



## NFPA 652: Fundamentals of Combustible Dust

NFPA 652 is the latest Standard addition (2019) which provides the fundamentals of combustible dust management, including the basic principles of, and requirements for, identifying and managing fire and explosion hazards of combustible dusts and particulate solids, regardless of industry.

The Standard provides general requirements for management of combustible dust fire and explosion hazards, and directs the user to NFPA's industry or commodity-specific standards, as appropriate:

- [NFPA 61 \(Agricultural & Food Processing Facilities\)](#);
- [NFPA 484 \(Combustible Metals\)](#);
- [NFPA 655 \(Sulfur\)](#);
- [NFPA 664 \(Wood Processing\)](#);
- [NFPA 654 \(General Industry\)](#).

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## Combustible Dust Hazard Evaluations

A dust explosion can be catastrophic, causing employee deaths, injuries, and destruction of entire buildings. In many combustible dust accidents, employers and employees were unaware that a hazard even existed. Between 1980 and 2005, there were 281 documented combustible dust incidents that killed 119 workers, injured 718, and extensively damaged industrial facilities. The incidents occurred in 44 states, in many different industries, and involved a variety of different materials.

As a result, in 2007 OSHA embarked on a National Emphasis Program (NEP) to inspect facilities that generate or handle combustible dusts that pose a deflagration or other fire hazard when suspended in air, regardless of particle size or shape. BakerRisk assists clients to evaluate whether a facility is in compliance with the intent of applicable national codes and standards, to identify combustible dust explosion hazards, and to develop preventative and mitigation options.

BakerRisk staff members serve on a number of relevant National Fire Protection Association (NFPA) committees and can appropriately interpret these standards and provide context with respect to the basis of their prescriptive requirements. As a BakerRisk client, you will benefit from our experience and ability to provide the most cost-effective recommendations to mitigate hazards associated with handling combustible dust.

## Dust Hazard Analysis (DHA)

NFPA 652 introduces a new provision which is to be applied retroactively, namely the dust hazards analysis, or DHA. This is defined as a systematic review to identify and evaluate the potential fire, flash fire, or explosion hazards associated with the presence of one or more combustible particulate solids in a process or facility. For existing facilities, a DHA is permitted to be phased in and completed by a qualified person no later than five years from the effective date of the standard (i.e., by September 2020). BakerRisk has been facilitating and supplying subject matter experts to assist with dust hazard analyses for over 20 years.



DHA studies help companies identify hazard scenarios for a process that could adversely affect people, property, or the environment. BakerRisk subject matter experts serve as facilitators to coordinate the DHA team's brainstorming of causes and consequences of possible accidents and the formulation of recommendations for appropriate corrective actions. Results are presented in a form where the risk of potential events is clearly established and mitigation options intended to reduce risk to tolerable levels are presented in the DHA report.

### BAKER ENGINEERING AND RISK CONSULTANTS, INC. LOCATIONS

SAN ANTONIO | HOUSTON | LOS ANGELES | CHICAGO  
TORONTO, CANADA | CHESTER, UNITED KINGDOM





## ABOUT BAKERRISK

Baker Engineering and Risk Consultants, Inc. is one of the world's leading explosion analysis, structural design, and risk engineering companies. BakerRisk provides comprehensive consulting, engineering, laboratory and range testing services to government agencies and private companies who are involved with dangerous, highly hazardous, reactive, or explosive materials.

- Blast Effects & Explosion Testing
- Dynamic Structural Analysis and Design
- Risk Engineering
- Process Safety
- Incident Investigations
- Reactive Chemicals Testing & Management Systems
- Materials Engineering and Failure Analysis

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## Overview of NFPA Standards

The NFPA Standards exist to help owner/operators determine and provide mitigation against combustible dust hazards. The following are some of the general recommendations provided:

- *Minimize the escape of dust from process equipment or ventilation systems*
- *Use dust collection systems and filters*
- *Utilize surfaces that minimize dust accumulation and facilitate cleaning*
- *Provide access to all hidden areas to permit inspection*
- *Inspect for dust residues in open and hidden areas, at regular intervals*
- *Clean dust residues at regular intervals*
- *Use cleaning methods that do not generate dust clouds, if ignition sources are present*
- *Only use vacuum cleaners approved for dust collection*
- *Locate explosion vents and relief valves away from dust hazard areas*
- *Develop and implement a hazardous dust inspection, testing, housekeeping, and control program (preferably in writing with established frequency and methods).*
- *Perform a dust hazard analysis (DHA) to identify and evaluate the potential fire or explosion hazards associated with the presence of combustible particulate solids in a process or facility.*

## BakerRisk Services

**Dust Hazard Analysis (DHA)** — perform systematic study to evaluate potential hazards, evaluate safeguards and establish risk to personnel and property. Appropriate mitigation options are identified to reduce risk to tolerable levels. BakerRisk's DHA process is consistent with similar techniques employed to satisfy PSM compliance requirements (OSHA 29 CFR 1910).

**Provision of Subject Matter Experts (SME)** — BakerRisk can supply SMEs with expertise regarding fire and explosion hazards, implementation of safeguards and best practices to assist with internal hazard assessments.

**NFPA Compliance Audits** — consulting advice on explosion prevention and impartial guidance on choice and design of explosion protection systems (relief venting, containment, suppression, use of inert gas, isolation techniques, etc.)

**Incident Investigation** — Assistance with gathering complete, accurate and objective incident data to perform a complete cause and origin investigation.

**Combustible Dust Testing** — Facilitate explosibility testing through Fike, provide impartial recommendations of which combustible dust tests to conduct (P<sub>max</sub>, k<sub>st</sub>, LOC, MIE, MIT, etc), how to interpret results, and what they mean.

**Corporate Guidance** — Provide guidance at corporate level including review of practices and provide recommendations on how to meet industry standards. Focus how to minimize risk associated with combustible dust hazards across multiple assets, domestically and globally.



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