# American Industrial Hygiene Association

## RECOMMENDED SKILLS AND CAPABILITIES FOR SILICA COMPETENT PERSONS

**White Paper**


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# Introduction

## a) The Importance of Competent Persons in Construction

A key component in preventing overexposure to silica and subsequent disease is to have at least one individual on the jobsite who is capable of recognizing and evaluating situations where overexposure may be occurring; who knows how to evaluate the exposure potential; and who can make an initial recommendation on how to control that exposure. This is the role of the silica competent person. While this job is critical to the effective implementation of a silica program, what actually constitutes a competent person in this area is not well defined. This document provides a list of recommended subject-specific skills and competency objectives a silica competent person should have to enable them to perform the job successfully. This document is not a training program, but could be used as an outline for what to include in that program. It represents a common, minimum body of knowledge needed by a competent person to provide meaningful worker protection from silica.

The hazards of excessive exposure to crystalline silica have been known since ancient times. However, data from the National Occupational Respiratory Mortality System indicates between 1990 and 1999 there were still 118 reported silica-related deaths in the construction industry.[1]

The construction industry is dominated by small- and medium-sized employers. Over 80 percent of construction establishments have 10 or fewer employees, according to *The Construction Chart Book* (published by the Center for Construction Research and Training, or CPWR). Many small- and medium-sized employers have neither safety nor industrial hygiene staff. An approach used by OSHA and ANSI for construction regulations and guidance is to specify that an employer designate a "competent person" for hazards involving medium to high complexity. For example, competent persons are required by construction standards for scaffolding, trenching, asbestos, and lead. In general, 29 CFR 1926.32(f) states that a competent person shall be one who is "capable of identifying existing and predictable hazards in the surroundings or working conditions which are unsanitary, hazardous, or dangerous to employees, and who has authorization to take prompt corrective measures to eliminate them."

Use of competent persons is well recognized and accepted in the construction industry, and this approach provides a mechanism to encourage that a minimal level of safety and health capability be available even for small jobs and small employers. The competent person is on-scene, recognizes the problem, initiates basic corrective action, and calls in more sophisticated assistance for more difficult situations.

It is important to note that skill levels for competent persons for occupational health are much more basic than those of industrial hygienists. OSHA regulations commonly use the term "qualified person" to differentiate a safety and health professional from a competent person.

## b) Limitations of the Competent Person Approach

OSHA regulations that incorporate competent persons vary in the detail provided on the skills and capabilities needed by competent persons to be able to successfully identify and address hazards. Some regulations such as the asbestos in construction standard provide specific training requirements, whereas other regulations such as trenching are silent about training or skills needed by competent persons. Lack of specificity undercuts the value of the competent

[1] As with all occupational illnesses, underreporting occurs, and the true number of cases would be expected to be higher.

person concept, and leads to variation in the training developed by various safety and health professionals and training providers.

Providing a list of recommended subject-specific skills and competency objectives is one way to remedy this limitation. That is the purpose of this report. It can be used as a list of training objectives (or evaluation objectives for those who have received prior training) to help ensure more consistent training and more consistent protection of construction workers. It represents a common minimum body of knowledge needed by competent persons to provide meaningful worker protection from silica.

### c) Silica Competent Person

OSHA's Advisory Committee for Construction Safety and Health (ACCSH) has recommended that OSHA utilize a competent person approach for the upcoming proposed silica in construction rule. OSHA is considering providing employers with an option of following task-specific precautions that would include the use of specific controls and personal protective equipment (PPE) in lieu of exposure assessment. While this approach does provide flexibility for small- and medium-sized employers, such an approach could put exposed employees at risk if controls are not correctly used or maintained. In addition, the National Occupational Research Agenda (NORA) Construction goals for silica identified competent person training needs as an area for partnering and development. Competent person provisions can add to confidence that controls are being used effectively and that someone on the jobsite knows how to call in an industrial hygienist for more complex or unusual scenarios.

