Combustible Dust Quiz

QUESTION

How do combustible dust explosions happen’

ANSWER

Any fire needs three elements. These elements are known as the **“fire triangle”:**

1. Fuel to burn

2. Oxygen

3. Ignition source (heat, spark, etc.)

A dust explosion needs two additional elements – known as the **“dust pentagon”:**

4. Dispersion of dust particles in the right concentration.

   - Dispersion means dust particles are suspended in air.

5. Confinement of the dust cloud.

   - Confinement means the dust is in an enclosed or limited space.

WHY IS IT RIGHT

WHAT IS COMBUSTIBLE DUST

Essentially, a combustible dust is any fine material that has the ability to catch fire and explode when mixed with air. Combustible dusts can be from:

- most solid organic materials (such as sugar, flour, grain, wood, etc.)
- many metals, and
- some nonmetallic inorganic materials.

Some of these materials are not “normally” combustible, but they can burn or explode if the particles are the right size and in the right concentration.

Any activity that creates dust should be investigated to see if there is a risk of that dust being combustible.

Dust are created when material are transported, handled, processed, polished, ground and shaped. Dust are also created by abrasive blasting, cutting, crushing, mixing, sifting or screening dry materials. The buildup of dried residue from the processing of wet materials can also generate dusts. Essentially, any workplace that generates dust is potentially at risk.

IDENTIFICATION OF COMBUSTIBLE DUST

Step 1: Conduct a risk assessment for dust explosion possibilities

Step 2: Key Questions

- Identify Processes
- Search/Information
- Ignition Sources (ie) sparks, flames, stories kilns.
- Housekeeping Programs/Protocols
- Education/Training

PREVENTION TECHNIQUES

Take Prevention measures once hazards are identified.

Eliminate

- Where possible, avoid horizontal surfaces (such as window ledges, beams, light fittings, etc.) where dust can accumulate.
- Eliminate “hidden” areas where dust can accumulate unnoticed.
- Do not use brooms or compressed air hoses to clean surfaces. Only use vacuums approved for dust collection.
- Only use a dust collection / dust extraction system that is designed to eliminate or control combustible dust. Using most models of fans typically stirs the dust, adding dust particles into the air and worsening the situation.

Substitute

Install smooth ceilings and other surfaces (instead of a rough finish) to minimize dust accumulation and to make cleaning easier.

Engineering

- Use an appropriate dust extraction and collection system with the inlet located as close to the dust producing process as possible. Follow required standards and codes when installing these systems. Locate dust collectors outdoors, where possible.
- Direct explosion venting away from areas where there may be employees.
- Use appropriate electrical and ventilation equipment.
- Keep all mechanical and electrical equipment in good repair.
- Keep static electricity under control, which includes the bonding and grounding of equipment. Check all bonded and grounded equipment regularly to ensure the bonds are in good condition.
- Check equipment that may wear (e.g. , bearings) as they may generate heat and become an ignition source.
- Remove open flames, sparks, friction, heat sources, and other sources of ignition.

- Select and use intrinsically safe tools or machinery.
- Put covers around pipes and cables, or embed pipes and cables in the walls, where possible, to reduce surfaces where dust can accumulate.

Administration

- Develop and implement a combustible dust inspection and control program which outlines how often inspections will occur and how dust will be controlled.
- Develop a hot work permit system for activities such as welding and cutting.
- Develop an ignition control program to eliminate or reduce sources of ignition. Keep ignition sources away from dusty areas or use suitable controls.
- Educate all employees about combustible dusts, the hazards, and how they can help eliminate the risk of fire and explosions.
- Inspect for dust at regular intervals.
- Establish a housekeeping program that will remove dust regularly.
- Use proper equipment and techniques when cleaning dust. Care must be taken to minimize dust clouds, and only use vacuums approved for dust collection.
- Regularly inspect machines, ducts, and ventilation systems for dust. Repair or clean promptly.

WHY IS EVERYTHING ELSE WRONG

EXPLOSIONS ‘ EXPLAINED

Any combustible material can burn rapidly when in a finely divided form. If such a dust is suspended in air in the right concentration, under certain conditions, it can become explosible. Left uncontrolled, dusts may migrate from the point of production/release, increasing the portion of the facility subjected to combustible dust fire and explosion hazards. Even materials that do not burn in larger pieces, given the proper conditions, can be explosible in dust form.

Combustible dusts can come from: sugar, spice, starch, and flour; grain, feed, and tobacco; plastics and rubber; wood, paper, and pulp; pesticides, pharmaceuticals, dyes, and coal, and metals.

If such a dust is suspended in air in the right concentration, under certain conditions, it has the potential to explode.

The potential for a dust explosion depends on many factors, including the dust particle’s size, shape, and moisture content. Your employer should assess any dust-producing activity to determine if it’s combustible. If it is, processes must be in place to remove or minimize the amount of dust present.

The build-up of even a small amount of dust on surfaces such as rafters, roofs, suspended ceilings, ducts, and window sills can cause serious damage if an explosion occurs.

Many combustible dusts, such as flour and metal dust, may seem unlikely to cause an explosion or fire, but they can. It is vital workers know the risks and follow all measures in place to control dust and ignitions sources.

The saying, ‘If it ain’t broke, don’t fix it’ isn’t a wise model to follow in

the workplace safety world. Chilling examples of the danger in that type of thinking can be found in any industry where combustible dust accumulates.

Do not think that just because your workplace has never experienced a dust explosion, you don’t need to worry about letting dust accumulate. It can take years for materials such as sugar, flour, feed, grain, wood, metal, textile and other types of dust to accumulate to levels where they can suddenly explode, with devastating consequences for workers.

Everything else is wrong.