

DEPARTMENT OF INDUSTRIAL RELATIONS  
Occupational Safety and Health Standards Board  
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**FINDING OF EMERGENCY  
GOVERNMENT CODE SECTION 11346.1  
OCCUPATIONAL SAFETY AND HEALTH STANDARDS BOARD  
PROPOSED EMERGENCY REGULATION  
TITLE 8, CALIFORNIA CODE OF REGULATIONS  
GENERAL INDUSTRY SAFETY ORDERS  
CHAPTER 4, SUBCHAPTER 7,  
REVISED SECTION 5204**

**Occupational Exposures to Respirable Crystalline Silica**

**KEY POINTS**

- The Board is proposing an Emergency Temporary Standard (ETS) to protect workers in the stone fabrication industry from exposure to respirable crystalline silica (RCS).
- When inhaled, RCS can result in silicosis, an incurable, progressive lung disease that causes pulmonary fibrosis, respiratory failure, and in many cases, death.
- RCS exposure from working with artificial stone produces an aggressive form of silicosis, with rapid disease progression, accelerated decline in lung function, and high mortality, typically at a young age.
- There is a growing number of silicosis cases in the artificial stone fabrication industry that began in 2019 and has since been described by the California Department of Health (CDPH) Occupational Health Branch (OHB) as an epidemic.
- In July 2023, OHB investigators reported a total of 52 workers with silicosis who were exposed to RCS while fabricating countertops from artificial stone.
- The median age of these workers was 45 years at diagnosis; 51 (98%) were Latino men. Ten of these patients (19%) died by the time investigators reported their findings. The median age at death was 46 years, with a median work tenure of 15 years. Three individuals underwent lung transplantation, which has a five-year survival rate of 59%.
- In November 2023, OHB reported that the total number of silicosis cases in the artificial stone industry had increased 79%, from the 52 workers reported in July of 2023, to a total of 93. One worker with severe silicosis is 27 years of age, is on continual oxygen, and worked for a period of 10 years in the industry.

- About 4,040 workers are employed in California's stone fabrication shops. Based on a silicosis prevalence rate of 12% to 21% and a fatality rate of 19%, Cal/OSHA estimates that between 500 and 850 cases of silicosis will occur among these workers, and between 90 and 160 will likely die of silicosis.
- Cal/OSHA's existing silica standard, California Code of Regulations (CCR) title 8, 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 of the stone fabrication industry. In 2019, Cal/OSHA found that 72% of shops in this industry were out of compliance with section 5204.
- Section 5204 also contains three key loopholes that allow employers to easily exempt themselves from the requirements of the regulation and put workers in grave danger.
- In light of these factors, an ETS is needed that will require far safer conditions for workers who handle both artificial stone (containing >0.1% silica) and natural stone (containing >10% silica). An ETS is needed that will be clearer for employers to implement and more efficient for Cal/OSHA to enforce.
- The proposed ETS meets these objectives with new requirements pertaining to engineering controls, safe work practices, respiratory protection, signage, housekeeping, training and reporting.
- The proposed ETS also provides a means for Cal/OSHA to quickly identify RCS hazards and efficiently stop certain operations in a shop, or shut-down the shop itself, pending abatement of those hazards.
- With these immediate improvements, the proposed ETS is expected to substantially reduce the number of silicosis cases and deaths in California.
- Over 10 years, the expected costs of the proposed ETS to businesses are \$66 million; benefits over the same period are estimated at \$603 million, not including indirect costs associated with lost wages and benefits, lost lifetime productivity, and pain and suffering.

### **BACKGROUND**

Silicosis is an incurable, progressive lung disease that can, and usually does, lead to pulmonary fibrosis, respiratory failure, and eventually death. Its primary cause is occupational exposure to RCS. 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>

The objective of the proposed emergency regulation is to reduce occupational RCS exposure and silicosis occupational disease cases by responding as efficiently as possible to an epidemic of silicosis that has emerged among workers in the artificial stone fabrication industry. To date, all of the affected workers have been exposed occupationally to RCS while fabricating countertops from artificial stone. Many of these workers have since died of their disease. Relative to the typical experience with silicosis, these workers' cases of silicosis have been particularly aggressive, characterized by rapid disease progression, accelerated decline in lung function, and high mortality, typically at a young age.<sup>2</sup>

The proposed emergency regulation will require employers in the artificial stone fabrication industry to implement safeguards that will prevent RCS exposures among their employees. The proposal will also apply to other industries where workers cut, grind or polish natural stone materials with a silica content of 10% or greater.

Government Code (GC) section 11346.1 requires a finding of emergency to include a written statement with the information required by paragraphs (2), (3), (4), (5) and (6) of subdivision (a) of GC section 11346.5 and a description of the specific facts demonstrating the existence of an emergency and showing the need for immediate action.

