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Occupational Exposure to Respirable Crystalline Silica 29 C.F.R. § 1910.1053

Frequently Asked Questions for General Industry

On March 25, 2016, the Occupational Safety and Health Administration (OSHA) published a final rule regulating occupational exposure to respirable crystalline silica (silica) in general industry (the standard). 81 Fed. Reg. 16286. OSHA developed these Frequently Asked Questions (FAQs) about the standard in consultation with industry and union stakeholders.

These FAQs provide guidance to employers and employees regarding the standard's requirements. This document is organized by topic. A short introductory paragraph is included for each group of questions and answers to provide background information about the underlying regulatory requirements.

The following acronyms are used throughout this document:

AL – action level (25 $\mu\text{g}/\text{m}^3$ as an 8-hour time-weighted average)

HEPA filter – high-efficiency particulate air filter

PEL – permissible exposure limit (50 $\mu\text{g}/\text{m}^3$ as an 8-hour time-weighted average)

PLHCP – physician or other licensed health care professional

SAE – sampling and analytical error

TWA – time-weighted average

Scope and Application (29 C.F.R. § 1910.1053(a))

OSHA's silica standard for general industry applies to all occupational exposures to respirable crystalline silica, with the following exceptions. First, the general industry standard does not apply to construction work as defined in 29 C.F.R. § 1910.12(b); occupational exposures to silica in construction are covered under 29 C.F.R. § 1926.1153. Second, the general industry standard does not apply to agricultural operations covered under 29 C.F.R. part 1928. Third, the general industry standard does not apply to silica exposures that result from the processing of sorptive clays. And finally, the general industry standard does not apply where the employer has objective data demonstrating that employee exposure to silica will remain below the AL of 25 $\mu\text{g}/\text{m}^3$ measured as an 8-hour TWA under any foreseeable conditions. 29 C.F.R. § 1910.1053(a)(1), (2). This last exception does not apply where exposures below 25 $\mu\text{g}/\text{m}^3$ as an 8-hour TWA are expected or achieved, but only because controls are being used to limit exposures. The exception for scenarios in which employers have objective data demonstrating that exposures will be below the AL under all foreseeable conditions ensures that the standard does not apply to employees with only minimal silica exposures. *See* 81 Fed. Reg. at 16705-06.

Under the general industry standard, an employer can elect to comply with the construction standard at 29 C.F.R. § 1926.1153, instead of the general industry standard at 29 C.F.R.

§ 1910.1053, if the task performed is indistinguishable from a construction task listed on Table 1 in 29 C.F.R. § 1926.1153(c), and the task will not be performed regularly in the same environment and conditions. 29 C.F.R. § 1910.1053(a)(3).

1. In determining whether the standard applies, does the objective data used to demonstrate that employee exposure to silica will remain below 25 µg/m³ measured as an 8-hour TWA under any foreseeable conditions have to reflect exposures that exist in the absence of controls?

Generally, yes. The intent of the standard is to exempt conditions where employees will be exposed to minimal levels of silica under any foreseeable conditions. Although engineering controls are usually a reliable means of limiting employee exposures, equipment does occasionally fail (*e.g.*, due to a gradual deterioration in effectiveness attributable to poor maintenance or failure to follow standard operating procedures). Because OSHA considers the failure of most controls to be a foreseeable condition, the exception usually applies only where exposures below 25 µg/m³ as an 8-hour TWA are expected or achieved without the use of controls. Operations where engineering controls have been implemented specifically for the purpose of reducing exposures to silica will typically be covered by the standard, because the failure to properly implement, operate, and maintain those controls would generally be expected to result in exposures at or above 25 µg/m³ as an 8-hour TWA. For example, if an employer controls employee silica exposures using local exhaust ventilation or a conveyor containment system, OSHA considers the failure of those controls to be a foreseeable condition, and the employer will not be exempt from the standard on the basis of data showing that exposures are below 25 µg/m³ as an 8-hour TWA when the ventilation or containment system is used.

However, failure of some types of controls (*e.g.*, substitution of non-silica-containing materials for materials that contain silica, fixed walls that are a permanent part of a building's structure) is not possible or so improbable that it is not a foreseeable condition, and therefore employers need not account for the potential failure of such controls when determining whether employee exposure to silica will remain below 25 µg/m³ measured as an 8-hour TWA under any foreseeable conditions. Furthermore, in determining whether the standard applies, employers do not need to disable, remove, or otherwise account for the potential failure of measures that may contribute, in a limited fashion, to reducing silica exposures, but that are not adopted for that specific purpose, *i.e.*, general building ventilation or heating, ventilation, and air conditioning (HVAC) systems.

Thus, with very limited exceptions, any objective data used to demonstrate that employee exposure to silica will remain below 25 µg/m³ measured as an 8-hour TWA under any foreseeable conditions must represent employee exposures that exist in the absence of controls.

2. Does the standard cover employees who perform silica-generating tasks for only 15 minutes or less a day?

The standard does not include a specific exemption for tasks with only short-term exposures (*e.g.*, tasks with exposure for 15 minutes a day or less). However, the standard does not apply where the employer has objective data demonstrating that employee exposure to respirable

crystalline silica will remain below $25 \mu\text{g}/\text{m}^3$ as an 8-hour TWA under any foreseeable conditions. Short-term silica exposures must be very high in order for those exposures to reach or exceed $25 \mu\text{g}/\text{m}^3$ as an 8-hour TWA; for example, if an employee is exposed for only 15 minutes, his or her exposure would have to be higher than $800 \mu\text{g}/\text{m}^3$ for that 15-minute period before the 8-hour TWA exposure would be at or above $25 \mu\text{g}/\text{m}^3$. See 81 Fed. Reg. at 16706. Some examples of tasks that could generate very high short-term exposures include abrasive blasting and grinding engineered stone countertops, which are typically associated with high levels of visible dust.

Workers may perform maintenance tasks involving occasional, brief exposures to silica that are incidental to their primary work. Provided that these employees perform these tasks in isolation from activities that generate significant exposures to silica, and perform them for no more than 15 minutes throughout the work day, their exposures will usually fall below the AL of $25 \mu\text{g}/\text{m}^3$ as an 8-hour TWA under all foreseeable conditions. When employers obtain or develop objective data showing that exposures will remain below the AL under any foreseeable conditions, these employees will not be covered by the standard.

3. If general industry employees are not covered by the standard because their exposures will remain below the AL under any foreseeable conditions, does the employer need to document this determination?

Yes. The standard's exception for exposures below the AL applies *only* if the employer has documentation (*i.e.*, objective data) demonstrating that employees' silica exposures will remain below the AL of $25 \mu\text{g}/\text{m}^3$ as an 8-hour TWA under any foreseeable conditions. (Note that documentation is required only when employees have *some level* of occupational exposure to silica. The standard does not apply to employees who have no occupational exposure.) Also, nothing in the silica standard alters employers' duty to maintain employee exposure records under 29 C.F.R. § 1910.1020.

4. If an employer has objective data demonstrating that employee exposure will remain below the AL of $25 \mu\text{g}/\text{m}^3$ as an 8-hour TWA under any foreseeable conditions, does the standard require employers to complete a written exposure control plan for the worksite?

No. None of the standard's requirements apply where the employer has objective data demonstrating that all employees' exposures to silica will remain below the AL of $25 \mu\text{g}/\text{m}^3$ as an 8-hour TWA under any foreseeable conditions.

Definitions (29 C.F.R. § 1910.1053(b))

The standard defines certain key terms used in the rule. For example, the standard defines such terms as "action level" (a concentration of airborne respirable crystalline silica of $25 \mu\text{g}/\text{m}^3$, calculated as an 8-hour TWA) and "employee exposure" (exposure to airborne respirable crystalline silica that would occur if the employee were not using a respirator). 29 C.F.R. § 1910.1053(b).

5. Some provisions in the standard refer to high-efficiency particulate air (HEPA) filters. The standard defines a HEPA filter as a “filter that is at least 99.97 percent efficient in removing mono-dispersed particles of 0.3 micrometers in diameter.” May an employer rely on a manufacturer’s representation of the effectiveness of a filter?

Yes. The standard does not require employers to independently test the effectiveness of filters to determine if they meet the definition in paragraph (b). Employers can rely on a manufacturer’s representation that a filter is at least 99.97 percent efficient in removing mono-dispersed particles of 0.3 micrometers in diameter or that it is compliant with the OSHA definition of a “HEPA filter.” However, employers must properly select, use, maintain, and replace HEPA filters in order to ensure that they continue to function according to the manufacturer’s specifications.

