

Abrasive Blasting Operations Safety	Page 1
Absolute Pipeline Maintenance & Consulting Master Safety & Health Program	Rev. Date 6/2/2009

Applicable OSHA Standards: 29 CFR 1910.94, 1926.57

1. Purpose

- 1.1. This program establishes the safety requirements for abrasive blasting in the Company workplace to protect Absolute Pipeline Maintenance & Consulting employees.

2. Scope

- 2.1. Program requirements and safe work procedures apply to all employees and subcontractors working within Company-controlled worksites. This *Abrasive Blasting Program* covers minimum safety requirements for performing abrasive blasting.

3. Introduction

- 3.1. Abrasive blasting is primarily used for preparation of metal surfaces to accept a coating or lining. This procedure covers the safety requirements pertaining to mechanical precautions, personal protective equipment, personal hygiene, housekeeping, sanitation, administrative dust control methods and respiratory protection as required.

4. Mechanical Precautions & Blasting Safety Procedures

- 4.1. Abrasive material or product that contains silica ***WILL NOT*** be used for blasting operations. This is established as an engineering control to prevent employee exposure to silica.
- 4.2. Machines and hoses will be inspected frequently and all parts showing excessive wear should be repaired or replaced.
- 4.3. Nozzles will be externally attached to the hose by a fitting, which will prevent accidental disengagement.
- 4.4. The blast cleaning nozzle will have an operating valve that is held open manually. Additionally, the nozzle will have a support device so that it can be mounted for storage when not being used.
- 4.5. Lengths of hose should be joined by external metallic connectors. The connectors will have pin-clips to prevent disengagement. Anti-whip arresters may be used between each connector.
- 4.6. All bull hoses, from the compressor to the abrasive blast pot, will have pin-clips and anti-whip arresters on each end.
- 4.7. A remote control "deadman" valve must be provided. Electric deadman controls will be low voltage (12 volt DC) and have continuous wire or plug connections provided.

Abrasive Blasting Operations Safety	Page 2
Absolute Pipeline Maintenance & Consulting Master Safety & Health Program	Rev. Date 6/2/2009

- 4.8. In abrasive blasting situations where flammable or explosive dust mixtures may be present, construction of equipment and any exhaust system, including all electric wiring, will conform to American National Standard Installation of Blower and Exhaust Systems for Dust, Stock, and Vapor Removal or Conveying, Z33.1-1961 (NFPA 91-1961), as well as 1926 Subpart S (i.e. underground construction).
- 4.9. Prior to operation where flammable or explosive dust mixtures may exist, confirm that the blast nozzle is bonded and grounded to prevent the build up of static charges.
- 4.10. If flammable or explosive dust mixtures may be present, all exhaust systems, electrical wiring and equipment construction will comply with American National Standard Installation of Blower and Exhaust Systems for Dust, Stock, and Vapor Removal or Conveying, Z33.1-1961 (NFPA 91-1961), and Subpart S. Blast nozzles will be bonded and grounded as a protection against an accumulation of electrostatic charge.
- 4.11. Where flammable or explosive dust mixtures may be present, any abrasive blasting enclosure, ducts and the dust collector will be constructed with loose panels or explosion venting areas, located on sides away from any occupied area. These areas will provide pressure relief in the event of an explosion, in accordance with principles explained in the National Fire Protection Association Explosion Venting Guide, NFPA 68-1954.
- 4.12. Compressed air can only be used for cleaning objects and materials when the pressure is reduced to less than 30 p.s.i. and effective chip guarding and personal protective equipment are utilized.
- 4.13. At no time will compressed air be used for cleaning clothes while being worn or directly applied to any part of the body.
- 4.14. Combustible organic abrasives will be used only in automatic systems.

5. Personal Protective Equipment

- 5.1. Operators will be equipped with appropriate heavy canvas or leather gloves and wear Tyvek or similar protective outer clothing. Safety shoes also will be worn.
- 5.2. Eye, face, hearing and respiratory protection will be supplied to blasting personnel as required by hazard assessment of the task.
- 5.3. Hearing protection will be utilized as required by personnel in the blasting zone, including the blasting operator. Exposure to excessive noise and use of hearing protection will be addressed in accordance with the Company written *Hearing Conservation Program*.
- 5.4. Vortex tubes that cool the air supply to the blaster's hood will be considered, depending on season and exposure of the employee to heat sources.

Abrasive Blasting Operations Safety	Page 3
Absolute Pipeline Maintenance & Consulting Master Safety & Health Program	Rev. Date 6/2/2009

6. Housekeeping, Personal Hygiene & Sanitation

- 6.1. Good housekeeping practices will be followed in abrasive blasting operation to prevent slips, trips, and falls and minimize exposure to blasting material.
- 6.2. Do not allow dust or blast material residue to accumulate on the floor or ledges outside of an abrasive-blasting enclosure. Clean up dust or material spills in a prompt and consistent manner. Keep walkways and aisles clear of abrasive blasting product such as steel shot or any other material that could cause a slipping hazard.
- 6.3. A facility will be available for blasters to wash before eating and after blasting operations.
- 6.4. Personnel involved in blasting operations will wash their face and hands prior to drinking, eating or smoking.
- 6.5. Food, beverages, tobacco products, eating, drinking and smoking are prohibited in areas where abrasive blasting is conducted and there is potential exposure to blasting material, dusts and residue.

