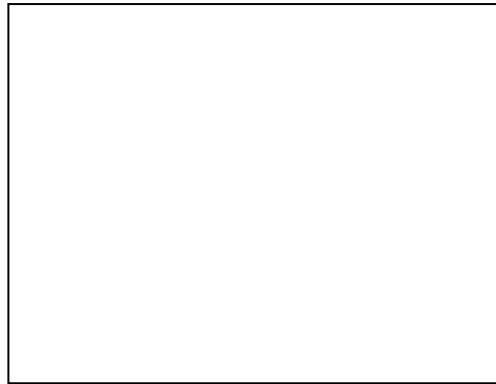




Silica Exposure Control Plan

(Template)





1. Purpose

The written *Silica Exposure Control Plan* is designed to protect employees from respirable crystalline silica through identification, evaluation, and control of respirable silica hazards in the workplace. It establishes procedures and controls to be used and communicated to all affected employees to lower exposure to respirable crystalline silica (RCS). [1910.1053(f)(2)(i)]

2. Responsibilities

Below are suggestions explaining how a variety of staff members may contribute to the successful implementation of a *Silica Exposure Control Plan*. The underlined area in paragraph B is the only required element in this section.

- A. **Safety Manager, EHS Manager, or responsible party**—communicates the requirements to all relevant managers, shares the content of the plan, ensures training and medical surveillance are scheduled in a timely manner, monitors the plan, makes revisions on an annual basis or as needed, facilitates problem solving and assists in determining if outside assistance is required.
- B. **Foundry Management**—authorize and support program implementation, ensure employees are given time to complete training, are familiar with the requirements of the plan, and model positive compliance with the requirements. Management also interfaces with union representatives, if applicable. Management, at all levels, may assist in verifying employee compliance with the approved work practices. Managers must ensure that the written *Silica Exposure Control Plan* is readily available for examination and copying, upon request, to each employee covered by the silica rules, their designated representatives, or OSHA representatives. [1910.1053(f)(2)(iii)]
- C. **Human Resources**—assist with scheduling of respiratory evaluations and silica medical surveillance and participates in the Health Insurance Portability and Accountability Act (HIPPA) compliant medical recordkeeping and training records. Human Resources may also be involved in disciplinary actions.
- D. **Finance**—are aware of and anticipates the needs of the *Silica Exposure Control Plan*, and its implementation, facilitates budget development, and assists in feasibility calculations and cost/benefit analysis for proposed projects.
- E. **Facility and Process Engineers**—are conscious of how casting design, equipment purchases, workstation layout, and tool selection can affect worker exposures.
- F. **Maintenance**—are mindful of equipment selection, preventive maintenance, trouble-shooting, and work order follow-up and how those affect silica exposures in the work place. Keep an inventory of spare parts on hand so ventilation, filtration equipment, sand transfer systems, and mechanical sweepers, etc., function at optimal performance.



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- G. **Employees**—remain proactive in keeping current on training, medical surveillance, and following work practices as trained. Ask questions if you do not understand what is being asked of you. If you see equipment that is not operating as designed bring it to your supervisor's attention. If you wear a respirator ensure you are receiving fit tests and training annually, and inspect, clean and store your equipment as trained.
- H. **Outside Services**—contracted consultants may come from the fields of occupational medicine (Physician or other Licensed Health Care Professionals-PLHCPs), industrial hygiene, laboratories, Heating, Ventilation and Air Conditioning (HVAC) specialists, engineers or others who design, construct, install or maintain systems.

3. Tasks in the workplace that may have exposure to respirable crystalline silica. (Mandatory)

OSHA requires each foundry to develop a list all tasks and/or regulated areas that may have exposures to respirable crystalline silica above the Action Level (AL). [1910.1053(f)(2)(i)(A)] Examples of some common tasks performed in foundries, which may be exposed to RCS over the PEL are listed below. In addition, you may attach a map of your facility indicating zones that are within regulated areas. As your efforts lower RCS to below the Action Level (AL) on a consistent basis, those areas may be removed from the list. Be sure you document the date(s) of sampling and how the decision was made to remove any tasks or regulated areas from your program. You will develop one *Task-Based Silica Exposure Control Form (TSECF)* (Section 9) for each task listed in Table 2.

