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# **SILICA SAFETY IN INDUSTRIAL AND CONSTRUCTION ENVIRONMENTS**

**Leader's Guide, Fact Sheet  
& Quiz**

**Item Number: 5094**

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***This easy-to-use Leader's Guide is provided to assist in conducting a successful presentation.***

## **PREPARING FOR THE MEETING**

Here are a few suggestions for using this program:

- a) Review the contents of the Fact Sheet that immediately follows this page to familiarize yourself with the program topic and the training points discussed in the program. The Fact Sheet also includes a list of Program Objectives that details the information that participants should learn from watching the program.
- b) If required by your organization, make an attendance record to be signed by each participant to document the training to be conducted.
- c) Prepare the area and equipment to be used for the training. Make sure the watching environment is comfortable and free from outside distractions. Also, ensure that participants can see and hear the TV screen or computer monitor without obstructions.
- d) Make copies of the Review Quiz included at the end of this Leader's Guide to be completed by participants at the conclusion of the presentation. Be aware that the page containing the answers to the quiz comes before the quiz itself, which is on the final page.

## **CONDUCTING THE PRESENTATION**

- a) Begin the meeting by welcoming the participants. Introduce yourself and give each person an opportunity to become acquainted if there are new people joining the training session.
- b) Introduce the program by its title and explain to participants what they are expected to learn as stated in the Program Objectives of the Fact Sheet.
- c) Play the program without interruption. Upon completion, lead discussions about your organization's specific policies regarding the subject matter. Make sure to note any unique hazards associated with the program's topic that participants may encounter while performing their job duties at your facility.
- d) Hand out copies of the review quiz to all of the participants and make sure each one completes it before concluding the training session.

# 5094 SILICA SAFETY IN INDUSTRIAL AND CONSTRUCTION ENVIRONMENTS

## FACT SHEET

**LENGTH: 16 MINUTES**

### **PROGRAM SYNOPSIS:**

Respirable crystalline silica can create severe health problems for anyone who breathes it. OSHA estimates that more than 100,000 employees in general industry as well as 2 million construction workers are exposed to respirable crystalline silica on the job each year. In order to work safely, employees need to understand the hazards of silica dust and the regulations that have been created to help protect them from it. They should also be able to recognize silica hazards that they may encounter in their workplace and know the equipment and safe practices they should use to reduce their exposure to respirable crystalline silica. This program reminds employees about the hazards of silica dust and what they can do to avoid them.

Topics include silicosis, OSHA's Silica Standards, Table 1 of the Construction Standard, the Exposure Control Plan, housekeeping, personal protective equipment and medical surveillance.

### **PROGRAM OBJECTIVES:**

After watching the program, the participant should:

- Know where crystalline silica can be encountered in the workplace.
- Understand the health hazards that are associated with respirable crystalline silica.
- Understand how OSHA regulations can help to protect them from exposure to silica dust in the workplace.
- Know the purpose and content of a typical exposure control plan.
- Understand how "Table 1" in OSHA's Silica Standard for Construction guides employers in controlling silica dust on their job sites.
- Be able to recognize respirable crystalline silica hazards in their work areas.
- Know the equipment and safe work practices that they should use to avoid exposure to silica dust.
- Understand how a medical surveillance program can help protect their health.

### **PROGRAM OUTLINE:**

#### **RESPIRABLE CRYSTALLINE SILICA AND ITS HAZARDS**

- **Crystalline silica is mineral.**
    - It's commonly found in the earth's crust, as well as in many materials that are used in manufacturing and construction.
  - **When crystalline silica is reduced to a dust, it can be inhaled into the lungs.**
    - In this form, it's known as respirable crystalline silica.
    - Respirable crystalline silica can create severe health problems for anyone who breathes it.
    - OSHA estimates that each year more than one hundred thousand employees in general industry and two million construction workers are exposed to respirable crystalline silica on the job.
  - **Crystalline silica is a basic ingredient in soil, sand, stone (such as granite), and other natural materials.**
  - **The most common naturally-occurring forms of crystalline silica are quartz, cristobalite and tridymite.**
  - **More importantly, crystalline silica is often used in the manufacture of abrasives, adhesives, paints and soaps, and even as an additive in foods and pharmaceuticals.**
    - It is commonly found in concrete, brick, cinderblock, glass, asphalt roofing materials, and many other construction materials.
    - In these unaltered forms, it is generally not a health hazard.
- But when crystalline silica or materials that contain it are chipped, sawn, drilled or ground, the silica can be released in the form of a dust.**
- It then becomes "respirable silica" because it can be inhaled.

#### **SILICOSIS**

- **When respirable crystalline silica is breathed into the body it can cause scarring of the tissues in the lungs, which interferes with their ability to absorb oxygen.**
- **This condition is known as "silicosis".**
  - It is possible to develop silicosis without being aware of it.

— Depending on how much silica dust you are exposed to, and over what period of time, it can take months or years for the disease to develop.

