

OSHA Crystalline Silica Rule - Construction

Announced on March 25, 2016

Agenda

- **Summary and Hilti path forward**
 - OSHA standard part 1926.1153 crystalline silica construction summary
- **Compliance options**
 1. Table 1 – use of pre-defined OSHA approved controls
 2. Performance or objective data option – compliance through objective data
 3. Scheduled monitoring option – proving compliance through a self-monitoring program
- **Additional construction requirements**
 - Summary and Hilti path forward



OSHA's new crystalline silica rule for construction implementation schedule

Activity	2016										2017					
	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	
Announcement ▲																
3/2016																
Effective ▲																
6/2016																
Full compliance ▲																
6/23/2017																

▲
12/1/2016

- OSHA published a new rule for silica for the construction industry on March 25, 2016. The new rule is effective June 23, 2016. Employers have one year to phase in compliance with parts of the rule.
- Part 1926.1153 of OSHA crystalline silica rule covers construction
- Full employer and product compliance was due June 23, 2017, now Sept 23, 2017.

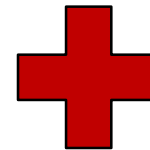
Summary of new standards – Compliance and Enforcement due by September 23, 2017

What is OSHA 29 CFR 1926.1153?

- The new standard requires a **more stringent “permissible exposure limit”**, moving from approx. 250 micrograms / m³ over an 8 hour day (time weighted average) to 50 micrograms / m³ over an 8 hour day.
- OSHA has provided three options for compliance in the new standard
 1. **Table 1:** a table of pre-defined applications and approved control solutions available in the market today
 2. **Performance or Objective data:** Providing objective data proving the control method used reduces silica dust exposure below the stated permissible exposure limit (50 micrograms / m³)
 3. **Scheduled self-monitoring program** to ensure employees are not exposed to applications exceeding 50 micrograms / m³ in an 8-hour work day
- In addition, in the construction industry employers are required to also **implement additional requirements:**
 - **Offer medical exams** to workers required to wear a respirator 30 or more times in a year
 - Additional requirements

Additional requirements

- Develop and keep a **written exposure control plan**
- Designated a **key competent person** to implement the exposure control plan, identify exposure risks, take actions to correct exposure issues
- **Train workers** to work safely with regards to silica dust
- **Restrict housekeeping** practices (dry sweeping) when silica dust is involved
- **Maintain records** of the above



Agenda

- Timing of silica dust standards in the US
- Summary of the new standard
 - OSHA standard part 1926.1153 crystalline silica construction summary

Compliance options

1 **Table 1 – Use of pre-defined OSHA approved controls**

- 2. Performance or Objective data option – Compliance through objective data
 3. Scheduled monitoring option – Proving compliance through a self-monitoring program
- Additional construction requirements
 - Summary and Hilti path forward

Table 1: Option to use pre-defined OSHA approved controls from table 1 list

Examples of control measures found in Table 1 of the ruling include:

- **Water-fed solutions** (ie. diamond coring and cutting with gas powered saws)
- **Use of a dust-collection system** with an approved vacuum based on tool type for dry cutting, grinding, drilling, breaking

Example: Dust Controls in Construction

The most common methods of limiting silica exposures in construction tasks are wet methods, where water is used to keep silica-containing dust from getting into the air, and vacuum dust collection systems, which capture dust at the point it is made.

in Table 1 of the standard. Unlike in the proposed rule, employers who fully and properly implement the controls listed on Table 1 are not separately required to comply with the PEL, and are not subject to provisions for exposure assessment and methods of compliance. The entries on Table 1 have also been revised extensively.

Examples of common Hilti relevant applications found in Table 1 :

- **Gas saw cutting – wet**
- **Coring– wet**
Drilling – w/ shroud and vacuum system
- **Breaking – wet or with shroud and vacuum system**
- **Grinding – wet or with shroud and vacuum system**

*source: www.osha.gov/silica

Small Entity Compliance Guide - OSHA publication 3902-11 2016

The cover of the guide is a teal-colored rectangle with a black border at the top. It features the title "Small Entity Compliance Guide" in large, white, bold, sans-serif font. Below the title, the subtitle "for the Respirable Crystalline Silica Standard for Construction" is written in a smaller, white, sans-serif font. The background of the cover has a subtle, light-colored wave pattern at the bottom.

