Regulatory Compliance

Adapting Metalworking Safety Programs for the New Silica Standard

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Description

With the compliance deadline now past for the new U.S. Occupational Safety and Health Administration (OSHA) Construction Respirable Crystalline Silica Standard, attention is starting to turn toward getting ready for requirements under the General Industry and Maritime Standard, with an upcoming compliance deadline of 23 June, 2018. OSHA has listed foundries as having a high number of workers exposed to respirable crystalline silica (see Table A), and elevated worker exposures to silica for certain types of workers in the iron and steel industry have been documented in industrial hygiene studies in the past. Getting ready for silica compliance will likely be a significant part of the iron and steel safety conversation in the coming months.

What does getting ready for the new Respirable Crystalline Silica Standard mean? U.S. industry was already expected to comply with the existing permissible exposure limit (PEL) of 0.1 mg/m^3 as an 8-hour time-weighted average (TWA) since 1971 and other OSHA standards relevant to worker exposure such as hazard communication were also already in existence, so how do current safety programs need to be adapted? This bulletin looks at some of the key aspects of what's new, along with tips for adapting safety programs for the new requirements. **Readers should also review the complete Respirable Crystalline Silica Standard, available at *www.osha.gov/silica*.**

Industry Selector	Workers Currently Exposed	Workers Currently Exposed Above the New Permissible Exposure Limit (PEL)
Asphalt roofing materials	3,158	1,410
Concrete products	32,981	9,391
Cut stone	9,429	5,243
Dental laboratories	31,105	864
Foundries	34,591	12,173
Jewelry	6,772	2,434
Porcelain enameling	4,113	1,654
Pottery	6,269	2,496
Railroads	16,895	5,340
Ready-mix-concrete	27,123	19,941
Shipyards	3,038	2,228
Structural clay products	7,893	3,198
Support activities for oil and gas operations	16,960	11,207

Source: OSHA Directorate of Standards and Guidance, accessed April, 2018

Table A. Number of Workers Exposed to Respirable Crystalline Silica in Selected General Industry/Maritime Sectors

First, in addition to a lower PEL, there will now be a substance-specific standard for silica. But what is an OSHA substance-specific standard? OSHA has long used substance-specific standards to regulate certain hazards, and currently has a little more than 30 of these standards, with respirable crystalline silica being the latest addition. Like some of the other chemicals regulated this way, workplaces where there is potential exposure to silica will need a specific program to manage compliance. This program consists of elements such as:

- Worker exposure assessment.
- Written exposure control plan.
- Signage and housekeeping practices.
- Worker training and medical evaluation.

As in many substance-specific standards, the new silica standard establishes not only a lower PEL of 0.05 mg/m^3 (8-hour TWA), but also adds an Action Level of 0.025 mg/m^3 (8-hour TWA). This level is a trigger for certain actions under the standard and is commonly one-half of the PEL in other OSHA substance-specific standards. It should be noted that these levels may be expressed as mg/m^3 (milligrams per cubic meter) or µg/m^3 (micrograms per cubic meter), but these are easily interchangeable by just remembering that there are 1,000 micrograms in a milligram.

Worker Exposure Assessment

Determining the amount of worker exposure to airborne contaminants, such as respirable crystalline silica, is often called exposure assessment. In the new standard, OSHA requires this assessment to include:

- Initial air monitoring within 12 months.
- Ongoing air monitoring if exposures are found above the Action Level:
  – If above the PEL, schedule every 3 months.
  – If above the Action Level but below the PEL, schedule every 6 months.

Air monitoring may be discontinued when two consecutive measurements, 7 days apart, are less than Action Level, but exposures must be reassessed if changes to production, process, control equipment, personnel, or work practices occur that could produce exposures greater than Action Level. As one can see, reducing the amount of air monitoring required may be one reward for reducing worker exposure.

OSHA does allow for the use of adequate objective data in lieu of air monitoring to establish that exposures are less than the Action Level. This data could come from exposure studies in similar types of foundries or other iron and steel industry workplaces. However, while there are some studies in the published literature, they often indicate elevated silica exposure. Nonetheless, information such as Fig. 1, regarding work areas and tasks with elevated exposure, can be useful in setting up an air monitoring program (remember the Action Level of 0.025 mg/m^3 is equivalent to 25 µg/m^3).

