

# Dust Hazard Analysis



NEBULA  
SAFETY & ENVIRONMENTAL



## Dust Hazards

Dust hazards exist in many different industries including metal processing, grain processing, wood processing, sugar processing, etc. Grain handling facilities are covered by a specialized industry OSHA standard 1910.272 since they are historically identified as having explosion hazards. NFPA has published industry guidance documents for various industries where dust hazards exist; however, the generic dust hazard publication is NFPA 652 & 654. The guidance documents provide best practices for testing protocols to correctly identify the combustible, flammable, or explosive characteristics of the dust present at the facility. Additionally, the International Fire Code, which has been adopted by many states as regulation, requires the implementation of the NFPA 652 & 654 to protect against dust hazards.

## 2008 Imperial Sugar Company Dust Explosion

*On February 7, 2008, a huge explosion and fire occurred at the Imperial Sugar refinery northwest of Savannah, Georgia, causing 14 deaths and injuring 38 others, including 14 with serious and life-threatening burns. The explosion was fueled by massive accumulations of combustible sugar dust throughout the packaging building.*

*Resulting Recommendations:*

- *Ensure design and operational compliance with applicable industry standards.*
- *Implement a comprehensive housekeeping program to control combustible dust accumulation.*
- *Develop a training program (including refresher training) that address combustible dust hazards for employees and contractors.*
- *Improve emergency evacuation policies and procedures including an emergency alert system and periodic emergency evacuation drills*

**“If you have processes that create dust or use powders, then you have a responsibility to determine if you have a combustible dust hazard.”**

## In This Issue

Recognized and Generally Accepted Good Engineering Practices for Dust Hazards, along with applicable regulations are discussed.

Safety Snippets are published monthly and can be located on the Nebula Safety & Environmental LinkedIn page or Website.

<https://www.NebulaSafety.com>

## Applicable Industry Resources

NFPA 61: Standard for the Prevention of Fires and Dust Explosions in Agricultural and Food Processing Facilities

NFPA 499: Recommended Practice for the Classification of Combustible Dusts and Hazardous (Classified) Locations for Electrical Installations in Chemical Process Areas

NFPA 654: Standard for the Prevention of Fire and Dust Explosions from the Manufacturing, Processing, and Handling of Combustible Particulate Solids

NFPA 625: Standard on Fundamentals of Combustible Dust

NFPA 68: Standard on Explosion Protection by Deflagration Venting

NFPA 69: Standard on Explosion Prevention Systems

NFPA 484: Standard for Combustible Metals

NFPA 655: Standard for Prevention of Sulfur Fires and Explosions

NFPA 664: Standard for the Prevention of Fires and Explosions in Wood Processing and Woodworking Facilities

## Dust Hazard Analysis (DHA)

“One of the new requirements for the NFPA’s combustible dust standards is a dust hazard analysis, which must be kept on record and presented to “the authority having jurisdiction.” Often, this applies to a local, county or state official who enforces building codes and fire safety inspections. Since OSHA does not have an official standard requiring a dust hazard analysis, they cannot demand a dust hazard analysis. However, there are OSHA standards for Process Hazard Analysis, and any dust-producing process should include combustible dust issues in this analysis.”

## General Duty Clause

“While NFPA 652 is not a legally binding standard, OSHA looks to the NFPA standards, and NFPA 652 in particular, to establish GDC violations regarding combustible dust. The absence of a complete and up-to-date DHA presents a citation risk during an OSHA inspection.”

The General Duty Clause (GDC) requires an employer to provide each employee with “employment and a place of employment which are free from recognized hazards that are causing or are likely to cause death or serious physical harm.” For OSHA to successfully cite a GDC violation, the relevant hazard must be: (1) recognized by the industry or the employer; (2) have caused, or be likely to cause, death or serious physical harm; and (3) have a feasible means available to correct the hazard. OSHA has cited the NFPA combustible-dust standards as evidence of all three GDC requirements. Many OSHA combustible-dust citations also involve poor hazard communication, substandard housekeeping, under-maintained electrical components, a lack of appropriate personal protective equipment, or a lack of fire extinguisher.

## Dust Hazard Protections

There are many protection mechanisms that can be utilized to mitigate potential combustible dust hazards. Amongst these is the critical administrative control of establishing safe housekeeping protocols. By ensuring periodic inspections for observation of dust accumulation and safe dust capture and removal techniques, the source for combustible dust hazards is removed. Additionally, there should always be adequate ventilation and electrical classification in place to mitigate potential ignition sources. For processes that result in dust accumulation, it is important to ensure that there are dust collection systems that are designed to be inherently safe and in compliance with RAGAGEP. By following these minimum protection guidelines, disasters such as the Sugar Company Dust Explosion discussed previously can be avoided.

Reach out to the Nebula Safety & Environmental Team at [NebulaSafety.com](https://NebulaSafety.com) for additional information. Nebula Safety can conduct a gap analysis for your facility to identify applicable deficiencies and opportunities for improvement.

### Dust Control Measures

The dust-containing systems (ducts and dust collectors) are designed in a manner (i.e., no leaking) that fugitive dusts are not allowed to accumulate in the work area.

The facility has a housekeeping program with regular cleaning frequencies established for floors and horizontal surfaces, such as ducts, pipes, hoods, ledges, and beams, to minimize dust accumulations within operating areas of the facility.

The working surfaces are designed in a manner to minimize dust accumulation and facilitate cleaning.

### Ignition Control Measures

Electrically-powered cleaning devices such as vacuum cleaners, and electrical equipment are approved for the hazard classification for Class II locations.

The facility has an ignition control program, such as grounding and bonding and other methods, for dissipating any electrostatic charge that could be generated while transporting the dust through the ductwork.

The facility has a Hot Work permit program.

Areas where smoking is prohibited are posted with "No Smoking" signs.

Duct systems, dust collectors, and dust-producing machinery are bonded and grounded to minimize accumulation of static electrical charge.

The facility selects and uses industrial trucks that are approved for the combustible dust locations.

### Prevention Measures

The facility has separator devices to remove foreign materials capable of igniting combustible dusts.

MSDSs for the chemicals which could become combustible dust under normal operations are available to employees.

Employees are trained on the explosion hazards of combustible dusts.

### Protection Measures

The facility has an emergency action plan.

Dust collectors are not located inside of buildings. (Some exceptions)

Rooms, buildings, or other enclosures (dust collectors) have explosion relief venting distributed over the exterior wall of buildings and enclosures.

Explosion venting is directed to a safe location away from employees.

The facility has isolation devices to prevent deflagration propagation between pieces of equipment connected by ductwork.

The dust collector systems have spark detection and explosion/deflagration suppression systems.

Emergency exit routes are maintained properly.


## References:

1. <https://www.ehstoday.com/industrial-hygiene/article/21126226/oshas-combustible-dust-program-where-are-we-today>
2. <https://www.ishn.com/articles/112906-avoid-dust-ups-with-osha-over-nfpa-652-compliance>
3. <https://www.osha.gov/sites/default/files/publications/combustibledustposter.pdf>




**NEBULA**  
SAFETY & ENVIRONMENTAL

Providing safety & environmental services to promote personnel safety and environmental responsibility in the work place.

 (949) 317-1424

 [admin@nebulasafety.com](mailto:admin@nebulasafety.com)

 8583 Irvine Center Dr #184 Irvine, Ca 92618

## A Message From Nebula

Safety Snippets are published monthly and are generally about one main topic of interest. Feel free to reach out to request a specific topic for the next Safety Snippet.

Nebula Safety & Environmental also conducts interactive Webinars on key topics to allow for indepth discussion.