HOW TO MITIGATE HAZARDS IN YOUR DUST COLLECTION OPERATION
The risk of dust explosions is a dangerous vulnerability in industrial facilities that produce large amounts of dust and static throughout their daily operations. Fine materials in the atmosphere can explode or catch flame, especially in small spaces or larger enclosed spaces without sufficient ventilation and/or proper cleaning procedures in place. Even materials that don’t regularly present a combustion risk may ignite or explode in the right circumstances. Explosions and fires are a constant hazard for dust collection operations and the workers who operate the equipment. Employee training and awareness campaigns can do a lot to counteract the potential dangers of improper dust collection.

The first dust explosion with clear documentation occurred in 1785. A bakery in Turin, Italy, suffered in an explosion when too much flour accumulated near a storeroom lamp. In the period between 1996-2005, there were 106 documented dust explosions. They caused an aggregate 16 deaths, 126 injuries, and over $160 million in damage. Preventing these disasters with good education and reliable equipment is essential.
How Do Dust Explosions Occur?

Dust explosions generally need a combination of dust accumulation and static or a heat source to cause ignition. The following factors may contribute to the risk of dust explosion:

Dust Accumulation

General facility dust can collect in hard-to-reach places and surfaces. Commonly affected areas include vents, floors, sub-ceilings, and equipment with high surfaces or nooks. If the dust gets disturbed, it raises into a cloud. The mixture of dust and air is much more vulnerable to ignition and explosion; it just needs one more element—heat—to complete the critical fire triangle of fuel, heat, and oxygen. This is generally caused by poor maintenance that allows the dust to accumulate and any sudden activity that lifts the dust into the air.

Deflagration is another risk. This happens when large quantities of dust are dispersed in high enough concentrations to change the pressure in an enclosed room or space. The pressure increase can trigger an explosion, which feeds on the dust. Similar to the fire triangle of fuel, heat, and oxygen, the Dust Explosion Pentagon needs all five elements: fuel, heat, oxygen, dispersion, and confinement. Explosion prevention systems should focus on preventing one or multiple elements of the Dust Explosion Pentagon.
Static

There doesn’t need to be an open flame or clear heat source to start a dust explosion—simple static can trigger the event. Static can build up as dust particulates rub together or against equipment, creating an ignition point that also generates high air pressure due to the rapid combustion of a dust cloud. Not only can explosions spontaneously generate from static, but they can also trigger another explosion by disturbing surrounding dust. This chain reaction can do severe damage to a facility and injure or kill anyone caught in the blast.

Operations that generate friction are particularly at risk because these operations also tend to generate static. The static clings to moving materials, especially dust, and continues to build up an electric discharge. If the dust is enough, the charge can cause ignition.

Which Industries Need Dust Collection and Static Mitigation?

An expansive array of production systems across industries will generate dust that creates a risk of dust explosions. The following industries include:

- AGRICULTURE
- FOOD PRODUCTION
  (grains, bakeries, dry powdered)
While the above industries face unique risks when it comes to dust explosions, this list doesn’t cover every type of operation or industry that faces this challenge. If a risk exists, it’s critical to obtain equipment and implement procedures to mitigate the risk of fulfilling fire triangles and Dust Explosion Pentagons.

These conditions increase the likelihood of a dust explosion at any facility:

- The presence of combustible and fine dust
- The quantity of dust meets or exceeds its particular Minimum Explosive Concentration (MEC)
- The dust is at risk of being oxygenated by being disturbed or pressurized into a dust cloud
- An ignition source is present, either through heat or static buildup
- The dust is confined and dry

It’s in the best interests of any facility to examine their processes and procedures and assess the risk of dust explosion.
Mitigating Hazards with Flexaust Hoses

At Flexaust, we specialize in creating hoses designed with anti-static features and other options to control the hazardous conditions that lead to dust explosions. Our product line includes a variety of dust collection hoses and anti-static hoses.

