

# Regulatory Update

## #37 - Occupational Exposure to Silica; Final Rule

Published: April 1, 2016

### General Industry and Maritime 29 CFR 1910.1053

On March 25, 2016, OSHA (Occupational Safety and Health Administration) issued two new final rules in the *Federal Register*, 81 Fed. Reg. 16285-16890 (2016) regulating exposure to respirable crystalline silica: one for general industry and maritime and the other for the construction industry. This regulation update discusses the final rule for general industry and maritime.

This summary of the OSHA standard for occupational exposure to silica in the construction industry was prepared by 3M Personal Safety Division (PSD) and emphasizes the respiratory protection aspects of the standard. It does not represent an official or legal or necessarily complete interpretation of the standard. The complete standard should be reviewed; if specific questions arise, the standard itself should be relied on rather than this summary. A copy of this standard can be obtained at <https://www.federalregister.gov/articles/2016/03/25/2016-04800/occupational-exposure-to-respirable-crystalline-silica>.

### Introduction

According to OSHA, evidence in the record for this rulemaking indicates that workers exposed to respirable crystalline silica are at increased risk of developing silicosis and other nonmalignant respiratory diseases, lung cancer, and kidney disease.

### Dates (29 CFR 1910.1053 (I))

Effective date: June 23, 2016.

According to OSHA the effective date is set to allow sufficient time (90 days) for employers to obtain the standard, read and understand its requirements, and undertake the necessary planning and preparation for compliance.

### Start-up Dates

Depending on the provision of the standard, the date to be in compliance varies.

Standard provision	Date	Time period
All obligations ( <i>i.e.</i> , exposure assessment and other ancillary provisions, engineering controls) for general industry and maritime employers (other than hydraulic fracturing operations in the oil and gas industry and an action level trigger for medical surveillance for all general industry and maritime employers)	June 23, 2018	Allows 2 years after the effective date to come into compliance
All obligations for hydraulic fracturing operations in the oil and gas industry (except obligations for engineering controls and an action level trigger for medical surveillance)	June 23, 2018	Allows 2 years after the effective date to come into compliance
Obligations for engineering controls for hydraulic fracturing operations in the oil and gas industry	June 23, 2021	Allows 5 year after the effective date to come into compliance
Obligations for an action level trigger for medical surveillance in the standard for general industry and maritime, including hydraulic fracturing operations in the oil and gas industry	June 23, 2020	Allows 4 years after the effective date to come into compliance

### Scope and application (29 CFR 1910.1053 (a))

This section (*i.e.* 29 CFR 1910.1053) applies to all occupational exposures to respirable crystalline silica, except:

- Construction work (see 29 CFR 1926.1153)
- Agricultural operations covered under 29 CFR 1928
- Exposures that result from the processing of sorptive clays

This rule does not apply where employee exposures will remain below 25 µg/m<sup>3</sup> as an 8-hour time-weighted average (TWA) under any foreseeable conditions.

This rule does not apply if the employer complies with 29 CFR 1926.1153 and:

- The task performed is indistinguishable from a construction task listed in Table 1 in paragraph (c) of 29 CFR 1926.1153 and
- The task will not be performed regularly in the same environment and conditions.

### Definitions (29 CFR 1910.1053(b))

The following is a partial list of the definitions from the respirable crystalline silica standard verbatim. Only definitions from the silica standard that are used in this document were copied.

*Action level* means a concentration of airborne respirable crystalline silica of 25 µg/m<sup>3</sup>, calculated as an 8-hour TWA.

*Employee exposure* means the exposure to airborne respirable crystalline silica that would occur if the employee were not using a respirator.

*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 respirable crystalline 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.

*Physician or other licensed health care professional [PLHCP]* means 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) of this section (29 CFR 1910.1053).

*Regulated area* means an area, demarcated by the employer, where an employee's exposure to airborne concentrations of respirable crystalline silica exceeds, or can reasonably be expected to exceed, the PEL.

