# **Respirable Crystalline Silica Program**

## PURPOSE

This Respirable Crystalline Silica Program was developed to prevent employee exposure to hazardous levels of Respirable Crystalline Silica that could result through construction activities or nearby construction activities occurring on worksites. Respirable Crystalline Silica exposure at hazardous levels can lead to lung cancer, silicosis, chronic obstructive pulmonary disease, and kidney disease. It is intended to meet the requirements of the Respirable Crystalline Silica Construction Standard (29 CFR 1926.1153) established by the Occupational Safety and Health Administration (OSHA).

All work involving chipping, cutting, drilling, grinding, or similar activities on materials containing Crystalline Silica can lead to the release of respirable-sized particles of Crystalline Silica (i.e. Respirable Crystalline Silica). Crystalline Silica is a basic component of soil, sand, granite and many other minerals. Quartz is the most common form of Crystalline Silica. Many materials found on constructions sites include Crystalline Silica; including but not limited to – cement, concrete, asphalt, pre-formed structures (inlets, pipe, etc.) and others. Consequently, this program has been developed to address and control these potential exposures to prevent our employees from experiencing the effects of occupational illnesses related to Respirable Crystalline Silica exposure.

## SCOPE

This Respirable Crystalline Silica Program applies to all employees who have the potential to be exposed to Respirable Crystalline Silica when covered by the OSHA Standard. The OSHA Respirable Crystalline Silica Construction Standard applies to all occupational exposures to Respirable Crystalline Silica in construction work, except where employee exposure will remain below 25 micrograms of Respirable Crystalline Silica per cubic meter of air ( $25 \mu g/m^3$ ) as an 8-hour time-weighted average (TWA) under any foreseeable conditions.

## RESPONSIBILITIES

TR Concrete firmly believes protecting the health and safety of our employees is everyone's responsibility. This responsibility begins with upper management providing the necessary support to properly implement this program. However, all levels of the organization assume some level of responsibility for this program including the following positions.

TR CONCRETE	
Last Revision:	
3/28/2018	
Policy Title:	
RESPIRABLE CRYSTALLINE SILICA PROGRAM	

## Upper Management:

- Conduct job site assessments for Silica containing materials and perform employee Respirable Crystalline Silica hazard assessments in order to determine if an employee's exposure will be above 25 μg/m<sup>3</sup> as an 8-hour TWA <u>under any foreseeable conditions</u>
- Select and implement into the project's ECP the appropriate control measures in accordance with the Construction Tasks identified in OSHA's Construction Standard Table 1; and potentially including (but not limited to) - a written Exposure Control Plan (ECP), exposure monitoring, Hazard Communication training, medical surveillance, housekeeping and others.

NOTE: OSHA's Construction Standard Table 1 is a list of 18 common construction tasks along with acceptable exposure control methods and work practices that limit exposure for those tasks.

- Ensure that the materials, tools, equipment, personal protective equipment (PPE), and other resources (such as worker training) required to fully implement and maintain this Respirable Crystalline Silica Program are in place and readily available if needed.
- Ensure that Project Managers, Site Managers, Competent Persons, and employees are educated in the hazards of Silica exposure and trained to work safely with Silica in accordance with OSHA's Respirable Crystalline Silica Construction Standard and OSHA's Hazard Communication Standard. Managers and Competent Persons may receive more advanced training than other employees.
- Maintain written records of training (for example, proper use of respirators), ECPs, inspections (for equipment, PPE, and work methods/practices), medical surveillance (under lock and key), respirator medical clearances (under lock and key) and fit-test results.
- Conduct an annual review (or more often if conditions change) of the effectiveness of this program and any active project ECP's that extend beyond a year. This includes a review of available dust control technologies to ensure these are selected and used when practical.
- Coordinate work with other employers and contractors to ensure a safe work environment relative to Silica exposure.

## Project Manager:

- Ensure all applicable elements of this Respirable Crystalline Silica Program are implemented on the project including the selection of a Competent Person.
- Assist the Safety Department in conduct job site assessments for Silica containing materials and perform employee Respirable Crystalline Silica hazard assessments in order to determine if an ECP, exposure monitoring, and medical surveillance is necessary.
- Assist in the selection and implementation of the appropriate control measures in accordance with the Construction Tasks identified in OSHA's Construction Standard Table 1; and potentially including (but not limited to) - a written Exposure Control Plan (ECP), exposure monitoring, Hazard Communication training, medical surveillance, housekeeping and others.
- Ensure that employees using respirators have been properly trained, medically cleared, and fit-tested in accordance with the company's Respiratory Protection Program. This process will be documented.
- Ensure that work is conducted in a manner that minimizes and adequately controls the risk to workers and others. This includes ensuring that workers use appropriate engineering controls, work practices, and wear the necessary PPE.
- Where there is risk of exposure to Silica dust, verify employees are properly trained on the applicable contents of this program, the project-specific ECP, and the applicable OSHA Standards (such as Hazard Communication). Ensure employees are provided appropriate PPE when conducting such work.

## Competent Person and/or Site Manager (Superintendent, Foreman, etc.)

- Make frequent and regular inspections of job sites, materials, and equipment to implement the written ECP.
- Identify existing and foreseeable Respirable Crystalline Silica hazards in the workplace and take prompt corrective measures to eliminate or minimize them.
- Notify the Project Manager and/or Safety Department of any deficiencies identified during inspections in order to coordinate and facilitate prompt corrective action.

TR CONCRETE	
Last Revision:	
3/28/2018	
Policy Title:	
RESPIRABLE CRYSTALLINE SILICA PROGRAM	

• Assist the Project Manager and Safety Department in conducting job site assessments for Silica containing materials and perform employee Respirable Crystalline Silica hazard assessments in order to determine if an ECP, exposure monitoring, and medical surveillance is necessary.

## Employees:

- Follow recognized work procedures (such as the Construction Tasks identified in OSHA's Construction Standard Table 1) as established in the project's ECP and this program.
- Use the assigned PPE in an effective and safe manner.
- Participate in Respirable Crystalline Silica exposure monitoring and the medical surveillance program.
- Report any unsafe conditions or acts to the Site Manager and/or Competent Person.
- Report any exposure incidents or any signs or symptoms of Silica illness.

## DEFINITIONS

If a definition is not listed in this section, please contact your supervisor. If your supervisor is unaware of what the term means, please contact the Competent Person or your Safety Department.