Exposure Assessments (29 C.F.R. § 1910.1053(d))

The standard requires employers to ensure that no employee is exposed to an airborne concentration of silica in excess of the PEL of 50 µg/m³, calculated as an 8-hour TWA. 29 C.F.R. § 1910.1053(c). Employers must assess the exposure of each employee who is or may reasonably be expected to be exposed to respirable crystalline silica at or above the AL using either a performance option or a scheduled monitoring option. 29 C.F.R. § 1910.1053(d)(1). Under the performance option, employers must assess the 8-hour TWA exposure for each employee based on any combination of air monitoring data or objective data sufficient to accurately characterize employees’ current silica exposures. 29 C.F.R. § 1910.1053(d)(2). Under the performance option, the burden is on the employer to demonstrate that the data accurately characterize employee exposure. 81 Fed. Reg. at 16763-64. Under the scheduled monitoring option, employers must conduct initial monitoring to assess the 8-hour TWA exposure for each employee on the basis of one or more personal breathing zone air samples that reflect the exposures of employees on each shift, for each job classification, in each work area, and then conduct follow-up monitoring at specified intervals based upon the results of the initial monitoring. 29 C.F.R. § 1910.1053(d)(3). Under both the performance and scheduled monitoring options, employers must reassess exposures whenever a change in the production, process, control equipment, personnel, or work practices may reasonably be expected to result in new or additional exposures at or above the AL, or when there is any reason to believe that new or additional exposures at or above the AL have occurred. 29 C.F.R. § 1910.1053(d)(4).

The standard’s recordkeeping provisions require employers to make and maintain accurate records of all exposure measurements and all objective data taken or relied upon to assess employee exposure. 29 C.F.R. § 1910.1053(k)(1)(i), (2)(i). Records of exposure measurements taken to assess employee silica exposure, as prescribed in paragraph (d) of the standard, must include at least the following information: (1) the date of measurement for each sample taken; (2) the task monitored; (3) sampling and analytical methods used; (4) number, duration, and results of samples taken; (5) identity of the laboratory that performed the analysis; (6) type of personal protective equipment, such as respirators, worn by the employees monitored; and (7) name and job classification of all employees represented by the monitoring, indicating which employees were actually monitored. 29 C.F.R. § 1910.1053(k)(1)(ii). Records of objective data relied upon to comply with the standard must include at least the following information: (1) the crystalline silica-containing material in question; (2) the source of the objective data; (3) the

testing protocol and results of testing; (4) a description of the process, task, or activity on which the objective data were based; and (5) other data relevant to the process, task, activity, material, or exposures on which the objective data were based. 29 C.F.R. § 1910.1053(k)(2)(ii).

6. Paragraph (d)(1) of the silica standard allows employers to use either the performance option in (d)(2) or the scheduled monitoring option in (d)(3) to satisfy their obligation to assess employee exposures to silica. Can an employer use a combination of these two exposure assessment approaches in a single facility?

Yes, as long as the employer ensures that each employee's exposures are adequately assessed. The employer may determine the optimal approach for assessing each employee's silica exposures. This means that, for each individual employee, the employer may choose to use either the performance option under paragraph (d)(2) or the scheduled monitoring option under paragraph (d)(3).

7. Can an employer use the scheduled monitoring option, but then switch to the performance option?

Yes. The employer has the option of switching to the performance option, and can use air monitoring data generated during scheduled monitoring to fulfill assessment requirements under the performance option, provided that the air monitoring data relied on is sufficient to accurately characterize employee exposures. Whether an employer's air monitoring data accurately reflect current exposures depends on several factors, including the degree to which exposures vary by day, shift, or process; work practices used; or the condition of equipment. Furthermore, when following *either* exposure assessment option under the silica standard, the employer must reassess exposures following any changes in the production, process, control equipment, personnel, or work practices that may reasonably be expected to result in new or additional exposures to silica at or above the AL, or when the employer has any reason to believe that new or additional exposures at or above the AL have occurred. *See* 29 C.F.R. § 1910.1053(d)(4).

8. What type of information can an employer use to assess exposures using the performance option?

Under the performance option, the employer must assess each employee's 8-hour TWA exposure using any combination of air monitoring data or objective data, provided that the data is sufficient to accurately characterize employee exposures to silica. *See* 29 C.F.R. § 1910.1053(d)(2). Any data used to assess exposures under the performance option must accurately reflect existing workplace conditions. *See* 81 Fed. Reg. at 16764.

The term "air monitoring data" refers to any monitoring conducted by the employer to comply with the requirements of this standard, including the prescribed accuracy and confidence requirements (*see* 29 C.F.R. § 1910.1053(d)(5), Appendix A).

The term "objective data" means information, such as air monitoring data from industry-wide surveys or calculations based on the composition of a substance, demonstrating employee exposure to silica associated with a particular product or material or a specific process, task, or

activity. The data must reflect workplace conditions closely resembling, or with a higher exposure potential than, the processes, types of material, control methods, work practices, and environmental conditions in the employer's current operations. *See* 29 C.F.R. § 1910.1053(b). Types of data and exposure assessment strategies that may qualify as objective data include:

- Data from industry-wide surveys;
- Data provided by equipment manufacturers;
- Data provided by trade or professional associations;
- Exposure mapping (determining exposures associated with particular locations based on information obtained from sources that may include personal samples, area samples, and direct-reading instruments);
- Calculations based on the composition of a substance;
- Calculations based on the chemical and physical properties of a substance (in those instances where a substance's physical and chemical properties demonstrate employee exposure to silica associated with a particular product or material or a specific process, task, or activity); and
- The employer's historical air monitoring data, including data obtained prior to the effective date of the standard.

The preamble to the standard provides more ideas about data and exposure assessment strategies that could qualify as or generate objective data. *See* 81 Fed. Reg. at 16763. OSHA notes that the same types of objective data that can be used to assess employee exposures under the performance option may be used to demonstrate that employee exposure to silica will remain below the AL of 25 $\mu\text{g}/\text{m}^3$ measured as an 8-hour TWA under any foreseeable conditions for purposes of ascertaining coverage under paragraph (a)(2). Objective data, such as an employer's historical air monitoring data, reflecting "worst case" conditions, in particular, may be helpful in characterizing exposures for purposes of determining coverage under the standard.

When employers rely on objective data generated by others as an alternative to developing their own air monitoring data, they remain responsible for ensuring that the data relied upon accurately characterize each employee's current exposures.

9. Given the potential for variability in silica exposures in some industries, how can an employer using the performance option for assessing exposures “accurately characterize” exposures?

An employer may characterize employee exposures within a range. For example, an employer following the performance option could determine that an employee is exposed below the AL or between the AL and the PEL. *See* 81 Fed. Reg. at 16763. An employer using the performance option could also determine that exposures exceed the PEL by a certain level, such as less than 10 times the PEL. In addition, an employer using the performance option could characterize exposures using a “worst-case” assessment of the highest exposure levels expected during an employee’s workday. OSHA notes that employers must reassess exposures when a change occurs that could reasonably be expected to result in new or additional exposures at or above the AL. *See* 29 C.F.R. § 1910.1053(d)(4).

10. Can an employer use old sampling data for its exposure assessment?

Yes. Old sampling data, or historical air monitoring data, may qualify as “objective data” if the data demonstrate employee exposure to silica associated with a particular product or material or a specific process, task, or activity. Like all objective data, old sampling data can be used to assess current exposures only if the data reflect workplace conditions closely resembling or with a higher exposure potential than the processes, types of material, control methods, work practices, and environmental conditions in the employer’s current operations. *See* 29 C.F.R. § 1910.1053(b). Any historical air monitoring data (or other objective data) an employer uses to meet its exposure assessment obligations under the performance option must, alone or in combination with other objective data, enable the employer to accurately characterize employee exposures. *See* 29 C.F.R. § 1910.1053(d)(2). Employers must characterize employees’ exposure as an 8-hour TWA in micrograms per cubic meter of air ($\mu\text{g}/\text{m}^3$).

11. Can employers use data from real-time monitoring and exposure mapping to assess employee exposures under the performance option?

Yes. Data generated by real-time monitoring of respirable dust levels (conducted using direct-reading instruments) can be combined with exposure mapping to assess employee exposures under the performance option, provided that the data can be correlated with individual employee exposures and otherwise meet the requirements for objective data. OSHA notes that in order to estimate the level of respirable crystalline silica in the air using real-time monitoring data, employers must also know the percentage of silica in the dust (*e.g.*, from the analysis of a bulk sample or information from a safety data sheet). If an employer does not know the percentage of silica in the dust, it can assume 100% of the respirable dust is silica for purposes of determining worst case exposures from real-time monitoring data under the standard.

