

STANDARD PRACTICE INSTRUCTION

DATE IMPLEMENTED: 04 April 2019

SUBJECT: Occupational Exposure to Abrasive Blasting Agents

REGULATORY STANDARDS: OSHA - 29 CFR 1910.244, Portable Tools and Equipment
OSHA - 29 CFR 1910.1000, Air Contaminants
OSHA - 29 CFR 1910.1200, Hazard Communication
OSHA - 29 CFR 1910.132-138, Personal Protective Equipment
OSHA - 29 CFR 1910.134, Respiratory Protection
OSHA - 29 CFR 1910.94, Ventilation
OSHA - 29 CFR 1910.146, Confined Space Program

BASIS: Estimates indicate that more than 1 million U.S. workers are at risk of developing silicosis and that more than 100,000 of these workers are employed as sandblasters. Approximately 59,000 of the 1 million workers exposed to crystalline silica will eventually develop silicosis unless job safety precautions are initiated. The Occupational Safety and Health Administration (OSHA) estimates that most of the hazards associated with sandblasting can be prevented if proper safety precautions at job sites are initiated.

GENERAL: Nowland Associates, Inc. will ensure that all potential sources of Abrasive Blasting within our facility(s) or host employers are evaluated. This standard practice instruction is intended to address comprehensively the issues of evaluating and identifying potential sources of Abrasive Blasting, evaluating the associated potential hazards, communicating information concerning these hazards, and establishing appropriate procedures, and protective measures for employees.

RESPONSIBILITY: The company Safety Officer is responsible for the administration of this program and has full authority to make necessary decisions to ensure success of the program. All company employees are responsible for safety at all times. This company has expressly authorized the Safety Officer to halt any company operation where there is danger of serious personal injury.

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Abrasive Blasting Safety Program

1. Written Program. Nowland Associates, Inc. will review and evaluate this standard practice instruction in accordance with the following:

- On an annual basis.
- When changes occur to governing regulatory sources that require revision.
- When changes occur to related company procedures that require a revision.
- When facility operational changes occur that require a revision.
- When there is an accident or close-call that relates to this area of safety.
- Anytime the procedures fail.

1.1 Effective implementation of this program requires support from all levels of management. This written program will be communicated to all personnel that are affected by it. It encompasses the total workplace, regardless of the number of workers employed or the number of work shifts. It is designed to establish clear goals and objectives.

2. Related Programs. A respiratory protection program shall be established wherever it is necessary to use respiratory protective equipment including worksite-specific procedures and elements for required respirator use. Abrasive blasting respirators shall be worn by all abrasive blasting operators under certain conditions. The following safety programs are used in consonance with this program:

- 2.1 Ventilation Safety Program.
- 2.2 Confined Space Entry Program.
- 2.3 Respiratory Protection Program.
- 2.4 Hazard Communication Program.
- 2.5 Air Contaminants Safety Program.

3. Hazard Overview. Abrasive blasting involves forcefully projecting a stream of abrasive particles onto a surface, usually with compressed air or steam. Because silica sand is commonly used in this process, workers who perform abrasive blasting are often known as sandblasters. Exposure of employees to inhalation, ingestion, skin absorption, or contact with any material or substance at a concentration above those specified in the "Threshold Limit Values of Airborne Contaminants for 1970" of the American Conference of Governmental Industrial Hygienists, shall be avoided.

4. Health Effects. When workers inhale the crystalline silica used in abrasive blasting, the lung tissue reacts by developing fibrotic nodules and scarring around the trapped silica particles. This fibrotic condition of the lung is called silicosis. If the nodules grow too large, breathing becomes difficult and death may result. Silicosis victims are also at

high risk of developing active tuberculosis. The silica sand used in abrasive blasting typically fractures into fine particles and becomes airborne. Inhalation of such silica appears to produce a more severe lung reaction than silica that is not freshly fractured. This factor may contribute to the development of acute and accelerated forms of silicosis among sandblasters. Sandblaster working in the dusty atmosphere created by airborne particles of silica sand without proper personal protective equipment and who remain in an atmosphere containing these particles may inhale dangerous or lethal amounts unknowingly.

