

# MAPEI products and OSHA’s silica standard

In October of 2017, new OSHA thresholds for workplace exposure to respirable crystalline silica were put in place by the Occupational Safety and Health Administration (OSHA). The new standard lowers the permissible exposure limit (PEL) for respirable silica to 0.05 mg/m<sup>3</sup> with an action level (AL) of 0.025 mg/m<sup>3</sup>.

To provide objective data to our customers, MAPEI has conducted jobsite testing of several of its products that contain up to 75% silica sand (and that are representative of the family of other MAPEI products containing silica). These tests were conducted while these products were being poured and mixed with water during an 8-hour period. An independent lab report is attached to this

bulletin that provides much more information concerning the testing conducted and workplace conditions existing at the time of the test.

The results of this testing indicate that pouring and mixing these powdered mortar and patching products do not, when considered alone, introduce sufficient amounts of respirable crystalline silica into the workplace to cause employees to exceed the AL or PEL under the new OSHA guidelines. The jobsite results were much less than the AL. Actual and predicted results for various MAPEI products containing silica are as follows:

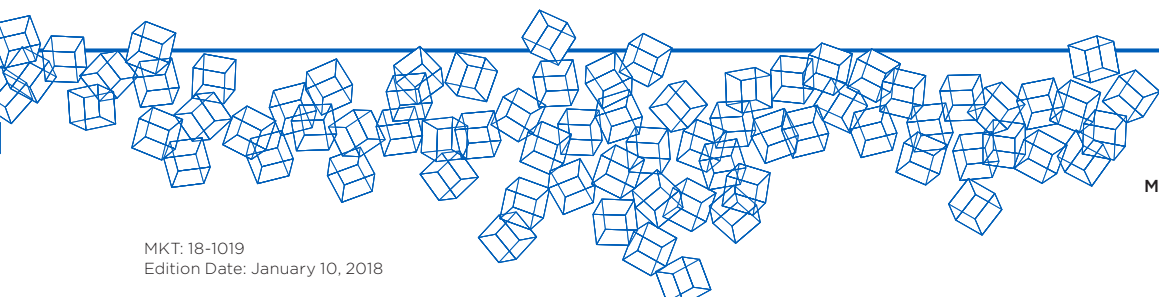
Product	Silica sand, minimum	Silica sand, maximum	Respirable crystalline silica – predicted 8-hour exposure	Actual results*
<i>Mapecem® Quickpatch</i>	50%	75%	< 0.025 mg/m <sup>3</sup>	0.0061 mg/m <sup>3</sup>
<i>Kerabond® T</i>	50%	75%	< 0.025 mg/m <sup>3</sup>	Product is included for comparison to the results for products tested
<i>Ultraflex LHT®</i>	50%	75%	< 0.025 mg/m <sup>3</sup>	Product is included for comparison to the results for products tested
<i>Ultraflex™ 2</i>	50%	60%	< 0.025 mg/m <sup>3</sup>	Product is included for comparison to the results for products tested
<i>Ultraflex 3</i>	50%	60%	< 0.025 mg/m <sup>3</sup>	Product is included for comparison to the results for products tested
<i>Ultraflor™ Plus</i>	50%	60%	< 0.025 mg/m <sup>3</sup>	Product is included for comparison to the results for products tested
<i>Ultraflex™ LFT™</i>	40%	60%	< 0.025 mg/m <sup>3</sup>	0.0059 mg/m <sup>3</sup>
<i>Ultracontact®</i>	40%	60%	< 0.025 mg/m <sup>3</sup>	Product is included for comparison to the results for products tested
<i>Ultraflex RS</i>	40%	60%	< 0.025 mg/m <sup>3</sup>	Product is included for comparison to the results for products tested
<i>Ultraflex LFT Rapid</i>	20%	40%	< 0.025 mg/m <sup>3</sup>	Product is included for comparison to the results for products tested
<i>MAPEI Ultralite™ S2</i>	20%	40%	< 0.025 mg/m <sup>3</sup>	Product is included for comparison to the results for products tested
<i>MAPEI Ultralite S1 Quick</i>	5%	10%	< 0.025 mg/m <sup>3</sup>	Product is included for comparison to the results for products tested
<i>Planipatch®</i>	0.49%	1%	< 0.025 mg/m <sup>3</sup>	Product is included for comparison to the results for products tested
<i>Planiprep™ SC</i>	0.25%	0.49%	< 0.025 mg/m <sup>3</sup>	Product is included for comparison to the results for products tested
<i>MAPEI Ultralite Mortar Pro</i>	0.25%	0.49%	< 0.025 mg/m <sup>3</sup>	Product is included for comparison to the results for products tested
<i>MAPEI Ultralite Mortar</i>	0%	0%	< 0.025 mg/m <sup>3</sup>	Product is included for comparison to the results for products tested

\* Actual results are for one particular jobsite under those specific conditions noted in the lab report. Your results may differ.