Small Entity Compliance Guide

for the Respirable Crystalline
Silica Standard for Construction

<https://www.osha.gov/Publications/OSHA3902.pdf>



Table 1 solutions may require APF 10 or APF 25 respirator use

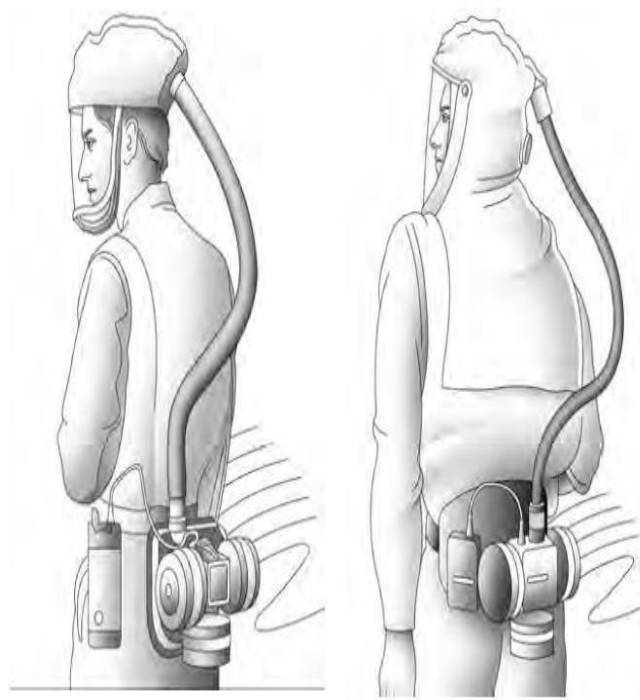
APF 10



Half mask/Dust mask
APF=10
Needs to be fit tested

Half mask (Elastomeric)
APF=10
Needs to be fit tested

APF 25



Loose-Fitting Powered
Air-Purifying Respirator (PAPR)
APF= 25

Hood Powered Air-Purifying
Respirator (PAPR)
APF= 25

*APF = Assigned protection factor *source: www.osha.gov

Table 1: Lists water as an acceptable control measure with some tool types

Table 1 example – Rig-mounted core drill (core rig)

Equipment/task	Engineering and work practice control methods	Required respiratory protection and minimum assigned protection factor (APF)	
		≤4 hours/shift	>4 hours/shift
(vi) Rig-mounted core saws or drills.	Use tool equipped with integrated water delivery system that supplies water to cutting surface. Operate and maintain tool in accordance with manufacturer’s instructions to minimize dust emissions.	None	None.



A rig-mounted core drill with an integrated water delivery system.

*source: www.osha.gov/silica

Reference page 12 from the OSHA publication 3902-11 2016

Rig-mounted core saws or drills must be equipped with an integrated water delivery system (commercially developed specifically for the type of tool in use) that supplies water to the cutting surface, and must be operated and maintained in accordance with manufacturer's instructions to minimize dust emissions.

Full and proper implementation of water controls on rig-mounted core saws or drills requires the employer to ensure that:

- An adequate supply of water for dust suppression is used;
- The spray nozzles produce a pattern that applies water at the point of dust generation;
- The spray nozzles are not clogged or damaged; and
- All hoses and connections are intact.

When using rig-mounted core saws or drills indoors or in enclosed areas (areas where airborne dust can buildup, such as a structure with a roof and three walls), employers must provide additional exhaust, as needed to

minimize the accumulation of visible airborne dust. See the section on *Indoors or Enclosed Areas* for more information.

Respiratory protection is not required for work with rig-mounted core saws or drills regardless of task duration.



A rig-mounted core drill with an integrated water delivery system.

Photo courtesy of Hilti. The equipment shown in this picture is for illustrative purposes only and is not intended as an endorsement by OSHA of this company, its products or services.

Table 1: Wet cutting with a saw is allowed but requires a respirator if cutting inside or more than 4 hours outside

Table 1 example – Hand held power saw (Gas saw)

Equipment/task	Engineering and work practice control methods	Required respiratory protection and minimum assigned protection factor (APF)	
		≤4 hours/shift	>4 hours/shift
(ii) Handheld power saws (any blade diameter)	<p>Use saw equipped with integrated water delivery system that continuously feeds water to the blade.</p> <p>Operate and maintain tool in accordance with manufacturer’s instructions to minimize dust emissions.</p> <ul style="list-style-type: none"> – When used outdoors. – When used indoors or in an enclosed area. 	<p>None</p> <p>APF 10</p>	<p>APF 10</p> <p>APF 10</p>

*source: www.osha.gov/silica



Reference page 8 from the OSHA publication 3902-11 2016

Handheld power saws with any blade diameter must be equipped with an integrated water delivery system (commercially developed specifically for the type of tool in use) that continuously feeds water to the blade. The water delivery system usually includes a nozzle for spraying water attached near the blade that is connected to a water basin via a hose and pump. The tool must be operated and maintained in accordance with manufacturer’s instructions to minimize dust emissions. Handheld power saws equipped with an integrated water delivery system for blade cooling also suppress dusts and meet the requirements of Table 1.

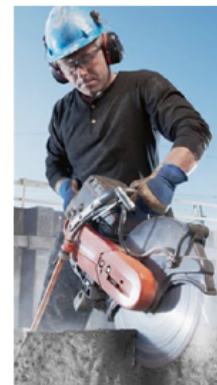
Full and proper implementation of water controls on handheld power saws requires the employer to ensure that:

- An adequate supply of water for dust suppression is used;
- The spray nozzle is working properly to apply water at the point of dust generation;
- The spray nozzle is not clogged or damaged;
- All hoses and connections are intact.

Table 1 does not specify a minimum flow rate; however, water must be applied at the flow rate specified by the manufacturer.

When working with handheld power saws of any blade diameter, respiratory protection with a minimum APF of 10 is required for work done outdoors for more than four hours per shift and for work done indoors, or in an enclosed location, regardless of task duration.

When using a handheld saw indoors or in enclosed spaces (areas where airborne dust can buildup, such as a structure with a roof and three walls), employers must provide additional exhaust, as needed to minimize the accumulation of visible airborne dust. See the section on *Indoors or Enclosed Areas* for more information.



A worker cutting a concrete block using a handheld masonry saw with an integrated water delivery system.