- <u>Action Level</u> means a concentration of airborne Respirable Crystalline Silica of 25 μg/m<sup>3</sup>, calculated as an 8-hour TWA.
- <u>Competent Person</u> means an individual who is capable of identifying existing and foreseeable Respirable Crystalline Silica hazards in the workplace and who has authorization to take prompt corrective measures to eliminate or minimize them.
- <u>Employee Exposure</u> means the exposure to airborne Respirable Crystalline Silica that would occur if the employee were not using a respirator.
- <u>High-Efficiency Particulate Air (HEPA) Filter</u> means a filter that is at least 99.97 percent efficient in removing monodispersed particles of 0.3 micrometers in diameter.
- <u>Objective Data</u> means information, such as air monitoring data from industry-wide surveys or calculations based on the composition of a substance, demonstrating

TR CONCRETE	
Last Revision:	
3/28/2018	
Policy Title:	
RESPIRABLE CRYSTALLINE SILICA PROGRAM	

employee exposure to Respirable Crystalline Silica associated with a particular product or material or a specific process, task, or activity. The data must reflect workplace conditions closely resembling or with a higher exposure potential than the processes, types of material, control methods, work practices, and environmental conditions in the employer's current operations.

- <u>Permissible Exposure Limit (PEL)</u> means the employer shall ensure that no employee is exposed to an airborne concentration of Respirable Crystalline Silica in excess of 50 μg/m<sup>3</sup>, calculated as an 8-hour TWA.
- <u>Physician or Other Licensed Health Care Professional (PLHCP)</u> means an individual whose legally permitted scope of practice (i.e., license, registration, or certification) allows him or her to independently provide or be delegated the responsibility to provide some or all of the particular health care services required by the Medical Surveillance Section of the OSHA Respirable Crystalline Silica Standard.
- <u>Respirable Crystalline Silica</u> means Quartz, Cristobalite, and/or Tridymite contained in airborne particles that are determined to be respirable by a sampling device designed to meet the characteristics for respirable-particle size- selective samplers specified in the International Organization for Standardization (ISO) 7708:1995: Air Quality-Particle Size Fraction Definitions for Health-Related Sampling.
- <u>Specialist</u> means an American Board Certified Specialist in Pulmonary Disease or an American Board Certified Specialist in Occupational Medicine.

## REQUIREMENTS

## Specified Exposure Control Methods

When possible and applicable, TR Concrete will conduct activities with potential Silica exposure to be consistent with OSHA's Construction Standard Table 1. Supervisors will ensure each employee under their supervision and engaged in a task identified on OSHA's Construction Standard Table 1 have fully and properly implemented the engineering controls, work practices, and respiratory protection specified for the task on Table 1 (unless TR Concrete has assessed and limited the exposure of the employee to Respirable Crystalline Silica in accordance with the Alternative Exposure Control Methods Section of this program).

The task(s) being performed by TR Concrete identified on OSHA's Construction Standard Table 1 is/are:

TR CONCRETE	
Last Revision:	
3/28/2018	
Policy Title:	
RESPIRABLE CRYSTALLINE SILICA PROGRAM	

# Table 1: Specified Exposure Control Methods WhenWorking With Materials Containing Crystalline Silica

Con	struction Task or	Engineering and Work Practice	-	Respiratory ection
Equi	pment Operation	Control Methods	≤ 4 hours/shift	>4 hours/shift
1	Stationary masonry saws	<ul> <li>Use saw equipped with integrated water delivery system that continuously feeds water to the blade.</li> <li>Operate and maintain tool in accordance with manufacturer's instructions to minimize dust emissions.</li> </ul>	None	None
2a	Handheld power saws (any blade diameter) when used outdoors	<ul> <li>Use saw equipped with integrated water delivery system that continuously feeds water to the blade.</li> <li>Operate and maintain tool in accordance with manufacturer's instructions to minimize dust emissions.</li> </ul>	None	N95 (or Greater Efficiency) Filtering Facepiece or Half Mask
2b	Handheld power saws (any blade diameter) when used indoors or in an enclosed area	<ul> <li>Use saw equipped with integrated water delivery system that continuously feeds water to the blade.</li> <li>Operate and maintain tool in accordance with manufacturer's instructions to minimize dust emissions.</li> </ul>	N95 (or Greater Efficiency) Filtering Facepiece or Half Mask	N95 (or Greater Efficiency) Filtering Facepiece or Half Mask
3a	Walk-behind saws when used outdoors	<ul> <li>Use saw equipped with integrated water delivery system that continuously feeds water to the blade.</li> <li>Operate and maintain tool in accordance with manufacturer's instructions to minimize dust emissions.</li> </ul>	None	None
3b	Walk-behind saws when used indoors or in an enclosed area	<ul> <li>Use saw equipped with integrated water delivery system that continuously feeds water to the blade.</li> <li>Operate and maintain tool in accordance with manufacturer's instructions to minimize dust emissions.</li> </ul>	N95 (or Greater Efficiency) Filtering Facepiece or Half Mask	N95 (or Greater Efficiency) Filtering Facepiece or Half Mask
4a	Jackhammers and handheld powered chipping tools when used outdoors	<ul> <li>Use tool with water delivery system that supplies a continuous stream or spray of water at the point of impact.</li> </ul>	None	N95 (or Greater Efficiency) Filtering Facepiece or Half Mask
4b	Jackhammers and handheld powered chipping tools when used indoors or in an enclosed area	<ul> <li>Use tool with water delivery system that supplies a continuous stream or spray of water at the point of impact.</li> </ul>	N95 (or Greater Efficiency) Filtering Facepiece or Half Mask	N95 (or Greater Efficiency) Filtering Facepiece or Half Mask

TR CONCRETE	
Last Revision:	
3/28/2018	
Policy Title:	
RESPIRABLE CRYSTALLINE SILICA PROGRAM	

Con	struction Task or	Engineering and Work Practice	-	Respiratory ection
Equi	pment Operation	Control Methods	≤ 4 hours/shift	>4 hours/shift
5	Handheld grinders for mortar removal (i.e., tuckpointing)	<ul> <li>Use grinder equipped with commercially available shroud and dust collection system.</li> <li>Operate and maintain tool in accordance with manufacturer's instructions to minimize dust emissions.</li> <li>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.</li> </ul>	N95 (or Greater Efficiency) Filtering Facepiece or Half Mask	Powered Air- Purifying Respirator (PAPR) with P100 Filters
6a	Handheld grinders for uses other than mortar removal when used outdoors	<ul> <li>Use grinder equipped with commercially available shroud and dust collection system.</li> <li>Operate and maintain tool in accordance with manufacturer's instructions to minimize dust emissions.</li> <li>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.</li> </ul>	None	None
6b	Handheld grinders for uses other than mortar removal when used indoors or in an enclosed area	<ul> <li>Use grinder equipped with commercially available shroud and dust collection system.</li> <li>Operate and maintain tool in accordance with manufacturer's instructions to minimize dust emissions.</li> <li>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.</li> </ul>	None	N95 (or Greater Efficiency) Filtering Facepiece or Half Mask

When implementing the control measures specified in Table 1, TR Concrete shall:

- For tasks performed indoors or in enclosed areas, provide a means of exhaust as needed to minimize the accumulation of visible airborne dust;
- For tasks performed using wet methods, apply water at flow rates sufficient to minimize release of visible dust;

TR CONCRETE	
Last Revision:	
3/28/2018	
Policy Title:	
RESPIRABLE CRYSTALLINE SILICA PROGRAM	

• Where an employee performs more than one task included on OSHA's Construction Standard Table 1 during the course of a shift, and the total duration of all tasks combined is more than four hours, the required respiratory protection for each task is the respiratory protection specified for more than four hours per shift. If the total duration of all tasks on Table 1 combined is less than four hours, the required respiratory protection for each task is the respiratory protection specified for less than four hours per shift.

