contact: Vapors or mists may cause irritation, redness, tearing and swelling. Direct contact may cause corneal damage.

Ingestion: Ingestion may cause mucous membrane and gastrointestinal irritation, visual disturbances and nervous system depression with symptoms of headache, dizziness, nausea, vomiting, weakness, fatigue, leg cramps, restlessness, confusion, drunken behavior, narcosis, and unconsciousness. Alcohol consumed before or after exposure may increase adverse effects. Aspiration into the lungs during ingestion or vomiting may cause serious lung damage which may be fatal. Methanol is very slowly eliminated from the body. Ingestion of methanol may cause nervous system effects, blurred vision, changes in color perception, blindness, coma and death.

Carcinogenicity Listing: Methylene chloride has been listed as "possibly carcinogenic to humans" (Group 2B) by IARC, "reasonably anticipated to be a human carcinogen" (R) by NTP, "confirmed animal carcinogen with unknown relevance to humans" (A3) by ACGIH and as a carcinogen by OSHA.

Chronic Effects: Prolonged occupational overexposure may cause effects on vision and damage to the kidneys, liver, lungs and cardiovascular system. Prolonged intentional abuse may damage many organ systems including central and peripheral nervous systems, vision, liver, kidneys, lymphoid system, heart and blood. Methylene chloride has been shown to cause reproductive toxicity and/or



**Dad's Easy Spray® Paint,
Stain & Varnish Remover,
Contractor Grade**

Date Prepared: 08/26/2019

birth defects only at doses that produce significant toxicity in the parent animal.

Acute toxicity:

Methylene Chloride: Oral rat LD50 >2000 mg/kg; Inhalation mouse LC50 86 mg/L/4 hr; Skin rat LD50>2000 mg/kg.

Methanol: Oral rat LD50 >2528 mg/kg; Skin rabbit 17,100 mg/kg

2-Butoxyethanol: Oral rat LD50 1746 mg/kg; Skin rabbit LD50 400 mg/kg; Inhalation rat LC50 450 ppm/4 hr

Ammonia: Oral rat LD50 350 mg/kg; Inhalation rat LC50 13770 mg/m³/1 hr

Section 12 – Ecological Information

Ecotoxicity:

Methylene Chloride: 96 hr LC50 Pimephales promelas (fathead minnows) 196 mg/l; 48 hr LC50 daphnia magna 27 mg/L

Methanol: 96 hr LC50 Lepomis macrochirus (Bluegill) 15,400 mg/L; 48 hr LC50 Ceriodaphnia dubia 11 mg/L

2-Butoxyethanol: 96 hr LC50 Cyprinodon variegatus (Sheepshead minnow) 116 mg/L; 96 hr LC50 grass shrimp 5.4 mg/L

Ammonia: 96 hr LC50 Pimephales promelas 0.75-3.4 mg/L (unionized ammonia) (structurally similar chemical); 48 hr EC50 daphnia magna 101 mg/L

Persistence and Degradability: Methylene chloride is readily biodegradable (92% in less than in 7days). Methanol and 2-butoxyethanol are readily biodegradable.

Bioaccumulative Potential: Methylene chloride has an estimated BCF of 2 which suggests the potential for bioaccumulation in aquatic organisms is low.

Mobility in Soil: Methylene chloride is expected to have a high mobility in soil.

Other Adverse Effects: None known

Section 13 – Disposal Considerations

Disposal instructions: Dispose of product in accordance with all local, state/provincial and federal regulations.

Contaminated packaging: Offer rinsed packaging material to local recycling facilities.

Section 14 – Transport Information

UN Number: UN 1992

UN Proper Shipping name: Flammable liquid, toxic n.o.s. (Methanol, Dichloromethane)

Transport Hazard Class: Class 3 (6.1)

Packing Group: PG III

Environmental Hazard: No

Special Precautions for User: None



**Dad's Easy Spray® Paint,
Stain & Varnish Remover,
Contractor Grade**

Date Prepared: 08/26/2019

For packages less than 5 liter or smaller, gross mass 30 kg or less may be re-classed as ORM-D and can be shipped by ground until 1/1/2014. After that date, this product can be shipped as Limited Quantity.

Section 15 – Regulatory Information

Safety, Health and Environmental Regulations/Legislation Specific for the Substance or Mixture

EPA SARA 302: This product does not contain chemicals regulated under SARA Section 302.

EPA SARA 311 Hazard Classification: Refer to Section 2 for OSHA Hazard Classification.

EPA SARA 313: This product contains the following chemicals regulated under SARA Title III, section 313:

Methylene Chloride	75-09-2	70-85%
Methanol	67-56-1	5-10%
2-Butoxyethanol (glycol ethers)	111-76-2	5-10%
Ammonia	7664-41-7	<1%

CERCLA: This product has a Reportable Quantity (RQ) of 1250 lbs. based on the RQ for methylene chloride of 1,000 lbs. Releases above the RQ must be reported to the National Response Center. Many states have more stringent release reporting requirements. Report spills required under federal, state and local regulations.

Toxic Substances Control Act: All of the components of this product are listed on the TSCA inventory. This chemical/product is not and cannot be distributed in commerce (as defined in TSCA section 3(5)) or processed (as defined in TSCA section 3(13)) for consumer paint or coating removal.

CALIFORNIA PROPOSITION 65: This product contains the following chemical known to the State of California to cause cancer or reproductive toxicity: methylene chloride 75-09-2 70-85% (cancer); methanol 67-56-1 5-10% (developmental)

Section 16 – Other Information

SDS Date of Preparation: April 14, 2019

NFPA Rating: Health: 3 Fire: 3 Instability: 0

NOTICE: Sansher Corporation warrants that the information given within to be true and makes no other warranties. The suitability of this product to the project shall solely up to the user.

SAFETY DATA SHEET**Section 1 – Chemical Product and Company Identification****Product/Chemical Name:** KBS Strip**CAS Number:** Mixture**General Use:** Paint Remover**Distributor:** Advanced Protective Technologies, LLC
1101 Cumberland Xing #180
Valparaiso, IN 46383
219-263-0073
support@kbs-coatings.com**Emergency Telephone Number:** 1-800-424-9300**Section 2 – Hazards Identification**

Note: This product is a consumer product and is labeled in accordance with the US Consumer Product Safety Commission regulations which take precedence over OSHA Hazard Communication labeling. The actual container label will not include the label elements below. The labeling below applies to industrial/professional products.

GHS / HAZCOM 2012 Classification:

Health	Physical
Skin Irritation Category 2 Eye Irritation Category 2A Carcinogenicity Category 1A Specific Target Organ Toxicity – Single Exposure Category 1 Specific Target Organ Toxicity – Single Exposure Category 3 (Respiratory, Central Nervous System) Specific Target Organ Toxicity – Repeat Exposure Category 2	Flammable Liquid Category 3

Label Elements**Danger!**

Flammable liquid and vapor.

Causes skin irritation.

Causes serious eye irritation.

May cause respiratory irritation.

May cause drowsiness or dizziness.

May cause cancer.

Causes damage to central nervous system and optic nerve.

May cause damage to central nervous system, blood and liver through prolonged or repeated exposure.

Prevention:

Obtain special instructions before use.

Do not handle until all safety precautions have been read and understood.

Keep away from heat, sparks, open flames and hot surfaces. No smoking.

Keep container tightly closed.

Ground or bond container and receiving equipment.

Use explosion-proof electrical, ventilation and lighting equipment.

Use only non-sparking tools.

Take precautionary measures against static discharge.

Wash thoroughly after handling.

Do not breathe mists, vapors or spray.

Do not eat, drink or smoke when using this product.

Use only outdoors or in a well-ventilated area.

Wear protective gloves, eye protection and face protection.

Response:

In case of fire: Use dry chemical, carbon dioxide, alcohol foam to extinguish.

IF exposed or concerned: Call a POISON CENTER

IF ON SKIN: Wash with plenty of soap and water.

If skin irritation occurs: Get medical attention.

Take off contaminated clothing and wash it before reuse.

IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.

If eye irritation persists: Get medical attention.

IF INHALED: Remove person to fresh air and keep comfortable for breathing.

Call a POISON CENTER if you feel unwell.

Storage:

Store in a well-ventilated place. Keep cool.

Store locked up.

Disposal:

Dispose of contents or container in accordance with local or national regulations.

Section 3 - Composition / Information on Ingredients

Components	CAS Number	Amount
Methylene Chloride (Dichloromethane)	75-09-2	70-85
Methanol	67-56-1	5-10
2-Butoxyethanol	111-76-2	5-10

Note: 29 CFR 1910.1052 is the OSHA regulation on Occupational Exposure to Methylene Chloride. Assure compliance with these regulations.

Section 4 – First Aid Measures

Eye Contact: Immediately flush eye with water for at least 15 minutes, holding eyelids open to assure the eye is thoroughly flushed. Get medical attention.

Skin Contact: Immediately wash with soap and water for several minutes. Remove contaminated clothing and shoes. Wash contaminated clothing before reuse. Discard or thoroughly clean contaminated shoes. Get medical attention if irritation persists.

Inhalation: Remove victim to fresh air. If breathing has stopped give artificial respiration. If breathing is difficult have qualified personnel administer oxygen. Get immediate medical attention.

Ingestion: Immediately call a physician or poison control center for assistance. . Do not induce vomiting unless directed to by medical personnel. Never give anything by mouth to a person who is unconscious or convulsing. Get immediate medical attention.

Most important symptoms and effects, acute and delayed:

Causes eye and skin irritation. Inhalation of vapors or mist may cause respiratory irritation and central nervous system effects such as headache, dizziness, drowsiness, nausea and unconsciousness. Harmful or fatal and may cause blindness if swallowed. Overexposure may cause heart, liver, kidney, blood system and nervous system damage. Methylene chloride is converted to carbon monoxide in the body which may worsen heart disease. May cause cancer based on animal data. This product contains methylene chloride which is suspected of causing cancer. The risk of cancer depends on the level and duration of exposure.

Indication of immediate medical attention and special treatment, if needed: If product is swallowed, immediately call poison control center for assistance.

Section 5 – Fire-Fighting Measures

Suitable (and Unsuitable) Extinguishing Media: Use dry chemical, carbon dioxide, alcohol foam to extinguish fire.

Specific Hazards Arising from the Chemical: Due to the unique chemical composition of this product, the liquid portion is nonflammable, however, due to methanol; vapors in a closely confined, non-ventilated area could flash. Vapors form explosive mixtures with air in confined or poorly ventilated areas. Vapors are heavier than air and will travel along surfaces to remote ignition sources and flash back. Closed containers may explode if exposed to extreme heat. Decomposition products are toxic.

Special Protective Equipment and Precautions for Fire-fighters: Firefighters should wear full emergency equipment and NIOSH approved positive pressure self-contained breathing apparatus. Cool fire exposed containers with water.

Section 6 – Accidental Release Measures

Personal precautions, Protective equipment, and Emergency procedures:

Evacuate spill area and keep unprotected personnel away. Remove all sources of ignition. Ventilate area with explosion proof equipment. Wear appropriate protective clothing.

Methods and Materials for Containment and Cleaning up:

Absorb with inert absorbent. Please in a suitable container for disposal. Avoid contamination of soil, surface water and ground water. Do not flush to sewer! Report releases as required by local, state and federal authorities.

Section 7 – Handling and Storage

Precautions for Safe Handling: Avoid contact with eyes, skin and clothing. Avoid breathing vapors. Use only with appropriate protective equipment and adequate ventilation. Immediately remove and launder contaminated clothing before re-use. Wash thoroughly after handling and before eating, drinking, smoking or using toilet facilities. Avoid use where carbon monoxide may be present (i.e. garages, loading docks). Keep away from heat, direct sunlight and all sources of ignition.

Refer to OSHA 1910.1052 for requirements for handling and use of methylene chloride.

OTHER PRECAUTIONS: Empty containers retain product residues. Follow all MSDS precautions in handling empty containers.

Conditions for Safe Storage, Including any Incompatibilities: Protect containers from physical damage. Store in a cool, well ventilated area away from ignition sources and incompatible materials.

Section 8 – Exposure Controls / Personal Protection

Exposure Guidelines:

Component	Exposure Limits
Methylene Chloride (Dichloromethane)	25 ppm TWA OSHA PEL 125 ppm STEL OSHA PEL 50 ppm TWA ACGIH TLV
Methanol	200 ppm TWA OSHA PEL 200 ppm TWA ACGIH TLV 250 ppm STEL ACGIH TLV
2-Butoxyethanol	50 ppm , skin TWA OSHA PEL 20 ppm TWA ACGIH TLV

Appropriate Engineering Controls: Use with adequate ventilation (equivalent to outdoors) to maintain exposures below the occupational exposure limits. Use explosion proof equipment where required. Open doors and use fans to achieve good air movement. If possible, use local exhaust to remove vapors.

Personal Protective Equipment:

Respiratory protection: If the exposure limits are exceeded a NIOSH approved full facepiece supplied air respirator or self-contained breathing apparatus should be used. Selection and use of respiratory equipment must be in accordance with OSHA 1910.134, 1910.1052 and good industrial hygiene practice.

Hand protection: Wear impervious gloves. Contact glove supplier to determine correct glove for this product.

Eye Protection: Chemical safety goggles recommended.

Skin Protection: Impervious apron, boots and other clothing are recommended if needed to prevent contact or if splashing is possible.

Other protective equipment or clothing: or operations where contact can occur, eye washing facilities should be available.

Hygiene measures: Avoid contact with eyes, skin and clothing. Wash thoroughly after use. Handle in accordance with good industrial hygiene and safety.

Section 9 – Physical and Chemical Properties

Appearance:	Opaque Liquid	Odor:	Low Characteristic
Odor Threshold:	0.92 ppm (methylene chloride)	Ph:	Not available
Melting/Freezing Point:	Not available	Boiling Point/Range:	104°F (39.8°C)
Flash Point:	75.7°F (24.3°C) ASTM D-3278-96 Method B*	Evaporation Rate:	14.5
Flammability: (Solid, Gas)	Not applicable	Flammability Limits:	LEL: 1.1% (2-butoxyethanol) UEL: 36% (methanol)
Vapor Pressure:	350 @ 20°C mm Hg	Vapor Density:	2.93
Relative Density:	1.16	Solubilities:	Rinseable
Partition Coefficient: (N-Octanol/Water)	Not determined	Autoignition Temperature:	Not determined
Decomposition Temperature:	Not determined	Viscosity:	Not determined

* Due to the unique chemical composition of this product, the liquid portion is nonflammable, however, due to methanol; vapors in a closely confined, non-ventilated area could flash

Section 10 – Stability and Reactivity

Reactivity: None known.

Chemical Stability: This material is stable.

Possibility of Hazardous Reactions: Contact with moisture may yield trichloroacetic acid and hydrochloric acid.

Conditions to avoid: Avoid contact with open flames, electric arc and other hot surfaces which can cause thermal decomposition.

Incompatible Materials: Strong oxidizing agents, caustics, nitric acid, chemically active metals, including aluminum, magnesium, potassium and sodium.

Hazardous decomposition products: Thermal decomposition may yield carbon monoxide, carbon dioxide, hydrogen chloride and phosgene.

Section 11 – Toxicological Information

Potential Health Effects:

Acute Hazards:

Inhalation: Inhalation of vapors or mists may cause mucous membrane and respiratory irritation and central nervous system depression with symptoms of headache, dizziness, giddiness, intoxication, tingling, numbness and shooting pains in the hands and arms, nausea, incoordination, drunkenness, stupor, irregular heartbeat. Overexposure may cause cardiac sensitization and increased risk of cardiac arrest, blurred vision, blindness, adverse effects on the lungs, liver, kidney, nervous system and other internal organs, coma or death. Carboxyhemoglobin levels can be elevated in persons exposed to methylene chloride causing stress on the cardiovascular system. Alcohol consumption may increase adverse effects.

Skin Contact: Prolonged or repeated contact may cause severe irritation or burns, drying, defatting of the skin and dermatitis. The liquid may be absorbed through the skin causing effects similar to those described under inhalation and ingestion.

Eye Contact: Vapors or mists may cause irritation, redness, tearing and swelling. Direct contact may cause corneal damage.

Ingestion: Ingestion may cause mucous membrane and gastrointestinal irritation, visual disturbances and nervous system depression with symptoms of headache, dizziness, nausea, vomiting, weakness, fatigue, leg cramps, restlessness, confusion, drunken behavior, narcosis, and unconsciousness. Alcohol consumed before or after exposure may increase adverse effects. Aspiration into the lungs during ingestion or vomiting may cause serious lung damage which may be fatal. Methanol is very slowly eliminated from the body. Ingestion of methanol may cause nervous system effects, blurred vision, changes in color perception, blindness, coma and death.

Carcinogenicity Listing: Methylene chloride has been listed as "possibly carcinogenic to humans" (Group 2B) by IARC, "reasonably anticipated to be a human carcinogen" (R) by NTP, "confirmed animal carcinogen with unknown relevance to humans" (A3) by ACGIH and as a carcinogen by OSHA.

Chronic Effects: Prolonged occupational overexposure may cause effects on vision and damage to the kidneys, liver, lungs and cardiovascular system. Prolonged intentional abuse may damage many organ systems including central and peripheral nervous systems, vision, liver, kidneys, lymphoid system, heart and blood. Methylene chloride has been shown to cause reproductive toxicity and/or birth defects only at doses that produce significant toxicity in the parent animal.

Acute toxicity:

Methylene Chloride: Oral rat LD50 >2000 mg/kg; Inhalation mouse LC50 86 mg/L/4 hr; Skin rat LD50>2000 mg/kg.

Methanol: Oral rat LD50 >2528 mg/kg; Skin rabbit 17,100 mg/kg

2-Butoxyethanol: Oral rat LD50 1746 mg/kg; Skin rabbit LD50 400 mg/kg; Inhalation rat LC50 450 ppm/4 hr

Section 12 - Ecological Information**Ecotoxicity:**

Methylene Chloride: 96 hr LC50 Pimephales promelas (fathead minnows) 196 mg/l; 48 hr LC50 daphnia magna 27 mg/L

Methanol: 96 hr LC50 *Lepomis macrochirus* (Bluegill) 15,400 mg/L; 48 hr LC50 *Ceriodaphnia dubia* 11 mg/L

2-Butoxyethanol: 96 hr LC50 *Cyprinodon variegatus* (Sheepshead minnow) 116 mg/L; 96 hr LC50 grass shrimp 5.4 mg/L

Persistence and Degradability: Methylene chloride is readily biodegradable (92% in less than 7 days). Methanol and 2-butoxyethanol are readily biodegradable.

Bioaccumulative Potential: Methylene chloride has an estimated BCF of 2 which suggests the potential for bioaccumulation in aquatic organisms is low.

Mobility in Soil: Methylene chloride is expected to have a high mobility in soil.

Other Adverse Effects: None known

Section 13 – Disposal Considerations

Disposal instructions: Dispose of product in accordance with all local, state/provincial and federal regulations.

Contaminated packaging Offer rinsed packaging material to local recycling facilities.

Section 14 – Transport Information

UN Number: UN 1992

UN Proper Shipping name: Flammable liquid, toxic n.o.s. (Methanol, Dichloromethane)

Transport Hazard Class: Class 3 (6.1)

Packing Group: PG III

Environmental Hazard: No

Special Precautions for User: None

For packages less than 5 liter or smaller, gross mass 30 kg or less may be re-classed as ORM-D and can be shipped by ground until 1/1/2014. After that date, this product can be shipped as Limited Quantity.

Section 15 – Regulatory Information

Safety, Health and Environmental Regulations/Legislation Specific for the Substance or Mixture

EPA SARA 302: This product does not contain chemicals regulated under SARA Section 302.

EPA SARA 311 Hazard Classification: Acute health, Chronic Health, Fire Hazard

EPA SARA 313: This product contains the following chemicals regulated under SARA Title III, section 313:

Methylene Chloride	75-09-2	70-85%
Methanol	67-56-1	5-10%
2-Butoxyethanol (glycol ethers)	111-76-2	5-10%

CERCLA: This product has a Reportable Quantity (RQ) of 1250 lbs. based on the RQ for methylene chloride of 1,000 lbs. Releases above the RQ must be reported to the National Response Center. Many states have more stringent release reporting requirements. Report spills required under federal, state and local regulations.

WHMIS Classification: Class B – Division 2 (Flammable liquid); Class D - Division 2A (Very toxic material causing other toxic effects)

Toxic Substances Control Act: All of the components of this product are listed on the TSCA inventory.

CALIFORNIA PROPOSITION 65: This product contains the following chemical known to the State of California to cause cancer or reproductive toxicity: methylene chloride 75-09-2 70-85% (cancer); methanol 67-56-1 5-10% (developmental)

Section 16 – Other Information

NFPA Rating: Health: 3 Fire: 3 Instability: 0

NOTICE: Advanced Protective Technologies, LLC warrants that the information given within to be true and makes no other warranties. The suitability of this product to the project shall solely up to the user.



SAFETY DATA SHEET

Paint and Coating Stripper

Prepared to U.S. OSHA, CMA, ANSI, Canadian WHMIS Standards, and European Directives

SECTION 1 - PRODUCT AND COMPANY IDENTIFICATION

1.1 Trade Name (as labeled):	Paint and Coating Stripper
IDH #:	210
Synonyms:	N/A
CAS No:	Mixture
1.2 Product Use:	Stripper
1.3 Company Name:	Glaze 'N Seal Products Inc.
Company Address:	18207 E. McDermott Street Suite C
Company Address Cont:	Irvine, CA 92614-6711
Business Phone:	(800) 486-1414
Website:	http://glaze-n-seal.com
1.4 Emergency Telephone Number:	(800) 424-9300
Date of Current Revision:	January 9, 2018
Date of Last Revision:	January 29, 2016

SECTION 2 - HAZARD IDENTIFICATION

EMERGENCY OVERVIEW: This product is an opaque liquid with a characteristic odor.

Health Hazards: May cause skin, eye, and respiratory system irritation. May be harmful if swallowed, in contact with skin, or inhaled. May cause damage to organs. Contains ingredients which are suspected of causing cancer.

Flammability Hazards: This product is a flammable liquid with a flash point of 75.7°F (24.3°C).

Reactivity Hazards: None.

Environmental Hazards: The environmental effects of this product have not been investigated, however release may cause adverse environmental effects.

US DOT Symbols:



EU and GHS Symbols:



Signal Word:

Danger!

2.1 GHS Labeling and Classification:

CLASSIFICATION OF SUBSTANCE OR MIXTURE IN ACCORDANCE WITH 29 CFR 1200 (OSHA HCS) AND THE EUROPEAN UNION DIRECTIVES:

This product meets the definition of a hazardous substance or preparation as defined by the European Union Council Directives 67/548/EEC, 1999/45/EC, 1272/2008/EC and subsequent Directives.

EU HAZARD CLASSIFICATION OF INGREDIENTS PER DIRECTIVE 1272/2008/EC:

Index Number:

EC# 200-838-9 Annex VI # is 602-004-00-3

EC# 200-659-6 Annex VI # is 603-001-00-x

EC# 203-905-0 Annex VI # is 603-014-00-0

Substances not listed either individually or in group entries must be self classified.

Components Contributing to Classification: Methylene Chloride, Methanol, 2-Butoxyethanol

2.2 Label Elements:**GHS Hazard Classifications:**

Flammable Liquid Category 3
 Carcinogenicity Category 1
 Acute Toxicity Category 4 Oral
 Acute Toxicity Category 4 Dermal
 Acute Toxicity Category 4 Inhalation
 STOT SE Category 2
 Skin Irritation Category 2
 Eye Irritation Category 2A

Hazard Statements:

H226 Flammable liquid and vapour
 H350 May cause cancer
 H302 Harmful if swallowed
 H312 Harmful in contact with skin
 H332 Harmful if inhaled
 H371 May cause damage to organs
 H315 Causes skin irritation
 H319 Causes serious eye irritation

Prevention Statements:

P210 Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking.
 P233 Keep container tightly closed.
 P240 Ground and bond container and receiving equipment.
 P242 Use non-sparking tools.
 P243 Take action to prevent static discharges.
 P201 Obtain special instructions before use.
 P202 Do not handle until all safety precautions have been read and understood.
 P264 Wash thoroughly after handling.
 P260 Do not breathe dust/fume/gas/mists/vapours/spray.
 P270 Do not eat, drink or smoke when using this product.
 P271 Use only outdoors or in a well-ventilated area.
 P280 Wear protective gloves/protective clothing/eye protection/face protection.

Response Statements:

P301+P312 IF SWALLOWED: Call a POISON/doctor if you feel unwell.
 P330 Rinse mouth.
 P303+P361+P353 IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water or shower.
 P370+P378 In case of fire: Use materials listed in section 5 to extinguish.
 P308+P311 IF exposed or concerned: Call a POISON Center/doctor.
 P304+P340 IF INHALED: Remove person to fresh air and keep comfortable for breathing.
 P312 Call a POISON CENTER/doctor if you feel unwell.
 P321 Specific treatment (see section 4 on this SDS).
 P362+P364 Take off contaminated clothing and wash it before reuse.
 P332+P313 If skin irritation occurs: Get medical advice / attention.
 P305+P351+P338 IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
 P337+P313 If eye irritation persists: Get medical advice / attention.

Storage Statements:

P405 Store locked up.

Disposal Statements:

P501 Dispose of contents/container in accordance with local/regional/national/international regulations.

2.3 Health Hazards or Risks From Exposure:**Symptoms of Overexposure by Route of Exposure:**

The most significant routes of overexposure for this product are by contact with skin, eyes, inhalation and ingestion. The symptoms of overexposure are described in the following paragraphs.

Acute:

Inhalation: May be harmful if inhaled. May cause respiratory Irritation. May cause drowsiness or dizziness.
 Skin Contact: May cause irritation.
 Eye Contact: May cause irritation and redness.
 Ingestion: May be harmful or fatal if swallowed, may cause blindness.

Chronic: May cause cancer. Overexposure may cause heart, liver, kidney, blood system and nervous system damage.

Target Organs:

Acute: Eyes, Skin, Respiratory system

Chronic: Heart, Kidney, Liver, Blood System, Central Nervous System

SECTION 3 - COMPOSITION / INFORMATION ON INGREDIENTS

Hazardous Ingredients:	WT%	CAS No.	EINECS No.	Hazard Classification
Methylene Chloride	70-85%	75-09-2	200-838-9	Carc Cat 2
Methanol	5-10%	67-56-1	200-659-1	Flam. Liq Cat 2, Acute Tox Cat 3 (Oral, Dermal, Inhalation), STOT SE Cat 2
2-Butoxyethanol	5-10%	111-76-2	203-905-0	Skin Irrit Cat 2, Eye Irrit Cat 2, Acute Tox Cat 4 (Oral, Dermal, Inhalation),
Balance of other ingredients are non-hazardous or less than 1% in concentration (or 0.1% for carcinogens, reproductive toxins, or respiratory sensitizers).				

Note: All WHMIS required information is included in appropriate sections based on the WHMIS 2015. This product has been classified in accordance with the hazard criteria of the CPR and the MSDS contains all the information required by the CPR and EU Directives.

SECTION 4 - FIRST AID MEASURES

4.1 Description of First Aid Measures:

Eye Contact:

If product enters the eyes, flush with plenty of water or eye wash solution for several minutes. Remove contacts if present and easy to do. Seek medical attention if irritation persists.

Skin Contact:

Wash skin thoroughly with soap and water after handling. Seek medical attention if irritation develops and persists.

Inhalation:

If breathing becomes difficult, remove victim to fresh air. If necessary, use artificial respiration to support vital functions. Seek medical attention.

Ingestion:

If product is swallowed, call physician or poison center immediately. If professional advice is not available, do not induce vomiting. Never induce vomiting or give diluents (milk or water) to someone who is unconscious, having convulsions, or who cannot swallow. Seek medical advice. Take a copy of the label and/or SDS with the victim to the health professional.

Medical Conditions Generally Aggravated by Exposure:

Pre-existing skin or eye problems may be aggravated by prolonged contact.

4.2 Symptoms and Effects Both Acute and Delayed:

Exposure to skin, eye, and respiratory irritation. Prolonged exposure may cause damage to organs.

4.3 Recommendations to Physicians:

Treat symptoms and eliminate overexposure.

SECTION 5 - FIRE FIGHTING MEASURES

5.1 Fire Extinguishing Materials:

Use the following fire extinguishing materials:

Water Spray: Yes **Carbon Dioxide:** Yes
Foam: Yes **Dry Chemical:** Yes
Halon: Yes **Other:** Any "C" Class

5.2 Unusual Fire and Explosion Hazards:

Irritating and toxic fumes may be produced at high temperatures.

Explosive Sensitivity to Mechanical Impact:

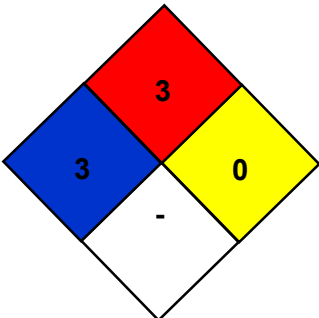
No

Explosive Sensitivity to Static Discharge:

Yes

5.3 Special Fire-Fighting Procedures:

- Incipient fire responders should wear eye protection.
- Structural firefighters must wear Self-Contained Breathing Apparatus (SCBA) and full protective equipment.
- Isolate materials not yet involved in the fire and protect personnel. Move containers from fire area if this can be done without risk; otherwise, cool with carefully applied water spray.
- If possible, prevent run-off water from entering storm drains, bodies of water, or other environmentally sensitive areas.

NFPA RATING SYSTEM		HMIS RATING SYSTEM									
Flammability  Health Reactivity Other		HAZARDOUS MATERIAL IDENTIFICATION SYSTEM									
		HEALTH HAZARD (BLUE)	3								
		FLAMMABILITY HAZARD (RED)	3								
		PHYSICAL HAZARD (YELLOW)	0								
		PROTECTIVE EQUIPMENT <table border="1"> <tr> <th>EYES</th><th>RESPIRATORY</th><th>HANDS</th><th>BODY</th></tr> <tr> <td></td><td>See Sect 8</td><td></td><td>See Sect 8</td></tr> </table> For Routine Industrial Use and Handling Applications		EYES	RESPIRATORY	HANDS	BODY		See Sect 8		See Sect 8
EYES	RESPIRATORY	HANDS	BODY								
	See Sect 8		See Sect 8								
Hazard Scale: 0 = Minimum 1 = Slight 2 = Moderate 3 = Serious 4 = Severe * = Chronic Hazard											

SECTION 6 - ACCIDENTAL RELEASE MEASURES (STEPS FOR SPILLS)

6.1 Personal Precautions, Protective Equipment and Emergency Procedures:

Use cautious judgment when cleaning up spill. Wear suitable protective clothing, gloves, and eye/face protection.

6.2 Environmental Precautions:

Construct a dike to prevent spreading. Keep out of sewers, storm drains, surface waters, and soils.

6.3 Spill and Leak Response:

Small Spills:

- Collect material via broom or mop. Place in tightly sealed containers for proper disposal.
- Approach spill areas with caution.
- If liquid was introduced, create a dike or trench to contain material. Soak up with absorbent material such as clay, sand or other suitable non-reactive material.
- Place in leak-proof containers. Seal tightly for proper disposal.
- Dispose of in accordance with U.S. Federal, State, and local hazardous waste disposal regulations and those of Canada and its Provinces, those of Australia, Japan and EU Member States (see Section 13, Disposal Considerations).

Large Spills:

SECTION 7 - HANDLING AND STORAGE

7.1 Precautions for Safe Handling:

To prevent eye contact under the foreseeable conditions of use, wear appropriate safety eyewear. When handling, do not eat, drink, or smoke. Wash thoroughly after handling.

7.2 Storage and Handling Practices:

Keep cool, in a well ventilated area, and away from ignition sources.

7.3 Specific Uses:

See Section 1.2.

SECTION 8 - EXPOSURE CONTROL/PERSONAL PROTECTION

8.1 Exposure Parameters:

Ingredients	CAS No.	ACGIH TLV	OSHA PEL	NIOSH PEL
Methylene Chloride	75-09-2	50 ppm	25 ppm	Not Listed
Methanol	67-56-1	200 ppm	200 ppm	200 ppm
2-Butoxyethanol	111-76-2	20 ppm	50 ppm	5 ppm

8.2 Exposure Controls:**Ventilation and Engineering Controls:**

Use with adequate ventilation to ensure exposure levels are maintained below the limits provided above.

The following information on appropriate Personal Protective Equipment is provided to assist employers in complying with OSHA regulations found in 29 CFR Subpart I (beginning at 1910.132), or standards of EU member states (including EN 149 for respiratory PPE, and EN 166 for face/eye protection), and those of Japan. Please reference applicable regulations and standards for relevant details.

Respiratory Protection:

Not required for properly ventilated areas.

Maintain airborne contaminant concentrations below guidelines listed above, if applicable. If necessary, use only respiratory protection authorized in the U.S. Federal OSHA Respiratory Protection Standard (29 CFR 1910.134), equivalent U.S. State standards, Canadian CSA Standard Z94.4-93, the European Standard EN149, or EU member states.

Eye Protection:

Safety glasses or goggles are required.

If necessary, refer to U.S. OSHA 29 CFR 1910.133, Canadian Standards, and the European Standard EN166, Australian Standards, or relevant Japanese Standards.

Hand Protection:

Chemical resistant gloves are required to prevent skin contact.

If necessary, refer to U.S. OSHA 29 CFR 1910.138, the European Standard DIN EN 374, the appropriate Standards of Canada, Australian Standards, or relevant Japanese Standards.

Body Protection:

Use body protect appropriate to task being performed.

If necessary, refer to appropriate Standards of Canada, or appropriate Standards of the EU, Australian Standards, or relevant Japanese Standards. If a hazard of injury to the feet exists due to falling objects, rolling objects, where objects may pierce the soles of the feet or where employee's feet may be exposed to electrical hazards, use foot protection, as described in U.S. OSHA 29 CFR 1910.136.

SECTION 9 - PHYSICAL AND CHEMICAL PROPERTIES**9.1 Information on Basic Physical and Chemical Properties:**

Appearance (Physical State and Color): Opaque Liquid

Odor: Characteristic odor

Odor Threshold: No data available

pH: No data available

Melting/Freezing Point: No data available

Boiling Point: 104°F (39.8°C)

Flash Point: 75.7°F (24.3°C)

Evaporation Rate: 14.5

Flammability (Solid; Gas): Not applicable

Upper/Lower Flammability or Explosion Limits: No data available

Vapor Pressure (mm Hg @ 20°C (68° F): 350 @ 20°C mm Hg

Vapor Density: No data available

Relative Density: 1.16

Specific Gravity: 0.91

Solubility in Water: No data available

Weight per Gallon: No data available

Partition Coefficient (n-octanol/water): No data available

Auto-Ignition Temperature: No data available

Decomposition Temperature: No data available

Viscosity: No data available

VOC: No data available

9.2 Other Information:

No data available

SECTION 10 - STABILITY AND REACTIVITY**10.1 Reactivity:**

No reactivity data available.

10.2 Stability:

Stable under conditions of normal storage and use.

10.3 Possibility of Hazardous Reactions:

Contact with moisture may yield trichloroacetic acid and hydrochloric acid.

10.4 Conditions to Avoid:

Avoid contact with open flames, electric arc and other hot surfaces which can cause thermal decomposition.

10.5 Incompatible Substances:

Strong oxidizing agents, caustics, nitric acid, chemically active metals, including aluminum, magnesium, potassium and sodium.

10.6 Hazardous Decomposition Products:

Thermal decomposition may yield carbon monoxide, carbon dioxide, hydrogen chloride and phosgene.

SECTION 11 - TOXICOLOGICAL INFORMATION**11.1 Information on Toxicological Effects:****Toxicity Data:**

Methanol	67-56-1	LD50 – Oral, Rat	143 mg/kg
		LC50 – Inhalation, Rat	128.2 mg/l – 4h
		LD50 – Dermal, Rabbit	17,100 mg/kg
2-Butoxyethanol	111-76-2	LD50 – Oral, Rat	880 mg/kg
		LD50 – Dermal, Rabbit	1.060 mg/kg

Suspected Cancer Agent:

Ingredients within this product are found on one or more of the following lists: FEDERAL OSHA Z LIST, NTP, IARC, or CAL/OSHA and therefore are considered to be cancer-causing agents by these agencies.

Irritancy:

Methylene Chloride CAS# 75-09-2

Sensitization to the Product:

Skin, eye, respiratory irritant.

Germ Cell Mutagenicity:

This product is not expected to be a skin sensitization.

Reproductive Toxicity:

This product does not contain ingredients that are suspected to be a germ cell mutagenic.

Specific Target Organ Toxicity – Single Exposure:

This product does not contain ingredients that are expected to be a human reproductive toxicant.

Specific Target Organ Toxicity – Repeated Exposure:

Skin, eye, respiratory irritation.

Aspiration Hazard:

Overexposure may cause heart, liver, kidney, blood system and nervous system damage

Not expected to be an aspiration hazard.

SECTION 12 - ECOLOGICAL INFORMATION**12.1 Toxicity**

No specific data available on this product.

12.2 Persistence and Degradability:

No specific data available on this product.

12.3 Bioaccumulative Potential:

No specific data available on this product.

12.4 Mobility in Soil:

No specific data available on this product.

12.5 Results of PBT and vPvB Assessment:

No specific data available on this product.

12.6 Other Adverse Effects:

No data available

12.7 Water Endangerment Class:

At present, there are no ecotoxicological assessments for this product.

SECTION 13 - DISPOSAL CONSIDERATIONS**13.1 Waste Treatment Methods:**

Waste disposal must be in accordance with appropriate U.S. Federal, State, and local regulations, those of Australia, EU Member States and Japan.

13.2 EU Waste Code:

Not determined

SECTION 14 - TRANSPORTATION INFORMATION**14.1 U.S. Department of Transportation (DOT) Shipping Regulations:***This product is classified (per 49 CFR 172.101) by the U.S. Department of Transportation, as follows.***UN Identification Number:**

UN1992

Proper Shipping Name:

Flammable liquid, toxic n.o.s. (Methanol, Dichloromethane)

Hazard Class Number and Description:
Packing Group:
DOT Label(s) Required:
North American Emergency Response Guidebook Number:

Class 3 – Flammable / Class 6.1 – Toxic Substance
III
Flammable / Toxic Substance
131

Note:

This product meets the limited quantity exemption when packaged in containers less than 60 Liters.

14.2 Environmental Hazards:

Marine Pollutant:

The components of this product are not designated by the Department of Transportation to be Marine Pollutants (49 CFR 172.101, Appendix B).

14.3 Special Precaution for User:

None

14.4 International Air Transport Association Shipping Information (IATA):

This product is considered as dangerous goods.

14.5 International Maritime Organization Shipping Information (IMO):

This product is considered as dangerous goods.

SECTION 15 - REGULATORY INFORMATION

15.1 Safety, Health and Environmental Regulations Specific for the Substance or Mixture:

United States Regulations:

U.S. SARA Reporting Requirements:

The components of this product are subject to the reporting requirements of Sections 302, 304, and 313 of Title III of the Superfund Amendments and Reauthorization Act.

Methylene Chloride CAS# 75-09-2, Methanol CAS# 67-56-1, 2-Butoxyethanol CAS# 111-76-2

U.S. SARA 311/312:

Acute Health: Yes; Chronic Health: Yes; Fire: Yes; Reactivity: No

U.S. CERCLA Reportable Quantity:

None

U.S. TSCA Inventory Status:

The components of this product are listed on the TSCA Inventory or are exempted from listing.

Other U.S. Federal Regulations:

None known

California Safe Drinking Water and Toxic Enforcement Act (Proposition 65):



WARNING! This product contains Methanol which is known to the State of California to be a developmental hazard. This product contains Methylene Chloride which is known to the State of California to cause Cancer.

15.2 Canadian Regulations:

Canadian DSL/NDSL Inventory Status:

Components are DSL Listed, NDSL Listed and/or are exempt from listing

Other Canadian Regulations:

Not applicable

Canadian Environmental Protection Act (CEPA) Priorities Substances Lists:

This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations and the MSDS contains all of the information required by those regulations.

Canadian WHMIS Classification and Symbols:

This product has been classified per WHMIS 2015 standards.

15.3 European Economic Community Information:

This product meets the definition of a hazardous substance or preparation as defined by the European Union Council Directives 67/548/EEC, 1999/45/EC, 1272/2008/EC and subsequent Directives. See Section 2 for Details.

Chemical Safety Assessment:

No Chemical Safety Assessment has been carried out for this substance/mixture by the supplier.

15.4 Australian Information for Product:

Components of this product are listed on the International Chemical Inventory list.

15.5 Japanese Information for Product:

Japanese Minister of International Trade and Industry (MITI) Status: The components of this product are not listed as Class I specified Chemical Substances, Class II Specified Chemical Substances, or Designated Chemical Substances by the Japanese MITI.

15.6 International Chemical Inventories:

Listing of the components on individual country Chemical Inventories is as follows:

Australian Inventory of Chemical Substances (AICS): Listed

Korean Existing Chemicals List (ECL): Listed

Japanese Existing National Inventory of Chemical Substances (ENCS): Listed

Philippines Inventory of Chemicals and Chemical Substances (PICCS): Listed

U.S. TSCA: Listed

SECTION 16 - ADDITIONAL INFORMATION

Prepared By: Chris Eigbrett (MSDS to GHS Compliance)

Date of Printing: January 9, 2018

The information contained herein is believed to be accurate but is not warranted to be so. Data and calculations are based on information furnished by the manufacturer of the product and manufacturers of the components of the product. Users are advised to confirm in advance of the need that information is current, applicable and suited to the circumstances of use. This safety sheet cannot cover all possible situations which the user may experience during processing. Each aspect of your operation should be examined to determine if, or where, additional precautions may be necessary. All health and safety information contained in this bulletin should be provided to your employees or customers. Glaze 'N Seal Products Inc. assumes no responsibility for injury to vendee or third party person proximately caused by the material if reasonable safety procedures are not adhered to as stipulated in the data sheet. Furthermore, Glaze 'N Seal Products Inc. assumes no responsibility for injury caused by abnormal use of this material even if reasonable safety procedures are followed. Compliance with all applicable federal, state, and local laws and local regulations remains the responsibility of the user.

END OF SDS SHEET

WM Barr

WM Barr Priority Product Notification versus Safety Data Sheets

Priority Product Notification	Safety Data Sheet	Product Code
Jasco/Bix Varnish & Stain Remover Quart	Jasco/Bix Varnish & Stain Remover	PJBV01011, QJBV00102, GJBV00103
Jasco Fiberglass Paint Remover Gallon	Jasco Fiberglass Paint Remover	GJFR354
Jasco Premium Paint & Epoxy Remover Quart, gallon & 5 Gallon	Jasco Premium Paint and Epoxy Remover	QJBP00202, CJBP00204, GJBP00203, PJBP02011
Jasco Premium Remover 17 oz aerosol	Jasco Premium Remover	EJBP00206
Jasco Premium Sprayable Stripper	Jasco Spray On Stripper	QJBS00212, GJBS00213
Klean Strip Adhesive Remover Quart & Gallon	Klean Strip Adhesive Remover/Klean Strip Premium Stripper	GKAS94325, QKAS94326, GKS3, QKS3, QKS3L, QKS34, PA11185
Aircraft Fiberglass Paint Remover Gallon	Klean-Strip Aircraft Fiberglass Paint Remover	GAF354, GAF354CN
Aircraft Low Odor Remover Gallon	Klean Strip Aircraft Low Odor Paint Remover	CAR777, GAR777, QAR777
Aircraft Remover 18 oz aerosol	Klean Strip Aircraft Paint Remover Aerosol	EAR322, EAR322CN
Aircraft Paint Remover for Flexible Plastic 18 oz aerosol	Klean Strip Aircraft Paint Remover for Flexible Plastic Aerosol	EUP367, EUP367CN
Aircraft Remover Quart & Gallon	Klean-Strip Aircraft Remover	GAR343, QAR343, GDX586
Klean Strip Klean Cutter Quart	Klean Strip Klean Cutter	QKK5.1
Naked Gun Spray Gun Paint Remover Gallon & 5 Gallon	Klean-Strip Naked Gun Spray Gun Paint Remover	CSG14, ESG14, GSG14, 35M.9
Naked Gun Spray Gun Paint Remover Kit	Based on our understanding, this product does not contain paint remover; it is just equipment and is not a priority product.	N/A
Aircraft Peeler 18 oz aerosol	Klean Strip Peeler	EFS459
Klean Strip Sprayable Quart & Gallon	Klean-Strip Premium Sprayable Stripper	GBLKSPRY, QBLK2212, GKS221, QKS2212
Klean Strip Premium Stripper Quart & gallon	Premium Stripper	ESR72, ESR72L
Klean Strip Premium Stripper 18 oz aerosol	Premium Stripper	ESR72, ESR72L
Klean Strip Strip X Stripper Quart & Gallon	Klean-Strip Strip X Stripper	GSX6, GSX62, QSX6, QXS64
Kwik Liquid No Wash 5 Gallon	KWIK Liquid No Wash	CLN950, DLN950
Kwik Marine Remover Gallon	KWIK Marine Paint & Varnish Remover	GMR956
Master Pro Metal Stripper for O'Reilly's Gallon	Master Pro Refinishing Metal Strip	G7713, G3405

Jasco / Bix Varnish & Stain Remover

Revision: 05/02/2019

Supersedes Revision: 04/17/2015

1. PRODUCT AND COMPANY IDENTIFICATION

Product Name:	Jasco / Bix Varnish & Stain Remover	
Company Name:	W. M. Barr 2105 Channel Avenue Memphis, TN 38113	Phone Number: (901)775-0100
Web site address:	www.wmbarr.com	
Emergency Contact:	3E 24 Hour Emergency Contact	(800)451-8346
Information:	W.M. Barr Customer Service	(800)398-3892
Intended Use:	Paint/Varnish Remover	
Product Code:	PJBV01011, QJBV00102, GJBV00103	
Additional Information	This chemical/product is not and cannot be distributed in commerce (as defined in TSCA section 3(5)) or processed (as defined in TSCA section 3(13)) for consumer paint or coating removal.	

2. HAZARDS IDENTIFICATION

Flammable Liquids, Category 2
 Acute Toxicity: Oral, Category 3
 Acute Toxicity: Skin, Category 3
 Acute Toxicity: Inhalation, Category 3
 Skin Corrosion/Irritation, Category 2
 Serious Eye Damage/Eye Irritation, Category 2A
 Carcinogenicity, Category 1B
 Toxic To Reproduction, Category 2
 Specific Target Organ Toxicity (single exposure), Category 1
 Specific Target Organ Toxicity (repeated exposure), Category 2



GHS Signal Word: Danger

GHS Hazard Phrases:

- Highly flammable liquid and vapor.
- Toxic if swallowed.
- Toxic in contact with skin.
- Causes skin irritation.
- Causes serious eye irritation.
- Toxic if inhaled.
- May cause cancer.
- Suspected of damaging fertility or the unborn child.
- Causes damage to organs.
- May cause damage to organs through prolonged or repeated exposure.

GHS Precautionary Phrases:

- Obtain special instructions before use.
- Do not handle until all safety precautions have been read and understood.
- Keep away from heat/sparks/open flames/hot surfaces. - No smoking.
- Keep container tightly closed.
- Ground/bond container and receiving equipment.
- Use explosion-proof electrical/ventilating/lighting equipment.
- Use only non-sparking tools.
- Take precautionary measures against static discharge.
- Do not breathe gas/mist/vapors/spray.
- Wash hands thoroughly after handling.
- Do not eat, drink or smoke when using this product.

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GHS Response Phrases:

Use only outdoors or in a well-ventilated area.
 Wear protective gloves/protective clothing/eye protection/face protection.
 Use personal protective equipment as required.
 Keep cool.

IF SWALLOWED: Immediately call a POISON CENTER or doctor/physician.
 IF ON SKIN: Wash with plenty of soap and water.
 IF ON SKIN (or hair): Remove/take off immediately all contaminated clothing. Rinse skin with water/shower.
 IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing.
 IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
 IF exposed: Call a POISON CENTER or doctor/physician.
 IF exposed or concerned: Get medical attention/advice.
 Call a POISON CENTER or doctor/physician.
 Get medical attention/advice if you feel unwell.
 Specific treatment see label.
 Rinse mouth.
 If skin irritation occurs, get medical advice/attention.
 If eye irritation persists, get medical advice/attention.
 Remove/Take off immediately all contaminated clothing.
 Wash contaminated clothing before reuse.
 In case of fire, use dry chemical powder to extinguish.

GHS Storage and Disposal Phrases:

Store container tightly closed in well-ventilated place.
 Store locked up.
 Dispose of contents/container according to local, state and federal regulations.

OSHA Regulatory Status:

This material is classified as hazardous under OSHA regulations.

Potential Health Effects (Acute and Chronic):

Potential Acute Health Effects:

EYE: Vapors can cause eye irritation. Contact can produce redness, inflammation, pain and temporal eye damage.

SKIN: Causes irritation, redness, pain, drying and cracking of the skin. Prolonged contact can cause burns. May be absorbed through skin.

INGESTION: May cause irritation of the gastrointestinal tract and/or abdominal spasms. Symptoms parallel inhalation.
 Aspiration of material into the lungs can cause chemical pneumonitis.

INHALATION: Causes irritation to the respiratory tract. Causes formation of carbon monoxide in blood which affects cardiovascular system and central nervous symptoms. Symptoms of overexposure may include skin sensations (e.g. pins and needles), fatigue, confusion, headaches, dizziness and drowsiness. Very high concentrations or continued exposure may cause increased light-headedness, vomiting, blurred vision, blindness, staggering, unconsciousness, comas, and even death.

CHRONIC EXPOSURE: Methylene Chloride may cause headache, mental confusion, depression, liver effects, kidney

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effects, bronchitis, loss of appetite, nausea, lack of balance, and visual disturbances. Prolonged and/or repeated skin contact can cause severe irritation or dermatitis. Methylene chloride may cause cancer in humans. Toluene may affect the developing fetus. Toluene chronic poisoning describe anemia, decreased blood cell count and bone marrow hypoplasia. Methanol report impaired vision.

Target Organs: eyes, skin, respiratory system, liver, kidneys, pancreas, heart, lungs, brain, central nervous system

Medical Conditions Generally Aggravated By Exposure: Those of the skin, eye, and lungs/respiratory system. This may include dermatitis; asthma and other breathing disorders; chronic lung disease; coronary artery disease; anemia;

3. COMPOSITION/INFORMATION ON INGREDIENTS

CAS #	Hazardous Components (Chemical Name)	Concentration
67-56-1	Methanol {Methyl alcohol; Carbinol; Wood alcohol}	30.0 -50.0 %
75-09-2	Dichloromethane {Methylene chloride; R-30; Freon 30}	25.0 -40.0 %
67-64-1	Acetone {2-Propanone}	10.0 -25.0 %
108-88-3	Toluene {Benzene, Methyl-; Toluol}	10.0 -20.0 %
143-18-0	Oleic acid potassium salt	< 2.0 %

Additional Chemical Information Specific percentage of composition is being withheld as a trade secret.

4. FIRST AID MEASURES

Emergency and First Aid Procedures:

INHALATION: If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen and seek medical attention immediately.

SKIN: Immediately wash with mild soap and water for 15 minutes, while removing contaminated clothing and shoes. Wash clothing before reuse. Get medical attention.

EYE: Immediately flush with water for at least 15 minutes, lifting lower and upper eyelids occasionally. Get medical attention immediately.

INGESTION: Aspiration hazard. Do not take internally. If swallowed, DO NOT INDUCE VOMITING. Give large quantities of water. Never give anything by mouth to an unconscious person. Get medical attention immediately. If vomiting occurs, keep head below hips to prevent aspiration into lungs.

Signs and Symptoms Of Exposure: See Potential Health Effects.

Note to Physician: This product contains methanol which can cause intoxication and central nervous system depression. Methanol is metabolized to formic acid and formaldehyde. These metabolites can cause metabolic acidosis, visual disturbances and blindness. Since metabolism is required for these toxic symptoms, their onset may be delayed from 6 to 30 hours following ingestion. Ethanol competes for the same metabolic pathway and

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has been used to prevent methanol metabolism. Ethanol administration is indicated in symptomatic patients or at blood methanol concentrations above 20 ug/dl. Methanol is effectively removed by hemodialysis.

5. FIRE FIGHTING MEASURES

	IB
Flash Pt:	26.00 F Method Used: Pensky-Marten Closed Cup
Explosive Limits:	LEL: No data. UEL: No data.
Autoignition Pt:	No data.
Suitable Extinguishing Media:	Use alcohol foam, carbon dioxide, and dry chemical. Water may be used to flush spills away from exposures and to dilute spills to non-flammable mixtures.
Unsuitable Extinguishing Media:	None known.
Fire Fighting Instructions:	Evacuate personnel to a safe area. Keep containers cool with water spray. Avoid breathing decomposition products. Firefighters should wear NIOSH approved self-contained breathing apparatus and full body protection. Vapors can flow along surfaces to distant ignition source and flash back.
Flammable Properties and Hazards:	Flammable Liquid and Vapor! Dangerous fire hazard when exposed to heat or flame. Vapors can flow along surfaces to distant ignition source and flash back.
Hazardous Combustion Products:	Carbon monoxide and carbon dioxide, hydrogen chloride, and trace amounts of phosgene, chlorine.

6. ACCIDENTAL RELEASE MEASURES

Steps To Be Taken In Case Material Is Released Or Spilled:	Vapors may cause flash fire or ignite explosively.
	Clean up: Keep unnecessary people away; isolate hazard area and deny entry. Stay upwind, out of low areas, and ventilate closed spaces before entering. Shut off ignition sources; keep flares, smoking or flames out of hazard area. Use non-sparking tools. Use proper bonding and grounding methods for all equipment and processes. Keep out of waterways and bodies of water. Be cautious of vapors collecting in small enclosed spaces, sewers, low lying areas, confined spaces, etc.
	Small spills: Take up with sand, earth or other noncombustible absorbent material and place in a plastic container where applicable.
	Large spills: Dike far ahead of spill for later disposal.
	Waste Disposal: Dispose in accordance with applicable local, state and federal regulations.

7. HANDLING AND STORAGE

Precautions To Be Taken in Handling:	Read carefully all cautions and directions on product label before use. Since empty container retains residue, follow all label warnings even after container is empty. Dispose of empty container according to all regulations. Do not reuse this container.
	Do not use this product near any source of heat or open flame, furnace areas, pilot lights, stoves, etc.

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Precautions To Be Taken in Storing:

Do not use in small enclosed spaces, such as basements and bathrooms. Vapors can accumulate and explode if ignited.

Do not spread this product over large surface areas because fire and health safety risks will increase dramatically.

Keep container tightly closed when not in use. Store in a cool, dry place. Do not store near flames or at elevated temperatures.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

CAS #	Chemical Name	Jurisdiction	Recommended Exposure Limits	Notations
67-56-1	Methanol {Methyl alcohol; Carbinol; Wood alcohol}	ACGIH TLV	TLV: 200 ppm STEL: 250 ppm	
		OSHA PELs	PEL: 200 ppm	
75-09-2	Dichloromethane {Methylene chloride; R-30; Freon 30}	ACGIH TLV	TLV: 50 ppm	
		OSHA PELs	PEL: 25 ppm STEL: 125 ppm (15 min)	
67-64-1	Acetone {2-Propanone}	ACGIH TLV	TLV: 500 ppm STEL: 750 ppm	
		OSHA PELs	PEL: 1000 ppm	
108-88-3	Toluene {Benzene, Methyl-; Toluol}	ACGIH TLV	TLV: 50 ppm	
		OSHA PELs	PEL: 200 ppm STEL: 500 ppm/(10min) CEIL: 300 ppm	
Respiratory Equipment (Specify Type):		Avoid breathing vapor. Use NIOSH approved pressure demand or other positive pressure SCBA or airline respirators.		
Eye Protection:		Use chemical goggles or glasses with side shields. A faceshield in combination with safety glasses or chemical goggles is recommended when the potential exists for spraying or splashing of liquid to the face.		
Protective Gloves:		Wear gloves with as much resistance to the chemical ingredients as possible. Glove materials such as nitrile rubber may provide protection. Glove selection should be based on chemicals being used and conditions of use. Consult your glove supplier for additional information. Gloves contaminated with product should be discarded and not reused.		
Other Protective Clothing:		Full Protective Clothing. Various application methods can dictate use of additional protective safety equipment, such as impermeable aprons, etc., to minimize exposure.		
Engineering Controls (Ventilation etc.):		Use process enclosures, local exhaust ventilation, or other engineering controls to control airborne levels below recommended exposure limits.		
Use only with adequate ventilation to prevent buildup of vapors. Do not use in areas where vapors can accumulate and concentrate, such as basements, bathrooms or small enclosed areas. Whenever possible, use outdoors in an open air area. If using indoors open all windows and doors and maintain a cross ventilation of moving fresh air across the work area. If strong odor is noticed or you experience slight dizziness, headache, nausea or eye-watering -- STOP -- ventilation is inadequate. Leave area immediately and move to fresh air.				

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Work/Hygienic/Maintenance Practices: Have an eyewash and safety shower available.

The usual precaution for the handling of chemicals must be observed.

Wash hands thoroughly after use and before eating, drinking, or smoking. Do not eat, drink, or smoke in the work area. Discard any clothing or other protective equipment that cannot be decontaminated.

9. PHYSICAL AND CHEMICAL PROPERTIES

Physical States: [] Gas [X] Liquid [] Solid

Appearance and Odor: Viscous, opaque white or clear liquid with aromatic ether like odor.

pH: 6.0 - 7.0

Melting Point: No data.

Boiling Point: 132.80 F - 140.00 F

Flash Pt: 26.00 F Method Used: Pensky-Marten Closed Cup

Evaporation Rate: > 1

Flammability (solid, gas): No data available.

Explosive Limits: LEL: No data. UEL: No data.

Vapor Pressure (vs. Air or mm Hg): > 134 MM HG

Vapor Density (vs. Air = 1): < 2

Specific Gravity (Water = 1): 0.92 - 0.93

Density: 7.628 - 7.728 LB/GL

Solubility in Water: Slight

Octanol/Water Partition Coefficient: No data.

Percent Volatile: 97.0 % by weight.

VOC / Volume: 463.0000 G/L

Autoignition Pt: No data.

Decomposition Temperature: No data.

Viscosity: 2000 CPS

10. STABILITY AND REACTIVITY

Stability: Unstable [] Stable [X]

Conditions To Avoid - Instability: No data available.

Incompatibility - Materials To Avoid: Strong oxidizers, strong caustics, acids, water + heat, and chemically active metals. May attack some forms of plastics, rubber, and coatings.

Moisture, heat, flame, ignition sources and incompatibles.

Hazardous Decomposition or Byproducts: Carbon monoxide, carbon dioxide, formaldehyde, hydrochloric acid and toxic gas phosgene.

Possibility of Hazardous Reactions: Will occur [] Will not occur [X]

Conditions To Avoid - Hazardous Reactions: No data available.

11. TOXICOLOGICAL INFORMATION

Toxicological Information:	This product as a whole has not been tested. Refer to section 2 for acute and chronic effects. CAS# 75-09-2: Tumorigenic Effects:, TCLo, Inhalation, Rat, 3500. PPM, 6 Y. Result: Tumorigenic: Carcinogenic by RTECS criteria. Endocrine: Tumors. - Fundamental and Applied Toxicology., Academic Press, Inc., 1 E. First St., Duluth, MN 55802, Vol/p/yr: 4,30, 1984 Standard Draize Test, Eyes, Species: Rabbit, 100.0 MG, Severe. Result: Effects on Newborn: Growth statistics (e.g., reduced weight gain). Effects on Newborn: Physical. - Union Carbide Data Sheet, Union Carbide Corp., 39 Old Ridgebury Rd., Danbury, CT 06817, Vol/p/yr: 4/25, 1958 Standard Draize Test, Skin, Species: Rabbit, 810.0 MG, 24 H, Severe. Result: Specific Developmental Abnormalities: Musculoskeletal system. - European Journal of Toxicology and Environmental Hygiene., For publisher information, see TOERD9, Paris France, Vol/p/yr: 9,171, 1976 CAS# 67-64-1: Standard Draize Test, Eyes, Species: Rabbit, 20.00 MG, Severe. Result: Behavioral: Change in motor activity (specific assay). Behavioral: Alteration of classical conditioning. - American Journal of Ophthalmology., Ophthalmic Pub. Co., 435 N. Michigan Ave., Suite 1415, Chicago, IL 60611, Vol/p/yr: 29,1363, 1946 CAS# 108-88-3: Reproductive Effects:, TCLo, Inhalation, Rat, 800.0 MG/M3, 6 H, female 14-20 day(s) after conception. Result: Effects on Embryo or Fetus: Fetotoxicity (except death, e.g., stunted fetus). Effects on Newborn: Behavioral. - Brazilian Journal of Medical and Biological Research., Vol/p/yr: 23,533, 1990 Standard Draize Test, Eyes, Species: Rabbit, 2.000 MG, 24 H, Severe. Result: Effects on Embryo or Fetus: Other effects to embryo. Specific Developmental Abnormalities: Eye, ear. - Prehled Prumyslove Toxikologie, Marhold, J., Organicke Latky, Prague Czechoslovakia, Vol/p/yr: -,29, 1986
Carcinogenicity/Other	Methylene Chloride has been shown to increase the incidence of malignant tumors in

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Information:

mice and benign tumors in rats. Other animal studies, as well as several human epidemiology studies, failed to show a tumorigenic response.

-Methylene Chloride (Dichloromethane) (CAS 75-09-2) is on the IARC list as a Group 2B: Possibly Carcinogenic to Humans, and on the NTP list as Reasonably anticipated to be a human carcinogen.

-Toluene (CAS 108-88-3) is on the IARC list as a Group 3: Not Classifiable as to Carcinogenicity in Humans.

CAS #	Hazardous Components (Chemical Name)	NTP	IARC	ACGIH	OSHA
67-56-1	Methanol {Methyl alcohol; Carbinol; Wood alcohol}	n.a.	n.a.	n.a.	n.a.
75-09-2	Dichloromethane {Methylene chloride; R-30; Freon 30}	Possible	2B	A3	Yes
67-64-1	Acetone {2-Propanone}	n.a.	n.a.	A4	n.a.
108-88-3	Toluene {Benzene, Methyl-; Toluol}	n.a.	3	A4	n.a.
143-18-0	Oleic acid potassium salt	n.a.	n.a.	n.a.	n.a.

12. ECOLOGICAL INFORMATION**General Ecological Information:**

This product as a whole has not been tested.

13. DISPOSAL CONSIDERATIONS**Waste Disposal Method:**

Dispose of in accordance with all applicable local, state, and federal regulations.

14. TRANSPORT INFORMATION**LAND TRANSPORT (US DOT):**

DOT Proper Shipping Name: Paint Related Material

DOT Hazard Class: 3 FLAMMABLE LIQUID

UN/NA Number: UN1263

Packing Group: II

**Additional Transport Information:**

The shipper / supplier may be able to apply one of the following exceptions if allowed under 49 CFR Regulations: Combustible Liquid, Consumer Commodity, Limited Quantity, Viscous Liquid, Does Not Sustain Combustion, or others, as allowed under 49 CFR Hazmat Regulations. Please consult 49 CFR Subchapter C to ensure that subsequent shipments comply with these exceptions.

15. REGULATORY INFORMATION**EPA SARA (Superfund Amendments and Reauthorization Act of 1986) Lists**

CAS #	Hazardous Components (Chemical Name)	S. 302 (EHS)	S. 304 RQ	S. 313 (TRI)
67-56-1	Methanol {Methyl alcohol; Carbinol; Wood alcohol}	No	Yes 5000 LB	Yes
75-09-2	Dichloromethane {Methylene chloride; R-30; Freon 30}	No	Yes 1000 LB	Yes
67-64-1	Acetone {2-Propanone}	No	Yes 5000 LB	No
108-88-3	Toluene {Benzene, Methyl-; Toluol}	No	Yes 1000 LB	Yes
143-18-0	Oleic acid potassium salt	No	No	No

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CAS #	Hazardous Components (Chemical Name)	Other US EPA or State Lists
67-56-1	Methanol {Methyl alcohol; Carbinol; Wood alcohol}	CAA HAP,ODC: HAP: VHAP TSCA: Inventory CA PROP.65: Yes: RDTox.
75-09-2	Dichloromethane {Methylene chloride; R-30; Freon 30}	CAA HAP,ODC: HAP: VHAP CWA NPDES TSCA: Inventory, 8A CAIR CA PROP.65: Yes: Canc.
67-64-1	Acetone {2-Propanone}	TSCA: Inventory
108-88-3	Toluene {Benzene, Methyl-; Toluol}	CAA HAP,ODC: HAP: VHAP CWA NPDES TSCA: Inventory, 8A CAIR CA PROP.65: Yes: RDTox(F)
143-18-0	Oleic acid potassium salt	TSCA: Inventory

Regulatory Information: This product is regulated by the United States Consumer Product Safety Commission and is subject to certain labeling requirements under the Federal Hazardous Substances Act. These requirements differ from the classification criteria and hazard information required for safety data sheets (SDS). The product label also includes other important information, including directions for use, and should always be read in its entirety prior to using the product.

Additional Regulatory Information This chemical/product is not and cannot be distributed in commerce (as defined in TSCA section 3(5)) or processed (as defined in TSCA section 3(13)) for consumer paint or coating removal.

16. OTHER INFORMATION

Revision Date: 05/02/2019

Preparer Name: W.M. Barr EHS Dept (901)775-0100

Additional Information About This Product: No data available.

Company Policy or Disclaimer: The information contained herein is presented in good faith and believed to be accurate as of the effective date shown above. This information is furnished without warranty of any kind. Employers should use this information only as a supplement to other information gathered by them and must make independent determination of suitability and completeness of information from all sources to assure proper use of these materials and the safety and health of employees. Any use of this data and information must be determined by the user to be in accordance with applicable federal, state and local laws and regulations.

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1. PRODUCT AND COMPANY IDENTIFICATION

Product Name: Jasco Fiberglass Paint Remover
Company Name: W. M. Barr
2105 Channel Avenue
Memphis, TN 38113
Phone Number: (901)775-0100
Web site address: www.wmbarr.com
Emergency Contact: 3E 24 Hour Emergency Contact (800)451-8346
Information: W.M. Barr Customer Service (800)398-3892
Intended Use: Paint/Varnish Remover
Product Code: GJFR354
Additional Information: This chemical/product is not and cannot be distributed in commerce (as defined in TSCA section 3(5)) or processed (as defined in TSCA section 3(13)) for consumer paint or coating removal.

2. HAZARDS IDENTIFICATION

Flammable Liquids, Category 2
Acute Toxicity: Oral, Category 4
Acute Toxicity: Skin, Category 4
Acute Toxicity: Inhalation, Category 4
Skin Corrosion/Irritation, Category 1B
Serious Eye Damage/Eye Irritation, Category 2A
Carcinogenicity, Category 1B
Toxic To Reproduction, Category 2
Specific Target Organ Toxicity (single exposure), Category 1
Specific Target Organ Toxicity (repeated exposure), Category 2



GHS Signal Word: Danger

GHS Hazard Phrases: Highly flammable liquid and vapor.
Harmful if swallowed.
Harmful in contact with skin.
Causes severe skin burns and eye damage.
Causes serious eye irritation.
Harmful if inhaled.
May cause cancer state route of exposure if it is conclusively proven that no other routes of exposure cause the hazard.
Suspected of damaging fertility or the unborn child.
Causes damage to organs.
May cause damage to organs through prolonged or repeated exposure.

GHS Precautionary Phrases: Obtain special instructions before use.
Do not handle until all safety precautions have been read and understood.
Keep away from heat/sparks/open flames/hot surfaces. - No smoking.
Keep container tightly closed.
Use explosion-proof electrical/ventilating/lighting equipment.
Use only non-sparking tools.
Take precautionary measures against static discharge.
Do not breathe gas/mist/vapors/spray.
Wash hands thoroughly after handling.
Do not eat, drink or smoke when using this product.

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GHS Response Phrases:

Use only outdoors or in a well-ventilated area.
Wear protective gloves/protective clothing/eye protection/face protection.
Use personal protective equipment as required.
IF SWALLOWED: Call a POISON CENTER or doctor/physician if you feel unwell.
IF ON SKIN: Wash with plenty of soap and water.
IF ON SKIN (or hair): Remove/take off immediately all contaminated clothing. Rinse skin with water/shower.
IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing.
IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
IF exposed: Call a POISON CENTER or doctor/physician.
IF exposed or concerned: Get medical attention/advice.
Immediately call a POISON CENTER or doctor/physician.
Get medical attention/advice if you feel unwell.
Specific treatment see label.
Rinse mouth.
If eye irritation persists, get medical advice/attention.
Wash contaminated clothing before reuse.

GHS Storage and Disposal Phrases:

Store in cool/well-ventilated place.
Store locked up.
Dispose of contents/container according to local, state and federal regulations.

OSHA Regulatory Status:

This material is classified as hazardous under OSHA regulations.

Potential Health Effects (Acute and Chronic):

INHALATION ACUTE EFFECTS:
Vapor harmful. May cause dizziness; headache; watering of eyes; irritation of respiratory tract; nausea; numbness in fingers, arms, and legs; hot flashes; loss of appetite; spotted vision; fatigue; dilation of pupils; increase of carboxyhemoglobin levels, which can cause stress to the cardiovascular system; arm, leg and chest pains; depression of the central nervous system; visual disturbances; giddiness and intoxication; sleepiness; cough and dyspnea; cold, clammy extremities; diarrhea; vomiting; and hallucinations. Severe overexposure may cause irregular or rapid heartbeat; convulsions; unconsciousness; coma; and death. Intentional misuse of this product by deliberately concentrating and inhaling can be harmful or fatal. Elevated carboxyhemoglobin levels can be additive to the increase caused by smoking and other carbon monoxide sources.

SKIN CONTACT ACUTE EFFECTS:

This product is a skin irritant. May be absorbed through the skin. May cause irritation; drying of skin; numbness in fingers and arms; defatting of skin; and dermatitis. May cause symptoms listed under inhalation.

EYE CONTACT ACUTE EFFECTS:

This material is an eye irritant. May cause irritation; burns; conjunctivitis of eyes; and corneal ulcerations of the eye. Vapors may irritate eyes.

INGESTION ACUTE EFFECTS:

POISON. CANNOT BE MADE NON-POISONOUS. May be fatal or cause blindness. May cause dizziness; headache; nausea; vomiting; loss of coordination; stupor; irritation in mouth, throat and stomach; burning sensation in mouth, throat and stomach; gastrointestinal irritation; diarrhea; loss of appetite; depression of the central nervous system; narcosis; liver, kidney and heart damage; coma; and death. May produce symptoms listed under inhalation. Liquid aspirated into lungs, during vomiting,

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may cause chemical pneumonia and systemic effects.

CHRONIC EFFECTS:

Reports have associated repeated and prolonged overexposure to solvents with neurological and other physiological damage. Prolonged or repeated contact may cause dermatitis. Prolonged skin contact may result in absorption of a harmful amount of this material. May cause conjunctivitis; gastric disturbances; insomnia; giddiness; dizziness; headache; weakness; fatigue; nausea; skin irritation; numbness in hands and feet; pancreatic damage; permanent central nervous system changes; decreased response to visual and auditory stimulation; some loss of memory; visual impairment or blindness; hallucinations; changes in blood; blood disorders; kidney and liver damage; heart palpitations; and death. May cause additional symptoms listed under inhalation.

PRIMARY ROUTES OF EXPOSURE:

Inhalation, ingestion, and dermal.

TARGET ORGANS:

Central nervous system, skin, kidney, liver, blood, lungs, respiratory system, and eyes

Medical Conditions Generally Aggravated By Exposure: Diseases of the blood, skin, eyes, liver, kidneys, lungs, cardiovascular system and respiratory system; alcoholism; and rhythm disorders of the heart.

3. COMPOSITION/INFORMATION ON INGREDIENTS

CAS #	Hazardous Components (Chemical Name)	Concentration
108-88-3	Toluene {Benzene, Methyl-, Toluol}	15.0 -40.0 %
75-09-2	Dichloromethane {Methylene chloride; R-30; Freon 30}	10.0 -30.0 %
67-64-1	Acetone {2-Propanone}	10.0 -30.0 %
67-56-1	Methanol {Methyl alcohol; Carbinol; Wood alcohol}	10.0 -20.0 %

Additional Chemical Information Specific percentage of composition is being withheld as a trade secret.

4. FIRST AID MEASURES

Emergency and First Aid Procedures:	INHALATION If user experiences breathing difficulty, move to air free of vapors. Administer oxygen or artificial respiration until medical assistance can be rendered.
	SKIN CONTACT Immediately wash with soap and large quantities of water. Seek medical attention if irritation from contact persists.
	EYE CONTACT Flush with large quantities of water, remove any contact lens, and continue flushing with water for at least 15 minutes, then seek immediate medical attention.
	INGESTION Call your poison control center, hospital emergency room or physician immediately for instructions to induce vomiting.
	Signs and Symptoms Of Exposure: See Potential Health Effects.
Note to Physician:	POISON. THIS PRODUCT CONTAINS METHANOL AND METHYLENE CHLORIDE.

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This product contains methanol which can cause intoxication and central nervous system depression. Methanol is metabolized to formic acid and formaldehyde. These metabolites can cause metabolic acidosis, visual disturbances and blindness. Since metabolism is required for these toxic symptoms, their onset may be delayed from 6 to 30 hours following ingestion. Ethanol competes for the same metabolic pathway and has been used to prevent methanol metabolism. Ethanol administration is indicated in symptomatic patients or at blood methanol concentrations above 20 ug/dl. Methanol is effectively removed by hemodialysis.

5. FIRE FIGHTING MEASURES

	NFPA Class 1B
Flash Pt:	10.00 F Method Used: Setaflash Closed Cup (Rapid Setaflash)
Explosive Limits:	LEL: 1.2 % UEL: 36 %
Autoignition Pt:	No data.
Suitable Extinguishing Media:	Carbon dioxide, dry powder or alcohol resistant foam. Water spray may be used, but may be ineffective at extinguishing the fire.
Unsuitable Extinguishing Media:	None known.
Fire Fighting Instructions:	Self-contained respiratory protection should be provided for fire fighters fighting fires in buildings or confined areas. Storage containers exposed to fire should be kept cool with water spray to prevent pressure build-up. Stay away from heads of containers that have been exposed to intense heat or flame.
Flammable Properties and Hazards:	DANGER! FLAMMABLE. KEEP AWAY FROM HEAT, SPARKS, FLAME AND ALL OTHER SOURCES OF IGNITION. VAPORS MAY CAUSE FLASH FIRE OR IGNITE EXPLOSIVELY. VAPORS MAY TRAVEL LONG DISTANCES TO OTHER AREAS AND ROOMS AWAY FROM WORK SITE. Do not smoke. Extinguish all flames and pilot lights, and turn off stoves, heaters, electric motors and all other sources of ignition anywhere in the structure, dwelling or building during use and until all vapors are gone from the work site and all areas away from the work site. Keep away from electrical outlets and switches. Beware of static electricity that may be generated by synthetic clothing and other sources.
Hazardous Combustion Products:	Carbon monoxide, carbon dioxide, other unburned hydrocarbons and toxic fumes. Incomplete combustion could result in the formation of phosgene.

6. ACCIDENTAL RELEASE MEASURES

Steps To Be Taken In Case Material Is Released Or Spilled:	Keep unnecessary people away; isolate hazard area and deny entry. Stay upwind, out of low areas, and ventilate closed spaces before entering. Shut off ignition sources; keep flares, smoking or flames out of hazard area. Use non-sparking tools. Use proper bonding and grounding procedures. Keep material out of waterways, bodies of water, and sewers. SMALL SPILLS: Take up liquid with sand, earth or other noncombustible absorbent material and place in a plastic container where applicable. LARGE SPILLS: Dike far ahead of spill. If possible collect material for reuse. Collect remainder of material for proper disposal.

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7. HANDLING AND STORAGE

Precautions To Be Taken in Handling: Read carefully all cautions and directions on product label before use. Since empty container retains residue, follow all label warnings even after container is empty. Dispose of empty container according to all regulations. Do not reuse this container.

Avoid breathing of vapors or mist and contact with skin, eyes, and clothing.

A source of clean water should be immediately available for flushing of the eyes and skin should contact occur.

Precautions To Be Taken in Storing: Store in a cool, dry place. Keep container tightly closed. Exposure to high temperatures or prolonged exposure to sun may cause can to leak or swell. Once opened, remover should be used within six months or discarded to avoid can deterioration. Do not store near flames or at elevated temperatures.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

CAS #	Chemical Name	Jurisdiction	Recommended Exposure Limits	Notations
108-88-3	Toluene {Benzene, Methyl-; Toluol}	ACGIH TLV	TLV: 50 ppm	
		OSHA PELs	PEL: 200 ppm STEL: 500 ppm/(10min) CEIL: 300 ppm	
75-09-2	Dichloromethane {Methylene chloride; R-30; Freon 30}	ACGIH TLV	TLV: 50 ppm	
		OSHA PELs	PEL: 25 ppm STEL: 125 ppm (15 min)	
67-64-1	Acetone {2-Propanone}	ACGIH TLV	TLV: 500 ppm STEL: 750 ppm	
		OSHA PELs	PEL: 1000 ppm	
67-56-1	Methanol {Methyl alcohol; Carbinol; Wood alcohol}	ACGIH TLV	TLV: 200 ppm STEL: 250 ppm	
		OSHA PELs	PEL: 200 ppm	

Respiratory Equipment (Specify Type): For OSHA controlled work place and other regular users - Use only with adequate ventilation under engineered air control systems designed to prevent exceeding appropriate TLV. For occasional use, where engineered air control is not feasible, use properly maintained and properly fitted NIOSH approved supplied air respirator or breathing apparatus for chlorinated solvent vapors. A dust mask does not provide protection against vapors.

Eye Protection: Safety glasses, chemical goggles, or face shields are recommended to safeguard against potential eye contact, irritation, or injury. Chemical goggles or face shields are recommended when splashing or spraying of chemical is possible. A faceshield provides more protection to help reduce chemical contact to the face and eyes.

Protective Gloves: Wear gloves with as much resistance to the chemical ingredients as possible. Lamine film gloves offer the best protection. Other glove materials, such as nitrile rubber, will be degraded by methylene chloride, but may provide protection for some amount of time, based on the type of glove and the conditions of use. Consult your glove supplier for additional information. Gloves contaminated with product should be discarded and not reused.

Other Protective Clothing: Various application methods can dictate use of additional protective safety equipment, such as impermeable aprons, etc., to minimize exposure.

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**Engineering Controls
(Ventilation etc.):**

Use only with adequate ventilation to prevent build up of vapors. Do not use in areas where vapors can accumulate and concentrate such as basements, bathrooms, and small enclosed areas. Whenever possible, use outdoors in an open air area. If strong odor is noticed or you experience slight dizziness - STOP - ventilation is not adequate. Leave area immediately. If the work area is not adequately ventilated, do not use this product.

For OSHA controlled workplaces, use process enclosures, local exhaust ventilation, or other engineering controls to control airborne levels below recommended exposure limits.

**Work/Hygienic/Maintenance
Practices:**

Wash hands thoroughly after use and before eating, drinking, or smoking.
Do not eat, drink, or smoke in the work area.

Discard any clothing or other protective equipment that cannot be decontaminated.

Facilities storing or handling this material should be equipped with an emergency eyewash and safety shower.

9. PHYSICAL AND CHEMICAL PROPERTIES

Physical States:	[] Gas [X] Liquid [] Solid
Appearance and Odor:	Solvent odor.
pH:	No data.
Melting Point:	No data.
Boiling Point:	104.00 F - 230.00 F
Flash Pt:	10.00 F Method Used: Setaflash Closed Cup (Rapid Setaflash)
Evaporation Rate:	> 1
Flammability (solid, gas):	No data available.
Explosive Limits:	LEL: 1.2 % UEL: 36 %
Vapor Pressure (vs. Air or mm Hg):	40 mm Hg - (of VOC) at 68.0 F
Vapor Density (vs. Air = 1):	> 1
Specific Gravity (Water = 1):	No data.
Density:	7.451 LB/GL at 77.0 F
Solubility in Water:	Partially
Octanol/Water Partition Coefficient:	No data.
Percent Volatile:	98.0 % by weight.
VOC / Volume:	49.1000 % WT
Autoignition Pt:	No data.
Decomposition Temperature:	No data.
Viscosity:	No data.

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10. STABILITY AND REACTIVITY

Stability:	Unstable [] Stable [X]
Conditions To Avoid -	No data available.
Instability:	
Incompatibility - Materials To Avoid:	Incompatible with strong oxidizing agents; strong caustics; strong alkalis; oxygen; nitrogen peroxide; chemically active metals such as aluminum or magnesium; sodium; potassium; and nitric acid.
Hazardous Decomposition or Byproducts:	Thermal decomposition may produce hydrogen chloride; chlorine gas; small quantities of phosgene; carbon monoxide; carbon dioxide; formaldehyde; and unidentified organic compounds in black smoke.
Possibility of Hazardous Reactions:	Will occur [] Will not occur [X]
Conditions To Avoid - Hazardous Reactions:	No data available.

11. TOXICOLOGICAL INFORMATION

Toxicological Information:	This product has not been tested as a whole. Refer to section 2 for acute and chronic effects. CAS# 108-88-3: Reproductive Effects:, TCLo, Inhalation, Rat, 800.0 MG/M3, 6 H, female 14-20 day(s) after conception. Result: Effects on Embryo or Fetus: Fetotoxicity (except death, e.g., stunted fetus). Effects on Newborn: Behavioral. - Brazilian Journal of Medical and Biological Research., Vol/p/yr: 23,533, 1990 Standard Draize Test, Eyes, Species: Rabbit, 2.000 MG, 24 H, Severe. Result: Effects on Embryo or Fetus: Other effects to embryo. Specific Developmental Abnormalities: Eye, ear. - Prehled Prumyslove Toxikologie, Marhold, J., Organicke Latky, Prague Czechoslovakia, Vol/p/yr: -,29, 1986 CAS# 75-09-2: Tumorigenic Effects:, TCLo, Inhalation, Rat, 3500. PPM, 6 Y. Result: Tumorigenic: Carcinogenic by RTECS criteria. Endocrine: Tumors. - Fundamental and Applied Toxicology., Academic Press, Inc., 1 E. First St., Duluth, MN 55802, Vol/p/yr: 4,30, 1984 Standard Draize Test, Eyes, Species: Rabbit, 100.0 MG, Severe. Result: Effects on Newborn: Growth statistics (e.g., reduced weight gain). Effects on Newborn: Physical. - Union Carbide Data Sheet, Union Carbide Corp., 39 Old Ridgebury Rd., Danbury, CT 06817, Vol/p/yr: 4/25, 1958

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Standard Draize Test, Skin, Species: Rabbit, 810.0 MG, 24 H, Severe.

Result:

Specific Developmental Abnormalities: Musculoskeletal system.

- European Journal of Toxicology and Environmental Hygiene., For publisher information, see TOERD9, Paris France, Vol/p/yr: 9,171, 1976

CAS# 67-64-1:

Standard Draize Test, Eyes, Species: Rabbit, 20.00 MG, Severe.

Result:

Behavioral: Change in motor activity (specific assay).

Behavioral: Alteration of classical conditioning.

- American Journal of Ophthalmology., Ophthalmic Pub. Co., 435 N. Michigan Ave., Suite 1415, Chicago, IL 60611, Vol/p/yr: 29,1363, 1946

Carcinogenicity/Other Information:

IARC 2B - Possibly Carcinogenic to Humans

IARC 3: Not Classifiable as to Carcinogenicity in Humans.

ACGIH A3 - Confirmed Animal Carcinogen with Unknown Relevance to Humans

ACGIH A4 - Not Classifiable as a Human Carcinogen.

CAS #	Hazardous Components (Chemical Name)	NTP	IARC	ACGIH	OSHA
108-88-3	Toluene {Benzene, Methyl-, Toluol}	n.a.	3	A4	n.a.
75-09-2	Dichloromethane {Methylene chloride; R-30; Freon 30}	Possible	2B	A3	Yes
67-64-1	Acetone {2-Propanone}	n.a.	n.a.	A4	n.a.
67-56-1	Methanol {Methyl alcohol; Carbinol; Wood alcohol}	n.a.	n.a.	n.a.	n.a.

12. ECOLOGICAL INFORMATION

General Ecological Information:

No information available for this product as a whole.

13. DISPOSAL CONSIDERATIONS

Waste Disposal Method:

Dispose of in accordance with local, state, and federal laws.

Do not place material in general trash.

Do not allow material to enter bodies of water or sewers.

14. TRANSPORT INFORMATION

LAND TRANSPORT (US DOT):

DOT Proper Shipping Name: Paint Related Material

DOT Hazard Class: 3 FLAMMABLE LIQUID

UN/NA Number: UN1263

Packing Group: II



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Additional Transport Information: The supplier may apply one of the following exceptions: Combustible Liquid, Consumer Commodity, Limited Quantity, Viscous Liquid, Does Not Sustain Combustion, or others, as allowed under 49CFR Hazmat Regulations. Please consult 49CFR Subchapter C to ensure that subsequent shipments comply with these exceptions.

15. REGULATORY INFORMATION

EPA SARA (Superfund Amendments and Reauthorization Act of 1986) Lists

CAS #	Hazardous Components (Chemical Name)	S. 302 (EHS)	S. 304 RQ	S. 313 (TRI)
108-88-3	Toluene {Benzene, Methyl-; Toluol}	No	Yes 1000 LB	Yes
75-09-2	Dichloromethane {Methylene chloride; R-30; Freon 30}	No	Yes 1000 LB	Yes
67-64-1	Acetone {2-Propanone}	No	Yes 5000 LB	No
67-56-1	Methanol {Methyl alcohol; Carbinol; Wood alcohol}	No	Yes 5000 LB	Yes

CAS #	Hazardous Components (Chemical Name)	Other US EPA or State Lists
108-88-3	Toluene {Benzene, Methyl-; Toluol}	CAA HAP,ODC: HAP: VHAP CWA NPDES TSCA: Inventory, 8A CAIR CA PROP.65: Yes: RDTox(F)
75-09-2	Dichloromethane {Methylene chloride; R-30; Freon 30}	CAA HAP,ODC: HAP: VHAP CWA NPDES TSCA: Inventory, 8A CAIR CA PROP.65: Yes: Canc.
67-64-1	Acetone {2-Propanone}	TSCA: Inventory
67-56-1	Methanol {Methyl alcohol; Carbinol; Wood alcohol}	CAA HAP,ODC: HAP: VHAP TSCA: Inventory CA PROP.65: Yes: RDTox.

Regulatory Information: This product is regulated by the United States Consumer Product Safety Commission and is subject to certain labeling requirements under the Federal Hazardous Substances Act. These requirements differ from the classification criteria and hazard information required for safety data sheets (SDS). The product label also includes other important information, including directions for use, and should always be read in its entirety prior to using the product.

Additional Regulatory Information This chemical/product is not and cannot be distributed in commerce (as defined in TSCA section 3(5)) or processed (as defined in TSCA section 3(13)) for consumer paint or coating removal.

16. OTHER INFORMATION

Revision Date: 05/01/2019
Preparer Name: W.M. Barr EHS Dept (901)775-0100

Additional Information About This Product: No data available.

Company Policy or Disclaimer: The information contained herein is presented in good faith and believed to be accurate as of the effective date shown above. This information is furnished without warranty of any kind. Employers should use this information only as a supplement to other information gathered by them and must make independent determination of suitability and completeness of information from all sources to assure proper use of these materials and the safety and health of employees. Any use of this data and information

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Jasco Fiberglass Paint Remover

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must be determined by the user to be in accordance with applicable federal, state and local laws and regulations.

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Jasco Premium Paint and Epoxy Remover

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Supersedes Revision: 03/08/2015

1. PRODUCT AND COMPANY IDENTIFICATION

Product Name:	Jasco Premium Paint and Epoxy Remover	
Company Name:	W. M. Barr 2105 Channel Avenue Memphis, TN 38113	Phone Number: (901)775-0100
Web site address:	www.wmbarr.com	
Emergency Contact:	3E 24 Hour Emergency Contact	(800)451-8346
Information:	W.M. Barr Customer Service	(800)398-3892
Intended Use:	Removal of adhesives, mastics, & contact cement from wood, concrete, metal and masonry.	
Synonyms:	QJBP00202, CJPBP00204, GJPBP00203, PJPBP02011	

2. HAZARDS IDENTIFICATION

Acute Toxicity: Oral, Category 4
Acute Toxicity: Skin, Category 4
Acute Toxicity: Inhalation, Category 4
Skin Corrosion/Irritation, Category 1A-1C
Serious Eye Damage/Eye Irritation, Category 2A
Carcinogenicity, Category 1B
Specific Target Organ Toxicity (single exposure), Category 1



GHS Signal Word: Danger

GHS Hazard Phrases:

- H302: Harmful if swallowed.
- H312: Harmful in contact with skin.
- H314: Causes severe skin burns and eye damage.
- H319: Causes serious eye irritation.
- H332: Harmful if inhaled.
- H350: May cause cancer.
- H370: Causes damage to organs.

GHS Precaution Phrases:

- P201: Obtain special instructions before use.
- P202: Do not handle until all safety precautions have been read and understood.
- P260: Do not breathe gas/mist/vapors/spray.
- P264: Wash hands thoroughly after handling.
- P270: Do not eat, drink or smoke when using this product.
- P271: Use only outdoors or in a well-ventilated area.
- P280: Wear {protective gloves/protective clothing/eye protection/face protection}.

GHS Response Phrases:

- P301+312: IF SWALLOWED: Call a POISON CENTER or doctor/physician if you feel unwell.
- P302+352: IF ON SKIN: Wash with plenty of soap and water.
- P303+361+353: IF ON SKIN (or hair): Remove/take off immediately all contaminated clothing. Rinse skin with water/shower.
- P304+340: IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing.
- P305+351+338: IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
- P307+311: IF exposed: Call a POISON CENTER or doctor/physician.
- P308+313: IF exposed or concerned: Get medical attention/advice.
- P310: Immediately call a POISON CENTER or doctor/physician.

Jasco Premium Paint and Epoxy Remover

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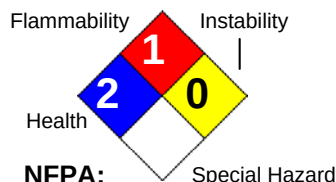
Supersedes Revision: 03/08/2015

GHS Storage and Disposal Phrases:

P321: Specific treatment see label.
 P322: Specific measures see label.
 P330: Rinse mouth.
 P337+313: If eye irritation persists, get medical advice/attention.
 P363: Wash contaminated clothing before reuse.
 P405: Store locked up.
 P501: Dispose of contents/container according to local, state and federal regulations.

Hazard Rating System:

HEALTH	*	2
FLAMMABILITY		1
PHYSICAL		0
PPE		X

HMIS:**OSHA Regulatory Status:**

This material is classified as hazardous under OSHA regulations.

Potential Health Effects (Acute and Chronic):**INHALATION ACUTE EXPOSURE EFFECTS:**

Vapor harmful. May cause upper respiratory tract irritation and central nervous system depression with symptoms such as confusion, lightheadedness, nausea, vomiting, headache, drowsiness, and fatigue. Mist or vapor can irritate the throat and lungs. Causes formation of carbon monoxide in blood which may affect the cardiovascular system and central nervous system. Continued exposure may cause unconsciousness and even death. Intentional misuse of this product by deliberately concentrating and inhaling the vapors can be harmful or fatal. Concurrent exposure to carbon monoxide, smoking, and physical activity may increase the level of carboxyhemoglobin levels in the blood resulting in additive effects.

SKIN CONTACT ACUTE EXPOSURE EFFECTS:

This product is a skin irritant. Product may be absorbed through the skin. Harmful if absorbed through the skin. Effects may range from mild irritation to severe pain, and possibly burns, depending on the intensity of contact. Prolonged or repeated contact may dry the skin and cause irritation. Symptoms include redness, itching, burning, drying and cracking of the skin, and skin burns.

EYE CONTACT ACUTE EXPOSURE EFFECTS:

This material is an eye irritant. Vapors may irritate the eyes. Contact may cause tearing, redness, a stinging or burning feeling, swelling, and blurred vision.

INGESTION ACUTE EXPOSURE EFFECTS:

Poison. May be fatal or cause blindness if swallowed. May cause nausea or vomiting. Aspiration hazard. This material may be aspirated into the lungs during vomiting. If vomiting results in aspiration, chemical pneumonia could occur. It can be readily absorbed by the stomach and intestinal tract. Absorption through the gastrointestinal tract may produce central nervous system depression and systemic effects. Swallowing this material may irritate the mucous membranes of the mouth, throat, and esophagus. May cause cyanosis (blue coloring of the skin and nails from lack of oxygen).

CHRONIC EXPOSURE EFFECTS:

Reports have associated repeated and prolonged overexposure to solvents with neurological and other physiological damage. Prolonged skin contact may cause irritation, redness, swelling and possible tissue destruction. Prolonged or repeated contact may cause dermatitis. Prolonged skin contact may result in absorption of a harmful amount of this material. May cause liver damage. May cause cancer based on animal data (see Section 11. Toxicological Information).

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Target Organs:

Blood, central nervous system, liver, skin, cardiovascular system, eyes, respiratory system, lungs.

Medical Conditions Generally Aggravated By Exposure:

Heart of cardiovascular disorders, kidney disorders, liver disorders, central nervous system disorders, respiratory system (including asthma and other breathing disorders), skin disorders and allergies.

Alcohol may enhance the toxic effects of methylene chloride exposure. May cross the placenta. May be excreted in breast milk.

3. COMPOSITION/INFORMATION ON INGREDIENTS

CAS #	Hazardous Components (Chemical Name)	Concentration	RTECS #
75-09-2	Dichloromethane {Methylene chloride; R-30; Freon 30}	60.0 -100.0 %	PA8050000
67-56-1	Methanol {Methyl alcohol; Carbinol; Wood alcohol}	10.0 -20.0 %	PC1400000
64742-47-8	Hydrotreated light distillate (petroleum)	< 5.0 %	OA5504000

Additional Chemical Information

Specific percentage of composition is being withheld as a trade secret.

4. FIRST AID MEASURES

Emergency and First Aid Procedures:

INHALATION:

If user experiences breathing difficulty, move to air free of vapors. Administer oxygen or artificial respiration until medical assistance can be rendered.

SKIN CONTACT:

Wash with soap and large quantities of water and seek medical attention if irritation from contact persists.

EYE CONTACT:

Immediately flush with water, remove any contact lens, continue flushing with water for at least 15 minutes, then get medical attention immediately.

INGESTION:

Do not induce vomiting, unless directed to by medical personnel. Call your poison control center, hospital, emergency room, or physician immediately for instructions. Do not give anything by mouth to an unconscious person.

Signs and Symptoms Of Exposure:

See Potential Health Effects.

Note to Physician:

This product contains methylene chloride and methanol.

This product contains methanol which can cause intoxication and central nervous system depression. Methanol is metabolized to formic acid and formaldehyde. These metabolites can cause metabolic acidosis, visual disturbances and blindness. Since metabolism is required for these toxic symptoms, their onset may be delayed from 6 to 30 hours following ingestion. Ethanol competes for the same metabolic pathway and has been used to prevent methanol metabolism. Ethanol administration is indicated in symptomatic patients or at blood methanol concentrations above 20 ug/dl. Methanol is effectively removed by hemodialysis.

This material sensitizes the heart to the effects of sympathomimetic amines.

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Epinephrine and other sympathomimetic drugs may initiate cardiac arrhythmia in individuals exposed to this material. This material is metabolized to carbon monoxide. Consequently, elevations in carboxyhemoglobin as high as 50% have been reported, and levels may continue to rise for several hours after exposure has ceased. Data in experimental animals suggest there is a narrow margin between concentrations causing anesthesia and death. Adrenalin should never be given to a person overexposed to methylene chloride.

5. FIRE FIGHTING MEASURES

Flash Pt:	NP
Explosive Limits:	LEL: No data. UEL: No data.
Autoignition Pt:	No data.
Suitable Extinguishing Media:	Use carbon dioxide, dry powder, water spray, or foam.
Unsuitable Extinguishing Media:	None known.
Fire Fighting Instructions:	Self-contained respiratory protection should be provided for fire fighters fighting fires in buildings or confined areas. Storage containers exposed to fire should be kept cool with water spray to prevent pressure build-up. Stay away from heads of containers that have been exposed to intense heat or flame.
Flammable Properties and Hazards:	No flash to boil. Contact of liquid or vapor with flame or hot surfaces will produce toxic gases and a corrosive residue that will cause deterioration of metal. Vapors are heavier than air and will tend to collect in low areas.

6. ACCIDENTAL RELEASE MEASURES

Steps To Be Taken In Case Material Is Released Or Spilled:	Isolate the immediate area. Prevent unauthorized entry. Eliminate all sources of ignition in area and downwind of the spill area. Stay upwind, out of low areas, and ventilate closed spaces before entering. All equipment used when handling this product must be grounded or non-sparking. Do not touch or walk through spilled material. Stop leak if you can do so without risk. Prevent entry into waterways, sewers, or confined areas. A vapor suppressing foam may be used to reduce vapors. Absorb or cover with dry earth, sand, or other non-combustible material and transfer to compatible containers.

7. HANDLING AND STORAGE

Precautions To Be Taken in Handling:	Read carefully all cautions and directions on product label before use. Since empty container retains residue, follow all label warnings even after container is empty. Dispose of empty container according to all regulations. Do not reuse this container. Avoid contact with eyes, skin, and clothing. Wash thoroughly after handling. A source of clean water should be kept in the immediate work area for flushing of the eyes and skin. Keep away from heat, sparks, flame, and any other source of ignition. Do not smoke when anywhere near this material. Ground and bond containers when transferring material. Do not use in confined spaces, basements, bathrooms, etc, where vapors can build up and explode if ignited by an ignition source.

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Vapors are heavier than air and will collect in low areas.

Precautions To Be Taken in Storing:

Store in a cool place in original container and protect from sunlight. Exposure to high temperatures or prolonged exposure to sun may cause can to leak or swell. Once opened, remover should be used within six months or properly disposed of to avoid can deterioration. Do not store near flames or at elevated temperatures.

Keep container tightly closed when not in use.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

CAS #	Partial Chemical Name	OSHA TWA	ACGIH TWA	Other Limits
75-09-2	Dichloromethane {Methylene chloride; R-30; Freon 30}	PEL: 25 ppm STEL: 125 ppm (15 min)	TLV: 50 ppm	No data.
67-56-1	Methanol {Methyl alcohol; Carbinol; Wood alcohol}	PEL: 200 ppm	TLV: 200 ppm STEL: 250 ppm	No data.
64742-47-8	Hydrotreated light distillate (petroleum)	No data.	TLV: 200 mg/m3	No data.

Respiratory Equipment (Specify Type):

For use in areas with inadequate ventilation or fresh air, wear a properly maintained and properly fitted NIOSH approved self-contained breathing apparatus or powered air supply respirator or loose fitting hood.

For OSHA controlled work places and other regular users - Use only with adequate ventilation under engineered air control systems designed to prevent exceeding the appropriate TLV.

A dust mask does not provide protection against vapors.

Eye Protection:

Chemical goggles or face shields are recommended to safeguard against potential eye contact, irritation, or injury. Chemical goggles or face shields are recommended when splashing or spraying of chemical is possible. A faceshield provides more protection to help reduce chemical contact to the face and eyes.

Protective Gloves:

Wear gloves with as much resistance to the chemical ingredients as possible. Laminate film gloves offer the best protection. Other glove materials, such as nitrile rubber, neoprene, and PVC will be degraded by methylene chloride, but may provide protection for some amount of time, based on the type of glove and the conditions of use. Consult your glove supplier for additional information. Gloves contaminated with product should be discarded and not reused.

Other Protective Clothing:

Various application methods can dictate use of additional protective safety equipment, such as impermeable aprons, etc., to minimize exposure.

Engineering Controls (Ventilation etc.):

Use only with adequate ventilation to prevent buildup of vapors. If work area is not well ventilated, do not use this product. Do not use in areas where vapors can accumulate and concentrate, such as basements, bathrooms or small enclosed areas.

Whenever possible, use outdoors in an open air area. If using indoors open all windows and doors and maintain a cross ventilation of moving fresh air across the work area. If strong odor is noticed or you experience slight dizziness, headache, nausea or eye-watering -- STOP -- ventilation is inadequate. Leave area immediately and move to fresh air.

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Work/Hygienic/Maintenance Practices:

Use process enclosures, local exhaust ventilation, or other engineering controls to control airborne levels below recommended exposure limits.

A source of clean water should be available in the work area for flushing of the eyes and skin.

Wash hands thoroughly after use.

Do not eat, drink, or smoke in the work area.

Before reuse, thoroughly clean any clothing or protective equipment that has been contaminated by prior use.

Discard any clothing or other protective equipment that cannot be decontaminated, such as gloves or shoes.

9. PHYSICAL AND CHEMICAL PROPERTIES

Physical States: [] Gas [X] Liquid [] Solid

Appearance and Odor: Viscous opaque to clear

Melting Point: No data.

Boiling Point: No data.

Autoignition Pt: No data.

Flash Pt: NP

Explosive Limits: LEL: No data. UEL: No data.

Specific Gravity (Water = 1): 1.138

Density: 9.2 - 9.5

Vapor Pressure (vs. Air or mm Hg): No data.

Vapor Density (vs. Air = 1): > 1

Evaporation Rate: < 1

Solubility in Water: Slight

pH: 10.0 - 10.5

Percent Volatile: 97.33 % by weight.

VOC / Volume: 22.7000 % WT

10. STABILITY AND REACTIVITY

Stability: Unstable [] Stable [X]

Conditions To Avoid - Instability: No data available.

Incompatibility - Materials To Avoid: Incompatible with strong oxidizing agents; bases; strong caustics; strong acids; oxygen; nitrogen peroxide; reactive metals such as aluminum and magnesium; sodium; potassium; and nitric acid.

Hazardous Decomposition Or Byproducts: Decomposition may produce carbon monoxide and carbon dioxide, hydrogen chloride, chlorine gas, and small quantities of phosgene.

Possibility of Hazardous Reactions: Will occur [] Will not occur [X]

Conditions To Avoid - Hazardous Reactions: No data available.

11. TOXICOLOGICAL INFORMATION

Toxicological Information: No information available for this product as a whole. Refer to section 2 for acute and chronic effects.

Carcinogenicity/Other Information:

CAS# 75-09-2:
Tumorigenic Effects:, TCLo, Inhalation, Rat, 3500. PPM, 6 Y.
Result:
Tumorigenic: Carcinogenic by RTECS criteria.
Endocrine: Tumors.
- Fundamental and Applied Toxicology., Academic Press, Inc., 1 E. First St., Duluth, MN 55802, Vol/p/yr: 4,30, 1984

Standard Draize Test, Eyes, Species: Rabbit, 100.0 MG, Severe.
Result:
Effects on Newborn: Growth statistics (e.g., reduced weight gain).
Effects on Newborn: Physical.
- Union Carbide Data Sheet, Union Carbide Corp., 39 Old Ridgebury Rd., Danbury, CT 06817, Vol/p/yr: 4/25, 1958

Standard Draize Test, Skin, Species: Rabbit, 810.0 MG, 24 H, Severe.
Result:
Specific Developmental Abnormalities: Musculoskeletal system.
- European Journal of Toxicology and Environmental Hygiene., For publisher information, see TOERD9, Paris France, Vol/p/yr: 9,171, 1976

IARC 2B - Possibly Carcinogenic to Humans
ACGIH A3 - Confirmed Animal Carcinogen with Unknown Relevance to Humans

CAS #	Hazardous Components (Chemical Name)	NTP	IARC	ACGIH	OSHA
75-09-2	Dichloromethane {Methylene chloride; R-30; Freon 30}	Possible	2B	A3	Yes
67-56-1	Methanol {Methyl alcohol; Carbinol; Wood alcohol}	n.a.	n.a.	n.a.	n.a.
64742-47-8	Hydrotreated light distillate (petroleum)	n.a.	n.a.	A4	n.a.

12. ECOLOGICAL INFORMATION

General Ecological Information: No information available for this product as a whole.

13. DISPOSAL CONSIDERATIONS

Waste Disposal Method: Dispose in accordance with applicable local, state, and federal regulations.

Keep out of bodies of water.

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14. TRANSPORT INFORMATION

LAND TRANSPORT (US DOT):

DOT Proper Shipping Name: Consumer commodity
DOT Hazard Class: ORM-D None
UN/NA Number: None

AIR TRANSPORT (ICAO/IATA):

ICAO/IATA Shipping Name: Paint [or] Paint related material
UN Number: 3066 **Packing Group:** II
Hazard Class: 8 - CORROSIVE

Additional Transport Information: The supplier may apply one of the following exceptions: Combustible Liquid, Consumer Commodity, Limited Quantity, Viscous Liquid, Does Not Sustain Combustion, or others, as allowed under 49CFR Hazmat Regulations. Please consult 49CFR Subchapter C to ensure that subsequent shipments comply with these exceptions.

15. REGULATORY INFORMATION

EPA SARA (Superfund Amendments and Reauthorization Act of 1986) Lists

CAS #	Hazardous Components (Chemical Name)	S. 302 (EHS)	S. 304 RQ	S. 313 (TRI)
75-09-2	Dichloromethane {Methylene chloride; R-30; Freon 30}	No	Yes 1000 LB	Yes
67-56-1	Methanol {Methyl alcohol; Carbinol; Wood alcohol}	No	Yes 5000 LB	Yes
64742-47-8	Hydrotreated light distillate (petroleum)	No	No	No

This material meets the EPA ☒ Yes ☐ No Acute (immediate) Health Hazard
'Hazard Categories' defined ☒ Yes ☐ No Chronic (delayed) Health Hazard
for SARA Title III Sections ☐ Yes ☒ No Fire Hazard
311/312 as indicated: ☐ Yes ☒ No Sudden Release of Pressure Hazard
 ☐ Yes ☒ No Reactive Hazard

CAS #	Hazardous Components (Chemical Name)	Other US EPA or State Lists
75-09-2	Dichloromethane {Methylene chloride; R-30; Freon 30}	CAA HAP,ODC: HAP; CWA NPDES: Yes; TSCA: Yes - Inventory, 8A CAIR; CA PROP.65: Yes
67-56-1	Methanol {Methyl alcohol; Carbinol; Wood alcohol}	CAA HAP,ODC: HAP; CWA NPDES: No; TSCA: Yes - Inventory; CA PROP.65: Yes
64742-47-8	Hydrotreated light distillate (petroleum)	CAA HAP,ODC: No; CWA NPDES: No; TSCA: Yes - Inventory; CA PROP.65: No

Regulatory Information:

16. OTHER INFORMATION

Revision Date: 03/25/2015
Preparer Name: W.M. Barr EHS Dept (901)775-0100

Additional Information About No data available.

This Product:

Company Policy or Disclaimer: The information contained herein is presented in good faith and believed to be accurate as of the effective date shown above. This information is furnished without warranty of any kind. Employers should use this information only as a supplement to other information gathered by them and must make independent determination of suitability

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Jasco Premium Paint and Epoxy Remover

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and completeness of information from all sources to assure proper use of these materials and the safety and health of employees. Any use of this data and information must be determined by the user to be in accordance with applicable federal, state and local laws and regulations.

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Supersedes Revision: 06/12/2015

1. PRODUCT AND COMPANY IDENTIFICATION

Product Name: Jasco Premium Remover

Company Name: W. M. Barr
2105 Channel Avenue
Memphis, TN 38113

Phone Number: (901)775-0100

Web site address: www.wmbarr.com

Emergency Contact: 3E 24 Hour Emergency Contact (800)451-8346
Information: W.M. Barr Customer Service (800)398-3892

Intended Use: Paint/Varnish Remover

Product Code: EJP00206

Additional Information: This chemical/product is not and cannot be distributed in commerce (as defined in TSCA section 3(5)) or processed (as defined in TSCA section 3(13)) for consumer paint or coating removal.

2. HAZARDS IDENTIFICATION

Gas Under Pressure, Liquefied gas
Acute Toxicity: Inhalation, Category 4
Skin Corrosion/Irritation, Category 2
Serious Eye Damage/Eye Irritation, Category 1
Carcinogenicity, Category 1B
Specific Target Organ Toxicity (single exposure), Category 1
Simple Asphyxiant



GHS Signal Word: Danger

GHS Hazard Phrases: Containers gas under pressure; may explode if heated.
Causes skin irritation.
Causes serious eye damage.
Harmful if inhaled.
May cause cancer.
Causes damage to organs.

