

DEPARTMENT OF PUBLIC HEALTH

CHAPTER III - HEALTH HAZARD CONTROL MEASURES PART II - VENTILATION CONTROL FOR SPECIFIC PROCESSES

Rule 3201 Scope and Applicability

This part applies to the following operations:

- (1) Abrasive blasting - See Rule 3205(1) for scope.
- (2) Forging machines - See Rule 3210.
- (3) Grinding, polishing and buffing - See Rule 3215(1) for scope.
- (4) Open-surface tanks - See Rule 3220(1) for scope.
- (5) Powered industrial trucks - See Rule 3225.
- (6) Sanding machines - See Rule 3230.
- (7) Spray finishing - See Rule 3235(1) for scope.
- (8) Welding, cutting and brazing - See Rule 3240.

Rule 3205 Abrasive Blasting

(1) **Scope.** This rule applies to all operations where an abrasive is forcibly applied to a surface by pneumatic or hydraulic pressure, or by centrifugal force. It does not apply to steam blasting, or steam cleaning, or hydraulic-cleaning methods where work is done without the aid of abrasives. [1910.94(a)(8)]

(2) Definitions applicable to this rule.

(a) **Abrasive.** A solid substance used in an abrasive-blasting operation. [1910.94(a)(1)(i)]

(b) **Abrasive-blasting respirator.** A continuous flow air-line respirator constructed so that it will cover the wearer's head, neck, and shoulders to protect him from rebounding abrasive. [1910.94(a)(1)(ii)]

(c) **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. [1910.94(a)(1)(iii)]

(d) **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. [1910.94(a)(1)(iv)]

(e) **Blasting cabinet.** An enclosure where the operator stands outside and operates the blasting nozzle through an opening or openings in the enclosure. [1910.94(a)(1)(v)]

(f) **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. [1910.94(a)(1)(vi)]

(g) **Dust collectors.** A device or combination of devices for separating dust from the air handled by an exhaust ventilation system. [1910.94(a)(1)(vii)]

(h) **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) ductwork, (c) dust-collecting equipment, (d) exhauster, and (e) discharge stack. [1910.94(a)(1)(viii)]

(i) **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. [1910.94(a)(1)(ix)]

(j) **Respirable dust.** Airborne dust in sizes capable of passing throughout the upper respiratory system to reach the lower lung passages. [1910.94(a)(1)(x)]

(k) **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. [1910.94(a)(1)(xi)]

(l) **Abrasive blasting.** The forcible application of an abrasive to a surface by pneumatic pressure, hydraulic pressure, or centrifugal force. [1910.94(a)(1)(xii)]

(3) Dust hazards from abrasive blasting.

(a) 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. [1910.94(a)(2)(i)]

(b) 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 Chapter II of these rules. [1910.94(a)(2)(ii)]

(c) 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), and the National Electrical Code, NFPA 70-1971; ANSI C1-1971 (Rev. of C1-1968). The blast nozzle shall be bonded and grounded to prevent the buildup 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. [1910.94(a)(2)(iii)]

(4) Blast-cleaning enclosures.

(a) 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. [1910.94(a)(3)(i)]

(b) 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 particles into an adjacent work area will be minimized and visible spurts of dust will not be observed. [1910.94(a)(3)(i)(a)]

(c) The rate of exhaust shall be sufficient to provide prompt clearance of dust-laden air within the enclosure after the cessation of blasting. [1910.94(a)(3)(i)(b)]

(d) Before the enclosure is opened, the blast shall be turned off and the system shall be run for a sufficient period of time to remove the dusty air within the enclosure. [1910.94(a)(3)(i)(c)]

(e) Safety glass protected by screening shall be used in observation windows, where hard deep-cutting abrasives are used. [1910.94(a)(3)(i)(d)]

(f) Slit abrasive-resistant baffles shall be installed in multiple sets of all small access openings where dust might escape and shall be inspected regularly and replaced when needed. [1910.94(a)(3)(i)(e)]

(i) Doors shall be flanged and tight when closed. [1910.94(a)(3)(i)(e)(1)]

(ii) 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. [1910.94(a)(3)(i)(e)(2)]

(5) Exhaust ventilation systems.

(a) 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. [1910.94(a)(4)(i)]

(i) When dust leaks are noted, repairs shall be made as soon as possible. [1910.94(a)(4)(i)(a)]

(ii) 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. [1910.94(a)(4)(i)(b)]

(b) 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.

[1910.94(a)(4)(ii)]

(c) 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. [1910.94(a)(4)(iii)]

(6) Personal protective equipment.

(a) Only respiratory protective equipment approved by the Bureau of Mines, U.S. Department of Interior (see 30 CFR Part 11) shall be used for protection of personnel against dusts produced during abrasive-blasting operations. [1910.94(a)(5)(i)]

(b) Abrasive-blasting respirators shall be worn by all abrasive-blasting operators. [1910.94(a)(5)(ii)]

(i) When working inside of blast-cleaning rooms, or [1910.94(a)(5)(ii)(a)]

(ii) 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 [1910.94(a)(5)(ii)(b)]

(iii) Where concentrations of toxic dust dispersed by the abrasive blasting may exceed the limits set in Chapter II and the nozzle and blast are not physically separated from the operator in an exhaust-ventilated enclosure. [1910.94(a)(5)(ii)(c)]

(c) Particulate filter respirators, commonly referred to as dust-filter respirators, properly fitted, 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. Respirators used shall be approved (see 30 CFR Part 11) for protection against the specific type of dust encountered. [1910.94(a)(5)(iii)]

(i) 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. [1910.94(a)(5)(iii)(a)]

(ii) Dust-filter respirators shall not be used for continuous protection where silica sand is used as the blasting abrasive, or toxic materials are blasted. [1910.94(a)(5)(iii)(b)]

(d) A respiratory protection program as defined and described in Rules 3501 and 3502 shall be established wherever it is necessary to use respiratory protective equipment. [1910.94(a)(5)(iv)]

(7) Air supply and air compressors. The air for abrasive-blasting respirators shall be free of harmful quantities of dust, mists, or noxious gases, and shall meet the requirements for air purity set forth in ANSI Z9.2-1960. The air from the regular compressed air line of the plant may be used for the abrasive-blasting respirator if: [1910.94(a)(6)]

(a) A trap and carbon filter are installed and regularly maintained, to remove oil, water, scale, and odor, [1910.94(a)(6)(i)]

(b) A pressure reducing diaphragm or valve is installed to reduce the pressure down to requirements of the particular type of abrasive-blasting respirator, and [1910.94(a)(6)(ii)]

(c) An automatic control is provided to either sound an alarm or shut down the compressor in case of overheating. [1910.94(a)(6)(iii)]

(8) Operational procedures and general safety. Dust shall not be permitted to accumulate on the floor or on ledges outside of an abrasive-blasting enclosure, and dust spills shall be cleaned up promptly. Aisles and walkways shall be kept clear of steel shot or similar abrasive which may create a slipping hazard. [1910.94(a)(7)]