OSHA's Final Rule on Occupational Exposure to Respirable Crystalline Silica

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Final Rule Published on March 25, 2016

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Construction – Compliance Dates

- Employers must comply with all requirements (except methods of sample analysis) by ~~June 23~~ 2017
- Compliance with methods of sample analysis required by June 23, 2018

September 23, 2017 For Construction

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Definitions:

- Crystalline Silica - A common mineral found in many naturally occurring materials and used in many industrial products. Sand, concrete, stone, mortar, glass, pottery, ceramics, bricks containing crystalline silica.
- Respirable - Particles in the air able to be breathed in.
- P.E.L. - Permissible Exposure Limit
- Competent Person – An individual who is capable of identifying existing and foreseeable respirable crystalline silica hazards in the workplace and who has authorization to take prompt corrective measures to eliminate or minimize them.

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Definitions:

- Employee Exposure - The exposure to airborne respirable crystalline silica that would occur if the employee were not using a respirator.
- High-Efficiency Particulate Air (HEPA) Filter - A filter that is at least 99.97 percent efficient in removing mono-dispersed particles of .3 micrometers in diameter.
- Exposure Assessment - The employer shall assess the exposure of each employee who is or may reasonably be expected to be exposed to respirable crystalline silica.

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What are the Hazards of Crystalline Silica?

- Crystalline silica has been classified as a human lung carcinogen. Additionally, breathing silica dust over time can cause silicosis, which in severe cases can be disabling or fatal. The respirable silica dust enters the lungs and causes the formation of scar tissue, thus reducing the lungs' ability to take in oxygen. There is no cure for silicosis. Silica exposure also puts workers at a higher risk for developing lung cancer, respiratory diseases and kidney disease. In addition, smoking causes lung damage and adds to the damage caused by breathing silica dust.

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Reasons for the Rule

- Previous permissible exposure limits (PELs) are formulas that many find hard to understand
- Construction/shipyard PELs are obsolete particle count limits
- General industry formula PEL is about equal to 100 µg/m^3; construction/shipyard formulas are about 250 µg/m^3

Reason for the Rule

- There 2.3 million workers affected in over 600,000 establishments
- OSHA estimates that more than 840,000 of these workers are exposed to silica levels that exceed the new permissible exposure limit (PEL).
- **Previous PELs do not adequately protect workers.**

Reason for the Rule

- Exposure to respirable crystalline silica has been linked to:
  - Silicosis
  - Lung cancer
  - Chronic obstructive pulmonary disease
  - Kidney disease
- Extensive epidemiologic evidence that lung cancer and silicosis occur at exposure levels below 100 µg/m^3

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Construction Standard

- The Respirable Crystalline Silica in Construction standard establishes a new 8-hour time weighted average (TWA):
  - Permissible exposure limit **(PEL) of 50 µg/m^3**
  - Action level **(AL) of 25 µg/m^3**
- Scope
  - All occupational exposures to respirable crystalline silica are covered, unless employee exposure will remain below 25 µg/m^3 as an 8-hr TWA under any foreseeable conditions.

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Scope of Coverage

- Three forms of silica: quartz, cristobalite and tridymite
- Exposures from chipping, cutting, sawing, drilling, grinding, sanding, and crushing of concrete, brick, block, rock, and stone products (such as in construction operations)
- Exposures from using sand products (such as glass manufacturing, foundries, and sand blasting)

Health Benefits

The effect of the new rule is estimated to prevent:

- More than 600 deaths per year
  - Lung cancer: 124
  - Silicosis and other non-cancer lung diseases: 325
  - End-stage kidney disease: 193
- More than 900 new silicosis cases per year

Health Effects

- Silicosis – Fibrosis of lungs. Shortness of breath, cough. May allow lung infections, in particular TB.
  - Chronic >10 years of low level exposure
  - Accelerated <10 years of elevated exposure
  - Acute <2 years of very high exposure – Often fatal
- COPD
  - Heart disease may be subsequent to COPD. Associated with silica exposure.
- Kidney Disease
- Autoimmune Disease

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Silicosis

- Silicosis affects the lungs by damaging the lining of the lung air sacs. Once this begins, it leads to scarring and, in some situations, to a condition called progressive massive fibrosis. This condition happens when there is severe scarring and stiffening of the lung, which makes it difficult to breathe.

