New Silica Standard

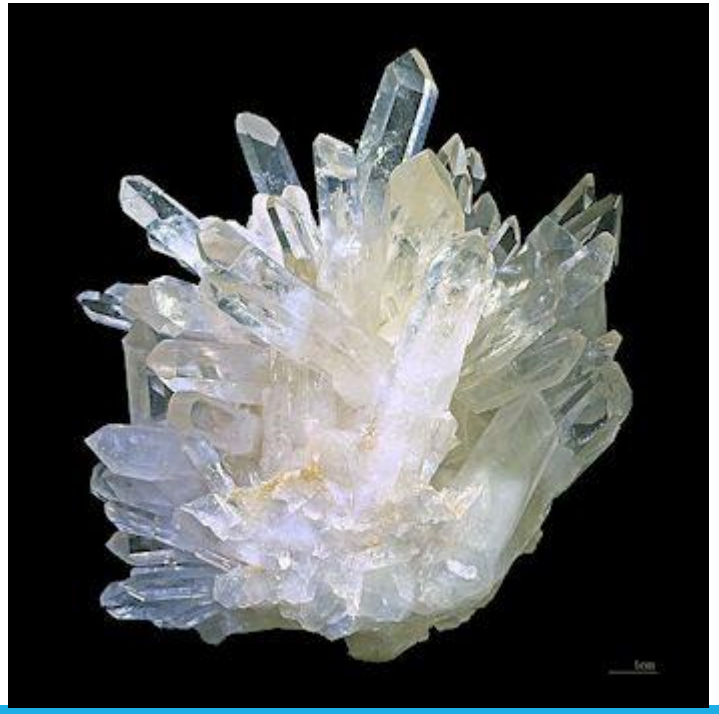
1926.1153

1910.1053

What is Silica?

What?

- Silicon dioxide (SiO_2)
- Major component of sand, rock & mineral ores



What Industries Impacted?

Manufacturing: Foundries, Abrasive blasting, Paint, Glass, Concrete, Brick making, Plumbing fixtures, Refractory

Construction: highway, masonry, concrete, rock drilling

Construction tasks: masonry saws, grinders, drills, jackhammers and handheld powered chipping tools; vehicle-mounted drilling rigs; milling; operating crushing machines; and heavy equipment for demolition.

Silica Health Hazards

Silicosis

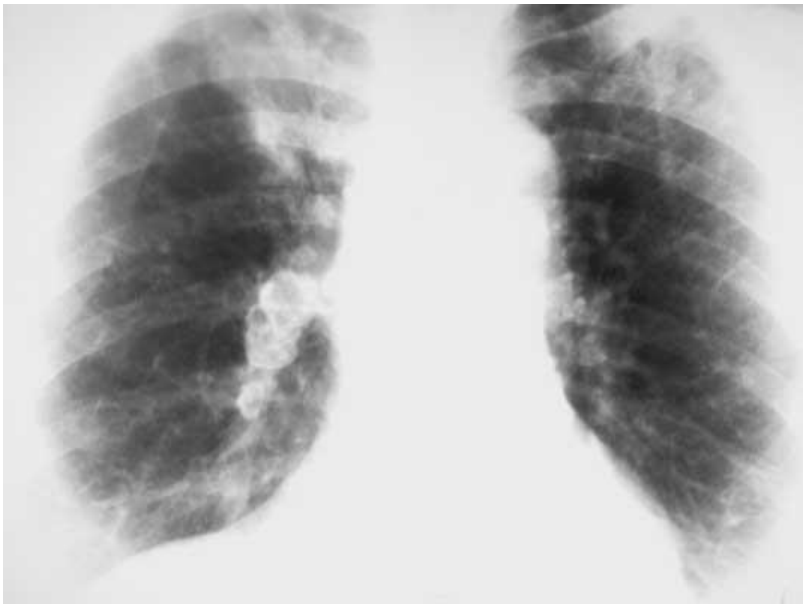
Chronic Obstructive Pulmonary Disease (COPD)

Tuberculosis (TB)