7. Administrative Dust Control Methods

7.1. Isolation

- 7.1.1. As most of the blasting as possible should be done in a specified location, a blasting zone (where dust is visible) will be established and marked off with signs around the perimeter of the area such as:

CAUTION
*Abrasive Blasting Area, Eye and Ear Protection and Respirators
Must Be Worn In This Area.*

- 7.1.2. Blasting should not be done when wind direction and velocity carry visible dust to people unprotected by proper respirators.

7.2. Enclosure

- 7.2.1. Blasting of small objects should be done in a containment enclosure, box or device designed specifically to reduce the dust exposure hazards.

8. Respiratory Protection

- 8.1. All use of respirators or other respiratory protective equipment will be in accordance with the Company's written *Respiratory Protection Program*.

Abrasive Blasting Operations Safety	Page 4
Absolute Pipeline Maintenance & Consulting Master Safety & Health Program	Rev. Date 6/2/2009

- 8.2. No employee will don or attempt to use a respirator unless he or she has undergone proper medical evaluation; has been fit tested; trained in the proper selection, use, maintenance and storage of the specific respirator; and is individually authorized by the Company for wearing a respirator in the scope and course of work.
- 8.3. During job site operations overall, and abrasive blasting specifically, special safety and health considerations will be given whenever hazardous dusts, fumes, mists, vapors, gases or other substances either exist or are produced in the course of work.
- 8.4. Concentrations of any such exposure will not exceed the limits specified in 1926.55(a) OSHA.
- 8.5. When ventilation is used as an engineering control method, the system will be installed and operated in accordance with these same OSHA requirements.
- 8.6. Tyvek protective clothing, properly fitted and worn, will be used by employees engaged in blasting. In addition to a protective hood, blasters will wear a disposable respirator when working in a high dust concentration. This is intended to provide protection when the blasting operation has ceased and the blaster is removing the air supplied equipment, or when taking a break.
- 8.7. Abrasive-blasting hoods will be worn by all abrasive-blasting operators, at all times:
 - 8.7.1. When working inside of blast-clean rooms,
 - 8.7.2. When using abrasive product in manual blasting operations where the nozzle and blast are not physically separated from the operator in an exhaust ventilated enclosure, and
 - 8.7.3. Where concentrations of toxic dust dispersed by the abrasive blasting may exceed the limits set in paragraph 1919.93 OSHA and the nozzle and blast are not physically separated from the operator in an exhaust-ventilated enclosure.
- 8.8. In situations where the abrasives and the surface coatings on the materials blasted become shattered and pulverized during blasting operations, the dust formed by this work will contain particles of a size that can be breathed (respirable size). Consequently, consideration will be given to the composition and toxicity of these dust sources when evaluating potential health hazards of the work.
- 8.9. Concentration of respirable dust or fume in the abrasive blasting operator's breathing zone will be kept below Permissible Exposure Limits as required by OSHA. The same consideration will be given regarding exposure of any other worker in the area to this respirable dust.
- 8.10. Particulate filter respirators, commonly referred to as dust-filter respirators, properly fitted, may be used for short, intermittent, or occasional dust exposure such as

clean-up, dumping of dust collectors, or unloading shipments of abrasive material at a receiving point, when it is not feasible to control the dust by enclosure, exhaust ventilation, or other means. Respirators used will be certified for protection against the specific type of dust.

- 8.11. Dust-filter respirators may be used to protect the operator of outside abrasive-blasting operations where non-silica abrasives are used on materials having low toxicities.
- 8.12. Maintenance
 - 8.12.1. Respirators will be cleaned daily. This can be accomplished by use of vacuum or water.
 - 8.12.2. Respirators will be kept in maximum operating condition.
 - 8.12.3. After daily cleaning, respirators and hoods will be maintained and hung in an upright position to prevent abrasive material and residue from spilling inside.
- 8.13. Air Supply and Air Compressors for Abrasive Blasting Hoods
 - 8.13.1. Air supply will be free of harmful quantities of dust, mists or noxious gases, and will meet Grade D requirements. The use and quality of supplied air will be in accordance with 29 CFR 1910.134(i).
 - 8.13.2. The air from the regular compressed air line of a compressor unit may be used for the abrasive-blasting hood if:
 - 8.13.2.1. A trap and carbon filter system (with in-line CO monitor alarm) is installed that will remove oil, water particulate and odor and is regularly maintained. A record of the maintenance of these filters should be kept.
 - 8.13.2.2. A pressure reducing diaphragm or valve is installed to reduce the pressure to requirements of the particular type of abrasive blasting respirator.
 - 8.13.2.3. An automatic control is provided to either sound an alarm or shut down the compressor in case of overheating.
 - 8.13.2.4. Periodic checks should be made to ensure that the worker is not being exposed to amounts of carbon monoxide >10 ppm.
 - 8.13.2.5. Pulmonary function testing (spirometry); and
 - 8.13.2.6. An annual evaluation for tuberculosis.