OSHA’s Rule on Respirable Silica Dust Regulations in Construction Field
1926.1153

Presentation Designed for the End User
REASONS FOR THE RULE

GENERAL INDUSTRY FORMULA FOR PERMISSIBLE EXPOSURE LIMITS (PEL) WAS EQUAL TO 100 UG/M3.

CONSTRUCTION INDUSTRY LIMITS IN THE PAST WAS 250 UG/M3.

EVIDENCE WAS DISCOVERED THAT LUNG CANCER AND SILICOSIS DISEASE OCCUR AT EXPOSURE LEVELS BELOW 100 UG/M3.

ON SEPT. 23, 2017 OSHA CHANGED THE PERMISSIBLE EXPOSURE LIMIT TO 50 UG/M3.
ARE YOU IN DANGER?

- Silica can be found in many building materials including:
  - SAND
  - ROCK MATERIAL
  - MASONRY
  - CONCRETE
  - MORTAR

- If you do the following to these materials:
  - SAND BLASTING/ABRASIVE BLASTING
  - CUT OR SAW
  - JACKHAMMER
  - GRIND OR DRILL
  - CRUSH OR DEMOLISH

- THEN YES!!!!!!!!!!!!!!

- The dust around you contains silica and breathing it could be deadly.
US DOL IT'S NOT JUST DUST OSHA

IT'S SILICA

A worker is surrounded by dust, highlighting the importance of recognizing silica dust in the workplace.
DANGERS OF RESPIRABLE SILICA

- **LUNG CANCER**
  Generally Fatal – Leading Cause of Death from cancer in the US.

- **SILICOSIS**
  Incurable – Causes scaring and Inflammation in the lungs – IRREVERSIBLE

- **CHRONIC OBSTRUCTIVE - PULMONARY DISEASE**
  Chronic Obstruction of Lung Airflow – A form of lung disease which is NOT FULLY REVERSIBLE

- **KIDNEY DISEASE**
  Kidneys can no longer filter waste from the body which can be fatal without dialysis or transplant
Silicosis: Occupational lung disease

Silicosis is an often fatal lung disease caused by breathing dust containing crystalline silica particles, a basic component of sand and granite. There is no cure for silicosis, and treatment options are limited. However, the condition can be prevented if measures are taken to reduce exposure.

Symptoms
- Continued exposure:
  - Shortness of breath
  - Fever
  - Bluish skin at the ear lobes or lips
- As the disease progresses:
  - Fatigue
  - Extreme shortness of breath
  - Loss of appetite
  - Chest pain
  - Respiratory failure

At-risk occupations
- Construction
- Mining
- Sandblasting
- Masonry
- Demolition
- Manufacturing of glass and metal products
- Plumbing
- Painting

Inhaling the dust can cause scar tissue to form in the lungs that reduces the lungs' ability to extract oxygen from the air.

Silica dust particles can embed themselves in the alveolar sacs deep in the lungs where they cannot be cleared by mucous or coughing.

Source: U.S. Department of Labor Occupational Safety and Health Administration, silicosis.com

Amy Lewis/The Salt Lake Tribune
Respiratory System

Diagram showing the respiratory system with labeled parts:
- nasal cavity
- voice box
- windpipe
- throat
- bronchi
- left lung
- right lung
- diaphragm
- capillaries
- alveoli
- carbon dioxide out
- oxygen in
- blood cells

© 2006 Encyclopaedia Britannica, Inc.
Lung Disease

- **Acute silicosis**: causes cough, weight loss, and fatigue within a few weeks or years of exposure to inhaled silica.

- **Chronic silicosis**: appears 10 to 30 years after exposure and can affect upper lungs and sometimes cause extensive scarring.