Lung Cancer

Kidney disease

Autoimmune conditions



Silicosis

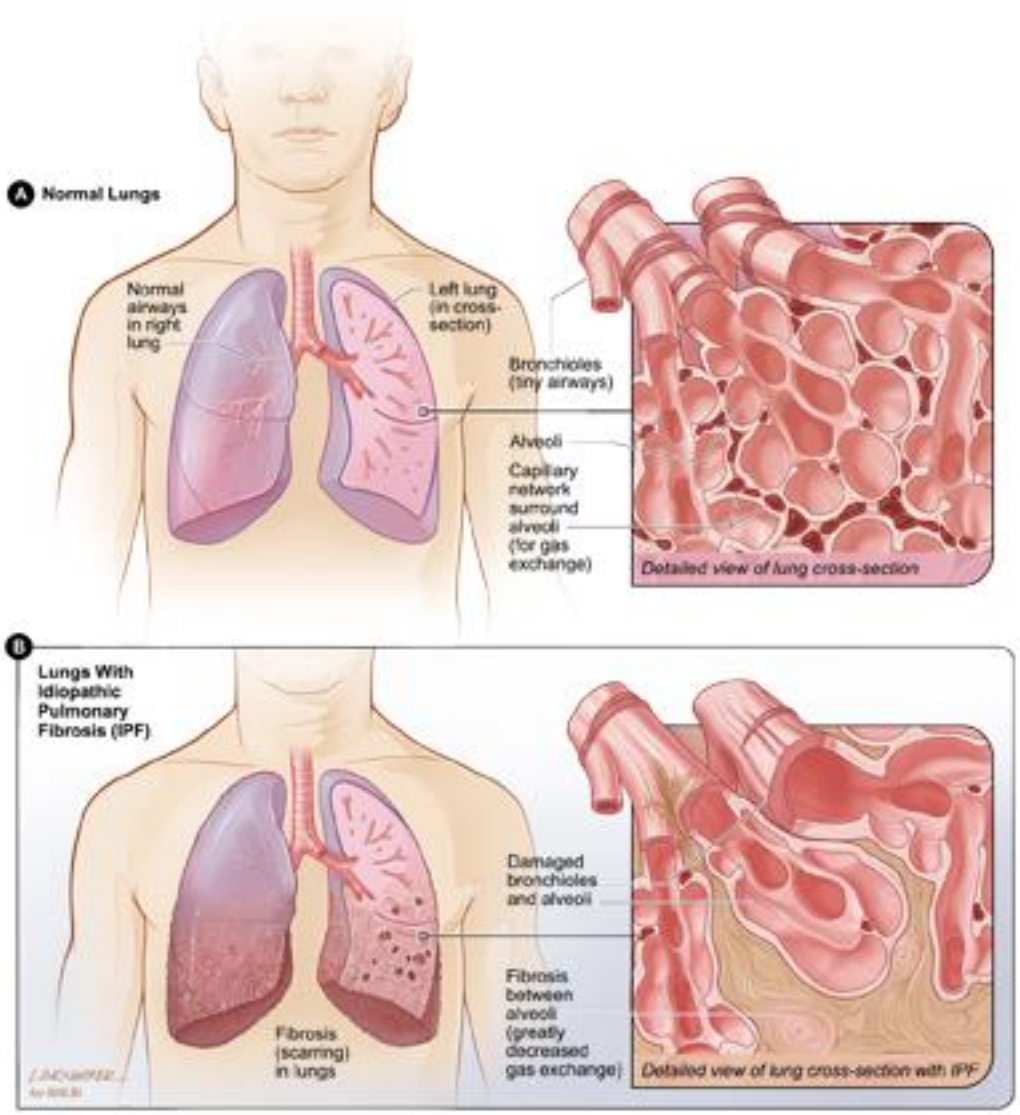
Most common occupational lung disease worldwide

Irreversible fibrotic lung disease

Three types:

- Chronic
- Accelerated
- Acute

Can still occur after exposure ends


A Normal Lungs
Normal airways in right lung
Left lung (in cross-section)
Bronchioles (tiny airways)
Alveoli
Capillary network surround alveoli (for gas exchange)
Detailed view of lung cross-section
B
Lungs With Idiopathic Pulmonary Fibrosis (IPF)
Fibrosis (scarring) in lungs
Damaged bronchioles and alveoli
Fibrosis between alveoli (greatly decreased gas exchange)
Detailed view of lung cross-section with IPF

