



ABRASIVE BLASTING & HEXAVALENT CHROMIUM

Bridge Coating Removal, Surface Preparation and Exposure Control

POLICY STANDARD

Abrasive blasting shall not begin until the coating, substrate, abrasive, containment, exposure controls, respiratory protection, decontamination and emergency arrangements have been evaluated and authorized.

PHEIFER BROTHERS CONSTRUCTION CO., INC.
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USE OF THIS POLICY

This company policy establishes minimum expectations. Project specifications, owner requirements, product SDSs, industrial-hygiene findings and applicable regulations may require additional controls.

Primary Regulatory References

- 29 CFR 1926.57(f) - Abrasive blasting ventilation, PPE and operating requirements
- 29 CFR 1926.1126 - Chromium (VI) in construction
- 29 CFR 1926.62 - Lead in construction, when lead-containing coatings are disturbed
- 29 CFR 1926.103 and 29 CFR 1910.134 - Respiratory protection
- 29 CFR 1926.55, 1926.59, 1926.95-.102 and 1926.200 - Air contaminants, hazard communication, PPE and signs
- 29 CFR 1926.1153 - Respirable crystalline silica, when applicable

Official references: www.osha.gov/laws-regs/regulations/standardnumber/1926/1926.57 and www.osha.gov/laws-regs/regulations/standardnumber/1926/1926.1126

1. Purpose, Scope and Responsibilities

Purpose and Scope

This policy protects employees and the public from abrasive impact, high-pressure equipment, airborne dust and toxic metals generated during abrasive blasting, coating removal and related cleanup on bridges, highway structures, equipment and fabricated steel. It applies to Pheifer Brothers employees and subcontractors whose work may create or enter an affected area.

Hexavalent chromium [Cr(VI)] may be present in bridge coatings, primers, pigments, stainless steel and welding fumes. Blasting can also release lead, silica, cadmium and other contaminants. The abrasive alone does not define the hazard; the coating, substrate, spent abrasive and work method must all be evaluated.

Management / Program Owner

- Maintain this policy, the respiratory protection program and access to qualified industrial-hygiene support.
- Provide required engineering controls, PPE, training, medical evaluations and exposure monitoring at no cost to employees.
- Review projects and assign competent supervision before work begins.
- Ensure subcontractor coordination and preserve exposure, training and medical records.

Project Manager / Foreman

- Confirm the pre-job hazard assessment, coating information, containment plan, exposure-control plan and emergency arrangements are complete.
- Establish regulated and exclusion areas; verify daily inspections and employee authorization.
- Stop work when controls fail, dust escapes, conditions change or exposure assumptions are no longer valid.
- Coordinate with the controlling contractor, owner, traffic-control personnel and adjacent employers.

Employees

- Follow the approved plan, training, respirator requirements and decontamination sequence.
- Inspect assigned equipment and report defects, symptoms, spills, visible emissions and loss of containment immediately.
- Do not eat, drink, smoke, chew gum/tobacco or apply cosmetics in contaminated areas.
- Use stop-work authority when conditions are unsafe or different from the plan.

STOP-WORK AUTHORITY

Any employee may stop abrasive blasting when containment, ventilation, respiratory protection, communication, traffic control or emergency capability is inadequate. Work resumes only after authorized correction and reassessment.

2. Hazard Assessment and Pre-Job Planning

Coating, Substrate and Abrasive Evaluation

Before disturbance, obtain available coating records, owner surveys, SDSs and analytical results. When composition is unknown or unreliable, arrange representative sampling by a qualified person and plan conservatively until results are available.

- Identify lead, chromium, cadmium, arsenic, silica, asbestos or other hazardous constituents in coatings, corrosion products, substrate and abrasive.
- Review the abrasive SDS and prohibit unapproved media. A substitute abrasive may still produce hazardous dust.
- Evaluate welding, torch cutting, grinding, needle-gunning and cleanup performed inside or near the containment.
- Identify environmental permits, owner specifications and waste-characterization requirements.

Site-Specific Blasting Plan

- Work limits, sequence, schedule and responsible supervisor.
- Containment class/design, ventilation, dust collection, negative pressure or inward airflow where specified, and inspection methods.
- Regulated/exclusion areas, access control, warning signs and separation from traffic, waterways, pedestrians and other crews.
- Air-monitoring strategy for blasters, pot tenders, helpers, cleanup workers and potentially exposed employees outside containment.
- Respirator type, breathing-air source, compressor/CO safeguards, PPE, communication and heat-stress controls.
- Decontamination, hygiene facilities, clean/dirty change areas, waste storage and emergency/rescue procedures.