5. Engineering Controls. This company will install and maintain engineering controls where possible to eliminate or reduce the amount of silica in the work area and to reduce build-up of dust on equipment and machinery surfaces. Preventative maintenance will be conducted as a high priority to ensure effectiveness of the Engineering Controls. Where possible controls will include, but are not limited to:

- 5.1 General exhaust ventilation systems
- 5.2 Local ventilation systems
- 5.3 Dust collection systems
- 5.4 Enclosed cabs for workers
- 5.5 Water sprays for dust reduction
- 5.6 Wet Drilling when drilling operations are in effect
- 5.7 Drill platform skirts when drilling operations are in effect

6. Administrative Controls. Where Engineering Controls are not feasible Administrative Controls will be attempted where possible to eliminate or reduce the amount of silica or environmental dusts each worker is exposed to. Where possible controls will include, but are not limited to:

- 6.1 Job-specific training programs
- 6.2 Job rotation
- 6.3 Job enlargement
- 6.4 Job pacing variations
- 6.5 Checklists for job improvement
- 6.6 Policies and procedure development

6.7 Regular job inspections and review

6.8 Employee feedback surveys

7. Personal Protective Equipment (PPE). Where Administrative Controls are not feasible PPE will be selected and used through the Job Hazard Analysis Program. Equipment for protection of the eyes and face shall be supplied to any other personnel working in the vicinity of abrasive blasting operations. Air for abrasive-blasting respirators must be free of harmful quantities of dusts, mists, or noxious gases. Supervisors will ensure that equipment selected will meet the following requirements:

7.1 It will be appropriate for the particular hazard.

7.2 It will be maintained in good condition.

7.3 It will be properly stored when not in use, to prevent damage or loss.

7.4 It will be kept clean, fully functional and sanitary.

7.5 Hazards Associated with Wear of Protective Clothing, PPE, Personal Clothing and Jewelry. Protective clothing and PPE can present additional safety hazards. Supervisors will ensure workers wear appropriate clothing and PPE. These items will be worn so as not create additional hazards.

7.5.1 Personal Clothing and Jewelry. Personal clothing and jewelry will be monitored by the immediate supervisor. Clothing or jewelry that could become entangled in tools, equipment or machinery or of an excessively flammable nature will be prohibited.

7.6 Documentation. PPE requirements will be documented on a "Protective Measures Determination" form (Job Hazard Analysis Program) and properly filed.

7.7 Types of PPE. Where required, PPE will include, but are not limited to:

7.7.1 Abrasive Blasting Gloves

7.7.2 Appropriate Respirators

7.7.3 Body Shields

7.7.4 Aprons

7.7.5 Non-slip and steel-toed shoes

7.7.6 Full eye protection

7.7.7 full-body jump suits for dust protection

7.7.8 Hard hats

7.7.9 Caps

7.7.10 Hair nets

7.7.11 Footguards

8. General Requirements. Nowland Associates, Inc. will establish Abrasive Blasting operational procedures through the use of this document.

8.1 Facility Evaluation. This employer shall evaluate our facility(s) or host employer facilities to determine if any work area meets the criteria for designation as an Abrasive Blasting Hazard Area. Such areas will be fully evaluated for safety and compliance with respective safety regulations.

9. Permit-Required Confined Space. This employer will implement our confined space program when performing work in areas designated as a confined space. The permit-required confined space program will conform to the requirements of 29 CFR 1910.146. This employer shall:

9.1 Implement the measures necessary to prevent unauthorized entry.

9.2 Identify and evaluate the hazards of permit spaces before employees enter them.

9.3 Pre-Entry Requirements. Develop and implement the means, procedures, and practices necessary for safe permit space entry operations, including, but not limited to, the following:

9.3.1 Specifying acceptable entry conditions.

9.3.2 Isolating the permit space.

9.3.3 Purging, inerting, flushing, or ventilating the permit space as necessary to eliminate or control atmospheric hazards.

9.3.4 Provide pedestrian, vehicle, or other barriers as necessary to protect entrants from external hazards.

9.3.5 Verify that conditions in the permit space are acceptable for entry throughout the duration of an authorized entry.

9.3.6 Develop and utilize checklists based on this standard practice instruction and 29 CFR 1910.146.

10. Procedures for atmospheric testing. Atmospheric testing for Abrasive Blasting Hazard Areas is required for two distinct purposes: Evaluation of the hazards of the work area and verification that acceptable particulate levels exist in that area.