GHS Precautionary Phrases: Obtain special instructions before use.
Do not handle until all safety precautions have been read and understood.
Do not breathe gas/mist/vapors/spray.
Wash hands thoroughly after handling.
Do not eat, drink or smoke when using this product.
Use only outdoors or in a well-ventilated area.
Wear protective gloves/protective clothing/eye protection/face protection.

GHS Response Phrases: IF ON SKIN: Wash with plenty of soap and water.
IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing.
IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
IF exposed: Call a POISON CENTER or doctor/physician.
IF exposed or concerned: Get medical attention/advice.
Immediately call a POISON CENTER or doctor/physician.
Specific treatment see label.
If skin irritation occurs, get medical advice/attention.
Take off contaminated clothing and wash before re-use.

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GHS Storage and Disposal Phrases:

Store locked up.
Protect from sunlight and store in well-ventilated place.
Dispose of contents/container according to local, state and federal regulations.

OSHA Regulatory Status:

This material is classified as hazardous under OSHA regulations.

Potential Health Effects (Acute and Chronic):

INHALATION ACUTE EXPOSURE EFFECTS:

Vapor harmful. May cause dizziness; headache; burns and severe irritation to the respiratory tract; injuries to mucous membranes; watering of the eyes; weakness; drowsiness; nausea; numbness in fingers, arms, and legs; hot flashes; depression of the central nervous system; spotted vision; fatigue; dilation of pupils; increase in carboxyhemoglobin levels, which can cause stress to the cardiovascular system; arm, leg and chest pains; eye irritation; giddiness and intoxication; narcosis; anesthesia; confusion; olfactory changes; vomiting; visual disturbances; sleepiness; cough and dyspnea; cold, clammy extremities; diarrhea; irregular or rapid heartbeat; liver and kidney damage; unconsciousness; coma; and death. Severe overexposure may cause irregular or rapid heartbeat, convulsions, unconsciousness, and death. Intentional misuse of this product by deliberately concentrating and inhaling the vapors can be harmful or fatal. Elevated carboxyhemoglobin levels can be additive to the increase caused by smoking and other carbon monoxide sources. The propellant used in this product is a simple asphyxiant.

SKIN CONTACT ACUTE EXPOSURE EFFECTS:

This product is a skin irritant. Product may be absorbed through the skin. Harmful if absorbed through the skin. May cause itching; irritation; redness; defatting of the skin; drying of the skin; inflammation; discomfort or pain; swelling; dermatitis; and tissue damage. May cause symptoms listed under inhalation and ingestion. May increase the severity of symptoms listed under inhalation.

EYE CONTACT ACUTE EXPOSURE EFFECTS:

This material is an eye irritant. May cause irritation, burns, temporary corneal injury, redness, tearing, blurred vision, conjunctivitis of eyes, and corneal ulcerations of the eye. Vapors may irritate the eyes.

INGESTION ACUTE EXPOSURE EFFECTS:

Harmful if swallowed. May cause nausea; irritation to mouth, throat and stomach; loss of coordination; stupor; drowsiness; vomiting; depression of the central nervous system; narcosis; diarrhea; liver, kidney and heart damage; unconsciousness; and death. May produce symptoms listed under inhalation. Liquid aspirated into lungs may cause chemical pneumonitis and systemic effects.

CHRONIC EXPOSURE EFFECTS:

Reports have associated repeated and prolonged overexposure to solvents with neurological and other physiological damage. Prolonged skin contact may cause irritation, redness, swelling and possible tissue destruction. Prolonged or repeated contact may cause dermatitis. Prolonged skin contact may result in absorption of a harmful amount of this material. May cause headaches; conjunctivitis; skin irritation; pancreatic damage; permanent central nervous system changes; gastric disturbances; giddiness; insomnia; decreased response to visual and auditory stimulation; visual impairment or blindness; hallucinations; changes in blood; blood disorders; kidney damage; eye irritation; brain damage; hallucinations; liver damage, and death. May cause additional symptoms listed under inhalation.

Medical Conditions Generally Aggravated By Exposure:

Diseases of the blood, skin, eyes, liver, kidneys, lungs, cardiovascular system and respiratory system; alcoholism and rhythm disorders of the heart.

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Jasco Premium Remover

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3. COMPOSITION/INFORMATION ON INGREDIENTS

CAS #	Hazardous Components (Chemical Name)	Concentration
75-09-2	Dichloromethane {Methylene chloride; R-30; Freon 30}	70.0 -95.0 %
67-56-1	Methanol {Methyl alcohol; Carbinol; Wood alcohol}	< 5.0 %
127087-87-0	Poly(oxy-1,2-ethanediyl),.alpha.-(4-nonylphenyl)-.omega.-hydroxy-,branched	< 5.0 %
124-38-9	Carbon dioxide	< 5.0 %

Additional Chemical Information

Specific percentage of composition is being withheld as a trade secret.

4. FIRST AID MEASURES

Emergency and First Aid Procedures:

INHALATION:

If user experiences breathing difficulty, move to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical attention.

SKIN CONTACT:

Wash with soap and water. Get medical attention if irritation from contact persists.

EYE CONTACT:

Immediately flush eyes with water, remove any contact lens, continue flushing with water for at least 15 minutes. Get medical attention.

INGESTION:

Call your poison control center, hospital emergency room, or physician immediately for instructions.

Signs and Symptoms Of Exposure:

See Potential Health Effects.

Note to Physician:

This product contains methylene chloride and methanol.

This product contains methanol which can cause intoxication and central nervous system depression. Methanol is metabolized to formic acid and formaldehyde. These metabolites can cause metabolic acidosis, visual disturbances and blindness. Since metabolism is required for these toxic symptoms, their onset may be delayed from 6 to 30 hours following ingestion. Ethanol competes for the same metabolic pathway and has been used to prevent methanol metabolism. Ethanol administration is indicated in symptomatic patients or at blood methanol concentrations above 20 ug/dl. Methanol is effectively removed by hemodialysis. Adrenalin should never be given to a person overexposed to methylene chloride.

This material sensitizes the heart to the effects of sympathomimetic amines. Epinephrine and other sympathomimetic drugs may initiate cardiac arrhythmias in individuals exposed to this material. This material is metabolized to carbon monoxide. Consequently, elevations in carboxyhemoglobin as high as 50% have been reported, and levels may continue to rise for several hours after exposure has ceased. Data in experimental animals suggest there is a narrow margin between concentrations causing anesthesia and death.

5. FIRE FIGHTING MEASURES

Flash Pt:	No data.
Explosive Limits:	LEL: No data. UEL: No data.
Autoignition Pt:	No data.
Suitable Extinguishing Media:	Use carbon dioxide, dry powder, or foam.
Fire Fighting Instructions:	Self-contained respiratory protection should be provided for fire fighters fighting fires in buildings or confined areas. Storage containers exposed to fire should be kept cool with water spray to prevent pressure build-up. Stay away from heads of containers that have been exposed to intense heat or flame.
Flammable Properties and Hazards:	Aerosol Flammability Classification according to ASTM D-3065-77 and FHSA 1500.45. CPSC FLAMMABILITY: Non-Flammable Aerosol - Level 1 Propellant: Carbon Dioxide Contents under pressure. Do not puncture, incinerate or store above 120 degrees F. Exposure to heat or prolonged exposure to sun may cause bursting. Contact of liquid or vapor with flame or hot surfaces will produce toxic gases and a corrosive residue that will cause deterioration of metal. Flashpoint of liquid only: No flash to boiling ~104 F
Hazardous Combustion Products:	Combustion may produce carbon monoxide and carbon dioxide.

6. ACCIDENTAL RELEASE MEASURES

Steps To Be Taken In Case Material Is Released Or Spilled:	Keep unnecessary people away; isolate hazard area and deny entry. Stay upwind, out of low areas, and ventilate closed spaces before entering. Shut off ignition sources; keep flares, smoking or flames out of hazard area. Small Spills: take up liquid with sand, earth or other noncombustible absorbent material and place in a plastic container where applicable. Large Spills: dike far ahead of spill for later disposal.

7. HANDLING AND STORAGE

Precautions To Be Taken in Handling:	Read carefully all cautions and directions on product label before use. Since empty container retains residue, follow all label warnings even after container is empty. Dispose of empty container according to all regulations. Do not reuse this container.
Precautions To Be Taken in Storing:	Store in a cool place and protect from sunlight. Exposure to high temperatures or prolonged exposure to sun may cause can to leak or swell. Do not store near flames or at elevated temperatures. Replace overcap on container after each use.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

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CAS #	Chemical Name	Jurisdiction	Recommended Exposure Limits	Notations
75-09-2	Dichloromethane {Methylene chloride; R-30; Freon 30}	ACGIH TLV OSHA PELs	TLV: 50 ppm PEL: 25 ppm STEL: 125 ppm (15 min)	
67-56-1	Methanol {Methyl alcohol; Carbinol; Wood alcohol}	ACGIH TLV OSHA PELs	TLV: 200 ppm STEL: 250 ppm PEL: 200 ppm	
124-38-9	Carbon dioxide	ACGIH TLV OSHA PELs	TLV: 5000 ppm STEL: 30,000 ppm PEL: 5000 ppm	
Respiratory Equipment (Specify Type):		For occasional consumer use - Use with adequate ventilation to prevent a build-up of vapors in confined areas. Open windows or position fans to provide cross ventilation. If a mild to strong odor is noticeable, ventilation is not adequate. For OSHA controlled workplace and other regular users - Use only with adequate ventilation under engineered air control systems designed to prevent exceeding appropriate TLVs. For occasional use, where engineered air control is not feasible, use properly maintained and properly fitted NIOSH approved self-contained breathing apparatus for chlorinated solvent vapors. A dust mask does not provide protection against vapors.		
Eye Protection:		Safety glasses, chemical goggles, or face shields are recommended to safeguard against potential eye contact, irritation, or injury.		
Protective Gloves:		Wear impermeable gloves. Gloves contaminated with product should be discarded.		
Other Protective Clothing:		Various application methods can dictate use of additional protective safety equipment, such as impermeable aprons, etc., to minimize exposure.		
Engineering Controls (Ventilation etc.):		Use only with adequate ventilation to prevent buildup of vapors. Do not use in areas where vapors can accumulate and concentrate, such as basements, bathrooms or small enclosed areas. Whenever possible, use outdoors in an open air area. If using indoors open all windows and doors and maintain a cross ventilation of moving fresh air across the work area. If strong odor is noticed or you experience slight dizziness, headache, nausea or eye-watering -- STOP -- ventilation is inadequate. Leave area immediately and move to fresh air.		
Work/Hygienic/Maintenance Practices:		A source of clean water should be available in the work area for flushing of the eyes and skin. Wash hands thoroughly after use. Do not eat, drink, or smoke in the work area. Before reuse, thoroughly clean any clothing or protective equipment that has been contaminated by prior use. Discard any clothing or other protective equipment that cannot be decontaminated, such as gloves or shoes.		

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9. PHYSICAL AND CHEMICAL PROPERTIES

Physical States:	[X] Gas [X] Liquid [] Solid	
Appearance and Odor:	Free and Clear, Water White	
pH:	Neutral	
Melting Point:	No data.	
Boiling Point:	104.00 F - 150.00 F	
Flash Pt:	No data.	
Evaporation Rate:	< 1	
Flammability (solid, gas):	No data available.	
Explosive Limits:	LEL: No data.	UEL: No data.
Vapor Pressure (vs. Air or mm Hg):	No data.	
Vapor Density (vs. Air = 1):	> 1	
Specific Gravity (Water = 1):	1.26	
Density:	10.48 - (of liquid) LB/GL at 75.0 F	
Solubility in Water:	Slight	
Octanol/Water Partition Coefficient:	No data.	
Percent Volatile:	96.1 % by weight.	
Autoignition Pt:	No data.	
Decomposition Temperature:	No data.	
Viscosity:	No data.	

10. STABILITY AND REACTIVITY

Stability:	Unstable [] Stable [X]
Conditions To Avoid - Instability:	No data available.
Incompatibility - Materials To Avoid:	Incompatible with strong oxidizing agents; strong caustics; strong alkalis; oxygen; nitrogen peroxide; chemically active metals such as aluminum and magnesium; sodium; potassium; and nitric acid.
Hazardous Decomposition or Byproducts:	Thermal decomposition may produce carbon monoxide and carbon dioxide, hydrogen chloride, chlorine gas, and small quantities of phosgene.
Possibility of Hazardous Reactions:	Will occur [] Will not occur [X]
Conditions To Avoid - Hazardous Reactions:	No data available.

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11. TOXICOLOGICAL INFORMATION

Toxicological Information: This product has not been tested as a whole. Refer to section 2 for acute and chronic effects.

CAS# 75-09-2:
Tumorigenic Effects:, TCLo, Inhalation, Rat, 3500. PPM, 6 Y.
Result:
Tumorigenic: Carcinogenic by RTECS criteria.
Endocrine: Tumors.
- Fundamental and Applied Toxicology., Academic Press, Inc., 1 E. First St., Duluth, MN 55802, Vol/p/yr: 4,30, 1984

Standard Draize Test, Eyes, Species: Rabbit, 100.0 MG, Severe.
Result:
Effects on Newborn: Growth statistics (e.g., reduced weight gain).
Effects on Newborn: Physical.
- Union Carbide Data Sheet, Union Carbide Corp., 39 Old Ridgebury Rd., Danbury, CT 06817, Vol/p/yr: 4/25, 1958

Standard Draize Test, Skin, Species: Rabbit, 810.0 MG, 24 H, Severe.
Result:
Specific Developmental Abnormalities: Musculoskeletal system.
- European Journal of Toxicology and Environmental Hygiene., For publisher information, see TOERD9, Paris France, Vol/p/yr: 9,171, 1976

Carcinogenicity/Other Information: IARC 2B - Possibly Carcinogenic to Humans
ACGIH A3 - Confirmed Animal Carcinogen with Unknown Relevance to Humans

CAS #	Hazardous Components (Chemical Name)	NTP	IARC	ACGIH	OSHA
75-09-2	Dichloromethane {Methylene chloride; R-30; Freon 30}	Possible	2B	A3	Yes
67-56-1	Methanol {Methyl alcohol; Carbinol; Wood alcohol}	n.a.	n.a.	n.a.	n.a.
127087-87-0	Poly(oxy-1,2-ethanediyl),.alpha.-(4-nonylphenyl)-.omega.-hydroxy-,branched	n.a.	n.a.	n.a.	n.a.
124-38-9	Carbon dioxide	n.a.	n.a.	n.a.	n.a.

12. ECOLOGICAL INFORMATION

General Ecological Information: This product has not been tested as a whole.

13. DISPOSAL CONSIDERATIONS

Waste Disposal Method: Dispose in accordance with applicable local, state, and federal regulations.

14. TRANSPORT INFORMATION

LAND TRANSPORT (US DOT):

DOT Proper Shipping Name: Aerosols, non-flammable

DOT Hazard Class: 2.2 NONFLAMMABLE GAS
UN/NA Number: UN1950



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Additional Transport Information: The shipper / supplier may apply one of the following exceptions: Combustible Liquid, Consumer Commodity, Limited Quantity, Viscous Liquid, Does Not Sustain Combustion, or others, as allowed under 49CFR Hazmat Regulations. Please consult 49CFR Subchapter C to ensure that subsequent shipments comply with these exceptions.

15. REGULATORY INFORMATION

EPA SARA (Superfund Amendments and Reauthorization Act of 1986) Lists

CAS #	Hazardous Components (Chemical Name)	S. 302 (EHS)	S. 304 RQ	S. 313 (TRI)
75-09-2	Dichloromethane {Methylene chloride; R-30; Freon 30}	No	Yes 1000 LB	Yes
67-56-1	Methanol {Methyl alcohol; Carbinol; Wood alcohol}	No	Yes 5000 LB	Yes
127087-87-0	Poly(oxy-1,2-ethanediyl),.alpha.-(4-nonylphenyl)-.omega.-hydroxy-,branched	No	No	No
124-38-9	Carbon dioxide	No	No	No

CAS #	Hazardous Components (Chemical Name)	Other US EPA or State Lists
75-09-2	Dichloromethane {Methylene chloride; R-30; Freon 30}	CAA HAP,ODC: HAP: VHAP CWA NPDES TSCA: Inventory, 8A CAIR CA PROP.65: Yes: Canc.
67-56-1	Methanol {Methyl alcohol; Carbinol; Wood alcohol}	CAA HAP,ODC: HAP: VHAP TSCA: Inventory CA PROP.65: Yes: RDTox.
127087-87-0	Poly(oxy-1,2-ethanediyl),.alpha.-(4-nonylphenyl)-.omega.-hydroxy-,branched	TSCA: Inventory, 8A PAIR
124-38-9	Carbon dioxide	TSCA: Inventory

Regulatory Information: This product is regulated by the United States Consumer Product Safety Commission and is subject to certain labeling requirements under the Federal Hazardous Substances Act. These requirements differ from the classification criteria and hazard information required for safety data sheets (SDS). The product label also includes other important information, including directions for use, and should always be read in its entirety prior to using the product.

Additional Regulatory Information This chemical/product is not and cannot be distributed in commerce (as defined in TSCA section 3(5)) or processed (as defined in TSCA section 3(13)) for consumer paint or coating removal.

16. OTHER INFORMATION

Revision Date: 05/01/2019
Preparer Name: W.M. Barr EHS Dept (901)775-0100

Additional Information About This Product: No data available.

Company Policy or Disclaimer: The information contained herein is presented in good faith and believed to be accurate as of the effective date shown above. This information is furnished without warranty of any kind. Employers should use this information only as a supplement to other information gathered by them and must make independent determination of suitability and completeness of information from all sources to assure proper use of these materials and the safety and health of employees. Any use of this data and information must be determined by the user to be in accordance with applicable federal, state and local laws and regulations.

SAFETY DATA SHEET

Jasco Spray On Stripper

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Revision: 05/02/2019
Supersedes Revision: 08/12/2016

1. PRODUCT AND COMPANY IDENTIFICATION

Product Code: 31053.1
Product Name: Jasco Spray On Stripper
Company Name: W. M. Barr
2105 Channel Avenue
Memphis, TN 38113
Phone Number: (901)775-0100
Web site address: www.wmbarr.com
Emergency Contact: 3E 24 Hour Emergency Contact (800)451-8346
Information: W.M. Barr Customer Service (800)398-3892
Intended Use: Paint/Varnish Remover
Product Code: QJBS00212, GJBS00213
Additional Information This chemical/product is not and cannot be distributed in commerce (as defined in TSCA section 3(5)) or processed (as defined in TSCA section 3(13)) for consumer paint or coating removal.

2. HAZARDS IDENTIFICATION

Flammable Liquids, Category 2
Acute Toxicity: Oral, Category 4
Acute Toxicity: Skin, Category 3
Acute Toxicity: Inhalation, Category 3
Skin Corrosion/Irritation, Category 2
Serious Eye Damage/Eye Irritation, Category 2A
Carcinogenicity, Category 1B
Toxic To Reproduction, Category 2
Specific Target Organ Toxicity (single exposure), Category 1
Specific Target Organ Toxicity (repeated exposure), Category 2



GHS Signal Word: Danger

GHS Hazard Phrases: H225: Highly flammable liquid and vapor.
H302: Harmful if swallowed.
H311: Toxic in contact with skin.
H315: Causes skin irritation.
H319: Causes serious eye irritation.
H331: Toxic if inhaled.
H350: May cause cancer.
H361: Suspected of damaging fertility or the unborn child.
H370: Causes damage to organs.
H373: May cause damage to organs through prolonged or repeated exposure.

GHS Precautionary Phrases: P201: Obtain special instructions before use.
P202: Do not handle until all safety precautions have been read and understood.
P210: Keep away from heat/sparks/open flames/hot surfaces. - No smoking.
P233: Keep container tightly closed.
P240: Ground/bond container and receiving equipment.
P241: Use explosion-proof electrical/ventilating/lighting equipment.
P242: Use only non-sparking tools.
P243: Take precautionary measures against static discharge.
P260: Do not breathe gas/mist/vapors/spray.
P264: Wash hands thoroughly after handling.
P270: Do not eat, drink or smoke when using this product.

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Jasco Spray On Stripper

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P271: Use only outdoors or in a well-ventilated area.

P280: Wear protective gloves/protective clothing/eye protection/face protection.

P281: Use personal protective equipment as required.

P235: Keep cool.

GHS Response Phrases:

P301+312: IF SWALLOWED: Call a POISON CENTER or doctor/physician if you feel unwell.

P302+352: IF ON SKIN: Wash with plenty of soap and water.

P303+361+353: IF ON SKIN (or hair): Remove/take off immediately all contaminated clothing.

Rinse skin with water/shower.

P304+340: IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing.

P305+351+338: IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.

P307+311: IF exposed: Call a POISON CENTER or doctor/physician.

P308+313: IF exposed or concerned: Get medical attention/advice.

P311: Call a POISON CENTER or doctor/physician.

P314: Get medical attention/advice if you feel unwell.

P321: Specific treatment see label.

P322: Specific measures see label.

P330: Rinse mouth.

P332+313: If skin irritation occurs, get medical advice/attention.

P337+313: If eye irritation persists, get medical advice/attention.

P361: Remove/Take off immediately all contaminated clothing.

P363: Wash contaminated clothing before reuse.

P370+378: In case of fire, use dry chemical powder to extinguish.

GHS Storage and Disposal Phrases:

P403+233: Store container tightly closed in well-ventilated place.

P405: Store locked up.

P501: Dispose of contents/container according to local, state and federal regulations.

OSHA Regulatory Status:

This material is classified as hazardous under OSHA regulations.

Potential Health Effects (Acute and Chronic):

Potential Acute Health Effects:

EYE: Vapors can cause eye irritation. Contact can produce redness, inflammation, pain and temporal eye damage.

SKIN: Causes irritation, redness, pain, drying and cracking of the skin. Prolonged contact can cause burns. May be absorbed through skin.

INGESTION: May cause irritation of the gastrointestinal tract and/or abdominal spasms. Symptoms parallel inhalation.

Aspiration of material into the lungs can cause chemical pneumonitis.

INHALATION: Causes irritation to the respiratory tract. Causes formation of carbon monoxide in blood which affects

cardiovascular system and central nervous symptoms. Symptoms of overexposure may include skin sensations (e.g.

pins and needles), fatigue, confusion, headaches, dizziness and drowsiness. Very high concentrations or continued

exposure may cause increased light-headedness, vomiting, blurred vision, blindness, staggering, unconsciousness, comas, and even death.

CHRONIC EXPOSURE: Methylene Chloride may cause headache, mental confusion, depression,

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Jasco Spray On Stripper

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liver effects, kidney effects, bronchitis, loss of appetite, nausea, lack of balance, and visual disturbances. Prolonged and/or repeated skin contact can cause severe irritation or dermatitis. Methylene chloride may cause cancer in humans. Toluene may affect the developing fetus. Toluene chronic poisoning describe anemia, decreased blood cell count and bone marrow hypoplasia. Methanol report impaired vision.

Target Organs: eyes, skin, respiratory system, liver, kidneys, pancreas, heart, lungs, brain, central nervous system

Medical Conditions Generally Aggravated By Exposure:

Those of the skin, eye, and lungs/respiratory system. This may include dermatitis; asthma and other breathing disorders; chronic lung disease; coronary artery disease; anemia;

3. COMPOSITION/INFORMATION ON INGREDIENTS

CAS #	Hazardous Components (Chemical Name)	Concentration
75-09-2	Dichloromethane {Methylene chloride; R-30; Freon 30}	25.0 -40.0 %
67-56-1	Methanol {Methyl alcohol; Carbinol; Wood alcohol}	10.0 -30.0 %
108-88-3	Toluene {Benzene, Methyl-; Toluol}	10.0 -20.0 %
67-64-1	Acetone {2-Propanone}	<10.0 %

Additional Chemical Information Specific percentage of composition is being withheld as a trade secret.

4. FIRST AID MEASURES

Emergency and First Aid Procedures:

INHALATION: If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen and seek medical attention immediately.

SKIN: Immediately wash with mild soap and water for 15 minutes, while removing contaminated clothing and shoes.
Wash clothing before reuse. Get medical attention.

EYE: Immediately flush with water for at least 15 minutes, lifting lower and upper eyelids occasionally. Get medical attention immediately.

INGESTION: Aspiration hazard. Do not take internally. If swallowed, DO NOT INDUCE VOMITING. Give large quantities of water. Never give anything by mouth to an unconscious person. Get medical attention immediately. If vomiting occurs, keep head below hips to prevent aspiration into lungs.

Signs and Symptoms Of Exposure:

See Potential Health Effects.

Note to Physician:

This product contains methylene chloride and methanol.

This product contains methanol which can cause intoxication and central nervous system depression. Methanol is metabolized to formic acid and formaldehyde. These metabolites can cause metabolic acidosis, visual disturbances and blindness. Since metabolism is required for these toxic symptoms, their onset may be delayed from 6 to 30 hours following ingestion. Ethanol competes for the same metabolic pathway and has been used to prevent methanol metabolism.

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Ethanol administration is indicated in symptomatic patients or at blood methanol concentrations above 20 ug/dl. Methanol is effectively removed by hemodialysis. Adrenalin should never be given to a person overexposed to methylene chloride.

Methylene Chloride is an aspiration hazard. Risk of aspiration must be weighed against possible toxicity of the material when determining whether to induce emesis or to perform gastric lavage. This material sensitizes the heart to the effects of sympathomimetic amines. Epinephrine and other sympathomimetic drugs may initiate cardiac arrhythmias in individuals exposed to this material. This material is metabolized to carbon monoxide. Consequently, elevations in carboxyhemoglobin as high as 50% have been reported, and levels may continue to rise for several hours after exposure has ceased. Data in experimental animals suggest there is a narrow margin between concentrations causing anesthesia and death.

5. FIRE FIGHTING MEASURES

	IB
Flash Pt:	48.00 F Method Used: Pensky-Marten Closed Cup
Explosive Limits:	LEL: No data. UEL: No data.
Autoignition Pt:	No data.
Suitable Extinguishing Media:	Use alcohol foam, carbon dioxide, and dry chemical. Water may be used to flush spills away from exposures and to dilute spills to non-flammable mixtures.
Unsuitable Extinguishing Media:	None known.
Fire Fighting Instructions:	Evacuate personnel to a safe area. Keep containers cool with water spray. Avoid breathing decomposition products. Firefighters should wear NIOSH approved self-contained breathing apparatus and full body protection. Vapors can flow along surfaces to distant ignition source and flash back.
Flammable Properties and Hazards:	Flammable Liquid and Vapor! Dangerous fire hazard when exposed to heat or flame. Vapors can flow along surfaces to distant ignition source and flash back.
Hazardous Combustion Products:	Carbon monoxide and carbon dioxide, hydrogen chloride, and trace amounts of phosgene, chlorine.

6. ACCIDENTAL RELEASE MEASURES

Steps To Be Taken In Case Material Is Released Or Spilled:	Ventillate area of leak or spill. Remove all sources of ignition. Use non-sparking tools and equipment. Clean up remaining materials from spill with suitable absorbent. Small spills may be absorbed with nonreactive absorbent (sand) and placed in suitable, covered, labeled containers. For large spills provide diking or other appropriate containment to keep material from spreading. Prevent large spills from entering sewers or waterways. If diked material can be pumped, store recovered material in compatible drums for recovery or disposal. Observe all personal protection equipment recommendations.

7. HANDLING AND STORAGE

Precautions To Be Taken in Handling:	No smoking or eating. Keep container closed when not in use. Keep away from heat, sparks, open flames and other sources of ignition. Containers of this material may be hazardous when empty since they retain product residues. Separate from incompatibles. This material may corrode plastic and rubber. KEEP OUT OF REACH OF CHILDREN.
Precautions To Be Taken in Storing:	Store in a cool, dry well-ventilated location. Protect against physical damage.

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Jasco Spray On Stripper

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Revision: 05/02/2019
Supersedes Revision: 08/12/2016

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

CAS #	Chemical Name	Jurisdiction	Recommended Exposure Limits	Notations
75-09-2	Dichloromethane {Methylene chloride; R-30; Freon 30}	ACGIH TLV	TLV: 50 ppm	
		OSHA PELs	PEL: 25 ppm STEL: 125 ppm (15 min)	
67-56-1	Methanol {Methyl alcohol; Carbinol; Wood alcohol}	ACGIH TLV	TLV: 200 ppm STEL: 250 ppm	
		OSHA PELs	PEL: 200 ppm	
108-88-3	Toluene {Benzene, Methyl-; Toluol}	ACGIH TLV	TLV: 50 ppm	
		OSHA PELs	PEL: 200 ppm STEL: 500 ppm/(10min) CEIL: 300 ppm	
67-64-1	Acetone {2-Propanone}	ACGIH TLV	TLV: 500 ppm STEL: 750 ppm	
		OSHA PELs	PEL: 1000 ppm	
Respiratory Equipment (Specify Type):		Avoid breathing vapor. Use NIOSH approved pressure demand or other positive pressure SCBA or airline respirators if the exposure level to methylene chloride is above permissible exposure limits.		
Eye Protection:		Use chemical goggles or glasses with side shields. A faceshield in combination with safety glasses or chemical goggles is recommended when the potential exists for spraying or splashing of liquid to the face.		
Protective Gloves:		Wear gloves with as much resistance to the chemical ingredients as possible. Laminate film gloves offer the best protection. Other glove materials, such as nitrile rubber, neoprene, and PVC will be degraded by methylene chloride, but may provide protection for some amount of time, based on the type of glove and the conditions of use. Consult your glove supplier for additional information. Gloves contaminated with product should be discarded and not reused.		
Other Protective Clothing:		Full Protective Clothing. Various application methods can dictate use of additional protective safety equipment, such as impermeable aprons, etc., to minimize exposure.		
Engineering Controls (Ventilation etc.):		Use process enclosures, local exhaust ventilation, or other engineering controls to control airborne levels below recommended exposure limits. Use only with adequate ventilation to prevent buildup of vapors. Do not use in areas where vapors can accumulate and concentrate, such as basements, bathrooms or small enclosed areas. Whenever possible, use outdoors in an open air area. If using indoors open all windows and doors and maintain a cross ventilation of moving fresh air across the work area. If strong odor is noticed or you experience slight dizziness, headache, nausea or eye-watering -- STOP -- ventilation is inadequate. Leave area immediately and move to fresh air.		
Work/Hygienic/Maintenance Practices:		Have an eyewash and safety shower available. The usual precaution for the handling of chemicals must be observed. Wash hands thoroughly after use and before eating, drinking, or smoking. Do not eat, drink, or smoke in the work area. Discard any clothing or other protective equipment that cannot be decontaminated.		

9. PHYSICAL AND CHEMICAL PROPERTIES

Physical States:	[] Gas	[X] Liquid	[] Solid
Appearance and Odor:	Off-white, cloudy liquid		
pH:	No data.		
Melting Point:	No data.		
Boiling Point:	~ 105.00 F - 0.00 F		
Flash Pt:	48.00 F	Method Used:	Pensky-Marten Closed Cup
Evaporation Rate:	> 1		
Flammability (solid, gas):	No data available.		
Explosive Limits:	LEL: No data.	UEL: No data.	
Vapor Pressure (vs. Air or mm Hg):	No data.		
Vapor Density (vs. Air = 1):	< 2		
Specific Gravity (Water = 1):	No data.		
Density:	7.92 - 8.12 LB/GL		
Solubility in Water:	Slight		
Octanol/Water Partition Coefficient:	No data.		
Percent Volatile:	97.0 % by weight.		
VOC / Volume:	465.0000 G/L		
Autoignition Pt:	No data.		
Decomposition Temperature:	No data.		
Viscosity:	50 - 400 CPS		

10. STABILITY AND REACTIVITY

Stability:	Unstable [] Stable [X]
Conditions To Avoid - Instability:	No data available.
Incompatibility - Materials To Avoid:	Strong oxidizers, strong caustics, acids, water + heat, and chemically active metals. May attack some forms of plastics, rubber, and coatings.
Hazardous Decomposition or Byproducts:	Moisture, heat, flame, ignition sources and incompatibles. Carbon monoxide, carbon dioxide, formaldehyde, hydrochloric acid and toxic gas phosgene.
Possibility of Hazardous Reactions:	Will occur [] Will not occur [X]
Conditions To Avoid - Hazardous Reactions:	No data available.

11. TOXICOLOGICAL INFORMATION

Toxicological Information: There is no data available for the product. Refer to section 2 for acute and chronic effects.

CAS# 75-09-2:

Tumorigenic Effects:, TCLo, Inhalation, Rat, 3500. PPM, 6 Y.

Result:

Tumorigenic: Carcinogenic by RTECS criteria.

Endocrine: Tumors.

- Fundamental and Applied Toxicology., Academic Press, Inc., 1 E. First St., Duluth, MN 55802,
Vol/p/yr: 4,30, 1984

Standard Draize Test, Eyes, Species: Rabbit, 100.0 MG, Severe.

Result:

Effects on Newborn: Growth statistics (e.g., reduced weight gain).

Effects on Newborn: Physical.

- Union Carbide Data Sheet, Union Carbide Corp., 39 Old Ridgebury Rd., Danbury, CT 06817,
Vol/p/yr: 4/25, 1958

Standard Draize Test, Skin, Species: Rabbit, 810.0 MG, 24 H, Severe.

Result:

Specific Developmental Abnormalities: Musculoskeletal system.

- European Journal of Toxicology and Environmental Hygiene., For publisher information, see
TOERD9, Paris France, Vol/p/yr: 9,171, 1976

CAS# 108-88-3:

Reproductive Effects:, TCLo, Inhalation, Rat, 800.0 MG/M3, 6 H, female 14-20 day(s) after
conception.

Result:

Effects on Embryo or Fetus: Fetotoxicity (except death, e.g., stunted fetus).

Effects on Newborn: Behavioral.

- Brazilian Journal of Medical and Biological Research., Vol/p/yr: 23,533, 1990

Standard Draize Test, Eyes, Species: Rabbit, 2.000 MG, 24 H, Severe.

Result:

Effects on Embryo or Fetus: Other effects to embryo.

Specific Developmental Abnormalities: Eye, ear.

- Prehled Prumyslove Toxikologie, Marhold, J., Organicke Latky, Prague Czechoslovakia, Vol/p/yr:
-,29, 1986

CAS# 67-64-1:

Standard Draize Test, Eyes, Species: Rabbit, 20.00 MG, Severe.

Result:

Behavioral: Change in motor activity (specific assay).

Behavioral: Alteration of classical conditioning.

- American Journal of Ophthalmology., Ophthalmic Pub. Co., 435 N. Michigan Ave., Suite 1415,
Chicago, IL 60611, Vol/p/yr: 29,1363, 1946

**Carcinogenicity/Other
Information:**

Methylene Chloride has been shown to increase the incidence of malignant tumors in mice and
benign tumors in rats. Other animal studies, as well as several human epidemiology studies, failed
to show a tumorigenic response.

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-Methylene Chloride (Dichloromethane) (CAS 75-09-2) is on the IARC list as a Group 2B: Possibly Carcinogenic to Humans, and on the NTP list as Reasonably anticipated to be a human carcinogen.

-Toluene (CAS 108-88-3) is on the IARC list as a Group 3: Not Classifiable as to Carcinogenicity in Humans.

CAS #	Hazardous Components (Chemical Name)	NTP	IARC	ACGIH	OSHA
75-09-2	Dichloromethane {Methylene chloride; R-30; Freon 30}	Possible	2B	A3	Yes
67-56-1	Methanol {Methyl alcohol; Carbinol; Wood alcohol}	n.a.	n.a.	n.a.	n.a.
108-88-3	Toluene {Benzene, Methyl-; Toluol}	n.a.	3	A4	n.a.
67-64-1	Acetone {2-Propanone}	n.a.	n.a.	A4	n.a.

12. ECOLOGICAL INFORMATION

General Ecological Information: No environmental toxicity studies have been conducted on the product.

13. DISPOSAL CONSIDERATIONS

Waste Disposal Method: Dispose of in accordance with all applicable local, state, and federal regulations.

14. TRANSPORT INFORMATION

LAND TRANSPORT (US DOT):

DOT Proper Shipping Name: Paint related material
DOT Hazard Class: 3 FLAMMABLE LIQUID
UN/NA Number: UN1263 **Packing Group:** II



Additional Transport Information:

For D.O.T. information, contact W.M. Barr Technical Services at 1-800-398-3892.

The shipper / supplier may apply one of the following exceptions: Combustible Liquid, Consumer Commodity, Limited Quantity, Viscous Liquid, Does Not Sustain Combustion, or others, as allowed under 49CFR Hazmat Regulations. Please consult 49CFR Subchapter C to ensure that subsequent shipments comply with these exceptions.

Flammable material products shipped in containers less than 1L (0.3 gallons) in volume: Per 49 CFR 173.150, Limited Quantities of flammable liquids (Class 3), Packing Group II that are shipped in packaging not over 1.0 L net capacity packed in strong outer packaging are exempted from labeling requirements and specification packaging requirements, unless offered for transportation by aircraft. Limited quantities are not subject to Subpart F (Placarding). Each package must be packed in strong outer packaging and can not exceed 30 kg (66 lbs).

Consumer commodities (per 173.150): A limited quantity that conforms to the paragraph above and is a consumer commodity (per 49 CFR 171.8) can be renamed "Consumer commodity" and reclassified as an ORM-D Material. In addition to the exceptions for labeling and placarding provided by paragraph 173.150, shipments of

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ORM-D Material are not subject to the shipping paper requirements of subpart C of part 172 of this subchapter, unless the material meets the definition of a hazardous substance, hazardous waste, marine pollutant, or are offered for transportation and transported by aircraft. Additional exceptions, as provided in §173.156 may also apply.

15. REGULATORY INFORMATION

EPA SARA (Superfund Amendments and Reauthorization Act of 1986) Lists

CAS #	Hazardous Components (Chemical Name)	S. 302 (EHS)	S. 304 RQ	S. 313 (TRI)
75-09-2	Dichloromethane {Methylene chloride; R-30; Freon 30}	No	Yes 1000 LB	Yes
67-56-1	Methanol {Methyl alcohol; Carbinol; Wood alcohol}	No	Yes 5000 LB	Yes
108-88-3	Toluene {Benzene, Methyl-; Toluol}	No	Yes 1000 LB	Yes
67-64-1	Acetone {2-Propanone}	No	Yes 5000 LB	No

CAS #	Hazardous Components (Chemical Name)	Other US EPA or State Lists
75-09-2	Dichloromethane {Methylene chloride; R-30; Freon 30}	CAA HAP,ODC: HAP: VHAP; CWA NPDES: Yes; TSCA: Yes - Inventory, 8A CAIR; CA PROP.65: Yes: Canc.
67-56-1	Methanol {Methyl alcohol; Carbinol; Wood alcohol}	CAA HAP,ODC: HAP: VHAP; CWA NPDES: No; TSCA: Yes - Inventory; CA PROP.65: Yes: RDTox.
108-88-3	Toluene {Benzene, Methyl-; Toluol}	CAA HAP,ODC: HAP: VHAP; CWA NPDES: Yes; TSCA: Yes - Inventory, 8A CAIR; CA PROP.65: Yes: RDTox(F)
67-64-1	Acetone {2-Propanone}	CAA HAP,ODC: No; CWA NPDES: No; TSCA: Yes - Inventory; CA PROP.65: No

Regulatory Information:	This product is regulated by the United States Consumer Product Safety Commission and is subject to certain labeling requirements under the Federal Hazardous Substances Act. These requirements differ from the classification criteria and hazard information required for safety data sheets (SDS). The product label also includes other important information, including directions for use, and should always be read in its entirety prior to using the product.
Additional Regulatory Information	This chemical/product is not and cannot be distributed in commerce (as defined in TSCA section 3(5)) or processed (as defined in TSCA section 3(13)) for consumer paint or coating removal.

16. OTHER INFORMATION

Revision Date:	05/02/2019
Preparer Name:	W.M. Barr EHS Dept (901)775-0100
Additional Information About This Product:	No data available.
Company Policy or Disclaimer:	The information contained herein is presented in good faith and believed to be accurate as of the effective date shown above. This information is furnished without warranty of any kind. Employers should use this information only as a supplement to other information gathered by them and must make independent determination of suitability and completeness of information from all sources to assure proper use of these materials and the safety and health of employees. Any use of this data and information must be determined by the user to be in accordance with applicable federal, state and local laws and regulations.

Klean Strip Adhesive Remover / Klean Strip Premium Stripper

Revision: 04/22/2019

Supersedes Revision: 06/22/2017

1. PRODUCT AND COMPANY IDENTIFICATION

Product Name:	Klean Strip Adhesive Remover / Klean Strip Premium Stripper	
Company Name:	W. M. Barr 2105 Channel Avenue Memphis, TN 38113	Phone Number: (901)775-0100
Web site address:	www.wmbarr.com	
Emergency Contact:	3E 24 Hour Emergency Contact	(800)451-8346
Information:	W.M. Barr Customer Service	(800)398-3892
Intended Use:	Removal of adhesives, mastics, & contact cement from wood, concrete, metal and masonry.	
Product Code:	GKAS94325, QKAS94326, GKS3, QKS3, QKS3L, QKS34, PA11185	
Additional Information	This chemical/product is not and cannot be distributed in commerce (as defined in TSCA section 3(5)) or processed (as defined in TSCA section 3(13)) for consumer paint or coating removal.	

2. HAZARDS IDENTIFICATION

Acute Toxicity: Oral, Category 4
Acute Toxicity: Skin, Category 4
Acute Toxicity: Inhalation, Category 4
Skin Corrosion/Irritation, Category 1B
Serious Eye Damage/Eye Irritation, Category 1
Carcinogenicity, Category 1B
Specific Target Organ Toxicity (single exposure), Category 1



GHS Signal Word: **Danger**

GHS Hazard Phrases:

- Harmful if swallowed.
- Harmful in contact with skin.
- Causes severe skin burns and eye damage.
- Causes serious eye damage.
- Harmful if inhaled.
- May cause cancer.
- Causes damage to organs.

GHS Precautionary Phrases:

- Obtain special instructions before use.
- Do not handle until all safety precautions have been read and understood.
- Do not breathe gas/mist/vapors/spray.
- Wash hands thoroughly after handling.
- Do not eat, drink or smoke when using this product.
- Use only outdoors or in a well-ventilated area.
- Wear protective gloves/protective clothing/eye protection/face protection.

GHS Response Phrases:

- IF SWALLOWED: Call a POISON CENTER or doctor/physician if you feel unwell.
- IF ON SKIN: Wash with plenty of soap and water.
- IF ON SKIN (or hair): Remove/take off immediately all contaminated clothing. Rinse skin with water/shower.
- IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing.
- IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
- IF exposed: Call a POISON CENTER or doctor/physician.

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GHS Storage and Disposal Phrases:

OSHA Regulatory Status:

Potential Health Effects (Acute and Chronic):

IF exposed or concerned: Get medical attention/advice.
Immediately call a POISON CENTER or doctor/physician.
Specific treatment see label.
Rinse mouth.
Wash contaminated clothing before reuse.

Store locked up.
Dispose of contents/container according to local, state and federal regulations.

This material is classified as hazardous under OSHA regulations.

INHALATION ACUTE EXPOSURE EFFECTS:

Vapor harmful. May cause upper respiratory tract irritation and central nervous system depression with symptoms such as confusion, lightheadedness, nausea, vomiting, headache, drowsiness, and fatigue. Mist or vapor can irritate the throat and lungs. Causes formation of carbon monoxide in blood which may affect the cardiovascular system and central nervous system. Continued exposure may cause unconsciousness and even death. Intentional misuse of this product by deliberately concentrating and inhaling the vapors can be harmful or fatal. Concurrent exposure to carbon monoxide, smoking, and physical activity may increase the level of carboxyhemoglobin levels in the blood resulting in additive effects.

SKIN CONTACT ACUTE EXPOSURE EFFECTS:

Product may be absorbed through the skin. Harmful if absorbed through the skin. Effects may range from mild irritation to severe pain, and possibly burns, depending on the intensity of contact. Prolonged or repeated contact may dry the skin and cause irritation. Symptoms include redness, itching, burning, drying and cracking of the skin, and skin burns.

EYE CONTACT ACUTE EXPOSURE EFFECTS:

Vapors may irritate the eyes. Contact may cause tearing, redness, a stinging or burning feeling, swelling, and blurred vision.

INGESTION ACUTE EXPOSURE EFFECTS:

Poison. May be fatal or cause blindness if swallowed. May cause nausea or vomiting. Aspiration hazard. This material may be aspirated into the lungs during vomiting. If vomiting results in aspiration, chemical pneumonia could occur. It can be readily absorbed by the stomach and intestinal tract. Absorption through the gastrointestinal tract may produce central nervous system depression and systemic effects. Swallowing this material may irritate the mucous membranes of the mouth, throat, and esophagus. May cause cyanosis (blue coloring of the skin and nails from lack of oxygen).

CHRONIC EXPOSURE EFFECTS:

Reports have associated repeated and prolonged overexposure to solvents with neurological and other physiological damage. Prolonged skin contact may cause irritation, redness, swelling and possible tissue destruction. Prolonged or repeated contact may cause dermatitis. Prolonged skin contact may result in absorption of a harmful amount of this material. May cause liver damage. May cause cancer based on animal data (see Section 11. Toxicological Information).

Target Organs:

Blood, central nervous system, liver, skin, cardiovascular system, eyes, respiratory system, lungs.

Medical Conditions Generally Aggravated By Exposure:

Heart of cardiovascular disorders, kidney disorders, liver disorders, central nervous system disorders, respiratory system (including asthma and other breathing disorders),

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skin disorders and allergies.

Alcohol may enhance the toxic effects of methylene chloride exposure. May cross the placenta. May be excreted in breast milk.

3. COMPOSITION/INFORMATION ON INGREDIENTS

CAS #	Hazardous Components (Chemical Name)	Concentration
75-09-2	Dichloromethane {Methylene chloride; R-30; Freon 30}	60.0 -100.0 %
67-56-1	Methanol {Methyl alcohol; Carbinol; Wood alcohol}	15.0 -25.0 %
8052-41-3	Stoddard solvent {Mineral spirits; Aliphatic Petroleum Distillates; White spirits}	< 5.0 %

Additional Chemical Information

Specific percentage of composition is being withheld as a trade secret.

4. FIRST AID MEASURES

Emergency and First Aid Procedures:

INHALATION:

If user experiences breathing difficulty, move to air free of vapors. Administer oxygen or artificial respiration until medical assistance can be rendered.

SKIN CONTACT:

Wash with soap and large quantities of water and seek medical attention if irritation from contact persists.

EYE CONTACT:

Immediately flush with water, remove any contact lens, continue flushing with water for at least 15 minutes, then get medical attention immediately.

INGESTION:

Do not induce vomiting, unless directed to by medical personnel. Call your poison control center, hospital, emergency room, or physician immediately for instructions. Do not give anything by mouth to an unconscious person.

Signs and Symptoms Of Exposure:

See Potential Health Effects.

Note to Physician:

This product contains methylene chloride and methanol.

This product contains methanol which can cause intoxication and central nervous system depression. Methanol is metabolized to formic acid and formaldehyde. These metabolites can cause metabolic acidosis, visual disturbances and blindness. Since metabolism is required for these toxic symptoms, their onset may be delayed from 6 to 30 hours following ingestion. Ethanol competes for the same metabolic pathway and has been used to prevent methanol metabolism. Ethanol administration is indicated in symptomatic patients or at blood methanol concentrations above 20 ug/dl. Methanol is effectively removed by hemodialysis.

This material sensitizes the heart to the effects of sympathomimetic amines. Epinephrine and other sympathomimetic drugs may initiate cardiac arrhythmia in individuals exposed to this material. This material is metabolized to carbon monoxide. Consequently, elevations in carboxyhemoglobin as high as 50% have been reported, and levels may continue to rise for several hours after exposure has ceased. Data in

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experimental animals suggest there is a narrow margin between concentrations causing anesthesia and death. Adrenalin should never be given to a person overexposed to methylene chloride.

5. FIRE FIGHTING MEASURES

Flash Pt:	Nonflammable
Explosive Limits:	LEL: No data. UEL: No data.
Autoignition Pt:	No data.
Suitable Extinguishing Media:	Use carbon dioxide, dry powder, water spray, or foam.
Unsuitable Extinguishing Media:	None known.
Fire Fighting Instructions:	Self-contained respiratory protection should be provided for fire fighters fighting fires in buildings or confined areas. Storage containers exposed to fire should be kept cool with water spray to prevent pressure build-up. Stay away from heads of containers that have been exposed to intense heat or flame.
Flammable Properties and Hazards:	Contact of liquid or vapor with flame or hot surfaces will produce toxic gases and a corrosive residue that will cause deterioration of metal.
	Vapors are heavier than air and will tend to collect in low areas.

6. ACCIDENTAL RELEASE MEASURES

Steps To Be Taken In Case Material Is Released Or Spilled:	Isolate the immediate area. Prevent unauthorized entry. Eliminate all sources of ignition in area and downwind of the spill area. Stay upwind, out of low areas, and ventilate closed spaces before entering. All equipment used when handling this product must be grounded or non-sparking. Do not touch or walk through spilled material. Stop leak if you can do so without risk. Prevent entry into waterways, sewers, or confined areas. A vapor suppressing foam may be used to reduce vapors. Absorb or cover with dry earth, sand, or other non-combustible material and transfer to compatible containers.

7. HANDLING AND STORAGE

Precautions To Be Taken in Handling:	Read carefully all cautions and directions on product label before use. Since empty container retains residue, follow all label warnings even after container is empty. Dispose of empty container according to all regulations. Do not reuse this container. Avoid contact with eyes, skin, and clothing. Wash thoroughly after handling. A source of clean water should be kept in the immediate work area for flushing of the eyes and skin. Keep away from heat, sparks, flame, and any other source of ignition. Do not smoke when anywhere near this material. Ground and bond containers when transferring material. Do not use in confined spaces, basements, bathrooms, etc, where vapors can build up and explode if ignited by an ignition source. Vapors are heavier than air and will collect in low areas.
Precautions To Be Taken in Storing:	Store in a cool place in original container and protect from sunlight. Exposure to high temperatures or prolonged exposure to sun may cause can to leak or swell. Once opened, remover should be used within six months or properly disposed of to avoid can deterioration. Do not store near flames or at elevated temperatures.

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Keep container tightly closed when not in use.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

CAS #	Partial Chemical Name	OSHA TWA	ACGIH TWA	Other Limits
75-09-2	Dichloromethane {Methylene chloride; R-30; Freon 30}	PEL: 25 ppm STEL: 125 ppm (15 min)	TLV: 50 ppm	No data.
67-56-1	Methanol {Methyl alcohol; Carbinol; Wood alcohol}	PEL: 200 ppm	TLV: 200 ppm STEL: 250 ppm	No data.
8052-41-3	Stoddard solvent {Mineral spirits; Aliphatic Petroleum Distillates; White spirits}	PEL: 500 ppm	TLV: 100 ppm	No data.

Respiratory Equipment (Specify Type): For use in areas with inadequate ventilation or fresh air, wear a properly maintained and properly fitted NIOSH approved self-contained breathing apparatus or powered air supply respirator or loose fitting hood.

For OSHA controlled work places and other regular users - Use only with adequate ventilation under engineered air control systems designed to prevent exceeding the appropriate TLV.

A dust mask does not provide protection against vapors.

Eye Protection: Chemical goggles or face shields are recommended to safeguard against potential eye contact, irritation, or injury. Chemical goggles or face shields are recommended when splashing or spraying of chemical is possible. A faceshield provides more protection to help reduce chemical contact to the face and eyes.

Protective Gloves: Wear gloves with as much resistance to the chemical ingredients as possible. Laminate film gloves offer the best protection. Other glove materials, such as nitrile rubber, neoprene, and PVC will be degraded by methylene chloride, but may provide protection for some amount of time, based on the type of glove and the conditions of use. Consult your glove supplier for additional information. Gloves contaminated with product should be discarded and not reused.

Other Protective Clothing: Various application methods can dictate use of additional protective safety equipment, such as impermeable aprons, etc., to minimize exposure.

Engineering Controls (Ventilation etc.): Use only with adequate ventilation to prevent buildup of vapors. If work area is not well ventilated, do not use this product. Do not use in areas where vapors can accumulate and concentrate, such as basements, bathrooms or small enclosed areas.

Whenever possible, use outdoors in an open air area. If using indoors open all windows and doors and maintain a cross ventilation of moving fresh air across the work area. If strong odor is noticed or you experience slight dizziness, headache, nausea or eye-watering -- STOP -- ventilation is inadequate. Leave area immediately and move to fresh air.

Use process enclosures, local exhaust ventilation, or other engineering controls to control airborne levels below recommended exposure limits.

Work/Hygienic/Maintenance Practices: A source of clean water should be available in the work area for flushing of the eyes and skin.

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Wash hands thoroughly after use.

Do not eat, drink, or smoke in the work area.

Before reuse, thoroughly clean any clothing or protective equipment that has been contaminated by prior use.

Discard any clothing or other protective equipment that cannot be decontaminated, such as gloves or shoes.

9. PHYSICAL AND CHEMICAL PROPERTIES

Physical States:	[] Gas [X] Liquid [] Solid	
Appearance and Odor:	Viscous opaque to clear	
Melting Point:	No data.	
Boiling Point:	104.00 F	
Autoignition Pt:	No data.	
Flash Pt:	Nonflammable	
Explosive Limits:	LEL: No data.	UEL: No data.
Specific Gravity (Water = 1):	1.138	
Density:	9.2 - 9.5	
Vapor Pressure (vs. Air or mm Hg):	No data.	
Vapor Density (vs. Air = 1):	> 1	
Evaporation Rate:	< 1	
Solubility in Water:	Slight	
pH:	10.0 - 10.5	
Percent Volatile:	97.33 % by weight.	
VOC / Volume:	22.7000 % WT	

10. STABILITY AND REACTIVITY

Stability:	Unstable [] Stable [X]
Conditions To Avoid - Instability:	No data available.
Incompatibility - Materials To Avoid:	Incompatible with strong oxidizing agents; bases; strong caustics; strong acids; oxygen; nitrogen peroxide; reactive metals such as aluminum and magnesium; sodium; potassium; and nitric acid.
Hazardous Decomposition or Byproducts:	Decomposition may produce carbon monoxide and carbon dioxide, hydrogen chloride, chlorine gas, and small quantities of phosgene.
Possibility of Hazardous Reactions:	Will occur [] Will not occur [X]
Conditions To Avoid - Hazardous Reactions:	No data available.

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11. TOXICOLOGICAL INFORMATION

Toxicological Information: No information available for this product as a whole. Refer to section 2 for acute and chronic effects.

Carcinogenicity/Other Information:

CAS# 75-09-2:
Tumorigenic Effects:, TCLo, Inhalation, Rat, 3500. PPM, 6 Y.
Result:
Tumorigenic: Carcinogenic by RTECS criteria.
Endocrine: Tumors.
- Fundamental and Applied Toxicology., Academic Press, Inc., 1 E. First St., Duluth, MN 55802, Vol/p/yr: 4,30, 1984

Standard Draize Test, Eyes, Species: Rabbit, 100.0 MG, Severe.
Result:
Effects on Newborn: Growth statistics (e.g., reduced weight gain).
Effects on Newborn: Physical.
- Union Carbide Data Sheet, Union Carbide Corp., 39 Old Ridgebury Rd., Danbury, CT 06817, Vol/p/yr: 4/25, 1958

Standard Draize Test, Skin, Species: Rabbit, 810.0 MG, 24 H, Severe.
Result:
Specific Developmental Abnormalities: Musculoskeletal system.
- European Journal of Toxicology and Environmental Hygiene., For publisher information, see TOERD9, Paris France, Vol/p/yr: 9,171, 1976

IARC 2B - Possibly Carcinogenic to Humans
ACGIH A3 - Confirmed Animal Carcinogen with Unknown Relevance to Humans

CAS #	Hazardous Components (Chemical Name)	NTP	IARC	ACGIH	OSHA
75-09-2	Dichloromethane {Methylene chloride; R-30; Freon 30}	Possible	2B	A3	Yes
67-56-1	Methanol {Methyl alcohol; Carbinol; Wood alcohol}	n.a.	n.a.	n.a.	n.a.
8052-41-3	Stoddard solvent {Mineral spirits; Aliphatic Petroleum Distillates; White spirits}	n.a.	n.a.	n.a.	n.a.

12. ECOLOGICAL INFORMATION

General Ecological Information: No information available for this product as a whole.

13. DISPOSAL CONSIDERATIONS

Waste Disposal Method: Dispose in accordance with applicable local, state, and federal regulations.

Keep out of bodies of water.

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14. TRANSPORT INFORMATION

LAND TRANSPORT (US DOT):

DOT Proper Shipping Name: Paint related material

DOT Hazard Class: 8 CORROSIVE

UN/NA Number: UN3066

Packing Group: II



Additional Transport Information:

The supplier may apply one of the following exceptions: Combustible Liquid, Consumer Commodity, Limited Quantity, Viscous Liquid, Does Not Sustain Combustion, or others, as allowed under 49CFR Hazmat Regulations. Please consult 49CFR Subchapter C to ensure that subsequent shipments comply with these exceptions.

15. REGULATORY INFORMATION

EPA SARA (Superfund Amendments and Reauthorization Act of 1986) Lists

CAS #	Hazardous Components (Chemical Name)	S. 302 (EHS)	S. 304 RQ	S. 313 (TRI)
75-09-2	Dichloromethane {Methylene chloride; R-30; Freon 30}	No	Yes 1000 LB	Yes
67-56-1	Methanol {Methyl alcohol; Carbinol; Wood alcohol}	No	Yes 5000 LB	Yes
8052-41-3	Stoddard solvent {Mineral spirits; Aliphatic Petroleum Distillates; White spirits}	No	No	No

CAS #	Hazardous Components (Chemical Name)	Other US EPA or State Lists
75-09-2	Dichloromethane {Methylene chloride; R-30; Freon 30}	CAA HAP, ODC: HAP: VHAP CWA NPDES TSCA: Inventory, 8A CAIR CA PROP.65: Yes: Canc.
67-56-1	Methanol {Methyl alcohol; Carbinol; Wood alcohol}	CAA HAP, ODC: HAP: VHAP TSCA: Inventory CA PROP.65: Yes: RDTox.
8052-41-3	Stoddard solvent {Mineral spirits; Aliphatic Petroleum Distillates; White spirits}	TSCA: Inventory

Regulatory Information:

This product is regulated by the United States Consumer Product Safety Commission and is subject to certain labeling requirements under the Federal Hazardous Substances Act. These requirements differ from the classification criteria and hazard information required for safety data sheets (SDS). The product label also includes other important information, including directions for use, and should always be read in its entirety prior to using the product.

Additional Regulatory Information

This chemical/product is not and cannot be distributed in commerce (as defined in TSCA section 3(5)) or processed (as defined in TSCA section 3(13)) for consumer paint or coating removal.

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Revision: 04/22/2019

Supersedes Revision: 06/22/2017

16. OTHER INFORMATION**Revision Date:** 04/22/2019**Preparer Name:** W.M. Barr EHS Dept (901)775-0100**Additional Information About** No data available.**This Product:****Company Policy or****Disclaimer:**

The information contained herein is presented in good faith and believed to be accurate as of the effective date shown above. This information is furnished without warranty of any kind. Employers should use this information only as a supplement to other information gathered by them and must make independent determination of suitability and completeness of information from all sources to assure proper use of these materials and the safety and health of employees. Any use of this data and information must be determined by the user to be in accordance with applicable federal, state and local laws and regulations.

Klean-Strip Aircraft Fiberglass Paint Remover

Revision: 05/01/2019

Supersedes Revision: 01/29/2019

1. PRODUCT AND COMPANY IDENTIFICATION

Product Name:	Klean-Strip Aircraft Fiberglass Paint Remover	
Company Name:	W. M. Barr 2105 Channel Avenue Memphis, TN 38113	Phone Number: (901)775-0100
Web site address:	www.wmbarr.com	
Emergency Contact:	3E 24 Hour Emergency Contact	(800)451-8346
Information:	W.M. Barr Customer Service	(800)398-3892
Intended Use:	Paint/Varnish Remover	
Product Code:	GAF354, GAF354CN	
Additional Information	This chemical/product is not and cannot be distributed in commerce (as defined in TSCA section 3(5)) or processed (as defined in TSCA section 3(13)) for consumer paint or coating removal.	

2. HAZARDS IDENTIFICATION

Flammable Liquids, Category 2
 Acute Toxicity: Oral, Category 4
 Acute Toxicity: Skin, Category 4
 Acute Toxicity: Inhalation, Category 4
 Skin Corrosion/Irritation, Category 1B
 Serious Eye Damage/Eye Irritation, Category 2A
 Carcinogenicity, Category 1B
 Toxic To Reproduction, Category 2
 Specific Target Organ Toxicity (single exposure), Category 1
 Specific Target Organ Toxicity (repeated exposure), Category 2



GHS Signal Word: Danger

GHS Hazard Phrases:

- Highly flammable liquid and vapor.
- Harmful if swallowed.
- Harmful in contact with skin.
- Causes severe skin burns and eye damage.
- Causes serious eye irritation.
- Harmful if inhaled.
- May cause cancer state route of exposure if it is conclusively proven that no other routes of exposure cause the hazard.
- Suspected of damaging fertility or the unborn child.
- Causes damage to organs.
- May cause damage to organs through prolonged or repeated exposure.

GHS Precautionary Phrases:

- Obtain special instructions before use.
- Do not handle until all safety precautions have been read and understood.
- Keep away from heat/sparks/open flames/hot surfaces. - No smoking.
- Keep container tightly closed.
- Use explosion-proof electrical/ventilating/lighting equipment.
- Use only non-sparking tools.
- Take precautionary measures against static discharge.
- Do not breathe gas/mist/vapors/spray.
- Wash hands thoroughly after handling.
- Do not eat, drink or smoke when using this product.

Klean-Strip Aircraft Fiberglass Paint Remover

Revision: 05/01/2019

Supersedes Revision: 01/29/2019

GHS Response Phrases:

Use only outdoors or in a well-ventilated area.
 Wear protective gloves/protective clothing/eye protection/face protection.
 Use personal protective equipment as required.

IF SWALLOWED: Call a POISON CENTER or doctor/physician if you feel unwell.
 IF ON SKIN: Wash with plenty of soap and water.
 IF ON SKIN (or hair): Remove/take off immediately all contaminated clothing. Rinse skin with water/shower.
 IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing.
 IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
 IF exposed: Call a POISON CENTER or doctor/physician.
 IF exposed or concerned: Get medical attention/advice.
 Immediately call a POISON CENTER or doctor/physician.
 Get medical attention/advice if you feel unwell.
 Specific treatment see label.
 Rinse mouth.
 If eye irritation persists, get medical advice/attention.
 Wash contaminated clothing before reuse.

GHS Storage and Disposal Phrases:

Store in cool/well-ventilated place.
 Store locked up.
 Dispose of contents/container according to local, state and federal regulations.

OSHA Regulatory Status:

This material is classified as hazardous under OSHA regulations.

Potential Health Effects (Acute and Chronic):

See above.

3. COMPOSITION/INFORMATION ON INGREDIENTS

CAS #	Hazardous Components (Chemical Name)	Concentration
108-88-3	Toluene {Benzene, Methyl-; Toluol}	15.0 -40.0 %
75-09-2	Dichloromethane {Methylene chloride; R-30; Freon 30}	10.0 -30.0 %
67-64-1	Acetone {2-Propanone}	10.0 -30.0 %
67-56-1	Methanol {Methyl alcohol; Carbinol; Wood alcohol}	10.0 -30.0 %

Additional Chemical Information

Specific percentage of composition is being withheld as a trade secret.

SAFETY DATA SHEET

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4. FIRST AID MEASURES

Emergency and First Aid Procedures:

INHALATION

If user experiences breathing difficulty, move to air free of vapors. Administer oxygen or artificial respiration until medical assistance can be rendered.

SKIN CONTACT

Immediately wash with soap and large quantities of water. Seek medical attention if irritation from contact persists.

EYE CONTACT

Flush with large quantities of water, remove any contact lens, and continue flushing with water for at least 15 minutes, then seek immediate medical attention.

INGESTION

Call your poison control center, hospital emergency room or physician immediately for instructions to induce vomiting.

Signs and Symptoms Of Exposure:

Refer to section 2.

Note to Physician:

5. FIRE FIGHTING MEASURES

Flash Pt:

NFPA Class 1B

10.00 F Method Used: Setaflash Closed Cup (Rapid Setaflash)

Explosive Limits:

LEL: 1.2 % UEL: 36 %

Autoignition Pt:

N.D.

Suitable Extinguishing Media: Carbon dioxide, dry powder or alcohol resistant foam. Water spray may be used, but may be ineffective at extinguishing the fire.

Unsuitable Extinguishing Media:

None known.

Fire Fighting Instructions:

Self-contained respiratory protection should be provided for fire fighters fighting fires in buildings or confined areas. Storage containers exposed to fire should be kept cool with water spray to prevent pressure build-up. Stay away from heads of containers that have been exposed to intense heat or flame.

Flammable Properties and Hazards:

DANGER! FLAMMABLE. KEEP AWAY FROM HEAT, SPARKS, FLAME AND ALL OTHER SOURCES OF IGNITION. VAPORS MAY CAUSE FLASH FIRE OR IGNITE EXPLOSIVELY. VAPORS MAY TRAVEL LONG DISTANCES TO OTHER AREAS AND ROOMS AWAY FROM WORK SITE. Do not smoke. Extinguish all flames and pilot lights, and turn off stoves, heaters, electric motors and all other sources of ignition anywhere in the structure, dwelling or building during use and until all vapors are gone from the work site and all areas away from the work site. Keep away from electrical outlets and switches. Beware of static electricity that may be generated by synthetic clothing and other sources.

Hazardous Combustion Products:

Carbon monoxide, carbon dioxide, other unburned hydrocarbons and toxic fumes. Incomplete combustion could result in the formation of phosgene.

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6. ACCIDENTAL RELEASE MEASURES

Steps To Be Taken In Case Material Is Released Or Spilled:

Keep unnecessary people away; isolate hazard area and deny entry. Stay upwind, out of low areas, and ventilate closed spaces before entering. Shut off ignition sources; keep flares, smoking or flames out of hazard area. Use non-sparking tools. Use proper bonding and grounding procedures. Keep material out of waterways, bodies of water, and sewers.

SMALL SPILLS: Take up liquid with sand, earth or other noncombustible absorbent material and place in a plastic container where applicable.

LARGE SPILLS: Dike far ahead of spill. If possible collect material for reuse. Collect remainder of material for proper disposal.

7. HANDLING AND STORAGE

Precautions To Be Taken in Handling:

Read carefully all cautions and directions on product label before use. Since empty container retains residue, follow all label warnings even after container is empty. Dispose of empty container according to all regulations. Do not reuse this container.

Avoid breathing of vapors or mist and contact with skin, eyes, and clothing.

A source of clean water should be immediately available for flushing of the eyes and skin should contact occur.

Precautions To Be Taken in Storing:

Store in a cool, dry place. Keep container tightly closed. Exposure to high temperatures or prolonged exposure to sun may cause can to leak or swell. Once opened, remover should be used within six months or discarded to avoid can deterioration. Do not store near flames or at elevated temperatures.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

CAS #	Chemical Name	Jurisdiction	Recommended Exposure Limits	Notations
108-88-3	Toluene {Benzene, Methyl-; Toluol}	ACGIH TLV	TLV: 50 ppm	
		OSHA PELs	PEL: 200 ppm STEL: 500 ppm/(10min) CEIL: 300 ppm	
75-09-2	Dichloromethane {Methylene chloride; R-30; Freon 30}	ACGIH TLV	TLV: 50 ppm	
		OSHA PELs	PEL: 25 ppm STEL: 125 ppm (15 min)	
67-64-1	Acetone {2-Propanone}	ACGIH TLV	TLV: 500 ppm STEL: 750 ppm	
		OSHA PELs	PEL: 1000 ppm	
67-56-1	Methanol {Methyl alcohol; Carbinol; Wood alcohol}	ACGIH TLV	TLV: 200 ppm STEL: 250 ppm	
		OSHA PELs	PEL: 200 ppm	

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Respiratory Equipment (Specify Type):	For OSHA controlled work place and other regular users - Use only with adequate ventilation under engineered air control systems designed to prevent exceeding appropriate TLV. For occasional use, where engineered air control is not feasible, use properly maintained and properly fitted NIOSH approved supplied air respirator or breathing apparatus for chlorinated solvent vapors. A dust mask does not provide protection against vapors.
Eye Protection:	Safety glasses, chemical goggles, or face shields are recommended to safeguard against potential eye contact, irritation, or injury. Chemical goggles or face shields are recommended when splashing or spraying of chemical is possible. A faceshield provides more protection to help reduce chemical contact to the face and eyes.
Protective Gloves:	Wear gloves with as much resistance to the chemical ingredients as possible. Laminate film gloves offer the best protection. Other glove materials, such as nitrile rubber, will be degraded by methylene chloride, but may provide protection for some amount of time, based on the type of glove and the conditions of use. Consult your glove supplier for additional information. Gloves contaminated with product should be discarded and not reused.
Other Protective Clothing:	Various application methods can dictate use of additional protective safety equipment, such as impermeable aprons, etc., to minimize exposure.
Engineering Controls (Ventilation etc.):	Use only with adequate ventilation to prevent build up of vapors. Do not use in areas where vapors can accumulate and concentrate such as basements, bathrooms, and small enclosed areas. Whenever possible, use outdoors in an open air area. If strong odor is noticed or you experience slight dizziness - STOP - ventilation is not adequate. Leave area immediately. If the work area is not adequately ventilated, do not use this product. For OSHA controlled workplaces, use process enclosures, local exhaust ventilation, or other engineering controls to control airborne levels below recommended exposure limits.
Work/Hygienic/Maintenance Practices:	Wash hands thoroughly after use and before eating, drinking, or smoking. Do not eat, drink, or smoke in the work area. Discard any clothing or other protective equipment that cannot be decontaminated. Facilities storing or handling this material should be equipped with an emergency eyewash and safety shower.

9. PHYSICAL AND CHEMICAL PROPERTIES

Physical States:	[] Gas [X] Liquid [] Solid
Appearance and Odor:	Solvent odor. Odor threshold not determined.
pH:	N.D.
Melting Point:	N.D.
Boiling Point:	104.00 F - 230.00 F
Flash Pt:	10.00 F Method Used: Setaflash Closed Cup (Rapid Setaflash)
Evaporation Rate:	> 1
Flammability (solid, gas):	No data available.
Explosive Limits:	LEL: 1.2 % UEL: 36 %
Vapor Pressure (vs. Air or mm Hg):	40 mm Hg - (of VOC) at 68.0 F
Vapor Density (vs. Air = 1):	> 1

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Specific Gravity (Water = 1):	0.89
Density:	7.451 LB/GL at 77.0 F
Solubility in Water:	Partially
Octanol/Water Partition Coefficient:	N.D.
Percent Volatile:	98.0 % by weight.
VOC / Volume:	49.1000 % WT
Autoignition Pt:	N.D.
Decomposition Temperature:	N.D.
Viscosity:	N.D.

10. STABILITY AND REACTIVITY

Stability:	Unstable [] Stable [X]
Conditions To Avoid - Instability:	None known.
Incompatibility - Materials To Avoid:	Incompatible with strong oxidizing agents; strong caustics; strong alkalis; oxygen; nitrogen peroxide; chemically active metals such as aluminum or magnesium; sodium; potassium; and nitric acid.
Hazardous Decomposition or Byproducts:	Thermal decomposition may produce hydrogen chloride; chlorine gas; small quantities of phosgene; carbon monoxide; carbon dioxide; formaldehyde; and unidentified organic compounds in black smoke.
Possibility of Hazardous Reactions:	Will occur [] Will not occur [X]
Conditions To Avoid - Hazardous Reactions:	None known.

11. TOXICOLOGICAL INFORMATION

Toxicological Information:	This product has not been tested as a whole. Refer to section 2 for acute and chronic effects. Information below is for ingredients.

CAS# 108-88-3:

Reproductive Effects:, TCLo, Inhalation, Rat, 800.0 MG/M3, 6 H, female 14-20 day(s) after conception.

Result:

Effects on Embryo or Fetus: Fetotoxicity (except death, e.g., stunted fetus).

Effects on Newborn: Behavioral.

- Brazilian Journal of Medical and Biological Research., Vol/p/yr: 23,533, 1990

Standard Draize Test, Eyes, Species: Rabbit, 2.000 MG, 24 H, Severe.

Result:

Effects on Embryo or Fetus: Other effects to embryo.

Specific Developmental Abnormalities: Eye, ear.

- Prehled Prumyslove Toxikologie, Marhold, J., Organické Latky, Prague Czechoslovakia, Vol/p/yr: -,29, 1986

CAS# 75-09-2:

Tumorigenic Effects:, TCLo, Inhalation, Rat, 3500. PPM, 6 Y.

Result:

Tumorigenic: Carcinogenic by RTECS criteria.

Endocrine: Tumors.

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- Fundamental and Applied Toxicology., Academic Press, Inc., 1 E. First St., Duluth, MN 55802, Vol/p/yr: 4,30, 1984

Standard Draize Test, Eyes, Species: Rabbit, 100.0 MG, Severe.

Result:

Effects on Newborn: Growth statistics (e.g., reduced weight gain).

Effects on Newborn: Physical.

- Union Carbide Data Sheet, Union Carbide Corp., 39 Old Ridgebury Rd., Danbury, CT 06817, Vol/p/yr: 4/25, 1958

Standard Draize Test, Skin, Species: Rabbit, 810.0 MG, 24 H, Severe.

Result:

Specific Developmental Abnormalities: Musculoskeletal system.

- European Journal of Toxicology and Environmental Hygiene., For publisher information, see TOERD9, Paris France, Vol/p/yr: 9,171, 1976

CAS# 67-64-1:

Standard Draize Test, Eyes, Species: Rabbit, 20.00 MG, Severe.

Result:

Behavioral: Change in motor activity (specific assay).

Behavioral: Alteration of classical conditioning.

- American Journal of Ophthalmology., Ophthalmic Pub. Co., 435 N. Michigan Ave., Suite 1415, Chicago, IL 60611, Vol/p/yr: 29,1363, 1946

Carcinogenicity/Other Information:

IARC 2B - Possibly Carcinogenic to Humans

IARC 3: Not Classifiable as to Carcinogenicity in Humans.

ACGIH A3 - Confirmed Animal Carcinogen with Unknown Relevance to Humans

ACGIH A4 - Not Classifiable as a Human Carcinogen.

CAS #	Hazardous Components (Chemical Name)	NTP	IARC	ACGIH	OSHA
108-88-3	Toluene {Benzene, Methyl-, Toluol}	n.a.	3	A4	n.a.
75-09-2	Dichloromethane {Methylene chloride; R-30; Freon 30}	Possible	2B	A3	Yes
67-64-1	Acetone {2-Propanone}	n.a.	n.a.	A4	n.a.
67-56-1	Methanol {Methyl alcohol; Carbinol; Wood alcohol}	n.a.	n.a.	n.a.	n.a.

12. ECOLOGICAL INFORMATION**General Ecological Information:**

No information available for this product as a whole.

13. DISPOSAL CONSIDERATIONS**Waste Disposal Method:**

Dispose of in accordance with local, state, and federal laws.

Do not place material in general trash.

Do not allow material to enter bodies of water or sewers.

14. TRANSPORT INFORMATION

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LAND TRANSPORT (US DOT):

DOT Proper Shipping Name: Paint Related Material

DOT Hazard Class: 3 FLAMMABLE LIQUID

UN/NA Number: UN1263

Packing Group: II



LAND TRANSPORT (Canadian TDG):

TDG Shipping Name:

UN Number: 1263

Packing Group: II

Hazard Class: 3 - FLAMMABLE LIQUID

TDG Classification:

Additional Transport Information:

The supplier may apply one of the following exceptions: Combustible Liquid, Consumer Commodity, Limited Quantity, Viscous Liquid, Does Not Sustain Combustion, or others, as allowed under 49CFR Hazmat Regulations. Please consult 49CFR Subchapter C to ensure that subsequent shipments comply with these exceptions.

15. REGULATORY INFORMATION

EPA SARA (Superfund Amendments and Reauthorization Act of 1986) Lists

CAS #	Hazardous Components (Chemical Name)	S. 302 (EHS)	S. 304 RQ	S. 313 (TRI)
108-88-3	Toluene {Benzene, Methyl-; Toluol}	No	Yes 1000 LB	Yes
75-09-2	Dichloromethane {Methylene chloride; R-30; Freon 30}	No	Yes 1000 LB	Yes
67-64-1	Acetone {2-Propanone}	No	Yes 5000 LB	No
67-56-1	Methanol {Methyl alcohol; Carbinol; Wood alcohol}	No	Yes 5000 LB	Yes

CAS #	Hazardous Components (Chemical Name)	Other US EPA or State Lists
108-88-3	Toluene {Benzene, Methyl-; Toluol}	CAA HAP, ODC: HAP: VHAP CWA NPDES TSCA: Inventory, 8A CAIR CA PROP.65: Yes: RDTox(F)
75-09-2	Dichloromethane {Methylene chloride; R-30; Freon 30}	CAA HAP, ODC: HAP: VHAP CWA NPDES TSCA: Inventory, 8A CAIR CA PROP.65: Yes: Canc.
67-64-1	Acetone {2-Propanone}	TSCA: Inventory
67-56-1	Methanol {Methyl alcohol; Carbinol; Wood alcohol}	CAA HAP, ODC: HAP: VHAP TSCA: Inventory CA PROP.65: Yes: RDTox.

Regulatory Information:

This product is regulated by the United States Consumer Product Safety Commission and is subject to certain labeling requirements under the Federal Hazardous Substances Act. These requirements differ from the classification criteria and hazard information required for safety data sheets (SDS). The product label also includes other important information, including directions for use, and should always be read in its entirety prior to using the product.

Klean-Strip Aircraft Fiberglass Paint Remover

Revision: 05/01/2019

Supersedes Revision: 01/29/2019

Additional Regulatory Information	This chemical/product is not and cannot be distributed in commerce (as defined in TSCA section 3(5)) or processed (as defined in TSCA section 3(13)) for consumer paint or coating removal.

16. OTHER INFORMATION

Revision Date: 05/01/2019
Preparer Name: W.M. Barr EHS Dept (901)775-0100

Additional Information About This Product: N.D. - Not determined.

Company Policy or Disclaimer: The information contained herein is presented in good faith and believed to be accurate as of the effective date shown above. This information is furnished without warranty of any kind. Employers should use this information only as a supplement to other information gathered by them and must make independent determination of suitability and completeness of information from all sources to assure proper use of these materials and the safety and health of employees. Any use of this data and information must be determined by the user to be in accordance with applicable federal, state and local laws and regulations.

Klean Strip Aircraft Low Odor Paint Remover

Revision: 05/01/2019

Supersedes Revision: 04/17/2015

1. PRODUCT AND COMPANY IDENTIFICATION

Product Name:	Klean Strip Aircraft Low Odor Paint Remover	
Company Name:	W. M. Barr 2105 Channel Avenue Memphis, TN 38113	Phone Number: (901)775-0100
Web site address:	www.wmbarr.com	
Emergency Contact:	3E 24 Hour Emergency Contact	(800)451-8346
Information:	W.M. Barr Customer Service	(800)398-3892
Intended Use:	Paint/Varnish Remover	
Product Code:	CAR777, GAR777, QAR777	
Additional Information	This chemical/product is not and cannot be distributed in commerce (as defined in TSCA section 3(5)) or processed (as defined in TSCA section 3(13)) for consumer paint or coating removal.	

2. HAZARDS IDENTIFICATION

Acute Toxicity: Oral, Category 4
Acute Toxicity: Inhalation, Category 4
Skin Corrosion/Irritation, Category 1A-1C
Serious Eye Damage/Eye Irritation, Category 2A
Carcinogenicity, Category 1B
Specific Target Organ Toxicity (single exposure), Category 1



GHS Signal Word: **Danger**

GHS Hazard Phrases:

- Harmful if swallowed.
- Causes severe skin burns and eye damage.
- Causes serious eye irritation.
- Harmful if inhaled.
- May cause cancer.
- Causes damage to organs.

GHS Precautionary Phrases:

- Obtain special instructions before use.
- Do not handle until all safety precautions have been read and understood.
- Do not breathe gas/mist/vapors/spray.
- Wash hands thoroughly after handling.
- Do not eat, drink or smoke when using this product.
- Use only outdoors or in a well-ventilated area.
- Wear {protective gloves/protective clothing/eye protection/face protection}.

GHS Response Phrases:

- IF SWALLOWED: Call a POISON CENTER or doctor/physician if you feel unwell.
- IF ON SKIN (or hair): Remove/take off immediately all contaminated clothing. Rinse skin with water/shower.
- IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing.
- IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
- IF exposed: Call a POISON CENTER or doctor/physician.
- IF exposed or concerned: Get medical attention/advice.
- Immediately call a POISON CENTER or doctor/physician.
- Specific treatment see label.
- Rinse mouth.

Klean Strip Aircraft Low Odor Paint Remover

Revision: 05/01/2019

Supersedes Revision: 04/17/2015

GHS Storage and Disposal Phrases:

If eye irritation persists, get medical advice/attention.
Wash contaminated clothing before reuse.
Store locked up.
Dispose of contents/container according to local, state and federal regulations.

OSHA Regulatory Status:

This material is classified as hazardous under OSHA regulations.

Potential Health Effects (Acute and Chronic):

This product has not been tested as a whole to determine health effects. The health effects listed below are associated with the individual ingredients listed in Section 3.

EYES: Causes eye irritation. May cause tearing, redness, stinging or burning, swelling, and blurred vision. May cause corneal injury.

SKIN: May cause effects ranging from mild irritation to severe pain, and possibly burns, depending on the intensity of contact. Skin absorption may occur.

INHALATION: May cause upper respiratory tract irritation and central nervous system depression with symptoms such as confusion, lightheadedness, dizziness, nausea, vomiting, headache, and fatigue. Causes formation of carbon monoxide in blood which may affect the cardiovascular system and central nervous system, and can cause a lack of oxygen in the blood. Continued exposure may cause unconsciousness, coma, and even death.

INGESTION: May cause nausea, vomiting, and diarrhea. May cause central nervous system excitement, followed by headache, dizziness, and drowsiness. If vomiting results in aspiration, chemical pneumonia could occur, which may be fatal. Absorption through the gastrointestinal tract may produce central nervous system depression. May cause kidney damage. May cause blurred vision and visual impairment (including blindness).

CHRONIC OVEREXPOSURE EFFECTS: May cause liver and kidney damage. May cause cancer based on animal data (methylene chloride). Prolonged or repeated skin contact may cause defatting and dermatitis.

Methanol has caused birth defects in laboratory animals, but only when inhaled at extremely high vapor concentrations. The relevance of this finding to humans is uncertain.

Reports have associated repeated and prolonged overexposure to solvents with neurological and other physiological damage. Intentional misuse by deliberately concentrating and inhaling solvents may be harmful or fatal.

ADDITIONAL DATA:

For Methylene Chloride: Alcohol may enhance the toxic effects. May cross the placenta. May be excreted in breast milk. Concurrent exposure to carbon monoxide, smoking, or physical activity may increase the level of carboxyhemoglobin in the blood resulting in additive effects.

TARGET ORGANS: blood, central nervous system, liver, skin, cardiovascular system, eyes, kidney, pancreas, heart, lungs, brain

PRIMARY ROUTES OF ENTRY: skin, eyes, inhalation, ingestion

Medical Conditions Generally Aggravated By Exposure:

Disorders of the heart or cardiovascular system, kidney, liver, nervous system, respiratory system, skin, and other allergies.

Klean Strip Aircraft Low Odor Paint Remover

Revision: 05/01/2019

Supersedes Revision: 04/17/2015

3. COMPOSITION/INFORMATION ON INGREDIENTS

CAS #	Hazardous Components (Chemical Name)	Concentration
75-09-2	Dichloromethane {Methylene chloride; R-30; Freon 30}	80.0 -90.0 %
67-56-1	Methanol {Methyl alcohol; Carbinol; Wood alcohol}	5.0 -10.0 %
544-60-5	Ammonium oleate	< 5.0 %
64742-47-8	Hydrotreated light distillate (petroleum, mineral spirits)	< 5.0 %

Additional Chemical Information

Specific percentage of composition is being withheld as a trade secret.

4. FIRST AID MEASURES

Emergency and First Aid Procedures:

Skin:

Immediately begin washing the skin thoroughly with large amounts of water and mild soap, if available, while removing contaminated clothing. Seek medical attention if irritation develops or persists.

Eyes:

Immediately begin to flush eyes with water, remove any contact lens. Continue to flush the eyes for at least 15 minutes. Seek medical attention.

Inhalation:

Remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get immediate medical attention.

Ingestion:

If swallowed, do NOT induce vomiting. Seek immediate medical attention. Call a physician, hospital emergency room, or poison control center immediately. Never give anything by mouth to an unconscious person.

Signs and Symptoms Of Exposure:

See Potential Health Effects.

Note to Physician:

THIS PRODUCT CONTAINS METHYLENE CHLORIDE AND LESS THAN 4% METHANOL.

These metabolites can cause metabolic acidosis, visual disturbances and blindness. Since metabolism is required for these toxic symptoms, their onset may be delayed from 6 to 30 hours following ingestion. Ethanol competes for the same metabolic pathway and has been used to prevent methanol metabolism. Ethanol administration is indicated in symptomatic patients or at blood methanol concentrations above 20 ug/dl. Methanol is effectively removed by hemodialysis. Adrenalin should never be given to a person overexposed to methylene chloride.

This material sensitizes the heart to the effects of sympathomimetic amines. Epinephrine and other sympathomimetic drugs may initiate cardiac arrhythmia in individuals exposed to this material. This material is metabolized to carbon monoxide. Consequently, elevations in carboxyhemoglobin as high as 50% have been reported, and levels may continue to rise for several hours after exposure has ceased. Data in experimental animals suggest there is a narrow margin between concentrations causing anesthesia and death.

Klean Strip Aircraft Low Odor Paint Remover

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Supersedes Revision: 04/17/2015

5. FIRE FIGHTING MEASURES

Flash Pt:	No data.
Explosive Limits:	LEL: No data. UEL: No data.
Autoignition Pt:	No data.
Suitable Extinguishing Media:	Use carbon dioxide, dry powder, foam, or water spray.
Unsuitable Extinguishing Media:	None known.
Fire Fighting Instructions:	Self-contained respiratory protection should be provided for fire fighters fighting fire in buildings or confined areas. Storage containers exposed to fire should be kept cool with water spray to prevent pressure build-up. Stay away from heads of containers that have been exposed to intense heat or flame.
Flammable Properties and Hazards:	Flashpoint: No flash to boiling.
Hazardous Combustion Products:	carbon monoxide, carbon dioxide, hydrogen chloride, chlorine, phosgene

6. ACCIDENTAL RELEASE MEASURES

Steps To Be Taken In Case Material Is Released Or Spilled:	Clean up: Keep unnecessary people away; isolate hazard area and deny entry. Stay upwind, out of low areas, and ventilate closed spaces before entering. Shut off ignition sources; keep flares, smoking or flames out of hazard area. Use non-sparking tools. Use proper bonding and grounding methods for all equipment and processes. Keep out of waterways and bodies of water. Be cautious of vapors collecting in small enclosed spaces, sewers, low lying areas, confined spaces, etc. Small spills: Take up with sand, earth or other noncombustible absorbent material and place in a plastic container where applicable. Large spills: Dike far ahead of spill for reclamation or disposal. Waste Disposal: Dispose in accordance with applicable local, state and federal regulations.

7. HANDLING AND STORAGE

Precautions To Be Taken in Handling:	Read carefully all cautions and directions on product label before use. Since empty container retains residue, follow all label warnings even after container is empty. Dispose of empty container according to all regulations. Do not reuse this container. Avoid breathing of vapors or mist. Avoid contact with eyes and skin. A source of clean water should be available in or near the work area for flushing of the eyes and skin if contact occurs.
Precautions To Be Taken in Storing:	Store in a cool, dry place. Exposure to temperatures in excess of 90 degrees Fahrenheit or prolonged exposure to sun may cause can to leak or swell. Once opened, remover should be used within six months or discarded to avoid can deterioration. Do not store near flames or at elevated temperatures.

Klean Strip Aircraft Low Odor Paint Remover

Revision: 05/01/2019

Supersedes Revision: 04/17/2015

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

CAS #	Chemical Name	Jurisdiction	Recommended Exposure Limits	Notations
75-09-2	Dichloromethane {Methylene chloride; R-30; Freon 30}	ACGIH TLV	TLV: 50 ppm	
		OSHA PELs	PEL: 25 ppm STEL: 125 ppm (15 min)	
67-56-1	Methanol {Methyl alcohol; Carbinol; Wood alcohol}	ACGIH TLV	TLV: 200 ppm STEL: 250 ppm	
		OSHA PELs	PEL: 200 ppm	
64742-47-8	Hydrotreated light distillate (petroleum, mineral spirits)	ACGIH TLV	TLV: 200 mg/m3	
Respiratory Equipment (Specify Type):		For use in areas with inadequate ventilation or fresh air, wear a properly maintained and properly fitted NIOSH approved self-contained breathing apparatus or powered air supply respirator or loose fitting hood.		
		For OSHA controlled work places and other regular users - Use only with adequate ventilation under engineered air control systems designed to prevent exceeding the appropriate TLV.		
		A dust mask does not provide protection against vapors.		
Eye Protection:		Safety glasses, chemical goggles, or face shields are recommended to safeguard against potential eye contact, irritation, or injury. Chemical goggles or face shields are recommended when splashing or spraying of chemical is possible. A faceshield provides more protection to help reduce chemical contact to the face and eyes.		
Protective Gloves:		Wear gloves with as much resistance to the chemical ingredients as possible. Laminate film gloves offer the best protection. Other glove materials, such as nitrile rubber, neoprene, and PVC will be degraded by methylene chloride, but may provide protection for some amount of time, based on the type of glove and the conditions of use. Consult your glove supplier for additional information. Gloves contaminated with product should be discarded and not reused.		
Other Protective Clothing:		OTHER PROTECTION: Various application methods can dictate use of additional protective safety equipment, such as impermeable aprons, etc., to minimize exposure.		
Engineering Controls (Ventilation etc.):		Use process enclosures, local exhaust ventilation, or other engineering controls to control airborne levels below recommended exposure limits.		
		Use only with adequate ventilation to prevent buildup of vapors. Do not use in areas where vapors can accumulate and concentrate, such as basements, bathrooms or small enclosed areas. Whenever possible, use outdoors in an open air area. If using indoors open all windows and doors and maintain a cross ventilation of moving fresh air across the work area. If strong odor is noticed or you experience slight dizziness, headache, nausea or eye-watering -- STOP -- ventilation is inadequate. Leave area immediately and move to fresh air.		
Work/Hygienic/Maintenance Practices:		Wash hands thoroughly after use and before eating, drinking, or smoking.		
		Do not eat, drink, or smoke in the work area.		

Klean Strip Aircraft Low Odor Paint Remover

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Discard any clothing or other protective equipment that cannot be decontaminated.

Facilities storing or handling this material should be equipped with an emergency eyewash and safety shower.

9. PHYSICAL AND CHEMICAL PROPERTIES

Physical States:	[] Gas [X] Liquid [] Solid	
Appearance and Odor:	Thick, orange to yellow opaque paste.	
pH:	8.5 - 10.5	
Melting Point:	No data.	
Boiling Point:	105.00 F - 300.00 F	
Flash Pt:	No data.	
Evaporation Rate:	No data.	
Flammability (solid, gas):	No data available.	
Explosive Limits:	LEL: No data.	UEL: No data.
Vapor Pressure (vs. Air or mm Hg):	286.5 mm HG at 68.0 F	
Vapor Density (vs. Air = 1):	> 1	
Specific Gravity (Water = 1):	No data.	
Density:	10.04 LB/GL	
Solubility in Water:	Slight	
Octanol/Water Partition Coefficient:	No data.	
Percent Volatile:	95.0 % by weight.	
VOC / Volume:	71.0000 G/L	
Autoignition Pt:	No data.	
Decomposition Temperature:	No data.	
Viscosity:	80 - 90 KU	

10. STABILITY AND REACTIVITY

Stability:	Unstable [] Stable [X]
Conditions To Avoid - Instability:	No data available.
Incompatibility - Materials To Avoid:	Bases, oxygen, sodium, potassium, strong oxidizers, reactive metals, strong acids
Hazardous Decomposition or Byproducts:	Hydrogen chloride, chlorine, phosgene, carbon monoxide, carbon dioxide
Possibility of Hazardous Reactions:	Will occur [] Will not occur [X]
Conditions To Avoid - Hazardous Reactions:	No data available.

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11. TOXICOLOGICAL INFORMATION

Toxicological Information: This product has not been tested as a whole. Refer to section 2 for acute and chronic effects.

CAS# 75-09-2:
 Tumorigenic Effects: TLo, Inhalation, Rat, 3500. PPM, 6 Y.
 Result:
 Tumorigenic: Carcinogenic by RTECS criteria.
 Endocrine: Tumors.
 - Fundamental and Applied Toxicology., Academic Press, Inc., 1 E. First St., Duluth, MN 55802, Vol/p/yr: 4,30, 1984

Standard Draize Test, Eyes, Species: Rabbit, 100.0 MG, Severe.
 Result:
 Effects on Newborn: Growth statistics (e.g., reduced weight gain).
 Effects on Newborn: Physical.
 - Union Carbide Data Sheet, Union Carbide Corp., 39 Old Ridgebury Rd., Danbury, CT 06817, Vol/p/yr: 4/25, 1958

Standard Draize Test, Skin, Species: Rabbit, 810.0 MG, 24 H, Severe.
 Result:
 Specific Developmental Abnormalities: Musculoskeletal system.
 - European Journal of Toxicology and Environmental Hygiene., For publisher information, see TOERD9, Paris France, Vol/p/yr: 9,171, 1976

Carcinogenicity/Other Information:

IARC 2B - Possibly Carcinogenic to Humans
 ACGIH A3 - Confirmed Animal Carcinogen with Unknown Relevance to Humans

CAS #	Hazardous Components (Chemical Name)	NTP	IARC	ACGIH	OSHA
75-09-2	Dichloromethane {Methylene chloride; R-30; Freon 30}	Possible	2B	A3	Yes
67-56-1	Methanol {Methyl alcohol; Carbinol; Wood alcohol}	n.a.	n.a.	n.a.	n.a.
544-60-5	Ammonium oleate	n.a.	n.a.	n.a.	n.a.
64742-47-8	Hydrotreated light distillate (petroleum, mineral spirits)	n.a.	n.a.	A4	n.a.

12. ECOLOGICAL INFORMATION

General Ecological Information: This product has not been tested as a whole.

13. DISPOSAL CONSIDERATIONS

Waste Disposal Method: Dispose in accordance with applicable local, state and federal regulations.

14. TRANSPORT INFORMATION

LAND TRANSPORT (US DOT):

DOT Proper Shipping Name: Paint Related Material

DOT Hazard Class: 8 CORROSIVE

UN/NA Number: UN3066

Packing Group: II



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Additional Transport Information: The shipper/supplier may apply one of the following exceptions: Combustible Liquid, Consumer Commodity, Limited Quantity, Viscous Liquid, Does Not Sustain Combustion, or others, as allowed under 49CFR Hazmat Regulations. Please consult 49CFR Subchapter C to ensure that subsequent shipments comply with these exceptions.

15. REGULATORY INFORMATION

EPA SARA (Superfund Amendments and Reauthorization Act of 1986) Lists

CAS #	Hazardous Components (Chemical Name)	S. 302 (EHS)	S. 304 RQ	S. 313 (TRI)
75-09-2	Dichloromethane {Methylene chloride; R-30; Freon 30}	No	Yes 1000 LB	Yes
67-56-1	Methanol {Methyl alcohol; Carbinol; Wood alcohol}	No	Yes 5000 LB	Yes
544-60-5	Ammonium oleate	No	No	No
64742-47-8	Hydrotreated light distillate (petroleum, mineral spirits)	No	No	No

CAS #	Hazardous Components (Chemical Name)	Other US EPA or State Lists
75-09-2	Dichloromethane {Methylene chloride; R-30; Freon 30}	CAA HAP, ODC: HAP: VHAP CWA NPDES TSCA: Inventory, 8A CAIR CA PROP.65: Yes: Canc.
67-56-1	Methanol {Methyl alcohol; Carbinol; Wood alcohol}	CAA HAP, ODC: HAP: VHAP TSCA: Inventory CA PROP.65: Yes: RDTox.
544-60-5	Ammonium oleate	TSCA: Inventory
64742-47-8	Hydrotreated light distillate (petroleum, mineral spirits)	TSCA: Inventory

Regulatory Information: This product is regulated by the United States Consumer Product Safety Commission and is subject to certain labeling requirements under the Federal Hazardous Substances Act. These requirements differ from the classification criteria and hazard information required for safety data sheets (SDS). The product label also includes other important information, including directions for use, and should always be read in its entirety prior to using the product.

Additional Regulatory Information: This chemical/product is not and cannot be distributed in commerce (as defined in TSCA section 3(5)) or processed (as defined in TSCA section 3(13)) for consumer paint or coating removal.

16. OTHER INFORMATION

Revision Date: 05/01/2019
Preparer Name: W.M. Barr EHS Dept (901)775-0100

Additional Information About This Product: No data available.

Company Policy or Disclaimer: The information contained herein is presented in good faith and believed to be accurate as of the effective date shown above. This information is furnished without warranty of any kind. Employers should use this information only as a supplement to other information gathered by them and must make independent determination of suitability and completeness of information from all sources to assure proper use of these materials and the safety and health of employees. Any use of this data and information must be determined by the user to be in accordance with applicable federal, state and local laws and regulations.

Klean Strip Aircraft Paint Remover Aerosol

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1. PRODUCT AND COMPANY IDENTIFICATION

Product Name:	Klean Strip Aircraft Paint Remover Aerosol	
Company Name:	W. M. Barr 2105 Channel Avenue Memphis, TN 38113	Phone Number: (901)775-0100
Web site address:	www.wmbarr.com	
Emergency Contact:	3E 24 Hour Emergency Contact	(800)451-8346
Information:	W.M. Barr Customer Service	(800)398-3892
Intended Use:	Remove a wide range of finishes from the metal surfaces of automobiles, trucks and cycles	
Product Code:	EAR322, EAR322CN	
Additional Information	This chemical/product is not and cannot be distributed in commerce (as defined in TSCA section 3(5)) or processed (as defined in TSCA section 3(13)) for consumer paint or coating removal.	

2. HAZARDS IDENTIFICATION

Flammable Aerosols, Category 2
 Gas Under Pressure, Liquefied gas
 Acute Toxicity: Inhalation, Category 4
 Skin Corrosion/Irritation, Category 2
 Serious Eye Damage/Eye Irritation, Category 1
 Germ Cell Mutagenicity, Category 1A
 Carcinogenicity, Category 1B
 Specific Target Organ Toxicity (single exposure), Category 1
 Simple Asphyxiant



GHS Signal Word: Danger

GHS Hazard Phrases:

- Flammable aerosol.
- Containers gas under pressure; may explode if heated.
- Causes skin irritation.
- Causes serious eye damage.
- Harmful if inhaled.
- May cause genetic defects.
- May cause cancer.
- Causes damage to organs.

GHS Precautionary Phrases:

- Obtain special instructions before use.
- Do not handle until all safety precautions have been read and understood.
- Keep away from heat/sparks/open flames/hot surfaces. - No smoking.
- Do not spray on an open flame or any other ignition source.
- Pressurized container: Do not pierce or burn, even after use.
- Do not breathe gas/mist/vapors/spray.
- Wash hands thoroughly after handling.
- Do not eat, drink or smoke when using this product.
- Use only outdoors or in a well-ventilated area.
- Wear protective gloves/protective clothing/eye protection/face protection.
- Use personal protective equipment as required.

GHS Response Phrases:

- IF ON SKIN: Wash with plenty of soap and water.
- IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for

Klean Strip Aircraft Paint Remover Aerosol

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	breathing. IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. IF exposed: Call a POISON CENTER or doctor/physician. IF exposed or concerned: Get medical attention/advice. Immediately call a POISON CENTER or doctor/physician. Specific treatment see label. If skin irritation occurs, get medical advice/attention. Take off contaminated clothing and wash before re-use.
GHS Storage and Disposal Phrases:	Store locked up. Protect from sunlight and store in well-ventilated place. Do not expose to temperatures exceeding 50 °C/122 °F. Dispose of contents/container according to local, state and federal regulations.
OSHA Regulatory Status:	This material is classified as hazardous under OSHA regulations.
Potential Health Effects (Acute and Chronic):	See above.

3. COMPOSITION/INFORMATION ON INGREDIENTS

CAS #	Hazardous Components (Chemical Name)	Concentration
75-09-2	Dichloromethane {Methylene chloride; R-30; Freon 30}	60.0 -80.0 %
68476-86-8	Liquified petroleum gas, sweetened {propane, isobutane, n-butane}	10.0 -30.0 %
67-56-1	Methanol {Methyl alcohol; Carbinol; Wood alcohol}	1.0 -5.0 %
9016-45-9	Poly(oxy-1,2-ethanediyl), .alpha.-(nonylphenyl)-.omega.-hydr {Nonylphenol Ethoxylate}	1.0 -5.0 %

Additional Chemical Information Specific percentage of composition is being withheld as a trade secret.

4. FIRST AID MEASURES

Emergency and First Aid Procedures:	INHALATION: If user experiences breathing difficulty, move to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical attention. SKIN CONTACT: Wash with soap and water. Get medical attention if irritation from contact persists. EYE CONTACT: Immediately flush eyes with water, remove any contact lens, continue flushing with water for at least 15 minutes. Get medical attention. INGESTION: Call your poison control center, hospital emergency room, or physician immediately for instructions.
Signs and Symptoms Of Exposure:	Refer to section 2.

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Note to Physician:

5. FIRE FIGHTING MEASURES

	Flammable Aerosol Level 1
Flash Pt:	NA
Explosive Limits:	LEL: N.D. UEL: N.D.
Autoignition Pt:	N.D.
Suitable Extinguishing Media:	Use carbon dioxide, dry powder, or foam.
Unsuitable Extinguishing Media:	None known.
Fire Fighting Instructions:	Self-contained respiratory protection should be provided for fire fighters fighting fires in buildings or confined areas. Storage containers exposed to fire should be kept cool with water spray to prevent pressure build-up. Stay away from heads of containers that have been exposed to intense heat or flame.
Flammable Properties and Hazards:	Contents under pressure. Do not puncture, incinerate or store above 120 degrees F. Exposure to heat or prolonged exposure to sun may cause bursting. Contact of liquid or vapor with flame or hot surfaces will produce toxic gases and a corrosive residue that will cause deterioration of metal. Flashpoint of propellant: -142.50 degrees F (closed cup)
Hazardous Combustion Products:	Combustion may produce carbon monoxide and carbon dioxide.

6. ACCIDENTAL RELEASE MEASURES

Steps To Be Taken In Case Material Is Released Or Spilled:	Absorb spill with inert material (e.g. dry sand or earth), then place in a chemical waste container.

7. HANDLING AND STORAGE

Precautions To Be Taken in Handling:	Read carefully all cautions and directions on product label before use. Since empty container retains residue, follow all label warnings even after container is empty. Dispose of empty container according to all regulations. Do not reuse this container.
Precautions To Be Taken in Storing:	Wear protective clothing and take precautions to prevent all skin and eye contact. Store in a cool place and protect from sunlight. Exposure to high temperatures or prolonged exposure to sun may cause can to leak or swell. Do not store near flames or at elevated temperatures. Replace overcap on container after each use.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

CAS #	Chemical Name	Jurisdiction	Recommended Exposure Limits	Notations
75-09-2	Dichloromethane	ACGIH TLV	TLV: 50 ppm	
	{Methylene chloride; R-30; Freon 30}	OSHA PELs	PEL: 25 ppm STEL: 125 ppm (15 min)	
68476-86-8	Liquified petroleum gas, ACGIH TLV		TLV: (1000 ppm) STEL: (—) ppm	

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CAS #	Chemical Name	Jurisdiction	Recommended Exposure Limits	Notations
sweetened {propane, isobutane, n-butane}				
68476-86-8	Liquified petroleum gas, OSHA PELs		PEL: 1000 ppm	
sweetened {propane, isobutane, n-butane}				
(continued)				
67-56-1	Methanol {Methyl alcohol; Carbinol; Wood alcohol}	ACGIH TLV	TLV: 200 ppm STEL: 250 ppm	
		OSHA PELs	PEL: 200 ppm	
Respiratory Equipment (Specify Type):	For occasional consumer use - Use with adequate ventilation to prevent a build-up of vapors in confined areas. Open windows or position fans to provide cross ventilation. If a mild to strong odor is noticeable, ventilation is not adequate. For OSHA controlled workplace and other regular users - Use only with adequate ventilation under engineered air control systems designed to prevent exceeding appropriate TLVs. For occasional use, where engineered air control is not feasible, use properly maintained and properly fitted NIOSH approved self-contained breathing apparatus for chlorinated solvent vapors. A dust mask does not provide protection against vapors.			
Eye Protection:	Safety glasses, chemical goggles, or face shields are recommended to safeguard against potential eye contact, irritation, or injury. Chemical goggles or face shields are recommended when splashing or spraying of chemical is possible. A faceshield provides more protection to help reduce chemical contact to the face and eyes.			
Protective Gloves:	Wear gloves with as much resistance to the chemical ingredients as possible. Laminate film gloves offer the best protection. Other glove materials will be degraded by methylene chloride, but may provide protection for some amount of time, based on the type of glove and the conditions of use. Consult your glove supplier for additional information. Gloves contaminated with product should be discarded and not reused.			
Other Protective Clothing:	Various application methods can dictate use of additional protective safety equipment, such as impermeable aprons, etc., to minimize exposure.			
Engineering Controls (Ventilation etc.):	Use only with adequate ventilation to prevent buildup of vapors. Do not use in areas where vapors can accumulate and concentrate, such as basements, bathrooms or small enclosed areas. Whenever possible, use outdoors in an open air area. If using indoors open all windows and doors and maintain a cross ventilation of moving fresh air across the work area. If strong odor is noticed or you experience slight dizziness, headache, nausea or eye-watering -- STOP -- ventilation is inadequate. Leave area immediately and move to fresh air.			
Work/Hygienic/Maintenance Practices:	A source of clean water should be available in the work area for flushing of the eyes and skin. Wash hands thoroughly after use. Do not eat, drink, or smoke in the work area. Before reuse, thoroughly clean any clothing or protective equipment that has been contaminated by prior use. Discard any clothing or other protective equipment that cannot be decontaminated, such as gloves or shoes.			

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9. PHYSICAL AND CHEMICAL PROPERTIES

Physical States: ☒ Gas ☒ Liquid ☐ SolidAppearance and Odor: Yellow to orange clinging liquid.
Odor threshold not determined.

pH: N.A.

Melting Point: N.D.

Boiling Point: 104.00 F - 150.00 F

Flash Pt: NA

Evaporation Rate: < 1

Flammability (solid, gas): No data available.

Explosive Limits: LEL: N.D. UEL: N.D.

Vapor Pressure (vs. Air or mm Hg): N.D.

Vapor Density (vs. Air = 1): > 1

Specific Gravity (Water = 1): 1.26

Density: 10.5 - (of liquid) LB/GL at 75.0 F

Solubility in Water: Slight

Octanol/Water Partition Coefficient: N.D.

Coefficient:

Percent Volatile: 96.1 % by weight.

VOC / Volume: 18.4000 % WT

Autoignition Pt: N.D.

Decomposition Temperature: N.D.

Viscosity: N.D.

10. STABILITY AND REACTIVITY

Stability: Unstable ☐ Stable ☒

Conditions To Avoid - None known.

Instability:

Incompatibility - Materials To Avoid: Incompatible with strong oxidizing agents; strong caustics; strong alkalis; oxygen; nitrogen peroxide; chemically active metals such as aluminum and magnesium; sodium; potassium; and nitric acid.

Hazardous Decomposition or Byproducts: Thermal decomposition may produce carbon monoxide and carbon dioxide, hydrogen chloride, chlorine gas, and small quantities of phosgene.

Possibility of Hazardous Reactions: Will occur ☐ Will not occur ☒

Reactions:

Conditions To Avoid - None known.

Hazardous Reactions:

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11. TOXICOLOGICAL INFORMATION

Toxicological Information: This product has not been tested as a whole. Refer to section 2 for acute and chronic effects. Information below is for ingredients.

