

Summary of Comments and Agency Decisions

Title: Proposed changes to Silica and corrections to Air Contaminants in General Industry and Construction

Administrative Order Number: AO 6-2008

Adopted Date: 05/13/08

Effective Date: 07/01/08

On October 23, 2007, Oregon OSHA published a proposal to, among other things, change the permissible exposure limit (PEL) to silica from a calculation to 0.05 milligrams per cubic meter of air (mg/m³). We also proposed to change the criteria for the sample collection method from the Dorr-Oliver nylon cyclone to an aluminum cyclone.

Based on a review of all of the silica air samples we have collected since 1989, our analysis showed that these changes would have impacted only 3% of those samples. We also evaluated other sample methods, and chose one that meets the International Standards Organization (ISO), and is used by many other countries.

The current PEL is a calculation based on a mixture of respirable silica and all other respirable dusts. Most of the comments we received pointed out that the current PEL calculation is based on a 0.1 mg/m³ limit for silica, and changing the PEL to 0.05 mg/m³ is a reduction that would impact industry more than what we had estimated. We agree with these assessments, although we still believe that a PEL based on a number instead of a calculation is much less confusing to employers, particularly small employers. It is also important to note that respirable dust does not cause silicosis, and respirable dust as a whole can be evaluated separately.

Several commenters pointed out that the current calculation is based on a conversion from an older collection method. However, this collection method is quite antiquated and we are unaware of anyone who currently uses that particular sampling method.

Several commenters stated that the current calculation is not confusing to industrial hygienists and safety professionals. We do not find this argument persuasive because our own experience is that safety and health professionals often find the calculation confusing when they do not evaluate silica exposures on a regular basis. This also fails to take into account that most small employers do not have full-time industrial hygienists or professional safety staff.

Some commenters expressed concern that if Oregon OSHA had a different PEL than Federal OSHA, manufacturers would need to change their MSDSs. However, these comments fail to take into account that Oregon OSHA already has PELs that are different from Federal OSHA, including substances for which Federal OSHA has no established limit. None of these

substances must be listed on an MSDS. These concerns also fail to take into account that several other states established PELs for silica that are different from the Federal OSHA limit.

Several commenters also stated that Federal OSHA has developed a comprehensive silica standard, and a different PEL in Oregon could run counter to the new standard. However, these comments fail to take into account that any rulemaking by Federal OSHA will result in a change in the Air Contaminants code anyway. These comments also fail to take into account that no new standard has been proposed and it is not uncommon for Federal OSHA to have new standards near the proposal stage for many years.

Several commentors pointed out difficulties in the analysis of silica. Oregon OSHA is well aware of the limitations in the analysis of samples for quartz and cristobalite by X-ray diffraction discussed in the public comments. While it does have limitations, it is the only technique for which both NIOSH and OSHA have published methods. The sensitivity of the method is one of the issues. The sensitivity can be increased by increasing the sample volume or lowering the limit of quantitation (LOQ). The sample volume collected is limited by the flow rate required by the size selective sampler used. The current Dorr-Oliver nylon cyclone requires a flow of 1.7 L/min. Other commercially available samplers use a higher flow; the Higgins Dewell samples at 2.2 L/min and the SKC aluminum cyclone samples at 2.5 L/min. All of these cyclones are listed in NIOSH 7500 as sampling apparatus for collecting respirable particulate matter.

For example using the nylon Dorr-Oliver cyclone at 1.7 L/min for a 480 minute sample gives a volume of 816 L, while an SKC aluminum cyclone at 2.5 L/min gives a volume of 1200 L. By using the higher flow rate the lower end of quantifiable range in air is lowered from 0.013 mg/m³ to 0.008 mg/m³ for an analytical limit of quantitation (LOQ) of 10 micrograms.

The sensitivity can also be increased with better instrumentation. New developments in X-ray diffraction detectors makes analytical limits of quantitation lower than 3 micrograms practical. This lowers the lower end of the quantifiable range in air for a 480 minute sample taken at 2.5 L/min down to 0.003 mg/m³.

We also received comments regarding the change in the sampling method. Oregon OSHA fully understands that there is a great deal of debate regarding the various methods for sampling for silica, and there can be problems with size-selective sampling. The performance of the samplers is also effected by humidity, electrostatic charges, filter cassette leaks, orientation, and wind, as well as a host of other issues. NIOSH Analytical Sampling Method 7500 has a +/- 18% accuracy range, which takes into account all of this variability. As with many materials in nature, aerosol particles are highly diverse, and their size range is highly varied. The NIOSH method lists a series of samplers which are acceptable for use, and there are manufacturers who sell products that meet these methods.

Oregon OSHA will change the PEL for silica to 0.1 mg/m³, as this was suggested by several commenters. We will also change the sampling method to any that conforms to OSHA or NIOSH sampling methods for respirable quartz silica.