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Symptoms of Silicosis

- Cough
- Weight loss
- Tiredness
- Wheezing
- Fever or a sharp chest pain
- Shortness of breath over time, especially with chronic silicosis.
- Having silicosis increases the risk of other problems, such as kidney disease, tuberculosis, lung cancer, and chronic bronchitis

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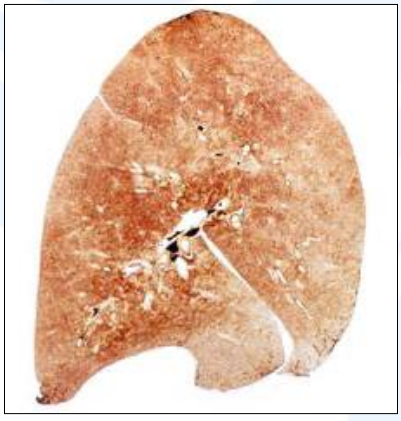
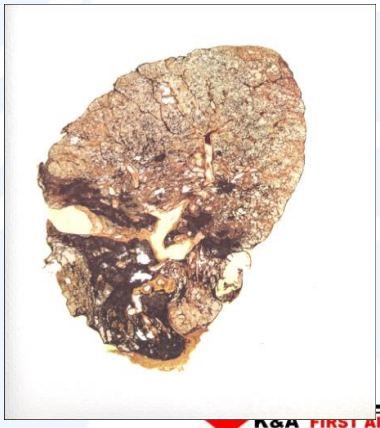
Effect On The Lung

- Normal Lung



- Lung With Silicosis



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Construction Standard

(a) Scope
(b) Definitions
(c) Specified exposure control methods- Table 1
OR
(d) Alternative exposure control methods
(1) PEL
(2) Exposure Assessment
(3) Methods of Compliance
(e) Respiratory protection
(f) Housekeeping
(g) Written exposure control plan
(h) Medical surveillance
(i) Communication of silica hazards
(j) Recordkeeping
(k) Dates

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Industries and Operations with Exposures

- Construction
- Glass manufacturing
- Pottery products
- Structural clay products
- Concrete products
- Foundries
- Dental laboratories
- Paintings and coatings
- Jewelry production
- Refractory products
- Asphalt products
- Landscaping
- Ready-mix concrete
- Cut stone and stone products
- Abrasive blasting in:
  - Maritime work
  - Construction
  - General industry
- Refractory furnace installation and repair
- Railroads
- Hydraulic fracturing for gas and oil

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Respirable Crystalline Silica Rule

- Two standards:
  - One for general industry and maritime
  - One for construction
- Similar to other OSHA health standards and ASTM consensus standards

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Construction Standard

(a) Scope
(b) Definitions
(c) Specified exposure control methods
OR
(d) Alternative exposure control methods
(1) PEL
(2) Exposure Assessment
(3) Methods of Compliance
(e) Respiratory protection
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(j) Recordkeeping
(k) Dates

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THE NEW STANDARD has additional requirements FOR CONTRACTORS BEYOND EXPOSURE COMPLIANCE

1. Develop and keep a written exposure control plan
2. Designate a key competent person to implement the exposure control plan, identify exposure risks, take actions to correct exposure issues
3. Train workers to work safely with regards to silica dust
4. Restrict housekeeping practices when silica dust is involved (dry sweeping of concrete)
5. Maintain records of the above

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Requirement	Must the Employer Follow this Requirement?	
	If Fully and Properly Implementing Table 1	**If Following Alternative Exposure Controls**
PEL	**No**	**Yes**
Exposure Assessment	**No**	**Yes,** when exposures are reasonably expected to be above the action level.
Methods of Compliance	**No**	**Yes**
Respiratory Protection	**Yes,** if respirator use is required by Table 1	**Yes,** if respirator use is required to reduce exposures to the PEL
Housekeeping	**Yes**	**Yes**
Written Exposure Control Plan	**Yes**	**Yes**
Medical surveillance	**Yes,** for employees who must wear a respirator under the silica standard for 30 or more days a year.	
Communication of Hazards	**Yes**	**Yes**
Recordkeeping	**Yes,** for any employees who are getting medical examinations	**Yes,** for exposure assessments and for any employees who are getting medical examinations

Construction – Scope

- All occupational exposures to respirable crystalline silica are covered, unless employee exposure will remain below 25 µg/m^3 as an 8-hr TWA under any foreseeable conditions.

