



HILTI SUBMITTAL PACKAGE OSHA 1926.1153 TABLE 1, SECTION vii:

**Handheld and stand-mounted drills
(including impact and
rotary hammer drills)**

**Current Hilti self-contained dust collection systems:
DRS 4-A
DRS 6-A
DRS-M**



 For instructions on how to assemble these systems, please refer to the Hilti North America Youtube page

 Onboard systems

TABLE 1 REQUIREMENTS

These systems fall under table 1, **section vii: handheld and stand-mounted drills (including impact and rotary hammer drills)**. In order to be table 1 compliant, the below requirements must be met:

- 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
- Have a filter with 99% or greater efficiency and a filter-cleaning mechanism

Note: Vacuum must be equipped with a HEPA-filter when cleaning holes

Table 1 states that no respirator is required if the above controls are fully and properly implemented.

Equipment / Task	Engineering and work practice control methods	Required respiratory protections and minimum Assigned Protection Factor (APF)	
		≤ 4 hours / shift	> 4 hours / shift
Handheld and stand-mounted drills (including impact and rotary hammer drills)	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
		None	None

Check below to see how your system can be compliant with 1926.1153. To verify the generation of your tool, check the rating plate, or call Hilti at 800-879-8000 with your serial number.

DRS module name	Tool name and generation	DRS system item number	Method of compliance
DRS 4-A	TE 4-A gen 1	n/a	Exposure assessment
	TE 4-A gen 2	2098490**	Objective data*
DRS 6-A	TE 6-A gen 1	2177080	Objective data* / Table 1
	TE 6-A gen 2	n/a	Exposure assessment
	TE 6-A gen 3	n/a	Exposure assessment
	TE 6-A gen 4	2040914	Objective data
DRS-M	TE 6 / 6-S / 7 / 7-C / TE 7-A	2172902	Objective data* / Table 1
		2098511**	Objective data*
		267769	Objective data*

*See Hilti’s published Objective Data — if not applicable to a specific application, exposure assessment is required.

**Can be upgraded to table 1 compliance through purchase of the compliant filter box

SYSTEM OVERVIEW

Self-contained dust-collection systems are systems that fit on the tool and do not require a separate stand-alone vacuum to collect dust. Hilti currently offers the below systems with this configuration:

Tool	Accessory	Vacuum
 <p>Rotary hammer TE 4-A 18 or TE 4-A 22</p>	 <p>Dust removal system TE DRS 4-A</p>	
 <p>Rotary hammer TE 6-A 36</p>	 <p>Dust removal system TE DRS 6-A</p>	
 <p>Rotary hammer TE 7 or TE 7-C</p>	 <p>Dust removal system TE DRS-M</p>	

Note: previous generations of tools may have different item numbers or nomenclature. Check with your local Hilti representative or product instruction manual to verify

OSHA 29 CFR §1926.1153 RESPIRABLE SILICA DUST EXPOSURE

Hilti TE 4-A/6-A with on-board dust removal system (DRS)

Hilti has performed testing of the above system to determine the operator's respirable silica dust exposure in accordance with EN 50632-1 and EN 50632-2-6¹. Testing was performed under the following conditions:

- Room size: 7.8m x 7.8m x 3.3m Closed — no air exchange
- Drilled hole dimensions: $\varnothing 5/8'' \times 2''$
- Test duration: 1 hour
- Total holes drilled: 75
- Drilling orientation: overhead
- Base material: concrete
- Sampler: 10 l/min GSP pump, FSP sampler, ISO 7708-compliant, 5 μm filter
- Air sample volume collected during test: 600 liters
- Dust collection receptacle on tool emptied every 8 holes drilled



DRS module items 2098490 (TE 4A gen 2) and 2172902 (TE 6A gen 4) only

Results:

Time-Weighted Average Respirable Silica Dust Exposure^{2,3}	45 $\mu\text{g}/\text{m}^3$
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1 Exception: EN 50632-2-6 specifies drilling one hundred twenty $\varnothing 16\text{mm} \times 50\text{mm}$ holes at a 15° downward-from-horizontal position.
2 The silica content of base materials varies. As a result, the silica content in respirable dust samples also varies. The above-published exposure value is based on a 20% silica content applied to the total respirable dust measurement. Measured average silica content during testing was 13.8%.
3 Exposure value represents the time-weighted average (TWA) over the 1-hour test period. Due to the test being conducted in a closed, non-ventilated room, this TWA exposure value would increase if the test duration was extended under the same conditions.
4 These test results can be applied for modules used with previous generations of tools.

HOW TO UTILIZE HILTI “OBJECTIVE DATA”

29 CFR §1926.1153(d)(2)(ii)

Performance option

Hilti has conducted testing to establish the respirable silica dust exposure (exposure level), associated with the use of various Hilti tool systems. These tests were performed in accordance with EN 50632, except the specific work configuration may vary to provide more versatile data and better address U.S. practices. The purpose of the testing was to generate “Objective Data” to be used as part of the exposure assessment requirements of 29 CFR §1926.1153(d)(2)(ii).

