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Dust Testing Guide

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 (Kst & Pmax)** – Useful for determining parameters which are the basis of design for mitigation strategies such as deflagration venting and suppression
- **ASTME 1226 – 2010** - Determines values necessary for designing protective measures, such as deflagration venting
- **EN14034 - Part 1:2004** - Determination of the Maximum Explosion Pressure (Pmax) of Dust Clouds – Part 2:2006 - Determination of the Maximum Rate of Explosion Pressure Rise (dP/dtMax) of Dust Clouds

How easily will the dust ignite?

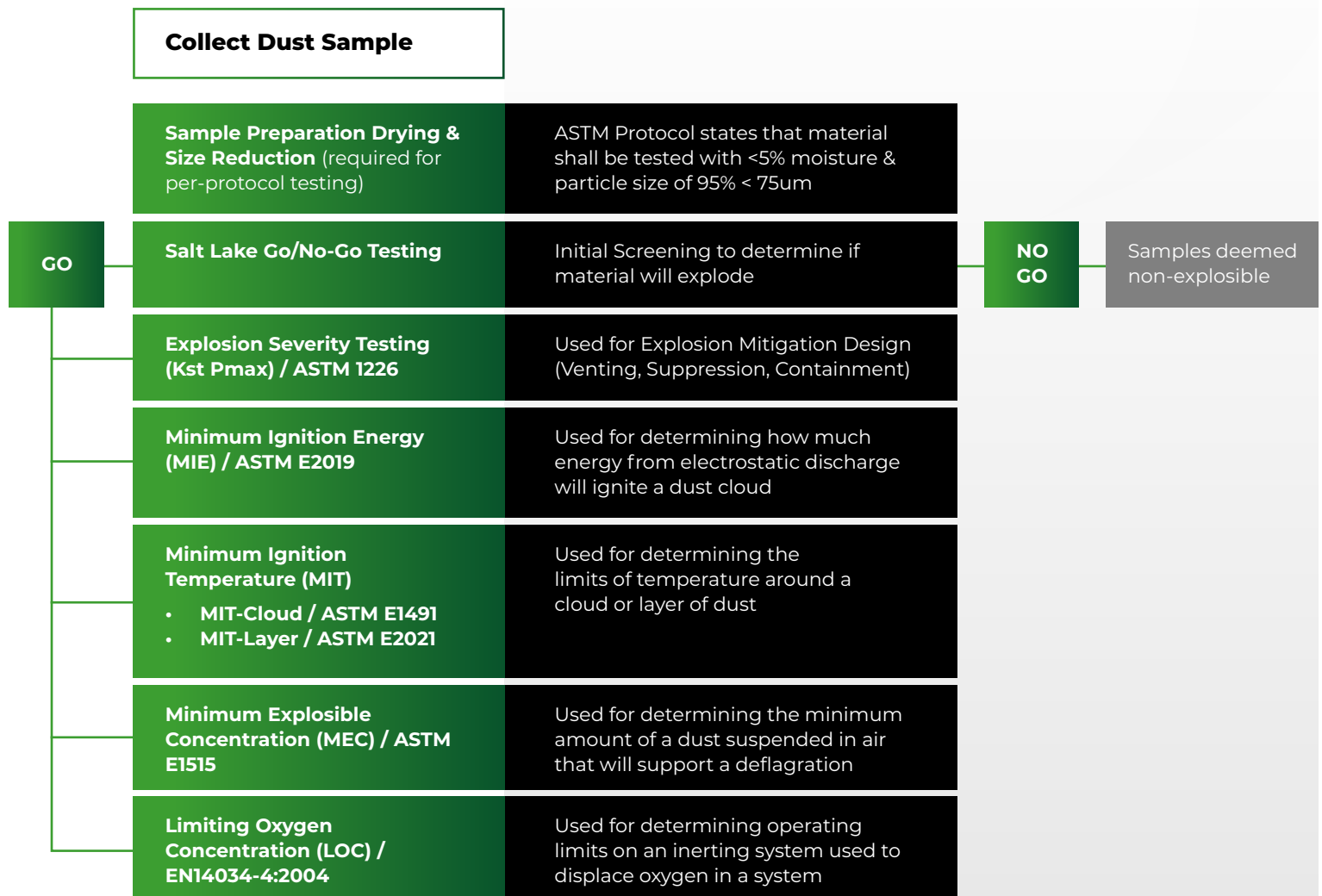
- ✓ **Minimum Ignition Energy (MIE)** - Useful for determining the minimum energy required by electrostatic discharge to ignite a dust cloud
- ✓ **ASTM E2019** - Standard Test Method for Minimum Ignition Energy of a Dust Cloud in Air
- ✓ **EN13821:2002** - Potentially Explosive Atmospheres - Explosive Prevention and Protection - Determination of Minimum Ignition Energy of Dust/Air Mixtures2:2006 - Determination of the Maximum Rate of Explosion Pressure Rise (dP/dtMax) of Dust Clouds
- ✓ **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
- ✓ **EN50281-2-1:1999** - Electrical Apparatus for Use in the Presence of Combustible Dust - Part 2-1: Test Methods - Methods for Determining the Minimum Ignition Temperatures of Dust
- ✓ **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
- ✓ **EN50281-2:1999** - Electrical Apparatus for Use in the Presence of Combustible Dust - Part 2-1: Test Methods - Methods for Determining the Minimum Ignition Temperatures of Dust

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
- **EN14034-3:2006** - Determination of Explosion Characteristics of Dust Clouds
- Part 3: Determination of the Lower Explosion Limit (LEL) of Dust Clouds
- **Limiting Oxygen Concentration (LOC)**
- Useful for determining the minimum oxygen concentration capable of supporting a deflagration, needed to design Inerting Systems
- **EN14034-4:2004** - Determination of Explosion Characteristics of Dust Clouds
- Part 4: Determination of the Limiting Oxygen Concentration LOC of Dust Clouds



Dust Testing Process Flow





About Dustcon Solutions

Dustcon Solutions is an Engineering & Safety Consulting Firm based out of West Palm Beach, FL. Our focus is on helping clients identify and address Combustible Dust Hazards that pose a risk to assets and personnel. Dustcon was started to meet the need for Dust Hazard Analysis (DHA) services within all industry segments. With over 20 years of active involvement on the NFPA Technical Committees responsible for the latest standards pertinent to the dust explosion problem, Dustcon has the knowledge and expertise required to provide DHA services.

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**Talk to your Dustcon
Solutions representative
today about how to
address Combustible Dust
Hazards in your facility!**

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