Examples of some common tasks performed in foundries, which may be exposed to RCS over the PEL include:

- Sand receiving
- Sand mixing/mulling
- Scrap metal management
- Charging the furnace
- Mold making
- Coremaking
- Shakeout
- Knockout
- Cut off
- Cleaning/grinding
- Abrasive blasting/shot blasting/Wheelabrator
- Refractory knockout & relining
- Mechanical sweeper operation
- Specific preventive maintenance operations
- Changing filters in ventilation systems
- Changing bags in the baghouse



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By June 23, **2018**, employers must develop a list of all employees who work more than 30 days a year in areas with RCS levels **over the PEL** and include them in a Medical Surveillance Program. After June 23, **2020**, the Medical Surveillance Program must include all employees working **over the AL**, for more than 30 days per year. Those medical surveillance records are kept separate from the *Silica Exposure Control Plan*.



NOTE

Before proceeding to read the following Sections 4 through 8, remember that OSHA has a hierarchy of controls. They expect employers to lower silica levels, if feasible, through engineering controls and work practices. If that is not possible, housekeeping measures are the next most preferred form of control. Only if those do not achieve the needed reduction in exposure may administrative controls be implemented. Finally, the use of Personal Protective Equipment (PPE) such as respiratory protection is OSHA's least-favored method, to be used (as a final solution) only when the other methods do not achieve the needed reduction below the PEL. **However, a respiratory protection program must be implemented to protect employee health if RCS exposures are over the PEL, while you work to lower employee exposures below the PEL.**

In Sections 4 through 8, you will see, the order of OSHA's preferred hierarchy, examples of Engineering Controls (Section 4), Work Practices (Section 5), Housekeeping Measures (Section 6), Administrative Controls (Section 7), and Personal Protective Equipment [PPE] (Section 8). These are only examples. You may have some, all, or none of the examples listed. Once you understand the type of equipment or activities in each category, list your own controls in the *TSECF*, in Section 9.

4. Engineering Controls

Below are some examples of engineering controls used by foundries. Later, you will identify any engineering controls your company has installed on the *TSECF* in Section 9.

- Workstation ventilation
- Fresh air islands
- High Efficiency Particulate Air (HEPA) filters
- Downdraft or backdraft tables
- Turntables to orient work
- Enclosures for blasting
- Industrial curtains to separate spaces
- Robots in high exposure areas

5. Work Practices

Listed below are a few examples of work practices you may train your employees to use, to lower exposure to RCS. You will insert the work practices used at your facility when you develop the *TSECF* in Section 9.

- Minimize spillage during the replacement of dust receptacles
- Develop a procedure for employees to request filter changeout for their ventilation hoods
- Teach employees to direct grinding swarf away from their body and toward exhaust hoods.
- Do not allow forklifts to drive over accumulations of sand.

- Do not open blasting cabinets immediately after turning them off. Allow time for the dust to settle.
- Teach employees to report to their supervisor if their exhaust doesn't seem to be functioning properly.
- Handle bagged sand carefully and do not toss it or tear the bags while moving by forklift to avoid leakage.
- Don't leave the muller running continuously as it will pulverize the sand and generate respirable particles.
- Notify supervisors if you see unusual amounts of sand burn-on/burn-in on casting surfaces.

6. Housekeeping Measures (Mandatory)

Please notice that the other silica exposure controls (engineering controls, work practices, administrative controls, and PPE) are required to be listed for *specific tasks*, whereas housekeeping measures may apply to a specific task, or they may apply to a single workstation, a specific building, one or more departments, or the entire facility. Housekeeping measures do not need to be Task-Based. If a housekeeping measure is task or work unit specific, list it in the *TSECF* in Section 9. Table 3a is an example of some housekeeping measures that could apply to your entire facility. The first four measures (A through D) are OSHA requirements. The remaining items (E-G) are additional examples. If the housekeeping measure applies to the entire facility, or multiple work areas, you may document it in Table 3b. [1910.1053(f)(2)(i)(C)]