- **Accelerated silicosis**: which occurs within 10 years of high-level exposure
Diseased and Healthy Lung

- Compare these sections cut from a diseased lung with large cavities (left) and a pink, healthy lung (right). The diseased lung shows a case of miner’s phthisis (also known as silicosis) which has led to tuberculosis. Quartz dust is inhaled by miners, and trapped in the lungs causes silicosis making the victim more susceptible to diseases such as tuberculosis and pneumonia.
NEW OSHA EXPOSURE LEVELS

- The new PEL is 50 µg/m³
- Equivalent to a grain of salt inside a refrigerator
“Regular Dust” vs “Respirable Dust”

- 100 times smaller than ordinary beach sand
- Respirable dust: <10 microns (µm)
OSHA’s Crystalline Silica Standard 29 CFR 1926.1153

- **Exposure Determination**: OSHA provides 2 options
  - **Option 1**: Use of OSHA’s predetermined list of tasks and control strategies (Table 1)
  - **OR**
  - **Option 2**: Completion of Exposure Assessment (air monitoring/objective data)
Employer’s Responsibilities

- Utilize engineering controls, work practices, and PPE when employees are exposed to respirable silica dust
- Provide medical evaluations (when appropriate and/or necessary)
- Provide training on respirable silica dust, the standard controls, and PPE in place to protect employees from exposure
- Develop written exposure control plan
- Understand the exposure of employees
Competent Person (CP) Inspections

- OSHA expects “routine observations” of dust-generating tasks to be made by the CP.

- If increases in visible dust occur, the competent person’s assigned role is to take prompt, corrective action.

- Capable of identifying existing and foreseeable silica hazards in workplace AND who has authorization to take corrective measures.

- Make frequent and regular inspection of jobsites, materials, and equipment to implement the written Exposure Control Plan (ECP).
Medical Surveillance Requirements

Construction:

When use of a respirator is required (by the silica standard) for more than 30 days a year

The initial (baseline) exam must be made available within 30 days of initial assignment

UNLESS the employee has received an equivalent medical exam within the last 3 years AND THEN

Periodic examinations must be made available at least every 3 years
Not Viable Options

Hierarch of Controls

- Elimination
  - Physically remove the hazard
- Substitution
  - Replace the hazard
- Engineering Controls
  - Isolate people from the hazard
- Administrative Controls
  - Change the way people work
- PPE
  - Protect the worker with Personal Protective Equipment

Least effective

Most effective
PROTECT YOURSELF USING THE FOLLOWING 3 METHODS
1. WEAR A RESPIRATOR

**FULL FACE RESPIRATOR**
- Strap Holds the Mask Snugly in Place
- A Filter traps Particles
- Cartridge Captures Certain Gases and Vapors
- Valve Opens when you exhale and closes when you inhale

**Face Seal Keeps Contaminants out of Mask**
- Full Face Adds Eye Protection
2. USE WATER

OSHA’s Preferred Method when applicable

Applying water to a saw blade when cutting materials that contain crystalline silica – such as stone, rock, concrete, brick and block, substantially reduces the amount of dust created during these operations.
3. USE A VACUUM ATTACHMENT TO THE EQUIPMENT
Dust Collection Systems

OSHA is requiring the use of “commercially available dust collection system” for several pieces of equipment on Table 1.

Purpose: These pieces of equipment are appropriately designed for the tool being used and will be effective in capturing the dust generated from the tool/task AND won’t introduce additional safety hazards.

The Goal is to prevent ineffective “on-site improvisation”.

Employer is free to improvise and use controls not “commercially available,” however, if Engineering Controls (Methods in Table 1) are not met, then Option 2 must apply.
# How to Read Table 1

## Inside or Outside

<table>
<thead>
<tr>
<th>Tool</th>
<th>Control</th>
<th>4 Hours + / -</th>
</tr>
</thead>
</table>

