

(TAKEN FROM ACPA TECHNICAL BULLETIN)

### **Understanding OSHA's Crystalline Silica Rule**

"The ACPA takes worker health and safety very seriously, and in that spirit, has prepared this technical bulletin to provide general information about how OSHA's final rule for crystalline silica exposure will impact common practices in the concrete pavement industry.

At the time this information was published, questions and concerns remain about the rule itself, as well as about the impact of implementation and enforcement on construction companies. Although ACPA recognizes these questions and concerns, the focus of this document is solely to provide contactors with general information and guidance.

This guide is not a comprehensive treatise, but is intended to help concrete contractors gain a better understanding of how the rule may apply specifically to concrete pavement construction operations. It also identifies the basic steps contractors should take to comply with the ruling.

### **Understanding the Rule's Scope**

The rule is comprised of two standards, one for Construction and one for General Industry and Maritime, according to OSHA. For purposes of this document, only the *construction standard* is addressed and considered applicable to concrete paving and preservation contractors.

Employers covered by the construction standard have until June 23, 2017, to comply with most requirements of the ruling, according to OSHA.

Cutting, drilling, chipping and breaking concrete with handheld concrete power saws, jackhammers, an dowel drilling rigs are the predominant activities in concrete pavement construction and preservation that may require engineering and work practice control measures, or required respiratory protections for workers.

Although the need for control measures may be obvious for the operations noted above, employers also should consider other operations (such as sandblasting, air-blowing joints or sweeping), as well as exposure of employees who may be working in close proximity to any operations where RCS may be present.

### **Air Purifying Respirators**

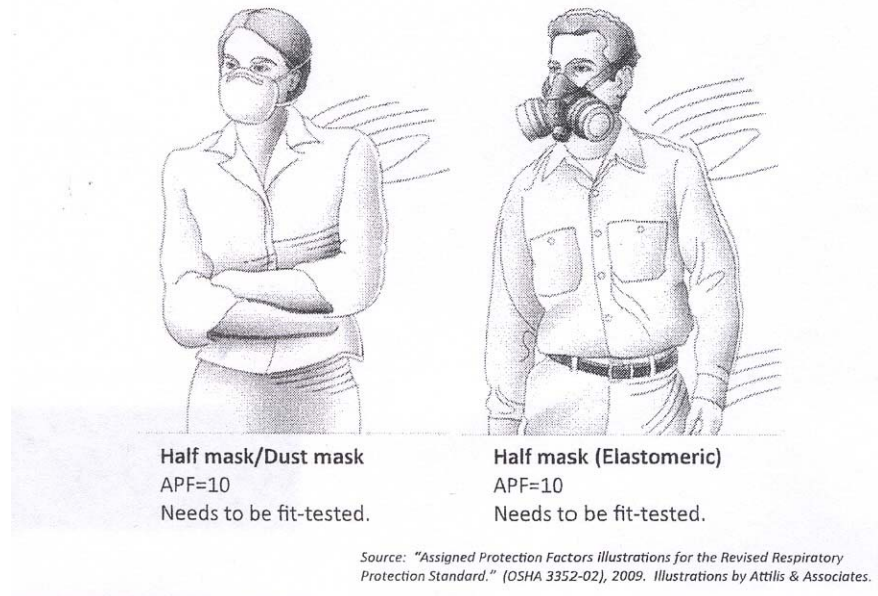
OSHA provides guidance on air purifying respirators in its guide, "Assigned Protection Factors for the Revised Respirator Protection Standard" (OSHA 3352-02 2009).<sup>2</sup>

For the applicable concrete paving operations, adequate respiratory protection can be accomplished with dust masks rated APF 10. Figure 1, which comes from the OSHA guide, illustrates two APF 10 type masks.

### OSHA Table 1 Provides Additional Guidance

Table 1 of this guide (pages 5-8) is a truncated version of the complete Table 1 found in OSHA's "Regulatory Text for Construction Standard with Table 1."<sup>3</sup> Table 1 in this guide only includes the equipment or tasks typical used in concrete sawing, drilling or breaking operations employed in concrete pavement construction, preservation or repair. For ease of reference the table is color coded to show the required actions applicable to the equipment or tasks listed.

Figure 1—Major Types of Respirators



*Notations highlighted in green in Table 1 indicate no action is required; items highlighted in range indicate a respirator is required.*

For the full construction regulatory text and unabridged Table 1, see reference 3 listed on page 10.