Air monitoring for respirable crystalline silica must be done using specific methods to comply with the OSHA standard. Those methods are described in Appendix A of the standard and will require the use of an appropriately accredited laboratory. The American Industrial Hygiene Association (AIHA) has a laboratory accreditation program and provides a list on their website (***www.aiha.org***) of laboratories qualified to perform silica analysis.

It is also important for enough air monitoring to be done so that results are representative of the variability in worker exposure that can occur with different tasks, different workers and other potential scenarios that might influence exposure. Keep in mind the air monitoring schedule in the OSHA standard is expected to be used for the variety of exposure scenarios on-site. The American Foundry Society publication titled Control of Silica Exposures in Foundries, listed as a reference for this article, contains additional useful detail on exposure assessment that might be consulted when adapting an air sampling program to meet the new OSHA requirements (see Fig. 1).[1] It is also important not to forget about non-routine tasks like furnace cleaning, as exposures above the historic PEL have been documented in the literature there as well.

As before with monitoring results, employees must be informed and records must be maintained (see OSHA 29 CFR 1910.1020). Silica monitoring results must be communicated to employees within 15 working days along with planned corrective actions if results are over the PEL.

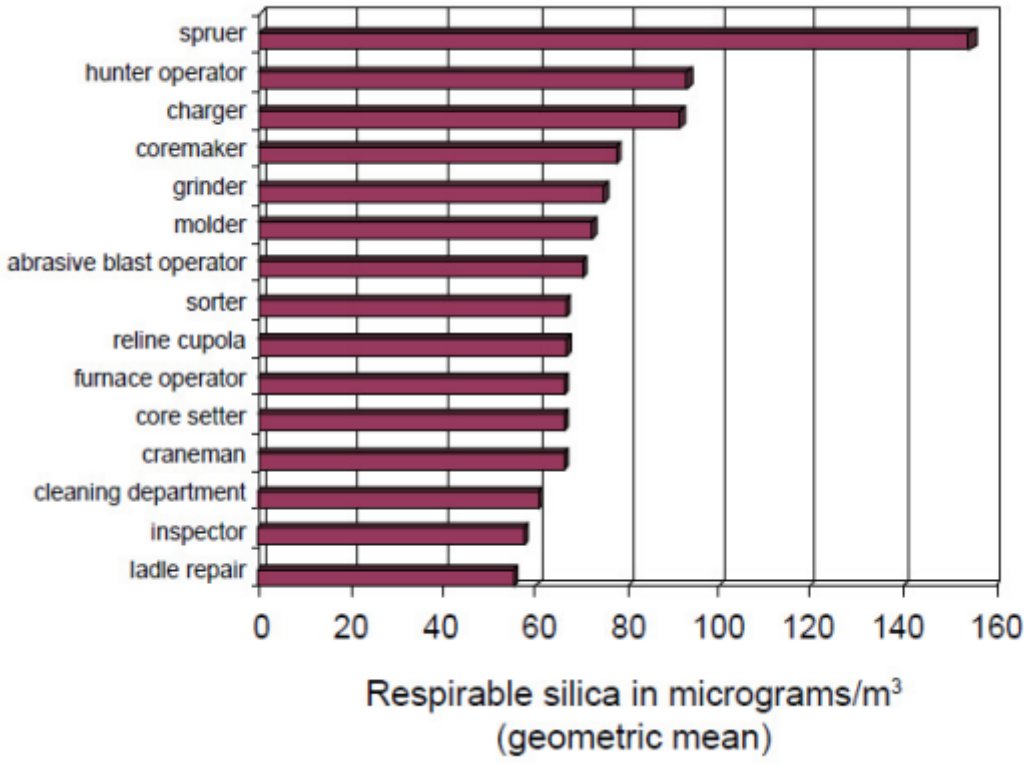

Figure 1. Crystalline silica exposure levels measured by the U.S. Occupational Safety and Health Administration (OSHA) for several foundry operations.

Written Exposure Control Plan

Another requirement under the new Respirable Crystalline Silica Standard is a written document titled the Exposure Control Plan. The results of the air monitoring program should indicate where exposures need to be controlled, preferably by implementing or improving engineering controls such as ventilation systems or process enclosures. Where preferable controls are not feasible, or while they are being implemented, personal protective equipment (PPE) such as respiratory protection is expected to be used.

