

Be Aware of Respiratory Hazards During Abrasive Blasting and Learn How to Stay Safe

By Holly Jo Johnson
Bullard

Abrasive blasting, commonly referred to as sand blasting, is a profession that dates back to the late 1800s when Benjamin Tilghman patented machinery to remove paint and rust from surfaces in preparation for recoating. Since then, the abrasive blasting industry has progressed a great deal and is focusing more than ever on safety.

Today, abrasive blasters can be seen cleaning and removing paint from the hulls of ships, stone buildings, metal bridges, tombstones and much more. Let's look at some of the hazards associated with abrasive blasting and how you can be protected against these hazards, especially respiratory hazards.

Silica (SiO₂) is the number one hazard in sand abrasive blasting. When sand is used as the abrasive in blasting, a dust cloud is formed by the sand particles breaking down into much smaller silica particles. The copious amount of dust and fine particles, if breathed into the lungs, over time can cause respiratory damage that could become life-threatening.

It is extremely important to protect yourself against the risk of silica exposure, not only during the blasting operation, but in clean-up and painting operations. The microscopic sized particles that are invisible can remain suspended in the atmosphere around the workers for hours at concentrations relatively close to those concentrations measured during blasting.

Prolonged exposure to silica can cause silicosis; exposure to large concentrations of silica over a relatively short period of time can cause acute silicosis. The silica particles that are inhaled form fibrous scar tissue in the lungs. This scar tissue prevents lungs from correctly expanding and contracting, thus



PHOTO COURTESY BULLARD

ABOUT THE AUTHOR

Holly Jo Johnson is the product manager for respiratory protection at Bullard (www.bullard.com), a manufacturer of high-quality personal protective equipment and systems. The International Safety Equipment Association member company is based in Cynthiana, KY. Ms. Johnson's product responsibilities include blast respirators and air-quality products. Reach her at Holly_Jo_Johnson@bullard.com or 877-BULLARD.

depriving the body of the oxygen it needs. This usually begins with complaints of shortness of breath and in some cases can progress to end stage silicosis or possible death.

The best way for the employer to prevent silicosis is to substitute a non-toxic blasting medium. This approach is required by the U.S. Occupational Safety and Health Administration (OSHA) whenever it is feasible to do so. The last line of defense is wearing the proper respiratory protection. First, you must establish a written respiratory protection program that meets the requirements of OSHA 29 CFR 1910.134. As part of this program, you must select a respirator approved by the National Institute for Occupational Safety and Health (NIOSH).

As part of this selection process, you must ensure that the respirator is appropriate for the hazard(s), which means knowing the concentration of silica in the ambient atmosphere, as well as the assigned protection factors of the respirator.

The only NIOSH-approved respirators for abrasive blasting are Type CE. These are Type C supplied-air respirators that are manufactured with additional accessories (think "E" for "extra") to protect the user's face, neck and head from rebounding abrasives and impact. All certified blasting respirators must be tested by NIOSH and assigned a testing and certification approval number (also known as TC ▶54

Look for Certified Respiratory Protection from ISEA Members

Protection Update readers are encouraged to specify respiratory protection devices that are certified by the National Institute for Occupational Safety and Health, and manufactured by the following International Safety Equipment Association members:

- Avon Protection, www.avon-rubber.com
- Bullard, www.bullard.com
- Draeger Safety, Inc., www.draeger.com
- Honeywell Safety Products, www.honeywellsafety.com
- ILC Dover, www.ilcdover.com
- Kimberly-Clark Professional, www.kcprofessional.com
- 3M Company, www.3M.com
- Mine Safety Appliances Co., www.msafety.com
- Moldex-Metric Inc., www.moldex.com
- Scott Safety, www.scottsafety.com
- U.S. Safety, www.ussafety.com

Links to other ISEA member companies may be found at www.safetysafetyequipment.org; click on "Resources" and, from the drop-down menu click on "Buyer's Guide."

