

Dust can pose a significant fire and explosion hazard in the workplace, and many employers are unaware that this dangerous condition exists in their facility. Failure to analyze dust hazards and use the correct mitigation strategies puts companies at serious risk for fire and explosions.

The important distinction between dust fires and explosions is the sudden release of energy resulting in a pressure wave or deflagration. This often results in secondary explosions due to resuspension of dust. While fires require fuel, an ignition source, and oxidant, dust explosions require dispersion and confinement of a dust cloud.

## What is Combustible Dust?

National Fire Protection Association Standard NFPA 654 (2013) defines combustible dust as “a combustible particulate solid that presents a fire or deflagration hazard when suspended in air over a range of concentrations, regardless of particle size or shape.”

Several characteristics affect the combustibility of dust: temperature, particle size, moisture content, turbulence, pressure (confinement), and presence of oxidants. Dust explosion can occur when the five basic conditions of the “Dust Explosion Pentagon” come together in a “perfect storm” scenario.



Dust needs to be characterized as to whether it is explosive. The process flow diagram (overleaf) identifies decision points and criteria to determine if dust is more than just a nuisance. Two analytical procedures may be used: (1) screening combustibility test (A/B Test) where the dust is determined to be combustible or not but does not provide a value as to the severity of an explosion; and (2)  $K_{ST}$  test, which determines the combustibility and deflagration index.

## Regulation

OSHA cites combustible dust hazards under the General Duty Clause [5(a)(1)]. To strengthen its enforcement, OSHA implements the National Emphasis Program (NEP) for combustible dust (Compliance Directive CPL 03-00-008). It provides policies and procedures for inspecting workplaces that create or handle combustible dusts.

Specific NFPA standards for processing and handling combustible dusts include NFPA 654, 484, 61, 68, 69, and 70.

## Industry

Combustible dust can exist in many industries. Most natural and synthetic organic materials and some metals can form combustible dust. Industries susceptible to combustible dust include agriculture, chemical, metal processing, coal and other carbon products, paper products, food processing, pharmaceuticals, textile and furniture products, and wastewater treatment (bio-solids).

## Combustible Dust Services

EQM can assist with the evaluation and control of combustible dust hazards. Key service areas include:

- Identify areas of the facility where combustible dust cloud atmospheres could exist under normal and/or abnormal conditions.
- Characterize the dust for combustibility.
- Identify potential ignition sources.
- NFPA 654 compliance audit.
- Employee training.

## About EQM

EQM is a full-service environmental consulting, engineering, and remediation firm. In addition to our corporate headquarters in Cincinnati, EQM has eight offices located throughout the United States.

### For additional information, please contact:

John Kominsky  
1800 Carillon Boulevard  
Cincinnati, Ohio 45240  
(800) 229-7495  
[www.eqm.com](http://www.eqm.com)

