

# NFPA Combustible Dust Primer

A compliance guide for industrial facilities

The logo for DURGVAC is a yellow hexagon with rounded corners. The word "DURGVAC" is written in a bold, dark blue, sans-serif font across the center of the hexagon.

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# Why combustible dust compliance matters

## And why it's so confusing



Most plant leaders know the dangers of combustible dust. Compared to fires, dust explosions account for more fatalities and injuries, can spark much more suddenly, and can spread much more quickly.

So, why do dust explosions happen in modern facilities? Here are some possible reasons:

- There's a lack of deeper knowledge about combustible dust and compliance.
- Combustible dust is light and prone to accumulating in hidden and hard-to-reach areas.
- Production pressures and deadlines take priority.
- Plants use the wrong housekeeping tools and equipment.
- Workers lack proper training and internal knowledge is fragmented across teams.
- Budget constraints make it difficult to keep up with evolving standards. Compliance is just plain complicated, with information spread across multiple sources.

**Combustible dust compliance is complex, with requirements that vary by facility, system, and application. This primer helps bridge the gap between understanding the rules and taking action.**

# What is combustible dust?

## A reality check for industrial facilities



You might be surprised to see the types of products that can act as fuel for combustible dust explosions. It's easy to imagine with materials like wood, coal, and various types of flours, but more unexpected products like peach and tomato can also qualify. [1]

In recent reports, organic materials dominate the data: food products accounted for 43% of the combustible dust explosions recorded worldwide in 2023, while wood products accounted for 35.4%. Other materials were less common, but metal, coal, and plastic were also involved in several incidents. [2]

### What makes dust combustible?

A material's unprocessed form is very different from the dust it generates throughout the production process. To determine combustibility, you need to look at the dust itself.

- The shape and size of particles;

- Moisture retention and drying behavior;
- The chemical composition of particles.

Because combustibility depends on these variables, it cannot be determined by a simple checklist. The safest approach is to have materials tested by a qualified laboratory.

### How do fires and explosions start?

A dust explosion has two added requirements: **dispersion of dust particles and confinement of a dust cloud.**[3]

Friction from machinery, static electricity, hot surfaces, and elevated temperatures in your equipment are all possible **ignition** sources. **Dispersion** refers to the right concentration of dust particles suspended in air. When a dust cloud is **confined** in an enclosed or limited space, pressure can build up and increase the chance of an

explosion. [4]

When all five elements combine to create a dust explosion, it's common for the first one to set off another, more destructive explosion. The force of the **primary explosion** can shake up other dust that has built up in the area. Once those dust particles are airborne, they also ignite, creating a catastrophic **secondary explosion**.



Watch [this short video](#) explaining primary and secondary dust explosions.

#### Takeaway:

If your process creates fine particulate, assume it's a risk until proven otherwise.

Knowing dust can be hazardous is only part of the equation. The challenge is understanding how the rules apply.

# The NFPA landscape

## How combustible dust standards are organized today

Combustible dust compliance was more complicated in the recent past. One NFPA standard would cover rules for your industry, but you could also find another three that referenced your material, process, and equipment – and the guidance wasn't always consistent.

The NFPA 660 Standard for Combustible Dusts and Particulate Solids (2025) replaces six previous standards that covered fire and explosion prevention in a mix of different industries. The information in those older standards has been reorganized, rewritten, and consolidated to provide a unified framework.



### How to use the standard

NFPA 660 is now the main source of truth for combustible dust compliance, but it's not the only source of truth. You may still need to check other standards for additional information, such as industry-specific rules or guidance for explosion protection, venting, and prevention.

Even if you've done your homework, it's important to remember that compliance isn't a one-time event. It's a cyclical process, and it requires regular evaluation to keep your facility safe and up-to-date.



 [Read the article](#)

 If you're wondering how this applies to your facility, start with  this short [self-assessment](#).

# The dust hazard analysis (DHA)

## The foundation of compliance in your plant

If you've determined that your facility handles combustible dust, you'll need to perform a dust hazard analysis (DHA). While NFPA standards list requirements and general guidance, the DHA is a systematic approach that helps you identify and understand the fire and explosion risks in your facility.

Remember: the DHA is your friend. The process will highlight what your facility already does well, identify the gaps and blind spots, and provide the insights you need to develop a solid action plan.