12. If an employer characterizes employee exposures under the performance option using objective data from real-time monitoring and exposure mapping, how often does the employer need to repeat the monitoring and mapping process?

The goal of the performance option is to give employers flexibility to accurately characterize employee exposures using whatever combination of air monitoring data or objective data is most appropriate for their circumstances. Therefore, OSHA has not specified exactly how often data should be collected for these purposes. Employers may rely on existing data as long as the data continues to be sufficient to accurately characterize employee exposures. OSHA notes, however, that accurately characterizing employee exposures is an ongoing duty, and employers must reassess exposures whenever a change in the production, process, control equipment, personnel, or work practices may reasonably be expected to result in new or additional exposures at or above the AL, or when the employer has any reason to believe that new or additional exposures at or above the AL have occurred. *See* 29 C.F.R. § 1910.1053(d)(4).

13. If an employer using the performance option elects to characterize exposures using area samples or other exposure mapping approaches, how many specific testing locations/positions are required?

OSHA has not specified or recommended a particular number of testing locations or positions. If an employer chooses to characterize exposures using area samples or other exposure mapping approaches, it must determine which testing locations or positions will provide it with the data needed to accurately characterize the exposure of each employee. *See* 29 C.F.R. § 1910.1053(d)(2). Care must be taken when extrapolating data from area samples or other exposure mapping approaches to avoid mischaracterizing an employee's personal TWA exposure.

14. Under the performance option in paragraph (d)(2) of the standard, can data reflecting conditions that are standard across an industry be used to assess exposures of employees at individual facilities?

Yes, provided that the requirements in the standard are met. First, the data must meet the definition of "objective data." Specifically, the data must demonstrate employee exposure to silica associated with a particular product or material or a specific process, task, or activity, and reflect workplace conditions closely resembling or with a higher exposure potential than the processes, types of material, control methods, work practices, and environmental conditions in the employer's current operations. *See* 29 C.F.R. § 1910.1053(b). Objective data could be, for example, air monitoring data developed by an industry trade association based on standard products and processes in that industry. Second, the data must be sufficient to accurately characterize employee exposures to silica at the specific worksite. *See* 29 C.F.R. § 1910.1053(d)(2).

In order to determine whether the data meet these requirements, an evaluation of silica-generating tasks must be performed by each employer at each facility. This evaluation would generally involve determining whether the conditions under which the objective data were generated are similar enough to, or have a higher exposure potential than, the conditions at the employer's worksite such that the data "accurately characterize" exposures for each employee performing the tasks in question. Employers that rely on objective data generated by others are responsible for ensuring that the data relied upon accurately characterize their own employees'

exposures. And employers must keep records of any objective data used to characterize their employees' exposures, in accordance with paragraph (k)(2).

15. Does an employer using the performance option to assess exposures have ongoing exposure assessment obligations?

Yes. The duty to assess employee exposures under the performance option is ongoing. There is no set schedule for reassessment of exposures under the performance option. However, in order for an employer to continue to accurately characterize its employees' exposures, reassessment must occur whenever a change in the production, process, control equipment, personnel, or work practices may reasonably be expected to result in new or additional exposures at or above the AL, or when the employer has any reason to believe that new or additional exposures at or above the AL have occurred. *See* 29 C.F.R. § 1910.1053(d)(4). For example, reassessment would be required if the flow rate of the employer's ventilation system decreases. Not all changes in the workplace, however, will trigger the reassessment requirement. For example, reassessment would not be required if a personnel change is made that is not expected to impact the magnitude of employee exposure to silica.

If an employer wants to minimize the frequency with which it needs to reassess employee silica exposures, the employer can, at the outset, characterize exposures within a range, *e.g.*, between the AL and the PEL, or using the worst case (or highest exposure) scenario.

16. Assume that one facility produces two similar products – Products A and B – on different days. When determining employee exposures for days when the facility is producing product B, can the employer rely on employee exposure data generated on days when the facility is producing product A?

It depends. Under the performance option, objective data may be used to characterize employee exposures when that data reflects workplace conditions closely resembling or with a higher exposure potential than the processes, types of material, control methods, work practices, and environmental conditions in the employer's current operations. *See* 29 C.F.R. § 1910.1053(b). If the workplace conditions under which product A is produced are the same or have a higher exposure potential than the conditions that will exist when product B is produced, then the employer could reasonably determine that the exposure information generated based on product A can be used to characterize exposures for the days when product B is produced. In order to make this determination, the employer must consider the processes, types of material, control methods, work practices, and environmental conditions that exist when producing both products. The employer must be able to demonstrate that, in both cases, the employee exposure information relied upon is sufficient to accurately characterize exposures under paragraph (d)(2).

An employer using the scheduled monitoring option must reassess employee exposures whenever a change in the production, process, control equipment, personnel, or work practices may reasonably be expected to result in new or additional exposures at or above the AL, or when the employer has any reason to believe that new or additional exposures at or above the AL have occurred. *See* 29 C.F.R. § 1910.1053(d)(4). If an employer has performed exposure monitoring when the facility is producing product A, and plans to switch production to product B, the

employer will need to determine if any changes made as a result of the change in product are reasonably expected to result in new or additional silica exposures at or above the AL. If such new or additional exposures are reasonably expected, the employer must perform additional monitoring during production of product B. If new or additional exposures above the AL are not reasonably expected, the employer may rely on the sampling data collected during production of product A.

17. Do employers need to sample *every* employee when using the scheduled monitoring option?

No. Employers using the scheduled monitoring option must assess the 8-hour TWA exposure for each employee on the basis of one or more personal breathing zone air samples that reflect the exposures of employees on each shift, for each job classification, in each work area. But, where several employees perform the same tasks on the same shift and in the same work area, employers may sample a representative fraction of these employees in order to meet this requirement. Representative sampling involves monitoring the employee or employees reasonably expected to have the highest exposure (for example, the employee closest to an exposure source). *See* 29 C.F.R. § 1910.1053(d)(3)(i). This exposure is then assigned to the other employees in the group who perform the same tasks on the same shift and in the same work area.

Employers should remember that the general industry standard requires employers to individually notify each affected employee in writing of the results of the exposure assessment or post the assessment results in an appropriate location accessible to all affected employees. *See* 29 C.F.R. § 1910.1053(d)(6)(i). The term “affected” includes all employees whose exposures were assessed, even those employees whose exposures were determined by representative sampling of other employees.

18. What if an employee refuses to wear a personal sampler?

The silica standard does not prohibit employers from requiring employees to wear personal samplers as a condition of employment, however, other state or federal laws or regulations, or collective bargaining agreements, may apply. OSHA notes that the standard does not require employers to sample every employee at each worksite. For example, under the scheduled monitoring option, employers may use representative sampling to assess the exposure of employees. *See* 29 C.F.R. § 1910.1053(d)(3)(i).

19. Do employers need to report sampling results to OSHA?

No. However, employers must make and maintain accurate records of all exposure measurements taken to assess employee exposure and all objective data relied upon to comply with the standard. *See* 29 C.F.R. § 1910.1053(k)(1), (2). These records must be provided to OSHA upon request. *See* 29 C.F.R. § 1910.1020(e)(3)(i).

20. Under Appendix A to the standard, employers must ensure that each laboratory used to analyze their silica air samples “[i]mplements an internal quality control (QC)

program that evaluates analytical uncertainty and provides employers with estimates of sampling and analytical error” (SAE). 29 C.F.R. § 1910.1053, Appendix A; 29 C.F.R. § 1910.1053(d)(5). May employers consider the laboratory’s estimated SAE when determining their employees’ silica exposure levels?

Considering the SAE associated with employers’ air sampling results can enhance employers’ understanding of exposures that occur in their workplaces by providing an indication of the extent to which random measurement error can affect sampling results. Employers considering the SAE reported by their labs should, however, consider both the lower *and* upper ends of the range of exposures described using the SAE. Employers can be confident that a measured exposure is below the PEL if the sum of the sampling result and the result times the SAE is below the PEL. For example, an employer that receives a sample result of 40 µg/m³ with a reported SAE of 18 percent can be confident that the exposure is below the PEL because the upper end of the exposure range is below 50 µg/m³ (*i.e.*, 40 + (40 x .18) = 47.2). However, where requirements of the standard are triggered by exposure levels (*i.e.*, the AL or the PEL), these requirements are triggered by the measured exposure level, without regard to SAE.

