

Hazardous
Area Weighing



Dust Risks

How to Avoid Dust Explosions

METTLER TOLEDO

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Small Particles – Major Impact

Powders or dusts are either used in or generated as a byproduct of chemical, pharmaceutical, food and other manufacturing processes. A majority of dust like substances poses a danger of fire or possibly even an explosion – and many operators and production managers are not aware of the risk.

This quicknote serves as a resource to help avoid the explosion potential of dust by working to:

- provide you the facts and details of dust risks.
- help you understand the consequences of a dust explosion in your production facility, and take suitable steps to minimize dust explosion risk.

**DANGER**



Combustible dust explosion hazard

- NO smoking or ignition sources
- NO welding

MUST USE proper cleaning procedures



Combustible Dusts

Different parameters determine the combustibility and safety factors of dusts that characterize the risk and extent of the hazard:

- **Size of particles**, as only particles between 400 µm to 20 µm are combustible
- **Combustible dust concentration**, which is specific for each material
- **Moisture content**, which influences ignition energy
- **Ignition temperature**, or the lowest temperature of a heated wall that ignites the mixture upon brief contact
- **Minimum ignition energy**, which is the minimum energy of a spark able to ignite the mixture
- **Smoldering temperature**, or the lowest temperature of a hot surface on which a 5 mm dust deposit is ignited

Examples of Risky Materials

Many materials can become combustible under specific situations. Examples include:

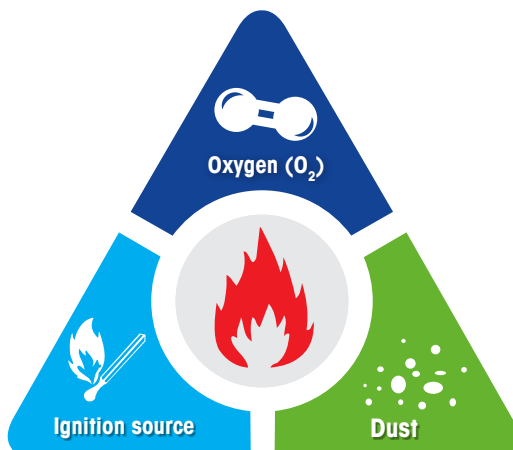
- Agricultural products such as powdered milk, cornstarch, sugar, flour, grain, potato, rice
- Metals such as aluminum, bronze, magnesium, zinc
- Chemical dusts such as coal, sulphur, etc.
- Pharmaceuticals
- Pesticides
- Rubber
- Plastics
- Wood

www.osha.gov/Publications/combustibledustposter.pdf



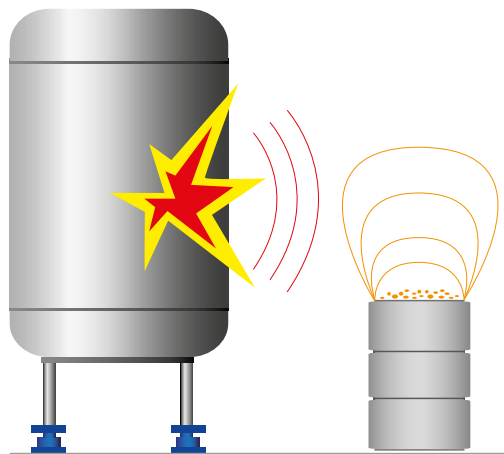
1 How it Starts

Similar to flammable gases, combustible dust, air and an ignition source must be present under the right circumstances.



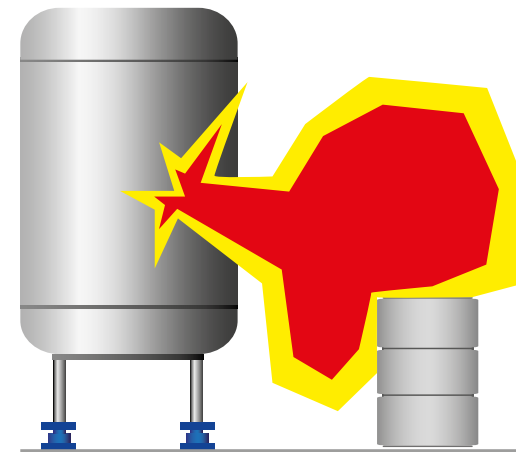
2 Initial Explosion

Dust that is swirled up forms a combustible dust mixture. If ignited by an ignition source an initial explosion is triggered.