Photo courtesy Husqvarna. The equipment shown in this picture is for illustrative purposes only and is not intended as an endorsement by OSHA of this company, its products or services.



Table 1: Breaking concrete requires a respirator indoors or if breaking for >4 hours outdoors

Table 1 example – Handheld chipping tools (breakers)

Equipment/task	Engineering and work practice control methods	Required respiratory protection and minimum assigned protection factor (APF)	
		≤4 hours/shift	>4 hours/shift
(x) Jackhammers and handheld powered chipping tools.	Use tool with water delivery system that supplies a continuous stream or spray of water at the point of impact: —When used outdoors —When used indoors or in an enclosed area	None APF 10	APF 10. APF 10.
	OR Use tool equipped with commercially available shroud and dust collection system. Operate and maintain tool in accordance with manufacturer’s instructions to minimize dust emissions.		
	Dust collector must provide the air flow recommended by the tool manufacturer, or greater, and have a filter with 99% or greater efficiency and a filter-cleaning mechanism: —When used outdoors —When used indoors or in an enclosed area	None APF 10	APF 10. APF 10.

HEPA filter is not required for breaking

*source: www.osha.gov/silica

Reference page 17/18 from the OSHA publication 3902-11 2016`

Jackhammers and handheld powered chipping tools must be operated using either a water delivery system that supplies a continuous stream or spray of water at the point of impact, or a tool equipped with a commercially available shroud and vacuum dust collection system. Jackhammers and other handheld powered chipping tools must be operated and maintained in accordance with manufacturer's instructions to minimize dust emissions.

If using the shroud and dust collector system, the vacuum dust collection system must provide at least the air fl recommended by the tool manufacturer and have a filter with 99 percent or gr efficiency and a filter cleaning mechar

The water delivery system is not requ be integrated or mounted on the tool; be assembled and installed by the em However, it must deliver a continuous or spray of water at the point of impac

Full and proper implementation of water controls on jackhammers and other handheld powered chipping tools requires the employer to ensure that:

- An adequate supply of water for dust suppression is used;
- The water sprays are working properly and produce a pattern that applies water at the point of dust generation;
- The spray nozzles are not clogged or damaged; and
- All hoses and connections are intact.

Acceptable water delivery systems include direct connections to fixed water lines or portable water tank systems. These water delivery systems can be operated by one worker or could require a second worker to supply the water at the point of impact.

Full and proper implementation of dust collection systems requires the employer to ensure that:

- The shroud is intact and installed in accordance with the manufacturer's instructions;
- The hose connecting the tool to the vacuum is intact and without kinks or tight bends;
- The filter(s) on the vacuum are cleaned or changed in accordance with the manufacturer's instructions; and
- The dust collection bags are emptied to avoid overfilling.

Respiratory protection with an APF of 10 is required when the task is done outdoors for more than four hours per shift, or when the task is done indoors or in an enclosed location regardless of task duration.

When working indoors or in an enclosed space (areas where airborne dust can buildup, such as a structure with a roof and three walls), employers must provide additional exhaust, as needed to minimize the accumulation of visible airborne dust. See the section on *Indoors or Enclosed Areas* for more information.



Jackhammer equipped with water spray delivery system to control dust. The water nozzle is mounted on the jackhammer frame just to the right of the chisel. Note the wet concrete on left from the water spray.

Photo courtesy of CPWR, Norman Zuckerman.

Table 1: Dry cutting / grinding applications require 25 CFM per diameter inch of wheel from vacuum

Table 1 example – Handheld grinding or cutting

Equipment/task	Engineering and work practice control methods	Required respiratory protection and minimum assigned protection factor (APF)	
		≤4 hours/shift	>4 hours/shift
(xii) Handheld grinders for uses other than mortar removal.	For tasks performed outdoors only: Use grinder equipped with integrated water delivery system that continuously feeds water to the grinding surface. Operate and maintain tool in accordance with manufacturer’s instructions to minimize dust emissions. OR Use grinder equipped with commercially available shroud and dust collection system. Operate and maintain tool in accordance with manufacturer’s instructions to minimize dust emissions. 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: —When used outdoors —When used indoors or in an enclosed area	None	None.
		None None	None. APF 10.

Example: 5” grinder requires hood & 125 CFM or greater vacuum

HEPA filter is not required

*source: www.osha.gov/silica



Reference page 21/22 from the OSHA publication 3902-11 2016

TABLE 1: Specified Exposure Control Methods When Working with Materials Containing Crystalline Silica

Equipment/Task	Engineering and Work Practice Control Methods	Required Respiratory Protection and Minimum Assigned Protection Factor (APF)	
		≤ 4 hours/shift	> 4 hours/shift
(xii) Handheld grinders for uses other than mortar removal	<p>For tasks performed outdoors only:</p> <p>Use grinder equipped with integrated water delivery system that continuously feeds water to the grinding surface.</p> <p>Operate and maintain tool in accordance with manufacturer's instructions to minimize dust emissions.</p> <p style="text-align: center;">OR</p> <p>Use grinder equipped with commercially available shroud and dust collection system.</p> <p>Operate and maintain tool in accordance with manufacturer's instructions to minimize dust emissions.</p> <p>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.</p> <ul style="list-style-type: none"> ▪ When used outdoors. ▪ When used indoors or in an enclosed area. 	None	None
		None	None

