

Protecting Workers from the Hazards of Abrasive Blasting Materials

Abrasive blasting uses compressed air or water to direct a high velocity stream of an abrasive material to clean an object or surface, remove burrs, apply a texture, or prepare a surface for the application of paint or other type of coating. Employers must protect workers from hazardous dust levels and toxic metals that may be generated from both the blasting material and the underlying substrate and coatings being blasted. This fact sheet provides information on abrasive blasting material, health hazards, and methods to protect workers.

Abrasive Blasting Materials

The decision to use a certain type of abrasive material can depend on factors such as cost, job specifications, environment, and worker health.

Commonly used abrasive materials:

- Silica sand (crystalline)
- Coal slag
- Garnet sand
- Nickel slag
- Copper slag
- Glass (beads or crushed)
- Steel shot
- Steel grit
- Specular hematite (iron ore)

Alternative, less toxic blasting materials include:

- Ice cubes
- Dry ice
- Plastic bead media
- Sponge
- Sodium bicarbonate (baking soda)



Abrasive blasting creates high levels of dust. Photo courtesy of NIOSH.

- Ground walnut shells, ground corn cob and other biodegradable materials
- High pressure water

**** CAUTION ****

Abrasive blasting creates high levels of noise that can cause substantial hearing loss. Always wear hearing protection. Employers must administer a hearing conservation program as required by the OSHA [Occupational Noise standard](#).

Health Hazards

Abrasive blasting operations can create high levels of dust and noise. Abrasive material and the surface being blasted may contain toxic materials (e.g., lead paint, silica) that are hazardous to workers.

- Silica sand (crystalline) can cause silicosis, lung cancer, and breathing problems in exposed workers.
- Coal slag and garnet sand may cause lung damage similar to silica sand (based on preliminary animal testing).
- Copper slag, nickel slag, and glass (crushed or beads) also have the potential to cause lung damage.
- Steel grit and shot have less potential to cause lung damage.
- Slags can contain trace amounts of toxic metals such as arsenic, beryllium, and cadmium.

How to Protect Workers from Exposure to Abrasive Blasting Materials

Each abrasive blasting operation is unique, involving different surfaces, coatings, blast material, and working conditions. Before beginning work, employers should identify the hazards and assign a knowledgeable person trained to recognize hazards and with the authority to quickly take corrective action to eliminate them. Use engineering and administrative controls, personal protective equipment (PPE), including respiratory protection, and training to protect workers involved in abrasive blasting activities. Engineering controls, such as substitution, isolation, containment, and ventilation are the primary means of preventing or reducing exposures to airborne hazards during abrasive blasting operations. Administrative controls, including the use of good work and personal hygiene practices, can also reduce exposure. When engineering and administrative controls cannot keep exposures to hazardous materials below OSHA permissible exposure limits, respiratory protection must be used.



Abrasive blasting using a dust collection system with multiple exhaust ducts. (Photo courtesy of Flexaust, Inc. This equipment is shown for illustrative purposes only and is not intended as an endorsement by OSHA of this company, its products or services.)

Engineering Controls

1. Substitution

- Use a less toxic abrasive blasting material.
- Use abrasives that can be delivered with water (slurry) to reduce dust.

2. Isolation and Containment

- Use barriers and curtain walls to isolate the blasting operation from other workers.
- Use blast rooms or blast cabinets for smaller operations.
- Use restricted areas for non-enclosed blasting operations.
- Keep coworkers away from the blaster.

3. Ventilation

- Use exhaust ventilation systems in containment structures to capture dust.

Employers can use OSHA's free [On-site Consultation Program](#) for advice on safety and health issues.

Administrative Controls

Perform routine cleanup using wet methods or HEPA filtered vacuuming to minimize the accumulation of toxic dusts.

- Do not use compressed air to clean as this will create dust in the air.
- Clean and decontaminate tarps and other equipment on the worksite.
- Schedule blasting when the least number of workers are at the site.
- Avoid blasting in windy conditions to prevent the spread of any hazardous materials.

Personal Hygiene Practices

- Prohibit eating, drinking, or using tobacco products in blasting areas.
- Provide wash stations so workers can wash their hands and face routinely and before eating, drinking, or smoking.
- Vacuum or remove contaminated work clothes before eating, drinking or smoking.

- Provide accommodations for end-of-shift showers and change areas with separate storage facilities for street clothes, protective clothing and equipment.
- Keep contaminated clothing and equipment out of the clean change area.

Respiratory Protection

An abrasive-blasting respirator must cover the wearer’s head, neck, and shoulders to protect the wearer from rebounding abrasive. Workers must use only respirators approved by [NIOSH](#) to provide protection from dusts produced during abrasive-blasting operations.

- Type CE NIOSH-certified blasting airline respirator with positive pressure blasting helmet.

