

# Memorandum

**Date:** May17, 2023

**To:** Christina Shupe, Executive Officer  
Occupational Safety and Health Standards Board  
2520 Venture Oaks Way, Suite 350  
Sacramento, CA 95833

**From:** Michael Wilson, Stacey Christian, Kevin Graulich, and Eric Berg  
Division of Occupational Safety and Health

**Subject:** Evaluation of Petition No. 597 to Amend Title 8 Section 5204 to Prevent Silicosis in the Engineered Stone Countertop Industry

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## EXECUTIVE SUMMARY

In an April 7, 2023 petition, the Western Occupational and Environmental Medicine Association (Petitioner) requested that the Standards Board (Board) adopt an emergency temporary standard (ETS) to protect workers from exposure to respirable crystalline silica (RCS) in the engineered stone fabrication industry. The Petitioner points to four problems that call for immediate action: (1) about 50 workers in the industry have been diagnosed with advanced silicosis, some of whom have now died; (2) these workers were exposed to RCS while working with engineered stone; (3) engineered stone contains up to 95% silica; and (4) the existing silica standard (§5204) is not well-suited for protecting employees in this industry.

The Petitioner recommends that an ETS be implemented wherever engineered stone is used that consists of  $\geq 50\%$  silica, and that it require (1) greater control over regulated areas where fabrication work is conducted; (2) prohibition of dry fabrication processes; (3) use of supplied air or powered air purifying respirators (PAPRs); (4) annual reporting to Cal/OSHA; and (5) classification of all citations as serious.

To understand the state of the science, Cal/OSHA performed a literature review and convened meetings with experts at UCSF and CDPH, who are reporting this month at the American Thoracic Society meeting that California is now facing a “statewide epidemic of silicosis among engineered stone fabrication workers.” Of 48 cases of silicosis identified among these workers between 2010 and 2022, 22 (46%) were identified in 2022 alone. In April 2023, UCLA physicians reported a caseload of more than 60 cases.

In its analysis, Cal/OSHA identified several factors that place employees in this industry at high risk, and which underscore the need for an ETS:

### Market Forces

Engineered stone now dominates the stone countertop industry and is expected to grow 9.6% annually over the next two years.

### A Uniquely Hazardous Product

Engineered stone is  $\geq 93\%$  crystalline silica, compared to 10-45% for granite.

### Challenges in Reducing Exposures

A combination of water jets, local exhaust ventilation, work practices, and personal protective equipment (PPE) is needed to reduce exposures.

### Severe Consequences of Exposures

The silicosis fatality rate in this industry is 18-20%; many of those who survive will likely face a lifetime of suffering from the effects of an incurable, disabling lung disease.

### Limitations of Small Businesses

Small businesses do not often have the capacity to implement effective RCS prevention strategies.

### Vulnerable Workers

The workforce is unrepresented and almost entirely foreign-born; English is a second language.

Cal/OSHA concurs with the Petitioner that section 5204 is a performance standard that is oriented primarily to large, well-resourced employers who are required to conduct sophisticated exposure assessments, and then implement RCS protections based on those assessments. This approach is not well-calibrated to the needs of California's stone fabrication industry, which is made up almost entirely of small shops with a median of five employees. In subsection 8.2, Cal/OSHA identifies several other limitations of section 5204 that blunt its effectiveness when applied to the small shops and high risk conditions found in this industry.

Perhaps not surprisingly, Cal/OSHA found widespread non-compliance with section 5204 during the 2019-2020 special emphasis program (SEP) in this industry. Based on these findings, Cal/OSHA estimates that about 582 (72%) of the 808 fabrication shops operating in the state today are likely out of compliance with the existing silica standard. Of the estimated 4,040 workers employed in the industry, Cal/OSHA estimates that about 1,000 (25%) are exposed over the PEL of 50  $\mu\text{g}/\text{m}^3$ . Cal/OSHA expects that between 485 and 848 workers in the industry will develop silicosis; of these, between 92 and 161 could die of pulmonary fibrosis and respiratory failure, absent complete lung transplants.

Accordingly, Cal/OSHA recommends that the Petitioner's requested actions be adopted into an ETS; however, to ensure the effectiveness of an ETS for this industry, Cal/OSHA recommends several additional changes to strengthen each subsection of §5204. These recommendations are described in subsection 9.0, below.

Finally, in addition to the adoption of a comprehensive ETS, Cal/OSHA recommends that the SEP reevaluate worker exposures in the industry as early as January 2024. If inspections show that (1) employers have moved quickly to implement the ETS; (2) exposures are below the action level across the industry; and (3) silicosis cases have dropped to zero, Cal/OSHA recommends that the ETS and associated enforcement activities be continued.

However, if inspections continue to show widespread non-compliance, as occurred in the 2019-2020 SEP, Cal/OSHA recommends that an advisory committee be immediately convened to develop plans for prohibiting the use of engineered stone products in California, effective July 1, 2024, following the lead of the Australian government.

In conclusion, because silicosis is a permanently disabling, progressive, and often fatal disease, and a silicosis epidemic is now occurring in the engineered stone countertop industry, Cal/OSHA recommends the Board do the following:

- Grant the petition;
- Request Cal/OSHA to develop language for an emergency regulation;
- Undertake emergency rulemaking;
- Follow up on the emergency rulemaking with regular rulemaking to establish a permanent regulation;
- Request Cal/OSHA to review inspection data within six months after implementation of the ETS to determine if the use of engineered stone should be prohibited.

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Appendix A

## 1.0 INTRODUCTION

Labor Code Section 142.2 permits interested persons to propose new or revised standards concerning occupational safety and health, and requires the Occupational Safety and Health Standards Board (Standards Board) to consider such proposals and render a decision no later than six months following receipt.

California Labor Code section 147 requires the Standards Board to refer to the Division of Occupational Safety and Health (Cal/OSHA) for evaluation any proposed occupational safety and health standard. Cal/OSHA is required to submit a report on the proposal within 60 days of receipt.

On April 7, 2023, Cal/OSHA received a petition from Dr. R. Terrazas, MD, MPH (petitioner) on behalf of the Western Occupational and Environmental Medicine Association (WOEMA). The petitioner requests the addition of an Emergency Temporary Standard (ETS) to title 8 to protect workers from the hazards of airborne silica dust in shops that fabricate engineered stone. The petitioner expresses concern that the existing standard for the control of silica hazards (title 8 California Code of Regulations (CCR) section 5204) is not sufficiently protective in such workplaces.

## 2.0 EMERGENCY TEMPORARY STANDARD (ETS) REQUESTED BY THE PETITIONER

The petitioner recommends that an ETS for the control of airborne crystalline silica in stone fabrication shops accomplish the following:

- Scope  
Cover all workplaces where engineered stone is used that consists of more than 50% silica.
- Regulated Areas  
Strictly control access to areas where engineered stone is fabricated.
- Dry fabrication  
Prohibit any activity conducted without the use of water to suppress dust.
- Respiratory protection  
Require the use of supplied air respirators or powered air purifying respirators (PAPRs), comparable to the requirements of 8 CCR 5208(g) for asbestos.
- Written Plan  
Require annual reporting to Cal/OSHA, pursuant to 8 CCR 5203.
- Penalties  
Require that violations of the ETS be classified as Serious.

The petitioner further requests that Cal/OSHA prepare specific guidance materials for physicians and other licensed health care providers (PLHCPs) who perform surveillance exams under 8 CCR 5204. Finally, the petitioner recommends that PLHCPs be required to report all silicosis cases to Cal/OSHA.

### 3.0 SILICOSIS IN THE ENGINEERED STONE FABRICATION INDUSTRY

#### 3.1 Exposure to Respirable Crystalline Silica (RCS) Can Result in Permanent Disability and Death from Silicosis

Inhalation of respirable crystalline silica (RCS) is associated with the development of silicosis, an incurable, progressive lung disease that can lead to pulmonary fibrosis, respiratory failure, and eventually death. RCS exposure is also associated with other diseases, including autoimmune disorders, chronic renal disease, lung cancer, pulmonary tuberculosis, and chronic obstructive pulmonary disease (COPD).<sup>1</sup>

RCS particles are those with diameters smaller than 10 µm, which is about 100 times smaller than ordinary sand.<sup>2 3</sup> When inhaled, RCS particles travel to the deep lung, where they trigger an inflammatory response that can produce fibrotic areas that are unable to exchange oxygen. This scarring process continues even after exposure to RCS stops, producing a progressive respiratory insufficiency that has been described as akin to suffocating.<sup>4</sup> Apart from a lung transplant, there is no effective treatment for silicosis.<sup>5 6</sup>

Workers in the occupations of mining, quarrying and sandblasting have long been recognized to be at risk of exposure to RCE and to the development of silicosis.<sup>7</sup>

#### 3.2 Engineered Stone Used in Fabricating Countertops Contains ≥93% Crystalline Silica.

Over the last decade, engineered stone has emerged as the predominant material used in fabricating countertops in the U.S. (Figure 1). It is marketed on the basis of its longevity and low maintenance and high resistance to scratches, stains and heat, while offering a variety of colors and patterns. In 2021, it surpassed all other materials to become the predominant countertop product in the U.S. for residential and commercial applications, with a market size of \$17.7 billion. U.S. demand for engineered stone countertops is expected to continue growing at 9.6% annually through 2026, solidifying the material's position as the most popular type of countertop material used in the U.S.<sup>8</sup>

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<sup>1</sup> National Institute for Occupational Safety and Health (NIOSH) (2002). Health effects of occupational exposure to respirable crystalline silica (publication no. 2002-129); 2022. <https://www.cdc.gov/niosh/docs/2002-129/default.html>. Accessed April 26, 2022.

<sup>2</sup> U.S. Department of Labor. Occupational Safety and Health Administration. Silica, Crystalline. Accessed April 25, 2023. <https://www.osha.gov/silica-crystalline>. Accessed April 26, 2022.

<sup>3</sup> Carrieri M, Guzzardo C, Farcas D, Cena L. Characterization of Silica Exposure during Manufacturing of Artificial Stone Countertops. *Int J Environ Res Public Health*. 2020 Jun; 17(12): 4489. <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7345731/>. Accessed May 3, 2023.

<sup>4</sup> Morris J, Rojas LB (December 2, 2022). Ancient Lung Disease Strikes Countertop Cutters in Southern California. *Public Health Watch*. <https://publichealthwatch.org/2022/12/02/lung-disease-silica-countertops-southern-california/>. Accessed April 27, 2023

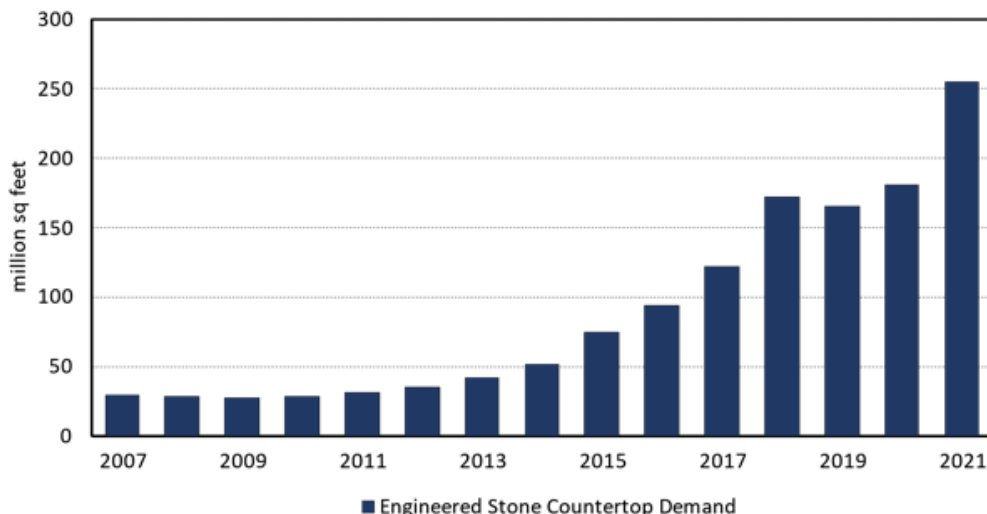
<sup>5</sup> Blackley DJ, Halldin CN, Hayanga JA, Laney AS. Transplantation for work-related lung disease in the USA. *Occup Environ Med*. 2020;77(11):790-794. <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7702182/>

<sup>6</sup> Krefft S, Wolff J, Rose C. Silicosis: an update and guide for clinicians. *Clin Chest Med*. 2020;41(4):709-722.

<sup>7</sup> NIOSH (2002). op. cit. <https://pubmed.ncbi.nlm.nih.gov/33153689/>

<sup>8</sup> Freedonia Group (Sept 2022). Industry Reports, United States. U.S. Engineered Stone Countertops. <https://www.freedoniagroup.com/industry-study/engineered-stone-countertops-4395.htm>. Accessed May 2, 2023

Figure 1. U.S. Engineered Stone Countertop Demand, 2007-2021 (million square feet).<sup>9</sup>



Engineered stone contains more than 93% crystalline silica, in combination with adhesives and pigments (Figure 2). In contrast, granite contains between 10% and 45% crystalline silica and marble contains little or no silica.<sup>10</sup> An analysis of silica dust generated from cutting and grinding engineered stone found that 54% was in the respirable range of  $\leq 10 \mu\text{m}$ .<sup>11</sup>

Figure 2. Silica content of engineered stone compared to natural stone.

Stone	Average % Silica
Engineered stone	$\geq 93$
Quartzite	95
Quartzitic sandstone	90
Sandstone	60
Granite	10 to 45
Slate	Varies
Soapstone	Varies

### 3.3 Workers in the Engineered Stone Fabrication Industry Perform Tasks that Expose them to RCS.

As of 2018, there were an estimated 8,694 establishments and 96,366 employees in the stone fabrication industry in the United States.<sup>12</sup> Workers in this industry perform cutting, grinding, edging, and contouring of

<sup>9</sup> Freedonia Group (Sept 2022), *ibid*.

<sup>10</sup> Occupational Safety and Health Administration (OSHA) and National Institute for Occupational Safety and Health (NIOSH) (2015). *Hazard Alert: Worker Exposure to Silica during Countertop Manufacturing, Finishing and Installation*. Publication number 2015-106. <https://www.osha.gov/sites/default/files/publications/OSHA3768.pdf>. Accessed May 2, 2023.

