OSHA OUTREACH COURSES

JOB AID

Combustible Dust

Definition and Sources

Combustible dust is dust that can ignite and burn. Combustible dusts are produced when we manufacture powders, such as cornstarch or aluminum powder coatings, or when we handle and process combustible materials such as wood, coal and plastic. Polishing, grinding, transporting and shaping many of these materials can produce very small airborne dust particles. Combustible dust can also come from materials not normally considered combustible:

- Metal fines in an aluminum manufacturing plant
- Dry ingredients in a food processing plant
- Powders in a pharmaceutical lab

To determine if a dust is combustible, review the material's Safety Data Sheet (SDS) and/or the dust or job hazard analysis. If you have questions, consult your supervisor or safety manager.

Types of Fires

A primary event is the initial fire. If the initial fire produces a pressure wave – as is common with suspended dust fires – or if emergency workers disrupt settled dust when responding, more dust can be lofted into the air and ignite, resulting in a second fire.

Surface fires can occur when enough dust accumulates near an ignition source: • Hot surfaces

- Static sparks
- Slag from a welding torch
- Electrical arcing from motors and switches

Any material that burns in a solid form can be explosive when in a finely divided form. These particles can create an extremely volatile **suspended dust fire** when enough combustible dust is airborne and an ignition source is present. The most basic type of suspended dust fire is a deflagration (heating a substance until it burns away rapidly), or flash fire.

Combustible dust accumulation may lead to explosions. They are dust fires that cause a catastrophic, uncontrolled release of built-up pressure and generate a violent pressure wave.

When responding to even small dust fires, you must be careful to prevent any additional dust from lofting into the air and possibly triggering a secondary event. *Take all dust fires seriously!*

Safety Measures

Capturing dust at the source, limiting accumulation and controlling ignition sources are the best methods for preventing combustible dust events.
Work areas that have the potential to contain hazardous or ignitable concentrations of dust may be "classified" areas. Equipment and materials used in these areas need to be dust-tight or dust-ignition-proof. Other precautions for classified locations include:

- Non-sparking tools and electronic devices
- Specially rated electrical equipment and wiring
- Specially rated powered industrial forklifts and equipment
- Flame-retardant clothing
- Prohibiting ignition sources, such as welding and other hot work

Housekeeping Measures

Clean up dust before it can accumulate to hazardous levels. Use mopping/washing, vacuuming and gentle sweeping to clean up dust. Use vacuum systems specifically rated for the type of dust you are collecting.

To avoid dust clouds, don't use compressed air or steam for cleaning unless you vacuum first, limit pressure to 15 pounds per square inch (103 kPa), and eliminate ignition sources.

Hidden Dust

Overhead areas – Dust can accumulate on top of shelving or on overhead beams. If there is an ignition source, these overhead areas can catch fire and either spread rapidly or smolder unnoticed, later burning out of control. Overhead dust can also fall, creating suspended dust and greatly increasing the risk of a flash fire or explosion.

Low-lying areas – Dust can accumulate under cabinets and on the floor around equipment. Sparks or heat from equipment can easily ignite low-lying dust, causing a serious fire.

Hidden areas – Tiny particles of dust can fall into small openings, allowing accumulation in concealed areas. For example, dust can get behind or between walls, collect under raised floors, and settle in rooms that are not used often.

To avoid fires and explosions:

- Inspect work areas routinely and maintain them
- Monitor dust levels
- Keep work areas clean
    - Some dusts are hazardous at just 5% coverage at a thickness of 0.8 mm (1/32 inch)
- Make sure cracks and holes are repaired and sealed
- Train employees about the hazards created by possible ignition sources •

Resolve all potential combustible dust hazards