Handheld grinders may also be used for tasks other than mortar removal, such as to remove thin layers of concrete and surface coatings. Two control options may be used: (1) A grinder equipped with an integrated water delivery system (commercially developed specifically for the type of tool in use) that continuously feeds water to the grinding surface operated for outdoor work only; and (2) a dust collector equipped with

a commercially available shroud and dust collection system with the same features as the dust collection system used for mortar removal for outdoor and indoor work. The dust collector must be rated to provide 25 cfm or greater air flow per inch of wheel diameter, have a filter with a 99 percent or greater efficiency, and a cyclonic pre-separator or filter-cleaning mechanism. Cyclonic pre-separators and filter-cleaning

mechanisms improve the suction of dust collection systems by preventing debris from building up on the filter. The grinder and both controls must be operated and maintained in accordance with manufacturer's instructions to minimize dust emissions.

The integrated water delivery system can be a free-flowing water system designed for blade cooling as well as manufacturers' systems designed for dust suppression alone. This option applies only when grinders are used outdoors.

Full and proper implementation of water controls on grinders requires the employer to ensure that:

- An adequate supply of water for dust suppression is used;
- The spray nozzles are working properly and produce a pattern that applies water at the point of dust generation;
- The spray nozzles are not clogged or damaged; and
- All hoses and connections are intact.

Handheld grinders equipped with dust collection systems may be used outdoors or indoors. Full and proper implementation of dust collection systems on handheld grinders requires the employer to ensure that:

- The shroud is intact and installed in accordance with the manufacturer's instructions;
- The hose connecting the tool to the vacuum is intact and without kinks or tight bends;

- The filter(s) on the vacuum are cleaned or changed in accordance with the manufacturer's instructions; and
- The dust collection bags are emptied to avoid overfilling.

Respiratory protection is not required when water-based dust suppression systems are used regardless of task duration. When dust collection systems are used, respiratory protection with a minimum APF of 10 is required only when engaged in a task indoors or in an enclosed location for more than four hours per shift.

When using handheld grinders indoors or in enclosed areas (areas where airborne dust can buildup, such as a structure with a roof and three walls), employers must provide additional exhaust as needed to minimize the accumulation of visible airborne dust. See the section on *Indoors or Enclosed Areas* for more information.



Worker grinding concrete floor with grinder attached to dust collector (background).

Photo courtesy of the University of Washington.

Table 1: some applications, like tuck pointing, still require a respirator for entire time of use

Table 1 example – Tuck pointing

Equipment/task	Engineering and work practice control methods	Required respiratory protection and minimum assigned protection factor (APF)	
		≤4 hours/shift	>4 hours/shift
(xi) Handheld grinders for mortar removal (i.e., tuckpointing).	<p>Use grinder equipped with commercially available shroud and dust collection system.</p> <p>Operate and maintain tool in accordance with manufacturer's instructions to minimize dust emissions.</p> <p>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.</p>	APF 10	APF 25.

HEPA filter is not required for tuck pointing

*source: www.osha.gov/silica



Reference page 19/20 from the OSHA publication 3902-11 2016

Handheld grinders for mortar removal (i.e., tuckpointing). Tuckpointing involves removing deteriorating mortar from between bricks using a handheld grinder and replacing it with fresh mortar.

The handheld grinders must be equipped with a commercially available shroud and dust collection system and operated and maintained in accordance with manufacturer's instructions to minimize dust emissions. The dust collection system must provide at least 25 cfm of air flow per inch of wheel diameter and have a filter that has a 99 percent or greater efficiency and either a cyclonic pre-separator or a filter-cleaning mechanism. Cyclonic pre-separators and filter-cleaning mechanisms improve the suction of dust collection systems by preventing debris from building up on the filter.

Full and proper implementation of dust collection systems on handheld grinders requires the employer to ensure that:

- The shroud is intact, encloses most of the grinding blade, and is installed in accordance with the manufacturer's instructions;
- The hose connecting the tool to the vacuum is intact and without kinks or tight bends;
- The filter(s) on the vacuum are cleaned or changed in accordance with the manufacturer's instructions;
- The dust collection bags are emptied to avoid overfilling;
- The blade is kept flush against the surface whenever possible; and
- The tool is operated against the direction of blade rotation, whenever practical.



Reference page 19/20 from the OSHA publication 3902-11 2016

When using handheld grinders for mortar removal indoors or in enclosed areas (areas where airborne dust can buildup, such as a structure with a roof and three walls), employers must provide additional exhaust if needed to minimize the accumulation of visible airborne dust. See the section on *Indoors or Enclosed Areas* for more information on how to determine when those work situations apply.

Respiratory protection with a minimum APF of 10 is required for work with handheld grinders for mortar removal lasting four hours or less in a shift. Respiratory protection with a minimum APF of 25 is required for work lasting more than four hours per shift.



Worker grinding mortar from between bricks with a handheld grinder equipped with a shroud and dust collection system. In addition, worker is using respiratory protection.

Photo courtesy of OSHA, International Masonry Institute.

