



SAFETRAN Industry Notice: NFPA 652 Combustible Dust Hazards

Annually, combustible dust explosions result in serious injuries and fatalities (SIF) and millions of dollars in capital costs, significant litigation fees, and severe regulatory actions. To safeguard companies and their employees, SAFETRAN Site Safety Support Services and the National Fire Protection Association (NFPA) Standard 652 address safety issues surrounding combustible dust in industry and construction.



Courtesy NFPA 652

Dust Hazard Analysis Standard of Care

All facilities that produce combustible dust must have completed a Dust Hazard Analysis (DHA) by September 7, 2020 to comply with the NFPA Standard 652.

Remember, Combustible Dust Incidents are Fully Preventable!

Notable Combustible Dust Incidents (North America 2008-2017)

- Imperial Sugar Company – Savannah, Georgia – February 7, 2008 ¹



Imperial Sugar Company explosion,
February 7, 2008
Photo Courtesy
US Chemical Safety Board (CSB)

Facility Explosion Scenario

The Imperial Sugar Company facility just outside of Savannah, Georgia, was completely destroyed after a series of sugar dust explosions raced their way through the building, burning through built-up combustible dusts. Fourteen

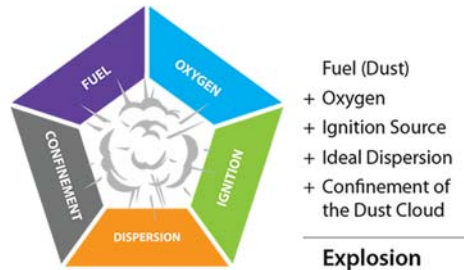
¹ CBC investigation of Imperial Sugar multiple fatality/injury: <https://www.csb.gov/imperial-sugar-company-dust-explosion-and-fire>

workers were killed and another 38 were injured, many contracting life-threatening burns. In July 2008, OSHA issued Imperial Sugar Company \$8,777,500 in fines, the fourth largest fine in OSHA history.

- AL Solutions – New Cumberland, West Virginia – December 9, 2010
- Hoeganaes Corporation – Gallatin, TN – January 31, 2011; to May 27, 2011
- Babine Forest Products – Burns Lake, British Columbia – January 20, 2012
- U.S. Ink – East Rutherford, New Jersey – October 9, 2012
- Powderpart Inc. – Woburn, Massachusetts – November 5, 2013
- Nestle Purina PetCare – Flagstaff, Arizona – September 14, 2014
- Veolia Environmental Services – Sarnia, Ontario – Oct. 25, 2014
- Wrigley – Chattanooga, Tennessee – March 11, 2015
- Nakanishi Manufacturing Corp. – Winterville, Georgia – September 23, 2015
- Furniture factory – Abbotsford, British Columbia – September 12, 2016
- Didion Milling Inc. – Cambria, Wisconsin – May 31, 2017
- T.I.C Gums – Belcamp, Maryland – June 28, 2017
- UTC Aerospace Systems – Vergennes, Vermont – December 8, 2017

What exactly is combustible dust? A combustible dust is any fine material that can catch fire and explode when mixed with air. Surprisingly, many organic materials such as flour, sugar, wood dust, grains, starch, potatoes, and even rice are combustible under the right conditions. Additionally, metals, plastics, chemicals, rubber, pharmaceuticals, and textile dusts are also commonly combustible. These products or materials may be stored in silos or containers, may gather in buildings at the eaves, rafters, on the roofs, and various other places.

How does a dust explosion occur?



What types of facilities must comply?

- Food production and agricultural products processing facilities
- Chemical, pharmaceutical and general manufacturing facilities
- Lumber processing or woodworking facilities
- Metal processing and fabrication facilities
- Recycling facilities
- Power plants fired by coal
- Mining and process industries

Understand the risk? According to the Chemical Safety Board (CSB), from 2003-2017, nine combustible dust incidents killed 55 people and injured hundreds more. Beyond the potentially fatal consequences, combustible dust hazards can result in Cal/OSHA enforcement actions including severe monetary penalties.

How stringent is this compliance requirement?

