

KILLER DUST

Are you aware of risks in your workplace?

By MASSIMO DE PASTENA

According to OSHA, there have been at least 350 combustible dust explosions in the United States since 1980, resulting in more than 130 fatalities and 800 injuries.

In many of these incidents both the employers and the employees were unaware that a hazard even existed or that their workplace was considered a high-risk environment.

Dust accumulations of as little as 1/32 of an inch are sufficient to create a dust deflagration when dispersed and exposed to an ignition source, says NFPA.

A common problem appears to be a serious lack of awareness and therefore a lack of precaution in the areas of:

- ▲ Inspection
- ▲ Housekeeping
- ▲ Work Practices
- ▲ Maintenance
- ▲ Design of Facilities and Equipment

As a result, OSHA and the National Fire Protection Association (NFPA) now seriously focus on combustible dust potential regulation and practical recommendations. One of the most important mandatory

regulations being implemented is to perform a thorough risk evaluation (also known as a hazard assessment) at your facility. This is essential in identifying and eliminating factors that could contribute to an explosion.

An explosive combination

Although industries and materials differ, there are five conditions necessary for a dust explosion to occur. Known as the Dust Explosion Pentagon; these conditions include:

- 1) The presence of combustible dust (fuel)
- 2) Ignition source (heat)
- 3) Oxygen in the air (oxidizer)
- 4) Dispersion of dust particles in sufficient concentration
- 5) Confinement of the dust cloud

Explosions can occur in any manufacturing process or facility where combustible dust is stored, accumulated or is present in the atmosphere. NFPA currently states that dust accumulations of as little as 1/32 of an inch (approximately the same thickness as a paperclip) are sufficient to create a dust deflagration when dispersed and exposed to an ignition source.

OSHA defines combustible dust as a solid material composed of distinct particles or pieces, regardless of size, shape or chemical composition that present a fire or deflagration hazard (the process that produces the explosion). When these particles are suspended in the air or some other oxidizing medium over a range of concentrations, an explosion can occur. These types of dusts include, but are not limited to, metal dust and organic dust (sugar, flour, paper, soap and dried blood), as well as dusts from certain textiles.

Suck it up

Explosion-proof vacuum cleaners are specifically designed for use in areas where the presence of flammable gases, vapors or finely pulverized dust in the atmosphere are sufficient to create a threat of explosion or fire. The design of the vacuum must be legally certified and evaluated for hazardous locations by a Nationally Recognized Testing Lab (NRTL) approved by OSHA. Although many vacuum companies claim to offer "explosion proof vacuums," it is imperative that you ask for proof of NRTL certification.

Hazardous locations are grouped as follows:

- ▲ **Class I - Group D:**

where there is the presence of acetone, ammonia, butane, isopropyl acetate, naphtha, propane, styrene, toluene and other flammable liquids.

- ▲ **Class II - Group E:** atmospheres containing metal dust including aluminum, magnesium and other commercial alloys.

- ▲ **Class II - Group F:** atmospheres containing carbon black, coke or coal dust.

- ▲ **Class II - Group G:** atmospheres containing flour, starch, grain dust and any combustible dust having a resistivity of 108 ohm - centimeter or greater.

Areas or equipment potentially subject to explosion (including the dust collection extraction system) should also be designed to vent explosive pressure in a safe manner, or be provided with proper suppression, explosion prevention systems, or an oxygen-deficient atmosphere. Also, explosion-proof vacuum cleaners may be fitted with rupture discs.



Photo courtesy of Tiger-Vac, Inc.

The design of the vacuum must be legally certified and evaluated for hazardous locations by a Nationally Recognized Testing Lab (NRTL).

Additional info

NFPA publishes a number of standards relating to combustible dusts, including NFPA 654, Standard for the Prevention of Fire and Dust Explosions from the Manufacturing, Processing, and Handling of Combustible Particulate Solids; NFPA 664, Standard for the Prevention of Fires and Explosions in Wood Processing and Woodworking Facilities; NFPA 61, Standard for the Prevention of Fires and Explosions in Agricultural and Food Processing Facilities; NFPA 484, Standard for Combustible Metals; NFPA 655, Standard for Prevention of Sulfur Fires and Explosions. For more information, visit www.nfpa.org.

For other resources on combustible dusts, including a list of applicable standards, visit <http://www.osha.gov/dsg/combustible/index.html>. **ISHN**

Massimo De Pastena is sales manager for Tiger-Vac, Inc. (www.tiger-vac.com), a leading manufacturer of legally certified explosion proof vacuum cleaners with over 40 years of experience. Technical representatives are available to assist you in your risk assessment and in the recommendation of the appropriate equipment for your application.

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