CAS# 75-09-2:
 Tumorigenic Effects: TLo, Inhalation, Rat, 3500. PPM, 6 Y.
 Result:
 Tumorigenic: Carcinogenic by RTECS criteria.
 Endocrine: Tumors.
 - Fundamental and Applied Toxicology., Academic Press, Inc., 1 E. First St., Duluth, MN 55802, Vol/p/yr: 4,30, 1984

Standard Draize Test, Eyes, Species: Rabbit, 100.0 MG, Severe.
 Result:
 Effects on Newborn: Growth statistics (e.g., reduced weight gain).
 Effects on Newborn: Physical.
 - Union Carbide Data Sheet, Union Carbide Corp., 39 Old Ridgebury Rd., Danbury, CT 06817, Vol/p/yr: 4/25, 1958

Standard Draize Test, Skin, Species: Rabbit, 810.0 MG, 24 H, Severe.
 Result:
 Specific Developmental Abnormalities: Musculoskeletal system.
 - European Journal of Toxicology and Environmental Hygiene., For publisher information, see TOERD9, Paris France, Vol/p/yr: 9,171, 1976

Carcinogenicity/Other Information: IARC 2B - Possibly Carcinogenic to Humans
 ACGIH A3 - Confirmed Animal Carcinogen with Unknown Relevance to Humans

CAS #	Hazardous Components (Chemical Name)	NTP	IARC	ACGIH	OSHA
75-09-2	Dichloromethane {Methylene chloride; R-30; Freon 30}	Possible	2B	A3	Yes
68476-86-8	Liquified petroleum gas, sweetened {propane, isobutane, n-butane}	n.a.	n.a.	n.a.	n.a.
67-56-1	Methanol {Methyl alcohol; Carbinol; Wood alcohol}	n.a.	n.a.	n.a.	n.a.
9016-45-9	Poly(oxy-1,2-ethanediyl), .alpha.-(nonylphenyl)-.omega.-hydr {Nonylphenol Ethoxylate}	n.a.	n.a.	n.a.	n.a.

12. ECOLOGICAL INFORMATION

General Ecological Information: This product has not been tested as a whole.

13. DISPOSAL CONSIDERATIONS

Waste Disposal Method: Dispose in accordance with applicable local, state, and federal regulations.

14. TRANSPORT INFORMATION

LAND TRANSPORT (US DOT):

DOT Proper Shipping Name: Aerosols, flammable

DOT Hazard Class: 2.1 FLAMMABLE GAS
UN/NA Number: UN1950



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Supersedes Revision: 01/29/2019

LAND TRANSPORT (Canadian TDG):

TDG Shipping Name:

UN Number: 1950

Hazard Class: 2.1 - FLAMMABLE GAS TDG Classification:

Additional Transport Information:

The shipper / supplier may apply one of the following exceptions: Combustible Liquid, Consumer Commodity, Limited Quantity, Viscous Liquid, Does Not Sustain Combustion, or others, as allowed under 49CFR Hazmat Regulations. Please consult 49CFR Subchapter C to ensure that subsequent shipments comply with these exceptions.

15. REGULATORY INFORMATION

EPA SARA (Superfund Amendments and Reauthorization Act of 1986) Lists

CAS #	Hazardous Components (Chemical Name)	S. 302 (EHS)	S. 304 RQ	S. 313 (TRI)
75-09-2	Dichloromethane {Methylene chloride; R-30; Freon 30}	No	Yes 1000 LB	Yes
68476-86-8	Liquified petroleum gas, sweetened {propane, isobutane, n-butane}	No	No	No
67-56-1	Methanol {Methyl alcohol; Carbinol; Wood alcohol}	No	Yes 5000 LB	Yes
9016-45-9	Poly(oxy-1,2-ethanediyl), .alpha.-(nonylphenyl)-.omega.-hydr {Nonylphenol Ethoxylate}	No	No	No

CAS #	Hazardous Components (Chemical Name)	Other US EPA or State Lists
75-09-2	Dichloromethane {Methylene chloride; R-30; Freon 30}	CAA HAP, ODC: HAP: VHAP CWA NPDES TSCA: Inventory, 8A CAIR CA PROP.65: Yes: Canc.
68476-86-8	Liquified petroleum gas, sweetened {propane, isobutane, n-butane}	TSCA: Inventory
67-56-1	Methanol {Methyl alcohol; Carbinol; Wood alcohol}	CAA HAP, ODC: HAP: VHAP TSCA: Inventory CA PROP.65: Yes: RDTox.
9016-45-9	Poly(oxy-1,2-ethanediyl), .alpha.-(nonylphenyl)-.omega.-hydr {Nonylphenol Ethoxylate}	TSCA: Inventory, 8A PAIR, 12(b)

Additional Regulatory Information

This chemical/product is not and cannot be distributed in commerce (as defined in TSCA section 3(5)) or processed (as defined in TSCA section 3(13)) for consumer paint or coating removal.

16. OTHER INFORMATION

Revision Date: 05/01/2019

Preparer Name: W.M. Barr EHS Dept (901)775-0100

Additional Information About N.D. - Not determined.

This Product:

Company Policy or

Disclaimer:

The information contained herein is presented in good faith and believed to be accurate as of the effective date shown above. This information is furnished without warranty of any kind. Employers should use this information only as a supplement to other information gathered by them and must make independent determination of suitability and completeness of information from all sources to assure proper use of these materials and the safety and health of employees. Any use of this data and information must be determined by the user to be in accordance with applicable federal, state and

SAFETY DATA SHEET

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local laws and regulations.

Klean Strip Aircraft Paint Remover for Flexible Plastic Aerosol

Revision: 05/01/2019

Supersedes Revision: 01/29/2019

1. PRODUCT AND COMPANY IDENTIFICATION

Product Name:	Klean Strip Aircraft Paint Remover for Flexible Plastic Aerosol	
Company Name:	W. M. Barr 2105 Channel Avenue Memphis, TN 38113	Phone Number: (901)775-0100
Web site address:	www.wmbarr.com	
Emergency Contact:	3E 24 Hour Emergency Contact	(800)451-8346
Information:	W.M. Barr Customer Service	(800)398-3892
Intended Use:	Remove a wide range of finishes from the metal surfaces of automobiles, trucks and cycles	
Product Code:	EUP367, EUP367CN	
Additional Information	This chemical/product is not and cannot be distributed in commerce (as defined in TSCA section 3(5)) or processed (as defined in TSCA section 3(13)) for consumer paint or coating removal.	

2. HAZARDS IDENTIFICATION

Flammable Aerosols, Category 2
Gas Under Pressure, Liquefied gas
Acute Toxicity: Inhalation, Category 4
Skin Corrosion/Irritation, Category 2
Serious Eye Damage/Eye Irritation, Category 1
Germ Cell Mutagenicity, Category 1A
Carcinogenicity, Category 1B
Specific Target Organ Toxicity (single exposure), Category 1
Simple Asphyxiant



GHS Signal Word: **Danger**

GHS Hazard Phrases:

- Flammable aerosol.
- Containers gas under pressure; may explode if heated.
- Causes skin irritation.
- Causes serious eye damage.
- Harmful if inhaled.
- May cause genetic defects.
- May cause cancer.
- Causes damage to organs.

GHS Precautionary Phrases:

- Obtain special instructions before use.
- Do not handle until all safety precautions have been read and understood.
- Keep away from heat/sparks/open flames/hot surfaces. - No smoking.
- Do not spray on an open flame or any other ignition source.
- Pressurized container: Do not pierce or burn, even after use.
- Do not breathe gas/mist/vapors/spray.
- Wash hands thoroughly after handling.
- Do not eat, drink or smoke when using this product.
- Use only outdoors or in a well-ventilated area.
- Wear protective gloves/protective clothing/eye protection/face protection.
- Use personal protective equipment as required.

GHS Response Phrases:

- IF ON SKIN: Wash with plenty of soap and water.
- IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for

Klean Strip Aircraft Paint Remover for Flexible Plastic Aerosol

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	breathing. IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. IF exposed: Call a POISON CENTER or doctor/physician. IF exposed or concerned: Get medical attention/advice. Immediately call a POISON CENTER or doctor/physician. Specific treatment see label. If skin irritation occurs, get medical advice/attention. Take off contaminated clothing and wash before re-use.
GHS Storage and Disposal Phrases:	Store locked up. Protect from sunlight and store in well-ventilated place. Do not expose to temperatures exceeding 50 °C/122 °F. Dispose of contents/container according to local, state and federal regulations.
OSHA Regulatory Status:	This material is classified as hazardous under OSHA regulations.
Potential Health Effects (Acute and Chronic):	See above.

3. COMPOSITION/INFORMATION ON INGREDIENTS

CAS #	Hazardous Components (Chemical Name)	Concentration
75-09-2	Dichloromethane {Methylene chloride; R-30; Freon 30}	60.0 -80.0 %
68476-86-8	Liquified petroleum gas, sweetened {propane, isobutane, n-butane}	10.0 -30.0 %
67-56-1	Methanol {Methyl alcohol; Carbinol; Wood alcohol}	1.0 -5.0 %
9016-45-9	Poly(oxy-1,2-ethanediyl), .alpha.-(nonylphenyl)-.omega.-hydr {Nonylphenol Ethoxylate}	1.0 -5.0 %

Additional Chemical Information Specific percentage of composition is being withheld as a trade secret.

4. FIRST AID MEASURES

Emergency and First Aid Procedures:	INHALATION: If user experiences breathing difficulty, move to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical attention. SKIN CONTACT: Wash with soap and water. Get medical attention if irritation from contact persists. EYE CONTACT: Immediately flush eyes with water, remove any contact lens, continue flushing with water for at least 15 minutes. Get medical attention. INGESTION: Call your poison control center, hospital emergency room, or physician immediately for instructions.
Signs and Symptoms Of Exposure:	Refer to section 2.

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Revision: 05/01/2019

Supersedes Revision: 01/29/2019

Note to Physician:

5. FIRE FIGHTING MEASURES

	Flammable Aerosol Level 1
Flash Pt:	NA
Explosive Limits:	LEL: N.D. UEL: N.D.
Autoignition Pt:	N.D.
Suitable Extinguishing Media:	Use carbon dioxide, dry powder, or foam.
Unsuitable Extinguishing Media:	None known.
Fire Fighting Instructions:	Self-contained respiratory protection should be provided for fire fighters fighting fires in buildings or confined areas. Storage containers exposed to fire should be kept cool with water spray to prevent pressure build-up. Stay away from heads of containers that have been exposed to intense heat or flame.
Flammable Properties and Hazards:	Contents under pressure. Do not puncture, incinerate or store above 120 degrees F. Exposure to heat or prolonged exposure to sun may cause bursting. Contact of liquid or vapor with flame or hot surfaces will produce toxic gases and a corrosive residue that will cause deterioration of metal. Flashpoint of propellant: -142.50 degrees F (closed cup)
Hazardous Combustion Products:	Combustion may produce carbon monoxide and carbon dioxide.

6. ACCIDENTAL RELEASE MEASURES

Steps To Be Taken In Case Material Is Released Or Spilled:	Absorb spill with inert material (e.g. dry sand or earth), then place in a chemical waste container.

7. HANDLING AND STORAGE

Precautions To Be Taken in Handling:	Read carefully all cautions and directions on product label before use. Since empty container retains residue, follow all label warnings even after container is empty. Dispose of empty container according to all regulations. Do not reuse this container.
Precautions To Be Taken in Storing:	Wear protective clothing and take precautions to prevent all skin and eye contact. Store in a cool place and protect from sunlight. Exposure to high temperatures or prolonged exposure to sun may cause can to leak or swell. Do not store near flames or at elevated temperatures. Replace overcap on container after each use.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

CAS #	Chemical Name	Jurisdiction	Recommended Exposure Limits	Notations
75-09-2	Dichloromethane	ACGIH TLV	TLV: 50 ppm	
	{Methylene chloride; R-30; Freon 30}	OSHA PELs	PEL: 25 ppm STEL: 125 ppm (15 min)	
68476-86-8	Liquified petroleum gas, ACGIH TLV		TLV: (1000 ppm) STEL: (—) ppm	

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CAS #	Chemical Name	Jurisdiction	Recommended Exposure Limits	Notations
sweetened {propane, isobutane, n-butane}				
68476-86-8	Liquified petroleum gas, OSHA PELs		PEL: 1000 ppm	
sweetened {propane, isobutane, n-butane}				
(continued)				
67-56-1	Methanol {Methyl alcohol; Carbinol; Wood alcohol}	ACGIH TLV	TLV: 200 ppm STEL: 250 ppm	
		OSHA PELs	PEL: 200 ppm	
Respiratory Equipment (Specify Type):	For occasional consumer use - Use with adequate ventilation to prevent a build-up of vapors in confined areas. Open windows or position fans to provide cross ventilation. If a mild to strong odor is noticeable, ventilation is not adequate. For OSHA controlled workplace and other regular users - Use only with adequate ventilation under engineered air control systems designed to prevent exceeding appropriate TLVs. For occasional use, where engineered air control is not feasible, use properly maintained and properly fitted NIOSH approved self-contained breathing apparatus for chlorinated solvent vapors. A dust mask does not provide protection against vapors.			
Eye Protection:	Safety glasses, chemical goggles, or face shields are recommended to safeguard against potential eye contact, irritation, or injury. Chemical goggles or face shields are recommended when splashing or spraying of chemical is possible. A faceshield provides more protection to help reduce chemical contact to the face and eyes.			
Protective Gloves:	Wear gloves with as much resistance to the chemical ingredients as possible. Laminate film gloves offer the best protection. Other glove materials will be degraded by methylene chloride, but may provide protection for some amount of time, based on the type of glove and the conditions of use. Consult your glove supplier for additional information. Gloves contaminated with product should be discarded and not reused.			
Other Protective Clothing:	Various application methods can dictate use of additional protective safety equipment, such as impermeable aprons, etc., to minimize exposure.			
Engineering Controls (Ventilation etc.):	Use only with adequate ventilation to prevent buildup of vapors. Do not use in areas where vapors can accumulate and concentrate, such as basements, bathrooms or small enclosed areas. Whenever possible, use outdoors in an open air area. If using indoors open all windows and doors and maintain a cross ventilation of moving fresh air across the work area. If strong odor is noticed or you experience slight dizziness, headache, nausea or eye-watering -- STOP -- ventilation is inadequate. Leave area immediately and move to fresh air.			
Work/Hygienic/Maintenance Practices:	A source of clean water should be available in the work area for flushing of the eyes and skin. Wash hands thoroughly after use. Do not eat, drink, or smoke in the work area. Before reuse, thoroughly clean any clothing or protective equipment that has been contaminated by prior use. Discard any clothing or other protective equipment that cannot be decontaminated, such as gloves or shoes.			

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9. PHYSICAL AND CHEMICAL PROPERTIES

Physical States: ☒ Gas ☒ Liquid ☐ Solid

Appearance and Odor: Yellow to orange clinging liquid.
Odor threshold not determined.

pH: N.A.

Melting Point: N.D.

Boiling Point: 104.00 F - 150.00 F

Flash Pt: NA

Evaporation Rate: < 1

Flammability (solid, gas): No data available.

Explosive Limits: LEL: N.D. UEL: N.D.

Vapor Pressure (vs. Air or mm Hg): N.D.

Vapor Density (vs. Air = 1): > 1

Specific Gravity (Water = 1): 1.26

Density: 10.5 - (of liquid) LB/GL at 75.0 F

Solubility in Water: Slight

Octanol/Water Partition Coefficient: N.D.

Percent Volatile: 96.1 % by weight.

VOC / Volume: 18.4000 % WT

Autoignition Pt: N.D.

Decomposition Temperature: N.D.

Viscosity: N.D.

10. STABILITY AND REACTIVITY

Stability: Unstable ☐ Stable ☒

Conditions To Avoid - Instability: None known.

Incompatibility - Materials To Avoid: Incompatible with strong oxidizing agents; strong caustics; strong alkalis; oxygen; nitrogen peroxide; chemically active metals such as aluminum and magnesium; sodium; potassium; and nitric acid.

Hazardous Decomposition or Byproducts: Thermal decomposition may produce carbon monoxide and carbon dioxide, hydrogen chloride, chlorine gas, and small quantities of phosgene.

Possibility of Hazardous Reactions: Will occur ☐ Will not occur ☒

Conditions To Avoid - Hazardous Reactions: None known.

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11. TOXICOLOGICAL INFORMATION

Toxicological Information: This product has not been tested as a whole. Refer to section 2 for acute and chronic effects. Information below is for ingredients.

CAS# 75-09-2:
 Tumorigenic Effects: TClO, Inhalation, Rat, 3500. PPM, 6 Y.
 Result:
 Tumorigenic: Carcinogenic by RTECS criteria.
 Endocrine: Tumors.
 - Fundamental and Applied Toxicology., Academic Press, Inc., 1 E. First St., Duluth, MN 55802, Vol/p/yr: 4,30, 1984

Standard Draize Test, Eyes, Species: Rabbit, 100.0 MG, Severe.
 Result:
 Effects on Newborn: Growth statistics (e.g., reduced weight gain).
 Effects on Newborn: Physical.
 - Union Carbide Data Sheet, Union Carbide Corp., 39 Old Ridgebury Rd., Danbury, CT 06817, Vol/p/yr: 4/25, 1958

Standard Draize Test, Skin, Species: Rabbit, 810.0 MG, 24 H, Severe.
 Result:
 Specific Developmental Abnormalities: Musculoskeletal system.
 - European Journal of Toxicology and Environmental Hygiene., For publisher information, see TOERD9, Paris France, Vol/p/yr: 9,171, 1976

Carcinogenicity/Other Information: IARC 2B - Possibly Carcinogenic to Humans
 ACGIH A3 - Confirmed Animal Carcinogen with Unknown Relevance to Humans

CAS #	Hazardous Components (Chemical Name)	NTP	IARC	ACGIH	OSHA
75-09-2	Dichloromethane {Methylene chloride; R-30; Freon 30}	Possible	2B	A3	Yes
68476-86-8	Liquified petroleum gas, sweetened {propane, isobutane, n-butane}	n.a.	n.a.	n.a.	n.a.
67-56-1	Methanol {Methyl alcohol; Carbinol; Wood alcohol}	n.a.	n.a.	n.a.	n.a.
9016-45-9	Poly(oxy-1,2-ethanediyl), .alpha.-(nonylphenyl)-.omega.-hydr {Nonylphenol Ethoxylate}	n.a.	n.a.	n.a.	n.a.

12. ECOLOGICAL INFORMATION

General Ecological Information: This product has not been tested as a whole.

13. DISPOSAL CONSIDERATIONS

Waste Disposal Method: Dispose in accordance with applicable local, state, and federal regulations.

14. TRANSPORT INFORMATION

LAND TRANSPORT (US DOT):

DOT Proper Shipping Name: Aerosols, flammable

DOT Hazard Class: 2.1 FLAMMABLE GAS

UN/NA Number: UN1950



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LAND TRANSPORT (Canadian TDG):**TDG Shipping Name:****UN Number:** 1950**Hazard Class:** 2.1 - FLAMMABLE GAS **TDG Classification:****Additional Transport Information:**

The shipper / supplier may apply one of the following exceptions: Combustible Liquid, Consumer Commodity, Limited Quantity, Viscous Liquid, Does Not Sustain Combustion, or others, as allowed under 49CFR Hazmat Regulations. Please consult 49CFR Subchapter C to ensure that subsequent shipments comply with these exceptions.

15. REGULATORY INFORMATION

EPA SARA (Superfund Amendments and Reauthorization Act of 1986) Lists

CAS #	Hazardous Components (Chemical Name)	S. 302 (EHS)	S. 304 RQ	S. 313 (TRI)
75-09-2	Dichloromethane {Methylene chloride; R-30; Freon 30}	No	Yes 1000 LB	Yes
68476-86-8	Liquified petroleum gas, sweetened {propane, isobutane, n-butane}	No	No	No
67-56-1	Methanol {Methyl alcohol; Carbinol; Wood alcohol}	No	Yes 5000 LB	Yes
9016-45-9	Poly(oxy-1,2-ethanediyl), .alpha.-(nonylphenyl)-.omega.-hydr {Nonylphenol Ethoxylate}	No	No	No

CAS #	Hazardous Components (Chemical Name)	Other US EPA or State Lists
75-09-2	Dichloromethane {Methylene chloride; R-30; Freon 30}	CAA HAP, ODC: HAP: VHAP CWA NPDES TSCA: Inventory, 8A CAIR CA PROP.65: Yes: Canc.
68476-86-8	Liquified petroleum gas, sweetened {propane, isobutane, n-butane}	TSCA: Inventory
67-56-1	Methanol {Methyl alcohol; Carbinol; Wood alcohol}	CAA HAP, ODC: HAP: VHAP TSCA: Inventory CA PROP.65: Yes: RDTox.
9016-45-9	Poly(oxy-1,2-ethanediyl), .alpha.-(nonylphenyl)-.omega.-hydr {Nonylphenol Ethoxylate}	TSCA: Inventory, 8A PAIR, 12(b)

Additional Regulatory Information

This chemical/product is not and cannot be distributed in commerce (as defined in TSCA section 3(5)) or processed (as defined in TSCA section 3(13)) for consumer paint or coating removal.

16. OTHER INFORMATION

Revision Date: 05/01/2019**Preparer Name:** W.M. Barr EHS Dept (901)775-0100**Additional Information About This Product:** N.D. - Not determined.**Company Policy or Disclaimer:**

The information contained herein is presented in good faith and believed to be accurate as of the effective date shown above. This information is furnished without warranty of any kind. Employers should use this information only as a supplement to other information gathered by them and must make independent determination of suitability and completeness of information from all sources to assure proper use of these materials and the safety and health of employees. Any use of this data and information must be determined by the user to be in accordance with applicable federal, state and

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local laws and regulations.

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1. PRODUCT AND COMPANY IDENTIFICATION

Product Name: Klean-Strip Aircraft Remover

Company Name: W. M. Barr
2105 Channel Avenue
Memphis, TN 38113

Phone Number:
(901)775-0100

Web site address: www.wmbarr.com

Emergency Contact: 3E 24 Hour Emergency Contact (800)451-8346
Information: W.M. Barr Customer Service (800)398-3892

Intended Use: Remove a wide range of finishes from the metal surfaces of automobiles, trucks and cycles

Synonyms: GAR343, QAR343, GDX586

2. HAZARDS IDENTIFICATION

Skin Corrosion/Irritation, Category 2
Serious Eye Damage/Eye Irritation, Category 2A
Germ Cell Mutagenicity, Category 1A
Carcinogenicity, Category 1B
Target Organ Systemic Toxicity (single exposure), Category 1



GHS Signal Word: Danger

GHS Hazard Phrases: H315: Causes skin irritation.
H319: Causes serious eye irritation.
H340: May cause genetic defects.
H350: May cause cancer.
H370: Causes damage to organs.

GHS Precaution Phrases: P264: Wash hands thoroughly after handling.
P280: Wear protective gloves/protective clothing/eye protection/face protection.
P362+364: Take off contaminated clothing and wash it before reuse.
P201: Obtain special instructions before use.
P202: Do not handle until all safety precautions have been read and understood.
P281: Use personal protective equipment as required.
P260: Do not breathe gas/mist/vapours/spray.
P270: Do not eat, drink or smoke when using this product.

GHS Response Phrases: P302+352: IF ON SKIN: Wash with plenty of soap and water.
P321: Specific treatment see directions on this label.
P332+313: If skin irritation occurs, get medical advice/attention.
P305+351+338: IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
P337+313: If eye irritation persists, get medical advice/attention.
P308+313: IF exposed or concerned: Get medical attention/advice.

GHS Storage and Disposal Phrases: P405: Store locked up.
P501: Dispose of contents/container according to local, state and federal regulations.

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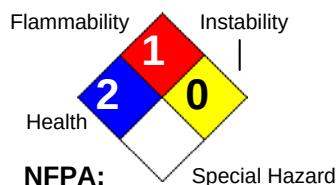
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Hazard Rating System:

HEALTH	*	2
FLAMMABILITY	1	
PHYSICAL	0	
PPE	X	



HMIS:

OSHA Regulatory Status:

This material is classified as hazardous under OSHA regulations.

Potential Health Effects

(Acute and Chronic):

Inhalation Acute Exposure Effects:

Vapor harmful. May cause dizziness; headache; watering of eyes; injuries to mucous membranes; irritation of the throat and respiratory tract; nausea; numbness in fingers, arms and legs; bronchospasm; hot flashes; tissue damage; spotted vision; dilation of pupils; increase of carboxyhemoglobin levels, which can cause stress to the cardiovascular system; arm, leg, and chest pains; depression of the central nervous system; bronchitis; pulmonary edema; chemical pneumonitis; difficulty breathing; vomiting; visual disturbances; giddiness; intoxication; sleepiness; cough and dyspnea; cold, clammy, extremities, and diarrhea. Severe overexposure may cause irregular or rapid heartbeat; convulsions; unconsciousness; and death. Elevated carboxyhemoglobin levels can be additive to the increase caused by smoking and other carbon monoxide sources.

Skin Contact Acute Exposure Effects

This product is a skin irritant. May be absorbed through the skin. May cause irritation; burns; blisters; tissue destruction; drying and defatting of skin; and dermatitis. May cause symptoms listed under inhalation. Vapors and mist can irritate moist skin.

Eye Contact Acute Exposure Effects

This material is an eye irritant. May cause irritation and pain; conjunctivitis of eyes; corneal ulcerations of the eye; burns; and blindness. Vapors and mist can irritate eyes.

Ingestion Acute Exposure Effects

Poison. Cannot be made non-poisonous. May be fatal or cause blindness. May cause irritation to mouth, throat and stomach; headache; nausea; dizziness; stupor; liver, kidney and heart damage; depression of the central nervous system; narcosis; burning of esophagus, stomach, mouth and throat; vomiting; gastrointestinal irritation; diarrhea; abdominal pain; collapse; and death. May be corrosive to mouth and throat. May produce symptoms listed under inhalation. Liquid aspirated into lungs may cause chemical pneumonitis and systemic effects.

Chronic Exposure Effects

Reports have associated repeated and prolonged overexposure to solvents with neurological and other physiological damage. Prolonged or repeated contact may cause dermatitis. Prolonged skin contact may result in absorption of a harmful amount of this material. May cause headache; conjunctivitis; gastric disturbances; skin irritation; permanent central nervous system changes; decreased response to visual and auditory stimulation; visual impairment or blindness; hallucinations; changes in blood; blood disorders; kidney, liver or pancreatic damage; insomnia; giddiness; and death. May cause additional symptoms listed under inhalation.

Medical Conditions Generally Aggravated By Exposure:

Diseases of the blood; skin; eyes; liver; kidneys; lungs; cardiovascular; pulmonary; and respiratory systems; alcoholism; and rhythm disorders of the heart.

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3. COMPOSITION/INFORMATION ON INGREDIENTS

CAS #	Hazardous Components (Chemical Name)	Concentration
75-09-2	Dichloromethane {Methylene chloride; R-30; Freon 30}	72.6 %
67-56-1	Methanol {Methyl alcohol; Carbinol; Wood alcohol}	6.2 %
1336-21-6	Ammonium hydroxide {Ammonia aqua; Ammonium liquor}	4.9 %
1330-20-7	Xylene (mixed isomers) {Benzene, dimethyl-}	4.0 %
64742-47-8	Hydrotreated light distillate (petroleum)	3.0 %
68132-50-3	Fatty acid soap	1.6 %

4. FIRST AID MEASURES

Emergency and First Aid Procedures:

Skin:

Immediately begin washing the skin thoroughly with large amounts of water and mild soap, if available, while removing contaminated clothing. Seek medical attention if irritation persists.

Eyes:

Immediately begin to flush eyes with water, remove any contact lens. Continue to flush the eyes for at least 15 minutes, then seek immediate medical attention.

Inhalation:

Remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get immediate medical attention.

Ingestion:

If swallowed, do NOT induce vomiting. Seek immediate medical attention. Call a physician, hospital emergency room, or poison control center immediately. Never give anything by mouth to an unconscious person.

Signs and Symptoms Of Exposure:

See Potential Health Effects.

Note to Physician:

Poison. This product contains methylene chloride and methanol.

This product contains methanol which can cause intoxication and central nervous system depression. Methanol is metabolized to formic acid and formaldehyde. These metabolites can cause metabolic acidosis, visual disturbances and blindness. Since metabolism is required for these toxic symptoms, their onset may be delayed from 6 to 30 hours following ingestion. Ethanol competes for the same metabolic pathway and has been used to prevent methanol metabolism. Ethanol administration is indicated in symptomatic patients or at blood methanol concentrations above 20 ug/dl. Methanol is effectively removed by hemodialysis. Adrenalin should never be given to a person overexposed to methylene chloride.

This material sensitizes the heart to the effects of sympathomimetic amines. Epinephrine and other sympathomimetic drugs may initiate cardiac arrhythmias in individuals exposed to this material. This material is metabolized to carbon monoxide. Consequently, elevations in carboxyhemoglobin as high as 50% have been reported, and levels may continue to rise for several hours after exposure has ceased. Data in experimental animals suggest there is a narrow margin between concentrations causing

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anesthesia and death.

5. FIRE FIGHTING MEASURES

Flash Pt:	No data.
Explosive Limits:	LEL: No data. UEL: No data.
Autoignition Pt:	No data.
Suitable Extinguishing Media:	Use carbon dioxide, dry powder or foam.
Fire Fighting Instructions:	Self-contained respiratory protection should be provided for fire fighters fighting fires in buildings or confined areas. Storage containers exposed to fire should be kept cool with water spray to prevent pressure build-up. Stay away from heads of containers that have been exposed to intense heat or flame. Contact of liquid or vapor with flame or hot surfaces will produce toxic gases and a corrosive residue that will cause deterioration of metal.
Flammable Properties and Hazards:	Flashpoint: NO FLASH TO BOILING

6. ACCIDENTAL RELEASE MEASURES

Steps To Be Taken In Case Material Is Released Or Spilled:	Clean-up Keep unnecessary people away; isolate hazard area and deny entry. Stay upwind, out of low areas, and ventilate closed spaces before entering. Shut off ignition sources; keep flares, smoking or flames out of hazard area. Small Spills Take up liquid with sand, earth or other noncombustible absorbent material and place in a plastic container where applicable. Large Spills Dike far ahead of spill for later disposal. Waste Disposal Dispose in accordance with applicable local, state and federal regulations.

7. HANDLING AND STORAGE

Precautions To Be Taken in Handling:	Read carefully all cautions and directions on product label before use. Since empty container retains residue, follow all label warnings even after container is empty. Dispose of empty container according to all regulations. Do not reuse this container. Wear protective clothing and take precautions to prevent all skin and eye contact.
Precautions To Be Taken in Storing:	Store in a cool, dry place. Exposure to high temperatures or prolonged exposure to sun may cause can to leak or swell. Once opened, remover should be used within six months or discarded to avoid can deterioration. Do not store near flames or at elevated temperatures.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

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CAS #	Partial Chemical Name	OSHA TWA	ACGIH TWA	Other Limits
75-09-2	Dichloromethane {Methylene chloride; R-30; Freon 30}	PEL: 25 ppm STEL: 125 ppm (15 min)	TLV: 50 ppm	No data.
67-56-1	Methanol {Methyl alcohol; Carbinol; Wood alcohol}	PEL: 200 ppm	TLV: 200 ppm STEL: 250 ppm	No data.
1336-21-6	Ammonium hydroxide {Ammonia aqua; Ammonium liquor}	No data.	No data.	No data.
1330-20-7	Xylene (mixed isomers) {Benzene, dimethyl-}	PEL: 100 ppm	TLV: 100 ppm STEL: 150 ppm	No data.
64742-47-8	Hydrotreated light distillate (petroleum)	No data.	TLV: 200 mg/m3	No data.
68132-50-3	Fatty acid soap	No data.	No data.	No data.
Respiratory Equipment (Specify Type):		For OSHA controlled work place and other regular users. Use only with adequate ventilation under engineered air control systems designed to prevent exceeding appropriate TLV. For occasional use, where engineered air control is not feasible, use properly maintained and properly fitted NIOSH approved self-contained breathing apparatus for chlorinated solvent vapors. A dust mask does not provide protection against vapors.		
Eye Protection:		Safety glasses, chemical goggles, or face shields are recommended to safeguard against potential eye contact, irritation, or injury. Chemical goggles or face shields are recommended when splashing or spraying of chemical is possible. A faceshield provides more protection to help reduce chemical contact to the face and eyes.		
Protective Gloves:		Wear gloves with as much resistance to the chemical ingredients as possible. Laminate film gloves offer the best protection. Other glove materials will be degraded by methylene chloride, but may provide protection for some amount of time, based on the type of glove and the conditions of use. Consult your glove supplier for additional information. Gloves contaminated with product should be discarded and not reused.		
Other Protective Clothing:		Various application methods can dictate use of additional protective safety equipment, such as impermeable aprons, etc., to minimize exposure. A source of clean water should be available in the work area for flushing eyes and skin. Do not eat, drink, or smoke in the work area. Wash hands thoroughly after use. Before reuse, thoroughly clean any clothing or protective equipment that has been contaminated by prior use. Discard any clothing or other protective equipment that cannot be decontaminated, such as gloves or shoes.		
Engineering Controls (Ventilation etc.):		Use only with adequate ventilation to prevent build up of vapors. Open all windows and doors. Use only with a cross ventilation of moving fresh air across the work area. If strong odor is noticed or you experience slight dizziness, headache, nausea, or eye-watering, STOP ventilation is inadequate. Leave area immediately.		
Work/Hygienic/Maintenance Practices:		A source of clean water should be available in the work area for flushing of the eyes and skin. Wash hands thoroughly after use. Do not eat, drink, or smoke in the work area. Before reuse, thoroughly clean any clothing or protective equipment that has been contaminated by prior use. Discard any clothing or other protective equipment that cannot be decontaminated, such as gloves or shoes.		

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9. PHYSICAL AND CHEMICAL PROPERTIES

Physical States: [] Gas [X] Liquid [] Solid
Appearance and Odor: No data available.
Melting Point: No data.
Boiling Point: ~ 107.00 F
Autoignition Pt: No data.
Flash Pt: No data.
Explosive Limits: LEL: No data. UEL: No data.
Specific Gravity (Water = 1): 1.1683 - 1.1985
Vapor Pressure (vs. Air or mm Hg): 350 MM HG at 20.0 C
Vapor Density (vs. Air = 1): > 1
Evaporation Rate: > 1
Solubility in Water: Partial
pH: 10 - 12
Percent Volatile: 95.0 % by weight.
VOC / Volume: 12.0000 % WT

10. STABILITY AND REACTIVITY

Stability: Unstable [] Stable [X]
Conditions To Avoid - Instability: No data available.
Incompatibility - Materials To Avoid: Incompatible with strong oxidizing agents; strong caustics; strong alkalis; oxygen; nitrogen peroxide; chemically active metals such as aluminum and magnesium; sodium; potassium; and nitric acid.
Hazardous Decomposition Or Byproducts: Thermal decomposition may produce hydrogen chloride; chlorine gas; small quantities of phosgene; carbon monoxide; carbon dioxide; formaldehyde; and unidentified organic compounds in black smoke.
Possibility of Hazardous Reactions: Will occur [] Will not occur [X]
Conditions To Avoid - Hazardous Reactions: Will not occur.

11. TOXICOLOGICAL INFORMATION

Toxicological Information: This product has not been tested as a whole.

CAS# 75-09-2:
Mutagenicity:, Mutation test: DNA damage., Human, 1000. Umol/L, Cell Type: lung..
Result:
Endocrine: Changes in spleen weight.
Blood:Changes in spleen.
- Mutation Research., Elsevier Science Pub. B.V., POB 211, 1000 AE, Amsterdam
Netherlands, Vol/p/yr: 538,41, 2003

Tumorigenic Effects:, TClO, Inhalation, Rat, 3500. PPM, 6 Y.
Result:
Tumorigenic: Carcinogenic by RTECS criteria.
Endocrine: Tumors.
- Fundamental and Applied Toxicology., Academic Press, Inc., 1 E. First St., Duluth, MN
55802, Vol/p/yr: 4,30, 1984

Standard Draize Test, Eyes, Species: Rabbit, 100.0 MG, Severe.
Result:
Effects on Newborn: Growth statistics (e.g., reduced weight gain).
Effects on Newborn: Physical.
- Union Carbide Data Sheet, Union Carbide Corp., 39 Old Ridgebury Rd., Danbury, CT
06817, Vol/p/yr: 4/25, 1958

Standard Draize Test, Skin, Species: Rabbit, 810.0 MG, 24 H, Severe.
Result:
Specific Developmental Abnormalities: Musculoskeletal system.
- European Journal of Toxicology and Environmental Hygiene., For publisher
information, see TOERD9, Paris France, Vol/p/yr: 9,171, 1976

CAS# 67-56-1:
Mutagenicity:, Mutation test: DNA damage., Oral, Rat, 10.00 UMOL/KG.
Result:
Tumorigenic: Equivocal tumorigenic agent by RTECS criteria.
Tumorigenic:Tumors at site of application.
- Environmental Mutagenesis., For publisher information, see EMMUEG, New York, NY,
Vol/p/yr: 4,317, 1982

CAS# 1330-20-7:
Standard Draize Test, Skin, Species: Rabbit, 100.0 %, Moderate.
Result:
Specific Developmental Abnormalities: Craniofacial (including nose and tongue).
- AMA Archives of Industrial Health., For publisher information, see AEHLAU, Chicago,
IL, Vol/p/yr: 14,387, 1956

Standard Draize Test, Eyes, Species: Rabbit, 5.000 MG, 24 H, Severe.
Result:
Behavioral: General anesthetic.
Behavioral: Somnolence (general depressed activity).
Behavioral: Irritability.

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- "Sbornik Vysledku Toxikologickeho Vysetreni Latek A Pripravku," , Institut Pro Vychovu Vedoucicn P, Marhold, J.V., Institut Pro Vychovu Vedoucicn, Pracovniku Chemickeho, Prumyclu Praha Czechoslovakia, Vol/p/yr: -,24, 1972

Carcinogenicity/Other Information:

IARC 2B - Possibly Carcinogenic to Humans
IARC 3: Not Classifiable as to Carcinogenicity in Humans.
ACGIH A3 - Confirmed Animal Carcinogen with Unknown Relevance to Humans
ACGIH A4 - Not Classifiable as a Human Carcinogen.

CAS #	Hazardous Components (Chemical Name)	NTP	IARC	ACGIH	OSHA
75-09-2	Dichloromethane {Methylene chloride; R-30; Freon 30}	Possible	2B	A3	Yes
67-56-1	Methanol {Methyl alcohol; Carbinol; Wood alcohol}	n.a.	n.a.	n.a.	n.a.
1336-21-6	Ammonium hydroxide {Ammonia aqua; Ammonium liquor}	n.a.	n.a.	n.a.	n.a.
1330-20-7	Xylene (mixed isomers) {Benzene, dimethyl-}	n.a.	3	A4	n.a.
64742-47-8	Hydrotreated light distillate (petroleum)	n.a.	n.a.	A4	n.a.
68132-50-3	Fatty acid soap	n.a.	n.a.	n.a.	n.a.

12. ECOLOGICAL INFORMATION

General Ecological Information:

This product has not been tested as a whole.

13. DISPOSAL CONSIDERATIONS

Waste Disposal Method:

Dispose in accordance with applicable local, state, and federal regulations.

14. TRANSPORT INFORMATION

LAND TRANSPORT (US DOT):

DOT Proper Shipping Name: UN1760, Corrosive Liquid, N.O.S. 8, PGI (Ammonium Hydroxide, Methylene Chloride)

DOT Hazard Class: 8 CORROSIVE

UN/NA Number: 1760

Packing Group: I



15. REGULATORY INFORMATION

This material meets the EPA 'Hazard Categories' defined for SARA Title III Sections 311/312 as indicated:

☒ Yes ☐ No	Acute (immediate) Health Hazard
☒ Yes ☐ No	Chronic (delayed) Health Hazard
☒ Yes ☐ No	Fire Hazard
☐ Yes ☒ No	Sudden Release of Pressure Hazard
☐ Yes ☒ No	Reactive Hazard

CAS #	Hazardous Components (Chemical Name)	Other US EPA or State Lists
75-09-2	Dichloromethane {Methylene chloride; R-30; Freon 30}	CAA HAP,ODC: HAP; CWA NPDES: Yes; TSCA: Yes - Inventory, 8A CAIR; CA PROP.65: Yes
67-56-1	Methanol {Methyl alcohol; Carbinol; Wood alcohol}	CAA HAP,ODC: HAP; CWA NPDES: No; TSCA: Yes - Inventory; CA PROP.65: Yes
1336-21-6	Ammonium hydroxide {Ammonia aqua; Ammonium liquor}	CAA HAP,ODC: No; CWA NPDES: No; TSCA: Yes - Inventory; CA PROP.65: No
1330-20-7	Xylene (mixed isomers) {Benzene, dimethyl-}	CAA HAP,ODC: HAP; CWA NPDES: Yes; TSCA: Yes -

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Klean-Strip Aircraft Remover

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64742-47-8 Hydrotreated light distillate (petroleum)

Inventory; CA PROP.65: No

CAA HAP,ODC: No; CWA NPDES: No; TSCA: Yes -

Inventory; CA PROP.65: No

68132-50-3 Fatty acid soap

CAA HAP,ODC: No; CWA NPDES: No; TSCA: Yes -

Inventory; CA PROP.65: No

Regulatory Information:

16. OTHER INFORMATION

Revision Date: 12/24/2014

Preparer Name: W.M. Barr EHS Dept (901)775-0100

Additional Information About This Product: No data available.

This Product:

Company Policy or

Disclaimer:

The information contained herein is presented in good faith and believed to be accurate as of the effective date shown above. This information is furnished without warranty of any kind. Employers should use this information only as a supplement to other information gathered by them and must make independent determination of suitability and completeness of information from all sources to assure proper use of these materials and the safety and health of employees. Any use of this data and information must be determined by the user to be in accordance with applicable federal, state and local laws and regulations.

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Klean Strip Klean Kutter

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Supersedes Revision: 04/17/2015

1. PRODUCT AND COMPANY IDENTIFICATION

Product Name: Klean Strip Klean Kutter

Company Name: W. M. Barr
2105 Channel Avenue
Memphis, TN 38113

Phone Number: (901)775-0100

Web site address: www.wmbarr.com

Emergency Contact: 3E 24 Hour Emergency Contact (800)451-8346

Information: W.M. Barr Customer Service (800)398-3892

Intended Use: Strips varnish, lacquer, shellac & polyurethane from all types of wood.

Product Code: QKK5.1

Additional Information: This chemical/product is not and cannot be distributed in commerce (as defined in TSCA section 3(5)) or processed (as defined in TSCA section 3(13)) for consumer paint or coating removal.

2. HAZARDS IDENTIFICATION

Flammable Liquids, Category 2
Acute Toxicity: Oral, Category 3
Acute Toxicity: Skin, Category 3
Acute Toxicity: Inhalation, Category 3
Skin Corrosion/Irritation, Category 2
Serious Eye Damage/Eye Irritation, Category 2A
Carcinogenicity, Category 1B
Toxic To Reproduction, Category 2
Specific Target Organ Toxicity (single exposure), Category 1
Specific Target Organ Toxicity (repeated exposure), Category 2
Aspiration Toxicity, Category 1



GHS Signal Word: Danger

GHS Hazard Phrases: Highly flammable liquid and vapor.
Toxic if swallowed.
May be fatal if swallowed and enters airways.
Toxic in contact with skin.
Causes skin irritation.
Causes serious eye irritation.
Toxic if inhaled.
May cause cancer.
Suspected of damaging fertility or the unborn child.
Causes damage to organs.
May cause damage to organs through prolonged or repeated exposure.

GHS Precautionary Phrases: Obtain special instructions before use.
Do not handle until all safety precautions have been read and understood.
Keep away from heat/sparks/open flames/hot surfaces. - No smoking.
Keep container tightly closed.
Ground/bond container and receiving equipment.
Use explosion-proof electrical/ventilating/lighting equipment.
Use only non-sparking tools.
Take precautionary measures against static discharge.
Do not breathe gas/mist/vapors/spray.

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GHS Response Phrases:

Wash hands thoroughly after handling.
Do not eat, drink or smoke when using this product.
Use only outdoors or in a well-ventilated area.
Wear protective gloves/protective clothing/eye protection/face protection.
Use personal protective equipment as required.
Keep cool.

IF SWALLOWED: Immediately call a POISON CENTER or doctor/physician.
IF ON SKIN: Wash with plenty of soap and water.
IF ON SKIN (or hair): Remove/take off immediately all contaminated clothing. Rinse skin with water/shower.
IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing.
IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
IF exposed: Call a POISON CENTER or doctor/physician.
IF exposed or concerned: Get medical attention/advice.
Call a POISON CENTER or doctor/physician.
Get medical attention/advice if you feel unwell.
Specific treatment see label.
Rinse mouth.
Do NOT induce vomiting.
If skin irritation occurs, get medical advice/attention.
If eye irritation persists, get medical advice/attention.
Remove/Take off immediately all contaminated clothing.
Wash contaminated clothing before reuse.
In case of fire, use dry chemical powder to extinguish.

GHS Storage and Disposal Phrases:

Store container tightly closed in well-ventilated place.
Store locked up.
Dispose of contents/container according to local, state and federal regulations.

OSHA Regulatory Status:

This material is classified as hazardous under OSHA regulations.

Potential Health Effects (Acute and Chronic):

This product has not been tested as a whole. Effects will be for the ingredients listed.

Inhalation Exposure Effects:

Breathing high vapor concentrations may be harmful. Mist or vapors may be irritating to the eyes, nose, throat, and lungs. May cause upper respiratory tract irritation and central nervous system depression with symptoms such as confusion, lightheadedness, nausea, vomiting, headache, and fatigue. Causes formation of carbon monoxide in blood which may affect the cardiovascular system and central nervous system. Continued exposure may cause unconsciousness and even death. May cause cancer based on animal data. May cause liver damage.

Intentional misuse of this product by deliberately concentrating and inhaling can be harmful or fatal. Elevated carboxyhemoglobin levels can be additive to the increase caused by smoking and other carbon monoxide sources.

Skin Contact Exposure Effects:

This product is a skin irritant. May cause effects ranging from mild irritation to severe pain, and possibly burns, depending on the intensity of the contact. May be absorbed through the skin, if contact with skin is prolonged.

Prolonged or repeated skin contact with liquid may cause defatting resulting in drying, redness, and possible blistering. Skin absorption may cause similar effects as from inhalation or ingestion.

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Eye Contact Exposure Effects:

This material is an eye irritant. Vapors may cause eye irritation. Contact may cause tearing, redness, a stinging or burning feeling, swelling, and blurred vision. May cause corneal injury. Effects may become more serious with repeated or prolonged contact.

Ingestion Exposure Effects:

May cause nausea or vomiting with pain, nausea, and/or diarrhea. Aspiration hazard. If vomiting results in aspiration, chemical pneumonia could occur. Absorption through the gastrointestinal tract may produce central nervous system depression. May cause systemic poisoning with symptoms paralleling those of inhalation. Toxic if swallowed. Irreversible effects, such as blindness may occur. Poison. Cannot be made non-poisonous. May be fatal or cause blindness. Harmful or fatal if swallowed.

Chronic Exposure Effects:

Methanol has caused birth defects in laboratory animals, but only when inhaled at extremely high vapor concentrations. The relevance of this finding to humans is uncertain. Mild irritation effect.

Methylene Chloride (MC) overexposure may cause liver damage. May cause cancer based on animal data. Alcohol may enhance the toxic effects. May cross the placenta. May be excreted in breast milk. Concurrent exposure to carbon monoxide, smoking, or physical activity may increase the level of carboxyhemoglobin in the blood resulting in additive effects.

The best evidence that MC causes cancer is from laboratory studies in which rats, mice and hamsters inhaled MC 6 hours per day, 5 days per week for 2 years. MC exposure produced lung and liver tumors in mice and mammary tumors in rats. No carcinogenic effects of MC were found in hamsters.

There are also some human epidemiological studies which show an association between occupational exposure to MC and increases in biliary (bile duct) cancer and a type of brain cancer. Other epidemiological studies have not observed a relationship between MC exposure and cancer. OSHA interprets these results to mean that there is suggestive (but not absolute) evidence that MC is a human carcinogen.

Toluene: May cause harm to the human fetus based on tests with laboratory animals. Prolonged or repeated overexposure has been associated with reproductive effects in experimental animals and in long-term chemical abuse situations. Long term overexposure to toluene has been associated with impaired color vision. Long term overexposure to toluene in occupational environments have been associated with hearing damage.

Reports have associated repeated and prolonged overexposure to solvents with neurological and other physiological damage. Intentional misuse by deliberately concentrating and inhaling solvents may be harmful or fatal.

Medical Conditions Generally Aggravated By Exposure: Hear or cardiovascular disorders, kidney disorders, liver disorders, nervous system disorders, circulatory system disorders, respiratory system (including asthma and other breathing disorders), skin disorders, and allergies.

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3. COMPOSITION/INFORMATION ON INGREDIENTS

CAS #	Hazardous Components (Chemical Name)	Concentration
67-56-1	Methanol {Methyl alcohol; Carbinol; Wood alcohol}	25.0 -35.0 %
75-09-2	Dichloromethane {Methylene chloride; R-30; Freon 30}	25.0 -35.0 %
67-64-1	Acetone {2-Propanone}	15.0 -25.0 %
108-88-3	Toluene {Benzene, Methyl-; Toluol}	1.5 -20.0 %

Additional Chemical Information

Specific percentage of composition is being withheld as a trade secret.

4. FIRST AID MEASURES

Emergency and First Aid Procedures:

Inhalation:

If user experiences breathing difficulty, move to air free of vapors. Administer oxygen or artificial respiration until medical assistance can be rendered.

Skin Contact:

Wash with soap and large quantities of water and seek medical attention if irritation from contact persists.

Eye Contact:

Flush with large quantities of water for at least 15 minutes and seek immediate medical attention.

Ingestion:

Call you poison control center, hospital emergency room or physician immediately for instructions to induce vomiting.

Signs and Symptoms Of Exposure:

Primary routes of exposure:

Inhalation; ingestion; and dermal.

Note to Physician:

This product contains methylene chloride and methanol.

This product contains methanol which can cause intoxication and central nervous system depression. Methanol is metabolized to formic acid and formaldehyde. These metabolites can cause metabolic acidosis, visual disturbances and blindness. Since metabolism is required for these toxic symptoms, their onset may be delayed from 6 to 30 hours following ingestion. Ethanol competes for the same metabolic pathway and has been used to prevent methanol metabolism. Ethanol administration is indicated in symptomatic patients or at blood methanol concentrations above 20 ug/dl. Methanol is effectively removed by hemodialysis. Adrenalin should never be given to a person overexposed to methylene chloride.

Methylene Chloride is an aspiration hazard. Risk of aspiration must be weighed against possible toxicity of the material when determining whether to induce emesis or to perform gastric lavage. This material sensitizes the heart to the effects of sympathomimetic amines. Epinephrine and other sympathomimetic drugs may initiate cardiac arrhythmias in individuals exposed to this material. This material is metabolized to carbon monoxide. Consequently, elevations in carboxyhemoglobin as high as 50% have been reported, and levels may continue to rise for several hours after exposure has ceased. Data in experimental animals suggest there is a narrow margin between concentrations causing anesthesia and death.

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5. FIRE FIGHTING MEASURES

	Class IB
Flash Pt:	0.00 F
Explosive Limits:	LEL: No data. UEL: No data.
Autoignition Pt:	No data.
Suitable Extinguishing Media:	Use carbon dioxide, dry powder, or foam.
Fire Fighting Instructions:	Self-contained respiratory protection should be provided for fire fighters fighting fires in buildings or confined areas. Storage containers exposed to fire should be kept cool with water spray to prevent pressure build-up. Stay away from heads of containers that have been exposed to intense heat or flame.
Flammable Properties and Hazards:	No data available.
Hazardous Combustion Products:	No data available.

6. ACCIDENTAL RELEASE MEASURES

Steps To Be Taken In Case Material Is Released Or Spilled:	Vapors may cause flash fire or ignite explosively. Clean up: Keep unnecessary people away; isolate hazard area and deny entry. Stay upwind, out of low areas, and ventilate closed spaces before entering. Shut off ignition sources; keep flares, smoking or flames out of hazard area. Use non-sparking tools. Use proper bonding and grounding methods for all equipment and processes. Keep out of waterways and bodies of water. Be cautious of vapors collecting in small enclosed spaces, sewers, low lying areas, confined spaces, etc. Small spills: Take up with sand, earth or other noncombustible absorbent material and place in a plastic container where applicable. Large spills: Dike far ahead of spill for later disposal. Waste Disposal: Dispose in accordance with applicable local, state and federal regulations.

7. HANDLING AND STORAGE

Precautions To Be Taken in Handling:	Read carefully all cautions and directions on product label before use. Since empty container retains residue, follow all label warnings even after container is empty. Dispose of empty container according to all regulations. Do not reuse this container. Do not use this product near any source of heat or open flame, furnace areas, pilot lights, stoves, etc. Do not use in small enclosed spaces, such as basements and bathrooms. Vapors can accumulate and explode if ignited. Do not spread this product over large surface areas because fire and health safety risks will increase dramatically.
Precautions To Be Taken in Storing:	Store in a cool, dry place. Exposure to high temperatures or prolonged exposure to sun may cause can to leak or swell. Do not store near flames or at elevated temperatures.

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8. EXPOSURE CONTROLS/PERSONAL PROTECTION

CAS #	Chemical Name	Jurisdiction	Recommended Exposure Limits	Notations
67-56-1	Methanol {Methyl alcohol; Carbinol; Wood alcohol}	ACGIH TLV	TLV: 200 ppm STEL: 250 ppm	
		OSHA PELs	PEL: 200 ppm	
75-09-2	Dichloromethane {Methylene chloride; R-30; Freon 30}	ACGIH TLV	TLV: 50 ppm	
		OSHA PELs	PEL: 25 ppm STEL: 125 ppm (15 min)	
67-64-1	Acetone {2-Propanone}	ACGIH TLV	TLV: 500 ppm STEL: 750 ppm	
		OSHA PELs	PEL: 1000 ppm	
108-88-3	Toluene {Benzene, Methyl-; Toluol}	ACGIH TLV	TLV: 50 ppm	
		OSHA PELs	PEL: 200 ppm STEL: 500 ppm/(10min) CEIL: 300 ppm	
Respiratory Equipment (Specify Type):		For use in areas with inadequate ventilation or fresh air, wear a properly maintained and properly fitted NIOSH approved self-contained breathing apparatus or powered air supply respirator or loose fitting hood.		
		For OSHA controlled work places and other regular users - Use only with adequate ventilation under engineered air control systems designed to prevent exceeding the appropriate TLV.		
		A dust mask does not provide protection against vapors.		
Eye Protection:		Safety glasses, chemical goggles, or face shields are recommended to safeguard against potential eye contact, irritation, or injury. Chemical goggles or face shields are recommended when splashing or spraying of chemical is possible. A faceshield provides more protection to help reduce chemical contact to the face and eyes.		
Protective Gloves:		Wear gloves with as much resistance to the chemical ingredients as possible. Laminate film gloves offer the best protection. Other glove materials, such as nitrile rubber, neoprene, and PVC will be degraded by methylene chloride, but may provide protection for some amount of time, based on the type of glove and the conditions of use. Consult your glove supplier for additional information. Gloves contaminated with product should be discarded and not reused.		
Other Protective Clothing:		Various application methods can dictate use of additional protective safety equipment, such as impermeable aprons, etc., to minimize exposure.		
Engineering Controls (Ventilation etc.):		Use only with adequate ventilation to prevent buildup of vapors. Open all windows and doors. Do not use in areas where vapors can accumulate and concentrate such as basements, bathrooms or small enclosed areas. Whenever possible, use outdoors in an open air area. If using indoors, open all windows and doors and maintain a cross ventilation of moving fresh air across the work area. If strong odor is noticed or you experience slight dizziness, headache or eye-watering, Stop, ventilation is inadequate. Leave area immediately. If the work area is not well ventilated, do not use this product. A dust mask does not provide protection against vapors.		
Work/Hygienic/Maintenance Practices:		Wash hands thoroughly after use and before eating, drinking, smoking, or using the restroom.		

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Do not eat, drink, or smoke in the work area.

Discard any clothing or other protective equipment that cannot be decontaminated.

Facilities storing or handling this material should be equipped with an emergency eyewash and safety shower.

9. PHYSICAL AND CHEMICAL PROPERTIES

Physical States:	[] Gas [X] Liquid [] Solid	
Appearance and Odor:	Clear thin blue liquid.	
pH:	No data.	
Melting Point:	No data.	
Boiling Point:	> 103.00 F	
Flash Pt:	0.00 F	
Evaporation Rate:	No data.	
Flammability (solid, gas):	No data available.	
Explosive Limits:	LEL: No data.	UEL: No data.
Vapor Pressure (vs. Air or mm Hg):	No data.	
Vapor Density (vs. Air = 1):	No data.	
Specific Gravity (Water = 1):	No data.	
Density:	7.65 LB/GL	
Solubility in Water:	No data.	
Octanol/Water Partition Coefficient:	No data.	
Percent Volatile:	98.35 % by weight.	
VOC / Volume:	493.0000 G/L	
Autoignition Pt:	No data.	
Decomposition Temperature:	No data.	
Viscosity:	No data.	

10. STABILITY AND REACTIVITY

Stability:	Unstable [] Stable [X]
Conditions To Avoid - Instability:	No data available.
Incompatibility - Materials To Avoid:	Bases, Oxygen, Sodium, Potassium, Strong oxidizing agents, Reactive metals, Strong acids, Alkalies, Chlorine compounds, Ammonia, Amines, Aldehydes, Reducing agents, Chromic anhydride, Chromyl alcohol, Hexachloromelamine, Hydrogen peroxide, Permonosulfuric acid, Potassium tertbutoxide, Thioglycol
Hazardous Decomposition or Byproducts:	Thermal decomposition may produce carbon dioxide; carbon monoxide; hydrogen chloride; small quantities of phosgene; formaldehyde; aldehydes; oxides of nitrogen; chlorine gas; and unidentified organic compounds in black smoke.
Possibility of Hazardous Reactions:	Will occur [] Will not occur [X]
Conditions To Avoid - Hazardous Reactions:	No data available.

11. TOXICOLOGICAL INFORMATION

Toxicological Information:	This product has not been tested as a whole. Refer to section 2 for acute and chronic effects. CAS# 75-09-2: Tumorigenic Effects:, TCLo, Inhalation, Rat, 3500. PPM, 6 Y. Result: Tumorigenic: Carcinogenic by RTECS criteria. Endocrine: Tumors. - Fundamental and Applied Toxicology., Academic Press, Inc., 1 E. First St., Duluth, MN 55802, Vol/p/yr: 4,30, 1984 Standard Draize Test, Eyes, Species: Rabbit, 100.0 MG, Severe. Result: Effects on Newborn: Growth statistics (e.g., reduced weight gain). Effects on Newborn: Physical. - Union Carbide Data Sheet, Union Carbide Corp., 39 Old Ridgebury Rd., Danbury, CT 06817, Vol/p/yr: 4/25, 1958 Standard Draize Test, Skin, Species: Rabbit, 810.0 MG, 24 H, Severe. Result: Specific Developmental Abnormalities: Musculoskeletal system. - European Journal of Toxicology and Environmental Hygiene., For publisher information, see TOERD9, Paris France, Vol/p/yr: 9,171, 1976 CAS# 67-64-1: Standard Draize Test, Eyes, Species: Rabbit, 20.00 MG, Severe. Result: Behavioral: Change in motor activity (specific assay). Behavioral: Alteration of classical conditioning. - American Journal of Ophthalmology., Ophthalmic Pub. Co., 435 N. Michigan Ave., Suite 1415, Chicago, IL 60611, Vol/p/yr: 29,1363, 1946 CAS# 108-88-3: Reproductive Effects:, TCLo, Inhalation, Rat, 800.0 MG/M3, 6 H, female 14-20 day(s) after conception. Result: Effects on Embryo or Fetus: Fetotoxicity (except death, e.g., stunted fetus). Effects on Newborn: Behavioral. - Brazilian Journal of Medical and Biological Research., Vol/p/yr: 23,533, 1990 Standard Draize Test, Eyes, Species: Rabbit, 2.000 MG, 24 H, Severe. Result: Effects on Embryo or Fetus: Other effects to embryo. Specific Developmental Abnormalities: Eye, ear. - Prehled Prumyslove Toxikologie, Marhold, J., Organicke Latky, Prague Czechoslovakia, Vol/p/yr: -,29, 1986
Carcinogenicity/Other Information:	IARC 2B - Possibly Carcinogenic to Humans IARC 3: Not Classifiable as to Carcinogenicity in Humans. ACGIH A3 - Confirmed Animal Carcinogen with Unknown Relevance to Humans ACGIH A4 - Not Classifiable as a Human Carcinogen.

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CAS #	Hazardous Components (Chemical Name)	NTP	IARC	ACGIH	OSHA
67-56-1	Methanol {Methyl alcohol; Carbinol; Wood alcohol}	n.a.	n.a.	n.a.	n.a.
75-09-2	Dichloromethane {Methylene chloride; R-30; Freon 30}	Possible	2B	A3	Yes
67-64-1	Acetone {2-Propanone}	n.a.	n.a.	A4	n.a.
108-88-3	Toluene {Benzene, Methyl-; Toluol}	n.a.	3	A4	n.a.

12. ECOLOGICAL INFORMATION

No data available.

13. DISPOSAL CONSIDERATIONS

Waste Disposal Method: Dispose in accordance with applicable local, state, and federal regulations.

14. TRANSPORT INFORMATION

LAND TRANSPORT (US DOT):

DOT Proper Shipping Name: Paint Related Material

DOT Hazard Class: 3 FLAMMABLE LIQUID

UN/NA Number: 1263 **Packing Group:** II



Additional Transport Information:

The shipper / supplier may be able to apply one of the following exceptions if allowed under 49 CFR Regulations: Combustible Liquid, Consumer Commodity, Limited Quantity, Viscous Liquid, Does Not Sustain Combustion, or others, as allowed under 49 CFR Hazmat Regulations. Please consult 49 CFR Subchapter C to ensure that subsequent shipments comply with these exceptions.

15. REGULATORY INFORMATION

EPA SARA (Superfund Amendments and Reauthorization Act of 1986) Lists

CAS #	Hazardous Components (Chemical Name)	S. 302 (EHS)	S. 304 RQ	S. 313 (TRI)
67-56-1	Methanol {Methyl alcohol; Carbinol; Wood alcohol}	No	Yes 5000 LB	Yes
75-09-2	Dichloromethane {Methylene chloride; R-30; Freon 30}	No	Yes 1000 LB	Yes
67-64-1	Acetone {2-Propanone}	No	Yes 5000 LB	No
108-88-3	Toluene {Benzene, Methyl-; Toluol}	No	Yes 1000 LB	Yes

CAS #	Hazardous Components (Chemical Name)	Other US EPA or State Lists
67-56-1	Methanol {Methyl alcohol; Carbinol; Wood alcohol}	CAA HAP, ODC: HAP: VHAP TSCA: Inventory CA PROP.65: Yes: RDTox.
75-09-2	Dichloromethane {Methylene chloride; R-30; Freon 30}	CAA HAP, ODC: HAP: VHAP CWA NPDES TSCA: Inventory, 8A CAIR CA PROP.65: Yes: Canc.
67-64-1	Acetone {2-Propanone}	TSCA: Inventory
108-88-3	Toluene {Benzene, Methyl-; Toluol}	CAA HAP, ODC: HAP: VHAP CWA NPDES TSCA: Inventory, 8A CAIR

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CA PROP.65: Yes: RDTox(F)

Regulatory Information:	This product is regulated by the United States Consumer Product Safety Commission and is subject to certain labeling requirements under the Federal Hazardous Substances Act. These requirements differ from the classification criteria and hazard information required for safety data sheets (SDS). The product label also includes other important information, including directions for use, and should always be read in its entirety prior to using the product.
Additional Regulatory Information	This chemical/product is not and cannot be distributed in commerce (as defined in TSCA section 3(5)) or processed (as defined in TSCA section 3(13)) for consumer paint or coating removal.
Regulatory Information Statement:	All components of this material are listed on the TSCA Inventory or are exempt.

16. OTHER INFORMATION

Revision Date: 05/02/2019
Preparer Name: W.M. Barr EHS Department (901)775-0100

Additional Information About This Product: No data available.

Company Policy or Disclaimer: The information contained herein is presented in good faith and believed to be accurate as of the effective date shown above. This information is furnished without warranty of any kind. Employers should use this information only as a supplement to other information gathered by them and must make independent determination of suitability and completeness of information from all sources to assure proper use of these materials and the safety and health of employees. Any use of this data and information must be determined by the user to be in accordance with applicable federal, state and local laws and regulations.

Klean-Strip Naked Gun Spray Gun Paint

Remover

Revision: 05/01/2019

Supersedes Revision: 06/16/2017

1. PRODUCT AND COMPANY IDENTIFICATION

Product Name:	Klean-Strip Naked Gun Spray Gun Paint Remover	
Company Name:	W. M. Barr 2105 Channel Avenue Memphis, TN 38113	Phone Number: (901)775-0100
Web site address:	www.wmbarr.com	
Emergency Contact:	3E 24 Hour Emergency Contact	(800)451-8346
Information:	W.M. Barr Customer Service	(800)398-3892
Intended Use:	Spray gun cleaning.	
Product Code:	CSG14, ESG14, GSG14, 35M.9	
Additional Information	This chemical/product is not and cannot be distributed in commerce (as defined in TSCA section 3(5)) or processed (as defined in TSCA section 3(13)) for consumer paint or coating removal.	

2. HAZARDS IDENTIFICATION

Acute Toxicity: Inhalation, Category 3
Skin Corrosion/Irritation, Category 1B
Serious Eye Damage/Eye Irritation, Category 1
Germ Cell Mutagenicity, Category 1A
Carcinogenicity, Category 1B
Specific Target Organ Toxicity (repeated exposure), Category 2
Aspiration Toxicity, Category 1



GHS Signal Word: Danger

GHS Hazard Phrases:

- May be fatal if swallowed and enters airways.
- Causes severe skin burns and eye damage.
- Causes serious eye damage.
- Toxic if inhaled.
- May cause genetic defects.
- May cause cancer.
- May cause damage to organs through prolonged or repeated exposure.

GHS Precautionary Phrases:

- Obtain special instructions before use.
- Do not handle until all safety precautions have been read and understood.
- Do not breathe gas/mist/vapors/spray.
- Wash hands thoroughly after handling.
- Use only outdoors or in a well-ventilated area.
- Wear protective gloves/protective clothing/eye protection/face protection.
- Use personal protective equipment as required.

GHS Response Phrases:

- IF SWALLOWED: Immediately call a POISON CENTER or doctor/physician.
- IF ON SKIN (or hair): Remove/take off immediately all contaminated clothing. Rinse skin with water/shower.
- IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing.
- IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
- IF exposed or concerned: Get medical attention/advice.
- Immediately call a POISON CENTER or doctor/physician.
- Get medical attention/advice if you feel unwell.

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GHS Storage and Disposal Phrases:

Specific treatment see label.
 Do NOT induce vomiting.
 Wash contaminated clothing before reuse.
 Store container tightly closed in well-ventilated place.
 Store locked up.
 Dispose of contents/container according to local, state and federal regulations.

OSHA Regulatory Status:

This material is classified as hazardous under OSHA regulations.

Potential Health Effects (Acute and Chronic):

Inhalation Acute Exposure Effects:
 Vapor harmful. May cause upper respiratory tract irritation and central nervous system depression with symptoms such as confusion, lightheadedness, nausea, vomiting, headache, and fatigue. Causes formation of carbon monoxide in blood which may affect the cardiovascular system and central nervous system. Continued exposure may cause unconsciousness and even death. Intentional misuse by deliberately concentrating and inhaling this product may be harmful or fatal.

Inhalation may result in spasm, inflammation and edema of the larynx and bronchi, chemical pneumonitis, and pulmonary edema. Lung sensitizer.

Skin Contact Acute Exposure Effects:

Harmful if absorbed through skin. Product may be absorbed through skin. Causes severe burns. May cause effects ranging from mild irritation to severe pain and burns, depending on the intensity of contact.

Skin sensitizer.

Eye Contact Acute Exposure Effects:

This material is an eye irritant. Causes severe burns. Vapors may cause eye irritation. Contact may cause tearing, redness, a stinging or burning feeling, swelling, and blurred vision.

May cause corneal injury and blindness.

Ingestion Acute Exposure Effects:

Harmful or fatal if swallowed. May cause nausea or vomiting. If vomiting results in aspiration to the lungs, chemical pneumonia could occur. Aspiration can result in severe lung damage or death. Absorption through the gastrointestinal tract may produce central nervous system depression.

Chronic Exposure Effects:

Reports have associated repeated and prolonged overexposure to solvents with neurological and other physiological damage. May cause irreversible brain and nervous system damage. May cause liver damage. May cause cancer based on animal data. Chronic effects of ingestion and subsequent aspiration into the lungs may cause pneumatocele (lung cavity) formation and chronic lung dysfunction.

Additional Data:

Alcohol may enhance the toxic effects. May cross the placenta. May be excreted in breast milk. Concurrent exposure to carbon monoxide, smoking, or physical activity may increase the level of carboxyhemoglobin in the blood resulting in additive effects.

Target Organs: blood, central nervous system, liver, kidneys, lungs, upper respiratory tract, skin, cardiovascular system, eyes

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Routes of Entry: skin absorption, inhalation, ingestion

Medical Conditions Generally diseases of the blood, skin disorders, liver disorders, kidney disorders, heart or
Aggravated By Exposure: cardiovascular disorders, nervous system disorders, respiratory system (including
asthma and other breathing disorders), and allergies

3. COMPOSITION/INFORMATION ON INGREDIENTS

CAS #	Hazardous Components (Chemical Name)	Concentration
75-09-2	Dichloromethane {Methylene chloride; R-30; Freon 30}	30.0 -60.0 %
64742-47-8	Hydrotreated light distillate (petroleum, mineral spirits)	10.0 -30.0 %
61790-44-1	Tall oil soap, potassium {Fatty acids, tall-oil, potassium salts}	< 5.0 %
108-95-2	Phenol {Carbolic acid; Hydroxybenzene}	< 5.0 %
1310-58-3	Potassium hydroxide {Caustic potash}	< 1.0 %

Additional Chemical Information Specific percentage of composition is being withheld as a trade secret.

4. FIRST AID MEASURES

Emergency and First Aid Procedures:

INHALATION:
If user experiences breathing difficulty, move to air free of vapors. Administer oxygen or artificial respiration until medical assistance can be rendered.

SKIN CONTACT:
Wash with soap and large quantities of water and seek medical attention if irritation from contact persists.

EYE CONTACT:
Immediately flush with water, remove any contact lens, continue flushing with water for at least 15 minutes. Get medical attention immediately.

INGESTION:
Immediately, call your poison control center, hospital, emergency room, or physician immediately for instructions. Do not induce vomiting, unless directed to by medical personnel. Do not give anything by mouth to an unconscious person.

Signs and Symptoms Of Exposure: See Potential Health Effects.

Note to Physician: Adrenalin should never be given to a person overexposed to methylene chloride. Call your local poison control center for further information.

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5. FIRE FIGHTING MEASURES

Flash Pt:	Nonflammable
Explosive Limits:	LEL: No data. UEL: No data.
Autoignition Pt:	No data.
Suitable Extinguishing Media:	Use carbon dioxide, dry powder, or foam.
Unsuitable Extinguishing Media:	None known.
Fire Fighting Instructions:	Self-contained respiratory protection should be provided for fire fighters fighting fires in buildings or confined areas. Storage containers exposed to fire should be kept cool with water spray to prevent pressure build-up. Stay away from heads of containers that have been exposed to intense heat or flame. Do not scatter spilled material with high pressure water streams. Keep water runoff out of water supplies and sewers.
Flammable Properties and Hazards:	No data available.
Hazardous Combustion Products:	Oxides of carbon, hydrogen chloride, chlorine, phosgene

6. ACCIDENTAL RELEASE MEASURES

Steps To Be Taken In Case Material Is Released Or Spilled:	Isolate the immediate area. Prevent unauthorized entry. Eliminate all sources of ignition in area and downwind of the spill area. Stay upwind, out of low areas, and ventilate closed spaces before entering. All equipment used when handling this product must be grounded or non-sparking. Do not touch or walk through spilled material. Stop leak if you can do so without risk. Prevent entry into waterways, sewers, or confined areas. A vapor suppressing foam may be used to reduce vapors. Absorb or cover with dry earth, sand, or other non-combustible material and transfer to compatible containers. For large spills, dike ahead of the spill.

7. HANDLING AND STORAGE

Precautions To Be Taken in Handling:	Read carefully all cautions and directions on product label before use. Since empty container retains residue, follow all label warnings even after container is empty. Dispose of empty container according to all regulations. Do not reuse this container. Avoid contact with eyes, skin, and clothing. Wash thoroughly after handling. A source of clean water should be kept in the immediate work area for flushing of the eyes and skin. Do not use in small enclosed spaces, such as basements and bathrooms. Whenever possible, use outdoors in an open air area. If strong odor is noticed or you experience slight dizziness - STOP - ventilation is inadequate. Leave area immediately. IF THE WORK AREA IS NOT VENTILATED, DO NOT USE THIS PRODUCT. A dust mask does not provide protection against vapors.
Precautions To Be Taken in Storing:	Keep container tightly closed when not in use. Store in a cool, dry place. Exposure to high temperatures or prolonged exposure to sun may cause can to leak or swell. Do not use near flames or at elevated temperatures.

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8. EXPOSURE CONTROLS/PERSONAL PROTECTION

CAS #	Chemical Name	Jurisdiction	Recommended Exposure Limits	Notations
75-09-2	Dichloromethane {Methylene chloride; R-30; Freon 30}	ACGIH TLV	TLV: 50 ppm	
		OSHA PELs	PEL: 25 ppm STEL: 125 ppm (15 min)	
64742-47-8	Hydrotreated light distillate (petroleum, mineral spirits)	ACGIH TLV	TLV: 200 mg/m3	
108-95-2	Phenol {Carbolic acid; Hydroxybenzene}	ACGIH TLV	TLV: 5 ppm	
		OSHA PELs	PEL: 5 ppm	
1310-58-3	Potassium hydroxide {Caustic potash}	ACGIH TLV	CEIL: 2 mg/m3	
Respiratory Equipment (Specify Type):		For use in areas with inadequate ventilation or fresh air, wear properly maintained and properly fitted NIOSH approved respiratory protection for organic solvent vapors. This may include the use of supplied air.		
		For OSHA controlled work places and other regular users - Use only with adequate ventilation under engineered air control systems designed to prevent exceeding the appropriate TLV.		
		A dust mask does not provide protection against vapors.		
Eye Protection:		Safety glasses, chemical goggles, or face shields are recommended to safeguard against potential eye contact, irritation, or injury. Chemical goggles or face shields are recommended when splashing or spraying of chemical is possible. A faceshield provides more protection to help reduce chemical contact to the face and eyes.		
Protective Gloves:		Wear gloves with as much resistance to the chemical ingredients as possible. Laminate film gloves offer the best protection. Other glove materials will be degraded by methylene chloride, but may provide protection for some amount of time, based on the type of glove and the conditions of use. Consult your glove supplier for additional information. Gloves contaminated with product should be discarded and not reused.		
Other Protective Clothing:		Various application methods can dictate use of additional protective safety equipment, such as impermeable aprons, etc., to minimize exposure.		
Engineering Controls (Ventilation etc.):		Use only with adequate ventilation to prevent buildup of vapors. Do not use in areas where vapors can accumulate and concentrate such as basements, bathrooms, or small enclosed areas. Whenever possible, use outdoors in an open area. If using indoors, open all windows and doors and maintain a cross ventilation of moving fresh air across the work area. If strong odor is noticed or you experience slight dizziness, headache, nausea or eye-watering -- STOP -- ventilation is inadequate. Leave area immediately. IF THE WORK AREA IS NOT VENTILATED, DO NOT USE THIS PRODUCT. A dust mask does not provide protection against vapors.		
Work/Hygienic/Maintenance Practices:		Wash hands thoroughly after use and before eating, drinking, or smoking.		
		Do not eat, drink, or smoke in the work area.		
		Discard any clothing or other protective equipment that cannot be decontaminated.		
		Facilities storing or handling this material should be equipped with an emergency eyewash and safety shower.		

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9. PHYSICAL AND CHEMICAL PROPERTIES**Physical States:** ☐ Gas ☒ Liquid ☐ Solid**Appearance and Odor:** Yellow, milky liquid.**ADDITIONAL INFORMATION:**

VOC / Volume: 196 g/L

pH: 9.5 - 10.5**Melting Point:** No data.**Boiling Point:** No data.**Flash Pt:** Nonflammable**Evaporation Rate:** > 1**Flammability (solid, gas):** No data available.**Explosive Limits:** LEL: No data. UEL: No data.**Vapor Pressure (vs. Air or mm Hg):** <=35 MM HG at 68.0 F**Vapor Density (vs. Air = 1):** > 1**Specific Gravity (Water = 1):** 1.1**Density:** 9.327 LB/GL**Solubility in Water:** Partially**Octanol/Water Partition Coefficient:** No data.**Percent Volatile:** 99.3 % by weight.**VOC / Volume:** 1.6400 % WT**Autoignition Pt:** No data.**Decomposition Temperature:** No data.**Viscosity:** No data.**10. STABILITY AND REACTIVITY****Stability:** Unstable ☐ Stable ☒**Conditions To Avoid -** No data available.**Instability:****Incompatibility - Materials To Avoid:** bases, oxygen, sodium, potassium, strong oxidizing materials, reactive metals, strong acids, alkalies**Hazardous Decomposition or Byproducts:** Thermal decomposition may produce carbon monoxide, carbon dioxide, chlorine gas, hydrogen chloride, and small quantities of phosgene.**Possibility of Hazardous Reactions:** Will occur ☐ Will not occur ☒**Conditions To Avoid -** No data available.**Hazardous Reactions:**

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11. TOXICOLOGICAL INFORMATION

Toxicological Information:	This product has not been tested as a whole. Refer to section 2 for acute and chronic effects. CAS# 75-09-2: Tumorigenic Effects:, TCLo, Inhalation, Rat, 3500. PPM, 6 Y. Result: Tumorigenic: Carcinogenic by RTECS criteria. Endocrine: Tumors. - Fundamental and Applied Toxicology., Academic Press, Inc., 1 E. First St., Duluth, MN 55802, Vol/p/yr: 4,30, 1984 Standard Draize Test, Eyes, Species: Rabbit, 100.0 MG, Severe. Result: Effects on Newborn: Growth statistics (e.g., reduced weight gain). Effects on Newborn: Physical. - Union Carbide Data Sheet, Union Carbide Corp., 39 Old Ridgebury Rd., Danbury, CT 06817, Vol/p/yr: 4/25, 1958 Standard Draize Test, Skin, Species: Rabbit, 810.0 MG, 24 H, Severe. Result: Specific Developmental Abnormalities: Musculoskeletal system. - European Journal of Toxicology and Environmental Hygiene., For publisher information, see TOERD9, Paris France, Vol/p/yr: 9,171, 1976 CAS# 108-95-2: Mutagenicity:, Mutation test: DNA damage., Mouse, 1500. UMOL/L, Cell Type: lymphocyte.. Result: Kidney, Ureter, Bladder: Changes in liver weight. Nutritional and Gross Metabolic:Weight loss or decreased weight gain. Biochemical:Enzyme inhibition, induction, or change in blood or tissue levels: Hepatic microsomal mixed oxidase (dealkylation, hydroxylation, etc.) - Mutation Research., Elsevier Science Pub. B.V., POB 211, 1000 AE, Amsterdam Netherlands, Vol/p/yr: 203,155, 1988 Acute toxicity, LC50, Inhalation, Rat, 316.0 MG/M3. Result: Specific Developmental Abnormalities: Central nervous system. - Gigiena i Sanitariya, Mezhdunarodnaya Kniga, ul. B. Yakimanka, 39, 113095, Moscow 113095 Russia, Vol/p/yr: 41(6),103, 1976 Standard Draize Test, Skin, Species: Rabbit, 500.0 MG, 24 H, Severe. Result: Sense Organs and Special Senses (Nose, Eye, Ear, and Taste): Ear: Changes in cochlear structure or function. - BIOFAX Industrial Bio-Test Laboratories, Inc., Data Sheets., Vol/p/yr: 27-4, 1973 Standard Draize Test, Eyes, Species: Rabbit, 5.000 MG, Severe. Result: Behavioral: Convulsions or effect on seizure threshold. - Union Carbide Data Sheet, Union Carbide Corp., 39 Old Ridgebury Rd., Danbury, CT

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06817, Vol/p/yr: 1/6, 1966

Chronic Toxicological Effects:

Carcinogenicity/Other Information:

IARC 2B - Possibly Carcinogenic to Humans
 ACGIH A3 - Confirmed Animal Carcinogen with Unknown Relevance to Humans
 IARC 3: Not Classifiable as to Carcinogenicity in Humans.
 ACGIH A4 - Not Classifiable as a Human Carcinogen.

CAS #	Hazardous Components (Chemical Name)	NTP	IARC	ACGIH	OSHA
75-09-2	Dichloromethane {Methylene chloride; R-30; Freon 30}	Possible	2B	A3	Yes
64742-47-8	Hydrotreated light distillate (petroleum, mineral spirits)	n.a.	n.a.	A4	n.a.
61790-44-1	Tall oil soap, potassium {Fatty acids, tall-oil, potassium salts}	n.a.	n.a.	n.a.	n.a.
108-95-2	Phenol {Carbolic acid; Hydroxybenzene}	n.a.	3	A4	n.a.
1310-58-3	Potassium hydroxide {Caustic potash}	n.a.	n.a.	n.a.	n.a.

12. ECOLOGICAL INFORMATION

General Ecological Information:

No information available for this product as a whole.

13. DISPOSAL CONSIDERATIONS

Waste Disposal Method:

Dispose in accordance with applicable local, state and federal regulations.

14. TRANSPORT INFORMATION

LAND TRANSPORT (US DOT):

DOT Proper Shipping Name: Corrosive Liquid, n.o.s. (Potassium Hydroxide, Methylene Chloride)

DOT Hazard Class: 8 CORROSIVE

UN/NA Number: UN1760

Packing Group: II



Additional Transport Information:

15. REGULATORY INFORMATION

EPA SARA (Superfund Amendments and Reauthorization Act of 1986) Lists

CAS #	Hazardous Components (Chemical Name)	S. 302 (EHS)	S. 304 RQ	S. 313 (TRI)
75-09-2	Dichloromethane {Methylene chloride; R-30; Freon 30}	No	Yes 1000 LB	Yes
64742-47-8	Hydrotreated light distillate (petroleum, mineral spirits)	No	No	No
61790-44-1	Tall oil soap, potassium {Fatty acids, tall-oil, potassium salts}	No	No	No
108-95-2	Phenol {Carbolic acid; Hydroxybenzene}	Yes 500 LB	Yes 1000 LB	Yes
1310-58-3	Potassium hydroxide {Caustic potash}	No	Yes 1000 LB	No

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CAS #	Hazardous Components (Chemical Name)	Other US EPA or State Lists
75-09-2	Dichloromethane {Methylene chloride; R-30; Freon 30}	CAA HAP,ODC: HAP: VHAP CWA NPDES TSCA: Inventory, 8A CAIR CA PROP.65: Yes: Canc.
64742-47-8	Hydrotreated light distillate (petroleum, mineral spirits)	TSCA: Inventory
61790-44-1	Tall oil soap, potassium {Fatty acids, tall-oil, potassium salts}	TSCA: Inventory
108-95-2	Phenol {Carbolic acid; Hydroxybenzene}	CAA HAP,ODC: HAP: VHAP CWA NPDES TSCA: Inventory
1310-58-3	Potassium hydroxide {Caustic potash}	TSCA: Inventory

Regulatory Information: This product is regulated by the United States Consumer Product Safety Commission and is subject to certain labeling requirements under the Federal Hazardous Substances Act. These requirements differ from the classification criteria and hazard information required for safety data sheets (SDS). The product label also includes other important information, including directions for use, and should always be read in its entirety prior to using the product.

Additional Regulatory Information This chemical/product is not and cannot be distributed in commerce (as defined in TSCA section 3(5)) or processed (as defined in TSCA section 3(13)) for consumer paint or coating removal.

Regulatory Information Statement: All components of this material are listed on the TSCA Inventory or are exempt.

16. OTHER INFORMATION

Revision Date: 05/01/2019

Preparer Name: EHS Department

Additional Information About This Product: No data available.

Company Policy or Disclaimer: The information contained herein is presented in good faith and believed to be accurate as of the effective date shown above. This information is furnished without warranty of any kind. Employers should use this information only as a supplement to other information gathered by them and must make independent determination of suitability and completeness of information from all sources to assure proper use of these materials and the safety and health of employees. Any use of this data and information must be determined by the user to be in accordance with applicable federal, state and local laws and regulations.

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1. PRODUCT AND COMPANY IDENTIFICATION

Product Name: Klean-Strip Peeler
Company Name: W. M. Barr
2105 Channel Avenue
Memphis, TN 38113
Phone Number: (901)775-0100
Web site address: www.wmbarr.com
Emergency Contact: 3E 24 Hour Emergency Contact (800)451-8346
Information: W.M. Barr Customer Service (800)398-3892
Intended Use: Basecoat & Clearcoat Remover
Product Code: EFS459
Additional Information: This chemical/product is not and cannot be distributed in commerce (as defined in TSCA section 3(5)) or processed (as defined in TSCA section 3(13)) for consumer paint or coating removal.

2. HAZARDS IDENTIFICATION

Flammable Aerosols, Category 3
Gas Under Pressure, Liquefied gas
Acute Toxicity: Inhalation, Category 4
Skin Corrosion/Irritation, Category 1A-1C
Serious Eye Damage/Eye Irritation, Category 2A
Germ Cell Mutagenicity, Category 1A
Carcinogenicity, Category 1B
Specific Target Organ Toxicity (single exposure), Category 1
Simple Asphyxiant



GHS Signal Word: Danger

GHS Hazard Phrases: Pressurized container: may burst if heated.
Containers gas under pressure; may explode if heated.
Causes severe skin burns and eye damage.
Causes serious eye irritation.
Harmful if inhaled.
May cause genetic defects.
May cause cancer.
Causes damage to organs.

GHS Precautionary Phrases: Obtain special instructions before use.
Do not handle until all safety precautions have been read and understood.
Keep away from heat/sparks/open flames/hot surfaces. - No smoking.
Pressurized container: Do not pierce or burn, even after use.
Do not breathe gas/mist/vapors/spray.
Wash hands thoroughly after handling.
Do not eat, drink or smoke when using this product.
Use only outdoors or in a well-ventilated area.
Wear protective gloves/protective clothing/eye protection/face protection.
Use personal protective equipment as required.

GHS Response Phrases: IF SWALLOWED: Rinse mouth. Do NOT induce vomiting.
IF ON SKIN (or hair): Remove/take off immediately all contaminated clothing. Rinse skin with water/shower.
IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for

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GHS Storage and Disposal Phrases:

breathing.
IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
IF exposed: Call a POISON CENTER or doctor/physician.
IF exposed or concerned: Get medical attention/advice.
Immediately call a POISON CENTER or doctor/physician.
Specific treatment see label.
If eye irritation persists, get medical advice/attention.
Wash contaminated clothing before reuse.

OSHA Regulatory Status:

Store locked up.
Protect from sunlight and store in well-ventilated place.
Do not expose to temperatures exceeding 50 °C/122 °F.
Dispose of contents/container according to local, state and federal regulations.

Potential Health Effects (Acute and Chronic):

This material is classified as hazardous under OSHA regulations.

INHALATION ACUTE EXPOSURE EFFECTS:

Harmful if inhaled. May cause upper respiratory tract irritation and central nervous system depression with symptoms such as confusion, lightheaded, nausea, vomiting, headache, and fatigue. Causes formation of carbon monoxide in blood which may affect the cardiovascular system and central nervous system. Continued exposure may cause unconsciousness and even death. High vapor concentrations may also cause irritation of the eyes and respiratory tract. Exposure to methylene chloride may make the symptoms of angina (chest pains) worse.

SKIN CONTACT ACUTE EXPOSURE EFFECTS:

This product is a skin irritant. May cause mild to moderate skin irritation. Prolonged or repeated contact may dry the skin or cause skin burns. Symptoms may include redness, burning, drying and cracking of the skin, pain, and skin burns. Skin absorption may occur.

INGESTION ACUTE EXPOSURE EFFECTS:

Harmful or fatal if swallowed. May cause nausea, diarrhea or vomiting. If vomiting results in aspiration, chemical pneumonia could occur. Absorption through the gastrointestinal tract may produce central nervous system depression. Methanol exposure may cause visual impairment, including blindness, coma, and death.

CHRONIC HEALTH EFFECTS:

The best evidence that methylene chloride causes cancer is from laboratory studies in which rats, mice and hamsters inhaled methylene chloride 6 hours per day, 5 days per week for 2 years. Methylene chloride exposure produced lung and liver tumors in mice and mammary tumors in rats. No carcinogenic effects of methylene chloride were found in hamsters.

There are also some human epidemiological studies which show an association between occupational exposure to methylene chloride and increases in biliary (bile duct) cancer and a type of brain cancer. Other epidemiological studies have not observed a relationship between methylene chloride exposure and cancer. OSHA interprets these results to mean that there is suggestive (but not absolute) evidence that methylene chloride is a human carcinogen.

Alcohol may enhance the toxic effects of methylene chloride. May cross the placenta. May be excreted in breast milk. Concurrent exposure to carbon monoxide, smoking, or physical activity may increase the level of carboxyhemoglobin in the blood resulting in additive effects.

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Methanol has caused birth defects in laboratory animals, but only when inhaled at extremely high vapor concentrations. The relevance of this finding to humans is uncertain.

Reports have associated repeated and prolonged overexposure to solvents with neurological and other physiological damage. Prolonged or repeated contact may cause dermatitis.

TARGET ORGANS: liver, kidneys, pancreas, heart, lungs, brain, central nervous system

ROUTES OF ENTRY: Inhalation, skin absorption, skin contact, eye contact.

Medical Conditions Generally Aggravated By Exposure: Disorders of the heart or cardiovascular system, kidneys, liver, nervous system, respiratory system (including asthma), skin, and allergies.

3. COMPOSITION/INFORMATION ON INGREDIENTS

CAS #	Hazardous Components (Chemical Name)	Concentration
75-09-2	Dichloromethane {Methylene chloride; R-30; Freon 30}	60.0 -100.0 %
68476-86-8	Liquified petroleum gas, sweetened {propane, isobutane, n-butane}	<30.0 %
67-56-1	Methanol {Methyl alcohol; Carbinol; Wood alcohol}	< 5.0 %

Additional Chemical Information Specific percentage of composition is being withheld as a trade secret.

4. FIRST AID MEASURES

Emergency and First Aid Procedures:

Skin:

Remove contaminated clothing. Immediately wash skin thoroughly with large amounts of water and mild soap, if available. Seek medical attention if irritation develops or persists.

Eyes:

Immediately begin to flush eyes with water, remove any contact lens. Continue to flush the eyes for at least 15 minutes. Seek medical attention.

Inhalation:

Remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get immediate medical attention.

Ingestion:

If swallowed, do NOT induce vomiting. Seek immediate medical attention. Call a physician, hospital emergency room, or poison control center immediately. Never give anything by mouth to an unconscious person.

Signs and Symptoms Of Exposure:

See Potential Health Effects.

Note to Physician:

This product contains methanol which can cause intoxication and central nervous system depression. Methanol is metabolized to formic acid and formaldehyde. These metabolites can cause metabolic acidosis, visual disturbances and blindness. Since metabolism is required for these toxic symptoms, their onset may be delayed from 6 to 30 hours following ingestion. Ethanol competes for the same metabolic pathway and

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has been used to prevent methanol metabolism. Ethanol administration is indicated in symptomatic patients or at blood methanol concentrations above 20 ug/dl. Methanol is effectively removed by hemodialysis. Adrenalin should never be given to a person overexposed to methylene chloride.

Methylene Chloride is an aspiration hazard. Risk of aspiration must be weighed against possible toxicity of the material when determining whether to induce emesis or to perform gastric lavage. This material sensitizes the heart to the effects of sympathomimetic amines. Epinephrine and other sympathomimetic drugs may initiate cardiac arrhythmias in individuals exposed to this material. This material is metabolized to carbon monoxide. Consequently, elevations in carboxyhemoglobin as high as 50% have been reported, and levels may continue to rise for several hours after exposure has ceased. Data in experimental animals suggest there is a narrow margin between concentrations causing anesthesia and death.

5. FIRE FIGHTING MEASURES

	Level 1 Aerosol
Flash Pt:	No data.
Explosive Limits:	LEL: No data. UEL: No data.
Autoignition Pt:	No data.
Suitable Extinguishing Media:	Use carbon dioxide, dry powder, or foam.
Unsuitable Extinguishing Media:	None known.
Fire Fighting Instructions:	Self-contained respiratory protection should be provided for fire fighters fighting fire in buildings or confined areas. Storage containers exposed to fire should be kept cool with water spray to prevent pressure build-up. Stay away from heads of containers that have been exposed to intense heat or flame.
Flammable Properties and Hazards:	FLASHPOINT OF LIQUID CONCENTRATE: NO FLASH TO BOILING. FLASHPOINT OF PROPELLANT: -142 F
Hazardous Combustion Products:	Liquid concentrate may form flammable vapor-air mixtures at approximately 100 deg. C (212 deg. F), or higher. carbon monoxide, carbon dioxide, hydrogen chloride, chlorine, phosgene

6. ACCIDENTAL RELEASE MEASURES

Steps To Be Taken In Case Material Is Released Or Spilled:	Clean up: Keep unnecessary people away; isolate hazard area and deny entry. Stay upwind, out of low areas, and ventilate closed spaces before entering. Shut off ignition sources; keep flares, smoking or flames out of hazard area. Use non-sparking tools. Use proper bonding and grounding methods for all equipment and processes. Keep out of waterways and bodies of water. Be cautious of vapors collecting in small enclosed spaces, sewers, low lying areas, confined spaces, etc. Small spills: Take up with sand, earth or other noncombustible absorbent material and place in a plastic container where applicable. Large spills: Dike far ahead of spill for later collection and reuse or disposal.

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Waste Disposal: Dispose in accordance with applicable local, state and federal regulations.

7. HANDLING AND STORAGE

Precautions To Be Taken in Handling:

Read carefully all cautions and directions on product label before use. Since empty container retains residue, follow all label warnings even after container is empty. Dispose of empty container according to all local, state, and federal regulations. Do not reuse this container.

Do not puncture or incinerate container.

Exposure to heat or prolonged exposure to sun can cause bursting.

Do not use this product near any source of heat or open flame, furnace areas, pilot lights, stoves, etc.

Do not use in small enclosed spaces, such as basements and bathrooms. Vapors can accumulate and explode if ignited.

Avoid contact with the skin, eyes, and clothing. Avoid breathing of vapors.

Precautions To Be Taken in Storing:

Store in a cool, dry place. Exposure to high temperatures or prolonged exposure to sun may cause can to rupture. Do not store near flames or at elevated temperatures.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

CAS #	Chemical Name	Jurisdiction	Recommended Exposure Limits	Notations
75-09-2	Dichloromethane	ACGIH TLV	TLV: 50 ppm	
	{Methylene chloride; R-30; Freon 30}	OSHA PELs	PEL: 25 ppm STEL: 125 ppm (15 min)	
67-56-1	Methanol {Methyl alcohol; Carbinol; Wood alcohol}	ACGIH TLV	TLV: 200 ppm STEL: 250 ppm	
		OSHA PELs	PEL: 200 ppm	
Respiratory Equipment (Specify Type):		For use in areas with inadequate ventilation or fresh air, wear a properly maintained and properly fitted NIOSH approved respirator for organic solvent vapors.		
		For OSHA controlled work places and other regular users - Use only with adequate ventilation under engineered air control systems designed to prevent exceeding the appropriate TLV.		
		A dust mask does not provide protection against vapors.		
Eye Protection:		Wear chemical splash goggles to protect the eyes from contact with liquid. Wearing safety glasses with a face shield can also provide protection to the face and eyes from spraying, spattering, or splashing liquid.		
Protective Gloves:		Wear gloves with as much resistance to the chemical ingredients as possible. Laminate film gloves offer the best protection. Other glove materials will be degraded by methylene chloride, but may provide protection for some amount of time, based on the type of glove and the conditions of use. Solvent-resistant gloves, such as nitrile rubber can offer protection. Consult your glove supplier for additional information. Gloves contaminated with product should be discarded and not reused.		
Other Protective Clothing:		Various application methods can dictate use of additional protective safety equipment,		

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Engineering Controls (Ventilation etc.):

such as impermeable aprons, etc., to minimize exposure.

Use process enclosures, local exhaust ventilation, or other engineering controls to control airborne levels below recommended exposure limits.

Use only with adequate ventilation to prevent buildup of vapors. Do not use in areas where vapors can accumulate and concentrate, such as basements, bathrooms or small enclosed areas. Whenever possible, use outdoors in an open air area. If using indoors open all windows and doors and maintain a cross ventilation of moving fresh air across the work area. If strong odor is noticed or you experience slight dizziness, headache, nausea or eye-watering -- STOP -- ventilation is inadequate. Leave area immediately and move to fresh air.

Work/Hygienic/Maintenance Practices:

Wash hands thoroughly after use and before eating, drinking, or smoking.

Do not eat, drink, or smoke in the work area.

Discard any clothing or other protective equipment that cannot be decontaminated.

Facilities storing or handling this material should be equipped with an emergency eyewash and safety shower.

9. PHYSICAL AND CHEMICAL PROPERTIES

Physical States:	[X] Gas [X] Liquid [] Solid	
Appearance and Odor:	Transparent viscous liquid.	
pH:	No data.	
Melting Point:	No data.	
Boiling Point:	104.00 F	
Flash Pt:	No data.	
Evaporation Rate:	< 1	
Flammability (solid, gas):	No data available.	
Explosive Limits:	LEL: No data.	UEL: No data.
Vapor Pressure (vs. Air or mm Hg):	420 MM HG	
Vapor Density (vs. Air = 1):	> 1	
Specific Gravity (Water = 1):	No data.	
Density:	10.64 LB/GL	
Solubility in Water:	slight	
Octanol/Water Partition Coefficient:	No data.	
Percent Volatile:	< 2.0 % by weight.	
VOC / Volume:	27.9000 % WT	
Autoignition Pt:	No data.	
Decomposition Temperature:	No data.	
Viscosity:	No data.	

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10. STABILITY AND REACTIVITY

Stability:	Unstable [] Stable [X]
Conditions To Avoid -	No data available.
Instability:	
Incompatibility - Materials To Avoid:	Bases, oxygen, sodium, potassium, strong acids, strong oxidizers, reactive metals
Hazardous Decomposition or Byproducts:	Thermal decomposition may produce hydrogen chloride, chlorine gas, small quantities of phosgene, carbon monoxide, carbon dioxide, and unidentified organic compounds in black smoke.
Possibility of Hazardous Reactions:	Will occur [] Will not occur [X]
Conditions To Avoid -	No data available.
Hazardous Reactions:	

11. TOXICOLOGICAL INFORMATION

Toxicological Information:	This product has not been tested as a whole. Refer to section 2 for acute and chronic effects. CAS# 75-09-2: Tumorigenic Effects:, TCLo, Inhalation, Rat, 3500. PPM, 6 Y. Result: Tumorigenic: Carcinogenic by RTECS criteria. Endocrine: Tumors. - Fundamental and Applied Toxicology., Academic Press, Inc., 1 E. First St., Duluth, MN 55802, Vol/p/yr: 4,30, 1984 Standard Draize Test, Eyes, Species: Rabbit, 100.0 MG, Severe. Result: Effects on Newborn: Growth statistics (e.g., reduced weight gain). Effects on Newborn: Physical. - Union Carbide Data Sheet, Union Carbide Corp., 39 Old Ridgebury Rd., Danbury, CT 06817, Vol/p/yr: 4/25, 1958 Standard Draize Test, Skin, Species: Rabbit, 810.0 MG, 24 H, Severe. Result: Specific Developmental Abnormalities: Musculoskeletal system. - European Journal of Toxicology and Environmental Hygiene., For publisher information, see TOERD9, Paris France, Vol/p/yr: 9,171, 1976 Carcinogenicity/Other Information: IARC 2B - Possibly Carcinogenic to Humans ACGIH A3 - Confirmed Animal Carcinogen with Unknown Relevance to Humans

CAS #	Hazardous Components (Chemical Name)	NTP	IARC	ACGIH	OSHA
75-09-2	Dichloromethane {Methylene chloride; R-30; Freon 30}	Possible	2B	A3	Yes
68476-86-8	Liquified petroleum gas, sweetened {propane, isobutane, n-butane}	n.a.	n.a.	n.a.	n.a.
67-56-1	Methanol {Methyl alcohol; Carbinol; Wood alcohol}	n.a.	n.a.	n.a.	n.a.

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12. ECOLOGICAL INFORMATION

General Ecological Information: This product has not been tested as a whole.

13. DISPOSAL CONSIDERATIONS

Waste Disposal Method: Dispose in accordance with applicable local, state and federal regulations.

14. TRANSPORT INFORMATION

LAND TRANSPORT (US DOT):

DOT Proper Shipping Name: Aerosols, flammable

DOT Hazard Class: 2.1 FLAMMABLE GAS
UN/NA Number: UN1950



Additional Transport Information: The shipper/supplier may apply one of the following exceptions: Combustible Liquid, Consumer Commodity, Limited Quantity, Viscous Liquid, Does Not Sustain Combustion, or others, as allowed under 49CFR Hazmat Regulations. Please consult 49CFR Subchapter C to ensure that subsequent shipments comply with these exceptions.

15. REGULATORY INFORMATION

EPA SARA (Superfund Amendments and Reauthorization Act of 1986) Lists

CAS #	Hazardous Components (Chemical Name)	S. 302 (EHS)	S. 304 RQ	S. 313 (TRI)
75-09-2	Dichloromethane {Methylene chloride; R-30; Freon 30}	No	Yes 1000 LB	Yes
68476-86-8	Liquified petroleum gas, sweetened {propane, isobutane, n-butane}	No	No	No
67-56-1	Methanol {Methyl alcohol; Carbinol; Wood alcohol}	No	Yes 5000 LB	Yes

CAS #	Hazardous Components (Chemical Name)	Other US EPA or State Lists
75-09-2	Dichloromethane {Methylene chloride; R-30; Freon 30}	CAA HAP, ODC: HAP: VHAP CWA NPDES TSCA: Inventory, 8A CAIR CA PROP.65: Yes: Canc.
68476-86-8	Liquified petroleum gas, sweetened {propane, isobutane, n-butane}	TSCA: Inventory
67-56-1	Methanol {Methyl alcohol; Carbinol; Wood alcohol}	CAA HAP, ODC: HAP: VHAP TSCA: Inventory CA PROP.65: Yes: RDTox.

Regulatory Information: This product is regulated by the United States Consumer Product Safety Commission and is subject to certain labeling requirements under the Federal Hazardous Substances Act. These requirements differ from the classification criteria and hazard information required for safety data sheets (SDS). The product label also includes other important information, including directions for use, and should always be read in its entirety prior to using the product.

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Additional Regulatory Information	This chemical/product is not and cannot be distributed in commerce (as defined in TSCA section 3(5)) or processed (as defined in TSCA section 3(13)) for consumer paint or coating removal.

16. OTHER INFORMATION

Revision Date: 05/01/2019
Preparer Name: W.M. Barr EHS Dept (901)775-0100

Additional Information About This Product: No data available.

Company Policy or Disclaimer: The information contained herein is presented in good faith and believed to be accurate as of the effective date shown above. This information is furnished without warranty of any kind. Employers should use this information only as a supplement to other information gathered by them and must make independent determination of suitability and completeness of information from all sources to assure proper use of these materials and the safety and health of employees. Any use of this data and information must be determined by the user to be in accordance with applicable federal, state and local laws and regulations.

Klean-Strip Premium Sprayable Stripper

Revision: 05/01/2019

Supersedes Revision: 06/22/2017

1. PRODUCT AND COMPANY IDENTIFICATION

Product Name:	Klean-Strip Premium Sprayable Stripper	
Company Name:	W. M. Barr 2105 Channel Avenue Memphis, TN 38113	Phone Number: (901)775-0100
Web site address:	www.wmbarr.com	
Emergency Contact:	3E 24 Hour Emergency Contact	(800)451-8346
Information:	W.M. Barr Customer Service	(800)398-3892
Intended Use:	Paint/Varnish Remover	
Product Code:	GBLKSPRY, QBLK2212, GKS221, QKS2212,	
Additional Information	This chemical/product is not and cannot be distributed in commerce (as defined in TSCA section 3(5)) or processed (as defined in TSCA section 3(13)) for consumer paint or coating removal.	

2. HAZARDS IDENTIFICATION

Acute Toxicity: Oral, Category 4
Acute Toxicity: Skin, Category 4
Acute Toxicity: Inhalation, Category 4
Skin Corrosion/Irritation, Category 1A-1C
Serious Eye Damage/Eye Irritation, Category 2A
Carcinogenicity, Category 1B
Specific Target Organ Toxicity (single exposure), Category 1



GHS Signal Word: Danger

GHS Hazard Phrases:

- Harmful if swallowed.
- Harmful in contact with skin.
- Causes severe skin burns and eye damage.
- Causes serious eye irritation.
- Harmful if inhaled.
- May cause cancer.
- Causes damage to organs.

GHS Precautionary Phrases:

- Obtain special instructions before use.
- Do not handle until all safety precautions have been read and understood.
- Do not breathe gas/mist/vapors/spray.
- Wash hands thoroughly after handling.
- Do not eat, drink or smoke when using this product.
- Use only outdoors or in a well-ventilated area.
- Wear protective gloves/protective clothing/eye protection/face protection.

GHS Response Phrases:

- IF SWALLOWED: Call a POISON CENTER or doctor/physician if you feel unwell.
- IF ON SKIN: Wash with plenty of soap and water.
- IF ON SKIN (or hair): Remove/take off immediately all contaminated clothing. Rinse skin with water/shower.
- IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing.
- IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
- IF exposed: Call a POISON CENTER or doctor/physician.
- IF exposed or concerned: Get medical attention/advice.

Klean-Strip Premium Sprayable Stripper

Revision: 05/01/2019

Supersedes Revision: 06/22/2017

GHS Storage and Disposal Phrases:**OSHA Regulatory Status:****Potential Health Effects (Acute and Chronic):**

Immediately call a POISON CENTER or doctor/physician.
 Specific treatment see label.
 Specific measures see label.
 Rinse mouth.
 If eye irritation persists, get medical advice/attention.
 Wash contaminated clothing before reuse.

Store locked up.
 Dispose of contents/container according to local, state and federal regulations.

This material is classified as hazardous under OSHA regulations.

This product has not been tested as a whole to determine health effects. The health effects listed below are associated with the individual ingredients listed in Section 3.

EYES: Causes eye irritation. May cause tearing, redness, stinging or burning, swelling, and blurred vision. May cause corneal injury.

SKIN: May cause effects ranging from mild irritation to severe pain, and possibly burns, depending on the intensity of contact. Skin absorption may occur.

INHALATION: May cause upper respiratory tract irritation and central nervous system depression with symptoms such as confusion, lightheadedness, dizziness, nausea, vomiting, headache, and fatigue. Causes formation of carbon monoxide in blood which may affect the cardiovascular system and central nervous system, and can cause a lack of oxygen in the blood. Continued exposure may cause unconsciousness, coma, and even death.

INGESTION: May cause nausea, vomiting, and diarrhea. May cause central nervous system excitement, followed by headache, dizziness, and drowsiness. Absorption through the gastrointestinal tract may produce central nervous system depression. May cause kidney damage. May cause blurred vision and visual impairment (including blindness).

CHRONIC OVEREXPOSURE EFFECTS: May cause liver and kidney damage. May cause cancer based on animal data (methylene chloride). Prolonged or repeated skin contact may cause defatting and dermatitis.

Methanol has caused birth defects in laboratory animals, but only when inhaled at extremely high vapor concentrations. The relevance of this finding to humans is uncertain.