### What happens during a DHA?

The steps can vary depending on who performs the DHA, but generally they start by gathering documentation. The DHA can:

- Identify where combustible dust is present, including hidden or overlooked areas.
- Evaluate explosion and fire hazards tied to your materials and processes.
- Highlight gaps in your current engineering, administrative, housekeeping, or other safeguards.

Throughout the process, the DHA team will assess equipment, dust collectors, processing areas, building compartments, and more. Where can combustible

dust potentially accumulate, and what aspects of your process could lead to that dust being ignited? You should end up with a report that identifies the important hazards and recommends solutions to mitigate them. [5]

DHAs can be performed by independent consultants or an in-house team led by a qualified person.

### Turning DHA findings into action

Once the DHA has identified the risks, the next step is to prioritize practical changes that strengthen safety and compliance in your plant. That could mean fine-tuning housekeeping procedures, improving dust capture at key points, or adding engineering controls where dust is most likely to build up or disperse.

NFPA standards require you to perform DHAs once every five years at minimum, but you should also revisit them when you change elements of your process such as your material, layout, or housekeeping methods.

The agencies that enforce NFPA standards may want to see evidence of your regular DHAs and resulting action plans. Make sure you follow and document the steps carefully.



# Common NFPA misconceptions

## Clarifications to help you reduce risk

### MISCONCEPTION 1

#### The meaning of “explosion-proof”

If the hazard is present in the surrounding environment, equipment must be rated as “explosion-proof.” Required in ATEX-classified areas, these systems are designed to protect the equipment.

Industrial vacuum systems protect you facility and people by removing and safely containing combustible dust. Using controlled airflow and sealed collection, they capture material at the source and prevent it from becoming airborne.

Because the hazard is contained within the system, properly designed industrial vacuums can be used outside classified ATEX zones while still supporting safe, compliant housekeeping. Additional features such as venting and suppression further help control ignition events and prevent secondary and tertiary explosions from spreading.

### MISCONCEPTION 2

#### Size and placement don't matter

Should you place your air-material separators indoors or outdoors? If an explosion hazard exists, NFPA standards say it depends on sizing and protection methods.

We'll start with the easy one: If your air-material separator has a dirty-side volume of **less than 8 cubic feet, it can be used indoors.** It's usually impractical for these smaller systems to have explosion protection.

If the dirty-side volume is **more than 8 cubic feet, it can only be used indoors if the air-material separator is properly protected.** All of these larger systems require protection regardless, but keep in mind that certain protection methods require the system to be used outdoors. To be sure, you'll have to read the NFPA codes carefully and check with your supplier.