After the OSHA National Emphasis Program on combustible dust was rolled out, Federal and State OSHA offices began its inspection and enforcement program. In just two years, they inspected over 1,000 facilities and issued over 4,900 violations. Of these citations, 75% were levied from federal inspectors and 34% from state inspectors. With the enforcement of NFPA 652, those inspections will increase. Furthermore, once employers are on notice of combustible issues because of an incident or OSHA citation at any of their facilities, OSHA may treat future violations as willful, and civil liability increases.¹

What does your company need to do?

Put safety first. While NFPA itself doesn't have regulatory authority, OSHA currently follows NFPA standards to ensure that facilities stay safe while handling potentially explosive/combustible materials. If your facility falls within an at-risk industry sector, you may need to conduct a DHA, if you haven't already. You will also need to complete a DHA if you have experienced or adapted any process change since your last DHA. If you have onsite confined spaces involving production dust, all powered electrical equipment including air-movers, illumination, vessel, and vacuums must be rated as intrinsically safe for site specific workplaces contingent upon dust explosivity factors. As safety protocols evolve, and variables such as storage and confinement conditions change, and as combustible dust accumulates over time, DHAs should be reviewed and updated every five years.

This is where SAFETRAN can help

SAFETRAN's Certified Safety and Industrial Hygiene Professionals will review your facility, processes, documents, and your existing engineering and administrative controls. We will identify where a hazard may exist and any associated risks, as well as ensure that the appropriate safeguards are in place based on NFPA 652 requirements.

What Cal/OSHA DHA standards apply to General Industry operations in California

<https://www.dir.ca.gov/title8/5174.html>

CCR T-8, Section 5174, Combustible Dusts, General

(a) Any action which liberates combustible dust that exceeds or may reasonably be expected to exceed a concentration of 25 percent of its lower explosive limit in air shall not be permitted

unless all sources of ignition are eliminated or are identified and specifically controlled.

Note: Most combustible materials and some materials not usually considered combustible when reduced to dust or powder form, present an explosion hazard when mixed with air.

(b) No source of ignition shall be permitted in locations where a hazard of dust explosion exists until all dust-producing operations have been stopped, airborne dust allowed to settle, and accumulated dust removed to an extent which will remove the hazard of the dust explosion.

(c) All machines, conveyors, housings, and conductive surfaces in locations where combustible dusts are generated or are present shall be electrically bonded to ground to prevent the accumulation of electrostatic charges which are sufficient to potentially cause dust ignition.

(d) Hoses and nozzles used in the collection or blowing of dusts shall have electrical continuity maintained along the entire length from coupling to nozzle and shall be bonded to ground.

(e) Static electricity shall be removed from belts by grounded metal combs or other effective static elimination devices.

NOTE: Ground/grounded see definition of Grounded, Effectively in Section 3207.

(See Electrical Safety Orders for regulations governing electrical installations in locations where combustible dusts are generated, and/or are present.)

(f) All enclosed areas wherein combustible dusts are generated or are present, except in closed or covered containers shall be cleaned as often as necessary to prevent accumulation of dust on floors, ledges, beams, equipment, machines or elsewhere which may present a fire or explosion hazard. Safe means of access for cleaning of all surfaces shall be provided.

What Federal OSHA standards apply to NFPA 652? General Duty Clause, Section 5(a)(1) of the Occupational Safety and Health Act (Employers must keep workplaces free from recognized hazards likely to cause death or serious physical harm).

- §1910.22 General requirements
- §1910.38 Emergency action plans
- §1910.39 Fire prevention plans
- §1910.94 Ventilation
- §1910.146 Permit-required confined spaces
- §1910.157 Portable fire extinguishers
- §1910.165 Employee alarm systems
- §1910.176 Handling materials—general
- §1910.178 Powered industrial trucks
- §1910.261 Pulp, paper, and paperboard mills
- §1910.263 Bakery equipment
- §1910.265 Sawmills
- §1910.269 Electric power generation, transmission and distribution
- §1910.272 Grain handling facilities
- §1910.307 Hazardous (classified) locations
- §1910.1200 Hazard communication
- §1910.119 Process safety management