

New Regulations

An explosive situation

New explosion venting requirements have a major impact on the paper industry

EDWARD
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The hazard of combustible dusts in manufacturing plants is a major safety concern. This year, the Occupational Safety and Health Administration (OSHA) contacted 30,000 companies that deal with combustible dusts, warning them of the danger of a deadly explosion if airborne dust particles come in contact with an ignition source. Congress is considering a measure that will require OSHA to impose new safety rules for combustible dust. And the National Fire Protection Association (NFPA) has issued *NFPA 68 Standard on Explosion Protection by Deflagration Venting*, a completely revised standard that focuses on this topic.

Companies that handle paper and scrap are among the businesses heavily impacted by these developments. In the process of making paper or paper products, dusts are generated during cutting, slitting, scoring, shredding and other processes—and these dusts are potentially combustible. Paper mills, converters, recyclers, corrugated box and folding carton manufacturers, printers and binder-

Four photos show a staged deflagration in a dust collector equipped with explosion venting.



ies, and paper products manufacturers may now be required to use updated dust collection/explosion protection to ensure regulatory compliance.

NFPA 68 applies to all closed-vessel, dry collection systems such as cartridge-style dust collectors, and has five key implications:

1. IT HAS CHANGED FROM A GUIDELINE TO A STANDARD

The new NFPA 68 provides mandatory requirements for dust collection applications involving explosive dusts. This recent change from a guideline to a standard, which incorporates much more stringent requirements than past editions, is echoed by OSHA, which has launched a National Emphasis Program (NEP) focusing on the safe handling of combustible dusts. Simply stated, it is the NFPA's role to set the standard and the role of OSHA and local authorities to enforce it.

You can purchase a copy of the full standard online at www.nfpa.org. The OSHA National Emphasis Program on safe handling of combustible dusts is available at www.osha.org.

Most insurance agencies and local fire codes state that NFPA standards shall be followed as code, so in nearly every town and county in the U.S., NFPA 68 should be treated as legal code. The only exceptions would be where the authority having jurisdiction (AHJ) specifies another safety approach such as Factory Mutual, which is typically more stringent.

2. YOU NOW NEED TO DETERMINE WHETHER YOUR DUST IS EXPLOSIVE.

To determine whether your dust is combustible, it must undergo explosibility testing in accordance with ASTM test methods. NFPA 68 stipulates that if a dust sample is available, it must be tested. The





standard further states that it is the responsibility of the end-user (i.e., the plant or safety engineer) to commission the required testing and report on results. Your dust collection supplier may ask you to supply a report of the test or, if not available, to supply, in writing, any information you have about your sample's highest Kst value (the explosive power of a dust, measured as the rate of pressure rise).

Both NFPA and Factory Mutual use Kst values in formulas to calculate the amount of explosion vent area required for a dust collector. Tests of pure paper dusts show typical values starting around 30 Kst; but as you add inks, coatings or other agents to the paper during processing, these potential igniters can increase the value to 100 Kst. In most plants, dusts are combined into a central dust collection system; to ensure compliance, you need to establish a worst-case scenario and design the collector to handle the most combustible dust. Dust testing, using properly collected samples from all sources that generate dust (e.g., the scrap system and ancillary equipment), will determine the best approach to compliance. Any dust above 0 Kst is considered explosive, and explosion venting or an alternative protection technology is required.

3. YOU NOW NEED TO COMMISSION A HAZARD ANALYSIS (ALSO CALLED A RISK EVALUATION).

Chapter 4 of NFPA 68 introduces a new Hazard Analysis requirement (4.2.3) stipulating that a plant will have to commission a risk evaluation performed on the dust collection system,

and keep the report on file, to show to the local fire marshal or other official.

4. YOU NOW NEED TO MAINTAIN EXTENSIVE DOCUMENTATION.

In Chapter 11, NFPA outlines many documents that must now be maintained on file to satisfy the local fire marshal or other AHJ. Such documents include manufacturers' equipment data sheets, instruction manuals, specifications, a combustible material (dust) properties test report, and user documentation of conformity with applicable standards and employee training requirements.

5. YOU NOW MUST SCHEDULE ANNUAL INSPECTIONS.

Chapter 11 also stipulates that an inspection shall be performed on explosion venting equipment at least annually and possibly more often, based on documented operating experience. The objectives are to determine that all components of the system are operating correctly and that the production process material has not changed since the last inspection.



QUESTIONS TO ASK

Here are some useful questions to ask when dealing with suppliers and contractors:

- Is the explosion venting equipment manu-

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(Left) Cartridge dust collection system with flameless venting at a corrugated box plant.



(Right) This explosion vent has been sized for applications up to 100 Kst and is manufactured in accordance with NFPA standards.




factured by a company specializing in this area, or is it “homemade” by the dust collection manufacturer? Either way, ask for documentation that the equipment has been manufactured in accordance with NFPA 68.

■ Does the supplier have specific experience with paper industry applications? Such a supplier will be best equipped to help you find the most economical solution to regulatory and insurance requirements.

■ Can the supplier perform or commission the necessary dust testing?

■ Can the supplier perform a hazard analysis or recommend a qualified consultant for this task?

■ Does the supplier have access to, and familiarity with, alternative protection technologies such as flameless venting and explosion suppression? Flameless venting devices may allow you to vent an explosion safely indoors without allowing any flame (and pressure fronts) to escape from the collector. Flameless venting is sometimes used if product is baled in an area not adjacent to an exterior wall, or it is too costly to duct an explosion to the outside through a wall or ceiling or use flameless venting, you may need an explosion suppression or suppression-isolation system.

■ Is the system installer familiar with NFPA 68? There is no formal certification for this, so you will have to inquire about specific experience and capabilities. 

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