- **Symptoms of silicosis include shortness of breath, fatigue, chest pain and weight loss.**

— It can be fatal, and there is no cure.

- **Silicosis also makes people more susceptible to lung infections and may lead to chronic obstructive pulmonary disease.**

— A known carcinogen, respirable crystalline silica can depress the immune system, lead to kidney disease and cause lung cancer as well.

— Exposure to silica should be taken very seriously.

- **There are a number of occupations that can involve exposure to respirable crystalline silica.**

— Workers who are at the greatest risk of exposure to silica dust are those who perform "sand blasting" procedures.

— The "sand" that they discharge under high pressure is actually abrasive silica dust.

- **Other high-risk jobs include foundry and quarry work, stone cutting, rock drilling, tunneling and hydraulic "fracking".**

— You can also be exposed to silica dust during the manufacture of ready-mix concrete, brick, cinderblock, asphalt paving material as well as ceramics, or when grinding or cutting these substances.

— Silica dust can even be encountered in railroad work, dental laboratories and jewelry making.

### **OSHA'S SILICA SAFETY STANDARDS**

- **It was to protect workers from these hazards that OSHA issued the Silica Standards for General Industry and Construction. These regulations:**

— Set limits on how much respirable crystalline silica employees are permitted to be exposed to on the job.

— Establish policies and procedures that employers should follow to protect workers from the dust.

- **The Standard sets benchmark levels for exposure to silica dust that are significantly lower than the limits that had previously been considered to be safe.**

OSHA estimates that its updated regulations will prevent 900 cases of silicosis and save 600 lives each year.

- **Before you begin a new task that could expose you to respirable crystalline silica, the OSHA Silica Standards require your employer to find out just how much exposure to silica dust the job will involve.**

### **SILICA EXPOSURE LEVELS**

- **If the testing shows that the exposure will be below a threshold called the "action level", your employer does not have to take any action.**

— But new tests must be conducted if there are any changes in equipment, processes or personnel that might affect the level of silica dust in your work area.

- **If the new measurements show respirable silica exposure is at or above the action level, your employer must then measure the exposure levels for each individual task that is performed in the work area.**

- **You will be informed if any of your work activities could expose you to silica dust and receive training on how to avoid potential exposure.**

**The OSHA Standard also sets the maximum daily limit for worker exposure to silica dust at 50 micrograms of respirable silica per cubic meter of air over an eight-hour shift.**

— This is called its "Permissible Exposure Limit", or "PEL".

- **If testing shows that the respirable crystalline silica level is below the PEL, then employers do not have to institute any systems of controls to reduce the silica levels, and employees are not required to use personal protective equipment.**

To be on the safe side some employers may want their workers to wear PPE under these conditions anyway.

**If the respirable silica in the work area exceeds the PEL, your employer must use whatever "control systems" are necessary to reduce your exposure to safe levels, if possible.**

### **TABLE 1 REQUIREMENTS FOR CONSTRUCTION**

- **OSHA's Silica Standard for Construction provides an alternative approach for protecting employees from the hazards of respirable crystalline silica.**

— Instead of measuring exposure levels and creating control systems to reduce them, construction employers can comply with the regulation by implementing the safety precautions that have been described for various tasks in "Table 1" of the Construction Standard.

- **For example, when workers use handheld power saws to cut silica-containing materials indoors, Table 1 requires that:**

— The saws must be equipped with a water-delivery system to dampen the dust.

— Workers must wear respirators with an assigned protection factor of at least 10.

- **Similarly, workers using walk-behind floor grinders outdoors must:**
  - Use a grinder with an integrated water delivery system.
  - But wearing a respirator is not required.
- **In cases like these, Table 1 also requires workers to operate the tool in a way that minimizes dust emissions.**

## THE EXPOSURE CONTROL PLAN

- **There is another significant requirement that employers must meet if workers can be exposed to respirable crystalline silica at or above the PEL.**
  - They must create a written "exposure control plan" for their facility or worksite.
  - The plan lists the silica hazards that exist in the workplace and describes how potential exposure will be reduced to safe levels.
- **The plan serves as a "blueprint" that guides a company in controlling potential exposure to silica dust hazards.**
  - It should provide detailed information about the engineering and administrative controls as well as personal protective equipment that should be used for each task that is performed in a silica hazard area.
- **"Engineering controls" are physical and mechanical safeguards.**
  - "Administrative controls" include company policies and procedures.
  - "Personal protective equipment" ("PPE") is anything you wear that shields you from hazards in the workplace.
- **OSHA requires employers to:**
  - Review their exposure control plan at least annually.
  - Update it as necessary.
  - Make it available to all employees.
- **There are other important aspects of the OSHA Silica Standards that need to be incorporated into the exposure control plan as well.**
  - The Construction Standard requires employers to designate an employee who will act as the "competent person" in charge of silica safety on a job site.
  - The competent person ensures that all of the materials, equipment and procedures that are being used comply with the requirements of the company's plan.
- **Employee training is an important part of the plan for both industrial and construction companies.**
- **Before you start any job in which you may be exposed to hazardous levels of respirable crystalline silica, you will receive training on:**
  - The health hazards that are associated with silica exposure.
  - The requirements of the OSHA Silica Standards.
  - The contents of your exposure control plan.
- **If you need to wear PPE such as a respirator to protect you from silica dust while you work, your employer will provide:**
  - The equipment itself.
  - Training on how to use and maintain your PPE safely.

