

Dust Explosion Hazards

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The picture on the left shows a monument to the anthracite coal miners of northeastern Pennsylvania, located in the town of Jim Thorpe (named after the famous Olympic athlete). It is a single rock of anthracite coal – over 7 tons of nearly pure carbon. The sign on the monument indicates that it has an energy content of 205 million BTU (216,000 million joules), equivalent to about 50 tons of TNT! So, should we be worried about this huge amount of energy located in the middle of a small town? Of course not, because it would be extremely difficult to ignite this large rock of coal, and, if ignited, it would burn very slowly.

But, what would happen if we ground up a few kilograms of that coal into a fine powder, as in the picture at the right, and suspended that powder in the air as a dust cloud in a building or other confined space? If we lit a match or provided some other ignition source such as an electric spark, the result might be a massive and damaging dust explosion. The picture below shows the results of such an explosion, which killed 6 people and injured 37.



Did you know?

- Most solid materials which will burn can form an explosive dust cloud if the particle size of the solid is small enough. Some examples of materials which can explode as a dust include wood, flour, sugar, grain, plastics, many solid organic chemicals, and many metals.
- Accumulations of dust on floors, tops of vessels or tanks, support beams, in cable trays, above suspended ceilings, can form an explosive cloud if somehow disturbed and lifted into the air.
- A dust layer 1/32 inch (less than 1 mm) thick on exposed surfaces can create an explosive dust cloud once suspended in air.
- A dust layer can be considered to create a hazardous condition if it covers an area, on all surfaces, greater than 5 % of the floor area of a room.

What can you do?

- Be aware of the potential for a dust explosion when you handle solid materials which can burn. Follow the specified safe operating procedures for handling powders and dusts in your plant.
- Do not allow dust to accumulate on floors, on top of equipment, on beams, or other places. Be aware of those “hard to see” areas such the top of tanks or above a suspended ceiling and check them for dust accumulation regularly. Watch all areas, even those corners and hidden spaces.
- Be particularly careful to prevent dust accumulation on hot surfaces such as light fixtures, electric motors, steam pipes, etc., where the heat may cause the dust to ignite.
- Be sure that any equipment used to clean up dust (for example, an electric vacuum cleaner) is appropriate for use in an atmosphere which could contain an explosive dust.

Be aware of dust explosion hazards.