



# RESPIRABLE CRYSTALLINE SILICA DUST CONTROLS

Mid Atlantic Construction Safety Conference  
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Silica Dust Control | April , 2017

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## OSHA §1926.1153 RESPIRABLE CRYSTALLINE SILICA STANDARD - CONSTRUCTION

Announced on March 25, 2016

## WORKER JOBSITE PROTECTION HAS BECOME COMMON-PLACE AND DUST CONTROL WILL BE THE SAME

How has the construction industry's view on standard Personal Protective Equipment (PPE) changed over the past 20 years?



Silica dust control is becoming a standard topic and will be part of how the industry does business in the future.



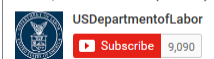
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## NEW SILICA DUST STANDARD PROVIDES OPTIONS FOR COMPLIANCE AND REQUIREMENTS FOR CONTRACTORS



"Stop Silicosis" (2016)



### What has changed?

- The permissible exposure limit: reduced from  $250 \mu\text{g} / \text{m}^3$  in an 8-hour day to  $50 \mu\text{g} / \text{m}^3$  in an 8-hour day
- Exposure compliance methods: evolved from Air monitoring to **3 compliance options**:
  - "Table 1" – Prescribed control methods or systems
  - Performance or Objective Data
  - Scheduled air monitoring
- Additional contractor requirements (following slide)
- Medical exams: Medical surveillance (exams) must be offered for employees required by the standard to wear a respirator for 30 or more days per year



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## THE NEW STANDARD HAS ADDITIONAL REQUIREMENTS FOR CONTRACTORS BEYOND EXPOSURE COMPLIANCE

1. Develop and keep a written exposure control plan
2. Designate a key competent person to implement the exposure control plan, identify exposure risks, take actions to correct exposure issues
3. Train workers to work safely with regards to silica dust
4. Restrict housekeeping practices when silica dust is involved (dry sweeping of concrete)
5. Maintain records of the above
6. And more... – See OSHA 29 CFR 1926.1153 for full requirements

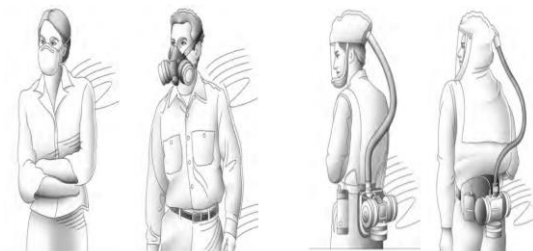


## NEW STANDARD OFFERS 3 OPTIONS FOR EXPOSURE CONTROL PROVIDING FLEXIBILITY & DEFINED SOLUTIONS

OSHA Table 1	Objective data performance testing	Scheduled air monitoring
Choose a pre-determined control solution, based on your application, from OSHA Table 1 – Exposure Control Methods for Silica Dust.	Utilize performance or objective data (internal or 3 <sup>rd</sup> party) to document that workers performing a particular application are in compliance with the permissible exposure limit of $\leq 50 \mu\text{g}/\text{m}^3$ averaged over an eight hour day.	Periodically test for a particular application to validate if the user falls under the permissible exposure limit of $\leq 50 \mu\text{g}/\text{m}^3$ .



## RESPIRATORS CAN DRIVE MEDICAL SCREENING REQUIREMENTS UNDER THE NEW STANDARD



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

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

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

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

Either APF 10 or APF 25

### Key respirator topics

- Employers must provide medical screening for workers required by the new standard to wear a respirator for 30 days or more in a year
- Certain respirators will require fit testing
- Respirators are required for:
  - Certain table 1 solutions
  - Non-table 1 applications exposing workers to silica levels higher than the permissible exposure limit [50 µg/m<sup>3</sup>]
- You can utilize objective data to eliminate the need to wear a respirator

Refer to Table 1 or your written exposure control plan for more information regarding when you need to wear a respirator



## TABLE 1: OPTION TO USE PRE-DEFINED OSHA APPROVED ENGINEERING CONTROLS FROM TABLE 1 LIST

Examples of engineering control measures found in Table 1 of the regulation 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 applications found in

Table 1 :

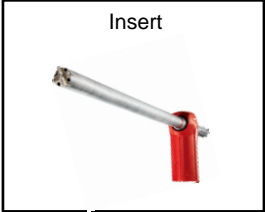
- **Gas saw cutting** – wet
- **Coring**– wet
- **Drilling** – w/ shroud and vacuum system
- **Breaking** – wet or with shroud and vacuum system
- **Grinding** – wet or with shroud and vacuum system

source: [www.osha.gov/silica](http://www.osha.gov/silica)

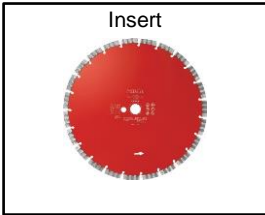


# DUST CONTROL SYSTEMS WILL BE EITHER WET OR DRY

## Dry solutions



## Wet solutions



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# SOLUTIONS FOR DUST-GENERATING APPLICATIONS

## Drilling



Cordless rotary up to 5/8"



