

# Beyond the Broom

The sweeping or blowing of fugitive dust during housekeeping is widely discouraged by the Occupational Safety and Health Administration (OSHA) and the National Fire Protection Association (NFPA). Though seemingly benign, dusts can create an assortment of hazards, ranging from ergonomic injuries and flying particles that can lead to eye injury to more serious respiratory and explosion hazards. The use of industrial vacuums is almost always recommended as a preferred method of removing fugitive dust. Rather than redistributing dust, industrial vacuum cleaners remove dusts, thus reducing or eliminating these hazards.

The most dramatic hazard associated with dust is secondary explosion. In fact, this issue captured the attention of the U.S. Congress, leading to a bill that directed OSHA to “issue an interim combustible dust rule and an amendment to the Hazard Communication Standard (HCS) in 90 days, and a final rule in 18 months,” according to OSHA’s *Combustible Dust; Advance Notice of Proposed Rulemaking*. With over 4900 violations associated with OSHA’s Combustible Dust National Emphasis Program (NEP), including fines at four companies ranging from \$63,000 to \$137,000 just this year, it is clear that OSHA is serious about enforcing current standards.

In response to OSHA’s NEP, many facility and safety managers have revamped their housekeeping practices and added industrial vacuum cleaners approved for use in Class II Div II areas to mitigate the possibility of secondary explosions caused by fugitive dust. However, of the over 1000 inspections that OSHA has completed, only 18-22% of the facilities were in compliance with OSHA requirements.



“It can sometimes be tough for facilities,” says David Kennedy, general manager of the vacuum cleaning division of Vac-U-Max, a manufacturer of industrial vacuum cleaning systems for production lines and other dust-intensive areas. “They may have gotten approval from the authority having jurisdiction (AHJ), but OSHA can still come in and fine them if they deem that the facility doesn’t meet combustible dust standards.”

## Compliance

Although it can be argued that current OSHA standards are ambiguous or too daunting to sift through, they are clearly noted in the OSHA Safety and Health Information Bulletin entitled *Combustible Dust in Industry: Preventing and Mitigating the Effects of Fire and Explosions*, which was first issued five years ago. Since OSHA is taking strong enforcement actions to address combustible dust hazards, facilities must make reasonable efforts to mitigate combustible dust hazards.

➤ The use of industrial vacuum cleaners is a preferred method of removing fugitive dust.

According to OSHA, housekeeping ranked second in citations under the NEP “with respect to combustible dust related hazards.” In addition to accumulations of combustible dust being prevalent among the violations, blowing dust with an air compressor and not using electrical equipment that was designed for hazardous (classified) locations were also among the top violations related to combustible dust-related hazards.

Although OSHA’s 1910.22 includes no specific wording that addresses fugitive dust, the status report states that the “housekeeping standard at 29 C.F.R. 1910.22 not only applies to typical housekeeping hazards but also applies to dust accumulation hazards.” Other OSHA standards, such as the *Dust Control Handbook for Minerals Processing*, the *Grain Handling Facilities Standard* or the *Mine Safety and Health Act*, do address fugitive dust and suggest that operations “eliminate the use of compressed air jets to clean accumulated dust from the equipment or clothing and substitute a vacuum cleaning system.” The standards also suggest that manufacturers should “use a vacuum cleaning system to clean spills and dust accumulations. Avoid brooms and shovels.”

In addition, most NFPA standards referenced in the combustible dust SHIP recommend vacuum cleaning as the preferred primary method for controlling fugitive dust. NFPA 654 8.2.2.2 states that “vigorous sweeping or blowing down with steam or compressed air produces dust clouds and shall be permitted only where the following requirements are met: (1) area and equipment shall be vacuumed prior to blow-down.” The standard also specifies that “vigorous sweeping or blowing down with steam or compressed air should only take place after the area or equip-

Above: Compressed air-powered vacuums meet the NFPA 70 requirements for grounding and bonding.

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ment has been vacuumed due to the creation of dust clouds by the other methods.”

With so many standards advocating the use of vacuum cleaners in the housekeeping process, one might be surprised to find so few being used in facilities, especially since the first air-operated industrial vacuum cleaner was developed in 1954 specifically to prevent dust explosions in textile mills. However, when most people think of vacuum cleaners in an industrial setting, they often think of the shop-type vacuums that they have in their garages. Some facilities may have attempted to employ those types of vacuums and found that they not only create sparking hazards but are also ineffective at sucking up fine dust particles or heavy materials. Furthermore, shop-type vacuums often create their own dust clouds during operation.