## CONTROL SYSTEMS

- **Because respirable crystalline silica can create such serious health hazards, it is very important for you to understand how engineering controls, safe work practices and personal protective equipment can be combined to protect you from it.**
- **Engineering controls can include:**
  - Blasting cabinets that prevent abrasive silica from escaping into the work area.
  - Ventilation systems that help remove any silica dust that does become airborne.
- **Some tools have built-in controls that prevent the release of hazardous dust when they operate on silica-containing materials.**
- **Equipment such as cutters, grinders and other powered devices can:**
  - Apply a stream of water to catch the dust in a liquid slurry (known as "working wet").
  - Use vacuum attachments to capture the dust in special filters.
- **Safe housekeeping practices can also help to prevent silica dust from becoming airborne. For example:**
  - You should never use "dry sweeping" or compressed air to clean up silica dust (this will stir it into the air where it can be inhaled).
  - Instead, wet down the dust with water before you disturb it, or use a vacuum equipped with a HEPA or other high-efficiency filter.
- **Gearing up to implement the use of these types of equipment and procedures can take time.**
  - But sometimes even they can't keep respirable silica levels below the Permissible Exposure Limit.

- **Work areas where exposure to respirable crystalline silica still exceeds the PEL are called "regulated areas".**
  - Employers are required to limit access to these areas.
  - Employees who enter them must wear PPE that will reduce their silica exposure to safe levels.
  - This usually includes wearing a respirator with a filter rating of "N95" or higher.
- **You may also need to wear overalls, gloves, hats, goggles, face shields, whatever is appropriate and necessary for the type of work you will be doing and the degree of exposure you may encounter.**

#### **MEDICAL SURVEILLANCE & RECORDKEEPING**

**Another thing that the OSHA Silica Standard requires is for employers to establish a program of "medical surveillance" as part of their exposure control plan.**

- Under both versions of the Standard, workers who are exposed to silica dust at or above the action level, or who are required to wear a respirator for 30 days or more per year, must be monitored through a medical surveillance program.
- The program provides employees with ongoing medical examinations at no cost.
- **The monitoring is intended to detect any effect that exposure to respirable crystalline silica may be having on an employee's health, such as impaired breathing or lung damage.**
- **Your heart and lung functions will also be examined to ensure that they are not being overstressed when you are wearing a respirator.**
- **The OSHA Silica Standards also require employers to maintain accurate records of:**
  - The results of all testing for respirable crystalline silica presence in their facilities.
  - The health information of employees who are involved in their medical surveillance program.
- **These records must be made available to employees, employee representatives and OSHA upon request.**

## SILICA SAFETY IN INDUSTRIAL AND CONSTRUCTION ENVIRONMENTS

### ANSWERS TO THE REVIEW QUIZ

1. b
2. b
3. a
4. a
5. b
6. b
7. a
8. a
9. a
10. b

**SILICA SAFETY IN INDUSTRIAL AND CONSTRUCTION ENVIRONMENTS**  
**REVIEW QUIZ**

Name \_\_\_\_\_ Date \_\_\_\_\_

*The following questions are provided to determine how well you understand the information presented in this program.*

1. With proper treatment, people can recover completely from silicosis.
  - a. True
  - b. False
2. The employees who are at the greatest risk of exposure to silica dust are those who work in hydraulic "fracking".
  - a. True
  - b. False
3. OSHA's Silica Standards set a limit on how much silica dust employees may be exposed to.
  - a. True
  - b. False
4. The "sand" that is discharged under high pressure during sand blasting procedures is actually abrasive silica dust.
  - a. True
  - b. False
5. Respirable crystalline silica is commonly used in the manufacture of cristobalite.
  - a. True
  - b. False
6. OSHA requires employers to review their exposure control plans for respirable crystalline silica at least every three years.
  - a. True
  - b. False
7. Policies and procedures that a company implements to reduce employee exposure to silica dust are known as "administrative controls".
  - a. True
  - b. False
8. One way to safely clean up silica dust is to capture it using a vacuum equipped with a HEPA filter.
  - a. True
  - b. False
9. An employer is required to keep records of the results of all testing that is associated with respirable crystalline silica in their facility.
  - a. True
  - b. False
10. Employees in a silica medical surveillance program must pay for their physical examinations themselves.
  - a. True
  - b. False