
Chapter 296-818 WAC
Safety Standards for Abrasive Blasting
(Form Number 414-144-000)

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This book contains rules for Safety Standards for abrasive blasting, as adopted under the Washington Industrial Safety and Health Act of 1973 (Chapter 49.17 RCW).

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ABRASIVE BLASTING**

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WAC 296-818-100 Scope. This chapter applies to all abrasive blasting operations where an abrasive is forcibly applied to a surface using any of the following:

- Pneumatic pressure
- Hydraulic pressure
- Centrifugal force

References:

- *Depending on your work processes, here are examples of other chapters you may need:*
 - *Safety and health core rules, chapter 296-800 WAC*
 - *Machine safety, chapter 296-806 WAC*
 - *Respiratory hazards, chapter 296-841 WAC*
 - *Respirators, chapter 296-842 WAC*
 - *Lead, chapter 296-857 WAC*
 - *Scaffolds, chapter 296-874 WAC*
 - *Cadmium, chapter 296-62 WAC*
 - *Part L, Electrical, chapter 296-24 WAC*

[Statutory Authority: RCW 49.17.010, .040, .050, and .060. 06-12-074 (Order 06-05), § 296-818-100, filed 06/06/06, effective 09/06/01.]

WAC 296-818-200 General safety--Summary contents.

Your responsibility:

To protect employees from hazards associated with their work environment

Dust hazards

WAC 296-818-20005

Personal protective equipment (PPE)

WAC 296-818-20010

Housekeeping

WAC 296-818-20015

[Statutory Authority: RCW 49.17.010, .040, .050, and .060. 06-12-074 (Order 06-05), § 296-818-20015, filed 06/06/06, effective 09/06/01.]

WAC 296-818-20005 Dust hazards.

IMPORTANT:

- Abrasives and the surface coatings on materials blasted are shattered and pulverized during blasting operations. The dust formed will contain particles that could result in the following hazards:
 - Respiratory
 - Fire
 - Explosion
- Wet blasting methods minimize dust exposure, but dispersed droplets, mists, and dried residues may become airborne and create potential exposures.

WAC 296-818-20005 (Cont.)

You must:

- Evaluate the potential health hazards from abrasive blasting operations by considering the composition and toxicity of the abrasive material and the surface being abraded.

References:

- *For additional hazard assessment requirements, go to these separate chapters:*
 - *Respirators, chapter 296-842 WAC*
 - *The Safety and health core rules, chapter 296-800 WAC*
 - *Personal protective equipment, WAC 296-800-16005.*
- *For requirements on the use of combustible organic abrasive, go to WAC 296-818-30005.*

You must:

- Keep dust concentrations below the permissible exposure limits found in a separate chapter, Respiratory hazards, chapter 296-841 WAC.

Note:

- *When sampling for dust concentrations, place the sample collection device:*
 - *In the breathing zone of the operator;*
 - *AND*
 - *Outside the respiratory protection worn.*

[Statutory Authority: RCW 49.17.010, .040, .050, and .060. 09-05-071 (Order 08-35), § 296-818-20010, filed 02/17/09, effective 04/01/09]. Statutory Authority: RCW 49.17.010, .040, .050, and .060. 06-12-074 (Order 06-05), § 296-818-20005, filed 06/06/06, effective 09/06/01.]

WAC 296-818-20010 Personal protective equipment (PPE).

You must:

- Provide, at no cost to the employee, and make sure personal protective equipment is worn.
- Follow the requirements in Table-1, Personal Protective Equipment (PPE).

WAC 296-818-20010 (Cont.)

Table-1: Personal Protective Equipment (PPE)

PROVIDE	WHEN
<p>Abrasive Blasting Respirators</p>	<ul style="list-style-type: none"> • Operators work in any of the following situations: <ul style="list-style-type: none"> – Inside blast cleaning rooms – Where silica sand is used in manual blasting operations – Where concentrations of toxic dust exceed the permissible exposure limits found in a separate chapter: <ul style="list-style-type: none"> ▪ Respiratory hazards, WAC 296-841-20020, Table-3 “Exposure Limits for Air Contaminants” <p><i>Exemption:</i></p> <ul style="list-style-type: none"> • <i>An abrasive respirator does not need to be worn if the operator is physically separated from the nozzle and blast by an exhaust ventilated enclosure.</i> <p>Definition:</p> <p>Abrasive-blasting respirator</p> <p>A supplied air or a continuous flow respirator constructed to cover and protect the operator's head, neck and shoulders from rebounding abrasive.</p>
<ul style="list-style-type: none"> • Eye and Face protection to both of the following: <ul style="list-style-type: none"> – Blasting operators – Personnel working near blasting operations 	<p>Respirators worn during blasting operations do not provide eye and face protection</p>
<p>Gloves and Aprons made of heavy canvas or leather; OR Equivalent protection</p>	<p>Operators are exposed to the impact of rebounding abrasives</p>