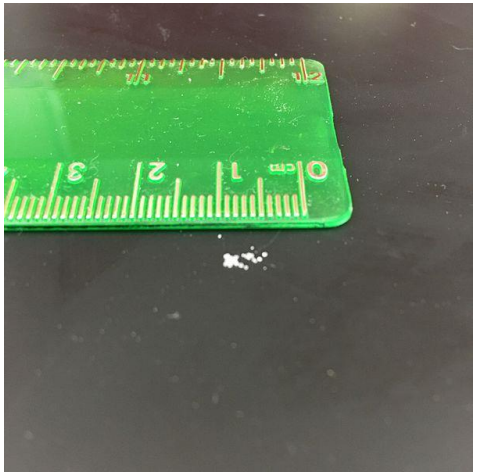
Crystalline Silica PEL/AL

PERMISSIBLE EXPOSURE LEVEL

0.050 mg/m^3 or
50 µg/m^3 8-hour TWA

ACTION LEVEL

0.025 mg/m^3 or
25 µg/m^3 8-hour TWA



Exposure Determination

Exposure Determination

Objective Data

IH Monitoring

Utilize Table 1 (Construction Only)

Construction Specific Operations

An exposure assessment is NOT required if…

- Table 1 Operation
- Engineering controls implemented
- Work practices implemented
- Respiratory protection worn

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

Table 1 Tasks

- Saws: Stationary masonry, Handheld power, Handheld power saws for fiber cement board, Walk-behind saws, Drivable saws
- Drills: 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
- Grinders: Handheld grinders for mortar removal (tuckpointing), Handheld grinders for other than mortar removal,
- Milling: 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 and for grading and excavating

Exposure Assessment

Initial assessment

- Not required if objective data of no exposure

Periodic

- < AL Discontinue
- ≥ AL ≤ PEL – every six months
- > PEL – every 3 months
- Performance option – assess exposure for each employee sufficient to characterize exposures

Reassess

Exposure Assessment

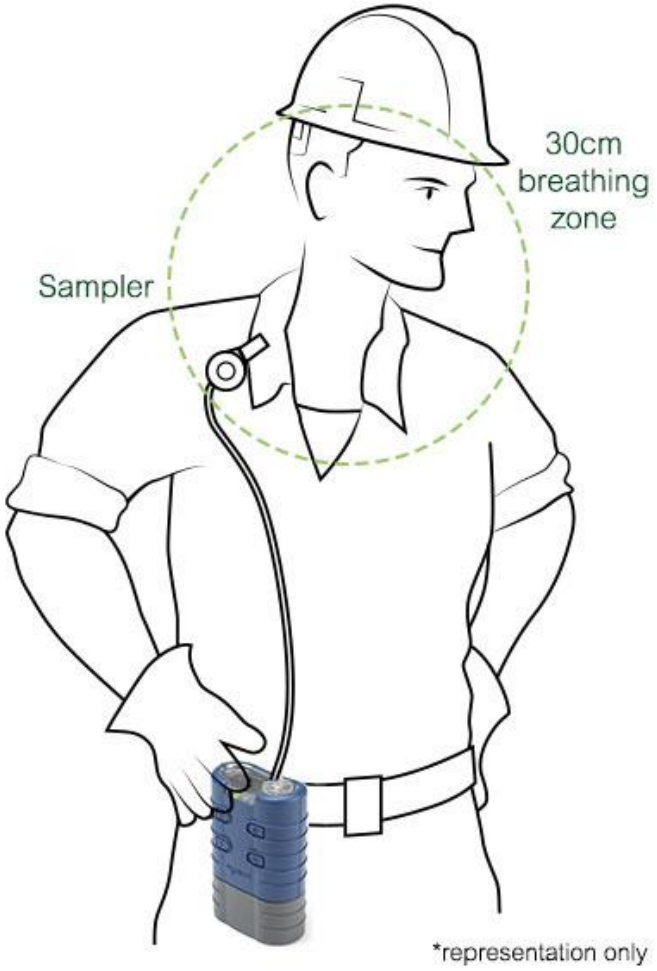
Assess exposure if expected to be ≥ AL

8-hour TWA BZ samples

Determine exposure on basis of ≥ 1 air samples that reflect exposures of employees

- On each shift
- For each job classification
- In each work area
- Representative sampling OK, include highest exposure