*Respirable crystalline silica* means quartz, cristobalite, and/or tridymite contained in airborne particles that are determined to be respirable by a sampling device designed to meet the characteristics for respirable-particle size- selective samplers specified in the International Organization for Standardization (ISO) 708:1995: Air Quality—Particle Size Fraction Definitions for Health-Related Sampling.

*Specialist* means an American Board Certified Specialist in Pulmonary Disease or an American Board Certified Specialist in Occupational Medicine.

### **Permissible exposure limit (PEL) (29 CFR 1910.1053 (c))**

The employer shall ensure that no employee is exposed to an airborne concentration of respirable crystalline silica in excess of 50  $\mu\text{g}/\text{m}^3$ , calculated as an 8-hour TWA.

The PEL prior to this rulemaking was approximately 100  $\mu\text{g}/\text{m}^3$  for general industry and 250  $\mu\text{g}/\text{m}^3$  for maritime and is lowered to 50  $\mu\text{g}/\text{m}^3$  of respirable crystalline silica. This makes the new PEL approximately 50% and 80% lower than the old PEL in general industry and maritime, respectively. Despite the new PEL, OSHA states in the *Federal Register* that "OSHA considers the level of risk remaining at the PEL of 50  $\mu\text{g}/\text{m}^3$  to be significant." OSHA expects the ancillary provisions (*e. g.*, medical surveillance and training) of the standard to reduce this risk below what engineering and work practice controls alone can achieve.

### **Exposure assessment (29 CFR 1910.1053 (d))**

Paragraph (d) of the standard for general industry and maritime imposes requirements similar to OSHA's traditional approach of requiring employers to demonstrate compliance with a PEL through required exposure assessments and controlling employee exposures through the use of feasible engineering controls and work practices.

### *General*

The employer shall assess the exposure of each employee who is or may reasonably be expected to be exposed to respirable crystalline silica at or above the action level in accordance with either the performance option or the scheduled monitoring option.

### *Performance option*

For the performance option, the employer must assess the 8- hour TWA exposure for each employee on the basis of any combination of air monitoring data or objective data sufficient to accurately characterize employee exposures to respirable crystalline silica.

### *Scheduled monitoring option*

For the scheduled monitoring option, the employer must perform initial monitoring to assess the 8-hour TWA exposure for each employee on the basis of one or more personal breathing zone (PBZ) air samples that reflect the exposures of employees on each shift, for each job classification, in each work area. Where several employees perform the same job tasks on the same shift and in the same work area, the employer may sample a representative fraction of these employees in order to meet this requirement. In representative sampling, the employer must sample the employee(s) who are expected to have the highest exposure to respirable crystalline silica. The rule also requires the employer to notify the affected employees within 15 working days after the completion of the sampling, notification of the corrective action being taken if the exposures are above the PEL and allow affected employees or their representative to observe the monitoring.

Under the scheduled monitoring option, requirements for periodic monitoring depend on the results of initial and subsequent monitoring.

Results of Initial Monitoring	Periodic Monitoring Requirement
Employee exposures < 25 µg/m <sup>3</sup>	No further monitoring is required
Employee exposures ≥25 µg/m <sup>3</sup> and ≤ 50 µg/m <sup>3</sup>	Repeat monitoring within 6 months of the most recent monitoring
Employee exposure > 50 µg/m <sup>3</sup>	Repeat monitoring within 3 months of the most recent monitoring

Where the most recent (non-initial) exposure monitoring indicates that employee exposures are below the action level, the employer shall repeat such monitoring within six months of the most recent monitoring until two consecutive measurements, taken seven or more days apart, are below the action level, at which time the employer may discontinue monitoring for those employees whose exposures are represented by such monitoring, except as otherwise provided in paragraph (d)(4), Reassessment of exposures, of 29 CFR 1910.1053.

### *Reassessment of exposures*

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 action level, or
- when the employer has any reason to believe that new or additional exposures at or above the action level have occurred.