Reports have associated repeated and prolonged overexposure to solvents with neurological and other physiological damage. Intentional misuse by deliberately concentrating and inhaling solvents may be harmful or fatal.

ADDITIONAL DATA:

For Methylene Chloride: Alcohol may enhance the toxic effects. May cross the placenta. May be excreted in breast milk. Concurrent exposure to carbon monoxide, smoking, or physical activity may increase the level of carboxyhemoglobin in the blood resulting in additive effects.

TARGET ORGANS: blood, central nervous system, liver, skin, cardiovascular system, eyes, kidney, pancreas, heart, lungs, brain

Klean-Strip Premium Sprayable Stripper

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Supersedes Revision: 06/22/2017

PRIMARY ROUTES OF ENTRY: skin, eyes, inhalation, ingestion

Medical Conditions Generally Aggravated By Exposure: Diseases of the blood, skin, eyes, liver, kidneys, lungs, cardiovascular system and respiratory system; alcoholism and rhythm disorders of the heart.

3. COMPOSITION/INFORMATION ON INGREDIENTS

CAS #	Hazardous Components (Chemical Name)	Concentration
75-09-2	Dichloromethane {Methylene chloride; R-30; Freon 30}	60.0 -75.0 %
67-56-1	Methanol {Methyl alcohol; Carbinol; Wood alcohol}	15.0 -25.0 %

Additional Chemical Information Specific percentage of composition is being withheld as a trade secret.

4. FIRST AID MEASURES

Emergency and First Aid Procedures:

Skin:

Immediately begin washing the skin thoroughly with large amounts of water and mild soap, if available, while removing contaminated clothing. Seek medical attention if irritation persists.

Eyes:

Immediately begin to flush eyes with water, remove any contact lens. Continue to flush the eyes for at least 15 minutes, then seek immediate medical attention.

Inhalation:

Remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get immediate medical attention.

Ingestion:

If swallowed, do NOT induce vomiting. Seek immediate medical attention. Call a physician, hospital emergency room, or poison control center immediately. Never give anything by mouth to an unconscious person.

Signs and Symptoms Of Exposure:

See Potential Health Effects.

Note to Physician:

This product contains methylene chloride and methanol.

This product contains methanol which can cause intoxication and central nervous system depression. Methanol is metabolized to formic acid and formaldehyde. These metabolites can cause metabolic acidosis, visual disturbances and blindness. Since metabolism is required for these toxic symptoms, their onset may be delayed from 6 to 30 hours following ingestion. Ethanol competes for the same metabolic pathway and has been used to prevent methanol metabolism. Ethanol administration is indicated in symptomatic patients or at blood methanol concentrations above 20 ug/dl. Methanol is effectively removed by hemodialysis.

Methylene Chloride sensitizes the heart to the effects of sympathomimetic amines. Epinephrine and other sympathomimetic drugs may initiate cardiac arrhythmias in individuals exposed to this material. This material is metabolized to carbon monoxide. Consequently, elevations in carboxyhemoglobin as high as 50% have been reported, and levels may continue to rise for several hours after exposure has ceased. Data in experimental animals suggest there is a narrow margin between concentrations causing anesthesia and death. Adrenalin should never be given to a person overexposed to methylene chloride.

Klean-Strip Premium Sprayable Stripper

Revision: 05/01/2019

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5. FIRE FIGHTING MEASURES

Flash Pt:	Nonflammable
Explosive Limits:	LEL: No data. UEL: No data.
Autoignition Pt:	No data.
Suitable Extinguishing Media:	Use carbon dioxide, dry powder, or foam.
Fire Fighting Instructions:	Self-contained respiratory protection should be provided for fire fighters fighting fires in buildings or confined areas. Storage containers exposed to fire should be kept cool with water spray to prevent pressure build-up. Stay away from heads of containers that have been exposed to intense heat or flame.
Flammable Properties and Hazards:	NF - Not Flammable. This material does not exhibit a flashpoint per the Setaflash Closed Cup test method.
	Contact of liquid or vapor with flame or hot surfaces will produce toxic gases and a corrosive residue that will cause deterioration of metal.
Hazardous Combustion Products:	Carbon monoxide, carbon dioxide, hydrogen chloride, chlorine, phosgene

6. ACCIDENTAL RELEASE MEASURES

Steps To Be Taken In Case Material Is Released Or Spilled:	Isolate the immediate area. Prevent unauthorized entry. Eliminate all sources of ignition in area and downwind of the spill area. Stay upwind, out of low areas, and ventilate closed spaces before entering. All equipment used when handling this product must be grounded or non-sparking. Do not touch or walk through spilled material. Stop leak if you can do so without risk. Prevent entry into waterways, sewers, or confined areas. A vapor suppressing foam may be used to reduce vapors. Absorb or cover with dry earth, sand, or other non-combustible material and transfer to compatible containers. For large spills, dike ahead of the spill.

7. HANDLING AND STORAGE

Precautions To Be Taken in Handling:	Read carefully all cautions and directions on product label before use. Since empty container retains residue, follow all label warnings even after container is empty. Dispose of empty container according to all regulations. Do not reuse this container.
Precautions To Be Taken in Storing:	Store in a cool place in original container and protect from sunlight. Exposure to high temperatures or prolonged exposure to sun may cause can to leak or swell. Once opened, remover should be used within six months or discarded to avoid can deterioration. Do not store near flames or at elevated temperatures.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

CAS #	Chemical Name	Jurisdiction	Recommended Exposure Limits	Notations
75-09-2	Dichloromethane	ACGIH TLV	TLV: 50 ppm	
	{Methylene chloride; R-30; Freon 30}	OSHA PELs	PEL: 25 ppm STEL: 125 ppm (15 min)	
67-56-1	Methanol {Methyl alcohol; Carbinol; Wood alcohol}	ACGIH TLV	TLV: 200 ppm STEL: 250 ppm	
		OSHA PELs	PEL: 200 ppm	

Klean-Strip Premium Sprayable Stripper

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Supersedes Revision: 06/22/2017

Respiratory Equipment (Specify Type):	For use in areas with inadequate ventilation or fresh air, wear a properly maintained and properly fitted NIOSH approved self-contained breathing apparatus or powered air supply respirator or loose fitting hood.
Eye Protection:	For OSHA controlled work places and other regular users - Use only with adequate ventilation under engineered air control systems designed to prevent exceeding the appropriate TLV. A dust mask does not provide protection against vapors. Chemical goggles, or face shields are recommended to safeguard against potential eye contact, irritation, or injury. Chemical goggles or face shields are recommended when splashing or spraying of chemical is possible. A faceshield provides more protection to help reduce chemical contact to the face and eyes.
Protective Gloves:	Wear gloves with as much resistance to the chemical ingredients as possible. Laminate film gloves offer the best protection. Other glove materials, such as nitrile rubber, neoprene, and PVC will be degraded by methylene chloride, but may provide protection for some amount of time, based on the type of glove and the conditions of use. Consult your glove supplier for additional information. Gloves contaminated with product should be discarded and not reused.
Other Protective Clothing:	Various application methods can dictate use of additional protective safety equipment, such as impermeable aprons, etc., to minimize exposure.
Engineering Controls (Ventilation etc.):	Use process enclosures, local exhaust ventilation, or other engineering controls to control airborne levels below recommended exposure limits. Use only with adequate ventilation to prevent buildup of vapors. If the work area is not well ventilated, DO NOT use this product. Do not use in areas where vapors can accumulate and concentrate, such as basements, bathrooms or small enclosed areas. Whenever possible, use outdoors in an open air area. If using indoors open all windows and doors and maintain a cross ventilation of moving fresh air across the work area. If strong odor is noticed or you experience slight dizziness, headache, nausea or eye-watering -- STOP -- ventilation is inadequate. Leave area immediately and move to fresh air.
Work/Hygienic/Maintenance Practices:	A source of clean water should be available in the work area for flushing of the eyes and skin. Wash hands thoroughly after use. Do not eat, drink, or smoke in the work area. Before reuse, thoroughly clean any clothing or protective equipment that has been contaminated by prior use. Discard any clothing or other protective equipment that cannot be decontaminated, such as gloves or shoes.

Klean-Strip Premium Sprayable Stripper

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Supersedes Revision: 06/22/2017

9. PHYSICAL AND CHEMICAL PROPERTIES

Physical States:	[] Gas [X] Liquid [] Solid	
Appearance and Odor:	Translucent to colorless liquid.	
pH:	No data.	
Melting Point:	No data.	
Boiling Point:	104.00 F	
Flash Pt:	Nonflammable	
Evaporation Rate:	< 1	
Flammability (solid, gas):	No data available.	
Explosive Limits:	LEL: No data.	UEL: No data.
Vapor Pressure (vs. Air or mm Hg):	No data.	
Vapor Density (vs. Air = 1):	> 1	
Specific Gravity (Water = 1):	1.125	
Density:	9.355 LB/GL	
Solubility in Water:	Slight	
Octanol/Water Partition Coefficient:	No data.	
Percent Volatile:	98.06 % by weight.	
VOC / Volume:	24.7200 % WT	
Autoignition Pt:	No data.	
Decomposition Temperature:	No data.	
Viscosity:	350 cps	

10. STABILITY AND REACTIVITY

Stability:	Unstable [] Stable [X]
Conditions To Avoid -	No data available.
Instability:	
Incompatibility - Materials To Avoid:	Bases, oxygen, sodium, potassium, strong oxidizers, reactive metals, strong acids
Hazardous Decomposition or Byproducts:	Decomposition may produce carbon monoxide and carbon dioxide, hydrogen chloride, chlorine gas, and small quantities of phosgene.
Possibility of Hazardous Reactions:	Will occur [] Will not occur [X]
Conditions To Avoid -	No data available.
Hazardous Reactions:	

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Klean-Strip Premium Sprayable Stripper

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11. TOXICOLOGICAL INFORMATION

Toxicological Information: This product has not been tested as a whole.
CAS# 75-09-2:
Tumorigenic Effects:, TCLo, Inhalation, Rat, 3500. PPM, 6 Y.
Result:
Tumorigenic: Carcinogenic by RTECS criteria.
Endocrine: Tumors.
- Fundamental and Applied Toxicology., Academic Press, Inc., 1 E. First St., Duluth, MN 55802, Vol/p/yr: 4,30, 1984

Standard Draize Test, Eyes, Species: Rabbit, 100.0 MG, Severe.
Result:
Effects on Newborn: Growth statistics (e.g., reduced weight gain).
Effects on Newborn: Physical.
- Union Carbide Data Sheet, Union Carbide Corp., 39 Old Ridgebury Rd., Danbury, CT 06817, Vol/p/yr: 4/25, 1958

Standard Draize Test, Skin, Species: Rabbit, 810.0 MG, 24 H, Severe.
Result:
Specific Developmental Abnormalities: Musculoskeletal system.
- European Journal of Toxicology and Environmental Hygiene., For publisher information, see TOERD9, Paris France, Vol/p/yr: 9,171, 1976

Chronic Toxicological Effects:

This product has not been tested as a whole.

Carcinogenicity/Other Information:

IARC 2B - Possibly Carcinogenic to Humans
ACGIH A3 - Confirmed Animal Carcinogen with Unknown Relevance to Humans
ACGIH A4 - Not Classifiable as a Human Carcinogen.

CAS #	Hazardous Components (Chemical Name)	NTP	IARC	ACGIH	OSHA
75-09-2	Dichloromethane {Methylene chloride; R-30; Freon 30}	Possible	2B	A3	Yes
67-56-1	Methanol {Methyl alcohol; Carbinol; Wood alcohol}	n.a.	n.a.	n.a.	n.a.

12. ECOLOGICAL INFORMATION

General Ecological Information:

This product has not been tested as a whole.

13. DISPOSAL CONSIDERATIONS

Waste Disposal Method:

Dispose in accordance with applicable local, state, and federal regulations.

14. TRANSPORT INFORMATION

LAND TRANSPORT (US DOT):

DOT Proper Shipping Name: Paint Related Material

DOT Hazard Class: 8 CORROSIVE

UN/NA Number: UN3066

Packing Group: II



Klean-Strip Premium Sprayable Stripper

Revision: 05/01/2019

Supersedes Revision: 06/22/2017

Additional Transport Information: The shipper/supplier may apply one of the following exceptions: Combustible Liquid, Consumer Commodity, Limited Quantity, Viscous Liquid, Does Not Sustain Combustion, or others, as allowed under 49CFR Hazmat Regulations. Please consult 49CFR Subchapter C to ensure that subsequent shipments comply with these exceptions.

15. REGULATORY INFORMATION

EPA SARA (Superfund Amendments and Reauthorization Act of 1986) Lists

CAS #	Hazardous Components (Chemical Name)	S. 302 (EHS)	S. 304 RQ	S. 313 (TRI)
75-09-2	Dichloromethane {Methylene chloride; R-30; Freon 30}	No	Yes 1000 LB	Yes
67-56-1	Methanol {Methyl alcohol; Carbinol; Wood alcohol}	No	Yes 5000 LB	Yes

CAS #	Hazardous Components (Chemical Name)	Other US EPA or State Lists
75-09-2	Dichloromethane {Methylene chloride; R-30; Freon 30}	CAA HAP, ODC: HAP: VHAP CWA NPDES TSCA: Inventory, 8A CAIR CA PROP.65: Yes: Canc.
67-56-1	Methanol {Methyl alcohol; Carbinol; Wood alcohol}	CAA HAP, ODC: HAP: VHAP TSCA: Inventory CA PROP.65: Yes: RDTox.

Regulatory Information: This product is regulated by the United States Consumer Product Safety Commission and is subject to certain labeling requirements under the Federal Hazardous Substances Act. These requirements differ from the classification criteria and hazard information required for safety data sheets (SDS). The product label also includes other important information, including directions for use, and should always be read in its entirety prior to using the product.

Additional Regulatory Information: This chemical/product is not and cannot be distributed in commerce (as defined in TSCA section 3(5)) or processed (as defined in TSCA section 3(13)) for consumer paint or coating removal.

16. OTHER INFORMATION

Revision Date: 05/01/2019
Preparer Name: W.M. Barr EHS Dept (901)775-0100

Additional Information About This Product: No data available.

Company Policy or Disclaimer: The information contained herein is presented in good faith and believed to be accurate as of the effective date shown above. This information is furnished without warranty of any kind. Employers should use this information only as a supplement to other information gathered by them and must make independent determination of suitability and completeness of information from all sources to assure proper use of these materials and the safety and health of employees. Any use of this data and information must be determined by the user to be in accordance with applicable federal, state and local laws and regulations.

SAFETY DATA SHEET

Premium Stripper

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Revision: 05/01/2019

Supersedes Revision: 06/12/2015

1. PRODUCT AND COMPANY IDENTIFICATION

Product Name: Premium Stripper
Company Name: W. M. Barr
2105 Channel Avenue
Memphis, TN 38113
Phone Number: (901)775-0100
Web site address: www.wmbarr.com
Emergency Contact: 3E 24 Hour Emergency Contact (800)451-8346
Information: W.M. Barr Customer Service (800)398-3892
Intended Use: Paint/Varnish Remover
Product Code: ESR72, ESR72L
Additional Information: This chemical/product is not and cannot be distributed in commerce (as defined in TSCA section 3(5)) or processed (as defined in TSCA section 3(13)) for consumer paint or coating removal.

2. HAZARDS IDENTIFICATION

Gas Under Pressure, Liquefied gas
Acute Toxicity: Inhalation, Category 4
Skin Corrosion/Irritation, Category 2
Serious Eye Damage/Eye Irritation, Category 1
Carcinogenicity, Category 1B
Specific Target Organ Toxicity (single exposure), Category 1
Simple Asphyxiant



GHS Signal Word: Danger

GHS Hazard Phrases: Containers gas under pressure; may explode if heated.
Causes skin irritation.
Causes serious eye damage.
Harmful if inhaled.
May cause cancer.
Causes damage to organs.

GHS Precautionary Phrases: Obtain special instructions before use.
Do not handle until all safety precautions have been read and understood.
Do not breathe gas/mist/vapors/spray.
Wash hands thoroughly after handling.
Do not eat, drink or smoke when using this product.
Use only outdoors or in a well-ventilated area.
Wear protective gloves/protective clothing/eye protection/face protection.

GHS Response Phrases: IF ON SKIN: Wash with plenty of soap and water.
IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing.
IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
IF exposed: Call a POISON CENTER or doctor/physician.
IF exposed or concerned: Get medical attention/advice.
Immediately call a POISON CENTER or doctor/physician.
Specific treatment see label.
If skin irritation occurs, get medical advice/attention.
Take off contaminated clothing and wash before re-use.

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GHS Storage and Disposal Phrases:	Store locked up. Protect from sunlight and store in well-ventilated place. Dispose of contents/container according to local, state and federal regulations.
OSHA Regulatory Status:	This material is classified as hazardous under OSHA regulations.
Potential Health Effects (Acute and Chronic):	INHALATION ACUTE EXPOSURE EFFECTS: Vapor harmful. May cause dizziness; headache; burns and severe irritation to the respiratory tract; injuries to mucous membranes; watering of the eyes; weakness; drowsiness; nausea; numbness in fingers, arms, and legs; hot flashes; depression of the central nervous system; spotted vision; fatigue; dilation of pupils; increase in carboxyhemoglobin levels, which can cause stress to the cardiovascular system; arm, leg and chest pains; eye irritation; giddiness and intoxication; narcosis; anesthesia; confusion; olfactory changes; vomiting; visual disturbances; sleepiness; cough and dyspnea; cold, clammy extremities; diarrhea; irregular or rapid heartbeat; liver and kidney damage; unconsciousness; coma; and death. Severe overexposure may cause irregular or rapid heartbeat, convulsions, unconsciousness, and death. Intentional misuse of this product by deliberately concentrating and inhaling the vapors can be harmful or fatal. Elevated carboxyhemoglobin levels can be additive to the increase caused by smoking and other carbon monoxide sources. The propellant used in this product is a simple asphyxiant. SKIN CONTACT ACUTE EXPOSURE EFFECTS: This product is a skin irritant. Product may be absorbed through the skin. Harmful if absorbed through the skin. May cause itching; irritation; redness; defatting of the skin; drying of the skin; inflammation; discomfort or pain; swelling; dermatitis; and tissue damage. May cause symptoms listed under inhalation and ingestion. May increase the severity of symptoms listed under inhalation. EYE CONTACT ACUTE EXPOSURE EFFECTS: This material is an eye irritant. May cause irritation, burns, temporary corneal injury, redness, tearing, blurred vision, conjunctivitis of eyes, and corneal ulcerations of the eye. Vapors may irritate the eyes. INGESTION ACUTE EXPOSURE EFFECTS: Harmful if swallowed. May cause nausea; irritation to mouth, throat and stomach; loss of coordination; stupor; drowsiness; vomiting; depression of the central nervous system; narcosis; diarrhea; liver, kidney and heart damage; unconsciousness; and death. May produce symptoms listed under inhalation. Liquid aspirated into lungs may cause chemical pneumonitis and systemic effects. CHRONIC EXPOSURE EFFECTS: Reports have associated repeated and prolonged overexposure to solvents with neurological and other physiological damage. Prolonged skin contact may cause irritation, redness, swelling and possible tissue destruction. Prolonged or repeated contact may cause dermatitis. Prolonged skin contact may result in absorption of a harmful amount of this material. May cause headaches; conjunctivitis; skin irritation; pancreatic damage; permanent central nervous system changes; gastric disturbances; giddiness; insomnia; decreased response to visual and auditory stimulation; visual impairment or blindness; hallucinations; changes in blood; blood disorders; kidney damage; eye irritation; brain damage; hallucinations; liver damage, and death. May cause additional symptoms listed under inhalation.
Medical Conditions Generally Aggravated By Exposure:	Diseases of the blood, skin, eyes, liver, kidneys, lungs, cardiovascular system and respiratory system; alcoholism and rhythm disorders of the heart.

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3. COMPOSITION/INFORMATION ON INGREDIENTS

CAS #	Hazardous Components (Chemical Name)	Concentration
75-09-2	Dichloromethane {Methylene chloride; R-30; Freon 30}	70.0 -95.0 %
67-56-1	Methanol {Methyl alcohol; Carbinol; Wood alcohol}	< 5.0 %
127087-87-0	Poly(oxy-1,2-ethanediyl),.alpha.-(4-nonylphenyl)-.omega.-hydroxy-,branched	< 5.0 %
124-38-9	Carbon dioxide	< 5.0 %

Additional Chemical Information

Specific percentage of composition is being withheld as a trade secret.

4. FIRST AID MEASURES

Emergency and First Aid Procedures:

INHALATION:

If user experiences breathing difficulty, move to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical attention.

SKIN CONTACT:

Wash with soap and water. Get medical attention if irritation from contact persists.

EYE CONTACT:

Immediately flush eyes with water, remove any contact lens, continue flushing with water for at least 15 minutes. Get medical attention.

INGESTION:

Call your poison control center, hospital emergency room, or physician immediately for instructions.

Signs and Symptoms Of Exposure:

See Potential Health Effects.

Note to Physician:

This product contains methylene chloride and methanol.

This product contains methanol which can cause intoxication and central nervous system depression. Methanol is metabolized to formic acid and formaldehyde. These metabolites can cause metabolic acidosis, visual disturbances and blindness. Since metabolism is required for these toxic symptoms, their onset may be delayed from 6 to 30 hours following ingestion. Ethanol competes for the same metabolic pathway and has been used to prevent methanol metabolism. Ethanol administration is indicated in symptomatic patients or at blood methanol concentrations above 20 ug/dl. Methanol is effectively removed by hemodialysis. Adrenalin should never be given to a person overexposed to methylene chloride.

This material sensitizes the heart to the effects of sympathomimetic amines. Epinephrine and other sympathomimetic drugs may initiate cardiac arrhythmias in individuals exposed to this material. This material is metabolized to carbon monoxide. Consequently, elevations in carboxyhemoglobin as high as 50% have been reported, and levels may continue to rise for several hours after exposure has ceased. Data in experimental animals suggest there is a narrow margin between concentrations causing anesthesia and death.

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5. FIRE FIGHTING MEASURES

Flash Pt:	No data.
Explosive Limits:	LEL: No data. UEL: No data.
Autoignition Pt:	No data.
Suitable Extinguishing Media:	Use carbon dioxide, dry powder, or foam.
Fire Fighting Instructions:	Self-contained respiratory protection should be provided for fire fighters fighting fires in buildings or confined areas. Storage containers exposed to fire should be kept cool with water spray to prevent pressure build-up. Stay away from heads of containers that have been exposed to intense heat or flame.
Flammable Properties and Hazards:	Aerosol Flammability Classification according to ASTM D-3065-77 and FHSA 1500.45. CPSC FLAMMABILITY: Non-Flammable Aerosol - Level 1 Propellant: Carbon Dioxide Contents under pressure. Do not puncture, incinerate or store above 120 degrees F. Exposure to heat or prolonged exposure to sun may cause bursting. Contact of liquid or vapor with flame or hot surfaces will produce toxic gases and a corrosive residue that will cause deterioration of metal. Flashpoint of liquid only: No flash to boiling ~104 F
Hazardous Combustion Products:	Combustion may produce carbon monoxide and carbon dioxide.

6. ACCIDENTAL RELEASE MEASURES

Steps To Be Taken In Case Material Is Released Or Spilled:	Keep unnecessary people away; isolate hazard area and deny entry. Stay upwind, out of low areas, and ventilate closed spaces before entering. Shut off ignition sources; keep flares, smoking or flames out of hazard area. Small Spills: take up liquid with sand, earth or other noncombustible absorbent material and place in a plastic container where applicable. Large Spills: dike far ahead of spill for later disposal.

7. HANDLING AND STORAGE

Precautions To Be Taken in Handling:	Read carefully all cautions and directions on product label before use. Since empty container retains residue, follow all label warnings even after container is empty. Dispose of empty container according to all regulations. Do not reuse this container.
Precautions To Be Taken in Storing:	Store in a cool place and protect from sunlight. Exposure to high temperatures or prolonged exposure to sun may cause can to leak or swell. Do not store near flames or at elevated temperatures. Replace overcap on container after each use.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

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CAS #	Chemical Name	Jurisdiction	Recommended Exposure Limits	Notations
75-09-2	Dichloromethane {Methylene chloride; R-30; Freon 30}	ACGIH TLV OSHA PELs	TLV: 50 ppm PEL: 25 ppm STEL: 125 ppm (15 min)	
67-56-1	Methanol {Methyl alcohol; Carbinol; Wood alcohol}	ACGIH TLV OSHA PELs	TLV: 200 ppm STEL: 250 ppm PEL: 200 ppm	
124-38-9	Carbon dioxide	ACGIH TLV OSHA PELs	TLV: 5000 ppm STEL: 30,000 ppm PEL: 5000 ppm	
Respiratory Equipment (Specify Type):		For occasional consumer use - Use with adequate ventilation to prevent a build-up of vapors in confined areas. Open windows or position fans to provide cross ventilation. If a mild to strong odor is noticeable, ventilation is not adequate. For OSHA controlled workplace and other regular users - Use only with adequate ventilation under engineered air control systems designed to prevent exceeding appropriate TLVs. For occasional use, where engineered air control is not feasible, use properly maintained and properly fitted NIOSH approved self-contained breathing apparatus for chlorinated solvent vapors. A dust mask does not provide protection against vapors.		
Eye Protection:		Safety glasses, chemical goggles, or face shields are recommended to safeguard against potential eye contact, irritation, or injury.		
Protective Gloves:		Wear impermeable gloves. Gloves contaminated with product should be discarded.		
Other Protective Clothing:		Various application methods can dictate use of additional protective safety equipment, such as impermeable aprons, etc., to minimize exposure.		
Engineering Controls (Ventilation etc.):		Use only with adequate ventilation to prevent buildup of vapors. Do not use in areas where vapors can accumulate and concentrate, such as basements, bathrooms or small enclosed areas. Whenever possible, use outdoors in an open air area. If using indoors open all windows and doors and maintain a cross ventilation of moving fresh air across the work area. If strong odor is noticed or you experience slight dizziness, headache, nausea or eye-watering -- STOP -- ventilation is inadequate. Leave area immediately and move to fresh air.		
Work/Hygienic/Maintenance Practices:		A source of clean water should be available in the work area for flushing of the eyes and skin. Wash hands thoroughly after use. Do not eat, drink, or smoke in the work area. Before reuse, thoroughly clean any clothing or protective equipment that has been contaminated by prior use. Discard any clothing or other protective equipment that cannot be decontaminated, such as gloves or shoes.		

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9. PHYSICAL AND CHEMICAL PROPERTIES

Physical States:	[X] Gas [X] Liquid [] Solid	
Appearance and Odor:	Free and Clear, Water White	
pH:	Neutral	
Melting Point:	No data.	
Boiling Point:	104.00 F - 150.00 F	
Flash Pt:	No data.	
Evaporation Rate:	< 1	
Flammability (solid, gas):	No data available.	
Explosive Limits:	LEL: No data.	UEL: No data.
Vapor Pressure (vs. Air or mm Hg):	No data.	
Vapor Density (vs. Air = 1):	> 1	
Specific Gravity (Water = 1):	1.26	
Density:	10.48 - (of liquid) LB/GL at 75.0 F	
Solubility in Water:	Slight	
Octanol/Water Partition Coefficient:	No data.	
Percent Volatile:	96.1 % by weight.	
Autoignition Pt:	No data.	
Decomposition Temperature:	No data.	
Viscosity:	No data.	

10. STABILITY AND REACTIVITY

Stability:	Unstable [] Stable [X]
Conditions To Avoid - Instability:	No data available.
Incompatibility - Materials To Avoid:	Incompatible with strong oxidizing agents; strong caustics; strong alkalis; oxygen; nitrogen peroxide; chemically active metals such as aluminum and magnesium; sodium; potassium; and nitric acid.
Hazardous Decomposition or Byproducts:	Thermal decomposition may produce carbon monoxide and carbon dioxide, hydrogen chloride, chlorine gas, and small quantities of phosgene.
Possibility of Hazardous Reactions:	Will occur [] Will not occur [X]
Conditions To Avoid - Hazardous Reactions:	No data available.

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11. TOXICOLOGICAL INFORMATION

Toxicological Information: This product has not been tested as a whole. Refer to section 2 for acute and chronic effects.

CAS# 75-09-2:
Tumorigenic Effects:, TCLo, Inhalation, Rat, 3500. PPM, 6 Y.
Result:
Tumorigenic: Carcinogenic by RTECS criteria.
Endocrine: Tumors.
- Fundamental and Applied Toxicology., Academic Press, Inc., 1 E. First St., Duluth, MN 55802, Vol/p/yr: 4,30, 1984

Standard Draize Test, Eyes, Species: Rabbit, 100.0 MG, Severe.
Result:
Effects on Newborn: Growth statistics (e.g., reduced weight gain).
Effects on Newborn: Physical.
- Union Carbide Data Sheet, Union Carbide Corp., 39 Old Ridgebury Rd., Danbury, CT 06817, Vol/p/yr: 4/25, 1958

Standard Draize Test, Skin, Species: Rabbit, 810.0 MG, 24 H, Severe.
Result:
Specific Developmental Abnormalities: Musculoskeletal system.
- European Journal of Toxicology and Environmental Hygiene., For publisher information, see TOERD9, Paris France, Vol/p/yr: 9,171, 1976

Carcinogenicity/Other Information: IARC 2B - Possibly Carcinogenic to Humans
ACGIH A3 - Confirmed Animal Carcinogen with Unknown Relevance to Humans

CAS #	Hazardous Components (Chemical Name)	NTP	IARC	ACGIH	OSHA
75-09-2	Dichloromethane {Methylene chloride; R-30; Freon 30}	Possible	2B	A3	Yes
67-56-1	Methanol {Methyl alcohol; Carbinol; Wood alcohol}	n.a.	n.a.	n.a.	n.a.
127087-87-0	Poly(oxy-1,2-ethanediyl),.alpha.-(4-nonylphenyl)-.omega.-hydroxy-,branched	n.a.	n.a.	n.a.	n.a.
124-38-9	Carbon dioxide	n.a.	n.a.	n.a.	n.a.

12. ECOLOGICAL INFORMATION

General Ecological Information: This product has not been tested as a whole.

13. DISPOSAL CONSIDERATIONS

Waste Disposal Method: Dispose in accordance with applicable local, state, and federal regulations.

14. TRANSPORT INFORMATION

LAND TRANSPORT (US DOT):

DOT Proper Shipping Name: Aerosols, non-flammable

DOT Hazard Class: 2.2 NONFLAMMABLE GAS
UN/NA Number: UN1950



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Additional Transport Information: The shipper / supplier may apply one of the following exceptions: Combustible Liquid, Consumer Commodity, Limited Quantity, Viscous Liquid, Does Not Sustain Combustion, or others, as allowed under 49CFR Hazmat Regulations. Please consult 49CFR Subchapter C to ensure that subsequent shipments comply with these exceptions.

15. REGULATORY INFORMATION

EPA SARA (Superfund Amendments and Reauthorization Act of 1986) Lists

CAS #	Hazardous Components (Chemical Name)	S. 302 (EHS)	S. 304 RQ	S. 313 (TRI)
75-09-2	Dichloromethane {Methylene chloride; R-30; Freon 30}	No	Yes 1000 LB	Yes
67-56-1	Methanol {Methyl alcohol; Carbinol; Wood alcohol}	No	Yes 5000 LB	Yes
127087-87-0	Poly(oxy-1,2-ethanediyl),.alpha.-(4-nonylphenyl)-.omega.-hydroxy-,branched	No	No	No
124-38-9	Carbon dioxide	No	No	No

CAS #	Hazardous Components (Chemical Name)	Other US EPA or State Lists
75-09-2	Dichloromethane {Methylene chloride; R-30; Freon 30}	CAA HAP,ODC: HAP: VHAP CWA NPDES TSCA: Inventory, 8A CAIR CA PROP.65: Yes: Canc.
67-56-1	Methanol {Methyl alcohol; Carbinol; Wood alcohol}	CAA HAP,ODC: HAP: VHAP TSCA: Inventory CA PROP.65: Yes: RDTox.
127087-87-0	Poly(oxy-1,2-ethanediyl),.alpha.-(4-nonylphenyl)-.omega.-hydroxy-,branched	TSCA: Inventory, 8A PAIR
124-38-9	Carbon dioxide	TSCA: Inventory

Regulatory Information: This product is regulated by the United States Consumer Product Safety Commission and is subject to certain labeling requirements under the Federal Hazardous Substances Act. These requirements differ from the classification criteria and hazard information required for safety data sheets (SDS). The product label also includes other important information, including directions for use, and should always be read in its entirety prior to using the product.

Additional Regulatory Information This chemical/product is not and cannot be distributed in commerce (as defined in TSCA section 3(5)) or processed (as defined in TSCA section 3(13)) for consumer paint or coating removal.

16. OTHER INFORMATION

Revision Date: 05/01/2019

Preparer Name: W.M. Barr EHS Dept (901)775-0100

Additional Information About This Product: No data available.

Company Policy or Disclaimer: The information contained herein is presented in good faith and believed to be accurate as of the effective date shown above. This information is furnished without warranty of any kind. Employers should use this information only as a supplement to other information gathered by them and must make independent determination of suitability and completeness of information from all sources to assure proper use of these materials and the safety and health of employees. Any use of this data and information must be determined by the user to be in accordance with applicable federal, state and local laws and regulations.

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Premium Stripper

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Printed: 04/17/2015

Revision: 04/17/2015

Supersedes Revision: 03/09/2015

1. PRODUCT AND COMPANY IDENTIFICATION

Product Name:	Premium Stripper	
Company Name:	W. M. Barr 2105 Channel Avenue Memphis, TN 38113	Phone Number: (901)775-0100
Web site address:	www.wmbarr.com	
Emergency Contact:	3E 24 Hour Emergency Contact	(800)451-8346
Information:	W.M. Barr Customer Service	(800)398-3892
Intended Use:	Paint/Varnish Remover	
Synonyms:	ESR72, ESR72L	
Additional Information	This product is regulated by the United States Consumer Product Safety Commission and is subject to certain labeling requirements under the Federal Hazardous Substances Act. These requirements differ from the classification criteria and hazard information required for safety data sheets (SDS). The product label also includes other important information, including directions for use, and should always be read in its entirety prior to using the product.	

2. HAZARDS IDENTIFICATION

Gas Under Pressure, Liquefied gas
Acute Toxicity: Inhalation, Category 4
Skin Corrosion/Irritation, Category 2
Serious Eye Damage/Eye Irritation, Category 1
Carcinogenicity, Category 1B
Specific Target Organ Toxicity (single exposure), Category 1
Simple Asphyxiant



GHS Signal Word: Danger

GHS Hazard Phrases: H280: Containers gas under pressure; may explode if heated.
H315: Causes skin irritation.
H318: Causes serious eye damage.
H332: Harmful if inhaled.
H350: May cause cancer.
H370: Causes damage to organs.

GHS Precaution Phrases: P201: Obtain special instructions before use.
P202: Do not handle until all safety precautions have been read and understood.
P260: Do not breathe gas/mist/vapors/spray.
P264: Wash hands thoroughly after handling.
P270: Do not eat, drink or smoke when using this product.
P271: Use only outdoors or in a well-ventilated area.
P280: Wear protective gloves/protective clothing/eye protection/face protection.

GHS Response Phrases: P302+352: IF ON SKIN: Wash with plenty of soap and water.
P304+340: IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing.
P305+351+338: IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
P307+311: IF exposed: Call a POISON CENTER or doctor/physician.
P308+313: IF exposed or concerned: Get medical attention/advice.
P310: Immediately call a POISON CENTER or doctor/physician.

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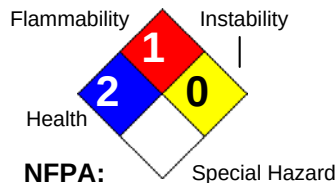
Supersedes Revision: 03/09/2015

GHS Storage and Disposal Phrases:

P321: Specific treatment see label.
P332+313: If skin irritation occurs, get medical advice/attention.
P362: Take off contaminated clothing and wash before re-use.
P405: Store locked up.
P410+403: Protect from sunlight and store in well-ventilated place.
P501: Dispose of contents/container according to local, state and federal regulations.

Hazard Rating System:

HEALTH	*	2
FLAMMABILITY		1
PHYSICAL		0
PPE		X



HMIS:

OSHA Regulatory Status:

This material is classified as hazardous under OSHA regulations.

Potential Health Effects (Acute and Chronic):

INHALATION ACUTE EXPOSURE EFFECTS:

Vapor harmful. May cause dizziness; headache; burns and severe irritation to the respiratory tract; injuries to mucous membranes; watering of the eyes; weakness; drowsiness; nausea; numbness in fingers, arms, and legs; hot flashes; depression of the central nervous system; spotted vision; fatigue; dilation of pupils; increase in carboxyhemoglobin levels, which can cause stress to the cardiovascular system; arm, leg and chest pains; eye irritation; giddiness and intoxication; narcosis; anesthesia; confusion; olfactory changes; vomiting; visual disturbances; sleepiness; cough and dyspnea; cold, clammy extremities; diarrhea; irregular or rapid heartbeat; liver and kidney damage; unconsciousness; coma; and death. Severe overexposure may cause irregular or rapid heartbeat, convulsions, unconsciousness, and death. Intentional misuse of this product by deliberately concentrating and inhaling the vapors can be harmful or fatal. Elevated carboxyhemoglobin levels can be additive to the increase caused by smoking and other carbon monoxide sources. The propellant used in this product is a simple asphyxiant.

SKIN CONTACT ACUTE EXPOSURE EFFECTS:

This product is a skin irritant. Product may be absorbed through the skin. Harmful if absorbed through the skin. May cause itching; irritation; redness; defatting of the skin; drying of the skin; inflammation; discomfort or pain; swelling; dermatitis; and tissue damage. May cause symptoms listed under inhalation and ingestion. May increase the severity of symptoms listed under inhalation.

EYE CONTACT ACUTE EXPOSURE EFFECTS:

This material is an eye irritant. May cause irritation, burns, temporary corneal injury, redness, tearing, blurred vision, conjunctivitis of eyes, and corneal ulcerations of the eye. Vapors may irritate the eyes.

INGESTION ACUTE EXPOSURE EFFECTS:

Harmful if swallowed. May cause nausea; irritation to mouth, throat and stomach; loss of coordination; stupor; drowsiness; vomiting; depression of the central nervous system; narcosis; diarrhea; liver, kidney and heart damage; unconsciousness; and death. May produce symptoms listed under inhalation. Liquid aspirated into lungs may cause chemical pneumonitis and systemic effects.

CHRONIC EXPOSURE EFFECTS:

Reports have associated repeated and prolonged overexposure to solvents with neurological and other physiological damage. Prolonged skin contact may cause irritation, redness, swelling and possible tissue destruction. Prolonged or repeated contact may cause dermatitis. Prolonged skin contact may result in absorption of a

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harmful amount of this material. May cause headaches; conjunctivitis; skin irritation; pancreatic damage; permanent central nervous system changes; gastric disturbances; giddiness; insomnia; decreased response to visual and auditory stimulation; visual impairment or blindness; hallucinations; changes in blood; blood disorders; kidney damage; eye irritation; brain damage; hallucinations; liver damage, and death. May cause additional symptoms listed under inhalation.

Medical Conditions Generally Aggravated By Exposure: Diseases of the blood, skin, eyes, liver, kidneys, lungs, cardiovascular system and respiratory system; alcoholism and rhythm disorders of the heart.

3. COMPOSITION/INFORMATION ON INGREDIENTS

CAS #	Hazardous Components (Chemical Name)	Concentration	RTECS #
75-09-2	Dichloromethane {Methylene chloride; R-30; Freon 30}	70.0 -95.0 %	PA8050000
67-56-1	Methanol {Methyl alcohol; Carbinol; Wood alcohol}	< 5.0 %	PC1400000
127087-87-0	Poly(oxy-1,2-ethanediyl),.alpha.-(4-nonylphenyl)-.omega.-hydroxy-,branched	< 5.0 %	RB2451000
124-38-9	Carbon dioxide	< 5.0 %	FF6400000

Additional Chemical Information Specific percentage of composition is being withheld as a trade secret.

4. FIRST AID MEASURES

Emergency and First Aid Procedures:

INHALATION:

If user experiences breathing difficulty, move to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical attention.

SKIN CONTACT:

Wash with soap and water. Get medical attention if irritation from contact persists.

EYE CONTACT:

Immediately flush eyes with water, remove any contact lens, continue flushing with water for at least 15 minutes. Get medical attention.

INGESTION:

Call your poison control center, hospital emergency room, or physician immediately for instructions.

Signs and Symptoms Of Exposure:

See Potential Health Effects.

Note to Physician:

This product contains methylene chloride and methanol.

This product contains methanol which can cause intoxication and central nervous system depression. Methanol is metabolized to formic acid and formaldehyde. These metabolites can cause metabolic acidosis, visual disturbances and blindness. Since metabolism is required for these toxic symptoms, their onset may be delayed from 6 to 30 hours following ingestion. Ethanol competes for the same metabolic pathway and has been used to prevent methanol metabolism. Ethanol administration is indicated in symptomatic patients or at blood methanol concentrations above 20 ug/dl. Methanol is effectively removed by hemodialysis. Adrenalin should never be given to a person overexposed to methylene chloride.

This material sensitizes the heart to the effects of sympathomimetic amines.

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Epinephrine and other sympathomimetic drugs may initiate cardiac arrhythmias in individuals exposed to this material. This material is metabolized to carbon monoxide. Consequently, elevations in carboxyhemoglobin as high as 50% have been reported, and levels may continue to rise for several hours after exposure has ceased. Data in experimental animals suggest there is a narrow margin between concentrations causing anesthesia and death.

5. FIRE FIGHTING MEASURES

Flash Pt:	No data.
Explosive Limits:	LEL: No data. UEL: No data.
Autoignition Pt:	No data.
Suitable Extinguishing Media:	Use carbon dioxide, dry powder, or foam.
Fire Fighting Instructions:	Self-contained respiratory protection should be provided for fire fighters fighting fires in buildings or confined areas. Storage containers exposed to fire should be kept cool with water spray to prevent pressure build-up. Stay away from heads of containers that have been exposed to intense heat or flame.
Flammable Properties and Hazards:	Aerosol Flammability Classification according to ASTM D-3065-77 and FHSA 1500.45. CPSC FLAMMABILITY: Non-Flammable Aerosol - Level 1 Propellant: Carbon Dioxide Contents under pressure. Do not puncture, incinerate or store above 120 degrees F. Exposure to heat or prolonged exposure to sun may cause bursting. Contact of liquid or vapor with flame or hot surfaces will produce toxic gases and a corrosive residue that will cause deterioration of metal. Flashpoint of liquid only: No flash to boiling ~104 F

6. ACCIDENTAL RELEASE MEASURES

Steps To Be Taken In Case Material Is Released Or Spilled:	Keep unnecessary people away; isolate hazard area and deny entry. Stay upwind, out of low areas, and ventilate closed spaces before entering. Shut off ignition sources; keep flares, smoking or flames out of hazard area. Small Spills: take up liquid with sand, earth or other noncombustible absorbent material and place in a plastic container where applicable. Large Spills: dike far ahead of spill for later disposal.

7. HANDLING AND STORAGE

Precautions To Be Taken in Handling:	Read carefully all cautions and directions on product label before use. Since empty container retains residue, follow all label warnings even after container is empty. Dispose of empty container according to all regulations. Do not reuse this container.
Precautions To Be Taken in Storing:	Store in a cool place and protect from sunlight. Exposure to high temperatures or prolonged exposure to sun may cause can to leak or swell. Do not store near flames or at elevated temperatures. Replace overcap on container after each use.

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8. EXPOSURE CONTROLS/PERSONAL PROTECTION

CAS #	Partial Chemical Name	OSHA TWA	ACGIH TWA	Other Limits
75-09-2	Dichloromethane {Methylene chloride; R-30; Freon 30}	PEL: 25 ppm STEL: 125 ppm (15 min)	TLV: 50 ppm	No data.
67-56-1	Methanol {Methyl alcohol; Carbinol; Wood alcohol}	PEL: 200 ppm	TLV: 200 ppm STEL: 250 ppm	No data.
127087-87-0	Poly(oxy-1,2-ethanediyl),.alpha.-(4-non ylphenyl)-.omega.-hydroxy-,branched	No data.	No data.	No data.
124-38-9	Carbon dioxide	PEL: 5000 ppm	TLV: 5000 ppm STEL: 30,000 ppm	No data.

**Respiratory Equipment
(Specify Type):**

For occasional consumer use - Use with adequate ventilation to prevent a build-up of vapors in confined areas. Open windows or position fans to provide cross ventilation. If a mild to strong odor is noticeable, ventilation is not adequate.

For OSHA controlled workplace and other regular users - Use only with adequate ventilation under engineered air control systems designed to prevent exceeding appropriate TLVs. For occasional use, where engineered air control is not feasible, use properly maintained and properly fitted NIOSH approved self-contained breathing apparatus for chlorinated solvent vapors.

A dust mask does not provide protection against vapors.

Eye Protection:

Safety glasses, chemical goggles, or face shields are recommended to safeguard against potential eye contact, irritation, or injury.

Protective Gloves:

Wear impermeable gloves. Gloves contaminated with product should be discarded.

Other Protective Clothing:

Various application methods can dictate use of additional protective safety equipment, such as impermeable aprons, etc., to minimize exposure.

**Engineering Controls
(Ventilation etc.):**

Use only with adequate ventilation to prevent buildup of vapors. Do not use in areas where vapors can accumulate and concentrate, such as basements, bathrooms or small enclosed areas. Whenever possible, use outdoors in an open air area. If using indoors open all windows and doors and maintain a cross ventilation of moving fresh air across the work area. If strong odor is noticed or you experience slight dizziness, headache, nausea or eye-watering -- STOP -- ventilation is inadequate. Leave area immediately and move to fresh air.

**Work/Hygienic/Maintenance
Practices:**

A source of clean water should be available in the work area for flushing of the eyes and skin.

Wash hands thoroughly after use.

Do not eat, drink, or smoke in the work area.

Before reuse, thoroughly clean any clothing or protective equipment that has been contaminated by prior use.

Discard any clothing or other protective equipment that cannot be decontaminated, such as gloves or shoes.

Physical States:	[X] Gas [X] Liquid [] Solid
Appearance and Odor:	Free and Clear, Water White
Melting Point:	No data.
Boiling Point:	104.00 F - 150.00 F
Autoignition Pt:	No data.
Flash Pt:	No data.
Explosive Limits:	LEL: No data. UEL: No data.
Specific Gravity (Water = 1):	1.26
Density:	10.48 - (of liquid) LB/GL at 75.0 F
Vapor Pressure (vs. Air or mm Hg):	No data.
Vapor Density (vs. Air = 1):	> 1
Evaporation Rate:	< 1
Solubility in Water:	Slight
pH:	Neutral
Percent Volatile:	96.1 % by weight.

Stability:	Unstable [] Stable [X]
Conditions To Avoid - Instability:	No data available.
Incompatibility - Materials To Avoid:	Incompatible with strong oxidizing agents; strong caustics; strong alkalis; oxygen; nitrogen peroxide; chemically active metals such as aluminum and magnesium; sodium; potassium; and nitric acid.
Hazardous Decomposition Or Byproducts:	Thermal decomposition may produce carbon monoxide and carbon dioxide, hydrogen chloride, chlorine gas, and small quantities of phosgene.
Possibility of Hazardous Reactions:	Will occur [] Will not occur [X]
Conditions To Avoid - Hazardous Reactions:	No data available.

Toxicological Information:	This product has not been tested as a whole. Refer to section 2 for acute and chronic effects. CAS# 75-09-2: Tumorigenic Effects:, TCLo, Inhalation, Rat, 3500. PPM, 6 Y. Result: Tumorigenic: Carcinogenic by RTECS criteria. Endocrine: Tumors. - Fundamental and Applied Toxicology., Academic Press, Inc., 1 E. First St., Duluth, MN 55802, Vol/p/yr: 4,30, 1984 Standard Draize Test, Eyes, Species: Rabbit, 100.0 MG, Severe. Result: Effects on Newborn: Growth statistics (e.g., reduced weight gain). Effects on Newborn: Physical. - Union Carbide Data Sheet, Union Carbide Corp., 39 Old Ridgebury Rd., Danbury, CT 06817, Vol/p/yr: 4/25, 1958

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Standard Draize Test, Skin, Species: Rabbit, 810.0 MG, 24 H, Severe.
Result:
Specific Developmental Abnormalities: Musculoskeletal system.
- European Journal of Toxicology and Environmental Hygiene., For publisher information, see TOERD9, Paris France, Vol/p/yr: 9,171, 1976

Carcinogenicity/Other Information:

IARC 2B - Possibly Carcinogenic to Humans
ACGIH A3 - Confirmed Animal Carcinogen with Unknown Relevance to Humans

CAS #	Hazardous Components (Chemical Name)	NTP	IARC	ACGIH	OSHA
75-09-2	Dichloromethane {Methylene chloride; R-30; Freon 30}	Possible	2B	A3	Yes
67-56-1	Methanol {Methyl alcohol; Carbinol; Wood alcohol}	n.a.	n.a.	n.a.	n.a.
127087-87-0	Poly(oxy-1,2-ethanediyl),.alpha.-(4-nonylphenyl)-.omega.-hydroxy-,branched	n.a.	n.a.	n.a.	n.a.
124-38-9	Carbon dioxide	n.a.	n.a.	n.a.	n.a.

12. ECOLOGICAL INFORMATION

General Ecological Information:

This product has not been tested as a whole.

13. DISPOSAL CONSIDERATIONS

Waste Disposal Method:

Dispose in accordance with applicable local, state, and federal regulations.

14. TRANSPORT INFORMATION

LAND TRANSPORT (US DOT):

DOT Proper Shipping Name: Aerosols, non-flammable

DOT Hazard Class:

2.2

NONFLAMMABLE GAS

UN/NA Number:

UN1950



MARINE TRANSPORT (IMDG/IMO):

IMDG/IMO Shipping Name: Aerosols, Non-Flammable Gas, Poison, PGIII

AIR TRANSPORT (ICAO/IATA):

ICAO/IATA Shipping Name: Aerosols, Non-Flammable, Containing Substances in Division 6.1, PGIII

Additional Transport Information:

The shipper / supplier may apply one of the following exceptions: Combustible Liquid, Consumer Commodity, Limited Quantity, Viscous Liquid, Does Not Sustain Combustion, or others, as allowed under 49CFR Hazmat Regulations. Please consult 49CFR Subchapter C to ensure that subsequent shipments comply with these exceptions.

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15. REGULATORY INFORMATION

EPA SARA (Superfund Amendments and Reauthorization Act of 1986) Lists

CAS #	Hazardous Components (Chemical Name)	S. 302 (EHS)	S. 304 RQ	S. 313 (TRI)
75-09-2	Dichloromethane {Methylene chloride; R-30; Freon 30}	No	Yes 1000 LB	Yes
67-56-1	Methanol {Methyl alcohol; Carbinol; Wood alcohol}	No	Yes 5000 LB	Yes
127087-87-0	Poly(oxy-1,2-ethanediyl),.alpha.-(4-nonylphenyl)-.omega.-hydroxy-,branched	No	No	No
124-38-9	Carbon dioxide	No	No	No

This material meets the EPA ☒ Yes ☐ No **Acute (immediate) Health Hazard**
'Hazard Categories' defined ☒ Yes ☐ No **Chronic (delayed) Health Hazard**
for SARA Title III Sections ☐ Yes ☒ No **Fire Hazard**
311/312 as indicated: ☒ Yes ☐ No **Sudden Release of Pressure Hazard**
☐ Yes ☒ No **Reactive Hazard**

CAS #	Hazardous Components (Chemical Name)	Other US EPA or State Lists
75-09-2	Dichloromethane {Methylene chloride; R-30; Freon 30}	CAA HAP,ODC: HAP; CWA NPDES: Yes; TSCA: Yes - Inventory, 8A CAIR; CA PROP.65: Yes
67-56-1	Methanol {Methyl alcohol; Carbinol; Wood alcohol}	CAA HAP,ODC: HAP; CWA NPDES: No; TSCA: Yes - Inventory; CA PROP.65: Yes
127087-87-0	Poly(oxy-1,2-ethanediyl),.alpha.-(4-nonylphenyl)-.omega.-hydroxy-,branched	CAA HAP,ODC: No; CWA NPDES: No; TSCA: Yes - Inventory, 8A PAIR; CA PROP.65: No
124-38-9	Carbon dioxide	CAA HAP,ODC: No; CWA NPDES: No; TSCA: Yes - Inventory; CA PROP.65: No

16. OTHER INFORMATION

Revision Date: 04/17/2015
Preparer Name: W.M. Barr EHS Dept (901)775-0100
Additional Information About No data available.

This Product:**Company Policy or****Disclaimer:**

The information contained herein is presented in good faith and believed to be accurate as of the effective date shown above. This information is furnished without warranty of any kind. Employers should use this information only as a supplement to other information gathered by them and must make independent determination of suitability and completeness of information from all sources to assure proper use of these materials and the safety and health of employees. Any use of this data and information must be determined by the user to be in accordance with applicable federal, state and local laws and regulations.

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Klean-Strip Strip X Stripper

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1. PRODUCT AND COMPANY IDENTIFICATION

Product Name: Klean-Strip Strip X Stripper

Company Name: W. M. Barr
2105 Channel Avenue
Memphis, TN 38113

Phone Number: (901)775-0100

Web site address: www.wmbarr.com

Emergency Contact: 3E 24 Hour Emergency Contact (800)451-8346
Information: W.M. Barr Customer Service (800)398-3892

Intended Use: Paint/Varnish Remover

Product Code: GSX6, GSX62, QSX6, QSX64

Additional Information: This chemical/product is not and cannot be distributed in commerce (as defined in TSCA section 3(5)) or processed (as defined in TSCA section 3(13)) for consumer paint or coating removal.

2. HAZARDS IDENTIFICATION

Flammable Liquids, Category 2
Acute Toxicity: Oral, Category 4
Acute Toxicity: Skin, Category 3
Acute Toxicity: Inhalation, Category 3
Skin Corrosion/Irritation, Category 2
Serious Eye Damage/Eye Irritation, Category 2A
Carcinogenicity, Category 1B
Toxic To Reproduction, Category 2
Specific Target Organ Toxicity (single exposure), Category 1
Specific Target Organ Toxicity (repeated exposure), Category 2



GHS Signal Word: Danger

GHS Hazard Phrases: Highly flammable liquid and vapor.
Harmful if swallowed.
Toxic in contact with skin.
Causes skin irritation.
Causes serious eye irritation.
Toxic if inhaled.
May cause cancer.
Suspected of damaging fertility or the unborn child.
Causes damage to organs.
May cause damage to organs through prolonged or repeated exposure.

GHS Precautionary Phrases: Obtain special instructions before use.
Do not handle until all safety precautions have been read and understood.
Keep away from heat/sparks/open flames/hot surfaces. - No smoking.
Keep container tightly closed.
Ground/bond container and receiving equipment.
Use explosion-proof electrical/ventilating/lighting equipment.
Use only non-sparking tools.
Take precautionary measures against static discharge.
Do not breathe gas/mist/vapors/spray.
Wash hands thoroughly after handling.
Do not eat, drink or smoke when using this product.

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GHS Response Phrases:

Use only outdoors or in a well-ventilated area.
Wear protective gloves/protective clothing/eye protection/face protection.
Use personal protective equipment as required.
Keep cool.

IF SWALLOWED: Call a POISON CENTER or doctor/physician if you feel unwell.
IF ON SKIN: Wash with plenty of soap and water.
IF ON SKIN (or hair): Remove/take off immediately all contaminated clothing. Rinse skin with water/shower.
IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing.
IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
IF exposed: Call a POISON CENTER or doctor/physician.
IF exposed or concerned: Get medical attention/advice.
Call a POISON CENTER or doctor/physician.
Get medical attention/advice if you feel unwell.
Specific treatment see label.
Rinse mouth.
If skin irritation occurs, get medical advice/attention.
If eye irritation persists, get medical advice/attention.
Remove/Take off immediately all contaminated clothing.
Wash contaminated clothing before reuse.
In case of fire, use dry chemical powder to extinguish.

GHS Storage and Disposal Phrases:

Store container tightly closed in well-ventilated place.
Store locked up.
Dispose of contents/container according to local, state and federal regulations.

OSHA Regulatory Status:

This material is classified as hazardous under OSHA regulations.

Potential Health Effects (Acute and Chronic):

This product has not been tested as a whole to determine health effects. The health effects listed below are associated with the individual ingredients listed in Section 3.

EYES: Causes eye irritation. May cause tearing, redness, stinging or burning, swelling, and blurred vision. May cause corneal injury.

SKIN: May cause effects ranging from mild irritation to severe pain, and possibly burns, depending on the intensity of contact. Skin absorption may occur.

INHALATION: May cause upper respiratory tract irritation and central nervous system depression with symptoms such as confusion, lightheadedness, dizziness, nausea, vomiting, headache, and fatigue. Causes formation of carbon monoxide in blood which may affect the cardiovascular system and central nervous system, and can cause a lack of oxygen in the blood. Continued exposure may cause unconsciousness, coma, and even death.

INGESTION: May cause nausea, vomiting, and diarrhea. May cause central nervous system excitement, followed by headache, dizziness, and drowsiness. Not expected due to high viscosity, but if vomiting results in aspiration, chemical pneumonia could occur, which may be fatal. Absorption through the gastrointestinal tract may produce central nervous system depression. May cause kidney damage. May cause blurred vision and visual impairment (including blindness).

CHRONIC OVEREXPOSURE EFFECTS: May cause liver and kidney damage. May cause cancer based on animal data (methylene chloride). Prolonged or repeated skin

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contact may cause defatting and dermatitis.

Methanol has caused birth defects in laboratory animals, but only when inhaled at extremely high vapor concentrations. The relevance of this finding to humans is uncertain.

Reports have associated repeated and prolonged overexposure to solvents with neurological and other physiological damage. Intentional misuse by deliberately concentrating and inhaling solvents may be harmful or fatal.

ADDITIONAL DATA:

For Methylene Chloride: Alcohol may enhance the toxic effects. May cross the placenta. May be excreted in breast milk. Concurrent exposure to carbon monoxide, smoking, or physical activity may increase the level of carboxyhemoglobin in the blood resulting in additive effects.

TARGET ORGANS: blood, central nervous system, liver, skin, cardiovascular system, eyes, kidney, pancreas, heart, lungs, brain

PRIMARY ROUTES OF ENTRY: skin, eyes, inhalation, ingestion

Medical Conditions Generally Aggravated By Exposure: Diseases of the blood; skin; eyes; liver; kidneys; lungs; pulmonary system; cardiovascular system and respiratory system; alcoholism and rhythm disorders of the heart.

3. COMPOSITION/INFORMATION ON INGREDIENTS

CAS #	Hazardous Components (Chemical Name)	Concentration
75-09-2	Dichloromethane {Methylene chloride; R-30; Freon 30}	15.0 -40.0 %
67-56-1	Methanol {Methyl alcohol; Carbinol; Wood alcohol}	10.0 -30.0 %
1330-20-7	Xylene (mixed isomers) {Benzene, dimethyl-}	10.0 -30.0 %
67-64-1	Acetone {2-Propanone}	10.0 -30.0 %
108-88-3	Toluene {Benzene, Methyl-; Toluol}	3.0 -7.0 %
100-41-4	Ethylbenzene {Ethylbenzol; Phenylethane}	1.0 -5.0 %
64-17-5	Ethyl alcohol {Ethanol}	1.0 -5.0 %

Additional Chemical Information Specific percentage of composition is being withheld as a trade secret.

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4. FIRST AID MEASURES

Emergency and First Aid Procedures:

Skin:

Immediately begin washing the skin thoroughly with large amounts of water and mild soap, if available, while removing contaminated clothing. Seek medical attention if irritation persists.

Eyes:

Immediately begin to flush eyes with water, remove any contact lens. Continue to flush the eyes for at least 15 minutes, then seek immediate medical attention.

Inhalation:

Remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get immediate medical attention.

Ingestion:

If swallowed, do NOT induce vomiting. Seek immediate medical attention. Call a physician, hospital emergency room, or poison control center immediately. Never give anything by mouth to an unconscious person.

Signs and Symptoms Of Exposure:

See Potential Health Effects.

Note to Physician:

This product contains methylene chloride and methanol.

This product contains methanol which can cause intoxication and central nervous system depression. Methanol is metabolized to formic acid and formaldehyde. These metabolites can cause metabolic acidosis, visual disturbances and blindness. Since metabolism is required for these toxic symptoms, their onset may be delayed from 6 to 30 hours following ingestion. Ethanol competes for the same metabolic pathway and has been used to prevent methanol metabolism. Ethanol administration is indicated in symptomatic patients or at blood methanol concentrations above 20 ug/dl. Methanol is effectively removed by hemodialysis. Adrenalin should never be given to a person overexposed to methylene chloride.

Methylene Chloride is an aspiration hazard. Risk of aspiration must be weighed against possible toxicity of the material when determining whether to induce emesis or to perform gastric lavage. This material sensitizes the heart to the effects of sympathomimetic amines. Epinephrine and other sympathomimetic drugs may initiate cardiac arrhythmias in individuals exposed to this material. This material is metabolized to carbon monoxide. Consequently, elevations in carboxyhemoglobin as high as 50% have been reported, and levels may continue to rise for several hours after exposure has ceased. Data in experimental animals suggest there is a narrow margin between concentrations causing anesthesia and death.

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5. FIRE FIGHTING MEASURES

Flammability Classification:	1B
Flash Pt:	30.00 F Method Used: Setaflash Closed Cup (Rapid Setaflash)
Explosive Limits:	LEL: No data. UEL: No data.
Autoignition Pt:	No data.
Suitable Extinguishing Media:	Use carbon dioxide, dry powder, or alcohol resistant foam.
Unsuitable Extinguishing Media:	Do not use straight streams of water. If water is used, use a water spray or fog.
Fire Fighting Instructions:	Self-contained respiratory protection should be provided for fire fighters fighting fires in buildings or confined areas. Storage containers exposed to fire should be kept cool with water spray to prevent pressure build-up. Stay away from heads of containers that have been exposed to intense heat or flame.
Flammable Properties and Hazards:	Danger! Flammable. Keep away from heat, sparks, flame, and all other sources of ignition. Do not smoke. Extinguish all flames and pilot lights, and turn off stoves, heaters, electric motors and all other sources of ignition during use and until all vapors are gone. Beware of static electricity that may be generated by synthetic clothing and other sources. Contact of liquid or vapor with flame or hot surfaces will produce toxic gases and a corrosive residue that will cause deterioration of metal.
Hazardous Combustion Products:	Carbon monoxide, carbon dioxide, hydrogen chloride, chlorine, phosgene

6. ACCIDENTAL RELEASE MEASURES

Steps To Be Taken In Case Material Is Released Or Spilled:	Vapors may cause flash fire or ignite explosively. Clean up: Keep unnecessary people away; isolate hazard area and deny entry. Stay upwind, out of low areas, and ventilate closed spaces before entering. Shut off ignition sources; keep flares, smoking or flames out of hazard area. Use non-sparking tools. Use proper bonding and grounding methods for all equipment and processes. Keep out of waterways and bodies of water. Be cautious of vapors collecting in small enclosed spaces, sewers, low lying areas, confined spaces, etc. Small spills: Take up with sand, earth or other noncombustible absorbent material and place in a plastic container where applicable. Large spills: Dike far ahead of spill for later disposal. Waste Disposal: Dispose in accordance with applicable local, state and federal regulations.

7. HANDLING AND STORAGE

Precautions To Be Taken in Handling:	Read carefully all cautions and directions on product label before use. Since empty container retains residue, follow all label warnings even after container is empty. Dispose of empty container according to all regulations. Do not reuse this container. Do not use this product near any source of heat or open flame, furnace areas, pilot lights, stoves, etc. Do not use in small enclosed spaces, such as basements and bathrooms. Vapors can accumulate and explode if ignited.

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Do not spread this product over large surface areas because fire and health safety risks will increase dramatically.

Precautions To Be Taken in Storing:

Store in a cool place in original container and protect from sunlight. Exposure to high temperatures or prolonged exposure to sun may cause can to leak or swell. Once opened, remover should be used within six months or properly disposed of to avoid can deterioration. Do not store near flames or at elevated temperatures.

Keep container tightly closed when not in use.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

CAS #	Chemical Name	Jurisdiction	Recommended Exposure Limits	Notations
75-09-2	Dichloromethane	ACGIH TLV	TLV: 50 ppm	
	{Methylene chloride; R-30; Freon 30}	OSHA PELs	PEL: 25 ppm STEL: 125 ppm (15 min)	
67-56-1	Methanol {Methyl alcohol; Carbinol; Wood alcohol}	ACGIH TLV	TLV: 200 ppm STEL: 250 ppm	
		OSHA PELs	PEL: 200 ppm	
1330-20-7	Xylene (mixed isomers) {Benzene, dimethyl-}	ACGIH TLV	TLV: 100 ppm STEL: 150 ppm	
		OSHA PELs	PEL: 100 ppm	
67-64-1	Acetone {2-Propanone}	ACGIH TLV	TLV: 500 ppm STEL: 750 ppm	
		OSHA PELs	PEL: 1000 ppm	
108-88-3	Toluene {Benzene, Methyl-, Toluol}	ACGIH TLV	TLV: 50 ppm	
		OSHA PELs	PEL: 200 ppm STEL: 500 ppm/(10min) CEIL: 300 ppm	
100-41-4	Ethylbenzene {Ethylbenzol; Phenylethane}	ACGIH TLV	TLV: 100 ppm STEL: 125 ppm	
		OSHA PELs	PEL: 100 ppm	
64-17-5	Ethyl alcohol {Ethanol}	ACGIH TLV	TLV: 1000 ppm	
		OSHA PELs	PEL: 1000 ppm	

Respiratory Equipment (Specify Type):

For use in areas with inadequate ventilation or fresh air, wear a properly maintained and properly fitted NIOSH approved self-contained breathing apparatus or powered air supply respirator or loose fitting hood.

For OSHA controlled work places and other regular users - Use only with adequate ventilation under engineered air control systems designed to prevent exceeding the appropriate TLV.

A dust mask does not provide protection against vapors.

Eye Protection:

Chemical goggles, or face shields are recommended to safeguard against potential eye contact, irritation, or injury. Chemical goggles or face shields are recommended when splashing or spraying of chemical is possible. A faceshield provides more protection to help reduce chemical contact to the face and eyes.

Protective Gloves:

Wear gloves with as much resistance to the chemical ingredients as possible. Laminate

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	film gloves offer the best protection. Other glove materials, such as nitrile rubber, neoprene, and PVC will be degraded by methylene chloride, but may provide protection for some amount of time, based on the type of glove and the conditions of use. Consult your glove supplier for additional information. Gloves contaminated with product should be discarded and not reused.
Other Protective Clothing:	Various application methods can dictate use of additional protective safety equipment, such as impermeable aprons, etc., to minimize exposure. Before reuse, thoroughly clean any clothing or protective equipment that has been contaminated by prior use. Discard any clothing or other protective equipment that cannot be decontaminated, such as gloves or shoes.
Engineering Controls (Ventilation etc.):	Use process enclosures, local exhaust ventilation, or other engineering controls to control airborne levels below recommended exposure limits. Use only with adequate ventilation to prevent buildup of vapors. If the work area is not well ventilated, DO NOT use this product. Do not use in areas where vapors can accumulate and concentrate, such as basements, bathrooms or small enclosed areas. Whenever possible, use outdoors in an open air area. If using indoors open all windows and doors and maintain a cross ventilation of moving fresh air across the work area. If strong odor is noticed or you experience slight dizziness, headache, nausea or eye-watering -- STOP -- ventilation is inadequate. Leave area immediately and move to fresh air.
Work/Hygienic/Maintenance Practices:	Wash hands thoroughly after use and before eating, drinking, or smoking. Do not eat, drink, or smoke in the work area. Facilities storing or handling this material should be equipped with an emergency eyewash and safety shower.

9. PHYSICAL AND CHEMICAL PROPERTIES

Physical States:	[] Gas [X] Liquid [] Solid	
Appearance and Odor:	Off-white opaque viscous liquid	
pH:	8 - 10	
Melting Point:	No data.	
Boiling Point:	No data.	
Flash Pt:	30.00 F Method Used: Setaflash Closed Cup (Rapid Setaflash)	
Evaporation Rate:	< 1	
Flammability (solid, gas):	No data available.	
Explosive Limits:	LEL: No data.	UEL: No data.
Vapor Pressure (vs. Air or mm Hg):	No data.	
Vapor Density (vs. Air = 1):	> 1	
Specific Gravity (Water = 1):	1.004	
Density:	8.346 LB/GL	
Solubility in Water:	Slight	

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Octanol/Water Partition Coefficient: No data.
Percent Volatile: 95.81 % by weight.
VOC / Volume: 25.1400 % WT
Autoignition Pt: No data.
Decomposition Temperature: No data.
Viscosity: 1325 cps

10. STABILITY AND REACTIVITY

Stability: Unstable [] Stable [X]
Conditions To Avoid - Instability: Stable
Incompatibility - Materials To Avoid: Bases, oxygen, sodium, potassium, strong oxidizers, reactive metals, strong acids
Hazardous Decomposition or Byproducts: Hydrogen chloride, chlorine, phosgene, carbon monoxide, carbon dioxide
Possibility of Hazardous Reactions: Will occur [] Will not occur [X]
Conditions To Avoid - Hazardous Reactions: Will not occur.

11. TOXICOLOGICAL INFORMATION

Toxicological Information: This product has not been tested as a whole. Refer to section 2 for acute and chronic effects.
CAS# 75-09-2:
Tumorigenic Effects:, TCLo, Inhalation, Rat, 3500. PPM, 6 Y.
Result:
Tumorigenic: Carcinogenic by RTECS criteria.
Endocrine: Tumors.
- Fundamental and Applied Toxicology., Academic Press, Inc., 1 E. First St., Duluth, MN 55802, Vol/p/yr: 4,30, 1984

Standard Draize Test, Eyes, Species: Rabbit, 100.0 MG, Severe.
Result:
Effects on Newborn: Growth statistics (e.g., reduced weight gain).
Effects on Newborn: Physical.
- Union Carbide Data Sheet, Union Carbide Corp., 39 Old Ridgebury Rd., Danbury, CT 06817, Vol/p/yr: 4/25, 1958

Standard Draize Test, Skin, Species: Rabbit, 810.0 MG, 24 H, Severe.
Result:
Specific Developmental Abnormalities: Musculoskeletal system.
- European Journal of Toxicology and Environmental Hygiene., For publisher information, see TOERD9, Paris France, Vol/p/yr: 9,171, 1976

CAS# 1330-20-7:
Acute toxicity, LC50, Inhalation, Rat, 5000. PPM, 4 H.
Result:
Behavioral: Muscle contraction or spasticity.
Lungs, Thorax, or Respiration: Other changes.
- Raw Material Data Handbook, Vol.1: Organic Solvents, 1974., National Assoc. of

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Printing Ink Research Institute, Francis McDonald Sinclair Memorial Labor, Lehigh Univ., Bethlehem, PA 18015, Vol/p/yr: 1,123, 1974

Standard Draize Test, Eyes, Species: Rabbit, 5.000 MG, 24 H, Severe.

Result:

Behavioral: General anesthetic.

Behavioral: Somnolence (general depressed activity).

Behavioral: Irritability.

- "Sbornik Vysledku Toxilogickeho Vysetreni Latek A Pripravku," , Institut Pro Vychovu Vedoucicn P, Marhold, J.V., Institut Pro Vychovu Vedoucicn, Pracovniku Chemickeho, Prumyclu Praha Czechoslovakia, Vol/p/yr: -,24, 1972

CAS# 67-64-1:

Standard Draize Test, Eyes, Species: Rabbit, 20.00 MG, Severe.

Result:

Behavioral: Change in motor activity (specific assay).

Behavioral: Alteration of classical conditioning.

- American Journal of Ophthalmology., Ophthalmic Pub. Co., 435 N. Michigan Ave., Suite 1415, Chicago, IL 60611, Vol/p/yr: 29,1363, 1946

CAS# 108-88-3:

Reproductive Effects:, TCLo, Inhalation, Rat, 800.0 MG/M3, 6 H, female 14-20 day(s) after conception.

Result:

Effects on Embryo or Fetus: Fetotoxicity (except death, e.g., stunted fetus).

Effects on Newborn: Behavioral.

- Brazilian Journal of Medical and Biological Research., Vol/p/yr: 23,533, 1990

Standard Draize Test, Eyes, Species: Rabbit, 2.000 MG, 24 H, Severe.

Result:

Effects on Embryo or Fetus: Other effects to embryo.

Specific Developmental Abnormalities: Eye, ear.

- Prehled Prumyslove Toxikologie, Marhold, J., Organicke Latky, Prague Czechoslovakia, Vol/p/yr: -,29, 1986

CAS# 100-41-4:

Tumorigenic Effects:, TCLo, Inhalation, Rat, 750.0 ppm.

Result:

Tumorigenic: Carcinogenic by RTECS criteria.

Kidney, Ureter, Bladder: Tumors.

Standard Draize Test, Eyes, Species: Rabbit, 500.0 MG, Severe.

Result:

Effects on Fertility: Post-implantation mortality (e.g., dead and/or resorbed implants per total number of implants).

Effects on Fertility: Litter size (e.g., # fetuses per litter; measured before birth).

Effects on Embryo or Fetus: Fetotoxicity (except death, e.g., stunted fetus).

- American Journal of Ophthalmology., Ophthalmic Pub. Co., 435 N. Michigan Ave., Suite 1415, Chicago, IL 60611, Vol/p/yr: 29,1363, 1946

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CAS# 64-17-5:

Acute toxicity, LD50, Oral, Rat, 7060. MG/KG.

Result:

Lungs, Thorax, or Respiration: Other changes.

- Toxicology and Applied Pharmacology, Academic Press, Inc., 1 E. First St., Duluth, MN 55802, Vol/p/yr: 16,718, 1970

Chronic Toxicological Effects:

This product has not been tested as a whole.

Carcinogenicity/Other Information:

IARC 2B - Possibly Carcinogenic to Humans

IARC 3: Not Classifiable as to Carcinogenicity in Humans

ACGIH A3 - Confirmed Animal Carcinogen with Unknown Relevance to Humans

ACGIH A4 - Not Classifiable as a Human Carcinogen.

CAS #	Hazardous Components (Chemical Name)	NTP	IARC	ACGIH	OSHA
75-09-2	Dichloromethane {Methylene chloride; R-30; Freon 30}	Possible	2B	A3	Yes
67-56-1	Methanol {Methyl alcohol; Carbinol; Wood alcohol}	n.a.	n.a.	n.a.	n.a.
1330-20-7	Xylene (mixed isomers) {Benzene, dimethyl-}	n.a.	3	A4	n.a.
67-64-1	Acetone {2-Propanone}	n.a.	n.a.	A4	n.a.
108-88-3	Toluene {Benzene, Methyl-; Toluol}	n.a.	3	A4	n.a.
100-41-4	Ethylbenzene {Ethylbenzol; Phenylethane}	n.a.	2B	A3	n.a.
64-17-5	Ethyl alcohol {Ethanol}	n.a.	1	A4	n.a.

12. ECOLOGICAL INFORMATION

General Ecological Information:

This product has not been tested as a whole.

13. DISPOSAL CONSIDERATIONS

Waste Disposal Method:

Dispose in accordance with all applicable local, state, and federal regulations.

14. TRANSPORT INFORMATION

LAND TRANSPORT (US DOT):**DOT Proper Shipping Name:** Paint Related Material**DOT Hazard Class:** 3 FLAMMABLE LIQUID**UN/NA Number:** UN1263**Packing Group:** II**Additional Transport Information:**

The shipper / supplier may apply one of the following exceptions: Combustible Liquid, Consumer Commodity, Limited Quantity, Viscous Liquid, Does Not Sustain Combustion, or others, as allowed under 49CFR Hazmat Regulations. Please consult 49CFR Subchapter C to ensure that subsequent shipments comply with these exceptions.

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15. REGULATORY INFORMATION

EPA SARA (Superfund Amendments and Reauthorization Act of 1986) Lists

CAS #	Hazardous Components (Chemical Name)	S. 302 (EHS)	S. 304 RQ	S. 313 (TRI)
75-09-2	Dichloromethane {Methylene chloride; R-30; Freon 30}	No	Yes 1000 LB	Yes
67-56-1	Methanol {Methyl alcohol; Carbinol; Wood alcohol}	No	Yes 5000 LB	Yes
1330-20-7	Xylene (mixed isomers) {Benzene, dimethyl-}	No	Yes 100 LB	Yes
67-64-1	Acetone {2-Propanone}	No	Yes 5000 LB	No
108-88-3	Toluene {Benzene, Methyl-; Toluol}	No	Yes 1000 LB	Yes
100-41-4	Ethylbenzene {Ethylbenzol; Phenylethane}	No	Yes 1000 LB	Yes
64-17-5	Ethyl alcohol {Ethanol}	No	No	No

CAS #	Hazardous Components (Chemical Name)	Other US EPA or State Lists
75-09-2	Dichloromethane {Methylene chloride; R-30; Freon 30}	CAA HAP,ODC: HAP: VHAP CWA NPDES TSCA: Inventory, 8A CAIR CA PROP.65: Yes: Canc.
67-56-1	Methanol {Methyl alcohol; Carbinol; Wood alcohol}	CAA HAP,ODC: HAP: VHAP TSCA: Inventory CA PROP.65: Yes: RDTox.
1330-20-7	Xylene (mixed isomers) {Benzene, dimethyl-}	CAA HAP,ODC: HAP: VHAP CWA NPDES TSCA: Inventory
67-64-1	Acetone {2-Propanone}	TSCA: Inventory
108-88-3	Toluene {Benzene, Methyl-; Toluol}	CAA HAP,ODC: HAP: VHAP CWA NPDES TSCA: Inventory, 8A CAIR CA PROP.65: Yes: RDTox(F)
100-41-4	Ethylbenzene {Ethylbenzol; Phenylethane}	CAA HAP,ODC: HAP: VHAP CWA NPDES TSCA: Inventory CA PROP.65: Yes: Canc.
64-17-5	Ethyl alcohol {Ethanol}	TSCA: Inventory

Regulatory Information: This product is regulated by the United States Consumer Product Safety Commission and is subject to certain labeling requirements under the Federal Hazardous Substances Act. These requirements differ from the classification criteria and hazard information required for safety data sheets (SDS). The product label also includes other important information, including directions for use, and should always be read in its entirety prior to using the product.

Additional Regulatory Information This chemical/product is not and cannot be distributed in commerce (as defined in TSCA section 3(5)) or processed (as defined in TSCA section 3(13)) for consumer paint or coating removal.

Regulatory Information Statement: All components of this material are listed on the TSCA Inventory or are exempt.

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16. OTHER INFORMATION

Revision Date: 05/01/2019
Preparer Name: W.M. Barr EHS Dept (901)775-0100

Additional Information About This Product: No data available.

Company Policy or Disclaimer:

The information contained herein is presented in good faith and believed to be accurate as of the effective date shown above. This information is furnished without warranty of any kind. Employers should use this information only as a supplement to other information gathered by them and must make independent determination of suitability and completeness of information from all sources to assure proper use of these materials and the safety and health of employees. Any use of this data and information must be determined by the user to be in accordance with applicable federal, state and local laws and regulations.

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KWIK Liquid No Wash

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1. PRODUCT AND COMPANY IDENTIFICATION

Product Name: KWIK Liquid No Wash

Reference #: 112P.5

Company Name: W. M. Barr
2105 Channel Avenue
Memphis, TN 38113

Phone Number: (901)775-0100

Web site address: www.wmbarr.com

Emergency Contact: 3E 24 Hour Emergency Contact (800)451-8346
Information: W.M. Barr Customer Service (800)398-3892

Intended Use: Paint/Varnish Remover

Product Code: CLN950, DLN950

Additional Information This chemical/product is not and cannot be distributed in commerce (as defined in TSCA section 3(5)) or processed (as defined in TSCA section 3(13)) for consumer paint or coating removal.

2. HAZARDS IDENTIFICATION

Flammable Liquids, Category 2
Acute Toxicity: Oral, Category 4
Acute Toxicity: Skin, Category 4
Acute Toxicity: Inhalation, Category 4
Skin Corrosion/Irritation, Category 2
Serious Eye Damage/Eye Irritation, Category 2
Carcinogenicity, Category 1B
Toxic To Reproduction, Category 2
Specific Target Organ Toxicity (single exposure), Category 1
Specific Target Organ Toxicity (repeated exposure), Category 2
Aspiration Toxicity, Category 1



GHS Signal Word: Danger

GHS Hazard Phrases: Highly flammable liquid and vapor.
Harmful if swallowed.
May be fatal if swallowed and enters airways.
Harmful in contact with skin.
Causes skin irritation.
Causes serious eye irritation.
Harmful if inhaled.
May cause cancer.
Suspected of damaging fertility or the unborn child.
Causes damage to organs.
May cause damage to organs through prolonged or repeated exposure.

GHS Precautionary Phrases: Obtain special instructions before use.
Do not handle until all safety precautions have been read and understood.
Keep away from heat/sparks/open flames/hot surfaces. - No smoking.
Keep container tightly closed.
Ground/bond container and receiving equipment.
Use explosion-proof electrical/ventilating/lighting equipment.
Use only non-sparking tools.
Take precautionary measures against static discharge.

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KWIK Liquid No Wash

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GHS Response Phrases:

Do not breathe gas/mist/vapors/spray.
Wash hands thoroughly after handling.
Do not eat, drink or smoke when using this product.
Use only outdoors or in a well-ventilated area.
Wear protective gloves/protective clothing/eye protection/face protection.
Use personal protective equipment as required.
IF SWALLOWED: Immediately call a POISON CENTER or doctor/physician.
Call a POISON CENTER or doctor/physician if you feel unwell.
IF ON SKIN: Wash with plenty of soap and water.
IF ON SKIN (or hair): Remove/take off immediately all contaminated clothing. Rinse skin with water/shower.
IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing.
IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
IF exposed: Call a POISON CENTER or doctor/physician.
IF exposed or concerned: Get medical attention/advice.
Get medical attention/advice if you feel unwell.
Specific treatment see label.
Rinse mouth.
Do NOT induce vomiting.
If skin irritation occurs, get medical advice/attention.
If eye irritation persists, get medical advice/attention.
Take off contaminated clothing and wash before re-use.
Wash contaminated clothing before reuse.
In case of fire, use dry chemical powder to extinguish.

GHS Storage and Disposal Phrases:

Store in cool/well-ventilated place.
Store locked up.
Dispose of contents/container according to local, state and federal regulations.

OSHA Regulatory Status:

This material is classified as hazardous under OSHA regulations.

Potential Health Effects (Acute and Chronic):

Inhalation Acute Exposure Effects:
Vapor harmful. May cause dizziness; headache; watering of eyes; irritation of respiratory tract; muscle weakness; muscle twitches; sweating; pallor; ringing in ears; irritation to the mucus membranes; gastric disturbances; edema of lungs; injury to kidney; liver; heart; pancreas and spleen; arm, leg and chest pains; hot flashes; increase in carboxyhemoglobin levels, which can cause stress to the cardiovascular system; vomiting; depression of the central nervous system; fall in body temperature; numbness in fingers, arms, and legs; irregular or rapid heartbeat; depression; loss of coordination; weakness; drowsiness; loss of appetite; fatigue; irritation; vomiting; eye irritation; anesthesia; insomnia; lightheadedness; stomach and intestinal pain; heartburn; confusion; giddiness; narcosis; brain damage; hallucinations; unconsciousness; olfactory changes; shock; collapse; coma; and death. Severe overexposure may cause poisoning; convulsions; unconsciousness; and death. Elevated carboxyhemoglobin levels can be additive to the increase caused by smoking and other carbon monoxide sources. Intentional misuse of this product by deliberately concentrating and inhaling can be harmful or fatal.

Skin Contact Acute Exposure Effects:

Harmful if absorbed through skin. Product may be absorbed through skin. Causes severe burns. May cause irritation; drying and cracking of skin; burning; redness; blisters; numbness in fingers and arms; erythema; dermatitis; defatting of skin; white patches and wrinkles on skin; itching; pain; and tissue destruction; intense pain if not

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promptly removed; skin discoloration and anesthetization. Absorption through skin may cause poisoning and death. May cause increase and cause additional symptoms listed under inhalation.

Eye Contact Acute Exposure Effects:

This material is an eye irritant. Causes severe burns. May cause irritation and injury; severe corneal effects; corneal damage; stinging; tearing; redness; and swelling. If not promptly removed, will injure eye tissue, which may result in permanent damage. May cause symptoms listed under inhalation. Vapors may also cause irritation.

Ingestion Acute Exposure Effects:

Poison. Cannot be made non-poisonous. Harmful or fatal if swallowed. May cause blindness; dizziness; nausea; headache; irritation to mouth; loss of coordination; stupor; nose, throat, and stomach irritation; abdominal pains, burns in mouth, pharynx and gastrointestinal tract; gastrointestinal irritation; muscle weakness and twitches; vomiting; diarrhea including bloody diarrhea; intense burning of mouth and throat; skin rash; urine output may be scanty and may contain hemoglobin; irregular breathing; frothing at mouth and nose; blue discoloration of skin; fall in blood pressure; depression of the central nervous system; collapse; shock; unconsciousness; and death. May produce additional symptoms listed under inhalation. Liquid aspirated into lungs, during vomiting, may cause chemical pneumonia and systemic effects.

Chronic Exposure Effects:

Reports have associated repeated and prolonged overexposure to solvents with neurological and other physiological damage. Prolonged or repeated contact may cause dermatitis. May cause dizziness; headache; fainting; skin rash; irritations; eruptions or discolorations; loss of appetite; difficulty swallowing; digestive disturbances; permanent central nervous system changes; jaundice; changes in blood; blood disorders; damage to bone marrow; mental confusion; mental disturbances; hallucinations; decreased response to visual and auditory stimulation; blindness; liver, kidney and lung damage; changes in blood; blood disorders; heart palpitations; and death. Some individuals may be hypersensitive to this material.

Medical Conditions Generally Aggravated By Exposure: Diseases of the blood, skin, liver, kidneys, lungs, cardiovascular system and respiratory system, alcoholism, and rhythm disorders of the heart.

3. COMPOSITION/INFORMATION ON INGREDIENTS

CAS #	Hazardous Components (Chemical Name)	Concentration
108-88-3	Toluene {Benzene, Methyl-, Toluol}	20.0 -40.0 %
75-09-2	Dichloromethane {Methylene chloride; R-30; Freon 30}	20.0 -30.0 %
67-64-1	Acetone {2-Propanone}	20.0 -30.0 %
67-56-1	Methanol {Methyl alcohol; Carbinol; Wood alcohol}	10.0 -25.0 %

Additional Chemical Information Specific percentage of composition is being withheld as a trade secret.

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4. FIRST AID MEASURES

Emergency and First Aid Procedures:

Inhalation:

If user experiences breathing difficulty, move to air free of vapors. Administer oxygen or artificial respiration until medical assistance can be rendered.

Skin Contact:

Irritation may result. Immediately wash with soap and water. Remove contaminated clothes and shoes. Wash clothing before reuse. Discard contaminated shoes.

Eye Contact:

Immediately flush with water, remove any contact lenses, continue flushing with water for at least 15 minutes, then get medical attention.

Ingestion:

Call your local poison control center, hospital emergency room, or physician immediately for instructions to induce vomiting. Never give anything by mouth to an unconscious person.

Signs and Symptoms Of Exposure:

Primary Routes of Exposure:

Inhalation, ingestion, and dermal.

Note to Physician:

Poison. This product contains methanol and methylene chloride. Methanol is metabolized to formaldehyde and formic acid. These metabolites may cause metabolic acidosis, visual disturbances, and blindness. Since metabolism is required for these toxic symptoms, their onset may be delayed from 6 to 30 hours following ingestion. Ethanol competes for the same metabolic pathway and has been used as an antidote. Methanol is effectively removed by hemodialysis. Adrenalin should never be given to a person overexposed to methylene chloride. Call your local poison control center for further instructions.

5. FIRE FIGHTING MEASURES

Flash Pt:

OSHA CLASS IB

20.00 F Method Used: TAG Closed Cup

Explosive Limits:

LEL: No data.

UEL: No data.

Autoignition Pt:

No data.

Suitable Extinguishing Media: Use carbon dioxide, dry powder, or foam.

Fire Fighting Instructions:

Self-contained respiratory protection should be provided for fire fighters fighting fires in buildings or confined areas. Storage containers exposed to fire should be kept cool with water spray to prevent pressure build-up. Stay away from heads of containers that have been exposed to intense heat or flame.

Flammable Properties and Hazards:

No data available.

Hazardous Combustion Products:

No data available.

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6. ACCIDENTAL RELEASE MEASURES

Steps To Be Taken In Case Material Is Released Or Spilled:

Cleanup:

Keep unnecessary people away; isolate hazard area and deny entry. Stay upwind, out of low areas, and ventilate closed spaces before entering. Shut off ignition sources; keep flares, smoking or flames out of hazard area.

Small Spills:

Take up liquid with sand, earth or other noncombustible absorbent material and place in a plastic container where applicable.

Large Spills:

Dike far ahead of spill for later disposal.

7. HANDLING AND STORAGE

Precautions To Be Taken in Handling:

Read carefully all cautions and directions on product label before use. Since empty container retains residue, follow all label warnings even after container is empty. Dispose of empty container according to all regulations. Do not reuse this container.

Precautions To Be Taken in Storing:

Keep container tightly closed when not in use. Store in a cool, dry place. Exposure to high temperatures or prolonged exposure to sun may cause can to leak or swell. Once opened, remover should be used within six months or discarded to avoid can deterioration. Do not use near flames or at elevated temperatures.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

CAS #	Chemical Name	Jurisdiction	Recommended Exposure Limits	Notations
108-88-3	Toluene {Benzene, Methyl-, Toluol}	ACGIH TLV	TLV: 50 ppm	
		OSHA PELs	PEL: 200 ppm STEL: 500 ppm/(10min) CEIL: 300 ppm	
75-09-2	Dichloromethane {Methylene chloride; R-30; Freon 30}	ACGIH TLV	TLV: 50 ppm STEL: 300 ppm	
		OSHA PELs	PEL: 25 ppm STEL: 125 ppm (15 min)	
67-64-1	Acetone {2-Propanone}	ACGIH TLV	TLV: 500 ppm STEL: 750 ppm	
		OSHA PELs	PEL: 1000 ppm	
67-56-1	Methanol {Methyl alcohol; Carbinol; Wood alcohol}	ACGIH TLV	TLV: 200 ppm STEL: 250 ppm CEIL: 2 mg/m3	
		OSHA PELs	PEL: 200 ppm	

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Respiratory Equipment (Specify Type):	For OSHA controlled work place and other regular users --Use only with adequate ventilation under engineered air control systems designed to prevent exceeding appropriate TLV. For occasional use, where engineered air control is not feasible, use properly maintained and properly fitted NIOSH approved respirator for organic solvent vapors. A dust mask does not provided protection against vapors.
Eye Protection:	Safety glasses, chemical goggles or face shields are recommended to safeguard against potential eye contact, irritation, or injury. Contact lenses should not be worn while working with chemicals.
Protective Gloves:	Wear impermeable gloves. Gloves contaminated with product should be discarded. Promptly remove clothing that becomes soiled with product.
Other Protective Clothing:	Various application methods can dictate the use of additional protective safety equipment, such as impermeable aprons, etc., to minimize exposure. A source of clean water should be available in the work area for flushing eyes and skin. Do not eat, drink, or smoke in the work area. Wash hands thoroughly after use. Before reuse, thoroughly clean any clothing or protective equipment that has been contaminated by prior use. Discard any clothing or other protective equipment that cannot be decontaminated, such as gloves or shoes.
Engineering Controls (Ventilation etc.):	Use only with adequate ventilation to prevent buildup of vapors. Do not use in areas where vapors can accumulate and concentrate such as basements, bathrooms, or small enclosed areas. Whenever possible, use outdoors in an open area. If using indoors, open all windows and doors and maintain a cross ventilation of moving fresh air across the work area. If strong odor is noticed or you experience slight dizziness, headache, nausea or eye-watering -- Stop -- ventilation is inadequate. Leave area immediately. If the work area is not well ventilated, then do not use this product. A dust mask does not provide protection against vapors.

9. PHYSICAL AND CHEMICAL PROPERTIES

Physical States:	[] Gas [X] Liquid [] Solid		
Appearance and Odor:	Cloudy thin liquid		
pH:	No data.		
Melting Point:	No data.		
Boiling Point:	> 104.00 F		
Flash Pt:	20.00 F Method Used: TAG Closed Cup		
Evaporation Rate:	> 1		
Flammability (solid, gas):	No data available.		
Explosive Limits:	LEL: No data.		UEL: No data.
Vapor Pressure (vs. Air or mm Hg):	No data.		
Vapor Density (vs. Air = 1):	No data.		
Specific Gravity (Water = 1):	No data.		
Density:	7.4 - 7.53 LB/GL		
Solubility in Water:	No data.		

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Octanol/Water Partition Coefficient: No data.

Percent Volatile: 98.43 % by weight.

VOC / Volume: 443.0000 G/L

Autoignition Pt: No data.

Decomposition Temperature: No data.

Viscosity: No data.

Molecular Formula & Weight: 112P.5 0.0

10. STABILITY AND REACTIVITY

Stability: Unstable [] Stable [X]

Conditions To Avoid - Instability: Stable. However, may decompose if heated.

Incompatibility - Materials To Avoid: Incompatible with strong oxidizing agents, nitric acid, strong alkalis, nitrogen peroxide, oxygen, strong caustics, chemically active metals such as magnesium or aluminum, sodium, or potassium.

Hazardous Decomposition or Byproducts: Thermal decomposition may produce carbon monoxide, carbon dioxide, chlorine gas, hydrogen chloride, small quantities of phosgene, formaldehyde, and unidentified organic compounds in black smoke.

Possibility of Hazardous Reactions: Will occur [] Will not occur [X]

Conditions To Avoid - Hazardous Reactions: No data available.

11. TOXICOLOGICAL INFORMATION

Toxicological Information: This product has not been tested as a whole. Refer to section 2 for acute and chronic health effects.

CAS# 108-88-3:

Reproductive Effects:, TCLo, Inhalation, Rat, 800.0 MG/M3, 6 H, female 14-20 day(s) after conception.

Result:

Effects on Embryo or Fetus: Fetotoxicity (except death, e.g., stunted fetus).

Effects on Newborn: Behavioral.

- Brazilian Journal of Medical and Biological Research., Vol/p/yr: 23,533, 1990

Standard Draize Test, Eyes, Species: Rabbit, 2.000 MG, 24 H, Severe.

Result:

Effects on Embryo or Fetus: Other effects to embryo.

Specific Developmental Abnormalities: Eye, ear.

- Prehled Prumyslove Toxikologie, Marhold, J., Organicke Latky, Prague Czechoslovakia, Vol/p/yr: -,29, 1986

CAS# 75-09-2:

Tumorigenic Effects:, TCLo, Inhalation, Rat, 3500. PPM, 6 Y.

Result:

Tumorigenic: Carcinogenic by RTECS criteria.

Endocrine: Tumors.

- Fundamental and Applied Toxicology., Academic Press, Inc., 1 E. First St., Duluth, MN 55802, Vol/p/yr: 4,30, 1984

Standard Draize Test, Eyes, Species: Rabbit, 100.0 MG, Severe.

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Result:

Effects on Newborn: Growth statistics (e.g., reduced weight gain).

Effects on Newborn: Physical.

- Union Carbide Data Sheet, Union Carbide Corp., 39 Old Ridgebury Rd., Danbury, CT 06817, Vol/p/yr: 4/25, 1958

Standard Draize Test, Skin, Species: Rabbit, 810.0 MG, 24 H, Severe.

Result:

Specific Developmental Abnormalities: Musculoskeletal system.

- European Journal of Toxicology and Environmental Hygiene., For publisher information, see TOERD9, Paris France, Vol/p/yr: 9,171, 1976

CAS# 67-64-1:

Standard Draize Test, Eyes, Species: Rabbit, 20.00 MG, Severe.

Result:

Behavioral: Change in motor activity (specific assay).

Behavioral: Alteration of classical conditioning.

- American Journal of Ophthalmology., Ophthalmic Pub. Co., 435 N. Michigan Ave., Suite 1415, Chicago, IL 60611, Vol/p/yr: 29,1363, 1946

Chronic Toxicological Effects:

See above.

Carcinogenicity/Other Information:

See related chart for NTP, IARC, ACGIH, and OSHA Carcinogenicity information for each ingredient.

CAS #	Hazardous Components (Chemical Name)	NTP	IARC	ACGIH	OSHA
108-88-3	Toluene {Benzene, Methyl-, Toluol}	n.a.	3	A4	n.a.
75-09-2	Dichloromethane {Methylene chloride; R-30; Freon 30}	Possible	2B	A3	Yes
67-64-1	Acetone {2-Propanone}	n.a.	n.a.	A4	n.a.
67-56-1	Methanol {Methyl alcohol; Carbinol; Wood alcohol}	n.a.	n.a.	n.a.	n.a.

12. ECOLOGICAL INFORMATION

General Ecological Information:

No information available for this product as a whole.

13. DISPOSAL CONSIDERATIONS

Waste Disposal Method:

Dispose in accordance with local, state, and federal regulations.

Waste Disposal Method:

D001

14. TRANSPORT INFORMATION

LAND TRANSPORT (US DOT):**DOT Proper Shipping Name:** Paint Related Material**DOT Hazard Class:** 3 FLAMMABLE LIQUID**UN/NA Number:** UN1263**Packing Group:** II

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15. REGULATORY INFORMATION

EPA SARA (Superfund Amendments and Reauthorization Act of 1986) Lists

CAS #	Hazardous Components (Chemical Name)	S. 302 (EHS)	S. 304 RQ	S. 313 (TRI)
108-88-3	Toluene {Benzene, Methyl-; Toluol}	No	Yes 1000 LB	Yes
75-09-2	Dichloromethane {Methylene chloride; R-30; Freon 30}	No	Yes 1000 LB	Yes
67-64-1	Acetone {2-Propanone}	No	Yes 5000 LB	No
67-56-1	Methanol {Methyl alcohol; Carbinol; Wood alcohol}	No	Yes 5000 LB	Yes

CAS #	Hazardous Components (Chemical Name)	Other US EPA or State Lists
108-88-3	Toluene {Benzene, Methyl-; Toluol}	CAA HAP,ODC: HAP: VHAP CWA NPDES TSCA: Inventory, 8A CAIR CA PROP.65: Yes: RDTox(F)
75-09-2	Dichloromethane {Methylene chloride; R-30; Freon 30}	CAA HAP,ODC: HAP: VHAP CWA NPDES TSCA: Inventory, 8A CAIR CA PROP.65: Yes: Canc.
67-64-1	Acetone {2-Propanone}	TSCA: Inventory
67-56-1	Methanol {Methyl alcohol; Carbinol; Wood alcohol}	CAA HAP,ODC: HAP: VHAP TSCA: Inventory CA PROP.65: Yes: RDTox.

Regulatory Information: This product is regulated by the United States Consumer Product Safety Commission and is subject to certain labeling requirements under the Federal Hazardous Substances Act. These requirements differ from the classification criteria and hazard information required for safety data sheets (SDS). The product label also includes other important information, including directions for use, and should always be read in its entirety prior to using the product.

Additional Regulatory Information This chemical/product is not and cannot be distributed in commerce (as defined in TSCA section 3(5)) or processed (as defined in TSCA section 3(13)) for consumer paint or coating removal.

Regulatory Information Statement: All components of this material are listed on the TSCA Inventory or are exempt.

16. OTHER INFORMATION

Revision Date: 05/01/2019

Additional Information About This Product: No data available.

Company Policy or Disclaimer: The information contained herein is presented in good faith and believed to be accurate as of the effective date shown above. This information is furnished without warranty of any kind. Employers should use this information only as a supplement to other information gathered by them and must make independent determination of suitability and completeness of information from all sources to assure proper use of these materials and the safety and health of employees. Any use of this data and information must be determined by the user to be in accordance with applicable federal, state and local laws and regulations.

KWIK Marine Paint & Varnish Remover

Revision: 05/02/2019

Supersedes Revision: 05/18/2016

1. PRODUCT AND COMPANY IDENTIFICATION

Product Name:	KWIK Marine Paint & Varnish Remover	
Company Name:	W. M. Barr 2105 Channel Avenue Memphis, TN 38113	Phone Number: (901)775-0100
Web site address:	www.wmbarr.com	
Emergency Contact:	3E 24 Hour Emergency Contact	(800)451-8346
Information:	W.M. Barr Customer Service	(800)398-3892
Intended Use:	Removes tough finishes, marine paints, and marine varnishes.	
Product Code:	GMR956	
Additional Information	This chemical/product is not and cannot be distributed in commerce (as defined in TSCA section 3(5)) or processed (as defined in TSCA section 3(13)) for consumer paint or coating removal.	

2. HAZARDS IDENTIFICATION

Acute Toxicity: Oral, Category 4
 Acute Toxicity: Inhalation, Category 4
 Skin Corrosion/Irritation, Category 2
 Serious Eye Damage/Eye Irritation, Category 2A
 Carcinogenicity, Category 1B
 Specific Target Organ Toxicity (single exposure), Category 1



GHS Signal Word: Danger

GHS Hazard Phrases: Harmful if swallowed.
 Causes skin irritation.
 Causes serious eye irritation.
 Harmful if inhaled.
 May cause cancer.
 Causes damage to organs.

GHS Precautionary Phrases: Obtain special instructions before use.
 Do not handle until all safety precautions have been read and understood.
 Do not breathe gas/mist/vapors/spray.
 Wash hands thoroughly after handling.
 Do not eat, drink or smoke when using this product.
 Use only outdoors or in a well-ventilated area.
 Wear protective gloves/protective clothing/eye protection/face protection.

GHS Response Phrases: IF SWALLOWED: Call a POISON CENTER or doctor/physician if you feel unwell.
 IF ON SKIN: Wash with plenty of soap and water.
 IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing.
 IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
 IF exposed: Call a POISON CENTER or doctor/physician.
 IF exposed or concerned: Get medical attention/advice.
 Call a POISON CENTER or doctor/physician if you feel unwell.
 Specific treatment see label.
 Rinse mouth.
 If skin irritation occurs, get medical advice/attention.

KWIK Marine Paint & Varnish Remover

Revision: 05/02/2019

Supersedes Revision: 05/18/2016

GHS Storage and Disposal Phrases:

If eye irritation persists, get medical advice/attention.
 Take off contaminated clothing and wash before re-use.
 Store locked up.
 Dispose of contents/container according to local, state and federal regulations.

OSHA Regulatory Status:

This material is classified as hazardous under OSHA regulations.

Potential Health Effects (Acute and Chronic):

This product has not been tested a mixture to determine potential health effects.
 Exposure effects below represent those of the ingredients listed in Section 3.

INHALATION ACUTE EXPOSURE EFFECTS:

Vapor harmful. May cause upper respiratory tract irritation and central nervous system depression with symptoms such as confusion, lightheadedness, dizziness, drowsiness, nausea, vomiting, headache, and fatigue. Causes formation of carbon monoxide in blood which may affect the cardiovascular system and central nervous system. Continued exposure may cause unconsciousness and even death. Intentional misuse of this product by deliberately concentration and inhaling vapors can be harmful or fatal.

SKIN CONTACT ACUTE EXPOSURE EFFECTS:

This product is a skin irritant. Product may be absorbed through the skin. May cause effects ranging from mild irritation to severe pain, and possibly burns, depending on the intensity of contact. Symptoms may include dryness, redness, burning, cracking of the skin, and skin burns.

EYE CONTACT ACUTE EXPOSURE EFFECTS:

This material is an eye irritant. May cause irritation, watering/tearing, redness, stinging or burning sensation, swelling, and blurred vision. May cause corneal injury. Vapors may irritate the eyes.

INGESTION ACUTE EXPOSURE EFFECTS:

POISON. CANNOT BE MADE NON-POISONOUS. May be fatal or cause blindness. May cause nausea, vomiting, diarrhea, irritation of the mouth and throat, gastrointestinal irritation, holes in esophagus and stomach, delirium, coma, and death. Absorption through the gastrointestinal tract may produce central nervous system depression, characterized by excitement, followed by headache, dizziness, drowsiness, and nausea. Advanced stages may cause collapse, unconsciousness, coma and possible death due to respiratory failure. May cause kidney damage.

CHRONIC EXPOSURE EFFECTS:

Reports have associated repeated and prolonged overexposure to solvents with neurological and other physiological damage.
 May cause liver and kidney damage.
 Methylene chloride may cause cancer based on animal data.
 Methanol has caused birth defects in laboratory animals, but only when inhaled at extremely high vapor concentration. The relevance of this finding to humans is uncertain.

TARGET ORGANS: blood, central nervous system, liver, kidneys, skin, cardiovascular system, heart, eyes, pancreas, lungs, brain

ADDITIONAL DATA: Alcohol may enhance the toxic effects. May cross the placenta. May be excreted in breast milk. Concurrent exposure to carbon monoxide, smoking, or physical activity may increase the level of carboxyhemoglobin in the blood resulting in

KWIK Marine Paint & Varnish Remover

Revision: 05/02/2019

Supersedes Revision: 05/18/2016

additive effects.

Medical Conditions Generally Aggravated By Exposure: Disorders and diseases of the skin, eyes, liver, kidneys, lungs, central nervous system, cardiovascular system and respiratory system; alcoholism; and rhythm disorders of the heart.

3. COMPOSITION/INFORMATION ON INGREDIENTS

CAS #	Hazardous Components (Chemical Name)	Concentration
75-09-2	Dichloromethane {Methylene chloride; R-30; Freon 30}	60.0 -100.0 %
67-56-1	Methanol {Methyl alcohol; Carbinol; Wood alcohol}	5.0 -10.0 %
67-63-0	Isopropyl alcohol {sec-Propyl alcohol; IPA; 2-Propanol}	< 5.0 %
64742-47-8	Hydrotreated light distillate (petroleum, mineral spirits)	< 5.0 %

Additional Chemical Information Specific percentage of composition is being withheld as a trade secret.

4. FIRST AID MEASURES

Emergency and First Aid Procedures:

Skin:

Immediately wash skin thoroughly with large amounts of water and mild soap, if available. Remove contaminated clothing. Seek medical attention if irritation develops or persists.

Eyes:

Immediately begin to flush eyes with water, remove any contact lens. Continue to flush the eyes for at least 15 minutes. Seek medical attention.

Inhalation:

Remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get immediate medical attention.

Ingestion:

If swallowed, do NOT induce vomiting, unless directed by medical personnel. Seek immediate medical attention. Call a poison control center, hospital emergency room, or physician immediately. Never give anything by mouth to an unconscious person.

Signs and Symptoms Of Exposure:

See Potential Health Effects.

Note to Physician:

This product contains methylene chloride and methanol.

This product contains methanol which can cause intoxication and central nervous system depression. Methanol is metabolized to formic acid and formaldehyde. These metabolites can cause metabolic acidosis, visual disturbances and blindness. Since metabolism is required for these toxic symptoms, their onset may be delayed from 6 to 30 hours following ingestion. Ethanol competes for the same metabolic pathway and has been used to prevent methanol metabolism. Ethanol administration is indicated in symptomatic patients or at blood methanol concentrations above 20 ug/dl. Methanol is effectively removed by hemodialysis. Adrenalin should never be given to a person overexposed to methylene chloride.

Methylene Chloride is an aspiration hazard. Risk of aspiration must be weighed against

KWIK Marine Paint & Varnish Remover

Revision: 05/02/2019

Supersedes Revision: 05/18/2016

possible toxicity of the material when determining whether to induce emesis or to perform gastric lavage. This material sensitizes the heart to the effects of sympathomimetic amines. Epinephrine and other sympathomimetic drugs may initiate cardiac arrhythmias in individuals exposed to this material. This material is metabolized to carbon monoxide. Consequently, elevations in carboxyhemoglobin as high as 50% have been reported, and levels may continue to rise for several hours after exposure has ceased. Data in experimental animals suggest there is a narrow margin between concentrations causing anesthesia and death.