21. How does OSHA take into account the SAE when evaluating compliance with the PEL?

OSHA uses its own SAE (*i.e.*, the SAE calculated by OSHA’s lab) in its enforcement of PELs, including the silica PEL. The sample result being analyzed by OSHA’s lab must exceed the PEL by more than the PEL multiplied by the SAE to be considered an overexposure (*see* Section II, Chapter 1, IV.D of the OSHA Technical Manual, https://www.osha.gov/dts/osta/otm/otm_ii/otm_ii_1.html). For example, given the silica PEL of 50 µg/m³ and assuming an SAE of 17 percent, an air sample result would have to be greater than 58.5 µg/m³ (*i.e.*, 50 + (50 x 0.17)) to be considered to have exceeded the PEL. This policy gives employers the benefit of the doubt because it assumes that a sample result that is above the PEL, but below the PEL adjusted for the SAE (*i.e.*, PEL + (PEL x SAE)), is not a violation of the standard. OSHA does not cite an employer for a violation of the exposure limit unless the Agency has obtained a sample measurement that is above the PEL after accounting for SAE.

22. Are employers required to include employees’ social security numbers in air monitoring records?

No. The silica standard does not require records of air monitoring data to include employees’ social security numbers. OSHA previously required social security numbers on these records because social security numbers, which do not change over time, are unique and constant personal identifiers that offer a useful method for linking records with individual employees. However, recognizing the threat of identity theft and the availability of other methods for tracking employees for research purposes, OSHA published a final rule that removed the requirements for employers to include employee social security numbers on exposure monitoring, medical surveillance, and other records from most of OSHA’s health standards, including the silica standard. *See* 84 Fed. Reg. 21416 (May 14, 2019).

23. Do employers need to post social security numbers along with exposure assessment results?

No. Paragraph (d)(6)(i) of the standard requires employers to notify affected employees of exposure assessment results. Employers can do so either by individually notifying each affected employee of the results in writing *or* by posting the results in an appropriate location accessible to all affected employees. If an employer chooses to notify employees by posting the results, the employer can use any employee identification method that ensures affected workers can identify their results, *e.g.*, by using the employees' names, identification numbers, or specific job titles and work shifts.

24. The standard requires employers to notify employees of the results of an exposure assessment within 15 working days after completing the assessment. What if an employer relies on sampling results and it takes longer than 15 working days to receive the results?

If an employer conducts exposure monitoring to assess employee exposures, the period for employee notification of assessment results does not begin to run until the employer receives the monitoring results.

Regulated Areas (29 C.F.R. § 1910.1053(e))

The standard requires employers to establish regulated areas wherever an employee's exposure to airborne concentrations of respirable crystalline silica is, or can reasonably be expected to be, in excess of the PEL. 29 C.F.R. § 1910.1053(e)(1). Employers must demarcate regulated areas from the rest of the workplace in a manner that minimizes the number of employees exposed to silica in those areas and post signs (with a specified legend) at all entrances to regulated areas. 29 C.F.R. § 1910.1053(e)(2), (j)(2). The standard also requires employers to limit access to regulated areas to: (1) persons authorized by the employer and required by work duties to be in those areas; (2) persons entering those areas as designated representatives of employees for the purpose of exercising the right to observe monitoring procedures under paragraph (d) of the standard; and (3) persons authorized to be in such areas by the Occupational Safety and Health Act and OSHA regulations. 29 C.F.R. § 1910.1053(e)(3). Employers must provide, and require use of, an appropriate respirator for each employee and designated representative who enters a regulated area. 29 C.F.R. § 1910.1053(e)(4).

25. If employees could be exposed above the PEL in a given area, but no employees actually enter the area, or work in the area for a long enough period of time that it would be reasonable to expect their 8-hour TWA exposures to exceed the PEL, does the employer need to establish a regulated area?

No. The term "regulated area" is defined as an area where an employee's silica exposure exceeds, or can reasonably be expected to exceed, the PEL. See 29 C.F.R. § 1910.1053(b). If an employer has, and adequately enforces, work rules precluding employees from entering a particular area, then the employer does not need to treat that location as a regulated area.

Furthermore, an area does not need to be designated as a regulated area if the employer has and enforces work rules limiting employees' time in the area so that there is no reasonable expectation that their 8-hour TWA exposures will exceed the PEL. OSHA notes, however, that if one or more employees will enter the area long enough that it is reasonable to expect their 8-hour TWA exposures to exceed the PEL, the employer must establish a regulated area and *all* employees entering the area must wear respirators (even those not in the area long enough for their exposures to exceed the PEL). *See* 29 C.F.R. § 1910.1053(e)(4).

26. In some facilities, e.g., a foundry that produces large castings, employees do not perform the same functions every day, and employee exposures are expected to exceed the PEL on some days, e.g., when casting cleaning is performed, but not others. Does the relevant area have to be designated as a regulated area on days when all exposures are below the PEL?

No. In some facilities, exposures above the PEL may be associated with an intermittent activity. Employers do not need to treat an area as a regulated area on days when employee exposures are not reasonably expected to exceed the PEL. In such cases, employers may elect to demarcate the regulated area on a temporary basis, on days when exposures are reasonably expected to exceed the PEL, by means of movable stanchions, portable cones, or barricade tape, as long as the required warning sign with prescribed hazard language is posted at all entrances. *See* 29 C.F.R. § 1910.1053(e)(2), (j)(2).

27. What are the standard's requirements for demarcating a regulated area?

Employers must demarcate (mark off) regulated areas from the rest of the workplace in a manner that minimizes the number of employees exposed to silica within those areas. *See* 29 C.F.R. § 1910.1053(e)(2)(i). However, the standard does not require a specific method of demarcation. Employers can determine how to demarcate regulated areas based on their knowledge of the specific conditions of their workplaces. Traffic cones, stanchions, tape, barricades, lines, or textured flooring may all be effective means of demarcating the boundaries of regulated areas. In determining how to demarcate regulated areas, employers may consider factors such as the configuration of the area, whether the regulated area is permanent, the airborne respirable crystalline silica concentration, the number of employees in adjacent areas, and the period of time the area is expected to have exposure levels above the PEL.

Employers must also post signs at all entrances to regulated areas that bear the legend specified in paragraph (j)(2) of the standard:

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

See 29 C.F.R. § 1910.1053(e)(2)(ii). The purpose of these signs, which supplement the training employees receive under other provisions of the standard, is to minimize the number of employees in a regulated area by alerting them that they must be authorized to enter, and to ensure that employees take appropriate protective measures when entering.

28. If personal sampling results show that one employee, who works in a small, non-enclosed area of a large building, is exposed above the PEL, but another employee, who is only a short distance away, is exposed below the PEL, how does the employer decide how far to extend the regulated area?

Because there is an exposure above the PEL, the facility must determine which task or operation is creating the overexposure and create a regulated area around that task or operation. In the example provided, the regulated area may include only the first employee's work station. If the second employee is not exposed above the PEL and is not reasonably expected to be exposed above the PEL, the regulated area does not have to cover that employee's work area. An employer could choose to use area sampling, real-time monitoring, or exposure mapping to assist in identifying the boundaries of a regulated area.

29. May an employer alter the language specified in paragraph (j)(2) for the warning signs required at entrances to regulated areas?

Signs bearing all of the specific cautionary wording specified in the standard must be posted at entrances to all regulated areas. *See* 29 C.F.R. § 1910.1053(e)(2)(ii). Thus, the signs must say: "DANGER – RESPIRABLE CRYSTALLINE SILICA – MAY CAUSE CANCER – CAUSES DAMAGE TO LUNGS – WEAR RESPIRATORY PROTECTION IN THIS AREA – AUTHORIZED PERSONNEL ONLY." 29 C.F.R. § 1910.1053(j)(2). Additional words or information may be included on the sign provided that the additional material is not confusing or misleading and does not detract from the language required by the standard. For example, employers may choose to include information about other silica-related health hazards, *e.g.*, kidney damage, or a heading at the top of the sign designed to draw workers' attention, *e.g.*, "Notice for Employees" or "Worker Alert."

Methods of Compliance (29 C.F.R. § 1910.1053(f))

The standard requires employers to use engineering and work practice controls to reduce and maintain employee exposure to silica to or below the PEL, unless they can demonstrate that such controls are not feasible. Wherever feasible engineering and work practice controls are not sufficient to reduce employee exposure to or below the PEL, the employer must reduce exposures to the lowest feasible level through these methods, and then provide appropriate respiratory protection. 29 C.F.R. § 1910.1053(f)(1).

30. Are employers permitted to use administrative controls to comply with the PEL?

Yes. Administrative controls, which are a type of work practice control, are an acceptable means of reducing employee exposures under 29 C.F.R. § 1910.1053(f)(1). For example, an employer could schedule high-exposure tasks to be conducted when employees are not working in adjacent areas. The standard does not prohibit the rotation of employees (a type of administrative control) to limit employee exposures. However, OSHA discourages this practice as a means of avoiding implementation of engineering and other work practice controls. It can be administratively difficult to maintain employees' exposures at or below the PEL solely using rotation. Moreover, the use of rotation may require the employer to provide medical surveillance to additional workers and to train many workers on multiple jobs.