## **Alternative Exposure Control Methods**

Alternative Exposure Control Methods apply for tasks not listed in OSHA's Construction Standard Table 1, or where TR Concrete cannot not fully and properly implement the engineering controls, work practices, and respiratory protection described in Table 1.

First, TR Concrete will assess the exposure of each employee who is or may reasonably be expected to be exposed to Respirable Crystalline Silica at or above the Action Level in accordance with either the Performance Option or the Scheduled Monitoring Option.

• **Performance Option** – TR Concrete will assess the 8-hour TWA exposure for each employee on the basis of any combination of air monitoring data or objective data sufficient to accurately characterize employee exposures to Respirable Crystalline Silica.

The following operations have been evaluated using this method:

- 1) Filling and operating mortar mixer from Spec-Mix silo. Objective data is attached in Appendix A
- Dry cutting brick, block, stone or other materials with 14" IQ vacuum saw. Manufacturers Objective data is attached in Appendix A

## • Scheduled Monitoring Option:

 TR Concrete will perform initial monitoring to assess the 8-hour TWA exposure for each employee on the basis of one or more personal breathing zone air samples that reflect the exposures of employees on each shift, for each job classification, and in each work area. Where several employees perform the same tasks on the same shift and in the same work area, TR Concrete will plan to monitor a representative fraction of these employees. When using representative monitoring, TR Concrete will sample the employee(s) who are expected to have the highest exposure to Respirable Crystalline Silica.

TR CONCRETE	
Last Revision:	
3/28/2018	
Policy Title:	
RESPIRABLE CRYSTALLINE SILICA PROGRAM	

- If initial monitoring indicates that employee exposures are below the Action Level, TR Concrete will discontinue monitoring for those employees whose exposures are represented by such monitoring.
- Where the most recent exposure monitoring indicates that employee exposures are at or above the Action Level but at or below the PEL, TR Concrete will repeat such monitoring within six months of the most recent monitoring.
- Where the most recent exposure monitoring indicates that employee exposures are above the PEL, TR Concrete will repeat such monitoring within three months of the most recent monitoring.
- Where the most recent (non-initial) exposure monitoring indicates that employee exposures are below the Action Level, TR Concrete will repeat such monitoring within six months of the most recent monitoring until two consecutive measurements, taken seven or more days apart, are below the Action Level, at which time TR Concrete will probably discontinue monitoring for those employees whose exposures are represented by such monitoring, except when a reassessment is required. TR Concrete will reassess exposures whenever a change in the production, process, control equipment, personnel, or work practices may reasonably be expected to result in new or additional exposures at or above the Action Level, or when TR Concrete has any reason to believe that new or additional exposures at or above the Action Level have occurred.

The following operations will be evaluated using this method and data attached in Appendix B once it becomes available:

1) Cleaning of scaffold components after masonry projects.

Within five working days after completing an exposure assessment, TR Concrete will individually notify each affected employee in writing of the results of that assessment or post the results in an appropriate location accessible to all affected employees.

Whenever an exposure assessment indicates that employee exposure is above the PEL, TR Concrete will describe in the written notification the corrective action being taken to reduce employee exposure to or below the PEL.

Where air monitoring is performed, TR Concrete will provide affected employees or their designated representatives an opportunity to observe any monitoring of employee exposure to Respirable Crystalline Silica. When observation of monitoring requires entry into an area where the use of protective clothing or equipment is required for any workplace hazard, TR Concrete

TR CONCRETE	
Last Revision:	
3/28/2018	
Policy Title:	
RESPIRABLE CRYSTALLINE SILICA PROGRAM	

will provide the observer with protective clothing and equipment at no cost and shall ensure that the observer uses such clothing and equipment.

Once air monitoring has been performed, TR Concrete will determine its method of compliance based on the monitoring data and the hierarchy of controls. TR Concrete will use engineering and work practice controls to reduce and maintain employee exposure to Respirable Crystalline Silica to or below the PEL, unless TR Concrete can demonstrate that such controls are not feasible. Wherever such feasible engineering and work practice controls are not sufficient to reduce employee exposure to or below the PEL, TR Concrete will nonetheless use them to reduce employee exposure to the lowest feasible level and shall supplement them with the use of respiratory protection.

In addition to the requirements of this program, TR Concrete will comply with other programs and OSHA standards (such as 29 CFR 1926.57 [Ventilation]), when applicable where abrasive blasting is conducted using Crystalline Silica-containing blasting agents, or where abrasive blasting is conducted on substrates that contain Crystalline Silica.

## **Control Methods**

TR Concrete will provide control methods that are either consistent with Table 1 or otherwise minimize worker exposures to Silica. These exposure control methods can include engineering controls, work practices, and respiratory protection. Listed below are control methods to be used when Table 1 is not followed:

- 1) Sweeping compound will be used for all operations where silica containing dust is swept.
- 2) HEPA vacuum will be used for all operations where silica containing dust must be vacuumed.

## **Respiratory Protection**

Where respiratory protection is required by this program, TR Concrete will provide each employee an appropriate respirator that complies with the requirements of the company's Respiratory Protection Program and the OSHA Respiratory Protection Standard (29 CFR 1910.134).

Respiratory protection is required where specified by the OSHA Construction Standard Table 1, for tasks not listed in Table 1, or where the company has not fully and properly implemented the engineering controls, work practices, and respiratory protection described in Table 1. Situations requiring respiratory protection include:

TR CONCRETE
Last Revision:
3/28/2018
Policy Title:
RESPIRABLE CRYSTALLINE SILICA PROGRAM

- Where exposures exceed the PEL during periods necessary to install or implement feasible engineering and work practice controls;
- Where exposures exceed the PEL during tasks, such as certain maintenance and repair tasks, for which engineering and work practice controls are not feasible; and
- During tasks for which an employer has implemented all feasible engineering and work practice controls and such controls are not sufficient to reduce exposures to or below the PEL.