For each employee engaged in a task identified in Table 1, OSHA says *"the employer shall fully and properly implement the engineering controls, work practices, and respirator protection specified for the task outlined in Table 1, unless the employer assesses and limits the exposure the employee to respirable crystalline silica in accordance with paragraph d in the full regulatory text)."*

Paragraph d in the rule outlines alternative exposure control methods, including assessing RCS by measuring employee exposure. It is important to note that contractors who comply with Table 1 do not need to measure RCS exposure levels to comply with the permissible exposure limits.

For tasks not listed in Table 1, and for which employees are reasonably expected to be exposed to RCS, the employer needs to assess the exposure of each employee. Assessment options are based on: 1) performance (8-hour exposure for each employee using any combination of air monitoring data or objective data sufficient to characterize RCS exposure), or 2) scheduled (8-hour exposure for each employee using one or more personal breathing zone air samples that reflect the exposures of employees on each shift. Where several employees perform the same tasks on the same shift and in the

same work area, the employer may sample a representative fraction of these employees.) Such assessments require hiring a consultant.

### **Early Entry Saws**

Early entry dry saws are not specifically mentioned in the Table 1 of the rule. However, the current understanding is that these saws, which are very common in pavement construction, adequately rely on concrete mixture water for dust suppression as the control. Regardless, workers still may be required to use APF 10 masks if the concrete hardens significantly and dry dust becomes present.

### **Recommendations**

Ahead of the full implementation of OSHA's rule and periodically thereafter, contractors should evaluate their operations and offer training to employees.

Contractors should follow the recommended best practices outlined on page 9, as well as write a company-specific exposure control plan. A short outline of an exposure control plan is found in Table 2 (page 9). To the extent practical, the exposure plan should cover all operations and concrete materials anticipated in typical work by the company.

No test results were found in researching this bulletin indicate that concrete made with different coarse or fine aggregates will result in appreciably different RSC production. However, contractors may want to consider differences based on the variety of concrete aggregates that they may encounter in their operational territory. The examples in this bulletin are primarily based on experiences with concrete containing limestone aggregates. Understanding variations based on the concrete materials and addressing these variations in the written exposure control plan could allow the plan to be applicable to a wider range of projects."

**Table 1—Specified Exposure Control Methods When Working With Materials Containing Crystalline Silica**

Equipment/task	Engineering and work practice control methods	Required respiratory protection and minimum assigned protection factor (APF)	
		≤4 hours/shift	>4 hours/shift
(ii) Handheld power saws (any blade diameter)	<ul style="list-style-type: none"> <li>Use saw equipped with integrated water delivery system that continuously feeds water to the blade.</li> <li>Operate and maintain tool in accordance with manufacturer's instructions to minimize dust emissions.</li> </ul>	<b>When Used Outdoors:</b>	
		None	APF 10
		<b>When Used Indoors or in Enclosed Areas:</b>	
		APF 10	APF 10
(iv) Walk-behind saws	<ul style="list-style-type: none"> <li>Use saw equipped with integrated water delivery system that continuously feeds water to the blade.</li> <li>Operate and maintain tool in accordance with manufacturer's instructions to minimize dust emissions.</li> </ul>	<b>When Used Outdoors:</b>	
		None	None
		<b>When Used Indoors or in Enclosed Areas:</b>	
		APF 10	APF 10
(v) Drivable saws	<b>For Tasks Performed Outdoors Only:</b>		
	<ul style="list-style-type: none"> <li>Use saw equipped with integrated water delivery system that continuously feeds water to the blade.</li> <li>Operate and maintain tool in accordance with manufacturer's instructions to minimize dust emissions.</li> </ul>	None	None
(vi) Rig-mounted core saws or drills	<b>For Any Operating Situation:</b>		
	<ul style="list-style-type: none"> <li>Use tool equipped with integrated water delivery system that supplies water to cutting surface.</li> <li>Operate and maintain tool in accordance with manufacturer's instructions to minimize dust emissions.</li> </ul>	None	None

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**Table 1—Specified Exposure Control Methods When Working With Materials Containing Crystalline Silica** *(continued)*