Additional Bridge/Highway Hazards

- Falls, scaffolds, suspended platforms and work over water.
- Live traffic, lane restrictions, public access and nighttime visibility.
- Compressed-air hoses, whip hazards, nozzle reaction, static electricity and stored pressure.
- Noise, reduced visibility, heat burden, cold, wind, lightning and confined or enclosed spaces.
- Fire/explosion hazards from combustible dusts, coatings, solvents or nearby hot work.

NO ASSUMPTIONS

Do not rely on coating color, age, appearance or the abrasive trade name to determine exposure. Use records, laboratory analysis, objective data and employee exposure monitoring as required.

3. Exposure Determination and Control

Hexavalent Chromium Limits

The Cr(VI) action level is 2.5 micrograms per cubic meter ($\mu\text{g}/\text{m}^3$) as an 8-hour time-weighted average (TWA). The permissible exposure limit is 5 $\mu\text{g}/\text{m}^3$ as an 8-hour TWA. Employee exposure is evaluated without credit for respirator use.

Exposure Determination

- Use the scheduled-monitoring option or a performance-oriented determination supported by air monitoring, objective data and process information meeting 29 CFR 1926.1126.
- Initial personal breathing-zone samples must represent each affected job classification, shift and work area; representative monitoring must include the employee expected to have the highest exposure.
- For Cr(VI), monitor at least every six months when exposure is at or above the action level and at least every three months when above the PEL, unless discontinuation criteria are met.
- Repeat monitoring after process, material, equipment, personnel or control changes, or whenever new/additional exposure may have occurred.
- Notify affected employees of Cr(VI) monitoring results within five workdays and describe corrective action when the PEL is exceeded.

Control Hierarchy

- Use engineering and work-practice controls to reduce exposures to or below applicable limits whenever feasible.
- Select less hazardous abrasives/coatings only after verifying the full hazard profile and project requirements.
- Use effective containment, local exhaust, dust collection, wet methods or automated/remote methods where feasible.
- Maintain inward airflow at blast enclosure openings and allow ventilation to clear airborne dust before opening containment.
- Use respirators in addition to controls when controls cannot achieve the limit, while controls are being installed, during emergencies, or where the applicable standard otherwise requires them.

Regulated Areas

Establish demarcated regulated areas wherever an employee's Cr(VI) exposure is expected to exceed the PEL. Limit entry to authorized persons who need access and who use required PPE and respiratory protection. Use signs and barriers appropriate to the hazards, including lead-regulated-area language when lead applies.

**VISIBLE DUST IS
A FAILURE
SIGNAL**

Escaping dust, failed negative pressure, damaged containment, overloaded collectors or unexpected residue requires immediate stop-work, isolation, correction and exposure reassessment.

4. Blasting Equipment, Containment and Work Zone

Daily Equipment Inspection

- Inspect blast pot, valves, deadman control, nozzle, couplings, gaskets, hoses, restraints/whip checks, air lines, breathing-air system and communication equipment before use.
- Use positive-locking couplings and manufacturer-compatible components rated for the operating pressure.
- Test the deadman control; never tie, wedge or bypass it.
- Tag out defective equipment and depressurize/isolate energy before adjustment, cleaning or repair.
- Ground and bond the nozzle, blast equipment and conductive components where static or combustible-dust hazards may exist.

Containment and Ventilation

- Construct containment to withstand wind, pressure differentials, abrasive rebound and expected loading without interfering with structural stability or traffic.
- Ventilate blast enclosures to maintain continuous inward airflow at openings and minimize dust escape.
- Position exhaust so contaminated air is not pulled through employee breathing zones and discharge through effective dust collection.
- Inspect seams, doors, seals, baffles, ducting and collectors before and during each shift. Repair leaks promptly.
- Turn blasting off and operate exhaust long enough to clear dusty air before opening or entering after blasting.

Exclusion Zone and Communication

- Barricade the blast zone for abrasive rebound, hose movement, noise and airborne contamination.
- Keep nonessential personnel outside. Provide warning signs and controlled access.
- Maintain reliable communication between blaster, pot tender, attendant/spotter and supervisor.
- The pot tender must be able to shut down the system immediately and must not leave the assigned position without relief.
- Protect the public, waterways, vehicles and adjacent crews from falling debris and releases.

Operating Rules

- Never point a nozzle at any person or use compressed air to clean skin or clothing.
- Maintain secure footing and control nozzle reaction. Stop if the hose snags, kinks, separates or cannot be controlled.
- Depressurize the system before clearing a blockage, changing a nozzle or disconnecting any component.
- Keep hoses routed away from sharp edges, traffic, hot surfaces, pinch points and fall hazards.

5. Respiratory Protection and Personal Protective Equipment

Respiratory Protection Program

All required respirator use must comply with the company Respiratory Protection Program and 29 CFR 1910.134/1926.103. Employees must receive medical clearance before fit testing or use, annual fit testing for tight-fitting facepieces, training, inspection and proper maintenance. Only NIOSH-approved equipment may be used.