5. FIRE FIGHTING MEASURES

Flash Pt:	NE
Explosive Limits:	LEL: No data. UEL: No data.
Autoignition Pt:	No data.
Suitable Extinguishing Media:	Use carbon dioxide, dry powder, or foam.
Unsuitable Extinguishing Media:	None known.
Fire Fighting Instructions:	Self-contained respiratory protection should be provided for fire fighters fighting fires in buildings or confined areas. Storage containers exposed to fire should be kept cool with water spray to prevent pressure build-up. Stay away from heads of containers that have been exposed to intense heat or flame.
Flammable Properties and Hazards:	Contact of liquid or vapor with flame or hot surface will produce toxic gasses and a corrosive residue that will cause deterioration of metal.
	FLASHPOINT: NO FLASH TO BOILING
Hazardous Combustion Products:	carbon monoxide, carbon dioxide

6. ACCIDENTAL RELEASE MEASURES

Steps To Be Taken In Case Material Is Released Or Spilled:	Vapors may cause flash fire or ignite explosively. Clean up: Keep unnecessary people away; isolate hazard area and deny entry. Stay upwind, out of low areas, and ventilate closed spaces before entering. Shut off ignition sources; keep flares, smoking or flames out of hazard area. Use non-sparking tools. Use proper bonding and grounding methods for all equipment and processes. Keep out of sewers, waterways and bodies of water. Be cautious of vapors collecting in small enclosed spaces, sewers, low lying areas, confined spaces, etc. Small spills: Take up with sand, earth or other noncombustible absorbent material and place in a plastic container where applicable. Large spills: Dike far ahead of spill for later disposal. Waste Disposal: Dispose in accordance with applicable local, state and federal regulations.

KWIK Marine Paint & Varnish Remover

Revision: 05/02/2019

Supersedes Revision: 05/18/2016

7. HANDLING AND STORAGE

Precautions To Be Taken in Handling:

Read carefully all cautions and directions on product label before use. Since empty container retains residue, follow all label warnings even after container is empty. Dispose of empty container according to all regulations. Do not reuse this container.

Once opened, remover should be used within six months or disposed of properly to avoid can deterioration.

Precautions To Be Taken in Storing:

Store in a cool dry place. Exposure to high temperatures or prolonged exposure to sun may cause can to leak or swell. Once opened, remover should be used within six months or discarded to avoid can deterioration. Do not store near flames or at elevated temperatures.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

CAS #	Chemical Name	Jurisdiction	Recommended Exposure Limits	Notations
75-09-2	Dichloromethane {Methylene chloride; R-30; Freon 30}	ACGIH TLV	TLV: 50 ppm	
		OSHA PELs	PEL: 25 ppm STEL: 125 ppm (15 min)	
67-56-1	Methanol {Methyl alcohol; Carbinol; Wood alcohol}	ACGIH TLV	TLV: 200 ppm STEL: 250 ppm	
		OSHA PELs	PEL: 200 ppm	
67-63-0	Isopropyl alcohol {sec-Propyl alcohol; IPA; 2-Propanol}	ACGIH TLV	TLV: 200 ppm STEL: 400 ppm	
		OSHA PELs	PEL: 400 ppm	
64742-47-8	Hydrotreated light distillate (petroleum, mineral spirits)	ACGIH TLV	TLV: 200 mg/m3	

Respiratory Equipment (Specify Type):

For OSHA controlled work places and other regular users - Use only with adequate ventilation under engineered air control systems designed to prevent exceeding the appropriate TLV.

For use in areas with inadequate ventilation or fresh air, wear a properly maintained and properly fitted NIOSH approved self-contained breathing apparatus.

A dust mask does not provide protection against vapors.

Eye Protection:

Safety glasses, chemical goggles, or face shields are recommended to safeguard against potential eye contact, irritation, or injury. Chemical goggles or face shields are recommended when splashing or spraying of chemical is possible. A faceshield provides more protection to help reduce chemical contact to the face and eyes.

Protective Gloves:

Wear gloves with as much resistance to the chemical ingredients as possible and for conditions of use. Laminate film gloves offer the best possible protection. Other glove materials will be degraded by methylene chloride, but may provide protection for some amount of time, based on the type of glove and the conditions of use. Consult your glove supplier for additional information. Gloves contaminated with product should be discarded and not reused.

Other Protective Clothing:

Various application methods can dictate use of additional protective safety equipment, such as impermeable aprons, etc., to minimize exposure.

Engineering Controls (Ventilation etc.):

Use process enclosures, local exhaust ventilation, or other engineering controls to control airborne levels below recommended exposure limits.

Use only with adequate ventilation to prevent buildup of vapors. Do not use in areas

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where vapors can accumulate and concentrate, such as basements, bathrooms or small enclosed areas. Whenever possible, use outdoors in an open air area. If using indoors open all windows and doors and maintain a cross ventilation of moving fresh air across the work area. If strong odor is noticed or you experience slight dizziness, headache, nausea or eye-watering -- STOP -- ventilation is inadequate. Leave area immediately and move to fresh air.

Work/Hygienic/Maintenance Practices: Wash hands thoroughly after use and before eating, drinking, or smoking.

Do not eat, drink, or smoke in the work area.

Discard any clothing or other protective equipment that cannot be decontaminated.

Facilities storing or handling this material should be equipped with an emergency eyewash and safety shower.

9. PHYSICAL AND CHEMICAL PROPERTIES

Physical States: [] Gas [X] Liquid [] Solid

Appearance and Odor: Hazy, colorless, viscous liquid.

pH: 7.4 - 8.4

Melting Point: No data.

Boiling Point: 104.00 F

Flash Pt: NE

Evaporation Rate: < 1

Flammability (solid, gas): No data available.

Explosive Limits: LEL: No data. UEL: No data.

Vapor Pressure (vs. Air or mm Hg): 20 MM HG at 20.0 C

Vapor Density (vs. Air = 1): > 1

Specific Gravity (Water = 1): 1.2

Density: 10.1 LB/GL

Solubility in Water: slight

Octanol/Water Partition Coefficient: No data.

Percent Volatile: 98.0 % by weight.

VOC / Volume: 132.0000 G/L

Autoignition Pt: No data.

Decomposition Temperature: No data.

Viscosity: No data.

10. STABILITY AND REACTIVITY

Stability:	Unstable [] Stable [X]
Conditions To Avoid -	No data available.
Instability:	
Incompatibility - Materials To Avoid:	bases, oxygen, sodium, potassium, strong acids, strong oxidizing materials, reactive metals
Hazardous Decomposition or Byproducts:	Thermal decomposition may produce hydrogen chloride; chlorine gas; small quantities of phosgene; carbon monoxide; carbon dioxide; formaldehyde; and unidentified organic compounds in black smoke.
Possibility of Hazardous Reactions:	Will occur [] Will not occur [X]
Conditions To Avoid - Hazardous Reactions:	No data available.

11. TOXICOLOGICAL INFORMATION

Toxicological Information:	This product has not been tested as a whole. Refer to section 2 for acute and chronic health effects. CAS# 75-09-2: Tumorigenic Effects:, TCLo, Inhalation, Rat, 3500. PPM, 6 Y. Result: Tumorigenic: Carcinogenic by RTECS criteria. Endocrine: Tumors. - Fundamental and Applied Toxicology., Academic Press, Inc., 1 E. First St., Duluth, MN 55802, Vol/p/yr: 4,30, 1984 Standard Draize Test, Eyes, Species: Rabbit, 100.0 MG, Severe. Result: Effects on Newborn: Growth statistics (e.g., reduced weight gain). Effects on Newborn: Physical. - Union Carbide Data Sheet, Union Carbide Corp., 39 Old Ridgebury Rd., Danbury, CT 06817, Vol/p/yr: 4/25, 1958 Standard Draize Test, Skin, Species: Rabbit, 810.0 MG, 24 H, Severe. Result: Specific Developmental Abnormalities: Musculoskeletal system. - European Journal of Toxicology and Environmental Hygiene., For publisher information, see TOERD9, Paris France, Vol/p/yr: 9,171, 1976 CAS# 67-63-0: Standard Draize Test, Eyes, Species: Rabbit, 100.0 MG, Severe. Result: Specific Developmental Abnormalities: Musculoskeletal system. Specific Developmental Abnormalities: Other developmental abnormalities. - American Journal of Ophthalmology., Ophthalmic Pub. Co., 435 N. Michigan Ave., Suite 1415, Chicago, IL 60611, Vol/p/yr: 29,1363, 1946
Carcinogenicity/Other Information:	IARC 2B - Possibly Carcinogenic to Humans ACGIH A3 - Confirmed Animal Carcinogen with Unknown Relevance to Humans

KWIK Marine Paint & Varnish Remover

Revision: 05/02/2019

Supersedes Revision: 05/18/2016

CAS #	Hazardous Components (Chemical Name)	NTP	IARC	ACGIH	OSHA
75-09-2	Dichloromethane {Methylene chloride; R-30; Freon 30}	Possible	2B	A3	Yes
67-56-1	Methanol {Methyl alcohol; Carbinol; Wood alcohol}	n.a.	n.a.	n.a.	n.a.
67-63-0	Isopropyl alcohol {sec-Propyl alcohol; IPA; 2-Propanol}	n.a.	3	A4	n.a.
64742-47-8	Hydrotreated light distillate (petroleum, mineral spirits)	n.a.	n.a.	A4	n.a.

12. ECOLOGICAL INFORMATION

General Ecological Information: This product has not been tested as a whole.

13. DISPOSAL CONSIDERATIONS

Waste Disposal Method: Dispose in accordance with applicable local, state, and federal regulations.

14. TRANSPORT INFORMATION

LAND TRANSPORT (US DOT):

DOT Proper Shipping Name: Paint related material

DOT Hazard Class: 8 CORROSIVE

UN/NA Number: UN3066

Packing Group: II



Additional Transport Information:

15. REGULATORY INFORMATION

EPA SARA (Superfund Amendments and Reauthorization Act of 1986) Lists

CAS #	Hazardous Components (Chemical Name)	S. 302 (EHS)	S. 304 RQ	S. 313 (TRI)
75-09-2	Dichloromethane {Methylene chloride; R-30; Freon 30}	No	Yes 1000 LB	Yes
67-56-1	Methanol {Methyl alcohol; Carbinol; Wood alcohol}	No	Yes 5000 LB	Yes
67-63-0	Isopropyl alcohol {sec-Propyl alcohol; IPA; 2-Propanol}	No	No	Yes
64742-47-8	Hydrotreated light distillate (petroleum, mineral spirits)	No	No	No

CAS #	Hazardous Components (Chemical Name)	Other US EPA or State Lists
75-09-2	Dichloromethane {Methylene chloride; R-30; Freon 30}	CAA HAP, ODC: HAP: VHAP CWA NPDES TSCA: Inventory, 8A CAIR CA PROP.65: Yes: Canc.
67-56-1	Methanol {Methyl alcohol; Carbinol; Wood alcohol}	CAA HAP, ODC: HAP: VHAP TSCA: Inventory CA PROP.65: Yes: RDTox.
67-63-0	Isopropyl alcohol {sec-Propyl alcohol; IPA; 2-Propanol}	TSCA: Inventory
64742-47-8	Hydrotreated light distillate (petroleum, mineral spirits)	TSCA: Inventory

SAFETY DATA SHEET

KWIK Marine Paint & Varnish Remover

Page: 9 of 9

Revision: 05/02/2019

Supersedes Revision: 05/18/2016

Regulatory Information:	This product is regulated by the United States Consumer Product Safety Commission and is subject to certain labeling requirements under the Federal Hazardous Substances Act. These requirements differ from the classification criteria and hazard information required for safety data sheets (SDS). The product label also includes other important information, including directions for use, and should always be read in its entirety prior to using the product.
Additional Regulatory Information	This chemical/product is not and cannot be distributed in commerce (as defined in TSCA section 3(5)) or processed (as defined in TSCA section 3(13)) for consumer paint or coating removal.

16. OTHER INFORMATION

Revision Date: 05/02/2019
Preparer Name: W.M. Barr EHS Dept (901)775-0100

Additional Information About This Product: No data available.

Company Policy or Disclaimer: The information contained herein is presented in good faith and believed to be accurate as of the effective date shown above. This information is furnished without warranty of any kind. Employers should use this information only as a supplement to other information gathered by them and must make independent determination of suitability and completeness of information from all sources to assure proper use of these materials and the safety and health of employees. Any use of this data and information must be determined by the user to be in accordance with applicable federal, state and local laws and regulations.

SAFETY DATA SHEET

Master Pro Refinishing Metal Strip

Page: 1 of 8

Revision: 05/02/2019

Supersedes Revision: 04/16/2015

1. PRODUCT AND COMPANY IDENTIFICATION

Product Name: Master Pro Refinishing Metal Strip
Company Name: O'Reilly Auto Parts
Springfield, MO 65802
Emergency Contact: 3E 24 Hour Emergency Contact (800)451-8346
Information: O'Reilly Auto Parts Customer Serv (800)755-6759
Intended Use: Remove a wide range of finishes from the metal surfaces of automobiles, trucks and cycles
Product Code: G7713, G3405
Additional Information This chemical/product is not and cannot be distributed in commerce (as defined in TSCA section 3(5)) or processed (as defined in TSCA section 3(13)) for consumer paint or coating removal.

2. HAZARDS IDENTIFICATION

Acute Toxicity: Oral, Category 4
Acute Toxicity: Inhalation, Category 4
Skin Corrosion/Irritation, Category 2
Serious Eye Damage/Eye Irritation, Category 2A
Carcinogenicity, Category 1B
Specific Target Organ Toxicity (single exposure), Category 1



GHS Signal Word: Danger

GHS Hazard Phrases: Harmful if swallowed.
Causes skin irritation.
Causes serious eye irritation.
Harmful if inhaled.
May cause cancer.
Causes damage to organs.

GHS Precautionary Phrases: Obtain special instructions before use.
Do not handle until all safety precautions have been read and understood.
Do not breathe gas/mist/vapors/spray.
Wash hands thoroughly after handling.
Do not eat, drink or smoke when using this product.
Use only outdoors or in a well-ventilated area.
Wear protective gloves/protective clothing/eye protection/face protection.

GHS Response Phrases: IF SWALLOWED: Call a POISON CENTER or doctor/physician if you feel unwell.
IF ON SKIN: Wash with plenty of soap and water.
IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing.
IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
IF exposed: Call a POISON CENTER or doctor/physician.
IF exposed or concerned: Get medical attention/advice.
Call a POISON CENTER or doctor/physician if you feel unwell.
Specific treatment see label.
Rinse mouth.
If skin irritation occurs, get medical advice/attention.
If eye irritation persists, get medical advice/attention.

SAFETY DATA SHEET

Master Pro Refinishing Metal Strip

Page: 2 of 8

Revision: 05/02/2019

Supersedes Revision: 04/16/2015

GHS Storage and Disposal Phrases:

Take off contaminated clothing and wash before re-use.
Store locked up.
Dispose of contents/container according to local, state and federal regulations.

OSHA Regulatory Status:

This material is classified as hazardous under OSHA regulations.

Potential Health Effects (Acute and Chronic):

Inhalation Acute Exposure Effects:
Vapor harmful. May cause dizziness; headache; watering of eyes; injuries to mucous membranes; irritation of the throat and respiratory tract; nausea; numbness in fingers, arms and legs; bronchospasm; hot flashes; tissue damage; spotted vision; dilation of pupils; increase of carboxyhemoglobin levels, which can cause stress to the cardiovascular system; arm, leg, and chest pains; depression of the central nervous system; bronchitis; pulmonary edema; chemical pneumonitis; difficulty breathing; vomiting; visual disturbances; giddiness; intoxication; sleepiness; cough and dyspnea; cold, clammy, extremities; and diarrhea. Severe overexposure may cause irregular or rapid heartbeat; convulsions; unconsciousness; and death. Elevated carboxyhemoglobin levels can be additive to the increase caused by smoking and other carbon monoxide sources.

Skin Contact Acute Exposure Effects:
This product is a skin irritant. May be absorbed through the skin. May cause irritation; burns; blisters; tissue destruction; drying and defatting of skin; and dermatitis. May cause symptoms listed under inhalation. Vapors and mist can irritate moist skin.

Eye Contact Acute Exposure Effects:
This material is an eye irritant. May cause irritation and pain; conjunctivitis of eyes; corneal ulcerations of the eye; burns; and blindness. Vapors and mist can irritate eyes.

Ingestion Acute Exposure Effects:
Poison. Cannot be made non-poisonous. May be fatal or cause blindness. May cause irritation to mouth, throat and stomach; headache; nausea; dizziness; stupor; liver, kidney and heart damage; depression of the central nervous system; narcosis; burning of esophagus, stomach, mouth and throat; vomiting; gastrointestinal irritation; diarrhea; abdominal pain; collapse; and death. May be corrosive to mouth and throat. May produce symptoms listed under inhalation. Liquid aspirated into lungs may cause chemical pneumonitis and systemic effects.

Chronic Exposure Effects:
Reports have associated repeated and prolonged overexposure to solvents with neurological and other physiological damage. Prolonged or repeated contact may cause dermatitis. Prolonged skin contact may result in absorption of a harmful amount of this material. May cause headache; conjunctivitis; gastric disturbances; skin irritation; permanent central nervous system changes; decreased response to visual and auditory stimulation; visual impairment or blindness; hallucinations; changes in blood; blood disorders; kidney, liver or pancreatic damage; insomnia; giddiness; and death. May cause additional symptoms listed under inhalation.

Medical Conditions Generally Aggravated By Exposure:

Diseases of the blood; skin; eyes; liver; kidneys; lungs; cardiovascular; pulmonary; and respiratory systems; alcoholism; and rhythm disorders of the heart.

SAFETY DATA SHEET

Master Pro Refinishing Metal Strip

Page: 3 of 8

Revision: 05/02/2019

Supersedes Revision: 04/16/2015

3. COMPOSITION/INFORMATION ON INGREDIENTS

CAS #	Hazardous Components (Chemical Name)	Concentration
75-09-2	Dichloromethane {Methylene chloride; R-30; Freon 30}	60.0 -90.0 %
67-56-1	Methanol {Methyl alcohol; Carbinol; Wood alcohol}	<10.0 %
1336-21-6	Ammonium hydroxide {Ammonia aqua; Ammonium liquor}	< 5.0 %
544-60-5	Ammonium oleate	< 5.0 %

Additional Chemical Information

Specific percentage of composition is being withheld as a trade secret.

4. FIRST AID MEASURES

Emergency and First Aid Procedures:

Inhalation:

If user experiences breathing difficulty, move to air free of vapors. Administer oxygen or artificial respiration until medical assistance can be rendered.

Skin Contact:

Wash with soap and large quantities of water and seek medical attention if irritation from contact persists.

Eye Contact:

Flush with large quantities of water for at least 15 minutes and seek immediate medical attention.

Ingestion:

Call your poison control center, hospital emergency room or physician immediately for instructions to induce vomiting.

Signs and Symptoms Of Exposure:

See Potential Health Effects.

Note to Physician:

Poison.

This product contains methylene chloride and methanol.

This product contains methanol which can cause intoxication and central nervous system depression. Methanol is metabolized to formic acid and formaldehyde. These metabolites can cause metabolic acidosis, visual disturbances and blindness. Since metabolism is required for these toxic symptoms, their onset may be delayed from 6 to 30 hours following ingestion. Ethanol competes for the same metabolic pathway and has been used to prevent methanol metabolism. Ethanol administration is indicated in symptomatic patients or at blood methanol concentrations above 20 ug/dl. Methanol is effectively removed by hemodialysis. Adrenalin should never be given to a person overexposed to methylene chloride.

This material sensitizes the heart to the effects of sympathomimetic amines. Epinephrine and other sympathomimetic drugs may initiate cardiac arrhythmias in individuals exposed to this material. This material is metabolized to carbon monoxide. Consequently, elevations in carboxyhemoglobin as high as 50% have been reported, and levels may continue to rise for several hours after exposure has ceased. Data in experimental animals suggest there is a narrow margin between concentrations causing anesthesia and death.

SAFETY DATA SHEET

Master Pro Refinishing Metal Strip

Page: 4 of 8

Revision: 05/02/2019
Supersedes Revision: 04/16/2015

5. FIRE FIGHTING MEASURES

Flash Pt:	N.A.
Explosive Limits:	LEL: No data. UEL: No data.
Autoignition Pt:	No data.
Suitable Extinguishing Media:	Use carbon dioxide, dry powder or foam.
Fire Fighting Instructions:	Self-contained respiratory protection should be provided for fire fighters fighting fires in buildings or confined areas. Storage containers exposed to fire should be kept cool with water spray to prevent pressure build-up. Stay away from heads of containers that have been exposed to intense heat or flame. Contact of liquid or vapor with flame or hot surfaces will produce toxic gases and a corrosive residue that will cause deterioration of metal.
Flammable Properties and Hazards:	Flashpoint: No flash to boiling.
Hazardous Combustion Products:	Carbon monoxide and carbon dioxide, hydrogen chloride, and trace amounts of phosgene, chlorine.

6. ACCIDENTAL RELEASE MEASURES

Steps To Be Taken In Case Material Is Released Or Spilled:	Clean-up: Keep unnecessary people away; isolate hazard area and deny entry. Stay upwind, out of low areas, and ventilate closed spaces before entering. Shut off ignition sources; keep flares, smoking or flames out of hazard area. Small Spills: Take up liquid with sand, earth or other noncombustible absorbent material and place in a plastic container where applicable. Large Spills: Dike far ahead of spill for later disposal. Waste Disposal: Dispose in accordance with applicable local, state and federal regulations.

7. HANDLING AND STORAGE

Precautions To Be Taken in Handling:	Read carefully all cautions and directions on product label before use. Since empty container retains residue, follow all label warnings even after container is empty. Dispose of empty container according to all regulations. Do not reuse this container. Open can slowly to relieve pressure. Use only with adequate ventilation to prevent build up of vapors. Do not use in areas where vapors can accumulate and concentrate such as basements, bathrooms, and small, enclosed areas. Whenever possible use outdoors in an open air area. If using indoors open all windows and doors and maintain a cross ventilation of moving fresh air across the work area. If strong odor is noticed or you experience slight dizziness ---STOP--- ventilation is inadequate. Leave area immediately. If the work area is not well ventilated, then do not use this product.
Precautions To Be Taken in Storing:	Store in a cool, dry place. Exposure to high temperatures or prolonged exposure to sun may cause can to leak or swell. Once opened, remover should be used within six months or discarded to avoid can deterioration. Do not store near flames or at elevated temperatures.

SAFETY DATA SHEET

Master Pro Refinishing Metal Strip

Page: 5 of 8

Revision: 05/02/2019

Supersedes Revision: 04/16/2015

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

CAS #	Chemical Name	Jurisdiction	Recommended Exposure Limits	Notations
75-09-2	Dichloromethane {Methylene chloride; R-30; Freon 30}	ACGIH TLV	TLV: 50 ppm	
		OSHA PELs	PEL: 25 ppm STEL: 125 ppm (15 min)	
67-56-1	Methanol {Methyl alcohol; Carbinol; Wood alcohol}	ACGIH TLV	TLV: 200 ppm STEL: 250 ppm	
		OSHA PELs	PEL: 200 ppm	
Respiratory Equipment (Specify Type):		For OSHA controlled work place and other regular users. Use only with adequate ventilation under engineered air control systems designed to prevent exceeding appropriate TLV. For occasional use, where engineered air control is not feasible, use properly maintained and properly fitted NIOSH approved self-contained breathing apparatus for chlorinated solvent vapors. A dust mask does not provide protection against vapors.		
Eye Protection:		Safety glasses, chemical goggles, or face shields are recommended to safeguard against potential eye contact, irritation, or injury. Chemical goggles or face shields are recommended when splashing or spraying of chemical is possible. A faceshield provides more protection to help reduce chemical contact to the face and eyes.		
Protective Gloves:		Wear gloves with as much resistance to the chemical ingredients as possible. Laminate film gloves offer the best protection. Other glove materials, such as nitrile rubber, neoprene, and PVC will be degraded by methylene chloride, but may provide protection for some amount of time, based on the type of glove and the conditions of use. Consult your glove supplier for additional information. Gloves contaminated with product should be discarded and not reused.		
Other Protective Clothing:		Various application methods can dictate use of additional protective safety equipment, such as impermeable aprons, etc., to minimize exposure. Before reuse, thoroughly clean any clothing or protective equipment that has been contaminated by prior use. Discard any clothing or other protective equipment that cannot be decontaminated, such as gloves or shoes.		
Engineering Controls (Ventilation etc.):		Use only with adequate ventilation to prevent build up of vapors. Open all windows and doors. Use only with a cross ventilation of moving fresh air across the work area. If strong odor is noticed or you experience slight dizziness, headache, nausea, or eye-watering, STOP ventilation is inadequate. Leave area immediately.		
Work/Hygienic/Maintenance Practices:		Wash hands thoroughly after use and before eating, drinking, smoking, or using the restroom.		
		Do not eat, drink, or smoke in the work area.		
		Facilities storing or handling this material should be equipped with an emergency eyewash and safety shower.		

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9. PHYSICAL AND CHEMICAL PROPERTIES

Physical States: [] Gas [X] Liquid [] Solid

Appearance and Odor: Colorless, turbid

pH: 10.9 - 11.9

Melting Point: No data.

Boiling Point: No data.

Flash Pt: N.A.

Evaporation Rate: No data.

Flammability (solid, gas): No data available.

Explosive Limits: LEL: No data. UEL: No data.

Vapor Pressure (vs. Air or mm Hg): 364 MM HG at 68.0 F

Vapor Density (vs. Air = 1): No data.

Specific Gravity (Water = 1): No data.

Density: 9 - 10 WASH HA

Solubility in Water: No data.

Octanol/Water Partition Coefficient: No data.

Percent Volatile: < 10.0 %

VOC / Volume: 71.0000 G/L

Autoignition Pt: No data.

Decomposition Temperature: No data.

Viscosity: 1500 - 3000 CPS

10. STABILITY AND REACTIVITY

Stability: Unstable [] Stable [X]

Conditions To Avoid - Instability: No data available.

Incompatibility - Materials To Avoid: Incompatible with strong oxidizing agents; strong caustics; strong alkalis; oxygen; nitrogen peroxide; chemically active metals such as aluminum and magnesium; sodium; potassium; and nitric acid.

Hazardous Decomposition or Byproducts: Thermal decomposition may produce hydrogen chloride; chlorine gas; small quantities of phosgene; carbon monoxide; carbon dioxide; formaldehyde; and unidentified organic compounds in black smoke.

Possibility of Hazardous Reactions: Will occur [] Will not occur [X]

Conditions To Avoid - Hazardous Reactions: Will not occur.

SAFETY DATA SHEET

Master Pro Refinishing Metal Strip

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Revision: 05/02/2019
Supersedes Revision: 04/16/2015

11. TOXICOLOGICAL INFORMATION

Toxicological Information: This product has not been tested as a whole. Refer to section 2 for acute and chronic effects.
CAS# 75-09-2:
Tumorigenic Effects:, TCLo, Inhalation, Rat, 3500. PPM, 6 Y.
Result:
Tumorigenic: Carcinogenic by RTECS criteria.
Endocrine: Tumors.
- Fundamental and Applied Toxicology., Academic Press, Inc., 1 E. First St., Duluth, MN 55802, Vol/p/yr: 4,30, 1984

Standard Draize Test, Eyes, Species: Rabbit, 100.0 MG, Severe.
Result:
Effects on Newborn: Growth statistics (e.g., reduced weight gain).
Effects on Newborn: Physical.
- Union Carbide Data Sheet, Union Carbide Corp., 39 Old Ridgebury Rd., Danbury, CT 06817, Vol/p/yr: 4/25, 1958

Standard Draize Test, Skin, Species: Rabbit, 810.0 MG, 24 H, Severe.
Result:
Specific Developmental Abnormalities: Musculoskeletal system.
- European Journal of Toxicology and Environmental Hygiene., For publisher information, see TOERD9, Paris France, Vol/p/yr: 9,171, 1976

Carcinogenicity/Other Information: IARC 2B - Possibly Carcinogenic to Humans
ACGIH A3 - Confirmed Animal Carcinogen with Unknown Relevance to Humans

Carcinogenicity: NTP? Unknown IARC Monographs? Unknown OSHA Regulated? Unknown

12. ECOLOGICAL INFORMATION

General Ecological Information: No information available for this product as a whole.

13. DISPOSAL CONSIDERATIONS

Waste Disposal Method: Dispose in accordance with applicable local, state, and federal regulations.

14. TRANSPORT INFORMATION

LAND TRANSPORT (US DOT):

DOT Proper Shipping Name: Paint related material

DOT Hazard Class: 8 CORROSIVE

UN/NA Number: UN3066

Packing Group: II



SAFETY DATA SHEET

Master Pro Refinishing Metal Strip

Page: 8 of 8

Revision: 05/02/2019

Supersedes Revision: 04/16/2015

15. REGULATORY INFORMATION

EPA SARA (Superfund Amendments and Reauthorization Act of 1986) Lists

CAS #	Hazardous Components (Chemical Name)	S. 302 (EHS)	S. 304 RQ	S. 313 (TRI)
75-09-2	Dichloromethane {Methylene chloride; R-30; Freon 30}	No	Yes 1000 LB	Yes
67-56-1	Methanol {Methyl alcohol; Carbinol; Wood alcohol}	No	Yes 5000 LB	Yes
1336-21-6	Ammonium hydroxide {Ammonia aqua; Ammonium liquor}	No	Yes 1000 LB	No
544-60-5	Ammonium oleate	No	No	No

Regulatory Information: This product is regulated by the United States Consumer Product Safety Commission and is subject to certain labeling requirements under the Federal Hazardous Substances Act. These requirements differ from the classification criteria and hazard information required for safety data sheets (SDS). The product label also includes other important information, including directions for use, and should always be read in its entirety prior to using the product.

Additional Regulatory Information This chemical/product is not and cannot be distributed in commerce (as defined in TSCA section 3(5)) or processed (as defined in TSCA section 3(13)) for consumer paint or coating removal.

16. OTHER INFORMATION

Revision Date: 05/02/2019

Preparer Name: EHS Department

Additional Information About This Product: The information contained herein is presented in good faith and believed to be accurate as of the effective date shown. This information is furnished without warranty of any kind. Employers should use this information only as a supplement to other information gathered by them and must make an independent determination of suitability and completeness of information from all sources to assure proper use of these materials and the safety and health of employees. Any use of this data and information must be determined by the user to be in accordance with applicable federal, state and local laws and regulations.

Company Policy or Disclaimer:

SAFETY DATA SHEET

Premium Stripper

Page: 1 of 9

Revision: 05/01/2019

Supersedes Revision: 06/12/2015

1. PRODUCT AND COMPANY IDENTIFICATION

Product Name: Premium Stripper
Company Name: W. M. Barr
2105 Channel Avenue
Memphis, TN 38113
Phone Number: (901)775-0100
Web site address: www.wmbarr.com
Emergency Contact: 3E 24 Hour Emergency Contact (800)451-8346
Information: W.M. Barr Customer Service (800)398-3892
Intended Use: Paint/Varnish Remover
Product Code: ESR72, ESR72L
Additional Information: This chemical/product is not and cannot be distributed in commerce (as defined in TSCA section 3(5)) or processed (as defined in TSCA section 3(13)) for consumer paint or coating removal.

2. HAZARDS IDENTIFICATION

Gas Under Pressure, Liquefied gas
Acute Toxicity: Inhalation, Category 4
Skin Corrosion/Irritation, Category 2
Serious Eye Damage/Eye Irritation, Category 1
Carcinogenicity, Category 1B
Specific Target Organ Toxicity (single exposure), Category 1
Simple Asphyxiant



GHS Signal Word: Danger

GHS Hazard Phrases: Containers gas under pressure; may explode if heated.
Causes skin irritation.
Causes serious eye damage.
Harmful if inhaled.
May cause cancer.
Causes damage to organs.

GHS Precautionary Phrases: Obtain special instructions before use.
Do not handle until all safety precautions have been read and understood.
Do not breathe gas/mist/vapors/spray.
Wash hands thoroughly after handling.
Do not eat, drink or smoke when using this product.
Use only outdoors or in a well-ventilated area.
Wear protective gloves/protective clothing/eye protection/face protection.

GHS Response Phrases: IF ON SKIN: Wash with plenty of soap and water.
IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing.
IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
IF exposed: Call a POISON CENTER or doctor/physician.
IF exposed or concerned: Get medical attention/advice.
Immediately call a POISON CENTER or doctor/physician.
Specific treatment see label.
If skin irritation occurs, get medical advice/attention.
Take off contaminated clothing and wash before re-use.

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Premium Stripper

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Supersedes Revision: 06/12/2015

GHS Storage and Disposal Phrases:	Store locked up. Protect from sunlight and store in well-ventilated place. Dispose of contents/container according to local, state and federal regulations.
OSHA Regulatory Status:	This material is classified as hazardous under OSHA regulations.
Potential Health Effects (Acute and Chronic):	INHALATION ACUTE EXPOSURE EFFECTS: Vapor harmful. May cause dizziness; headache; burns and severe irritation to the respiratory tract; injuries to mucous membranes; watering of the eyes; weakness; drowsiness; nausea; numbness in fingers, arms, and legs; hot flashes; depression of the central nervous system; spotted vision; fatigue; dilation of pupils; increase in carboxyhemoglobin levels, which can cause stress to the cardiovascular system; arm, leg and chest pains; eye irritation; giddiness and intoxication; narcosis; anesthesia; confusion; olfactory changes; vomiting; visual disturbances; sleepiness; cough and dyspnea; cold, clammy extremities; diarrhea; irregular or rapid heartbeat; liver and kidney damage; unconsciousness; coma; and death. Severe overexposure may cause irregular or rapid heartbeat, convulsions, unconsciousness, and death. Intentional misuse of this product by deliberately concentrating and inhaling the vapors can be harmful or fatal. Elevated carboxyhemoglobin levels can be additive to the increase caused by smoking and other carbon monoxide sources. The propellant used in this product is a simple asphyxiant. SKIN CONTACT ACUTE EXPOSURE EFFECTS: This product is a skin irritant. Product may be absorbed through the skin. Harmful if absorbed through the skin. May cause itching; irritation; redness; defatting of the skin; drying of the skin; inflammation; discomfort or pain; swelling; dermatitis; and tissue damage. May cause symptoms listed under inhalation and ingestion. May increase the severity of symptoms listed under inhalation. EYE CONTACT ACUTE EXPOSURE EFFECTS: This material is an eye irritant. May cause irritation, burns, temporary corneal injury, redness, tearing, blurred vision, conjunctivitis of eyes, and corneal ulcerations of the eye. Vapors may irritate the eyes. INGESTION ACUTE EXPOSURE EFFECTS: Harmful if swallowed. May cause nausea; irritation to mouth, throat and stomach; loss of coordination; stupor; drowsiness; vomiting; depression of the central nervous system; narcosis; diarrhea; liver, kidney and heart damage; unconsciousness; and death. May produce symptoms listed under inhalation. Liquid aspirated into lungs may cause chemical pneumonitis and systemic effects. CHRONIC EXPOSURE EFFECTS: Reports have associated repeated and prolonged overexposure to solvents with neurological and other physiological damage. Prolonged skin contact may cause irritation, redness, swelling and possible tissue destruction. Prolonged or repeated contact may cause dermatitis. Prolonged skin contact may result in absorption of a harmful amount of this material. May cause headaches; conjunctivitis; skin irritation; pancreatic damage; permanent central nervous system changes; gastric disturbances; giddiness; insomnia; decreased response to visual and auditory stimulation; visual impairment or blindness; hallucinations; changes in blood; blood disorders; kidney damage; eye irritation; brain damage; hallucinations; liver damage, and death. May cause additional symptoms listed under inhalation.
Medical Conditions Generally Aggravated By Exposure:	Diseases of the blood, skin, eyes, liver, kidneys, lungs, cardiovascular system and respiratory system; alcoholism and rhythm disorders of the heart.

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Premium Stripper

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Supersedes Revision: 06/12/2015

3. COMPOSITION/INFORMATION ON INGREDIENTS

CAS #	Hazardous Components (Chemical Name)	Concentration
75-09-2	Dichloromethane {Methylene chloride; R-30; Freon 30}	70.0 -95.0 %
67-56-1	Methanol {Methyl alcohol; Carbinol; Wood alcohol}	< 5.0 %
127087-87-0	Poly(oxy-1,2-ethanediyl),.alpha.-(4-nonylphenyl)-.omega.-hydroxy-,branched	< 5.0 %
124-38-9	Carbon dioxide	< 5.0 %

Additional Chemical Information

Specific percentage of composition is being withheld as a trade secret.

4. FIRST AID MEASURES

Emergency and First Aid Procedures:

INHALATION:

If user experiences breathing difficulty, move to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical attention.

SKIN CONTACT:

Wash with soap and water. Get medical attention if irritation from contact persists.

EYE CONTACT:

Immediately flush eyes with water, remove any contact lens, continue flushing with water for at least 15 minutes. Get medical attention.

INGESTION:

Call your poison control center, hospital emergency room, or physician immediately for instructions.

Signs and Symptoms Of Exposure:

See Potential Health Effects.

Note to Physician:

This product contains methylene chloride and methanol.

This product contains methanol which can cause intoxication and central nervous system depression. Methanol is metabolized to formic acid and formaldehyde. These metabolites can cause metabolic acidosis, visual disturbances and blindness. Since metabolism is required for these toxic symptoms, their onset may be delayed from 6 to 30 hours following ingestion. Ethanol competes for the same metabolic pathway and has been used to prevent methanol metabolism. Ethanol administration is indicated in symptomatic patients or at blood methanol concentrations above 20 ug/dl. Methanol is effectively removed by hemodialysis. Adrenalin should never be given to a person overexposed to methylene chloride.

This material sensitizes the heart to the effects of sympathomimetic amines. Epinephrine and other sympathomimetic drugs may initiate cardiac arrhythmias in individuals exposed to this material. This material is metabolized to carbon monoxide. Consequently, elevations in carboxyhemoglobin as high as 50% have been reported, and levels may continue to rise for several hours after exposure has ceased. Data in experimental animals suggest there is a narrow margin between concentrations causing anesthesia and death.

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Premium Stripper

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5. FIRE FIGHTING MEASURES

Flash Pt:	No data.
Explosive Limits:	LEL: No data. UEL: No data.
Autoignition Pt:	No data.
Suitable Extinguishing Media:	Use carbon dioxide, dry powder, or foam.
Fire Fighting Instructions:	Self-contained respiratory protection should be provided for fire fighters fighting fires in buildings or confined areas. Storage containers exposed to fire should be kept cool with water spray to prevent pressure build-up. Stay away from heads of containers that have been exposed to intense heat or flame.
Flammable Properties and Hazards:	Aerosol Flammability Classification according to ASTM D-3065-77 and FHSA 1500.45. CPSC FLAMMABILITY: Non-Flammable Aerosol - Level 1 Propellant: Carbon Dioxide Contents under pressure. Do not puncture, incinerate or store above 120 degrees F. Exposure to heat or prolonged exposure to sun may cause bursting. Contact of liquid or vapor with flame or hot surfaces will produce toxic gases and a corrosive residue that will cause deterioration of metal. Flashpoint of liquid only: No flash to boiling ~104 F
Hazardous Combustion Products:	Combustion may produce carbon monoxide and carbon dioxide.

6. ACCIDENTAL RELEASE MEASURES

Steps To Be Taken In Case Material Is Released Or Spilled:	Keep unnecessary people away; isolate hazard area and deny entry. Stay upwind, out of low areas, and ventilate closed spaces before entering. Shut off ignition sources; keep flares, smoking or flames out of hazard area. Small Spills: take up liquid with sand, earth or other noncombustible absorbent material and place in a plastic container where applicable. Large Spills: dike far ahead of spill for later disposal.

7. HANDLING AND STORAGE

Precautions To Be Taken in Handling:	Read carefully all cautions and directions on product label before use. Since empty container retains residue, follow all label warnings even after container is empty. Dispose of empty container according to all regulations. Do not reuse this container.
Precautions To Be Taken in Storing:	Store in a cool place and protect from sunlight. Exposure to high temperatures or prolonged exposure to sun may cause can to leak or swell. Do not store near flames or at elevated temperatures. Replace overcap on container after each use.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

SAFETY DATA SHEET

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CAS #	Chemical Name	Jurisdiction	Recommended Exposure Limits	Notations
75-09-2	Dichloromethane {Methylene chloride; R-30; Freon 30}	ACGIH TLV OSHA PELs	TLV: 50 ppm PEL: 25 ppm STEL: 125 ppm (15 min)	
67-56-1	Methanol {Methyl alcohol; Carbinol; Wood alcohol}	ACGIH TLV OSHA PELs	TLV: 200 ppm STEL: 250 ppm PEL: 200 ppm	
124-38-9	Carbon dioxide	ACGIH TLV OSHA PELs	TLV: 5000 ppm STEL: 30,000 ppm PEL: 5000 ppm	
Respiratory Equipment (Specify Type):		For occasional consumer use - Use with adequate ventilation to prevent a build-up of vapors in confined areas. Open windows or position fans to provide cross ventilation. If a mild to strong odor is noticeable, ventilation is not adequate. For OSHA controlled workplace and other regular users - Use only with adequate ventilation under engineered air control systems designed to prevent exceeding appropriate TLVs. For occasional use, where engineered air control is not feasible, use properly maintained and properly fitted NIOSH approved self-contained breathing apparatus for chlorinated solvent vapors. A dust mask does not provide protection against vapors.		
Eye Protection:		Safety glasses, chemical goggles, or face shields are recommended to safeguard against potential eye contact, irritation, or injury.		
Protective Gloves:		Wear impermeable gloves. Gloves contaminated with product should be discarded.		
Other Protective Clothing:		Various application methods can dictate use of additional protective safety equipment, such as impermeable aprons, etc., to minimize exposure.		
Engineering Controls (Ventilation etc.):		Use only with adequate ventilation to prevent buildup of vapors. Do not use in areas where vapors can accumulate and concentrate, such as basements, bathrooms or small enclosed areas. Whenever possible, use outdoors in an open air area. If using indoors open all windows and doors and maintain a cross ventilation of moving fresh air across the work area. If strong odor is noticed or you experience slight dizziness, headache, nausea or eye-watering -- STOP -- ventilation is inadequate. Leave area immediately and move to fresh air.		
Work/Hygienic/Maintenance Practices:		A source of clean water should be available in the work area for flushing of the eyes and skin. Wash hands thoroughly after use. Do not eat, drink, or smoke in the work area. Before reuse, thoroughly clean any clothing or protective equipment that has been contaminated by prior use. Discard any clothing or other protective equipment that cannot be decontaminated, such as gloves or shoes.		

SAFETY DATA SHEET

Premium Stripper

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Supersedes Revision: 06/12/2015

9. PHYSICAL AND CHEMICAL PROPERTIES

Physical States:	[X] Gas [X] Liquid [] Solid	
Appearance and Odor:	Free and Clear, Water White	
pH:	Neutral	
Melting Point:	No data.	
Boiling Point:	104.00 F - 150.00 F	
Flash Pt:	No data.	
Evaporation Rate:	< 1	
Flammability (solid, gas):	No data available.	
Explosive Limits:	LEL: No data.	UEL: No data.
Vapor Pressure (vs. Air or mm Hg):	No data.	
Vapor Density (vs. Air = 1):	> 1	
Specific Gravity (Water = 1):	1.26	
Density:	10.48 - (of liquid) LB/GL at 75.0 F	
Solubility in Water:	Slight	
Octanol/Water Partition Coefficient:	No data.	
Percent Volatile:	96.1 % by weight.	
Autoignition Pt:	No data.	
Decomposition Temperature:	No data.	
Viscosity:	No data.	

10. STABILITY AND REACTIVITY

Stability:	Unstable [] Stable [X]
Conditions To Avoid - Instability:	No data available.
Incompatibility - Materials To Avoid:	Incompatible with strong oxidizing agents; strong caustics; strong alkalis; oxygen; nitrogen peroxide; chemically active metals such as aluminum and magnesium; sodium; potassium; and nitric acid.
Hazardous Decomposition or Byproducts:	Thermal decomposition may produce carbon monoxide and carbon dioxide, hydrogen chloride, chlorine gas, and small quantities of phosgene.
Possibility of Hazardous Reactions:	Will occur [] Will not occur [X]
Conditions To Avoid - Hazardous Reactions:	No data available.

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Supersedes Revision: 06/12/2015

11. TOXICOLOGICAL INFORMATION

Toxicological Information: This product has not been tested as a whole. Refer to section 2 for acute and chronic effects.

CAS# 75-09-2:
Tumorigenic Effects:, TCLo, Inhalation, Rat, 3500. PPM, 6 Y.
Result:
Tumorigenic: Carcinogenic by RTECS criteria.
Endocrine: Tumors.
- Fundamental and Applied Toxicology., Academic Press, Inc., 1 E. First St., Duluth, MN 55802, Vol/p/yr: 4,30, 1984

Standard Draize Test, Eyes, Species: Rabbit, 100.0 MG, Severe.
Result:
Effects on Newborn: Growth statistics (e.g., reduced weight gain).
Effects on Newborn: Physical.
- Union Carbide Data Sheet, Union Carbide Corp., 39 Old Ridgebury Rd., Danbury, CT 06817, Vol/p/yr: 4/25, 1958

Standard Draize Test, Skin, Species: Rabbit, 810.0 MG, 24 H, Severe.
Result:
Specific Developmental Abnormalities: Musculoskeletal system.
- European Journal of Toxicology and Environmental Hygiene., For publisher information, see TOERD9, Paris France, Vol/p/yr: 9,171, 1976

Carcinogenicity/Other Information: IARC 2B - Possibly Carcinogenic to Humans
ACGIH A3 - Confirmed Animal Carcinogen with Unknown Relevance to Humans

CAS #	Hazardous Components (Chemical Name)	NTP	IARC	ACGIH	OSHA
75-09-2	Dichloromethane {Methylene chloride; R-30; Freon 30}	Possible	2B	A3	Yes
67-56-1	Methanol {Methyl alcohol; Carbinol; Wood alcohol}	n.a.	n.a.	n.a.	n.a.
127087-87-0	Poly(oxy-1,2-ethanediyl),.alpha.-(4-nonylphenyl)-.omega.-hydroxy-,branched	n.a.	n.a.	n.a.	n.a.
124-38-9	Carbon dioxide	n.a.	n.a.	n.a.	n.a.

12. ECOLOGICAL INFORMATION

General Ecological Information: This product has not been tested as a whole.

13. DISPOSAL CONSIDERATIONS

Waste Disposal Method: Dispose in accordance with applicable local, state, and federal regulations.

14. TRANSPORT INFORMATION

LAND TRANSPORT (US DOT):

DOT Proper Shipping Name: Aerosols, non-flammable

DOT Hazard Class: 2.2 NONFLAMMABLE GAS
UN/NA Number: UN1950



SAFETY DATA SHEET

Premium Stripper

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Additional Transport Information: The shipper / supplier may apply one of the following exceptions: Combustible Liquid, Consumer Commodity, Limited Quantity, Viscous Liquid, Does Not Sustain Combustion, or others, as allowed under 49CFR Hazmat Regulations. Please consult 49CFR Subchapter C to ensure that subsequent shipments comply with these exceptions.

15. REGULATORY INFORMATION

EPA SARA (Superfund Amendments and Reauthorization Act of 1986) Lists

CAS #	Hazardous Components (Chemical Name)	S. 302 (EHS)	S. 304 RQ	S. 313 (TRI)
75-09-2	Dichloromethane {Methylene chloride; R-30; Freon 30}	No	Yes 1000 LB	Yes
67-56-1	Methanol {Methyl alcohol; Carbinol; Wood alcohol}	No	Yes 5000 LB	Yes
127087-87-0	Poly(oxy-1,2-ethanediyl),.alpha.-(4-nonylphenyl)-.omega.-hydroxy-,branched	No	No	No
124-38-9	Carbon dioxide	No	No	No

CAS #	Hazardous Components (Chemical Name)	Other US EPA or State Lists
75-09-2	Dichloromethane {Methylene chloride; R-30; Freon 30}	CAA HAP,ODC: HAP: VHAP CWA NPDES TSCA: Inventory, 8A CAIR CA PROP.65: Yes: Canc.
67-56-1	Methanol {Methyl alcohol; Carbinol; Wood alcohol}	CAA HAP,ODC: HAP: VHAP TSCA: Inventory CA PROP.65: Yes: RDTox.
127087-87-0	Poly(oxy-1,2-ethanediyl),.alpha.-(4-nonylphenyl)-.omega.-hydroxy-,branched	TSCA: Inventory, 8A PAIR
124-38-9	Carbon dioxide	TSCA: Inventory

Regulatory Information: This product is regulated by the United States Consumer Product Safety Commission and is subject to certain labeling requirements under the Federal Hazardous Substances Act. These requirements differ from the classification criteria and hazard information required for safety data sheets (SDS). The product label also includes other important information, including directions for use, and should always be read in its entirety prior to using the product.

Additional Regulatory Information This chemical/product is not and cannot be distributed in commerce (as defined in TSCA section 3(5)) or processed (as defined in TSCA section 3(13)) for consumer paint or coating removal.

16. OTHER INFORMATION

Revision Date: 05/01/2019

Preparer Name: W.M. Barr EHS Dept (901)775-0100

Additional Information About This Product: No data available.

Company Policy or Disclaimer: The information contained herein is presented in good faith and believed to be accurate as of the effective date shown above. This information is furnished without warranty of any kind. Employers should use this information only as a supplement to other information gathered by them and must make independent determination of suitability and completeness of information from all sources to assure proper use of these materials and the safety and health of employees. Any use of this data and information must be determined by the user to be in accordance with applicable federal, state and local laws and regulations.

Appendix D

Information on Product Use Expectation

Tried, True, Trustworthy Home Advice

Newsletters

Find a Pro

Bob Vila Academy

HOW-TO CENTER | GET IDEAS | FIND INFO | DISCUSS IT | WATCH TV

Enter to Win a \$2,500
Garage Makeover!

How To's & Quick Tips

Buyer's Guide: Paint Strippers

Easily remove past-its-prime paint with these high-performing paint strippers.

By [Manasa Reddigari](#)

Photo: istockphoto.com

Some paint prep is easier than others. On a piece of furniture with only a few isolated peeling patches, you can simply scrape, sand, and prime before repainting. But if tackling a project that has already had *many* layers of paint—and likely shows widespread chipping, cracking, or blistering—you'll need to remove all the existing finish before pressing on with your project.

You could do this manually with a hand sander and ample elbow grease (not an option with lead-based paint). Or you can use a paint stripper, which will take care of the task at hand in far less time and with far less effort on your part.

Note that using a paint stripper is the only safe do-it-yourself option for [lead-based paint removal](#), because sanding sends toxic lead particles airborne. Paint strippers are also called for to remove paint when restoring antiques or intricately carved items to get into all the crannies.

Before you set out to pick up paint stripper for your project, know that not all are suitable for all types of paint and surfaces, and some have harmful chemical ingredients that require you to take special precautions. Keep reading to learn about paint stripper composition and how to use these products safely—as well as our recommendations for the best paint stripper in each category—to do a clean job on your next project.

Types of Paint Strippers

There are four main types of paint strippers, each with unique properties that make them better suited for removing particular finishes from specific surfaces. Some

strippers are also more effective at removing epoxy and polyurethane, two long-lasting synthetic coatings that are ubiquitous on such surfaces as garage floors.

Solvent

The most versatile paint strippers, these products rely on chemicals to loosen the bond between paint and surface. They effectively strip water- and oil-based paint as well as epoxy and polyurethane from wood, masonry, and metal surfaces without discoloration. While some have methylene chloride, which has a high volatile organic compound (VOC) content, others include a combo of alcohol, toluene, and methanol. High-VOC products generally have smellier fumes and are more of a [health hazard](#) than other strippers. Directly inhaling the fumes of methylene chloride-based strippers can damage the brain or reproductive system, so always wear a respirator (in addition to safety glasses, skin-covering clothing, and gloves made of a chemical resistant material like butyl) when handling them.

Fortunately, solvent strippers need only be applied in a thin layer (usually less than 1/8-inch) and stay on the surface briefly (often less than 15 minutes) before paint can be easily lifted off with a paint scraper. The stripped surface must then be washed with water or [mineral spirits](#) before repainting, but it won't require a neutralizing agent.

Caustic

These strippers with an active ingredient of lye (i.e., sodium hydroxide) partially convert dried paint into soap, causing it to loosen from the surface. Caustic strippers are ineffective on epoxy and polyurethane; they're best for removing oil-based paint on masonry surfaces such as [concrete floors](#) or [brick fireplace surrounds](#). While they can also remove water- and oil-based paint from some metals and wood, caustic strippers can erode the likes of aluminum and blacken such hardwoods as maple (this darkness can be removed with wood bleach).

Advertisement

Caustic strippers must be applied in a 1/8-inch to 1/4-inch layer and require a dwell time of at least 30 minutes before paint can be scraped off. Because caustic strippers are alkaline (high pH), the stripped surface must be neutralized (returned to a pH of 7) by wiping it down with a [water and vinegar solution](#).

Note that while caustic strippers can irritate the eyes, skin, and lungs if touched or inhaled (making a respirator, safety glasses, skin-covering clothing, and chemical-resistant gloves necessary when working with them), they're considered safer and lower in VOCs than solvent strippers.

Biochemical

These safer alternatives to solvent and caustic strippers are usually made with a combination of a plant-based solvent such as terpenes (found in pine trees and citrus fruit rind) and the organic compound N-methyl-2-pyrrolidone (NMP). Though lower in VOCs and fumes, NMP can still irritate the skin and adversely affect the respiratory and reproductive systems, so a respirator, chemical-resistant gloves, and skin-covering clothing should still be worn when handling them.

Biochemical strippers can remove water- or oil-based paint from masonry, metal, and wood, but they're ineffective at removing epoxy and polyurethane coatings and can leave loose wood fibers on the surface of stripped wood. They must be applied in a thick 1/8-inch to 1/4-inch layer and be left on the surface between three and four hours

before paint can be removed with a scraper. While you will wash the stripped surface with water or mineral spirits, there's no need to neutralize.

Zero-VOC

If you're concerned about using the strippers listed above, consider VOC-free paint removers made without methylene chloride, lye, or NMP. These virtually odorless (and pricier) products are made with naturally occurring solvents like benzyl alcohol that help break down the resins of water- and oil-based paint to loosen it from metal, masonry, and, to an extent, wood; they're less effective at removing epoxy and polyurethane. While these are the safest strippers available, direct exposure can still irritate the lungs or redden the skin, so a respirator and safety gloves are still recommended.

Zero-VOC strippers usually require an application of 1/8-inch to 1/4-inch and dwell time of three to 24 hours before paint can be removed. Follow up with a rinse with water or mineral spirits (no neutralization needed).

The Best Paint Strippers According to DIYers—and How to Use Them

Photo: istockphoto.com

Tips for Working with Any Type of Paint Stripper

In addition to the safety gear requirements mentioned above, follow these practices for safe and effective use of any paint stripper.

If stripping old paint in homes built pre-1978, [test with a lead paint test kit](#). If the test is positive, you must choose a paint stripper labeled for use on lead paint (these strippers may fall into any of the four categories of paint strippers above and usually come in a paste or gel form to trap lead particles and keep them from going airborne). Lay a chemical-resistant tarp over the floor and any furniture you can't move out of the room.

Apply paint stripper outdoors whenever possible to maximize ventilation. If any individual parts of furniture can be removed, e.g., cabinet doors, take these parts outdoors to strip. If you must apply paint stripper indoors, place a fan behind you as you work and open a window on two opposite sides of the room for ventilation.

Dip a disposable paintbrush into the stripper to apply in the thickness recommended on the package instructions. Move the brush in short strokes in a single direction (on wood, move in the direction of the grain). If the product came with laminate paper squares for easier paint removal, adhere the squares to the wet stripper immediately after application.

Let the paint stripper stay on the surface for the recommended dwell time on the package instructions.

Use a paint scraper or a [drywall knife](#) whose edge has been slightly dulled with a metal file to lift off the loosened paint (and any laminate paper squares) in a continuous motion and in a single direction (in the direction of the grain if stripping wood). Sweep the paint waste into a re-sealable plastic bag with the scraper.

If any paint remains trapped in the grooves of porous surfaces such as wood or masonry, gently scrub the surface with a plastic mesh scouring brush (or, if outdoors, rinse the surface with a power washer) to remove.

If the paint stripper requires a neutralizing step, use the solution recommended on the package (or a solution of equal parts vinegar and water), then test the pH of the stripped surface with pH paper to ensure it has a pH of 7.

For paint strippers that don't require neutralizing, wash the stripped surface with the cleaner recommended on the packaging (usually plain water or mineral spirits).

Let the surface dry completely; turn on portable fans in the room to speed up drying.

Discard the bag of paint waste at a local hazardous waste disposal site, which you can find by entering your zip code or address in the [Resource Conservation and Recovery Act Information \(RCRAInfo\) search tool](#).

Our Picks for the Best Paint Stripper

Stumped on where to start? Don't delay your paint project any longer—we've done the dirty work and found the best paint strippers available today, one for each type. Figure out which works for you from this list of fan favorites, each reviewed (and praised) by DIYers like yourself.

The 4 Best Paint Strippers According to DIYers—and How to Use Them

Photo: amazon.com

BEST BIOCHEMICAL PAINT STRIPPER: [Citri-Strip Paint and Varnish Stripping Gel](#)

Formulated with citrus terpenes and NMP, [this indoor-outdoor paint and varnish stripper with a citrus scent](#) earns high praise for do-it-yourself. The stripper goes on with a gel-like consistency and works to loosen multiple layers of water- or oil-based paint, varnish, shellac, or epoxy from wood, metal, or masonry in less than half an hour—without corroding the painting surface.

The 4 Best Paint Strippers According to DIYers—and How to Use Them

Photo: amazon.com

BEST ZERO-VOC PAINT STRIPPER: [Smart Strip Advanced Paint Remover](#)

The methylene chloride- and NMP-free formula of [this biodegradable paint stripper](#) imparts no nasty fumes as it removes paint (even lead-based), varnish, and urethane from wood, metal, masonry, and other surfaces indoors and out. Reviewers rate it highly for its convenient application by brush, roller, or sprayer, as well as for its success in stripping new and decades-old paint coats from stone, metal, and other painted surfaces, all with ease.

The 4 Best Paint Strippers According to DIYers—and How to Use Them

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BEST SOLVENT PAINT STRIPPER: [Jasco Premium Paint and Epoxy Remover](#)

A single application of [this powerful methylene chloride-based indoor-outdoor paint stripper](#) is enough to eat away at multiple layers of paint, varnish, lacquer, shellac, epoxy, or urethane from wooden desks, metal patio chairs, masonry fireplaces, and the like. The fast-acting formula brushes on as a gel and requires only 15 minutes of dwell time.

The 4 Best Paint Strippers According to DIYers—and How to Use Them

Photo: amazon.com

BEST CAUSTIC PAINT STRIPPER: [Dumond Peel Away 1 Heavy-Duty Paint Remover](#)

[This paint stripper kit](#) includes everything you need to strip up to 32 layers of water- or oil-based paint (lead-based included) from wood, metal, masonry, and plaster: an

alkaline paste stripper made with sodium hydroxide, a plastic applicator, laminated paper squares for easy removal of paint, and a neutralizing solution and pH test kit to restore the stripped surface to a neutral pH after paint removal. The inflammable, low-odor formula is suitable for indoor and outdoor use on everything from basic doors to intricately carved moldings.

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[Home](#) → [Painting Tools](#) → [Best Paint Stripper For Wood \(October 2019\) – Top 8 Picks & Reviews](#)

Best Paint Stripper For Wood (October 2019) – Top 8 Picks & Reviews

Know How To Choose The Best Paint Stripper For Wood

There will come a time when your wooden furniture needs some repainting jobs, and to do that, you need to remove first the old paint coating. In doing so, you will need to have excellent paint stripper to help you completely remove the old paint without harming the wood surface.

See Also:

- ✓ [Best Paint Scraper: Putty Knife vs Electric Paint Remover](#)
- ✓ [Best Painter Tape \(October 2019\) – Top 10 Picks & Reviews](#)
- ✓ [Must Have Painting Tools - List with Pictures](#)

Today, there are several brands of paint stripper in the market. Even the professionals are having a hard time choosing which one fits the job. The reason for that, there are numerous variables to be considered such as safety of an ingredient, easy to use, price, and surface applications.

In order to ease your task, we have written here a complete guide to help you choose the best paint stripper for 2019. Likewise, we also included a comparison chart and an in-depth product review for our top 8 best paint strippers for wood 2019.



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BEST PAINT STRIPPER FOR WOOD (OCTOBER 2019) – TOP 8 PICKS & REVIEWS

MODEL	PRICE	OVERALL
	Check Price	

MODEL	PRICE	OVERALL
 DUMOND CHEMICALS 3301		
 DUMOND CHEMICALS 1005N	Check Price	★★★★☆
 TRIMACO 10188	Check Price	★★★★☆
 CITRISTRIP QCSG801	Check Price	★★★★☆
 BLUE BEAR 605	Check Price	None
 GRAFFITI SOLUTIONS	Check Price	★★★★★
 D SUPER REMOVER 1001 NG	Check Price	★★★★☆
 STAP 00	Check Price	None

MODEL	PRICE	OVERALL
 CROWN STRP MAX		

Quick Navigation

1. [Dumond Chemicals, Inc. 3301 Smart Strip Advanced Paint Remover](#)
2. [Dumond Chemicals, Inc. 1005N Paint Remover](#)
3. [2 Pack Trimaco 10188 Paint Stripper](#)
4. [Citristrip QCSG801 Paint & Varnish Stripping Gel](#)
5. [Blue Bear 605 Pro Coating Remover](#)
6. [Elephant Snot Graffiti Remover](#)
7. [D Super Remover New Generation Paint Stripper](#)
8. [STRP Max Paint Stripper Liquid](#)

KNOW WHAT TO LOOK FOR THE BEST PAINT STRIPPER

Most people are having a hard time choosing between price and quality. For us, we still stick with quality as long as the price does not greatly differ and the job gets quickly done. Below are some of the important variables you need to consider upon choosing a good paint stripper.

1. Surface Application



Before you buy, recall what surfaces do you intend to use the paint remover. Different surfaces have varying effective means of removing the paint. For instance, large areas like metal sidings, removing the paint by heat application is more efficient compared to scraping it or applying paint removers.

Paint removers are ideal for wood furniture or other projects which requires care in the removal of the old paint coat.

2. Chemical Safety

These products contain chemicals which might be dangerous to one's health. Make sure to check the label if it does not contain any methylene chloride or dichloromethane (DCM) ingredient.

Despite its strength, DCM has short and long-term health consequences. Its short-term effects include dizziness, lightheadedness, and short quick breaths. This happens because DCM inhibits the blood from dissolving oxygen.

Meanwhile, its long-term effects include kidney and lung damage, and worse is cancer. DCM is a potential carcinogen which is why it is strictly prohibited to be used as an ingredient.



3. Categories Of Paint Strippers

Aside from different brands, this product also comes in various form and applications. The three main types of paint removers in the industry are solvent, caustic, and biochemical.

However, due to technological advancement, a few other categories are present in the market. Choose the one which best suits your purpose and gives you more convenience.

- ✓ **Solvent:** *This type removes paint by gradually decreasing the bond between paint molecules which are then dissolved for easier removal. Aside from the harmful DCM solvent, other solvents used are acetone, toluene, ketone, and alcohol.*
- ✓ **Caustic:** *This type is made from sodium hydroxide or lye solution. When applied on top of the old paint surface, it creates a soapy reaction which gradually loosens the grip of the paint towards the surface.
To be effective, it needs to stay on the paint surface for a few hours as its action is gradual. This type is slower compared to solvent paint strippers but they are much safer to the user.*
- ✓ **Biochemical:** *This type works similarly to the solvent ones. The main difference lies in the source of the solvent. Biochemical paint strippers use solvents that are extracted from plants, thus, safer and more environment-friendly.
Examples under this type include citric acid, terpenes, lactic acid, and dimethyl sulfoxide (DMSO) which is derived from soy oil and paper.*

TOP 8 BEST PAINT STRIPPER FOR WOOD REVIEWS 2019

1. Dumond Chemicals, Inc. 3301 Smart Strip Advanced Paint Remover

FEATURES



- ✓ Capacity: 1 gal
- ✓ Removes: any coating from surfaces
- ✓ Area Coverage: ----
- ✓ Material: biodegradable, water-based

[Check Price On Amazon](#)

PROS	CONS
• Biodegradable, water-based	• Slightly messy but works as expected
• Easy to apply	?
• No harmful odor	?

Best For Overall

We choose this paint stripper as our top pick for 2019. It amazingly exceeded our expectations from this product.

First of all, this product is extremely friendly because it is biodegradable, water-based, and no harmful caustic ingredients. It can work almost seamlessly with any types of surfaces starting from wood, metal, stone, concrete, plaster, glass, and plastics.

This paint stripper can take out 5 layers of paint from a window panel molding. Just apply a thick and even layer of this product on top of the paint surface and cover it with plastic. Let it stay for around 24 to 36 hours. It is expected to dry and crack. This makes it much easier to peel off from the surface.

Overall, this remover can cover around 50 square foot of painted area with a 1/8" to 1/4" thickness of application. This is a total saver.

What we don't like about it is expected to apply a thicker amount for paints with several layers.

2. Dumond Chemicals, Inc. 1005N Paint Remover

FEATURES



- ✓ Capacity: 5 gal
- ✓ Removes: any coatings
- ✓ Area Coverage: ---
- ✓ Material: biodegradable

[Check Price On Amazon](#)

PROS	CONS
• Friendly and biodegradable	• Consumes much water if the application is thick
• Easy to rinse off with water	?
• Easy to use and effectively removes paint	?

Best For Heavy-Duty Tasks

In our second spot, still another product from Dumond Chemicals, Inc. but this one is much suitable for heavy-duty paint removal.

The chemicals used for this product are biodegradable, no harmful odor, and safe to use.

This remover can take out lead paints even for a 1800s house. Just apply about 1/8" to 1/4" thickness of this material on top of the paint. It is slightly messy but no worries as it is not harmful to the hands and easy to rinse off with water. After, let it stay for around 36 hours.

As expected, it can remove the paint without scratching the wood surface. It makes the job more convenient to accomplish.

Note: It is slightly messy to use and you need to use a large volume of water if the application is thick.

3. 2 Pack Trimaco 10188 Paint Stripper

FEATURES



- ✓ Capacity: 2packs (100g x 2)
- ✓ Removes: paint
- ✓ Area Coverage: removes up to 1.34gal
- ✓ Material: safe to use

[Check Price On Amazon](#)

PROS	CONS
• Budget-friendly	• Needs to apply more when removing oil-based paints
• Simple to prepare and use	• ?
• Easy to peel off	• ?

Best For Budget

This paint remover hit our third spot because it provides effective paint stripping abilities at such an affordable price.

Each pack has the capacity to remove approximately 2/3 gallons of paint. First, dissolve 1 pack of this remover in water. The water added must be enough to make the whole solution slightly viscous but not that diluted.

After creating the solution, apply a sufficient amount on top of the paint to be removed. Let it stay for like 24 hours. The result is a hardened layer of paint which is very easy to crack and peel off.

Overall, this product works best with water-based or oil-based paints and latex.

4. Citristrip QCSG801 Paint & Varnish Stripping Gel

FEATURES



- ✓ Capacity: 1 quart
- ✓ Removes: dried latex and oil-based paint
- ✓ Area Coverage: ---
- ✓ Material: biodegradable, zero methylene chloride

[Check Price On Amazon](#)

PROS	CONS
• Able to strip multiple layers of paint coats	• Nothing can go wrong with this product
• Pleasant citrus smell	?
• Biodegradable ingredients	?

Best For Pleasant Smell

Hitting the fourth spot on our list is the Citristrip Paint Stripper. Aside from effectively removing multiple layers of latex and oil-based paints, you would love the citrus-like smell it has which makes it suitable for indoor applications.

Another worth admiring from this product is its moisture holding capacity. Most paint strippers require sitting for like 24 to 36 hours on top of the paint. Along the process, you need to make sure that it stays moist to continually act on the paint to be removed. However, for this one, it can hold much moisture needed for sitting 24 hours without any hassle.

Overall, this product has wide versatility, price is competitive, and quality is exemplary.

5. Blue Bear 605 Pro Coating Remover

[Check Price On Amazon](#)**FEATURES**

- ✓ Capacity: 128 oz
- ✓ Removes: enamel, urethane, varnish, lead-based paint,
- ✓ Area Coverage: 125 sqft
- ✓ Material: biodegradable, zero methylene chloride

PROS	CONS
• Versatile remover	• Slightly messy but manageable
• Simple to prepare and use	?
• Works on various surfaces	?

This fifth paint stripper in our list has great versatility as it can remove lead-based paints, varnish, enamel, urethane, and water-based paints. Aside from being effective, you are safe to use it as it does not contain methylene chloride, zero caustic chemicals, and harmful fumes.

You can vary the thickness of application depending on the thickness of the paint to be removed. The average horizontal coverage of this remover is 125 sq foot for every gallon while for vertical application, that is, 75 sq foot for every gallon.

Likewise, you can readily apply this paint remover at various surfaces such as wood, drywall, rubber, plastic, tile, veneer, and terrazzo.

6. Elephant Snot Graffiti Remover

FEATURES

- ✓ Capacity: 1 gal
- ✓ Removes: paints, varnish, enamel
- ✓ Area Coverage: ----
- ✓ Material: biodegradable, no harmful fumes

[Check Price On Amazon](#)

PROS	CONS

PROS	CONS
• Simple to use	• Leaves little spots which can be wiped off with a cloth
• Excellent remover for porous surfaces	?
• Easy to rinse off	?

Best For Porous Surface Removal

When you want to remove paints and other coats from any porous surfaces such as wood or unsealed walls, this sixth product on our list are most suitable.

Its chemical composition has an enhanced penetration ability to seep through pores and gradually dissolve those coats. After applying a sufficient amount of this remover on the surface, let it sit for a few minutes. You can also slowly brush or wipe the painted surface to help hasten the process. After, you can rinse it with water from your garden hose.

Sometimes, it leaves small spots on the surface which needs to be manually wiped off with a cloth

7. D Super Remover New Generation Paint Stripper

[Check Price On Amazon](#)

FEATURES



- ✓ Capacity: 32 oz
- ✓ Removes: polyurethane, lacquers, shellac, latex, oil-based paints, varnish, epoxy
- ✓ Area Coverage: ---
- ✓ Material: biodegradable, zero methylene chloride

PROS	CONS
• Fast acting	• Nothing can go wrong with this paint stripper
• Very straightforward to use	?
• Safe to use on concrete, wood, and metal surfaces	?

Best For Overall

We like this paint remover as it has the best quick action time, a minimum of 15 minutes up to 30 minutes. Unlike other products which need to sit for like 24 to 36 hours, it does work but takes a long time for a reaction to complete.

Similar to other known products, this one is very safe to use for it does not contain methylene chloride and no harmful fumes. So far, it works as expected in effectively removing various coats such as latex, oil-based paints, lacquers, shellac, polyurethane, and epoxies.

We find this product as a complete saver, helping you to renovate your old-looking furniture.

8. STRP Max Paint Stripper Liquid

[Check Price On Amazon](#)

FEATURES

- ✓ Capacity: 64 oz
- ✓ Removes: paint, varnish, enamel, epoxy, polyurethane, lacquer
- ✓ Area Coverage: 25 sq ft for vertical area
- ✓ Material: biodegradable, zero methylene chloride

PROS	CONS
• Quick reaction time	• So far, this product has always lived up for its claim
• Less messy application	?
• Can remove multiple layers	?
• Safe on your concrete, wood, and metal surfaces	?

This product is best known for its fast-acting stripping action. After applying a sufficient amount to cover the entire coat, let it sit for 5 minutes. Once 5 minutes is up, you can slowly peel off the paint from the surface without damaging it.

This paint remover is very safe to use on your wood, concrete, metal, and glass surfaces. The biodegradable and zero harmful fumes making up this remover make it good for indoor applications.

How To Use Paint Stripper - How to apply paint stripper and remove paint from wood.



Shop Related Products



2 Pack Trimaco 10188 Super Tuff
Waste Paint Hardener, Paint Str...

\$8.95

(17)



Dumond Chemicals, Inc. 3301 Smart
Strip Advanced Paint Remover, 1 G...

\$47.19 ~~\$58.95~~

(112)



STRP Max Paint Stripper Liquid, 64 oz

\$33.98

(1)



Blue Bear 605 Pro Coating Remover -
One Gallon (128 oz)

\$69.99

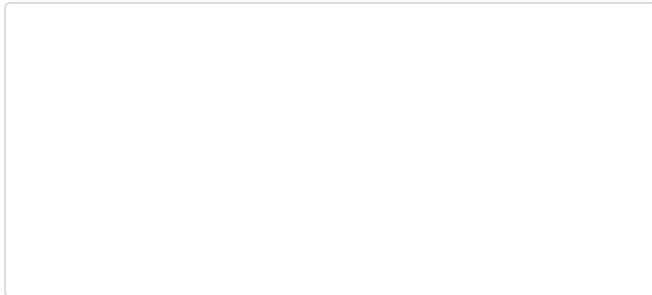
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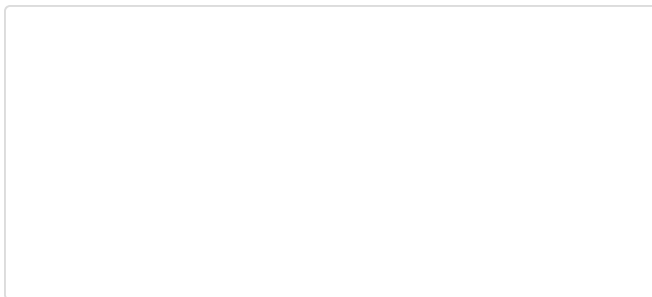
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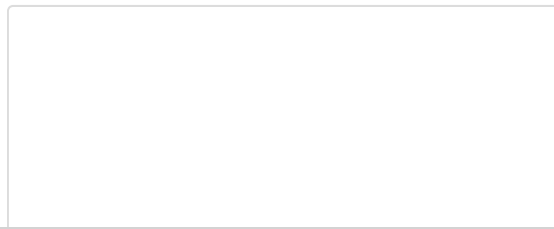
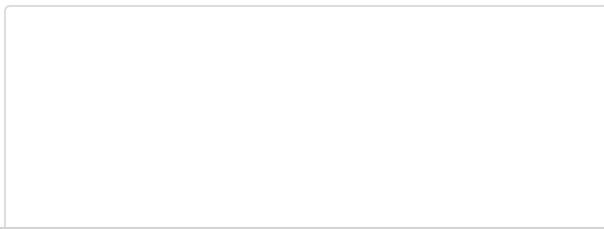
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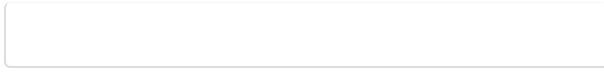
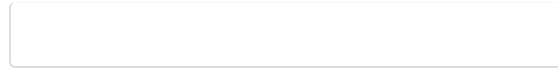


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Appendix E

**Chemical Composition of Data on Paint Removers Produced by
Responsible Entities Participating in This Effort and Other Example
Products**

Table E.1 Chemical Composition of Paint Removers Produced By Responsible Entities Participating in this Effort and Other Example Products

Formulator Name	Product Name on SDS	Contains Methylene Chloride?	%	Other Constituents Listed on SDS	Group 1= ≥60% MeCl 2= ≤45% MeCl 3= No MeCl, ATM 4= No MeCl, DBE 5= No MeCl, benzyl alcohol 6= caustic 7= No MeCl, other 8 = Lowell product
Benco	B4	Yes	70-80	Methanol (5-15%) 2-Butoxyethanol (1-10%) Ethanolamine (1-5%)	1
Benco	B6	Yes	70-85	Methanol (8-15%) Ammonium Hydroxide (2-4%) 2-Butoxyethanol (1-10%) 2-Methoxymethylethoxpropanol (1-10%)	1
Benco	B7	Yes	70-80	Methanol (5-15%) 2-Butoxyethanol (1-10%) Biodegradable Wetting Agent & Wax (1-5%) 2-Methoxymethylethoxpropanol (1-3%)	1
RecoChem	Industrial Zip Strip	Yes	60-100	Methanol (7-13%) Alcohols, C6-12, ethoxylated, liquids (1-5%) Hydrotreated kerosene (1-5%) 1,2-Epoxybutane (0.1-1%) Tetrachloroethylene (0.1-1%) Propylene Oxide (0.1-1%)	1
RecoChem	Paint and Varnish Remover and Stripper POR-15 Strip	Yes	60-100	Methanol (7-13%) Toluene (5-10%) Alcohols, C6-12, ethoxylated, liquids (1-5%)	1
Sansher Corp	Dad's Easy Spray Professional strength	Yes	70-80	Methanol (5-10%) 2-Butoxyethanol (5-10%)	1

Formulator Name	Product Name on SDS	Contains Methylene Chloride?	%	Other Constituents Listed on SDS	Group 1= ≥60% MeCl 2= ≤45% MeCl 3= No MeCl, ATM 4= No MeCl, DBE 5= No MeCl, benzyl alcohol 6= caustic 7= No MeCl, other 8 = Lowell product
WM Barr	Klean Strip Aircraft Remover	Yes	72.6	Methanol {Methyl alcohol; Carbinol; Wood alcohol} (6.2%) Ammonium hydroxide {Ammonia aqua; Ammonium liquor} (4.9%) Xylene (mixed isomers) {Benzene, dimethyl-} (4%) Hydrotreated light distillate (petroleum) (3%) Fatty acid soap (1.6%)	1
WM Barr	(Klean Strip) Premium Stripper	Yes	70-95	Methanol (<5%) Poly(oxy-1,2-ethanediyl),.alpha.-(4-nonylphenyl)-.omega.-hydroxy-,branched (<5%) Carbon dioxide (<5%)	1
Benco	B14	Yes	55-65	Phenol (12-20%) Formic Acid (12-20%)	1
Benco	B15	Yes	55-65	Phenol (12-20%) Formic Acid (12-20%)	1
Benco	B17	Yes	55-65	Phenol (12-20%) Formic Acid (12-20%) Hydrofluoric Acid (1-5%)	1
WM Barr	Master Pro Metal Stripper for O'Reilly's	Yes	60-90	Methanol (<10%) Ammonium oleate (<5%) Ammonium hydroxide (<5%)	1
Sansher Corp	Glaze N Seal Paint and Coating Stripper	Yes	70-85	Methanol (5-10%) 2-Butoxyethanol (5-10%)	1
WM Barr	(Klean Strip) Aircraft Low Odor Remover	Yes	80-90	Methanol (5-10%) Ammonium oleate (<5%) Hydrotreated light distillate (petroleum) (<5%)	1
Benco	B2	Yes	75-85	Methanol (8-15%) 2-Butoxyethanol (1-10%) Aromatic hydrocarbon (1-3%)	1

Formulator Name	Product Name on SDS	Contains Methylene Chloride?	%	Other Constituents Listed on SDS	Group 1= ≥60% MeCl 2= ≤45% MeCl 3= No MeCl, ATM 4= No MeCl, DBE 5= No MeCl, benzyl alcohol 6= caustic 7= No MeCl, other 8 = Lowell product
Green Products Co	Green's Semi-Paste Paint Remover	Yes	69-79	Paraffins (including naphthenes) (5.5-15.5 %) Alcohol (7-17%) Aromatics (>1%)	1
Sansher Corp	KBS Coatings KBS Strip	Yes	70-85	Methanol (5-10%) 2-Butoxyethanol (5-10%)	1
Sansher Corp	Dad's Easy Spray® Paint, Stain & Varnish Remover, Contractor Grade	Yes	70-85	Methanol (5-10%) 2-Butoxyethanol (5-10%) Ammonia (<1%)	1
WM Barr	Jasco Premium Paint & Epoxy Remover	Yes	60-100	Methanol (10-20%) Hydrotreated light distillate (petroleum) (<5%)	1
WM Barr	Jasco Premium Remover	Yes	70-95	Methanol (<5%) Poly(oxy-1,2-ethanediyl),.alpha.-(4-nonylphenyl)-.omega.-hydroxy-,branched (<5%) Carbon dioxide (<5%)	1
WM Barr	Klean Strip Adhesive Remover / Paint Stripper	Yes	60-100	Methanol (15-25%) Stoddard solvent (<5%)	1
WM Barr	(Klean Strip) Aircraft Paint Remover Aerosol	Yes	60-80	Liquified petroleum gas, sweetened (10-30%) Methanol (1-5%) Poly(oxy-1,2-ethanediyl),.alpha.-(nonylphenyl)-.omega.-hydr {Nonylphenol Ethoxylate} (1-5%)	1
WM Barr	(Klean Strip) Aircraft Paint Remover for Flexible Plastic	Yes	60-80	Liquified petroleum gas, sweetened (10-30%) Methanol (1-5%) Poly(oxy-1,2-ethanediyl),.alpha.-(nonylphenyl)-.omega.-hydr {Nonylphenol Ethoxylate} (1-5%)	1
WM Barr	Naked Gun Spray Gun Paint Remover	Yes	30-60	Hydrotreated light distillate (petroleum) (10-30%) Tall oil soap, potassium (<5%) Phenol (<5%) Potassium hydroxide (<1%)	1
WM Barr	(Klean Strip) (Aircraft) Peeler	Yes	60-100	Liquified petroleum gas, sweetened (<30%) Methanol (<5%)	1
WM Barr	Klean Strip Sprayable (Premium Sprayable Stripper)	Yes	60-75	Methanol (15-25%)	1

Formulator Name	Product Name on SDS	Contains Methylene Chloride?	%	Other Constituents Listed on SDS	Group 1= ≥60% MeCl 2= ≤45% MeCl 3= No MeCl, ATM 4= No MeCl, DBE 5= No MeCl, benzyl alcohol 6= caustic 7= No MeCl, other 8 = Lowell product
WM Barr	Kwik Marine Paint and Varnish Remover	Yes	60-100	Methanol (5-10%) Isopropyl alcohol (<5%) Hydrotreated light distillate (petroleum) (<5%)	1
RecoChem	Zip Strip Contractors Plus 88000	Yes	30-45	Methanol (29-37%) Toluene (12-19%) Acetone (1-5%)	2
WM Barr	(Klean Strip) Aircraft Fiberglass Paint Remover	Yes	10-30	Toluene (15-40%) Methanol (10-30%) Acetone (10-30%)	2
Benco	B1	Yes	20-30	Methanol (20-30%) Acetone (15-25%) Toluene (12-20%) 2-Butoxyethanol (2-5%)	2
Green Products Co	Green's Liquid Paint, Varnish & Lacquer Remover	Yes	10-30	Aromatic hydrocarbons (10-30 %) Ketone (10-30%) Alcohol (10-30%)	2
WM Barr	Klean Strip Strip-X Stripper	Yes	15-40	Methanol (10-30%) Acetone (10-30%) Xylene (10-30%) Toluene (3-7%) Ethylbenzene (1-5%) Ethyl alcohol (1-5%)	2
WM Barr	Jasco Premium Spray on Stripper	Yes	25-40	Methanol (10-30%) Toluene (10-20%) Acetone (<10%)	2
WM Barr	Kwik Liquid No Wash	Yes	20-30	Methanol (10-25%) Acetone (20-30%) Toluene (20-40%)	2

Formulator Name	Product Name on SDS	Contains Methylene Chloride?	%	Other Constituents Listed on SDS	Group 1= ≥60% MeCl 2= ≤45% MeCl 3= No MeCl, ATM 4= No MeCl, DBE 5= No MeCl, benzyl alcohol 6= caustic 7= No MeCl, other 8 = Lowell product
WM Barr	Jasco/Bix Varnish & Stain Remover Quart	Yes	25-40	Methanol (30-50%) Acetone (10-25%) Toluene (10-20%) Oleic acid potassium salt (<2%)	2
WM Barr	Jasco Fiberglass Paint Remover	Yes	10-30	Toluene (15-40%) Acetone (10-30%) Methanol (10-20%)	2
WM Barr	Klean Strip Klean Cutter Quart	Yes	25-30	Toluene (1.5-20%) Acetone (15-25%) Methanol (25-30%)	2
WM Barr	Experimental Formula A	No	NA	Acetone (40-50%) Toluene (40-50%) Methanol (<10%)	3
WM Barr	Experimental Formula C	No	NA	Acetone (45-55%) 1,3-Dioxolane (40-50%) Methanol (<10%)	3
3M	Safest Stripper	No	NA	Water (65-75%) Dimethyl adipate (20-30%) Dimethyl glutarate (1-5%) Smectite (1-5%)	4
INVISTA	Flexisolv DBE Esters	No	NA	Dimethyl glutarate (55-65%) Dimethyl succinate (15-25%) Dimethyl adipate (10-25%)	4
WM Barr	Experimental Formula E	No	NA	Water (40-60%) Dimethyl adipate (10-30%) Dimethyl glutarate (10-20%) Starch (5-20%) Alcohol ethoxylate (alcohol, C9-11, ethoxylated) (<5%)	4

Formulator Name	Product Name on SDS	Contains Methylene Chloride?	%	Other Constituents Listed on SDS	Group 1= ≥60% MeCl 2= ≤45% MeCl 3= No MeCl, ATM 4= No MeCl, DBE 5= No MeCl, benzyl alcohol 6= caustic 7= No MeCl, other 8 = Lowell product
EZ strip	EZ strip paint and varnish stripper	No	NA	Dimethyl glutarate (10-30%) Dimethyl succinate (5-10%) Dimethyl adipate (3-7%) Triethyl phosphate (3-7%)	4
Motsenbocker	Lift off paint and varnish remover	No	NA	Acetone (<10%) 2-Butoxy ethanol (not listed) Dimethyl glutarate (not listed) Dimethyl succinate (not listed) Dimethyl adipate (not listed)	4
Packaging Services Co	Crown paint strip next	No	NA	Dimethyl glutarate (45 %) Dimethyl sulfoxide (20-25 %) Dimethyl succinate (10-20 %) Dimethyl adipate (5-15 %) Alcohol ethoxylate surfactant (0-1 %)	4
Solvent Kleene	D-Zolve 1012 power coating remover	No	NA	Alkyl methyl ester (trade secret) Potassium hydroxide (2-5%) Cyclic amide (5-30%)	4
This stuff works, Inc	TSW9 Plasti-master	No	NA	Dimethyl glutarate (Trade secret) Dimethyl adipate (Trade secret) Proprietary surfactant (Trade secret)	4
Benco	B94	No	NA	Aromatic alcohol (50-60%) Formic acid (1-5%) Aromatic petroleum distillates (<2%)	5
Benco	B95	No	NA	Aromatic alcohol (50-60%) Formic acid (1-5%) Aromatic petroleum distillates (<2%)	5
Benco	B96	No	NA	Aromatic alcohol (50-60%) Formic acid (1-5%) Aromatic petroleum distillates (<2%)	5

Formulator Name	Product Name on SDS	Contains Methylene Chloride?	%	Other Constituents Listed on SDS	Group 1= ≥60% MeCl 2= ≤45% MeCl 3= No MeCl, ATM 4= No MeCl, DBE 5= No MeCl, benzyl alcohol 6= caustic 7= No MeCl, other 8 = Lowell product
WM Barr	Citristrip Stripping Gel	No	NA	Benzyl alcohol (30-60%) Diethylene glycol monobutyl ether (5-10%) 2-(2-Aminoethoxy) ethanol (3 - 7%) Petroleum, mineral spirits (1-5%) Terpinolene (0.1-1%) d-Limonene (0.1-1%)	5
WM Barr	Experimental Formula D	No	NA	Benzyl alcohol (20-40%) Alcohol ethoxylate (alcohol, C9-11, ethoxylated) (<5%)	5
Dumond	Smart Strip	No	NA	Water (40-60%) Benzyl alcohol (30-50%) Titanium dioxide (1-5%)	5
Dumond	Smart Strip Pro	No	NA	Water (40-60%) Benzyl alcohol (30-50%) Titanium dioxide (1-5%) Formic acid (1-5%)	5
Ecoprocote	EcoFast HD Heavy Duty Paint Stripper	No	NA	Water (Trade Secret) Benzyl alcohol (Trade Secret) Bio-based Emulsion (Trade Secret) Solvent -Free Thickeners (<1%) Solvent Free Surfactants (1-5%)	5
PPG	DuraPrep 200 coating remover	No	NA	Benzyl alcohol (15-40%) Solvent naphtha (petroleum), light aromatic (1-5%) 2-Aminoethanol (1-5%) Nonylphenol, branched, ethoxylated (0.1-1%)	5
PPG	DuraPrep 240 industrial coating remover	No	NA	Benzyl alcohol (15-40%) Hydrogen peroxide (5-10%) Solvent naphtha (petroleum), heavy aromatic (3-7%) Barium bis(dinoyl-naphthalenesulphonate) (0.1-1%) Amines, coco alkyl ethoxylated (0.1-1%)	5

Formulator Name	Product Name on SDS	Contains Methylene Chloride?	%	Other Constituents Listed on SDS	Group 1= ≥60% MeCl 2= ≤45% MeCl 3= No MeCl, ATM 4= No MeCl, DBE 5= No MeCl, benzyl alcohol 6= caustic 7= No MeCl, other 8 = Lowell product
Dumond	Peel Away 1	No	NA	Calcium hydroxide (21%) Magnesium hydroxide (16%) Sodium hydroxide (9%)	6
This stuff works, Inc	TSW3G(gel) Mason-master	No	NA	Potassium hydroxide (Trade secret) Butyl cellosolve (Trade secret)	6
Saver Systems	Defy Exterior Wood Stain Stripper	No	NA	Sodium hydroxide (10-15%) Sodium metasilicate (1-2%)	6
RecoChem	Heirloom PLUS Paint Stripper GEN. 2	No	NA	Methyl acetate (15-40%) Cyclohexanone (10-30%) Dimethylformamide (15-40%) Polyethylene glycol monoundecyl ether (1-5%)	7
WM Barr	Klean Strip Sprayable Stripper	No	NA	Dimethyl carbonate (30-60%) Methyl sulfoxide {Dimethyl sulfoxide; DMSO} (10-30%) Xylene (mixed isomers) (10-30%) Ethylbenzene (1-5%) Alcohol ethoxylate (0.1-1%) Cumene (0.1-1%) 2-(2-Aminoethoxy) ethanol (0.1-1%) Methanol (0.1-1%) Morpholine (0.1-1%)	7
WM Barr	Klean Strip Sprayable Stripper non-methylene Chloride	No	NA	Acetone (30-60%) Methyl sulfoxide {Dimethyl sulfoxide; DMSO} (10-30%) Xylene (mixed isomers) (10-30%)	7
PPG	DuraPrep prep 400 overspray remover	No	NA	2-(Methoxymethylethoxy) propanol (30-60%) Dimethyl glutarate (7-13 %) Dimethyl sulfoxide (5-10 %) Benzyl alcohol (5-10 %)	7

Formulator Name	Product Name on SDS	Contains Methylene Chloride?	%	Other Constituents Listed on SDS	Group 1= ≥60% MeCl 2= ≤45% MeCl 3= No MeCl, ATM 4= No MeCl, DBE 5= No MeCl, benzyl alcohol 6= caustic 7= No MeCl, other 8 = Lowell product
UMass/Super Remover	New Generation Stripper	No	NA	Methyl acetate (45-70%) 1,3-Dioxolane (5-40%) Dimethylsulfoxide (5-40%)	8

Appendix F

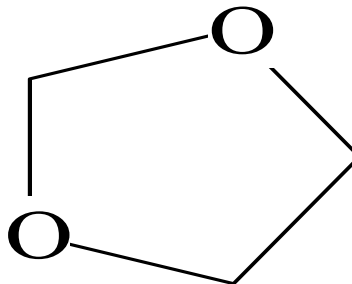
EpiSuite Output Files

CAS Number:
SMILES : C1COCO1
CHEM :
MOL FOR: C3 H6 O2
MOL WT : 74.08

----- EPI SUMMARY (v4.11) -----

Physical Property Inputs:

Log Kow (octanol-water): -----
Boiling Point (deg C) : -----
Melting Point (deg C) : -----
Vapor Pressure (mm Hg) : -----
Water Solubility (mg/L): -----
Henry LC (atm-m3/mole) : -----



Log Octanol-Water Partition Coef (SRC):

Log Kow (KOWWIN v1.68 estimate) = -0.31
Log Kow (Exper. database match) = -0.37
Exper. Ref: HANSCH,C ET AL. (1995)

Boiling Pt, Melting Pt, Vapor Pressure Estimations (MPBPVP v1.43):

Boiling Pt (deg C): 76.12 (Adapted Stein & Brown method)
Melting Pt (deg C): -75.26 (Mean or Weighted MP)
VP (mm Hg, 25 deg C): 104 (Mean VP of Antoine & Grain methods)
VP (Pa, 25 deg C): 1.39E+004 (Mean VP of Antoine & Grain methods)
MP (exp database): -95 deg C
BP (exp database): 78 deg C
VP (exp database): 7.90E+01 mm Hg (1.05E+004 Pa) at 20 deg C

Water Solubility Estimate from Log Kow (WSKOW v1.42):

Water Solubility at 25 deg C (mg/L): 2.769e+005
log Kow used: -0.37 (expkow database)
no-melting pt equation used
Water Sol (Exper. database match) = 1e+006 mg/L (25 deg C)
Exper. Ref: RIDDICK,JA ET AL. (1986)

Water Sol Estimate from Fragments:

Wat Sol (v1.01 est) = 8.512e+005 mg/L

ECOSAR Class Program (ECOSAR v1.11):

Class(es) found:
Neutral Organics

Henrys Law Constant (25 deg C) [HENRYWIN v3.20]:

Bond Method : 2.23E-005 atm-m3/mole (2.26E+000 Pa-m3/mole)
Group Method: 2.13E-005 atm-m3/mole (2.16E+000 Pa-m3/mole)
Exper Database: 2.45E-05 atm-m3/mole (2.48E+000 Pa-m3/mole)

For Henry LC Comparison Purposes:

User-Entered Henry LC: not entered
Henrys LC [via VP/WSol estimate using User-Entered or Estimated values]:
HLC: 3.661E-005 atm-m3/mole (3.709E+000 Pa-m3/mole)
VP: 104 mm Hg (source: MPBPVP)
WS: 2.77E+005 mg/L (source: WSKOWWIN)

Log Octanol-Air Partition Coefficient (25 deg C) [KOAWIN v1.10]:

Log Kow used: -0.37 (exp database)
Log Kaw used: -2.999 (exp database)
Log Koa (KOAWIN v1.10 estimate): 2.629
Log Koa (experimental database): None

Probability of Rapid Biodegradation (BIOWIN v4.10):

Biowin1 (Linear Model) : 0.0176
Biowin2 (Non-Linear Model) : 0.0074

Expert Survey Biodegradation Results:

Biowin3 (Ultimate Survey Model): 3.0181 (weeks)
Biowin4 (Primary Survey Model) : 3.7214 (days-weeks)

MITI Biodegradation Probability:

Biowin5 (MITI Linear Model) : 0.5539

Biowin6 (MITI Non-Linear Model): 0.7073
Anaerobic Biodegradation Probability:
Biowin7 (Anaerobic Linear Model): -0.0385
Ready Biodegradability Prediction: YES

Hydrocarbon Biodegradation (BioHCwin v1.01):
Structure incompatible with current estimation method!

Sorption to aerosols (25 Dec C) [AEROWIN v1.00]:
Vapor pressure (liquid/subcooled): 1.05E+004 Pa (79 mm Hg)
Log Koa (Koawin est): 2.629
Kp (particle/gas partition coef. (m3/ug)):
Mackay model : 2.85E-010
Octanol/air (Koa) model: 1.04E-010
Fraction sorbed to airborne particulates (phi):
Junge-Pankow model : 1.03E-008
Mackay model : 2.28E-008
Octanol/air (Koa) model: 8.36E-009

Atmospheric Oxidation (25 deg C) [AopWin v1.92]:
Hydroxyl Radicals Reaction:
OVERALL OH Rate Constant = 11.1578 E-12 cm3/molecule-sec
Half-Life = 0.959 Days (12-hr day; 1.5E6 OH/cm3)
Half-Life = 11.503 Hrs
Ozone Reaction:
No Ozone Reaction Estimation
Fraction sorbed to airborne particulates (phi):
1.65E-008 (Junge-Pankow, Mackay avg)
8.36E-009 (Koa method)
Note: the sorbed fraction may be resistant to atmospheric oxidation

Soil Adsorption Coefficient (KOCWIN v2.00):
Koc : 1.445 L/kg (MCI method)
Log Koc: 0.160 (MCI method)
Koc : 3.461 L/kg (Kow method)
Log Koc: 0.539 (Kow method)

Aqueous Base/Acid-Catalyzed Hydrolysis (25 deg C) [HYDROWIN v2.00]:
Rate constants can NOT be estimated for this structure!

Bioaccumulation Estimates (BCFBAF v3.01):
Log BCF from regression-based method = 0.500 (BCF = 3.162 L/kg wet-wt)
Log Biotransformation Half-life (HL) = -1.5985 days (HL = 0.02521 days)
Log BCF Arnot-Gobas method (upper trophic) = -0.038 (BCF = 0.9159)
Log BAF Arnot-Gobas method (upper trophic) = -0.038 (BAF = 0.9159)
log Kow used: -0.37 (expkow database)

Volatilization from Water:
Henry LC: 2.45E-005 atm-m3/mole (Henry experimental database)
Half-Life from Model River: 21.45 hours
Half-Life from Model Lake : 306.1 hours (12.76 days)

Removal In Wastewater Treatment:
Total removal: 3.16 percent
Total biodegradation: 0.09 percent
Total sludge adsorption: 1.74 percent
Total to Air: 1.33 percent
(using 10000 hr Bio P,A,S)

Level III Fugacity Model:

	Mass Amount (percent)	Half-Life (hr)	Emissions (kg/hr)
Air	3.45	23	1000
Water	46.4	360	1000
Soil	50	720	1000
Sediment	0.0878	3.24e+003	0

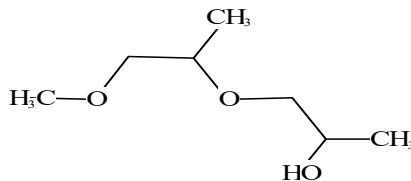
Persistence Time: 310 hr

CAS Number:
SMILES : COCC(C)OCC(C)O
CHEM :
MOL FOR: C7 H16 O3
MOL WT : 148.20

----- EPI SUMMARY (v4.11) -----

Physical Property Inputs:

Log Kow (octanol-water): -----
Boiling Point (deg C) : -----
Melting Point (deg C) : -----
Vapor Pressure (mm Hg) : -----
Water Solubility (mg/L): -----
Henry LC (atm-m3/mole) : -----



Log Octanol-Water Partition Coef (SRC):
Log Kow (KOWWIN v1.68 estimate) = -0.35

Boiling Pt, Melting Pt, Vapor Pressure Estimations:

Boiling Pt (deg C): 191.60 (Adapted Stein & Brown method,
Melting Pt (deg C): -15.51 (Mean or Weighted MP)
VP(mm Hg,25 deg C): 0.122 (Mean VP of Antoine & Grain methods)
VP (Pa, 25 deg C) : 16.3 (Mean VP of Antoine & Grain methods)

Water Solubility Estimate from Log Kow (WSKOW v1.42):

Water Solubility at 25 deg C (mg/L): 4.936e+005
log Kow used: -0.35 (estimated)
no-melting pt equation used

Water Sol Estimate from Fragments:

Wat Sol (v1.01 est) = 1e+006 mg/L

ECOSAR Class Program (ECOSAR v1.11):

Class(es) found:
Neutral Organics

Henrys Law Constant (25 deg C) [HENRYWIN v3.20]:

Bond Method : 1.15E-009 atm-m3/mole (1.16E-004 Pa-m3/mole)
Group Method: 9.09E-011 atm-m3/mole (9.21E-006 Pa-m3/mole)

For Henry LC Comparison Purposes:

User-Entered Henry LC: not entered
Henrys LC [via VP/WSol estimate using User-Entered or Estimated values]:
HLC: 4.820E-008 atm-m3/mole (4.884E-003 Pa-m3/mole)
VP: 0.122 mm Hg (source: MPBPVP)
WS: 4.94E+005 mg/L (source: WSKOWWIN)

Log Octanol-Air Partition Coefficient (25 deg C) [KOAWIN v1.10]:

Log Kow used: -0.35 (KowWin est)
Log Kaw used: -7.328 (HenryWin est)
Log Koa (KOAWIN v1.10 estimate): 6.978
Log Koa (experimental database): None

Probability of Rapid Biodegradation (BIOWIN v4.10):

Biowin1 (Linear Model) : 0.1410
Biowin2 (Non-Linear Model) : 0.0079

Expert Survey Biodegradation Results:

Biowin3 (Ultimate Survey Model): 3.0143 (weeks)
Biowin4 (Primary Survey Model) : 3.7439 (days-weeks)

MITI Biodegradation Probability:

Biowin5 (MITI Linear Model) : 0.4340
Biowin6 (MITI Non-Linear Model): 0.4390

Anaerobic Biodegradation Probability:

Biowin7 (Anaerobic Linear Model): -0.0641

Ready Biodegradability Prediction: NO

Hydrocarbon Biodegradation (BioHCwin v1.01):

Structure incompatible with current estimation method!

Sorption to aerosols (25 Dec C) [AEROWIN v1.00]:
Vapor pressure (liquid/subcooled): 14.5 Pa (0.109 mm Hg)
Log Koa (Koawin est): 6.978
Kp (particle/gas partition coef. (m3/ug)):
Mackay model : 2.06E-007
Octanol/air (Koa) model: 2.33E-006
Fraction sorbed to airborne particulates (phi):
Junge-Pankow model : 7.46E-006
Mackay model : 1.65E-005
Octanol/air (Koa) model: 0.000187

Atmospheric Oxidation (25 deg C) [AopWin v1.92]:
Hydroxyl Radicals Reaction:
OVERALL OH Rate Constant = 38.2273 E-12 cm3/molecule-sec
Half-Life = 0.280 Days (12-hr day; 1.5E6 OH/cm3)
Half-Life = 3.358 Hrs
Ozone Reaction:
No Ozone Reaction Estimation
Fraction sorbed to airborne particulates (phi):
1.2E-005 (Junge-Pankow, Mackay avg)
0.000187 (Koa method)
Note: the sorbed fraction may be resistant to atmospheric oxidation

Soil Adsorption Coefficient (KOCWIN v2.00):
Koc : 10 L/kg (MCI method)
Log Koc: 1.000 (MCI method)
Koc : 1.377 L/kg (Kow method)
Log Koc: 0.139 (Kow method)

Aqueous Base/Acid-Catalyzed Hydrolysis (25 deg C) [HYDROWIN v2.00]:
Rate constants can NOT be estimated for this structure!

Bioaccumulation Estimates (BCFBAF v3.01):
Log BCF from regression-based method = 0.500 (BCF = 3.162 L/kg wet-wt)
Log Biotransformation Half-life (HL) = -1.7302 days (HL = 0.01861 days)
Log BCF Arnot-Gobas method (upper trophic) = -0.039 (BCF = 0.9135)
Log BAF Arnot-Gobas method (upper trophic) = -0.039 (BAF = 0.9135)
log Kow used: -0.35 (estimated)

Volatilization from Water:
Henry LC: 9.09E-011 atm-m3/mole (estimated by Group SAR Method)
Half-Life from Model River: 7.841E+006 hours (3.267E+005 days)
Half-Life from Model Lake : 8.554E+007 hours (3.564E+006 days)

Removal In Wastewater Treatment:
Total removal: 1.85 percent
Total biodegradation: 0.09 percent
Total sludge adsorption: 1.76 percent
Total to Air: 0.00 percent
(using 10000 hr Bio P,A,S)

Level III Fugacity Model:

	Mass Amount (percent)	Half-Life (hr)	Emissions (kg/hr)
Air	0.00193	6.72	1000
Water	30.6	360	1000
Soil	69.4	720	1000
Sediment	0.0688	3.24e+003	0

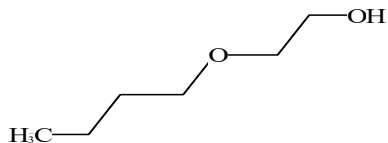
Persistence Time: 639 hr

CAS Number:
SMILES : CCCCCOCO
CHEM :
MOL FOR: C6 H14 O2
MOL WT : 118.18

----- EPI SUMMARY (v4.11) -----

Physical Property Inputs:

Log Kow (octanol-water): -----
Boiling Point (deg C) : -----
Melting Point (deg C) : -----
Vapor Pressure (mm Hg) : -----
Water Solubility (mg/L): -----
Henry LC (atm-m3/mole) : -----



Log Octanol-Water Partition Coef (SRC):

Log Kow (KOWWIN v1.68 estimate) = 0.57
Log Kow (Exper. database match) = 0.83
Exper. Ref: HANSCH,C ET AL. (1995)

Boiling Pt, Melting Pt, Vapor Pressure Estimations (MPBPVP v1.43):

Boiling Pt (deg C): 181.14 (Adapted Stein & Brown method)
Melting Pt (deg C): -20.31 (Mean or Weighted MP)
VP (mm Hg, 25 deg C): 0.475 (Mean VP of Antoine & Grain methods)
VP (Pa, 25 deg C): 63.3 (Mean VP of Antoine & Grain methods)
MP (exp database): -74.8 deg C
BP (exp database): 168.4 deg C
VP (exp database): 8.80E-01 mm Hg (1.17E+002 Pa) at 25 deg C

Water Solubility Estimate from Log Kow (WSKOW v1.42):

Water Solubility at 25 deg C (mg/L): 6.447e+004
log Kow used: 0.83 (expkow database)
no-melting pt equation used
Water Sol (Exper. database match) = 1e+006 mg/L (20 deg C)
Exper. Ref: RIDDICK,JA ET AL. (1986)

Water Sol Estimate from Fragments:

Wat Sol (v1.01 est) = 1.5532e+005 mg/L

ECOSAR Class Program (ECOSAR v1.11):

Class(es) found:
Neutral Organics

Henrys Law Constant (25 deg C) [HENRYWIN v3.20]:

Bond Method : 9.79E-008 atm-m3/mole (9.92E-003 Pa-m3/mole)
Group Method: 2.08E-008 atm-m3/mole (2.11E-003 Pa-m3/mole)
Exper Database: 1.60E-06 atm-m3/mole (1.62E-001 Pa-m3/mole)

For Henry LC Comparison Purposes:

User-Entered Henry LC: not entered
Henrys LC [via VP/WSol estimate using User-Entered or Estimated values]:
HLC: 1.146E-006 atm-m3/mole (1.161E-001 Pa-m3/mole)
VP: 0.475 mm Hg (source: MPBPVP)
WS: 6.45E+004 mg/L (source: WSKOWWIN)

Log Octanol-Air Partition Coefficient (25 deg C) [KOAWIN v1.10]:

Log Kow used: 0.83 (exp database)
Log Kaw used: -4.184 (exp database)
Log Koa (KOAWIN v1.10 estimate): 5.014
Log Koa (experimental database): None

Probability of Rapid Biodegradation (BIOWIN v4.10):

Biowin1 (Linear Model) : 0.6111
Biowin2 (Non-Linear Model) : 0.7032

Expert Survey Biodegradation Results:

Biowin3 (Ultimate Survey Model): 3.3877 (days-weeks)
Biowin4 (Primary Survey Model) : 4.0660 (days)

MITI Biodegradation Probability:

Biowin5 (MITI Linear Model) : 0.7707

Biowin6 (MITI Non-Linear Model): 0.8982
Anaerobic Biodegradation Probability:
Biowin7 (Anaerobic Linear Model): 0.4442
Ready Biodegradability Prediction: YES

Hydrocarbon Biodegradation (BioHCwin v1.01):
Structure incompatible with current estimation method!

Sorption to aerosols (25 Dec C) [AEROWIN v1.00]:
Vapor pressure (liquid/subcooled): 117 Pa (0.88 mm Hg)
Log Koa (Koawin est): 5.014
Kp (particle/gas partition coef. (m3/ug)):
Mackay model : 2.56E-008
Octanol/air (Koa) model: 2.54E-008
Fraction sorbed to airborne particulates (phi):
Junge-Pankow model : 9.24E-007
Mackay model : 2.05E-006
Octanol/air (Koa) model: 2.03E-006

Atmospheric Oxidation (25 deg C) [AopWin v1.92]:
Hydroxyl Radicals Reaction:
OVERALL OH Rate Constant = 23.5134 E-12 cm3/molecule-sec
Half-Life = 0.455 Days (12-hr day; 1.5E6 OH/cm3)
Half-Life = 5.459 Hrs
Ozone Reaction:
No Ozone Reaction Estimation
Fraction sorbed to airborne particulates (phi):
1.48E-006 (Junge-Pankow, Mackay avg)
2.03E-006 (Koa method)
Note: the sorbed fraction may be resistant to atmospheric oxidation

Soil Adsorption Coefficient (KOCWIN v2.00):
Koc : 2.823 L/kg (MCI method)
Log Koc: 0.451 (MCI method)
Koc : 7.624 L/kg (Kow method)
Log Koc: 0.882 (Kow method)

Aqueous Base/Acid-Catalyzed Hydrolysis (25 deg C) [HYDROWIN v2.00]:
Rate constants can NOT be estimated for this structure!

