Combustible Dust Testing Services

The starting point for evaluating combustible dust hazards in your facility is understanding the risks of your specific dust. Variations in moisture content, particle size, particle shape, or composition can affect the explosiveness of a dust in significant ways. Therefore, both OSHA and NFPA have set forth guidance that all materials that may be considered combustible should be tested in order to clearly identify and assess the hazard.

Our experts can assist you in determining what samples to test and what tests should be conducted. Once testing is completed, a formal report is generated and our experts can help with analyzing the data.

All of our dust explosion testing is performed in accordance with the applicable standards from the American Society for Testing and Material (ASTM), National Fire Protection Association (NFPA) and International Standards Organization (ISO).

How should the dust sample be prepared?

- **Per Protocol Testing** – Sample is prepared as defined by the ASTM E1226 Protocol which requires that particle size be reduced to 95% <75μm and dried to moisture content <5%. This is the preferred preparation method for obtaining conservative results and determining worst case scenario.

- **As Received Testing** – An alternative preparation method for testing is “As Received”. This means that the sample is tested without any drying or size reduction at the lab and the results will more closely reflect the actual explosivity of the material in the process. “As Received” testing should only be used where particle size and moisture can be controlled as variations in process conditions can under-predict the risk.

Will the dust cloud ignite?

- **Combustibility (Go / No-Go) Screening** – Initial screening to determine whether a dust will ignite. Uses a dust cloud dispersed around a strong ignition source.

How strong is the dust explosion?

- **Dust Explosion Severity (K_{st} & P_{max})** – Useful for determining parameters which are the basis of design for mitigation strategies such as deflagration venting and suppression
  - ASTM E1226 – 2010 - Determines values necessary for designing protective measures, such as deflagration venting

How easily will the dust ignite?

- **Minimum Ignition Energy (MIE)** - Useful for determining the minimum energy required by electrostatic discharge to ignite a dust cloud
Minimum Ignition Temperature for Dust Cloud (MIT-Cloud) – Useful for determining the minimum ignition temperature of a dust suspended in a cloud
- ASTM E1491 - Determines Safe Operating Temperatures at Which a Dust Cloud Will Not Autoignite

Minimum Ignition Temperature for Dust Layer (MIT-Layer) – Useful for determining the minimum ignition temperature for a layer of dust on a hot surface
- ASTM E2021 - Identifies Dangerous Operating Temperatures at Which a Dust Layer Will Self-Heat

What are the limits of explosibility?
Minimum Explosible Concentration (MEC) - Useful for determining the minimum amount of a dust suspended in air that will support a deflagration
- ASTM E1515 - Identifies the Minimum Hazardous Concentration of a Dust Cloud that will Sustain Combustion

Limiting Oxygen Concentration (LOC) - Useful for determining the minimum oxygen concentration capable of supporting a deflagration, needed to design Inerting Systems

Dust Testing Process Flow