Table 3a. Example List-Housekeeping Measures that Apply to Multiple Work Areas

	Description of Housekeeping Measures	Area Applied
A	Do not use air guns or pressurized air to clean people, clothing, or hair. Pressurized air may be used in production, for example to clean parts or molds.	Entire facility
B	Do not use air guns or pressurized air to clean work surfaces such as floor, work benches or equipment.	Entire facility
C	Keep all sand and dust under cover to comply with stormwater regulations.	Entire facility
D	The use of brooms (including whisk brooms) or brushes to remove sand, dust, and silica fines is prohibited.	Entire facility
E	Keep aisles and passageways free of accumulations of dust.	Entire facility
F	Implement a 5S workplace organization program to have all employees contribute toward a clean facility by using the last 10-minutes of each shift to clean their work area at the end of every shift.	Entire facility
G	Vacuum with a High-Efficiency Particulate Air Filter (HEPA) vacuum-equipped mechanical sweeper.	Aisles, passages, and outside paved roads



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Table 3b. Housekeeping Measures that Apply to Multiple Work Areas

	Description of Housekeeping Measures	Area Applied
A		
B		
C		
D		
E		
F		
G		
H		
I		
J		
K		
L		
M		
N		
O		
P		
Q		
R		
S		
T		



7. Administrative Controls

OSHA allows the use of administrative controls such as short shifts or rotating shifts to keep employee exposure below the PEL. If all employees in an area maintain their exposure level below the PEL, even through use of administrative controls, that area is not a regulated area. There are examples of administrative controls used to remain below the PEL in Table 4. If your facility uses administrative controls to remain below the PEL, document those controls in the *Task-Based Exposure Control Form* in Section 9.

Table 4. Examples of Administrative Controls by Task or Area

Task or Area	Description of Administrative Control
Maintenance or Dust Collection	The Maintenance Department has part-time staff that maintain the dust collection system in the evening, working only 4 hours per day. Their exposures have been tested and found to be below the PEL.
Shakeout and Melt Deck	Employees rotate between the shakeout area (higher exposures) and the melt deck (lower exposures) on 4-hour shifts. These full-time employees have been monitored throughout their 8-hour shifts and have consistently remained below the PEL.

8. Respiratory Protection (Mandatory) and Personal Protective Equipment

If air sampling analysis indicates that a specific task exposes one or more employees to respirable crystalline silica above the PEL, each affected employee must be provided with an appropriate respirator. Respiratory protection is required in the following situations:

- While feasible engineering and work practice controls are being installed or implemented.
- During tasks such as maintenance and repairs for which engineering controls and work practices are not feasible.
- After all feasible controls have been implemented but they are not sufficient to reduce RCS exposure below the PEL.
- During periods when an employee is in a regulated area.

The details of the respiratory equipment must be documented for each task within the *TSECF* in this document. [1910.1053(g) and 1910.134, on respiratory protection]

Note: Though OSHA does not require all Personal Protective Equipment (PPE) be documented for each task, you may find it easier to do so, as OSHA does require you to provide a description of all PPE required or worn (not just respiratory protection) to the Physician or other Licensed Healthcare Professional (PLHCP) for periodic medical examinations. If the information is on the *Task-Based Silica Exposure Control Forms*, it is easy to pull and send the applicable forms with the employee when they visit the PLHCP. [1910.1053(i)(3)]



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How do you know which PPE to specify? If you have conducted Job Hazard Analysis [also known as Task Hazard Analysis (THA) or Job Safety Analysis (JSA)] that information will be very useful while developing this section. If you have not conducted JHA, you will likely find the AFS publication, *PPE Guide for Metalcasting Operations*, to be a valuable resource. The book includes the following tasks, and specifies the PPE that is recommended for each task:

- Melting and pouring operations
- Molding and coremaking operations
- Cleaning and finishing
- Machining
- Maintenance and other operations

You may find it helpful to track the details of your respiratory program as shown in Table 5a (examples) and Table 5b, but it is not mandatory, so long as the details are in your *TSECF*, in Section 9.

Note: It is optional for you to use Table 5b, but respirator selection must be included in the *TSECF*. If you do keep respirator descriptions in Table 5b, the respiratory protection may be described in the *TSECF* by reference to the respirator Style #, such as Style #1, Style #2, or Style #3 (instead of writing out the detailed description over and over for each task).

