

# Supervisors Safety Bulletin™ Training Toolbox



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## Combustible dust: A deadly hazard

■ Minimizing the conditions which lead to explosions is key to prevention

*In too many combustible dust explosions, workers and safety pros didn't even know a hazard existed until it was too late. This guide will help you stay safe in situations where this hazard is present.*

### Incidents are preventable

Combustible dusts are fine particles suspended in the air that, with the right conditions (see story, right), could explode – with catastrophic results.

From 2008 to 2012, 50 combustible dust explosions at U.S. facilities killed 29 people and injured 161.

The good news: With proper engineering controls and ventilation, these dangerous incidents are preventable.

### The first line of defense

When it comes to identifying the potential for combustible dust explosions, you and your co-workers play a crucial role.

Keep a close eye out for:

- **Dust buildup** – anywhere dust is swept and not vacuumed, elevated surfaces (shelves, false ceilings)

where dust could accumulate, wood dusts decaying and creating their own heat, etc.

- **Heat sources** – open flames, hot surfaces, electrical discharges, etc.

### Controlling dust buildup

Good housekeeping is one of the best ways to prevent combustible dust explosions.

During daily work, always use appropriate electrical equipment and wiring methods, and make sure dust collection systems are working properly.

Also make sure to keep up with

preventive maintenance and keep your area as free from dust as possible.

### In a worst-case scenario

In the event a combustible explosion occurs, the best way to minimize the danger is to vent the area or isolate the dust/ignition source with distance or a barrier.

Ultimately, a thorough knowledge of emergency response and evacuation procedures is the best way to make sure you're safe if a combustible dust explosion occurs.



### KEY INGREDIENTS

**F**or a combustible dust explosion to occur, five elements must be present:

- **Fuel.** This is the dust present at the facility – sugar, flour, grain, sawdust, metal dust, coal/carbon dust, certain textiles, etc.
- **Oxygen.** This can be simply the surrounding air or oxygen from another source.
- **An ignition source.** There can be several sources for the initial ignition, including static electricity, sparks, flames, welding torches, smoldering dust, even cigarettes or cigarette butts.
- **Dispersion.** The combustible dust particles must form a cloud suspended in the air.
- **Confinement.** This cloud must be in a confined area (vessel, room, etc.) where the pressure can build.

These five conditions are known as the **Dust Explosion Pentagon**.

Most combustible dust incidents consist of at least two explosions: The primary explosion ignites what is already confined and dispersed.

This blast often shakes free other dust in the area, which also ignites in a secondary explosion, which is often much more destructive.

# Training Session Quiz

NAME \_\_\_\_\_

SIGNATURE \_\_\_\_\_

DATE \_\_\_\_\_

1 The elements of the Dust Explosion Pentagon are fuel, oxygen, ignition source, dispersion and confinement.

true  false

2 OSHA has a safety standard dedicated to combustible dust hazards.

true  false

3 Dispersion is the spread of dust through a vacuuming or ventilation system.

true  false

4 One of the best ways to prevent explosions is to always use proper electrical equipment and wiring methods.

true  false

5 In most cases, a combustible dust incident is actually made up of multiple (at least two) explosions.

true  false

6 Workers should keep an eye out for accumulations of dust near

recognized heat sources during daily work and report these safety issues to a supervisor or safety pro immediately.

true  false

7 Common kinds of combustible dust include sawdust, metal dust, sugar, flour and grains.

true  false

8 Hundreds of workers across the country have been killed in combustible dust explosions in the last five years.

true  false

9 Individual employees play a crucial role in preventing combustible dust explosions, as they are often the first ones to spot build-up of combustible dust and other hazards.

true  false

10 The primary explosion is usually the most dangerous and damaging part of a combustible dust incident.

true  false

## ANSWERS

1. True. The specific kind of dust or ignition source may vary, but these five elements must be present for there to be an explosion.
2. False. Although there are many OSHA standards that apply to combustible dust hazards, there is no dedicated standard.
3. False. Dispersion occurs when the dust forms a cloud in the air.
4. True. Using improper electrical methods or tools could provide an ignition source.
5. True. The primary blast often shakes loose additional dust, which can cause further explosions.
6. True. Workers should watch for areas where dust is swept and not vacuumed or where dust can accumulate, like on shelves. Common ignition sources include open flames and electrical discharges.
7. True. Other examples include coal/carbon dust and certain textiles.
8. False. These explosions are destructive, but not terribly common.
9. True. When it comes to combustible dust hazards, employees are often the first line of defense.
10. False. In many cases, the secondary explosion is the most destructive.

## OSHA STANDARD ON THE HORIZON?



There are several OSHA standards that cover combustible dust hazards – from housekeeping and materials handling to electrical and emergency response regs.

OSHA's even had a National Emphasis Program targeting the hazard since 2008.

Yet despite this emphasis and efforts by Congress and the U.S. Chemical Safety Board, the agency hasn't been able to finalize a combustible dust standard.

In the most recent Regulatory Agenda, the reg was in the prerule stage, downgraded from a proposed rule.