Notes:

- *Use only respirators certified by NIOSH in 42 C.F.R. Part 84 for protecting employees from dusts, and other hazards produced during abrasive blasting operations, like:*
 - *Using a garnet sand to blast a concrete surface, resulting in crystalline silica dust*
- *A filtering face piece may be used only for short, intermittent, or occasional dust exposures for any of the following tasks:*

WAC 296-818-20010 (Cont.)

- *To protect the operator during abrasive blasting operations performed outside the enclosure or outdoors where nonsilica abrasives are used on materials with low toxicity*
- *Clean-up*
- *Dumping dust collectors*
- *Unloading shipments of sand at receiving areas when the following controls are not feasible:*
 - *Enclosures*
 - *Exhaust ventilation*
 - OR**
 - *Other means*

Reference:

- *For additional requirements to help you fully protect employees, go to the following separate chapters:*
 - *The Safety and health core rules, chapter 296-800 WAC:*
 - *Personal protective equipment (PPE), WAC 296-800-160*
 - *Respiratory hazards, chapter 296-841 WAC*
 - *Respirators, chapter 296-842 WAC:*
 - *Respirator program, WAC 296-842-120*
 - *Specifications for air quality, WAC 296-842-200*

[Statutory Authority: RCW 49.17.010, .040, .050, and .060. 06-12-074 (Order 06-05), § 296-818-20010, filed 06/06/06, effective 09/06/01.]

WAC 296-818-20015 Housekeeping.

You must:

- *Keep aisles and walkways clear of steel shot or similar abrasives that may create a slipping hazard.*
- *Prohibit the accumulation of dust on the floors or ledges outside blasting enclosures.*
- *Clean up dust spills promptly.*

Note:

- *Removal of accumulated dust should be done:*
 - *With a high efficiency particulate air filter (HEPA), vacuum cleaner when the plant is not in operation;*
 - AND**
 - *By a person wearing a respirator approved for the existing conditions*

Reference:

- *For additional housekeeping requirements, see the Safety and health core rules, chapter 296-800 WAC, Housekeeping, WAC 296-800-220.*

[Statutory Authority: RCW 49.17.010, .040, .050, and .060. 06-12-074 (Order 06-05), § 296-818-20015, filed 06/06/06, effective 09/06/01.]

WAC 296-818-300 Operations--Summary contents.

Your responsibility:

To follow these operational requirements

Combustible organic abrasives
WAC 296-818-30005

Blast cleaning enclosures
WAC 296-818-30010

Blast cleaning nozzles
WAC 296-818-30015

[Statutory Authority: RCW 49.17.010, .040, .050, and .060. 06-12-074 (Order 06-05), § 296-818-300, filed 06/06/06, effective 09/06/01.]

WAC 296-818-30005 Combustible organic abrasive.

IMPORTANT:

- This section applies to blasting operations where flammable or explosive dust mixtures may be present.

You must:

- Prohibit the use of combustible organic abrasives, except in automatic blast cleaning systems.
- Bond and ground the blast nozzle to prevent the buildup of static charges.

Note: Fine dust produced from combustible, organic abrasive is a fire and explosion hazard.

[Statutory Authority: RCW 49.17.010, .040, .050, and .060. 06-12-074 (Order 06-05), § 296-818-30005, filed 06/06/06, effective 09/06/01.]

WAC 296-818-30010 Blast cleaning enclosures.

You must:

- Install adequate ventilation systems in blast cleaning enclosures that are able to do all of the following:
 - Control concentrations of airborne contaminants below the permissible exposure limits that apply
 - Provide a continuous inward flow of air at all openings in the enclosure during blasting operations
 - Minimize the escape of dust into adjacent work areas
 - Maintain visibility in blast cleaning rooms and cabinets
 - Rapidly clear dust from the air after blasting stops
 - Discharge exhaust so contaminated air does not do either of the following:
 - Present a health hazard to any worker; or
 - Reenter buildings in harmful amounts

WAC 296-818-30010 (Cont.)