In many cases, the silica monitoring and exposure control implementation becomes an iterative process that continuously strives to reduce exposure below the Action Level. That reduction may result in both worker safety improvements and a reduction in the number of activities needed to comply with the silica standard. OSHA indicates the Exposure Control Plan should list the tasks that result in exposure to respirable crystalline silica, along with the control methods and general housekeeping measures used to reduce exposure. Keep in mind that, as before, OSHA expects employers to make efforts to utilize other controls first rather than just relying on respirators to reduce exposure.

The existing OSHA Respiratory Protection Standard (see 29 CFR 1910.134) applied if respirators were already used in the facility. Now the written program under that standard may need to be adapted to reflect changes for compliance with the new PEL for respirable crystalline silica. Both the written Exposure Control Plan for silica and the written respirator program should be aligned so information is complete and does not conflict, so do not forget to update the respirator program when writing a silica plan. Be sure to select the appropriate assigned protection factor (APF), as exposures with some tasks like furnace cleaning may require an APF that exceeds the 10 assigned for some respirator types.

Signage and Housekeeping Practices

The areas listed in the Exposure Control Plan as having higher silica exposure are required to be posted with signage, according to the General Industry Respirable Crystalline Silica Standard. OSHA also prescribes the language that must be used:

DANGER
RESPIRABLE CRYSTALLINE SILICA
MAY CAUSE CANCER
CAUSES DAMAGE TO LUNGS
WEAR RESPIRATORY PROTECTION IN THIS AREA
AUTHORIZED PERSONNEL ONLY

This “regulated area” approach to preventing unnecessary exposure is used in other substance-specific standards. It also serves to remind workers that respirators need to be worn when going into these areas. A facility’s safety signage program will need to include posting this signage where silica exposure assessment indicates the PEL is exceeded.

General housekeeping measures that reduce exposure are also required to be used where respirable crystalline silica is present. These include the use of HEPA vacuums or wet cleaning methods rather than dry sweeping. Using compressed air to blow dust from surfaces or clothing is also not allowed under the new standard unless used in conjunction with a ventilation system that captures all dust.

Worker Training and Medical Evaluation

Hazard communication training under OSHA 29 CFR 1910.1200 will need to be adapted to comply with specific worker hazard training requirements under the new Respirable Crystalline Silica Standard. Workers are to be trained on the health hazards of silicosis, lung cancer, immune system and kidney

effects. Much of the information in the written Exposure Control Plan should also be part of this training, including where silica exposures occur and how they are to be controlled.

Workers also need to be informed of the medical surveillance program required under the silica standard, and given the option to participate or decline. In the General Industry Standard, this program is to be offered to workers exposed over the PEL at least 30 days per year, and after 30 June, 2020 the program threshold drops to those exposed over the Action Level at least 30 days per year. While a plant may have some existing medical evaluation program already in place, it may need to be modified to include all of the testing and frequency requirements under the silica standard.

Summary

The new Respirable Crystalline Silica Standard for General Industry and Maritime will be coming into effect soon and, with the relatively low exposure limit, will likely affect the iron and steel industry with new requirements for air monitoring and exposure controls. Adapting current safety programs to include requirements of the new silica standard will mean reviewing respirator, signage, housekeeping, medical and training activities at a minimum. Keep in mind that lowering worker exposure to airborne silica may have significant rewards, including lowering the burden of compliance. Industry associations like the American Foundry Society and professional associations like the AIHA have a number of resources to help employers as they plan for the upcoming silica deadline.

References

1. Yassin, A.; Yabesi, F.; and Tingle, R., "Occupations Exposure to Crystalline Silica Dust in the United States, 1988–2002," Environmental Health Perspectives, Vol. 113, No. 3, 2005, pp. 255–260.
2. Scholz, Robert C., Control of Silica Exposure in Foundries, American Foundry Society, Schaumburg, Ill., USA, November 2007, *www.afsinc.org*.
3. Strelec, F., "OSHA Compliance Issues: Silica Exposure in an Iron Foundry Furnace Cleaning Operation," J Occup Environ Hyg., 2010 Vol. 7, No. 5, May 2010, pp. D23-6.
4. "OSHA Respirable Crystalline Silica Standard for General Industry and Maritime," 29 CFR 1910.1053, *https://www.osha.gov/pls/oshaweb/owadisp.show_document?p_table=STANDARDS....*
5. "OSHA Small Entity Compliance Guide for General Industry," *https://www.osha.gov/Publications/OSHA3911.pdf*