Drilling up to 1-1/8"



SDS-MAX Up to 2"



Dry coring up to 6"



Wet coring up to 6-1/2"

## Breaking



SDS-max rotary hammers



Wall breakers



Medium-duty floor demo



Heavy-duty floor demo

## Cutting and Grinding



Cutting/tuck pointing



Grinding



Dry cutting up to 4-3/4"



Wet cutting up to 6"



Wet slitting/cutting



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# EMPLOYERS CAN USE OBJECTIVE DATA TO PROVE EXPOSURE LEVELS AND POTENTIALLY REMOVE RESPIRATOR REQUIREMENT

## Performance option (objective data):

- **Use data from an internal, industry or 3<sup>rd</sup> party testing**, to determine the whether amount of respirable crystalline silica that workers are exposed to may be at or above an action level of 25 µg/m<sup>3</sup> (micrograms of silica per cubic meter of air), averaged over an eight-hour day
- Use engineering controls to protect workers from silica exposures above the action level of 25 µg/m<sup>3</sup> (micrograms of silica per cubic meter of air), averaged over an eight-hour day
- **Use data from an internal, industry or 3<sup>rd</sup> party testing** to prove workers are exposed to less than the respirable crystalline silica PEL of 50 µg/m<sup>3</sup>, averaged over an eight-hour day. (Permissible exposure limit)
- Respirators are not required if workers are exposed to less than the respirable crystalline silica PEL of 50 µg/m<sup>3</sup>, averaged over an eight-hour day.
- Determine how long a worker may perform a task while staying below the PEL of 50 µg/m<sup>3</sup>, 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



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# CORDLESS ROTARY HAMMER WITH ON-BOARD DUST COLLECTION [TABLE 1, SECTION VII]



Table 1 Requirements		OSHA Compliance
Engineering controls	Respirator needed?	Method
99% filter efficiency	No	Objective Data
Filter-cleaning mechanism		
HEPA for hole-cleaning		

### NOTES:

- Performance data allows for use with current system without respirator, under defined conditions
- Table 1 solution requires a filter cleaning mechanism in the vacuum
- HEPA filter not required for drilling, only required for hole cleaning
- HEPA does not necessarily provide an added benefit:
  - the more material collected by the filter and the smaller the filter pore size, the faster it clogs



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## SDS+ ROTARY DRILLING WITH A SHROUD AND DUST COLLECTION SYSTEM [TABLE 1, SECTION VII]



Table 1 Requirements		OSHA Compliance
Engineering controls	Respirator needed?	Method
99% filter efficiency	No	Table 1
Filter-cleaning mechanism		
HEPA for hole-cleaning		

### NOTES:

- System available for any Hilti rotary hammer drill with a depth gauge
- HEPA filter not required for drilling, only required for hole cleaning
- Consider Hilti SafeSet™ or similar solution for drilling applications to eliminate the requirement to clean holes for anchoring by using a Hollow drill bit



## SDS-MAX DRILLING (WITH HILTI SDS-MAX COMBIHAMMER)

[TABLE 1, SECTION VII]



Table 1 Requirements		OSHA Compliance
Engineering controls	Respirator needed?	Method
99% filter efficiency	No	Table 1
Filter-cleaning mechanism		
HEPA for hole-cleaning		

### NOTES:

- HEPA system required for cleaning out holes
- Consider hollow drill bit solution for drilling applications eliminates the requirement to clean holes for anchoring by using a Hollow drill bit



## HOLLOW DRILL BITS

[TABLE 1, SECTION VII]



Table 1 Requirements		OSHA Compliance
Engineering controls	Respirator needed?	Method
99% filter efficiency	No	Table 1
Filter-cleaning mechanism		
HEPA for hole-cleaning		

### NOTES:

- Eliminates the need for manual hole cleaning when SafeSet™ system is used with either HIT-HY 200 A/R or HIT-RE 500 V3 or other manufacturer approved system
- For chemical anchoring applications in cracked/uncracked concrete, and masonry
- If compressed air is used to clean holes, HEPA filtered vacuum is needed



## SDS-MAX CHISELING (WITH HILTI SDS-MAX COMBIHAMMER)

[TABLE 1, SECTION X]



Table 1 Requirements		OSHA Compliance
Engineering controls	Respirator needed?	Method
99% filter efficiency	<u>Outdoor:</u> >4 hours or any indoor (APF 10)	Table 1
Filter-cleaning mechanism		

### NOTES:

- DRS-Y shroud with Hilti vacuum provides a full Table 1 compliant solution for SDS-Max drilling, chipping or breaking





# JACKHAMMERS AND HANDHELD POWERED CHIPPING TOOLS [TABLE 1, SECTION X]



Table 1 Requirements		OSHA Compliance
Engineering controls	Respirator needed?	Method
99% filter efficiency	<u>Outdoor:</u> >4 hours (APF 10) <u>Indoor:</u> APF 10	Table 1
Filter-cleaning mechanism		

**NOTES:**

- DRS-B shroud with Hilti vacuum provides a full Table 1 compliant solution for all Hilti breakers (except the TE 3000-AVR)
- TE 3000 DRS solution will be available by June 23<sup>rd</sup>, 2017 compliance deadline.