Please note that respirable crystalline silica can also be emitted by ingredients such as Portland cement. All maximum and minimum levels are derived from our Safety Data Sheets (SDSs) available at the time this technical bulletin was generated. We list a range on our SDSs because these products are manufactured at multiple facilities throughout the United States. The predicted exposure is based on best practices for mixing – adding powder to water in the bucket, pouring from a minimum distance above the bucket, and mixing at 300 rpm or less.

The above chart should allow employers to focus on more significant sources of respirable crystalline silica when developing their written exposure control plan.

For more information, visit <https://www.osha.gov/dsg/topics/silicacrystalline/>.



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***INDUSTRIAL HYGIENE STUDY***

***FOR***

***MAPEI***

***US CELLULAR FACILITY***

***CHICAGO, ILLINOIS***

***OCTOBER 17, 2017***

***PROJECT NUMBER: 17-36218***



A DIVISION OF GALLAGHER BASSETT SERVICES, INC.

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## EXECUTIVE SUMMARY

An industrial hygiene study was conducted on October 17, 2017 for Mapei, at the US Cellular regional office in Chicago, IL. The study was conducted to evaluate potential employee exposures to respirable silica and respirable dust while mixing the tile mortar. Mapei manufactures industrial adhesives. The study was conducted as a proactive baseline assessment.

The employee's exposure concentrations were evaluated with respect to the Occupational Safety and Health Administration's permissible exposure limits and action limits (OSHA PEL and AL) and the American Conference of Industrial Hygienists threshold limit values (ACGIH TLV). PEL are legal limits and TLV's are recommended exposure guidelines. TLV's for most air contaminants are more current than PEL's as they are reviewed and updated annually. Both PELs and TLVs are typically based on eight (8) hour time weighted averages (TWA).

Sample results for the mixing operation of LFT Thinset and Quickpatch were under the applicable recommended and regulatory limits. Sample results were under the current OSHA PEL.

Based on the sample results and conditions observed at the time of the study the following summary of recommendations is offered:

1. Based on the results of the assessment, the current respiratory protection is adequate for the operation performed. No further actions are required at this time.
2. In accordance with OSHA standard 1926.1153, construction silica standard results included in this report must be provided to employees within 5 days.

Additional details regarding the recommendations outlined above are offered in this report. The data reported represents results for several select products under conditions unique to the sampling dates and conditions of the study. Any significant changes in work practices, protocols, procedures, or controls should be evaluated by an industrial hygiene professional.

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## I. INTRODUCTION

An industrial hygiene study was conducted on October 17, 2017 for Mapei, at a facility in the greater Chicago, IL area. The study was conducted to evaluate potential employee exposures to respirable silica and respirable dust while mixing the tile mortar. Mapei manufactures industrial adhesives. The study was conducted as a proactive baseline assessment. Samples were collected from the following operations:

- Mixing – LFT Thinset (1)
- Mixing – Quickpatch (1)

Mr. Dan Petras, of Aires Consulting, a division of Gallagher Bassett Services, Inc. conducted the study. Mr. Timothy St. Pierre, MPH, CIH, CSP, assisted in the study design and data evaluation. MAPEI supplied essential information and assistance during the study.

## II. SAMPLING METHODS AND EXPOSURE GUIDELINES

### ***SAMPLING MATERIALS AND METHODS***

Personal and area samples were collected using portable sampling pumps and collection media. Respirable samples were collected using a particle size selective aluminum cyclone. Pump flow rate was established before, during and after the evaluation using a Dwyer rotameter that was calibrated with a Gilian Gilibrator electronic flow meter. An analytical blank (control) sample was submitted for each analyte unless otherwise noted.