# Definitions

a) Amorphous silica: Includes noncrystalline forms of silicon dioxide ($SiO_2$)—diatomaceous earth, silica gel, diatomite.

b) Crystalline silica: Crystalline form of silicon dioxide ($SiO_2$)—quartz, cristobalite, tridymite, Tripoli.

c) Occupational Exposure Limit (OEL): Health and feasibility-based workplace standards to protect workers from adverse exposure (e.g., OSHA PEL, ACGIH® TLV®, NIOSH REL, AIHA WEEL®, DFG MAK).

d) Respirator program: Occupational use of respirators must be in compliance with applicable health and safety standards such as 29 CFR 1910.134 in the United States, CSA Z94.4 in Canada, and/or requirements of the applicable jurisdiction as appropriate. Use must also comply with any applicable substance-specific regulations that maybe in force.

e) Silica: In this document, "silica" will refer to crystalline silica unless otherwise noted.

f) Silica competent person: Per 29 CFR 1926.32(f), "One who is capable of identifying existing and predictable hazards in the surroundings or working conditions which are unsanitary, hazardous, or dangerous to employees, and who has authorization to take prompt corrective measures to eliminate them." Silica competent persons specifically identify and control silica hazards in construction settings by effective implementation and management of a construction work site silica control program. In implementing and managing a construction work site silica control program, silica competent persons must:

- Anticipate the potential for worker silica exposure (e.g., observation, tasks to be performed, historical data);
- Make the initial evaluation of the work site for potential worker silica exposures;
- Select, implement, and manage the appropriate control strategy(ies) in simple situations or recommend involving a silica qualified person for more complex situations; and
- Monitor the work site and take prompt corrective action to ensure that safe work conditions are maintained.

Silica competent persons demonstrate competency by:

- Successfully completing a Silica Competent Person Training Program meeting the criteria set forth in Section 3 or by
- Successfully demonstrating each of the capabilities described in Section 3 through formal training or on-the-job experience.

A silica competent person is typically on site on a daily basis with this position being an additional duty (e.g., superintendent, lead foreman, on-site safety representative).

Silica qualified person:

- Has a recognized degree, certificate, or professional standing in an occupational health, safety, environmental, or engineering field (e.g., CIH, CSP, PE);
- Has extensive knowledge, training, and experience in hazards and control of silica hazards on the construction site through formal training and/or extensive, firsthand experience in anticipation, recognition, evaluation, and control of worker silica exposure; and
- Can make quantitative assessments of worker exposure and recommend detailed control measures.

The qualified person is typically not on site on a daily basis. The person may be the corporate or regional safety and health director/manager or outside consultant.

## Competency Objectives to be Demonstrated for Successful Completion of a Silica Competent Person Training Program

### a) Introduction to "Competent Person"

- Can describe the role of the silica competent person on a jobsite
- Can list typical construction tasks that may require review by a silica competent person
- Understands the knowledge, skills, capabilities and authority needed by a silica competent person
- Understands the role of qualified person and the relationship between a competent person and qualified person
- Knows the applicable regulatory requirements that apply for a silica competent person
- Understands what will be needed for successful completion of this course

### b) Introduction to Silica

- Can describe what silica and crystalline silica are and where they come from
- Can list silica-containing materials typically found on construction sites

## c) Silica Hazards and Exposures

- Can describe the routes of exposure significant for silica
- Can describe the health effects of silica overexposures
    - Signs, symptoms of exposure
    - Diseases associated with silica
- Understands the exposure levels and tasks associated with acute and chronic silicosis
- Can describe the obstacles to worker recognition of silica illnesses
- Understands what an occupational exposure level (OEL) is and how exposures are measured by qualified persons
- Familiar with current regulatory and good practice requirements
    - Silica regulatory OEL (e.g., OSHA PEL[2])
    - Silica good practice OEL (e.g., ACGIH TLV)
    - Non-silica specific regulatory requirements
        - Hazard communication
        - Sanitation
        - Respiratory protection

## d) Determining if Silica is Present

- Can describe the three major options for making a determination if silica is present
    - Bulk sample analysis of work materials
    - Use of MSDS for construction products brought on site
    - Presumption of silica content based on material checklists