## Housekeeping

TR Concrete does not allow dry sweeping or dry brushing where such activity could contribute to employee exposure to Respirable Crystalline Silica unless wet sweeping, HEPA-filtered vacuuming, or other methods that minimize the likelihood of exposure are not feasible.

TR Concrete does not allow compressed air to be used to clean clothing or surfaces where such activity could contribute to employee exposure to Respirable Crystalline Silica unless:

- The compressed air is used in conjunction with a ventilation system that effectively captures the dust cloud created by the compressed air; or
- No alternative method is feasible.

## Written Exposure Control Plan

When employee exposure on a construction project is expected to be at or above the Action Level, this Exposure Control Plan (ECP) will be implemented.

- Tasks in the workplace that involve exposure to Respirable Crystalline Silica:
  - 1) Wet cutting or sawing brick, block, stone other material with a stationary masonry saw.
  - 2) Control Joint Cutting of concrete with partner saw or walk behind concrete saw.
  - 3) Dry cutting brick, block, stone or other material with a handheld grinder.
  - 4) Tuck pointing with a handheld grinder
  - 5) Concrete demolition with a jackhammer
  - 6) Dry cutting or sawing brick, block, stone or other material it IQ vacuum saw
  - 7) Operation of Spec-mix tower and mortar mixer

TR CONCRETE	
Last Revision:	
3/28/2018	
Policy Title:	
RESPIRABLE CRYSTALLINE SILICA PROGRAM	

- A description of the engineering controls, work practices, and respiratory protection used to limit employee exposure to Respirable Crystalline Silica for each task;
- A description of the housekeeping measures used to limit employee exposure to Respirable Crystalline Silica; and
- A description of the procedures used to restrict access to work areas, when necessary, to minimize the number of employees exposed to Respirable Crystalline Silica and their level of exposure, including exposures generated by other employers or sole proprietors.

The written ECP will designate a Competent Person to make frequent and regular inspections of job sites, materials, and equipment to ensure the ECP is implemented.

The written ECP will be reviewed at least annually to evaluate the effectiveness of it and update it as necessary. Having said this, ECP's are project specific and most project durations do not exceed a year. The written ECP will be readily available for examination and copying, upon request, to each employee covered by this program and/or ECP, their designated representatives, and OSHA.

## **Medical Surveillance**

Medical surveillance will be made available for each employee who will be required to use a respirator for 30 or more days per year due to their Respirable Crystalline Silica exposure. Medical surveillance (i.e. medical examinations and procedures) will be performed by a PLHCP and provided at no cost to the employee at a reasonable time and place.

TR Concrete will make available an initial (baseline) medical examination within 30 days after initial assignment, unless the employee has received a medical examination that meets the requirements of the OSHA Respirable Crystalline Silica Construction Standard within the last three years. The examination shall consist of:

- A medical and work history, with emphasis on past, present, and anticipated exposure to Respirable Crystalline Silica, dust, and other agents affecting the respiratory system in addition to any history of respiratory system dysfunction, including signs and symptoms of respiratory disease (e.g., shortness of breath, cough, wheezing), history of tuberculosis, and smoking status and history;
- A physical examination with special emphasis on the respiratory system;

TR CONCRETE
Last Revision:
3/28/2018
Policy Title:
RESPIRABLE CRYSTALLINE SILICA PROGRAM

- A chest X-ray (a single postero-anterior radiographic projection or radiograph of the chest at full inspiration recorded on either film [no less than 14 x 17 inches and no more than 16 x 17 inches] or digital radiography systems) interpreted and classified according to the International Labour Office (ILO) International Classification of Radiographs of Pneumoconiosis by a NIOSH-certified B Reader;
- A pulmonary function test to include forced vital capacity (FVC) and forced expiratory volume in one second (FEV1) and FEV1/FVC ratio, administered by a spirometry technician with a current certificate from a NIOSH-approved spirometry course;
- Testing for latent tuberculosis infection; and
- Any other tests deemed appropriate by the PLHCP.

TR Concrete will make available medical examinations that include the aforementioned procedures (except testing for latent tuberculosis infection) at least every three years. If recommended by the PLHCP, periodic examinations can be more frequently than every three years.

TR Concrete will ensure that the examining PLHCP has a copy of the OSHA Respirable Crystalline Silica Construction Standard, this program, and the following information:

- A description of the employee's former, current, and anticipated duties as they relate to the employee's occupational exposure to Respirable Crystalline Silica;
- The employee's former, current, and anticipated levels of occupational exposure to Respirable Crystalline Silica;
- A description of any personal protective equipment (PPE) used or to be used by the employee, including when and for how long the employee has used or will use that equipment; and
- Information from records of employment-related medical examinations previously provided to the employee and currently within the control of TR Concrete.

TR Concrete will ensure that the PLHCP explains to the employee the results of the medical examination and provides each employee with a written medical report within 30 days of each medical examination performed. The written report shall contain:

• A statement indicating the results of the medical examination, including any medical condition(s) that would place the employee at increased risk of material impairment to

TR CONCRETE
Last Revision:
3/28/2018
Policy Title:
RESPIRABLE CRYSTALLINE SILICA PROGRAM

health from exposure to Respirable Crystalline Silica and any medical conditions that require further evaluation or treatment;

- Any recommended limitations on the employee's use of respirators;
- Any recommended limitations on the employee's exposure to Respirable Crystalline Silica; and;
- A statement that the employee should be examined by a Specialist if the chest X-ray is classified as 1/0 or higher by the B Reader, or if referral to a Specialist is otherwise deemed appropriate by the PLHCP.

TR Concrete will also obtain a written medical opinion from the PLHCP within 30 days of the medical examination. The written opinion shall contain only the following in order to protect the employee's privacy:

- The date of the examination;
- A statement that the examination has met the requirements of the OSHA Respirable Crystalline Silica Construction Standard; and
- Any recommended limitations on the employee's use of respirators.

If the employee provides written authorization, the written opinion shall also contain either or both of the following:

- Any recommended limitations on the employee's exposure to Respirable Crystalline Silica; and/or
- A statement that the employee should be examined by a Specialist if the chest X-ray is classified as 1/0 or higher by the B Reader, or if referral to a Specialist is otherwise deemed appropriate by the PLHCP.

If the PLHCP's written medical opinion indicates that an employee should be examined by a Specialist, TR Concrete will make available a medical examination by a Specialist within 30 days after receiving the PLHCP's written opinion. TR Concrete will ensure that the examining Specialist is provided with all of the information that the employer is obligated to provide to the PLHCP.

