INTRODUCTION

Silica (SiO2) are very jagged micro-sized crystallized glass type shards (Quartz, Cristobalite, Tridymite) and are the most common element on the Earth’s surface. SiO2 is extremely dangerous to the lungs, and it is eventually fatal to humans upon continued, extended, uncontrolled ingestion. It is created by taking sand and adding heat to form glass.

Silica dust is generated from cutting, grinding, drilling, sanding, sandblasting or abrasive blasting on concrete, bricks or masonry blocks. If the blasting grit contains silica, it will usually be labeled as silica sand or as containing quartz or crystalline silica.”

A lung disease called “silicosis” is caused by breathing in dust containing silica. The dust causes “fibrosis” (or scar tissue formation) in the lungs. This reduces the lung’s ability to extract oxygen from the air. The effects of silica are irreversible. As such, silica is considered a serious hazard on many construction sites.

“Chronic silicosis is the more common health effect. Acute silicosis occurs after exposure to massive amounts of silica dust. Although rare, workers in their 30’s and 40’s who didn’t know they were working with silica and didn’t wear respirators have died by suffocation within months of exposure to extremely heavy silica dust concentrations. Their lungs were so badly scarred they couldn’t get enough oxygen.”
SILICA (PART 2 of 3)

SILICA PEL
The safety amount of silica in the air is zero. The legal limit is called a “Permissible Exposure Limit” or PEL. The PEL for SiO2 in the air is 50 micrograms per cubic meter. This limit is for respirable (fine) dust.

Rule-of-thumb: if dust containing silica is visible in the air, it’s almost always over the permissible limit.

This limit is based on an 8-hour average exposure and is very low, because it doesn’t take much silica in the air to cause health problems.

Imagine an extremely tiny pinch of very fine dust dispersed in the air in a 3 square foot square box - you probably couldn’t even see it. Respirable dust is that fine dust that is inhaled deep into the lungs where it causes damage. Coarse dust is caught in the nose and throat before reaching the lungs.

WHERE IS SILICA FOUND ON MY JOB?

Abrasive blasting with silica sand creates extremely high levels of silica dust. Abrasive blasting on concrete with any kind of grit produces high levels of silica dust. Sandblasting concrete (even without silica sand) still results in high levels of silica in the air from the concrete itself.

Other trades/tasks that generate exposures exceeding the PEL include:
- Drywall finishing
- Sanding painted surfaces containing SiO2
- Concrete and masonry building construction
- Earthwork and rock crushing
- Masonry or concrete building construction
- Road construction and repair

In many construction jobs, we have short but high exposures to silica. Every time you inhale silica dust, it’s like inhaling fine, broken glass that scar your lungs. It adds up over time.
CONTROLLING SILICA EXPOSURES

When dust is controlled, exposures are low. When dust is uncontrolled, exposures are high. Many exposures are for short time periods but at very high concentrations. Short, high exposures can still excited permissible limits and cause lung damage.

Silica dust exposure can be controlled by use of water or exhaust ventilation. Using water for dust suppression is usually the most effective way of controlling silica dust. If inadequate amounts of water are used, operators of concrete cutters can still be exposed to too much silica dust. The amount often suggested is a pint of water per minute for best dust control. Too much water can create a disposal or cleanup problem and sometimes soak the operator.

The vacuum must have HEPA (high efficiency) filters to completely capture the fine dust.

New abrasive blasting equipment using water has recently been developed, but the levels of silica in the air will still probably exceed the allowable limit. Acid washing is sometimes used to prepare concrete flooring rather than sandblasting.

Avoid dry sweeping and use of compressed air on concrete. Both these activities can stir up large amounts of dust. Use a vacuum with high efficiency filters when possible. When these activities cannot be avoided, respirators must be worn.

Respirators may still be needed even when steps have been taken to reduce the amount of dust in the air.

Sometimes, it can be difficult to reduce the amount of silica dust to levels below the permissible limits. A supplied air respirator may be needed for high levels of silica dust where water or ventilation can’t be used to control the dust. A supplied air respirator is required if the amount of silica in the air is more than 10 times the permissible limit.