10.1 Evaluation Testing. This company will ensure that the atmosphere is analyzed using equipment of sufficient sensitivity and specificity to identify and evaluate any hazardous particulate levels that may exist or arise. Evaluation and interpretation of these data, and development work procedures, will be done by, or reviewed by, a technically qualified professional (e.g., OSHA consultation service, or certified industrial hygienist, registered safety engineer, certified safety professional, etc.) based on evaluation of all serious hazards.

11. Training.

11.1 Types of Training. The company will determine whether training required for specific jobs will be conducted in a classroom or on-the-job. The degree of training provided shall be determined by the complexity of the job and the Abrasive Blasting exposure hazards associated with the individual job.

11.1.1 Initial Training. Prior to job assignment, this employer shall provide training to ensure that the hazards associated with Abrasive Blasting are understood by employees and that the knowledge, skills and personal protective equipment required are acquired by employees. The training shall as a minimum include the following:

11.1.1.1 Each authorized employee shall receive training in the recognition of applicable hazards involved with the particular job and job site, as well as the methods and means necessary for safe work.

11.1.1.2 The specific nature of the operation which could result in exposure to Abrasive Blasting materials.

11.1.1.3 The purpose, proper selection, fitting, use and limitation of personal protective equipment (PPE)

11.1.1.4 The adverse health effects associated with excessive exposure to Abrasive Blasting materials.

11.1.1.5 The engineering controls, administrative controls and work practices associated with the employee's job assignment, including training of employees to follow relevant good work practices.

11.1.1.6 The contents of any compliance plan in effect.

11.1.1.7 The employee's right of access to records under 29 CFR 1910.20.

11.1.2 Refresher Training. Scheduled refresher training will be conducted on an annual basis.

12. Retraining.

12.1 Retraining shall be provided for all affected employees as a minimum under the following conditions:

12.1.1 Whenever there is a change in job assignments.

12.1.2 Whenever there is a change in personal protective equipment.

12.1.3 Whenever there is a change in equipment that presents a new hazard.

12.1.4 Whenever there is a change in processes that presents a new hazard.

12.1.5 Whenever their work takes them into hazardous areas.

12.1.6 Whenever there is a change in Abrasive Blasting safety procedures.

12.1.7 Whenever safety procedure fails resulting in a near-miss, illness, or injury.

12.2 **Additional Retraining.** Additional retraining shall also be conducted whenever a periodic inspection reveals, or whenever this employer has reason to believe, that there are deviations from or inadequacies in the employee's knowledge of known hazards, or use of equipment or procedures.

12.3 The retraining shall reestablish employee proficiency and introduce new equipment, or revised control methods and procedures, as necessary.

12.4 **Certification.** This employer shall certify that employee training has been accomplished and is being kept up to date. The certification shall contain a synopsis of the training conducted, each employee's name, and dates of training.

13. Work Operations.

13.1 Work operations in which particulate or Abrasive Blasting materials may be encountered involve welding, burning, cutting, brazing, grinding, and abrasive blasting sanding, and drilling work.

13.2 The equipment and materials used to accomplish work operations are those normally associated with sandblasting and painting operations.

13.3 Employee crew size will vary and employee job responsibilities will be that of their craft as stated in the company's policy manual. Specific additional responsibilities will be:

13.3.1 Superintendent/General Supervisor.

13.3.1.1 Monitors procedure to ensure compliance with this work practice.

13.3.2 Supervisors.

13.3.2.1 Ensures that the initial determination for potential Abrasive Blasting or particulate exposure has been accomplished before work begins.

13.3.2.2 Supervises the safe performance of work in accordance with this and other related work practices.

13.3.2.3 Assigns jobs only to qualified employees.

13.3.3 Employees.

13.3.3.1 Uses the protective and safety equipment as assigned and directed.

13.3.3.2 Abides by the requirements of this and site-specific work practices.

14. Monitoring and Measurement Procedures.

14.1 Eight Hour Time Weighted Average (TWA) Evaluations. Where possible 8hr TWAs will be taken so that the average eight-hour exposure is based on a single eight-hour sample. Air samples will be taken in the employee's breathing zone. Only qualified personnel will be selected to conduct evaluations.

