

# IS YOUR BLAST MEDIA A COMBUSTIBLE DUST RISK?

*AN EHS REFERENCE FOR FACILITIES THAT BLAST ALUMINUM PARTS*

**Aluminum dust is a combustible dust.** That's not a minor footnote. OSHA's Combustible Dust Hazard Alert identifies aluminum specifically as a metal processing material that presents an explosion hazard when fine particles are suspended in air in sufficient concentration. A primary dust explosion inside a building or piece of equipment can trigger secondary explosions from accumulated surface dust, often far more destructive than the initial event.

Between 1980 and 2005, the U.S. Chemical Safety and Hazard Investigation Board identified 281 combustible dust incidents that resulted in 119 worker deaths, 718 injuries, and extensive damage to industrial facilities across the country. In many of those incidents, employers and employees had no idea a hazard existed before it became an emergency.

Most facilities that blast aluminum parts are aware of general dust management requirements. Fewer stop to ask where that aluminum dust is coming from in the first place.



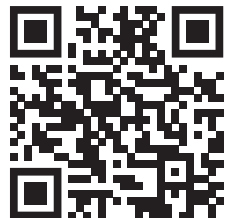
**"IN MANY COMBUSTIBLE DUST INCIDENTS, EMPLOYERS AND EMPLOYEES WERE UNAWARE THAT A HAZARD EVEN EXISTED."**

**The numbers behind that statement:**

- 281 combustible dust incidents in U.S. industrial facilities, 1980-2005
- 119 worker deaths and 718 injuries from those incidents
- 420 microns: the particle size at or below which aluminum dust presents a deflagration hazard
- 0.040 oz. per cubic foot: the lower explosive limit for aluminum dust
- Secondary explosions from accumulated surface dust are often more destructive than the initial event

Sources: [osha.gov/combustible-dust](https://www.osha.gov/combustible-dust) (incidents, deaths, injuries, secondary explosions); Aluminum Association Guidelines for Handling Aluminum Fines and U.S. Bureau of Mines Report RI-6516 (particle size threshold and lower explosive limit)

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## THE DUST EXPLOSION PENTAGON

**OSHA identifies five conditions that must exist simultaneously for a combustible dust explosion to occur. Remove any one of them and an explosion cannot take place.**

- Fuel: the combustible dust itself
- Oxygen: available in normal facility air
- Heat: an ignition source with sufficient energy
- Dispersion: dust suspended in air at sufficient concentration
- Confinement: an enclosure such as a building, room, vessel, or duct that allows pressure to build

This framework matters for blast operations because the fuel is being generated continuously during the blasting process. Every time hard media strikes an aluminum surface, it contributes to the fuel element of that pentagon. Managing the ignition sources, housekeeping, and ventilation are all necessary controls. Reducing fuel generation at the source is where media selection comes in.

## THE SOURCE OF THE PROBLEM

### ● *HARD MEDIA ON SOFT METAL GENERATES THE HAZARD*

Standard steel shot typically runs between 42 and 65 Rockwell C hardness. Aluminum, depending on the alloy, sits well below that. When hard shot strikes an aluminum surface at blast velocity, it doesn't just clean. It removes material. The aluminum that breaks off becomes fine, airborne particles, and the Aluminum Association's guidelines confirm that particles at or below 420 microns have the potential to sustain a dust explosion if concentration, dispersion, and an ignition source align.

Those particles collect on surfaces, settle in ductwork, and build up in areas not always visible during routine facility walks. OSHA notes that a primary explosion can dislodge this accumulated dust into the air, triggering one or more secondary explosions. Those secondary events are often the ones that cause the most damage and the most casualties.

#### **OSHA's dust control recommendations for facilities handling combustible dusts include:**

- Inspecting for dust residues in open and hidden areas at regular intervals
- Using proper dust collection systems and filters
- Minimizing the escape of dust from process equipment and ventilation systems
- Using cleaning methods that do not generate dust clouds when ignition sources are present
- Controlling static electricity, including bonding of equipment to ground

Managing accumulation after the fact is one layer of protection.

Reducing generation at the source is another, and it starts with the media.

## SWITCHING MEDIA ADDRESSES FUEL GENERATION AT THE SOURCE

Nu-Soft Steel Shot operates at less than 20 Rockwell C hardness, softer than aluminum in most blasting applications. It cleans aluminum surfaces by removing oxidation, release agents, and surface contamination without the aggressive material removal that generates fine aluminum particles.

This is not a theoretical claim. A GMA Industries customer blasting aluminum tanks with standard steel shot experienced a facility fire directly attributed to aluminum dust accumulation in their atmosphere. After the incident, switching blast media was part of their corrective action plan.

Nu-Soft won't eliminate all dust from a blasting operation. Proper dust collection, regular inspection, and housekeeping protocols remain essential. What it does is reduce aluminum fines at the point of generation. In the context of the Dust Explosion Pentagon, that directly addresses the fuel element of the hazard.

## THE PRACTICAL DETAILS

Nu-Soft is non-flammable and non-hazardous. Its dust collector waste is disposed of the same way as standard abrasive blast waste, with no special handling requirements. It works in existing centrifugal wheel blast machines and air blast cabinets with no equipment modifications needed.

#### **Key specifications relevant to EHS review:**

- Hardness: Under 20 Rockwell C (less than 200 HV)
- Flammability: Non-flammable
- Hazard classification: Non-hazardous
- NFPA Health Rating: 1
- NFPA Fire Rating: 0
- NFPA Reactivity Rating: 0
- Disposal: Same as standard SAE steel shot, no special requirements

**The full Safety Data Sheet is available at [gmaind.com/data-sheets/](https://gmaind.com/data-sheets/)**

## REGULATORY FRAMEWORK

Facilities that process or handle combustible metal dusts should be familiar with the following:

- OSHA General Duty Clause, Section 5(a)(1): Employers must keep workplaces free from recognized hazards likely to cause death or serious physical harm
- OSHA 1910.22: Housekeeping standards for walking and working surfaces
- OSHA 1910.1200: Hazard Communication standard
- NFPA 484: Standard for Combustible Metals
- NFPA 654: Standard for the Prevention of Fire and Dust Explosions from the Manufacturing, Processing, and Handling of Combustible Particulate Solids

*This document is intended as a reference, not a compliance guide. For a full assessment of combustible dust hazards in your facility, consult a qualified EHS professional and refer directly to the applicable OSHA and NFPA standards.*

# QUESTIONS ABOUT NU-SOFT ● FOR YOUR FACILITY?

Our team can provide the full Safety Data Sheet, discuss your specific aluminum blasting application, or arrange a sample order for testing. We have worked with facilities across a wide range of industries on this exact issue since 2003.

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