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Construction – Specified Exposure Control Methods

- Table 1 in the construction standard matches 18 tasks with effective dust control methods and, in some cases, respirator requirements.
- Employers that fully and properly implement controls on Table 1 do not have to:
  - Comply with the PEL
  - **Conduct exposure assessments for employees engaged in those tasks**

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Example of a Table 1 Entry

Equipment / Task	Engineering and Work Practice Control Methods	Required Respiratory Protection and Minimum APF	
		≤ 4 hr/shift	> 4 hr/shift
Stationary masonry saws	Use saw equipped with integrated water delivery system that continuously feeds water to the blade. Operate and maintain tool in accordance with manufacturer's instructions to minimize dust emissions.	None	None

Example of a Table 1 Entry

Equipment / Task	Engineering and Work Practice Control Methods	Required Respiratory Protection and Minimum APF	
		≤ 4 hr/shift	> 4 hr/shift
Handheld power saws (any blade diameter)	Use saw equipped with integrated water delivery system that continuously feeds water to the blade. Operate and maintain tool in accordance with manufacturers' instruction to minimize dust - When used outdoors - When used indoors or in an enclosed area	 None APF 10	 APF 10 APF 10

List of Table 1 Entries

- Stationary masonry saws
- Handheld power saws
- Handheld power saws for fiber cement board
- Walk-behind saws
- Drivable saws
- Rig-mounted core saws or drills
- Handheld and stand-mounted drills
- Dowel drilling rigs for concrete
- Vehicle-mounted drilling rigs for rock and concrete
- Jackhammers and handheld powered chipping tools
- Handheld grinders for mortar removal (tuckpointing)
- Handheld grinders for other than mortar removal
- Walk-behind milling machines and floor grinders
- Small drivable milling machines
- Large drivable milling machines
- Crushing machines
- Heavy equipment and utility vehicles to abrade or fracture silica materials
- Heavy equipment and utility vehicles for grading and excavating

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Equipment/task	Engineering and work practice control methods	Required respiratory protection and minimum assigned protection factor (APF)	
		≤ 4 hours/shift	>4 hours/shift
(i) Stationary masonry saws	Use saw equipped with integrated water delivery system that continuously feeds water to the blade Operate and maintain tool in accordance with manufacturer's instructions to minimize dust emissions	None	None
(ii) Handheld power saws (any blade diameter)	Use saw equipped with integrated water delivery system that continuously feeds water to the blade Operate and maintain tool in accordance with manufacturer's instructions to minimize dust emissions:		
	-When used outdoors	None	APF 10
	-When used indoors or in an enclosed area	APF 10	APF 10

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Equipment/task	Engineering and work practice control methods	Required respiratory protection and minimum assigned protection factor (APF)	
		≤ 4 hours/shift	>4 hours/shift
(iii) Handheld power saws for cutting fiber-cement board (with blade diameter of 8 inches or less)	For tasks performed outdoors only: Use saw equipped with commercially available dust collection system Operate and maintain tool in accordance with manufacturer's instructions to minimize dust emissions Dust collector must provide the air flow recommended by the tool manufacturer, or greater, and have a filter with 99% or greater efficiency	None	None
(iv) Walk-behind saws	Use saw equipped with integrated water delivery system that continuously feeds water to the blade Operate and maintain tool in accordance with manufacturer's instructions to minimize dust emissions:		
	-When used outdoors	None	None
	-When used indoors or in an enclosed area	APF 10	APF 10

Equipment/task	Engineering and work practice control methods	Required respiratory protection and minimum assigned protection factor (APF)	
		≤ 4 hours/shift	>4 hours/shift
	For tasks performed outdoors only:		
(v) Drivable saws	Use saw equipped with integrated water delivery system that continuously feeds water to the blade Operate and maintain tool in accordance with manufacturer's instructions to minimize dust emissions	None	None
(vi) Rig-mounted core saws or drills	Use tool equipped with integrated water delivery system that supplies water to cutting surface Operate and maintain tool in accordance with manufacturer's instructions to minimize dust emissions	None	None