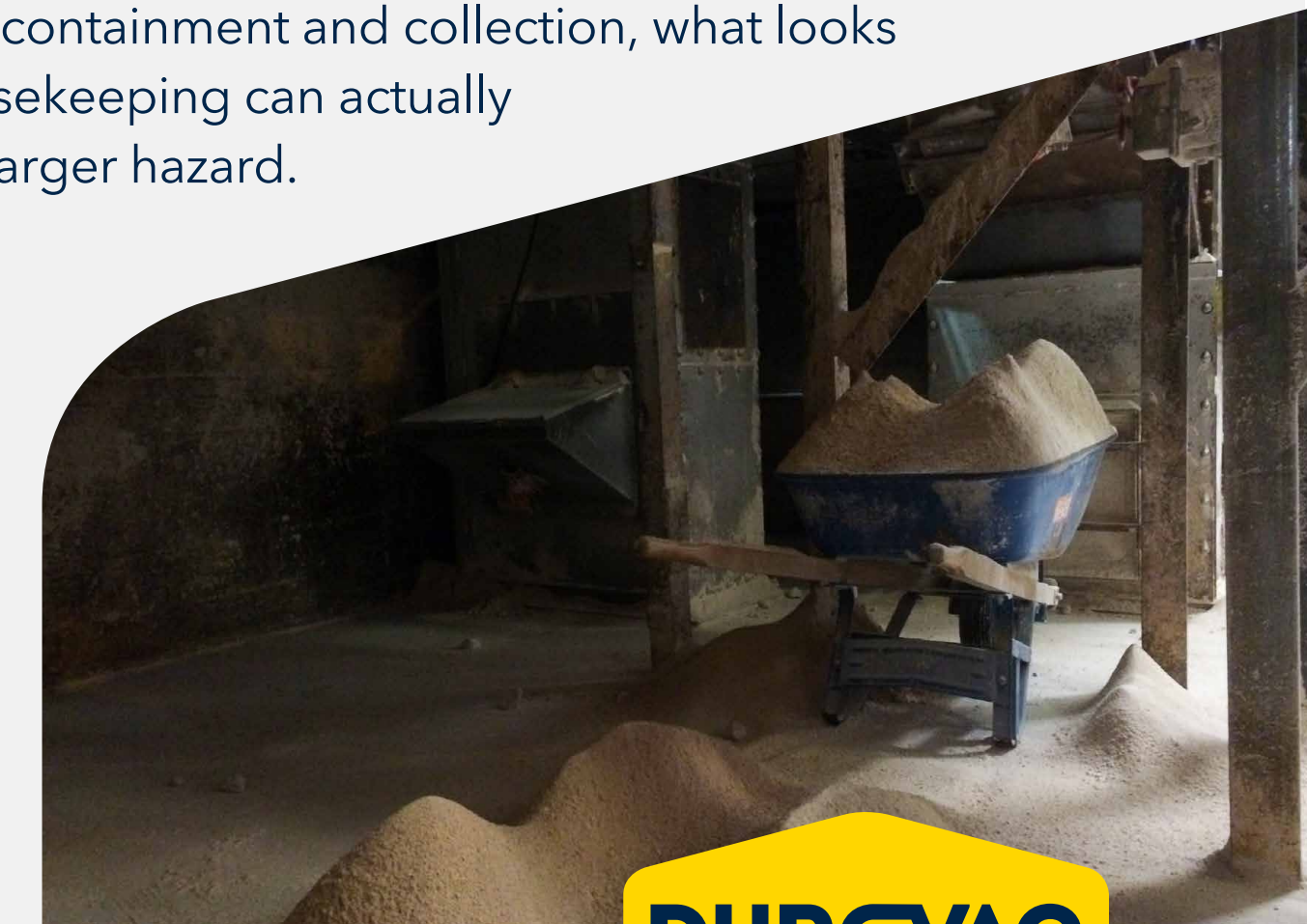
### MISCONCEPTION 3

#### Standard cleanup is good enough

Current cleanup methods may feel sufficient, but they do not remove the hazard. Sweeping, compressed air, or standard vacuums can disperse fine particles into the air and contribute to hidden buildup.

Occupational Safety and Health Administration guidelines restrict the use of compressed air for cleaning and emphasize proper dust collection and containment as part of an effective housekeeping program.

Without proper containment and collection, what looks like routine housekeeping can actually contribute to a larger hazard.



# Housekeeping

## The most overlooked compliance control

The thing about combustible dust (and dust in general) is that it gets everywhere. The particles are small, fine, and light and easy to disperse.

Even a thin layer of dust buildup can trigger an explosion under the right conditions. However, with the right equipment and housekeeping routine, facilities can significantly reduce the likelihood of an incident.

### Where does all that dust go?

Combustible dust incidents are most common in and around storage silos, dryers, and dust collectors, but they can happen anywhere. Dust particles tend to accumulate on hidden or hard-to-reach surfaces like rafters, beams, suspended ceilings, ducts, overhead piping, confined spaces, cracks and crevasses, and production equipment, particularly in low-airflow areas.

Then there's "fugitive dust", which can escape into environments through leaks, cracks in equipment, and transfer points. [3, 6]

It's always a good idea to frequently inspect those areas, seal leaks immediately, maintain equipment, and keep a routine cleaning schedule with engineered controls for containment.

### Manual cleanup is not enough

Frequent housekeeping is important, but if you're using the wrong methods, you won't have much impact on combustible dust hazards – in fact, you may be increasing risk without realizing.

The worst offenders are go-to methods like sweeping and blowing compressed air. Many regulations prohibit compressed air, and authorities having jurisdiction (AHJs) such as OSHA and CCOHS may impose fines or penalties for its use.

Rather than creating flyaway dust, your cleaning method should remove dust particles effectively and keep them in a safe, self-contained system.