Table 1: Dry solutions with dust shroud & hood require a vacuum with 99% filter efficiency and a filter-cleaning mechanism

Table 1 example – Handheld drills

Equipment/task	Engineering and work practice control methods	Required respiratory protection and minimum assigned protection factor (APF)	
		≤4 hours/shift	>4 hours/shift
(vii) Handheld and stand-mounted drills (including impact and rotary hammer drills).	<p>Use drill equipped with commercially available shroud or cowling with dust collection system.</p> <p>Operate and maintain tool in accordance with manufacturer’s instructions to minimize dust emissions.</p> <p>Dust collector must provide the air flow recommended by the tool manufacturer, or greater, and have a filter with 99% or greater efficiency and a filter-cleaning mechanism.</p>	None	None.

HEPA filter is not required for drilling

*source: www.osha.gov/silica

Reference page 13/14 from the OSHA publication 3902-11 2016

TABLE 1: Specified Exposure Control Methods When Working with Materials Containing Crystalline Silica			
Equipment/Task	Engineering and Work Practice Control Methods	Required Respiratory Protection and Minimum Assigned Protection Factor (APF)	
		≤ 4 hours/shift	> 4 hours/shift
(vii) Handheld and stand-mounted drills (including impact and rotary hammer drills)	<ul style="list-style-type: none"> Use drill equipped with commercially available shroud or cowling with dust collection system. Operate and maintain tool in accordance with manufacturer's instructions to minimize dust emissions. Dust collector must provide the air flow recommended by the tool manufacturer, or greater, and have a filter with 99% or greater efficiency and a filter-cleaning mechanism. Use a HEPA-filtered vacuum when cleaning holes. 	None	None

Handheld and stand-mounted drills (including impact and rotary hammer drills). Handheld and stand-mounted drills must be equipped with a commercially available shroud or cowling with a dust collection system that provides at least the minimum air flow recommended by the manufacturer. The dust collection system must include a filter cleaning mechanism and be equipped with a filter with 99 percent or greater efficiency. In addition, the tool must be operated and maintained in accordance with manufacturer's instructions to minimize dust emissions.

Full and proper implementation of dust collection systems on handheld drills requires the employer to ensure that:

- The shroud or cowling is intact and installed in accordance with the manufacturer's instructions;



Worker drilling into concrete with a rotary hammer equipped with shroud and dust collection system. Note the shroud around drill bit, silver and black hose, and dust collector are attached conveniently to the drill.

Photo courtesy of DeWalt. The equipment shown in this picture is for illustrative purposes only and is not intended as an endorsement by OSHA of this company, its products or services.

Reference page 13/14 from the OSHA publication 3902-11 2016

- The hose connecting the tool to the vacuum is intact and without kinks or tight bends;
- The filter(s) on the vacuum are cleaned or changed in accordance with the manufacturer's instructions; and
- The dust collection bags are emptied to avoid overfilling.

A HEPA-filtered vacuum must be used when cleaning holes. Compressed air can be used to clean holes when used in conjunction with a HEPA-filtered vacuum to capture the dust or a hole cleaning kit designed for use with compressed air.

When using handheld and stand-mounted drills indoors or in enclosed areas (areas where airborne dust can buildup, such as a structure with a roof and three walls), employers must provide additional exhaust, as needed to minimize the accumulation of visible airborne dust. See the section on *Indoors or Enclosed Areas* for more information.

Respiratory protection is not required when using handheld or stand-mounted drills equipped with a dust collection system, including for overhead drilling, regardless of task duration.



Worker is drilling horizontal holes in a concrete wall using two stand-mounted drills, each equipped with a dust collector. Note the shrouds around drill bits, black hose, and dust collector are attached to the stand.

Photo courtesy of David Rempel, University of California, San Francisco.

Table 1: Traditional anchor hole cleaning is the Hilti relevant application requiring a HEPA-filtered vacuum to capture dust

(vii) Handheld and stand-mounted drills (including impact and rotary hammer drills)	<p>Use drill equipped with commercially available shroud or cowling with dust collection system.</p> <p>Operate and maintain tool in accordance with manufacturer's instructions to minimize dust emissions.</p> <p>Dust collector must provide the air flow recommended by the tool manufacturer, or greater, and have a filter with 99% or greater efficiency and a filter-cleaning mechanism.</p>
	<p>Use a HEPA-filtered vacuum when cleaning holes.</p>

duration.

The practice of dry sweeping or brushing debris from a hole, or using compressed air to clean holes, contributes to the exposure of employees using drills. Based on the evidence in the record, OSHA is requiring that holes be cleaned with a HEPA-filtered vacuum. Any method for cleaning holes can be used, including the use of compressed air, if a HEPA-filtered vacuum is used to capture the dust. If a HEPA-filtered vacuum is not used when cleaning holes, then the employer must assess and limit the exposure of that employee in accordance with paragraph (d) of the standard for construction.

High-efficiency particulate air [HEPA] filter means a filter that is at least 99.97 percent efficient in removing mono-dispersed particles of 0.3 micrometers in diameter.

*source: www.osha.gov/silica



OSHA identifies that SafeSet systems eliminate the need for hole cleaning and thus HEPA filtered vacuum

HDB specifically called out as a way to meet the OSHA requirements

Hilti offers both hollow drill bit and HIT-Z rod solutions which eliminate the need for hole cleaning

following Table 1. Although OSHA is allowing the use of compressed air if used in conjunction with a HEPA-filtered vacuum to capture the dust, OSHA has determined that there are a number of feasible alternatives to using compressed air. At least one tool manufacturer offers an anchor system with “no hole cleaning requirement whatsoever,” due to the use of a drill with a ventilated drill bit (Document ID 4073, Attachment 4b, Slide 12). Another manufacturer offers a “hole cleaning kit” for large hammer hole drilling, which consists of a doughnut-shaped dust collection head that attaches directly to a vacuum cleaner hose. The head is placed against the surface to be drilled and captures dust generated as the hole is drilled (Document ID 4073, Attachment 4b, Slide 17). This hole cleaning kit also includes two sizes of hole cleaning tubes. Such a control could be used with existing as well as new drills (e.g., Document ID 3998, Attachment 10, p. 42).