31. Under 29 C.F.R. § 1910.1053(f)(1), employers must implement feasible engineering and work practice controls to reduce and maintain silica exposures to or below the PEL. If such controls are not sufficient to reduce exposures to that level, employers are nevertheless required to implement controls that reduce exposures to the lowest feasible level. Do the two uses of the term “feasible” in this paragraph impose separate requirements?

No. Paragraph (f)(1) requires employers to use feasible engineering and work practice controls to reduce and maintain exposures to or below the PEL. If the use of engineering and work practice controls results in exposures at or below the PEL, the employer need not use additional controls (even if feasible) to lower exposures further (*i.e.*, to an even lower level). On the other hand, if exposures are *above the PEL*, but the employer can demonstrate that it has implemented all feasible engineering and work practice controls, then the employer is in compliance with paragraph (f)(1) (assuming the provision and use of required respiratory protection in accordance with paragraph (g)).

Written Exposure Control Plan (29 C.F.R. § 1910.1053(f)(2))

The standard requires employers 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 silica; (2) a description of the engineering controls, work practices, and respiratory protection used to limit employee exposure to silica for each task; and (3) a description of the housekeeping measures used to limit employee exposure to silica. 29 C.F.R. § 1910.1053(f)(2)(i). The plan must be reviewed and evaluated for effectiveness at least annually and updated as necessary. 29 C.F.R. § 1910.1053(f)(2)(ii).

32. Does the standard require employers to list all of the tasks that could involve *any* exposure to silica in their written exposure control plans?

No. Tasks that are not covered by the standard, *e.g.*, because the employer has objective data demonstrating that employee exposures will remain below the AL under any foreseeable conditions, do not need to be included in the written exposure control plan.

33. In the written exposure control plan, what level of detail is required for the description of workplace tasks that involve silica exposures?

The written exposure control plan must describe the tasks that involve silica exposures in sufficient detail to enable the employer and employees to consistently identify and control silica-related hazards. *See* 29 C.F.R. § 1910.1053(f)(2)(i)(A); 81 Fed. Reg. at 16800-1. Thus, for example, if the materials being disturbed or the conditions under which the tasks are performed are relevant to the level of exposure related to the particular task, that information must be included. Employers may develop a single comprehensive plan for each worksite that includes all of the silica-generating tasks that employees will perform at the worksite (*i.e.*, employers do not need separate exposure control plans for different operations, processes, or shifts at the same worksite). However, using a broad term that could describe multiple tasks, such as “foundry operations” or “manufacturing,” would not be sufficiently descriptive.

Note that in addition to describing the silica-generating tasks, the exposure control plan must also include a description of the engineering controls, work practices, and respiratory protection used to limit exposure to respirable crystalline silica. *See* 29 C.F.R. § 1910.1053(f)(2)(i)(B).

34. Does the standard require employers to document their review and evaluation of the written exposure control plan?

No. The standard requires employers to review and evaluate the effectiveness of the written exposure control plan at least annually, and to update it as necessary, because work conditions can change (*e.g.*, the employer purchases a new type of equipment). However, the standard does not require that the review and evaluation be in writing or documented. Any updates to the plan adopted as a result of the review will need to be documented by incorporation in the written plan, and employers may document the review and evaluation process as a best practice. Retaining such documentation can help employers verify that they have reviewed and evaluated the plan, as required.

Housekeeping (29 C.F.R. § 1910.1053(h))

The standard includes requirements related to housekeeping. Under the standard, employers must not allow dry sweeping or dry brushing “where such activity could contribute to employee exposure to respirable crystalline silica unless wet sweeping, HEPA-filtered vacuuming or other methods that minimize the likelihood of exposure are not feasible.” 29 C.F.R.

§ 1910.1053(h)(1). In addition, employers must not allow compressed air to be used to clean clothing or surfaces where such activity could contribute to employee exposure to respirable crystalline silica unless (1) the compressed air is used in conjunction with a ventilation system

that effectively captures the dust cloud created by the compressed air, or (2) no alternative method is feasible. 29 C.F.R. § 1910.1053(h)(2).

In addition, the employer's exposure control plan must include a description of the housekeeping measures used to limit employee exposure to respirable crystalline silica. 29 C.F.R. § 1910.1053(f)(2)(i)(C).

35. If an employer has objective data demonstrating that employee exposure will remain below the AL of 25 µg/m³ as an 8-hour TWA under any foreseeable conditions, does the prohibition on dry sweeping, dry brushing, and the use of compressed air for cleaning clothing and surfaces apply?

No, none of the standard's requirements apply if the employer has objective data demonstrating that exposures will remain below the AL under any foreseeable conditions. Employers should note, however, that dry sweeping, dry brushing, and the use of compressed air, either alone or in combination with other tasks, *can* result in exposures at or above the AL. Employers should consider the duration of the dry sweeping, dry brushing, or use of compressed air; the location and frequency of the tasks; and other factors in developing objective data to demonstrate that employee exposures will remain below the AL under any foreseeable conditions. (Note that the standard's housekeeping provisions apply in areas where dry sweeping, dry brushing, or the use of compressed air could contribute to the exposures of any employees who *are* covered by the standard.)

36. Some employers use drivable powered industrial sweepers equipped with rotating brushes that lift dirt and dust from the floor and feed the dirt and dust into a vacuum located on the underside of the equipment. Some of these sweepers are equipped with HEPA filters. Do the housekeeping provisions in the silica standard prohibit the use of this type of equipment?

When these types of sweepers are equipped with HEPA filters, and effectively remove dirt and dust, their use is considered "HEPA-filtered vacuuming" for purposes of paragraph (h)(1) of the standard, and they are not prohibited by the rule. When these types of sweepers are *not* equipped with HEPA filters, their use is considered an "other [housekeeping] method[]," and they are not prohibited by the standard's housekeeping provisions, as long as they are operated and maintained properly so as to minimize the likelihood of employee exposure. *See* 29 C.F.R. § 1910.1053(h)(1).

For *all* such sweepers (HEPA or non-HEPA), the employer using the sweeper must ensure compliance with *all* applicable provisions of the silica standard, including the PEL. Thus, the employer must assess the exposures of employees operating or working in the vicinity of the sweeper in accordance with paragraph (d) of the standard. And if any of those employees are exposed to silica levels above the PEL, the employer must use feasible engineering and work practice controls to reduce and maintain each employee's exposure to or below the PEL in accordance with paragraphs (c) and (f)(1) of the standard. Such controls could include appropriate modifications to the sweepers (*e.g.*, installing a shroud around the bottom of the equipment to limit escaping dust) or establishing new, appropriate work practices. If feasible engineering and work practice controls are not sufficient to reduce exposures to or below the PEL, the employer must use them to reduce employee exposure to the lowest feasible level and provide appropriate respiratory protection that complies with the requirements of paragraph (g). *See* 29 C.F.R. § 1910.1053(f)(1).

OSHA encourages employers to acquire industrial sweepers equipped with HEPA filters when their existing sweepers need to be replaced.

37. Under the standard, an employer may not allow the use of dry sweeping or dry brushing where such activity could contribute to employee exposure to silica unless wet sweeping, HEPA-filtered vacuuming, or other methods that minimize the likelihood of exposure are not “feasible.” 29 C.F.R. § 1910.1053(h)(1). The standard contains a similar prohibition on the use of compressed air to clean clothing or surfaces; such use is prohibited unless the compressed air is used in conjunction with a ventilation system that effectively captures the dust cloud created by the compressed air or “[n]o alternative method is feasible.” 29 C.F.R. § 1910.1053(h)(2). What is the definition of “feasible” in this context?

The standard does not require employers to demonstrate that wet methods, a HEPA-filtered vacuum, or other methods are *impossible* to use in order to establish “infeasibility” for purposes of paragraph (h). As explained in the preamble to the standard, the limited “infeasibility” exceptions included in these housekeeping provisions are intended to encompass situations where wet methods, HEPA-filtered vacuuming, and other exposure-minimizing methods are not effective, would cause damage, or would create a hazard in the workplace. *See* 81 Fed. Reg. at 16795-96. For example, an employer can establish infeasibility for these purposes by demonstrating that wet sweeping, using a HEPA-filtered vacuum, and other methods that minimize the likelihood of exposure would negatively impact the quality of the work being done. However, even in cases where one of the acceptable cleaning methods may not be feasible, employers may be able to use another acceptable cleaning method. Irrespective of the housekeeping method used, employers must always assess and limit the silica exposures of employees, as required by paragraphs (c) and (d)(1).