<sup>11</sup> Carrieri et al (2020), op. cit.. at reference 3.

<sup>12</sup> Data from the Bureau of Labor Statistics quarterly census of employment and wages (<https://www.bls.gov/cew/data.htm>external icon) for North American Industrial Classification System (NAICS) industry code

engineered stone slabs to fabricate them into countertops. Without the use of properly designed and operated engineering controls, such as water sprays and local exhaust ventilation (LEV), together with respiratory protection, workers are exposed to dangerous levels of RCS during these operations.<sup>13</sup>

Previous evidence suggests that this industry sector does not consistently apply these protective measures. A 2013 study among countertop fabrication shops in metropolitan areas of Oklahoma found that 74% of 47 shops primarily used dry methods in at least one step of their work process.<sup>14</sup>

As described below, Cal/OSHA found in its 2019 engineered stone Special Emphasis Program (SEP) that 26% of workers interviewed reported sometimes using dry methods to perform cutting, grinding, laminating, or polishing stone.

### **3.4 California is Experiencing a Statewide Epidemic of Silicosis Among Engineered Stone Fabrication Workers**

Beginning in 2012, outbreaks of silicosis have occurred in California, the U.S. and other nations among workers who cut, shape, and finish engineered stone slabs for use as countertops, a process known as stone fabrication.<sup>15 16 17 18 19</sup> The affected workers were exposed to RCS as a consequence of working with engineered stone, a composite material used in fabricating countertops that contains ≥93% silica, as noted above. Many of the affected workers in these cases were young and experienced a rapid onset of severe silicosis.

Among these initial silicosis cases were six California workers, all under age 60, who were identified in 2019. Two of these individuals died of silicosis in their 30s.<sup>20</sup> Investigators attributed these cases to the high silica content of engineered stone; exposure to high levels of RCS generated during cutting, grinding,

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327911 (Cut Stone and Stone Product Manufacturing) and NAICS code 423320 (Masonry Material Merchant Wholesalers). At time of access, data for 2018 were preliminary. Cited in Rose et. al. MMWR (2019) op. cit. at reference 16.

<sup>13</sup> U.S Department of Labor, Occupational Safety and Health Administration. Final Economic Analysis and Final Regulatory Flexibility Analysis. Supporting Document for the Final Rule for Occupational Exposure to Respirable Crystalline Silica. Chapter IV Technological Feasibility. Mar 23, 2016. <https://www.regulations.gov/document/OSHA-2010-0034-4247>

<sup>14</sup> Phillips, M.L., Johnson, D.L., & Johnson, A.C. (2013). Determinants of Respirable Silica Exposure in Stone Countertop Fabrication: A Preliminary Study. *J Occup Environ Hyg*, 10(7), 368-373. <https://pubmed.ncbi.nlm.nih.gov/23668829/>. Accessed May 2, 2023.

<sup>15</sup> Heinzerling A, Cummings KJ, Flattery J, Weinberg JL, Materna B, Harrison R. Radiographic screening reveals high burden of silicosis among workers at an engineered stone countertop fabrication facility in California. *Am J Respir Crit Care Med*. 2021;203(6):764-766. <https://pubmed.ncbi.nlm.nih.gov/33207123/>. Accessed May 8, 2023.

<sup>16</sup> Leso V, Fontana L, Romano R, Gervetti P, Iavicoli I. Artificial stone associated silicosis: a systematic review. *Int J Environ Res Public Health*. 2019;16(4):568. <https://pubmed.ncbi.nlm.nih.gov/30781462/>. Accessed May 8, 2023.

<sup>17</sup> Rose C, Heinzerling A, Patel K, et al. Severe silicosis in engineered stone fabrication workers—California, Colorado, Texas, and Washington, 2017–2019. *MMWR* 2019;68(38):813-818. <https://www.cdc.gov/mmwr/volumes/68/wr/mm6838a1.htm>. Accessed May 9, 2023.

<sup>18</sup> Tustin AW, Kundu-Orwa S, Lodwick J, Cannon DL, McCarthy RB. An outbreak of work-related asthma and silicosis at a US countertop manufacturing and fabrication facility. *Am J Ind Med*. 2021;65(1):12-19. <https://pubmed.ncbi.nlm.nih.gov/34671999/>. Accessed May 8, 2023.

<sup>19</sup> Paolucci V, Romeo R, Sisinni AG, Bartoli D, Mazzei MA, Sartorelli P. Silicosis in workers exposed to artificial quartz conglomerates: does it differ from chronic simple silicosis? *Arch Bronconeumol*. 2015;51(12):e57-e60 <https://archbronconeumol.org/en-silicosis-trabajadores-expuestos-conglomerados-artificiales-articulo-S1579212915001883>. Accessed May 9, 2023.

<sup>20</sup> Rose et al (2019) op. cit. at reference 17.

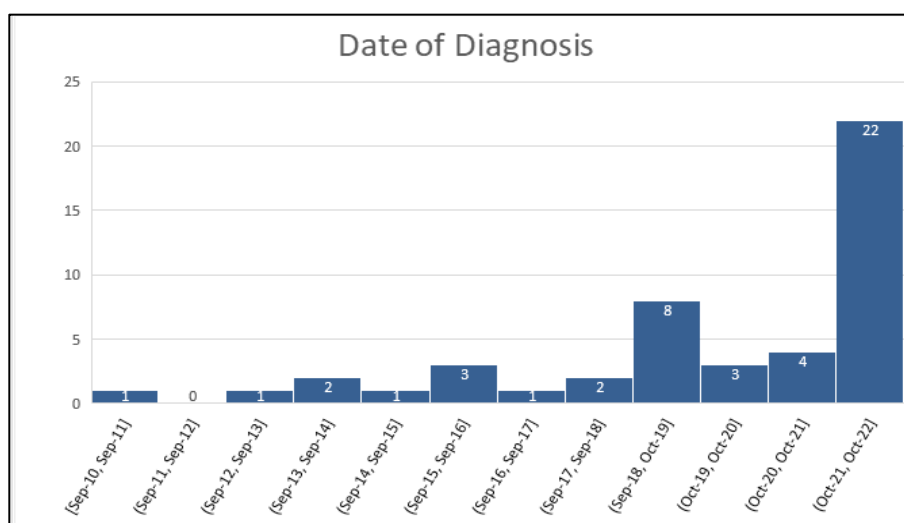


and sanding of the engineered stone in the absence of wetting agents and local exhaust ventilation; and the unique cytotoxicity of freshly fractured RCS particles.<sup>21</sup>

Recent research shows that, based on screening, the silicosis prevalence rate among engineered stone fabrication workers in California and Australia is between 12% and 21%.<sup>22 23 24</sup>

On May 22 2023, California Department of Public Health (CDPH) and University of California (UC) investigators will report at the American Thoracic Society international conference that between 2010 and 2022, they have identified 48 engineered stone countertop workers with a diagnosis of silicosis. These include 22 cases (46%) in 2022 alone, compared to a total of 26 cases over the 10-year period between 2011 and 2021 (Figure 3).

**FIGURE 3. California Workers Identified with Silicosis in the Engineered Stone Fabrication Industry, 2011 to 2022.**<sup>25</sup>



Investigators describe their findings as a “statewide epidemic of silicosis among engineered stone fabrication workers.” Seventeen of these workers (39%) presented with progressive massive fibrosis, a severely disabling and inevitably fatal disease process, barring lung transplant. Eight of these workers

<sup>21</sup> Hall S, Stacey P, Pengelly I, Stagg S, Saunders J, Hambling S. Characterizing and comparing emissions of dust, respirable crystalline silica, and volatile organic compounds from natural and artificial stones. *Ann Work Expo Health*. 2022;66:139-149. <https://pubmed.ncbi.nlm.nih.gov/34331440/>. Accessed May 10, 2023.

<sup>22</sup> Heinzerling (2021) op. cit. at reference 15.

<sup>23</sup> Hoy RF, Glass DC, Dimitriadis C, Hansen J, Hore-Lacy F, Sim MR. Identification of early-stage silicosis through health screening of stone benchtop industry workers in Victoria, Australia. *Occup Environ Med*. 2021;78(4):296-302. <https://pubmed.ncbi.nlm.nih.gov/33115923/>. Accessed May 10, 2023.

<sup>24</sup> Newbiggin K, Parsons R, Deller D, Edwards R, McBean R. Stonemasons with silicosis: preliminary findings and a warning message from Australia. *Respirology*. 2019;24(12):1220-1221. <https://pubmed.ncbi.nlm.nih.gov/31407419/>. Accessed May 9, 2023.

<sup>25</sup> Fazio J, Gandi S, Flattery J, Heinzerling A, Kamangar N, Afifi N, Cummings K, Harrison R. Identification of a Statewide Epidemic of Silicosis Among Engineered Stone Fabrication Workers – California. American Thoracic Society International Conference. Session B105 (To be presented May 22, 2023). <https://conference.thoracic.org/program/clinical-scientific-sessions/index.php>. Accessed May 10, 2023.

(17%) had died of silicosis at the time they were identified.<sup>26</sup> All 48 workers had originally presented with shortness of breath. Pulmonary function testing was abnormal in 33 (72%); 25 (64%) were misdiagnosed.

The investigators concluded that their findings “demonstrate a rapid increase in reported cases of pulmonary silicosis due to engineered stone fabrication in California. Cases are notable for late presentation of disease, misdiagnosis, and poor outcomes, likely reflecting these workers’ immigrant status, poor access to healthcare, and hazardous work environments.”

In an April 25, 2023 briefing for Cal/OSHA, the Los Angeles County Department of Health, and the California Department of Public Health, Dr. Jane Fazio of UCLA Olive View Medical Center stated that she is now aware of more than 60 silicosis cases in Los Angeles and neighboring counties among workers in the engineered stone fabrication industry, some of which are “extremely severe in young men and will be uniformly fatal.” Dr. Fazio stated that she is seeing a fatality rate among silicosis cases of 18% to 20%.

### **3.5 In 2019-2020, Cal/OSHA Found Widespread Non-Compliance with Title 8 Standards in the Engineered Stone Fabrication Industry.**

In response to the increase in silicosis cases among engineered stone fabrication workers, Cal/OSHA initiated a Special Emphasis Program (SEP) in January 2019 to enforce compliance with California’s RCS standard, CCR title 8, section 5204.<sup>27</sup> Under the SEP, Ca/OSHA identified 281 active engineered stone fabrication sites; of these, Cal/OSHA conducted inspections in 106 workplaces (38%), which included personal air sampling of workers at 47 sites (44%). A CDPH analysis of Cal/OSHA’s inspection findings for 152 employees at these 47 sites showed “widespread RCS overexposure among workers and numerous Cal/OSHA standard violation citations.”<sup>28</sup>

- 38 workers (25%) had exposures well above the permissible exposure limit (PEL) of 50 µg/m<sup>3</sup> (median = 90 µg/m<sup>3</sup>; range = 50–670 µg/m<sup>3</sup>);
- 17 workers (11%) had exposures between the action level (AL) of 25 µg/m<sup>3</sup> and the PEL;
- 24 workplaces (51%) had one or more exposures above the PEL;
- 7 workplaces (15%) had one or more exposures between the AL and PEL;
- 34 workplaces (72%) were cited for one or more violations of the RCS standard;
- 27 workplaces (57%) were cited for one or more violations of the respiratory protection standard.

These findings are illustrated in Figure 4.

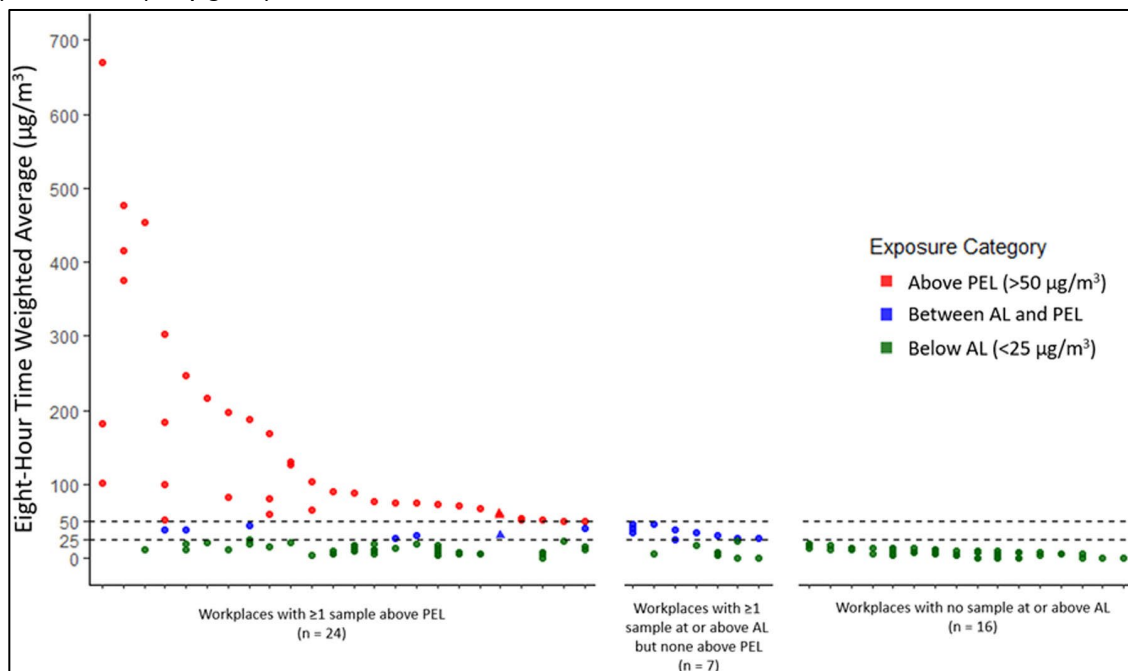
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<sup>26</sup> Fazio et al (2023) *ibid*.

<sup>27</sup> California Division of Occupational Safety and Health (Cal/OSHA). Special emphasis program—occupational exposure to Respirable crystalline silica cut stone and stone product manufacturing. <https://www.dir.ca.gov/Cal/OSHA/PP-SEPOn-Silica.pdf>. Accessed April 27, 2023.

