



Silica Understanding the Requirements of a Written Program

NECA Standards and Safety



Presenter

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Learning Objectives

- Review the history of Silica found in the construction industry
- Understand the types of Silica and the health effects associated with it
- Review OSHA's Final Rule on Respirable Crystalline Silica requirements for Construction Employers
- List the tasks in Table 1 that an electrical contractor employees perform
- Understand the requirements for a written exposure control plan
- Identify the competencies of a "Competent Person" related to Silica

Items not covered

- Procedures and tools for air monitoring and exposure sampling
- Tasks outside of the Table 1 area of responsibility
- Physician or other Licensed Health Care Professional (PLHCP) qualifications
- Your company's Written Respiratory Program

Respirable Crystalline Silica

- Silica is a natural substance that is present in many parts of the earth
 - Found in Construction Materials Like Sand, Gravel, Concrete Blocks, Stones and Mortar
- Respirable Crystalline Silica is generally attributed to certain construction operations
 - Cutting and Sawing Concrete
 - Drilling Operations in Rock, Concrete or Brick
 - Abrasive Blasting and Grinding Operations

Three Types of Silica

- Quartz

The most abundant mineral found in the Earth's surface

- Cristobalite

A type of quartz commonly found in volcanic rocks

- Tridymite

A rare form of crystalline quartz

Respirable Crystalline Silica – The History

- Hawks Nest Dam Project (1930 – 1933)
 - Many workers were exposed and died from silicosis
 - U.S. Secretary of Labor Francis Perkins brought together experts and stakeholders to develop protection plans
 - Previous Permissible Exposure Limits, (PELs) developed over 40 years ago
- Today more than 2.3 Million people in the workplace are exposed in U.S.

Respirable Crystalline Silica – Health

- Types of Exposures leading to Silicosis
 - Acute – resulting from short-term exposures to very large quantities of silica
 - Accelerated – exposures to large amounts of silica over a 4-8 year time period
 - Chronic – resulting from long-term exposures to small amounts over a long period of time

Respirable Crystalline Silica – Other Health Effects

- Chronic Obstructive Pulmonary Disease (COPD)
 - Chronic Bronchitis
 - Emphysema
- Tuberculosis
- Lung Cancer
- Renal Disease

Silica – Current Action and Permissible Exposure Limits (PELs)

- Action Level – a concentration of Respirable Crystalline Silica of $25\mu\text{g}/\text{m}^3$ based on a 8 hour Time Weighted Average (TWA)
- Permissible Exposure Limit (PELs) – a concentration of Respirable Crystalline Silica of $50\mu\text{g}/\text{m}^3$ based on a 8 hour Time Weighted Average (TWA)

Old General Industry/Maritime $100\mu\text{g}/\text{m}^3$, Construction $250\mu\text{g}/\text{m}^3$

Final Rule on Silica Important Dates

- Released: March 25, 2016
- Effective Date: June 23, 2016
- Construction Compliance Date June 23, 2017
 - 29 CFR 1926.1153 Respirable Crystalline Silica
 - Modified **Enforcement** Date: **September 23, 2017**
- General Industry/Maritime Compliance Date June 23, 2018

What does it mean to Electrical Contractors?

- Establish and Implement **written exposure control plan**
- Designate a Competent Person to implement **written exposure control plan**
- Restrict housekeeping practices that expose silica to workers
- Offer Medical exams every three years if worker wears a respirator for 30 or more days in a calendar year
- Train Workers on silica exposures and best work practices
- Recordkeeping of worker exposures and medical exams (How long?)

Table 1 for Construction

- Lists the common tasks found in construction with proper dust control methods
- Gives employers information to limit worker exposure
- Provides effective dust control measures
 - Based on worker time and task exposure
 - Lists approved water control methods
 - Identifies ventilation methods to capture dust
 - Lists when a respirator is required
 - Provides the Minimum Assigned Protection Factor (APF) for respirator

Employers who follow Table 1 “Correctly” are not required to measure and are not subject to PEL requirements

Table 1 versus Alternative Methods of Compliance

- Table 1

Identify the task and determine the appropriate Required Respiratory Protection and Minimum Assigned Protection Factor

- Alternate Methods of Compliance

PELs

Exposure Assessment

Performance Option (Objective Data and Air Sampling)

Table 1 Examples

TABLE 1: SPECIFIED EXPOSURE CONTROL METHODS WHEN WORKING WITH MATERIALS CONTAINING CRYSTALLINE SILICA[†]