TR CONCRETE	
Last Revision:	
3/28/2018	
Policy Title:	
RESPIRABLE CRYSTALLINE SILICA PROGRAM	

TR Concrete will ensure that the Specialist explains to the employee the results of the medical examination and provides each employee with a written medical report within 30 days of the examination. The written report will contain:

- A statement indicating the results of the medical examination, including any medical condition(s) that would place the employee at increased risk of material impairment to health from exposure to Respirable Crystalline Silica and any medical conditions that require further evaluation or treatment;
- Any recommended limitations on the employee's use of respirators; and
- Any recommended limitations on the employee's exposure to respirable crystalline Silica.

In addition, TR Concrete will obtain a written opinion from the Specialist within 30 days of the medical examination. The written opinion shall contain the following:

- The date of the examination;
- Any recommended limitations on the employee's use of respirators; and
- If the employee provides written authorization, the written opinion shall also contain any recommended limitations on the employee's exposure to Respirable Crystalline Silica.

## Hazard Communication

TR Concrete will include Respirable Crystalline Silica in the company's Hazard Communication Program established to comply with the OSHA Hazard Communication Standard (29 CFR 1910.1200).

TR Concrete will ensure that each employee has access to labels on containers of Crystalline Silica and those containers respective Safety Data Sheets (SDS's).

All employees will be trained in accordance with the provisions of the OSHA Hazard Communication Standard and the Training Section of this program. This training will cover concerns relating to cancer, lung effects, immune system effects, and kidney effects.

TR Concrete will ensure that each employee with the potential to be exposed at or above the Action Level for Respirable Crystalline Silica can demonstrate knowledge and understanding of at least the following:

TR CONCRETE
Last Revision:
3/28/2018
Policy Title:
RESPIRABLE CRYSTALLINE SILICA PROGRAM

- The health hazards associated with exposure to Respirable Crystalline Silica;
- Specific tasks in the workplace that could result in exposure to Respirable Crystalline Silica;
- Specific measures TR Concrete has implemented to protect employees from exposure to Respirable Crystalline Silica, including engineering controls, work practices, and respirators to be used;
- The contents of the OSHA Respirable Crystalline Silica Construction Standard;
- The identity of the Competent Person designated by TR Concrete; and
- The purpose and a description of the company's Medical Surveillance Program.

TR Concrete will make a copy of the OSHA Respirable Crystalline Silica Construction Standard readily available without cost to any employee who requests it.

## Recordkeeping

TR Concrete will make and maintain an accurate record of all exposure measurements taken to assess employee exposure to Respirable Crystalline Silica. This record will include at least the following information:

- The date of measurement for each sample taken;
- The task monitored;
- Sampling and analytical methods used;
- Number, duration, and results of samples taken;
- Identity of the laboratory that performed the analysis;
- Type of personal protective equipment (PPE), such as respirators, worn by the employees monitored; and
- Name, social security number, and job classification of all employees represented by the monitoring, indicating which employees were actually monitored.

TR CONCRETE
Last Revision:
3/28/2018
Policy Title:
RESPIRABLE CRYSTALLINE SILICA PROGRAM

TR Concrete will ensure that exposure records are maintained and made available in accordance with 29 CFR 1910.1020. Exposure records will be kept for at least 30 years.

The employer shall make and maintain an accurate record of all objective data relied upon to comply with the requirements of the OSHA Respirable Crystalline Silica Construction Standard. This record shall include at least the following information:

- The Crystalline Silica-containing material in question;
- The source of the objective data;
- The testing protocol and results of testing;
- A description of the process, task, or activity on which the objective data were based; and
- Other data relevant to the process, task, activity, material, or exposures on which the objective data were based.

TR Concrete will ensure that objective data are maintained and made available in accordance with 29 CFR 1910.1020. Objective data records will be kept for at least 30 years.

TR Concrete will make and maintain an accurate record for each employee enrolled in the Medical Surveillance portion of this program. The record shall include the following information about the employee:

- Name and social security number;
- A copy of the PLHCPs' and/or Specialists' written medical opinions; and
- A copy of the information provided to the PLHCPs and Specialists.

TR Concrete will ensure that medical records are maintained and made available in accordance with 29 CFR 1910.1020. Medical records will be kept under lock and key for at least the duration of employment plus 30 years. It is necessary to keep these records for extended periods because Silica-related diseases such as cancer often cannot be detected until several decades after exposure. However, if an employee works for an employer for less than one year, the employer does not have to keep the medical records after employment ends, as long as the employer gives those records to the employee.

TR CONCRETE
Last Revision:
3/28/2018
Policy Title:
RESPIRABLE CRYSTALLINE SILICA PROGRAM

## **PROGRAM EVALUATION**

This program will be reviewed and evaluated on an annual basis by the Safety Department unless changes to operations, the OSHA Respirable Crystalline Silica Construction Standard (29 CFR 1926.1153), or another applicable OSHA Standard require an immediate re-validation of this program.

## APPENDICES

APPENDIX A – Objective Data on Operating Spec-Mix silos



September 2, 2016

SPEC Mix, Inc. 1230 Eagan Industrial Road Suite 160 Eagan, Minnesota 55121

ARS Environmental Health, Inc. performed three industrial hygiene assessments of employee exposure to respirable dust and respirable crystalline silica in Chicago, Illinois; Statesboro Georgia; and Scottsdale, Arizona during June, 2016. The purpose of these assessments was to define exposure risks to respirable crystalline silica, in light of OSHA's new standard for crystalline silica in construction 29CFR1926.1153, when using the new SPEC Mix silos according to manufacturer's instructions.

## CONCLUSIONS

Risk of worker exposure to respirable crystalline silica and respirable particulate, at levels approaching or over the new OSHA Action Level and PEL was found to be low.

This study and these findings provide a good representation of standard masonry job site mortar mixing condition.

## FINDINGS and OBSERVATIONS

## **Results of Personal Sampling**

Results of this assessment may be found in Table I of this report.

**Respirable Crystalline Silica** - Crystalline silica was present in 5 of the 6 samples collected in levels below the analytical limit of quantification: no crystalline silica was found in 5 of 6 samples collected.

**Respirable Dust** - Measurable amounts of respirable dust were found in 5 of 6 samples. All levels were below the PEL for respirable dust.