<sup>28</sup> Surasi K, Ballen B, Weinberg JL, et al. Elevated exposures to respirable crystalline silica among engineered stone fabrication workers in California, January 2019–February 2020. *Am J Ind Med*. 2022;65:701-707. <https://pubmed.ncbi.nlm.nih.gov/35899403/>. Accessed April 24, 2023.

FIGURE 4. RCS personal air sampling measurements of workers at engineered stone fabrication workplaces inspected by Cal/OSHA, January 2019–February 2020. Dashed lines represent the RCS AL (25  $\mu\text{g}/\text{m}^3$ ) and PEL (50  $\mu\text{g}/\text{m}^3$ ).<sup>29</sup>



The number of employees with employer-reported exposure to RCS from their job tasks was recorded for 44 workplaces; within this group, the median number for employees was 5 (range = 1–30).<sup>30</sup>

As part of the SEP, Cal/OSHA also interviewed and administered a questionnaire in both English and Spanish to a sample of workers at each worksite. The questionnaire assessed worker tasks; whether they had received mandated medical surveillance exams; the worker's perceived exposures to silica dust; and the presence of workplace protections. Cal/OSHA provided CDPH with completed questionnaires from 92 workers at 33 inspected shops (33%). CDPH reported the following:<sup>31</sup>

- 84 workers (91%) reported performing tasks that can generate RCS, such as cutting, grinding, laminating or polishing stone;
- 22 (26%) of these 84 workers reported sometimes using dry methods to perform those tasks;
- 69 workers (75%) reported wearing disposable filtering facepiece respirators and/or half-face elastomeric respirators for more than 30 days within the past year;
- 18 workers (20%) reported completing a respirator fit test within the previous 12 months;
- 63 workers (68%) reported that their employer had not informed them of the results of silica air monitoring performed at their workplace;

<sup>29</sup> Surasi et al (2022) op. cit. at reference 28.

<sup>30</sup> Surasi et al (2022) op. cit. at reference 28.

<sup>31</sup> Spiegel A, Cummings K, Flattery J, Harrison R, Heinzerling A. Self-reported silica exposures and workplace protections among engineered stone fabrication workers in California. *Am J Ind Med.* 2022;65:1022-1024.

<https://pubmed.ncbi.nlm.nih.gov/36214615/>. Accessed May 8, 2023.

- 5 workers (5%) reported that their employers had sent them or their co-workers for required silica medical examinations.

These self-reported findings are consistent Cal/OSHA's citations issued under the SEP, which found 72% of employers in violation of the silica standard.

### 3.6 Hundreds of Engineered Stone Fabrication Workers are at Risk of Silicosis

Cal/OSHA ended the 2019 silica SEP during the first months of the COVID-19 pandemic, but the SEP is now being reestablished in response to the growing number of engineered stone fabrication workers identified with silicosis. To support the 2023 SEP, the CDPH Occupational Health Branch (OHB) identified all possible engineered stone fabrication shops in the state; within this dataset, Cal/OSHA confirmed the identity of 808 shops.

Assuming that a median of five workers are employed in each of these 808 shops (as seen in the 2019 SEP), and assuming that the prevalence rate for silicosis among these workers is 12% to 21%, and that the silicosis fatality rate among these cases is 19%, Cal/OSHA estimates that:

- 4,040 workers are employed in California's stone fabrication shops;<sup>32</sup>
- 485 to 848 cases of silicosis will likely occur among these 4,040 workers;<sup>33</sup>
- 92 to 161 of these 485 to 849 workers will likely die of silicosis.<sup>34</sup>

By applying the findings of the 2019 SEP to updated data on the number of workers in the engineered stone fabrication industry (4,040) and the number of active fabrication shops (808), Cal/OSHA expects that hundreds of shops are likely out of compliance with the RCS and respiratory protection standards, including among employers who were inspected during the 2019-2020 SEP, assuming they have made minimal changes in response to citations issued at that time. Applying the 2019 SEP findings shows that:

- 1,001 workers (25%) likely have silica exposures above the PEL of 50  $\mu\text{g}/\text{m}^3$ ;<sup>35</sup>
- 412 shops (51%) likely have one or more silica exposures above the PEL;<sup>36</sup>
- 582 shops (72%) likely are in violation of the RCS standard;<sup>37</sup>
- 461 shops (57%) likely are in violation of one or more respiratory protection requirements.<sup>38</sup>

### 3.7 Workers in this industry are uniquely vulnerable to RCS exposure for several reasons.

The great majority of workers in the engineered stone fabrication industry are foreign-born. For example, of the 48 silicosis cases reported by Dr. Fazio in May 2023, 47 (97%) were Hispanic and foreign-born;

<sup>32</sup> 808 sites \* 5 workers/site = 4,040 workers.

<sup>33</sup> A 12-21% silicosis prevalence rate = 485 to 848 workers with silicosis from a population of 4,040.

<sup>34</sup> A 19% fatality rate for 485 to 848 workers = 92 to 161 silicosis deaths.

<sup>35</sup> 0.25 \* 4,040 workers = 1,001 workers.

<sup>36</sup> 0.51 \* 808 workplaces = 412 workplaces.

<sup>37</sup> 0.72 \* 808 workplaces = 582 workplaces.

<sup>38</sup> 0.57 \* 808 workplaces = 461 workplaces.

most were underinsured.<sup>39</sup> Spanish or an indigenous language is their primary language. They have limited access to medical care and could face the threat of retaliation if they report workplace hazards or file Cal/OSHA complaints or workers' compensation claims.<sup>40 41</sup> These workers likely live with significant economic insecurity: to date, there is no evidence to suggest that workers in this industry are represented by a union. They are therefore unable to challenge an employer if they are fired from a job, for example, and they have little ability to advocate with their employer for workplace improvements, including in safety and health.

The combination of these factors means that workers in this industry are unlikely to register a complaint with a government agency, such as Cal/OSHA. Strong regulations that are clearly communicated to employers and workers in this industry are essential to protect this workforce from RCS exposure and silicosis.

### 3.8 Silicosis in the Stone Fabrication Industry is Preventable

Exposures to RCS and resulting disease and deaths are completely preventable through the use of well-established industrial hygiene controls. These include using water streams and local exhaust ventilation in all areas where workers are cutting, grinding, sanding, chipping, polishing, or otherwise working with stone, in order to prevent the release of dust into the work environment; using RCS-appropriate respiratory protection; continuously cleaning work areas and rest areas using wet methods; providing training to workers on protective measures; conducting early medical surveillance exams; providing workers with changing facilities; and training workers on procedures to safely change garments without re-entraining RCS into their breathing zone.<sup>42 43</sup>

A combination of controls is needed to effectively maintain exposures below dangerous levels. A federal OSHA review of exposures among stone sawyers from ten OSHA Special Emphasis Program (SEP) inspection reports found that 12 of 22 results (55%) exceeded the PEL ( $50 \mu\text{g}/\text{m}^3$ ), and four (18%) exceeded  $100 \mu\text{g}/\text{m}^3$ , even when a water feed was used to suppress dust during the cutting process. It is likely that a combination of wet methods, local exhaust ventilation and respiratory protection will be necessary to prevent RCS exposures in this industry, given the high silica content of engineered stone.<sup>44</sup>

In its 2020 guidance document on silicosis awareness and prevention, the industry's Natural Stone Institute recommended the following work practices:

- Use wet sweeping or HEPA-filtered vacuuming. Eliminate any dry sweeping. Never use compressed air or other practices that cause particles to become airborne.

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<sup>39</sup> Fazio et al. (2023) op. cit.

<sup>40</sup> Moyce SC, Schenker M. Occupational exposures and health outcomes among immigrants in the USA. *Curr Environ Health Rep* (2017);4:349–54. <https://pubmed.ncbi.nlm.nih.gov/28812286/>. Accessed May 8, 2023.

<sup>41</sup> Rose et al (2019) op. cit. at reference 16.

<sup>42</sup> U.S. Department of Labor. op. cit.

<sup>43</sup> Alexander B, Echt A, Qi Chaolong, Hammond D, Garcia A. Engineering Controls for Respirable Crystalline Silica Hazards: Investigations by NIOSH's Engineering Physical Hazards Branch. *The Synergist*. American Industrial Hygiene Association. (April 2022). <https://synergist.aiha.org/202204-engineering-controls-silica>. Accessed April 26, 2023.

<sup>44</sup> Occupational Safety and Health Administration (OSHA) and National Institute for Occupational Safety and Health (NIOSH) (2015), op. cit. at reference 10.

- Replace water and air filters periodically.
- Adjust water flow as necessary to control dust, following manufacturers' recommendations for water flow rates.
- Pre-wash stone slabs prior to cutting.
- Implement regular and thorough housecleaning procedures for water slurry and settled dust.
- Provide HEPA-filtered vacuums for cleaning worker clothes and water for cleaning hands, face, and hair in high exposure areas, such as where cutting or polishing work generates silica dust.
- Perform multiple wash-downs during a shift to remove silica slurry from walking surfaces.
- Perform periodic deep cleaning with a walk-behind floor scrubber/vacuum.
- Continually clean with HEPA-filtered air circulators.<sup>45</sup>

The Institute's worker safety precautions include providing workers with washing and changing facilities to prevent take-home exposures.

#### 4.0 TITLE 8 REGULATIONS APPLICABLE TO SILICA EXPOSURE IN GENERAL INDUSTRY

##### CCR Title 8, §334 Classification of Violations and Definitions.<sup>46</sup>

Violations involving any standard, order, or special order pertaining to the use of a carcinogen are classified as serious, pursuant to subsection 334(c)(4).

§334.

(c) Serious Violation.

\* \* \* \* \*

(4) For Carcinogens - a serious violation is a violation of any standard, order, or special order respecting the use of a carcinogen, as defined in 8 California Code of Regulations 330(f). However, the violation shall not be considered serious if the employer can demonstrate that he did not, and could not with the exercise of reasonable diligence, know of the presence of the violation or he can demonstrate that the Division should have determined that the violation was minor and resulted in no substantial health hazard.

\* \* \* \* \*

##### CCR Title 8, §5203. Carcinogen Report of Use Requirements.<sup>47</sup>

Subsection 5203(a) requires all employers who use a regulated carcinogen to report that use in writing to the Chief. Crystalline silica is included in the definition of regulated carcinogens under subsection 5203(b).

8 CCR §5203

##### **(a) Scope**

All employers who use a regulated carcinogen shall report that use in writing to the Chief as required by this section. Note: Asbestos has additional report of use and asbestos-related work registration requirements in sections 1529, 5208, and 8358.

<sup>45</sup> Natural Stone Institute (2022). Silicosis: An Industry Guide to Awareness and Prevention. [2020 Silicosis Tech Module UPDATE.indd \(naturalstoneinstitute.org\)](#). Accessed May 2, 2023.

<sup>47</sup> <https://www.dir.ca.gov/title8/5203.html>

<sup>47</sup> <https://www.dir.ca.gov/title8/5203.html>

**(b) Definitions.**

Chief means the Chief of the Division of Occupational Safety and Health, or designee.

\* \* \* \* \*

Regulated carcinogen means a recognized cancer-causing substance, compound, mixture, or product regulated by sections 1529, 1532, 1532.2, 1535, 8358, 8359 or Article 110, sections 5200-5220.

Use means any use by an employer that could potentially result in employee exposure to a regulated carcinogen. Use includes, but is not limited to: manufacturing, sale, transfer, storage, disposal, handling, research utilization, and transportation of a regulated carcinogen.

\* \* \* \* \*

**(c) Use that requires reporting.**

(1) Regulated area. For all regulated carcinogens that specify a requirement for the employer to establish a regulated area, use of a regulated carcinogen within such a regulated area shall be reported.

(2) For regulated carcinogens that do not have a regulated area requirement, use of the regulated carcinogen shall be reported in the following circumstances:

(A) For chromium (VI) regulated by sections 1532.2 or 8358, reporting is required where an employee's exposure to airborne concentrations of chromium (VI) exceeds, or can reasonably be expected to exceed, the PEL.

(B) For all other regulated carcinogens that do not have a regulated area requirement, reporting is required for any use of a concentration greater than or equal to 0.1% by weight or volume and which results in exposure or potential exposure to employees.

**(d) Report of use.**

(1) Initial use of a regulated carcinogen shall be reported in writing to the Chief within 15 calendar days of that initial use.

(2) Any changes in the reported information shall be similarly reported in writing within 15 calendar days of such change.

(3) All written reports shall be mailed to:

OCCUPATIONAL CARCINOGEN CONTROL UNIT  
DIVISION OF OCCUPATIONAL SAFETY AND HEALTH  
POST OFFICE BOX 420603  
SAN FRANCISCO, CALIFORNIA 94142

(4) The report shall include:

(A) The name of the employer and address of each workplace where a regulated carcinogen is in use;

(B) An identifying description of where the use of a regulated carcinogen is located in the workplace;

(C) A brief description of each process or operation which creates employee exposure to the regulated carcinogen, including the estimated number of employees engaged in each process or operation; and

(D) The names and addresses of any collective bargaining units or other representatives of the affected employees.

**(e) Temporary worksite notification.**

Employers with temporary worksites need only provide an initial report and changes as specified in subsection (c) for the employer's permanent workplace location. Such employers shall also provide notification of the time and date of commencement of work, the approximate duration of the work, the location, the type of business, and the kind of

work for each temporary worksite at least 24 hours prior to the commencement of each job when feasible, to the nearest district office of the Division of Occupational Safety and Health.

**(f) Emergency**

Any emergency, as defined in subsection (b), shall be reported as follows:

(1) A report of the occurrence of an emergency and the facts obtainable at that time shall be made within 24 hours to the nearest district office of the Division of Occupational Safety and Health.

(2) A written report shall be filed with the Chief within 15 calendar days after the occurrence of an emergency. The written report shall include:

(A) A description of the operation or process involved including its location, the amount of regulated carcinogen released, and the duration of the emergency.

(B) A statement of the known or estimated extent of employee exposure to the regulated carcinogen and area of contamination.

(C) An analysis of the circumstance that led up to the emergency.

(D) A description of the measures taken or to be taken, with specific dates, to prevent further similar emergencies from reoccurring.