*source: www.osha.gov/silica

Employers can use objective data to prove system compliance and potentially remove respirator requirement

Performance or Objective data option:

- Use data from an internal, industry or 3rd party testing, to determine the amount of respirable silica that workers are exposed to if it may be at or above an action level of 25 µg/m³ (micrograms of silica per cubic meter of air), averaged over an eight-hour day
- Use dust controls to protect workers from silica exposures above the action level of 25 µg/m³ (micrograms of silica per cubic meter of air), averaged over an eight-hour day
- ~~Use data from an internal, industry or 3rd party testing~~ to prove workers are exposed to less than the respirable crystalline silica PEL of 50 µg/m³, averaged over an eight-hour day.
- Respirators would not be required if workers are exposed to less than the respirable crystalline silica PEL of 50 µg/m³, averaged over an eight-hour day.
- Provide respirators to workers when dust controls cannot limit exposures to the PEL

(ii) *Performance option.* The employer shall 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.

“Objective data may come from the manufacturer”

*source: www.osha.gov/silica

Scheduled self-monitoring option is allowed under new OSHA standards

Scheduled self-monitoring option

- If following this option, employers will need to perform scheduled monitoring to prove how many micrograms of silica are created per cubic meter of air in **a time-weighted average over an 8 hour work day**
- Monitoring and dust controls are required to be used once workers are exposed to more than **25 micrograms (action level)** of respirable silica per cubic meter of air in a time-weighted average over an 8 hour work day
- When performing these applications, employers will be required to use control measures (wet cutting, dust hoods w/ vacuums) to keep **the exposure level below 50 micrograms (PEL) of silica per cubic meter of air** for a worker in a time-weighted average over an 8 hour work day
- Provide respirators to workers when dust controls in place can't limit exposures to a level below the PEL

(iii) *Scheduled monitoring option.* (A)
 The employer shall 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, in each work area. Where several employees perform the same tasks on the same shift and in the same work area, the employer may sample a representative fraction of these employees in order to meet this requirement. In representative sampling,

*source: www.osha.gov/silica



As part of new OSHA standards, employers are also required to train, document and put into place additional practices

Additional construction requirements

- Develop and keep a written exposure control plan
- Designated a key competent person to implement the exposure control plan, identify exposure risks, take actions to correct exposure issues
- Train workers to work safely with regards to silica dust
- Restrict housekeeping practices (dry sweeping) when silica dust is involved
- Offer medical exams during first 30 days to workers required to wear a respirator 30 or more days per year
- Keep records of the above

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Regardless of which exposure control method is used, all construction employers covered by the standard are required to:

- Establish and implement a **written exposure control plan** that identifies tasks that involve exposure and methods used to protect workers, including procedures to restrict access to work areas where high exposures may occur.
- Designate a **competent** person to implement the written exposure control plan.
- Restrict **housekeeping** practices that expose workers to silica where feasible alternatives are available.
- Offer **medical exams** – including chest X-rays and lung function tests – every three years for workers who are required by the standard to wear a respirator for 30 or more days per year.
- **Train workers** on work operations that result in silica exposure and ways to limit exposure.
- **Keep records** of workers’ silica exposure and medical exams.

*source: www.osha.gov/silica

Written exposure control plan guidelines in part 1926.1153 pertaining to construction

Written exposure plan / Key competent person

- Develop a written exposure control plan
- Identify a competent person who will be responsible for identifying crystalline silica hazards, make corrective measures and implement the exposure control plan

- Establish and implement a **written exposure control plan** that identifies tasks that involve exposure and methods used to protect workers, including procedures to restrict access to work areas where high exposures may occur.
- Designate a **competent** person to implement the written exposure control plan.

*source: www.osha.gov/silica

Worker training will be required to ensure a safe working environment where silica dust is involved

Worker training

- Training timing and frequency are performance based, shall be provided as often as needed to create a safe worker environment

OSHA agrees with commenters that additional or repeated training may be necessary under certain circumstances but does not consider it appropriate to impose a fixed schedule of periodic training. Therefore, the requirement for training is performance-oriented in order to allow flexibility for employers to provide training as needed to ensure that each employee can demonstrate the knowledge and understanding required under the rule. For example, if an employer observes an employee engaging in activities that contradict knowledge gained through training, it is a sign to the employer that the employee may require a reminder or periodic retraining on work practices. *

OSHA concludes that some site-specific or employer-specific training is always necessary, such as training on specific tasks that could result in exposures, controls or work practices that the employer has implemented, or the identity of the competent person (paragraphs (j)(3)(i)(B) and (C) of the standard for general industry and maritime and paragraphs (i)(2)(i)(B), (C), and (E) of the standard for construction). Full training would not be required if an employee is already able to demonstrate knowledge in health hazards, the contents of the respirable crystalline silica rule, or medical surveillance for respirable crystalline silica (paragraphs (j)(3)(i)(A), (D), and (E) of the standard for general industry and maritime, paragraphs (i)(2)(i)(A), (D) and (F) of the standard for construction). Site-specific training is unlikely to be costly or time-consuming. OSHA concludes that assessing an employee's knowledge to determine the type and level of additional training required is more meaningful than simply accepting a certificate of training. *