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Equipment/task	Engineering and work practice control methods	Required respiratory protection and minimum assigned protection factor (APF)	
		≤ 4 hours/shift	>4 hours/shift
(vii) Handheld and stand-mounted drills (including impact and rotary hammer drills)	Use drill equipped with commercially available shroud or cowling with dust collection system Operate and maintain tool in accordance with manufacturer's instructions to minimize dust emissions Dust collector must provide the air flow recommended by the tool manufacturer, or greater, and have a filter with 99% or greater efficiency and a filter-cleaning mechanism Use a HEPA-filtered vacuum when cleaning holes	None	None
(viii) Dowel drilling rigs for concrete	For tasks performed outdoors only:		
	Use shroud around drill bit with a dust collection system. Dust collector must have a filter with 99% or greater efficiency and a filtercleaning mechanism Use a HEPA-filtered vacuum when cleaning holes	APF 10	APF 10

Equipment/task	Engineering and work practice control methods	Required respiratory protection and minimum assigned protection factor (APF)	
		≤ 4 hours/shift	>4 hours/shift
(ix) Vehicle-mounted drilling rigs for rock and concrete	Use dust collection system with close capture hood or shroud around drill bit with a low-flow water spray to wet the dust at the discharge point from the dust collector	None	None
	OR		
	Operate from within an enclosed cab and use water for dust suppression on drill bit	None	None

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Equipment/task	Engineering and work practice control methods	Required respiratory protection and minimum assigned protection factor (APF)	
		≤ 4 hours/shift	>4 hours/shift
(x) Jackhammers and handheld powered chipping tools	Use tool with water delivery system that supplies a continuous stream or spray of water at the point of impact:		
	-When used outdoors	None	APF 10
	-When used indoors or in an enclosed area	APF 10	APF 10
	OR		
	Use tool equipped with commercially available shroud and dust collection system		
	Operate and maintain tool in accordance with manufacturer's instructions to minimize dust emissions		
	Dust collector must provide the air flow recommended by the tool manufacturer, or greater, and have a filter with 99% or greater efficiency and a filter-cleaning mechanism:		
	-When used outdoors	None	APF 10
	-When used indoors or in an enclosed area	APF 10	APF 10

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Equipment/task	Engineering and work practice control methods	Required respiratory protection and minimum assigned protection factor (APF)	
		≤ 4 hours/shift	>4 hours/shift
(xi) Handheld grinders for mortar removal (i.e., tuckpointing)	Use grinder equipped with commercially available shroud and dust collection system	APF 10	APF 25
	Operate and maintain tool in accordance with manufacturer's instructions to minimize dust emissions		
	Dust collector must provide 25 cubic feet per minute (cfm) or greater of airflow per inch of wheel diameter and have a filter with 99% or greater efficiency and a cyclonic pre-separator or filter-cleaning mechanism		

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Equipment/ task	Engineering and work practice control methods	Required respiratory protection and minimum assigned protection factor (APF)	
		≤ 4 hours/shift	>4 hours/shift
(xii) Handheld grinders for uses other than mortar removal	For tasks performed outdoors only: Use grinder equipped with integrated water delivery system that continuously feeds water to the grinding surface	None	None
	Operate and maintain tool in accordance with manufacturer's instructions to minimize dust emissions		
	OR		
	Use grinder equipped with commercially available shroud and dust collection system		
	Operate and maintain tool in accordance with manufacturer's instructions to minimize dust emissions		
	Dust collector must provide 25 cubic feet per minute (cfm) or greater of airflow per inch of wheel diameter and have a filter with 99% or greater efficiency and a cyclonic pre-separator or filter-cleaning mechanism:		
	-When used outdoors	None	None
	-When used indoors or in an enclosed area	None	APF 10

Equipment/ task	Engineering and work practice control methods	Required respiratory protection and minimum assigned protection factor (APF)	
		≤ 4 hours/shift	>4 hours/shift
(xiii) Walk-behind milling machines and floor grinders	Use machine equipped with integrated water delivery system that continuously feeds water to the cutting surface	None	None
	Operate and maintain tool in accordance with manufacturer's instructions to minimize dust emissions		
	OR		
	Use machine equipped with dust collection system recommended by the manufacturer	None	None
	Operate and maintain tool in accordance with manufacturer's instructions to minimize dust emissions		
	Dust collector must provide the air flow recommended by the manufacturer, or greater, and have a filter with 99% or greater efficiency and a filter-cleaning mechanism		
	When used indoors or in an enclosed area, use a HEPA-filtered vacuum to remove loose dust in between passes		