# HANDHELD POWER SAWS (ANY BLADE DIAMETER)

[TABLE 1, SECTION II]



Table 1 Requirements		OSHA Compliance
Engineering controls	Respirator needed?	Method
Water delivery system	<u>Outdoor:</u> >4 hours (APF 10) <u>Indoor:</u> APF 10	Table 1

**NOTES:**

- Gas powered saws must be equipped with a water delivery system



## RIG-MOUNTED CORE SAWS OR DRILLS

[TABLE 1, SECTION VI]



Table 1 Requirements		OSHA Compliance
Engineering controls	Respirator needed?	Method
Water delivery system	No	Table 1

### NOTES:

- Core rigs equipped with a water delivery system
- Hilti interprets hand-held core drilling as also being Table 1, section VII "handheld...drills". See previous slides for requirements.



## HANDHELD GRINDERS FOR MORTAR REMOVAL (I.E., TUCKPOINTING)

[TABLE 1, SECTION XI]



Table 1 Requirements		OSHA Compliance
Engineering controls	Respirator needed?	Method
99% filter efficiency	$\leq 4$ hours: APF 10 $> 4$ hours: APF 25	Table 1
Filter-cleaning mechanism or cyclonic pre-separator		
25 cubic feet per minute (cfm) of airflow per inch of wheel diameter		

### NOTES:

- 4-1/2" grinders would require 112.5 cfm; 5" grinders would require 125 cfm



# HANDHELD GRINDERS FOR USES OTHER THAN MORTAR REMOVAL [TABLE 1, SECTION XII]



Table 1 Requirements		OSHA Compliance
Engineering controls	Respirator needed?	Method
99% filter efficiency	<u>Outdoors:</u> none <u>Indoors:</u> > 4 hours (APF 10)	Table 1
Filter-cleaning mechanism or cyclonic pre-separator		
25 cubic feet per minute (cfm) of airflow per inch of wheel diameter		

- NOTES:**
- 4-1/2" grinders would require 112.5 cfm; 5" grinders would require 125 cfm



# ELECTRIC CONCRETE CUTTERS [TABLE 1, SECTION XII]



Table 1 Requirements		OSHA Compliance
Engineering controls	Respirator needed?	Method
99% filter efficiency	<u>Outdoors:</u> none <u>Indoors:</u> > 4 hours (APF 10)	Objective Data
Filter-cleaning mechanism or cyclonic pre-separator		
25 cubic feet per minute (cfm) of airflow per inch of wheel diameter		

- NOTES:**
- Performance data allows for use with current system without respirator, under defined conditions
  - Table 1 solution requires a vacuum with 225 cfm for the DCH 230 or 300 cfm for the DCH 300 (Table 1 compliant system available by June 2017)



# HIGH PERFORMANCE HAND HELD FLOOR GRINDER

[TABLE 1, SECTION XII]



Table 1 Requirements		OSHA Compliance
Engineering controls	Respirator needed?	Method
99% filter efficiency	<u>Outdoors:</u> none <u>Indoors:</u> > 4 hours (APF 10)	Objective Data
Filter-cleaning mechanism or cyclonic pre-separator		
25 cubic feet per minute (cfm) of airflow per inch of wheel diameter		

**NOTES:**

- Performance data allows for use with current system without respirator, under defined conditions
- Table 1 solutions for the DG 150 (6" wheel) require vacuum with 150 cfm or greater (Table 1 compliant system available by June 2017)



# SCHEDULED SELF-MONITORING OPTION IS ALLOWED UNDER NEW OSHA STANDARD

### Additional OSHA requirements

- Develop and keep a **written exposure control plan**
- Designated a **key competent person** to implement the exposure control plan, identify exposure risks, and 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 anticipated to be required, under the silica standard, to wear a respirator 30 or more days per year
- **Keep records** of the above

source: [www.osha.gov/silica](http://www.osha.gov/silica)

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.



## WHERE TO GO FOR MORE RESOURCES

### Hilti dustless information website: [www.hilti.com](http://www.hilti.com)

- Overall information on the dustless topic
- White paper which simplifies the standard
- Links to OSHA informational sites
- Valuable industry-related questions and answers

### Dustless educational webinars:

- Informative and complimentary

Email a topical professional directly with questions:  
[silicadustquestions@hilti.com](mailto:silicadustquestions@hilti.com)