Equipment/Task	Engineering and Work Practice Control Methods	Required Respiratory Protection and Minimum Assigned Protection Factor (APF)		What does <i>full and proper implementation</i> require?*
		≤ 4 hours /shift	> 4 hours /shift	
<p>(iii) Handheld power saws for cutting fiber-cement board (with blade diameter of 8 inches or less)</p> 	<p>For tasks performed <u>outdoors only</u>:</p> <ul style="list-style-type: none"> 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	<p>Dust Collection Systems:</p> <ul style="list-style-type: none"> The shroud or cowling is intact and installed in accordance with the manufacturer's instructions; The hose connecting the tool to the vacuum is intact and without kinks or tight bends; The filter(s) on the vacuum are cleaned or changed in accordance with the manufacturer's instructions to prevent clogging; and The dust collection bags are emptied to avoid overfilling.
<p>(iv) Walk-behind saws</p> 	<p>Use saw equipped with integrated water delivery system that continuously feeds water to the blade.</p> <p>Operate and maintain tool in accordance with manufacturer's instructions to minimize dust emissions.</p> <ul style="list-style-type: none"> When used outdoors. When used indoors or in an enclosed area. 	None APF 10	None APF 10	<p>Water Controls:</p> <ul style="list-style-type: none"> An adequate supply of water for dust suppression is used; The spray nozzles are working properly to apply water at the point of dust generation; The spray nozzles are not clogged or damaged; and All hoses and connections are intact.

TABLE 1: SPECIFIED EXPOSURE CONTROL METHODS WHEN WORKING WITH MATERIALS CONTAINING CRYSTALLINE SILICA[†]


Equipment/Task	Engineering and Work Practice Control Methods	Required Respiratory Protection and Minimum Assigned Protection Factor (APF)		What does <i>full and proper implementation</i> require?*
		≤ 4 hours /shift	> 4 hours /shift	
<p>(x) Jackhammers and handheld powered chipping tools</p> 	<p>Use tool with water delivery system that supplies a continuous stream or spray of water at the point of impact.</p> <ul style="list-style-type: none"> When used outdoors. When used indoors or in an enclosed area. <p>OR</p> <p>Use tool equipped with commercially available shroud and dust collection system.</p> <p>Operate and maintain tool in accordance with manufacturer's instructions to minimize dust emissions.</p> <p>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.</p> <ul style="list-style-type: none"> When used outdoors. When used indoors or in an enclosed area. 	None APF 10	APF 10 APF 10	<p>Water Controls[‡]:</p> <ul style="list-style-type: none"> An adequate supply of water for dust suppression is used; The water sprays are working properly and produce a pattern that applies water at the point of dust generation; The spray nozzles are not clogged or damaged; and All hoses and connections are intact. <p>Dust Collection Systems:</p> <ul style="list-style-type: none"> The shroud is intact and installed in accordance with the manufacturer's instructions; The hose connecting the tool to the vacuum is intact and without kinks or tight bends; The filter(s) on the vacuum are cleaned or changed in accordance with the manufacturer's instructions; and The dust collection bags are emptied to avoid overfilling.

Table 1 Examples




TABLE 1: SPECIFIED EXPOSURE CONTROL METHODS WHEN WORKING WITH MATERIALS CONTAINING CRYSTALLINE SILICA†				
Equipment/Task	Engineering and Work Practice Control Methods	Required Respiratory Protection and Minimum Assigned Protection Factor (APF)		What does <i>full and proper</i> implementation require?*
		≤ 4 hours /shift	> 4 hours /shift	
<p>(vii) Handheld and stand-mounted drills (including impact and rotary hammer drills)</p> 	<ul style="list-style-type: none"> ■ 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	<p>Dust Collection Systems:</p> <ul style="list-style-type: none"> ■ The shroud or cowling is intact and installed in accordance with the manufacturer's instructions; ■ The hose connecting the tool to the vacuum is intact and without kinks or tight bends; ■ The filter(s) on the vacuum are cleaned or changed in accordance with the manufacturer's instructions; and ■ The dust collection bags are emptied to avoid overfilling.

Table 1 Examples

TABLE 1: SPECIFIED EXPOSURE CONTROL METHODS WHEN WORKING WITH MATERIALS CONTAINING CRYSTALLINE SILICA ¹				
Equipment/Task	Engineering and Work Practice Control Methods	Required Respiratory Protection and Minimum Assigned Protection Factor (APF)		What does <i>full and proper</i> implementation require?*
		≤ 4 hours /shift	> 4 hours /shift	
<p>(v) Drivable saws</p> 	<p>For tasks performed <u>outdoors only</u>:</p> <ul style="list-style-type: none"> ■ 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	<p>Water Controls:</p> <ul style="list-style-type: none"> ■ An adequate supply of water for dust suppression is used; ■ The spray nozzles produce a pattern that applies water at the point of dust generation; ■ The spray nozzles are not clogged or damaged; and ■ All hoses and connections are intact.
<p>(vi) Rig-mounted core saws or drills</p> 	<ul style="list-style-type: none"> ■ 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	<p>Water Controls:</p> <ul style="list-style-type: none"> ■ An adequate supply of water for dust suppression is used; ■ The spray nozzles produce a pattern that applies water at the point of dust generation; ■ The spray nozzles are not clogged or damaged; and ■ All hoses and connections are intact.

