



ESTD. 1924

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OSHA 29 CFR §1926.1153

Respirable Silica Dust Exposure - Objective Test Data

SKILSAW® SPT79A WITH VACUUM

Skilsaw has performed testing of the above system to determine the operator's respirable silica dust exposure in accordance with EN 50632-1 and EN 50632-2-22. Testing was performed under the following conditions:

- Room size: 44ft x 16ft x 10ft ceiling (~200 m³). Closed – no air exchange
- Cutting disc: Ridgid SG70CP
- Test duration: 60 minutes
- Cutting depth: 25/32 inch (20mm)
- Cutting length: 60.4 feet (18.4m)
- Cutting orientation: horizontal, 8inches above floor level
- Average cutting speed: 1.2ft/min (.366m/min)
- Base material: 4 inch thick Concrete block (~5000PSI)
- Vacuum: Pullman-Holt Model S50 (rated 88 CFM at hose)
- Vacuum Operation: Vacuum "On" only when tool "On", Filter shaking performed every 12 minutes, maximum vacuum current level
- Sampler: 2.0 l/min SKC pump with Parallel Particulate Impactor (PPI) sampler, 37mm diameter, 5µm filter
- Average air sample volume collected during tests: 126 liters

Results^{1,2}:

1-Hour Time Weighted Average Silica Dust Exposure: 517 µg/m³

Estimated work time to reach PEL for 8 hours: 46 minutes (based on 1-Hour TWA of 517 µg/m³)

The 8-hour TWA is 50 µg/m³ if working 46 minutes @ 517 µg/m³ (1 Hour TWA), and no further exposure occurs throughout the shift.

Estimated work time to reach Action Level: 23 minutes

¹The 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 measured average silica content of 19.5%.

²Exposure 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.

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29 CFR §1926.1153(d)(2)(ii)

Performance Option

USING SKILSAW® “OBJECTIVE DATA”

Skilsaw has conducted testing to establish the respirable silica dust exposure (“exposure level”), associated with the use of the SPT79A dry cutting concrete with a vacuum system to generate “Objective Data” to be used as part of the exposure assessment requirements of 29 CFR §1926.1153(d)(2)(ii). 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.

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 Skilsaw’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.

Several important concepts when 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 Skilsaw’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.²
4. The OSHA 50 µg/m³ Permissible Exposure Level (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).

Skilsaw’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 when an employee performs ≤ “46 minutes work” during an 8-hour shift³.

¹ Skilsaw’s published Objective Data incorporates a silica content of 19.5% of the total respirable dust measurement. Site-specific silica content varies. Silica content can vary from <1%-50%, with an average of 9.1% per OSHA Docket No. OSHA-2010-0034.

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

³ As long as: (1) Skilsaw’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 ≤19.5% of total respirable dust.