Bioaccumulation Estimates (BCFBAF v3.01):
Log BCF from regression-based method = 0.500 (BCF = 3.162 L/kg wet-wt)
Log Biotransformation Half-life (HL) = -1.2697 days (HL = 0.05375 days)
Log BCF Arnot-Gobas method (upper trophic) = 0.139 (BCF = 1.376)
Log BAF Arnot-Gobas method (upper trophic) = 0.139 (BAF = 1.376)
log Kow used: 0.83 (expkow database)

Volatilization from Water:
Henry LC: 1.6E-006 atm-m3/mole (Henry experimental database)
Half-Life from Model River: 398.9 hours (16.62 days)
Half-Life from Model Lake : 4443 hours (185.1 days)

Removal In Wastewater Treatment:
Total removal: 1.96 percent
Total biodegradation: 0.09 percent
Total sludge adsorption: 1.78 percent
Total to Air: 0.09 percent
(using 10000 hr Bio P,A,S)

Level III Fugacity Model:

	Mass Amount (percent)	Half-Life (hr)	Emissions (kg/hr)
Air	2.35	13.8	1000
Water	40.9	208	1000
Soil	56.7	416	1000
Sediment	0.0751	1.87e+003	0

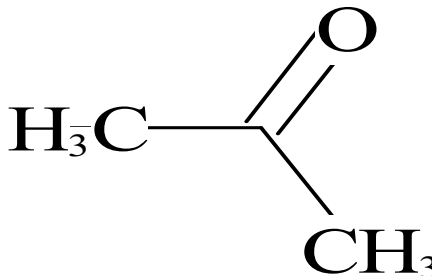
Persistence Time: 242 hr

CAS Number:
SMILES : CC(=O)C
CHEM :
MOL FOR: C3 H6 O1
MOL WT : 58.08

----- EPI SUMMARY (v4.11) -----

Physical Property Inputs:

Log Kow (octanol-water): -----
Boiling Point (deg C) : -----
Melting Point (deg C) : -----
Vapor Pressure (mm Hg) : -----
Water Solubility (mg/L): -----
Henry LC (atm-m3/mole) : -----



Log Octanol-Water Partition Coef (SRC):

Log Kow (KOWWIN v1.68 estimate) = -0.24
Log Kow (Exper. database match) = -0.24
Exper. Ref: HANSCH,C ET AL. (1995)

Boiling Pt, Melting Pt, Vapor Pressure Estimations (MPBPVP v1.43):

Boiling Pt (deg C): 44.80 (Adapted Stein & Brown method)
Melting Pt (deg C): -93.58 (Mean or Weighted MP)
VP(mm Hg, 25 deg C): 249 (Mean VP of Antoine & Grain methods)
VP (Pa, 25 deg C): 3.32E+004 (Mean VP of Antoine & Grain methods)
MP (exp database): -98.3 deg C
BP (exp database): 55.5 deg C
VP (exp database): 2.32E+02 mm Hg (3.09E+004 Pa) at 25 deg C

Water Solubility Estimate from Log Kow (WSKOW v1.42):

Water Solubility at 25 deg C (mg/L): 2.199e+005
log Kow used: -0.24 (expkow database)
no-melting pt equation used
Water Sol (Exper. database match) = 1e+006 mg/L (25 deg C)
Exper. Ref: RIDDICK,JA ET AL. (1986)

Water Sol Estimate from Fragments:

Wat Sol (v1.01 est) = 2.6753e+005 mg/L

ECOSAR Class Program (ECOSAR v1.11):

Class(es) found:
Neutral Organics

Henrys Law Constant (25 deg C) [HENRYWIN v3.20]:

Bond Method : 4.96E-005 atm-m3/mole (5.02E+000 Pa-m3/mole)
Group Method: 3.97E-005 atm-m3/mole (4.02E+000 Pa-m3/mole)
Exper Database: 3.50E-05 atm-m3/mole (3.55E+000 Pa-m3/mole)

For Henry LC Comparison Purposes:

User-Entered Henry LC: not entered
Henrys LC [via VP/WSol estimate using User-Entered or Estimated values]:
HLC: 8.653E-005 atm-m3/mole (8.768E+000 Pa-m3/mole)
VP: 249 mm Hg (source: MPBPVP)
WS: 2.2E+005 mg/L (source: WSKOWWIN)

Log Octanol-Air Partition Coefficient (25 deg C) [KOAWIN v1.10]:

Log Kow used: -0.24 (exp database)
Log Kaw used: -2.844 (exp database)
Log Koa (KOAWIN v1.10 estimate): 2.604
Log Koa (experimental database): 2.310

Probability of Rapid Biodegradation (BIOWIN v4.10):

Biowin1 (Linear Model) : 0.7267
Biowin2 (Non-Linear Model) : 0.8495

Expert Survey Biodegradation Results:

Biowin3 (Ultimate Survey Model): 3.0483 (weeks)
Biowin4 (Primary Survey Model) : 3.7417 (days-weeks)

MITI Biodegradation Probability:

Biowin5 (MITI Linear Model) : 0.6579

Biowin6 (MITI Non-Linear Model): 0.8483
Anaerobic Biodegradation Probability:
Biowin7 (Anaerobic Linear Model): 0.2850
Ready Biodegradability Prediction: YES

Hydrocarbon Biodegradation (BioHCwin v1.01):
Structure incompatible with current estimation method!

Sorption to aerosols (25 Dec C) [AEROWIN v1.00]:
Vapor pressure (liquid/subcooled): 3.09E+004 Pa (232 mm Hg)
Log Koa (Exp database): 2.310
Kp (particle/gas partition coef. (m3/ug)):
Mackay model : 9.7E-011
Octanol/air (Koa) model: 5.01E-011
Fraction sorbed to airborne particulates (phi):
Junge-Pankow model : 3.5E-009
Mackay model : 7.76E-009
Octanol/air (Koa) model: 4.01E-009

Atmospheric Oxidation (25 deg C) [AopWin v1.92]:
Hydroxyl Radicals Reaction:
OVERALL OH Rate Constant = 0.2040 E-12 cm3/molecule-sec
Half-Life = 52.431 Days (12-hr day; 1.5E6 OH/cm3)
Ozone Reaction:
No Ozone Reaction Estimation
Fraction sorbed to airborne particulates (phi):
5.63E-009 (Junge-Pankow, Mackay avg)
4.01E-009 (Koa method)
Note: the sorbed fraction may be resistant to atmospheric oxidation

Soil Adsorption Coefficient (KOCWIN v2.00):
Koc : 2.364 L/kg (MCI method)
Log Koc: 0.374 (MCI method)
Koc : 9.726 L/kg (Kow method)
Log Koc: 0.988 (Kow method)

Aqueous Base/Acid-Catalyzed Hydrolysis (25 deg C) [HYDROWIN v2.00]:
Rate constants can NOT be estimated for this structure!

Bioaccumulation Estimates (BCFBAF v3.01):
Log BCF from regression-based method = 0.500 (BCF = 3.162 L/kg wet-wt)
Log Biotransformation Half-life (HL) = -1.4496 days (HL = 0.03551 days)
Log BCF Arnot-Gobas method (upper trophic) = -0.032 (BCF = 0.929)
Log BAF Arnot-Gobas method (upper trophic) = -0.032 (BAF = 0.929)
log Kow used: -0.24 (expkow database)

Volatilization from Water:
Henry LC: 3.5E-005 atm-m3/mole (Henry experimental database)
Half-Life from Model River: 13.53 hours
Half-Life from Model Lake : 211.5 hours (8.811 days)

Removal In Wastewater Treatment:
Total removal: 3.69 percent
Total biodegradation: 0.09 percent
Total sludge adsorption: 1.73 percent
Total to Air: 1.87 percent
(using 10000 hr Bio P,A,S)

Level III Fugacity Model:

	Mass Amount (percent)	Half-Life (hr)	Emissions (kg/hr)
Air	12.3	1.17e+003	1000
Water	42.1	360	1000
Soil	45.5	720	1000
Sediment	0.0813	3.24e+003	0

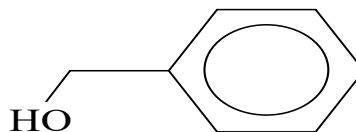
Persistence Time: 336 hr

CAS Number:
SMILES : c1ccc(cc1)CO
CHEM :
MOL FOR: C7 H8 O1
MOL WT : 108.14

----- EPI SUMMARY (v4.11) -----

Physical Property Inputs:

Log Kow (octanol-water): -----
Boiling Point (deg C) : -----
Melting Point (deg C) : -----
Vapor Pressure (mm Hg) : -----
Water Solubility (mg/L): -----
Henry LC (atm-m3/mole) : -----



Log Octanol-Water Partition Coef (SRC):

Log Kow (KOWWIN v1.68 estimate) = 1.08
Log Kow (Exper. database match) = 1.10
Exper. Ref: HANSCH,C ET AL. (1995)

Boiling Pt, Melting Pt, Vapor Pressure Estimations (MPBPVP v1.43):

Boiling Pt (deg C): 205.65 (Adapted Stein & Brown method)
Melting Pt (deg C): -5.43 (Mean or Weighted MP)
VP (mm Hg, 25 deg C): 0.0535 (Mean VP of Antoine & Grain methods)
VP (Pa, 25 deg C): 7.14 (Mean VP of Antoine & Grain methods)
MP (exp database): -15.2 deg C
BP (exp database): 205.3 deg C
VP (exp database): 9.40E-02 mm Hg (1.25E+001 Pa) at 25 deg C

Water Solubility Estimate from Log Kow (WSKOW v1.42):

Water Solubility at 25 deg C (mg/L): 4.105e+004
log Kow used: 1.10 (expkow database)
no-melting pt equation used
Water Sol (Exper. database match) = 4.29e+004 mg/L (25 deg C)
Exper. Ref: YALKOWSKY,SH & DANNENFELS, RM (1992)

Water Sol Estimate from Fragments:

Wat Sol (v1.01 est) = 32322 mg/L

ECOSAR Class Program (ECOSAR v1.11):

Class(es) found:
Benzyl Alcohols

Henrys Law Constant (25 deg C) [HENRYWIN v3.20]:

Bond Method : 2.17E-007 atm-m3/mole (2.20E-002 Pa-m3/mole)
Group Method: 4.66E-008 atm-m3/mole (4.72E-003 Pa-m3/mole)
Exper Database: 3.37E-07 atm-m3/mole (3.41E-002 Pa-m3/mole)

For Henry LC Comparison Purposes:

User-Entered Henry LC: not entered

Henrys LC [via VP/WSol estimate using User-Entered or Estimated values]:

HLC: 1.854E-007 atm-m3/mole (1.879E-002 Pa-m3/mole)
VP: 0.0535 mm Hg (source: MPBPVP)
WS: 4.11E+004 mg/L (source: WSKOWWIN)

Log Octanol-Air Partition Coefficient (25 deg C) [KOAWIN v1.10]:

Log Kow used: 1.10 (exp database)
Log Kaw used: -4.861 (exp database)
Log Koa (KOAWIN v1.10 estimate): 5.961
Log Koa (experimental database): None

Probability of Rapid Biodegradation (BIOWIN v4.10):

Biowin1 (Linear Model) : 0.9829
Biowin2 (Non-Linear Model) : 0.9878

Expert Survey Biodegradation Results:

Biowin3 (Ultimate Survey Model): 3.1422 (weeks)
Biowin4 (Primary Survey Model) : 3.8261 (days)

MITI Biodegradation Probability:

Biowin5 (MITI Linear Model) : 0.5370

Biowin6 (MITI Non-Linear Model): 0.7077
Anaerobic Biodegradation Probability:
Biowin7 (Anaerobic Linear Model): 0.7025
Ready Biodegradability Prediction: YES

Hydrocarbon Biodegradation (BioHCwin v1.01):
Structure incompatible with current estimation method!

Sorption to aerosols (25 Dec C) [AEROWIN v1.00]:
Vapor pressure (liquid/subcooled): 12.5 Pa (0.094 mm Hg)
Log Koa (Koawin est): 5.961
Kp (particle/gas partition coef. (m3/ug)):
Mackay model : 2.39E-007
Octanol/air (Koa) model: 2.24E-007
Fraction sorbed to airborne particulates (phi):
Junge-Pankow model : 8.65E-006
Mackay model : 1.91E-005
Octanol/air (Koa) model: 1.8E-005

Atmospheric Oxidation (25 deg C) [AopWin v1.92]:
Hydroxyl Radicals Reaction:
OVERALL OH Rate Constant = 8.2541 E-12 cm3/molecule-sec
Half-Life = 1.296 Days (12-hr day; 1.5E6 OH/cm3)
Half-Life = 15.550 Hrs
Ozone Reaction:
No Ozone Reaction Estimation
Fraction sorbed to airborne particulates (phi):
1.39E-005 (Junge-Pankow, Mackay avg)
1.8E-005 (Koa method)
Note: the sorbed fraction may be resistant to atmospheric oxidation

Soil Adsorption Coefficient (KOCWIN v2.00):
Koc : 21.46 L/kg (MCI method)
Log Koc: 1.332 (MCI method)
Koc : 13.25 L/kg (Kow method)
Log Koc: 1.122 (Kow method)
Experimental Log Koc: 1.1 (database)

Aqueous Base/Acid-Catalyzed Hydrolysis (25 deg C) [HYDROWIN v2.00]:
Rate constants can NOT be estimated for this structure!

Bioaccumulation Estimates (BCFBAF v3.01):
Log BCF from regression-based method = 0.137 (BCF = 1.371 L/kg wet-wt)
Log Biotransformation Half-life (HL) = -1.5734 days (HL = 0.02671 days)
Log BCF Arnot-Gobas method (upper trophic) = 0.190 (BCF = 1.549)
Log BAF Arnot-Gobas method (upper trophic) = 0.190 (BAF = 1.549)
log Kow used: 1.10 (expkow database)

Volatilization from Water:
Henry LC: 3.37E-007 atm-m3/mole (Henry experimental database)
Half-Life from Model River: 1808 hours (75.32 days)
Half-Life from Model Lake : 1.981E+004 hours (825.3 days)

Removal In Wastewater Treatment:
Total removal: 1.92 percent
Total biodegradation: 0.09 percent
Total sludge adsorption: 1.80 percent
Total to Air: 0.02 percent
(using 10000 hr Bio P,A,S)

Level III Fugacity Model:

	Mass Amount (percent)	Half-Life (hr)	Emissions (kg/hr)
Air	1.03	11.2	1000
Water	34	360	1000
Soil	64.8	720	1000
Sediment	0.0929	3.24e+003	0

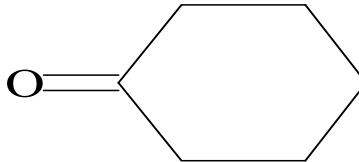
Persistence Time: 424 hr

CAS Number:
SMILES : C1CCC(=O)CC1
CHEM :
MOL FOR: C6 H10 O1
MOL WT : 98.15

----- EPI SUMMARY (v4.11) -----

Physical Property Inputs:

Log Kow (octanol-water): -----
Boiling Point (deg C) : -----
Melting Point (deg C) : -----
Vapor Pressure (mm Hg) : -----
Water Solubility (mg/L): -----
Henry LC (atm-m3/mole) : -----



Log Octanol-Water Partition Coef (SRC):

Log Kow (KOWWIN v1.68 estimate) = 1.13
Log Kow (Exper. database match) = 0.81
Exper. Ref: HANSCH,C ET AL. (1995)

Boiling Pt, Melting Pt, Vapor Pressure Estimations (MPBPVP v1.43):

Boiling Pt (deg C): 154.98 (Adapted Stein & Brown method)
Melting Pt (deg C): -29.56 (Mean or Weighted MP)
VP (mm Hg, 25 deg C): 4.04 (Mean VP of Antoine & Grain methods)
VP (Pa, 25 deg C): 539 (Mean VP of Antoine & Grain methods)
MP (exp database): -31 deg C
BP (exp database): 155.4 deg C
VP (exp database): 4.33E+00 mm Hg (5.77E+002 Pa) at 25 deg C

Water Solubility Estimate from Log Kow (WSKOW v1.42):

Water Solubility at 25 deg C (mg/L): 2.408E+004
log Kow used: 0.81 (expkow database)
no-melting pt equation used
Water Sol (Exper. database match) = 2.5E+004 mg/L (25 deg C)
Exper. Ref: YALKOWSKY,SH & DANNENFELS, RM (1992)

Water Sol Estimate from Fragments:

Wat Sol (v1.01 est) = 44013 mg/L

ECOSAR Class Program (ECOSAR v1.11):

Class(es) found:
Neutral Organics

Henrys Law Constant (25 deg C) [HENRYWIN v3.20]:

Bond Method : 5.11E-005 atm-m3/mole (5.18E+000 Pa-m3/mole)
Group Method: 1.28E-005 atm-m3/mole (1.30E+000 Pa-m3/mole)
Exper Database: 9.00E-06 atm-m3/mole (9.12E-001 Pa-m3/mole)

For Henry LC Comparison Purposes:

User-Entered Henry LC: not entered
Henrys LC [via VP/WSol estimate using User-Entered or Estimated values]:
HLC: 2.167E-005 atm-m3/mole (2.195E+000 Pa-m3/mole)
VP: 4.04 mm Hg (source: MPBPVP)
WS: 2.41E+004 mg/L (source: WSKOWWIN)

Log Octanol-Air Partition Coefficient (25 deg C) [KOAWIN v1.10]:

Log Kow used: 0.81 (exp database)
Log Kaw used: -3.434 (exp database)
Log Koa (KOAWIN v1.10 estimate): 4.244
Log Koa (experimental database): None

Probability of Rapid Biodegradation (BIOWIN v4.10):

Biowin1 (Linear Model) : 0.7077
Biowin2 (Non-Linear Model) : 0.7617

Expert Survey Biodegradation Results:

Biowin3 (Ultimate Survey Model): 2.9598 (weeks)
Biowin4 (Primary Survey Model) : 3.6839 (days-weeks)

MITI Biodegradation Probability:

Biowin5 (MITI Linear Model) : 0.6365

Biowin6 (MITI Non-Linear Model): 0.8466
Anaerobic Biodegradation Probability:
Biowin7 (Anaerobic Linear Model): -0.1559
Ready Biodegradability Prediction: YES

Hydrocarbon Biodegradation (BioHCwin v1.01):
Structure incompatible with current estimation method!

Sorption to aerosols (25 Dec C) [AEROWIN v1.00]:
Vapor pressure (liquid/subcooled): 577 Pa (4.33 mm Hg)
Log Koa (Koawin est): 4.244
Kp (particle/gas partition coef. (m3/ug)):
Mackay model : 5.2E-009
Octanol/air (Koa) model: 4.31E-009
Fraction sorbed to airborne particulates (phi):
Junge-Pankow model : 1.88E-007
Mackay model : 4.16E-007
Octanol/air (Koa) model: 3.44E-007

Atmospheric Oxidation (25 deg C) [AopWin v1.92]:
Hydroxyl Radicals Reaction:
OVERALL OH Rate Constant = 12.0971 E-12 cm3/molecule-sec
Half-Life = 0.884 Days (12-hr day; 1.5E6 OH/cm3)
Half-Life = 10.610 Hrs
Ozone Reaction:
No Ozone Reaction Estimation
Fraction sorbed to airborne particulates (phi):
3.02E-007 (Junge-Pankow, Mackay avg)
3.44E-007 (Koa method)
Note: the sorbed fraction may be resistant to atmospheric oxidation

Soil Adsorption Coefficient (KOCWIN v2.00):
Koc : 17.38 L/kg (MCI method)
Log Koc: 1.240 (MCI method)
Koc : 37.05 L/kg (Kow method)
Log Koc: 1.569 (Kow method)

Aqueous Base/Acid-Catalyzed Hydrolysis (25 deg C) [HYDROWIN v2.00]:
Rate constants can NOT be estimated for this structure!

Bioaccumulation Estimates (BCFBAF v3.01):
Log BCF from regression-based method = 0.500 (BCF = 3.162 L/kg wet-wt)
Log Biotransformation Half-life (HL) = -1.2386 days (HL = 0.05773 days)
Log BCF Arnot-Gobas method (upper trophic) = 0.135 (BCF = 1.366)
Log BAF Arnot-Gobas method (upper trophic) = 0.135 (BAF = 1.366)
log Kow used: 0.81 (expkow database)

Volatilization from Water:
Henry LC: 9E-006 atm-m3/mole (Henry experimental database)
Half-Life from Model River: 65.46 hours (2.727 days)
Half-Life from Model Lake : 797.2 hours (33.22 days)

Removal In Wastewater Treatment:
Total removal: 2.37 percent
Total biodegradation: 0.09 percent
Total sludge adsorption: 1.77 percent
Total to Air: 0.50 percent
(using 10000 hr Bio P,A,S)

Level III Fugacity Model:

	Mass Amount (percent)	Half-Life (hr)	Emissions (kg/hr)
Air	3.43	40.2	1000
Water	36	360	1000
Soil	60.5	720	1000
Sediment	0.0921	3.24e+003	0

Persistence Time: 389 hr

CAS Number:
SMILES : C(CL)CL
CHEM :
MOL FOR: C1 H2 CL2
MOL WT : 84.93

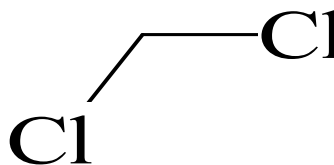
----- EPI SUMMARY (v4.11) -----

Physical Property Inputs:

Log Kow (octanol-water): -----
Boiling Point (deg C) : -----
Melting Point (deg C) : -----
Vapor Pressure (mm Hg) : -----
Water Solubility (mg/L): -----
Henry LC (atm-m3/mole) : -----

Log Octanol-Water Partition Coef (SRC):

Log Kow (KOWWIN v1.68 estimate) = 1.34
Log Kow (Exper. database match) = 1.25
Exper. Ref: HANSCH,C ET AL. (1995)



Boiling Pt, Melting Pt, Vapor Pressure Estimations (MPBPVP v1.43):

Boiling Pt (deg C): 80.42 (Adapted Stein & Brown method)
Melting Pt (deg C): -89.50 (Mean or Weighted MP)
VP (mm Hg, 25 deg C): 432 (Mean VP of Antoine & Grain methods)
VP (Pa, 25 deg C): 5.75E+004 (Mean VP of Antoine & Grain methods)
MP (exp database): -95.1 deg C
BP (exp database): 40 deg C
VP (exp database): 4.35E+02 mm Hg (5.80E+004 Pa) at 25 deg C

Water Solubility Estimate from Log Kow (WSKOW v1.42):

Water Solubility at 25 deg C (mg/L): 1.095e+004
log Kow used: 1.25 (expkow database)
no-melting pt equation used
Water Sol (Exper. database match) = 1.3e+004 mg/L (25 deg C)
Exper. Ref: HORVATH,AL (1982)

Water Sol Estimate from Fragments:

Wat Sol (v1.01 est) = 11665 mg/L

ECOSAR Class Program (ECOSAR v1.11):

Class(es) found:
Neutral Organics

Henrys Law Constant (25 deg C) [HENRYWIN v3.20]:

Bond Method : 9.14E-003 atm-m3/mole (9.26E+002 Pa-m3/mole)
Group Method: 3.01E-003 atm-m3/mole (3.05E+002 Pa-m3/mole)
Exper Database: 3.25E-03 atm-m3/mole (3.29E+002 Pa-m3/mole)

For Henry LC Comparison Purposes:

User-Entered Henry LC: not entered
Henrys LC [via VP/WSol estimate using User-Entered or Estimated values]:
HLC: 4.409E-003 atm-m3/mole (4.467E+002 Pa-m3/mole)
VP: 432 mm Hg (source: MPBPVP)
WS: 1.1E+004 mg/L (source: WSKOWWIN)

Log Octanol-Air Partition Coefficient (25 deg C) [KOAWIN v1.10]:

Log Kow used: 1.25 (exp database)
Log Kaw used: -0.877 (exp database)
Log Koa (KOAWIN v1.10 estimate): 2.127
Log Koa (experimental database): 2.270

Probability of Rapid Biodegradation (BIOWIN v4.10):

Biowin1 (Linear Model) : 0.4843
Biowin2 (Non-Linear Model) : 0.1298

Expert Survey Biodegradation Results:

Biowin3 (Ultimate Survey Model): 2.6651 (weeks-months)
Biowin4 (Primary Survey Model) : 3.5240 (days-weeks)

MITI Biodegradation Probability:

Biowin5 (MITI Linear Model) : 0.5111

Biowin6 (MITI Non-Linear Model): 0.3154
Anaerobic Biodegradation Probability:
Biowin7 (Anaerobic Linear Model): 0.8328
Ready Biodegradability Prediction: NO

Hydrocarbon Biodegradation (BioHCwin v1.01):
Structure incompatible with current estimation method!

Sorption to aerosols (25 Dec C) [AEROWIN v1.00]:
Vapor pressure (liquid/subcooled): 5.8E+004 Pa (435 mm Hg)
Log Koa (Exp database): 2.270
Kp (particle/gas partition coef. (m3/ug)):
Mackay model : 5.17E-011
Octanol/air (Koa) model: 4.57E-011
Fraction sorbed to airborne particulates (phi):
Junge-Pankow model : 1.87E-009
Mackay model : 4.14E-009
Octanol/air (Koa) model: 3.66E-009

Atmospheric Oxidation (25 deg C) [AopWin v1.92]:
Hydroxyl Radicals Reaction:
OVERALL OH Rate Constant = 0.1349 E-12 cm3/molecule-sec
Half-Life = 79.306 Days (12-hr day; 1.5E6 OH/cm3)
Ozone Reaction:
No Ozone Reaction Estimation
Fraction sorbed to airborne particulates (phi):
3E-009 (Junge-Pankow, Mackay avg)
3.66E-009 (Koa method)
Note: the sorbed fraction may be resistant to atmospheric oxidation

Soil Adsorption Coefficient (KOCWIN v2.00):
Koc : 21.73 L/kg (MCI method)
Log Koc: 1.337 (MCI method)
Koc : 12.15 L/kg (Kow method)
Log Koc: 1.084 (Kow method)
Experimental Log Koc: 1.44 (database)

Aqueous Base/Acid-Catalyzed Hydrolysis (25 deg C) [HYDROWIN v2.00]:
Total Kb for pH > 8 at 25 deg C : 5.095E-009 L/mol-sec
Kb Half-Life at pH 8: 4.311E+006 years
Kb Half-Life at pH 7: 4.311E+007 years
(Total Kb applies only to esters, carbmates, alkyl halides)

Bioaccumulation Estimates (BCFBAF v3.01):
Log BCF from regression-based method = 0.492 (BCF = 3.103 L/kg wet-wt)
Log Biotransformation Half-life (HL) = -0.6250 days (HL = 0.2371 days)
Log BCF Arnot-Gobas method (upper trophic) = 0.420 (BCF = 2.63)
Log BAF Arnot-Gobas method (upper trophic) = 0.420 (BAF = 2.63)
log Kow used: 1.25 (expkow database)

Volatilization from Water:
Henry LC: 0.00325 atm-m3/mole (Henry experimental database)
Half-Life from Model River: 1.106 hours
Half-Life from Model Lake : 89.34 hours (3.723 days)

Removal In Wastewater Treatment:
Total removal: 56.91 percent
Total biodegradation: 0.05 percent
Total sludge adsorption: 0.96 percent
Total to Air: 55.90 percent
(using 10000 hr Bio P,A,S)

Level III Fugacity Model:

	Mass Amount (percent)	Half-Life (hr)	Emissions (kg/hr)
Air	43.8	1.81e+003	1000
Water	45	900	1000

Soil	11	1.8e+003	1000
Sediment	0.132	8.1e+003	0

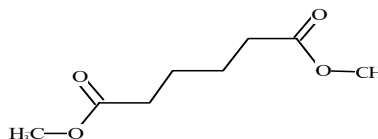
Persistence Time: 186 hr

CAS Number:
SMILES : COC(=O)CCCCC(=O)OC
CHEM :
MOL FOR: C8 H14 O4
MOL WT : 174.20

----- EPI SUMMARY (v4.11) -----

Physical Property Inputs:

Log Kow (octanol-water): -----
Boiling Point (deg C) : -----
Melting Point (deg C) : -----
Vapor Pressure (mm Hg) : -----
Water Solubility (mg/L): -----
Henry LC (atm-m3/mole) : -----



Log Octanol-Water Partition Coef (SRC):

Log Kow (KOWWIN v1.68 estimate) = 1.39
Log Kow (Exper. database match) = 1.03
Exper. Ref: HANSCH,C ET AL. (1995)

Boiling Pt, Melting Pt, Vapor Pressure Estimations (MPBPVP v1.43):

Boiling Pt (deg C): 186.96 (Adapted Stein & Brown method)
Melting Pt (deg C): -71.54 (Mean or Weighted MP)
VP(mm Hg,25 deg C): 0.687 (Mean VP of Antoine & Grain methods)
VP (Pa, 25 deg C) : 91.7 (Mean VP of Antoine & Grain methods)
MP (exp database): 10.3 deg C
BP (exp database): 115 @ 13 mm Hg deg C
VP (exp database): 6.04E-02 mm Hg (8.05E+000 Pa) at 25 deg C

Water Solubility Estimate from Log Kow (WSKOW v1.42):

Water Solubility at 25 deg C (mg/L): 7749
log Kow used: 1.03 (expkow database)
no-melting pt equation used
Water Sol (Exper. database match) = 6000 mg/L (deg C)
Exper. Ref: BENNETT,SR ET AL. (1984)

Water Sol Estimate from Fragments:

Wat Sol (v1.01 est) = 7098.1 mg/L

ECOSAR Class Program (ECOSAR v1.11):

Class(es) found:
Esters

Henrys Law Constant (25 deg C) [HENRYWIN v3.20]:

Bond Method : 9.77E-007 atm-m3/mole (9.90E-002 Pa-m3/mole)
Group Method: 1.28E-007 atm-m3/mole (1.30E-002 Pa-m3/mole)
Exper Database: 2.31E-06 atm-m3/mole (2.34E-001 Pa-m3/mole)

For Henry LC Comparison Purposes:

User-Entered Henry LC: not entered
Henrys LC [via VP/WSol estimate using User-Entered or Estimated values]:
HLC: 2.032E-005 atm-m3/mole (2.059E+000 Pa-m3/mole)
VP: 0.687 mm Hg (source: MPBPVP)
WS: 7.75E+003 mg/L (source: WSKOWWIN)

Log Octanol-Air Partition Coefficient (25 deg C) [KOAWIN v1.10]:

Log Kow used: 1.03 (exp database)
Log Kaw used: -4.025 (exp database)
Log Koa (KOAWIN v1.10 estimate): 5.055
Log Koa (experimental database): None

Probability of Rapid Biodegradation (BIOWIN v4.10):

Biowin1 (Linear Model) : 1.0130
Biowin2 (Non-Linear Model) : 0.9998

Expert Survey Biodegradation Results:

Biowin3 (Ultimate Survey Model): 3.0946 (weeks)
Biowin4 (Primary Survey Model) : 4.0543 (days)

MITI Biodegradation Probability:

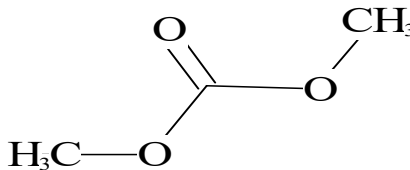
Biowin5 (MITI Linear Model) : 1.0799

CAS Number:
SMILES : COC(=O)OC
CHEM :
MOL FOR: C3 H6 O3
MOL WT : 90.08

----- EPI SUMMARY (v4.11) -----

Physical Property Inputs:

Log Kow (octanol-water): -----
Boiling Point (deg C) : -----
Melting Point (deg C) : -----
Vapor Pressure (mm Hg) : -----
Water Solubility (mg/L): -----
Henry LC (atm-m3/mole) : -----



Log Octanol-Water Partition Coef (SRC):
Log Kow (KOWWIN v1.68 estimate) = 0.23

Boiling Pt, Melting Pt, Vapor Pressure Estimation:

Boiling Pt (deg C): 97.75 (Adapted Stein & Brown method,
Melting Pt (deg C): -120.12 (Mean or Weighted MP)
VP(mm Hg,25 deg C): 56.2 (Mean VP of Antoine & Grain methods)
VP (Pa, 25 deg C) : 7.49E+003 (Mean VP of Antoine & Grain methods)
MP (exp database): 3 deg C
BP (exp database): 90.5 deg C
VP (exp database): 5.54E+01 mm Hg (7.39E+003 Pa) at 25 deg C

Water Solubility Estimate from Log Kow (WSKOW v1.42):

Water Solubility at 25 deg C (mg/L): 7.859e+004
log Kow used: 0.23 (estimated)
no-melting pt equation used

Water Sol Estimate from Fragments:

Wat Sol (v1.01 est) = 84977 mg/L

ECOSAR Class Program (ECOSAR v1.11):

Class(es) found:
Esters

Henrys Law Constant (25 deg C) [HENRYWIN v3.20]:

Bond Method : 6.20E-004 atm-m3/mole (6.29E+001 Pa-m3/mole)
Group Method: Incomplete

For Henry LC Comparison Purposes:

User-Entered Henry LC: not entered

Henrys LC [via VP/WSol estimate using User-Entered or Estimated values]:

HLC: 8.476E-005 atm-m3/mole (8.588E+000 Pa-m3/mole)
VP: 56.2 mm Hg (source: MPBPVP)
WS: 7.86E+004 mg/L (source: WSKOWWIN)

Log Octanol-Air Partition Coefficient (25 deg C) [KOAWIN v1.10]:

Log Kow used: 0.23 (KowWin est)
Log Kaw used: -1.596 (HenryWin est)
Log Koa (KOAWIN v1.10 estimate): 1.826
Log Koa (experimental database): None

Probability of Rapid Biodegradation (BIOWIN v4.10):

Biowin1 (Linear Model) : 0.7047
Biowin2 (Non-Linear Model) : 0.8494

Expert Survey Biodegradation Results:

Biowin3 (Ultimate Survey Model): 3.0001 (weeks)
Biowin4 (Primary Survey Model) : 3.7178 (days-weeks)

MITI Biodegradation Probability:

Biowin5 (MITI Linear Model) : 0.4450
Biowin6 (MITI Non-Linear Model): 0.4910

Anaerobic Biodegradation Probability:

Biowin7 (Anaerobic Linear Model): 0.6769

Ready Biodegradability Prediction: NO

Hydrocarbon Biodegradation (BioHCwin v1.01):

Structure incompatible with current estimation method!

Sorption to aerosols (25 Dec C) [AEROWIN v1.00]:

Vapor pressure (liquid/subcooled): 7.39E+003 Pa (55.4 mm Hg)

Log Koa (Koawin est): 1.826

Kp (particle/gas partition coef. (m3/ug)):

Mackay model : 4.06E-010

Octanol/air (Koa) model: 1.64E-011

Fraction sorbed to airborne particulates (phi):

Junge-Pankow model : 1.47E-008

Mackay model : 3.25E-008

Octanol/air (Koa) model: 1.32E-009

Atmospheric Oxidation (25 deg C) [AopWin v1.92]:

Hydroxyl Radicals Reaction:

OVERALL OH Rate Constant = 0.4352 E-12 cm3/molecule-sec

Half-Life = 24.577 Days (12-hr day; 1.5E6 OH/cm3)

Ozone Reaction:

No Ozone Reaction Estimation

Fraction sorbed to airborne particulates (phi):

2.36E-008 (Junge-Pankow, Mackay avg)

1.32E-009 (Koa method)

Note: the sorbed fraction may be resistant to atmospheric oxidation

Soil Adsorption Coefficient (KOCWIN v2.00):

Koc : 2.877 L/kg (MCI method)

Log Koc: 0.459 (MCI method)

Koc : 6.653 L/kg (Kow method)

Log Koc: 0.823 (Kow method)

Aqueous Base/Acid-Catalyzed Hydrolysis (25 deg C) [HYDROWIN v2.00]:

Rate constants can NOT be estimated for this structure!

Bioaccumulation Estimates (BCFBAF v3.01):

Log BCF from regression-based method = 0.500 (BCF = 3.162 L/kg wet-wt)

Log Biotransformation Half-life (HL) = -1.2061 days (HL = 0.06222 days)

Log BCF Arnot-Gobas method (upper trophic) = 0.010 (BCF = 1.023)

Log BAF Arnot-Gobas method (upper trophic) = 0.010 (BAF = 1.023)

log Kow used: 0.23 (estimated)

Volatilization from Water:

Henry LC: 0.00062 atm-m3/mole (estimated by Bond SAR Method)

Half-Life from Model River: 1.865 hours

Half-Life from Model Lake : 99.93 hours (4.164 days)

Removal In Wastewater Treatment:

Total removal: 22.66 percent

Total biodegradation: 0.08 percent

Total sludge adsorption: 1.44 percent

Total to Air: 21.14 percent

(using 10000 hr Bio P,A,S)

Level III Fugacity Model:

	Mass Amount (percent)	Half-Life (hr)	Emissions (kg/hr)
Air	36.5	828	1000
Water	42.2	360	1000
Soil	21.2	720	1000
Sediment	0.0824	3.24e+003	0

Persistence Time: 185 hr

Biowin6 (MITI Non-Linear Model): 0.9844
Anaerobic Biodegradation Probability:
Biowin7 (Anaerobic Linear Model): 1.1246
Ready Biodegradability Prediction: YES

Hydrocarbon Biodegradation (BioHCwin v1.01):
Structure incompatible with current estimation method!

Sorption to aerosols (25 Dec C) [AEROWIN v1.00]:
Vapor pressure (liquid/subcooled): 8.05 Pa (0.0604 mm Hg)
Log Koa (Koawin est): 5.055
Kp (particle/gas partition coef. (m3/ug)):
Mackay model : 3.73E-007
Octanol/air (Koa) model: 2.79E-008
Fraction sorbed to airborne particulates (phi):
Junge-Pankow model : 1.35E-005
Mackay model : 2.98E-005
Octanol/air (Koa) model: 2.23E-006

Atmospheric Oxidation (25 deg C) [AopWin v1.92]:
Hydroxyl Radicals Reaction:
OVERALL OH Rate Constant = 3.9736 E-12 cm3/molecule-sec
Half-Life = 2.692 Days (12-hr day; 1.5E6 OH/cm3)
Half-Life = 32.301 Hrs
Ozone Reaction:
No Ozone Reaction Estimation
Fraction sorbed to airborne particulates (phi):
2.16E-005 (Junge-Pankow, Mackay avg)
2.23E-006 (Koa method)
Note: the sorbed fraction may be resistant to atmospheric oxidation

Soil Adsorption Coefficient (KOCWIN v2.00):
Koc : 10 L/kg (MCI method)
Log Koc: 1.000 (MCI method)
Koc : 23.1 L/kg (Kow method)
Log Koc: 1.364 (Kow method)

Aqueous Base/Acid-Catalyzed Hydrolysis (25 deg C) [HYDROWIN v2.00]:
Total Kb for pH > 8 at 25 deg C : 1.327E-001 L/mol-sec
Kb Half-Life at pH 8: 60.458 days
Kb Half-Life at pH 7: 1.655 years
(Total Kb applies only to esters, carbmates, alkyl halides)

Bioaccumulation Estimates (BCFBAF v3.01):
Log BCF from regression-based method = 0.347 (BCF = 2.221 L/kg wet-wt)
Log Biotransformation Half-life (HL) = -2.6013 days (HL = 0.002504 days)
Log BCF Arnot-Gobas method (upper trophic) = 0.050 (BCF = 1.123)
Log BAF Arnot-Gobas method (upper trophic) = 0.050 (BAF = 1.123)
log Kow used: 1.03 (expkow database)

Volatilization from Water:
Henry LC: 2.31E-006 atm-m3/mole (Henry experimental database)
Half-Life from Model River: 335.9 hours (13.99 days)
Half-Life from Model Lake : 3775 hours (157.3 days)

Removal In Wastewater Treatment:
Total removal: 2.02 percent
Total biodegradation: 0.09 percent
Total sludge adsorption: 1.79 percent
Total to Air: 0.13 percent
(using 10000 hr Bio P,A,S)

Level III Fugacity Model:

	Mass Amount (percent)	Half-Life (hr)	Emissions (kg/hr)
Air	2.72	30.6	1000
Water	39	360	1000

Soil	58.2	720	1000
Sediment	0.0878	3.24e+003	0

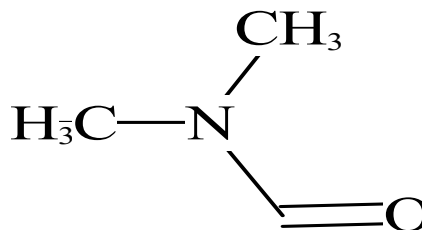
Persistence Time: 386 hr

CAS Number:
SMILES : CN(C)C=O
CHEM :
MOL FOR: C3 H7 N1 O1
MOL WT : 73.10

----- EPI SUMMARY (v4.11) -----

Physical Property Inputs:

Log Kow (octanol-water): -----
Boiling Point (deg C) : -----
Melting Point (deg C) : -----
Vapor Pressure (mm Hg) : -----
Water Solubility (mg/L): -----
Henry LC (atm-m3/mole) : -----



Log Octanol-Water Partition Coef (SRC):

Log Kow (KOWWIN v1.68 estimate) = -0.93
Log Kow (Exper. database match) = -1.01
Exper. Ref: HANSCH,C ET AL. (1995)

Boiling Pt, Melting Pt, Vapor Pressure Estimations (MPBPVP v1.43):

Boiling Pt (deg C): 117.42 (Adapted Stein & Brown method)
Melting Pt (deg C): -31.98 (Mean or Weighted MP)
VP (mm Hg, 25 deg C): 3.49 (Mean VP of Antoine & Grain methods)
VP (Pa, 25 deg C): 465 (Mean VP of Antoine & Grain methods)
MP (exp database): -60.4 deg C
BP (exp database): 153 deg C
VP (exp database): 3.87E+00 mm Hg (5.16E+002 Pa) at 25 deg C

Water Solubility Estimate from Log Kow (WSKOW v1.42):

Water Solubility at 25 deg C (mg/L): 9.779e+005
log Kow used: -1.01 (expkow database)
no-melting pt equation used
Water Sol (Exper. database match) = 1e+006 mg/L (25 deg C)
Exper. Ref: ISHOW (NA--) @2ND

Water Sol Estimate from Fragments:

Wat Sol (v1.01 est) = 1e+006 mg/L

ECOSAR Class Program (ECOSAR v1.11):

Class(es) found:
Amides

Henrys Law Constant (25 deg C) [HENRYWIN v3.20]:

Bond Method : 7.38E-008 atm-m3/mole (7.48E-003 Pa-m3/mole)
Group Method: Incomplete
Exper Database: 7.39E-08 atm-m3/mole (7.49E-003 Pa-m3/mole)

For Henry LC Comparison Purposes:

User-Entered Henry LC: not entered
Henrys LC [via VP/WSol estimate using User-Entered or Estimated values]:
HLC: 3.433E-007 atm-m3/mole (3.478E-002 Pa-m3/mole)
VP: 3.49 mm Hg (source: MPBPVP)
WS: 9.78E+005 mg/L (source: WSKOWWIN)

Log Octanol-Air Partition Coefficient (25 deg C) [KOAWIN v1.10]:

Log Kow used: -1.01 (exp database)
Log Kaw used: -5.520 (exp database)
Log Koa (KOAWIN v1.10 estimate): 4.510
Log Koa (experimental database): 4.380

Probability of Rapid Biodegradation (BIOWIN v4.10):

Biowin1 (Linear Model) : 0.9229
Biowin2 (Non-Linear Model) : 0.9906

Expert Survey Biodegradation Results:

Biowin3 (Ultimate Survey Model): 2.9834 (weeks)
Biowin4 (Primary Survey Model) : 3.9477 (days)

MITI Biodegradation Probability:

Biowin5 (MITI Linear Model) : 0.6221

Biowin6 (MITI Non-Linear Model): 0.7925
 Anaerobic Biodegradation Probability:
 Biowin7 (Anaerobic Linear Model): 0.1091
 Ready Biodegradability Prediction: YES

Hydrocarbon Biodegradation (BioHCwin v1.01):
 Structure incompatible with current estimation method!

Sorption to aerosols (25 Dec C) [AEROWIN v1.00]:
 Vapor pressure (liquid/subcooled): 516 Pa (3.87 mm Hg)
 Log Koa (Exp database): 4.380
 Kp (particle/gas partition coef. (m3/ug)):
 Mackay model : 5.81E-009
 Octanol/air (Koa) model: 5.89E-009
 Fraction sorbed to airborne particulates (phi):
 Junge-Pankow model : 2.1E-007
 Mackay model : 4.65E-007
 Octanol/air (Koa) model: 4.71E-007

Atmospheric Oxidation (25 deg C) [AopWin v1.92]:
 Hydroxyl Radicals Reaction:
 OVERALL OH Rate Constant = 17.5296 E-12 cm3/molecule-sec
 Half-Life = 0.610 Days (12-hr day; 1.5E6 OH/cm3)
 Half-Life = 7.322 Hrs
 Ozone Reaction:
 No Ozone Reaction Estimation
 Fraction sorbed to airborne particulates (phi):
 3.38E-007 (Junge-Pankow, Mackay avg)
 4.71E-007 (Koa method)
 Note: the sorbed fraction may be resistant to atmospheric oxidation

Soil Adsorption Coefficient (KOCWIN v2.00):
 Koc : 1 L/kg (MCI method)
 Log Koc: 0.000 (MCI method)
 Koc : 1.24 L/kg (Kow method)
 Log Koc: 0.094 (Kow method)

Aqueous Base/Acid-Catalyzed Hydrolysis (25 deg C) [HYDROWIN v2.00]:
 Rate constants can NOT be estimated for this structure!

Bioaccumulation Estimates (BCFBAF v3.01):
 Log BCF from regression-based method = 0.500 (BCF = 3.162 L/kg wet-wt)
 Log Biotransformation Half-life (HL) = -2.1399 days (HL = 0.007246 days)
 Log BCF Arnot-Gobas method (upper trophic) = -0.048 (BCF = 0.8953)
 Log BAF Arnot-Gobas method (upper trophic) = -0.048 (BAF = 0.8953)
 log Kow used: -1.01 (expkow database)

Volatilization from Water:
 Henry LC: 7.39E-008 atm-m3/mole (Henry experimental database)
 Half-Life from Model River: 6775 hours (282.3 days)
 Half-Life from Model Lake : 7.398E+004 hours (3082 days)

Removal In Wastewater Treatment:
 Total removal: 1.85 percent
 Total biodegradation: 0.09 percent
 Total sludge adsorption: 1.75 percent
 Total to Air: 0.00 percent
 (using 10000 hr Bio P,A,S)

Level III Fugacity Model:

	Mass Amount (percent)	Half-Life (hr)	Emissions (kg/hr)
Air	0.879	14.6	1000
Water	42.2	360	1000
Soil	56.9	720	1000
Sediment	0.0789	3.24e+003	0

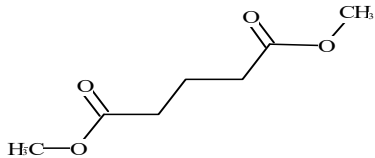
Persistence Time: 438 hr

CAS Number:
SMILES : COC(=O)CCCC(=O)OC
CHEM :
MOL FOR: C7 H12 O4
MOL WT : 160.17

----- EPI SUMMARY (v4.11) -----

Physical Property Inputs:

Log Kow (octanol-water): -----
Boiling Point (deg C) : -----
Melting Point (deg C) : -----
Vapor Pressure (mm Hg) : -----
Water Solubility (mg/L): -----
Henry LC (atm-m3/mole) : -----



Log Octanol-Water Partition Coef (SRC):

Log Kow (KOWWIN v1.68 estimate) = 0.90
Log Kow (Exper. database match) = 0.62
Exper. Ref: HANSCH,C ET AL. (1995)

Boiling Pt, Melting Pt, Vapor Pressure Estimations (MPBPVP v1.43):

Boiling Pt (deg C): 166.02 (Adapted Stein & Brown method)
Melting Pt (deg C): -83.29 (Mean or Weighted MP)
VP(mm Hg,25 deg C): 0.178 (Mean VP of Antoine & Grain methods)
VP (Pa, 25 deg C): 23.7 (Mean VP of Antoine & Grain methods)
MP (exp database): -42.5 deg C
BP (exp database): 214 deg C
VP (exp database): 1.80E-01 mm Hg (2.40E+001 Pa) at 25 deg C

Water Solubility Estimate from Log Kow (WSKOW v1.42):

Water Solubility at 25 deg C (mg/L): 2.019e+004
log Kow used: 0.62 (expkow database)
no-melting pt equation used
Water Sol (Exper. database match) = 5.9e+004 mg/L (25 deg C)
Exper. Ref: CHEM EVAL RES INST JAPAN (2002)

Water Sol Estimate from Fragments:

Wat Sol (v1.01 est) = 22475 mg/L

ECOSAR Class Program (ECOSAR v1.11):

Class(es) found:
Esters

Henrys Law Constant (25 deg C) [HENRYWIN v3.20]:

Bond Method : 7.36E-007 atm-m3/mole (7.45E-002 Pa-m3/mole)
Group Method: 9.09E-008 atm-m3/mole (9.21E-003 Pa-m3/mole)
Exper Database: 6.43E-07 atm-m3/mole (6.52E-002 Pa-m3/mole)

For Henry LC Comparison Purposes:

User-Entered Henry LC: not entered
Henrys LC [via VP/WSol estimate using User-Entered or Estimated values]:
HLC: 1.858E-006 atm-m3/mole (1.883E-001 Pa-m3/mole)
VP: 0.178 mm Hg (source: MPBPVP)
WS: 2.02E+004 mg/L (source: WSKOWWIN)

Log Octanol-Air Partition Coefficient (25 deg C) [KOAWIN v1.10]:

Log Kow used: 0.62 (exp database)
Log Kaw used: -4.580 (exp database)
Log Koa (KOAWIN v1.10 estimate): 5.200
Log Koa (experimental database): None

Probability of Rapid Biodegradation (BIOWIN v4.10):

Biowin1 (Linear Model) : 1.0197
Biowin2 (Non-Linear Model) : 0.9999

Expert Survey Biodegradation Results:

Biowin3 (Ultimate Survey Model): 3.1256 (weeks)
Biowin4 (Primary Survey Model) : 4.0746 (days)

MITI Biodegradation Probability:

Biowin5 (MITI Linear Model) : 1.0722

Biowin6 (MITI Non-Linear Model): 0.9840
Anaerobic Biodegradation Probability:
Biowin7 (Anaerobic Linear Model): 1.0986
Ready Biodegradability Prediction: YES

Hydrocarbon Biodegradation (BioHCwin v1.01):
Structure incompatible with current estimation method!

Sorption to aerosols (25 Dec C) [AEROWIN v1.00]:
Vapor pressure (liquid/subcooled): 24 Pa (0.18 mm Hg)
Log Koa (Koawin est): 5.200
Kp (particle/gas partition coef. (m3/ug)):
Mackay model : 1.25E-007
Octanol/air (Koa) model: 3.89E-008
Fraction sorbed to airborne particulates (phi):
Junge-Pankow model : 4.51E-006
Mackay model : 1E-005
Octanol/air (Koa) model: 3.11E-006

Atmospheric Oxidation (25 deg C) [AopWin v1.92]:
Hydroxyl Radicals Reaction:
OVERALL OH Rate Constant = 2.5605 E-12 cm3/molecule-sec
Half-Life = 4.177 Days (12-hr day; 1.5E6 OH/cm3)
Half-Life = 50.127 Hrs
Ozone Reaction:
No Ozone Reaction Estimation
Fraction sorbed to airborne particulates (phi):
7.26E-006 (Junge-Pankow, Mackay avg)
3.11E-006 (Koa method)
Note: the sorbed fraction may be resistant to atmospheric oxidation

Soil Adsorption Coefficient (KOCWIN v2.00):
Koc : 10 L/kg (MCI method)
Log Koc: 1.000 (MCI method)
Koc : 13.7 L/kg (Kow method)
Log Koc: 1.137 (Kow method)

Aqueous Base/Acid-Catalyzed Hydrolysis (25 deg C) [HYDROWIN v2.00]:
Total Kb for pH > 8 at 25 deg C : 1.327E-001 L/mol-sec
Kb Half-Life at pH 8: 60.458 days
Kb Half-Life at pH 7: 1.655 years
(Total Kb applies only to esters, carbmates, alkyl halides)

Bioaccumulation Estimates (BCFBAF v3.01):
Log BCF from regression-based method = 0.500 (BCF = 3.162 L/kg wet-wt)
Log Biotransformation Half-life (HL) = -2.7155 days (HL = 0.001925 days)
Log BCF Arnot-Gobas method (upper trophic) = -0.013 (BCF = 0.9713)
Log BAF Arnot-Gobas method (upper trophic) = -0.013 (BAF = 0.9713)
log Kow used: 0.62 (expkow database)

Volatilization from Water:
Henry LC: 6.43E-007 atm-m3/mole (Henry experimental database)
Half-Life from Model River: 1154 hours (48.07 days)
Half-Life from Model Lake : 1.269E+004 hours (528.8 days)

Removal In Wastewater Treatment:
Total removal: 1.90 percent
Total biodegradation: 0.09 percent
Total sludge adsorption: 1.77 percent
Total to Air: 0.04 percent
(using 10000 hr Bio P,A,S)

Level III Fugacity Model:

	Mass Amount (percent)	Half-Life (hr)	Emissions (kg/hr)
Air	3.52	77.8	1000
Water	36.8	360	1000

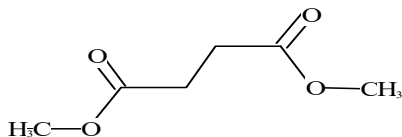
Soil	59.6	720	1000
Sediment	0.0828	3.24e+003	0
Persistence Time: 432 hr			

CAS Number:
SMILES : COC(=O)CCC(=O)OC
CHEM :
MOL FOR: C6 H10 O4
MOL WT : 146.14

----- EPI SUMMARY (v4.11) -----

Physical Property Inputs:

Log Kow (octanol-water): -----
Boiling Point (deg C) : -----
Melting Point (deg C) : -----
Vapor Pressure (mm Hg) : -----
Water Solubility (mg/L): -----
Henry LC (atm-m3/mole) : -----



Log Octanol-Water Partition Coef (SRC):

Log Kow (KOWWIN v1.68 estimate) = 0.40
Log Kow (Exper. database match) = 0.35
Exper. Ref: HANSCH,C ET AL. (1995)

Boiling Pt, Melting Pt, Vapor Pressure Estimations (MPBPVP v1.43):

Boiling Pt (deg C): 144.16 (Adapted Stein & Brown method)
Melting Pt (deg C): -95.30 (Mean or Weighted MP)
VP(mm Hg,25 deg C): 0.432 (Mean VP of Antoine & Grain methods)
VP (Pa, 25 deg C): 57.5 (Mean VP of Antoine & Grain methods)
MP (exp database): 19 deg C
BP (exp database): 196.4 deg C
VP (exp database): 4.10E-01 mm Hg (5.47E+001 Pa) at 25 deg C

Water Solubility Estimate from Log Kow (WSKOW v1.42):

Water Solubility at 25 deg C (mg/L): 3.962e+004
log Kow used: 0.35 (expkow database)
no-melting pt equation used
Water Sol (Exper. database match) = 2.5e+004 mg/L (deg C)
Exper. Ref: KIRK-OTHMER; 1st ed, 5:831

Water Sol Estimate from Fragments:

Wat Sol (v1.01 est) = 70618 mg/L

ECOSAR Class Program (ECOSAR v1.11):

Class(es) found:
Esters

Henrys Law Constant (25 deg C) [HENRYWIN v3.20]:

Bond Method : 5.54E-007 atm-m3/mole (5.62E-002 Pa-m3/mole)
Group Method: 6.43E-008 atm-m3/mole (6.52E-003 Pa-m3/mole)

For Henry LC Comparison Purposes:

User-Entered Henry LC: not entered
Henrys LC [via VP/WSol estimate using User-Entered or Estimated values]:
HLC: 2.097E-006 atm-m3/mole (2.124E-001 Pa-m3/mole)
VP: 0.432 mm Hg (source: MPBPVP)
WS: 3.96E+004 mg/L (source: WSKOWWIN)

Log Octanol-Air Partition Coefficient (25 deg C) [KOAWIN v1.10]:

Log Kow used: 0.35 (exp database)
Log Kaw used: -4.645 (HenryWin est)
Log Koa (KOAWIN v1.10 estimate): 4.995
Log Koa (experimental database): None

Probability of Rapid Biodegradation (BIOWIN v4.10):

Biowin1 (Linear Model) : 1.0263
Biowin2 (Non-Linear Model) : 0.9999

Expert Survey Biodegradation Results:

Biowin3 (Ultimate Survey Model): 3.1566 (weeks)
Biowin4 (Primary Survey Model) : 4.0948 (days)

MITI Biodegradation Probability:

Biowin5 (MITI Linear Model) : 1.0645
Biowin6 (MITI Non-Linear Model): 0.9836

Anaerobic Biodegradation Probability:
Biowin7 (Anaerobic Linear Model): 1.0726
Ready Biodegradability Prediction: YES

Hydrocarbon Biodegradation (BioHCwin v1.01):
Structure incompatible with current estimation method!

Sorption to aerosols (25 Dec C) [AEROWIN v1.00]:
Vapor pressure (liquid/subcooled): 54.7 Pa (0.41 mm Hg)
Log Koa (Koawin est): 4.995
Kp (particle/gas partition coef. (m3/ug)):
Mackay model : 5.49E-008
Octanol/air (Koa) model: 2.43E-008
Fraction sorbed to airborne particulates (phi):
Junge-Pankow model : 1.98E-006
Mackay model : 4.39E-006
Octanol/air (Koa) model: 1.94E-006

Atmospheric Oxidation (25 deg C) [AopWin v1.92]:
Hydroxyl Radicals Reaction:
OVERALL OH Rate Constant = 1.1475 E-12 cm3/molecule-sec
Half-Life = 9.321 Days (12-hr day; 1.5E6 OH/cm3)
Half-Life = 111.857 Hrs
Ozone Reaction:
No Ozone Reaction Estimation
Fraction sorbed to airborne particulates (phi):
3.19E-006 (Junge-Pankow, Mackay avg)
1.94E-006 (Koa method)
Note: the sorbed fraction may be resistant to atmospheric oxidation

Soil Adsorption Coefficient (KOCWIN v2.00):
Koc : 10 L/kg (MCI method)
Log Koc: 1.000 (MCI method)
Koc : 9.716 L/kg (Kow method)
Log Koc: 0.988 (Kow method)

Aqueous Base/Acid-Catalyzed Hydrolysis (25 deg C) [HYDROWIN v2.00]:
Total Kb for pH > 8 at 25 deg C : 9.454E-002 L/mol-sec
Kb Half-Life at pH 8: 84.850 days
Kb Half-Life at pH 7: 2.323 years
(Total Kb applies only to esters, carbmates, alkyl halides)

Bioaccumulation Estimates (BCFBAF v3.01):
Log BCF from regression-based method = 0.500 (BCF = 3.162 L/kg wet-wt)
Log Biotransformation Half-life (HL) = -2.7867 days (HL = 0.001634 days)
Log BCF Arnot-Gobas method (upper trophic) = -0.029 (BCF = 0.9357)
Log BAF Arnot-Gobas method (upper trophic) = -0.029 (BAF = 0.9357)
log Kow used: 0.35 (expkow database)

Volatilization from Water:
Henry LC: 6.43E-008 atm-m3/mole (estimated by Group SAR Method)
Half-Life from Model River: 1.101E+004 hours (458.7 days)
Half-Life from Model Lake : 1.202E+005 hours (5008 days)

Removal In Wastewater Treatment:
Total removal: 1.86 percent
Total biodegradation: 0.09 percent
Total sludge adsorption: 1.76 percent
Total to Air: 0.00 percent
(using 10000 hr Bio P,A,S)

Level III Fugacity Model:

	Mass Amount (percent)	Half-Life (hr)	Emissions (kg/hr)
Air	1.13	183	1000
Water	32	360	1000
Soil	66.8	720	1000

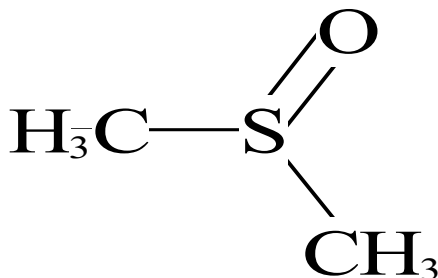
Sediment 0.072 3.24e+003 0
Persistence Time: 576 hr

CAS Number:
SMILES : CS(=O)C
CHEM :
MOL FOR: C2 H6 O1 S1
MOL WT : 78.13

----- EPI SUMMARY (v4.11) -----

Physical Property Inputs:

Log Kow (octanol-water): -----
Boiling Point (deg C) : -----
Melting Point (deg C) : -----
Vapor Pressure (mm Hg) : -----
Water Solubility (mg/L): -----
Henry LC (atm-m3/mole) : -----



Log Octanol-Water Partition Coef (SRC):

Log Kow (KOWWIN v1.68 estimate) = -1.22
Log Kow (Exper. database match) = -1.35
Exper. Ref: HANSCH,C ET AL. (1995)

Boiling Pt, Melting Pt, Vapor Pressure Estimations (MPBPVP v1.43):

Boiling Pt (deg C): 128.63 (Adapted Stein & Brown method)
Melting Pt (deg C): -49.71 (Mean or Weighted MP)
VP (mm Hg, 25 deg C): 0.622 (Mean VP of Antoine & Grain methods)
VP (Pa, 25 deg C): 82.9 (Mean VP of Antoine & Grain methods)
MP (exp database): 18.5 deg C
BP (exp database): 189 deg C
VP (exp database): 6.10E-01 mm Hg (8.13E+001 Pa) at 25 deg C

Water Solubility Estimate from Log Kow (WSKOW v1.42):

Water Solubility at 25 deg C (mg/L): 1e+006
log Kow used: -1.35 (expkow database)
no-melting pt equation used
Water Sol (Exper. database match) = 1e+006 mg/L (deg C)
Exper. Ref: DORIGAN,J ET AL. (1976A);@2ND

Water Sol Estimate from Fragments:

Wat Sol (v1.01 est) = 1e+006 mg/L

ECOSAR Class Program (ECOSAR v1.11):

Class(es) found:
Neutral Organics

Henrys Law Constant (25 deg C) [HENRYWIN v3.20]:

Bond Method : 4.96E-008 atm-m3/mole (5.02E-003 Pa-m3/mole)
Group Method: Incomplete
Exper Database: 1.51E-09 atm-m3/mole (1.53E-004 Pa-m3/mole)

For Henry LC Comparison Purposes:

User-Entered Henry LC: not entered
Henrys LC [via VP/WSol estimate using User-Entered or Estimated values]:
HLC: 6.394E-008 atm-m3/mole (6.479E-003 Pa-m3/mole)
VP: 0.622 mm Hg (source: MPBPVP)
WS: 1E+006 mg/L (source: WSKOWWIN)

Log Octanol-Air Partition Coefficient (25 deg C) [KOAWIN v1.10]:

Log Kow used: -1.35 (exp database)
Log Kaw used: -7.209 (exp database)
Log Koa (KOAWIN v1.10 estimate): 5.859
Log Koa (experimental database): 4.960

Probability of Rapid Biodegradation (BIOWIN v4.10):

Biowin1 (Linear Model) : 0.7104
Biowin2 (Non-Linear Model) : 0.8698

Expert Survey Biodegradation Results:

Biowin3 (Ultimate Survey Model): 3.0265 (weeks)
Biowin4 (Primary Survey Model) : 3.7350 (days-weeks)

MITI Biodegradation Probability:

Biowin5 (MITI Linear Model) : 0.4805

Biowin6 (MITI Non-Linear Model): 0.5766
Anaerobic Biodegradation Probability:
Biowin7 (Anaerobic Linear Model): 0.6769
Ready Biodegradability Prediction: NO

Hydrocarbon Biodegradation (BioHCwin v1.01):
Structure incompatible with current estimation method!

Sorption to aerosols (25 Dec C) [AEROWIN v1.00]:
Vapor pressure (liquid/subcooled): 81.3 Pa (0.61 mm Hg)
Log Koa (Exp database): 4.960
Kp (particle/gas partition coef. (m3/ug)):
Mackay model : 3.69E-008
Octanol/air (Koa) model: 2.24E-008
Fraction sorbed to airborne particulates (phi):
Junge-Pankow model : 1.33E-006
Mackay model : 2.95E-006
Octanol/air (Koa) model: 1.79E-006

Atmospheric Oxidation (25 deg C) [AopWin v1.92]:
Hydroxyl Radicals Reaction:
OVERALL OH Rate Constant = 62.1216 E-12 cm3/molecule-sec
Half-Life = 0.172 Days (12-hr day; 1.5E6 OH/cm3)
Half-Life = 2.066 Hrs
Ozone Reaction:
No Ozone Reaction Estimation
Fraction sorbed to airborne particulates (phi):
2.14E-006 (Junge-Pankow, Mackay avg)
1.79E-006 (Koa method)
Note: the sorbed fraction may be resistant to atmospheric oxidation

Soil Adsorption Coefficient (KOCWIN v2.00):
Koc : 2.082 L/kg (MCI method)
Log Koc: 0.319 (MCI method)
Koc : 1.877 L/kg (Kow method)
Log Koc: 0.273 (Kow method)

Aqueous Base/Acid-Catalyzed Hydrolysis (25 deg C) [HYDROWIN v2.00]:
Rate constants can NOT be estimated for this structure!

Bioaccumulation Estimates (BCFBAF v3.01):
Log BCF from regression-based method = 0.500 (BCF = 3.162 L/kg wet-wt)
Log Biotransformation Half-life (HL) = -1.6621 days (HL = 0.02177 days)
Log BCF Arnot-Gobas method (upper trophic) = -0.048 (BCF = 0.8952)
Log BAF Arnot-Gobas method (upper trophic) = -0.048 (BAF = 0.8952)
log Kow used: -1.35 (expkow database)

Volatilization from Water:
Henry LC: 1.51E-009 atm-m3/mole (Henry experimental database)
Half-Life from Model River: 3.427E+005 hours (1.428E+004 days)
Half-Life from Model Lake : 3.739E+006 hours (1.558E+005 days)

Removal In Wastewater Treatment:
Total removal: 1.85 percent
Total biodegradation: 0.09 percent
Total sludge adsorption: 1.75 percent
Total to Air: 0.00 percent
(using 10000 hr Bio P,A,S)

Level III Fugacity Model:

	Mass Amount (percent)	Half-Life (hr)	Emissions (kg/hr)
Air	0.0325	4.14	1000
Water	37	360	1000
Soil	62.8	720	1000
Sediment	0.071	3.24e+003	0

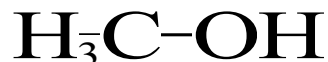
Persistence Time: 573 hr

CAS Number:
SMILES : CO
CHEM :
MOL FOR: C1 H4 O1
MOL WT : 32.04

----- EPI SUMMARY (v4.11) -----

Physical Property Inputs:

Log Kow (octanol-water): -----
Boiling Point (deg C) : -----
Melting Point (deg C) : -----
Vapor Pressure (mm Hg) : -----
Water Solubility (mg/L): -----
Henry LC (atm-m3/mole) : -----



Log Octanol-Water Partition Coef (SRC):

Log Kow (KOWWIN v1.68 estimate) = -0.63
Log Kow (Exper. database match) = -0.77
Exper. Ref: HANSCH,C ET AL. (1995)

Boiling Pt, Melting Pt, Vapor Pressure Estimations (MPBPVP v1.43):

Boiling Pt (deg C): 39.35 (Adapted Stein & Brown method)
Melting Pt (deg C): -101.00 (Mean or Weighted MP)
VP(mm Hg,25 deg C): 119 (Mean VP of Antoine & Grain methods)
VP (Pa, 25 deg C) : 1.58E+004 (Mean VP of Antoine & Grain methods)
MP (exp database): -97.6 deg C
BP (exp database): 64.7 deg C
VP (exp database): 1.27E+02 mm Hg (1.69E+004 Pa) at 25 deg C

Water Solubility Estimate from Log Kow (WSKOW v1.42):

Water Solubility at 25 deg C (mg/L): 1e+006
log Kow used: -0.77 (expkow database)
no-melting pt equation used
Water Sol (Exper. database match) = 1e+006 mg/L (25 deg C)
Exper. Ref: RIDDICK,JA ET AL. (1986)

Water Sol Estimate from Fragments:

Wat Sol (v1.01 est) = 1e+006 mg/L

ECOSAR Class Program (ECOSAR v1.11):

Class(es) found:
Neutral Organics

Henrys Law Constant (25 deg C) [HENRYWIN v3.20]:

Bond Method : 4.27E-006 atm-m3/mole (4.32E-001 Pa-m3/mole)
Group Method: 3.62E-006 atm-m3/mole (3.67E-001 Pa-m3/mole)
Exper Database: 4.55E-06 atm-m3/mole (4.61E-001 Pa-m3/mole)

For Henry LC Comparison Purposes:

User-Entered Henry LC: not entered
Henrys LC [via VP/WSol estimate using User-Entered or Estimated values]:
HLC: 5.017E-006 atm-m3/mole (5.083E-001 Pa-m3/mole)
VP: 119 mm Hg (source: MPBPVP)
WS: 1E+006 mg/L (source: WSKOWWIN)

Log Octanol-Air Partition Coefficient (25 deg C) [KOAWIN v1.10]:

Log Kow used: -0.77 (exp database)
Log Kaw used: -3.730 (exp database)
Log Koa (KOAWIN v1.10 estimate): 2.960
Log Koa (experimental database): 2.880

Probability of Rapid Biodegradation (BIOWIN v4.10):

Biowin1 (Linear Model) : 0.8910
Biowin2 (Non-Linear Model) : 0.9752

Expert Survey Biodegradation Results:

Biowin3 (Ultimate Survey Model): 3.2883 (days-weeks)
Biowin4 (Primary Survey Model) : 3.9310 (days)

MITI Biodegradation Probability:

Biowin5 (MITI Linear Model) : 0.7784

Biowin6 (MITI Non-Linear Model): 0.9324
Anaerobic Biodegradation Probability:
Biowin7 (Anaerobic Linear Model): 0.8893
Ready Biodegradability Prediction: YES

Hydrocarbon Biodegradation (BioHCwin v1.01):
Structure incompatible with current estimation method!

Sorption to aerosols (25 Dec C) [AEROWIN v1.00]:
Vapor pressure (liquid/subcooled): 1.69E+004 Pa (127 mm Hg)
Log Koa (Exp database): 2.880
Kp (particle/gas partition coef. (m3/ug)):
Mackay model : 1.77E-010
Octanol/air (Koa) model: 1.86E-010
Fraction sorbed to airborne particulates (phi):
Junge-Pankow model : 6.4E-009
Mackay model : 1.42E-008
Octanol/air (Koa) model: 1.49E-008

Atmospheric Oxidation (25 deg C) [AopWin v1.92]:
Hydroxyl Radicals Reaction:
OVERALL OH Rate Constant = 0.6160 E-12 cm3/molecule-sec
Half-Life = 17.364 Days (12-hr day; 1.5E6 OH/cm3)
Ozone Reaction:
No Ozone Reaction Estimation
Fraction sorbed to airborne particulates (phi):
1.03E-008 (Junge-Pankow, Mackay avg)
1.49E-008 (Koa method)
Note: the sorbed fraction may be resistant to atmospheric oxidation

Soil Adsorption Coefficient (KOCWIN v2.00):
Koc : 1 L/kg (MCI method)
Log Koc: 0.000 (MCI method)
Koc : 1.224 L/kg (Kow method)
Log Koc: 0.088 (Kow method)
Experimental Log Koc: 0.44 (database)

Aqueous Base/Acid-Catalyzed Hydrolysis (25 deg C) [HYDROWIN v2.00]:
Rate constants can NOT be estimated for this structure!

Bioaccumulation Estimates (BCFBAF v3.01):
Log BCF from regression-based method = 0.500 (BCF = 3.162 L/kg wet-wt)
Log Biotransformation Half-life (HL) = -1.6723 days (HL = 0.02126 days)
Log BCF Arnot-Gobas method (upper trophic) = -0.045 (BCF = 0.9013)
Log BAF Arnot-Gobas method (upper trophic) = -0.045 (BAF = 0.9013)
log Kow used: -0.77 (expkow database)

Volatilization from Water:
Henry LC: 4.55E-006 atm-m3/mole (Henry experimental database)
Half-Life from Model River: 73.41 hours (3.059 days)
Half-Life from Model Lake : 848.3 hours (35.35 days)

Removal In Wastewater Treatment:
Total removal: 2.10 percent
Total biodegradation: 0.09 percent
Total sludge adsorption: 1.75 percent
Total to Air: 0.26 percent
(using 10000 hr Bio P,A,S)

Level III Fugacity Model:

	Mass Amount (percent)	Half-Life (hr)	Emissions (kg/hr)
Air	10.3	272	1000
Water	39.3	208	1000
Soil	50.4	416	1000
Sediment	0.0695	1.87e+003	0

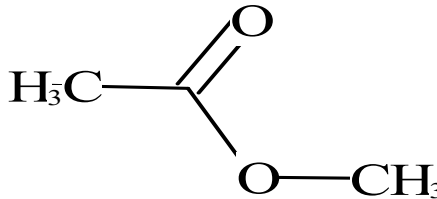
Persistence Time: 261 hr

CAS Number:
SMILES : CC(=O)OC
CHEM :
MOL FOR: C3 H6 O2
MOL WT : 74.08

----- EPI SUMMARY (v4.11) -----

Physical Property Inputs:

Log Kow (octanol-water): -----
Boiling Point (deg C) : -----
Melting Point (deg C) : -----
Vapor Pressure (mm Hg) : -----
Water Solubility (mg/L): -----
Henry LC (atm-m3/mole) : -----



Log Octanol-Water Partition Coef (SRC):

Log Kow (KOWWIN v1.68 estimate) = 0.37
Log Kow (Exper. database match) = 0.18
Exper. Ref: HANSCH,C ET AL. (1995)

Boiling Pt, Melting Pt, Vapor Pressure Estimations (MPBPVP v1.43):

Boiling Pt (deg C): 52.62 (Adapted Stein & Brown method)
Melting Pt (deg C): -95.10 (Mean or Weighted MP)
VP(mm Hg,25 deg C): 52.7 (Mean VP of Antoine & Grain methods)
VP (Pa, 25 deg C) : 7.03E+003 (Mean VP of Antoine & Grain methods)
MP (exp database): -98 deg C
BP (exp database): 92 deg C
VP (exp database): 2.16E+02 mm Hg (2.88E+004 Pa) at 25 deg C

Water Solubility Estimate from Log Kow (WSKOW v1.42):

Water Solubility at 25 deg C (mg/L): 9.39e+004
log Kow used: 0.18 (expkow database)
no-melting pt equation used
Water Sol (Exper. database match) = 2.43e+005 mg/L (20 deg C)
Exper. Ref: STEPHEN,H & STEPHEN,T (1963)

Water Sol Estimate from Fragments:

Wat Sol (v1.01 est) = 1.1275e+005 mg/L

ECOSAR Class Program (ECOSAR v1.11):

Class(es) found:
Esters

Henrys Law Constant (25 deg C) [HENRYWIN v3.20]:

Bond Method : 1.75E-004 atm-m3/mole (1.78E+001 Pa-m3/mole)
Group Method: 1.17E-004 atm-m3/mole (1.19E+001 Pa-m3/mole)
Exper Database: 1.15E-04 atm-m3/mole (1.17E+001 Pa-m3/mole)

For Henry LC Comparison Purposes:

User-Entered Henry LC: not entered
Henrys LC [via VP/WSol estimate using User-Entered or Estimated values]:
HLC: 5.471E-005 atm-m3/mole (5.543E+000 Pa-m3/mole)
VP: 52.7 mm Hg (source: MPBPVP)
WS: 9.39E+004 mg/L (source: WSKOWWIN)

Log Octanol-Air Partition Coefficient (25 deg C) [KOAWIN v1.10]:

Log Kow used: 0.18 (exp database)
Log Kaw used: -2.328 (exp database)
Log Koa (KOAWIN v1.10 estimate): 2.508
Log Koa (experimental database): 2.310

Probability of Rapid Biodegradation (BIOWIN v4.10):

Biowin1 (Linear Model) : 0.8865
Biowin2 (Non-Linear Model) : 0.9976

Expert Survey Biodegradation Results:

Biowin3 (Ultimate Survey Model): 3.1757 (weeks)
Biowin4 (Primary Survey Model) : 3.9698 (days)

MITI Biodegradation Probability:

Biowin5 (MITI Linear Model) : 0.8363

Biowin6 (MITI Non-Linear Model): 0.9464
Anaerobic Biodegradation Probability:
Biowin7 (Anaerobic Linear Model): 0.8488
Ready Biodegradability Prediction: YES

Hydrocarbon Biodegradation (BioHCwin v1.01):
Structure incompatible with current estimation method!

Sorption to aerosols (25 Dec C) [AEROWIN v1.00]:
Vapor pressure (liquid/subcooled): 2.88E+004 Pa (216 mm Hg)
Log Koa (Exp database): 2.310
Kp (particle/gas partition coef. (m3/ug)):
Mackay model : 1.04E-010
Octanol/air (Koa) model: 5.01E-011
Fraction sorbed to airborne particulates (phi):
Junge-Pankow model : 3.76E-009
Mackay model : 8.33E-009
Octanol/air (Koa) model: 4.01E-009

Atmospheric Oxidation (25 deg C) [AopWin v1.92]:
Hydroxyl Radicals Reaction:
OVERALL OH Rate Constant = 0.2598 E-12 cm3/molecule-sec
Half-Life = 41.176 Days (12-hr day; 1.5E6 OH/cm3)
Ozone Reaction:
No Ozone Reaction Estimation
Fraction sorbed to airborne particulates (phi):
6.05E-009 (Junge-Pankow, Mackay avg)
4.01E-009 (Koa method)
Note: the sorbed fraction may be resistant to atmospheric oxidation

Soil Adsorption Coefficient (KOCWIN v2.00):
Koc : 3.064 L/kg (MCI method)
Log Koc: 0.486 (MCI method)
Koc : 9.101 L/kg (Kow method)
Log Koc: 0.959 (Kow method)

Aqueous Base/Acid-Catalyzed Hydrolysis (25 deg C) [HYDROWIN v2.00]:
Total Kb for pH > 8 at 25 deg C : 1.279E-001 L/mol-sec
Kb Half-Life at pH 8: 62.702 days
Kb Half-Life at pH 7: 1.717 years
(Total Kb applies only to esters, carbmates, alkyl halides)

Bioaccumulation Estimates (BCFBAF v3.01):
Log BCF from regression-based method = 0.500 (BCF = 3.162 L/kg wet-wt)
Log Biotransformation Half-life (HL) = -1.9420 days (HL = 0.01143 days)
Log BCF Arnot-Gobas method (upper trophic) = -0.025 (BCF = 0.9433)
Log BAF Arnot-Gobas method (upper trophic) = -0.025 (BAF = 0.9433)
log Kow used: 0.18 (expkow database)

Volatilization from Water:
Henry LC: 0.000115 atm-m3/mole (Henry experimental database)
Half-Life from Model River: 5.26 hours
Half-Life from Model Lake : 129.6 hours (5.398 days)

Removal In Wastewater Treatment:
Total removal: 7.29 percent
Total biodegradation: 0.09 percent
Total sludge adsorption: 1.68 percent
Total to Air: 5.52 percent
(using 10000 hr Bio P,A,S)

Level III Fugacity Model:

	Mass Amount (percent)	Half-Life (hr)	Emissions (kg/hr)
Air	18.5	753	1000
Water	41.2	360	1000
Soil	40.2	720	1000

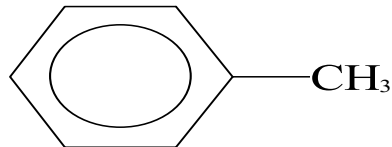
Sediment 0.0808 3.24e+003 0
Persistence Time: 277 hr

CAS Number:
SMILES : Cc1ccccc1
CHEM :
MOL FOR: C7 H8
MOL WT : 92.14

----- EPI SUMMARY (v4.11) -----

Physical Property Inputs:

Log Kow (octanol-water): -----
Boiling Point (deg C) : -----
Melting Point (deg C) : -----
Vapor Pressure (mm Hg) : -----
Water Solubility (mg/L): -----
Henry LC (atm-m3/mole) : -----



Log Octanol-Water Partition Coef (SRC):

Log Kow (KOWWIN v1.68 estimate) = 2.54
Log Kow (Exper. database match) = 2.73
Exper. Ref: HANSCH,C ET AL. (1995)

Boiling Pt, Melting Pt, Vapor Pressure Estimations (MPBPVP v1.43):

Boiling Pt (deg C): 125.72 (Adapted Stein & Brown method)
Melting Pt (deg C): -59.17 (Mean or Weighted MP)
VP (mm Hg, 25 deg C): 23.7 (Mean VP of Antoine & Grain methods)
VP (Pa, 25 deg C): 3.16E+003 (Mean VP of Antoine & Grain methods)
MP (exp database): -94.9 deg C
BP (exp database): 110.6 deg C
VP (exp database): 2.84E+01 mm Hg (3.79E+003 Pa) at 25 deg C

Water Solubility Estimate from Log Kow (WSKOW v1.42):

Water Solubility at 25 deg C (mg/L): 573.1
log Kow used: 2.73 (expkow database)
no-melting pt equation used
Water Sol (Exper. database match) = 526 mg/L (25 deg C)
Exper. Ref: SANEMASA,I ET AL. (1982)

Water Sol Estimate from Fragments:

Wat Sol (v1.01 est) = 471.12 mg/L

ECOSAR Class Program (ECOSAR v1.11):

Class(es) found:
Neutral Organics

Henrys Law Constant (25 deg C) [HENRYWIN v3.20]:

Bond Method : 5.95E-003 atm-m3/mole (6.02E+002 Pa-m3/mole)
Group Method: 5.73E-003 atm-m3/mole (5.81E+002 Pa-m3/mole)
Exper Database: 6.64E-03 atm-m3/mole (6.73E+002 Pa-m3/mole)

For Henry LC Comparison Purposes:

User-Entered Henry LC: not entered
Henrys LC [via VP/WSol estimate using User-Entered or Estimated values]:
HLC: 5.014E-003 atm-m3/mole (5.080E+002 Pa-m3/mole)
VP: 23.7 mm Hg (source: MPBPVP)
WS: 573 mg/L (source: WSKOWWIN)

Log Octanol-Air Partition Coefficient (25 deg C) [KOAWIN v1.10]:

Log Kow used: 2.73 (exp database)
Log Kaw used: -0.566 (exp database)
Log Koa (KOAWIN v1.10 estimate): 3.296
Log Koa (experimental database): 3.310

Probability of Rapid Biodegradation (BIOWIN v4.10):

Biowin1 (Linear Model) : 0.8864
Biowin2 (Non-Linear Model) : 0.9833

Expert Survey Biodegradation Results:

Biowin3 (Ultimate Survey Model): 2.9427 (weeks)
Biowin4 (Primary Survey Model) : 3.6512 (days-weeks)

MITI Biodegradation Probability:

Biowin5 (MITI Linear Model) : 0.5206

Biowin6 (MITI Non-Linear Model): 0.6843
Anaerobic Biodegradation Probability:
Biowin7 (Anaerobic Linear Model): 0.2053
Ready Biodegradability Prediction: YES

Hydrocarbon Biodegradation (BioHCwin v1.01):

LOG BioHC Half-Life (days) : 0.6526
BioHC Half-Life (days) : 4.4937

Sorption to aerosols (25 Deg C) [AEROWIN v1.00]:

Vapor pressure (liquid/subcooled): 3.79E+003 Pa (28.4 mm Hg)

Log Koa (Exp database): 3.310

Kp (particle/gas partition coef. (m3/ug)):

Mackay model : 7.92E-010

Octanol/air (Koa) model: 5.01E-010

Fraction sorbed to airborne particulates (phi):

Junge-Pankow model : 2.86E-008

Mackay model : 6.34E-008

Octanol/air (Koa) model: 4.01E-008

Atmospheric Oxidation (25 deg C) [AopWin v1.92]:

Hydroxyl Radicals Reaction:

OVERALL OH Rate Constant = 5.2263 E-12 cm3/molecule-sec

Half-Life = 2.047 Days (12-hr day; 1.5E6 OH/cm3)

Half-Life = 24.559 Hrs

Ozone Reaction:

No Ozone Reaction Estimation

Fraction sorbed to airborne particulates (phi):

4.6E-008 (Junge-Pankow, Mackay avg)

4.01E-008 (Koa method)

Note: the sorbed fraction may be resistant to atmospheric oxidation

Soil Adsorption Coefficient (KOCWIN v2.00):

Koc : 233.9 L/kg (MCI method)

Log Koc: 2.369 (MCI method)

Koc : 233.9 L/kg (Kow method)

Log Koc: 2.369 (Kow method)

Experimental Log Koc: 2.07 (database)

Aqueous Base/Acid-Catalyzed Hydrolysis (25 deg C) [HYDROWIN v2.00]:

Rate constants can NOT be estimated for this structure!

Bioaccumulation Estimates (BCFBAF v3.01):

Log BCF from regression-based method = 1.468 (BCF = 29.39 L/kg wet-wt)

Log Biotransformation Half-life (HL) = -0.5424 days (HL = 0.2868 days)

Log BCF Arnot-Gobas method (upper trophic) = 1.577 (BCF = 37.79)

Log BAF Arnot-Gobas method (upper trophic) = 1.577 (BAF = 37.79)

log Kow used: 2.73 (expkow database)

Volatilization from Water:

Henry LC: 0.00664 atm-m3/mole (Henry experimental database)

Half-Life from Model River: 1.064 hours

Half-Life from Model Lake : 92.1 hours (3.837 days)

Removal In Wastewater Treatment:

Total removal: 72.77 percent

Total biodegradation: 0.05 percent

Total sludge adsorption: 2.15 percent

Total to Air: 70.57 percent

(using 10000 hr Bio P,A,S)

Level III Fugacity Model:

	Mass Amount (percent)	Half-Life (hr)	Emissions (kg/hr)
Air	19	43	1000
Water	41.2	360	1000
Soil	39.4	720	1000

Sediment 0.443 3.24e+003 0
Persistence Time: 153 hr

Appendix G

Studies Used for Evaluation of Performance

**Methylene Chloride Consumer Product Paint Strippers: Low-VOC, Low Toxicity
Alternatives**

Prepared by:
Mike Morris and Katy Wolf
Institute for Research and Technical Assistance

Prepared For:
Cal/EPA's Department of Toxic Substances Control

May 2006

DISCLAIMER

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ACKNOWLEDGMENTS

The analysis in this report benefited considerably from the efforts of many persons within and outside the Institute for Research and Technical Assistance (IRTA). We would particularly like to acknowledge the valuable contributions made by Robert Ludwig from DTSC. We are especially grateful to Dr. Julia Quint from the Department of Health Services Hazard Evaluation System & Information Service for her work in evaluating the toxicity of the materials. We would also like to give special thanks to Benny Bixenman of Benco Sales for formulating alternative stripping formulations and providing formulations for testing. We are very thankful to Pat Mitchell of the Strip Joint and Mark Bausman of Sunset Strip for their help in testing the alternative stripping formulations. Finally, we are indebted to Amy Blume of IRTA for her assistance in preparing the document.

EXECUTIVE SUMMARY

Methylene chloride (METH) is a carcinogen. The chemical is classified as a Hazardous Air Pollutant (HAP) by U.S. EPA. It is also classified as a Toxic Air Contaminant (TAC) in California. METH is listed on Proposition 65 and is a listed hazardous waste under the Resource Conservation and Recovery Act (RCRA).

The California Air Resources Board (CARB) estimates that emissions of METH from consumer product strippers amount to 9.68 tons per day. METH based strippers are also used by companies that offer stripping services to consumers. The METH strippers pose a cancer risk to workers and consumers in California.

IRTA is a nonprofit organization that tests and demonstrates low-Volatile Organic Compound (VOC), low toxicity alternatives in a variety of different industries. DTSC contracted with IRTA to identify, test, develop and demonstrate alternative non-METH stripping formulations in consumer product applications. The aim of the project was to find safer alternative non-METH strippers that minimized the increase in VOC emissions.

This project involved testing alternative non-METH stripping formulations in four sectors including:

- large furniture stripping companies that use equipment to apply stripper;
- small furniture stripping companies that apply stripper by hand;
- contract stripping companies that strip on-site and apply stripper by hand; and
- consumer stripping where consumers apply the stripper by hand.

Benco Sales, a stripper and equipment supplier, assisted IRTA in the project by developing alternative non-METH stripping formulations that could be tested in the four sectors.

The alternative non-METH stripping formulations that worked most effectively in all four sectors contain benzyl alcohol as the active ingredient. IRTA conducted a cost comparison of METH based stripping formulations and the alternative benzyl alcohol stripping formulations for large furniture stripping companies and for consumer stripping. The cost of using the most effective alternative in large furniture stripping companies is comparable to the cost of using the high METH content stripper most widely employed today. The cost of using the most effective alternative in consumer stripping is lower than the cost of using the METH strippers sold at hardware and paint supply stores.

The Department of Health Services Hazard Evaluation System & Information Service (HESIS) evaluated and compared the toxicity of the METH strippers used most widely today and the alternative non-METH strippers tested in this project. HESIS concluded that the alternative stripping formulations, which contain benzyl alcohol, are generally much safer for workers and consumers than the METH based strippers.

The South Coast Air Quality Management District (SCAQMD) regulates the VOC and toxic emissions from furniture stripping facilities. The alternative strippers tested during

this project meet the District requirements for stripping formulations. CARB regulates the VOC and toxic content of consumer product strippers in California. The most effective alternative consumer product strippers tested during this project meet the definition of an Low Vapor Pressure (LVP) material which indicates that CARB does not classify it as a VOC.

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I. INTRODUCTION AND BACKGROUND

The California Air Resources Board (CARB) estimates that emissions from consumer product paint strippers amount to 16.72 tons per day. Emissions of methylene chloride (METH) from these paint strippers are 9.68 tons per day and emissions of VOC solvents from these paint strippers are 7.04 tons per day. Many of the stripping products are blends of METH and VOC solvents. Some of the stripping products may contain only VOC solvents and no METH.

The component of most concern in consumer product paint strippers is METH. The chemical is a suspect carcinogen. It is classified as a Hazardous Air Pollutant (HAP) by U.S. EPA and as a Toxic Air Contaminant (TAC) by the state of California. METH is a listed hazardous waste under the Resource Conservation and Recovery Act (RCRA). The chemical does not contribute to photochemical smog and has been deemed exempt from VOC regulations by U.S. EPA and the state of California.

The Institute for Research and Technical Assistance (IRTA) is a nonprofit organization established in 1989. IRTA works with companies and whole industries to identify, test, develop and demonstrate low-VOC, low toxicity solvent alternatives. Cal/EPA's Department of Toxic Substances Control (DTSC) contracted with IRTA to test and demonstrate alternatives to METH based consumer product strippers. This document presents the results of the analysis and testing.

PREVIOUS RELATED WORK

Over the last several years, IRTA conducted four projects that are related to the current project. The first project, sponsored by the South Coast Air Quality Management District (SCAQMD), involved performing a survey of furniture stripping facilities in the South Coast Basin and determining their stripping practices and the quality of their ventilation systems. The second project, sponsored by the National Institute for Occupational Safety and Health (NIOSH), involved testing alternative low-METH content stripping formulations and designing, installing and testing high air flow ventilation systems to determine if they could effectively reduce worker exposure to METH strippers. The third project, sponsored by CARB, was designed to work with furniture stripping companies to investigate methods of reducing the risk of METH based strippers to the surrounding community. As part of that project, alternative low-METH content strippers were tested. The fourth project, sponsored by SCAQMD, involved limited testing of a few non-METH stripping formulations in furniture stripping facilities. No work has been performed to date on alternative consumer product strippers.

CHARACTERISTICS OF PAINT STRIPPING

The most widely used paint strippers rely on METH as the active ingredient. The results of the earlier work indicated there may be as many as 80 facilities in California that have stripping equipment and use relatively large quantities of stripper. These companies generally purchase their stripper from suppliers that provide the stripper in quantities ranging in size from five gallon pails to 55 gallon drums. There are also companies in the state that provide on-site services to consumers for stripping kitchen cabinets or to offices for stripping wood cabinets; these facilities use the stripper to strip in place. The stripping companies purchase their strippers from paint supply or hardware stores. There are probably some 500 additional facilities in the

state that do some stripping as part of their business; typical facilities would include antique shops. These facilities purchase small quantities of stripper from hardware or paint supply stores. Consumers also purchase strippers from paint supply and hardware stores.

The SCAQMD began developing a regulation on METH furniture stripping facilities several years ago. The large furniture stripping facilities in the South Coast Basin that applied stripper with equipment believed it would be unfair to regulate their operations when small facilities that strip by hand could still purchase METH based strippers from paint supply and hardware stores and these operations would not be regulated. It is important to find alternative non-METH stripping formulations that can be used by large furniture stripping companies who purchase stripper from suppliers and by companies and individuals who purchase consumer product strippers. During this current project, IRTA focused on testing non-METH strippers in a comprehensive way. The structure of the tests was designed to find alternative non-METH strippers for:

- large furniture stripping firms that apply stripper with equipment;
- small furniture stripping firms that apply stripper by hand;
- contractors that provide stripping services to consumers and offices; and
- consumers that strip wood items by hand.

The items that are commonly stripped using consumer product paint strippers are made of wood and, less often, metal. A variety of coating types must be stripped using these stripping formulations. Stripping effectiveness is determined by the ability of a stripping formulation to strip the coating and the wood or metal type is comparatively unimportant.

The most common type of wood coating that requires stripping today is the conventional solventborne coating. This type of coating represents more than 50 percent of the coatings that require stripping by furniture strippers. Between 20 and 30 percent of the coatings encountered are conventional clear varnishes which include shellacs. Cross-linked clear finishes that also fall into this category have begun to be used over the last 15 or 20 years. Waterborne latex and acrylic coatings and high performance cross-linked pigmented and clear coatings account for the remaining 15 to 20 percent of the finishes encountered by furniture strippers today. The same types of coatings are likely to be encountered by on-site contractors and by consumers. The characteristics of metal coatings are likely to be similar. The most commonly encountered metal coatings are probably traditional solventborne coatings. Waterborne coatings and powder coatings probably account for a small percentage today. The cross-linked, powder and waterborne coatings that are more difficult to strip will be increasingly used in the future because of more stringent coating VOC regulations.

PROJECT ALTERNATIVES STRATEGY AND FINDINGS

IRTA worked with a stripper supply company, Benco Sales, during this project to test alternative non-METH stripping formulations. Benco Sales formulated a variety of

different alternatives for the different stripping applications and these were tested for effectiveness. For furniture stripping companies with equipment and contractors who strip on-site, it was assumed that a stripper needed to strip relatively quickly. In contrast, for furniture stripping companies without equipment and consumers who strip items at home, it was assumed that strippers need not strip quickly.

During this project, IRTA tested and compared baseline and alternative non-METH strippers with two large furniture stripping firms that use equipment for stripping. IRTA also tested baseline and alternative strippers at the furniture stripping companies where the strippers were applied by hand. These tests represented stripping by small furniture stripping companies and by consumers. IRTA tested baseline and alternative strippers with one contractor who strips on-site. Finally, IRTA tested baseline and alternative strippers on wood and metal panels containing coatings that consumers commonly encounter today and coatings that consumers could encounter in the future.

Some of the non-METH alternative strippers on the market today contain ingredients that have other toxicity problems. As an example, some stripping formulations contain n-methyl pyrrolidone (NMP) which is a reproductive and developmental toxin. IRTA tested two NMP strippers available on the market today for the consumer hand stripping application. Many of the non-METH stripping formulations are classified as VOCs so that conversion to these alternatives would increase VOC emissions. The aim was to formulate alternative strippers that did not contain other toxic materials like NMP and that had as low a VOC content as possible.

The results of the tests indicate that alternative non-METH strippers are available that can effectively strip items for consumer product applications and for large furniture stripping facilities that strip with equipment. The most effective and safest alternative stripping formulations contain benzyl alcohol. This chemical is classified as an LVP solvent in CARB's consumer product regulations meaning it is not considered to be a VOC.

STRUCTURE OF DOCUMENT

Section II of this document describes the stripping process for large furniture stripping facilities that use equipment, contractors that strip on-site and smaller furniture strippers and consumers that apply stripper by hand. Section III includes a detailed description of the formulations and the stripping tests that were conducted to determine the effectiveness of the alternative strippers. Section IV provides a cost analysis and comparison for the METH and non-METH strippers for large furniture stripping companies and consumer stripping applications. Section V discusses and compares the environmental characteristics and the toxicity of the METH based and alternative stripping formulations. Finally, Section VI provides a summary of the results of the testing.

II. CHARACTERISTICS AND DESCRIPTION OF STRIPPING FORMULATIONS AND STRIPPING PROCESSES

This section presents detailed information on the METH based stripping formulations that are commonly used today and the procedures that are used for stripping by large furniture stripping facilities that use equipment, contractors that perform on-site stripping and small furniture stripping facilities and consumers that strip by hand.

LARGE AND SMALL FURNITURE STRIPPING FIRMS

The use of stripper varies widely from firm to firm. Table 2-1 provides estimates of stripper usage for the industry using the assumption that there are 248 firms that perform stripping in the South Coast Basin and twice that number in the state. The values for the South Coast Basin were determined from a survey that was conducted in one of IRTA's earlier projects sponsored by SCAQMD. The survey results indicated that 248 firms in the Basin used METH formulations for stripping. An estimated two or three of the largest strippers use more than 1,200 gallons of stripper per year. An estimated 15 strippers use between 700 and 1,200 gallons of stripper annually. About 20 strippers use between 200 and 700 gallons per year. The smallest strippers, about half of the firms in the Basin, use less than five gallons of stripper per year. The remaining 86 strippers use between five and 200 gallons of stripper per year. The stripping firms that use more than about 200 gallons per year are likely to purchase stripper from suppliers; the stripping firms that use less than 200 gallons per year purchase stripper from suppliers or from paint supply or hardware stores. The firms that use less than five gallons of stripper annually purchase stripper from hardware or paint supply stores.

Table 2-1
Estimated Annual Stripper Usage by Furniture Stripping Facilities

Annual Stripper Usage (gallons per year)	Number of Firms in South Coast Basin	Number of Firms in California
1,200 - 2,000	3	6
700 - 1,200	15	30
200 - 700	20	40
5 - 200	86	172
< 5	124	248
Total	248	596

About half the people in California live in the South Coast Basin. Assuming that the South Coast Basin accounts for about half the stripping companies in the state, the statewide distribution might be expected to be similar. On this basis, there may be as many as 496 stripping facilities in California. Accordingly six of those stripping facilities use between 1,200 and 2,000 gallons of stripper annually and 40 stripping facilities use between 700 and 1,200 gallons per year. The vast majority of the stripping facilities use less than five gallons of stripper per year.

A Material Safety Data Sheet (MSDS) for a METH based stripper used by many of the large furniture stripping facilities that use equipment is shown in Appendix A. This stripping formulation, called Benco #B7 Industrial Paint Remover, contains METH (dichloromethane), methanol and small amounts of glycol ethers, wetting agents and wax. The stripper contains wax to prevent the METH, which has a very high vapor pressure, from being emitted immediately; it holds the stripper on the surface of the part. The stripper contains wetting agents because it is generally rinsed from the part after stripping.

Figure 2-1 shows a picture of a typical flow tray, the equipment used by the larger furniture stripping facilities to apply the stripper to parts. It is a sloped shallow tank eight feet long and four feet wide with a drain at the lower end. The stripper is pumped through a brush from a five gallon container. The item to be stripped is placed in the tray and the worker moves the brush over the part vigorously. At times, it is necessary to scrape the item to completely remove the coating.



Figure 2-1. Typical Flow Tray

When the worker is finished stripping the item, it is transferred from the flow tray to the water wash booth. A picture of a typical water wash booth is shown in Figure 2-2. High pressure wands containing water and oxalic acid are used to rinse the remaining stripper and coating residue from the item. The oxalic acid is used to brighten the wood surface.

Small furniture stripping firms do not use equipment for stripping. Rather, they apply the stripping formulation to the parts by hand. The #B7 stripper has low viscosity so it can be

pumped through the pumps in the flow tray. The strippers used by smaller firms that are applied by hand are often more viscous so they will remain on the part long enough to strip the coating. The parts are generally rinsed off with water to remove the stripper and the paint residue.

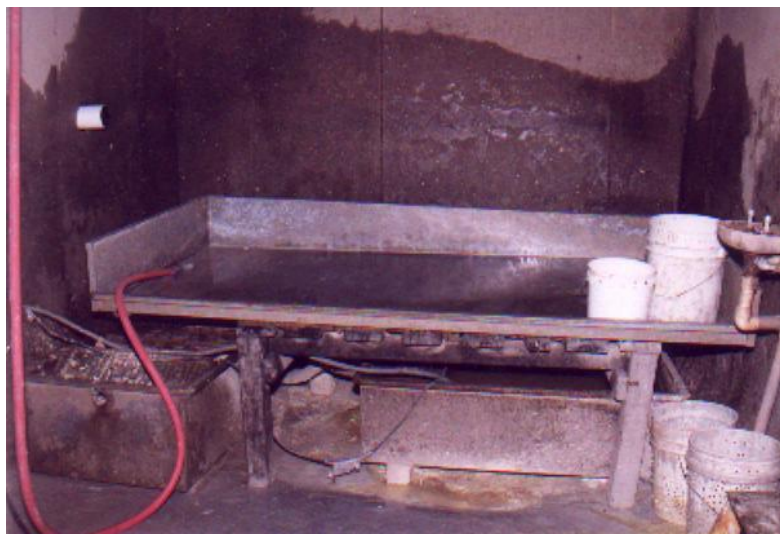


Figure 2-2. Typical Water Wash Booth

An MSDS for a typical stripper used for hand stripping by the industry is shown in Appendix A. This stripping formulation, called Benco #B4 Industrial Paint Remover, is used by some smaller stripping firms and by some contractors that perform on-site stripping. Like #B7, this stripping formulation contains METH, methanol, a glycol ether, a wetting agent and wax. It also contains a cellulose compound that thickens the formulation for hand stripping. Another typical stripping formulation used by small furniture stripping companies that can be purchased in a paint supply or hardware store is made by Jasco and is called Premium Paint & Epoxy Remover. An MSDS for this stripper is shown in Appendix A. Like #B7 and #B4, it contains a high concentration of METH and methanol.

CONTRACTORS THAT PERFORM ON-SITE STRIPPING

There is no information on how many California firms there are that perform on-site stripping. Some of the large furniture stripping firms perform on-site stripping. Many painting contractors that provide painting services to consumers and offices likely also perform on-site stripping.

Kitchen cabinets are often stripped by on-site stripping contractors. When large furniture stripping companies perform this service, they remove the cabinet doors and kitchen drawers and take them back to their shops to be stripped. The other kitchen wood is stripped on-site. Wood cabinetry is also stripped by contractors in offices and office buildings. Figure 2-3 shows a picture of a kitchen before being stripped by a contractor.



Figure 2-3. Preparing Kitchen for Stripping

Stripping formulations used by contractors for stripping on-site are generally quite viscous since they must remain on vertical surfaces for a period. The Benco #B4 stripper described above is an example of a METH stripper designed for this type of stripping. An MSDS for another stripper used for this purpose, called Lifteeze Paint & Varnish Remover, is shown in Appendix A. The Lifteeze stripper contains between 35 and 45 percent METH, methanol, acetone and toluene. It has a lower METH content than the Benco #B4 stripper.

CONSUMER STRIPPING

Consumers purchase stripping formulations in small quantities at paint supply or hardware stores. They generally use the strippers to strip doors, door jambs, kitchen cabinets and various types of wood furniture and, in some cases, metal items. Most of the stripping formulations used historically had fairly high concentrations of METH. As discussed in Section III, there are non-METH alternatives on the market today. These stripping formulations generally need to be more viscous because they are used to strip a variety of items and must be able to be used on vertical surfaces.

The Lifteeze Paint & Varnish Remover discussed above is available in paint supply stores and is likely to be purchased by consumers. The Jasco Premium Paint & Epoxy Remover is another stripping formulation that consumers might purchase in hardware stores. In both of these formulations, METH is the major active ingredient.

III. ALTERNATIVE STRIPPING TESTS

This section describes the test program IRTA used to determine the efficacy of the alternative stripping formulations. It discusses the test procedure and the test results of the baseline METH strippers and the alternative non-METH strippers.

LARGE FURNITURE STRIPPING FIRMS

IRTA worked with two large furniture stripping firms to compare the stripping capability of the METH and non-METH alternative strippers. The two companies, Sunset Strip in Huntington Beach and Strip Joint in Redondo Beach, collected a range of furniture items prior to the stripping tests. The stripping tests were conducted in flow trays.

The baseline stripping formulation for these tests was Benco #B7 Industrial Paint Remover which is the industrial stripping formulation used by most furniture stripping companies with equipment. This formulation, as discussed earlier, contains between 70 and 85 percent METH and eight to 15 percent methanol. The stripping procedure and test results for Sunset Strip and Strip Joint are discussed below.

Sunset Strip

Several items were stripped at Sunset Strip with #B7 and three alternative non-METH designed for flow tray stripping. One item was a chest containing three drawers that had a lacquer coating. A picture of the chest is shown in Figure 3-1. A picture of the three drawers before stripping is shown in Figure 3-2. The second item was a mirror frame containing a shellac coating. The third item was a door with a shellac coating. A picture of this item is shown in Figure 3-3. The fourth item was a chair with a white enamel coating. Figure 3-4 shows some of the items in the flow tray.



Figure 3-1. Chest at Sunset Strip



Figure 3-2. Drawers Before Stripping at Sunset Strip



Figure 3-3. Door at Sunset Strip

Some of the items or parts of the items were stripped with #B7 and with three alternative non-METH strippers. One of the alternatives, called #B94 Industrial Paint Remover, was too thick for flow tray stripping and the owner found it difficult to use. An MSDS for this product is shown in Appendix B.

An MSDS for the second alternative, called Benco #B96 Industrial Paint Remover, is shown in Appendix B. This formulation contains 50 to 60 percent benzyl alcohol (called aromatic alcohol on the MSDS), hydroxy benzene and formic acid.



Figure 3-4. Items in Flow Tray at Sunset Strip

An MSDS for the third alternative that was tested, called Benco #B73 Industrial Paint Remover, is shown in Appendix B. This formulation contains 40 to 50 percent benzyl alcohol (called alpha-hydroxy toluene on the MSDS) and 20 to 30 percent of an ester solvent.

The results of the flow tray stripping indicated that #B7 stripped the items more quickly than the alternatives. For instance, the #B7 stripped the drawer with the lacquer coating in five minutes whereas the #B96 stripper took about 15 minutes to strip the similar item. The #B96 also required more rinsing. This is to be expected since the stripper components have lower vapor pressure. An advantage of the #B96 was that it did not require rinsing with the oxalic acid which is used with the #B7. The owner of Sunset Strip stripped the furniture items himself and indicated that the #B96 performed acceptably.

The #B7 also stripped the items more quickly than the #B73 alternative stripper. The owner judged that the #B73 was not as effective as the #B96 alternative stripper. In addition, he indicated that the odor of the #B73 was retained on the furniture items and was difficult to eliminate.

During the testing, IRTA, Benco Sales and the owner observed that less of the alternative low vapor pressure strippers was required than the higher vapor pressure METH stripper. It was estimated that about half the amount of stripper was required. In addition, the participants noted that about twice as much waste was generated when the alternatives were used because there was less evaporation. The waste generated in stripping operations should be considered hazardous waste because it contains the coating residue.

Strip Joint

At the Strip Joint, several similar items were collected and stripped in the flow tray with the #B7, the baseline METH stripper, and two alternative stripping formulations, the #B94 and #B96 discussed above. The #B73 was not tested because it was less effective than the #B96 stripper and the odor was strong.