That's why engineered housekeeping solutions are essential. You want the cleanup process to be integrated into your system, properly sealed and contained, and protected against the risk of fires and explosions.



# Equipment and system considerations

## What to ask your vendors

To keep up with safety and compliance demands, your housekeeping equipment should be built for an industrial environment. You don't want frequent breakdowns or filter changes interrupting your schedule and adding unnecessary risk.

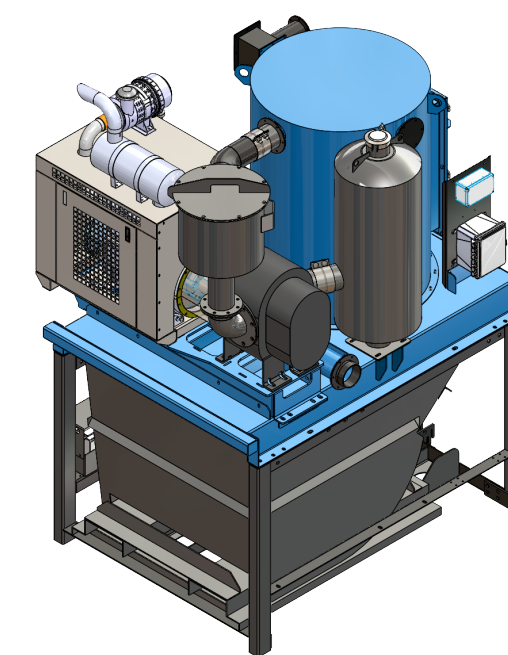
The right solutions should fit the footprint of your plant and be accessible to your workers, making it easier for them to clean frequently and thoroughly.

To support compliance and reduce combustible dust risk, vacuum systems should:

- Reduce ignition risks from heat buildup, friction, and mechanical sparks;
- Use filtration systems designed for combustible dust applications;
- Maintain sealed containment to prevent fugitive dust release,
- Include application-specific explosion protection such as flameless venting, suppression, or isolation systems.

Your vacuum system should be tailored to your specific application and requirements. Your vendor will need to understand factors such as the characteristics of your combustible dust, the application and use case, the number of simultaneous operators, and the layout of your facility.

If you're evaluating housekeeping or dust control solutions, [contact DuroVac](#) to discuss your application and compliance requirements.



If you're just getting started with industrial vacuums, try our [Vac Selector tool](#) to narrow down your choices.

# Roles and responsibilities

## Collaboration and accountability

In the end, responsibility for combustible dust compliance always rests with the facility. That includes testing materials for combustibility, maintaining DHAs, documenting hazards, and ensuring housekeeping practices support ongoing compliance.

Sharing material testing results and application details helps equipment suppliers configure systems appropriately for the facility. Industrial vacuum manufacturers should understand combustible dust applications, explain how their systems support compliance, and collaborate with explosion protection suppliers to help ensure systems are designed appropriately for the application and applicable standards.

**Evaluating your current housekeeping approach or combustible dust controls?** We'd be happy to discuss your application and compliance requirements.



# From awareness to action

## Further steps you can take towards compliance

Most combustible dust incidents are fueled by dust buildup that has been missed or neglected. Manual tools like compressed air and brooms can make the hazard worse by dispersing dust into the environment.

To reduce risk and support compliance, facilities should focus on three priorities:

- **Identify dust hazards through a current and documented DHA**
- **Eliminate cleanup methods that disperse dust rather than remove it**
- **Implement engineered housekeeping solutions that capture and contain dust at the source**

If you want to understand how your current setup compares, start with a [self-assessment](#) or [speak with one of our specialists](#) to evaluate your application and risk areas.



## Sources

[1] [https://www.osha.gov/sites/default/files/publications/combustible\\_dust\\_poster.pdf](https://www.osha.gov/sites/default/files/publications/combustible_dust_poster.pdf)

[2] <https://dustsafetyscience.com/combustible-dust-incident-report/>

[3] <https://www.osha.gov/combustible-dust>

[4] [https://www.ccohs.ca/oshanswers/chemicals/combustible\\_dust.html](https://www.ccohs.ca/oshanswers/chemicals/combustible_dust.html)

[5] <https://dustsafetyscience.com/dust-hazard-analysis/>

[6] <https://dustsafetyscience.com/what-is-a-combustible-dust-cloud/>

