

Combustible Dust and NFPA 652

By Reginald C. Whitaker, CSP
EH&S Manager, Oklahoma Steel & Wire Co.
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While combustible dust has been around and talked about for decades, it wasn't until the 2006 US Chemical Safety and Hazard Investigation Board (CSB) issued a report on combustible dust hazards and explosions in the US from 1980-2005, then the Occupational Safety Health Administration (OSHA) took notice.

OSHA implemented the first Nation Emphasis Program (NEP) in Oct 2007 and amended it in March of 2008. They also started the process of generating a Combustible Dust Standard in 2009. The NEP was again amended in 2015 after the Hazard Communications Revision that took place in 2012. OSHA finally withdrew the proposed Combustible Dust Standard in March 2017. This did not stop employers from being fined under OSHA inspections.

In [OSHA's Combustible Dust National Emphasis Program](#), two of the most common citations were **improper housekeeping**, which includes combustible dust accumulation, and **improper use of a compressed air hose** to blow down combustible dust. These unsafe practices and general lack of maintenance can be hazardous because even a small amount of dust in the wrong area can be combustible.

Citations under the NEP usually include some item being cited under the General Duty Clause (GDC) as it has the following language: "furnish to each of his employees employment and a place of employment which are free from recognized hazards that are causing or are likely to cause death or serious physical harm to his employees."

While all this has been going on with OSHA, the National Fire Protection Association (NFPA) has been providing Consensus Standards that deal with Combustible Dust and its hazards.

The relevant NFPA publications include: *Courtesy: Stonehouse Process Safety Inc.*

- **NFPA 61:** Standard for the prevention of fires and dust explosions in agricultural and food products facilities
- **NFPA 68:** Guide for venting of deflagrations
- **NFPA 69:** Standard on explosion prevention systems
- **NFPA 77:** Recommended practice on static electricity
- **NFPA 484:** Standard for combustible metals, metal powders and metal dusts
- **NFPA 499:** Recommended practice for the classification of combustible dusts and of hazardous (classified) locations for electrical installations in chemical process areas
- **NFPA 654:** Standard for the prevention of fire and dust explosions from the manufacturing, processing and handling of combustible particulate solids
- **NFPA 655:** Standard for prevention of sulfur fires and explosions
- **NFPA 664:** Standard for the prevention of fires and explosions in wood processing and woodworking facilities

These publications also have created some confusion regarding consistency and specific applicability of some of their requirements.

[NFPA 652 \(2019 Edition\)](#) has sought to consolidate the best general practices for all combustible solids, regardless of industry and powder/dust type and to direct the user to appropriate NFPA industry- or commodity-specific standards. The NFPA recently revised NFPA 652, "Standard on the

Fundamentals of Combustible Dust.” While there are several revisions, the most notable update is the new deadline for industrial manufacturers to complete a dust hazard analysis (DHA).

NFPA 652 requirements

1. Determine combustibility and explosibility of materials
2. Conduct a Dust Hazard Analysis
3. Plan for managing identified fire, flash fire, and explosion hazard
4. Establishing written safety management systems that address hazards

This leads to asking several questions and then acting on the answers, according to the NFPA 652.

First question – DO YOU NEED A DHA?

If you know that you have a combustible dust, then yes, you need a DHA for your site. If however, you don't know, then you must find out via testing, research or using commonly used materials that can cause a combustible dust to exist. According to OSHA, combustible dusts include those made from food products such as apple, carrot, cocoa powder, cotton, gluten, and/or potato. Carbonaceous dusts such as charcoal, cellulose, cork are also combustible. **Chemical dusts such as calcium acetate, calcium stearate, sodium stearate and dextrin, and metal dusts such as aluminum, magnesium, and zinc are also on the list.** Plastic dusts from epoxy and melamine resins are also considered highly probable of producing a dust explosion.

For the Wire Producing Industry, we can fall into the “use of commonly used materials”. Most of the lubricating soaps that we use for drawing wire contain stearates. Therefore, wire operations can create a combustible dust during the drawing process. So, most AWPA members will need to comply with NFPA 652 Standard.

The revised NFPA 652 requires manufacturing industries to complete a dust hazard analysis. According to the 2019 revised edition of NFPA 652, a DHA must be completed by **September 7, 2020**. The standard also requires the DHA be reviewed and updated every five years.

Next question – HOW DO YOU DO A DHA?

Basically, you have to go around your plant and ask 5 questions at each process, department or building.

1. Is there combustible dust in this area?
2. Is the dust concentration above the normal accumulation? (1/32” over 5% of surface area)
3. Can the combustible dust become or is it suspended in air?
4. Is there an ignition source in the area that could ignite a dust cloud?
5. Are there hazard controls already in place? (Housekeeping program, dust collectors, no ignition sources)

Consult appendix B of NFPA 652 for further guidance on performing a DHA.

After we have identified all the Dust Hazards doing the DHA, we need to **MANAGE THOSE HAZARDS**. This can be done by making sure at least one of the three items needed for a fire event is removed or protected.

- Remove the dust so that concentration can't be met. (Housekeeping or dust collectors are most common.)
- Remove the oxygen from the area, which is not easily done.
- Remove or control the ignition source or its energy level.

The last step: a written SAFETY MANAGEMENT PLAN

This is so the workplace and **ALL employees understand the process and controls used for the identified hazards**.