Equipment/ task	Engineering and work practice control methods	Required respiratory protection and minimum assigned protection factor (APF)	
		≤ 4 hours/shift	>4 hours/shift
(xiv) Small drivable milling machines (less than half-lane)	Use a machine equipped with supplemental water sprays designed to suppress dust. Water must be combined with a surfactant	None	None
	Operate and maintain machine to minimize dust emissions		
(xv) Large drivable milling machines (half-lane and larger)	For cuts of any depth on asphalt only: Use machine equipped with exhaust ventilation on drum enclosure and supplemental water sprays designed to suppress dust	None	None
	Operate and maintain machine to minimize dust emissions		
	For cuts of four inches in depth or less on any substrate:		
	Use machine equipped with exhaust ventilation on drum enclosure and supplemental water sprays designed to suppress dust	None	None
	Operate and maintain machine to minimize dust emissions		
	OR		
	Use a machine equipped with supplemental water spray designed to suppress dust. Water must be combined with a surfactant	None	None
	Operate and maintain machine to minimize dust emissions		

Equipment/task	Engineering and work practice control methods	Required respiratory protection and minimum assigned protection factor (APF)	
		≤ 4 hours/shift	>4 hours/shift
(xvi) Crushing machines	Use equipment designed to deliver water spray or mist for dust suppression at crusher and other points where dust is generated (e.g., hoppers, conveyers, sieves/sizing or vibrating components, and discharge points)	None	None
	Operate and maintain machine in accordance with manufacturer's instructions to minimize dust emissions		
	Use a ventilated booth that provides fresh, climate-controlled air to the operator, or a remote control station		

Equipment/task	Engineering and work practice control methods	Required respiratory protection and minimum assigned protection factor (APF)	
		≤ 4 hours/shift	>4 hours/shift
(xvii) Heavy equipment and utility vehicles used to abrade or fracture silica-containing materials (e.g., hoe-ramming, rock ripping) or used during demolition activities involving silica-containing materials	Operate equipment from within an enclosed cab	None	None
	When employees outside of the cab are engaged in the task, apply water and/or dust suppressants as necessary to minimize dust emissions	None	None
(xviii) Heavy equipment and utility vehicles for tasks such as grading and excavating but not including: Demolishing, abrading, or fracturing silica-containing materials	Apply water and/or dust suppressants as necessary to minimize dust emissions	None	None
	OR		
	When the equipment operator is the only employee engaged in the task, operate equipment from within an enclosed cab	None	None

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Engineering Controls

Cutting block without engineering controls

Cutting block using water to control the dust

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Engineering Controls (cont.)

Grinding without engineering controls

Grinding using a vacuum dust collector

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Engineering Controls (cont.)

Jackhammer use without engineering controls

Jackhammer use with water spray to control dust

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Fully and Properly Implementing Controls Specified on Table 1

- Presence of controls is not sufficient.
- Employers are required to ensure that:
  - Controls are present and maintained
  - Employees understand the proper use of those controls and use them accordingly

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Employees Engaged in Table 1 Tasks

- Employees <u>are</u> "engaged in the task" when operating the listed equipment, assisting with the task, or have some responsibility for the completion of the task
- Employees <u>are not</u> "engaged in the task" if they are only in the vicinity of a task

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Dust Collection

- Dust collector must provide the air flow recommended by the tool manufacturer, or greater, and have a filter with 99% or greater efficiency – (iii) Handheld power saws for cutting fiber-cement board (with blade diameter of 8 inches or less)
- Dust collector must have a filter with 99% or greater efficiency and a filter-cleaning mechanism – (vii) Handheld and stand-mounted drills (including impact and rotary hammer drills)
- Use a HEPA-filtered vacuum when cleaning holes - (vii) Handheld and stand-mounted drills (including impact and rotary hammer drills)
- Dust collector must provide 25 cubic feet per minute (cfm) or greater of airflow per inch of wheel diameter and have a filter with 99% or greater efficiency and a cyclonic pre-separator or filter cleaning mechanism - (xi) Handheld grinders for mortar removal (i.e., tuckpointing)

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Indoor/Outdoor

- Indoor or enclosed area =
  - Areas where airborne dust can build up unless additional exhaust is used
- What is considered additional exhaust?
  - the use of portable fans
  - portable ventilation systems
  - or other systems that increase air movement and assist in the removal and dispersion of airborne dust

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Indoor/Outdoor

- Examples of Enclosed Areas
  - Open-top structure with three walls and limited air movement
  - Roof structure that limits air dispersal
- Asses the area and implement necessary controls in Workplace Exposure Control Plan (WECP)

Water Delivery System

- Integrated water delivery systems are required for several types of equipment in Table 1
- Integrated water systems must be developed specifically for the type of tool in use so they will apply water at the appropriate dust emission points based on tool configuration and do not interfere with other tool components or safety devices. able 1.
- Flow rates vary to control dust; therefore must follow manufacturer's instructions.