Order a Complete Set of ANSI/ISEA Standards at Deep Discount

ISEA is offering a complete set of its American National Standards at 30 percent off the price of purchasing the publications individually. For \$335 including shipping, safety officers can get all the following publications in a convenient three-ring binder:

- *American National Standard for **Limited-Use and Disposable Coveralls** - Size and Labeling Requirements, ANSI/ISEA 101-1996 (R2008)*
- *American National Standard for **Classification and Performance Requirements for Chemical Protective Clothing**, ANSI/ISEA 103-2010*
- *American National Standard for **Gas Detector Tube Units** - Short Term Type for Toxic Gases and Vapors in Working Environments, ANSI/ISEA 102-1990 (R2009)*
- *American National Standard for **Air Sampling Devices** - Diffusive Type for Gases and Vapors in Working Environments, ANSI/ISEA 104-1998 (R2009)*
- *American National Standard for **Hand Protection Selection Criteria**, ANSI/ISEA 105-2011*
- *American National Standard for **High Visibility Safety Apparel and Headwear**, ANSI/ISEA 107-2010*
- *American National Standard for **Air-Purifying Respiratory Protective Smoke Escape Devices**, ANSI/ISEA 110-2009*
- *American National Standard for **Fixed and Portable Decontamination Shower Units**, ANSI/ISEA 113-2008*
- *American National Standard for **Classification of Insulating Apparel Used in Cold Work Environments**, ANSI/ISEA 201-2012*
- *American National Standard for **High Visibility Public Safety Vests**, ANSI/ISEA 207-2011*
- *American National Standard for Occupational and Educational **Personal Eye and Face Protection Devices**, ANSI/ISEA Z87.1-2010*
- *American National Standard for **Industrial Head Protection**, ANSI/ISEA Z89.1-2009*
- *American National Standard - Minimum Requirements for **Workplace First Aid Kits and Supplies**, ANSI/ISEA Z308.1-2009*
- *American National Standard for **Emergency Eyewash and Shower Equipment**, ANSI/ISEA Z358.1-2009*

Order directly online or download a faxable order form at www.safetyequipment.org.

RESPIRATORY HAZARDS

from page 49

number). All NIOSH-approved respirators can be verified on NIOSH's Certified Equipment List, available at www.cdc.gov/niosh.

It is extremely important never to use a blasting respirator that is not NIOSH approved. If the manufacturer cannot provide a TC number, the respirator is most likely not approved by NIOSH. Using a respirator without a TC number could result in fines from OSHA, and could result in a potential health hazard, including injury or death.

NIOSH only approves a respirator as a system. For blasting respirators, the system includes helmet, lens, cape, flow-control device, breathing tube and air-supply hose. All of the components of this system must be from the same manufacturer.

Ensuring that all of the system components are from one manufacturer helps blasters stay OSHA compliant and, more importantly, properly protected. Using replacement parts for a type CE air-fed hood that are not approved by NIOSH voids the NIOSH approval of that CE hood, and places the employee at great risk and the employer open for OSHA fines. Replacement parts should always be purchased from the same manufacturer that provided the hood.

Blasting respirators are categorized as supplied-air respirators. OSHA's 1910.134 Respiratory Protection Standard states that all breathing air for supplied-air respirators must meet the requirements for Grade D breathing air described in ANSI/Compressed Gas Association Commodity Specifications for Air, G-7.1-1989.

Two common supplied-air sources include ambient air pumps and compressors. In either case, the source must provide Grade D breathing air. When determining which type of air source best fits your needs, it's important to remember a few key features and benefits of using an ambient air pump or compressor:

- Ambient air pumps generally operate at low pressures (0-30 psi), use self-lubricating carbon vanes (CO monitor is not needed), are smaller and more mobile, and usually are not compatible with cool tube devices.
- Compressors typically operate at high pressures (30-120 psi), are oil lubricated (CO monitor is required), are larger and not as mobile, and are typically compatible with cool tube device options.

It is also important and good industrial hygiene practice to place the compressors as far away from the blasting operation as possible.

Blasting respirators not only protect against sand abrasives but also against other abrasives including ceramic, metallic, steel shot, grit, coal slag and synthetic. These abrasives also can create dust particles that enter through inhalation or ingestion, causing respiratory damage.

As an employer or employee in the blasting industry, make sure safety and respiratory protection come first by remembering a few key factors:

- Be aware that the most damaging dust particles can remain suspended in the air for long periods of time, especially in enclosed spaces. It is very important to wear appropriate respiratory protection when re-entering the blast area to clean up or to paint.
- The concentrations of silica after blasting is completed are nearly the same as the concentrations during the blasting operation itself. Choosing a respirator for clean up and painting operations is just as crucial.
- The blaster should always be instructed to use the respirator in accordance with the manufacturer's instructions and they should also be advised regularly to never remove the CE respirator while within the blasting area. ●