### *Methods of sample analysis*

Employers must ensure that the laboratory performing the sample analysis evaluates all samples using the procedures specified in Appendix A to § 1910.1053—Methods of Sample.

## **Regulated areas (29 CFR 1910.1053 (e))**

Employers are required 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 permissible exposure limit (PEL). Employers must demarcate regulated areas, and limit access to regulated areas to persons authorized by the employer and required by work duties to be present in the regulated area, persons observing exposure monitoring, or any person authorized by the Occupational Safety and Health (OSH) Act or regulations issued under it to be in a regulated area. Finally, the rule requires employers to provide each employee and the employee's designated representative entering a regulated area with an appropriate respirator and require its use while in the regulated area.

## **Methods of compliance (29 CFR 1910.1053(f))**

Paragraph (f)(1) of the standard for general industry and maritime establishes a hierarchy of controls that employers must use to reduce and maintain exposures to respirable crystalline silica to or below the permissible exposure limit (PEL) of 50 µg/m<sup>3</sup>. The rule requires employers to implement engineering and work practice controls as the primary means to reduce exposure to the PEL or to the lowest feasible level above the PEL. In situations where engineering and work practice controls are not sufficient to reduce exposures to or below the PEL, employers are required to supplement these controls with respiratory protection, according to the requirements of paragraph (g) of the standard for general industry and maritime.

Paragraph (f)(2)(i) of the standard for general industry and maritime requires that employers establish and implement a written exposure control plan. The written exposure control plans must contain:

1. A description of the tasks in the workplace that involve exposure to respirable crystalline silica;
2. A description of the engineering controls, work practices, and respiratory protection used to limit employee exposure to respirable crystalline silica for each task; and
3. A description of the housekeeping measures used to limit employee exposure to respirable crystalline silica.

The employer is required to review the plan at least annually and update it as needed. The rule also requires the employer to make the plan available to employees, employee representatives, OSHA, and NIOSH.

### *Abrasive blasting*

In addition to the requirements of Engineering and work practice controls listed above, the employer shall comply with other OSHA standards, when applicable, such as 29 CFR 1910.94 (Ventilation), 29 CFR 1910.34 (Mechanical paint removers), and 29 CFR 1915 Subpart I (Personal Protective Equipment), where abrasive blasting is conducted using crystalline silica-containing blasting agents, or where abrasive blasting is conducted on substrates that contain crystalline silica.

According to OSHA, this means:

1. Abrasive blasting operators must, separate from this rule, be provided with and wear the respiratory protection required by 29 CFR 1910.94(a)(5), and

2. Employees helping with the operation, or who otherwise must be in the vicinity of the operation, must also be adequately protected by a combination of engineering controls, work practices, and respirators.

OSHA points out that this standard also takes respirator use into account by cross-referencing the specific respirator requirements already in place for abrasive blasting. Employers are also required to comply with the requirements of 29 CFR 1910.134 whenever respiratory protection is required by this section. Under 29 CFR 1910.134, the employer is required to select and provide an appropriate respirator based on the respiratory hazards to which the employee is exposed and is required to use the APF table at 29 CFR 1910.134(d)(3)(i)(A). This includes note four of the APF table, which requires the employer to have evidence to support an APF of 1000 for helmet/hood respirators. In addition, paragraph (d) of the standard for general industry and maritime require employers to assess the exposure of each employee who is or may reasonably be expected to be exposed to respirable crystalline silica at or above the action level, which will provide employers with information to make appropriate respirator selection decisions. OSHA concludes that these requirements, including the referenced provisions in other OSHA standards, will adequately protect employees from exposures to respirable crystalline silica during abrasive blasting.

## **Respiratory protection (29 CFR 1910.1053 (g))**

### *General*

Where respiratory protection is required by this rule, the employer must provide each employee an appropriate respirator that complies with the requirements of this paragraph and 29 CFR 1910.134.