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)	<b>For Any Operating Situation:</b>		
	<ul style="list-style-type: none"> <li>• Use drill equipped with commercially available shroud or cowling with dust collection system.</li> <li>• Operate and maintain tool in accordance with manufacturer's instructions to minimize dust emissions.</li> <li>• 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.</li> <li>• Use a HEPA-filtered vacuum when cleaning holes.</li> </ul>	None	None
(viii) Dowel drilling rigs for concrete	<b>For Tasks Performed Outdoors Only:</b>		
	<ul style="list-style-type: none"> <li>• Use shroud around drill bit with a dust collection system. Dust collector must have a filter with 99% or greater efficiency and a filter-cleaning mechanism.</li> <li>• Use a HEPA-filtered vacuum when cleaning holes.</li> </ul>	APF 10	APF 10
(ix) Vehicle-mounted drilling rigs for rock and concrete	<b>For Any Operating Situation:</b>		
	<ul style="list-style-type: none"> <li>• Use dust collection system with close capture hood or shroud around drill bit with a low-flow water spray to wet the dust at the discharge point from the dust collector, OR...</li> </ul>	None	None
	<ul style="list-style-type: none"> <li>• Operate from within an enclosed cab and use water for dust suppression on drill bit</li> </ul>	None	None

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**Table 1—Specified Exposure Control Methods When Working With Materials Containing Crystalline Silica** *(continued)*

Equipment/task	Engineering and work practice control methods	Required respiratory protection and minimum assigned protection factor (APF)	
		≤4 hours/shift	>4 hours/shift
<b>(x) Jackhammers and handheld powered chipping tools</b>	<ul style="list-style-type: none"> <li>Use tool with water delivery system that supplies a continuous stream or spray of water at the point of impact, OR...</li> </ul>	<b>When Used Outdoors:</b>	
		None	APF 10
	<ul style="list-style-type: none"> <li>Use tool with commercially available shroud and dust collection system.</li> <li>Operate and maintain tool in accordance with manufacturer's instructions to minimize dust emissions.</li> <li>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</li> </ul>	<b>When Used Indoors or in Enclosed Areas:</b>	
		APF 10	APF 10
		<b>When Used Outdoors:</b>	
		None	APF 10
<b>When Used Indoors or in Enclosed Areas:</b>			
APF 10	APF 10		
<b>(xv) Large drivable milling machines (half-lane and larger)</b>	<b>For Cuts of any Depth on Asphalt Only:</b>		
	<ul style="list-style-type: none"> <li>Use machine equipped with exhaust ventilation on drum enclosure and supplemental water sprays designed to suppress dust.</li> <li>Operate and maintain machine to minimize dust emissions</li> </ul>	None	None
	<b>For Cuts of Four inches in Depth or Less on any Substrate:</b>		
	<ul style="list-style-type: none"> <li>Use machine equipped with exhaust ventilation on drum enclosure and supplemental water sprays designed to suppress dust.</li> <li>Operate and maintain machine to minimize dust emissions, OR...</li> </ul>	None	None
	<ul style="list-style-type: none"> <li>Use a machine equipped with supplemental water spray designed to suppress dust. Water must be combined with a surfactant.</li> <li>Operate and maintain machine to minimize dust emissions.</li> </ul>	None	None

*Continued on page 8...*

Table 1—Specified Exposure Control Methods When Working With Materials Containing Crystalline Silica *(continued)*

Equipment/task	Engineering and work practice control methods	Required respiratory protection and minimum assigned protection factor (APF)	
		≤4 hours/shift	>4 hours/shift
(xiv) Small drivable milling machines (less than half-lane)	<b>For Any Operating Situation:</b>		
	<ul style="list-style-type: none"> <li>• Use a machine equipped with supplemental water sprays designed to suppress dust. Water must be combined with a surfactant.</li> <li>• Operate and maintain machine to minimize dust emissions.</li> </ul>	None	None
(xvi) Crushing machines	<b>For Any Operating Situation</b>		
	<ul style="list-style-type: none"> <li>• Use equipment designed to deliver water spray or mist for dust suppression at crusher and other points where dust is generated (<i>e.g., hoppers, conveyers, sieves/sizing or vibrating components, and discharge points</i>).</li> <li>• Operate and maintain machine in accordance with manufacturer's instructions to minimize dust emissions.</li> <li>• Use a ventilated booth that provides fresh, climate-controlled air to the operator, or a remote control station.</li> </ul>	None	None
(xvii) Heavy equipment and utility vehicles used to abrade or fracture silica-containing material ( <i>e.g., hoe-ramming, rock ripping</i> ) or used during demolition activities involving silica-containing material	<b>For Any Operating Situation</b>		
	<ul style="list-style-type: none"> <li>• Operate equipment from within an enclosed cab.</li> <li>• When employees outside of the cab are engaged in the task, apply water and/or dust suppressants as necessary to minimize dust emissions.</li> </ul>	None	None