This sampling methodology meets the requirements outlined in the Occupational Safety and Health Administration (OSHA) technical manual; Personal Sampling for Air Contaminants (Section II: Chapter 1).

The specific methodology for air sampling collection and analysis are outlined in Table 1.

Table 1. Air sampling methodology

Contaminant	Collection Media	Analytical Method
Silica with Respirable Dust	Pre-weighed PVC filter cassette	Mod. NIOSH 0600

Samples requiring laboratory analysis were analyzed by Galson Laboratories of East Syracuse, NY. The laboratory is accredited under the American Industrial Hygiene Association (AIHA). Practices and procedures used by the laboratory conform to the recommended methods developed by the National Institute for Occupational Safety and Health (NIOSH) and OSHA.

## ***EXPOSURE GUIDELINES***

The employees' exposure concentrations were evaluated with respect to the Occupational Safety and Health Administration's permissible exposure limits and action levels (OSHA PEL and AL) and the American Conference of Industrial Hygienists threshold limit values (ACGIH TLV). The PELs and TLVs are intended as airborne concentrations of chemicals under which it is believed that a worker can be repeatedly exposed eight hours a day for a working lifetime without adverse health effects.

TLVs are revised annually to incorporate the latest scientific data. TLVs are used by professionals as guidelines and do not represent a strict separation between safe and hazardous environmental conditions. The guidelines are based upon the best available information from industrial experience, experimental human and animal studies and, when possible, a combination of the three.

OSHA recognizes that many of its permissible exposure limits (PELs) are outdated and inadequate for ensuring protection of worker health. OSHA adopted the majority of its PELs more than 40 years ago and since 1970, only 16 complete 6(b) standards with PELs and 13 standards for carcinogens (without PELs) have been promulgated. Recently, OSHA has acknowledged that new scientific data, industrial experience and developments in technology indicate that in many instances the mandatory PELs are not sufficiently protective of workers' health. OSHA recommends that employers consider using available alternative occupational exposure limits such as ACGIH TLVs, State PELs, The National Institute of Occupational Safety and Health (NIOSH) Recommended Exposure Limits (RELs), and other applicable limits.

## ***NEW OSHA SILICA STANDARD (Construction Industry)***

Respirable silica (quartz) is considered a fibrogenic dust. Long-term exposure to significant concentrations of free silica can lead to the progressive lung disease silicosis. The toxicity of silica-containing dust is directly related to the percentage of quartz contained in the dust.

On June 23<sup>rd</sup>, 2016, OSHA's new silica standard goes into effect. The new standard lowers the Permissible Exposure Limit (PEL) for respirable silica to 0.05 mg/m<sup>3</sup> with an action level (AL) of 0.025 mg/m<sup>3</sup>. Employers in the construction industry have until June 23<sup>rd</sup>, 2017 to comply with the updated regulations. A written exposure control plan is required under the new standard. The plan must describe

tasks involving exposure to respirable crystalline silica, engineering controls, work practices, and respiratory protection for each task, and finally housekeeping methods used to limit exposure. The construction industry has two (2) methods for compliance to the standard; Implementing specified exposure control methods or using alternative exposure control methods.

1. Specified exposure control methods: Table 1 in the construction standard outlines eighteen (18) common construction tasks with engineered exposure control methods and in some cases respirator requirements. If employers fully and properly implement the controls outlined in Table 1, they are exempt from certain requirements, such as compliance to the permissible exposure limit (PEL) and employee exposure monitoring for those engaged in select tasks. Medical surveillance will be required for employers who use respirators more than thirty (30) days a year.
2. Alternative exposure control methods: If an employer fails to comply with the specified exposure control methods in Table 1, exposures above the AL trigger certain compliance items such as baseline exposure monitoring, personal protective equipment, and/or medical surveillance. When the PEL is exceeded, compliance with all sections of the OSHA standard is mandatory.

Long-term exposure to elevated concentrations of free silica can lead to the progressive lung disease silicosis. The ACGIH TLV reflects research that indicates a significant silicosis risk for exposures greater than 0.025 mg/m<sup>3</sup> of respirable silica.

### III. PROCESS MONITORED, RESULTS AND RECOMMENDATIONS

Industrial hygiene monitoring was performed during routine operations on a tile company, while using multiple Mapei products. Employee exposures were assessed for select contaminants for the following processes. A summary of the sampling results is outlined below. Detailed sampling results can be found in Appendix I.