\* \* \* \* \*

CCR Title 8, §5204. Occupational Exposures to Respirable Crystalline Silica<sup>48</sup>

Section 5204 contains requirements for occupational exposure to crystalline silica for employees working in general industry. Subsections applicable to this petition include §5204(a), (e), (f)(1), (f)(2), (g), (h), and (i) which address the scope of the regulation, regulated areas, engineering and work practice controls, written exposure control plan, respiratory protection, housekeeping, and medical surveillance, respectively.

8 CCR § 5204

**(a) Scope and application.**

(1) This section applies to all occupational exposures to respirable crystalline silica, except:

(A) Construction work covered under Section 1532.3;

(B) Agricultural operations covered under Section 3436; and

(C) Exposures that result from the processing of sorptive clays.

(2) This section does not apply where the employer has objective data demonstrating that employee exposure to respirable crystalline silica will remain below 25 micrograms per cubic meter of air (25 µg/m<sup>3</sup>) as an 8-hour time-weighted average (TWA) under any foreseeable conditions.

(3) This section does not apply if the employer complies with Section 1532.3 and:

(A) The task performed is indistinguishable from a construction task listed on Table 1 in subsection (c) of Section 1532.3; and

(B) The task will not be performed regularly in the same environment and conditions.

\* \* \* \* \*

<sup>48</sup> <https://www.dir.ca.gov/title8/5204.html>



**(e) Regulated areas.**

(1) Establishment. The employer shall establish a regulated area wherever an employee's exposure to airborne concentrations of respirable crystalline silica is, or can reasonably be expected to be, in excess of the PEL.

(2) Demarcation.

(A) The employer shall demarcate regulated areas from the rest of the workplace in a manner that minimizes the number of employees exposed to respirable crystalline silica within the regulated area.

(B) The employer shall post signs at all entrances to regulated areas that bear the legend specified in subsection (j)(2).

(3) Access. The employer shall limit access to regulated areas to:

(A) Persons authorized by the employer and required by work duties to be present in the regulated area;

(B) Any person entering such an area as a designated representative of employees for the purpose of exercising the right to observe monitoring procedures under subsection (d); and

(C) Any person authorized by the Occupational Safety and Health Act or regulations issued under it to be in a regulated area.

(4) Provision of respirators. The employer shall provide each employee and the employee's designated representative entering a regulated area with an appropriate respirator in accordance with subsection (g) and shall require each employee and the employee's designated representative to use the respirator while in a regulated area.

**(f) Methods of compliance.**

(1) Engineering and work practice controls. The employer shall use engineering and work practice controls to reduce and maintain employee exposure to respirable crystalline silica to or below the PEL, unless the employer can demonstrate that such controls are not feasible. Wherever such feasible engineering and work practice controls are not sufficient to reduce employee exposure to or below the PEL, the employer shall nonetheless use them to reduce employee exposure to the lowest feasible level and shall supplement them with the use of respiratory protection that complies with the requirements of subsection (g).

(2) Written exposure control plan.

(A) The employer shall establish and implement a written exposure control plan that contains at least the following elements:

1. A description of the tasks in the workplace that involve exposure to respirable crystalline silica;

2. A description of the engineering controls, work practices, and respiratory protection used to limit employee exposure to respirable crystalline silica for each task; and

3. A description of the housekeeping measures used to limit employee exposure to respirable crystalline silica.

(B) The employer shall review and evaluate the effectiveness of the written exposure control plan at least annually and update it as necessary.

(C) The employer shall make the written exposure control plan readily available for examination and copying, upon request, to each employee covered by this section, their designated representatives, the Chief and the Director.

\* \* \* \* \*

**(g) Respiratory protection.**

(1) General. Where respiratory protection is required by this section, the employer must provide each employee an appropriate respirator that complies with the requirements of this subsection and Section 5144. Respiratory protection is required:

(A) Where exposures exceed the PEL during periods necessary to install or implement feasible engineering and work practice controls;

(B) Where exposures exceed the PEL during tasks, such as certain maintenance and repair tasks, for which engineering and work practice controls are not feasible;

(C) During tasks for which an employer has implemented all feasible engineering and work practice controls and such controls are not sufficient to reduce exposures to or below the PEL; and

(D) During periods when the employee is in a regulated area.

(2) Respiratory protection program. Where respirator use is required by this section, the employer shall institute a respiratory protection program in accordance with Section 5144.

**(h) Housekeeping.**

(1) The employer shall not allow dry sweeping or dry brushing where such activity could contribute to employee exposure to respirable crystalline silica unless wet sweeping, HEPA-filtered vacuuming or other methods that minimize the likelihood of exposure are not feasible.

(2) The employer shall not allow compressed air to be used to clean clothing or surfaces where such activity could contribute to employee exposure to respirable crystalline silica unless:

(A) The compressed air is used in conjunction with a ventilation system that effectively captures the dust cloud created by the compressed air; or

(B) No alternative method is feasible.

**(i) Medical surveillance.**

(1) General.

(A) The employer shall make medical surveillance available at no cost to the employee, and at a reasonable time and place, for each employee who will be occupationally exposed to respirable crystalline silica at or above the action level for 30 or more days per year.

(B) The employer shall ensure that all medical examinations and procedures required by this section are performed by a PLHCP as defined in subsection (b).

(2) Initial examination. The employer shall make available an initial (baseline) medical examination within 30 days after initial assignment, unless the employee has received a medical examination that meets the requirements of this section within the last three years. The examination shall consist of:

(A) A medical and work history, with emphasis on: Past, present, and anticipated exposure to respirable crystalline silica, dust, and other agents affecting the respiratory system; any history of respiratory system dysfunction, including signs and symptoms of respiratory disease (e.g., shortness of breath, cough, wheezing); history of tuberculosis; and smoking status and history;

(B) A physical examination with special emphasis on the respiratory system;

(C) A chest X-ray (a single posteroanterior radiographic projection or radiograph of the chest at full inspiration recorded on either film (no less than 14 x 17 inches and no more than 16 x 17 inches) or digital radiography systems), interpreted and classified according to the International Labour Office (ILO) International Classification of Radiographs of Pneumoconioses by a NIOSH-certified B Reader;

(D) A pulmonary function test to include forced vital capacity (FVC) and forced expiratory volume in one second (FEV1) and FEV1/FVC ratio, administered by a spirometry technician with a current certificate from a NIOSH-approved spirometry course;

(E) Testing for latent tuberculosis infection; and

(F) Any other tests deemed appropriate by the PLHCP.

(3) Periodic examinations. The employer shall make available medical examinations that include the procedures described in subsection (i)(2) (except subsection (i)(2)(E)) at least every three years, or more frequently if recommended by the PLHCP.

(4) Information provided to the PLHCP. The employer shall ensure that the examining PLHCP has a copy of this standard, and shall provide the PLHCP with the following information:

(A) A description of the employee's former, current, and anticipated duties as they relate to the employee's occupational exposure to respirable crystalline silica;

(B) The employee's former, current, and anticipated levels of occupational exposure to respirable crystalline silica;

(C) A description of any personal protective equipment used or to be used by the employee, including when and for how long the employee has used or will use that equipment; and

(D) Information from records of employment-related medical examinations previously provided to the employee and currently within the control of the employer.

(5) PLHCP's written medical report for the employee. The employer shall ensure that the PLHCP explains to the employee the results of the medical examination and provides each employee with a written medical report within 30 days of each medical examination performed. The written report shall contain:

(A) A statement indicating the results of the medical examination, including any medical condition(s) that would place the employee at increased risk of material impairment to health from exposure to respirable crystalline silica and any medical conditions that require further evaluation or treatment;

(B) Any recommended limitations on the employee's use of respirators;

(C) Any recommended limitations on the employee's exposure to respirable crystalline silica; and

(D) A statement that the employee should be examined by a specialist (pursuant to subsection (i)(7)) if the chest X-ray provided in accordance with this section is classified as 1/0 or higher by the B Reader, or if referral to a specialist is otherwise deemed appropriate by the PLHCP.

(6) PLHCP's written medical opinion for the employer.

(A) The employer shall obtain a written medical opinion from the PLHCP within 30 days of the medical examination. The written opinion shall contain only the following:

1. The date of the examination;

2. A statement that the examination has met the requirements of this section; and

3. Any recommended limitations on the employee's use of respirators.

(B) If the employee provides written authorization, the written opinion shall also contain either or both of the following:

1. Any recommended limitations on the employee's exposure to respirable crystalline silica;

2. A statement that the employee should be examined by a specialist (pursuant to subsection (i)(7)) if the chest X-ray provided in accordance with this section is classified as 1/0 or higher by the B Reader, or if referral to a specialist is otherwise deemed appropriate by the PLHCP.

(C) The employer shall ensure that each employee receives a copy of the written medical opinion described in subsection (i)(6)(A) and (B) within 30 days of each medical examination performed.

(7) Additional examinations.

(A) If the PLHCP's written medical opinion indicates that an employee should be examined by a specialist, the employer shall make available a medical examination by a specialist within 30 days after receiving the PLHCP's written opinion.

(B) The employer shall ensure that the examining specialist is provided with all of the information that the employer is obligated to provide to the PLHCP in accordance with subsection (i)(4).

(C) The employer shall ensure that the specialist explains to the employee the results of the medical examination and provides each employee with a written medical report within 30 days of the examination. The written report shall meet the requirements of subsection (i)(5) (except subsection (i)(5)(D)).

(D) The employer shall obtain a written opinion from the specialist within 30 days of the medical examination. The written opinion shall meet the requirements of subsection (i)(6) (except subsection (i)(6)(A)2. and (i)(6)(B)2.).

\* \* \* \* \*

### CCR Title 8 §1532.3. Occupational Exposures to Respirable Crystalline Silica.<sup>49</sup>

Crystalline silica exposure for employees working in the construction industry is addressed by CCR title 8, §1532.3, which includes the following requirements applicable to this petition for employees exposed to crystalline silica for an 8-hour time-weighted average at levels above the action level (AL) of 25 micrograms per cubic meter of air (25 µg/m<sup>3</sup>):

§ 1532.3.

\* \* \* \* \*

#### **(b) Definitions.**

For the purposes of this section the following definitions apply:

\* \* \* \* \*

Objective Data means information, such as air monitoring data from industry-wide surveys or calculations based on the composition of a substance, demonstrating employee exposure to respirable crystalline silica associated with a particular product or material or a specific process, task, or activity. The data must reflect workplace conditions closely resembling or with a higher exposure potential than the processes, types of material, control methods, work practices, and environmental conditions in the employer's current operations.

\* \* \* \* \*

Respirable Crystalline Silica means quartz, cristobalite, and/or tridymite contained in airborne particles that are determined to be respirable by a sampling device designed to meet the characteristics for respirable-particle-size-selective samplers specified in the International Organization for Standardization (ISO) 7708:1995: Air Quality - Particle Size Fraction Definitions for Health-Related Sampling.

\* \* \* \* \*

#### **(c) Specified exposure control methods.**

(1) For each employee engaged in a task identified on Table 1, the employer shall fully and properly implement the engineering controls, work practices, and respiratory protection specified for the task on Table 1, unless the employer assesses and limits the exposure of the employee to respirable crystalline silica in accordance with subsection (d).

Table 1 - Specified Exposure Control Methods When Working With Materials Containing Crystalline Silica

**(SEE APPENDIX A, PAGE 43, BELOW)**

(2) When implementing the control measures specified in Table 1, each employer shall:

(A) For tasks performed indoors or in enclosed areas, provide a means of exhaust as needed to minimize the accumulation of visible airborne dust;

(B) For tasks performed using wet methods, apply water at flow rates sufficient to minimize release of visible dust;

(C) For measures implemented that include an enclosed cab or booth, ensure that the enclosed cab or booth:

1. Is maintained as free as practicable from settled dust;

<sup>49</sup> [https://www.dir.ca.gov/title8/1532\\_3.html](https://www.dir.ca.gov/title8/1532_3.html).

2. Has door seals and closing mechanisms that work properly;
3. Has gaskets and seals that are in good condition and working properly;
4. Is under positive pressure maintained through continuous delivery of fresh air;
5. Has intake air that is filtered through a filter that is 95% efficient in the 0.3-10.0  $\mu\text{m}$  range (e.g., MERV-16 or better); and
6. Has heating and cooling capabilities.

(3) Where an employee performs more than one task on Table 1 during the course of a shift, and the total duration of all tasks combined is more than four hours, the required respiratory protection for each task is the respiratory protection specified for more than four hours per shift. If the total duration of all tasks on Table 1 combined is less than four hours, the required respiratory protection for each task is the respiratory protection specified for less than four hours per shift.

**(d) Alternative exposure control methods.**

For tasks not listed in Table 1, or where the employer does not fully and properly implement the engineering controls, work practices, and respiratory protection described in Table 1:

(1) Permissible exposure limit (PEL). The employer shall ensure that no employee is exposed to an airborne concentration of respirable crystalline silica in excess of 50  $\mu\text{g}/\text{m}^3$ , calculated as an 8-hour TWA.

(2) Exposure assessment.

(A) General. The employer shall assess the exposure of each employee who is or may reasonably be expected to be exposed to respirable crystalline silica at or above the action level in accordance with either the performance option in subsection (d)(2)(B) or the scheduled monitoring option in subsection (d)(2)(C).

(B) 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.

(C) Scheduled monitoring option.

1. The employer shall perform initial monitoring to assess the 8-hour TWA exposure for each employee on the basis of one or more personal breathing zone air samples that reflect the exposures of employees on each shift, for each job classification, in each work area. Where several employees perform the same tasks on the same shift and in the same work area, the employer may sample a representative fraction of these employees in order to meet this requirement. In representative sampling, the employer shall sample the employee(s) who are expected to have the highest exposure to respirable crystalline silica.

2. If initial monitoring indicates that employee exposures are below the action level, the employer may discontinue monitoring for those employees whose exposures are represented by such monitoring.

3. Where the most recent exposure monitoring indicates that employee exposures are at or above the action level but at or below the PEL, the employer shall repeat such monitoring within six months of the most recent monitoring.

4. Where the most recent exposure monitoring indicates that employee exposures are above the PEL, the employer shall repeat such monitoring within three months of the most recent monitoring.

