

MEMORANDUM REGIONAL ADMINISTRATORS

TO:

THROUGH: Dorothy Dougherty  
Acting Deputy Assistant Secretary

FROM: Thomas Galassi, Director  
Directorate of Enforcement Programs

SUBJECT: Classification of Combustible Dusts under the  
Revised Hazard Communication Standard

This memorandum provides guidance for compliance safety and health officers (CSHOs) to use in determining whether manufacturers or importers have properly classified their products<sup>1</sup> for combustible dust hazards under the revised Hazard Communication Standard (HCS). This guidance shall be used when inspecting manufacturers and importers, usually from referrals concerning inadequate or inappropriate labels or SDSs are conducted, not inspections of downstream users. Until OSHA addresses these issues through rulemaking, CSHOs shall use this document to determine if manufacturers and importers (from now on "classifier") are in compliance with the obligations of 1910.1200(d) for combustible dust. CSHOs may direct any questions that arise in applying this guidance to the Directorate of Enforcement Programs or the Salt Lake Technical Center (SLTC).

#### Background

On March 26, 2012, OSHA amended the HCS to align with the Globally Harmonized System for the Classification and Labelling of Chemicals (GHS). However, the GHS does not contain a classification for combustible dust hazards, and to maintain coverage of this hazard under the HCS, OSHA amended the standard's definition of "hazardous chemical" to include "combustible dust<sup>2</sup>." Noting ongoing efforts at the United Nations (UN) and in the Agency's own combustible dust rulemaking, OSHA did not adopt a definition of the term combustible dust in the final rule. Rather, as an interim measure, OSHA stated that it had already provided guidance on combustible dust, including the Combustible Dust National Emphasis Program (NEP), which "includes an operative definition." 77 FR 17705. OSHA also noted that a number of voluntary consensus standards exist, "particularly those of the NFPA," which provide further guidance. *Id.*

#### Compliance Guidance

Under the HCS, classifiers are required to "evaluate chemicals produced in their workplaces or imported by them to classify the chemicals in accordance with this section." 29 CFR 1910.1200(d)(1). Any such classification must "identify and consider the full range of available scientific literature and other evidence concerning the potential hazards." 1910.1200(d)(2). However, there **"is no requirement to test the chemical to determine how to classify its hazards."** *Id.* The classifier must consider not only the hazards of the chemical in the form it is shipped, but also consider the hazards that arise under normal conditions of use and foreseeable emergencies. When performing inspections of classifiers, CSHOs must ensure that the requirement to consider normal conditions of use and foreseeable emergencies is followed by the classifier.

The combustible dust NEP defines combustible dust as a solid combustible material, composed of distinct pieces or particles, that "presents a fire or deflagration hazard when suspended in air or some other oxidizing medium over a range of concentrations, regardless of particle size or shape." A number of voluntary standards prepared by the National Fire Protection Association (NFPA), FM-Global, and ASTM International suggest various tests, data, and criteria that may be used to determine whether a material presents a combustible dust hazard.

As noted above, classifiers must consider any hazards posed by the product in normal conditions of use and foreseeable emergencies, and must consider the full range of available information about those hazards. For combustible dusts, often the best information is actual experience with the product. If the classifier knows that its product has been involved in a deflagration or dust explosion event, the classifier should classify the product as a combustible dust unless the classifier can show that the conditions surrounding the event are not expected in normal conditions of use or foreseeable emergencies. In the absence of information on a deflagration or dust explosion event, classifiers may use one or more of the following approaches in determining whether such hazards exist, depending on the information that is available.

#### **1. Laboratory Testing.**

All of the voluntary standards recognize that reliable test data for a material, based on

scientifically validated tests, is strong evidence for determining whether a material presents a combustible dust hazard and should be used for classification if available. Reliable screening tests, such as that described in ASTM E1226<sup>3</sup>, showing a positive normalized rate of pressure rise (Kst), and tests for Class II dusts may be used to determine whether a material presents a combustible dust hazard, and classification should be based on such data if it is available. Many voluntary standards recognize the ASTM E1226 and E1515<sup>4</sup> methods as reliable means to establish a combustible dust hazard. When performing inspections of classifiers CSHOs must obtain and evaluate any appropriate and available test results for the product to ensure the classification accurately reflects the hazards of the chemical.

OSHA's combustible dust NEP describes its own test method for determining the Kst, and the NEP treats a dust as presenting the hazard when the Kst is greater than zero. In addition, the NEP describes OSHA's method for determining whether a dust is a Class II dust for purposes of the electrical standard, which is also an indication that a dust presents a combustible dust hazard. If laboratory data (e.g., company-generated data or regulatory body test results for the product) are available and the classifier chooses not to classify based on this data, the CSHO must ensure that classifier can adequately explain why this data was not used in the classification.

## 2. **Published Test Results.**

NFPA 61<sup>5</sup>, 68<sup>6</sup>, 484<sup>7</sup>, and 499<sup>8</sup> publish lists of test results for various materials. Though the NFPA documents caution care in the use of these results because the extent of explosibility can vary even for different dusts of the same solid material, they nonetheless can "aid in the determination of the potential for a dust hazard to be present in [an] enclosure." NFPA 61, A.6.2.1 (2013).

