If It's Silica, It's Not Just Dust!

What is silica and where can it be found?

Silica is the second most common mineral in the earth's crust. It's the scientific name for a group of minerals containing silicon and oxygen. Crystalline silica refers to a specific grouping or pattern of the oxygen and silicon atoms. There are several forms of crystalline silica, including quartz, cristobalite, and tridymite.

Crystalline silica can be found in abrasives, concrete, filter aids, masonry materials (grouts, mortar, bricks, etc.), mineral products, paints, pavement, perlite, plant materials, polishing compounds, Portland cement, sands, slag, soapstone, and soil.

Hazards of silica.

Crystalline silica is only a hazard when it becomes airborne. It can cause various forms of a progressive lung disease called silicosis, depending upon the dose and exposure time. Scar tissue forms in the lungs, limiting the body's ability to get oxygen. Initial symptoms include shortness of breath, severe cough, fatigue, chest pains, possible fever and susceptibility to infectious lung ailments.

Chronic silicosis – caused by low, but frequent exposures with symptoms developing in 10 – 40 years

Accelerated silicosis – the exposure level increases; symptoms develop within 5 to10 years

Acute silicosis – extremely high levels of exposure, such as in sand blasting, over a short period of time; symptoms can develop within a few weeks

Crystalline silica has also been linked to cancer. As a result, any material containing more than 0.1% crystalline silica must meet the labeling, information and training requirements of OSHA's Hazard Communication Standard.

Who is at risk?

Workers who are producing dust from crystalline silica containing materials.

Manufacturing & Research sector:

- ✓ Metal casting
- ✓ Glass products
- ✓ Ceramics, clay, and pottery
- ✓ Asphalt paving materials
- ✓ Cut stone and stone products
- ✓ Foundry industry: grinding, molding, shakeout

Construction Industry (including Operation & Maintenance activities):

- ✓ Chipping, hammering and drilling rock
- ✓ Crushing, loading, hauling and dumping rock
- ✓ Abrasive blasting
- ✓ Sawing, hammering, drilling, grinding, and chipping masonry or concrete
- ✓ Demolition/renovation of concrete or masonry structures
- ✓ Drywall finishing
- ✓ Dry sweeping or using pressurized air to blow concrete, rock, or sand dust
- ✓ Paint removal operations

What should be provided to affected workers?

At a minimum, Hazard Communication Training and exposure monitoring. If exposures exceed OSHA's Permissible Exposure Limit, then additional requirements apply, that include medical surveillance and annual chest X-rays, engineering and administrative controls, respiratory protection, and additional training and exposure monitoring.

EH&S can assist by providing training and working with departments to arrange the proper exposure monitoring for affected employees. Contact us to discuss the job or task; together we can determine the appropriate course of action for protecting employee health.

How can exposures be reduced?

Exposures can be reduced by using engineering and administrative controls, as well as personal protective equipment (PPE):

- ✓ Substituting other abrasives for silica sand
- ✓ Using water, or wet methods, to control dust exposure
- ✓ Local exhaust ventilation, removing dust as it is generated (for example, HEPA-shrouded equipment)
- ✓ Use of respiratory protection, in accordance with the University's Respiratory Protection Program

EH&S can provide guidance on developing engineering and administrative controls or providing PPE.

For more information on crystalline silica, check out the following websites:

The NIOSH Safety and Health Topic Page on Silica
http://www.cdc.gov/niosh/topics/silica/

NIOSH Publications on Silica by Industry
http://www.cdc.gov/niosh/topics/silica/industry.html

OSHA's Safety and Health Topic Page on Crystalline Silica
http://www.osha.gov/SLTC/silicacrystalline/index.html

Silicosis: Know the Facts! (NIOSH 2004-108)
http://www.cdc.gov/niosh/docs/2004-108/default.html

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Or contact the University of Connecticut's Department of Environmental Health & Safety, 486-3613