5. Where the most recent (non-initial) exposure monitoring indicates that employee exposures are below the action level, the employer shall repeat such monitoring within six months of the most recent monitoring until two consecutive measurements, taken seven or more days apart, are below the action level, at which time the employer may discontinue monitoring for those employees whose exposures are represented by such monitoring, except as otherwise provided in subsection (d)(2)(D).

(D) Reassessment of exposures. The employer shall reassess exposures whenever a change in the production, process, control equipment, personnel, or work practices may reasonably be expected to result in new or additional exposures at or above the action level, or when the employer has any reason to believe that new or additional exposures at or above the action level have occurred.

(E) Methods of sample analysis. The employer shall ensure that all samples taken to satisfy the monitoring requirements of subsection (d)(2) are evaluated by a laboratory that analyzes air samples for respirable crystalline silica in accordance with the procedures in Appendix A to this section.

(F) Employee notification of assessment results.

1. Within five working days after completing an exposure assessment in accordance with subsection (d)(2), 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.

2. Whenever an exposure assessment indicates that employee exposure is above the PEL, the employer shall describe in the written notification the corrective action being taken to reduce employee exposure to or below the PEL.

(G) Observation of monitoring.

1. Where air monitoring is performed to comply with the requirements of this section, the employer shall provide affected employees or their designated representatives an opportunity to observe any monitoring of employee exposure to respirable crystalline silica.

2. When observation of monitoring requires entry into an area where the use of protective clothing or equipment is required for any workplace hazard, the employer shall provide the observer with protective clothing and equipment at no cost and shall ensure that the observer uses such clothing and equipment.

(3) Methods of compliance.

(A) Engineering and work practice controls. The employer shall use engineering and work practice controls to reduce and maintain employee exposure to respirable crystalline silica to or below the PEL, unless the employer can demonstrate that such controls are not feasible. Wherever such feasible engineering and work practice controls are not sufficient to reduce employee exposure to or below the PEL, the employer shall nonetheless use them to reduce employee exposure to the lowest feasible level and shall supplement them with the use of respiratory protection that complies with the requirements of subsection (e).

(B) Abrasive blasting. In addition to the requirements of subsection (d)(3)(A), the employer shall comply with other Title 8 standards, when applicable, such as section 1530 (Ventilation), where abrasive blasting is conducted using crystalline silica-containing blasting agents, or where abrasive blasting is conducted on substrates that contain crystalline silica.

**(e) Respiratory protection.**

(1) General. Where respiratory protection is required by this section, the employer must provide each employee an appropriate respirator that complies with the requirements of this subsection and Section 5144. Respiratory protection is required:

(A) Where specified by Table 1 of subsection (c); or

(B) For tasks not listed in Table 1, or where the employer does not fully and properly implement the engineering controls, work practices, and respiratory protection described in Table 1:

1. Where exposures exceed the PEL during periods necessary to install or implement feasible engineering and work practice controls;

2. Where exposures exceed the PEL during tasks, such as certain maintenance and repair tasks, for which engineering and work practice controls are not feasible; and

3. During tasks for which an employer has implemented all feasible engineering and work practice controls and such controls are not sufficient to reduce exposures to or below the PEL.

(2) Respiratory protection program. Where respirator use is required by this section, the employer shall institute a respiratory protection program in accordance with Section 5144.

(3) Specified exposure control methods. For the tasks listed in Table 1 in subsection (c), if the employer fully and properly implements the engineering controls, work practices, and respiratory protection described in Table 1, the

employer shall be considered to be in compliance with subsection (e)(1) and the requirements for selection of respirators in Section 5144(d)(1)(C) and (d)(3) with regard to exposure to respirable crystalline silica.

**(f) Housekeeping.**

(1) The employer shall not allow dry sweeping or dry brushing where such activity could contribute to employee exposure to respirable crystalline silica unless wet sweeping, HEPA-filtered vacuuming or other methods that minimize the likelihood of exposure are not feasible.

(2) The employer shall not allow compressed air to be used to clean clothing or surfaces where such activity could contribute to employee exposure to respirable crystalline silica unless:

(A) The compressed air is used in conjunction with a ventilation system that effectively captures the dust cloud created by the compressed air; or

(B) No alternative method is feasible.

**(g) Written exposure control plan.**

(1) The employer shall establish and implement a written exposure control plan that contains at least the following elements:

(A) A description of the tasks in the workplace that involve exposure to respirable crystalline silica;

(B) A description of the engineering controls, work practices, and respiratory protection used to limit employee exposure to respirable crystalline silica for each task;

(C) A description of the housekeeping measures used to limit employee exposure to respirable crystalline silica; and

(D) A description of the procedures used to restrict access to work areas, when necessary, to minimize the number of employees exposed to respirable crystalline silica and their level of exposure, including exposures generated by other employers or sole proprietors.

(2) The employer shall review and evaluate the effectiveness of the written exposure control plan at least annually and update it as necessary.

(3) The employer shall make the written exposure control plan readily available for examination and copying, upon request, to each employee covered by this section, their designated representatives, the Chief and the Director.

(4) The employer shall designate a competent person to make frequent and regular inspections of job sites, materials, and equipment to implement the written exposure control plan.

**(h) Medical surveillance.**

(1) General.

(A) The employer shall make medical surveillance available at no cost to the employee, and at a reasonable time and place, for each employee who will be required under this section to use a respirator for 30 or more days per year.

(B) The employer shall ensure that all medical examinations and procedures required by this section are performed by a PLHCP as defined in subsection (b).

(2) Initial examination. The employer shall make available an initial (baseline) medical examination within 30 days after initial assignment, unless the employee has received a medical examination that meets the requirements of this section within the last three years. The examination shall consist of:

(A) A medical and work history, with emphasis on: Past, present, and anticipated exposure to respirable crystalline silica, dust, and other agents affecting the respiratory system; any history of respiratory system dysfunction, including signs and symptoms of respiratory disease (e.g., shortness of breath, cough, wheezing); history of tuberculosis; and smoking status and history;

(B) A physical examination with special emphasis on the respiratory system;

(C) A chest X-ray (a single posteroanterior radiographic projection or radiograph of the chest at full inspiration recorded on either film (no less than 14 x 17 inches and no more than 16 x 17 inches) or digital radiography

systems), interpreted and classified according to the International Labour Office (ILO) International Classification of Radiographs of Pneumoconioses by a NIOSH-certified B Reader;

(D) A pulmonary function test to include forced vital capacity (FVC) and forced expiratory volume in one second (FEV<sub>1</sub>) and FEV<sub>1</sub>/FVC ratio, administered by a spirometry technician with a current certificate from a NIOSH-approved spirometry course;

(E) Testing for latent tuberculosis infection; and

(F) Any other tests deemed appropriate by the PLHCP.

(3) Periodic examinations. The employer shall make available medical examinations that include the procedures described in subsection (h)(2) (except subsection (h)(2)(E)) at least every three years, or more frequently if recommended by the PLHCP.

(4) Information provided to the PLHCP. The employer shall ensure that the examining PLHCP has a copy of this standard, and shall provide the PLHCP with the following information:

(A) A description of the employee's former, current, and anticipated duties as they relate to the employee's occupational exposure to respirable crystalline silica;

(B) The employee's former, current, and anticipated levels of occupational exposure to respirable crystalline silica;

(C) A description of any personal protective equipment used or to be used by the employee, including when and for how long the employee has used or will use that equipment; and

(D) Information from records of employment-related medical examinations previously provided to the employee and currently within the control of the employer.

(5) PLHCP's written medical report for the employee. The employer shall ensure that the PLHCP explains to the employee the results of the medical examination and provides each employee with a written medical report within 30 days of each medical examination performed. The written report shall contain:

(A) A statement indicating the results of the medical examination, including any medical condition(s) that would place the employee at increased risk of material impairment to health from exposure to respirable crystalline silica and any medical conditions that require further evaluation or treatment;

(B) Any recommended limitations on the employee's use of respirators;

(C) Any recommended limitations on the employee's exposure to respirable crystalline silica; and

(D) A statement that the employee should be examined by a specialist (pursuant to subsection (h)(7)) if the chest X-ray provided in accordance with this section is classified as 1/0 or higher by the B Reader, or if referral to a specialist is otherwise deemed appropriate by the PLHCP.

(6) PLHCP's written medical opinion for the employer.

(A) The employer shall obtain a written medical opinion from the PLHCP within 30 days of the medical examination. The written opinion shall contain only the following:

1. The date of the examination;

2. A statement that the examination has met the requirements of this section; and

3. Any recommended limitations on the employee's use of respirators.

(B) If the employee provides written authorization, the written opinion shall also contain either or both of the following:

1. Any recommended limitations on the employee's exposure to respirable crystalline silica;

2. A statement that the employee should be examined by a specialist (pursuant to subsection (h)(7)) if the chest X-ray provided in accordance with this section is classified as 1/0 or higher by the B Reader, or if referral to a specialist is otherwise deemed appropriate by the PLHCP.



(C) The employer shall ensure that each employee receives a copy of the written medical opinion described in subsection (h)(6)(A) and (B) within 30 days of each medical examination performed.

(7) Additional examinations.

(A) If the PLHCP's written medical opinion indicates that an employee should be examined by a specialist, the employer shall make available a medical examination by a specialist within 30 days after receiving the PLHCP's written opinion.

(B) The employer shall ensure that the examining specialist is provided with all of the information that the employer is obligated to provide to the PLHCP in accordance with subsection (h)(4).

(C) The employer shall ensure that the specialist explains to the employee the results of the medical examination and provides each employee with a written medical report within 30 days of the examination. The written report shall meet the requirements of subsection (h)(5) (except subsection (h)(5)(D)).

(D) The employer shall obtain a written opinion from the specialist within 30 days of the medical examination. The written opinion shall meet the requirements of subsection (h)(6) (except subsection (h)(6)(A)2. and (B)2.).

**(i) Communication of respirable crystalline silica hazards to employees.**

(1) Hazard communication. The employer shall include respirable crystalline silica in the program established to comply with the hazard communication standard (HCS) (Section 5194). The employer shall ensure that each employee has access to labels on containers of crystalline silica and safety data sheets, and is trained in accordance with the provisions of HCS and subsection (i)(2). The employer shall ensure that at least the following hazards are addressed: Cancer, lung effects, immune system effects, and kidney effects.

(2) Employee information and training.

(A) The employer shall ensure that each employee covered by this section can demonstrate knowledge and understanding of at least the following:

1. The health hazards associated with exposure to respirable crystalline silica;
2. Specific tasks in the workplace that could result in exposure to respirable crystalline silica;
3. Specific measures the employer has implemented to protect employees from exposure to respirable crystalline silica, including engineering controls, work practices, and respirators to be used;
4. The contents of this section;
5. The identity of the competent person designated by the employer in accordance with subsection (g)(4); and
6. The purpose and a description of the medical surveillance program required by subsection (h).

(B) The employer shall make a copy of this section readily available without cost to each employee covered by this section.

**(j) Recordkeeping.**

(1) Air monitoring data.

(A) The employer shall make and maintain an accurate record of all exposure measurements taken to assess employee exposure to respirable crystalline silica, as prescribed in subsection (d)(2).

(B) This record shall include at least the following information:

1. The date of measurement for each sample taken;
2. The task monitored;
3. Sampling and analytical methods used;
4. Number, duration, and results of samples taken;

5. Identity of the laboratory that performed the analysis;

6. Type of personal protective equipment, such as respirators, worn by the employees monitored; and

7. Name, social security number, and job classification of all employees represented by the monitoring, indicating which employees were actually monitored.

(C) The employer shall ensure that exposure records are maintained and made available in accordance with Section 3204.

(2) Objective data.

(A) The employer shall make and maintain an accurate record of all objective data relied upon to comply with the requirements of this section.

(B) This record shall include at least the following information:

1. The crystalline silica-containing material in question;

2. The source of the objective data;

3. The testing protocol and results of testing;

4. A description of the process, task, or activity on which the objective data were based; and

5. Other data relevant to the process, task, activity, material, or exposures on which the objective data were based.

(C) The employer shall ensure that objective data are maintained and made available in accordance with Section 3204.

(3) Medical surveillance.

(A) The employer shall make and maintain an accurate record for each employee covered by medical surveillance under subsection (h).

(B) The record shall include the following information about the employee:

1. Name and social security number;

2. A copy of the PLHCPs' and specialists' written medical opinions; and

3. A copy of the information provided to the PLHCPs and specialists.

(C) The employer shall ensure that medical records are maintained and made available in accordance with Section 3204.

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### CCR Title 8, §5144. Respiratory Protection<sup>50</sup>

Respiratory protection is addressed in section 5144. The requirements of this section applicable to this petition are as follows:

§5144.

#### **(a) Permissible practice.**

(1) In the control of those occupational diseases caused by breathing air contaminated with harmful dusts, fogs, fumes, mists, gases, smokes, sprays, or vapors, the primary objective shall be to prevent atmospheric contamination. This shall be accomplished as far as feasible by accepted engineering control measures (for example, enclosure or confinement of the operation, general and local ventilation, and substitution of less toxic materials). When effective

<sup>50</sup> <https://www.dir.ca.gov/title8/5144.html>

engineering controls are not feasible, or while they are being instituted, appropriate respirators shall be used pursuant to this section.

(2) Respirators shall be provided by the employer when such equipment is necessary to protect the health of the employee. The employer shall provide the respirators which are applicable and suitable for the purpose intended. The employer shall be responsible for the establishment and maintenance of a respiratory protection program which shall include the requirements outlined in subsection ©.

\* \* \* \* \*

**(d) Selection of respirators.**

This subsection requires the employer to evaluate respiratory hazard(s) in the workplace, identify relevant workplace and user factors, and base respirator selection on these factors. The subsection also specifies appropriately protective respirators for use in IDLH atmospheres, and limits the selection and use of air-purifying respirators.

(1) General requirements.

(A) The employer shall select and provide an appropriate respirator based on the respiratory hazard(s) to which the worker is exposed and workplace and user factors that affect respirator performance and reliability.

(B) The employer shall select a NIOSH-certified respirator. The respirator shall be used in compliance with the conditions of its certification.