**Table I** 

# Chicago, Illinois Statesboro, Georgia and Scottsdale, Arizona **Respirable Crystalline Silica and Respirable Dust Airborne Concentrations**

June, 2016

# ARS Report No. 1640-090216

Description	Respirable Dust (mg/m <sup>3</sup> ) <sup>a</sup>	Respirable Crystalline Silica (ug/m <sup>3</sup> ) <sup>b</sup>
Chicago Project: Laborer mixing mortar and grout. Average of two days.	0.28	<13°
Statesboro Project: Laborer mixing mortar. Average of two days.	0.93	13
Scottsdale Project: Apprentice Mason mixing mortar. Avg. of two days	0.12	10
Average of all six samples in all three locations	0.44	12
a - milligrams of contaminant per cubic meter of air b – micrograms of contaminant per cubic meter of air c - helow analytical limit of anomification and the form of the second		

c - below analytical limit of quantification: none was found

Respirable Particulate analyses by Gravimetric analysis using TIC-GRV-01/NIOSH 0600 Analytical services provided by the Travelers' Industrial Hygiene Laboratory which is Accredited by the American Industrial Hygiene Association. Crystalline silica analyses by X-Ray Diffraction using TlC-XRD-01/NIOSH 7500



**Table I** 

# Airborne Concentrations Respirable Crystalline Silica and Respirable Dust Chicago, Illinois Statesboro, Georgia and Scottsdale, Arizona

June, 2016

ARS Report No. 1640-090216

	RESPIRABLE DU	ST (8 HOUR AVG)	RESPIRABL	UST (8 HOUR AVG) RESPIRABLE CRYSTALLINE SILICA (8 HOUR AVG)	ICA (8 HOUR AVG)
MASONDV DDATECT TEST STEE					
MANUNT FROJECT LEDI SLLED	OSHA PEL (mg/m <sup>3</sup> )	Project Average (mg/m <sup>3</sup> )	OSHA PEL* (ug/m <sup>3</sup> )	OSHA Action Level (ug/m <sup>3</sup> )	Project Average (ug/m <sup>3</sup> )
Illinois: 2 Day Average	5.0	0.28	50	25	<13**
Georgia: 2 Day Average	5.0	0.93	50	25	13
Arizona: 2 Day Average	5.0	0.12	50	25	<10
Project 2 Day Average	5.0	0.44	50	25	12
*OSHA PEL (Construction) limits worker exposure to 50 ug of crystalline silica per cubic meter of air (ug/m3) averaged over an 8 hour day (29 CFR 11926.1153)	orker exposure to 50 ug of cry	stalline silica per cubic meter	of air (ug/m3) average	d over an 8 hour day (29 CFR 11)	926.1153)

ž) ģ \*\* Results are below analytical limit of quantification, therefore, none was found.

 $mg/m^3$  – milligrams of contaminant per cubic meter of air  $ug/m^3$  – micrograms of contaminant per cubic meter of air.

Crystalline silica analyses by X-Ray Diffraction using TIC-XRD-01/NIOSH 7500 Respirable Particulate analyses by Gravimetric analysis using TIC-GRV-01/NIOSH 0600 Analytical services provided by the Travelers' Industrial Hygiene Laboratory which is Accredited by the American Industrial Hygiene Association.

## Air Sampling Report

March 15, 2017

Respirable Dust and Crystalline Silica Exposure While Dry Cutting Concrete and Masonry Materials Utilizing Engineered Controls for Dust Collection

> <u>Air samples collected by:</u> iQ Power Tools P.O. Box 7449 Moreno Valley, CA 92552 Telephone: (888) 274-7744 www.iqpowertools.com

Analytical report performed by: ALS Global Environmental Laboratory 960 West LeVoy Drive, Salt Lake City UT 84123 Telephone 801-268-9992 www.alsglobal.com

## **Table of Contents**

Sample ID Number	Tool Model	Air Sampling Location & Duration	Page #
iQ2000-030917-125844	iQ2000 w/iQT20 & MK5005S	Operator's Breathing Zone for 480 min.	3
iQ360x-030817-125847	iQ360x	Operator's Breathing Zone for 480 min.	4
PC912v-030817-125876	iQPC912v	Operator's Breathing Zone for 480 min.	5
Appendix "A & B"	ALS General Comments		6
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		ana ama ing kana ang	
		4	

## <u>Cutting Concrete Masonry Units with a 20" Stationary Masonry Saw (Air Sampling on the operator)</u> Test # iQ2000-030917-125844

**Test:** To measure the tool operators total respirable and crystalline silica dust exposure. **Work Process:** Cutting the listed concrete/masonry materials.

Frequency: Typical number of cuts made by a tool operator 25–200 cuts per 8 hour day.

Material: 8x8x16 concrete masonry unit (CMU) ASTM C90 spec. US market > 1 billion annually.

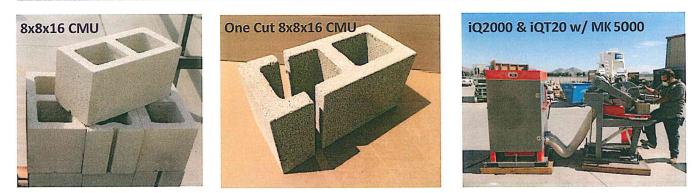
**Use:** A typical concrete product used throughout the US to construct commercial and industrial buildings, site walls, retaining walls.

**Cutting Equipment:** MK 5009G 20" gas masonry saw for materials up to 8" high, 8" wide and 24" long. **Dust Collection Equipment:** iQ2013G Dust Collection Vacuum 13 hp gas stationary saw and iQT20 20" Saw Dust Collection Table

Number of Cuts Made: 200 thru both the face shells of an 8x8x16 concrete masonry unit (CMU).

Air Sampling Location and Duration: In saw operator's breathing zone for 480 min.

Sample information: Lab Sample ID# 1707204001, March 09, 2017.



Testing Laboratory: ALS Global Environmental Laboratory, 960 West LeVoy Drive, Salt Lake City UT 84123 ALS Analytical Results: Sample ID 1707204001

Sample ID: iQ2000-030917-12	25844			Collect	ed: 03/09/2017
Lab ID: 1707204001	S	ampling Location: To	ol Testing	Received: 03/13/2017	
Method: NIOSH 0600 Mod., MW		Media: PVC Filter Impling Info: Air Volume 1320 L		Analyzed: 03/14/2017 (186888)	
Analyte	Result (mg/sample)	Result (mg/m <sup>3</sup> )	RL (mg/sample)	い、電話上	
Respirable Dust	0.26	0.19	0.020		
Method: NIOSH 7500 Mod.		Media: PVC Filter pling Info: Air Volume			5/2017 (186965)
Analyte	Result (mg/sample)	Result (ug/m³)	Result (%)	LOD (mg/sample)	RL (mg/sample)
Quartz	0.038	29	15	0.010	0.030

## **Monitoring and Analysis Methods**

The air samples were collected at iQ Power Tools, 4635 Wade Avenue, Perris, CA, 92571 on one iQ Power Tools employee on March 9th, 2017 during concrete masonry dry cutting activities. The air samples were collected using SKC Brand of AirCheck Touch air sampling pumps on pre-weighted 3-piece matched weight 37 mm PVC filter media and SKC GS-3 plastic cyclones (SKC Part # 225 -100) at a flow rate of 2.75 liters per minute (LPM). The air sampling flow rate was pre-calibrated and post calibrated with a SKC Checkmate calibrator (part # SKC 375-07550N). Analysis was conducted at an AIHA accredited laboratory, ALS Laboratory in Salt Lake City, Utah for the analysis of respirable dust and silica. The test was conducted in accordance with current OSHA regulations. The analysis was completed using National Institute of Occupational Safety and Health (NIOSH) method 0600 and method 7500.