Breathing Zone



Sampling Methodology

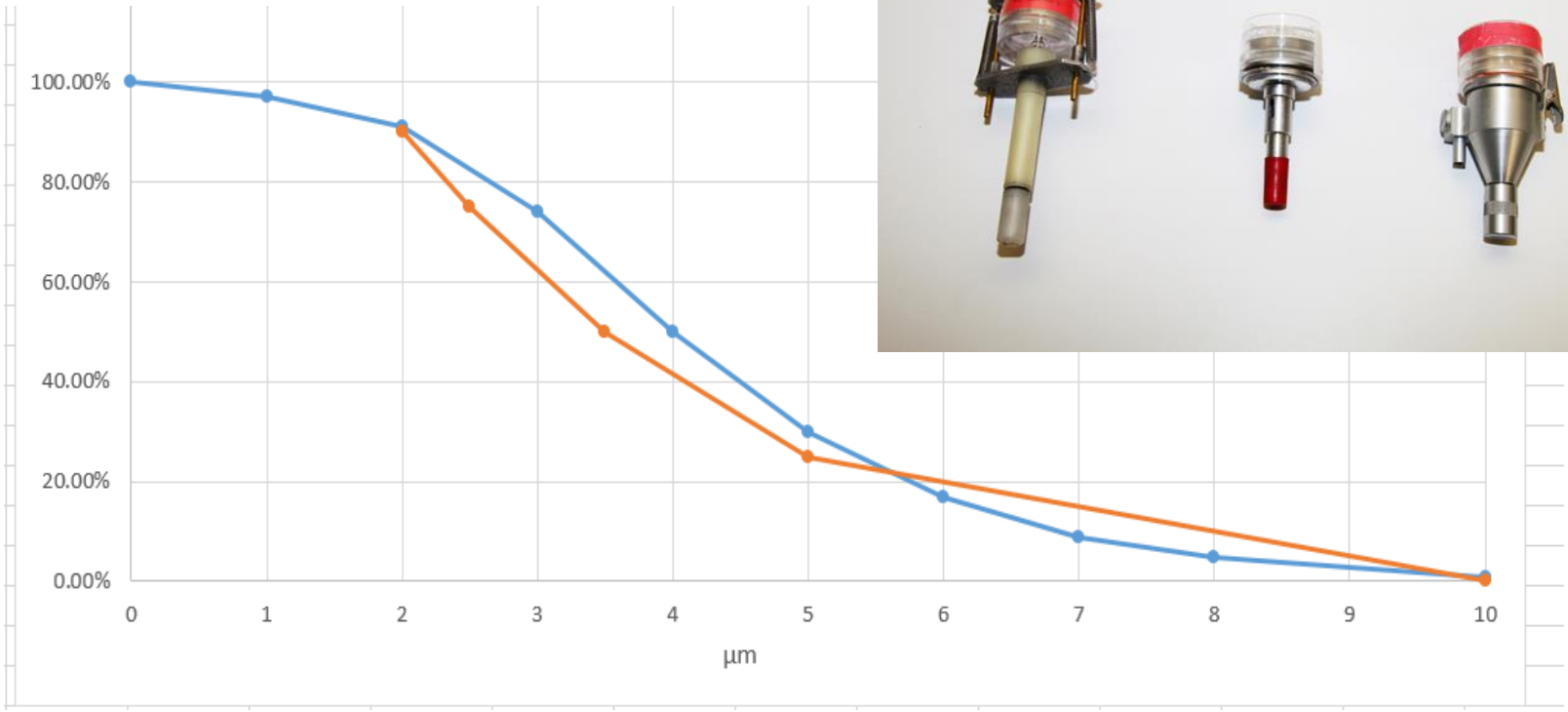
OSHA ID-142;NMAM 7500, NMAM 7602, NMAM 7603, MSHA P2, MSHA P-7

- Media: 5 µm PVC filter
- ISO CEN particle size selection
- Cyclone

Don’t allow sample to be inverted

Keep a “blank” sample for quality control

Respirable Dust Comparison



Employee Notification

Each employee affected notified within 5 working days (construction)

Each employee affected notified within 15 working days (general industry)

OR post the results for all affected employees

> PEL include corrective action

COMPANY X
123 Any Street
Columbus, OH

Employee Notification of Crystalline Silica Monitoring Results

Name: **Position:**

Site: **Sampling Date:**

This letter is to notify you of the results from the inhalation exposure to respirable crystalline silica sample collected in your breathing zone on the date listed above.

All sampling results are compared to the Occupational Safety and Health Administration's Permissible Exposure Limit (OSHA PEL) and Action Level as outlined in 29 CFR 1926.1153(a). These exposures are based on an 8-hour shift.

Sample No.	Sample Time (min)	Sample Results	OSHA PEL	Action Level
			0.05 mg/m^3	0.025 mg/m^3

Based on the results of the sampling, the following corrective actions will be put in place:

_____

_____

_____

_____

_____

☐ Sample results are less than the OSHA PEL for an 8-hour shift and no corrective actions are necessary.