*source: www.osha.gov/silica

Training standards found in OSHA guidelines, part 1926.1153, pertaining to construction

Training standards

Provide training to allow a work to demonstrate knowledge and understanding of:

- Health hazards associated with exposure to respirable crystalline silica
- Tasks on a job which could result in exposure
- Jobsite worker protection measures in place and how to use them

(2) *Employee information and training.* (i) The employer shall ensure that each employee covered by this section can demonstrate knowledge and understanding of at least the following:

- (A) The health hazards associated with exposure to respirable crystalline silica;
- (B) Specific tasks in the workplace that could result in exposure to respirable crystalline silica;
- (C) Specific measures the employer has implemented to protect employees from exposure to respirable crystalline silica, including engineering controls, work practices, and respirators to be used;
- (D) The contents of this section;
- (E) The identity of the competent person designated by the employer in accordance with paragraph (g)(4) of this section; and
- (F) The purpose and a description of the medical surveillance program required by paragraph (h) of this section.

(ii) The employer shall make a copy of this section readily available without cost to each employee covered by this section.

*

*source: www.osha.gov/silica



Record keeping standards found in OSHA guidelines, part 1926.1153, pertaining to construction

Record keeping

- Standard for record keeping gives employer freedom to use systems already in place within their organization

comparable rule, there will be time, effort, and expense involved in developing and maintaining records. However, OSHA expects that even employers who manage multiple projects will have a system for maintaining these records, just as they do for their other business records. As for high expenses of transferring data to new technology, the Agency understands that there are multiple ways to maintain these records and there are expenses involved in doing so

Therefore, the Agency is allowing employers the option to use whatever method works best for them, paper or electronic.

*source: www.osha.gov/silica

Regulated area requirements for jobsites as per OSHA guidelines, part 1926.1153, pertaining to construction

Regulated areas

- The jobsites written exposure control plan shall give direction workers as to how they shall minimize the number of employees exposed to respirable silica
- OSHA standard does not mandate a regulated area be created around applications creating respirable silica

Regulated Areas. OSHA proposed to provide employers covered by the rule with the alternative of either establishing a regulated area or an access control plan to limit access to areas where exposure to respirable crystalline silica exceeds the PEL. The final standard for general industry and maritime requires employers to

establish a regulated area in such circumstances. The final standard for construction does not include a provision for regulated areas, but includes a requirement that the written exposure control plan include procedures used to restrict access to work areas, when necessary, to minimize the numbers of employees exposed to respirable crystalline silica and their level of exposure. The access control plan alternative is not included in the final rule.

*

*source: www.osha.gov/silica

Medical surveillance OSHA guidelines

Medical surveillance requirements

- Medical surveillance be made available within first 30 days to any worker who performs applications which require them to use a respirator for 30 or more days per year
- **Following Table 1** - Example of someone who might be required to be offered medical surveillance: **worker who breaks concrete indoors 30 or more days during a year**

- Offer **medical exams** – including chest X-rays and lung function tests – every three years for workers who are required by the standard to wear a respirator for 30 or more days per year. *

*source: www.osha.gov/silica

Summary and path forward on new standards – Compliance due by June 23, 2017

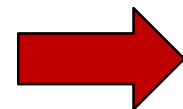


What is OSHA 29 CFR 1926.1153?

- The new standard requires a **more stringent “permissible exposure limit”**, moving from approx. 250 micrograms / m³ over an 8 hour day (time weighted average) to 50 micrograms / m³ over an 8 hour day.
- OSHA has provided three options for compliance in the new standard
 1. **Table 1:** a table of pre-defined applications and approved control solutions available in the market today
 2. **Performance or Objective data:** Providing objective data proving the control method used reduces silica dust exposure below the stated permissible exposure limit (50 micrograms / m³)
 3. **Scheduled Self-monitoring program** to ensure employees are not exposed to applications exceeding 50 micrograms / m³ in an 8-hour work day

In addition, in the construction industry employers are required to also **implement additional requirements:**

































- **Offer medical exams** to workers required to wear a respirator 30 or more times in a year
- **Exposure control plan** -----should also address workers in the area of the application
- **Additional requirements**



Customer feedback

- Our **customers** are still working to understand regulations and **have not yet defined a clear path forward**
- **Motivation** and/or risk for contractors **appears to be medical exams**
- Our **customers see a need for a data driven solutions** which “**keeps their workers out of respirators**” and thus **avoids** the requirement for **medical exams**



Products										OSHA 29 CFR 1926.1153 compliance					
Application	Tools with DRS						Dust removal accessory			Universal vacuum cleaners			Table 1 Compliant*	Testing required	
SDS++ drilling / chiseling	Rotary hammer TE 2	Rotary hammer TE 3-C	Rotary hammer TE 7-C	Combi- hammer TE 30-C	Rotary hammer TE 4-A**	Rotary hammer TE 6-A**	Cordless combi- hammer TE 30-A	Hammer drill bit TE-CD	OR	Dust removal system DRS-S Item number 340602	VC 20	VC 40-U			VC 40-UE
															