- Make sure ventilation systems are designed and operated so employees are not exposed to excessive air velocities
- Make sure make-up air systems do not interfere with the effectiveness of the exhaust system, and are designed to do both of the following:
 - Replace exhausted air in ample quantities
 - Temper make-up (supply) air when necessary
- Do both of the following before opening the blast cleaning enclosure:
 - Turn the blast off
 - Run the exhaust system for a sufficient period of time to clear the air of dust particles
- Follow the requirements in Table-2, Blast Cleaning Enclosures.

Table-2: Blast Cleaning Enclosures

If you have	Then make sure
Air inlets and access openings	<ul style="list-style-type: none"> • They are either baffled or arranged so the combination of inward airflow and baffles minimizes both of the following: <ul style="list-style-type: none"> – The escape of abrasive or dust particles into adjacent work areas. – Visible spurts of dust
Small access openings where dust might escape	<ul style="list-style-type: none"> • Slit resistant baffles are installed in multiple sets at all small access openings, and do both of the following: <ul style="list-style-type: none"> – Regularly inspect them – Replace them when needed
An observation window in enclosures where hard, deep cutting abrasives are used	The window is made of safety glass protected by screening Notes: <ul style="list-style-type: none"> • Hard, deep cutting abrasives may shatter normal glass.
	<ul style="list-style-type: none"> • If the safety glass shatters, the protective screening will help contain the glass and protect employees from cuts and lacerations.
Small operator access doors	They are flanged and tight when closed, and open from both inside and outside the enclosure. <i>Note:</i> <i>If you have a small operator access door and a large work access door, the large work access door may open or close from the outside only.</i>

WAC 296-818-30010 (Cont.)

References: For more information on:

- *Air velocities, refer to the following:*
 - *The latest edition of Recommended Industrial Ventilation Guidelines (ACGIH)*
 - *NIOSH 1976 Industrial Ventilation*
- *Exit routes, go to the Safety and health core rules, WAC 296-800-310.*

[Statutory Authority: RCW 49.17.010, .040, .050, and .060. 06-12-074 (Order 06-05), § 296-818-30010, filed 06/06/06, effective 09/06/01.]

WAC 296-818-30015 Blast cleaning nozzles.

You must:

- Make sure nozzles are all of the following:
 - Mounted on a support when not in use
 - Equipped with operating valves that are manually held open.

Note:

- *To help prevent the buildup of static charges, pressurized tanks used to supply abrasive should be:*
 - *Connected to the manual control of the nozzle;*
 - AND*
 - *Have the relief valve or opening located so it can safely vent.*

[Statutory Authority: RCW 49.17.010, .040, .050, and .060. 06-12-074 (Order 06-05), § 296-818-30015, filed 06/06/06, effective 09/06/01.]

WAC 296-818-400 Exhaust ventilation systems--Summary contents.

Your responsibility:

To make sure exhaust ventilation systems meet these requirements

Construction

WAC 296-818-40005

Explosion venting and wiring

WAC 296-818-40010

Inspection and maintenance

WAC 296-818-40015

[Statutory Authority: RCW 49.17.010, .040, .050, and .060. 06-12-074 (Order 06-05), § 296-818-400, filed 06/06/06, effective 09/06/01.]

WAC 296-818-40005 Construction.

You must:

- Make sure exhaust systems are constructed, installed, inspected, and maintained to meet both of the following:
 - The American National Standards Institute (ANSI), Z9.2-2001 for:
 - Fundamentals Governing the Design and Operation of Local Exhaust Systems
 - The National Fire Protection Association (NFPA) 91-2004 for:
 - Exhaust Systems for Air Conveying of Vapors, Gases and Noncombustible Particulate Solids.

Reference:

- Refer to the American National Standards Institute, ANSI Z9.4-1997 for information on the following:
 - *Exhaust Systems for Abrasive-blasting Operations, Ventilation, and Safe Practices for Fixed Location Enclosures.*

[Statutory Authority: RCW 49.17.010, .040, .050, and .060. 06-12-074 (Order 06-05), § 296-818-40005, filed 06/06/06, effective 09/06/01.]