A. What are some examples of situations where wet sweeping may be considered infeasible under paragraph (h)?

In some cases, wet sweeping may be infeasible where:

- The use of water would make an elevated surface slick and create a fall hazard;
- The water could come into contact with electrical panels, outlets, and other electrical equipment and such contact could damage the equipment or pose an electrical hazard;
- The water could come into contact with molten metal and create an explosion hazard;
- The water would cause the dust to harden (such as can occur with Portland cement dust or fly ash); or
- The use of water would adversely affect the quality of the final product.

B. What are some examples of situations where HEPA-filtered vacuuming may be infeasible under paragraph (h)?

In some cases, HEPA-filtered vacuuming may be infeasible where:

- Tight or obstructed spaces prevent a vacuum, hose, or nozzle from accessing or effectively cleaning the space (such as around some pipes, meters, and gauges); or

- Very large amounts of silica-containing materials must be cleaned, and the volume of material cannot effectively be cleaned by vacuuming.

With respect to A and B above, employers should note that, even in cases where one of the standard's acceptable cleaning methods is not feasible, employers may be able to use another acceptable cleaning method. Employers that use dry sweeping or dry brushing must be able to demonstrate that *none* of the alternative acceptable housekeeping methods (wet sweeping, HEPA-filtered vacuuming, or other methods that minimize the likelihood of exposure) are feasible. *See* 29 C.F.R. § 1910.1053(h)(1).

Paragraph (h) does not prohibit the use of tools such as shovels or floor scrapers to clean silica-containing materials from floors and other surfaces, so these tools may be used without the employer first demonstrating the infeasibility of other cleaning methods. Employers must, however, assess and limit the silica exposures (if any) of employees performing tasks with shovels or floor scrapers, as required by paragraphs (c) and (d)(1).

C. What are some examples of situations where the use of compressed air without a ventilation system may be permissible (*i.e.*, because the compressed air cannot be used with a ventilation system that effectively captures the dust cloud *and* no other alternatives are feasible)?

In some situations, use of a ventilation system in conjunction with compressed air may be infeasible because of the size or configuration of the equipment, and alternative cleaning methods may not be available. In those cases, employers may use compressed air *without* a ventilation system. Examples may include:

- Cleaning the inside of electrical control panels; and
- Cleaning machine assemblies, in cases where removing dust from tight spaces, nooks, and crannies is required.

Note that even for these tasks, employers may only use compressed air without a ventilation system if no alternative cleaning methods are feasible. Employers must always consider the feasibility of alternative cleaning methods, including wet sweeping, HEPA-filtered vacuuming, and compressed air in conjunction with an adequate ventilation system, before determining that the use of compressed air without a ventilation system is necessary. *See* 29 C.F.R. § 1910.1053(h)(2). For example, employers may use compressed air without a ventilation system where a ventilation system cannot be used with the compressed air, and the use of all other cleaning methods would damage the equipment (such as where the manufacturer indicates that compressed air is the only acceptable cleaning method).

38. Does the standard prohibit the use of commercially-available dust-suppression sweeping compounds in conjunction with dry sweeping and dry brushing?

No. The proper use of commercially-available dust-suppression sweeping compounds in accordance with the manufacturer's instructions is a cleaning "method[]" that minimize[s] the

likelihood of exposure” for purposes of paragraph (h)(1). Thus, it is an acceptable housekeeping method under the standard.

39. If a commercially-available dust-suppression sweeping compound contains crystalline silica, does the standard permit employers to use it in conjunction with dry sweeping and brushing?

Yes, provided the compound is used properly and effectively suppresses the generation of *respirable* crystalline silica dust during dry sweeping or dry brushing.

40. If an employer uses water spray to wet dust before sweeping, is that considered “wet sweeping” or “dry sweeping”?

OSHA considers this wet sweeping, permitted under the housekeeping provisions of the standard, as long as the dust is still wet when it is swept.

41. Is shoveling large clumps of dirt or clay materials from the floor into wheelbarrows or other containers considered dry sweeping under 29 C.F.R. § 1910.1053(h)(1)?

No. Shoveling is not considered dry sweeping, regardless of the type or amount of material being shoveled, and is not subject to the restrictions on dry sweeping in the standard. Instead, employers would need to assess exposures and follow the hierarchy of controls to reduce and maintain exposures to or below the PEL, as required by paragraphs (c) and (d)(1).

42. Does the standard prohibit an employer from using compressed air as part of a task not related to cleaning clothing or surfaces?

No. The standard generally prohibits the use of compressed air “to clean clothing or surfaces” where that activity can contribute to employee silica exposures. 29 C.F.R. § 1910.1053(h)(2). It does not prohibit the use of compressed air for purposes other than cleaning clothing or surfaces, *e.g.*, for operating a pneumatic tool. Employers may also use compressed air for housekeeping purposes when the compressed air is used in conjunction with a ventilation system that effectively captures the dust cloud created by the compressed air, or if no alternative method for cleaning clothes or surfaces is feasible. *See* 29 C.F.R. § 1910.1053(h)(2)(i), (ii). When the standard permits the use of compressed air, and the employer does not have objective data demonstrating that the employee exposures resulting from the use of compressed air will remain below the AL under any foreseeable conditions, the employer must comply with exposure control requirements and other applicable provisions of the standard.

43. The standard allows the use of compressed air to clean clothing or surfaces when the compressed air is used in conjunction with a ventilation system that effectively captures the dust cloud created by the compressed air. What type of ventilation system is acceptable to use?

The standard does not specify the use of a particular ventilation system for these purposes. Whatever type of system is selected, it must be able to effectively capture any dust cloud created

by the use of compressed air, thereby preventing the dust cloud from entering employees' breathing zones and contributing to silica exposures. For example, in the preamble to the standard, OSHA noted that the use of clothes-cleaning booths would be permitted because although such booths use compressed air to clean clothes, the dust is "blown out of the employee's breathing zone and is captured by a filter." 81 Fed. Reg. at 16797.

44. Do all vacuums need HEPA filters?

No. The general industry standard does not require vacuums to be equipped with HEPA filters. However, when vacuums are used without HEPA filtration, they may contribute to employee silica exposures. Employers should consider any such exposures for purposes of compliance with all of the provisions of the standard. For example, if fugitive dust from non-HEPA-filtered vacuuming or other discharge from vacuums contributes to employee exposures that exceed the PEL, then the employer would need to follow the hierarchy of controls to reduce and maintain exposures to or below the PEL. In such situations, employers might consider fitting vacuums with HEPA filters or using vacuum systems that discharge outside the facility.

45. Does the standard prohibit the use of a vacuum to clean silica dust from employees' clothing? Are vacuums required to be equipped with HEPA filters?

The answer to both questions is no. The standard does not prohibit the use of a vacuum to remove silica dust from employees' clothes (*e.g.*, before employees leave the worksite for lunch or at the end of their shift), nor does it require vacuums to be equipped with HEPA filters. However, when vacuums without HEPA filtration are used to clean clothing, they may contribute to employee silica exposures. Employers should consider any such exposures for purposes of compliance with all of the provisions of the standard. For example, if fugitive dust from non-HEPA-filtered vacuuming or other discharge from vacuums contributes to employee exposures that exceed the PEL, then the employer would need to follow the hierarchy of controls to reduce and maintain exposures to or below the PEL. In such situations, employers might consider fitting vacuums with HEPA filters or using vacuum systems that discharge outside the facility.

46. Does the standard prohibit the use of pneumatic hand-held tools that exhaust compressed air, *e.g.*, through the handle or side barrel ports, or along the tool?

No. With some exceptions, the standard prohibits the use of compressed air for cleaning clothing and surfaces. It does not address compressed air exhausted from hand-held tools. However, employers should remember to consider any exposures created by the exhausted air to ensure compliance with all provisions of the standard. For example, if the exhausted air contributes to silica exposures that exceed the PEL, the employer would need to follow the hierarchy of controls to reduce and maintain exposures to or below the PEL. *See* 29 C.F.R. § 1910.1053(f)(1).