14.2 Ceiling Evaluations. Where possible, measurements to determine employee ceiling exposure will be taken during periods of maximum expected airborne concentrations of Abrasive Blasting materials or particulates. Each measurement will consist of a fifteen (15) minute sample or series of consecutive samples totaling fifteen (15) minutes. Air samples will be taken in the employee's breathing zone and only by qualified personnel.

14.3 Peak and Above Ceiling Evaluations. Measurements to determine employee peak exposure will be taken during periods of maximum expected airborne concentrations of Abrasive Blasting materials or particulates. Each measurement will consist of a ten (10) minute sample or series of consecutive samples totaling ten (10) minutes. A minimum of three measurements will be taken on one work shift and the highest of all measurements taken will be assumed to be an estimate of the employee's exposure. Air samples will be taken in the employee's breathing zone and only by qualified personnel.

14.4 **Sampling Methods.** Sampling and analysis will be conducted in accordance with acceptable industrial hygiene practices. Sampling data will be maintained for the duration of employment of the affected employee plus 30 years.

15. Spill and Leak Procedures. Spill and leak procedures will largely depend on the capability and emergency procedures of this and any host employer. This employer will ensure that adequate clean up procedures are in effect in any facility owned by this company. Any time employees work with a host employer we will ensure adequate procedures are in-place for the protection of all employee's (host and contractor) and the surrounding area.

16. Emergency First Aid Procedures. In the event of an emergency, institute first aid procedures and send for first aid or medical assistance in accordance with local procedures.

16.1 **Eye Exposure.** Wash immediately with large amounts of water. Lifting the lower and upper lids occasionally, get medical attention as soon as possible.

16.2 **Skin Exposure (imbedded particulates).** Immediately flush with copious amounts of water. Remove any clothing blocking exposed skin areas and flush exposed skin areas, get medical attention as soon as possible.

16.3 **Respiratory Exposure.** Get the victim to open, fresh air immediately. If breathing has stopped perform Cardiopulmonary Resuscitation. Keep the victim warm and at rest. Get medical attention as soon as possible.

16.4 **Rescue Considerations.** Don't become a second victim. Move the affected person from the hazardous area. If the exposed person has been overcome, initiate local emergency notification procedures. Understand the facility's emergency rescue procedures and know the locations of rescue equipment before the need arises.

17. Tool Selection, Evaluation and Condition. The greatest hazards posed by tools usually result from misuse and/or improper maintenance. Tool selection sometimes is not considered a priority when arrangements are made to begin work.

17.1 Blast nozzles shall be bonded and grounded to prevent the build up of static charges.

17.2 The blast cleaning nozzles shall be equipped with an operating valve which must be held open manually. A support shall be provided on which the nozzle may be mounted when it is not in use.

17.3 Compressed air shall not be used for cleaning purposes except where the pressure is reduced to less than 30 p.s.i.

17.4 All employees will consider the following when selecting tools:

- Is the tool correct for the type work to be performed?
- Are guards installed properly and in good condition?
- Are grounding methods sufficient when working in wet conditions?
- Does the tool create sparks or heat? Has this been considered when working around flammable substances?
- Do impact tools such as chisels, wedges, or drift pins have mushroomed heads? The heads can shatter on impact, sending sharp fragments flying!
- Are wooden handled tools loose or splintered? This can result in the heads flying off and striking the user/coworkers!
- Are cutting tools sharp? Dull tools are more hazardous than sharp ones.
- Is the tool used on the proper working surface? Tools used on dirty or wet working surfaces can create a multitude of hazards.
- Are tools stored properly when not being used? Saw blades, knives, scissors and like sharp tools should be stored so that sharp edges are directed away from aisles and coworkers.
- Is there sufficient clearance for tools requiring swinging motions such as hammers, axes, picks, etc?
- Tools will be checked for excessive vibration.
- 17.12 Have tools been modified beyond the manufacturers specification? If so, have the modifications been approved by a "competent person"?

18. Medical Surveillance. The medical surveillance provisions of this standard practice instruction are intended to provide our employees with a comprehensive approach to prevention of Silicosis. The primary purpose is to supplement the OSHA standard's primary mechanisms of disease and illness prevention, the elimination or reduction of airborne concentrations of Abrasive Blasting Materials or particulates and sources of ingestion, by facilitating the early detection of medical effects associated with exposure to Abrasive Blasting Materials or particulates. The ultimate goal will be to develop a plan for reducing exposures of employees whose X-rays show changes consistent with silicosis.