Respiratory protection is required:

1. Where exposures exceed the PEL during periods necessary to install or implement feasible engineering and work practice controls;
2. Where exposures exceed the PEL during tasks, such as certain maintenance and repair tasks, for which engineering and work practice controls are not feasible;
3. During tasks for which an employer has implemented all feasible engineering and work practice controls and such controls are not sufficient to reduce exposures to or below the PEL; and
4. During periods when the employee is in regulated area.

### *Respiratory protection program*

Where respirator use is required by 29 CFR 1910.1053(g), the employer shall institute a respiratory protection program in accordance with 29 CFR 1910.134.

## **Housekeeping (29 CFR 1910.1053 (h))**

Paragraph (h) of the standard requires employers to adhere to housekeeping practices.

It forbids “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.”

This standard also prevents the use of compressed air to clean clothing or surfaces where such activity could contribute to employee exposure to respirable crystalline silica unless:

- The compressed air is used in conjunction with a ventilation system that effectively captures the dust cloud created by the compressed air; or



- No alternative method is feasible.

### **Medical surveillance (29 CFR 1910.1053 (i))**

This paragraph specifies which employees must be offered medical surveillance, as well as the frequency and content of medical examinations. It also sets forth the information that the physician or other licensed health care professional (PLHCP) is to provide to the employee and employer.

The purpose of medical surveillance for respirable crystalline silica is, where reasonably possible,

1. to identify respirable crystalline silica-related adverse health effects so that appropriate intervention measures can be taken;
2. to determine if an employee can be exposed to respirable crystalline silica in his or her workplace without increased risk of experiencing adverse health effects, or in other words, to determine if an employee has any condition, regardless of the cause, that might make him or her more sensitive to respirable crystalline silica exposure; and
3. to determine the employee's fitness to use respirators.\*

The employer is required to make medical surveillance available at no cost to the employee, and at a reasonable time and place, for each employee who will be occupationally exposed to respirable crystalline silica at or above the action level for 30 or more days per year. The required medical examinations and procedures must be performed by a PLHCP.

#### *Initial examinations*

An initial (baseline) medical examination is required within 30 days after initial assignment, unless the employee has received a medical examination that meets the requirements of 29 CFR 1910.1053(i) within the last three years. The examination shall consist of:

- A medical and work history, with emphasis on: past, present, and anticipated exposure to respirable crystalline silica, dust, and other agents affecting the respiratory system; any history of respiratory system dysfunction, including signs and symptoms of respiratory disease (*e.g.*, shortness of breath, cough, wheezing); history of tuberculosis; and smoking status and history;
- A physical examination with special emphasis on the respiratory system;
- A chest X-ray (a single posteroanterior radiographic projection or radiograph of the chest at full inspiration recorded on either film (no less than 14 x 17 inches and no more than 16 x 17 inches) or digital radiography systems), interpreted and classified according to the International Labour Office (ILO) International Classification of Radiographs of Pneumoconioses by a NIOSH-certified B Reader;
- A pulmonary function test to include forced vital capacity (FVC) and forced expiratory volume in one second (FEV<sub>1</sub>) and FEV<sub>1</sub>/FVC ratio, administered by a spirometry technician with a current certificate from a NIOSH approved spirometry course;
- Testing for latent tuberculosis infection; and
- Any other tests deemed appropriate by the PLHCP.

#### *Periodic examinations*

Periodic medical examinations that include everything listed under initial examination with the exception of testing for latent tuberculosis infection at least every three years, or more frequently if recommended by the PLHCP.

#### *Information provided to the PLHCP*

The employer is required to ensure that the examining PLHCP has a copy of this standard (29 CFR 1910.1053), and shall provide the PLHCP with the following information:

- A description of the employee's former, current, and anticipated duties as they relate to the employee's occupational exposure to respirable crystalline silica;
- The employee's former, current, and anticipated levels of occupational exposure to respirable crystalline silica;
- A description of any personal protective equipment used or to be used by the employee, including when and for how long the employee has used or will use that equipment; and
- Information from records of employment-related medical examinations previously provided to the employee and currently within the control of the employer.