(C) The employer shall identify and evaluate the respiratory hazard(s) in the workplace; this evaluation shall include a reasonable estimate of employee exposures to respiratory hazard(s) and an identification of the contaminant's chemical state and physical form. Where the employer cannot identify or reasonably estimate the employee exposure, the employer shall consider the atmosphere to be IDLH.

\* \* \* \* \*

**5.0 FEDERAL OSHA REGULATIONS APPLICABLE TO SILICA EXPOSURE**

The federal OSHA regulations specific to silica are identical to their counterpart California title 8 regulation as listed below. The California title 8 regulations were adopted pursuant to California Labor Code section 142.3(a)(3), which applies to California title 8 regulations that are identical to the corresponding federal regulation, except for changes in formatting.

<b>Industry</b>	<b>Title 29 Code of Federal Regulations Section</b>	<b>Title 8 California Code of Regulations Section</b>
Construction	1926.1153 - Respirable crystalline silica.	1532.3. Occupational Exposures to Respirable Crystalline Silica.
General Industry	1910.1053 - Respirable crystalline silica.	5204 Occupational Exposures to Respirable Crystalline Silica.
Ship Building, Ship Repairing and Ship Breaking	1915.1053 Respirable crystalline silica.	5204 Occupational Exposures to Respirable Crystalline Silica

**6.0 GUIDANCE TO PREVENT SILICA OVEREXPOSURE**

**6.1 Centers for Disease Control and Prevention (CDC), National Institute of Occupational Safety and Health (NIOSH)**

NIOSH conducted an evaluation in 2015 of a stone fabrication facility in Houston, Texas.<sup>51</sup> Industrial hygiene sampling was conducted to measure short-term, task-based exposures to respirable dust and RCS of workers who used handheld tools in the fabrication of countertops. Dust was suppressed by the application of water to the tools throughout the fabrication process. NIOSH found that, despite the use of wet grinding and polishing of engineered stone, overexposure to respirable crystalline silica may still occur.

To reduce exposures below the Recommended Exposure Limit (REL) of 50 µg/m<sup>3</sup>, NIOSH recommended additional controls, including using a larger amount of water, alternative means of cleaning and drying stone countertops other than compressed air, and respiratory protection.

In 2019, NIOSH presented information in its Science Blog on the composition of engineered versus natural stone materials and the hazards associated with cutting, grinding, polishing, and drilling operations.<sup>52</sup> NIOSH discussed several cases of silicosis identified in other countries and presented recommendations for preventing exposures.

NIOSH published findings in 2022 of an evaluation of engineering controls pertaining to RCS hazards during stone countertop grinding and polishing operations.<sup>53</sup> Engineering controls such as a dust collection booth, water sprays incorporated into grinding and polishing tools, and a simple garden hose used for sheet water wetting were evaluated. Sheet water wetting provided the greatest reduction in exposure and illustrated that water sprays contained within grinding and polishing tools did not always provide sufficient water where it was needed.

## 6.2 California Department of Public Health (CDPH)

The CDPH Occupational Health Branch (OHB) issued a health advisory in March 2019 pertaining to silica hazards in industries involved in cutting, grinding, sanding, and installing stone countertop products.<sup>54</sup> In the advisory, CDPH recommends methods to keep silica dust below the Cal/OSHA limit using computer numerical (CNC) machines, wet methods, local exhaust ventilation, cleaning with high-efficiency particulate (HEPA) vacuums and/or water cleaning systems, and good work practices. In addition to these methods, respirator use was also addressed.

CDPH has developed the Silica Safety Resources for Stone Fabricators website, which provides information on the health effects of silica exposure, resources to help prevent exposure in countertop fabrication, publications on the specific topic of engineered stone, and general silica hazard prevention resources, including in construction.<sup>55</sup>

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<sup>51</sup> Qi, C & Echt, A (2016) *Engineering Control of Silica Dust from Stone Countertop Fabrication and Installation*. EPHB Report No. 375-11a <https://www.cdc.gov/niosh/surveyreports/pdfs/2021-DFSE-710.pdf>. Accessed May 5, 2023

<sup>52</sup> Dodd, K., Heinzerling, A. et al. (October 29, 2019). *Outbreak of Silicosis among Engineered Stone Countertop Workers in Four States*. <https://blogs.cdc.gov/niosh-science-blog/2019/10/29/silicosis-countertop/>. Accessed May 4 2023.

<sup>53</sup> Alexander, B, Echt, A, et al. (2022) *Engineering Controls for Respirable Crystalline Silica Hazards*. <https://synergist.aiha.org/202204-engineering-controls-silica>. Accessed May 3, 2023.

<sup>54</sup> Health Advisory on Stone Fabrication Hazards (March 2019) <https://www.cdph.ca.gov/Programs/CCDC/DEOD/DCDC/DCDC/Pages/SilicaStoneFabricators.aspx>. Accessed May 5, 2023.

<sup>55</sup> Silica Safety Resources for Stone Fabricators <https://www.cdph.ca.gov/Programs/CCDC/DEOD/DCDC/DCDC/Pages/SilicaStoneFabricators.aspx>. Accessed May 4, 2023.

### **6.3 American Conference of Governmental Industrial Hygienists (ACGIH)**

A search for recommendations from the ACGIH did not yield any specific information for exposure to RCS from fabrication or installation of engineered stone, other than the established threshold limit value of 25  $\mu\text{g}/\text{m}^3$ .

### **6.4 American Industrial Hygiene Association (AIHA)**

In 2019, AIHA published an article to educate stone fabrication employers on the dangers of silica dust.<sup>56</sup> The article references material from CDPH, OSHA, and NIOSH on the emerging hazard of silicosis among engineered stone fabricators and installers. The article highlights several cases of silicosis in stone fabrication workers in the U.S. and globally, and it references information from the CDC and NIOSH website. Two articles from National Public Radio (NPR) are also cited regarding silicosis among U.S. countertop workers.

### **6.5 American Society for Testing and Materials (ASTM)**

ASTM has published the E1132 and E2625 standards regarding work environments with exposure to RCS. Both standards include descriptions of actions that should be taken to reduce the risk of occupational exposures to RCS. The E1132 standard contains recommendations for effective and attainable techniques to control exposure. The E2625 standard contains similar recommendations specific to the construction and demolition industries.

### **6.6 University of California, San Francisco (UCSF) – California Labor Lab**

The UCSF California Artificial Stone and Silicosis (CASS) Project discusses current silicosis cases and provides information on the risk of silicosis among workers who fabricate countertops using engineered stone.<sup>57</sup> The purpose of the project is to recommend and promote respiratory health among vulnerable workers through education, medical monitoring, and statewide surveillance.

## **7.0 PETITIONERS' BASIS FOR AN EMERGENCY REGULATION**

The petitioner raises the following points in support of an ETS:

- Physicians at Olive View UCLA Hospital in Southern California have identified about 50 workers with advanced silicosis, characterized by progressive massive fibrosis.<sup>58</sup>

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<sup>56</sup> Resources Seek to Protect Stone Workers from Silica Dust Exposure, Silicosis, December 13, 2019 <https://www.aiha.org/news/resources-seek-to-protect-stone-workers-from-silica-dust-exposure-silicosis>. Accessed May 4, 2023.

<sup>57</sup> Cummings, K., Harrison, R. et al. California Artificial Stone and Silicosis Project <https://calaborlab.ucsf.edu/california-artificial-stone-and-silicosis-project>. Accessed May 4, 2023.

<sup>58</sup> Los Angeles County Department of Public Health (2022). "Vigilant Olive View-UCLA Medical Center Physicians Identify Rare Occupational Lung Disease." *Pulse*. December 2022. <https://dhs.lacounty.gov/olive-view-ucla-silicosis/>. Accessed April 28, 2023.

- These workers were employed in engineered stone fabrication shops and were involved in cutting, shaping and polishing engineered stone slabs, which exposed them to respirable crystalline silica (RCS).
- Engineered stone slabs present a significantly increased risk of silicosis because they contain up to 95% silica, and because the binders used in the engineered material might themselves be toxic.<sup>59</sup>
- Despite the 2016 passage of federal OSHA’s updated silica rules, controlling silica dust in these fabrication shops has proved to be technically difficult. Respiratory protection is not sufficiently protective against the “clouds of airborne dust” encountered in these shops, and few workers are receiving mandated medical surveillance exams.
- Irreversible, end-stage silicosis is developing among these workers “after only a few years of poorly controlled occupational exposure.” This represents a “new epidemic of occupational lung disease among California workers.”

## **8.0 ANALYSIS: THE PETITION HAS MERITS**

### **8.1 Several Factors have Led to the Epidemic of Silicosis Among Workers in the Engineered Stone Fabrication Industry**

The following factors have produced conditions that place workers in this industry at high risk:

#### 8.1.1 Market Forces

Engineered stone dominates the stone countertop industry and will grow 9.6% annually, leading up to 2026.

#### 8.1.2 A Uniquely Hazardous Product

Engineered stone is ≥93% crystalline silica, compared to 10-45% for granite.

#### 8.1.3 Challenges in Reducing Exposures

A combination of water jets, local exhaust ventilation, work practices, and personal protective equipment (PPE) is needed to reduce exposures.

#### 8.1.4 Severe Consequences of Exposures

The silicosis fatality rate in this industry is 18-20%; many of those who survive will likely face a lifetime of suffering from the effects of an incurable, disabling lung disease.

#### 8.1.5 Evidence that Exposures are Occurring

72% of shops inspected by Cal/OSHA were cited for one or more violations of the RCS standard.

#### 8.1.6 Limitations of Small Businesses

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<sup>59</sup> Leso V, Fontana L, Romano R, Gervetti P, Iavicoli I. (2019). Artificial Stone Associated Silicosis: A Systematic Review. *Int J Environ Res Public Health*. 16(4):568. <https://pubmed.ncbi.nlm.nih.gov/30781462/>. Accessed May 10, 2023.

Small businesses do not often have the capacity to implement effective silica prevention strategies.

### 8.1.7 Vulnerable Workers

The workforce is primarily foreign-born and unrepresented; English is a second language.

As a consequence of the factors, cases of severe silicosis are growing. Twenty-two (85%) of 26 cases of silicosis in the industry identified between 2011 and 2022 were seen in 2022.

This combination of factors calls for a concerted response by Cal/OSHA, one component of which must include an emergency temporary standard that is appropriately calibrated to the needs of employers and workers in this industry.

## **8.2 Section 5204 is Primarily a Performance-based Standard. A Prescriptive Approach is Needed to Protect Workers in the Engineered Stone Fabrication Industry**

The evidence of widespread non-compliance identified by Cal/OSHA in 2019, combined with the emergence of serious silicosis cases and deaths among workers in this industry, suggests that the existing silica standard (§5204) is not well-calibrated to the needs of the engineered stone fabrication industry, which consists of hundreds of small shops, each of which operates with about five employees.

Section 5204 is primarily a performance-based standard that requires the employer to conduct relatively sophisticated exposure assessments as the basis for implementing silica exposure controls. This approach is best suited to well-resourced, large employers; it is less effective for small businesses, which typically do not often have the capacity to conduct a technically sound exposure assessment.

Specific limitations of §5204 are described below, along with possible solutions that apply to the engineered stone fabrication industry.

### 8.2.1 Exposure Assessment (subsection d)

§5204:

- All activities to protect workers are triggered by the results of an exposure assessment. The employer can meet this requirement by conducting exposure monitoring or by applying the results of industry-wide assessments to the conditions specific to the employer's shop.

Limitations:

- A small business will find that a properly conducted exposure assessment is complicated and costly. Most employers in the engineered stone fabrication industry (68%) do not conduct exposure assessments, and yet exposure control measures are only required under §5204 when an exposure assessment shows that workers are exposed over the PEL.
- Even a well-conducted exposure assessment can vary widely day-to-day, including for the same worker; results may falsely indicate that worker exposures are below the PEL. This is particularly the case with airborne sampling for silica.<sup>60</sup>

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<sup>60</sup> Kate Cole, Deborah Glass, Tracey Bence, Dino Pisaniello, Peter Knott, Shelley Rowett, Sharann Johnson, Prevention of the Occupational Silicosis Epidemic in Australia: What Do Those Who Assess Workplace Health Risk Think Should Be Done Now? *Annals of Work Exposures and Health*, Volume 67, Issue 2, March 2023, pp. 281–287.

Solutions:

- For all businesses, the use of engineered stone material itself should trigger specific engineering, work practice, and respiratory protection requirements. Protections should not be dependent on the results of an exposure assessment.
- This approach integrates the cost of exposure controls into the baseline costs of opening and operating an engineered stone fabrication shop.
- Due to the unique hazards documented among workers exposed to RCE from engineered stone, revised protections should cover all workplaces where engineered stone is used that consists of more than 5% silica.

### 8.2.2 Regulated Areas (subsection e)

§5204:

- Specific areas of a facility are set aside with special protections if exposures are, or are likely to be, over the PEL. These areas are called “regulated areas” and are simply demarcated by the employer; they are not physically contained spaces. These areas require signage and the use of “appropriate respirators.”

Limitations:

- In a small business, the entire facility is likely to be considered a “regulated area,” simply due to its small size. The meaning of “appropriate respirator” is likely to be unclear.
- Without negative pressure, silica contamination is unlikely to be contained inside a “regulated area.”

Solutions:

- To prevent dispersion of silica particles throughout the facility, “regulated areas” need to be physically differentiated from other areas and placed under negative pressure. See, for example, 8 CCR §1529 and §5208.
- Workers performing tasks with engineered stone inside the “regulated area” should be provided with, and should wear, supplied air respirators or powered air purifying respirators (PAPRs).

### 8.2.3 Methods of Compliance (subsection f)

§5204:

- Engineering controls, such as wet methods and local exhaust ventilation, and work practice controls are required unless the employer can demonstrate that they’re not feasible.
- Respiratory protection is required if these controls are not sufficient to reduce employee exposure to, or below, the PEL.

Limitations:

- Engineering and work practice controls are not explicitly required. Because the standard does not include a definition of “feasible,” a business could reasonably claim that any number of



logistical, financial, engineering, or other challenges make it infeasible to install engineering controls.

