

PURPOSE/APPLICATION

To provide guidance to workers who performing abrasive blasting and/or work in proximity to abrasive blasting operations, and to protect workers from injuries or illnesses associated with abrasive blasting.

PPE

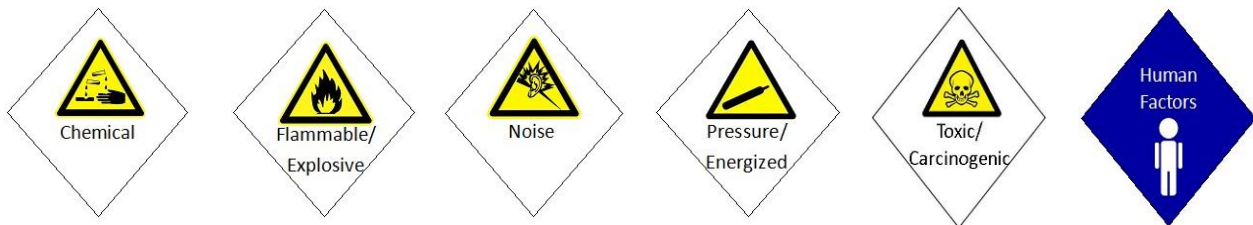
- Canadian Plains Energy Services (CPES) minimum site-specific requirements
- Coveralls/blasting suit (as per HIAC)
- Hearing protection
- Gauntlets
- Blast helmet/respirator
- Coveralls/leggings

TRAINING

- WHMIS 2015
- Site-specific product review - SDS
- Confined space – (where required)
- Respirator/Fit testing
- Review this SWP – Abrasive Blasting
- Review COP 02 Respiratory Protective Equipment

HAZARD SOURCES & CONCERNS

- Personal Occupational illness and/or injury
- Toxic Material
- Abrasive Blasting Agent
- Noise, Flying Debris
- Flammable Materials (gas, oil, propane)
- NORMs Potential
- Wind
- Use of Breathing Equipment (SABA, SCBA)



Abrasive blasting involves the removal of a coating, or an encrustation such as dirt or rust, from an object (pipeline, spool or metal structure). The types of surface coating, the nature of the encrustation, the composition of the base material being treated, as well as the abrasive material itself are some of the sources of contaminants that may be present in used abrasive material.

Approaching any work involving abrasive blasting requires the utilization CPES’s Hazard Identification, Assessment and Control (HIAC) process. A key consideration in planning your blasting tasks is having knowledge of the materials that have been utilized in the process/operation, state of manufacturing/fabrication.

For work planning and execution this SWP follows the three stage HIAC process;

- 1) Before Work Starts
- 2) Prior to Execution of Work
- 3) Execution of Work

PRECAUTIONS

- Caution must always be applied when abrasive blasting on pressurized systems. Prior to any abrasive blasting on process or in-service equipment, a review with Client Integrity Program or Management team is required. For example, abrasive blasting on a pipeline integrity dig site, where client has communicated, reduced line pressures and supervision requirements.
- Use non-silica abrasive materials/agents. Silica-based material puts the user and nearby workers at risk for serious respiratory illnesses.
- Ensure systems that being abrasive blasted are locked and tagged out (LOTO) where zero pressure is required. If line will not be fully depressurized, verify that pressure has been lowered to the level approved by line owner and by hazard assessment.
- Confirm potential hazardous materials that may be encountered with asset owner. CPES may not have control over the content of the material that is being removed by the abrasive blasting process. However, there is a reasonable expectation for CPES to be aware of the composition of the material being removed and of the base material, and to be aware of the presence of any harmful substances (e.g. lead paint, asbestos, etc.).
- Exposure to hazardous substances must be kept as low as reasonably achievable, and if material less hazardous to the worker can replace more hazardous material, then this should be considered.