As a part of a poster about combustible dust hazards, OSHA has published a list of combustible materials based on the information provided in the NFPA standards (<https://www.osha.gov/Publications/combustibledustposter.pdf>). In addition, there are public databases of dust explosibility characteristics that may be consulted, such as the "Gestis-Dust-EX" database maintained by the Institute for Occupational Safety and Health of the German Social Accident Insurance (<http://www.dguv.de/ifa/en/gestis/expl/index.jsp>).

In the absence of any test data for a particular product, the classifier may rely on published test data for the classification of dusts if the data is for a material that is substantially similar to the product under review. Where the classifier has not classified its product as presenting a combustible dust hazard and the CSHO finds positive published data for a material that appears similar, the CSHO must ensure that the classifier has an adequate explanation for discounting the data.

## 3. **Dust Particle Size.**

For many years, NFPA 654<sup>9</sup> defined combustible dust as a "finely divided solid material 420 microns or smaller in diameter (material passing a U.S. No. 40 Standard Sieve) that presents a fire or explosion hazard when dispersed and ignited in air." OSHA used this definition in

earlier combustible dust guidance, such as its 2005 safety and health information bulletin, and uses a similar criterion in defining "fugitive grain dust" in its Grain Handling Facilities Standard (see 29 CFR 1910.272(c)). Some NFPA standards still use a size criterion in defining combustible dust, such as NFPA 61 (2013) and NFPA 704 (2012)<sup>10</sup>.

Other NFPA standards, however, have changed their combustible dust definition to remove the size criterion, but discuss size in their explanatory notes. In general the notes concerning particle size state that dusts of combustible material with a particle size of less than 420 microns can be presumed to be combustible dusts. However, certain particles, such as fibers, flakes, and agglomerations of smaller particles, may not pass a No. 40 sieve but still have a surface-area-to-volume ratio sufficient to pose a deflagration hazard. In the most recent revisions, the explanatory notes in many of the NFPA standards have moved from a 420 to 500 micron size threshold. *See* NFPA 484 (2013), NFPA 654 (2013), NFPA 664<sup>11</sup> (2012) and FM Global Data Sheet 7-76 (2013)<sup>12</sup>.

Where there is no test data, or if the testing is inconclusive, classification may be based on particle size, if particle size information is available. If the material will burn and contains a sufficient concentration of particles 420 microns or smaller to create a fire or deflagration hazard, it should be classified as a combustible dust. A classifier may, if desired, instead use the 500 micron particle size (U.S. Sieve No. 35) threshold contained in more recent NFPA standards. Care must be used with this approach where the particles are fibers or flakes, or where agglomerations of smaller particles may be held together by static charges or by other means that would prevent the dust from passing through respective sieves No. 40 and 35, but would still present a fire or deflagration hazard.

## Summary

In summary, when conducting inspections of classifiers, CSHOs should determine how classifiers have handled the available evidence about a product's explosibility. Where there is evidence that the product has actually been involved in a deflagration or dust explosion event, it should be classified as a combustible dust. Similarly, where results of accepted tests on the product are available, the dust should be classified in accordance with those results. Finally, in the absence of actual events or test data on the product, the classifier may either rely on the published test data on similar materials or use the available information about particle size to determine the combustible dust hazard of the product. This guidance is not intended to be exclusive, and classifiers may have other reliable methods to establish whether their product does or does not present a combustible dust hazard in normal conditions of use and foreseeable emergencies. CSHOs should consider such claims carefully, and in such cases consultation with the Directorate of Enforcement Programs and/or the SLTC is strongly encouraged.

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1 The Hazard Communication Standard's classification requirements apply to "chemicals," 29 CFR 1910.1200(d)(1), which is defined as "any substance or mixture of substances," 1910.1200(c). The word "product" in this memorandum is intended to be understood as a synonym of "chemical" as defined in the standard.

2 While the GHS requires dust explosion hazards to be noted on the safety data sheet, it does not include a chapter or classification criteria for combustible dusts.

3 ASTM E1226: Standard Test Method for Explosibility of Dust Clouds.

4 ASTM E1515: Standard Test Method for Minimum Explosible Concentration of Combustible Dusts.

5 NFPA 61: Standard for the Prevention of Fires and Dust Explosions in Agricultural and Food Processing Facilities.

6 NFPA 68: Standard on Explosion Protection by Deflagration Venting.

7 NFPA 484: Standard for Combustible Metals.

8 NFPA 499: Recommended Practice for the Classification of Combustible Dusts and of Hazardous (Classified) Locations for Electrical Installations in Chemical Process Areas.

9 NFPA 654: Standard for the Prevention of Fire and Dust Explosions from the Manufacturing, Processing, and Handling of Combustible Particulate Solids.

10 NFPA 704: Standard System for the Identification of Hazardous Materials for Emergency Response.

11 NFPA 664: Standard for the Prevention of Fires and Explosions in Wood Processing and Woodworking Facilities.

12 FM Global Property Loss Prevention Data Sheet 7-76: Prevention and Mitigation of Combustible Dust Explosion and Fire.