Elements of a Written Exposure Control Plan

Must include:

- A description of tasks that may involve exposure to silica dust
- A description of engineering controls, work practices and respiratory protection used to protect employees
- A list of housekeeping measures to limit employee exposure to silica dust

Construction also includes:

- Procedures to restrict access to work areas
- Name of Designated, Competent Person

Examples of Tasks

- Drilling holes for anchoring in tile, concrete and/or concrete block
- Cutting concrete such as pads, sidewalks or duct-banks
- Chipping or Jackhammering concrete
- Cutting Asphalt or other roadway material
- Using powder-actuated tools
- Excavating in earth and rock containing silica

Other Factors

Environmental related conditions:

- Weather
- Wind and
- Humidity
- Location
 - Indoors
 - Outdoors

Control Measures

- Engineering Controls – in addition to any respiratory protection
 - Ventilation
 - Vacuuming
 - Wet Cutting Procedures and Best Practices
 - Other means to reduce or eliminate exposures

Housekeeping Measures

- Cleaning methods to permit, reduce or prohibit generation of airborne silica
 - Compounds for sweeping
- Local exhaust for compressed air cleaning
- Clothing and Hygiene
- Respiratory protection needed

Restricting Access to Areas containing Silica

- Construction Employers using Table 1 must restrict access to bystanders in any area in which a respirator is required or when the PEL for silica is exceeded
- Methods
 - Demarcation of Area
 - Notification and Job Briefings for affected employees
 - Administratively control area by scheduling work when others are away
- The method chosen must be documented in written program

Competent Person

- Defined as:

“an individual who is capable of identifying existing and foreseeable *respirable crystalline* silica hazards in the workplace and who has the authorization to take prompt corrective measures to eliminate or minimize them.”

- Remember:

That person must be willing to accept the role of competent person ***and*** the company must designate and authorize them.

Competent Person

The “competent person” must also be trained in the rules and regulations pertaining to silica

Duties include:

- Recognizing areas for where exposures could exist
- Evaluating exposure potentials
- Provide recommendations to control exposures

Medical Surveillance

- The regulations require a plan for medical surveillance of employees who wear a respirator 30 or more days a year
- Recordkeeping/Documentation per 29 CFR 1910.1020
 - Exposure and air monitoring data
 - Medical Records
- Issues with Transient Workforce and Employee Turnover

Hazard Communication 29 CFR 1910.1200

- Initial Hazard Communication Training
- Remember the Hierarchy of Controls
- Recognition and knowledge of silica hazards
- Proper warning labels and notifications
- Exposure control methods
- Personal Protective Equipment

Alternative Methods of Compliance

- Performance Option

Requires exposure assessments be performed using air monitoring data, objective data or combination thereof to accurately characterize respirable crystalline silica worker exposure.

- Objective Data

Air monitoring data from industry wide surveys or calculations.

Demonstrates a relative exposure to a product or material or related to a specific task, process or activity.

It must be representative of the workplace conditions or exposure potentials face by employees and workers.

Alternative Methods of Compliance

- Scheduled Monitoring Option
- Requires a schedule for initial and then periodic personal monitoring
 - Initial Below Action Level – no additional monitoring required
 - At or Above Action Level – Repeat within 6 months
 - Above Personal Exposure Level – Repeat within 3 months
 - When 2 consecutive non-initial monitoring results taken at 7 or more days apart, are below the Action Level, monitoring can be discontinued
 - Reassess if conditions or circumstances change

Alternative Methods of Compliance

- Refer to Appendix A – Methods of Sample Analysis in the Final Rule on Silica for more information
- May use engineering or work practice controls to limit exposure to PEL
- Respirators are permitted where the PEL exposure cannot be controlled by engineering and work practice controls

Respiratory Protection

- Written Respiratory program that complies with 29 CFR 1910.134
- Where respirators are used as specified by Table 1 or exposures exceeding PEL

Review: Silica Written Exposure Control Plan

- Competent Person
- Tasks above action level
- Engineering Controls
- Work Methods
- Housekeeping
- Description of Procedures to restrict access
- Review and Evaluate Effectiveness Annually
Site Specific in field office

Review: Silica Written Exposure Control Plan *cont.*

- Medical Surveillance
 - Respirator for 30 or more days must provide tracking
 - Initial Exam
 - Periodic Exam every 3 years
- Medical and Work History
 - Physical Exam
 - Chest X-ray 3 years due to cycles (B-Reader Certified Radiologist)
 - Pulmonary Function Test
 - Tb Skin Test
 - PLHCP tests requests

Review: Silica Written Exposure Control Plan *cont.*

- Duties
- Exposure Levels
- PPE
- Previous Medical History and Exposures
- Detailed Written Report to Employee
- Employer receives a Written Medical Opinion from PLHCP

Additional Resources

OSHA Final Rule on Silica Page

www.OSHA.gov/silica

Small Entity Compliance Guide for the Respirable Crystalline Silica Standard for Construction

www.osha.gov/Publications/OSHA3902.pdf

National Institute for Occupational Safety and Health

www.cdc.gov/niosh/topics/silica/

QUESTIONS

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