Water Delivery System

- Secondary exposure from slurry
  - WECP
- Consider environmental factors:
  - Cold Temperature - Freezing

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Task Duration

- Shift:
  - A standard 8-hour work period;
  - A day with a break between work periods
  - (e.g., four hours on, two hours off, four
  - hours on);
  - Work periods longer than eight hours;
  - Double shifts within a single day;
  - A work period spanning two calendar days (e.g., 8 pm to 4 am)

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Task Duration

- Multiple tasks in Table 1 during the course of a shift, and the total duration of all tasks combined is less than four hours, the required respiratory protection for each task is the respiratory protection specified in the less than four hours per shift column.

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Task Duration

- If the total duration of all Table 1 tasks combined is more than four hours per shift, the required respiratory protection for each task is the respiratory protection specified in the more than four hours per shift column.

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Respiratory Protection Requirements on Table 1

- Where respirators are required, they must be used by all employees engaged in the task for entire duration of the task
- Must comply with 29 CFR 1910.134

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Assigned Protection Factor

- APF means the workplace level of respiratory protection that a respirator or class of respirators is expected to provide to employees when the employer implements a continuing, effective respiratory protection program as specified by 29 CFR 1910.134
- APFs are used to select the appropriate class of respirators that will provide the necessary level of protection.

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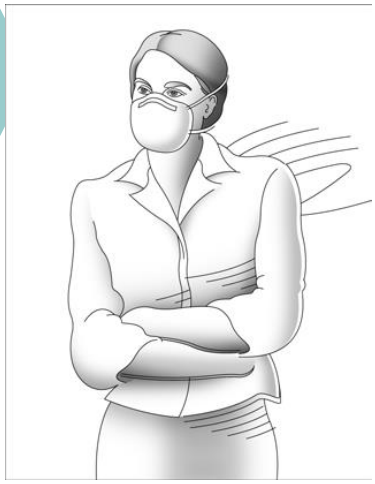
Assigned Protection Factor



- **Half mask Filtering Facepiece Dust mask**
- APF=10
- Does it need to be fit tested?
- YES if it is required

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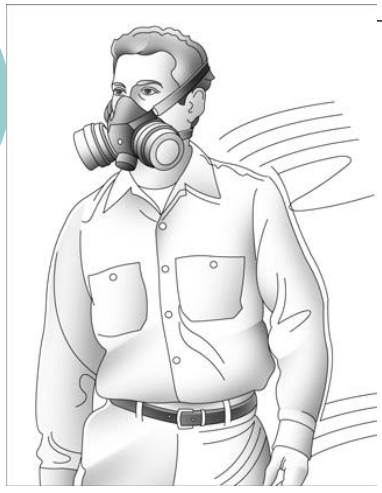
Assigned Protection Factor



- **Half mask Elastromeric Respirator**
- APF=10
- Does it need to be fit tested?
- YES if it is required

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Table 1. Assigned Protection Factors

Type of Respirator[1,2]	Quarter Mask	Half Mask	Full Facepiece	Helmet/Hood	Loose-Fitting Facepiece
1. Air-Purifying Respirator	5	10[3]	50	—	—
2. Powered Air-Purifying Respirator (PAPR)	—	50	1,000	25/1,000[4]	25
3. Supplied-Air Respirator (SAR) or Airline Respirator	—	10	50	—	—
• Demand mode	—	50	1,000	25/1,000[4]	25
• Continuous flow mode	—	50	1,000	—	—
• Pressure-demand or other positive pressure mode					
4. Self-Contained Breathing Apparatus (SCBA)	—	10	50	50	—
• Demand mode	—	—	10,000	10,000	—
• Pressure-demand or other positive pressure mode (e.g., open/closed circuit)					

Medical Surveillance

- Employers must offer medical examinations to workers who will be required to wear a respirator under the standard for 30 or more days a year.
- Employers must offer examinations every three years to workers who continue to be exposed above the trigger
- Exam includes medical and work history, physical exam, chest X-ray, and pulmonary function test (TB test on initial exam only)