By signing below, you are indicating that you have been provided with the results of the respirable crystalline silica monitoring sample collected on you and the results have been explained to you. If you have any questions, please talk to your safety representative.

_____	_____	_____	_____
Employee Signature	Date	Safety Representative Signature	Date

Observation of Monitoring

Affected employees

Designated representatives

PPE provided to observer

Regulated Area and Control Plan

Regulated Area (Mfg.)

- Exposure > PEL
- Demarcation
- Limit access
- Respirators provided
- Work clothing provided if gross contamination potential

Written Access Control Plan (Manufacturing & Construction)

- Competent person ID presence/location
- Procedures to notify and mark
- Inform other contractors
- Provisions to limit access
- Procedures to provide respirators
- PPE
- Annual review & update
- Available

Compliance

Engineering controls

Work practice controls

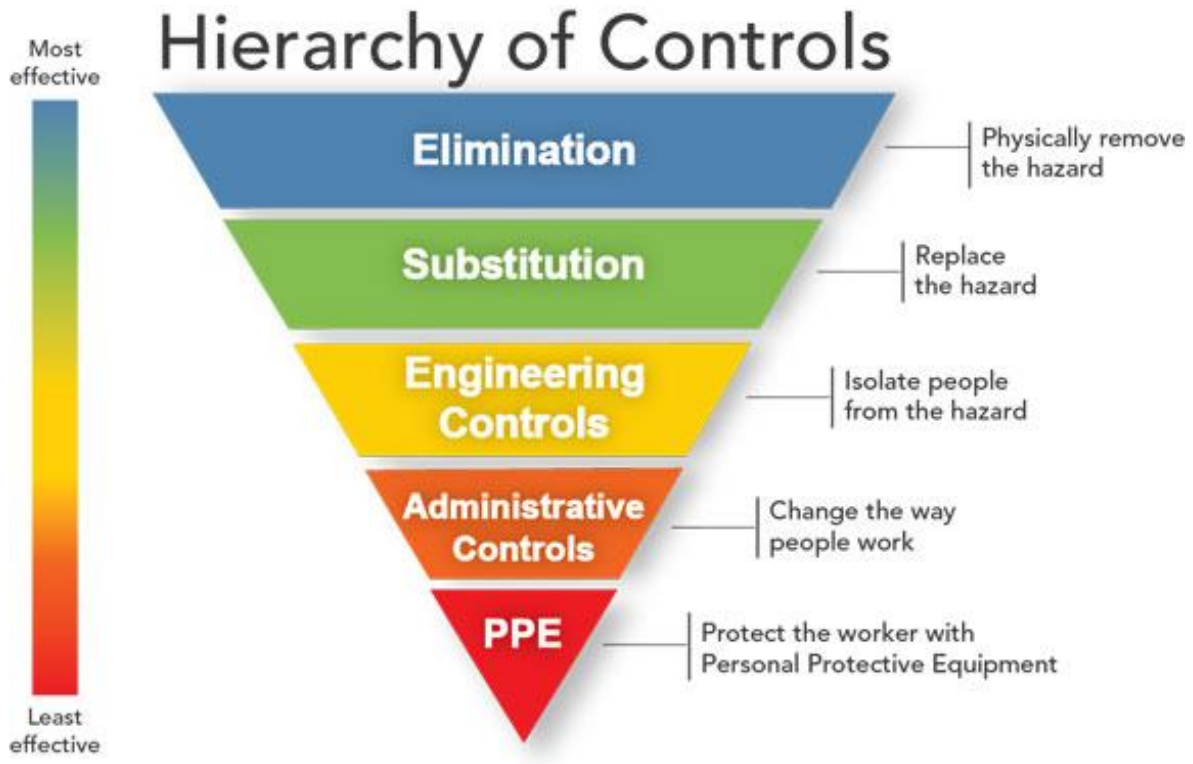
Control exposures <PEL

If not feasible, reduce to lowest feasible level

- Supplement with respirators

Abrasive blasting – Ventilation 1910.94; 1915.34 mechanical paint removers and 1915 Subpart I PPE