WAC 296-818-40010 Explosion venting and wiring.

You must:

- Follow the requirements in Table-3 for flammable or combustible dust mixtures

Table-3: Explosion Venting and Wiring

If you have	Then
Flammable or explosive dust mixtures that may be present	Make sure the construction of equipment, including the exhaust system and all electrical wiring, meets both of the following: <ul style="list-style-type: none"> • The American National Standard Installation (ANSI) of Blower and Exhaust Systems for Dust, Stock, and Vapor Removal or Conveying, NFPA 91. 2004. • The electrical requirements for Class II locations in WAC 296-24-95613, located in Part L of chapter 296-24 WAC.
	Make sure blast cleaning enclosures, the ducts, and the dust collector are constructed with either loose panels or explosion venting areas that meet all of the following: <ul style="list-style-type: none"> • Provides pressure relief in case of an explosion. • Are located away from occupied areas. • The Guide for Deflagations, NFPA 68. 2002.

[Statutory Authority: RCW 49.17.010, .040, .050, and .060. 06-12-074 (Order 06-05), § 296-818-40010, filed 06/06/06, effective 09/06/01.]

WAC 296-818-40015 Inspection and maintenance.

You must:

- Make sure the exhaust ventilation system is fully operational by checking the static pressure drop at the exhaust ducts leading from the equipment at both of the following times:
 - When installation is completed
 - Annually after installation.
- Repair or clean exhaust systems when either of the following occur:
 - Dust leaks are found; or
 - The pressure drop gauge indicates a change exceeding 20 percent.
- Use an abrasive separator to separate larger particles for reuse on installations where abrasive is recirculated.
- Set up dust collecting equipment to do both of the following:
 - Empty and remove accumulated dust without contaminating work areas
 - Discharge the air used in blast cleaning equipment.

Note: Dispose fine dust from dry collectors by doing one of the following:

- *Emptying and transporting the fine dust in enclosed containers*
- *Using a sluice with a wetting process to contain the dust.*

[Statutory Authority: RCW 49.17.010, .040, .050, and .060. 06-12-074 (Order 06-05), § 296-818-40015, filed 06/06/06, effective 09/06/01.]

WAC 296-818-500 Definitions.

Abrasive: - A solid granular substance used in abrasive blasting operations.

Abrasive blasting: - The forcible application of an abrasive to a surface using either:

- Pneumatic or hydraulic pressure;
- **OR**
- Centrifugal force

Abrasive-blasting respirator: - A supplied air or a continuous flow respirator constructed with a shroud that covers and protects the head, neck, and shoulders.

Automatic blast cleaning systems: - A unit that has a blast cleaning chamber which usually has both of the following to provide a timed cleaning cycle:

- An automatic timer;
- **AND**
- An automatic shutoff control

Baffles: - Partial enclosures in and around the emission sources which improve or enhance airflow at the hood.

WAC 296-818-500 (Cont.)

Blast cleaning barrel: - A complete enclosure that rotates on an axis or an internal tread to tumble parts in order to expose various surfaces of the parts to an automatic blast spray.

Blast cleaning room: - An enclosed room where blasting operations are performed by an operator who works from inside the room using a blasting nozzle to direct the flow of abrasive material.

Blasting cabinet: - An enclosure where the operator stands outside using a blasting nozzle through an opening, or openings in the enclosure.

Dust collector: - A device in an exhaust ventilation system used to remove dust from air.

Exhaust ventilation system: - A system that removes contaminated air using the following:

- Enclosure or hood
- Duct work
- Dust collecting equipment
- Exhauster
- Discharge stack

Local exhaust ventilation: - The mechanical removal of contaminated air from the point where the contaminant is being generated or liberated.

Make-up air systems: - A ventilation system that controls the volume of outdoor air supplied to a building to replace air being exhausted.

Rotary blast cleaning table: - An enclosure where the pieces to be cleaned are placed on a rotating table and passed automatically through a series of blast sprays.

Tempered make-up air: - Air which has been conditioned by changing its heat content to get a specific desired temperature.

Ventilation: - The provision, circulation or exhausting of air into or from an area or space.

[Statutory Authority: RCW 49.17.010, .040, .050, and .060. 06-12-074 (Order 06-05), § 296-818-500, filed 06/06/06, effective 09/06/01.]