



## Objective Data Testing for Concrete Drilling (Overhead)

### **Bosch Rotary Hammer (GBH18V-26) With Integrated Dust Collection Attachment (GDE18V-16)**

#### OSHA 29 CFR § 1926.1153 - Respirable Silica Dust Exposure

Bosch conducted a respirable silica and dust exposure assessment to understand the operator's exposure level, per the application performed. The results of the test conclude with objective data for compliance under the exposure assessment requirements of the OSHA 29 CFR § 1926.1153 - Respirable Crystalline Silica Standard.

#### Test Conditions:

- **Sampler:**<sup>1</sup> SKC Leland Legacy Pump (8 liters per minute)
- **Air Sample Volume Collected:** 394 liters
- **Duration:** 50 minutes
- **Base Material:** Concrete (5,000 psi)
- **Room Size:**<sup>1</sup> 1,979 m<sup>3</sup>
- **Ventilation:** Closed with no ventilation (high exposure level vs ventilated room)
- **Drilling Orientation:** Overhead (higher exposure level vs vertical or downward)
- **Total Holes Drilled:** 75
- **Hole Dimensions:** ½" (diameter) x 1 ½" (deep)
- **Dust container emptied:** Every 10 holes<sup>5</sup>

#### **RESULTS:**

Time-Weighted Average Respirable Silica Dust Exposure <sup>2,3,4</sup> (8 hours)	2.6 µg/m <sup>3</sup>
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<sup>1</sup> A single test was conducted in a closed room with no ventilation. Exception: EN50632-1 specifies using a room size of 200 m<sup>3</sup> and EN50632-2-6 specifies drilling one hundred twenty ø16mm x 50mm holes at a 15° downward-from-horizontal position; and the monitor be equipped with an 8-micron filter. All air samples were collected in accordance with modified OSHA ID-142, XRD (X-ray diffraction) sampling methods. SKC PPI's have been approved for use in this method in lieu of a cyclone.

<sup>2</sup> The base material silica content varies. Therefore, the silica content in respirable dust samples also varies.

<sup>3</sup> The exposure value represents the time-weighted average based on the 50 minute single test period performed. If the test condition was extended, under the same conditions, the TWA exposure value would increase.

<sup>4</sup> Each employer must make assessment of your worker's environment and compare to these test conditions for proper compliance with the OSHA Regulation. As of 6/1/2017, OSHA has not included "integrated dust vacuums without filter cleaning" as part of Table 1.

<sup>5</sup> Please refer to the Owner's Manual for proper process when emptying the "dust container".

29 CFR §1926.1153(d)(2)(ii)  
Performance Option  
Utilizing Bosch “Objective Data”

Bosch conducted respirable silica and dust exposure assessment testing to keep the operator’s exposure potential level, per overhead drilling (75 holes ½” diameter 1-1/2” deep) application performed, using representative Bosch systems (tool, attachment, accessory and dust extractor). The assessment tests were done in accordance with EN 50632<sup>1</sup>, except modifying the work applications to U.S. practices; in order to gain relative objective data. The generated “Objective Data” provides an understanding as part of the assessment of respirable dust exposure requirements of 29 CFR §1926.1153(d)(2)(ii).

According to the EN standard, testing is performed for one-hour in a closed and non-ventilated 200m<sup>3</sup> room. As these conditions provide a benchmark; the longer the time on an application the more increase in exposure levels. Bosch conducted one test per application, resulting in the exposure values being published as “Bosch Objective Data”, representing the average over a one-hour test (1-hour TWA). These one-hour exposure levels would incrementally increase if the test time were extended beyond one hour.

Several key points for any assessment evaluation based on the Objective Data:

1. Room size will have a direct effect on exposure levels (the larger the room, the less exposure level) <sup>1</sup>.
2. Air movement within the work environment has a direct effect on exposure levels. Please note that a closed environment (with no ventilation) will represent closer to Bosch’s 1-hour Respirable Silica Sample Result TWA.
3. Time performed on an application will have a direct effect on exposure levels (the longer the time, higher the exposure level).
4. OSHA’s 50 µg/m<sup>3</sup> Permissible Exposure Level (PEL) relates to an 8-hour TWA. Therefore, when calculating the total exposure level over eight hours it cannot exceed 50 µg/m<sup>3</sup>.  
Example: (2 hours @ 75 µg/m<sup>3</sup>) + (1.5 hours @ 50 µg/m<sup>3</sup>) + (1 hour @ 100 µg/m<sup>3</sup>) = 325 µg/m<sup>3</sup> / 8 hours or 8-hour TWA = 40.6 µg/m<sup>3</sup>.

Bosch’s Objective Data represents one test per application and the amount of work performed during the one-hour test. The results provide the respirable silica dust exposure level based on the specific testing conditions, and in specific case situations it is expected to be below the 8-hour TWA PEL if:

1. The worker perform work for less than or equal to one hour in same environment.
2. Adequate air-exchange, within an environment, to prevent significant airborne dust accumulation during the one-hour work application is maintained for the worker.
3. All work, done by one worker, in one eight hour shift must cumulatively meet the PEL requirements.

<sup>1</sup> EN50632-1 (Pub. 9/30/2015) specifies using a room size of 200 m<sup>3</sup> and EN50632-2-6 (Pub. 9/4/2015) specifies drilling one hundred twenty ø16mm x 50mm holes at a 15° downward-from-horizontal position; and the monitor be equipped with an 8-micron filter. All air samples were collected in accordance with modified OSHA ID-142, XRD (X-ray diffraction) sampling methods. SKC PPI’s have been approved for use in this method in lieu of a cyclone.