Blasting Respirators

- Abrasive-blasting operators shall wear a NIOSH-approved abrasive-blasting respirator when required by 29 CFR 1926.57(f), including work inside blast-cleaning rooms and uncontrolled manual blasting where toxic dust may exceed applicable limits.
- Select respirators from measured or reasonably anticipated concentrations, contaminant form, assigned protection factor, IDLH potential and applicable lead/Cr(VI)/silica requirements.
- For supplied-air systems, breathing air must meet Grade D quality requirements. Locate compressor intakes away from exhaust and engine emissions; use required sorbent beds, alarms and carbon-monoxide monitoring/control.
- Never use compressed shop air or oxygen as breathing air. Breathing-air couplings must be incompatible with nonrespirable gas systems.
- Employees shall leave the area immediately for loss of airflow, alarm, odor/taste, breakthrough, dizziness, breathing difficulty, damaged equipment or any suspected respirator failure.

Required PPE

- Blast hood/helmet providing head, neck, shoulder, eye and face protection appropriate to the blasting operation.
- Heavy-duty blast suit or coveralls, leather/canvas gloves and protective footwear resistant to abrasive rebound and contamination.
- Hearing protection selected through the hearing-conservation program; dual protection where exposure assessment requires it.
- Fall protection, high-visibility apparel, PFDs and other task/site PPE remain required and must be compatible with the respirator and blast suit.
- Protective clothing selected to prevent Cr(VI), lead and other contamination from contacting skin, street clothing or personal items.

Facial Hair and Compatibility

Nothing may pass between a tight-fitting respirator seal and the face. Facial hair, eyewear, hoods, straps and other PPE must not interfere with the seal, valves, breathing-air supply, vision, mobility or communication.

RESPIRATOR LIMIT

A respirator does not replace feasible containment, ventilation or work-practice controls. Never select a respirator from appearance or odor; use the exposure assessment and written program.

6. Hygiene, Decontamination, Housekeeping and Waste

Clean/Dirty Separation

- Provide designated change areas that prevent contaminated protective clothing from contacting street clothing.
- Provide washing facilities appropriate to the hazard and ensure employees wash hands and face before eating, drinking, smoking, chewing or leaving the site.
- Where required by the exposure assessment or lead program, provide showers and separate clean/dirty facilities.
- Keep food, beverages, tobacco, gum, cosmetics, phones and personal items out of regulated and contaminated areas.

Removal and Handling of PPE

- Follow the posted doffing sequence to prevent contamination of skin, clothing, vehicles and clean areas.
- Remove surface contamination using HEPA vacuuming or another method that does not disperse dust. Do not blow or shake clothing.
- Place contaminated reusable clothing/equipment in labeled, closed containers for cleaning or disposal.
- Do not take contaminated work clothing or equipment home. Inform laundry/cleaning personnel in writing of Cr(VI), lead or other hazards as applicable.

Housekeeping

- Use HEPA vacuuming or wet methods. Dry sweeping, dry brushing and compressed-air cleaning are prohibited unless the applicable narrow exception is documented and no feasible alternative exists.
- Clean dust spills promptly and prevent abrasive from accumulating on floors, platforms and ledges.
- Keep walkways clear of steel shot, hoses and debris that create slip/trip hazards.
- Use methods that minimize secondary exposure during filter changes, collector emptying and containment teardown.

Waste and Environmental Control

- Collect spent abrasive, coating debris, filters and disposable PPE in compatible, closed and labeled containers.
- Characterize, store, transport and dispose of waste under project specifications and applicable environmental requirements.
- Prevent releases to soil, storm drains and waterways. Report containment breaches or spills immediately.
- Treat collected material as potentially hazardous until characterization establishes otherwise.

NO TAKE-HOME EXPOSURE

Contaminated clothing, shoes, tools or personal items shall not be carried into vehicles or homes. Complete decontamination before entering clean areas.

7. Hexavalent Chromium: Medical Surveillance, Training and Records

Medical Surveillance

Pheifer Brothers will make Cr(VI) medical surveillance available at no cost and at a reasonable time and place to employees who are or may be occupationally exposed in an emergency, who experience signs or symptoms of adverse Cr(VI) effects, or who are exposed at or above the action level for 30 or more days per year.

- Provide an initial examination within 30 days after assignment unless an equivalent examination was provided within the preceding 12 months.
- Provide periodic examinations at least annually and additional examinations when required by 29 CFR 1926.1126(i), including after emergencies and at employment termination when applicable.
- Provide the examining physician or other licensed healthcare professional the standard, job/exposure information, PPE information and relevant prior written medical opinions.
- Provide the employee a copy of the written medical opinion within two weeks after receipt. Maintain medical confidentiality.
- Employees should promptly report persistent cough, wheezing, shortness of breath, nose irritation/bleeding, skin rash, ulcers or eye irritation.