Support personnel involved in cleanup and other related activities may also need respiratory protection.

When respirators are used, employers must establish a comprehensive respiratory protection program as required by the [OSHA Respiratory Protection standard \(29 CFR 1910.134\)](#).

Personal Protective Equipment

- Hearing protection
- Eye and face protection
- Helmet
- Leather gloves that protect to full forearm and aprons (or coveralls)
- Safety shoes or boots

Worker Training and Hazard Communication

- Provide training to abrasive blasters and support personnel on blasting health and safety hazards, how to use controls, personal hygiene practices, safe work practices and the use of PPE and respirators.
- Manufacturers are required to include appropriate health hazard information on the blasting materials on safety data sheets (SDS) as required under OSHA’s Hazard Communication standard ([29 CFR 1910.1200](#)).
- Obtain and read the manufacturer’s SDS for health hazard information on the abrasive blasting material you are using.

For more information on abrasive blasting and control measures see: OSHA’s guidance document: [“Abrasive Blasting Hazards in Shipyard Employment” \(2006\)](#); and [eTool: Mechanical Removers \(Ship Repair\)](#).

Disclaimer: This OSHA Fact Sheet provides a general overview of the requirements in OSHA standards related to abrasive blasting. It does not alter or determine compliance responsibilities in these standards or the Occupational Safety and Health Act of 1970. Since interpretations and enforcement policy may change over time, the reader should consult current OSHA interpretations and decisions by the Occupational Safety and Health Review Commission and the courts for additional guidance on OSHA compliance requirements.

This is one in a series of informational fact sheets highlighting OSHA programs, policies or standards. It does not impose any new compliance requirements. For a comprehensive list of compliance requirements of OSHA standards or regulations, refer to Title 29 of the Code of Federal Regulations. This information will be made available to sensory-impaired individuals upon request. The voice phone is (202) 693-1999; teletypewriter (TTY) number: (877) 889-5627.

For assistance, contact us. We can help. It’s confidential.



www.osha.gov (800) 321-OSHA (6742)



U.S. Department of Labor

Applicable OSHA Standards and Safety and Health Topic Pages

The following table provides links to several OSHA standards (not all-inclusive) that may contain requirements that apply to abrasive blasting operations. For example, the removal of lead paint by abrasive blasting will likely require employers to follow provisions of the OSHA Lead standard. Safety and health topic pages listed here provide employers and workers with information that may be useful for safely conducting abrasive blasting.

General Industry	Shipyards Industry	Construction Industry	OSHA Topics Page(s)
1910.94, Ventilation	1915.33 & 1915.34, Chemical & Mechanical paint removers Ventilation (as it applies to shipyard employment, 1910.94) 1915.13, Cleaning and other cold work	1926.57, Ventilation	Ventilation
1910.95, Occupational noise exposure	1910.95, Occupational noise exposure (as per Shipyard "Tool Bag" Directive, CPL 02-00-182)	1926.52, Occupational noise exposure 1926.101, Hearing Protection	Noise
1910.132, Personal Protective Equipment	1915 Subpart I, Personal Protective Equipment	1926 Subpart E, Personal Protective Equipment	Personal Protective Equipment
Respiratory Protection (1910.134)	1915.154, Respiratory Protection refers to (1910.134)	1926.103, Respiratory Protection (refers to 1910.134)	Respiratory Protection
1910.141, Sanitation 1910.1000, Air contaminants Table Z-1, Limits for air contaminants Table Z-2, Toxic and Hazardous Substances Table Z-3, Mineral dusts	1915.88, Sanitation 1915.1000, Air contaminants Table Z – Shipyards	1926.51, Sanitation 1926.55, Gases, vapors, fumes, dusts, and mists Appendix A, Threshold limit values of airborne contaminants for construction	Permissible Exposure Limits (PELs) & Hazardous and Toxic Substances
Beryllium See 1910.1000, Table Z-1 for air contaminants	Beryllium See 1915.1000, Table Z	Beryllium See Table 1926.55, Appendix A	Beryllium
Silica See 1910.1000, Table Z-3	Silica See 1915.1000, Table Z	Silica See 1926.55, Appendix A	Silica
1910.1018, Inorganic Arsenic	1915.1018, Inorganic Arsenic	1926.1118, Inorganic Arsenic	Arsenic
1910.1025, Lead	1915.1025, Lead	1926.62, Lead	Lead (General Industry) Lead (Construction)
1910.1026, Chromium(VI)	1915.1026, Chromium(VI)	1926.1126, Chromium(VI)	Hexavalent Chromium
1910.1027, Cadmium	1915.1027, Cadmium	1926.1127, Cadmium	Cadmium
1910.1200, Hazard Communication	1915.1200, Hazard Communication (refers to 1910.1200)	1926.59, Hazard Communication (refers to 1910.1200)	Hazard Communication