Table 5a. Examples of Respiratory Protection by Task or Area

Style#	Tasks or Areas	Description of Respirator
1	Muller Operation, Maintenance of Dust Collection System, and Shakeout [Voluntary Use]	NIOSH-approved, Honeywell N95, double-adjustable strap, close-fitting, disposable filtering facepiece. One-size fits all. Employees are taught to adjust the elastic straps and to pinch the metal strip over the bridge of their nose for the best fit. So far, all employees have been able to pass fit-testing with these masks.
2	Knock off, Moldmaking and Coremaking [Mandatory Use]	NIOSH-approved, 3M 6800, full facepiece, reusable respirators. (S-M-L-XL) with P100 cartridges. A cartridge changeout schedule has been provided to employees.
3	Grinding and Blasting [Mandatory Use]	NIOSH-approved, Nova 2000 with supplied airline, polycarbonate lens material with disposable Mylar lens covers, air pump, filters, airline hose, and chillers available



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Our Respiratory Protection Plan is:

Required
 Voluntary
 We have employees in both programs

Describe the make, model and type of respirator(s) used:

Table 5b. Description of Respiratory Protection by Task or Area

Style #	Tasks or Areas	Description of Respirator
1		
2		
3		
4		
5		
6		
7		
8		
9		
10		
11		
12		
13		
14		
15		

9. Task-Based Silica Exposure Control Form [1910.1053(f)(2)(i)(B)] Mandatory

Make one copy of Table 6 for each task listed in Table 2. Review the entire *Silica Exposure Control Plan* including the *Task-Based Silica Exposure Control Forms* every year including new technologies, equipment, and methods that may become available. The *Task-Based Silica Exposure Control Form* is the heart of the *Silica Exposure Control Plan*. If RCS exposure sampling is performed correctly, the forms are completed with care, and the controls described are diligently implemented, your program should protect employees from over-exposures to respirable crystalline silica.



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Table 6. Task-Based Silica Exposure Control Form	
Company:	
Preparer:	
Location:	
Date Created:	
Task Name:	
Task Description: [1910.1053(f)(2)(i)(A)]:	
Description of controls for this task [1910.1053(f)(2)(i)(B)]	
Engineering Controls: [1910.1053(f)(2)(i)(B)]	
Work Practices: [1910.1053(f)(2)(i)(B)]	
Housekeeping Measures: [Specific only to employees performing this task- 1910.1053(h)]	
Administrative Controls: [If they apply]	
Respiratory Protection: [1910.1053(f)(2)(i)(B)] and Other PPE: [1910.1053(i)(4)(III)]	
Review [1910.1053(f)(2)(ii)]	
Reviewed by:	Review Date: (Must be reviewed at least annually.)
Effectiveness and notes for improvement:	
Available to employee, and others [1910.1053(f)(2)(iii)] Yes ____ No ____	
Comments	



10. Abrasive Blasting [1910.1053(f)(3)]

Abrasive blasting exposes employees to a number of risks including exposure to respirable crystalline silica (RCS). Therefore, in addition to the requirements of paragraph (f)(1) of this section (engineering and work practice controls as methods of compliance), OSHA has additional requirements for abrasive blasting as outlined below, where applicable:

- A. 29 CFR 1910.94 for Ventilation
These regulations cover ventilation standards for abrasive blasting. It describes abrasive blasting respirators, blast-cleaning rooms, blasting cabinets, dust collectors, PPE, grinding, abrasive cut-off wheels, exhaust systems, grinding wheels, hood exhaust design.
 - i. Dust hazards are covered in 1910.94(a)(2)
 - ii. PPE is covered in 1910.94(a)(5)
 - iii. Grinding polishing and buffing operations are covered in 1910.94(b)
 - iv. Spray finishing operations are covered in 1910.94(c)

- B. 29 CFR 1910.244 applies to the use of hand and portable powered tools and other hand-held Equipment and 1910.244(b) applies specifically to abrasive blast cleaning nozzles. All blast nozzles must be equipped with two features, and the OSHA inspector's visiting facilities with silica will be looking for these two features (they are on their checklist):
 - i. Blast cleaning nozzles must be equipped with a switch or valve that will automatically shut off if the operator loses control of the handle. The nozzle must be equipped with a "dead-man" nozzle or a spring-actuated switch, or any mechanism that will shut off if the operator is not manually holding the valve in the open position.
 - ii. A support must also be provided where the operator can hang the nozzle when not in use.

Document which, if any, of these requirements apply to your facility and either within this Silica Exposure Control Plan or separately document how you have complied with the regulations.

[End]