Figure 3-5 shows four of the items after they were stripped with the baseline #B7 stripper. The items that were stripped included a drawer made of mahogany with a lacquer coating, a dental cabinet drawer with multiple layers of a latex coating, a mahogany door with several coats of enamel and an oak drawer and door with a varnish coating. The #B7 stripped all the coatings effectively except the dental cabinet drawer with the latex coating. The worker had to abrade the coating off with a tool.



Figure 3-5. Items After Stripping With #B7 at Strip Joint.

The #B94 alternative stripper stripped the varnish coating and the lacquer coating easily. It did not strip the enamel panel completely in the same time allotted for the #B7 stripper. It did, however, strip the latex coating from the dental drawer which the #B7 was not able to strip. Figure 3-6 shows the items after stripping with the #B94. As was the case at Sunset Strip, the worker judged the #B94 stripper to be too thick for easy flow tray stripping.

The #B96 alternative stripper also stripped the varnish and lacquer coatings easily. It stripped the enamel coating as quickly as the #B7 stripper. This stripping formulation stripped the latex coating on the dental drawer more effectively and quickly than the #B94 and much more effectively than the #B7. Figure 3-7 shows the items after stripping with #B96.



Figure 3-6. Items After Stripping With #B94 at Strip Joint



Figure 3-7. Items After Stripping With #B96 at Strip Joint

The alternative stripper that performed best at the Strip Joint was #B96. It performed better than the #B7 in stripping the latex coating. The owner of the Strip Joint used the #B96 stripper to strip several items in the flow tray at a later date. He indicated that the stripper was acceptable and that it performed effectively as an alternative to #B7.

At Strip Joint, IRTA, Benco Sales and the owner made the same observations about usage and waste generation as at Sunset Strip. About twice as much of the METH stripper, #B7, was required and the alternative strippers generated about twice as much waste.

CONSUMER HAND STRIPPING

At Sunset Strip and Strip Joint, IRTA conducted tests of alternative strippers that would be provided by suppliers to small furniture stripping facilities without equipment. The results of the tests are discussed below.

Sunset Strip

At Sunset Strip, IRTA conducted preliminary hand stripping tests with a baseline METH stripper, #B4, and four alternative non-METH strippers. Two of the alternative stripping formulations, called #B74A and #B94A, contain benzyl alcohol and acetone. MSDSs for these strippers are shown in Appendix B. Two other alternative stripping formulations, called #B74 and #B95, contain benzyl alcohol but do not contain acetone. MSDSs for these products are shown in Appendix B.

The items that were hand stripped at Sunset Strip included a bed rail with a shellac coating, a chair with two coats of enamel and a bookcase shelf with a lacquer coating. Figure 3-8 shows a picture of the bed rail with the five strippers applied in the sequence right to left: #B95, #B74, #B74A, #B95A and #B4. The bed rail was checked after three minutes and after six minutes. After three minutes, the #B4 baseline stripper had stripped about 90 percent of the coating. #B95 was the best stripper of the five; it had stripped 100 percent of the coating. #B74 was comparable to the #B4 baseline stripper; it had stripped 90 percent of the coating. The #B74A was less effective; it stripped 70 percent of the coating. The #B95 stripped 85 percent of the coating. Figure 3-9 shows the bed rail after six minutes. #B4, #B95 and #B74 stripped 100 percent of the coating. #B95A stripped an estimated 95 percent of the coating and #B74A stripped only 75 percent of the coating.



Figure 3-8. Bed Rail After Applying Five Strippers at Sunset Strip



Figure 3-9. Bed Rail After Six Minutes at Sunset Strip

Table 3-1 summarizes the results of the bed rail stripping tests. The alternative, #B95, was the best performing stripper followed by #B4, the baseline METH stripper.

Table 3-1
Results of Stripping Tests for Bed Rail With Shellac Coating at Sunset Strip

	Estimated Coating Removal (Percent)				
	#B4	#B95	#B74	#B95A	#B74A
Three Minutes	90	100	90	85	70
Six Minutes	100	100	100	95	75

The lacquer on the bookshelf was easier to strip. The baseline #B4 stripper stripped the coating in about one minute. The #B95 was faster; it stripped the coating in less than one minute. The #B95A stripped the coating in about one minute. The #B74 stripper removed the coating in three minutes but the #B74A stripper did not remove the coating in three minutes. Figure 3-10 shows the bookshelf after stripping. The sequence of strippers is the same sequence as before from right to left: #B95, #B74, #B74A, #B95A, #B4.

Table 3-2 summarizes the results of the stripping tests for the bookshelf. Again, the alternative #B95 performed best followed by the #B4 baseline METH stripper.

Table 3-2
Results of Stripping Tests for Bookshelf With Lacquer Coating at Sunset Strip

	#B4	#B95	#B74	#B95A	#B74A
< One Minute	-	Stripped	-	-	-
One Minute	Stripped	-	-	Stripped	-
Three Minutes	-	-	Stripped	-	-



Figure 3-10. Bookshelf after Stripping at Sunset Strip

The strippers were also tested on a chair with two enamel coats and different results were obtained. After 30 minutes, the #B74, #B74A and #B95A had stripped 100 percent of the coating. The baseline METH stripper, #B4, had stripped 95 percent of the coating and the #B95 had stripped only about 50 percent of the coating.

Table 3-3 shows the results of the stripping for the chair. In this case, the acetone based formulations performed better than the baseline stripper.

Table 3-3
Results of Stripping Tests for Chair With Two Enamel Coats at Sunset Strip

		Estimated Coating Removal (Percent)			
	#B4	#B95	#B74	#B95A	#B74A
30 minutes	95	50	100	100	100

The results of the testing indicated that the acetone based strippers did not perform well on the shellac coating but one of them performed well on the lacquer coating. The acetone coatings performed very well, however, on the enamel coating. A hybrid stripping formulation consisting of 80 percent of the #B95 and 20 percent acetone was formulated at the site. This stripper was used to strip the bed rail with the shellac coating, the shelf with the lacquer coating and the chair with the two enamel coatings. The stripper worked effectively on all items.

The results of the hand stripping tests at Sunset Strip indicated that alternative non-METH strippers can effectively strip coatings. This suggests that alternative consumer product stripping formulations could be used by the sector.

Strip Joint

At the Strip Joint, the same hand stripping formulations were tested on several items including a panel with a lacquer coating, a dental drawer with three coats of latex, a panel with five coats of enamel and a mirror frame with a varnish coating. Figure 3-11 shows the items before the strippers were applied. The same sequence in applying the strippers was used here as at Sunset Strip: right to left, #B95, #B74, #B74A, #B95A and #B4.



Figure 3-11. Items Before Applying Strippers at Strip Joint

After five minutes, all of the stripping formulations stripped 100 percent of the lacquer from the panel and the varnish from the mirror frame.

After 15 minutes, the #B95 and #B95A had removed one of the five enamel coats on the panel. The #B4 had removed three of the coats. After 30 minutes, the #B4 had removed four enamel coats. The #B95 and #B95A had removed two of the five coats. The #B74 and #B74A had not removed even one coat. After 45 minutes, the #B95 had removed 2.3 coats, the #B95A had removed two coats and the #B74 and #B74 A had removed only one coat. After three hours, the #B4 and the #B95 had removed 4.2 coats, the #B74 had removed four coats and the #B74A and #B95 A had removed 2.5 coats. Figure 3-12 shows the panel after three hours.

Table 3-4 summarizes the results of the stripping for the panel. The results show that the #B4 stripped the fastest but that over a long time frame, the #B95 alternative performed as well as the #B4.

Table 3-4
Results of Stripping Tests for Panel With Five Enamel Coats at Strip Joint
Number of Coats Removed

	#B4	#B95	#B74	#B95A	#B74A
15 Minutes	3	1	-	1	-
30 Minutes	4	2	-	2	-
45 Minutes	4	2.3	1	2	1
Three Hours	4.2	4.2	4	2.5	2.5



Figure 3-12. Panel After Three Hours of Stripping at Strip Joint

After 15 minutes, #B4 had taken part of one of the three coats of latex off the dental drawer, the #B95 and #B95A were starting to work on the coatings but the #B74 and #B74A had not worked at all. After three hours, the #B4 had removed all three coats, the #B95 had removed 2.5 coats, the #B95A had removed 1.2 coats, the #B74 had removed 0.3 coats and the #B74A had not removed any of the coating. Figure 3-13 shows a picture of the dental drawer after three hours.



Figure 3-13. Dental Drawer After Three Hours of Stripping at Strip Joint

Table 3-5 shows the results of the stripping tests for the latex coating. The results demonstrate that the #B4 performed best on the coating, followed by #B95.

Table 3-5
Results of Stripping Tests for Dental Drawer With Three Latex Coats at Strip Joint

	Number of Coats Removed				
	#B4	#B95	#B74	#B95A	#B74A
15 Minutes	0.5	-	-	-	-
Three Hours	3	2.5	0.3	1.2	-

The results of the hand stripping at the Strip Joint indicate that all of the stripping formulations can remove certain coatings like lacquers and shellacs. The #B4 METH stripper was somewhat more effective in removing the enamel and latex coatings. The #B95 was almost as effective as the #B4 in removing these coatings.

CONTRACTOR ON-SITE STRIPPING

IRTA conducted testing with a contractor who performs on-site stripping. The task was to strip and refinish the cabinets in a Palos Verdes home. The kitchen cabinets were made of pine and they had a varnish coating.

Figure 3-14 shows the contractor's workers preparing the kitchen for stripping. The pieces are first broken down. The drawers and cabinet doors are removed and taken back to the shop for stripping in the flow tray. Figure 3-15 shows the drawers and doors removed from the cabinetry. The moldings, styles and frames of the cabinetry are stripped on-site. The procedure is to apply the stripper, remove the coating residue, sand and stain the cabinetry with the new finish.



Figure 3-14. Workers Preparing Kitchen for Stripping



Figure 3-15. Drawers and Doors Removed From Cabinetry

The contractor uses a METH based stripping formulation called Lifteeze for stripping the cabinetry. An MSDS for this stripper is shown in Appendix A. Two non-METH alternative strippers, #B95 and #B74, which contain benzyl alcohol, were tested. The MSDSs for the alternative products are shown in Appendix B.

The first test involved applying the three strippers to a panel. The #B74 was applied to the left hand side of the panel, the #B95 to the middle of the panel and the Lifteeze to the right hand side of the panel. Figure 3-16 shows the first panel with the three areas where the stripper is applied separated by tape. The normal procedure is to brush on the stripper as demonstrated in Figure 3-17, to let the stripper sit for four or five minutes and then to scrape off the coating as shown in Figure 3-18.



Figure 3-16. Panel #1 Areas Separated by Tape



Figure 3-17. Brushing Stripper on Panel #1



Figure 3-18. Scraping Panel #1

After the coating was scraped off, the worker judged that the Lifteeze stripper left the panel a little cleaner and it worked a little faster than the alternative strippers. The #B95 alternative was more effective and stripped faster than the #B74. A second coat of stripper was applied to the panel to remove the secondary finish that was still on the cabinetry. The worker then used steel wool and water to remove the rest of the finish. The Lifteeze stripped area appeared to be the best. The #B95 was somewhat better than the #B74 stripped area. Figure 3-19 shows the panel after the stripping work was completed.



Figure 3-19. Panel #1 After Stripping

The same strippers were tested again on a second panel. This time the strippers were left on for 10 minutes, the panel was scraped and the stripper was reapplied. Again the Lifteeze was the best and most effective stripper. The #B74 was not as good as the #B95 alternative stripper. The #B95 was almost as effective as the Lifteeze. Figure 3-20 shows the panel after the stripping.



Figure 3-20. Panel #2 After Stripping

The strippers were tested on another panel that had coating on the top and an adhesive residue on the bottom. This time the strippers were left on for about eight minutes. The Lifteeze was judged to work the best but the #B95 was almost as good. The #B74 was not as good as the other two stripping formulations.

The results of the testing indicated that the METH based stripper performed better than the alternative non-METH strippers. The contractor judged that the #B95 worked almost as well as the Lifteeze and he said he would be willing to use it. The #B74 alternative stripper did not work

as effectively as the #B95. In addition, the contractor indicated that the odor of the #B74 was unpleasant.

CONSUMER STRIPPING TESTS

Most of the coatings that are stripped by consumers are wood items including doors, door jambs, cabinetry, chairs, bed frames and tables. When IRTA and Benco Sales performed the hand stripping at the two furniture stripping facilities, several wood items were stripped. The coatings that were stripped ranged from easy-to-remove lacquers and shellacs to hard-to-remove enamel and latex coatings. The vast majority of coatings that will be encountered by consumers that want to strip wood pieces are nitrocellulose lacquers. Benco Sales provided a wood panel containing a nitrocellulose lacquer for conducting comparative hand stripping tests for consumer product strippers. Other items that are fairly commonly stripped by consumers are metal patio furniture pieces. Benco Sales provided a green metal panel containing an epoxy primer and a cross-linked polyurethane topcoat for conducting hand stripping tests. A silver metal panel containing an epoxy primer and a UV cured topcoat was also provided by Benco Sales. The latter coating was meant to represent the future coatings that may be much more difficult to remove than the universe of coatings encountered today.

IRTA went to Home Depot and Virgils Hardware to purchase consumer product strippers that are available on the market today. The baseline stripper that was used for comparison was #B4 which is a thickened stripper used for industrial stripping. It contains between 70 and 85 percent METH. The MSDS for this stripper is shown in Appendix A. This stripper and five other stripping formulations were tested and compared for stripping the coatings on the wood and two metal panels. MSDSs for the five other consumer product strippers are shown in Appendix C. They include:

- KS Brushable Stripper made by W.M. Barr & Company which contains 80 to 85 percent METH and methanol;
- BIX Stripper made by BIX Mfg. Co. which contains 15 to 25 percent METH and methanol;
- CS Stripping Gel made by W.M. Barr & Company which contains 40 to 50 percent NMP and a methyl ester;
- Ready-Strip Pro made by Back to Nature Products Co. which contains 25 to 30 percent benzyl alcohol, NMP and formic acid; and
- Ben's Nu-Tech Stripper made by Benco Sales which contains 50 to 60 percent benzyl alcohol and formic acid

The panels were masked off with tape. A picture of the masked panels is shown in Figure 3-21. From right to left are the wood panel, the green metal panel and the gray metal panel. The strippers were applied to the masked off sections of the panels and allowed to sit.

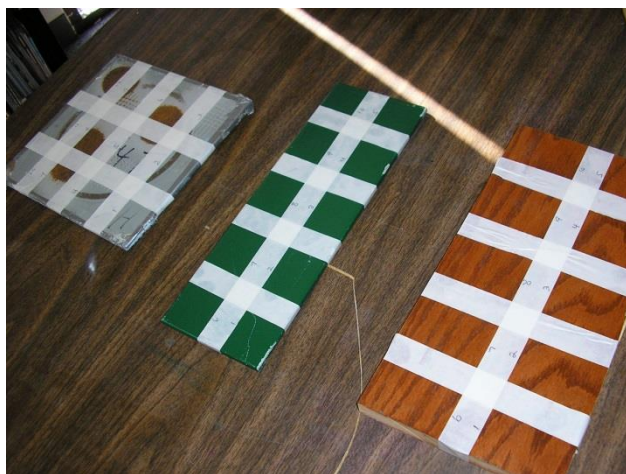


Figure 3-21. Three Masked Panels

The wood panel, after the strippers were applied, is shown in Figure 3-22. On the bottom of the panel from left to right the strippers that were applied are CS Stripping Gel, KS Brushable Stripper, BIX Stripper, #B4 and Ben's Nu-Tech Stripper. On the top left hand side of the panel, the Ready-Strip Pro was applied. After 10 minutes, the corner of the wood was scraped. Section numbers 1, 2, 4 and 5 were fully stripped. These sections contained the CS Stripping Gel which contains NMP, the KS Brushable Stripper which contains high concentrations of METH, #B4 which contains high concentrations of METH and Ben's Nu-Tech Stripper which contains benzyl alcohol. Section number 3 was also stripped but not as well as numbers 1, 2, 4 and 5. Section number 3 contained BIX Stripper which has a lower concentration of METH. Section number 6, which contained the Ready-Strip Pro containing benzyl alcohol and NMP, was not stripped at the 10 minute mark. After 20 minutes, section number 6 was still not stripped. Figure 3-23 shows the wood panel at the 20 minute mark. The panels were checked again at the one hour mark. All the stripping formulations had removed the coating by then.

Table 3-6 summarizes the results for the stripping tests of the wood panel. An S in the table indicates the coating was fully stripped. After 20 minutes, the only stripper that did not strip the coating was Ready-Strip Pro.

Table 3-6
Results of Hand Stripping Tests for Wood Panel With Lacquer Coating

Stripper	Description	10 Minutes	20 Minutes	One Hour
CS Stripping Gel	NMP	S	-	-
KS Brushable Stripper	High METH	S	-	-
Bix Stripper	Low METH	-	S	-
#B4	High METH	S	-	-
Ben's NuTech Stripper	Benzyl Alcohol	S	-	-
Ready Strip Pro	Benzyl Alcohol, NMP	-	-	S



Figure 3-22. Wood Panel With Strippers Applied

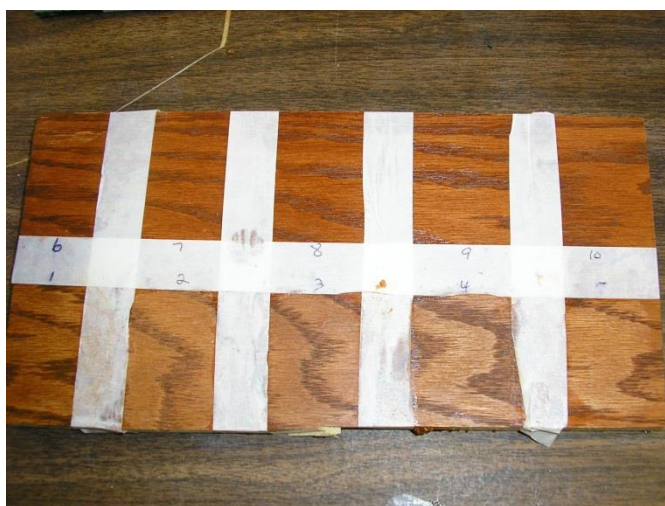


Figure 3-23. Wood Panel After 20 Minutes

The coatings on the green metal panel were more difficult to strip. The strippers were applied in the same order as was the case for the wood panel. Figure 3-24 shows the panel after the strippers were applied. After about 30 minutes, the only sections that were beginning to be stripped (indicated by a bubbling up of the coating) were number 2 and number 4. These sections contained the high METH content strippers, the KS Brushable Stripper and the #B4. At the 30 minute mark, the coating residue was removed and the strippers were reapplied. After five and a half hours, both the topcoat and primer were removed for section numbers 3, 4 and 5. Section number 3 contained the Bix stripper with the low METH concentration. Section number 4 contained the #B4 which has a high METH concentration and section number 5 was Ben's Nu-Tech Stripper which contains benzyl alcohol. The Ready-Strip Pro that contains benzyl alcohol removed the primer and topcoat on panel number 6 after considerable scraping. Section number 2, which contained the KS Brushable Stripper that has a high METH concentration removed the topcoat and with hard scraping and was starting to remove the primer. Section number 1, which contained the CS Stripping Gel with NMP, had removed only the topcoat with hard scraping.



Figure 3-24. Green Metal Panel After Strippers Applied

After more than 20 hours, all of the stripping formulations had removed the primer and topcoat on the green metal panel. After scraping the coating residue off and rinsing the panels, they were inspected. Figure 3-25 shows the green metal panel at this stage. The appearance of panels number 1, number 2, number 3, number 5 and number 6 was very good and clean. These were stripped with the CS Stripping Gel which contains NMP, the KS Brushable Stripper which contains a high METH concentration, BIX Stripper which contains a low METH concentration, Ben's Nu-Tech Stripper which contains benzyl alcohol and Ready-Strip Pro which contains benzyl alcohol. Section number 4 was very clean but darker; the stripper used on this panel was #B4 which has a high METH concentration.



Figure 3-25. Green Metal Panel After More Than Twenty Hours

Table 3-7 summarizes the result of the stripping tests for the green metal panel. B indicates the strippers were beginning to work on the coatings. T indicates the topcoat was removed and P indicates the primer was removed.

Table 3-7

Results of Hand Stripping Tests for Green Metal Panel With Epoxy Primer and Polyurethane Topcoat

Stripper	Description	30 Minutes	5.5 Hours	20 Hours
CS Stripping Gel	NMP	-	T	T, P
KS Brushable Stripper	High METH	B	T	T, P
Bix Stripper	Low METH	-	T, P	-
#B4	High METH	B	T, P	-
Ben's NuTech Stripper	Benzyl Alcohol	-	T, P	-
Ready Strip Pro	Benzyl Alcohol, NMP	-	T, P	-

The coating on the gray metal panel was extremely difficult to remove. After 20 hours, with intense scraping, the coating was starting to be removed on panel number 5 and number 6. Number 5 contained the Ben's Nu-Tech Stripper and number 6 contained the Ready-Strip Pro. Both of these strippers are formulated with benzyl alcohol.

The results of the panel testing demonstrates that all strippers--METH and non-METH--stripped the nitrocellulose coating fairly easily. This type of coating is the most commonly encountered by consumers who strip items at home. The metal coating that is commonly found on patio furniture required much more time for stripping for all the stripping formulations tested. Nearly all of the formulations, including those with METH and those without METH, were able to strip the topcoat and primer if an extended period was allowed. The best performing stripper that does not contain either METH or NMP was Ben's Nu-Tech Stripper which was specially formulated with benzyl alcohol for the testing. For the coatings likely to be encountered in the future, none of the strippers did a good job. The best strippers for these coatings were those that contained benzyl alcohol. This makes sense because the METH in some of the other strippers is likely to evaporate more quickly leaving the stripping formulation dry and inactive.

IV. COST ANALYSIS AND COMPARISON

This section presents a cost analysis that compares the cost of using the high METH content strippers with the alternative non-METH strippers. It first presents a cost comparison for large furniture stripping companies that use stripping equipment. It then presents a cost comparison for consumer strippers.

COST ANALYSIS FOR LARGE FURNITURE STRIPPING COMPANIES

For the cost analysis and comparison, IRTA considered a furniture stripping facility that uses 550 gallons of #B7 stripper annually. The facility has a flow tray and a water wash booth.

The stripping formulation that performed best at Sunset Strip and Strip Joint was #B96 which contains a high concentration of benzyl alcohol. If a furniture stripping company converted to this benzyl alcohol stripper, new polyethylene equipment would be required. One flow tray and one water wash booth tray would be required. The cost of these trays is estimated at \$800 each for a total of \$1,600. A new pump for the flow tray would also be required; the cost of the pump is \$469. The total capital investment a furniture stripping company must make is \$2,069. Assuming a 10 year life for the equipment and a cost of capital of five percent, the annualized cost of the capital investment would amount to \$217.

The furniture stripping company currently purchases 10 drums or 550 gallons of #B7 stripper annually. The cost of the #B7 stripper is \$479 per drum. On this basis, the annual cost of purchasing stripper is \$4,790. The vapor pressure of the #B7 METH based stripper is very high so it evaporates quickly. During the testing of the alternative strippers with the furniture stripping companies, it was estimated that about twice as much of the METH stripper was required as the alternative non-METH stripper. The vapor pressure of the benzyl alcohol is low and it does not evaporate as readily. Under the assumption that half as much of the #B96 would be required, the stripping company would use only 275 gallons or five drums of the stripper annually. At a cost of \$850 per drum, the annual cost of purchasing the alternative non-METH stripper would be \$4,250.

As discussed earlier, the #B7 stripper is rinsed in the water wash booth with water and with oxalic acid. The oxalic acid must be used in about a three percent concentration. The cost of the oxalic acid is about \$1 per pound. For every 100 gallons of METH based stripper, about 10 pounds of oxalic acid is required. Under this assumption and assuming the facility uses 550 gallons of stripper, the annual cost of the oxalic acid is \$55.

The benzyl alcohol stripper must be rinsed with a dilute 30 percent concentration of hydrogen peroxide in water. The cost of the hydrogen peroxide is \$1.50 per gallon. For every 100 gallons of benzyl alcohol stripper, about 30 gallons of hydrogen peroxide is required. On this basis and assuming the stripper use is 275 gallons, the annual cost of purchasing the hydrogen peroxide is \$124.

The spent METH stripper and the spent benzyl alcohol stripper must be disposed of as hazardous waste. Because the vapor pressure of the METH stripper is higher, more evaporates so there will be less waste generated than when the benzyl alcohol is used. During the stripping tests, when equal volumes of METH and Benzyl Alcohol stripper are used, it was estimated that two to three times the waste would be generated with the Benzyl Alcohol stripper. Currently, for every drum of METH stripper used, five gallons of waste is generated. Since 10 drums of stripper are used by the furniture stripper in this case, 50 gallons of hazardous waste is generated. Assuming the facility must dispose of one drum annually and taking into account that the cost of disposing of one drum of METH stripper is \$300, the annual waste disposal cost with the METH stripper is \$300. For every drum of benzyl alcohol stripper that is used, between 10 and 15 gallons of waste will be generated. Selecting the higher number to be conservative, the stripper will generate 75 gallons or two drums of waste annually. The disposal cost of one drum of benzyl alcohol stripper waste is estimated at between \$150 and \$175. Again, assuming the higher figure, the annual waste disposal cost of the benzyl alcohol stripper is \$350.

Table 4-1 shows the annualized cost comparison for the furniture stripper using the METH based stripper and the benzyl alcohol based stripper. The results indicate that the cost of using the #B7 METH stripper and the alternative stripper are comparable.

Table 4-1
Annualized Cost Comparison for Furniture Stripping Company

	METH Stripper	Benzyl Alcohol Stripper
Capital Cost	-	\$217
Stripper Cost	\$4,790	\$4,250
Rinse Agent Cost	\$55	\$124
Disposal Cost	\$300	\$350
Total Cost	\$5,145	\$4,941

The analysis presented in Table 4-1 assumes no difference in labor costs for using the two strippers. Certain work practice changes would be required, however, if a furniture stripping facility converted from the METH based stripper to the benzyl alcohol based stripper. The METH stripper is applied several times to the item to complete the stripping. The benzyl alcohol stripper takes longer to penetrate the typical coatings. Instead of applying the stripper and fully stripping one item at a time in the flow tray, the benzyl alcohol stripper should be applied to several items at once. Once the benzyl alcohol stripper is applied to the items, no additional stripper will need to be applied because of the lower vapor pressure of the alternative non-METH stripper. After a slightly longer residence time, each of the items can be fully stripped.

COST ANALYSIS FOR HAND STRIPPING

IRTA compared the cost of hand stripping for a consumer using METH based strippers and the alternative strippers that were tested on the wood and metal panels. The stripping formulations that were included in the cost analysis included:

- KS Brushable Stripper made by W.M. Barr & Company which contains 80 to 85 percent METH and methanol;
- BIX Stripper made by BIX Mfg. Co. which contains 15 to 25 percent METH and methanol;
- CS Stripping Gel made by W.M. Barr & Company which contains 40 to 50 percent NMP and a methyl ester;
- Ready-Strip Pro made by Back to Nature Products Co. which contains 25 to 30 percent benzyl alcohol, NMP and formic acid; and
- Ben's Nu-Tech Stripper made by Benco Sales which contains 50 to 60 percent benzyl alcohol and formic acid.

Four assumptions were made for the cost analysis. First it was assumed that about twice as much of a METH based stripper would be required for a stripping task. This follows from the fact that the vapor pressure of METH is very high so the stripper evaporates and needs to be reapplied. During the panel testing, the METH strippers did dry out much more quickly than the alternative strippers with lower vapor pressure components. Second, the cost analysis was performed assuming a consumer would use two quarts of a METH containing stripper and one quart of a non-METH stripper for a particular stripping job. Third, it was assumed that the consumer would dispose of the waste from the stripping operation in the garbage. Fourth, the price of the strippers was the price paid at a hardware store. Under these assumptions, the cost of using a particular stripper depends only on how much is used and the cost of the stripper.

Table 4-2 shows the cost comparison for using the METH based and alternative consumer hand strippers. The figures show that the lowest cost consumer stripping formulation is Ben's Nu-Tech Stripper. The CS Stripping Gel is also a relatively low cost stripper. The Ready-Strip Pro Stripper is the highest cost stripper.

Table 4-2
Cost Comparison of Consumer Hand Strippers

Stripper	Type	Stripper Cost Per Quart	Amount Used	Total Cost
KS Brushable Stripper	METH	\$7.47	2 quarts	\$14.94
BIX Stripper	METH	\$5.97	2 quarts	\$11.94
CS Stripping Gel	NMP	\$10.99	1 quart	\$10.99
Ready-Strip Pro	NMP, benzyl alcohol	\$17.69	1 quart	\$17.69
Ben's Nu-Tech	benzyl alcohol	\$7.95	1 quart	\$7.95

V. ENVIRONMENTAL CHARACTERISTICS AND TOXICITY OF STRIPPING FORMULATIONS

This section focuses on the environmental and health characteristics of the METH based strippers and the alternative non-METH strippers. The Occupational Safety and Health Administration (OSHA), CARB and SCAQMD regulations that apply to stripping formulations in California and southern California are reviewed. that they could substitute for the METH based strippers under the current regulations. The section also summarizes the results of a toxicity evaluation and comparison conducted by the California Department of Health Services Hazard Evaluation System & Information Service (HESIS) for METH based formulations and alternatives. The section provides an assessment of the alternatives in terms of the regulations and the toxicity findings. The characteristics of the alternative strippers are described to show that they could substitute for the METH based strippers under current regulations.

REGULATIONS THAT AFFECT THE USE OF STRIPPING FORMULATIONS IN CALIFORNIA

OSHA passed a landmark regulation on methylene chloride in 1997. As mentioned in Section I, the SCAQMD in southern California initiated a regulatory development for furniture stripping with METH but this regulation was not finalized. CARB has jurisdiction over consumer products in California, those containing METH and other materials. These regulations and regulatory developments are reviewed below.

OSHA Regulations

On January 10, 1997, OSHA finalized a regulation on METH that was under development for 10 years. It lowered the Permissible Exposure Limit (PEL) of METH from 500 ppm to 25 ppm over an 8-hour time-weighted average (TWA). The regulation established a Short-Term Exposure Limit (STEL) of 125 ppm; the previous STEL was set at 1,000 ppm. The regulation also established an action level of 12.5 ppm for METH. If workers' exposure exceeds 12.5 ppm, the employers must institute exposure monitoring and medical surveillance. If the exposure is above the PEL, monitoring is required every six months. Where the action level is exceeded, the employees with exposure to METH for more than 30 days per year must see a health care provider and this must be paid for by the employer.

Many furniture stripping firms that use METH based stripping formulations have poor ventilation in their shops. Based on measurements taken in earlier projects, most stripping firms do not meet the 25 ppm PEL or the action level of 12.5 ppm. In contrast to most of the furniture stripping facilities in the country, the two facilities IRTA worked with during this project have high air flow ventilation systems that were installed and tested in earlier projects.

SCAQMD Regulations

The first SCAQMD regulation that applies to stripping formulations is Rule 1136 “Wood Products Coatings.” It limits strippers to those with a VOC content of 350 grams per liter of material or less or those that have a composite vapor pressure of 2 mm Hg or less. METH is not classified as a VOC; the other components in stripping formulations are the contributors to the VOC content of the strippers. Many of the other local air districts in California have regulations that have requirements similar to SCAQMD Rule 1136.

The second SCAQMD rule that has had a substantial effect on furniture stripping firms in southern California is Rule 1401 “New Source Review of Carcinogenic Air Contaminants.” This rule contains a list of chemicals that are classified as carcinogens, including METH. New firms and firms that relocate or modify their operation that use one of the listed chemicals are covered by the rule requirements. The rule requires that the Maximum Individual Cancer Risk (MICR) posed by the facility not exceed one in a million. If the facility installs Toxics Best Available Control Technology (T-BACT), then the MICR must not exceed 10 in a million. The MICR is defined in Rule 1401 as the estimated probability of a potential maximally exposed individual contracting cancer as a result of exposure to toxic air contaminants over a period of 70 years for residential and 46 years for worker receptor locations.

The third SCAQMD regulation that affects existing stripping firms is Rule 1402 “Control of Toxic Air Contaminants from Existing Sources.” Rule 1402 requires that existing facilities reduce the MICR to no more than 25 in a million. This rule applies to larger facilities that use toxic air contaminants and all of these facilities have prepared and submitted risk assessments to the District. An additional 7,500 facilities in the South Coast Basin, most of them small businesses, are likely to pose an MICR higher than 25 in a million. SCAQMD has developed technology based industry specific regulations for all of these industries except furniture strippers.

As discussed in Section I, SCAQMD began developing a regulation specifically for stripping firms that use METH based stripping formulations. The regulation was never finalized because the large furniture stripping companies indicated that regulating their METH emissions would be unfair. A large number of smaller firms like antique shops also use METH strippers but they apply them by hand rather than with equipment. These smaller companies that apply stripper by hand most often purchase their stripping formulations from hardware or paint supply stores. A more comprehensive approach would be a regulation that applies to both large furniture stripping firms that use stripping equipment and smaller companies that apply stripper by hand. This project involved finding viable and cost effective alternatives for large stripping firms and smaller firms.

Other local air districts in the state have policies and regulations on toxic air contaminants. These policies and regulations affect the METH emissions from furniture stripping facilities.

CARB Consumer Product Regulations

CARB consumer product regulations established a VOC limit for “paint remover or stripper” of 50 percent on January 1, 2005. The regulations also define an LVP or Low Vapor Pressure material that is not classified as a VOC if it meets certain criteria. LVP-VOC means a chemical “compound” or “mixture” that contains at least one carbon atom and meets one of the following three criteria”

- (1) has a vapor pressure less than 0.1 mm Hg at 20 degrees C as determined by ARB Method 310; or
- (2) is a chemical “compound” with more than 12 carbon atoms or a chemical “mixture” comprised solely of “compounds” with more than 12 carbon atoms as verified by formulation data, and the vapor pressure and boiling point are unknown; or
- (3) is a chemical “compound” with a boiling point greater than 216 degrees C as determined by ARB Method 310; or
- (4) is the weight percent of a chemical “mixture” that boils above 216 degrees C as determined by ARB Method 310.

TOXICITY EVALUATION OF METH AND ALTERNATIVE FORMULATIONS

The HESIS evaluation involved examining the MSDSs of the METH based strippers and the alternatives that were tested during this project and evaluating the toxicity of the stripper components. This subsection summarizes the results of the HESIS analysis.

METH Based Strippers

Appendix A shows MSDSs for several of the METH based stripping formulations that functioned as baseline strippers for the testing performance comparison. According to the MSDS, #B7, the baseline flow tray stripper, contains 70 to 85 percent METH. #B4, one of the baseline hand strippers, also contains between 70 and 85 percent METH. Jasco Stripper, a typical consumer product stripper, contains more than 80 percent METH. KS Brushable Stripper, another consumer product stripper, contains 80 to 85 percent METH.

METH most often affects the central nervous system (the brain) causing headaches, nausea, dizziness, clumsiness, drowsiness and other effects like those of drinking alcohol. At very high levels, it can cause unconsciousness and death.

METH causes cancer in animals and is regulated as a cancer-causing substance in the workplace. Because it forms carbon monoxide in the body, METH can increase angina (chest pains) and can cause other heart symptoms in workers who have heart disease. Pregnant women are at increased risk due to METH metabolism to carbon monoxide.

The MSDS in Appendix A for Lifteeze Paint & Varnish Remover and Hand Stripper indicates the stripper has a lower METH content, 35 to 45 percent, than the other high METH content strippers. The MSDS for another stripping formulation, Bix Stripper, shown in Appendix C as a consumer product stripper, has a lower METH concentration of 15 to 25 percent. Based on the

reduced concentration of METH, these materials could be considered of lower toxicity than the high METH content strippers discussed above.

n-Methyl Pyrrolidone (NMP) Based Strippers

NMP is an ingredient of CS Stripping Gel and Ready-Strip Pro. MSDSs for these formulations, which are alternative non-METH consumer product strippers, are shown in Appendix C. NMP is listed on California's Proposition 65. Exposure to NMP by inhalation or through skin absorption poses risks of developmental toxicity and male reproductive toxicity. In addition, the chemical also poses risks of solvent-induced acute and chronic nervous system damage, dermatitis and respiratory irritation.

Benzyl Alcohol Based Strippers

Several of the alternative strippers tested in the project, #B94, #B96 and #B73 flow tray strippers, #B74 #B74A, #B94A and #B95 hand strippers and Ready-Strip Pro and Ben's Nu-Tech consumer product strippers, contain benzyl alcohol. HESIS indicates that benzyl alcohol is of comparatively low toxicity relative to METH. Exposure to benzyl alcohol can occur through inhalation and skin absorption. The vapor is a skin, eye and respiratory irritant. Cases of allergic contact dermatitis have been reported. Animal tests of its reproductive and development toxicity and carcinogenicity are negative.

Other ingredients

All four of the high METH content strippers and the two low METH content strippers also contain methyl alcohol, a chemical that is often combined with METH in strippers for a synergistic effect. Like many solvents, methyl alcohol can also have toxic effects on the brain or central nervous system. The symptoms of long-term health effects include fatigue, sleeplessness, poor coordination, difficulty in concentrating, loss of short-term memory and personality changes such as depression, anxiety and irritability. It can also irritate the eyes, nose, throat and skin and contact with skin can cause dermatitis. Methyl alcohol exposure has been associated with visual disturbances and neuropathy and birth defects in animals.

The best performing alternative flow tray stripper, #B96, contains benzyl alcohol, phenol (called hydroxybenzene on the MSDS) and formic acid. Two of the consumer product strippers, Ready-Strip Pro and Ben's Nu-Tech Stripper also contain formic acid. The workplace health standard or PEL for phenol of five ppm is established to minimize the potential for eye and respiratory irritation and cardiovascular, hepatic, renal and neurologic toxicity. As a vapor, liquid or solid, phenol can penetrate intact skin and cause serious systemic effects, including death. Formic acid is corrosive and can burn the skin and eyes upon contact. The vapor is irritating to the skin, eyes and respiratory tract. It does not pose risks of long-term health damage.

Summary of HESIS Evaluation

METH is a major ingredient of widely used stripping formulations. The chemical is a carcinogen and poses a significant risk to workers and community members located near furniture stripping facilities and consumers. The alternative non-METH stripping formulations that performed best in the testing contain benzyl alcohol as the active ingredient. The HESIS evaluation indicates that benzyl alcohol poses much less of a toxic risk than does METH.

EFFECTS OF REGULATIONS AND THE TOXICITY EVALUATION ON STRIPPING FORMULATIONS

The toxicity evaluation by HESIS indicates that METH is a carcinogen and poses severe health risks to the workers in stripping facilities and consumers that use formulations containing the chemical. Furniture stripping facilities that use METH based products also must meet a very stringent OSHA regulation and certain risk requirements set by local air districts in California. The HESIS evaluation also indicates that NMP, which is present in some of the alternative stripping formulations, is a reproductive and developmental toxin. The analysis of the best stripping formulations below is based on eliminating from consideration all formulations containing METH or NMP.

There is a strong incentive to convert to stripping formulations that do not contain METH. Companies can avoid the OSHA and local air district regulations on Toxic Air Contaminants with this strategy. Consumers can avoid the use of a carcinogen. The purpose of this project was to find alternative stripping formulations that do not contain METH, NMP or other components that pose significant toxic risks. The major focus was to find alternatives that perform well, are reasonably cost effective, do not increase VOC emissions substantially and comply with the existing regulations in California that affect stripping formulations.

The best performing alternative stripping formulation for large furniture stripping firms was #B96. According to the MSDS for this product which is shown in Appendix B, the formulation contains 50 to 60 percent aromatic alcohol, 10 to 20 percent hydroxybenzene and 10 to 20 percent formic acid. The aromatic alcohol is benzyl alcohol and hydroxy benzene is phenol. Another formulation, #B95, performed well in the hand stripping tests conducted at the furniture stripping facilities that participated in the project. This formulation, according to the MSDS is Appendix B, contains 50 to 60 percent aromatic alcohol, one to five percent formic acid and less than two percent aromatic petroleum distillates. These formulations could serve as alternatives to #B7 used by larger stripping companies with equipment. #B95 could serve as an alternative to #B4 and Lifteeze which are used and applied by hand by smaller furniture stripping facilities and contractors.

The only requirement for furniture stripping facilities in the South Coast Basin is that the stripping formulations have a vapor pressure of two mm Hg or less. The MSDSs for these alternative products both indicate that the vapor pressure of the mixture is less than 0.1 mm. The formulations meet the SCAQMD Rule 1136 requirement that strippers have a vapor pressure of two mm Hg or less. One of the ingredients in the #B96 formulation is phenol which is listed on SCAQMD Rule 1401. It is present at a concentration of 10 to 20 percent. The chemical is not a

carcinogen but it does pose a variety of toxic hazards according to HESIS. Even so, the tradeoff of using this material instead of a formulation containing more than 70 percent METH is likely beneficial.

The best performing consumer product alternative stripper that does not contain METH or NMP is Ben's Nu-Tech Stripper. The MSDS, shown in Appendix C, indicates that the formulation contains 50 to 60 percent of an aromatic alcohol, one to five percent formic acid and less than two percent aromatic petroleum distillates. The aromatic alcohol in this formulation is also benzyl alcohol. This particular stripping formulation, because it is sold as a consumer product, must meet the CARB regulations. The MSDS lists the vapor pressure of the formulation as less than 0.1 mm Hg. This indicates the mixture meets the CARB LVP-VOC definition which means the formulation is not defined as a VOC. It therefore meets the requirement that stripping formulations have a VOC content of 50 percent or less.

VI. RESULTS AND CONCLUSIONS

The most widely used and effective stripping formulations contain METH. The chemical is a carcinogen, is classified as a HAP by U.S. EPA, is classified as a TAC in California and is listed on California's Proposition 65. METH is also a listed hazardous waste under RCRA.

This project involved identifying, developing, testing and demonstrating safer alternatives to METH based stripping formulations. Alternatives were tested in four sectors including large furniture stripping companies who utilize stripping equipment and purchase stripper from suppliers, smaller furniture stripping companies who apply stripper by hand and purchase stripper either from suppliers or from hardware and paint supply stores, contractors who hand strip wood items and cabinetry on-site and generally purchase strippers from hardware and paint supply stores and consumers who hand strip wood and metal items and purchase stripper from hardware and paint supply stores. IRTA tested the alternative stripping formulations in flow trays with two large furniture stripping facilities. IRTA also tested the alternative formulations by applying them by hand in the two stripping facilities. IRTA tested alternative strippers with one contracting firm that strips on-site in homes and offices. Finally, IRTA conducted panel testing to find the best alternative strippers that could be used by consumers.

The non-METH strippers that were tested during the project were formulated by Benco Sales or purchased from hardware and home improvement stores. The best performing alternative stripping formulations contained benzyl alcohol as the active ingredient. For large furniture stripping companies that use equipment, the alternative that performed most effectively in two shops was #B96 which contains 50 to 60 percent benzyl alcohol. The most effective alternative for hand stripping in furniture stripping facilities was #B95 which also contains 50 to 60 percent benzyl alcohol. Adding about 20 percent acetone to the #B95 formulation improved its hand stripping capability for certain types of coatings. The #B95 also worked well for on-site contract stripping of wood items. Finally, the best performing stripping formulation in the consumer product testing was Ben's Nu-Tech Stripper which also contains benzyl alcohol.

The results of the cost analysis for large furniture stripping facilities that generally use #B7 stripper which contains a high concentration of METH indicate that the cost of using #B7 and #B96, the alternative containing benzyl alcohol, is comparable. For consumer product stripping, the cost of using the best non-METH alternative is lower than the cost of using METH based strippers that are on the market today.

In general, the non-METH alternatives that performed best contained benzyl alcohol. The toxicity evaluation conducted by HESIS indicated that benzyl alcohol is much lower in toxicity than METH.

The SCAQMD began developing a regulation for METH stripping facilities that use equipment several years ago. The regulation was never finalized because the stripping companies believed it was unfair to regulate them when smaller stripping companies could still purchase METH strippers from hardware and paint supply stores. The testing conducted in this project demonstrates that alternative non-METH stripping formulations can be used by large and small

furniture stripping companies. The alternative non-METH stripping formulations comply with SCAQMD Rule 1136 which requires the stripping formulations to have a composite vapor pressure of 2 mm Hg or less.

CARB estimates that emissions of METH from consumer product strippers amounted to 9.68 tons per day in 2006. Emissions of VOC solvents from these strippers totaled 7.04 tons per day. The testing conducted in this project with small furniture stripping companies, contractors and on panels demonstrates that effective non-METH stripping formulations can substitute for the METH based strippers that are widely employed today. The alternative benzyl alcohol strippers that performed most effectively in these applications are classified by CARB as LVP materials based on their composite vapor pressure. This suggests that substituting the alternatives would not increase VOC emissions from consumer product strippers.

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Performance Evaluation of Hap-Free Paint Strippers vs. Methylene-Chloride-Based Strippers for Removing Army Chemical Agent Resistant Coatings (CARC)

by John Kelley and Thomas Considine

ARL-TR-3823

June 2006

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1. Introduction

Methylene chloride is a widely used chemical solvent with a diverse number of applications. It was introduced as a replacement for more flammable solvents over 60 years ago and is commonly used in paint removers and industrial adhesive applications (1). Methylene chloride (dichloromethane) is an organic solvent that is especially effective as a paint remover. However, overexposure can cause serious health problems. Like many organic solvents, methylene chloride can damage the brain, as well as the skin, lungs, and other organs. In addition, it has been shown to cause cancer in humans and laboratory animals (2). For this reason, the Occupational Safety and Health Administration reduced its allowable exposure limits from 500 ppm in an 8-hr time weighted average (TWA) period in 1971 down to 25 ppm TWA for 8 hr or a 125 ppm for shorter term exposure in a 15-min sampling effective in 10 April 1997 (3). Additionally, the National Institute for Occupational Safety and Health (NIOSH) recommends that exposure to methylene chloride in the workplace be limited to the lowest feasible limit and the American Conference of Governmental Industrial Hygienists (ACGIH) recommends a workplace exposure limit of 50 ppm averaged over an 8-hr day.

The effects of methylene chloride are not limited to the health implications caused in the workplace. It has also been identified as a Hazardous Air Pollutant (HAP) by the U.S. Environmental Protection Agency (EPA). In fact, the EPA will be introducing a series of new National Emission Standards for Hazardous Air Pollutants (NESHAPs) that will likely impact current operations within the U.S. Department of Defense (DoD) and industry as a whole. It is expected that one of these NESHAPs, specifically “Surface Coating of Defense Land Systems and Miscellaneous Equipment” will directly impact many of the Army’s chemical depainting operations that use methylene chloride (4). Since this NESHAP focuses specifically on organic finishing processes, the U.S. Army expects a number of their current operations to be impacted. One of the most significant ways these operations could be impacted may include compromising combat readiness by limiting or discontinuing current refinishing operations. Therefore the U.S. Army has initiated the Sustainable Painting Operations for Total Army (SPOTA) program. This program is aimed at keeping the effected operations and facilities operational and in compliance upon implementation of the upcoming NESHAP.

The U.S. Army Research Laboratory (ARL) has been tasked with identifying and evaluating HAP-free alternative paint strippers as a potential replacement for methylene-chloride-based strippers. One of the major obstacles in finding a suitable “drop-in” replacement for methylene chloride is that most HAP-free products have been known to have slower stripping times than those that contain methylene chloride. The overall strip time is an important consideration especially in the high volume operations typically found at U.S. Army depots. Finding a chemical stripping “process” that will maintain, as close as possible, the current throughput rate

at the depots is of utmost importance. Compounding the issue further is the U.S. Army's family of Chemical Agent Resistant Coatings (CARC). These coatings are, by their very nature, chemical resistant and are among the most difficult to remove by chemical means. The coating system is made up of an epoxy primer with a high solids polyurethane top-coat. Moreover, the various surface conditions and pretreatments used and the substrate alloys can also affect the coatings resistance to chemical strippers.

The Gap Assessment Report generated by Concurrent Technologies Corp. (CTC) and National Defense Center for Environmental Excellence (NDCEE) (4) identified three U.S. Army facilities as primary users of methylene chloride strippers: Anniston Army Depot (ANAD), AL; Corpus Christi Army Depot, TX; and Letterkenny Army Depot, PA. The majority of the methylene chloride coating removal process at Corpus Christi is done with a MIL-R-81294 Type I Class I stripper (5). The MIL-R-81294 contains phenol and sodium chromate as well as methylene chloride. This stripping operation is typically a multistage process. The stripper is brushed on and allowed to penetrate the coating for at least 2 hr. At the end of this dwell time, the coating is scraped off. Multiple applications are usually necessary to remove all of the coating. This is referred to as a "manual" process. Similarly, some of the "manual" processes performed at Letterkenny utilize a methylene-chloride-based stripper that conforms to Federal Specification TT-R-251J Type III, Class A (6). No methylene chloride immersion tank processes are in use at either Corpus Christi or Letterkenny.

The largest consumer of methylene chloride strippers within the U.S. Army is ANAD. ANAD has five immersion vats ranging from 1800 to 2200 gallons designated for use with a methylene chloride paint stripper. In this operation, various parts from battlefield tanks and other armaments are totally immersed in the methylene chloride solution at ambient temperature for up to 30 min. The stripper used in the immersion processes at ANAD conforms to specification MIL-R-81903A Type II Class II (7), and the major ingredients are methylene chloride, formic acid, surfactants, aromatic hydrocarbons, and wax. The wax acts as a floating barrier layer to help reduce the chemical emissions. ANAD uses nearly 20,000 gallons of this product which emits 50 tons of methylene chloride annually (8). To a far lesser degree, ANAD also performs the "manual" stripping operations using other methylene chloride products conforming to TT-R-251J.

ARL worked in cooperation with the depots to draft site-specific performance requirements and establish baselines by which to measure the effectiveness of the HAP-free strippers. Because of their large volume of work and size of the parts stripped, the requirements for HAP-free alternatives to methylene chloride in the immersion process were almost exclusively based on the requirements of ANAD. The primary requirements that an alternative stripper must meet to be considered for use at ANAD are as follows: (1) it must remove 100% of the coating in a 30-min immersion time; (2) it must meet NESHAP emission standards; (3) it must not create a health hazard that is excessively difficult to manage; (4) it must be available in large enough quantities to satisfy ANAD operations; (5) it must be cost effective; and (6) its maintenance must be manageable by the ANAD operations staff.

The “manual” stripping process performance requirements were somewhat more ambiguous. Letterkenny and Corpus Christi use different products and therefore their expectations for the strippers were different. Moreover, even with the use of a methylene chloride product, the “manual” process was much more time consuming. Dwell times ranged from 2 hr to overnight. However, to set some project metrics, ARL in conjunction with Aviation & Missile Command (AMCOM) developed a baseline performance criterion that is a function of the thickness of the coating being stripped.

The information presented in this report represents the results of laboratory performance evaluations of the HAP-free strippers vs. the baseline methylene chloride containing strippers. More testing is ongoing to further qualify the better performing HAP-free strippers using the U.S. Army Depainting Test Protocol (9).

2. Experimental Procedure

2.1 Sample Preparation

Aluminum alloy 2024-T3 and standard cold rolled steel plate were chosen as the substrate materials. All aluminum panels were treated with Alodine 600 chromate pretreatment and all steel panels were zinc phosphated prior to painting. The panels were painted according to a modified version of ASTM D6189-97 (10). Both aluminum and steel panels designated for solvent-borne CARC (MIL-C-53039 [11] and MIL-C-46168 [12]) were primed with epoxy primer MIL-C-53022B (13), and those designated for water-borne CARC (MIL-DTL-64159 [14] Type I and Type II) were primed with MIL-P-53030 (15). Multiple coating applications were used to achieve the final coating thickness. The layer colors were alternated between 686 tan and 383 green to make the stripping evaluations easier to quantify. A schematic of each of the CARC painted panels can be seen in figure 1. The top layer of the solvent-borne panels was tan while the water-borne panels were green.

2.2 Alternatives Selection

The Gap Assessment Report generated by CTC/NDCEE identified many HAP-free alternatives to methylene chloride for use in both the “manual” and “immersion” processes. The information presented in the NDCEE report also included the estimated strip times (as reported by the vendor) of many of the products. ARL used this information to select the alternatives to be included in its test matrix. Those that reported strip times of above 2 hr were not included. ARL also consulted with end users and other leaders in the paint and industrial chemical industry for their recommendations. Once all of this information was considered, a list of the candidate strippers was compiled and the manufacturers were contacted. The candidates for “immersion” stripping are listed in table 1, and the candidate strippers for the “manual” process are listed in table 2.

Table 1. Immersion process candidates.

Product Trade Name	Manufacturer	Process	Contents	PH
Gardostrip 7900Q	Chemetall Oakite	Trade Secret Alt.	Proprietary ingredients	3
Dip Strip	Back to Nature	NMP	N-methyl pyrrolidone	—
Safety Strip 5896	Brulin	NMP	N-methyl pyrrolidone (90%)	—
Envirostrip 1-S	Chem Marketing	NMP	N-methyl pyrrolidone (80%)	—
Envirostrip #2	Chem Marketing	NMP	Phenyl carbinol, hydrogencarboxylic acid (20%), aromatic petroleum dist. surfactant	—
Envirostrip #3	Chem Marketing	NMP	Propionic acid, N-methyl pyrrolidone (70%), dihydro furanone, tergitol	—
CEM 483WW23	Coral Chemical	NMP	N-methyl pyrrolidone	—
Greensolv 273D	Greensolve Inc.	NMP	Amide, pyrrole	6–8
Greensolv 274WL	Greensolve Inc.	NMP	Pyrrole alcohol, ethoxylated alcohols, ammonia	10.74
Aerostrip 5182	West Penetone	NMP	N-methyl pyrrolidone	11.6
RS 75	WSI	NMP	N-methyl pyrrolidone	—
A1 Strip 49	Coral Chemical	Hydrogen peroxide	Hydrogen peroxide	—
CEM 483WW32	Coral Chemical	Hydrogen peroxide	Hydrogen peroxide	—
A1 Strip/AD 3030	Coral Chemical	Hydrogen peroxide	Hydrogen peroxide	—
HT-2263	Eldorado	Hydrogen peroxide	Formic acid, oil, ethanolamine	—
PR 5044	Eldorado	Hydrogen peroxide	Hydrogen peroxide	—
K-Chem Strip III	K-Chem	Benzyl alcohol	Formic acid, benzyl alcohol	2
D-Zolve 15-33LO	Solvent Kleene	Benzyl alcohol	Alkyl methyl ester, petroleum naptha, benzyl alcohol, methyl phenyl ether	10.5
D-Zolve 298	Solvent Kleene	Benzyl alcohol	Benzyl alcohol, formic acid	2.1
D-Zolve 3703	Solvent Kleene	Benzyl alcohol	Dimethyl formamide	5.03
NPX	West Penetone	Baseline	75% methylene chloride, 25% formic acid	—
Methylene Chloride/H2O	NA	Baseline	Methylene chloride	—

Note: NA = not applicable.

Table 2. Manual process candidates.

Product Trade Name	Manufacturer	Process	Contents	PH
Multi-Strip	Back to Nature	NMP	N-methyl pyrrolidone (15–30%), dimethyl glutarate (25–40%), dimethyl adipate (10–20%)	—
Readstrip Hi-Perf	Back to Nature	NMP	N-methyl pyrrolidone (10–15%), dimethyl glutarate(30–35%), dimethyl adipate (10–15%)	—
Ultra-Strip	Back to Nature	NMP	N-methyl pyrrolidone (35–50%), dimethyl glutarate(20–35%), dimethyl adipate (5–20%)	—
Ardrox 2865	Chemetall Oakite	Benzyl Alcohol	Benzyl alcohol	6.0–7.3
Dorado 5051	Eldorado	Benzyl Alcohol	Benzyl alcohol, hydrogen peroxide	3.0–5.0
D-Zolve 15-33LO	Solvent Kleene	Benzyl Alcohol	Alkyl methyl ester, petroleum naptha, benzyl alcohol, methyl phenyl ether	10.5
D-Zolve 3703	Solvent Kleene	Benzyl Alcohol	Dimethyl formamide	5.03
D-Zolve 1220GEL	Solvent Kleene	Benzyl Alcohol	Benzyl alcohol, formic acid	2.1
Crest Strip #28	Crest	Baseline	Phenol, methylene chloride	—

2.3 Immersion Stripping Experiment

As previously mentioned, this effort focused on two chemical stripping processes commonly used at the U.S. Army depots: “immersion” and “manual.” The immersion process employs stainless-steel vats or tanks of various sizes filled with chemical stripper. The parts are immersed in the stripper for a period of time, removed, and subsequently rinsed with water. This is typically done at ambient temperatures using methylene chloride based strippers. However, the manufacturers of all of the HAP-free candidates recommend that their product be used in heated immersion baths. The temperature range recommended by the manufacturers is between 150 and 170 °F. Therefore, the apparatus used for these experiments were stainless steel “mini” vats that were heated in a hot water tank similar to a steam table. The temperatures of the individual chemical strippers were monitored closely with a digital thermocouple to ensure that the strippers were used within the recommended temperature range (figure 2). Stainless-steel bars were positioned across the tops of the mini-vats to support and evenly space the test panels during immersion. The panels were immersed vertically exposing approximately 1/3 of the panel to direct contact with the stripper. The panels remained immersed for 30 min, then removed and immediately rinsed with deionized water.

2.4 Manual Stripping Experiment

The manual process requires the chemical stripper to be brushed or sprayed on and allowed to penetrate for a period of time. Because the manual process is performed in open air, and on surfaces that may be positioned vertically, the chemical is usually thickened. Figure 3 shows the test panels awaiting manual application of the chemical strippers. For this experiment, a prescribed test area was masked off on each panel. The chemical stripper was applied to the exposed area of the panel using a 2-in paintbrush. The amount of time the stripper is allowed to penetrate (dwell time) was dependent on the total paint thickness. The paint thickness varied by the type of CARC. The average thickness of the MIL-C-46168 was 10 mil while the MIL-DTL-64159 averaged 6 mil thick. The dwell time allowed for all manual strippers was derived from the CCAD requirement of 45 min per each 3 mil of paint. At the end of the predetermined dwell time, the panels are scraped using a plastic Klean Strip^{*} paint scraper (figure 4 and 5), and rinsed in deionized water.

2.5 Evaluations

The evaluations of the test panels were performed in the same way for both the manual and immersion experiments. Duplicate panels for each CARC version were prepared for each of the stripping products (tables 3–5). The amount of area of each layer of paint that was removed from the panels by the strippers was measured using a similar method described in ASTM standard D 1654 procedure B (16). The area exposed to the stripper is divided up into 100 smaller areas with the use of a grid printed on a transparent film. The grid is placed over the test area

^{*}Klean Strip is a registered trademark of W. M. Barr & Company, Inc., Memphis, TN.

Table 3. Test matrix for round 1 of immersion tests.

Round 1 Immersion Experiment Test Matrix		
Product	Phosphated Steel Substrate	
	SB CARC 53022B/53039	WB CARC 53030/64159 Type 1
	Number of Panels	Number of Panels
RS #75	2	2
Greensolv 273D	2	2
Greensolv 274WL	2	2
Ardrox 2865	2	2
Gardostrip Q7900	2	2
PR-5044	2	2
HT-2263	2	2
Al Strip 49/AD 3030	2	2
CEM 483WW32	2	2
Al Strip 49	2	2
CEM 483WW23	2	2
Envirostrip #3	2	2
Envirostrip 1-S	2	2
Safety Strip 5896	2	2
Methylene Chloride/H ₂ O	2	2

Table 4. Test matrix for round 2 of immersion tests.

Round 2 Immersion Experiment Test Matrix				
Product	Phosphated Steel Substrate (S)		Chromated Al Substrate (A)	
	SB CARC 53022B/46168		WB CARC 53030/64159 Type 2	
	Number of Panels		Number of Panels	
K-Chem III	2	2	2	2
Greensolv 274WL	2	2	2	2
Dip Strip	2	2	2	2
D-Zolve 298	2	2	2	2
D-Zolve 15-33LO	2	2	2	2
Safety Strip 5896	2	2	2	2
Envirostrip #3	2	2	2	2
HT-2263	2	2	2	2
Gardostrip Q7900	2	2	2	2
NPX	2	2	2	2

(figure 6) and the percentage of painted area removed is determined. The percent area removed of each layer of coating including the primer was recorded. The results of the two panels were averaged and the results were plotted.

Table 5. Test matrix for manual tests.

Manual Experiment Test Matrix				
Product	Phosphated Steel Substrate (S)		Chromated Al Substrate (A)	
	SB CARC 53022B/46168		WB CARC 53030/64159 Type 2	
	Number of Panels		Number of Panels	
Multi-Strip	2	2	2	2
ReadyStrip Hi-Perf.	2	2	2	2
Ultra-Strip	2	2	2	2
Ardrox 2865	2	2	2	2
Dorado 5051	2	2	2	2
D-Zolve 15-33LO	2	2	2	2
D-Zolve 3703	2	2	2	2
D-Zolve 1220GEL	2	2	2	2
Crest Strip #28	2	2	2	2

The immersion experiments were performed using the following two rounds of testing: (1) a screening round and (2) final down selection for full-scale trials. The test matrix for each can be found in tables 3 and 4, respectively. The first screening round was performed on MIL-C-53039 (single component CARC) and MIL-DTL-64159 Type II (two-component water-borne CARC) on steel substrates only. The steel test panels coated with these two versions of CARC were the easiest and quickest to produce in-house and were therefore used for the first screening round. Round 2, the final down selection round, included MIL-C-46168 (two-component solvent-borne CARC) and MIL-DTL-64159 Type I coated steel and aluminum samples. The majority of the U.S. Army's currently fielded systems are coated with the 46168 CARC, and many of them are constructed of aluminum. Therefore, it was considered prudent to include both MIL-C-46168 and aluminum substrate for the final down selection before full scale-up trials were performed.

3. Results

3.1 Immersion Stripping Experiments

A list of all the candidates, their manufacturer, and a brief list of characteristics can be found in table 1. All were used at full concentration with the exception of D-Zolve* 298 which requires the addition of 20–25% water prior to use. The immersion experiments were carried out in two rounds of testing. The results of the first round are displayed in figures 7–11. The data presented in figures 7 and 8 represent the performance of the listed strippers against MIL-C-53039 (figure 7) and MIL-DTL-64159 (figure 8). The actual product used at ANAD for immersion stripping is known as Pen-Strip NPX[†] manufactured by West Penetone. ARL did not receive this product in time to include it in round 1. However, it was suggested by ANAD that ARL include straight

*D-Zolve is a registered trademark of Solvent Kleene, Inc., Peabody, MA.

[†]Pen-Strip is a registered trademark of West Penetone, Inc., Villa D'Anjou, QC, CAN.

methylene chloride with a water “blanket” to reduce emissions. The straight methylene chloride was the only one in figures 7 and 8 that was tested at room temperature.

The coatings in round 1 were applied in the lab at ARL. The two CARC versions used in round 1 were selected because they were readily available and stocked in the lab and represented what was currently being applied at the depots. Note that the data in figure 8 represents the stripping performance of the HAP-free candidates against water-borne CARC MIL-DTL-64159 Type II. The Type II version contains a polymeric flattening compound rather than the silica found in the Type I. The images shown in figures 9–11 illustrate some of the effects the strippers had on the respective coatings in round 1. Each of these figures illustrates distinctly different effects of the strippers on the coatings, particularly with the 64159 Type II panels.

The second round of testing included the NPX product. The NPX formulation used at ANAD includes a wax layer to help reduce chemical emissions from the volatile methylene chloride and extend the tank life of the product. Figure 12 shows a sample of the product with the floating wax barrier layer. The NPX product performed as expected removing 100% of the coating within 30 min on all samples tested. Thus, the group photo in figure 13 showing all the NPX panels was deemed adequate to illustrate its effectiveness.

Round 1 did not produce an overwhelmingly strong candidate to be the “drop-in” replacement for the methylene chloride based products. For this reason, additional new products were solicited and investigated for round 2. The new products that were introduced in round 2 were: K-Chem CARC Stripper III, Dip Strip, D-Zolve 298, D-Zolve 15-33, and the baseline NPX product. Following the testing in round 1, only a limited number of the MIL-C-53039 coated test panels remained. Since this coating proved to be the biggest challenge in round 1, the remaining samples were used to test the additional new products and obtain the results in figure 14.

The vast majority of the U.S. Army’s legacy vehicles are currently coated with MIL-C-46168. Also, many of the vehicles, including all of the high-mobility, multipurpose, wheeled vehicles (HMMWV), bodies and parts are made from aluminum alloys. Therefore, before the final three candidates could be accurately down selected and recommended for full-scale trials, they must perform well against MIL-C-46168 and on chromated aluminum substrates. Round 2 includes these test panels along with those coated with MIL-DTL-64159 Type I water borne CARC. The results of these evaluations are shown in figures 15 and 16 (on steel substrates) and in figures 17 and 18 (on aluminum substrates).

To obtain a broad picture of the overall performance of the various strippers on the family of CARC coatings, the performance across all of the coatings regardless of the substrate is averaged and presented in figure 19.

3.2 Manual Stripping Experiment

The results of the manual stripping experiment can be seen in figures 20–23. The performance requirements for manual strippers were difficult to determine, particularly the dwell times.

ASTM D 6189-97 (17) required a dwell time of 30 min. Initial test (performed concurrently with the round 1 immersion tests) using only 30 min yielded no discernable results. Therefore, ASTM D 6189-97 was modified to allow for a longer dwell time that better reflected actual depot procedures. An adequate number of MIL-DTL-64159 Type II and MIL-C-53039 coated panels were not available to include in the manual tests because nearly all were consumed during the first round of immersion tests.

3.3 Pilot Testing Using Miscellaneous Parts

An assortment of used CARC-coated hardware was obtained from ANAD for the purpose of conducting some additional pilot tests using the top three performing HAP-free candidates, along with the baseline NPX. This hardware was mainly comprised of various brackets, hinges, covers, flanges, etc. An effort was made to sort these components into groups containing an equal number of each that was on hand. The experiment was carried out using the same process employed in the immersion panel experiments. The results for the component tests can be seen in figures 29–32. The amount of NPX remaining was not quite enough to fill the vat and completely immerse all of the components. Consequently, some areas of two of the components in figure 29 are still partially coated. There was a sufficient amount of all of the HAP-free candidates to completely immerse the parts in their vats.

4. Discussion

4.1 Immersion Tests, Round 1

In the first round of testing, only five of the HAP-free strippers, Gardostrip^{*} Q7900, HT-2263, Envirostrip #3 and 1-S, and Safety Strip 5896 were effective on the MIL-C-53039 solvent-borne CARC system. As can be seen in figure 7, Gardostrip Q7900 clearly outperformed the others by removing nearly 55% of all the topcoat layers and more than 20% of the primer. The next best, Envirostrip #3, barely removed 5%, all of which was paint lifting at the edge of the panels (figure 9a). The straight methylene chloride was nearly twice as effective as the Gardostrip Q7900 removing 90% of the entire MIL-C-53039 coating system including the epoxy primer. The only noticeable effect on the panels by RS #75, Greensolve 274WL, Alstrip/AD3030, CEM 483WW32, Al Strip 49, and CEM 483WW23, was some color fading similar to that seen in figure 9a.

Significantly different results were observed for some of the alternatives on the MIL-DTL-64159 Type II waterborne CARC coating. For all but three of the HAP-free strippers, the MIL-DTL-64159 Type II was considerably easier to remove. Figure 8 shows that Greensolv 274WL, Gardostrip Q7900, HT-2263, Envirostrip #3 and 1-S, and Safety Strip 5896 all performed better than even the straight methylene chloride on the water-borne Type II CARC

^{*}Gardostrip is a registered trademark of Chemetall Chemical Products, Berkeley Heights, NJ.

system (see figures 9b, 10b, 11b). It can be seen in figure 9 that, although the Envirostrip #3 had a minimal effect on the MIL-C-53039 (figure 9a), it was able to remove all of the 64159 Type II coating (figure 9b). The Envirostrip #3 seems to break the bond of the coating at the substrate, leaving the released coating almost completely intact. This phenomenon was typical for the 64159 Type II reacting to many of the strippers, indicating that water-borne Type II CARC remains more flexible. The performance of the Gardostrip Q7900 (figure 10) was very similar to that which was found in a previous study by Penn State's Applied Research Laboratory (18). Much of this removal occurred within the first 10 min, indicating that perhaps agitation of the vats would enhance the strippers effectiveness. The inability of RS #75 Alstrip/AD3030, Al Strip 49, and both CEM 483WW23 and CEN 483WW32 to penetrate this seemingly easily strippable coating prevented them from moving beyond the first round.

4.2 Immersion Tests, Round 2

Based on the results of round 1, only the top HAP-free candidates were down selected to the top candidates to move on to round 2. In addition, four new products: K-Chem CARC Stripper III, D-Zolve 298, D-Zolve 15-33, and Dip Strip were added to the round 2 test matrix. The Pen-Strip NPX, which was not available in round 1, was also included as the baseline. The data presented in figure 14 are a compilation of the results of round 1 and 2 testing on MIL-C-53039 on steel substrate. Here it can be seen that two of the new candidates (K-Chem III and D-Zolve 298) performed well. In fact the K-Chem product matched the performance of the Pen Strip NPX removing 100% of all layers in 30 min. The D-Zolve 298 also performed well, removing 90% of the topcoat and more than 65% of the epoxy primer. These two products were not tested on the MIL-DTL-64159 Type II with polymeric beads. However, given the results in round 1, MIL-C-53039 is considered a more difficult coating to remove using HAP-free strippers. Therefore, it is expected that if the stripper can remove the MIL-C-53039, then it is likely that it will remove the MIL-DTL-64159 Type II.

Figures 15–18 represent all new results from round 2. The ability of the immersion strippers to remove MIL-DTL-64159 Type I from steel substrates is shown in figure 15, while the ability to remove MIL-C-46168 from steel is shown in figure 16. By comparing figures 15 and 16, it can be seen that the HAP-free strippers, as a whole, had more success removing MIL-C-46148 than MIL-64159 Type I. That is, the solvent-borne system was easier to remove than the water-borne system. That is contrary to what was seen in round 1 of testing where the water-borne MIL-DTL-64159 Type II was considered easier to remove than the solvent-borne MIL-C-53039. This is evident when comparing figure 10 with figure 24. One possible explanation for this phenomenon may be that the polymeric beads in the Type II system enabled the stripper to be absorbed more readily. Nevertheless, the K-Chem III and the D-Zolve 298 equaled the performance of the NPX on both the MIL-64159 Type I and MIL-C-46168 systems. Moreover, on the MIL-C-46168 only one product, Dip Strip, failed to remove at least 40% of the entire coating system.

Figures 17 and 18 show the same two CARC systems on a chromated aluminum 2024 substrate. The aluminum data in figures 17 and 18 demonstrate a similar performance trend as with the steel substrate data in figures 15 and 16. K-Chem III and D-Zolve 298 performed best on the MIL-DTL-64159 Type I. Once again, several HAP-free strippers performed well on the MIL-C-46168. Along with the K-Chem III and D-Zolve 298, Safety Strip 5896, Envirostrip #3, and Gardostrip Q7900 all removed more than 90% of the entire coating system, including the epoxy primer.

The average of all of the panels for each of the candidate strippers tested in round 2 was taken to determine their performance independent of the CARC version being stripped. It can be seen from figure 19 that of the eight nonmethylene chloride strippers, only three achieved more than 65% paint removal, with two of those being over 90%. More importantly, figure 19 shows that the K-Chem III (figure 25) product maintains the same stripping effectiveness as the methylene-chloride-based NPX (figure 13).

4.3 Manual Tests

The results from the manual stripping experiments are presented in figures 20–23. The Crest Strip #28 performed the best overall, removing the majority of all layers from the chromated aluminum panels and nearly 40% of the three layers of top coat from the steel panels. The Crest Strip #28 began blistering the paint within 5 min after application (figure 27). The D-Zolve 1220GEL showed blistering of the 46168 panels at about 30 min. Figure 28 shows a picture of the panels 40 min after stripper was applied. Although the lifting looks significant, only the top layer of the MIL-C-46168 was removed. Ardrox^{*} 2865 and Dorado[†] 5051 also showed signs of peeling early on the MIL-C-46168 samples, but also didn't manage to penetrate beyond the first layer. Each product, when applied to the MIL-DTL-64159 Type I coating, seemed to dry out relatively fast, as opposed to when applied to MIL-C-46168, which seemed to stay moist throughout the test. The reason for this has not yet been confirmed. However we could speculate that these differences in “drying rates” could be related to differences in the surface energies.

It is evident, given the resources and limited boundaries of this experiment, that none of the HAP-free strippers performed adequately on MIL-DTL-64159 Type I CARC. In fact, none even penetrated the top layer of coating. Regardless of the substrate, the HAP-free strippers were completely ineffective on the MIL-DTL-64159 Type I CARC.

4.4 Stripping of Miscellaneous Parts

The stripping of the miscellaneous parts was conducted to obtain a sense of how the top HAP-free candidate strippers would perform on actual materiel. The version and type of CARC paint on these parts is unknown. Therefore, the results presented in figures 29–32 are considered

^{*} Ardrox is a registered trademark of Chemetall Chemical Products, Berkeley Heights, NJ.

[†] Dorado is a registered trademark of Eldorado Chemical Company, Inc., Indianapolis, IN.

anecdotal. As expected, the NPX product removed all of the paint that was immersed from all of the parts cleanly. Although the D-Zolve 298 product left some paint behind, it also left the metal surface with a bright, clean appearance. On the other hand, like the NPX, the K-Chem product removed all of the paint from all of the parts. Of some concern though, may be the residual corrosion products left behind by the K-Chem CARC Stripper III. This may add an extra step for removing the corrosion in the refinishing process. Of the three HAP-free strippers tested on the parts, Gardostrip left the most paint on the parts. These results, although anecdotal, are in agreement with the panel results previously discussed. That is, consider the data in figure 19 for the overall immersion stripping performance. From this, one may expect that K-Chem III would be the most effective, D-Zolve 298 next, and Gardostrip third.

5. Conclusions and Recommendations

Benzyl alcohol-formic acidic strippers were the most effective HAP-free product for removing the different CARC formulations against which they were tested. The D-Zolve 298 and K-Chem CARC Stripper III, with a reported PH of 2, when heated to approximately 160 °F, can achieve similar stripping performance to that of the NPX. Based on this performance alone, both can be a viable alternative to the current immersion processes involving methylene-chloride-based substances. However, the low PH of these strippers should be carefully considered when being used on materials known to be susceptible to hydrogen embrittlement, such as high-strength steels.

The two-component, solvent-borne MIL-C-46168 was not as resistant to the non-methylene chloride HAP-free strippers as the MIL-C-53039 and MIL-DTL-64159 Type I CARC versions. Since MIL-C-46168 has been in use since the early 1960's, the vast majority of the U.S. Army legacy vehicles are presently coated with it. Therefore, a HAP-free stripper for the immersion process can be used in place of methylene chloride products with little or no reduction in throughput. However, a toxicity evaluation by the U.S. Army Center for Health Promotion and Preventive Medicine (CHPPM) should be completed before permanent implementation is considered.

The success of many of the HAP-free strippers on the water-borne MIL-DTL-64159 Type II with polymeric beads suggests that a broader use of this CARC version, in the long run, will help maintain shorter strip times while enabling the U.S. Army depots to remain in compliance with the new NESHAP regulations, as well as provide a wider selection of the HAP-free strippers that are currently commercially available.

Given the boundaries of the manual stripping experiment, none of the HAP-free strippers tested proved to be even slightly effective at removing the MIL-DTL-64159 Type I CARC. For manual stripping under ambient conditions, only the methylene chloride-phenol Crest #28 had

any impact on the Type I water-borne system. For this reason, no HAP-free alternatives can be recommended for use on this paint at this time under these conditions.

Several of the HAP-free strippers were successful at removing at least some portion of the top layer of the MIL-C-46168, but were not able to penetrate beyond that with only one application. In fact, the D-Zolve 1220 GEL nearly matched the performance of the methylene chloride-phenol Crest #28 on the painted steel substrate. For many of the legacy vehicles coated with the MIL-C-46168, the D-Zolve 1220GEL may be a viable alternative to Crest #28. However, multiple applications of the product will be necessary to be completely successful.

6. Summary/Future Work

Although this effort focuses on the task of identifying and evaluating HAP-free alternative paint strippers as a potential replacement for methylene chloride, it is understood that maintaining the level of productivity at the U.S. Army depots is an important consideration. The work presented here is part of an ongoing effort to identify and qualify the alternatives and more work is planned for the coming months. In addition to continuing a search for better products, materials compatibility, and toxicity examination by CHPPM, as well as scale-up trials, are planned for some of the products evaluated in this report.

7. References

1. Halogenated Solvents Industry Alliance Inc. (HSIA) Web Page. <http://www.hsia.org>, White Paper on Methylene Chloride (accessed January 2003).
2. American Federation of State, County and Municipal Employees Web Page. <http://www.afscme.org> (accessed September 2005).
3. U.S. Department of Labor, Occupational Safety and Health Administration. *Methylene Chloride*. Published 1997 at Yale University Web page, URL: <http://www.yale.edu>.
4. National Defense Center for Environmental Excellence (NDCEE). *Sustainable Paint Operations for Total Army (SPOTA)*; Draft--Depainting Technology Gap Assessment/Potential Alternatives Report. Concurrent Technologies Corp. (CTC): Johnstown, PA, 22 December 2003.
5. MIL-R-81294. *Remover, Paint, Epoxy, Polysulfide and Polyurethane Systems* **1999**.
6. TT-R-251J. *Remover, Paint (Organic Solvent Type)* **1999**.
7. MIL-R-81903A. *Remover, Acid Activated for Amine Cured Epoxy Coating Systems* **1991**.
8. Dunstan, M. T.; Franklin, D. *Evaluation of Methylene Chloride Emission Control Technologies at Anniston Army Depot*. Waste Minimization and Pollution Prevention Program, MSE Technology Applications Inc.: Butte, MT, June 2004.
9. Concurrent Technologies Corp. (CTC). *Sustainable Paint Operations for Total Army (SPOTA)*, Draft: Depainting Army Test Protocol, Prepared by National Defense Center for Environmental Excellence (NDCEE), January 2004.
10. ASTM D6189-97. Standard Practice for Evaluating the Efficiency of Chemical Removers for Organic Coatings. *Annu. Book ASTM Stand.* **2003**.
11. MIL-C-53039A. *Coating, Aliphatic Polyurethane, Single Component, Chemical Agent Resistant* **1993**.
12. MIL-C-46168. *Coating, Aliphatic Polyurethane, Chemical Agent Resistant* **1993**.
13. MIL-P-53022-10. *Primer, Epoxy Coating, Corrosion Inhibitions, Lead and Chromate Free* **1992**.
14. MIL-DTL-64159. *Coating, Water Dispersable Aliphatic Polyurethane, Chemical Agent Resistant* **2002**.
15. MIL-P-53030. *Primer Coating, Epoxy Water Reducible, Lead and Chromate Free* **1992**.

16. ASTM D 1654. Standard Method for Evaluation of Painted or Coated Specimens Subjected to Corrosive Environments. *Annu. Book ASTM Stand.* **1984.**
17. ASTM D 6189-97. Standard practice for Evaluating the Efficiency of Chemical Removers for Organic Coatings. *Annu. Book ASTM Stand.* **1997.**
18. Schneider, J. M.; Tricou, C. S. *Surface Preparation Improvement: Chemical Paint Remover Evaluation for the Albany Marine Corps Logistics Base (MCLB).* Pennsylvania State University, Applied Research Laboratory: State College, PA, 2001.

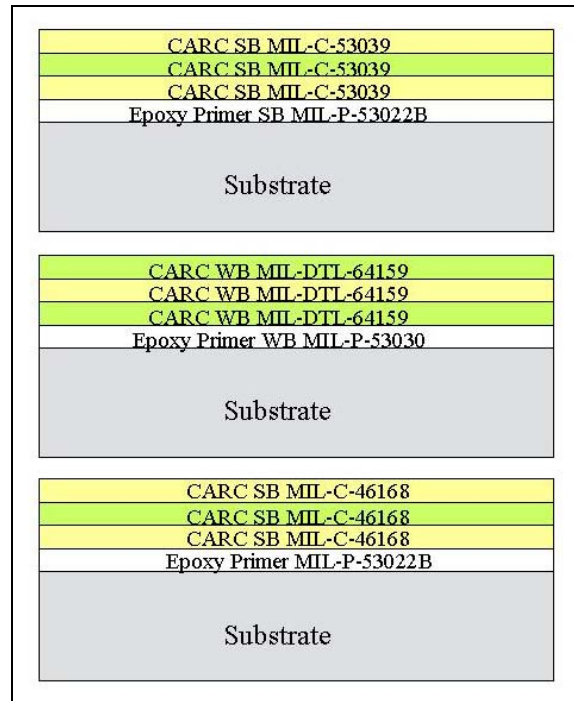


Figure 1. Paint layering systems used to enable easier stripping evaluations.



Figure 2. Immersion process “mini” vat setup with thermocouples. The horizontal stainless steel bars shown are for supporting the test panels when immersed.



Figure 3. Panels awaiting manual application.

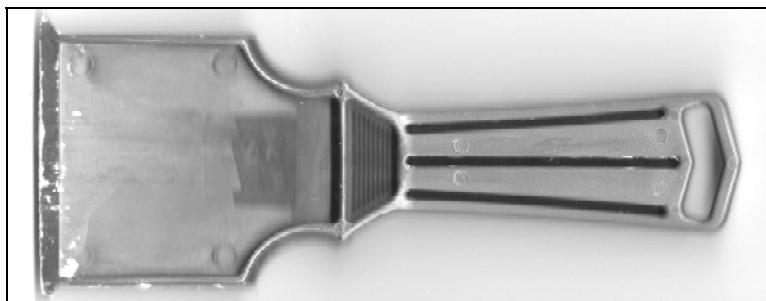


Figure 4. Plastic Klean Strip paint scraper used for scraping in the “manual” paint-stripping process.



Figure 5. Scraping operation in the manual stripping experiment. A bucket of water was used to capture the debris for disposal. A separate bucket of deionized water was used for rinsing.

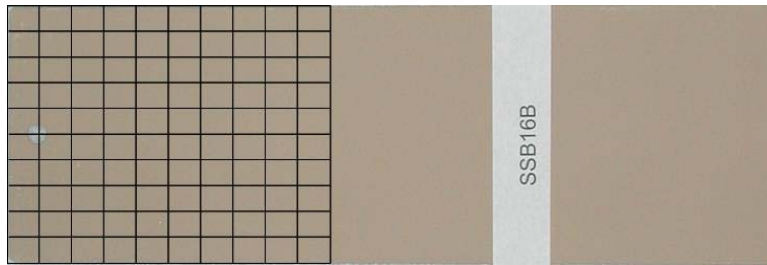


Figure 6. Example of a CARC-coated test panel with overlaid evaluation grid. The grid is commonly used rating corrosion panels according to ASTM 1654 Procedure B.

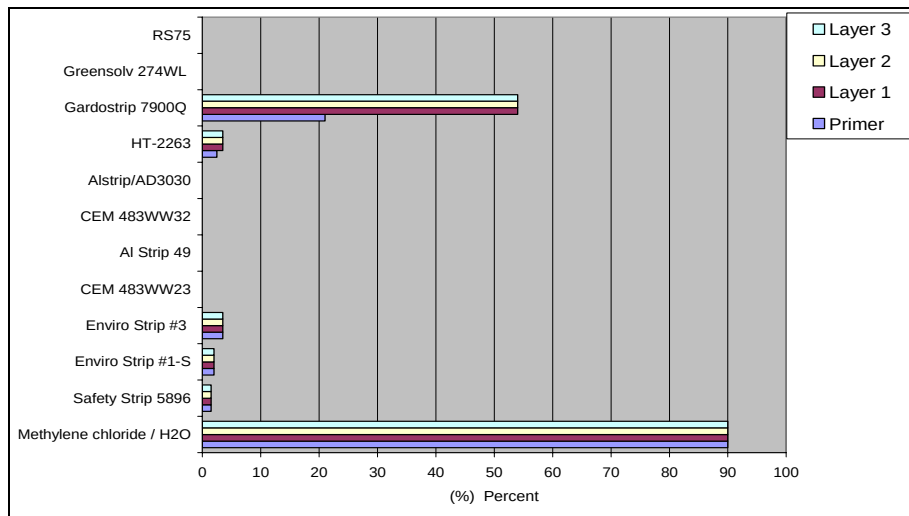


Figure 7. Round 1: percentage of MIL-C-53039 CARC removed from steel substrate after 30-min immersion.

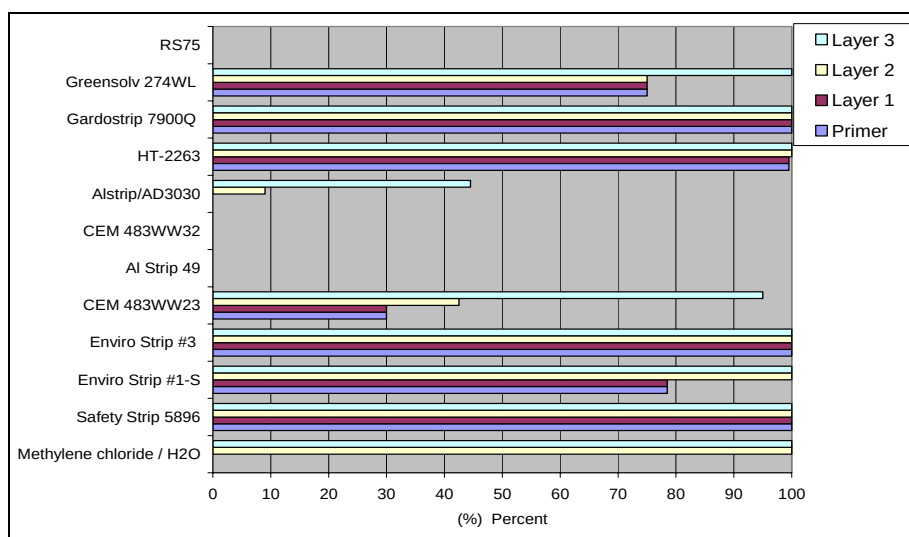


Figure 8. Round 1: percentage of MIL-DTL-64159 water-borne CARC removed from steel substrate after 30-min immersion.

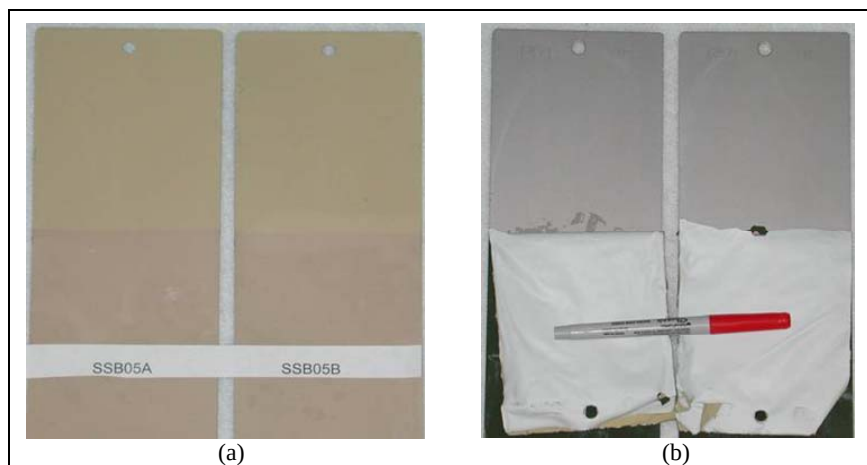


Figure 9. MIL-C-53039 CARC (a), MIL-DTL-64159 Type II CARC (b), both shown after 30-min immersion in Envirostrip #3. Several HAP-free alternatives performed well on the waterborne CARC, while MIL-C-53039 presented more of a challenge.



Figure 10. MIL-C-53039 CARC (a), MIL-DTL-64159 Type II CARC (b), both shown after 30-min immersion in Gardostrip Q7900.



Figure 11. MIL-C-53039 CARC (a), MIL-DTL-64159 Type II CARC (b), both shown after 30-min immersion in straight methylene chloride.



Figure 12. Example of the methylene-chloride-based NPX chemical stripper. Note the floating wax layer that is necessary to reduce chemical emissions.

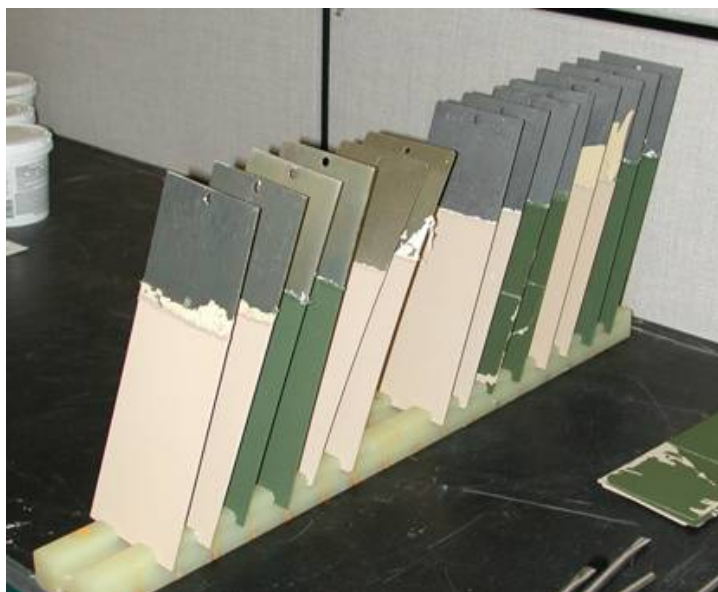


Figure 13. Depicts the effectiveness of the NPX stripper on all of the CARC-coated panels.

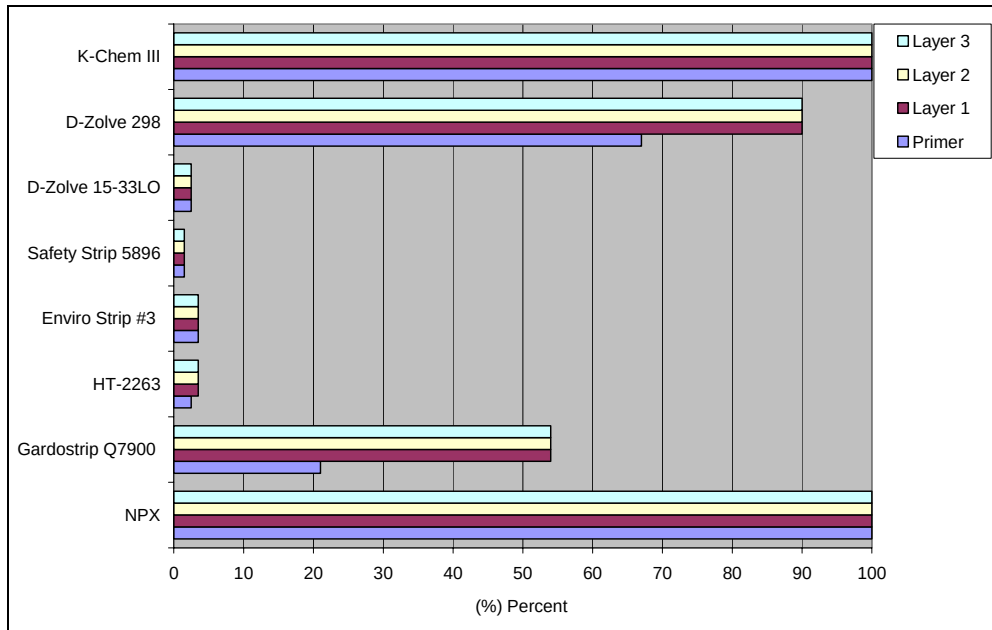


Figure 14. Round 2: percentage of MIL-C-53039 single component solvent-borne CARC removed from steel substrate after 30-min immersion.

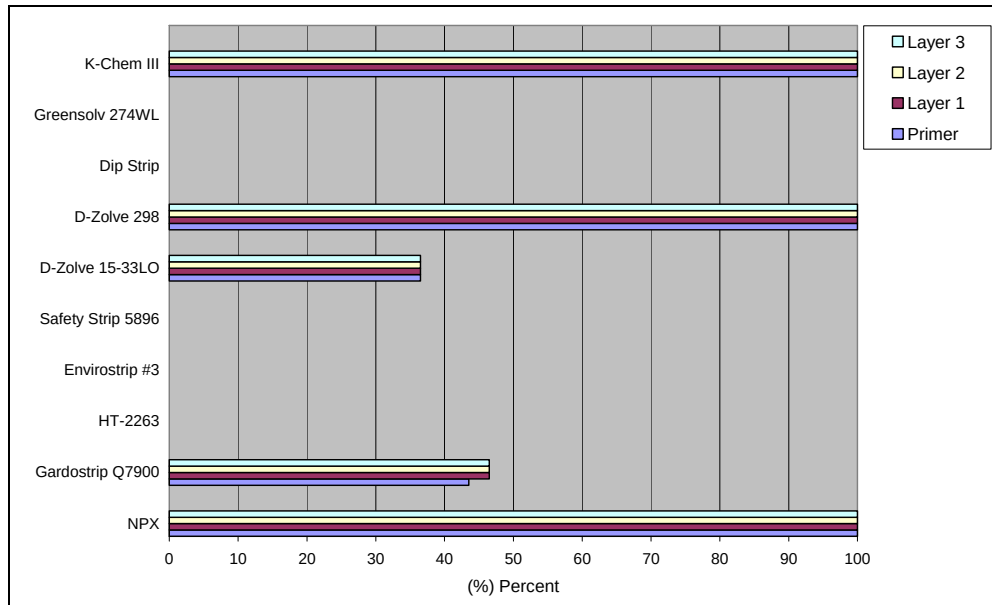


Figure 15. Round 2: percentage of MIL-DTL-64159 water-borne CARC removed from steel substrate after 30-min immersion.

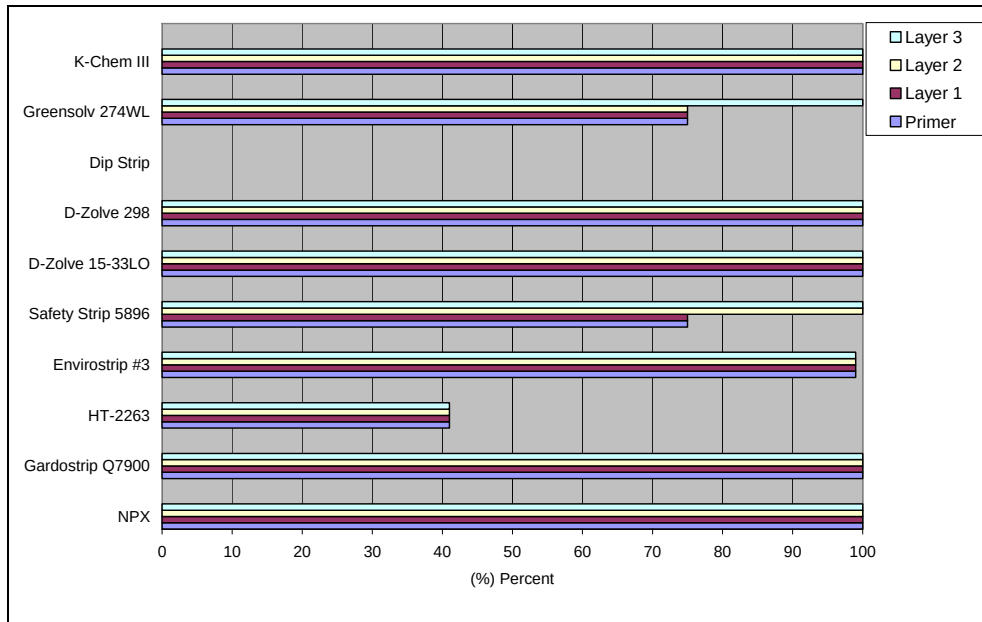


Figure 16. Round 2: percentage of MIL-C-46168 two-component solvent-borne CARC removed from steel substrate after 30-min immersion.

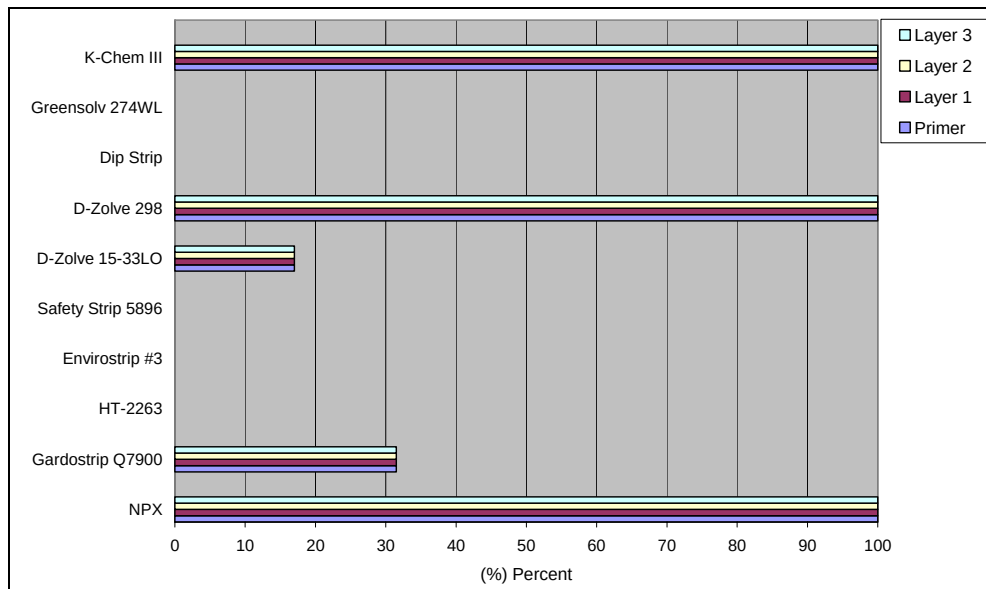


Figure 17. Round 2: percentage of MIL-DTL-64159 water-borne CARC removed from aluminum substrates after 30-min immersion.

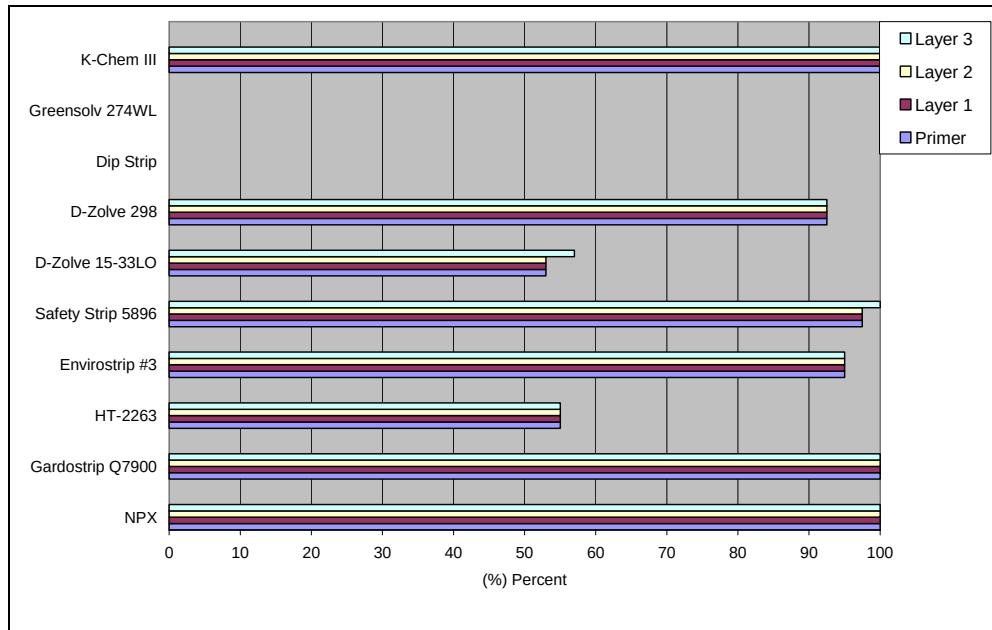


Figure 18. Round 2: percentage of MIL-C-46168 two-component solvent-borne CARC removed from aluminum substrate after 30-min immersion.

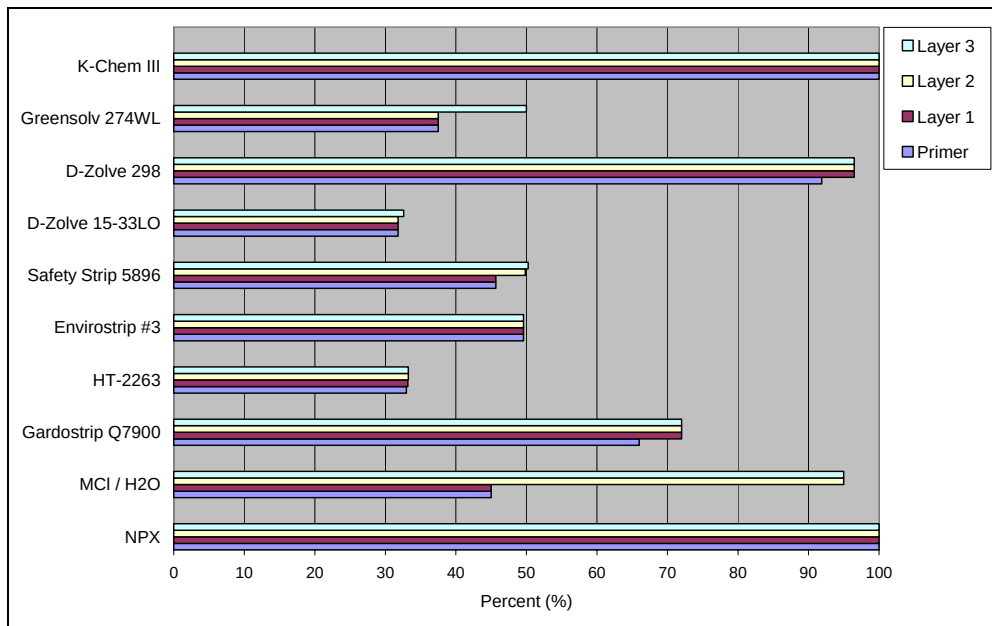


Figure 19. Overall immersion stripping performance averaged across all CARC versions regardless of substrate.

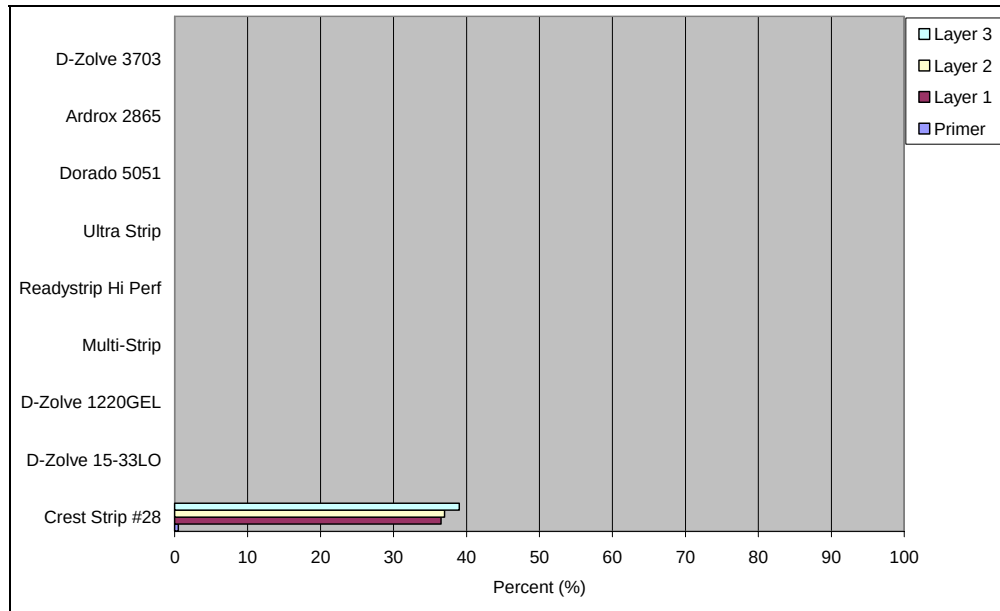


Figure 20. Percentage of MIL-DTL-64159 Type I water-borne CARC removed from steel substrate using manually applied (brush-on) paint-stripping candidates.

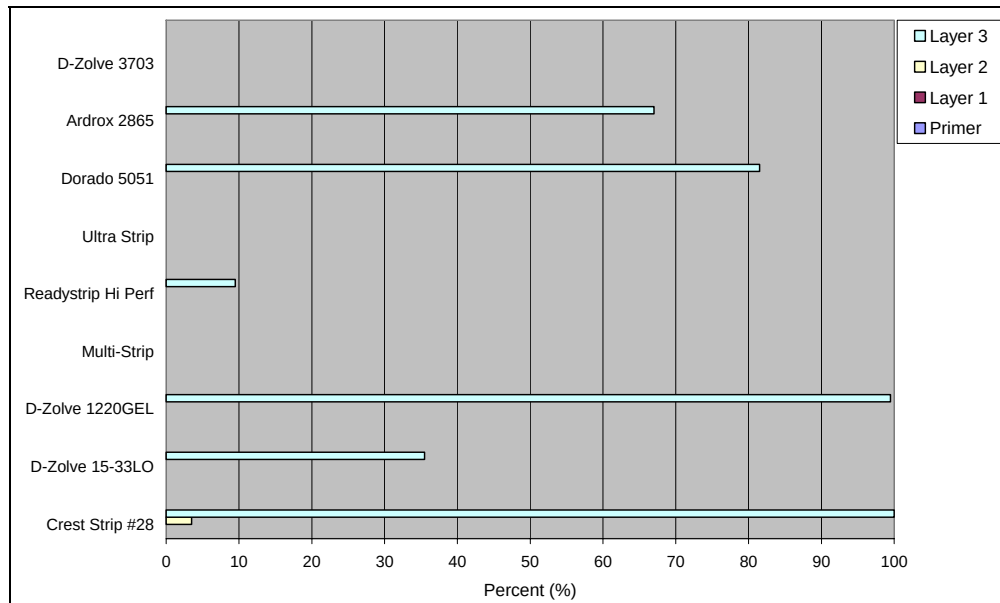


Figure 21. Percentage of MIL-C-46168 solvent-borne CARC removed from steel substrate using manually applied (brush-on) paint-stripping candidates.

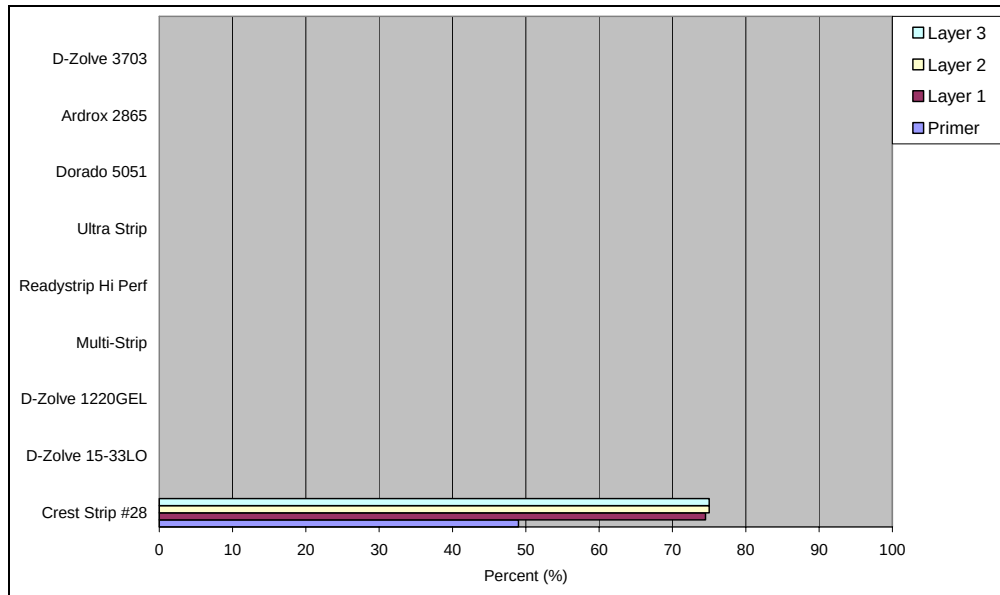


Figure 22. Percentage of MIL-DTL-64159 Type I water-borne CARC removed from aluminum substrate using manually applied (brush-on) paint-stripping candidates.