Air-powered industrial vacuum cleaners that meet NFPA 70 requirements for grounding and bonding also meet the definition of an “intrinsically safe system” because they do not use electricity and do not generate any



Most central vacuum applications are modular.

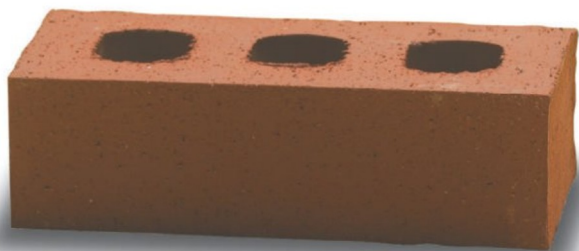
heat from operation. In addition, industrial vacuum cleaners offer five times the suction power of commercial or personal use, shop-type vacuums. Implementing industrial vacuum cleaners is one of the most cost-effective methods to handle fugitive dust, avoid some of the most cited OSHA violations regarding combustible dust and protect facilities from catastrophic dust explosions.

### Dust Explosions

In three recent dust explosions (two outside the U.S. and one in Douglas County, Ore.), 19 people were killed and 53 injured. These incidents serve as reminders that secondary dust explosions are more destructive than primary explosions due to the increased concentrations of dispersed combustible dust that are activated from the initial explosion.

Beyond creating dust clouds that have the potential to ignite, sweeping or blowing dust during housekeeping routines causes powders to become suspended and settle in hard-to-reach areas, including beams and walls, areas that are hidden behind equipment, or those that are located in very small spaces. These types of accumulations are among the most cited violations by OSHA. The use of industrial vacuum cleaners designed for use in Class II Div II environments not only removes dust particles as small as 1 micron, but, when used regularly in housekeeping routines, minimizes

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the amount of dust that can accumulate in hard-to-reach areas. Reducing the amount of dust that is suspended in the air also leads to lower housekeeping costs because less time is required for cleanup.

"The business of working with powders is fascinating," says Kennedy. "We work with so many different chemicals that have such wide-ranging reactions—it never gets boring. Some chemicals don't get wet with water; in fact, they can even become more flammable when exposed to water. We are working on an application right now that is a waste product of three different chemicals. There is no name for this chemical, but we are helping our client deal with the explosive nature of this waste."

### Respiratory, Slip and Ergonomic Hazards

Reducing the amount of combustible powder that is suspended in the air by using industrial vacuum cleaners not only mitigates the possibility of dust

explosions, but can also lead to a better respiratory environment for workers, a reduction in slip hazards and the prevention of back injuries caused by cleaning heavy dusts. "Some powders, such as silica, when blown with air compressors, have the ability to hang in the air for days," says Kennedy. "Others, such as graphite, are slippery; some are very heavy, like cement that can weigh 50-70 lbs per cubic foot and can cause back injuries when sweeping them."

When dusts hang in the air for longer periods, they can exacerbate respiratory threats. Silica exposure can lead to silicosis, a lung disease caused by continued inhalation of siliceous minerals that are prevalent in brick, glass, ceramic, cement, asphalt, and metal fabrication industries where sand is used as a component or for blasting, as well as in tunneling operations. "Silica, of course, is only one of the powders that pose respiratory threats to workers," says Kennedy. "To combat those,

we can provide a second HEPA filter rated 99.97% on particle size to 0.3 microns."

### Best Practices

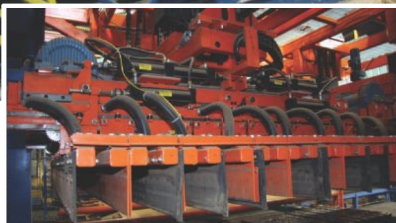
Fugitive dust and debris is a housekeeping issue that plagues most industries. Working with an industrial vacuum cleaner manufacturer that is familiar with chemical characteristics produces the best outcome for facilities combating fugitive dust. Most vacuum cleaning solutions that are used to combat fugitive dust can be purchased as pre-engineered solutions designed for specific powder characteristics, quickly bringing facilities into compliance not only for explosion hazards, but for other dust- and debris-related housekeeping issues that pose respiratory, slip, and ergonomic hazards. 🌐

*For more information regarding dust safety, contact Vac-U-Max at 37 Rutgers St., Belleville, NJ 07109; call (800) 822-8629; e-mail [info@vac-u-max.com](mailto:info@vac-u-max.com); or visit [www.vac-u-max.com](http://www.vac-u-max.com) or [www.combustibledustvac.com](http://www.combustibledustvac.com).*

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