Medical Surveillance (29 C.F.R. § 1910.1053(i))

The general industry standard requires employers to make medical surveillance available at no cost, and at a reasonable time and place, to any employee who will be occupationally exposed to respirable crystalline silica at or above the AL (or, before June 23, 2020, above the PEL) for 30 or more days a year. 29 C.F.R. § 1910.1053(i)(1)(i), (1)(4). All required medical examinations and procedures must be performed by a physician or other licensed health care professional (PLHCP), defined as an individual whose legally permitted scope of practice allows him or her to independently provide or be delegated the responsibility to provide some or all of the particular health care services required by paragraph (i) of the standard. 29 C.F.R. § 1910.1053(b), (i)(1)(ii). An examination must be offered within 30 days of initial assignment, unless the employee has received a medical examination that meets the requirements of the standard within the last three years. 29 C.F.R. § 1910.1053(i)(2). Thereafter, the employee must be offered a follow-up examination at least every three years, or more frequently if recommended by the PLHCP. 29 C.F.R. § 1910.1053(i)(3).

The examinations must include a medical and work history, a physical examination, a chest x-ray, a pulmonary function test, a test for latent tuberculosis infection (initial exam only), and any other tests deemed appropriate by the PLHCP. 29 C.F.R. § 1910.1053(i)(2). *See* paragraph (i)(2) of the standard for more detailed information about the content of required medical exams. The employee will receive a written medical report from the PLHCP within 30 days of each exam that includes: (1) a statement indicating the results of the medical examination; (2) any recommended limitations on the employee's use of respirators; (3) any recommended limitations on the employee's exposure to silica; and (4) a statement, if applicable, that the employee should be examined by a specialist. 29 C.F.R. § 1910.1053(i)(5). *See* paragraph (i)(5) for more detailed information about the required content of written medical reports provided to employees.

The employer must also obtain a written medical opinion from the PLHCP within 30 days of each exam; this opinion contains more limited information than the report to the employee. The PLHCP's opinion to the employer contains the date of the examination, a statement that the examination has met the requirements of the standard, and any recommended limitations on the employee's use of respirators. 29 C.F.R. § 1910.1053(i)(6)(i). If the employee gives written authorization, the written opinion for the employer must also contain any recommended limitations on the employee's exposure to silica and/or a statement that the employee should be seen by a specialist (if applicable). 29 C.F.R. § 1910.1053(i)(6)(ii). The employer must ensure that each employee receives a copy of the written medical opinion provided to the employer within 30 days of his or her exam. 29 C.F.R. § 1910.1053(i)(6)(iii).

47. Does the silica standard preclude in-house health care providers from performing the required medical surveillance examinations?

No. For initial and periodic examinations, employers may choose to use any health care provider that meets the definition of a PLHCP in paragraph (b) of the standard, including a qualified in-house health care professional. Similarly, if an additional examination by a specialist is required by 29 C.F.R. § 1910.1053(i)(7), an employer with a specialist on staff may elect to have the additional examination(s) performed by that in-house physician. Employers must ensure that in-

house PLHCPs, like all PLHCPs performing medical surveillance examinations and procedures under the silica standard, adhere to the standard's confidentiality requirements. *See* 29 C.F.R. § 1910.1053(i)(6)(ii), (7)(iv).

48. Under the standard, can an employer require employees who participate in medical surveillance to see a health care professional of the employer's choice?

Yes, the silica standard permits employers to select a health care professional to perform the medical examinations required by the standard. Employers must ensure that all the medical examinations required by the standard are performed by a PLHCP, *i.e.*, "an individual whose legally permitted scope of practice (*i.e.*, license, registration, or certification) allows him or her to independently provide or be delegated the responsibility to provide some or all of the particular health care services required by paragraph (i)." 29 C.F.R. § 1910.1053(b), *see also* 29 C.F.R. § 1910.1053(i)(1)(ii). Employers should consult state or local laws for relevant requirements.

49. Does the standard require employees to participate in medical surveillance?

No, although the standard requires employers to make medical surveillance available to qualifying employees, the standard does not require qualifying employees to participate in medical surveillance. However, the employer must offer the examination fairly and in good faith, at no cost to employees, and at a reasonable time and place, and must make another examination available if the employee requests it, or, at a minimum, the next time an examination is due (*i.e.*, within three years). *See* 29 C.F.R. § 1910.1053(i). In addition, the standard requires employers to train employees on the purpose of the medical surveillance program. *See* 29 C.F.R. § 1910.1053(j)(3)(i)(E). If an employer wishes to document an employee's decision to decline a medical examination, the employer could ask the employee to sign a statement affirming that he or she was offered the benefits and declined to participate.

Note that the medical examination under the silica standard is different than the medical evaluations required under the respiratory protection standard. If an employee declines a medical evaluation under the respiratory protection standard, then the employer may not assign him or her a task requiring respirator use.

50. Although the standard does not require employees to participate in medical surveillance, can an employer make such participation mandatory?

Nothing in the silica standard precludes an employer from requiring participation in medical surveillance programs, as appropriate under other applicable laws or collective bargaining agreements.

51. The silica standard limits the information that can be included in a PLHCP's or specialist's written medical opinion for the employer without the employee's written consent. See 29 C.F.R. § 1910.1053(i)(6)(ii), (7)(iv). Does the standard prohibit an employer from receiving any of the information described in 29 C.F.R. § 1910.1053(i)(6)(ii) from sources outside of the medical surveillance examination process, such as via a workers' compensation claim?

No. The standard limits only the information that can be included in the PLHCP's or specialist's written medical opinion for the employer following an examination offered to an employee for purposes of compliance with the medical surveillance provisions of the standard. If an employer uses the same individual or entity to manage medical surveillance and workers' compensation records, there must be separate procedures for maintaining and managing the separate sources of information.

52. Can an employer send an employee for a second opinion after receiving the PLHCP's written medical opinion for the employee's initial or periodic medical surveillance examination?

The standard does not preclude employers from offering employees a second medical surveillance examination that meets the requirements of paragraph (i). However, if *any* of the written medical opinions provided to the employer as a result of the first or subsequent medical surveillance examinations contains a statement that the employee should be examined by a specialist, or a statement that the employee should receive more frequent periodic examinations, then the employer must make the required examination(s) available, in accordance with 29 C.F.R. § 1910.1053(i)(7) or (i)(3), respectively. Any second examination must also be provided at a reasonable time and place and at no cost to the employee, and the restrictions on information that can be provided to the employer without the employee's authorization would apply equally to the second written medical opinion.

53. If a PLHCP recommends that an employee see a specialist, but the employee does not authorize the PLHCP to include that recommendation in the written medical opinion for the employer, does the employer need to make the specialist examination available?

No. The standard requires the employer to make available an additional examination with a specialist only if the PLHCP's written medical opinion for the employer indicates that the employee should be examined by a specialist. See 29 C.F.R. § 1910.1053(i)(7)(i). And the employee must provide written authorization before the PLHCP's written medical opinion for the employer may include a recommendation for a specialist examination. See 29 C.F.R. § 1910.1053(i)(6)(ii)(B). Thus, if the PLHCP's opinion for the employer does not contain the PLHCP's recommendation for a specialist examination because the employee did not authorize the employer to receive it, then the employer is not responsible for offering additional examinations. See 81 Fed. Reg. at 16837.

54. The standard requires respirator use under certain circumstances. Under OSHA’s respiratory protection standard, employees must be medically able to use a respirator. What are the employer’s responsibilities for employees who are assigned a task that requires the use of a respirator under the standard, but are not medically able to use a negative pressure respirator?

Among other things, OSHA’s respiratory protection standard requires employers to provide a medical evaluation to determine the employee’s ability to use a respirator, before the employee is fit tested or required to use the respirator in the workplace. *See* 29 C.F.R. § 1910.134(e)(1). It also requires employers to obtain a written recommendation from the PLHCP on whether the employee is medically able to use a respirator. *See* 29 C.F.R. § 1910.134(e)(6)(i)(A). If an employee receives medical surveillance under the silica standard, the PLHCP’s written medical opinion for the employer also must include any recommended limitations on the employee’s use of respirators. *See* 29 C.F.R. § 1910.1053(i)(6)(i)(C). If a PLHCP determines through either a medical evaluation under the respiratory protection standard, or medical surveillance under the silica standard, that an employee has a medical condition that places the employee’s health at increased risk if a negative pressure respirator is used, but the employee can use a powered air purifying respirator (PAPR), then the employer must provide a PAPR. *See* 29 C.F.R. § 1910.134(e)(6)(ii). OSHA believes many workers who are medically unable to use a negative pressure respirator will be able to use a PAPR. However, if an employee cannot use either type of respirator, then the employer must not assign the employee to perform a task that would require the employee to use a respirator. In such a situation, the employer may need to consult other local, state, or federal laws and regulations and collective bargaining agreements to determine its obligations with respect to such employees.