## Jackhammers & handheld powered chipping tools

<table>
<thead>
<tr>
<th></th>
<th>Up to 4 Hours a Day</th>
<th>More than 4 Hours a Day</th>
</tr>
</thead>
<tbody>
<tr>
<td>![Tool Image]</td>
<td>Use tool with water delivery system that supplies a continuous stream or spray of water at the point of impact:</td>
<td><strong>NONE REQUIRED</strong></td>
</tr>
<tr>
<td>![Tool Image]</td>
<td><strong>OR</strong></td>
<td>![Mask Diagram]</td>
</tr>
<tr>
<td>Use tool equipped with commercially available shroud and dust collection system.</td>
<td><strong>10 APF Required</strong></td>
<td>![Mask Diagram]</td>
</tr>
<tr>
<td>Dust collector must provide the airflow recommended by the tool manufacturer, or greater, and have a filter with 99% or greater efficiency and a filter-cleaning mechanism.</td>
<td>![Mask Diagram]</td>
<td>![Mask Diagram]</td>
</tr>
<tr>
<td>![Mask Diagram]</td>
<td><strong>10 APF Required</strong></td>
<td>![Mask Diagram]</td>
</tr>
<tr>
<td>![Mask Diagram]</td>
<td><strong>10 APF Required</strong></td>
<td>![Mask Diagram]</td>
</tr>
<tr>
<td>Tool Type</td>
<td>Hours per Day</td>
<td>Respiratory Protection</td>
</tr>
<tr>
<td>-----------------------------------------------</td>
<td>---------------</td>
<td>------------------------</td>
</tr>
<tr>
<td><strong>Jackhammers &amp; handheld powered chipping tools</strong></td>
<td>Up to 4 hours/day</td>
<td>None required</td>
</tr>
<tr>
<td>Use tool with water delivery system that supplies a continuous stream or spray of water at the point of impact:</td>
<td></td>
<td><strong>Outdoors</strong></td>
</tr>
<tr>
<td><strong>OR</strong></td>
<td></td>
<td><strong>Indoors</strong></td>
</tr>
<tr>
<td>Use tool equipped with commercially available shroud and dust collection system.</td>
<td></td>
<td>10 APF required</td>
</tr>
<tr>
<td>Dust collector must provide the airflow recommended by the tool manufacturer, or greater, and have a filter with 99% or greater efficiency and a filter-cleaning mechanism.</td>
<td></td>
<td>10 APF required</td>
</tr>
<tr>
<td><strong>Handheld grinders for mortar removal (i.e., tuckpointing)</strong></td>
<td>Up to 4 hours/day</td>
<td>10 APF required</td>
</tr>
<tr>
<td>Use grinder equipped with commercially available shroud and dust collection system.</td>
<td></td>
<td><strong>Outdoors</strong></td>
</tr>
<tr>
<td>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.</td>
<td></td>
<td><strong>Indoors</strong></td>
</tr>
<tr>
<td><strong>Handheld grinders for uses other than mortar removal</strong></td>
<td>Up to 4 hours/day</td>
<td>None required</td>
</tr>
<tr>
<td><strong>FOR OUTDOOR TASKS ONLY</strong></td>
<td></td>
<td><strong>Outdoors</strong></td>
</tr>
<tr>
<td>Use grinder equipped with integrated water delivery system that continuously feeds water to the grinding surface.</td>
<td></td>
<td><strong>None required</strong></td>
</tr>
<tr>
<td><strong>Handheld grinders for uses other than mortar removal OR</strong></td>
<td>Up to 4 hours/day</td>
<td>None required</td>
</tr>
<tr>
<td></td>
<td>More than 4 hours/day</td>
<td>None required</td>
</tr>
</tbody>
</table>
### Table 1 Continued

<table>
<thead>
<tr>
<th>Tool Type</th>
<th>Dust Collector Requirement</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Stationary Masonry Saws</strong></td>
<td>10 APF Required</td>
</tr>
<tr>
<td><strong>Handheld Power Saws</strong> (any blade diameter)</td>
<td>None Required, 10 APF Required</td>
</tr>
</tbody>
</table>

- Use grinder equipped with commercially available shroud and dust collection system.

- Dust collector must provide 15 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.
Not an Engineered Controlled Method
OPTION 2—EXPOSURE ASSESSMENT

- Identify any tasks performed that are NOT included on Table 1
  - Determine exposure levels using 1 of 2 options
    - Perform air monitoring for work being performed
    - Once air monitoring data is collected, this may or may not be used for future work depending on compliance. Check your project conditions
    - Air monitoring is required to be performed by a Certified Industrial Hygienist (CIH)
Air Sampling & Data Recording