#### *PLHCP's written medical report for the employee*

The employer is required to ensure that the PLHCP explains to the employee the results of the medical examination and provides each employee with a written medical report within 30 days of each medical examination performed. The written report shall contain:

- A statement indicating the results of the medical examination, including any medical condition(s) that would place the employee at increased risk of material impairment to health from exposure to respirable crystalline silica and any medical conditions that require further evaluation or treatment;
- Any recommended limitations on the employee's use of respirators\*;
- Any recommended limitations on the employee's exposure to respirable crystalline silica; and
- A statement that the employee should be examined by a specialist if the chest X-ray required above is classified as 1/0 or higher by the B Reader, or if referral to a specialist is otherwise deemed appropriate by the PLHCP.

#### *PLHCP's written medical opinion for the employer*

1. The employer is required to obtain a written medical opinion from the PLHCP within 30 days of the medical examination. The written opinion shall contain only the following:
  - (A) The date of the examination;
  - (B) A statement that the examination has met the requirements of this section; and
  - (C) Any recommended limitations on the employee's use of respirators.\*
2. If the employee provides written authorization, the written opinion shall also contain either or both of the following:
  - (A) Any recommended limitations on the employee's exposure to respirable crystalline silica;
  - (B) A statement that the employee should be examined by a specialist (pursuant to paragraph (i)(7) of this section) if the chest X-ray required above is classified as 1/0 or higher by the B Reader, or if referral to a specialist is otherwise deemed appropriate by the PLHCP.
3. The employer shall ensure that each employee receives a copy of the written medical opinion described under *PLHCP's written medical opinion* for the employer within 30 days of each medical examination performed.

#### *Additional examinations*

- If the PLHCP's written medical opinion indicates that an employee should be examined by a specialist, the employer shall make available a medical examination by a specialist within 30 days after receiving the PLHCP's written opinion.
- The employer shall ensure that the examining specialist is provided with all of the information that the employer is obligated to provide to the PLHCP under *Information provided to the PLHCP*.



- The employer shall ensure that the specialist explains to the employee the results of the medical examination and provides each employee with a written medical report within 30 days of the examination. The written report must include: a statement indicating the results of the medical examination, including any medical condition(s) that would place the employee at increased risk of material impairment to health from exposure to respirable crystalline silica and any medical conditions that require further evaluation or treatment, any recommended limitations on the employee's use of respirators, and any recommended limitations on the employee's exposure to respirable crystalline silica.
- The employer shall obtain a written opinion from the specialist within 30 days of the medical examination. The written opinion shall include: the date of the examination, any recommended limitations on the employee's use of respirators and any recommended limitations on the employee's exposure to respirable crystalline silica.

\*By incorporation of 29 CFR 1910.134, the medical evaluation requirements of "134" must be met in addition to the medical surveillance requirements above.

## **Communication of respirable silica hazards to employees (29 CFR 1910.1053 (j))**

### *Hazard communication*

Paragraph (j) of the standard for general industry and maritime sets forth requirements intended to ensure that the dangers of respirable crystalline silica exposure are communicated to employees. It requires the employer to:

- (1) include respirable crystalline silica in the program established to comply with the hazard communication standard (HCS) (29 CFR 1910.1200);
- (2) ensure that each employee has access to labels on containers of crystalline silica and safety data sheets (SDS), and is trained in accordance with the provisions of the HCS and the provisions on employee information and training (contained in paragraph (j)(3) of the standard for general industry and maritime); and
- (3) ensure that at least the following hazards are addressed: cancer, lung effects, immune system effects, and kidney effects.