DO'S

- **DO** Ensure you are aware of the composition of the materials being removed.
- **DO** Ensure systems that are being blasted are locked and tagged out.
- **DO** Inspect all components of the blasting unit prior to beginning. Including all hose connections to have whip checks.
- **DO** Test dead man switches at blasting handle to verify proper operation.
- **DO** Have warning signage in place indicating that sand blasting is taking place in the vicinity.
- **DO** Ensure no other work activity is taking place in the vicinity of the blasting area. Set up barriers to isolate the blasting area from other workers as required.
- **DO** Use non-silica based abrasive materials.
- **DO** Ensure adequate air supply is delivered to blasting helmet prior to use.
- **DO** Obtain and review SDS sheets for blasting medium and materials being removed.
- **DO** Inspect all PPE before each use. Includes to wear hearing protection when in area of blasting operations.

DON'Ts

- **DON'T** Use silica-based materials, they put workers at risk for serious respiratory illness.
- **DON'T** Blast any assets that have asbestos or NORM contamination.
- **DON'T** Remove respiratory protection until well clear of the blasting area.
- **DON'T** Eat, drink or use tobacco products in the work area.
- **DON'T** Enter a work area where blasting is taking place unless authorized and wearing proper PPE.
- **DON'T** Remove blast nozzle from workpiece until flow of air and abrasive material has completely stopped.

1. BEFORE WORK STARTS (PRE-JOB PLANNING)

Review job scope, potential hazard sources with owner and/or client

- a) Depending on scope of work; complete job site, yard and/or shop visit.
- b) Hold a pre-job meeting with the client (internal, external, other contractors).
- c) The meeting should be held well enough in advance of the work, to allow for the sourcing of the equipment, material and for proper planning to take place, including:
 - Assess work location and work areas
 - Verify potential hazard sources and energy requirements meet zero or the permitted levels from owner/client and hazard assessment
 - Determine potentially hazardous products, obtain SDS sheets for all controlled products, and
 - Confirm any concurrent operations.

Review job scope and potential hazard sources with workers and supervisors

- a) Obtain SDS sheets for all controlled products (i.e. blasting medium(s), base materials, process materials)
- b) A HIAC hazard assessment must be conducted to assess the potential for overexposure, considering all routes of exposure, including inhalation, ingestion, and skin contact
- c) Review the equipment requirements (i.e. compressors for abrasive blasting, supplied air equipment, PPE) meet CSA and regulatory standards
- d) When contractors are being utilized to for abrasive blasting duties, contractors and their equipment must be evaluated and verified capable to perform the tasks safely

2. PRIOR TO EXECUTION OF WORK

Review site specific hazards, assessment and controls with clients

- a) Review the Code of Practice(s) that are relevant to the scope of work, may include:
 - i. Respiratory Protective Equipment (COP-02)
 - ii. Confined Space Entry (COP-03)
 - iii. Lockout Tagout LOTO (COP-05)
 - iv. Fall Protection (COP-06)
 - v. Noise Control and Hearing Conservation (COP-04)
- b) Develop job plan and HIAC with considerations for:
 - i. Weather conditions (wind, temperature, rain)
 - ii. Confirm the equipment required (compressor, hose lengths)
 - iii. Location where blasting is to be done and in consideration for other activities
 - iv. Review the SDS and labels to know the procedures for safe use, storage, and handling of all hazardous materials, products, and substances you are working with.

- c) Review site-specific emergency response plans and emergency procedures associated with all hazardous materials, products, and substances they may be exposed to.