- In its 2019 SEP, Cal/OSHA found that 26% of workers reported using dry methods for certain tasks. Overall, it is clear that controls used in this industry are insufficient in reducing exposures: Cal/OSHA found one or more exposures above the PEL in 51% of shops inspected during the 2019 SEP.
- Given the number and seriousness of silicosis cases, engineering controls are essential in the engineered stone fabrication industry.

Solutions:

- The effective use of engineering controls that include a combination of wet methods, local exhaust ventilation and air purification systems, together with safe work practices, should be mandatory as a condition of operating an engineered stone fabrication shop.
- While some studies have shown that wet methods can be up to 70 and 90% effective in reducing exposures,<sup>61 62</sup> NIOSH has shown that, even with wet methods, overexposure to RCS can still occur.<sup>63</sup> To reduce exposures below the 50 µg/m<sup>3</sup>, NIOSH has recommended additional controls, including using a larger amount of water, alternative means of cleaning and drying stone countertops other than compressed air, and respiratory protection.
- All dry operations and work practices should be expressly prohibited.

#### 8.2.4 Respiratory Protection (subsection g)

§5204:

- Respiratory protection is required for workers in regulated areas; when installing engineering controls or conducting maintenance and repair work; and when engineering controls are not sufficient to reduce exposures to or below the PEL.
- To select a respirator, employers must comply with section 5144, which requires that respiratory protection be appropriate for the specific hazard and its concentration in the workplace.

Limitations:

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<sup>61</sup> Cooper JH, Johnson DL, Phillips ML. (2015) Respirable silica dust suppression during artificial stone countertop cutting. *Ann Occup Hyg*; 59: 122–6.

<sup>62</sup> Deborah C Glass, Christina Dimitriadis, Jessy Hansen, Ryan F Hoy, Fiona Hore-Lacy, Malcolm R Sim, Silica Exposure Estimates in Artificial Stone Benchtop Fabrication and Adverse Respiratory Outcomes, *Annals of Work Exposures and Health*, Volume 66, Issue 1 (January 2022), pp. 5–13 <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC8751787/>. Accessed May 8, 2023.

<sup>63</sup> Qi, C & Echt, A (2016) *Engineering Control of Silica Dust from Stone Countertop Fabrication and Installation*. EPHB Report No. 375-11a <https://www.cdc.gov/niosh/surveyreports/pdfs/2021-DFSE-710.pdf>. Accessed May 5, 2023

- Because employers are not measuring exposures in this industry, they cannot determine the appropriate form of respiratory protection.<sup>64 65</sup>
- Use of air-purifying respirators has proved difficult in this industry, even when accompanied by training programs and fit-testing.<sup>66</sup>
- In its 2019 SEP, Cal/OSHA found that 25% of workers had exposures ranging from 50–670  $\mu\text{g}/\text{m}^3$ , with a median of 90  $\mu\text{g}/\text{m}^3$ , well above the PEL of 50  $\mu\text{g}/\text{m}^3$ . Cal/OSHA found that only 20% of workers reported completing a respirator fit test within the previous 12 months.
- Interviews with employees conducted during the 2019 silica SEP indicated that N95's and other filtering facepiece respirators often become clogged with dust, and are difficult to wear during fabrication activities.
- Studies have indicated the presence of volatile organic compounds (VOC's), including styrene and phthalic anhydride, among the air contaminants released when engineered stone is fabricated.<sup>67</sup> These substances may be responsible for some of the toxic effects on the airways of the lungs, which have been observed in workers who fabricate engineered stone. These volatiles will not be removed by many filtering facepiece respirators.

## Solutions

- Given these factors and the severity of silicosis in this industry, a full-face, powered air purifying respirator (PAPR) or supplied air respirator should be required as the standard form of respiratory protection for all dust-generating tasks.
- A full face PAPR provides an assigned protection factor (APF) of 1000 compared to 50 for a non-powered APR and 10 for a half-face APR. Until fabrication shops are able to install effective RCS engineering controls and demonstrate their efficacy, a full-face PAPR is necessary to ensure worker protection from the high RCS exposure levels Cal/OSHA identified in its 2019 SEP.
- While more costly, PAPRs are more comfortable to wear over multiple hours, compared to non-powered devices; they are therefore more likely to be used consistently by workers.

### 8.2.5 Housekeeping (subsection h)

<sup>64</sup> U.S. Dept of Labor, Occupational Safety and Health Administration (2009). Assigned Protection Factors for the Revised Respiratory Protection Standard. OSHA 3352-02. <https://www.osha.gov/sites/default/files/publications/3352-APF-respirators.pdf>. Accessed May 3, 2023.

<sup>65</sup> Employers must understand the Maximum Use Concentration (MUC) to determine the appropriate respiratory protection.  $\text{MUC} = \text{Assigned Protection Factor (APF)} * \text{PEL}$ . For example, the APF for an N95 or half-face air purifying respirator is 10; the PEL for silica is 50  $\mu\text{g}/\text{m}^3$ . Therefore, the  $\text{MUC} = 10 * 50 \mu\text{g}/\text{m}^3 = 500 \mu\text{g}/\text{m}^3$ . This is the maximum workplace concentration against which an N95 or half face APR is protective

<sup>66</sup> Anlimah, Frederick, et al. A systematic review of the effectiveness of dust control measures adopted to reduce workplace exposure. *Environmental Science and Pollution Research* (2023): 30, pp. 54407–54428 <https://link.springer.com/article/10.1007/s11356-023-26321-w>. Accessed May 2, 2023

<sup>67</sup> Chandnee Ramkissoon, Sharyn Gaskin, Tony Hall, Dino Pisaniello, Graeme Zosky (2023). Engineered Stone Fabrication Work Releases Volatile Organic Compounds Classified as Lung Irritants, *Annals of Work Exposures and Health*, Volume 67, Issue 2(March 2023), pp 288–293. <https://pubmed.ncbi.nlm.nih.gov/36239208/>. Accessed May 4, 2023.

§5204:

- Dry sweeping is prohibited, unless wet sweeping or HEPA-filtered vacuuming or other methods are not feasible.
- Use of compressed air to clean clothing or surfaces is prohibited, unless there is no feasible alternative or a ventilation system effectively captures the dust cloud.

Limitations:

- Because the standard does not include a definition of “feasible,” a small business could reasonably claim that any number of logistical, financial, engineering or other challenges make it infeasible to perform wet sweeping or HEPA-filtered vacuuming.

Solutions:

- Dry sweeping and use of compressed air should be expressly prohibited.
- A shower facility or disposable Tyvek coveralls and hair covers should be provided to all employees, along with a changing area, along with procedures for properly removing coveralls to prevent exposures.

8.2.6 Medical Surveillance (subsection i)

§5204:

- The employer must make medical exams available if the employee will be exposed at or above the action level for 30 or more days. Exams must include a chest X-ray and pulmonary function test.
- Medical exams include an initial exam within 30 days of employment, followed by exams at least every three years thereafter.
- The employer must provide the PLHCP with the employee’s exposure information.
- The employer must obtain the results of the exams and opinion of the PLHCP. This typically consists of the exam date; a statement that the exam met the requirements of 5204; and any recommended limitations on the employee’s use of respirators.
- The employer must provide for specialty care if recommended by the PLHCP.

Limitations:

- Very few employers in this industry comply with the medical surveillance requirements. During the 2019 SEP, only 5% of workers reported that their employers had sent them or their co-workers for required silica medical examinations.
- Employers that do not perform an exposure assessment then claim that employees will not be exposed above the action level and that these employees therefore do not need to be provided with medical exams.

- It can be challenging to find a PLHCP with the qualifications necessary to evaluate silica exposure.
- Chest x-ray has limited sensitivity for silicosis, particularly in early stages of disease. 43% of Australian workers with silicosis diagnosed on chest (computerized tomography) CT scan had normal chest x-rays.<sup>68</sup> Silicosis diagnoses may therefore be missed, even in workers who undergo required medical surveillance.

Solutions:

- Employers should be required to provide an initial medical exam at the time of hire to all employees who work directly with engineered stone, regardless of exposure conditions.
- Follow-up exams should be performed every year thereafter, regardless of exposure conditions, unless the employer can demonstrate that the employee has not been exposed above the action level throughout the year, based on properly conducted exposure assessments.
- Exams should only be performed by qualified PLHCPs who have received at least three hours of Continuing Medical Education about silicosis. Results of all exams should be provided to the employee.
- For workers with longer duration of exposure or higher level of risk as assessed by the PLHCP, exams should include a chest CT rather than chest x-ray.

### 8.2.7 Communication of Hazards to Employees (subsection j)

§5204:

- In addition to complying with the hazard communication standard (section 5194) the employer must post signs at entrances to regulated areas with specific words warning of the dangers of RCS.
- The employer is required to train employees in the hazards of RCS; tasks where exposures to RCS could occur; protective actions taken by the employer; the silica standard; and the medical surveillance program.

Limitations:

- The signage states that RCS “causes damage to lungs,” which is not sufficiently clear.

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<sup>68</sup> Newbiggin K, Parsons R, Deller D, Edwards R, McBean R. Stonemasons with silicosis: Preliminary findings and a warning message from Australia. *Respirology*. Vol 24, Issue 12 (Dec 2019) pp. 1220-1221. <https://onlinelibrary.wiley.com/doi/10.1111/resp.13672>. Accessed May 4, 2023.

- Employee training is of little utility if RCS hazards and/or exposures are uncontrolled; employees cannot be trained to avoid inhaling silica particles.

Solutions:

- The required signage should state that “exposure to Respirable Crystalline Silica in dust causes permanent lung damage and can lead to death.”
- Employee training should be repeated annually and should include material on the proper use of engineering controls, work practices and respiratory protection.

### 8.2.8 Recordkeeping (subsection k)

§5204:

- The employer must maintain a record of exposure measurements, as well as the tasks performed and PPE worn while the measurements were taken, and the names of employees who were monitored.
- A record must be maintained if the employer relied on objective data in lieu of exposure monitoring to estimate exposures.
- The employer must also maintain a record with information on the results of medical exams.

Limitations:

- As noted above, most employers in the engineered stone fabrication industry (68%) do not conduct exposure assessments; therefore the employer is under no obligation to maintain exposure records.
- The same is true for the results of medical exams: Cal/OSHA found during the 2019 SEP that only 5% of employees reported receiving such an exam.
- There is no requirement of employers or PLHCPs to report silicosis cases to a public agency, which makes it difficult to identify and respond quickly to cases as they emerge.

Solutions:

- Records should be maintained as currently required; however, employers should be required to report silicosis cases to Cal/OSHA and to county health officers. PLHCPs should be required to report silicosis cases to the California Department of Public Health.
- Section 5204 should require employers to register their operations with Cal/OSHA, in compliance with section 5203.

### **8.3 An Emergency Regulation Is Necessary to Protect Employee Health**

Workers exposed to RCS in the engineered stone fabrication industry have now been shown to develop silicosis much more often and with much more rapid progression compared to workers in the industries where silica exposure has traditionally occurred, and for whose protection the silica standards were promulgated in 2016.

This is occurring because workers in this industry are facing a unique RCS hazard in engineered stone, on account of its very high silica content, and because of the inability or unwillingness of employers in the industry to install well-recognized engineering and work practice controls.

In addition, the great majority of workers in this industry have little to no ability to affect their working conditions, due to their immigrant status, limited alternative employment opportunities, language barriers, lack of union representation, and other challenges. The result is that California is faced with a “statewide epidemic of silicosis among engineered stone fabrication workers,” according to University of California and CDPH investigators.<sup>69</sup>

Because the existing section 5204 was promulgated based on the experience of silicosis in traditional industries, such as mining, quarrying, and sandblasting, it is not well calibrated to the small businesses and working conditions that characterize the engineered stone fabrication industry today. As noted above under section 8.2, section 5204 was designed as a performance-based standard that is most applicable to large, well-resourced employers who are able to conduct complicated exposure assessments and deploy protective measures based on the findings of those assessments.

Accordingly, an emergency standard is needed that adopts the principles of section 5204 and applies them more prescriptively to today’s engineered stone fabrication industry.

As noted above under section 8.3, as an alternative to section 5204, an emergency standard that incorporates a more prescriptive approach will be more effective at protecting workers in today’s engineered stone fabrication industry and be easier for employers to implement. At its most basic, this approach makes it clear that implementing effective RCS exposure controls is integral to the business of operating an engineered stone fabrication shop.

### **9.0 PETITIONER’S PROPOSAL SHOULD BE ENACTED AS A REGULATION, BUT NUMEROUS ADDITIONAL PROVISIONS ARE NEEDED TO ENSURE EFFECTIVENESS**

Cal/OSHA concurs with Petitioner’s proposal and recommends the following additional provisions to ensure that the silica emergency standard will effectively protect workers in this industry from exposure to RCS. Petitioner’s recommended provisions are notated in *italics and underlining*, below.

#### **9.1 Scope**

*Petitioner: Cover all workplaces where engineered stone is used that consists of more than 5% silica.*

Cal/OSHA: Due to the unique hazards associated with engineered stone, the emergency standard shall cover all workplaces where engineered stone is used that consists of more than 1% silica.

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<sup>69</sup> Fazio J, et. Al. (2023) op. cit. at reference 25.

## **9.2 Exposure Assessment (subsection d)**

Cal/OSHA: The use of engineered stone itself must trigger the implementation of specific engineering, work practice and respiratory protection requirements. These protections must not hinge on the outcome of exposure assessments.

## **9.3 Regulated Areas (subsection e)**

Petitioner: Strictly control access to areas where engineered stone is fabricated.

Cal/OSHA: Regulated areas must be enclosed and placed under negative pressure sufficient to retain RCS particles inside the space. Workers performing tasks inside the regulated area must be provided with supplied air respirators or full-face, powered air purifying respirators (PAPRs).

## **9.4 Methods of Compliance (subsection f)**

Petitioner: Prohibit any activity conducted without the use of water to suppress dust.

Cal/OSHA: The effective use of engineering controls that include a combination of wet methods, local exhaust ventilation and air purification systems, together with safe work practices and respiratory protection, must be implemented and operated properly. All dry operations and work practices are expressly prohibited.

## **9.5 Respiratory Protection (subsection g)**

Petitioner: Require the use of supplied air respirators or powered air purifying respirators (PAPRs), comparable to the requirements of 8 CCR 5208(g).

