



## GOALS

This safety session teaches employees to:

- Identify circumstances under which dust can become hazardous.
- Understand that combustible dust hazards are often hidden from view.
- Learn what methods are in use to keep the workplace safe from combustible dust hazards.

**Applicable Regulations: 29 CFR 1910.22 (surface conditions), 1910.1200 (hazard communication), and General Duty Clause 5(a)(1)**



### 1. What is combustible dust?

- Strange as it may seem, the dust that accumulates in the workplace may create a serious fire and explosion hazard.
- Some substances that are not readily combustible in solid form may become dangerous when they are finely divided—when they are “dusts.” Examples include plastics and metals.
- Other substances that are readily combustible may become explosive in finely divided form, including agricultural products like grains when they are processed into flour and carbonaceous dust like coal dust when it is allowed to accumulate.

### 2. When does dust become a fire and explosion hazard?

- Small amounts of dust are not likely to create a problem, but large accumulations of dust can be hazardous.
- Dusts that are confined in a small area, such as a ventilation duct, are hazardous because they can form a concentrated cloud in the small space that is easy to ignite.
- In addition to the “fire triangle” of an ignition source, oxygen, and a fuel source, combustible dust explosions require dispersion of dust in a confined area. This is called the “dust explosion pentagon.”
- When a small amount of dust is ignited (a primary explosion), the small explosion can dislodge additional dust, creating a much larger dust cloud that then explodes (a secondary explosion).

### 3. Hazardous dust may be hidden from view.

- Even if you have a good housekeeping program that eliminates dust accumulations on visible surfaces, you may have a combustible dust hazard.
- Dust can accumulate in areas where it is not easily seen or cleaned, including:
  - On elevated surfaces;
  - Inside ventilation ductwork;
  - In crevices;
  - In dust collectors and process equipment; *and*
  - Above suspended ceilings and in plenum spaces.

### 4. Some safety features are built into the workplace.

- The electrical installations in dusty areas must comply with requirements for hazardous areas.



- Equipment is grounded and bonded to prevent the buildup of static electricity that can ignite dusts and other flammable materials.
- Pipes, cables, and other installations are enclosed in the walls whenever possible in order to eliminate surfaces where dust can accumulate.

### **5. Ventilation and dust collection systems are specifically designed to minimize the possibility of dust explosions.**

- All dust control equipment, including local exhaust ventilation and material transport systems involved in handling dusty products, are protected either by explosion relief vents, an explosion suppression system, or an oxygen-deficient environment.
- Explosion venting is directed away from occupied areas.
- Dust-handling systems (such as exhaust ducts, dust collectors, vessels, and processing equipment) are designed to be leakproof to prevent dust from accumulating outside the system.
- Dust collection system inlets are located as close to the point where dusts are generated as possible.
- Dust collectors are located outdoors, away from personnel areas.

### **6. In order to control dust hazards, special cleaning methods are required.**

- Cleaning methods that could raise dust clouds, like dry sweeping and compressed air, are not permitted.
- Dusts are cleaned by vacuuming, using vacuums designed for dust collection.

### **7. Ignition sources must be carefully controlled.**

- Open flames and sparks are not allowed in the work area, except as allowed in compliance with the hot work permitting program.
- Maintenance procedures for components that may generate heat as they become worn, such as bearings, must be strictly followed.
- In addition to grounding and bonding precautions, you can prevent static electricity by using nonsparking tools and explosionproof equipment in dusty areas.

#### **DISCUSSION POINTS:**

When workers understand what features in the workplace protect against combustible dust explosions, they can use that information to help ensure that protective measures are working properly and report when they see signs that something is amiss, such as dust leaking from a ventilation system or damaged bonding and grounding connections.

#### **CONCLUSION:**

Protect yourself from combustible dust hazards by making sure you do your job safely, knowing how the protective systems work and speaking up if you see a problem.

#### **TEST YOUR KNOWLEDGE:**

Have your employees take the Combustible Dust quiz. By testing their knowledge, you can judge their understanding of combustible dust hazards and protective measures and whether they need to review this important topic again soon.



## COMBUSTIBLE DUST QUIZ

1. Some substances that are not readily combustible in solid form, like metals and plastics, may become dangerous when they are finely divided—when they are “dusts.”
  - a. True
  - b. False
2. In addition to the “fire triangle” of an ignition source (heat), oxygen, and a fuel source, combustible dust explosions require:
  - a. Distribution of dust over a defined area.
  - b. Dispersion of dust in a confined area.
  - c. Disturbance of dust in an open area.
  - d. Encroachment of dust in a hidden area.
3. One of the most dangerous things about dust hazards is that they can be:
  - a. Caused by very small amounts of dust
  - b. Triggered by disturbances in the weather
  - c. Created by dust that accumulates in areas that are hidden from view
  - d. Spread over a long period of time
4. To control static electricity, it is important to:
  - a. Ground and bond process equipment.
  - b. Complete hot work permits.
  - c. Use nonsparking tools.
  - d. Only a and c.
5. Dust control equipment may be protected against dust explosions by:
  - a. Explosion relief vents
  - b. An explosion suppression system
  - c. An oxygen-deficient environment
  - d. All of these
6. Dust-handling systems are leakproof because:
  - a. It is important to keep dusts confined.
  - b. It can be dangerous for dusts to accumulate in areas that are not regularly inspected.
  - c. A leakproof system will better contain an explosion.
  - d. Leaks are inconsistent with good manufacturing practice.
7. To protect personnel, dust collectors are usually located outside the building.
  - a. True
  - b. False
8. Dry sweeping and compressed air are two safe methods for cleaning up combustible dusts.
  - a. True
  - b. False
9. Vacuums cannot be used to clean up dust because they may generate dust clouds.
  - a. True
  - b. False
10. It is important to control ignition sources in dusty workplaces.
  - a. True
  - b. False

When you have completed this quiz, turn it in to your supervisor.

Name: \_\_\_\_\_

Date: \_\_\_\_\_



## ANSWERS TO COMBUSTIBLE DUST QUIZ

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1. a. True.
2. b. Dispersion and confinement are the two additional sides of the “dust explosion pentagon.”
3. c. Created by dust that accumulates in areas that are hidden from view.
4. d. Only a and c.
5. d. All of these
6. b. It can be dangerous for dusts to accumulate in areas that are not regularly inspected.
7. a. True.
8. b. False. Dry sweeping and the use of compressed air can create dangerous dust clouds.
9. b. False
10. a. True.