Minnesota Electrical Association

Electrical Toolbox Talks

Crystalline Silica

OSHA Crystalline Silica Standard CFR 29- 1926.1153 to be enforced **starting September 23, 2017**.

What is crystalline silica?

- Crystalline silica is a common mineral found in many naturally occurring materials and used in many industrial products and at construction sites. Materials like sand, concrete, stone and mortar contain crystalline silica. Crystalline silica is also used to make products such as glass, pottery, ceramics, bricks, concrete and artificial stone.

Who is at risk from exposure to crystalline silica?

- Around 2 million workers are exposed to crystalline silica on the job. Simply being near sand or other silica containing materials is not hazardous. The hazard exists when specific activities create respirable dust that is released into the air.

How are electricians exposed to respirable crystalline silica?

- Respirable crystalline silica means quartz, cristobalite and-/or tridymite is very small particles, typically 100 times smaller than ordinary sand found on beaches or playgrounds. It is created by high-energy operations like cutting, sawing, grinding, and drilling stone, rock, concrete, brick, block and mortar. Activities such as abrasive blasting with sand; sawing brick or concrete; sanding or drilling into concrete walls; grinding mortar; and cutting or crushing stone creates respirable dust. Crystalline silica is found in masonry products including concrete, mortar, quartz and even sand. Amorphous silica, such as silica gel, is not crystalline silica.

- Typically this standard does not apply to exposures that remain low as in mixing mortar, or pouring concrete- where water is used to reduce dusts. As masonry products are drilled or sawn, the dust contains respirable silica.

- Construction and maintenance workers could be exposed to this silica dust and that at least thousands of workers are exposed to levels higher than the **Permissible Exposure Levels (PEL)** 50 micrograms per cubic meter of air over 8 hours

- Inhalation of the crystalline silica can cause silicosis (scarred lung tissues) making it difficult to breathe, contributes to lung cancer, other respiratory disease, and kidney disease.

Methods to control the inhalation of the dusts are required.

Small employers can use Table 1 in OSHA construction standards - 1926.1153 for guidance, or they can measure the workers' exposure and take measures to limit to the PEL.

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(continued)

PARTIAL Table 1 below. Full table go to: www.osha.gov/silica/

Equipment / Task	**Engineering and Work Practice Control Methods**	**Required Respiratory Protection and Minimum Assigned Protection Factor (APF)**	
		≤ 4 hours / shift	**> 4 hours / shift**
(vii) Handheld and stand-mounted drills (including impact and rotary hammer drills)	Use drill equipped with commercially available shroud or cowling with dust collection system. Operate and maintain tool in accordance with manufacturer's instructions to minimize dust emissions. Dust collector must provide the air flow recommended by the tool manufacturer, or greater, and have a filter with 99% or greater efficiency and a filter-cleaning mechanism. Use a HEPA-filtered vacuum when cleaning holes.	None	None
(i) Stationary masonry saws	Use saw equipped with integrated water delivery system that continuously feeds water to the blade. Operate and maintain tool in accordance with manufacturer's instructions to minimize dust emissions.	None	None
(ii) Handheld power saws (any blade diameter)	Use saw equipped with integrated water delivery system that continuously feeds water to the blade. Operate and maintain tool in accordance with manufacturer's instructions to minimuze dust emissions. - When used outdoors - When used indoors or in an enclosed area	None APF 10	APF 10 APF 10
(iii) Handheld power saws for cutting fiber-cement board (with blade diameter of 8" or less)	For tasks performed outdoors only: Use saw equipped with commercially available dust collection system Operate and maintain tool in accordance with manufacturer's instructions to minimuze dust emissions. Dust collector must provide the air flow recommended by the tool manufacturer, or greater, and have a filter with 99% or greater efficiency.		
Table 1: Specified Exposure Control Methods when Working with Materials Containing Crystalline Silica			

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Alternative measures to Table 1 may be used.

- Example using water for cutting to keep dust down, or using dust collection systems and a High Efficiency Particulate Air (HEPA) filters at 99.97 % efficiency
- Measure the amount of silica that workers are exposed to if it may be at- or above- an action level of 25 µg/m3 (micrograms of silica per cubic meter of air), averaged over an eight-hour day.
- Protect workers from respirable crystalline silica exposures above the permissible exposure limit of 50 µg/cubic meter, averaged over an eight-hour day.
- Use dust controls to protect workers from silica exposures above the PEL.
- Provide respirators to workers when dust controls cannot limit exposures to the PEL.

All construction employers are required to:

- Write and implement a control plan
- Designate a competent person to implement the plan
- Restrict housekeeping practices to limit exposure
- Offer medical exams to workers who are required to wear respirators. E.g., dust masks of Assigned Protection Factor (APF) 10 - or more.
- Train workers to limit exposure
- Whenever an exposure assessment indicates that employee exposure is above the PEL, the employer shall describe in the written notification the corrective action being taken to reduce employee exposure to, or below, the PEL
- Keep records

The key competent person(s) for this company is _____.

Without dust controls, using a handheld power saw to cut concrete can expose workers to high levels of respirable crytalline silica.

Three Ways to Comply with the OSHA Requirement

1) Use OSHA Table 1:

- If the standard says an integrated system that continuously feeds water to the tool, it must be part of the tool and not a separate stream of water.
- Different rules for outdoor use vs. indoor or an enclosed area
- Determine length of time for exposure
- Use approved vacuum systems NOT shop vacuums
- If drilling, use shroud or cowling with a dust collection system (part vii)
- May use hollow drill bits and dust collection

2) Use objective data or performance testing:

- Utilize third-party data in specific applications that would be in compliance with PEL.
- Be sure the data fits your current application and use of a tool.
- A general rule for vacuum when cutting is 25 CFM for each inch of saw wheel diameter

3) Scheduled air monitoring:

- Set up air testing for each situation of dust producing procedures
- If testing indicates that employees are subjected to excess dust, they must wear respirators.
- If employees are required to wear respirators, they must have a fit test and follow a medical surveillance plan
- If other trades are creating silica dust and not controlling it, all other workers in the area need to evaluate the situation in order to avoid exposure above the PEL

OSHA:
www.osha.gov/silica

Hilti Tool Helpful Hints:
http://tiny.cc/yt3sny
OR
www.hilti.com/content/hilti/W1/US/en/services/power-tools/osha-silica-dust-regulations/osha-silica-dust-knowledge-center.html http://tiny.cc/yt3sny