Hierarchy of Controls



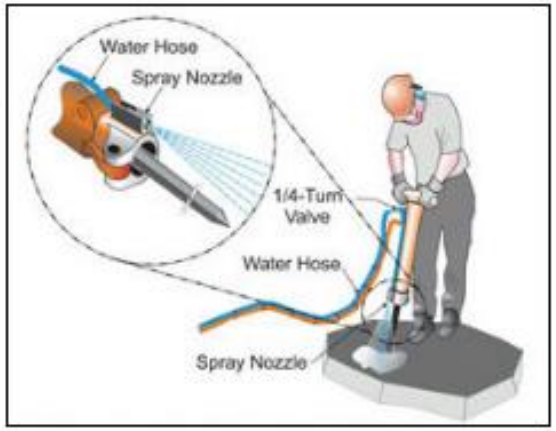
Engineering Controls

Built into the design of the equipment or process to reduce the hazard

- Wetting down work operations
- Local exhaust ventilation
- “Process isolation”

Requires maintenance and proper use every time

Figure 1. Grinder in use with the contr



Controls


HEPA
Ready


BOSCH
HDC200
BOSCH
HDC200
Includes Adapter
Incluye adaptador
Comprend un adaptateur
BOSCH
HDC200

Compliance

Cleaning

- HEPA and wet methods
- Compressed air, dry sweeping and dry brushing prohibited

Employee rotation prohibited

Respiratory Protection

Comply with 1910.134

Usage

Written program

Medical Surveillance

Medical Surveillance

Construction: Exposed >PEL/required to wear a respirator for 30 days or more

Manufacturing: Exposed ≥AL 30 days or more per year

Initial examination within 30 days of assignment (unless exam within 3 years)

Periodic- every 3 years

Info to PLHCP

PLHCP written opinion

Work Information

Employer must provide to PLHCP:

- Employee's duties that may lead to silica exposure
- Silica exposure levels
- Description of PPE used
- Previous employment-related medical exam information

A standard form can be used

Medical Surveillance - Content

PLHCP

Medical and work history

- Silica exposure
- Respiratory system medical history
  - Symptoms of respiratory diseases
  - Tuberculosis exposure history
  - Smoking status/history
- Past & current medical conditions
- History of surgeries and hospitalizations
- Past & current medications

Medical Surveillance - Content

Physical exam
- TB test
- Lung function test

Chest x-ray

Pulmonary function test

Additional exams, as needed

Results and Reports

Within 30 days: provide and explain results to employee

Written medical report must contain:

- Results of examination
- Any conditions that increase employee risk
- Any conditions that may require further evaluation or treatment
- Any limitations on respirator use or exposure to silica
- Referral to a specialist as applicable

Recommended: copy of exam and test results for employee's records

Written medical opinion to employer within 30 days

- Exposure limitations and specialist referrals only with employee permission

Employee Information and Training

What do employees need to know?

OSHA requires employees to know and understand:

- Health hazards associated with respirable crystalline silica
- Workplace tasks that could result in exposure
- Measures your company has put in place to protect employees
- Who the competent person is
- What the medical surveillance program is and its purpose

Hazard Communication

Employee communication

Labels

SDS

Employees demonstrate knowledge

- Operations
- Procedures
- Standard
- Medical Surveillance

Recordkeeping

Training

Air monitoring data

Objective Data

Medical Surveillance
- 1910.1020

Training Records

Delivery Records

- Date, location and duration of the course.
- Name and description of the course.
- Course materials.
- Name and qualification of the person delivering the course.
- Trainees participating.
- Trainees successfully completing the training.

Evaluation Records

- Training evaluation.
- Periodic re-evaluation of the course.

Air Monitoring

Records covering all exposure measurements taken

Documents must include

- Date of measurement for each sample
- Tasks monitored
- Sampling & analytical methods
- Number, duration, and results of samples
- Identity of lab that performed analysis
- Type of PPE worn by monitored employees
- Name, SSN, and job classification of all employees represented by monitoring

Effective Dates

Manufacturing

- June 23, 2018 Program Requirements
- June 23, 2020 – Medical Surveillance Requirements
- June 23, 2021 – Hydraulic Fracturing engineering controls

Construction

- ~~June 23, 2017~~ Program and Medical Requirements
  - September 28, 2017 (4/6/17 announcement)
- June 23, 2018 Laboratory Analysis Compliance

Your Next Steps

1. Determine potential exposures
2. Conduct exposure assessments
    1. Or use Table of Control Methods and Respirators if in Construction
3. Develop written exposure control plan
4. Designate a competent person (construction)
5. Develop employee training program
6. Implement medical surveillance if required
7. Recordkeeping

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Safex

25th Anniversary

1992-2017