Dust Explosions Meeting Kit



Dust explosions are the result of high concentrations of combustible dust particles rapidly combusting inside an enclosed space. When mixed with oxygen, these fine particles can be ignited when coming into contact with a spark, metal ember, cigarette butt, or other ignition source. This quick combustion process is known as deflagration, and results in a high-pressure airwave.

HOW DO COMBUSTIBLE DUST EXPLOSIONS OCCUR?

Dust explosions occur when combustible dusts build up in the air and combust rapidly, causing a strong pressure wave to form. They are a deadly hazard in a variety of workplaces, from grain silos to plastics factories. A dust explosion requires several factors to be present at once. These include:

- A combustible dust at the right concentration level
- Oxygen
- An enclosed space
- An ignition source

Sometimes these factors are combined into a graphic known as the “Dust Explosion Pentagon.” The component in this graphic called “dispersion” is also known as concentration. If a concentration of dust is too low, there is not enough of it present to fuel an explosion. If the concentration is too high, there is not enough oxygen to support combustion.

A combustible dust is any fine material that has the ability to catch fire and explode when mixed with air.

EXAMPLES OF MATERIALS THAT CAN BE A COMBUSTIBLE DUST HAZARD

- agricultural products such as egg whites, powdered milk, cornstarch, sugar, flour, grain, potato, rice, etc.
- metals such as aluminum, bronze, magnesium, zinc, etc.
- chemical dusts such as coal, sulphur, etc.
- pharmaceuticals
- pesticides
- rubber
- wood
- plastics

WORKPLACES AT RISK FOR A DUST EXPLOSION

- Grain elevators
- Food production
- Chemical manufacturing
- Woodworking
- Metal processing
- Recycling facilities
- Coal-fired plants.

IDENTIFY A COMBUSTIBLE DUST HAZARD – CONDUCT A RISK ASSESSMENT AND CONSIDER VARIABLES

1. Processes

- Do you manufacture or use any materials (and their by-products) that can become a dust?
- Do you have processes such as abrasive blasting, cutting, grinding, sieving, polishing, cleaning, or other tasks that create dust?

1. Research/Information

- Have you researched if the dust present is combustible?
- Are there documented cases reported in literature about the materials in your workplace being associated with a combustible dust explosion?

1. Ignition sources

- Do you have ignition sources (e.g., sparks, fire/flames, stoves, kilns, or welding flames)?
- Can dust enter or accumulate on electrical enclosures or equipment?
- Does your workplace have a no-smoking policy? Are there measures to isolate smoking and ignition sources away from production areas?

1. Housekeeping

- Do you know if there are open areas and overhead structures where dusts may accumulate?
- Have you looked for “hidden” areas where dust may accumulate?
- Do you have a housekeeping program to regularly remove dust?
- Do you have a dust collection system in place?
- If yes, does your dust collection system conform to local requirements (e.g., fire code)?

1. Education and Training

- Are employees aware of combustible dust and its hazards?
- Do employees follow housekeeping rules and take steps to reduce dust and remove ignition sources?
- Have employees been trained and educated on safe methods for cleaning?

BEST DUST COLLECTION PRACTICES

- Employees should be knowledgeable about the chemicals used at the worksite and be able to conduct a hazard assessment prior to beginning any task, especially one in which highly volatile materials or physical energies are present.
- Ensure your workshop is properly ventilated. Notify your supervisor if you have concerns about ventilation.

- Dust from grinding and other debris should be removed daily. If an accumulation of dust occurs in an unreachable area, notify your supervisor.
- When spills occur, procedures should be in place to minimize the impact of explosive vapors, mists, aerosols or dusts.
- Explosive atmospheres often exist in confined spaces. Proper training must take place in confined space entry, in the selection and usage of required respiratory protection and in emergency rescue procedures.

FINAL WORD

Before you begin any task, consider potential flammable substances and watch for ignition sources. Don’t let your work blow up on you.