3 Secondary Explosion

This explosion can shake loose more dust or damage a containment vessel. A secondary explosion is triggered that could be even more devastating.



More Information
www.goo.gl/dSoVCZ



There are three categories of processes and industries where flammable dusts are generated or used.

Milling Industries

- Convert non critical materials into powders, flours or dusts
- e.g. chemical production, sugar production



Industries that Use Powders

- Chemical, paint, food production
- Plastics & metal production
Agricultural production



Industries that Generate Dusts

- Wood working industries such as furniture production
- Metal handling



Critical unit operations include:

- Grinding
- Atomising
- Conveying
- Collecting
- Drying
- Screening
- Grading
- Blending
- Weighing
- Packaging

Dust explosions are prevented by either making dust non-combustible or by using the right equipment.

Avoid the Presence of Dust

The most important measure is to prevent the dispersal of combustible dust as much as possible by:

- Implementing suitable construction measures
- Regular cleaning, as good housekeeping is a primary component of any combustible dust control program



Avoid Ignition Sources

Preventing the explosive atmosphere from being ignited by:

- Correct grounding
- Using adequate electrical equipment approved for the correct hazardous area zone



Formulation and Recipe Weighing



When preparing raw materials for a production batch, often fine powders are weighed resulting in classification of Zone 21 or Zone 22 for the area.

- Scales that have the right accuracy to avoid quality fluctuations are also needed in hazardous areas
- Weighing data needs to be stored, printed or transferred to ensure full traceability
- Intrinsic safe solutions ensure safety and ease of use at the same time

Filling of Bags or Containers



Filling of combustible powders into bags or bulk containers is a common activity in Zone 21 or Zone 22.

- Using an Ex-approved scale with high accuracy reduces overfilling
- Terminals that provide features such as easy-to-configure software routines, discrete I/Os, material storage tables and more that help to automate and optimize filling processes

Learn more about Ex-Solutions
www.mt.com/hazardous



Ex Areas Standards and Regulations



Get advice from our experts on safe weighing processes in hazardous areas. Understand standards, regulations and Ex-equipment labeling.

► www.mt.com/ind-hazweb-standards

Protection Principles Webinar



Learn about relevant ignition-protection methods. Find examples how to optimally install scales in hazardous areas.

► www.mt.com/ind-hazweb-protection

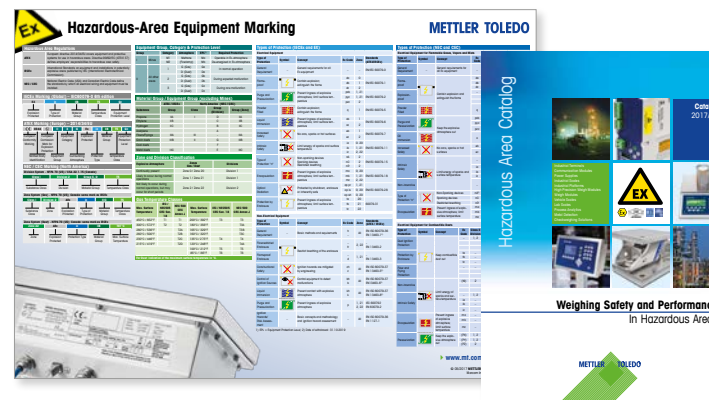
Ex-Equipment Lifecycle



Read our Quicknote to find out about requirements for maintenance, installation and repair of Ex equipment according to IEC standards.

► www.mt.com/ind-ex-lifecycle

Hazardous-Area Safety Guide & Poster



Read our comprehensive guide to ensure safe weighing and to comply with hazardous-area standards and regulations, and download our Ex-marking poster for easy identification of Ex equipment.

► www.mt.com/ind-hazguide
► www.mt.com/ind-haz-poster

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