Communication of respirable crystalline silica hazards to employees
(29 C.F.R. § 1910.1053(j))

Paragraph (j)(1) of the standard requires employers to include respirable crystalline silica in their hazard communication programs in accordance with 29 C.F.R. § 1910.1200, and the program must address at least the following hazards: cancer, lung effects, immune system effects, and kidney effects. 29 C.F.R. § 1910.1053(j)(1). Paragraph (j)(2) of the standard contains requirements for the signs that must be posted at all entrances to regulated areas. 29 C.F.R. § 1910.1053(j)(2). Paragraph (j)(3) of the standard establishes requirements for employee information and training. The standard requires employers to ensure that each employee who is covered by the silica standard can demonstrate knowledge and understanding of the health hazards associated with exposure to silica, specific tasks in the workplace that could result in exposure to silica, specific measures the employer has implemented to protect employees from exposure to silica, the contents of the standard, and the purpose and a description of the medical surveillance program. 29 C.F.R. § 1910.1053(j)(3).

55. Does this standard require classroom training for employees on the required subjects of the rule?

No. Employers are in the best position to determine how training can most effectively be accomplished. Therefore, the standard does not specify how an employer needs to train

employees. Acceptable forms of training may include hands-on training, videos, slide presentations, classroom instruction, informal discussions during safety meetings, written materials, or any combination of these methods. However, to ensure that employees comprehend the material presented during training, it is critical that trainees have the opportunity to ask questions and receive answers if they do not fully understand the material presented to them. This requirement can be met in a variety of ways. For example, employers that train employees through video presentations or computer-based programs can have a qualified trainer available to address questions after the presentation, or provide a telephone hotline so that trainees have direct access to a qualified trainer. *See* 81 Fed. Reg. at 16845. Employers may also choose to designate a qualified employee to answer questions for these purposes.

56. The standard requires employers to ensure that each employee covered by the standard can demonstrate knowledge and understanding of specified subjects. How do employers ensure that their employees can demonstrate knowledge and understanding of the required subjects?

There is no set method employers must use to ensure employees demonstrate knowledge and understanding of the required subjects. Instead, the standard defines employers' training obligations in terms of performance-oriented objectives meant to ensure that employees are aware of the hazards associated with silica in their workplace and how they can help protect themselves. However, as a general matter, employers can determine whether employees have the requisite knowledge through methods such as discussion of the required training subjects, written tests, or oral quizzes. *See* 81 Fed. Reg. at 16845.

The requirement for training is performance-oriented in order to allow flexibility for employers to provide training as needed to ensure that each employee can demonstrate the knowledge and understanding required under the rule. Although the standard does not set a fixed schedule for periodic training, additional or repeated training may be necessary under certain circumstances. For example, if an employer observes an employee engaging in activities that contradict knowledge gained through training, it is a sign to the employer that the employee may require a reminder or periodic retraining on work practices. *See* 81 Fed. Reg. at 16850.

57. Does the standard require silica-related training for employees for whom the employer has objective data demonstrating that exposures will remain below the AL of 25 $\mu\text{g}/\text{m}^3$ as an 8-hour TWA under any foreseeable conditions?

The training requirements in paragraph (j)(3) apply only to employees who fall within the scope of the silica standard. *See* 29 C.F.R. § 1910.1053(j)(3)(i). However, the hazard communication standard, which includes requirements for hazard communication training, applies to hazardous chemicals (including respirable crystalline silica) regardless of the airborne exposure level. *See* 29 C.F.R. §§ 1910.1053(j)(1), 1910.1200.

Recordkeeping (29 C.F.R. § 1910.1053(k))

The standard requires that employers make and maintain records of certain information, including air monitoring data, objective data, and medical surveillance data. Required records must be maintained and made available in accordance with 29 C.F.R. § 1910.1020, which generally requires employers to ensure that these types of records are maintained for at least 30 years. 29 C.F.R. § 1910.1053(k).

58. How can employers comply with the requirement to ensure that employee medical records are maintained for the proper period of time when they do not receive a copy of the PLHCP's written medical report to the employee?

Employers are responsible for maintaining records in their possession (*e.g.*, the PLHCP's written medical opinion for the employer described in paragraph (i)(6)). Employers are also responsible for ensuring the retention of records in the possession of the PLHCP (*e.g.*, the written medical report for the employee described in paragraph (i)(5)). An employer can fulfill this second obligation by including the retention requirement in a written agreement between the employer and the PLHCP or by otherwise specifically communicating to the PLHCP the substance of OSHA's record-retention requirements. *See* 81 Fed. Reg. at 16854.

Temporary Employees

59. Sometimes employers use temporary workers from staffing agencies to supplement their regular workforces, *e.g.*, when production demand increases. Many of these workers are on site for 29 days or less. Do host employers have any obligations to these temporary workers under the silica standard?

Yes. Temporary workers are entitled to the same protections as other employees under the Occupational Safety and Health Act and OSHA health and safety standards. Therefore, temporary workers within the scope of the silica standard must be protected as required by the standard. The duration of employment does not matter, except that the requirement for medical surveillance is triggered only for employees who will be occupationally exposed to silica at or above a threshold level for 30 or more days per year (*see* question 63, below).

When a staffing agency supplies temporary workers to a business, the staffing agency and the staffing agency's client (the host employer) must coordinate to ensure that the temporary workers are fully protected by the standard. While the host employer is often better situated to assess hazards and protect temporary workers from silica-related hazards in the workplace, the staffing agency may be better positioned to offer other protections under the silica standard, such as general training and medical surveillance.

60. Are host employers required to ensure that the exposures of temporary workers are assessed under paragraph (d) of the silica standard?

Yes, host employers must ensure that the exposures of temporary workers who are or may reasonably be expected to be exposed to silica at or above the AL are assessed using either the performance option in paragraph (d)(2) or the scheduled monitoring option in paragraph (d)(3).

Host employers using the performance option may rely on the same objective and/or air monitoring data used to assess the exposures of permanent employees, as long as such data accurately characterize the exposures of the temporary workers. *See* 29 C.F.R.

§ 1910.1053(d)(2). Host employers using the scheduled monitoring option may rely upon representative sampling to assess the exposures of temporary workers when the temporary workers are performing the same tasks on the same shift and in the same work area as the employees whose exposures have been sampled. (Representative sampling involves sampling the employees expected to have the highest silica exposures.) *See* 29 C.F.R.

§ 1910.1053(d)(3)(i).

61. Are host employers required to ensure that temporary workers are not exposed to silica above the PEL?

Yes. In accordance with paragraphs (c) and (f) of the silica standard, host employers must ensure that temporary workers are not exposed to silica above the PEL, using the hierarchy of controls set forth in the standard. Where respiratory protection is required, the host employer and the staffing agency can reach agreement as to which employer will provide and pay for the respirators.

62. Are host employers required to ensure that temporary workers wear respiratory protection when they enter regulated areas?

Yes. Host employers must ensure that temporary workers who enter regulated areas use appropriate respiratory protection, in accordance with paragraphs (e)(4) and (g) of the standard, as well as 29 C.F.R. § 1910.134. Although the host employer is often better situated to assess and control workplace hazards than the staffing agency that supplies the temporary workers, the staffing agency and the host employer may agree to have the staffing agency provide the temporary workers with respirators, as well as medical evaluations and fit testing required for respirator use, in accordance with 29 C.F.R. § 1910.134.

63. Are host employers required to make medical surveillance available to temporary workers?

It depends. A host employer has no obligation to make medical surveillance available to temporary workers who will not be exposed at or above the AL (or, before June 23, 2020, above the PEL) for 30 or more days in a 12-month period while working for the host employer. If a worker will be exposed above the appropriate trigger for medical surveillance for 30 or more days in a 12-month period at the host site, and the worker has not had a medical examination that meets the requirements of the silica standard within the last three years, then the host employer must work with the staffing agency to make sure the worker is offered medical surveillance. The staffing agency must determine the total days of exposure at or above the AL (or, before June 23, 2020, above the PEL) during all periods of employment with all host employers within each 12-month period and must add those days together to determine whether medical surveillance must be made available to a temporary worker.

64. Are host employers required to provide silica-related training for temporary workers?

Under paragraph (j) of the silica standard, host employers must ensure that temporary workers are trained and can demonstrate knowledge and understanding of the topics listed in that paragraph. Staffing agencies may be well-positioned to offer workers some of the general training required under paragraph (j) of the standard. However, some worksite-specific training is always required, and host employers are generally better situated to provide training on worksite-specific job tasks, machinery, equipment, processes, and measures taken to protect workers. OSHA recommends that staffing agencies and host employers coordinate responsibilities for the various aspects of silica-related training and inform each other when they have fulfilled their respective training obligations. For more complete information, *see* <https://www.osha.gov/Publications/OSHA3859.pdf>.