Training and Hazard Communication

- Train affected employees before assignment and when hazards or controls change.
- Cover health effects, exposure limits, regulated areas, controls, respirator/PPE use, hygiene, emergency procedures, medical surveillance and the contents/location of this policy.
- Review SDSs and labels for abrasives, coatings, cleaners and wastes. Employees must be able to explain the hazards and protective steps.
- Provide task-specific instruction for blast equipment, containment, ventilation, fall protection and site emergency procedures.

Records

- Maintain air-monitoring records with date, task, sampling method, results, PPE and employees represented.
- Maintain objective data used for exposure determinations and identity of the material/process represented.
- Maintain medical-surveillance records in accordance with 29 CFR 1910.1020 and the applicable substance standard.
- Maintain respirator medical clearance, fit tests, training/authorization, inspections, maintenance, incidents and corrective actions.

Program Review

Review this policy at least annually and after an exposure exceedance, containment failure, incident, regulatory change, new abrasive/coating system or material change. Printed copies are uncontrolled unless issued through the company document-control process.

8. Emergency Response, Inspection and Enforcement

Emergency Conditions

- Loss of breathing air, carbon-monoxide alarm, respiratory distress or suspected toxic exposure.
- Blast-hose/coupling failure, uncontrolled nozzle, pressure-vessel concern or major equipment failure.
- Containment collapse, significant dust escape, fire/explosion, fall, electrical contact, traffic intrusion or water rescue.
- Uncontrolled release of Cr(VI), lead or other hazardous material beyond incidental cleanup capability.

Response

- Stop blasting using the deadman/emergency shutdown; isolate energy when safe.
- Raise the alarm, keep unprotected persons out and call 911 when needed. Give the exact project location and access point.
- Do not enter a contaminated or IDLH atmosphere for rescue unless trained, equipped and assigned under an approved rescue plan.
- Move an exposed person to fresh air only when it can be done without creating another victim; begin first aid within training and obtain medical evaluation.
- Preserve the scene and report the event to the foreman/project manager. Only authorized personnel may release or restart the area.

Daily Field Verification

- Approved blasting plan, hazard assessment and current SDS/coating data onsite.
- Containment, ventilation, dust collection and access controls operating as designed.
- Blast and breathing-air equipment inspected; alarms and deadman control tested.
- Employees authorized, medically cleared, fit tested and wearing compatible PPE.
- Decontamination, hygiene, waste containers, communication, first aid and emergency access ready.
- Weather, wind, traffic, fall, water and adjacent-work conditions remain within the plan.

Enforcement

Failure to follow regulated-area controls, respirator requirements, decontamination, equipment safeguards or stop-work directions is a safety violation subject to corrective action under company policy. Deliberate bypass of a deadman control, entry without required PPE or use of unauthorized blasting equipment is prohibited.

RESTART AUTHORIZATION

After any loss of containment, alarm, equipment failure, exposure concern or changed condition, work may restart only after the cause is corrected, the plan is reassessed and the foreman or designated competent supervisor authorizes restart.

9. Test Your Knowledge

Circle the best answer. Review any missed question with your foreman before performing or supporting abrasive blasting.

1. What determines blasting dust hazards? A. Abrasive name only B. Abrasive, coating, substrate and process C. Dust color	2. What is the Cr(VI) PEL? A. 5 µg/m³ as an 8-hour TWA B. 50 µg/m³ C. 2.5 mg/m³
3. Who may enter a regulated area? A. Anyone wearing a hard hat B. Authorized persons with required protection C. Visitors	4. May the deadman control be tied open? A. Yes B. Only for short work C. No
5. What breathing air is permitted? A. Oxygen B. Air meeting required breathing-air quality C. Any shop compressor	6. How should contaminated dust be cleaned? A. HEPA vacuum or wet method B. Compressed air C. Dry sweeping
7. Can contaminated clothing go home? A. Yes, if bagged B. No C. Only weekly	8. What does visible dust escaping mean? A. Work faster B. A control failure requiring stop and correction C. Normal operation
9. When must exposure be reassessed? A. Only each decade B. After relevant changes or suspected new exposure C. Never after initial sampling	10. What follows a respirator airflow alarm? A. Leave the area immediately B. Ignore it if no odor C. Finish the tank

EMPLOYEE: _____

DATE: _____

ANSWER KEY: 1-B | 2-A | 3-B | 4-C | 5-B | 6-A | 7-B | 8-B | 9-B | 10-A