
29 C.F.R. § 1910.94

Ventilation.

- (a) *Abrasive blasting*—(1) *Definitions applicable to this paragraph*—(i) *Abrasive*. A solid substance used in an abrasive blasting operation.
- (ii) *Abrasive-blasting respirator*. A respirator constructed so that it covers the wearer's head, neck, and shoulders to protect the wearer from rebounding abrasive.
- (iii) *Blast cleaning barrel*. A complete enclosure which rotates on an axis, or which has an internal moving tread to tumble the parts, in order to expose various surfaces of the parts to the action of an automatic blast spray.
- (iv) *Blast cleaning room*. A complete enclosure in which blasting operations are performed and where the operator works inside of the room to operate the blasting nozzle and direct the flow of the abrasive material.
- (v) *Blasting cabinet*. An enclosure where the operator stands outside and operates the blasting nozzle through an opening or openings in the enclosure.
- (vi) *Clean air*. Air of such purity that it will not cause harm or discomfort to an individual if it is inhaled for extended periods of time.
- (vii) *Dust collector*. A device or combination of devices for separating dust from the air handled by an exhaust ventilation system.
- (viii) *Exhaust ventilation system*. A system for removing contaminated air from a space, comprising two or more of the following elements (a) enclosure or hood, (b) duct work, (c) dust collecting equipment, (d) exhauster, and (e) discharge stack.
- (ix) *Particulate-filter respirator*. An air purifying respirator, commonly referred to as a dust or a fume respirator, which removes most of the dust or fume from the air passing through the device.
- (x) *Respirable dust*. Airborne dust in sizes capable of passing through the upper respiratory system to reach the lower lung passages.
- (xi) *Rotary blast cleaning table*. An enclosure where the pieces to be cleaned are positioned on a rotating table and are passed automatically through a series of blast sprays.
- (xii) *Abrasive blasting*. The forcible application of an abrasive to a surface by pneumatic pressure, hydraulic pressure, or centrifugal force.
- (2) *Dust hazards from abrasive blasting*. (i) Abrasives and the surface coatings on the materials blasted are shattered and pulverized during blasting operations and the dust formed will contain particles of respirable size. The composition and toxicity of the dust from these sources shall be considered in making an evaluation of the potential health hazards.
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(ii) The concentration of respirable dust or fume in the breathing zone of the abrasive-blasting operator or any other worker shall be kept below the levels specified in § 1910.1000.

(iii) Organic abrasives which are combustible shall be used only in automatic systems. Where flammable or explosive dust mixtures may be present, the construction of the equipment, including the exhaust system and all electric wiring, shall conform to the requirements of American National Standard Installation of Blower and Exhaust Systems for Dust, Stock, and Vapor Removal or Conveying, Z33.1-1961 (NFPA 91-1961), which is incorporated by reference as specified in § 1910.6, and subpart S of this part. The blast nozzle shall be bonded and grounded to prevent the build up of static charges. Where flammable or explosive dust mixtures may be present, the abrasive blasting enclosure, the ducts, and the dust collector shall be constructed with loose panels or explosion venting areas, located on sides away from any occupied area, to provide for pressure relief in case of explosion, following the principles set forth in the National Fire Protection Association Explosion Venting Guide, NFPA 68-1954, which is incorporated by reference as specified in § 1910.6.

(3) *Blast-cleaning enclosures.* (i) Blast-cleaning enclosures shall be exhaust ventilated in such a way that a continuous inward flow of air will be maintained at all openings in the enclosure during the blasting operation.

(a) All air inlets and access openings shall be baffled or so arranged that by the combination of inward air flow and baffling the escape of abrasive or dust particules into an adjacent work area will be minimized and visible spurts of dust will not be observed.

(b) The rate of exhaust shall be sufficient to provide prompt clearance of the dust-laden air within the enclosure after the cessation of blasting.

(c) Before the enclosure is opened, the blast shall be turned off and the exhaust system shall be run for a sufficient period of time to remove the dusty air within the enclosure.

(d) Safety glass protected by screening shall be used in observation windows, where hard deep-cutting abrasives are used.

(e) Slit abrasive-resistant baffles shall be installed in multiple sets at all small access openings where dust might escape, and shall be inspected regularly and replaced when needed.

(1) Doors shall be flanged and tight when closed.

(2) Doors on blast-cleaning rooms shall be operable from both inside and outside, except that where there is a small operator access door, the large work access door may be closed or opened from the outside only.

(ii) [Reserved]

(4) *Exhaust ventilation systems.* (i) The construction, installation, inspection, and maintenance of exhaust systems shall conform to the principles and requirements set forth in American National Standard Fundamentals Governing the Design and Operation of Local Exhaust Systems, Z9.2-1960, and ANSI Z33.1-1961, which is incorporated by reference as specified in § 1910.6.

(a) When dust leaks are noted, repairs shall be made as soon as possible.

(b) The static pressure drop at the exhaust ducts leading from the equipment shall be checked when the installation is completed and periodically thereafter to assure continued satisfactory operation. Whenever an appreciable change in the pressure drop indicates a partial blockage, the system shall be cleaned and returned to normal operating condition.

(ii) In installations where the abrasive is recirculated, the exhaust ventilation system for the blasting enclosure shall not be relied upon for the removal of fines from the spent abrasive instead of an abrasive separator. An abrasive separator shall be provided for the purpose.

(iii) The air exhausted from blast-cleaning equipment shall be discharged through dust collecting equipment. Dust collectors shall be set up so that the accumulated dust can be emptied and removed without contaminating other working areas.

(5) *Personal protective equipment.* (i) Employers must use only respirators approved by the National Institute for Occupational Safety and Health (NIOSH) under 42 CFR part 84 to protect employees from dusts produced during abrasive-blasting operations.

(ii) Abrasive-blasting respirators shall be worn by all abrasive-blasting operators:

(a) When working inside of blast-cleaning rooms, or

(b) When using silica sand in manual blasting operations where the nozzle and blast are not physically separated from the operator in an exhaust ventilated enclosure, or

(c) Where concentrations of toxic dust dispersed by the abrasive blasting may exceed the limits set in § 1910.1000 and the nozzle and blast are not physically separated from the operator in an exhaust-ventilated enclosure.

(iii) Properly fitted particulate-filter respirators, commonly referred to as dust-filter respirators, may be used for short, intermittent, or occasional dust exposures such as cleanup, dumping of dust collectors, or unloading shipments of sand at a receiving point when it is not feasible to control the dust by enclosure, exhaust ventilation, or other means. The respirators used must be approved by NIOSH under 42 CFR part 84 for protection against the specific type of dust encountered.

(a) Dust-filter respirators may be used to protect the operator of outside abrasive-blasting operations where nonsilica abrasives are used on materials having low toxicities.

(b) Dust-filter respirators shall not be used for continuous protection where silica sand is used as the blasting abrasive, or toxic materials are blasted.

(iv) For employees who use respirators required by this section, the employer must implement a respiratory protection program in accordance with 29 CFR 1910.134.

(v) Operators shall be equipped with heavy canvas or leather gloves and aprons or equivalent protection to protect them from the impact of abrasives. Safety shoes shall be worn to protect against foot injury where heavy pieces of work are handled.

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