

29  
January  
2026

# WSH INSIGHTS

## Preventing Combustible Dust Fires and Explosions

Combustible dust hazards are present in industries where finely divided chemical, organic, metal or plastic particulate solids are stored, handled or processed. When not properly managed, these dusts can become airborne, ignite easily and result in flash fires or explosions, causing serious workplace injuries or fatalities.

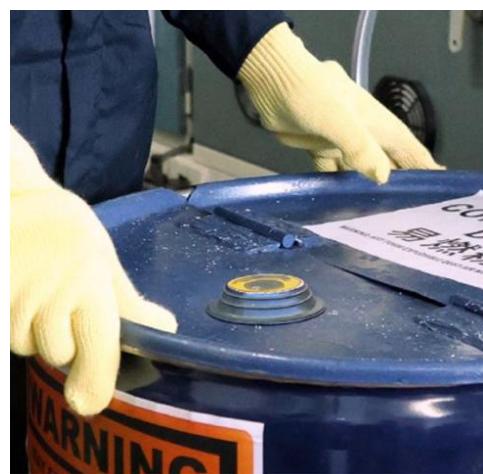
In the coming months, the Ministry of Manpower (MOM) will be conducting inspections focusing on compliance with revised combustible dust legislation. This includes notification and labelling requirements, and safe management of combustible dust hazards. Companies handling combustible dusts specified in the Fourth Schedule of the WSH (General Provisions) Regulations are reminded to submit the required combustible dust notification to MOM.

The following are good WSH practices observed among companies that effectively manage combustible dust risks. Companies should also refer to the [WSH Guidelines on Combustible Dust](#) for practical guidance on identifying, assessing and controlling fire and explosion risks. The WSH Council urges all companies handling combustible dust to conduct dust hazard analysis and adopt the following practices to prevent fires and explosions, and protect workers from harm.

### Safe Storage and Hazard Communication

Store combustible dust in sealed containers or closed bins to prevent dust dispersion.

Example of a sealed container.



Label containers and/or areas clearly with dust hazard warnings to alert workers. For example: **"Warning: May form explosive dust-air mixture if dispersed".**

Example of labelling for a 25kg bag containing combustible dust.



Example of warning signage in a storage area.



## Workplace housekeeping

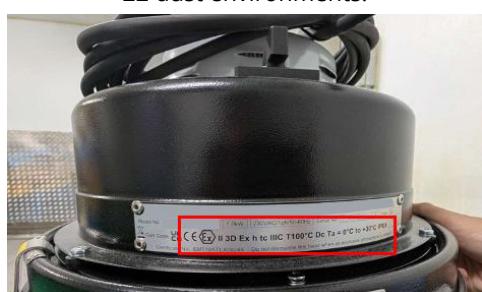
Minimise dust accumulation by regularly cleaning work areas using wet cleaning methods or appropriate explosion-proof vacuum cleaning devices.

*Note: Do not use compressed air guns or dry sweeping methods as these will promote dust dispersion.*

Example of explosion-proof vacuum cleaner.



Explosion-proof specifications are typically found on the equipment label. These include "Ex", which denotes explosion protection properties, and "II 3D", which indicates that it is suitable for use in zone 22 dust environments.



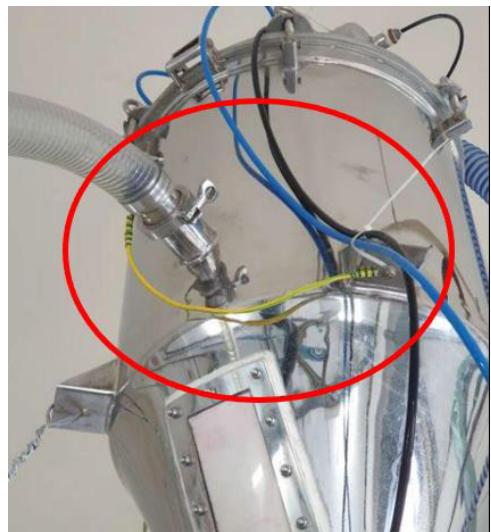
<h3>Ignition Source Control</h3>	
<p>Do not allow naked flames or smoking near areas where combustible dust are handled or stored. Display clear signages to warn workers of the associated hazards.</p>	<p>Example of warning signages near areas with combustible dust.</p> 
<p>Use non-sparking tools for work activities in the vicinity of combustible dust.</p> <p><i>Note: Non-sparking tools are safety tools manufactured from non-ferrous alloys (such as aluminium bronze, beryllium copper, and brass) that prevent ignition of flammable substances by minimising spark generation from impact or friction.</i></p>	<p>Check that non-sparking tools are made of non-ferrous alloys.</p> 

Bond and ground conductive equipment to prevent accumulation of electrostatic charges.

Example of earthing with a crocodile clip.  
Ensure metal-to-metal contact.



Example of bonding a conductive flexible hose to a dust hopper. Check for continuity in bonding and grounding cables.



<h3>Dust Handling</h3>	
<p>Provide local exhaust ventilation (LEV) at work areas where dust dispersion may occur (e.g. manual loading, blending, grinding).</p>	<p>Example of LEV to dust collector provided at feed hopper.</p> 
<h3>Dust and Explosion Suppression</h3>	<p>Install a dust collection system to capture dust emissions from a dust generating process.</p> <p>A dust collector with an explosion-suppression system. Maintain the collector regularly for continued efficient capture.</p> 

Install an explosion suppression system to reduce the impact of an explosion.

A dust collector with an explosion-suppression system.



Equip process equipment with explosion vents and pressure-relief systems to reduce the risk of explosions.

Flame-free explosion vent. Check that pressure relief from the vents are directed away from people and critical equipment.



<h3>Personal Protection</h3>	
<p>Provide workers with personal protective equipment (PPE) for handling combustible dust.</p> <p><i>Note: PPE include (but not limited to) fire-retardant overalls, safety goggles, dust respirator and anti-static safety shoes.</i></p>	<p>Example of suitable PPE.</p> 

#### For more information:

#### WSH Legislation

WSH Act 2006

WSH (Risk Management) Regulations

WSH (General Provisions) Regulations

#### Ministry of Manpower

[Enhanced Safety Measures for Higher-Risk Machineries and Combustible Dust](#)

[List of Combustible Dust Service Providers](#)

[MOM Circular on the Hazards and Controls of Combustible Dusts](#)

Presentation slides: [Preventing Dust Explosions](#)

Presentation slides: [Legislative Requirements on the Safe Use of Combustible Dust](#)

#### Singapore Standard

SS 667: 2020 Code of practice for handling, storage and processing of combustible dust

SS 508-2: 2008 Specification for graphical symbols - Safety colours and safety signs

- Design principles for product safety labels

SS 586-2: 2022 Specification for hazard communication for hazardous chemicals and dangerous goods – Part 2: Globally harmonised system of classification and labelling of chemicals

- Singapore's adaptations

SS 586-3: 2022 Specification for hazard communication for hazardous chemicals and dangerous goods – Part 3: Preparation of safety data sheets (SDSs)

#### Workplace Safety and Health Council

[WSH Guidelines on Combustible Dust](#)

[WSH Guidelines on Flammable Materials](#)

[6 Basic WSH Rules for Handling Combustible Dust](#)

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