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Medical Opinion

- Worker receives ***report*** with detailed medical findings, any work restrictions, and recommendations concerning any further evaluation or treatment
- Employer receives an ***opinion*** that only describes limitations on respirator use, and if the worker gives written consent, recommendations on:
  - Limitations on exposure to respirable crystalline silica, and/or
  - Examination by a specialist

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Housekeeping

- When it can contribute to exposure, employers must not allow:
  - Dry sweeping or brushing
  - Use of compressed air for cleaning surfaces or clothing, unless it is used with ventilation to capture the dust
- Those methods can be used if no other methods like HEPA vacuums, wet sweeping, or use of ventilation with compressed air are feasible

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Housekeeping

- Sweeping compounds is an acceptable dust suppression housekeeping method.
- Compressed air is allowed when in conjunction with a ventilation system that effectively captures dust cloud or where no alternative method is feasible.

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Construction – Written Exposure Control Plan

- The plan must describe:
  - Tasks involving exposure to respirable crystalline silica
  - Engineering controls, work practices, and respiratory protection for each task
  - Housekeeping measures used to limit exposure
  - Procedures used to restrict access, when necessary to limit exposures

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Construction – Competent Person

- Construction employers must designate a competent person to implement the written exposure control plan
- *Competent person* is an individual capable of identifying existing and foreseeable respirable crystalline silica hazards, who has authorization to take prompt corrective measures
- Makes frequent and regular inspection of job sites, materials, and equipment

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Communication of Hazards

- Employers required to comply with hazard communication standard (HCS) (29 CFR 1910.1200)
- Address: Cancer, lung effects, immune system effects, and kidney effects as part of HCS
- Train workers on health hazards, tasks resulting in exposure, workplace protections, the identity of the competent person, and the medical surveillance program

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Recordkeeping

- Must maintain records per 29 CFR 1910.1020 for:
  - Air monitoring data
  - Objective data
  - Medical records

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Flowchart A: Specified Exposure Controls for Table 1 Tasks

Q1) Is any employee performing a task listed on Table 1? (see Note 1)

No → Go to Flowchart B – Alternative Exposure Control Methods

Yes ↓

Q2) Are engineering and work practice controls listed on Table 1 for that task in use?

No →

Yes ↓

Q3) Are specified engineering controls fully and properly implemented? (see Note 2)

No → Employer is NOT in compliance with Paragraph (c)

Yes ↓

Q4) Is the employee wearing the required level of respiratory protection specified on Table 1?

No →

Yes ↓

Employer is in compliance with Paragraph (c).

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Other Standards

- Respirator Standard 1910.134
- Noise 1926.52
- Hazard Communication Program 1910.1200
- Machine Guarding 1926.300

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Reference Slides

General Industry and Maritime Standards

General Industry/Maritime Standard

(a) Scope
(b) Definitions
(c) Permissible exposure limit (PEL)
(d) Exposure assessment
(e) Regulated areas
(f) Methods of compliance
  (1) Engineering and work practice controls
  (2) Written exposure control plan
(g) Respiratory protection
(h) Housekeeping
(i) Medical surveillance
(j) Communication of silica hazards
(k) Recordkeeping
(l) Dates

General Industry/Maritime - Scope

- All occupational exposures to respirable crystalline silica are covered, unless objective data shows exposures remain below 25 µg/m^3 as an 8-hr TWA under any foreseeable conditions.
- Agricultural operations and exposures resulting from processing of sorptive clays are not covered.
- General industry employers can follow the construction standard in some very limited circumstances.

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Permissible Exposure Limit (PEL)

- PEL = 50 µg/m^3 as an 8-hour TWA
- Action Level = 25 µg/m^3 as an 8-hour TWA

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Exposure Assessment

- Required if exposures are or may reasonably be expected to be at or above action level of 25 µg/m^3
- Exposures assessments can be done following:
  - The performance option
  - The scheduled monitoring option

Performance Option

- Exposures assessed using any combination of air monitoring data or objective data sufficient to accurately characterize employee exposure to respirable crystalline silica

Objective Data

- Includes air monitoring data from industry-wide surveys or calculations based on the composition of a substance
- Demonstrates employee exposure associated with a particular product or material or a specific process, task, or activity
- 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

