HELP PREVENT DUST EXPLOSIONS:

DEMYSTIFYING OSHA GUIDELINES. **10 TIPS YOU CAN USE TODAY!**

Dust harnesses amazing destructive power. A combustible dust explosion can potentially destroy an entire plant. Is your facility at risk?

Major dust explosions often follow the pattern of the 2008 Imperial Sugar refinery catastrophe: the blast from a smaller, initial explosion disperses accumulated dust into a cloud, which ignites and fuels a powerful chain of secondary explosions. This model shows that areas that normally do not contain high levels of dispersed dust can still be at risk for explosion when settled dust is disturbed by the blast wave of a primary explosion.

The five elements necessary for a dust explosion—fuel, oxygen, ignition, dust dispersion and confinement of the dust cloud—form the "Dust Explosion Pentagon" (OSHA SHIB 07-31-2005). Fortunately, if one element is lacking, a catastrophic explosion cannot occur. Prevent explosions by eliminating one or more factors in the pentagon.

Consider the following guidelines from OSHA as you assess your facility:

Dust disaster: A string of dust explosions destroyed the Imperial Sugar refinery in Port Wentworth, Georgia, in early 2008. The primary explosion occurred when a sugar dust cloud accidentally ignited. The blast wave dispersed settled sugar dust in other areas of the plant. These dust clouds ignited, setting off a chain of deadly, destructive explosions.

1. **KNOW THAT MOST DUSTS ARE COMBUSTIBLE.** According to OSHA, any solid that can catch fire can become explosive when turned into dust. The NFPA's Industrial Fire Hazards Handbook states, "Any industrial process that reduces a combustible material and some normally noncombustible materials to a finely divided state presents a potential for a serious fire or explosion." For example, aluminum, bronze and polypropylene dusts are all combustible.
2. **PROVIDE ACCESS TO ALL HIDDEN AREAS OF YOUR PLANT.** Make sure you can access every horizontal surface of your plant—including ductwork, beam and joist surfaces, and the area above suspended ceilings—to assess dust buildup levels.
3. **REGULARLY INSPECT FOR DUST BUILDUP.** How much dust is too much? OSHA inspectors look for accumulations of 1/32 of an inch, about the thickness of a standard paper clip. An immediate cleaning is warranted when a layer of that thickness covers a surface area equal to 5% of the floor area. (Include dust on all surfaces—beams, joists, ducts, etc.— when determining the dust coverage area.) Besides keeping dust in check, regular cleaning rounds can reveal an increase in dust particle buildup, possibly alerting you to equipment maintenance needs.
4. **CLEAN AT REGULAR INTERVALS.** OSHA strongly recommends a written plan with cleaning frequencies established for all horizontal surfaces. Take into account work cycles—dust should be removed concurrently with operations and not allowed to accumulate. Take care to minimize dust dispersion during housekeeping.
5. **MOVE DUST COLLECTORS OUTSIDE.** According to OSHA, dust collectors with a volume greater than 8 cubic feet should be located outside of buildings to limit the risk of further dust displacement.

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6. **ENSURE ELECTRICAL WIRING AND EQUIPMENT IS APPROVED FOR USE IN YOUR DUST HAZARD CONDITIONS.** According to OSHA, "The use of proper electrical equipment in hazardous locations is crucial to eliminating a common ignition source." See OSHA 29 CFR 1910.399 to determine your level of hazard.
7. **USE ONLY VACUUM CLEANERS APPROVED FOR DUST COLLECTION IN YOUR HAZARD CONDITIONS.** Essential in hazardous dust environments, vacuums approved for Class II conditions don't produce sparks.
8. **CONTROL IGNITION SOURCES.** Post "No Smoking" signs. Control static electricity by bonding and grounding equipment. Provide personal protective equipment as needed, not only as a protective barrier for the employees but also to prevent ignition from static electricity.
9. **PERFORM REGULAR PREVENTATIVE MAINTENANCE ON EQUIPMENT.** Equipment in bad repair is a common cause of ignition.
10. **TRAIN EMPLOYEES TO RECOGNIZE AND PREVENT HAZARDS.** Train before they start work, and again periodically to refresh material or when they are reassigned. In addition to understanding safe work practices relating to their tasks, employees should also know the overall plant programs for dust control and ignition source control. Develop a company culture of safety by encouraging employees to report unsafe practices.

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Resources

Hazard Alert: Combustible Dust Explosions
Two-page OSHA fact sheet in PDF form—a starting point for assessing your plant's risk for dust explosions
http://www.osha.gov/OshDoc/data_General_Facts/OSHAcombustibledust.pdf

Combustible Dust in Industry: Preventing and Mitigating the Effects of Fire and Explosions
OSHA Safety and Health Information Bulletin—includes case studies and guidance in assessing risk
http://www.osha.gov/dts/shib/shib073105.html

Combustible Dust National Emphasis Program 2008
OSHA Instruction file—helpful appendices, with sample compliance inspection questions, sample citations, and a list of relevant NFPA publications
http://www.osha.gov/pls/oshaweb/owadisp.show_document?p_table=DIRECTIVES&p_id=3830

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