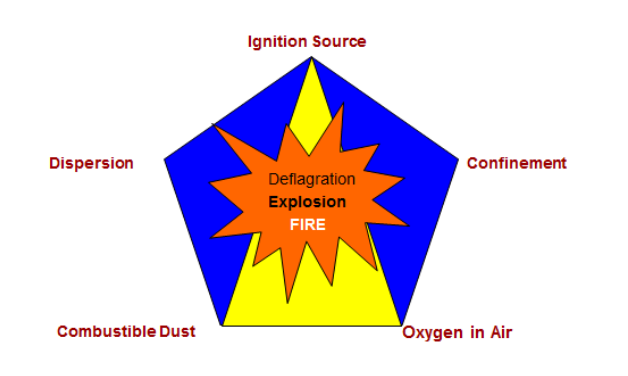
NOT JUST ANOTHER FIRE

2-Minute Training

COMBUSTIBLE DUST EXPLOSIONS

Combustible dusts include fine particles, fibers, chips, chunks, or flakes that when suspended in air could potentially cause a fire or an explosion.

Combustible dust hazards exist in a variety of industries—food processing, grain handling, plastics, forest products, furniture, textiles, pharmaceuticals, and metal fabrication, among countless others. Raw materials such as wood, flour, sugar, coal, and some metal dusts can present very dangerous conditions in the right situations.



Any combustible material, and even some materials typically considered noncombustible, can burn rapidly when divided into a small enough form. Generally speaking, the smaller the dust particle, the greater the potential hazard.

If such a dust is suspended in the right concentration within an enclosed area, a violent explosion can result. The force of such an explosion can destroy entire buildings and cause serious injury or death. Depending on the particle size and type, and the area of compartmentation during dispersal, a dust layer of only 1⁄32 inch deep (about as thick as a paperclip) is enough to cause an explosion.

Dust fires in their essence are no different from any other fire involving ordinary combustibles. Elementary fire behavior tells us that every dust fire involves the basic fire triangle: fuel, ignition source, and oxygen. However, two additional conditions are somewhat unique to combustible dust explosions. The first is the dispersion of the dust particles, and the second is the confinement of the dust cloud, such as in a vessel, a room, a building, or ductwork. These five conditions make up the dust explosion pentagon.

In many dust explosions, the initiating event may be relatively minor. Although this could involve a small primary fire or explosion, anything producing sufficient vibration to cause dust dispersal could create an explosive situation. A forklift striking a support column or an overhead beam may be enough to trigger a dust cloud, as can something as benign as cleaning an area with compressed air.

Once dust is stirred up and suspended in the air, the only thing needed for a deflagration is for the right concentration to reach an ignition source. Once even a small explosion occurs, this often stirs enough additional fuel load to trigger secondary events that can rattle the building enough to shake dust free from all overhead areas and begin a chain-reaction explosion event that can potentially level a building.

Properly understanding and assessing combustible dust dangers involves looking at every aspect of a facility, from the raw materials to the packaging of the final product. Performing regular walkthroughs at industrial and manufacturing facilities can help you determine your exposure to combustible dust and help you to be better prepared in the event of a fire situation.