## Table 2 — Written Exposure Control Plan

Regardless of which exposure control methods are selected, all construction employers covered by the OSHA standard are required to establish and implement a written exposure control plan that contains at least the following elements:

- 1) A description of the tasks in the workplace that involve exposure to RCS;
- 2) A description of the engineering controls, work practices, and respiratory protection used to limit employee exposure to RCS for each task;
- 3) A description of the housekeeping measures used to limit employee exposure to RCS; and
- 4) A description of the procedures used to restrict access to work areas, when necessary, to minimize the number of employees exposed to RCS and their level of exposure, including exposures generated by other employers or sole proprietors.

— Source: OSHA

### Recommended Best Practices

Regardless of the types of work or the degree to which RCS-causing operations are used, ACPA interprets that the new rule will require contractors to generate some additional plans and records<sup>4</sup>. The following are interpreted as best practices under the OSHA ruling:

- Establish and implement a written exposure control plan that identifies tasks that involve RCS exposure potential and methods used to protect workers. (*See Table 2.*) The plan should:
  - 1) Be developed around compliance with Table 1.
  - 2) Include procedures to restrict employee access to work areas where high exposures may occur.
  - 3) Address monitoring for silica if Table 1 controls are deemed inadequate to comply with the permissible exposure limits spelled out in the regulation.
- Designate a competent person to write and implement the written exposure control plan.
- Restrict housekeeping practices that expose workers to silica where feasible alternatives are available.
- Offer medical exams—including chest X-rays and lung function tests—performed by a physician or other licensed health care professional every three years for workers who are required by the standard to wear a respirator for 30 or more days per year.
- Keep accurate records of workers' silica exposure and medical exams.
- Provide information and training for workers on operations that result in silica exposure and ways to limit their exposure.



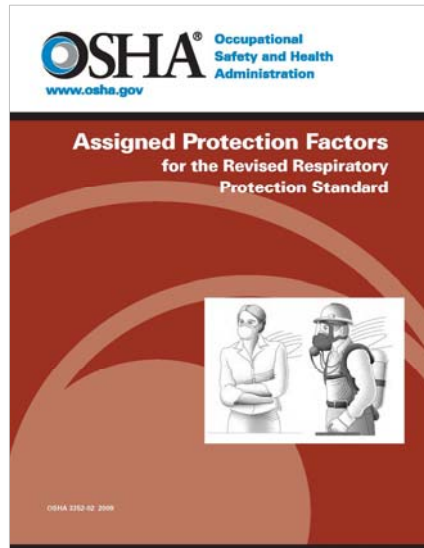
## References

1. "OSHA's Final Rule to Protect Workers from Exposure to Respirable Crystalline Silica," <https://www.osha.gov/silica>. Accessed 5 June 2016.
2. "Assigned Protection Factors for the Revised Respiratory Protection Standard," Occupational Safety and Health Administration U.S. Department of Labor (OSHA 3352-02), 2009. Accessed 6 June 2016.
3. "Regulatory Text for Construction Standard, with Table 1," <https://www.osha.gov/silica/SilicaConstructionRegText.pdf/>. Accessed 5 June 2016.
4. "About NIOSH." Centers for Disease Control and Prevention, The National Institute for Occupational Safety and Health (NIOSH) website, <http://www.cdc.gov/niosh/about/default.html>. Accessed 5 June 2016.

## Other Helpful Resources

- "OSHA's Crystalline Silica Rule: Construction," OSHA Fact Sheet. <https://www.osha.gov/Publications/OSHA3681.pdf>.
- Final Rule (29 CFR 1926.1153): "Occupational Exposure to Respirable Crystalline Silica: A Rule by the Occupational Safety and Health Administration on 03/25/16." <https://www.federalregister.gov/articles/2016/03/25/2016-04800/occupational-exposure-to-respirable-crystalline-silica>
- Appendix A to § 1926.1153 – Methods of sample analysis. <https://www.osha.gov/silica/AppendixAtosect1926.1153.pdf>
- Appendix B to § 1926.1153 – Medical Surveillance Guidelines. <https://www.osha.gov/silica/AppendixBtosect1926.1153.pdf>

*Recommended OSHA documents available online for download.*



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