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Scheduled Monitoring Option

- Prescribes a schedule for performing initial and periodic personal monitoring
- If monitoring indicates:
  - Initial below the AL: no additional monitoring
  - Most recent at or above the AL: repeat within 6 months
  - Most recent above the PEL: repeat within 3 months
  - When two consecutive non-initial results, taken 7 or more days apart, are below the AL, monitoring can be discontinued
  - Reassess if circumstances change

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Appendix A – Methods of Sample Analysis

- Employers must ensure that samples are analyzed by a laboratory that follows the procedures in Appendix A
- Appendix A specifies methods of sample analysis
  - Allows for use of OSHA, NIOSH, or MSHA methods
  - Analysis must be conducted by accredited laboratories that follow specified quality control procedures

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General Industry/Maritime – Regulated Areas

- Required where exposures can reasonably be expected to exceed the PEL
- Must be demarcated in any manner that limits workers in the area
- Must post warning signs at entrances
- Respirator use required

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Methods of Compliance – Hierarchy of Controls

- Employers can use any engineering or work practice controls to limit exposures to the PEL
- Respirators permitted where PEL cannot be achieved with engineering and work practice controls

General Industry/Maritime – Written Exposure Control Plan

- The plan must describe:
  - Tasks involving exposure to respirable crystalline silica
  - Engineering controls, work practices, and respiratory protection for each task
  - Housekeeping measures used to limit exposure

Respiratory Protection

- Must comply with 29 CFR 1910.134
- Respirators required for exposures above the PEL:
  - While installing or implementing controls or work practices
  - For tasks where controls or work practices are not feasible
  - When feasible controls cannot reduce exposures to the PEL
  - While in a regulated area (General Industry/Maritime)

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Housekeeping

- When it can contribute to exposure, employers must not allow:
  - Dry sweeping or brushing
  - Use of compressed air for cleaning surfaces or clothing, unless it is used with ventilation to capture the dust
- Those methods can be used if no other methods like HEPA vacuums, wet sweeping, or use of ventilation with compressed air are feasible

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Exposure Monitoring - GI

- Initial monitoring to assess 8 hr TWA for silica exposure of representative employees for each job classification (picking EE with highest expected exposure)
  - If initial monitoring shows below AL, employer may discontinue monitoring for those employees
  - IF most recent monitoring indicates exposure > AL but < PEL, repeat monitoring within 6 mo.
  - IF most recent monitoring indicates exposures > PEL, repeat within 3 mon.
  - Where non-initial monitoring indicates exposures < AL, repeat monitoring within 6 mo. until 2 consecutive are < AL … then discontinue monitoring.

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Exposure Monitoring – GI

- Reassess exposures whenever change in production, process, control equipment, personnel or work practices indicate new or additional exposures above AL, or if ER has reason to believe exposures above AL have occurred.
- Sample analysis must conform to Appendix A.
- Employee representative has right to observe air monitoring and must be provided with appropriate PPE at no cost.
  - Exposure records and medical surveillance must be maintained and made available in accordance with 29 CFR 1910.1020

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General Industry/Maritime – Medical Surveillance

- Employers must offer medical examinations to workers who will be exposed above the action level for 30 or more days a year
- Employers must offer examinations every three years to workers who continue to be exposed above the trigger
- Exam includes medical and work history, physical exam, chest X-ray, and pulmonary function test (TB test on initial exam only)

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Medical Opinion

- Worker receives ***report*** with detailed medical findings, any work restrictions, and recommendations concerning any further evaluation or treatment
- Employer receives an ***opinion*** that only describes limitations on respirator use, and if the worker gives written consent, recommendations on:
  - Limitations on exposure to respirable crystalline silica, and/or
  - Examination by a specialist

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Communication of Hazards

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- Address: Cancer, lung effects, immune system effects, and kidney effects as part of HCS
- Train workers on health hazards, tasks resulting in exposure, workplace protections, and medical surveillance.

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Recordkeeping

- Must maintain records per 29 CFR 1910.1020 for:
  - Air monitoring data
  - Objective data
  - Medical records

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General Industry/Maritime – Compliance Dates

- Employers must comply with all requirements of the standard by June 23, 2018, except:
  - For tasks where controls or work practices are not feasible
  - Employers must comply with the action level trigger for medical surveillance by June 23, 2020. (The PEL is the trigger from June 23, 2018 through June 23, 2020.)
  - Hydraulic fracturing operations in the oil and gas industry must implement engineering controls to limit exposures to the new PEL by June 23, 2021.

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