	Item number 3497788	Item number 3553166	Item number 3476284	Item number 3476293	Item number 3482408	Item number 3551238	Item number 3500960				Item number 222428	Item number 218360	Item number 3540260		
SDS-max drilling / chiseling	Combihammer TE 50	Combihammer TE 60	Combihammer TE 60-ATC	Combihammer TE 70	Combihammer TE 70-ATC	Combihammer TE 80	Hammer drill bit TE-YD	OR	Dust removal system TE DRS-Y	VC 20	VC 40-U	VC 40-UE	✓		
															
	Item number 3553052	Item number 3493739	Item number 3493740	Item number 3514170	Item number 3514171	Item number 2083438			Item number 2055718	Item number 222428	Item number 218360	Item number 3540260			
Concrete breaking	Breaker TE 500-AVR	Breaker TE 700-AVR	Breaker TE 800-AVR	Breaker TE 1000-AVR	Breaker TE 1500-AVR		Dust removal system DRS-B			VC 20	VC 40-U	VC 40-UE	✓		
															
	Item number 3512856	Item number 3484793	Item number 3531084	Item number 3523418	Item number 3455043		Item number 365044			Item number 222428	Item number 218360	Item number 3540260			






















Concrete cutting and grinding

<p>Angle grinder AG 450-S</p>  <p>Item number 2075613</p>		<p>Angle grinder AG 450-D</p>  <p>Item number 2075614</p>		<p>Cutting hood</p>  <p>Item number 2101312</p>		<p>Grinding hood</p>  <p>Item number 2102983</p>		<p>VC 20</p>  <p>Item number 222428</p>	<p>VC 40-U</p>  <p>Item number 218369</p>	<p>VC 40-UE</p>  <p>Item number 3540269</p>	✓		
<p>5" Angle grinder DAG 500</p>  <p>Item number 382594</p>	<p>5" Angle grinder DCG 500</p>  <p>Item number 382581</p>		<p>5" Angle grinder DEG 500</p>  <p>Item number 285937</p>		<p>Tuck pointing/ cutting</p>  <p>Item number 284978</p>	<p>Grinding</p>  <p>Item number 267719</p>	<p>Cutting</p>  <p>Item number 267720</p>	<p>VC 20</p>  <p>Item number 222428</p>	<p>VC 40-U</p>  <p>Item number 218369</p>	<p>VC 40-UE</p>  <p>Item number 3540269</p>	✓		
<p>Diamond grinder DG 150</p>  <p>Item number 369388</p>					<p>Vacuum hose adapter</p>  <p>Item number 281862</p>					<p>VC 20</p>  <p>Item number 222428</p>	<p>VC 40-U</p>  <p>Item number 218369</p>	<p>VC 40-UE</p>  <p>Item number 3540269</p>	✓
<p>Diamond cutter DCH 230</p>  <p>Item number 3444488</p>		<p>Diamond cutter DCH 300</p>  <p>Item number 3444489</p>		<p>Vacuum hose adapter</p>  <p>Item number 209878</p>					<p>VC 20</p>  <p>Item number 222428</p>	<p>VC 40-U</p>  <p>Item number 218369</p>	<p>VC 40-UE</p>  <p>Item number 3540269</p>	✓	
<p>Hand-held gas saw DSH 700-X</p>  <p>14" Item number 2121540</p>		<p>Hand-held gas saw DSH 900-X</p>  <p>16" Item number 2121542</p>		<p>DWP 10 tank (water is needed)</p>  <p>Item number 365595</p>								✓	

Concrete sawing



Concrete coring

<p>Diamond coring tool DD EC-1</p>  <p>Item number 336737</p>	<p>Diamond coring tool DD 120</p>  <p>Item number 274935</p>	<p>Diamond coring tool DD 150-U</p>  <p>Item number 3483076</p>	<p>Diamond coring tool DD 160-U</p>  <p>Item number 3496301</p>	<p>Diamond coring tool DD 250</p>  <p>Item number 3550349</p>	<p>Diamond coring tool 350-CA</p>  <p>Item number 3536957</p>	<p>Diamond coring tool DD 500-CA</p>  <p>Item number 3536965</p>	<p>DWP 10 tank (water is needed)</p>  <p>Item number 365595</p>	✓		
<p>Diamond coring tool DD 110-W</p>  <p>Item number 2087491</p>					<p>Adapter</p>  <p>Item number 315826</p>	<p>DD-X LM</p> 	<p>VC 20</p>  <p>Item number 222428</p>	<p>VC 40-U</p>  <p>Item number 218369</p>	<p>VC 40-UE</p>  <p>Item number 3540269</p>	✓
<p>Diamond coring tool DD 150-U</p>  <p>Item number 3483121</p>					<p>DD-X LM</p> 		<p>VC 20</p>  <p>Item number 222428</p>	<p>VC 40-U</p>  <p>Item number 218369</p>	<p>VC 40-UE</p>  <p>Item number 3540269</p>	✓



Questions?

Questions:

- Silicadustquestions@hilti.com

Resources:

- www.osha.gov/silica

* www.dir.ca.gov

[1532.3](#)

- **Hilti white paper**
- **Hilti dust control brochure – includes compliance info**
- **Customer webinar invitation**

*source: www.osha.gov/silica