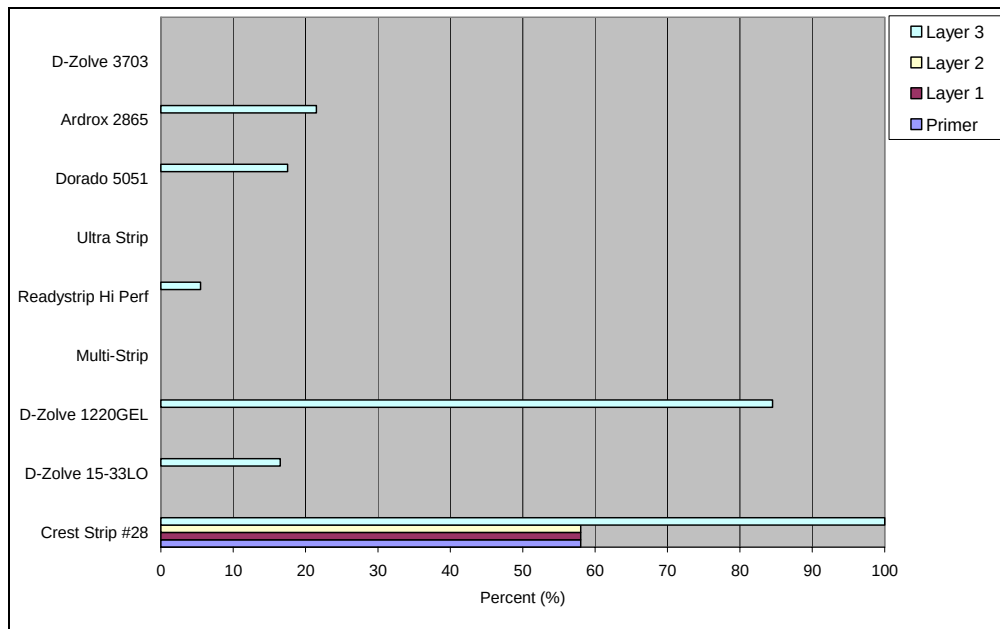


Figure 23. Percentage of MIL-C-46168 solvent-borne CARC removed from aluminum substrate using manually applied (brush-on) paint-stripping candidates.

ROUND 2 IMAGES

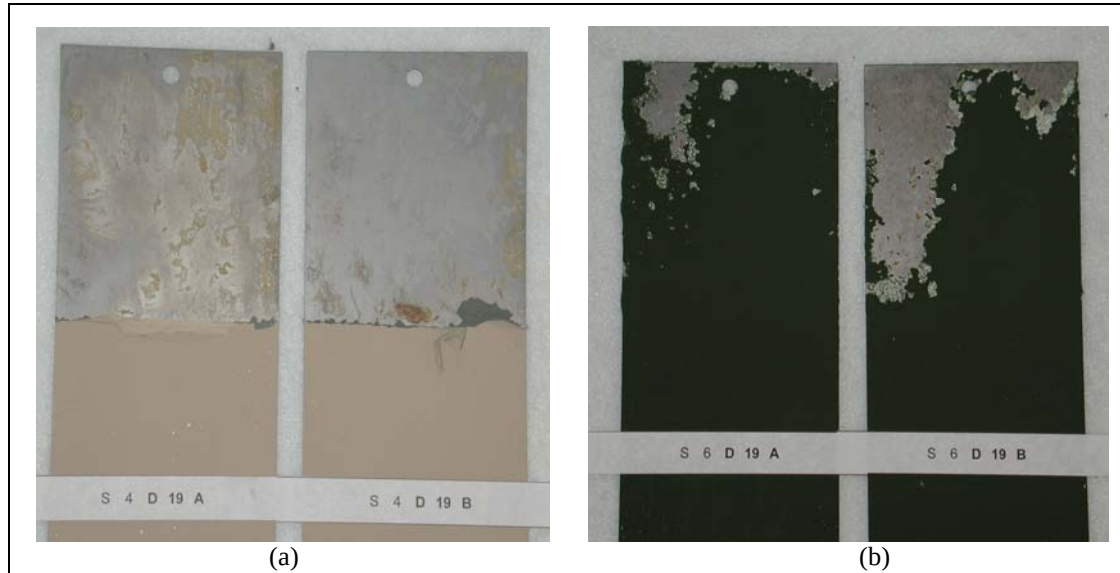


Figure 24. MIL-C-46168 CARC (a), MIL-DTL-64159 Type I CARC (b) on steel substrate, both shown after 30-min immersion in Gardostrip Q7900.

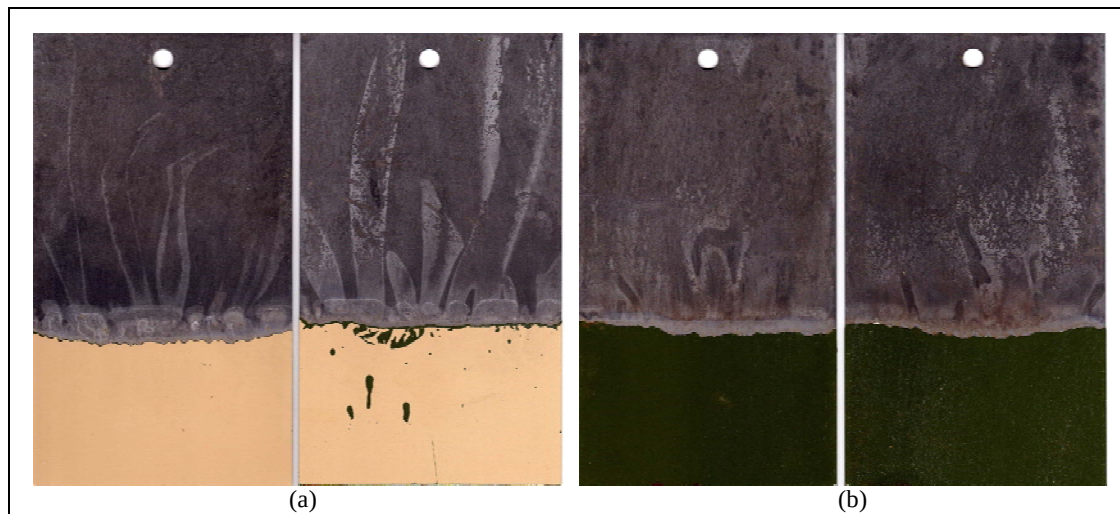


Figure 25. MIL-C-46168 CARC (a), MIL-DTL-64159 Type I CARC (b) on steel substrate, both shown after 30-min immersion in K-Chem CARC Stripper III.

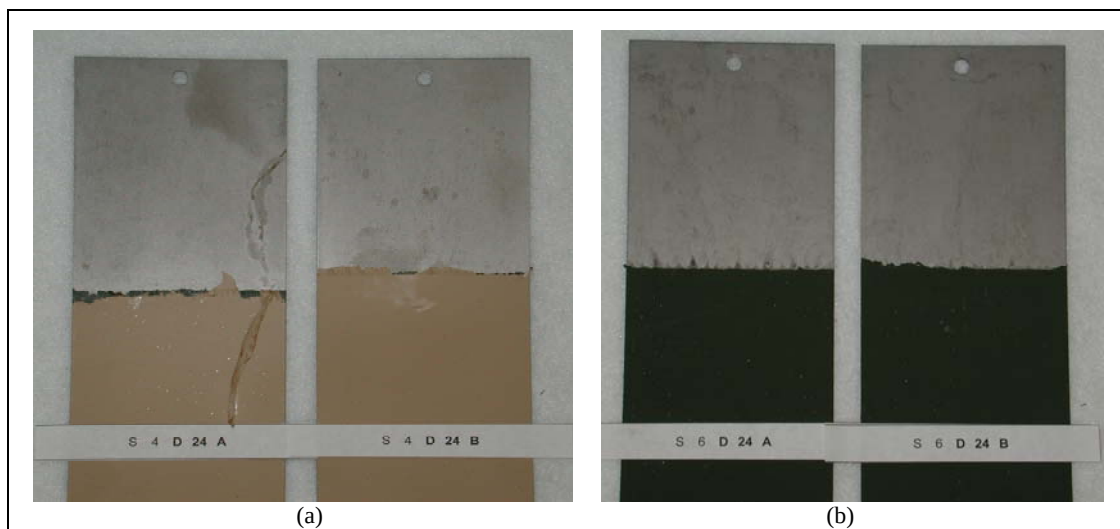


Figure 26. MIL-C-46168 CARC (a), MIL-DTL-64159 Type I CARC (b) on steel substrate, both shown after 30-min immersion in D-Zolve 298.



Figure 27. Crest Strip #28 began to lift the MIL-C-46168 within 5 min after application (a) and after 1.5 hr, all of the top layer was removed and some spots were removed down to the substrate (b).



Figure 28. The D-Zolve 1220GEL began to show signs of paint lifting at about 40 min after application on MIL-C-46168 (a). The panels after the 1.5-hr dwell time (b). Nearly all of the first coating has been removed from panel a and about 90% of panel b.

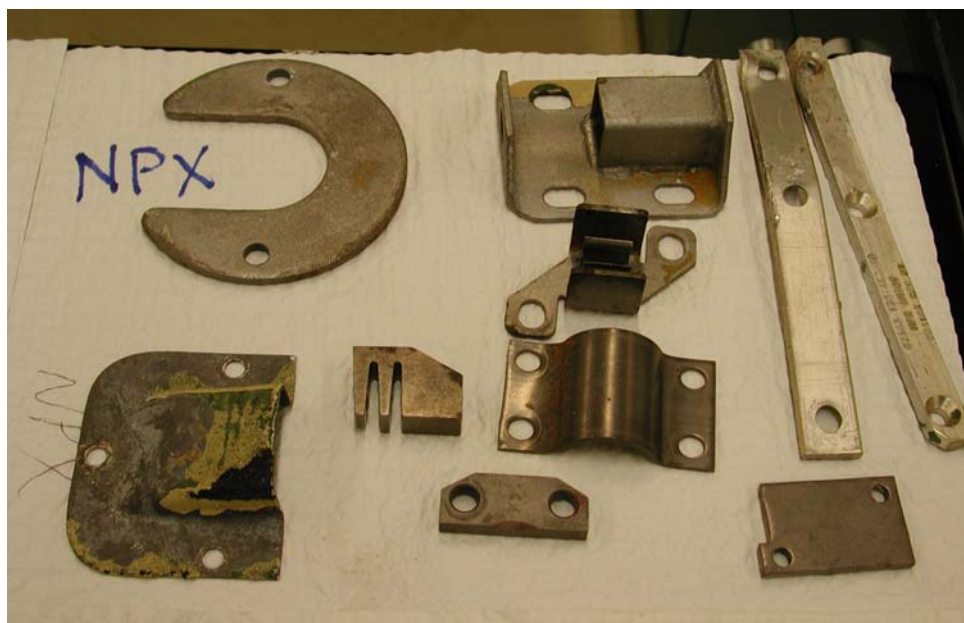


Figure 29. Stripping of miscellaneous parts after 30-min immersion in the baseline Pen-Strip NPX. Nearly 100% of the paint was removed.



Figure 30. Stripping of miscellaneous parts after 30-min immersion in K-Chem CARC Stripper III. One hundred percent of the paint was removed; however, some light corrosion on the steel parts was generated.



Figure 31. Stripping of miscellaneous parts after 30-min immersion in D-Zolve 298. With the exception of the two parts shown (see arrows), all of the paint was removed, and parts were free of corrosion. Paint was left on only one side of the C-flange (shown).



Figure 32. Stripping of miscellaneous parts after 30-min immersion in Gardostrip Q7900. A significant amount of paint remained, but parts were free of corrosion. One hundred percent of the paint was removed from one side of the C-flange.

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Assessment of Safer and Effective Alternatives to Methylene Chloride for Paint Stripping Products

Gregory Morose, Jason Marshall, Alicia McCarthy, Vanessa Harripersaud, Abigail Giarrosso

Toxics Use Reduction Institute
June 2017

TURI Report 2017-102

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I. Introduction

Background

Methylene chloride is a widely used component in paint stripping products. The three major categories of use are industrial (e.g., in a permanent stationary technical installation), professional (e.g., by a tradesman), and consumer (e.g., by a homeowner for do it yourself activities) [1]. Methylene chloride is highly volatile and the primary route of exposure is inhalation. Numerous occupational and consumer deaths during paint stripping operations have resulted from acute methylene chloride poisoning, with 56 reported accidental exposure deaths linked to methylene chloride since 1980 [2]. Methylene chloride can cause acute and chronic effects on the central nervous system. The inhalation of methylene chloride can result in short-term effects such as dizziness, clumsiness, headache, nausea, and numbness of fingers and toes, and long-term effects such as loss of concentration, memory loss, and personality changes [3]. Further, methylene chloride is classified as "reasonably anticipated to be a human carcinogen" by the U.S. National Toxicology Program [4]. Consequently, there is increasing demand for paint stripping products that do not contain methylene chloride.

Several commercially available paint stripping products do not contain methylene chloride; however, their performance is significantly below that of methylene chloride. In addition, , some of the replacement chemicals, such as N-Methyl-2-Pyrrolidone (NMP), introduce other environmental, health, and safety hazards. The Toxics Use Reduction Institute (TURI) at the University of Massachusetts Lowell (UMass Lowell) undertook a research effort to identify and evaluate safer alternatives to methylene chloride in paint stripping products. TURI had two meetings in 2015 with Savogran to start defining the requirements of the research project. The research objective was the identification and initial evaluation of solvent blends with equal or better paint stripping performance, comparable ingredient costs, and a safer environmental, health, and safety profile than methylene chloride. The primary functional requirements that would need to be satisfied for a solvent blend to replace methylene chloride in general purpose paint stripping products was derived from discussions with paint stripper product manufacturers (e.g. Savogran, Fiberlock Technologies, etc.), furniture refinishers, and available paint stripper-related literature. The primary requirements are the following:

1. Coating stripping performance comparable or equal to methylene chloride.
2. Utilizing solvent blends with appropriate Hansen Solubility Parameters to provide efficacy across a wide range of coatings: paints (oil, latex, lead), varnishes, lacquers, shellacs, epoxies, and polyurethanes.
3. Effectiveness on multiple substrate materials: wood, metal, ceramic, and masonry.

4. Non-flammable or low flammability.
5. Volatile organic compounds (VOC) content less than 50%.
6. Raw material cost less than approximately \$0.70 per pound.
7. Does not damage substrate material – will not stain, discolor, or alter the substrate, corrode the metal substrate, or raise the grain on wood substrate.
8. Comprised of chemicals that are safer from an environmental, health, and safety standpoint as compared to methylene chloride.
9. Composed of chemicals that have small molar volumes and low hydrogen bonding values so that they can rapidly penetrate the various polymer coatings [5].

Approach

The research team used Hansen Solubility Parameters in Practice (HSPiP) software to help identify solvent blends with the desired solvency parameters (diffusion, polarity, and hydrogen bonding). The Hansen Solubility Parameters-based approach was an efficient method to rapidly identify safer and effective alternatives to methylene chloride and NMP in paint stripping products.

Hansen Solubility Parameters (HSP) were used to characterize the solvency of methylene chloride and potential alternatives, and are based on three distinctive forms of inter-molecular force:

- 1) Dispersion forces (δD): All atoms are surrounded by electron "clouds." The electron cloud is, on average, evenly distributed around the atom. At a given instant, however, the electron distribution may be lopsided. This temporary polarization results in attractive interactions with nearby atoms.
- 2) Polar forces (δP): Dipole moments are created when atoms of the same molecule have different electronegativities.
- 3) Hydrogen bond forces (δH): This force exists between hydrogen atoms and other atoms present in adjacent molecules.

These three parameters are used to describe solvent and solute interactions. Each parameter can be used as an axis in three-dimensional solubility space so that each solvent and solute can be represented as points and spheres in three-dimensional solubility space. The distance between HSP points in solubility space is calculated as follows:

$$\text{Distance}^2 = 4(\delta D_1 - \delta D_2)^2 + (\delta P_1 - \delta P_2)^2 + (\delta H_1 - \delta H_2)^2$$

HSP values are based on the principle that "like dissolves like," meaning that the closer the solute and solvent are in three-dimensional solubility space, the greater the likelihood that the solvent will be effective. If a single solvent with the desired HSP values does not exist, then

mixing together two or three solvents with different HSP values can generate a solvent blend with the desired HSP values [6]. The HSPiP software can be used to quickly scan through thousands of chemicals to find the optimal solvent and solvent blends for the target HSP values. The larger the molecule (molar volume), the more it will affect kinetics and slow down the dissolution reaction. With other things being equal, small solvents dissolve better than large solvents. Smaller molecules penetrate more easily into the polymer network typically present in coating materials. This is one reason that methylene chloride performs so well in paint stripping applications. For the paint stripping process, the size of the molecule is important to enhance the transport through the paint layers, so that the solvent can penetrate the paint and attack the adhesive bond to the substrate [7].

The new solvent blends identified were then evaluated for environmental, health, and safety characteristics, as well as raw material cost. The solvent blends then underwent technical performance testing for paint stripping efficacy on various substrates and coatings at the TURI Laboratory. The initial field-based testing of the solvent blends took place at Belcastro Furniture Restoration during May 2017.

Currently, the U.S. EPA estimates that 1.3 million consumers and 17,600 workers use methylene chloride-based paint stripping products, and 732,000 consumers and 30,300 workers use NMP-based paint stripping products. The potential benefit of a successful outcome for this research is the significant reduction in these exposures [8, 9].

II. Laboratory Testing Results

The TURI Laboratory at UMass Lowell provided the lab space, resources, and oversight needed to complete the laboratory testing. The following summarizes the paint stripper test results for the nine primary functional requirements.

Requirements 1, 2, and 3: Coating stripping performance

One of the testing goals was that the coating stripping performance be comparable to methylene chloride for a wide range of coatings and for multiple substrate materials: wood, metal, ceramic, and masonry. The laboratory testing was completed for wood, metal, and masonry, and the laboratory testing for ceramic substrates will be conducted in the near future.

The ASTM International Standard D6189, "Standard Practice for Evaluating the Efficiency of Chemical Removers for Organic Coatings," was used as a starting point for creating test

coupons for this research. The scope of the ASTM D6189 standard is the evaluation of the effectiveness of coatings removers used on clear or pigmented coatings as applied to wood and metal. For the creation of test coupons, the standard requires that three layers of coating be applied to the wood or metal substrate.

To create a more challenging and realistic paint stripping performance test, the test coupons created for this research had the following four additional requirements that were not specified in ASTM International Standard D6189: 1) a primer layer, 2) a minimum of four layers of coatings instead of only three layers, 3) extended thermal aging for 3 weeks in an oven set at 140°F to simulate 11 months of aging, and 4) sanding and alcohol-wiping between each coating layer to better promote adhesion between the coating layers.

For creating the wood test coupons, 3.5 inches wide by 15 inches long planks of white pine wood were first coated with Kilz Original Interior Oil-Based primer and then left to dry at room temperature overnight. The following day, the coupons were then lightly sanded with 100-grit sandpaper to allow the primer layer and the following layer of coating to adhere more tightly. Once sanded, the coupons were then wiped clean with isopropanol. Each coupon was designated a different specific coating such as lacquer, oil-based paint, latex-based paint, epoxy, varnish, or polyurethane. The coating was then applied on top of the primer layer. Each coupon was painted with four layers of its designated top coat, allowing for each layer to dry overnight, be sanded, and cleaned with isopropanol. In addition, a mixed test coupon was created that had an oil primer layer, a latex-based paint layer, an oil-based paint layer, another latex-based paint layer, another oil-based paint layer, and two layers of polyurethane. This mixed coupon created a challenging scenario for paint stripping products. After the test coupons were painted with their final layer of top coat and dried overnight, they were then thermally aged in an oven for three weeks at 140°F to simulate 11 months of aging.

For the metal test coupons, steel sheets with a galvanized finish were used. Each steel sheet was 12 inches wide, 12 inches long, and 28 gauge thick. The metal test coupons were first coated with a white Rust-oleum Clean Metal Primer. Next, four layers of black Rust-oleum Protective Enamel were applied onto the metal test coupons. Similar to the wood test coupons, the metal test coupons were sanded and wiped clean with isopropanol between each coating layer and the finished coupons were thermally aged in an oven for three weeks at 140°F.

For the masonry test coupons, masonry (concrete) blocks were used to create the test coupons. Each masonry block was 3.5 inches wide, 7.5 inches long, and 2.25 inches high. Each masonry block was first coated with white Behr Premium Concrete Stain. Next, some masonry coupons were coated with white Behr Masonry, Stucco, and Brick paint, and other masonry coupons were coated with gray Behr Premium Basement and Masonry Waterproofer. Similar to the wood test coupons, the masonry test coupons were sanded and wiped clean with isopropanol

between each coating layer and the finished coupons were thermally aged in an oven for three weeks at 140° F.

Following completion of the coupon aging process, rubber gaskets were super-glued onto the aged test coupons to designate the testing areas. The rubber rings enabled the thickened and un-thickened paint stripping solvent blends to remain in one area on the test coupon without flowing to other areas of the test coupon surface. The rubber gaskets used were 3/16 inches high with a 1.5 inch outside diameter and a 1.25 inch inside diameter. This created a test area of approximately 1.23 square inches on the surface of the test coupon. During the test, 1.5 ml of the chemical paint stripper was placed within the test area by pipet. Next, a laboratory watch glass was placed on top of the rubber gasket to ensure that it would not evaporate out of the testing area during the test. This step was conducted to evaluate the new solvent blends that had not yet had evaporation barrier additives included within the formulation. Once the chemical remained in the test area for a pre-determined dwell time, the chemical paint stripper and paint residue was then removed from the testing area using a spatula and paper towel. Then the coating was scraped with a plastic scraper until no more coating material could be easily removed. Figure 1 shows a wood coupon with ring gaskets after testing was completed.



Figure 1: Wood coupon with ring gaskets after testing

After scraping, the testing area was then given a visual rating between 0% and 100% to indicate how much substrate surface had been exposed during the given dwell time. The ratings were estimates provided by a lab technician after visual inspection of the test area. The ratings were provided in increments of 5% since it was not possible for the lab technician to attain any further resolution with the visual estimation process. The rating "0%" was given if the paint stripper removed some coating layer(s) but the substrate surface was still completely covered by a coating. The rating would be "**0%**" in bold and underlined if the paint stripper did not remove any coating at all. The rating "50%" would be given if approximately half of the substrate surface was exposed. The rating "100%" would be given if the substrate surface was completely exposed.

Fourteen different chemical paint removers, ten commercially available and four formulations recently developed by TURI/UMass Lowell, were tested at different dwell times for specific coatings. Of the ten commercially available paint stripping products, three of them contained methylene chloride. The first product was Strypeeze™, from the company Savogran, which is a low methylene chloride content paint stripper. The other two methylene chloride-based paint stripping products, SuperStrip™ from Savogran and KleanStrip™ from W.M. Barr, had high methylene chloride content. The seven commercially available paint stripping products that did not contain any methylene chloride were based on other chemicals such as NMP, benzyl alcohol, and dibasic esters. Table 1 shows the solvents used in the three methylene chloride-based paint strippers, the seven alternative paint strippers without methylene chloride, and the four new UMass Lowell-developed formulations.

Table 1: *Solvents Used in Paint Stripping Products*

Supplier	Product	Primary Component	Secondary Component	Other Component(s)
Savogran	Strypeeze™	Methylene chloride	Methanol	Toluene, Acetone
Savogran	SuperStrip™	Methylene chloride	Methanol	Toluene
W.M. Barr	KleanStrip™	Methylene chloride	Methanol	-
UMass Lowell	Formulation #4	Methyl Acetate	Dimethyl sulfoxide	Thiophene
UMass Lowell	Formulation B	Methyl Acetate	Dimethyl sulfoxide	Thiophene
UMass Lowell	Formulation F	Methyl Acetate	Dimethyl sulfoxide	None
UMass Lowell	Formulation #9	Acetone	Dimethyl sulfoxide	Thiophene
Eco Safety Prod.	EcoFast™	Benzyl Alcohol	Water	-
Dumond Chem.	Peel Away 7™	Benzyl Alcohol	NMP	-
W.M. Barr	Citristrip™	NMP	Dibasic Esters	Citrus
Sunnyside Corp.	ReadyStrip™	Benzyl Alcohol	NMP	Formic Acid
EZ Strip	EZStrip™	Dibasic Esters	Triethyl Phosphate	Water
Motsenbocker	LiftOff™	Glycol Ether DB	Acetone	-
Dumond Chem.	SmartStrip™	Benzyl Alcohol	Water	-

To determine the dwell time for each type of coating for wood and masonry coupons, the methylene chloride-based strippers were tested at different dwell times until substrate exposure between 65% and 95% was achieved. This target range was selected because it

provided a dwell time where the methylene chloride-based stripper was effective at removing the majority of the coating material on the substrate. A target value of 100% would not be helpful because 1) it would not be possible to determine the exact dwell time when 100% coating material removal occurred, and 2) it does not provide the opportunity for non-methylene chloride formulations to potentially exceed methylene chloride's performance. The resultant dwell times vary between coatings because of the range of difficulty to remove the different types of coatings. For example, the oil, varnish, and epoxy coatings are difficult to remove and require longer dwell times for the methylene chloride-based paint strippers to reach the 65%–95% target range. In realistic paint stripping scenarios, it is sometimes recommended that the chemical be reapplied as needed. Reapplication was implemented for the wood coupons with the epoxy, varnish, and oil coatings as well as the mixed coupon. For example, the paint stripper applied on an epoxy coating would have an initial 20 minute dwell time, followed by a scraping, a paint stripper reapplication for a subsequent 10 minute dwell, and then a second scraping. For the metal coupons, there was not a predetermined dwell time, and instead the coupons were scraped after cracking of the coating materials occurred.

The results of the paint stripper performance testing conducted at the TURI Laboratory are shown in Table 2 for wood coupons, in Table 3 for masonry coupons, and Table 4 for metal coupons. The results in the table are for a single test conducted for each coating and paint stripper combination. The test was not designed to provide statistical significance, but rather to ascertain the relative paint stripping effectiveness of the paint strippers.

Table 2: Laboratory Performance Testing Results for Wood Coupons: % Substrate Exposed

	Dwell Time (min)	Strypeeze	SuperStrip	Klean-Strip	UML Form 4	UML Form B	UML Form F	UML Form 9	EcoFast	Peel Away	CitriStrip	Ready-Strip	EZ Strip	Lift Off	Smart Strip
Epoxy	20,10	80	95	95	80	85	75	90	0	0	0	0	0	0	0
Shellac	8	65	75	70	70	50	20	0	0	0	0	0	0	0	0
Lacquer	10	75	95	85	95	60	65	95	0	0	0	0	0	0	0
Polyur.	10	95	85	85	95	65	70	60	0	0	0	0	0	0	0
Varnish	20,12	85	85	85	80	75	80	95	0	0	0	0	0	0	0
Oil	25,10	95	90	95	70	75	75	50	0	0	0	0	0	0	0
Latex	25	85	80	85	70	80	60	15	0	0	0	0	0	0	0
Mixed	20,15	85	90	85	60	65	70	75	0	0	0	0	0	0	0
Avg.		83	87	86	78	69	64	60	0	0	0	0	0	0	0

Table 3: Laboratory Performance Testing Results for Masonry Coupons: % Substrate Exposed

	Dwell Time (min)	Strypeeze	SuperStrip	Klean-Strip	UMLForm 4	UML Form B	UML Form F	EcoFast	Peel Away	CitriStrip	Ready-Strip	EZ Strip	Lift Off	Smart Strip
White	7	85	95	95	75	85	65	0	0	20	0	0	0	0
Grey	8	95	99	95	80	70	75	2	0	20	0	0	0	0
Avg.		90	97	95	78	78	70	1	0	20	0	0	0	0

Table 4: Laboratory Performance Testing Results for Metal Coupons: % Substrate Exposed

	Strypeeze	Super Strip	Klean-Strip	UML Form 4	UML Form B	UML Form F	EcoFast	Peel Away	CitriStrip	Ready-Strip	EZ Strip	Lift Off	Smart Strip
Dwell time	6 min	5 min	3.5 min	15 min	23 min	30 min	376 min	360 min	225 min	363 min	296 min	288 min	181 min
% Substrate Exposed	85	100	100	100	70	55	60	25	70	50	30	40	50

The results for the three types of substrates (wood, masonry, and metal) were similar in that the UMass Lowell formulations showed a range of paint stripping performance similar to methylene chloride-based paint strippers, and a range of performance significantly better than the non-methylene chloride products currently commercially available. For example, on wood coupons the range of substrate exposure across all types of coatings achieved by the three methylene chloride-based products (Strypeeze, SuperStrip, and KleanStrip) was 65% to 95%. For the UMass Lowell-developed Formulation #4, the range of substrate exposure across all types of coatings was 60% to 95%. For the seven commercially available alternative paint stripper products without methylene chloride, there was zero substrate exposure across all types of coatings.

Requirement 4: Non-flammable or low flammability

The target requirement was to have a solvent blend that was non-flammable with a flash point greater than 100°F. The Occupational Safety and Health Agency (OSHA) and the Consumer Product Safety Commission classify a liquid with a flash point less than 100°F as "Flammable" and a liquid with a flash point greater than 100°F as "Combustible." The flash points for the solvents used in the UMass Lowell Formulations are: methyl acetate 14°F, dimethyl sulfoxide (DMSO) 189°F, and thiophene 30°F. While some components of the new UMass Lowell

formulations have flash points less than 100°F, the percentage of the individual solvents used in the overall formulations can be modified to result in flashpoints above 100°F, depending on cost and performance tradeoffs. Flashpoint tests have not yet been completed for the UMass Lowell solvent blends, but will be completed by August 2017.

Requirement 5: Volatile organic compounds (VOC) content less than 50%

All of the UMass Lowell paint stripper formulations have VOC content less than 50% as they contain 50% or greater of VOC-exempt solvents such as methyl acetate, dimethyl carbonate, and acetone.

Requirement 6: Raw material cost less than approximately \$0.70 per pound

The alternative solvent blends evaluated under this research were selected for low raw material cost. To have commercial potential, the cost of the alternative solvent blends must be cost comparable to paint stripping formulations containing methylene chloride. The target cost level for alternatives was to have raw material cost less than approximately \$0.70 per pound. Therefore, many solvents were screened out from further consideration due to raw material costs significantly above the target cost level.

It is difficult to obtain exact pricing for solvents because of factors like the quantity of chemicals ordered (i.e. bulk orders of an ISO tank rather than just a 55-gallon drum), different prices from different chemical suppliers, geographic location (domestic or international source of chemicals), and the ongoing price fluctuations of any given solvent. However, based on our best information at the time of this research, Formulation F has an approximate cost (\$0.59 per lb) which is below the target cost, Formulation B (\$0.73 per pound) is comparable to the target cost, and Formulation 4 (\$0.94 per lb) and Formulation 9 (\$0.94 per lb) are slightly above the target cost.

Requirement 7: No damage to substrate material

A key requirement for the alternative materials is to not damage the substrate material. This includes staining, discoloring, or altering the substrate, corrosion of the metal substrates, and raising the grain of the wood substrates. Alternative materials that are caustic, acidic, or corrosive would have a high likelihood of damaging the substrate materials. Therefore, the alternative materials were selected based on not having significant caustic, acidic, or corrosive properties. During the performance testing conducted in the TURI laboratory, the substrate surface was thoroughly examined for damage after each paint stripping test for all substrate materials: wood, metal, and masonry. The alternative solvent blends evaluated in this research

did not exhibit any damage to the substrate materials during any of the testing conducted on wood, metal, and masonry substrates.

Requirement 8: Environmental, health, and safety

The UMass Lowell-developed formulations were designed to be composed of chemicals that are safer from an environmental, health, and safety standpoint compared to methylene chloride. First, the solvents selected for consideration in the UMass Lowell paint stripping formulations were screened for significant environmental, health, and safety issues by using information provided in safety data sheets and other publicly available chemical hazard sources.

For the solvents that passed this initial screen, the GreenScreen™ for Safer Chemicals was then used as the evaluation tool to provide a more detailed and comprehensive environmental, health, and safety assessment. GreenScreen for Safer Chemicals, developed by Clean Production Action, is a comparative chemical hazard assessment method. In this tool, 20 human health, environmental toxicity, fate, and physical hazard endpoints are evaluated for each chemical. Assessing chemicals is accomplished by examining comprehensive toxicological data, checking GreenScreen specified lists, and using estimated data from suitable analogs or modeled data where measured data are lacking. As a result of this assessment, chemicals are designated with one of the following four Benchmark Levels [10]:

Benchmark 1: Chemical of High Concern - Avoid
Benchmark 2: Use but Search for Safer Substitutes
Benchmark 3: Use but Still Opportunity for Improvement
Benchmark 4: Prefer – Safer Chemical

In 2015, ToxServices conducted GreenScreen assessments for several chemicals used in paint stripping formulations including methanol, methylene chloride, benzyl alcohol, etc. [11]. In 2017, TURI contracted with ToxServices to conduct GreenScreen assessments for the following four chemicals used in the UMass Lowell solvent blends: methyl acetate, thiophene, DMSO, and acetone. The complete report from the 2017 assessment by ToxServices is available on the TURI website. The Benchmark results from the 2015 and 2017 Green Screen analyses by ToxServices are provided in Table 5. The chemicals used in methylene chloride-based paint stripping products (methylene chloride, methanol, and toluene) each received a Benchmark Level 1: "Chemical of High Concern – Avoid." The chemicals used in the new UMass Lowell formulations (acetone, methyl acetate, and DMSO) received Benchmark Levels of 2 or 3, and are, therefore, safer than the three chemicals (methylene chloride, methanol, and toluene) used in methylene chloride-based paint strippers. Thiophene was assigned a preliminary Benchmark Level 2 based

on currently available data for eighteen out of the twenty different hazard endpoints assessed. Thiophene received a final score of "U," which means "Unspecified due to Insufficient Data" since there is currently insufficient data in the scientific literature to assess thiophene for two hazard endpoints: carcinogenicity and endocrine activity. Other commonly used chemicals (benzyl alcohol, dibasic esters) for non-methylene chloride paint stripping products have received a Benchmark Level 2. Therefore, all of the paint strippers that do not contain methylene chloride are likely to be safer than the methylene chloride-based strippers. TURI will conduct additional investigation into the potential hazards of the entire solvent blend formulations and the data gaps identified for thiophene.

Table 5: *GreenScreen Benchmark Levels for Chemicals Used in Paint Strippers*

Chemical	Benchmark	Benchmark Explanation	Benchmark Reason (Primary Hazard Endpoints of Concern)
Methanol	1	Chemical of High Concern – Avoid	"High" developmental toxicity
Methylene chloride	1	Chemical of High Concern - Avoid	"High" carcinogenicity
Toluene	1	Chemical of High Concern – Avoid	"High" reproductive and developmental toxicity
Acetone	2	Use but Search for Safer Substitutes	"Moderate" developmental toxicity, reproductive toxicity, and endocrine activity; and "High" flammability
Benzyl alcohol	2	Use but Search for Safer Substitutes	"Moderate" developmental toxicity; "High" neurotoxicity (repeated dose) and skin sensitization
Dibasic ester mixture (Estasol)	2	Use but Search for Safer Substitutes	"Moderate" developmental toxicity and endocrine activity
Methyl acetate	2	Use but Search for Safer Substitutes	"Moderate" developmental toxicity and endocrine activity; and "High" flammability
DMSO	3	Use but Still Opportunity for Improvement	"Moderate" skin irritation & eye irritation; "Moderate" flammability
Thiophene	U	Data Gaps	Prior to data gap analysis, it was assigned a Benchmark 2. Insufficient data for carcinogenicity and endocrine activity

Requirement 9: Be composed of chemicals that have small molar volumes and low hydrogen bonding values

Paint penetration is an important consideration in removing multiple layers of paint in a single application of a paint stripper. The penetration of the multiple layers of paint and breaking the bond between the paint and substrate make it easy to remove all layers with a scraper. Paint

penetration is a function of molar volume and Hansen hydrogen bonding parameter. In general, the smaller the molar volume, the better the paint penetration, and the lower the Hansen hydrogen bonding parameter, the better the paint penetration.

Therefore, the chemicals selected for the alternative formulations were composed of chemicals that have small molar volumes so that they can penetrate the various polymer coatings. Based on the results of numerous tests, it was found that the ability of the solvents to effectively strip multi-layer coatings was significantly decreased after the molar volume size exceeded 80 ml/mol. Methylene chloride has a molar volume of 64 ml/mol. The solvents chosen for the alternative formulations, DMSO (71 ml/mol), acetone (71 ml/mol), methyl acetate (70 ml/mol), and thiophene (79 ml/mol), have molar volume sizes comparable to or less than 80 ml/mol. The molar volume size is much greater than 80 ml/mol for many of the chemicals typically found in commercially available alternative paint stripping formulations: NMP (96 ml/mol), benzyl alcohol (104 ml/mol), dimethyl succinate (135 ml/mol), dimethyl glutarate (152 ml/mol), d-Limonene (163 ml/mol), dimethyl adipate (168 ml/mol), and triethyl phosphate (171 ml/mol).

Although water has a low molar volume, it has a high hydrogen bonding Hansen Solubility Parameter of 42.3 MPa^{1/2}, and therefore is not an effective penetrant of polymer matrices found in coating materials. Methylene chloride has a low hydrogen bonding Hansen Solubility Parameter of 7.1 MPa^{1/2} and a low molar volume, which makes it an effective penetrator of coating materials. The solvents used in the UMass Lowell formulations all have low hydrogen bonding Hansen Solubility Parameters: methyl acetate (7.6 MPa^{1/2}), DMSO (10.2 MPa^{1/2}), and thiophene (7.8 MPa^{1/2}).

III. Field-based Testing Results

Field testing for one of the new paint stripping formulations developed by UMass Lowell was conducted on May 19, 2017. The field testing took place at the Belcastro Furniture Restoration facility located in Tyngsboro, Massachusetts. Belcastro Furniture Restoration has been doing antique repair, refinishing and restoration for over 40 years, and has been working with the Massachusetts Office of Technical Assistance and Technology and the Toxics Use Reduction Institute to find safer and effective alternatives to methylene chloride. For the field testing, a decorative column was used that had several layers of lead-based paint and was approximately 115 years old (Figure 2).



Figure 2: Decorative column with lead-based paint

The two paint stripper materials used during the field testing are shown in Table 6.

Table 6: *Paint Stripper Materials*

Product	Supplier	Ingredients
B7 Industrial Paint Remover	Benco Sales Inc., Crossville, TN	Methylene chloride 70%–80% Methanol 5%–15% 2-Butoxyethanol 1%–10% 2-Methoxymethylethoxpropanol 1%–3% Wetting agent and wax 1%–5%
Formulation #4	University of Massachusetts Lowell	Methyl acetate Dimethyl sulfoxide (DMSO) Thiophene

The two paint stripper materials were applied by the Belcastro operator to the decorative column using paint brushes. The methylene chloride-based paint stripper was applied to the left side of the decorative column, and Formulation #4 was applied to the right side of the decorative column. The initial application of the paint stripper materials can be seen in Figure 3.



*Figure 3: Initial application of paint stripping materials
(B7 on left side, Formulation #4 on right side)*

The paint removal method conducted by the Belcastro operator consisted of the following iterative process:

1. Apply the paint stripping materials onto the surface of the decorative column.
2. Allow the paint stripper to remain on the surface of the column for a few minutes.
3. Scrub the area with ScotchBrite™ scouring pads and wire brushes.
4. Wipe the area clean with a cloth rag so that photos could be taken.

Steps 1–4 were repeated several times so that photos could be taken after 20 minutes, 29 minutes, 34 minutes, and 39 minutes of testing. These photos can be seen in Figures 4–7. The testing was concluded after 39 minutes from the initial application of the paint stripping materials. A single Belcastro operator conducted the tests for the B7 and Formulation #4 paint strippers at the same time by alternating efforts to allow the paint stripper on one side to dwell on the surface, while scraping the other side. Separate paint brushes, ScotchBrite scouring pads, and wire brushes were used for the two different paint stripping materials to prevent cross contamination during the testing.



Figure 4: Testing results after 20 minutes (B7 on left side, Formulation #4 on right side)



Figure 5: Testing results after 29 minutes (B7 on left side, Formulation #4 on right side)



Figure 6: Testing results after 34 minutes (B7 on left side, Formulation #4 on right side)



Figure 7: Testing results after 39 minutes (B7 on left side, Formulation #4 on right side)

The Belcastro operator made the following observations during the field test:

- There were several layers of lead paint on the decorative column. (The cream, brown, white, and grey colored paint layers are visible in Figures 3–6.)
- The methylene chloride-based product made the paint more gummy during the removal process than the Formulation #4 did.

- Formulation #4 seemed to evaporate faster than the methylene chloride-based product. (Unlike with many commercially available paint stripping formulations such as B7 used by the operator, Formulation #4 does not yet contain an evaporation barrier additive.)
- Some areas of wood substrate are exposed as a result of the testing for both the methylene chloride-based product and Formulation #4.
- Overall, the two paint stripping products performed approximately equally for removing the lead paint from the wood substrate.

Additional field testing will be conducted at Belcastro Furniture Restoration once an evaporation barrier has been added to the UMass Lowell paint stripping formulations.

IV. Conclusions and Next Steps

Performance testing at the TURI Laboratory was conducted for a variety of coating materials on wood, masonry, and metal substrates. The testing results showed that the new solvent blends developed by UMass Lowell, comprising various combinations and amounts of methyl acetate, dimethyl sulfoxide, thiophene, and other solvents, worked comparably to methylene chloride-based paint strippers and significantly better than other commercially available alternatives based on chemicals such as NMP, benzyl alcohol, and dibasic esters. In addition, the UMass Lowell formulations without thiophene are likely safer than methylene chloride from an environmental, health, and safety standpoint. Thiophene was assigned a preliminary Benchmark Level 2; however, there is currently insufficient data publicly available to assess thiophene for carcinogenicity and endocrine activity. Therefore, the UMass Lowell formulations with thiophene will be further investigated to address the current data gaps.

The field testing conducted at Belcastro Furniture Restoration provided results that indicate that one of the new solvent blends developed by UMass Lowell performs comparably with methylene chloride-based paint strippers for multi-layer lead paint on wood substrate applications.

Further research and testing is needed to build on the successful paint stripper solvent blend formulations already developed. Paint stripper products typically comprise 95% to 98% solvent blends and 2% to 5% chemical additives. TURI identified and evaluated suitable solvent blends to meet the solvency functionality provided by methylene chloride within a paint stripping product. To enhance the overall performance of paint stripping products, formulations routinely contain chemical additives that perform the following functions [12]:

- Activator: an additive that increases the penetration of the solvent or solvent blend into the coating matrix.
- Evaporation inhibitor: an additive used to reduce evaporation of the solvent and increase contact time with the coating and substrate.
- Thickener: an additive used to increase the viscosity of the product so that it can remain in place for use on vertical surfaces.
- Corrosion inhibitor: an additive used to ensure the stability of the stripper in its packaging or to protect the substrate.
- Surfactants/rinsing agent: an additive used to wet or penetrate the coating surface.
- Colorant: an additive used to provide color to the formulation to make it easier to locate where the paint stripper has been applied on the substrate.

The next steps for the research include the identification and evaluation of the other additive ingredients of a complete paint stripping formulation. Once viable additive chemicals with acceptable environmental, health, and safety characteristics have been determined, we will conduct performance testing of the completed paint stripping formulations at the TURI laboratory and at a furniture refinishing facility.

The funding for the research conducted so far was provided by TURI, the University of Massachusetts Lowell, and a U.S. EPA People, Prosperity, and Planet (P3) Phase I Award. TURI has submitted a proposal to the U.S. EPA for a People, Prosperity, and Planet (P3) Phase II Award to fund further research efforts for safer paint stripper alternatives.

IV. References

1. RPA, "Impact Assessment of Potential Restrictions on the Marketing and Use of Dichloromethane in Paint Strippers," April 2007.
2. The Center for Public Integrity, "Common solvent keeps killing workers, consumers," September 21, 2015.
3. Agency for Toxic Substances and Disease Registry. Toxicological Profile for Methylene Chloride. 2000.
4. National Toxicology Program. *13th Report on Carcinogens (RoC)*. Dichloromethane. 2014. Accessed 9/1/2014 at: <http://ntp.niehs.nih.gov/pubhealth/roc/roc13/index.html>.
5. Young, Han, "Scientific Basis for Paint Stripping Mechanism for Methylene Chloride Based Paint Removers," SERDP Project WP-1682, September 2011.
6. Abbott, Steven, Hansen, Charles M., Yamamoto, Hiroshi, Hansen Solubility Parameters in Practice, 4th Edition, 2013.
7. Luey, K. T., Coleman, D. J., and Ternet, G. K., Replacement of Methylene Chloride in NVR and Paint Removal Applications," December, 2000.
8. U.S. EPA, Methylene Chloride and N-Methylpyrrolidone; Regulation of Certain Uses under TSCA Section 6(a)(RIN2070-AK07), January 12, 2017.
9. U.S. EPA, Economic Analysis of Proposed TSCA Section 6 Action on Methylene Chloride and N Methylpyrrolidone (NMP) in Paint and Coating Removal (EPA Docket EPAHQ-OPPT-2016-0231; RIN2070-AK07), January 9, 2017.
10. Clean Production Action, GreenScreen™ Chemical Hazard Assessment Procedure V1.2, 2013.
11. Jacobs, Molly, Wang, Bingxuan, Rossi, Mark, "Alternatives to Methylene Chloride in Paint and Varnish Strippers," October 27, 2015.
12. Wollbrink T. The composition of proprietary paint strippers. Journal of the American Institute for Conservation. 1993;32(1): 43-57. Available at: <http://cool.conservation-us.org/jaic/articles/jaic32-01-005.html>.



Toxics Use Reduction Institute
University of Massachusetts Lowell
600 Suffolk Street, Suite 501
Lowell, MA 01854
(978) 934-3275
www.turi.org

Identification and Comparison of Solvents and Paint Removers as Alternatives to Methylene Chloride in Paint Removal Applications

R&D, W. M. Barr
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ABSTRACT

This study compares the paint removing performance of methylene chloride to 22 solvents currently used in non-methylene chloride paint removers or solvents proposed as an alternative to methylene chloride by chemical manufacturers. The paint stripping performance of three methylene chloride paint removers was then compared to 26 non-methylene chloride paint removers and five experimental formulas using alternative methylene chloride chemistry. The solvents and paint removers were tested on 1 month and 1 year aged wood panels treated with multiple layers of an oil-based alkyd paint, a solvent-borne epoxy paint and OEM automotive coating. For chemically resistant oil-based alkyd, solvent-borne epoxy paints and OEM automotive coatings, only methylene chloride based paint removers were determined to be effective.

BACKGROUND

Methylene chloride has been the preferred solvent for use in paint removers for seventy years. Before methylene chloride was introduced, most paint removers consisted of a mixture of benzene and other volatile solvents such as methanol, acetone, and methyl ethyl ketone. Paint removers formulated with these volatile solvents are extremely flammable and the flammability of these paint removers resulted in fires causing injury and deaths. The benzene based removers were rapidly replaced with the methylene chloride paint removers because methylene chloride paint removers can be formulated to be non-flammable and are effective in removing multiple layers of paint. The physical characteristics give the methylene chloride molecule the ability to quickly penetrate multiple layers and to soften or dissolve chemically resistant coatings. Methylene chloride does not deplete the ozone layer and is considered to make negligible contributions to smog formation, the green-house effect and acid rain. Like other organic solvents, methylene chloride can be harmful to human health if used improperly.

Consumer Use of Paint Removers

Most consumers use paint removers for refinishing antique furniture, or woodworking's (doors, frames, moldings, etc.) in older houses. Many of these items have been painted, and repainted many times over the years. This results in items that have multiple layers of paint of different chemistry types which have a different degree of difficulty from being removed. Paint removers are also used in the auto body repair industry to help with restoration.

Effect of Paint Chemistry and Age of Paint

There is a range of paint types that a consumer will come across when stripping an old item. The main paint chemistries that can be encountered include latex, urethane, 1-part epoxy, 2-part epoxy, enamel (alkyd type), lacquer, varnish, and shellac based paint. In recent times, latex paint has taken over the painting industry as the paint technology of choice. This paint is relatively easy to remove with paint strippers, but is also a paint technology that people will not frequently encounter as they are stripping older items. Historically, enamel alkyd based paint have been the most prevalently used paint technology. The resin used in alkyd paint dries by an oxidation reaction with oxygen from the air after the solvents has evaporated from the paint. The oxidation reaction irreversibly cross-links the polymers hardening the alkyd resin making it very difficult to remove. The alkyd paint continues to form cross-linking bonds as the paint ages making older painted items even harder to strip. 2-part epoxy paint is by far the most difficult paint technology to remove. It is frequently used in industrial settings. For this

reason, the experimental studies outlined in this report will focus on the removal of alkyd, 2-part epoxy paint, and OEM automotive coatings.

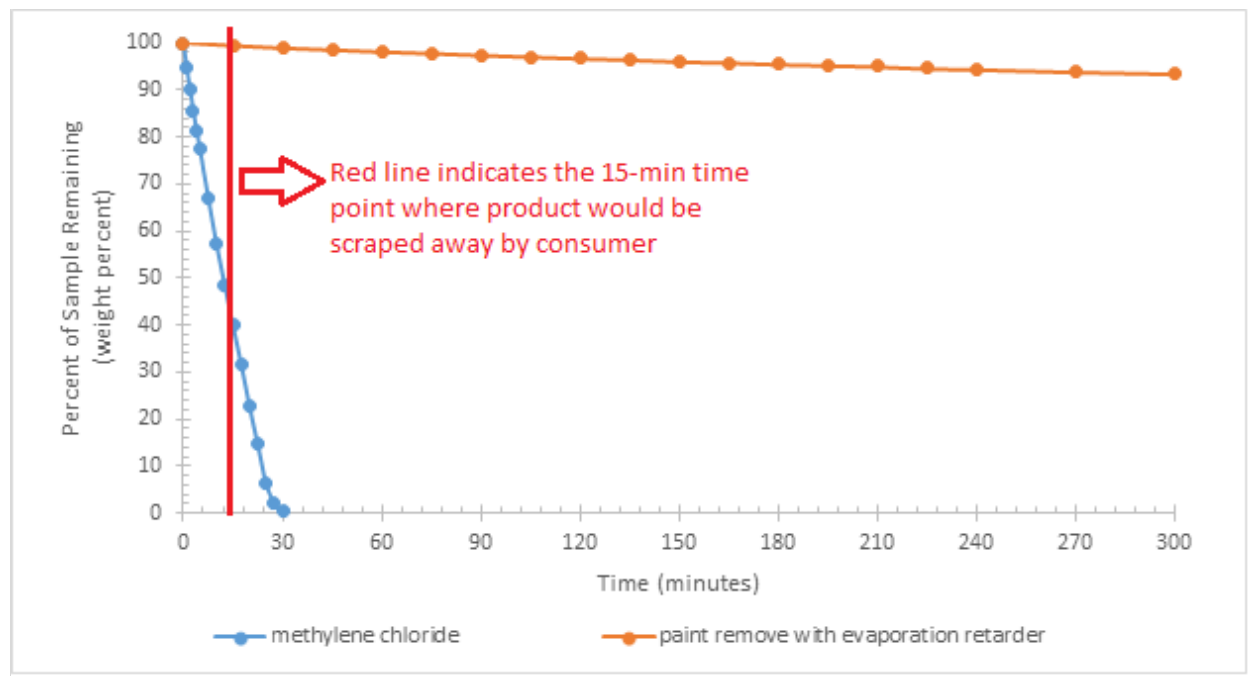
Basics of Paint Remover Formulation

A chemical paint remover is composed of a mixture of solvents, additives and sometimes an activator. To be an effective paint remover, the solvent must be able to penetrate multiple layers of paint and have solubility to cause the paint to swell which breaks the bond of the paint to the substrate. The movement of the solvent from the paint remover to the paint layer is called diffusion and is the result of the random kinetic movement of the solvent. The rate of diffusion is affected by the size of the solvent molecule (molar volume) and the polarity of the molecule. Smaller, nonpolar molecules will have a higher diffusion rate into the coating than molecules that are larger or more polar. The more effective replacements for methylene chloride will be molecules with the following general characteristics, small nonpolar or halogenated molecules, five-member cyclic rings or six-member aromatic rings. These types of molecules are generally flammable and will also have health and safety risks.

Additives, such as surfactants, thickeners and paraffin wax are added to modify the physical properties of the paint remover. Surfactants improve the wetting of the surface by the paint remover and permits the use of water for clean-up after the paint has been stripped. Thickeners are added to allow the paint removers to cling to vertical surfaces. To reduce the evaporation of methylene chloride and other solvents in the paint remover, paraffin wax is added. Paraffin wax reduces the evaporation of the solvents by forming a physical barrier between the paint remover and air. The weight loss of methylene chloride over a period of five hours was compared to the weight loss of a paint remover containing more than 60% methylene chloride and an evaporation retarder with the results shown in **Figure 1**.

Approximately 20 grams of methylene chloride and 20 grams of the paint remover were placed in separate containers and the weight of the sample remaining was determined at timed intervals. After 30 minutes, only 0.5% of the straight methylene chloride remained in the container. The result of the study showed that evaporation retarder is effective in reducing the evaporation rate of methylene chloride from the paint remover. As shown in **Figure 1**, 98.9% of the paint remover remained after 30 minutes and 93.5% remained after five hours. Since the methylene chloride based paint remover (containing evaporation retardant) is effective after 15 minutes from application, the amount of methylene chloride released into the atmosphere during this time is minimal, minimizing the inhalation risk to the product user. At 15 min, only 0.6% of the methylene chloride based paint stripper formula has evaporated.

Figure 1. Comparison of weight loss of methylene chloride to a methylene chloride paint remover formulated with an evaporation retarder at 70°F. At 15 min, only 0.6% of the methylene chloride based paint stripper formula has evaporated.



To increase the performance of the paint remover, an acid or a base is sometimes added as an activator. The activator is thought to disrupt the bond between the substrate and the paint and weaken or break the chemical or physical bonds in the polymer that is used in the paint. Formic acid, ammonium hydroxide and ethanolamine are common activators used in paint removers.

To establish the performance criteria of methylene chloride based paint removers, the label copies from different manufactures were evaluated for consumer benefits. The three most important criteria include:

- A. Removal of many types of coatings including oil-based and epoxy paints for architectural coatings and factory applied OEM automotive paints
- B. Removal of multiple layer of coatings
- C. Fast removal of the coating, starts working within 15 minutes.

Other criterial considered in the evaluation of the paint remover includes the cost of the paint remove and the VOC content of the paint remover. The VOC content of paint removers is limited to 50 % by weight. When considering viability of a paint remover it must be considered that the paints to be removed are generally older and more chemically resistant than many paints available today. While water-based latex paints are widely available and chemically easily removed, they were not nearly as common 30 or more years ago. Furthermore, there are coatings in common use today that are

considered more chemically resistant than water-based latex paints. This study focused on the more difficult, chemically resistant oil-based alkyd and solvent-borne two-part epoxy paints.

MATERIALS AND METHODS

The procedure used to test the performance of the solvents and paint removers is based on a modification of the ASTM D-6189 (2003) test method (Standard Practice for Evaluating the Efficiency of Chemical Removers for Organic Coatings). Modification of the procedure included using 12 x 8 inch panels instead of 12 x 12 inch panels and the panels were treated with five coats of the oil-based alkyd paint instead of three coats as described in the panel preparation procedure in the ASTM D-6189 test method. Painted panels aged 1 month were used for screening experiments and painted panels aged 1 year were used for final efficacy validation. The solvents and paint removers were applied to the panel using a pipette instead of following manufacturers directions for application as called for in the ASTM test method.

Solvent Selection – The solvents used in this study were selected from solvents currently used in non-methylene chloride paint removers, solvents recommended as methylene chloride replacements by chemical manufacturers, and the EPA Exempt VOC Solvents list. Technical grade samples of the solvents were obtained and used in this study's experimental formulations without further purification.

Paint Remover Selection – The paint removers used in this study were purchased from hardware stores or from suppliers on the internet. Composition and the flash point of the paint removers based on information found in the Material Safety Data Sheets (MSDS) are listed in **Appendix A**. All paint removers were used as is in the experiments.

Experimental Paint Removers – Based on the results of the solvents screening testing, two alternative methylene chloride solvents were identified as having some paint remover potential. These solvents were formulated into paint removers that meet the 50 wt% VOC requirements. Three other experimental formulas based on solvent chemistry utilized by paint removers on the market today were also formulated into experimental paint removers with the VOC content less than 50 wt%. These experimental paint removers are listed below:

- A. a solvent based remover based on toluene, methanol, and acetone
- B. a solvent based remover based on 1,2 trans-dichloroethylene, methanol, and acetone
- C. a solvent based remover based on 1,3-dioxolane, methanol, and acetone
- D. an emulsion based on benzyl alcohol
- E. an emulsion based on dibasic esters (DBE)

Paint Selection - Oil-based alkyd paint was selected to be used since it has historically been the most predominantly used paint technology and consumers are typically stripping older items which contains multiple layers of this type of paint. Two-part component epoxy paint was also selected because it is the most difficult paint technology to remove and is frequently used in industry applications. The paints used were purchased from a local hardware or paint stores. The paints purchased for this study are listed in Table 1 along with numbers of layers of paint used on the test panel. Only one type of paint was used for each test panel.

Table 1. List of paint, paint type and number of coatings used in study

Paint	Paint Type	Number of Coatings
Rust-Oleum Professional High Performance Protective Enamel Exterior Gloss	Oil-based alkyd paint	5
Sherwin Williams Macropoxy 646	Two component oil-based epoxy paint	3

1 month aged Panel Preparation Procedure – Sanded birch plywood (4 ft. x 4 ft. x ½ in.) was cut into approximately 12 x 8 inch panels. A four-inch multi-purpose paint roller was used to apply the coats of the designated paint to the birch panels as determined in Table 1. Each layer of paint was dried for four hours at ambient conditions and then was placed in a laboratory oven at 50°C overnight. Each layer of paint was tinted to a different color to increase the visibility of the paint layers. The color schematic went as follows: Blue = color of 1st paint layer applied, White = color of 2nd paint layer applied, Green = color of 3rd paint layer applied, Yellow = color of 4th paint layer applied, Red= last paint layer applied. After the red coat of paint was applied, the panels were then aged for 30 days at 50°C in the laboratory. The test panels were then stored at ambient conditions until needed for the stripping test.

1 year Aged Panels- Painted panels aged for 1 month/30days are only good for giving directional data on the efficacy of a paint stripper. These 1 month aged panels are typically used by the formulation chemist to quickly screen new chemistries to see if they have the potential of becoming an efficacious paint remover. The reality is that consumers are trying to remove multiple layers of paint off items that are many years old. As mentioned in the introduction, alkyd paint types get harder to remove over time due to their chemistry. True efficacy validation of a paint remover requires it to be tested on Alkyd painted boards that have been allowed to age for at least 1 year. These boards were initially prepared in the same manner as the 1 month aged boards, but were allowed to sit at ambient conditions for up to a year prior to testing.

Automotive Panel Preparation – The hood from a 2006 Chevrolet Impala SS was purchased in good condition with the factory paint intact. The hood was cleaned with a damp cloth and used in testing without further modifications. The original paint was used on the hood, so the paint job during removal testing was at least 9 years old. The age of this paint is not as of great importance due to the chemistry being stable over time in comparison to the Alkyd paint which continues to react and get stronger.

Neat Solvent Screening – Neat solvent screening was done on 1 month aged boards to generate directional efficacy data on chemicals that might be promising to be incorporated in a paint remover formula. A grid is marked on the panel with masking tape creating test cells approximately 1 ½ in. x 1 ½ in. for the stripping trials. Each cell was labeled with the name of the solvent to be tested and the duration time of the test. A C31 Large Commercial Sponge from 3M was cut to approximately sized 1 ½ in. x 1 ½ in. x ¼ in. pieces were placed on each test cell to control evaporation and retain the solvent to the test area. For each sample, 2 ml of solvent was applied to the sponge and a timer is started.

Additional solvent was added to the sponges as needed to ensure that the solvent remained in contact with the surface of the test panel. At the timed intervals, the test area was scraped using a plastic scraper and evaluated for the effects on the coatings and the number of layers of paint removed.

Experimental Paint Remover Screening and Validation – Experimental paint remover formulas were tested on 1 month aged boards to get directional efficacy data in comparison to a commercialized paint remover competitive set. This process helps weed out underperforming formulas prior to testing on valuable 1 year aged boards. This same experiment was then repeated on 1 year aged alkyd painted boards to validate the true efficacy of the experimental and commercially available paint removers. A grid was marked on the panel with masking tape to create test cells of approximately 1 ½ in. x 1 ½ in. dimensions. Each cell was labeled with the name of the solvent to be tested and the time duration of the test. Approximately 2 ml of the paint remover was applied to the cell and a timer is started. At timed intervals, the test area was scraped using a plastic scraper and judged for the effects on the coating and the numbers of layers of paint removed.

Results

Neat Solvent Testing – Neat solvent experiments were done on 1 month aged painted boards for the sole purpose of getting directional efficacy data to drive future non-methylene chloride formulation development. The results comparing the performance of methylene chloride to the 22-alternate solvents selected are listed in Table 2. The performance was evaluated after 15 minutes, 30 minutes and 1 hour with number of layers of paint removed and the effect of the solvent on the paint noted. Methylene chloride performed the best removing all five layers of oil-based alkyd paint and two layers of the two-component oil-based epoxy paint in 15 minutes. Trans-1,2-dichloroethylene and 1,3-dioxolane were identified as the best performing alternate solvent removing all five layers of the oil-based alkyd paint in 30 minutes. After 1 hour, 1,3-dioxolane removed two layers of the two-component oil-base epoxy paint, however, trans-1,2-dichloroethylene failed to remove any layers of the epoxy paint after an hour. Results from this experiment helped drive decisions on which chemicals could be used in new experimental paint removal formulas that did not utilize methylene chloride.

Table 2. Neat solvent experiments were done on 1 month aged painted boards for the sole purpose of getting directional efficacy data to drive future formulation development. Results of solvent testing showing the layers of oil-based alkyd and two component oil-based epoxy removed.

Chemical (Neat)	Alkyd (5 Layers)			Epoxy (3 Layers)		
	15 min	30 min	1 hrs	15 min	30 min	1 hrs
methylene chloride	5	5	5	2	2	2
trans-1,2 dichloroethylene	5	5	5			
1,3 dioxolane	5	5	5			2
n-methyl-2-pyrrolidone		5	5			
acetone	5	5	5			
dimethoxymethane (methylal)		5	5			
n-butyl propionate			5			
dimethyl sulfoxide (DMSO)			4			
dimethyl carbonate						
benzyl methyl ether						
TOC (2,5,7,10 tetraoxaundecane)						
3-methoxy-3-methyl-1-butyl acetate (MMB-AC)						
Steposol MET-10U						
PCBTF/Oxsol 100						
3-methoxy-3-methyl-1-butanol (MMB)						
Eastman Omnia (butyl-3-hydroxybutyrate)						
benzyl alcohol						
dibasic esters (LVP)						
dibutoxymethane (butylal)						
propylene carbonate						
Elevance Clean 1200						
soya methyl ester						
glycerol formal						

no effect on coating	
slight softening of paint but no removal with plastic scraper	
paint has softened requiring effort to remove with plastic scraper	
paint has blistered with all layers paint removed with plastic scraper	

The performance of trans-1,2-dichloroethylene and 1,3-dioxolane in removing OEM automotive paint was then compared to methylene chloride and three solvents n-methyl-2-pyrrolidone, benzyl alcohol and DBE currently used in commercially available non-methylene chloride paint removes with the results listed in **Table 3**. The performance of the solvents was evaluated after 15 minutes, 30 minutes, 1 hour and 4 hours with number of layers of paint removed and the effect of the solvent on the paint noted in **Table 3**. Once again methylene chloride performed the best by removed the clear and color coat in fifteen minutes. Trans-1,2-dichloroethylene and 1,3-dioxolane removed the clear and color coat after 30 minutes while NMP, benzyl alcohol and DBE had no effect on the paint after four hours. None the neat solvents, including methylene chloride, stripped all layers of the automotive coating including the primer. Only a formulated paint remover would remove all layers of an automotive coating.

Table 3. Neat solvent experiments were done on 1 month paint for the sole purpose of getting directional efficacy data to drive future formulation development. Results of solvent testing showing the layers of OEM automotive paint removed.

Chemical (Neat)	Automotive Coating			
	15 min	30 min	1 hrs.	4 hrs.
methylene chloride				
trans-1,2 dichloroethylene				
1,3 dioxolane				
n-methyl-2-pyrrolidone				
benzyl alcohol				
dibasic esters (LVP)				

No effect	
Stripped clear coat and top coat	
Stripped clear coat, top coat and base coat	

Experimental Formula Paint Remover Screening on 1 month Aged Boards

Test results comparing the performance of three methylene chloride paint removers to 5 experimental formulas and 26 commercial non-methylene chloride paint removers on one month aged boards are presented in **Table 4**. The panels used in this experiment were evaluated after 5 minutes, 15 minutes, 30 minutes, 1 hour and 4 hours with the numbers of layers of paint stripped by the paint remover recorded. For test panels painted with oil-based alkyd paint, two of the three methylene chloride paint removers, Klean Strip Aircraft Remover and Klean Strip Premium Stripper, stripped all five layers of the alkyd paint after five minutes. The third paint remover, Klean Strip Strip-X, contains less methylene chloride and took 15 minutes to strip the five layers of the alkyd paint. Experimental Formulas A, B, and C were also able to strip all five layers of the oil-based alkyd paint in 15 minutes. Experimental Formula A was formulated with toluene, methanol and acetone. Experimental Formulas B and C contained the two alternate solvents identified in the alternated solvent study and were formulated with 1,2 trans-dichloroethylene, methanol, and acetone and 1,3-dioxolane, methanol, and acetone. Experimental Formula D based on a benzyl alcohol emulsion and Experimental Formula E based on a DBE emulsion failed to strip any layers of the alkyd paint after four hours. Fifteen of the twenty-six commercial non-methylene chloride paint removers tested stripped all layers of alkyd paint in four hours. Eight of sixteen paint removers that stripped the alkyd paint were formulated with NMP. Five of the sixteen paint removers were formulated for professionals to remove automotive or aircraft coatings were based a blend of solvents and high levels of an activator. The remaining two formulas were based on dimethyl sulfoxide (DMSO) or caustic.

For the panels painted with the two-component oil-based epoxy paint, two of the three methylene chloride paint removers, Klean Strip Aircraft Remover and Klean Strip Premium Stripper, stripped two layers of the epoxy paint after 15 minutes. The third paint remover, Klean Strip Strip-X which contains less methylene chloride, took four hours to remove two layers of the epoxy paint. The experimental and

the commercial paint removers failed to strip any layers of the epoxy paint at 15 and 30 minutes, 1 hour and four hours.

Since the experimental formulas A, B, and C showed comparable efficacy on the 1 month aged boards in comparison to the methylene chloride containing formulas they were allowed to advance onto the validation test done on a 1 year aged painted board.

Final Efficacy Validation of Experimental Formulations vs Competition on 1 Year Aged Boards

As shown in the results, Klean Strip Premium Stripper took 15 minutes to remove all layers of paint on a 1 year aged panel but only 5 minutes on the newer 1 month aged panel. The alternate paint removers also required more time to strip all layers of the alkyd paint on the aged panels. The time to strip all layers increased to an hour compared to 30 minutes for the Experimental Formulas A, B, and C. Crown Safer Paint Strip stripped all layers of paint after 24 hours on the new panels but failed to remove any layers of paint on the 1 year aged panels. See **Appendix B** for a visual of 1 month and 1 year aged panels used in this validation test.

Table 5. Validation results of paint remover testing done on panels aged 1 month to 1 year. Klean-strip Premium Stripper methylene chloride based stripper is far superior to the current competitive set on the market. New experimental formulas are extremely flammable and do not perform as fast as current methylene chloride formulations.

Company	Paint Remover	Ingredients (MSDS)	New Panel - Alkyd (5 Layers)						Aged Panel - Alkyd (5 Layers)					
			5 min	15 min	30 min	1 hrs	4 hrs	24 hrs	5 min	15 min	30 min	1 hrs	4 hrs	24 hrs
W. M. Barr	Klean-Strip Premium Stripper	methylene chloride/methanol/Stoddard solvent	5	5	5	5				5	5	5	5	
	Klean-Strip Strip-X Stripper	methylene chloride/methanol/toluene/acetone/xylene		1	5	5					5	5		
	Experimental Formula A	toluene/acetone/methanol		1	5	5						5		
	Experimental Formula B	1,2 trans dichloroethylene/acetone/methanol			5	5						5		
	Experimental Formula C	1,3 dioxolane/acetone/methanol		1	5	5						5		
	CitriStrip Safer Paint & Varnish Stripping Gel	NMP/DBE					5	5					5	5
Dumond	Peel Away 1	calcium hydroxide/magnesium hydroxide/sodium hydroxide					3	5					5	5
	Smart Strip	water/benzyl alcohol						5						5
	Smart Strip Pro	water/benzyl alcohol/formic acid			1	1	1	5						5
EZ Strip	EZ Strip Paint and Varnish Stripper	DBE/triethyl phosphate												
Motsenbocker	Lift Off Paint and Varnish Remover	acetone/2-butoxyethanol/DBE												
Packaging Service Co.	Crown Safer Paint Strip	DBE/DMSO						5						

no layers of paint were removed with plastic paint scraper	
paint has softened requiring effort to remove with plastic scraper	
paint has blistered with all layers of paint removed with plastic scraper	

Test results comparing the performance of three methylene chloride paint removers to five experimental formulas and five commercial non-methylene chloride paint removers on an OEM automotive coating are listed in Table 6. The five commercial non-methylene chloride paint removers were formulated to remove automotive or aircraft coatings containing a blend of solvents and an activator. The effects on automotive coating was evaluated after 15, and 30 minutes, 1 hour and 4 hours. Only one of the paint removers tested, Klean Strip Aircraft Remover, stripped all layers of the OEM automotive coating. Klean Strip Aircraft Remover stripped the clear, color and base coat in 15 minutes and continued to strip all layers at 4 hours without drying. Klean Strip Aircraft Remover is formulated to remove automotive coatings containing methylene chloride and the activator ammonium

hydroxide. Klean Strip Premium Stripper and Klean Strip Strip-X, removed the clear and color coat after 15 minutes but did not strip the primer coat after four hours. Klean Strip Premium Stripper and Klean Strip-X are methylene chloride paint removers but do not contain an activator. Experimental Formulas A, B, and C were also able to strip the clear and color coat after 15 minutes but failed to strip the primer coat after 4 hours. Experimental Formulas D and E failed to strip the automotive coating after four hours. D-Zolve 15-33R from Solvent Kleene was the only commercial non-methylene chloride paint remover tested that stripped the automotive coating. D-Zolve 15-33R is a paint remover designed to remove aircraft coatings and took four hours to remove the clear and color coats.

Table 6. Results of paint remover testing on an OEM Automotive Coating.

Company	Paint Remover	Ingredients (MSDS)	Automotive Coating			
			15 min	30 min	1 hrs	4 hrs
W.M. Barr	Klean-Strip Aircraft Remover	methylene chloride/methanol/Tall oil/ammonium hydroxide/xylene				
	Klean-Strip Premium Stripper	methylene chloride/methanol/Stoddard solvent				
	Klean-Strip Strip-X Stripper	methylene chloride/methanol/toluene/nonyl phenol ethoxylate/acetone/xylene				
	Citristrip Safer Paint & Varnish Stripping Gel	NMP/DBE				
	Experimental Formula A	toluene/acetone/methanol				
	Experimental Formula B	1,2 trans dichloroethylene/acetone/methanol				
	Experimental Formula C	1,3 dioxolane/acetone/methanol				
	Experimental Formula D	benzyl alcohol emulsion				
	Experimental Formula E	DBE emulsion				
PPG	DuraPrep 200 Coating Remover (Gel)	benzyl alcohol/solvent naphtha/2-aminoethanol/nonylphenol, branched ethoxylated				
	DuraPrep 240 Industrial Coating Remover (Gel)	benzyl alcohol/hydrogen peroxide/solvent naphtha/glycolic acid/malic acid/barium bis(dinonylnaphthalenesulphonate)/amines, coco alkyl, ethoxylated				
	DuraPrep Prep 400 Overspray Remover	benzyl alcohol/petroleum distillates/glycolic acid/quaternary ammonium compounds/hydrogen peroxide				
Solvent Kleene	D-Zolve 1012 Powder Coating Remover (immersion tank)	alkyl methyl ester/potassium hydroxide/cyclic amide				
	D-Zolve 15-33R (aircraft)	alkyl methyl ester/petroleum naphtha/benzyl alcohol/methyl phenyl ether				

No effect	
Stripped clear coat and top coat	
Stripped clear coat, top coat and base coat	

Conclusion

The performance of methylene chloride was compared to 22 alternate solvents selected as possible replacements for methylene chloride in paint removers. Testing was conducted on three types of paints using wood panels painted with an oil-based alkyd paint, wood panels paint with a two-component oil-based epoxy paint and an OEM automotive coating. Trans-1,2-dichloroethylene and 1,3-dioxolane were identified as the best performing alternate solvent tested. However, based on the results from this study, none of the alternative solvents tested were determined to be an adequate replacement for methylene chloride.

Based on the results of the solvents screening testing, two solvents, trans-1,2-dichloroethylene and 1,3-dioxolane were selected as having some paint remover potential and were formulated into paint removers that met the 50 wt% VOC limit for paint removers. Three other experimental formulas were also formulated based on a toluene, methanol and acetone formula, a benzyl alcohol emulsion formula and a DBE emulsion formula. Three methylene chloride paint removers were then compared to the five-experimental formula and 26 commercially available non-methylene chloride paint removers. Based on

the results of the paint remover study, none of the experimental formulas or the 26 non-methylene chloride paint removers were determined to be an adequate replacement for methylene chloride paint removers. Performance of the experimental formulas based on trans-1,2-dichloroethylene and 1,3-dioxolane was determined to be no better than the experimental formula based on toluene, methanol and acetone.

Methylene chloride has been the preferred for use in paint removers for seventy. Consumers expect that paint removers to be able to remove many types of coatings, remove multiple layers of the coating and to start working within 15 minutes and quickly remove the coating. To be an effective paint remover, the solvent must be able to penetrate multiple layers of paint and have solubility to cause the paint to swell which breaks the bond of the paint to the substrate. The size of the solvent molecule and the polarity of the molecule affects rate the solvent penetrates the coating. The movement of the solvent from the paint remover to the paint layer is call diffusion and is the result of the random kinetic movement of the solvent molecules. Smaller, nonpolar molecules will have a higher diffusion rate into the coating than molecules that are larger or more polar. The more effective replacements for methylene chloride will be molecules with the following general characteristics, small polar or halogenated molecules, five-member cyclic rings or six-member aromatic rings. These types of molecules are most likely flammable and possibly will have a significant threat to health and safety.

Appendix A. Composition of Paint Removers and Flash Point as Listed in Material Safety Data Sheets

Company	Paint Remover	Ingredients (MSDS)			Flash Point
		Chemical Name	CAS Number	Weight %	
W. M. Barr	Klean Strip Aircraft Remover	methylene chloride	75-09-2	60 – 100	no flash to boiling
		methanol	67-56-1	5 – 10	
		ammonium hydroxide	1336-21-6	< 5	
		xylene	1330-20-7	< 5	
		hydrotreated light distillate (petroleum)	64742-47-8	< 5	
		fatty acid soap	68132-50-3	< 5	
		ethylbenzene	100-41-4	< 3	
	Klean Strip Premium Stripper	methylene chloride	75-09-2	60 – 100	no flash to boiling
		methanol	67-56-1	10 – 20	
		Stoddard Solvent	8052-41-2	< 5	
	Klean Strip Strip-X Stripper	methylene chloride	75-09-2	30 – 40	30°F
		methanol	67-56-1	15 – 26	
		acetone	67-64-1	< 10	
		xylene	1330-20-7	< 10	
		toluene	108-88-3	< 10	
		ethylbenzene	100-41-4	< 5	
		ethyl alcohol	64-17-5	< 5	
		isopropyl alcohol	67-63-0	< 5	
	Citristrip Stripping Gel	n-methyl-2-pyrrolidone	872-50-4	30 – 60	>200°F
		dimethyl adipate	627-93-0	10 – 30	
		dimethyl glutarate	1119-40-0	10 – 20	
	Experimental Formula A	acetone	67-64-1	40 – 50	0°F
		toluene	108-88-3	40 – 50	
		methanol	67-56-1	< 10	
	Experimental Formula B	acetone	67-64-1	40 – 50	0°F
		trans-1,2-dichloroethylene	646-06-0	40 – 50	
		methanol	67-56-1	< 10	
	Experimental Formula C	acetone	67-64-1	45 – 55	0°F
		1,3-dioxolane	646-06-0	40 – 50	
		methanol	67-56-1	< 10	
	Experimental Formula D	benzyl alcohol	100-51-6	20 - 40	no flash to boiling
		alcohol ethoxylate (alcohols, c9-11, ethoxylated)	68439-46-3	< 5	
	Experimental Formula E	water	7732-15-5	40 – 60	no flash to boiling
		dimethyl adipate	627-93-0	10 – 30	
		dimethyl glutarate	1119-40-0	10 – 20	
		starch	9005-25-8	5 – 20	
		alcohol ethoxylate (alcohols, C9-11, ethoxylated)	68439-46-3	<5	

Company	Paint Remover	Ingredients (MSDS)			Flash Point
		Chemical Name	CAS Number	Weight %	
Dumond	Peel Away 1	calcium hydroxide	1305-62-0	21	none
		magnesium hydroxide	1309-42-8	16	
		sodium hydroxide	1310-73-2	9	
	Peel Away 5 Soy Based	benzyl alcohol	100-51-6	20 – 50	> 200°F
		n-methyl-2-pyrrolidone	872-50-4	25 – 35	
		fatty acid methyl ester	67784-80-9	15 – 20	
		alpha-(4-nonylphenyl)- omega-hydroxy-poly(oxy- 1,2,ethanediyl) branched	127087-0	< 3	
		dimethyl glutarate	1119-40-0	25 – 35	
		dimethyl adipate	627-93-0		
		Peel Away 7	benzyl alcohol	100-51-6	
	n-methyl-2-pyrrolidone		872-50-4	10 – 20	
	alpha-(4-nonylphenyl)- omega-hydroxy-poly(oxy- 1,2,ethanediyl) branched		127087-0	< 2	
	dimethyl glutarate		1119-40-0	25 – 35	
	dimethyl adipate		627-93-0		
	Smart Strip		water	7732-18-5	40 – 60
		benzyl alcohol	100-51-6	30 – 50	
		titanium dioxide	13463-67-7	1 - 5	
	Smart Strip Pro	water	7732-18-5	40 – 60	none
		benzyl alcohol	100-51-6	30 – 50	
		titanium dioxide	13463-67-7	1 – 5	
		formic acid	64-18-6	1 – 5	
Ecoprocote	EcoFast HD Heavy Duty Paint Stripper	water	7732-18-5	Trade Secret	non- flammable
		benzyl alcohol	100-51-6	Trade Secret	
		Bio-Based Emulsion	Non- Hazardous	Trade Secret	
		Solvent-Free Thickeners	Non- Hazardous	< 1	
		Solvent-Free Surfactants	Non- Hazardous	1 – 5	
EZ Strip	EZ Strip Paint and Varnish Stripper	dimethyl adipate	627-93-0	3 – 7	not listed
		dimethyl succinate	106-65-0	5 – 10	
		dimethyl glutarate	1119-40-0	10 – 30	
		triethyl phosphate	78-40-0	3 – 7	
Frammar	Soy-Gel Paint and Varnish Stripper	n-methyl-2-pyrrolidone	872-50-4	41	> 200°F
		dimethyl adipate	627-93-0	40 – 45	
		dimethyl glutarate	1119-40-0		
		soy ester	67781-80-9	15 – 20	
		Proprietary Thickening and Surfactant Blend	Proprietary	1 – 5	
Motsenbocker	Lift Off Paint and Varnish Remover	acetone	67-64-1	< 10	not listed
		2-butoxy ethanol	111-76-2	Not Listed	
		dimethyl adipate	627-93-0	Not Listed	
		dimethyl succinate	106-65-0	Not Listed	
		dimethyl glutarate	1119-40-0	Not Listed	

Company	Paint Remover	Ingredients (MSDS)			Flash Point
		Chemical Name	CAS Number	Weight %	
Packaging Services Co	Crown Paint Strip Next	dimethyl sulfoxide	67-68-5	20 – 25	160°F
		dimethyl glutarate	1119-40-0	45 – 45	
		dimethyl succinate	106-65-0	10 – 20	
		dimethyl adipate	627-93-0	5 – 15	
		alcohol ethoxylate surfactant	Not Listed	0 – 1	
PPG	DuraPrep 200 Coating Remover	benzyl alcohol	100-51-6	15 – 40	221°F
		solvent naphtha (petroleum), light aromatic	64742-95-6	1 – 5	
		2-aminoethanol	141-43-5	1 – 5	
		nonylphenol, branched, ethoxylated	68412-54-4	0.1 – 1	
	DuraPrep 240 Industrial Coating Remover	benzyl alcohol	100-51-6	15 – 40	178°F
		hydrogen peroxide	7722-84-1	5 – 10	
		solvent naphtha (petroleum), heavy aromatic	64742-94-5	3 – 7	
		barium bis(dinonyl-naphthalenesulphonate)	25619-56-1	0.1 – 1	
		amines, coco alkyl, ethoxylated	61791-14-8	0.1 – 1	
	DuraPrep Prep 400 Overspray Remover	2-(methoxymethylethoxy) propanol	34590-94-8	30 – 60	203°F
		dimethyl sulfoxide	67-68-5	7 – 13	
		dimethyl glutarate	1119-40-0	5 – 10	
		benzyl alcohol	100-51-6	5 – 10	
Solvent Kleene	D-Zolve 1012 Power Coating Remover	alkyl methyl ester	Proprietary	Trade Secret	170°F
		potassium hydroxide	1310-58-3	2 – 5	
		cyclic amide	72-50-4	5 – 30	
Sunnyside	Multi-Strip Professional Paint Remover	n-methyl-2-pyrrolidone	872-50-4	15 – 35	203°F
		dimethyl glutarate	1119-40-0	20 – 35	
		dimethyl adipate	627-93-0	5 – 10	
		dimethyl succinate	106-65-0	5 – 15	
		formic acid	64-18-6	1 – 2	
		non-hazardous components	N/A	20 – 40	
	Ready Strip Pro	benzyl alcohol	100-51-6	20 – 35	205°F
		n-methyl-2-pyrrolidone	872-50-4	5 – 15	
		formic acid	64-18-6	2 – 15	
		non-hazardous components	N/A	50 – 65	
	Ready Strip Safer Paint & Varnish Remover	benzyl alcohol	100-51-6	20 – 35	205°F
		n-methyl-2-pyrrolidone	872-50-4	5 – 15	
		formic acid	64-18-6	2 – 15	
		non-hazardous components	N/A	50 – 65	
	Ready Strip Spray	n-methyl-2-pyrrolidone	872-50-4	35 – 50	205°F
		dimethyl glutarate	1119-40-0	20 – 35	
		dimethyl adipate	627-93-0	5 – 20	
dimethyl succinate		106-65-0	3 – 5		
monoethanolamine		141-43-5	1 – 3		
isopropanolamine mixture		78-96-6	2 - 5		
		110-97-4			
		122-20-3			
non-hazardous components	N/A	45 – 50			

Company	Paint Remover	Ingredients (MSDS)			Flash Point
		Chemical Name	CAS Number	Weight %	
Sunnyside	Ready Strip Spray	n-methyl-2-pyrrolidone	872-50-4	35 – 50	205°F
		dimethyl glutarate	1119-40-0	20 – 35	
		dimethyl adipate	627-93-0	5 – 20	
		dimethyl succinate	106-65-0	3 – 5	
		monoethanolamine	141-43-5	1 – 3	
		isopropanolamine mixture	78-96-6	2 - 5	
			110-97-4		
			122-20-3		
	non-hazardous components	N/A	45 – 50		
	Ultra-Strip	n-methyl-2-pyrrolidone	872-50-4	35 – 50	>200°F
		dimethyl glutarate	119-40-0	20 – 35	
		dimethyl adipate	627-93-0	5 – 20	
		dimethyl succinate	106-65-0	3 – 5	
		formic acid	64-18-6	1 – 2	
non-hazardous components		N/A	5 – 35		
This Stuff Works, Inc	TSW2 Multi-Master	n-methyl-2-pyrrolidone	872-50-4	Trade Secret	>212°F
		dimethyl glutarate	1119-40-0	Trade Secret	
		dimethyl adipate	627-93-0	Trade Secret	
	TSW2G Multi-Master (Gel)	n-methyl-2-pyrrolidone	872-50-4	Trade Secret	>212°F
		dimethyl glutarate	1119-40-0	Trade Secret	
		dimethyl adipate	627-93-0	Trade Secret	
	TSW3G (Gel) Mason-Master	potassium hydroxide	1310-58-3	Trade Secret	non-flammable
		butyl cellosolve	11-76-2	Trade Secret	
	TSW9 Plasti-Master	dimethyl glutarate	1119-40-0	Trade Secret	>212°F
		dimethyl adipate	627-93-0	Trade Secret	
		proprietary surfactant	Trade Secret	Trade Secret	
Zinsser	Magic Strip Citrus-Action	n-methyl-2-pyrrolidone	872-50-4	25 – 50	>199°F
		dimethyl glutarate	1119-40-0	25 – 50	
		dimethyl adipate	627-93-0	2.5 – 10	
		dimethyl succinate	106-65-0	2.5 – 10	
		monoethanolamine	141-43-5	2.5 – 10	
		d-limonene	5989-27-5	1.0 – 2.5	

Appendix B: Photographs comparing test results on new and aged panels painted with an oil-based alkyd paint.

Figure 1. Results of stripping screening test on a new panel (**1-month-aged**) painted with an oil-based alkyd paint. **Column 1** is Klean Strip Premium (methylene chloride based), **Column 2** is Strip-X methylene chloride based (lower level), **Column 3** is an experimental formula containing toluene, **Column 4** is an experimental formula containing trans-1,2-dichloroethylene, **Column 5** is an experimental formula containing 1,3-dioxolane and **Column 6** is Citrus strip (contains NMP and DBE). Blue = 1st paint layer applied, White = 2nd paint layer applied, Green = 3rd paint layer applied, Yellow = 4th paint layer applied, Red= last paint layer applied. Seeing Red = no layers of paint were stripped.

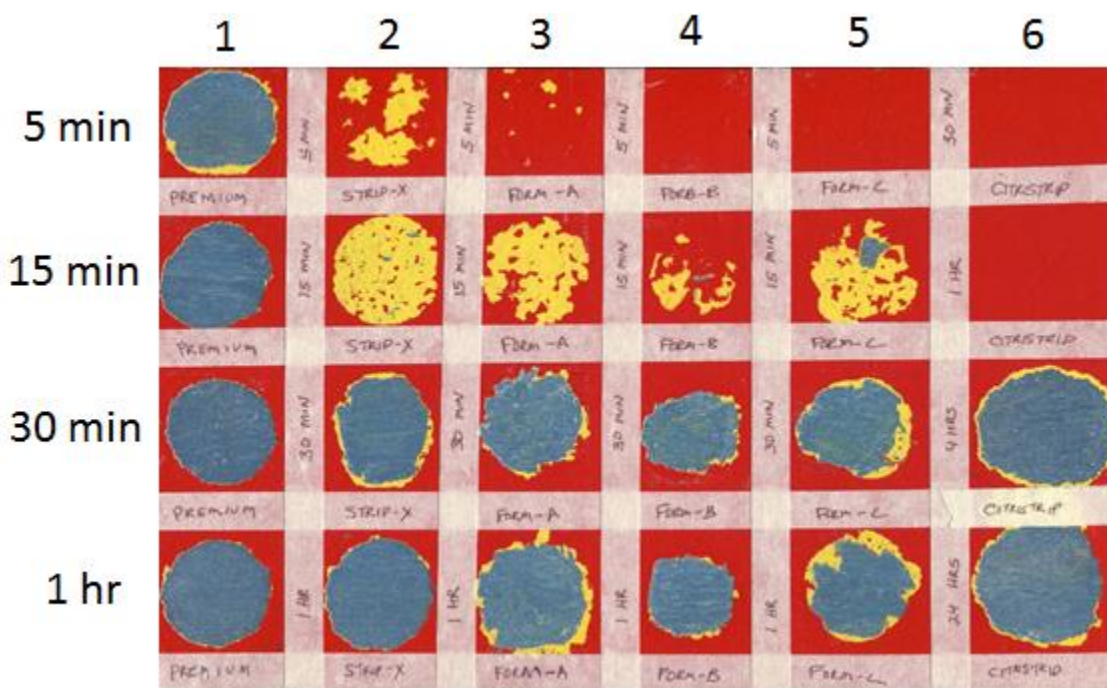


Figure 2. Results of stripping validation test on an aged panel (**1-year-aged**) painted with an oil-based alkyd paint. **Column 1** is Klean Strip Premium (methylene chloride based), **Column 2** is Strip-X methylene chloride based (lower level), **Column 3** is an experimental formula containing toluene, **Column 4** is an experimental formula containing trans-1,2-dichloroethylene, **Column 5** is an experimental formula containing 1,3-dioxolane and **Column 6** is Citrus strip (contains NMP and DBE). Blue = 1st paint layer applied, White = 2nd paint layer applied, Green = 3rd paint layer applied, Yellow = 4th paint layer applied, Red= last paint layer applied. Seeing Red = no layers of paint were stripped.

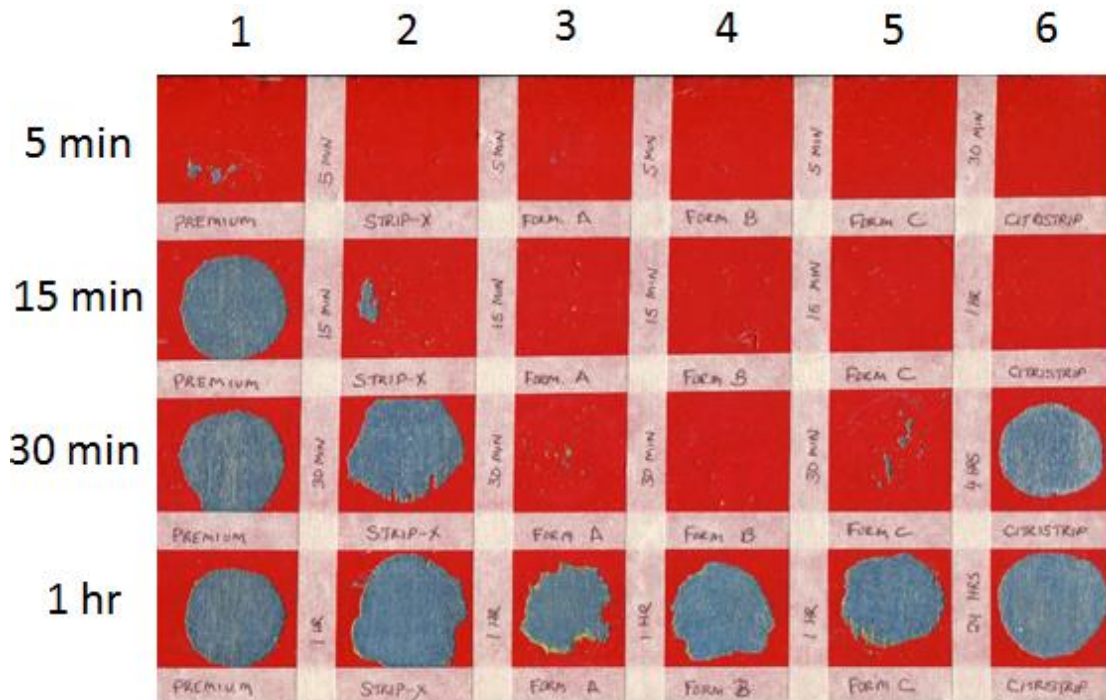


Figure 3. Results of stripping screening test on a new panel (**1-month-aged**) painted with an oil-based alkyd paint. **Column 1** is Peel Away 1 (caustic based), **Column 2** is Smart Strip (benzyl alcohol based), **Column 3** is Smart Strip Pro (benzyl alcohol based with formic acid), **Column 4** is EZ strip (DBE and triethyl phosphate), **Column 5** Lift Off (acetone and 2-butoxy ethanol and DBE based) and **Column 6** is Safer Paint Strip (DMSO and DBE based). Blue = 1st paint layer applied, White = 2nd paint layer applied, Green = 3rd paint layer applied, Yellow = 4th paint layer applied, Red= last paint layer applied. Seeing Red = no layers of paint were stripped. ** Ingredients of competitive products cited from MSDS and/or GC analysis.

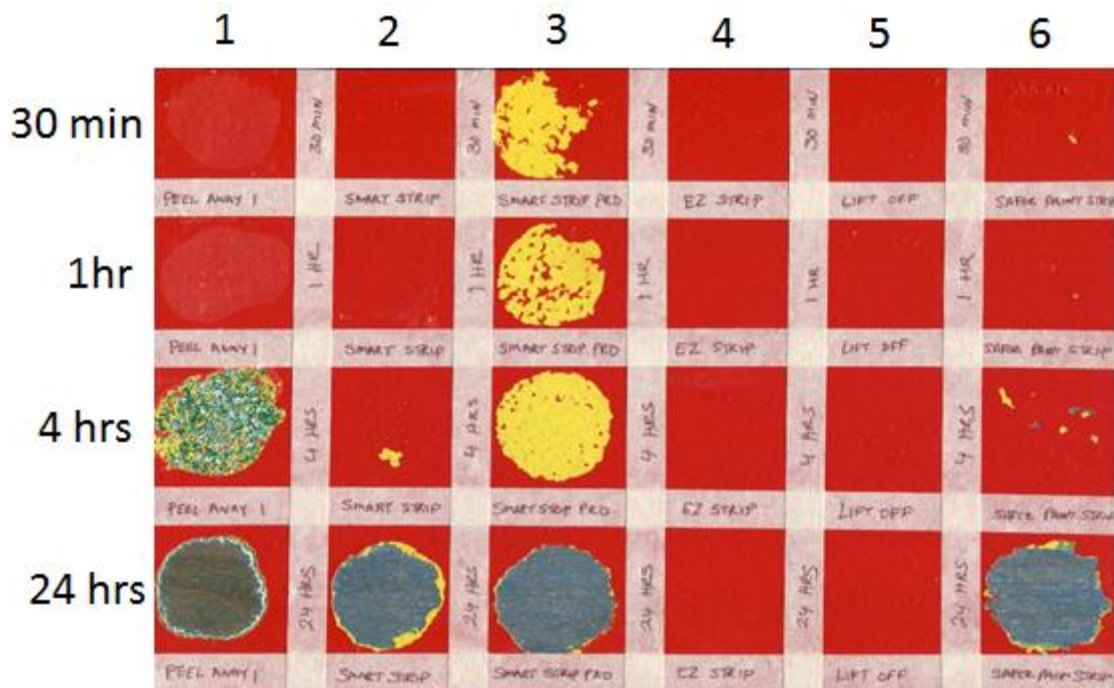
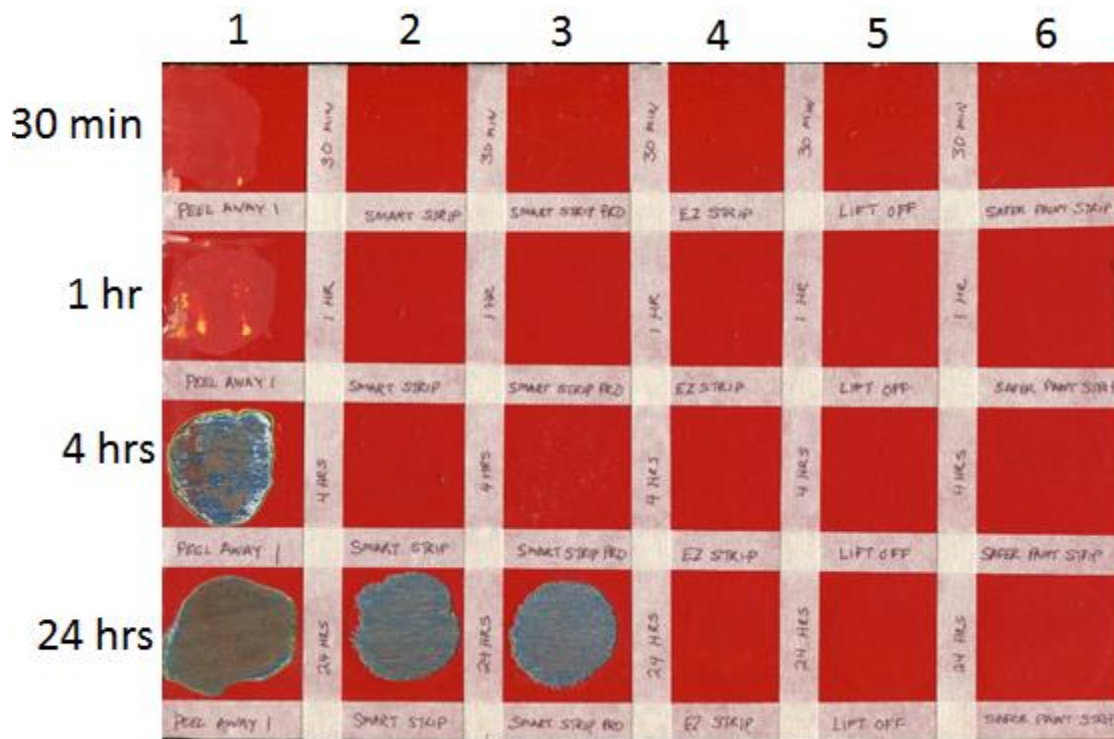


Figure 4. Results of stripping validation test on an aged panel (**1-year-aged**) painted with an oil-based alkyd paint. **Column 1** is Peel Away 1 (caustic based), **Column 2** is Smart Strip (benzyl alcohol based), **Column 3** is Smart Strip Pro (benzyl alcohol based with formic acid), **Column 4** is EZ strip (DBE and triethyl phosphate), **Column 5** Lift Off (acetone and 2-butoxy ethanol and DBE based) and **Column 6** is Safer Paint Strip (DMSO and DBE based). Blue = 1st paint layer applied, White = 2nd paint layer applied, Green = 3rd paint layer applied, Yellow = 4th paint layer applied, Red= last paint layer applied. Seeing Red = no layers of paint were stripped. ** Ingredients of competitive products cited from MSDS and/or GC analysis.





Comparative Study First and Second Generation PVRs



Competitive Products





Panel Preparation (Modified from ASTM D6189)

Wood Panels

- Primer and paint application
 - Coat wood panel on one side with primer using a paint brush and allow to dry overnight at room temperature.
 - Coat the panel with paint while ensuring uniform thickness of the applied layer using a paint brush. Allow to dry for 24 h at room temperature.
 - Apply and dry additional layers of paint using different colors. Allow each layer to dry for 24 hours
 - Place the panel at room temperature for 48 hours and then at 53°C for 72 hours.

Metal Panels

- Old painted metal furniture parts were used

Adhesives Application

- Different types of adhesives were applied either on metal or on wood surface
- Adhesives were let dry for ~24 hours prior to testing



Paint / Adhesive Removal from Wood and Metal Surface (Modified from ASTM D6189)

- Apply equal amount of paint strippers using a disposable plastic pipette
- Start stop watch after the panel has been fully coated leaving the panel in horizontal position during the test
- Wait for 15-30 minutes and then remove the paint stripper using a paper towel
- Scrape the surface using a plastic scrapper and take pictures



15 minutes, Polyurethane paint

D-Super
Partial 2 layers

Smart strip
No performance

Citri strip
No performance

Safest Stripper
No performance

EZ-Strip
No performance



Heirloom
2 layers

Recochem Gen 1
Partial 1 layer

Recochem Gen 2
2 layers

Ultimate stripper
2 layers

Klean strip
2 layers

Oil based primer-white, 1st paint layer- off-white, 2nd paint layer-blue, 3rd paint layer- red (top coat)



30 minutes, Polyurethane paint

D-Super Partial 2 layers	Smart strip No performance	Citri strip No performance	Safest Stripper No performance	EZ-Strip No performance
				
				
Heirloom Partial 3 layers	Recochem Gen 1 2 layers	Recochem Gen 2 2 layers	Ultimate stripper 2 layers	Klean strip 2 layers

Oil based primer-white, 1st paint layer- off-white, 2nd paint layer-blue, 3rd paint layer- red (top coat)

15 minutes, Alkyd based

Recochem Gen 1 Partial 4 layers	Recochem Gen 2 4 layers	Ultimate stripper 4 layers	Klean strip Partial 4 layers	D-Super Partial 4 layers	Smart strip, No Performance	Citri strip, Partial 1 layer	Safest Stripper, No performance	EZ-Strip, No performance	Heirloom 4 layers
									

Oil based primer-white, 1st paint layer-green, 2nd paint layer-red, 3rd paint layer-black (top coat)



30 minutes, Alkyd based

Recochem Gen 1 Partial 4 layers	Recochem Gen 2 4 layers	Ultimate stripper 4 layers	Klean strip 4 layers	D-Super 4 layers	Smart strip Partial 1	Citri strip, Partial 4 layer	Safest Stripper No performance	EZ-Strip Partial 1	Heirloom 4 layers



Oil based primer-white, 1st paint layer-green, 2nd paint layer-red, 3rd paint layer-black (top coat)

15 minutes, Water based

Partial 3
layers

4 layers

4 layers

4 layers

3 layers

Partial 1

Partial 3

No
performance

Partial 1

4 layers



Water based primer- white, 1st paint layer- yellow , 2nd paint layer-purple, 3rd paint layer- red (top coat)



15 minutes, metal paint (old metal table)

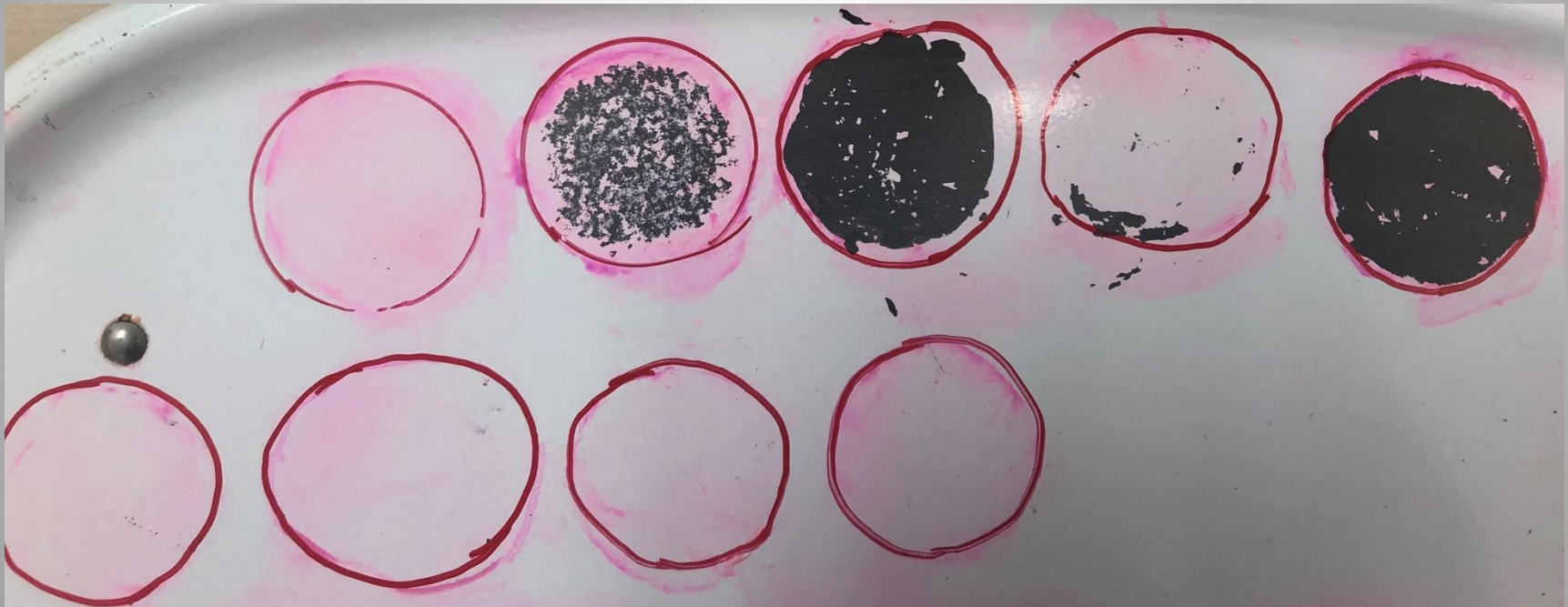
Recochem 1
No performance

Recochem 2
Partial removal

Ultimate stripper
Complete removal

Klean strip
No performance

D-Super
Complete removal



Smart strip
No performance

Citri strip
No performance

Safest Stripper
No performance

EZ-Strip
No performance



30 minutes, metal paint (old metal table)

Recochem 1
No performance

Recochem 2
Complete removal

**Ultimate
Stripper,**
Complete removal

Klean strip
Complete removal

D-Super
Complete removal

Smart strip
No performance



**EZ-Strip, no
performance**

Citri strip
No performance

Safest Stripper,
No performance



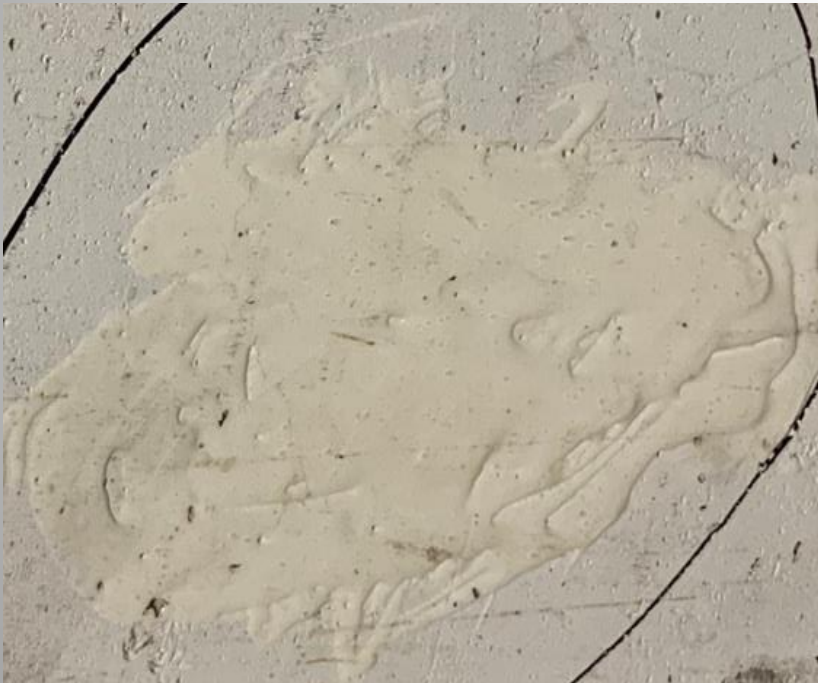
30 minutes, metal paint (old metal drawer)





Masonry (painted dry wall) , 5 minutes

Recochem Gen 2, after PVR application



Recochem Gen 2, after PVR removal





Adhesives, tested on metal surface

Recochem Gen 2, 5 minutes after PVR application



Recochem Gen 2, after PVR removal



Recochem paint stripper removed different adhesives from metal in 5 minutes

Adhesives, tested on uncoated wood surface

Recochem Gen 2, 5 minutes after PVR application



Recochem Gen 2, after PVR removal



Recochem paint stripper removed different adhesives from wood in 5 minutes



Reasons to Believe- Gen 2

- Consists of safer alternatives to the toxic methylene chloride and N-methyl-2-pyrrolidone chemicals
- A fast, professional grade that will cut through multiple layers of varnish, acrylics, enamel, polyurethane, metal and oil based paint within minutes.
- Stays wet and active for up to 16 hours for persistent layers
- Volatile organic compounds compliant
- Excellent vertical cling (higher viscosity formula)
- Leaves a smooth finish
- Rinseability in water making it easy to clean spills, splatters, brushes etc.