## e) Potential Worker Exposure Levels for Common Construction Tasks without Controls

- Is knowledgeable about published exposure level ranges for common construction tasks
    - Abrasive blasting dry
    - Tuckpointing
    - Masonry cutting
    - Surface grinding
    - Concrete mixing
    - Chipping gun/jackhammer
    - Walk-behind saw
    - Backhoe/excavator
    - Concrete/mortar mixing

- Understands and can identify situations that could result in higher exposures
    - Enclosed areas
    - Multiple workers in same area
    - High silica content
    - High-power tools
    - Maintenance failures
    - Improper technique
    - Extended shift work

- Understands and can identify situations when a qualified person should be called in for further evaluation

[2]See Appendix A regarding OSHA's Permissible Exposure Limit and exposure monitoring.

## f) Controls Used to Reduce Silica Exposures

*Engineering Controls*

- Understands the two major engineering controls for reducing silica exposure levels
    - Local exhaust ventilation (LEV)
    - Wet methods

- Understands the critical features for controls to be effective (e.g., portable local exhaust: duct size, CFM, duct velocity; wet methods: water flow rate, point of application)
    - Pros/cons for each control
    - Waste disposal issues
    - Importance of maintenance
        - Vacuum flow rates
        - Emptying vacuum safely
        - Filter replacement
        - Water flow rates
        - Waste water

*Respiratory Protection*

Note: Training to be a qualified respirator program administrator is out of scope for this training.

- Basic understanding of respiratory protection, how respirators work, and types used for construction tasks
    - How respirators work
    - Types of respirators: negative pressure, powered air-purifying respirator (PAPR), supplied air
    - Pros, cons, and limitations of each type
    - Assigned protection factor (APF)
    - General recommendations based on tasks
    - Training and medical requirements

- Is knowledgeable about reduced exposure levels when controls are used for common construction tasks and use of OSHA Table 1
    - Abrasive blasting wet
    - Tuckpointing with LEV
    - Masonry cutting with wet methods

## g) Oversight and Quality Assurance

- Understand need for regular review and exposure monitoring by a qualified person to assure program effectiveness
- On multi-employer work sites, use proper chain to notify other employers who may be affected by silica-generating tasks

## h) Review of OSHA's Silica Standard

A silica competent person will need to be familiar with the current regulation and will also need to be familiar with features of the new OSHA silica standard when it is finalized. OSHA has indicated that the proposed rule will provide employers with an option to perform exposure assessment. The option is only for specific tasks listed in an OSHA-provided Table 1, and will apply only where the employer uses the combination of control measures and PPE described in the table.

- Understands features of OSHA standard
- List main categories of standard
- Option 1: Using Table 1
- Option 2 (or task not listed on Table 1): Exposure assessment

### i) Authority: Responsibilities and Procedures

- Understands responsibility and authority to act
- Understands role of specific project or company procedures for resolving common jobsite safety and health situations
- Can describe key corrective actions needed for situations such as breakdown of engineering control equipment or improper use of PPE, or shutdown of work
- Understands communication roles involving employer, employees, emergencies, documentation of actions, sharing of exposure monitoring results, and regulatory communication and recordkeeping
- Understands communication roles involving potentially affected non-employer parties such as bystander exposed employees of subcontractors or other contractors on site

### j) Putting It All Together: Mock Job Examples

The competent person should be able to demonstrate that he/she understands the information and can identify actions needed for several mock job examples, from the pre-job planning stage through silica determination and construction and oversight steps.

The competent person needs to be able to demonstrate that he/she understands his/her responsibility and authority and can properly prompt corrective actions needed for a mock job example.

The competent person should be able to list the specific procedural, communications, and documentation protocols to be followed for the situations found in the following case studies.

*Overexposures Abatement Procedures and Protocols*
What action should be taken when an overexposure situation is determined for:

- Employees of the competent person's employer
- Employees of the competent person's employer's subcontractors
- Employees of other contractors

*Lack of Proper Evaluation of Exposures*
What action is to be taken when potential exposures are noted that have not been properly evaluated for:

- Employees of the competent person's employer
- Employees of the competent person's employer's subcontractors
- Employees of other contractors

# Useful Resources

1. ASTM E1132 – Practice for Health Requirements Relating to Occupational Exposure to Respirable Crystalline Silica. www.astm.org.