**PROCESS DESCRIPTION (Mixing – LFT Thinset):** The employee mixed mortar with water to create adhesive for laying tile. The following operations were monitored for potential employee exposure to select air contaminants.

One (1) employee mixing LFT Thinset mortar was monitored for respirable silica and respirable dust. The employee opened and dumped ¼ of LFT Thinset bags into a bucket of water at a time, and then used an



electric powered mixing tool to create the adhesive. The employee used 16 of the LFT Thinset 50 pound bags. The following activities were monitored:

- Mixing (1)

**PPE:** The employee wore a hard hat, steel toe, work clothes and nitrile gloves while mixing.

**RESULTS:** One employee was measured for respirable silica and respirable dust. The TWA sample result collected for silica was 0.0098 mg/m<sup>3</sup>; the adjusted eight (8) hour TWA was 0.0061 mg/m<sup>3</sup> as such, sample results were under the applicable TWA<sub>8</sub> regulatory/recommended limits.

The sample result collected for respirable dust was 0.21 mg/m<sup>3</sup>; the adjusted eight (8) hour TWA was 0.13 mg/m<sup>3</sup>. Again, sample results were under the TWA<sub>8</sub> applicable regulatory/recommended limits.

**DISCUSSION/RECOMMENDATIONS:** Based on the results of the assessment, the current respiratory protection is adequate for the operation performed.



Photo 1. Employee mixing LFT Thinset



Photo 2. Bag of LFT Thinset

**PROCESS DESCRIPTION (Mixing – Quickpatch):** The tile company mixed floor patch to prepare for tiling, this makes the surface even and smooth. The following operations were monitored for potential employee exposure to select air contaminants.

One (1) employee mixing Quickpatch mortar was monitored for respirable silica and respirable dust. The employee opened and dumped ¼ of Quickpatch bags into a bucket of water at a time, and then used an electric powered mixing tool to create the adhesive. The employee used 8.5 bags of the Quickpatch 50 pound bags. The following activities were monitored:

- Mixing (1)

**PPE:** The employee wore a hard hat, steel toe, work clothes and nitrile gloves while mixing.

**RESULTS:** One employee was measured for respirable silica and total dust. The sample result collected for silica was  $0.0090 \text{ mg/m}^3$ ; the adjusted eight (8) hour TWA was  $0.0059 \text{ mg/m}^3$ . As such, sample results were under the applicable regulatory/recommended limits.

The sample result collected for respirable dust was  $0.56 \text{ mg/m}^3$ ; the adjusted eight (8) hour TWA was  $0.37 \text{ mg/m}^3$ . Again, sample results were under the applicable TWA<sub>8</sub> regulatory/recommended limits.

**DISCUSSION/RECOMMENDATIONS:** Based on the results of the assessment, the current respiratory protection is adequate for the operation performed.



Photo 4. Employee mixing Quickpatch



Photo 5. Bag of Quickpatch

#### IV. SUMMARY OF RECOMMENDATIONS

Based on the sample results and conditions observed at the time of the study the following summary of recommendations is offered:

1. Based on the results of the assessment, the current respiratory protection is adequate for the operation performed. No further actions are required at this time.

In accordance with OSHA standard 1926.1153, construction silica standard results included in this report must be provided to employees within 5 days.

*Within five working days after completing an exposure assessment ... the employer shall individually notify each affected employee in writing of the results of that assessment or post the results in an appropriate location accessible to all affected employees*

It is recommended that all personnel sampling data be shared with employees who participated in the process and with those that may be represented by the monitoring results.

## V. PROFESSIONAL CERTIFICATION

We hope and trust the results of this study are useful. This study was not intended to include every health hazard or exposure that may be present in the facility; only those items specifically addressed in the report were evaluated. Results are based on conditions observed during our study. Substantial changes in production levels, methods of operation, or materials used can alter the outcome of an environmental study. If you have any questions concerning this study please do not hesitate to contact us.

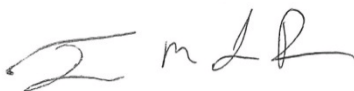
Aires retains electronic files of all reports, correspondence, and data. We do not retain hand written field notes indefinitely.

Respectfully submitted,



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