### *Signs*

The employer shall post signs at all entrances to regulated areas that bear the following legend:

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

### *Employee information and training*

The employer shall ensure that each employee covered by this section can demonstrate knowledge and understanding of at least the following:

- The health hazards associated with exposure to respirable crystalline silica;
- Specific tasks in the workplace that could result in exposure to respirable crystalline silica;

- Specific measures the employer has implemented to protect employees from exposure to respirable crystalline silica, including engineering controls, work practices, and respirators to be used;
- The contents of 29 CFR 1910.1053; and
- The purpose and a description of the medical surveillance program.

The employer shall make a copy of 29 CFR 1910.1053 readily available without cost to each employee covered by this rule.

### **Recordkeeping (29 CFR 1910.1053 (k))**

Paragraph (k) of the standard for general industry and maritime requires employers to make and maintain air monitoring data, objective data, and medical surveillance records. These records must be maintained and made available in accordance with 29 CFR 1910.1020.

#### *Air monitoring data*

These records include all exposure measurements taken to assess employee exposure to respirable crystalline silica and must include:

- The date of measurement for each sample taken;
- The task monitored;
- Sampling and analytical methods used;
- Number, duration, and results of samples taken;
- Identity of the laboratory that performed the analysis;
- Type of personal protective equipment, such as respirators, worn by the employees monitored; and
- Name, social security number, and job classification of all employees represented by the monitoring, indicating which employees were actually monitored.

#### *Objective data*

These records include all objective data relied upon to meet the requirements of this rule and includes:

- The crystalline silica-containing material in question;
- The source of the objective data;
- The testing protocol and results of testing;
- A description of the process, task, or activity on which the objective data were based; and
- Other data relevant to the process, task, activity, material, or exposures on which the objective data were based.

#### *Medical surveillance*

These records include an accurate record for each employee covered by medical surveillance and must include:

- Name and social security number;
- A copy of the PLHCPs' and specialists' written medical opinions; and
- A copy of the information provided to the PLHCPs and specialists.

## Annex: Respiratory Protection

### 3M Respirators Listed by APF or Maximum Use Concentration

Respirator APF from 29 CFR 1910.134	Respirator Type	3M Suggested Respirators
10 Or Up to 500 µg/m <sup>3</sup>	Half facepiece air-purifying respirator (Includes filtering facepieces and elastomeric half facepiece respirators)	<ul style="list-style-type: none"> <li>8110S, 8210, 8511 or 8271</li> <li>6000 Series half facepiece respirator with 2071 or 2091 filters</li> </ul>
25 Or Up to 1250 µg/m <sup>3</sup>	Powered air-purifying respirators (PAPR) with loose-fitting facepiece	<ul style="list-style-type: none"> <li>TR-300 PAPR with M-300 headgear</li> <li>TR-600 PAPR with M-400 headgear</li> </ul>
50 Or Up to 2500 µg/m <sup>3</sup>	Full facepiece air purifying respirators or PAPR with elastomeric half facepiece.	<ul style="list-style-type: none"> <li>6000 or 7800 Series full facepiece respirator with 2071 or 2091 filters</li> <li>FF 400 full facepiece with 2071 or 2091 filters</li> </ul>
1000 Or Up to 50,000 µg/m <sup>3</sup>	PAPR with either full facepiece, hood or helmet or continuous flows supplied air (SAR) airline respirator with full facepiece, hood or helmet	<ul style="list-style-type: none"> <li>TR-300 PAPR with M-400 headgear</li> <li>TR-600 PAPR with M-400 headgear</li> <li>GVP PAPR with GVP-440 filter and 6000 or 7800 full facepiece</li> <li>BE PAPR with HE filter and 6000 Series full facepiece</li> <li>Versaflo SAR with C-122 breathing tube, Versaflo SA valve and M-400 or L900 headgear</li> </ul>
<ul style="list-style-type: none"> <li>Abrasive blasting Up to 50,000 µg/m<sup>3</sup></li> </ul>	Type CE supplied air respirator (airline) with helmet for abrasive blasting	<ul style="list-style-type: none"> <li>W-8100B abrasive blasting helmet with GVP-122 breathing tube, V-300 air regulator, W9435 air hose</li> </ul>