Per the EN standard, testing was performed for 1 hour in a 200m³ closed, non-ventilated room. Under these conditions, exposure levels increase over time. The exposure values published in Hilti’s Objective Data represent the average over the 1-hour test period (1-hour TWA)¹. Meaning the TWA started at zero, rose to the published 1-hour value, and would continue to rise if the test were continued.

There are several underlying concepts important to applying the Objective Data to any case-specific assessment:

1. More/less work performed in a given time period will increase/decrease the exposure level.
2. Larger/smaller room size will decrease/increase the exposure level.
3. Air exchange decreases exposure levels. Specifically, a 100% air-exchange every hour (either by the work moving to a discrete area, or via sufficient air movement), means Hilti’s published 1-hour TWA exposure level is expected to conservatively represent a steady-state TWA. The conceptual basis is two-fold: air exchange would inherently reduce the published “closed room” exposure value. And sufficient air exchange to “reset” the environment every hour would keep the exposure values at that level. For reference, a typical 20”, 2500 CFM box fan would introduce 100% new air volume in Hilti’s test chamber (7,200 ft³), every 3 minutes².
4. The OSHA 50 µg/m³ Permissible Exposure Limit (PEL), is based on an 8-hour TWA. This means the exposure level as an 8-hour TWA is ≤50 µg/m³; a 4-hour TWA is ≤100 µg/m³ (assuming no exposure for the remainder of the shift); a 2-hour TWA is ≤200 µg/m³ (assuming no exposure for the remainder of the shift) etc. (time [hours] x exposure level [µg/m³] ≤ 400).

Hilti’s published Objective Data states the amount of work performed during the 1-hour test (“1-hour work”). Therefore, the respirable silica dust exposure level in any case-specific situation is expected to be below the 8-hour TWA PEL in the following conditions³:

- An employee performing ≤ “1-hour work” during a shift.
- An employee performing ≤ “1-hour work” in an hour, then moving to another discrete area and performing ≤ “1-hour work” in an hour, etc., throughout an entire shift.
- An employee performing ≤ “1-hour work” each hour, in an environment with sufficient airexchange to prevent accumulation of airborne dust.

¹ Hilti’s published Objective Data incorporates a silica content of 20% of the total respirable dust measurement. Site-specific silica content varies. OSHA Docket No. OSHA-2010-0034, reviewed 588 respirable dust samples from construction tasks, finding the silica content varied from <1%-50%, with an average of 9.1%.

² Note introduction/exhaust of 100% air volume does not necessarily correlate to a 100% air exchange.

³ As long as: (1) Hilti’s published Objective Data exposure level is ≤50 µg/m³; (2) work is performed in a room with volume ≥ 200m³, and/or having adequate ventilation; and (3) site-specific respirable silica content is ≤20% of total respirable dust.

HOW TO USE THE TABLE 1 SOLUTION

Cordless rotary hammer

TE DRS OSHA

Hilti developed TE DRS dust collection system with a filter cleaning mechanism and 99% filter efficiency, compliant with OSHA 1926.1153, Table 1. The TE DRS-4-A dust box is compatible with the TE DRS-4-A and TE DRS-4-A (T1) only. The TE DRS-6-A dust box is compatible with the TE DRS-6-A and TE DRS-6-A (T1) only.

Set-up

1. Empty the TE DRS dust box, and clean and inspect the filter.
2. Attach the TE DRS module to the rotary hammer.
3. Start TE DRS vacuum by pressing tool's control switch.
4. Verify proper operation of the TE DRS vacuum, including suction at the extraction head.
 - Check for damage or leaks in the dust box, hose, and extraction head.
 - Make sure the hose extends/retracts freely.

Drilling

1. Start drilling, and allow the TE DRS to reach full speed before beginning to drill.
 - Hold the rotary hammer perpendicular to the work surface and keep the extraction head in contact with the work surface.
2. To maximize dust collection, after the hole is drilled, slowly withdraw bit from the hole, and keep the rotary hammer running until the bit is fully withdrawn.

Cleaning and maintenance

- Empty the dust box after every 5 in³ of hole drilling (e.g. after 8-10 holes 5/8 in x 2 in (16 mm x 50 mm)).
- After every 3 in³ of hole drilling (e.g. after 5 holes \varnothing 1/2 in depth 3 in (\varnothing 12 mm x 76 mm)) or if suction performance decreases push the button of the cleaning mechanism 5 times in each direction.
- To minimize dust emission, either use a vacuum to clean the dust box or place the dust box in a plastic bag keeping it closed as much as possible.
- Replace the filter if the dust debris cannot be removed, or if there are any tears or leaks in the filter.
- If more-than-usual dust is emitted during drilling, inspect the TE DRS system, and clean/inspect the dust box and filter.