Implement Hazard Control Measures

- a) Use the personal protective equipment (e.g. gloves, goggles, respirator etc.) as recommended in the SDS.
 - i. Workers must wear respiratory protective equipment when airborne contaminants exceed occupational exposure limits. Refer to your provincial regulations for specific OELs.
 - ii. Workers exposed to hazards that may affect the skin must wear protective equipment based on SDS or hazard.
- b) No worker will be exposed to a substance that exceeds the ceiling limit, short-term exposure limit, or 8-hour TWA limit prescribed by ACGIH.
- c) If there is no enclosed cabinet/workspace, determine "Critical/Restricted Area" and tape off (red), barricade, and post signs of "No Entry" to restrict access to the area.
- d) Ensure no other activity is taking place adjacent to or on the item you are performing abrasive blasting activities. Or, do not perform other work activities downwind from abrasive blasting operations.
- e) Crystalline silica should only be used when there is no other less-harmful option available, and only when all controls are implemented.
- f) If a worker may be contaminated by a harmful substance at a work site, the employer shall ensure that a means to decontaminate the worker is available. For chemicals that are harmful to the eyes or skin the worker will have immediate access to baths, showers, or eye flushing equipment as appropriate in case of emergency.
- g) Employees must be instructed on the proper handling, storage, and disposal of wastes. This may include general instruction on disposal of non-hazardous wastes, trash, or scrap materials.
- h) Address safe practices related to the immediate storage and handling of waste, scrap, or leftover materials. If PPE or other precautions are necessary to handle waste, these should be identified in the program, this would include but not limited to coveralls, eye protection, specialized gloves, and breathing apparatus.
- i) If wastes generated are classified as hazardous, employees must be trained to ensure proper disposal.

Hazard reassessments are to be conducted when there is a change in work conditions, which may increase the exposure, such as a change in production rate, process, or equipment using CF-S-01.

- j) Designate Safety watch to monitor air system (SCBA) as necessary.

Work Area

- When abrasive blasting is being conducted ensure no other activities are being performed in adjacent areas and/or down wind, consider the location of vehicles and equipment, there is a potential for damage to windows or equipment.
- When abrasive blasting or a similar operation is conducted by a worker outside a cabinet, building, enclosure or comparable work area, written THAs and safe job procedures addressing the hazards and necessary controls must be prepared.

- Abrasive blasting and similar operations shall, be conducted inside a cabinet, building, enclosure, or other work area provided with exhaust ventilation and makeup air to reduce exposure of workers inside the enclosure and prevent the uncontrolled release of air contaminants from the enclosure whenever possible.
- This area must be inspected prior to each use to ensure that it meets all legislative requirements and provides the protection required to workers outside the work area.

Personal Protective Equipment

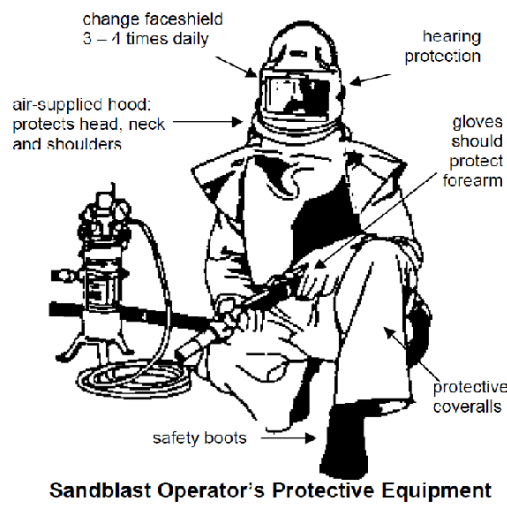
Respiratory Protection:

- When PPE is used as one of the control measures, an approved respiratory system must be worn, such as:
 - Air supply hood and air supply system.
 - A self-contained breathing apparatus (SCBA), sufficiently charged so that the worker can perform the work safely, operates in a pressure-demand or positive pressure mode, and has a minimum rated capacity of 30 minutes.
 - Where portable air supply compressors are used, it must be placed in an area where other containments will not be draw into the air supply and into the hood.
 - A supplied air breathing apparatus (SABA) where the airline respirator is equipped with a full-face piece that operates in a pressure demand or positive pressure mode, and has an auxiliary supply of air sufficient to allow the worker to escape in case of failure of the primary air supply equipment.
- Respiratory protection and the air supplied to the approved respirator must meet all legislative requirements, and NIOSH approved air lines and subassemblies must be used to deliver breathing air to the user.
- Operators must not remove their respiratory protection systems until they are well removed from the work location, as some airborne hazards can remain suspended in the air for long periods of time.
- Care should be taken when removing potentially contaminated PPE to prevent second degree exposure.
- All supplied air systems must comply with local legislative supplied air regulations.