2. Construction Safety Council – Training courses on silica and other construction site safety and health hazards. www.buildsafe.org.

3. Guides for Managing Crystalline Silica Control Programs in Construction 2004 – Mt. Sinai-Irving J. Kelikoff Center for Occupational & Environmental Medicine, Construction Hygiene and Ergonomics Program. www.blueprintproject.org.

4. Model Silica Protection Program for Contractors – Laborer's Health & Safety Fund of North America. 905 16th St. NW, Washington, DC, 20006.

5. National Institute for Occupational Safety and Health (NIOSH) – (1996) *NIOSH Respirator User Notices Subject: All Users of Type CE, Abrasive-blast Supplied-air Respirators*.

6. National Institute for Occupational Safety and Health (NIOSH) – (1997) *A Guide to Working Safely with Silica: If It's Silica It's Not Just Dust*.

7. National Institute for Occupational Safety and Health (NIOSH) – (2002) *Health Effects of Occupational Exposure to Respirable Silica*: DHHS (NIOSH) Pub. No. 2002-129.

8. National Institute for Occupational Safety and Health (NIOSH) – (2004) *Silicosis – Learn the Facts*: DHHS (NIOSH) Pub. No. 2004-108.

9. National Institute for Occupational Safety and Health (NIOSH) – (2005) *NIOSH Pocket Guide to Chemical Hazards*: DHHS (NIOSH) Pub. No. 2005-151.

10. National Institute for Occupational Safety and Health (NIOSH) – (2003) *NIOSH Manual of Analytical Methods*, Fourth Edition: DHHS (NIOSH) Pub. No. 94-113.

11. OSHA Silica Advisor. www.osha.gov/SLTC/etools/silica/index.html.

12. Occupational Safety and Health Administration (OSHA) – (1996) *Special Emphasis Program May, 2, 1996.* Available on the World Wide Web: www.osha.gov/SLTC/etools/silica/spec_emph_prog/spec_emph_prog.html.

13. Occupational Safety and Health Administration (OSHA) – (2008) *National Emphasis Program on Crystalline Silica 01/24/2008*: Directive CPL 03-00-007.

14. Occupational Safety and Health Administration (OSHA) – (2008) *OSHA Technical Manual* TED 01-00-015 [TED 1-0.15A] Section II; Chapter 1; Part VII – Crystalline Silica.

15. Occupational Safety and Health Administration (OSHA) – (2009) *Controlling Silica Exposure in Construction*: OSHA 3362-04.

16. University of Washington Silica on Construction Work Sites. http://depts.washington.edu/silica.

# Appendix A: OSHA's Permissible Exposure Limit and Exposure Monitoring

A silica competent person is expected to perform air sampling only under the direct supervision of an industrial hygienist (qualified person). However, the competent person should understand how air sampling results are obtained and interpreted.

The sampling methodology for crystalline silica differs from many other particulates found in construction. Silica sampling is size selective for respirable particulate only. These are smaller size particles that can be inhaled into the lungs. This requires a particle size selection device and a specific sampling air flow rate.

As of September 2012, the crystalline silica permissible exposure limit (PEL) for the construction industry at 29 CFR 1926.55(a) is expressed in terms of millions of particles per cubic foot (mppcf). This PEL is based on a particle count method long rendered obsolete by respirable mass (gravimetric) sampling, which yields results reported in milligrams per cubic meter ($mg/m^3$) (see reference 10). A formula is available to convert from $mg/m^3$ to mppcf for compliance purposes (see references 13 and 14).

OSHA is in the process of proposing a new silica standard for construction. The new standard will be based on gravimetric methods and will eliminate the need for conversions. OSHA used a benchmark of 0.1 $mg/m^3$ of respirable silica dust in its 2009 guidance for controlling silica exposures in construction. The agency indicated that since this benchmark is generally more conservative (lower) than the construction PEL, employers who meet the benchmark will also be in compliance with the obsolete construction PEL (see reference 15). The PEL options under consideration by OSHA for the proposed new silica rule are 0.1 and 0.05 $mg/m^3$ of respirable silica dust.