## Cutting Concrete Paver with a 14" Masonry Saw (Air Sampling on the operator)

## Test # iQ360x-030817-125847

**Test:** To measure the tool operator's total respirable and crystalline silica dust exposure. **Work Process:** Cutting the listed concrete/masonry materials.

Frequency: Typical number of cuts made by a tool operator 25–200 cuts per 8 hour day.

Material: Manufactured Concrete Paver 4"x8" Unit—US market > 100 million annually.

**Use:** A typical concrete product used throughout the US to construct residential and commercial projects. **Cutting Equipment:** iQ360x electric masonry 14" saw for materials up to 5" high, 12" wide and 12" long. **Dust Collection Equipment:** iQ360x 14" masonry saw with integrated vacuum, filter and dust containment system.

Number of Cuts Made: 200 thru cuts in material size 2.25" thick by 4" wide by 8" long Air Sampling Location and Duration: In saw operator's breathing zone for 480 min. Sample information: Lab Sample ID# 1707204002 March 08, 2017





Testing Laboratory: ALS Global Environmental Laboratory, 960 West LeVoy Drive, Salt Lake City UT 84123 ALS Analytical Results: Sample ID 1707204002

Sample ID: iQ360x-030817-12			-1 To office of	Collected: 03/08/2017 Received: 03/13/2017	
Lab ID: 1707204002	5	ampling Location: To	or resting	11eceived. 00/10/2011	
Method: NIOSH 0600 Mod., MW		Media: PVC Filter pling Info: Air Volume	1320 L	Analyzed: 03/14	4/2017 (186888)
Analyte	Result (mg/sample)	Result (mg/m³)	RL (mg/sample)		
Respirable Dust	0.27	0.21	0.020		
Method: NIOSH 7500 Mod. Media: PVC Filter Sampling Info: Air Volume 1320 L		1320 L	Analyzed: 03/15/2017 (186965)		
Analyte	Result (mg/sample)	Result (ug/m³)	Result (%)	LOD (mg/sample)	RL (mg/sample)
Quartz	0.036	27	13	0.010	0.030

## **Monitoring and Analysis Methods**

The air samples were collected at iQ Power Tools, 4635 Wade Avenue, Perris, CA, 92571 on one iQ Power Tools employee on March 8th, 2017 during concrete masonry dry cutting activities. The air samples were collected using SKC Brand of AirCheck Touch air sampling pumps on pre-weighted 3-piece matched weight 37 mm PVC filter media and SKC GS-3 plastic cyclones (SKC Part # 225 -100) at a flow rate of 2.75 liters per minute (LPM). The air sampling flow rate was pre-calibrated and post calibrated with a SKC Checkmate calibrator (part # SKC 375-07550N). Analysis was conducted at an AIHA accredited laboratory, ALS Laboratory in Salt Lake City, Utah for the analysis of respirable dust and silica. The test was conducted in accordance with current OSHA regulations. The analysis was completed using National Institute of Occupational Safety and Health (NIOSH) method 0600 and method 7500.

## Cutting Concrete Masonry Units with a 12" Hand Held Saw (Air Sampling on the operator)

## Test # PC912v-030817-125876

**Test:** To measure the tool operators total respirable and crystalline silica dust exposure. **Work Process:** cutting the listed concrete/masonry materials.

**Frequency:** Typical number of cuts made by a tool operator 25–100 cuts per 8 hour day.

Material: 8x8x16 concrete masonry unit (CMU) ASTM C90 spec. US market > 1 billion annually.

**Use:** A typical concrete product used throughout the US to construct commercial and industrial buildings, site walls, retaining walls.

Cutting Equipment: iQPC912v 12" Gasoline power cutter

**Dust Collection Equipment:** iQPC912v Gasoline power cutter with integrated vacuum, filter, and dust containment system.

Number of Cuts Made: 100 cuts thru the face shells of an 8x8x16 concrete masonry unit (CMU).

Air Sampling Location and Duration: In saw operator's breathing zone for 480 min.

Sample information: Lab Sample ID# 1707204003 March 08, 2017.







Testing Laboratory: ALS Global Environmental Laboratory, 960 West LeVoy Drive, Salt Lake City UT 84123 ALS Analytical Results: Sample ID 1707204003

Sample ID: PC912v-030817-1	25876			Collect	ed: 03/08/2017
Lab ID: 1707204003	Sa	ampling Location: To	ol Testing	Received: 03/13/2017	
Method: NIOSH 0600 Mod., MW		Media: PVC Filter bling Info: Air Volume	1320 L	Analyzed: 03/14/2017 (186888)	
Analyte	Result (mg/sample)	Result (mg/m³)	RL (mg/sample)	<b>以</b> 進之了。	
Respirable Dust	0.058	0.044	0.020		
Method: NIOSH 7500 Mod. Media: PVC Filter Sampling Info: Air Volume 1320 L		Analyzed: 03/15/2017 (186965)			
Analyte	Result (mg/sample)	Result (ug/m³)	Result (%)	LOD (mg/sample)	RL (mg/sample)
Quartz	<0.010	<7.6	<17	0.010	0.030

## **Monitoring and Analysis Methods**

The air samples were collected at iQ Power Tools, 4635 Wade Avenue, Perris, CA, 92571 on one iQ Power Tools employee on March 8th, 2017 during concrete masonry dry cutting activities. The air samples were collected using SKC Brand of AirCheck Touch air sampling pumps on pre-weighted 3-piece matched weight 37 mm PVC filter media and SKC GS-3 plastic cyclones (SKC Part # 225 -100) at a flow rate of 2.75 liters per minute (LPM). The air sampling flow rate was pre-calibrated and post calibrated with a SKC Checkmate calibrator (part # SKC 375-07550N). Analysis was conducted at an AIHA accredited laboratory, ALS Laboratory in Salt Lake City, Utah for the analysis of respirable dust and silica. The test was conducted in accordance with current OSHA regulations. The analysis was completed using National Institute of Occupational Safety and Health (NIOSH) method 0600 and method 7500.