Other PPE Required:

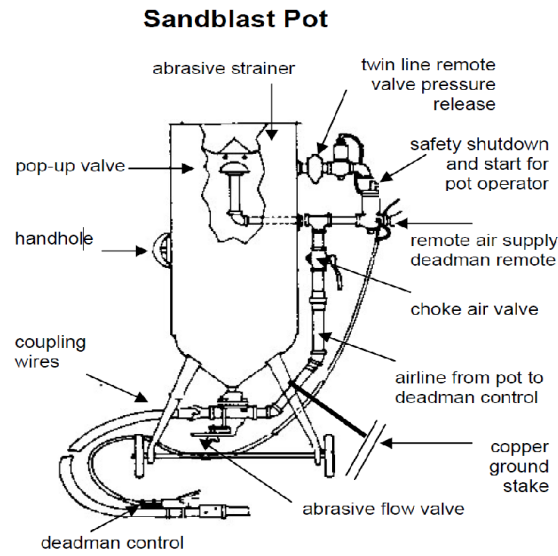
- Equipment that will protect the operators' head, neck and shoulders.
- Coveralls that provide suitable protection from rebound abrasives (i.e. disposable coveralls, basting suits, etc. as per Hazard Assessment).
- Hand and arm protection, including gloves that extend above the forearm (gauntlets).
- Hearing protection rated for the level of noise.

All PPE must be inspected before each use, stored in a location that is clean, secure and readily accessible by the worker, immediately repaired or replaced if it is defective, and immediately replaced with clean or decontaminated equipment if it is rendered ineffective because of contamination with a hazardous substance.



General Safety

- If an electrostatically conductive blast hose is not available, the blast nozzle must be grounded.
- The abrasive blast pot must be provided with an emergency stopping device and be de-energized while being filled with abrasives.
- The operator must blow out all air lines and hoses before and after use. The entire abrasive blasting unit must be carefully examined for defects before any work begins.
- Abrasive blasting nozzles must be equipped with a remote control (deadman) switch that allows the operator to control the abrasive blast at the nozzle.
- If workers are exposed to airborne chemicals, ensure that the workers' exposure remains at a safe level (within the occupational exposure limit, or OEL).
- Positive air shutoffs may be required for certain jobsites.
- Pre-use inspection must be completed on abrasive blasting and air supply system prior to use.



3. EXECUTION OF WORK

Complete Pre-Job/Site HIAC

- a) Prior to starting work, ensure all hazards have been identified. Complete CF-S-01 Hazard Identification, Assessment & Control.
- b) Notify other potentially affected workers of the risk associated with your blasting activity, and review the SDS with them, and other potential contaminants (e.g. paint dust).

Clean-Up and Removal

Regular removal of accumulations of used abrasive materials from the work area is an effective work practice for lowering the potential exposure of workers to contaminants. Vacuum recovery is the most effective method of removing large quantities of spent abrasive materials, but other effective control methods may be used, such as a wet floor scrubber. Wet sweeping or shoveling should not be used except where other effective means are not practical, and compressed air should not be used for cleanup. Follow SDS requirements for removal and disposal of used abrasive blasting materials to ensure that generation of airborne dust is minimized.

Unless indicated in the SDS, this removal must take place by the end of each shift.

REFERENCES / ADDITIONAL INFORMATION

- Safe Work Manitoba, Bulletin 153: Abrasive Blasting
- Safe Work Manitoba, Bulletin 299: Dangers of Breathing Silica Dust
- Safety data sheets (SDS): SDS Binders app

REGULATIONS

- Manitoba OHS Act, Regulation
- Alberta OHS Act, Regulation Code - Schedule 1, Table 2
- Saskatchewan OHS Legislation Part XXIV
- British Columbia OHS Regulation Part 12



SAFE WORK PRACTICE
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SWP - 78
ABRASIVE BLASTING

Developed by:	1. <u>HSE Department</u>	Date:	<u>November 4, 2014</u>
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