Cal/OSHA: A full-face, powered air purifying respirator (PAPR) or supplied air respirator must be used for all dust-generating tasks and must be equipped with HEPA filters and organic vapor cartridges.

## **9.6 Housekeeping (subsection h)**

Cal/OSHA: Dry sweeping and use of compressed air is expressly prohibited.

Cal/OSHA: A shower facility, disposable Tyvek coveralls, or cleanable uniforms, along with appropriate hair covers, must be provided to all employees, along with a changing area and procedures for properly removing coveralls or uniforms to prevent worker exposures and take-home exposures. Laundering of uniforms shall be paid for and managed by the employer.

## **9.7 Medical Surveillance (subsection i)**

Cal/OSHA: Medical exams must be provided at time of hire to all employees who work with engineered stone, regardless of exposure conditions.

Cal/OSHA: Exams should only be performed by qualified PLHCPs who have received at least three hours of Continuing Medical Education pertaining to silicosis that includes training on work processes and exposure to silica dust; clinical diagnosis and treatment of silicosis; and medical screening, referral and notification requirements. Results of all exams shall be provided to the employee.

Cal/OSHA: Follow-up exams must be performed every year thereafter, regardless of exposure conditions, unless the employer can demonstrate that the employee has not been exposed above the action level throughout the year, based on properly conducted exposure assessments.

## **9.8 Communication of Hazards to Employees (subsection j)**

Cal/OSHA: The required signage must state that “Exposure to Respirable Crystalline Silica in Dust Causes Permanent Lung Damage and Can Lead to Death.”

Cal/OSHA: Employee training must be repeated annually and must include material on the proper use of engineering controls, work practices and respiratory protection.

## **9.9 Recordkeeping (subsection k)**

*Petitioner: Require annual reporting to Cal/OSHA, pursuant to 8 CCR §5203.*

Cal/OSHA: Records shall be maintained as currently required under section 5204; employers must report silicosis cases to Cal/OSHA and to county health officers.

Cal/OSHA: All employers shall be required to register their operations with Cal/OSHA, in compliance with section 5203.

Silica violations are currently classified as serious because silica is a regulated carcinogen under Article 110.<sup>70</sup>

## **10 ACTIONS TO TAKE FOLLOWING IMPLEMENTATION OF AN EMERGENCY RULE**

### **10.1 If Widespread Non-compliance Occurs Following Implementation, an Advisory Committee Should be Convened to Consider a July 1, 2024 Prohibition on the Use of Engineered Stone.**

In addition to the above actions, Cal/OSHA recommends that the SEP reevaluate worker exposures in the engineered stone fabrication industry as early as January 2024. If inspections show that (A) employers have moved quickly to implement the emergency standard; (B) exposures are below the action level across most of the industry; and (C) silicosis cases have dropped to zero, Cal/OSHA recommends that the emergency standard and associated enforcement activities be continued.

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<sup>70</sup> CCR Title 8, §334. Classification of Violations and Definitions. Violations and Definitions. (c) Serious Violation. (4) For Carcinogens - a serious violation is a violation of any standard, order, or special order respecting the use of a carcinogen, as defined in 8 California Code of Regulations 330(f). However, the violation shall not be considered serious if the employer can demonstrate that he did not, and could not with the exercise of reasonable diligence, know of the presence of the violation or he can demonstrate that the Division should have determined that the violation was minor and resulted in no substantial health hazard.

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However, if the resulting inspections show widespread non-compliance, as occurred in the 2019-2020 SEP, Cal/OSHA recommends that an advisory committee be immediately convened to develop plans for prohibiting the use of engineered stone products in California workplaces, effective July 1, 2024.

Cal/OSHA's call for a potential workplace prohibition on the use of engineered stone products is based on conditions in the existing industry described above in subsection 8.1, and in particular the following three considerations:

(A) The existing industry may be unable to respond

Cal/OSHA recognizes that the existing engineered stone industry in California may not have the capacity and/or willingness to invest in the advanced controls necessary to protect their workers from exposure to RCS.

(B) Safe use of engineered stone may not be possible

Cal/OSHA is not convinced that engineered stone can be used safely. At >93% silica, engineered stone may be so hazardous that even properly designed engineering controls and work practices may be unable to prevent RCS exposures and silicosis among the workers who cut, shape and polish it.

(C) California is facing a silicosis epidemic

Cal/OSHA concurs with the findings of California Department of Public Health (CDPH) and University of California, San Francisco (UCSF) investigators, who will present their findings on May 22, 2023 at the American Thoracic Society International Conference, demonstrating that there is now an epidemic of silicosis among engineered stone fabrication workers in California.

## 10.2 Australian Health Officials Have Called for a Prohibition on the Use of Engineered Stone

Prohibiting the use of engineered stone would follow the lead of Australia, whose Dust Disease Task Force recommended in June 2021 that strict control measures be implemented to prevent RCS exposures, but then cautioned as follows:

“...if the measures we have recommended do not achieve the expected significant improvements in worker safety within the next three years, then immediate action must be taken to ban the product. Industry and governments must urgently demonstrate that engineered stone can, in fact, be used safely.”<sup>71</sup>

On February 2023, the work health and safety ministers of each of Australia's states and territories unanimously agreed to ask Safe Work Australia to prepare a plan within six months to prohibit engineered stone products.<sup>72</sup>

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<sup>71</sup> Australian Government Department of Health. National Dust Disease Taskforce – Final Report to the Minister for Health and Aged Care. (June 2021) p. 7. <https://www.health.gov.au/resources/publications/national-dust-disease-taskforce-final-report>. Accessed May 11, 2023.

<sup>72</sup> Paul Karp. (Feb 28, 2023). Australia moves to fast-track ban on silica stone benchtops that cause fatal lung disease. [Australia moves to fast-track ban on silica stone benchtops that cause fatal lung disease | Industrial relations | The Guardian](#). Accessed May 11, 2023.

In a parallel action, the Australian Construction, Forestry, Maritime, Mining and Energy Union announced that “if the federal government does not ban the production, importation and use of the material by July 2024, the CFMEU will ban its members from handling it.”<sup>73</sup>

## **11 CONCLUSION: PETITION SHOULD BE APPROVED**

Silicosis is a permanently disabling, progressive, and often fatal disease. A silicosis epidemic is occurring now in the engineered stone countertop industry in California. Due to the seriousness of the problem, Cal/OSHA recommends the Standards Board do the following:

- Grant the petition;
- Request Cal/OSHA to develop an emergency regulation;
- Undertake emergency rulemaking;
- Follow up on the emergency rulemaking with regular rulemaking to establish a permanent regulation;
- Request Cal/OSHA to review inspection data six months after implementation of the emergency rule to determine if use of engineered stone needs to be prohibited.

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<sup>73</sup> Construction, Forestry, Maritime, Mining and Energy Union. Stop This Killer Stone: Call To Ban Engineered Stone. Canberra, Australia. <https://stophiskillerstone.com.au/about-ratios/>. Accessed May 11, 2023.

## APPENDIX A

### CCR Title 8 §1532.3. Occupational Exposures to Respirable Crystalline Silica.<sup>74</sup>

Table 1 - Specified Exposure Control Methods When Working With Materials Containing Crystalline Silica

		<i>Required respiratory protection and minimum assigned protection factor</i>	
		<i>(APF)</i>	
		<i>≤ 4 hours/shift</i>	<i>&gt; 4 hours/shift</i>
<i>Equipment/task</i>	<i>Engineering and work practice control methods</i>		
(i) Stationary masonry saws	Use saw equipped with integrated water delivery system that	None	None.
	continuously feeds water to the blade		
	Operate and maintain tool in accordance with manufacturer's		
	instructions to minimize dust emissions		
(ii) Handheld power saws (any blade diameter)	Use saw equipped with integrated water delivery system that		
	continuously feeds water to the blade		
	Operate and maintain tool in accordance with manufacturer's		
	instructions to minimize dust emissions:		
	-When used outdoors	None	APF 10.
	-When used indoors or in an enclosed area	APF 10	APF 10.
(iii) Handheld power saws for cutting	For tasks performed outdoors only: Use saw equipped with	None	None.

<sup>74</sup> [https://www.dir.ca.gov/title8/1532\\_3.html](https://www.dir.ca.gov/title8/1532_3.html).

powered chipping tools	or spray of water at the point of impact:		
	-When used outdoors	None	APF 10.
	-When used indoors or in an enclosed area	APF 10	APF 10.
	OR		
	Use tool equipped with commercially available shroud and 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:		
	-When used outdoors	None	APF 10.
	-When used indoors or in an enclosed area	APF 10	APF 10.
(xi) Handheld grinders for mortar	Use grinder equipped with commercially available shroud and dust	APF 10	APF 25.
removal ( <i>i.e.</i> , tuckpointing)	collection system		
	Operate and maintain tool in accordance with manufacturer's		
	instructions to minimize dust emissions		
	Dust collector must provide 25 cubic feet per minute (cfm) or greater		
	of airflow per inch of wheel diameter and have a filter with 99% or		
	greater efficiency and a cyclonic pre-separator or filter-cleaning		
	mechanism		
(xii) Handheld grinders for uses	For tasks performed outdoors only: Use grinder equipped with	None	None.

fiber-cement board (with blade diameter of 8 inches or less)	commercially available 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		
(iv) Walk-behind saws	Use saw equipped with integrated water delivery system that continuously feeds water to the blade		
	Operate and maintain tool in accordance with manufacturer's instructions to minimize dust emissions:		
	-When used outdoors	None	None.
	-When used indoors or in an enclosed area	APF 10	APF 10.
(v) Drivable saws	For tasks performed outdoors only:		
	Use saw equipped with integrated water delivery system that continuously feeds water to the blade	None	None.
	Operate and maintain tool in accordance with manufacturer's instructions to minimize dust emissions		
(vi) Rig-mounted core saws or drills	Use tool equipped with integrated water delivery system that supplies water to cutting surface	None	None.
	Operate and maintain tool in accordance with manufacturer's instructions to minimize dust emissions		

(vii) Handheld and stand-mounted drills (including impact and rotary hammer drills)	Use drill equipped with commercially available shroud or cowling with dust collection system	None	None.
	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		
(viii) Dowel drilling rigs for concrete	For tasks performed outdoors only:		
	Use shroud around drill bit with a dust collection system. Dust collector must have a filter with 99% or greater efficiency and a filter-cleaning mechanism	APF 10	APF 10.
	Use a HEPA-filtered vacuum when cleaning holes		
(ix) Vehicle-mounted drilling rigs for rock and concrete	Use dust collection system with close capture hood or shroud around drill bit with a low-flow water spray to wet the dust at the discharge point from the dust collector	None	None.
	OR		
	Operate from within an enclosed cab and use water for dust suppression on drill bit	None	None.
(x) Jackhammers and handheld	Use tool with water delivery system that supplies a continuous stream		

other than mortar removal	integrated water delivery system that continuously feeds		
	water to the grinding surface		
	Operate and maintain tool in accordance with manufacturer's		
	instructions to minimize dust emissions		
	OR		
	Use grinder equipped with commercially available shroud and dust		
	collection system		
	Operate and maintain tool in accordance with manufacturer's		
	instructions to minimize dust emissions		
	Dust collector must provide 25 cubic feet per minute (cfm) or greater		
	of airflow per inch of wheel diameter and have a filter with 99% or		
	greater efficiency and a cyclonic pre-separator or		
	filter-cleaning mechanism:		
	-When used outdoors	None	None.
	-When used indoors or in an enclosed area	None	APF 10.
(xiii) Walk-behind milling machines	Use machine equipped with integrated water delivery system that	None	None.
and floor grinders	continuously feeds water to the cutting surface		
	Operate and maintain tool in accordance with manufacturer's		
	instructions to minimize dust emissions		
	OR		
	Use machine equipped with dust collection system recommended by	None	None.
	the manufacturer		
	Operate and maintain tool in accordance with manufacturer's		
	instructions to minimize dust emissions		

	Dust collector must provide the air flow recommended by the		
	manufacturer, or greater, and have a filter with 99% or greater		
	efficiency and a filter-cleaning mechanism		
	When used indoors or in an enclosed area, use a HEPA-filtered		
	vacuum to remove loose dust in between passes		
(xiv) Small drivable milling machines (less than half-lane)	Use a machine equipped with supplemental water sprays designed to suppress dust. Water must be combined with a surfactant	None	None.
	Operate and maintain machine to minimize dust emissions		
(xv) Large drivable milling machines (half-lane and larger)	For cuts of any depth on asphalt only: Use machine equipped with exhaust ventilation on drum enclosure and supplemental water sprays designed to suppress dust	None	None.
	Operate and maintain machine to minimize dust emissions		
	For cuts of four inches in depth or less on any substrate:		
	Use machine equipped with exhaust ventilation on drum enclosure and supplemental water sprays designed to suppress dust	None	None.
	Operate and maintain machine to minimize dust emissions		
	OR		
	Use a machine equipped with supplemental water spray designed to suppress dust. Water must be combined with a surfactant	None	None.
	Operate and maintain machine to minimize dust emissions		



(xvi) Crushing machines	Use equipment designed to deliver water spray or mist for dust	None	None.
	suppression at crusher and other points where dust is generated ( <i>e.g.</i> ,		
	hoppers, conveyers, sieves/sizing or vibrating components, and		
	discharge points)		
	Operate and maintain machine in accordance with manufacturer's		
	instructions to minimize dust emissions		
	Use a ventilated booth that provides fresh, climate-controlled air to		
	the operator, or a remote control station		
(xvii) Heavy equipment and utility	Operate equipment from within an enclosed cab When employees	None	None.
vehicles used to abrade or	outside of the cab are engaged in the task, apply water and/or		
fracture silica-containing materials	dust suppressants as necessary to minimize dust emissions		
( <i>e.g.</i> , hoe-ramming, rock ripping)			
or used during demolition activities			
involving silica-containing			
materials			
(xviii) Heavy equipment and utility	Apply water and/or dust suppressants as necessary to minimize dust	None	None.
vehicles for tasks such as grading	emissions OR		
and excavating but not including:			
Demolishing, abrading, or fracturing	When the equipment operator is the only employee engaged in the	None	None.
silica-containing materials	task, operate equipment from within an enclosed cab		