## ANALYTICAL REPORT

Report Date: March 15, 2017

Phone: (888) 274-7744 x 201

E-mail: joel.guth@iqpowertools.com

Workorder: 34-1707204

Client Project ID: Tool Testing 030917 Purchase Order: Tool Testing Project Manager: Paul Pope

## **Analytical Results**

Joel Guth

iQ Power Tools 4635 Wade Avenue

Perris, CA 92571

Sample ID: iQ2000-030917-12	5844			Collect	ed: 03/09/2017
Lab ID: 1707204001	Sampling Location: Tool Testing			Receiv	ed: 03/13/2017
Method: NIOSH 0600 Mod., MW P		Media: PVC Filter pling Info: Air Volume	1320 L	Analyzed: 03/14	4/2017 (186888)
Analyte	Result (mg/sample)	Result (mg/m³)	RL (mg/sample)		and the second second
Respirable Dust	0.26	0.19	0.020		
Method: NIOSH 7500 Mod.	Media: PVC Filter Sampling Info: Air Volume 1320		1320 L	Analyzed: 03/15/2017 (186965)	
Analyte	Result (mg/sample)	Result (ug/m³)	Result (%)	LOD (mg/sample)	RL (mg/sample)
Quartz	0.038	29	15	0.010	0.030

Sample ID: iQ360x-030817-1258	347			Collect	ed: 03/08/2017
Lab ID: 1707204002	Sampling Location: Tool Testing		ol Testing	Receiv	ed: 03/13/2017
Method: NIOSH 0600 Mod., MW PVC Filter		Media: PVC Filter mpling Info: Air Volume 1320 L		Analyzed: 03/14/2017 (186888)	
Analyte	Result (mg/sample)	Result (mg/m³)	RL (mg/sample)		
Respirable Dust	0.27	0.21	0.020		
Method: NIOSH 7500 Mod.	Sam	Media: PVC Filter Sampling Info: Air Volume 1320 L		Analyzed: 03/15/2017 (186965)	
Analyte	Result (mg/sample)	Result (ug/m³)	Result (%)	LOD (mg/sample)	RL (mg/sample)
Quartz	0.036	27	13	0.010	0.030

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## ANALYTICAL REPORT

Workorder: 34-1707204

Client Project ID: Tool Testing 030917 Purchase Order: Tool Testing Project Manager: Paul Pope

## **Analytical Results**

Sample ID: PC912v-030817-1258	76			Collect	ed: 03/08/2017
Lab ID: 1707204003	S	Sampling Location: Tool Testing		Received: 03/13/2017	
Method: NIOSH 0600 Mod., MW PVC Filter		Media: PVC Filter pling Info: Air Volume	Analyzed: 03/14/2017 (186888)		
Analyte	Result (mg/sample)	Result (mg/m³)	RL (mg/sample)		
Respirable Dust	0.058	0.044	0.020		
Method: NIOSH 7500 Mod.	Sam	Media: PVC Filter pling Info: Air Volume	1320 L	Analyzed: 03/1	5/2017 (186965)
Analyte	Result (mg/sample)	Result (ug/m³)	Result (%)	LOD (mg/sample)	RL (mg/sample)
Quartz	<0.010	<7.6	<17	0.010	0.030

## Report Authorization (/S/ is an electronic signature that complies with 21 CFR Part 11)

Method	Analyst	Peer Review	
	/S/ Jacob Knudson	/S/ Shane Stewart	
NIOSH 0600 Mod., MW PVC Filter	03/14/2017 15:31	03/15/2017 07:42	
	/S/ Paul M. Megerdichian	/S/ Kim Clymer	
NIOSH 7500 Mod.	03/15/2017 17:47	03/15/2017 18:35	

## Laboratory Contact Information

ALS Environmental 960 W Levoy Drive Salt Lake City, Utah 84123 Phone: (801) 266-7700 Email: alslt.lab@ALSGlobal.com Web: www.alsslc.com



## ANALYTICAL REPORT

Workorder: 34-1707204

Client Project ID: Tool Testing 030917 Purchase Order: Tool Testing Project Manager: Paul Pope

### **General Lab Comments**

The results provided in this report relate only to the items tested. Samples were received in acceptable condition unless otherwise noted. Samples have not been blank corrected unless otherwise noted. This test report shall not be reproduced, except in full, without written approval of ALS.

ALS provides professional analytical services for all samples submitted. ALS is not in a position to interpret the data and assumes no responsibility for the quality of the samples submitted.

All quality control samples processed with the samples in this report yielded acceptable results unless otherwise noted.

ALS is accredited for specific fields of testing (scopes) in the following testing sectors. The quality system implemented at ALS conforms to accreditation requirements and is applied to all analytical testing performed by ALS. The following table lists testing sector, accreditation body, accreditation number and website. Please contact these accrediting bodies or your ALS project manager for the current scope of accreditation that applies to your analytical testing.

Testing Sector	Accreditation Body (Standard)	Certificate Number	Website
Environmental	ANAB (DoD ELAP)	ADE-1420	http://www.anab.org/accredited-organizations/
	Utah (NELAC)	DATA1	http://health.utah.gov/lab/labimp/
	Nevada	UT00009	http://ndep.nv.gov/bsdw/labservice.htm
	Oklahoma	UT00009	http://www.deq.state.ok.us/CSDnew/
	lowa	IA# 376	http://www.iowadnr.gov/InsideDNR/RegulatoryWater.aspx
	Texas (TNI)	T104704456-11-1	http://www.tceq.texas.gov/field/qa/lab_accred_certif.html
	Washington	C596-16	http://www.ecy.wa.gov/programs/eap/labs/index.html
	Kansas	E-10416	http://www.kdheks.gov/lipo/index.html
Industrial Hygiene	AIHA LAP LLC (ISO 17025 & IHLAP/ELLAP)	101574	http://www.aihaaccreditedlabs.org
	Washington	C596-16	http://www.ecy.wa.gov/programs/eap/labs/index.html
Lead Testing:			
CPSC	ANAB (ISO 17025, CPSC)	ADE-1420	http://www.anab.org/accredited-organizations/
Soil, Dust, Paint ,Air	AIHA LAP LLC (ISO 17025 & IHLAP/ELLAP)	101574	http://www.aihaaccreditedlabs.org
Dietary Supplements	ACLASS (ISO 17025)	ADE-1420	http://www.aclasscorp.com

## Definitions

LOD = Limit of Detection = MDL = Method Detection Limit, A statistical estimate of method/media/instrument sensitivity. LOQ = Limit of Quantitation = RL = Reporting Limit, A verified value of method/media/instrument sensitivity. ND = Not Detected, Testing result not detected above the LOD or LOQ.

NA = Not Applicable.

\*\* No result could be reported, see sample comments for details.

< This testing result is less than the numerical value.

() This testing result is between the LOD and LOQ and has higher analytical uncertainty than values at or above the LOQ.