Dust Collection Hoses

Every facility at risk for dust explosions and fires should have two systems in place: ventilation systems and cleaning systems, which work together to remove dust. Our hoses work in tangent with strong ventilation systems to create clean, safe industrial environments with a significantly reduced risk of dust explosions.

Our hoses feature reinforced edges and designs that make them resistant to damage and crushing during operation in harsh industrial environments. We offer a variety of lightweight and medium-weight hoses to suit a broad range of applications. They are available in precise internal dimensions to best fit your existing systems and we build many of our hoses so they can be easily inspected and replaced as needed.

Our popular dust collection hoses include (not anti-static):

- Flx-Thane XLD
- Flx-Thane-MD
- T-7
- Flex-Tube EF
- Flx-Thane LD
- R-4 Stretch
- R-4
- Flex-Tube PV

Visit our Dust Collection product listing to learn more.
Anti-Static Hoses

Hoses don’t just need to be able to remove dangerous accumulations of dust. They also need to be able to safely collect the material without igniting or allowing a static charge to build up in the circulating dust. Our anti-static hoses reduce the risk of fires and explosions by maintaining maximum airflow and safely discharging static build-up.

Our popular anti-static hoses include:

- **Flexaust static dissipative hoses** are polyurethane formulated, reinforced with a rigid external wire helix, and embedded with copper or bronze-coated grounding wire to reduce static build-up. The smooth interior of these hoses also assures minimal friction.

- **Flexaust Anti-Static Hoses Are Static Dissipative**

  Flexaust static dissipative hoses are polyurethane formulated, reinforced with a rigid external wire helix, and embedded with copper or bronze-coated grounding wire to reduce static build-up. The smooth interior of these hoses also assures minimal friction.

  Furthermore, Flexaust hoses have permanent and non-humidity dependent ESD (electrostatic discharge) protection. This keeps static electricity low, reducing the risk associated with static build-up.

  Surface resistivity levels for these hoses are between $10^8$ - $10^{10}$ Ohms/square, where measurements in this range are examined as static dissipative. Anything below $10^8$ is examined as static conductive. Static
How to Mitigate Hazards in Your Dust Collection Operation

While there are several risk factors that can increase a facility’s chances of having a dust explosion, there are many ways to reduce those risks. Those steps include:

- **Good facility design.** The design of your building should include easy-to-clean surfaces, building relief valves away from likely areas of dust deposits, and quality ventilation systems and filters.

- **Good maintenance and cleaning procedures.** Standard preventative maintenance should include regular dust tests, housekeeping, and maintenance, especially near ignition points. Cleaning teams should use specially certified vacuums and static dissipative hoses.

- **Good inspection policies.** Regularly check for dust accumulation, dust escaping from equipment, dust residue, and clean areas around ignition sources.

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**Control Dust and Static with Help from Flexaust**

Flexaust creates specialized vacuum hoses and anti-static hoses that can safely collect dust without causing a dust explosion. Having the proper procedures in place to regularly clean dust and prevent dust buildup is essential to mitigate the risk of dust explosions and fires. We can help you find the right equipment for your facility safe. [Talk to our team today](http://www.flexaust.com) about creating the right procedures, cleaning schedules, and inspection schedules to keep your facility and workers safe.
About Flexaust

Flexaust has manufactured durable, long lasting, flexible hose and ducting solutions for industrial and commercial applications for 80 years. Our hose products are used in applications involving air, dust, fume and lightweight materials.

It all began in 1938 when Arizona mining engineer Harold Hersey filled a desperate need for the mining industry by developing the first flexible hose system to vent fumes and bring fresh air to hard working miners. The transition from mining to industrial applications was sparked by the heavy construction activities of World War II. After the war, Flexaust continued to grow by supporting industry with hose and ducting that would improve the workplace environment.

We are proud of our past, but more importantly, we are excited and focused on the future. As part of the international Schauenburg Group, our worldwide support network provides Flexaust with more resources and manufacturing capabilities to provide the best hose and ducting products and service to our customers.