

Abrasive Blasting

Applicable OSHA Standards: 29 CFR 1910.94, 1926.57

PURPOSE

To establish procedures outlining the safety requirements for abrasive blasting to protect L.E. Bell Construction Company employees.

SCOPE

This procedure applies to all employees and subcontractors working within L.E. Bell Construction Company controlled worksites. This *Abrasive Blasting Procedure* covers the minimum requirements to perform abrasive blasting.

INTRODUCTION

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

PROGRAM

MECHANICAL PRECAUTIONS & PROCEDURES

- Machines and hoses should be inspected frequently and all parts showing excessive wear should be repaired or replaced.
- Nozzles should be externally attached to the hose by a fitting, which will prevent accidental disengagement.
- 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.
- Lengths of hose should be joined by external metallic connectors. The connectors shall have pin-clips to prevent disengagement. Anti-whip arresters may be used between each connector.
- All Bull Hoses, from the compressor to the abrasive blast pot, shall have pin-clips and anti-whip arresters on each end.

L.E. Bell Construction Company

- A remote control "deadman" valve must be provided. Electric deadmen shall be low voltage (12 volt DC) and have continuous wire or plug connections provided.
- 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).
- 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.
- Where flammable or explosive dust mixtures may be present, confirm that the abrasive blasting enclosure, ducts and the dust collector are 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. This is in accordance with principles explained in the *National Fire Protection Association Explosion Venting Guide, NFPA 68-1954*.
- 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.
- At no time will compressed air be used for cleaning clothes while being worn or directly applied to any part of the body.

PERSONAL PROTECTIVE EQUIPMENT

- Operators should be equipped with heavy canvas or leather gloves and aprons. Safety shoes will also be worn.
- Eye, face, hearing and respiratory protection shall be supplied to all personnel working.
- Precautions will be taken to protect personnel in the blasting zone including the blasting operator from excessive noise exposure by supplying and requiring the use of earplugs or muffs.
- Vortex tubes that cool the air supply to the blasters hood will be considered depending on season and exposure of the employee to heat sources.

L.E. Bell Construction Company

HOUSEKEEPING AND SANITATION

- Good housekeeping practices should be followed in abrasive blasting operation to prevent slips, trips, and falls.
- A facility should be available for blasters to wash before eating and after blasting operations.
- Do not allow dust to accumulate on the floor or ledges outside of an abrasive-blasting enclosure. Clean up dust 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.

ADMINISTRATIVE DUST CONTROL METHODS

- Isolation
 1. As most of the blasting as possible should be done in a specified Location, a blasting zone (where dust is visible) should 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.

2. Blasting should not be done when wind direction and velocity carry visible dust to people unprotected by proper respirators.
- Enclosure
 1. Blasting of small objects should be done in an enclosure which is designed to specifically reduce the dust hazards.

RESPIRATORY PROTECTION

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

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.

L.E. Bell Construction Company

During construction and pipeline maintenance operations overall, and abrasive blasting specifically as per this program, 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.

Concentrations of any such exposure will not exceed the limits specified in 1926.55(a) OSHA.

When ventilation is used as an engineering control method, the system shall be installed and operated in accordance with these same OSHA requirements.

- Apron and dust collar, properly fitted and properly worn, shall be used by all persons blasting. In addition to the hood, blasters should also wear a disposable respirator when working in a high dust concentration. This would provide protection when the blasting operation has ceased and the blaster is removing the air supplied equipment or when merely taking a break.
- Abrasive-blasting hoods shall be worn by all abrasive-blasting operators -
 1. At all times,
 2. When working inside of blast-clean rooms,
 3. When using silica sand in manual blasting operations where the nozzle and blast are not physically separated from the operator in an exhaust ventilated enclosure,
 4. 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.
- 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 must be given to the composition and toxicity of these dust sources when evaluating potential health hazards of the work.

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.

L.E. Bell Construction Company

- 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 sand at a receiving point, when it is not feasible to control the dust by enclosure, exhaust ventilation, or other means. Respirators used shall be certified for protection against the specific type of dust.
 1. 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.
 2. Dust-filter respirators shall not be used for continuous protection where silica sand is used as the blasting abrasive, or toxic materials are blasted.

- Maintenance
 1. Respirators should be cleaned daily. This can be accomplished by use of vacuum or water.
 2. Respirators should be kept in maximum operating condition at all times.
 3. After their daily cleaning, respirators and hoods should be kept and hung in an upright position to prevent sand spilling inside.

- Air Supply and Air Compressors for Abrasive Blasting Hoods
 1. Air supply shall be free of harmful quantities of dust, mists or noxious gases, and shall meet Grade D requirements. The use and quality of supplied air will be in accordance with 29 CFR 1910.134(i).
 2. The air from the regular compressed air line of a compressor unit may be used for the abrasive-blasting hood if:
 - a. 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.
 - b. A pressure reducing diaphragm or valve is installed to reduce the pressure to requirements of the particular type of abrasive blasting respirator.

L.E. Bell Construction Company

- c. An automatic control is provided to either sound an alarm or shut down the compressor in case of overheating.
- d. Periodic checks should be made to ensure that the worker is not being exposed to amounts of carbon monoxide >10 ppm.