18.1 All medical examinations and procedures will be performed by or under the supervision of a licensed physician and are to be provided without cost to employees at a reasonable time and place.

18.2 **Two phases of surveillance.** The medical surveillance provisions contemplate two phases of medical surveillance; one is initial medical surveillance, the other is a medical surveillance program.

18.2.1 **Initial Surveillance.** Initial medical surveillance consists of X-rays read by a specialist in dust diseases. It will be provided to our employees occupationally exposed to airborne concentrations of Abrasive Blasting Materials or particulates on any one day at or above the action level as well as to employees performing high exposure "trigger tasks" during initial exposure assessment.

18.2.2 **Routine and Follow-Up Level Medical Surveillance.** If an employee's airborne Abrasive Blasting Materials or particulates exposure is of concern (based on healthcare provider recommendation) this employer shall provide a medical surveillance program to the employee consisting of routine monitoring as recommended by a healthcare provider. If a routine and follow-up test for Abrasive Blasting Materials or particulates exceed recommended exposure criteria the employee will be removed from exposure. Employees will be notified in writing of any medical monitoring results within five working days after the receipt of monitoring results.

18.3 **Surveillance Initiation.** This employer will provide a full medical surveillance program to any employee, including periodic medical exams (based on healthcare provider recommendation), when it is determined that the employee's exposure to Abrasive Blasting Materials or particulates is detrimental to his or health.

18.4 **Examination Criteria.** The content and frequency will be at the discretion of the attending physician. Each examination as a minimum will include:

- - A work and medical history
- - A physical examination
- - Appropriate X-rays
- - As required by the healthcare provider

18.5 **Medical Consultations.** Medical consultations will be provided upon notification by an employee under the following conditions:

18.5.1 The employee has developed symptoms commonly associated with Silicosis.

18.5.2 The employee has demonstrated difficulty in breathing during fit testing or use of a respirator.

18.6 **Cost.** This employer will bear the expense of the medical surveillance program.

18.7 **Medical Removal Protection.** This employer will remove an employee from work having an exposure to Abrasive Blasting Materials or particulates under the following conditions:

18.7.1 **Exposure Limit Exceedance.** When it is determined from workplace monitoring that airborne particulates exceed OSHA or NIOSH recommended exposure limits.

18.7.2 **Evidence of Silicosis.** When it is suspected from any source that an employee has any evidence of silicosis.

18.7.3 **Medical Determination.** On each occasion that a final medical determination results in a medical finding, determination, or opinion that the employee has a detected medical condition which places the employee at increased risk of impairment to health from exposure to Abrasive Blasting Materials or particulates.

18.8 **Return to Work.**

18.8.1 **Abrasive Blasting Materials or Particulates Level Exceedance.** Any employee removed from exposure to Abrasive Blasting Materials or particulates may return to former job status when approved by their healthcare provider. A Written recommendation that the employee no longer has a detected medical condition which places the employee at increased risk of impairment of health will be required by this company before return to work is authorized.

19. Entry Control. Those work areas meeting the criteria for delineation as an "Abrasive Hazards Work Area" will be restricted only to trained and authorized employees. Physical barriers, ropes, fencing or any other equally effective means of entry control may use to control entry.

20. Hazard Marking. Abrasive Hazards Work Areas will be identified by signage and color coding as needed. A sign reading "DANGER ABRASIVE HAZARDS WORK AREA" or similar language will be used to satisfy the requirement for a sign.

21. Hazard Notification. This employer shall inform employees working near Abrasive Hazards Work Areas, by posting danger signs, conducting awareness training, or by any

other equally effective means, of the existence and location of and the danger posed by abrasive blasting.

22. Definitions.

Abrasive. A solid substance used in an abrasive blasting operation.

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.

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.

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.

Blasting cabinet. An enclosure where the operator stands outside and operates the blasting nozzle through an opening or openings in the enclosure.

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.

Dust collector. A device or combination of devices for separating dust from the air handled by an exhaust ventilation system.

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.

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.

Respirable dust. Airborne dust in sizes capable of passing through the upper respiratory system to reach the lower lung passages.

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.

Abrasive blasting. The forcible application of an abrasive to a surface by pneumatic pressure, hydraulic pressure, or centrifugal force.