Target Health Hazard Fact Sheet

SILICA

WHAT IS IT? Silica is an oxide of silicon and is the characteristic ingredient of a great variety of minerals, including quartz, cristobalite, tridymite, amethyst and sand. It is widely used in cores for metal casting operations, ceramics, decorative materials, insulation, building materials and glass.

WHERE IS IT? Silica is found throughout industry in various manufacturing processes, such as iron and mineral processing plants, mining, abrasive soap production, glass manufacturing, potteries, foundries, abrasives use and manufacturing, in stone cutting and finishing industries.

WHAT IS THE HAZARD? More than 1.1 million employees are exposed to the hazard created by inhalation of silica dust. Inhalation of these particles can produce rapidly-developing (acute) or chronic silicosis -- a disabling lung disease. Typically, the lung tissue reacts to the presence of silica particles by forming fibrous matter around the particle. Evidence suggests that particles below one micron (one-millionth of a meter) in size may be the most dangerous since they may penetrate deeper into the lungs in high concentrations. In rapidly-developing silicosis, symptoms appear eight to 18 months after the first exposure. Chronic silicosis, the type usually encountered in industry, generally, is produced only after years of silica inhalation. The symptoms for either type are the same -- slowly increasing difficulty in breathing under exertion. In some workers, large masses of dense fibrous tissue develop in the upper portion of the lungs, leading to severe respiratory crippling. Tuberculosis is a frequent complication of silicosis.

HOW IS IT CONTROLLED? The best method is substitution of another material; for example, use of steel shot or alumina grit in place of sand-blasting operations. Other methods include enclosure of operations, local exhaust ventilation, segregation of operations, wetting, and ordinary good-housekeeping practices.

WHAT ARE APPROVED LEVELS? For respirable quartz particles, OSHA's permissible level is 10 milligrams per cubic meter of air, divided by the per cent of free silica plus 2, as shown in this formula: $\frac{10\ mg/m^3}{\%SiO_2+2}$.

For respirable cristobalite and tridymite, the limits are one-half the value for quartz. Imminent danger situations generally are not applicable. Any eight-hour, time-weighted average greater than four times the limit is considered a serious violation. Exposure to concentrations between the limit and four times the limit are considered a regular or nonserious violation.

HOW IS IT MEASURED? Personal sampling pumps with filters are used to collect dust samples for worker exposure. The collected dust then is weighed for a given volume of air. Similar procedures are used to determine the percentage of silica in the air.