

We are



Hello,

June 2021

Process Safety Dispatch

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Nitrogen Gas to Prevent Explosions and Fires; Nitrogen Gas as a Killer

In June last, year a researcher fell to the ground while manually filling a flask and tank with liquid nitrogen. A colleague entered the room and heard escaping gas which she identified

as nitrogen. She turned off the gas and then collapsed in a heap on top of the first victim. A third and fourth colleague entered the room; they had to leave for fresh air and were unable to pull the victims clear. The research worker's colleagues survived and could give evidence to the investigating Sheriff Court. Unfortunately, the first researcher died of asphyxiation.

This incident occurred in Scotland and resulted in the successful prosecution of the deceased employer for (1) inadequate ventilation, (2) failing to ensure a warning alarm was switched on and (3) failing to install a safety device that could automatically stop an excess flow of nitrogen from the liquid nitrogen storage tank [Ref 1].

Situation in USA

Between 1992 and 2002, there were 80 industrial deaths in USA caused by nitrogen asphyxiation [Ref 2]. Yet nitrogen is an incredibly useful gas. Indeed, in our work as process safety consultants, we routinely recommend the use of nitrogen as a way of preventing fire and explosions in process vessels. We regularly measure Limiting Oxygen Concentration (LOC) of dust clouds in air in our process safety laboratories. But as our real-life story illustrates, nitrogen gas has risks associated with its use and taking precautions to mitigate these risks are essential.

In this article, we look at the **effect of nitrogen on the human body** and on the **precautions available to protect against the dangers of asphyxiation**.

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- Fire and Explosion Hazard Assessment
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- Combustible Dust Testing
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- Self-Heating / Thermal Instability Testing
- Flammability Testing of Gases & Vapors



EXPLAINERS: NFPA 652, DHA (Dust Hazards Analysis), Do I need a DHA and more...



In this edition of Process Safety Dispatch, back by popular demand, we address some of the real basics of process safety associated with NFPA 652 and Dust Hazards Analysis and lead you to informative articles that provide you with more detailed information and sources of advice.

What is NFPA 652?

NFPA 652 is a technical standard prepared by the National Fire Protection Association that provides the basic principles and requirements for identifying and managing fire and explosion hazards of combustible dusts and particulate solids. The standard is intended to provide the **minimum general requirements** necessary to manage the fire, flash fire, and explosion hazards on your facility.

Cards on the table from the off!

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What is a Dust Hazards Analysis (DHA)?

A Dust Hazards Analysis (DHA), according to NFPA 652, is a formalized process for identifying and evaluating the fire, deflagration, and explosion hazards associated with dusts and particulate solids in your facility. The DHA provides recommendations to manage these hazards. The DHA has to be performed or led by a qualified person and should produce results that are documented. It should include necessary actions for change to your operations or facilities as necessary. The DHA should identify safe operating ranges, check safeguards are in place to mitigate the hazards and should recommend additional safeguards where warranted.

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Do I need to undertake dust explosion testing?

So why do processing companies invest in obtaining dust fire and explosion test data? Here are three good reasons:

- NFPA 652 requires it!
- Data allows you to identify previously unidentified hazards with your materials,
- Data allows you to save money by cost effective spending on explosion prevention and protection equipment,

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Electrostatic Hazards in Processing Industry: The Nature of the Problem and Practical Measures for its Control [\[watch\]](#)

Fire and Explosion Hazards: How to Identify and Control Them in Your Process [\[watch\]](#)

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