GC section 11346.1(a)(2) requires that, at least five working days prior to submission of the proposed emergency action to the Office of Administrative Law (OAL), the adopting agency provide a notice of the proposed emergency action to every person who has filed a request for notice of regulatory action with the agency. After submission of the proposed emergency regulation to OAL, OAL shall allow interested persons five calendar days to submit comments on the proposed emergency regulations as set forth in GC section 11349.6(b), unless the emergency situation clearly poses such an immediate serious harm that delaying action to allow public comment would be inconsistent with the public interest.

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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); 2002. <https://www.cdc.gov/niosh/docs/2002-129/default.html>. Accessed April 26, 2023.

<sup>2</sup> Fazio J, et al. Silicosis Among Immigrant Engineered Stone (Quartz) Countertop Fabrication Workers in California. *JAMA Internal Medicine*. 183(9): 991-998. Published online July 24, 2023. <https://jamanetwork.com/journals/jamainternalmedicine/article-abstract/2807615>. Accessed August 16, 2023.

The Occupational Safety and Health Standards Board (Board) finds that the adoption of this proposed emergency standard is necessary to address an emergency pursuant to GC section 11346.1(b)(1). The Board finds that immediate action must be taken to avoid serious harm to the public peace, health, safety or general welfare, for the reasons stated below.

## **FINDING OF EMERGENCY**

### **Basis for the Finding of Emergency**

#### 1) Exposure to RCS can result in silicosis.

Inhalation of RCS is associated with the development of silicosis, an incurable, progressive lung disease that can lead to pulmonary fibrosis, respiratory failure, and eventually death.<sup>3</sup> RCS exposure is also associated with other diseases, including autoimmune disorders, chronic renal disease, lung cancer, pulmonary tuberculosis and COPD.<sup>4</sup> All persons with high exposures to RCS develop silicosis within a few years.<sup>5</sup>

#### 2) Silicosis is an incurable disease.

The diameter of RCS particles is smaller than 10 micrometers ( $\mu\text{m}$ ), which is about 100 times smaller than ordinary sand.<sup>6, 7</sup> When inhaled, RCS particles are carried deeply into the lungs, creating fibrotic areas that are unable to exchange oxygen. This scarring process continues even after exposure to RCS stops, producing the progressive respiratory insufficiency of silicosis that has been described as akin to suffocating.<sup>8, 9</sup>

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<sup>3</sup> Kreff S, Wolff J, Rose C. Silicosis: an update and guide for clinicians. *Clin Chest Med*. 2020 Dec;41(4):709-722. <https://pubmed.ncbi.nlm.nih.gov/33153689/>. Accessed August 16, 2023

<sup>4</sup> NIOSH (2002). Health effects. op. cit. <https://www.cdc.gov/niosh/docs/2002-129/default.html>.

<sup>5</sup> Akgun M, et al. Silicosis Appears Inevitable Among Former Denim Sandblasters: A 4-Year Follow-up Study. *Chest*. 2015 Sep;148(3):647-654. <https://pubmed.ncbi.nlm.nih.gov/25654743/>. Accessed on August 21, 2023.

<sup>6</sup> U.S. Department of Labor. Occupational Safety and Health Administration. Overview: Silica, Crystalline. <https://www.osha.gov/silica-crystalline>. Accessed August 16, 2023.

<sup>7</sup> Carrieri M, et al. 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 August 16, 2023.

<sup>8</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 August 16, 2023

<sup>9</sup> Blackley DJ, et al. 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/> Accessed August 16, 2023.

3) Silicosis primarily affects workers.

Workers in the occupations of mining, quarrying and sandblasting have long been recognized to be at risk of exposure to RCS, and of developing—and dying from—silicosis.<sup>10</sup> For example, a four-year follow-up study of 83 former sandblasters, from an initial worker population of 145, found that about 6% had died in the intervening four-year period, at an average age of 24 years. Among the 74 former sandblasters still alive and available for reexamination, the prevalence of silicosis had increased from 55% to 96%, despite short-term exposures and a disease latency of only four years.<sup>11</sup>

Investigators in the United States (U.S.) and worldwide have identified RCS exposures and silicosis among workers in the artificial stone industry more recently. To date, the disease profile among these workers has proved to be particularly aggressive.

4) Artificial stone contains more than 93% crystalline silica.

Artificial stone contains more than 93% crystalline silica, in combination with adhesives and pigments (Figure 1).<sup>12</sup> In contrast, other stone materials used in countertops contain between 10% and 45% crystalline silica (granite) or little to no silica (marble). An analysis of silica dust generated from cutting and grinding artificial stone found that about 54% of the dust particles were in the respirable range of  $\leq 10 \mu\text{m}$ .<sup>13</sup>

Figure 1. Silica Content of Artificial Stone Compared to Natural Stone.

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

<sup>10</sup> NIOSH (2002). Health effects. op. cit. <https://www.cdc.gov/niosh/docs/2002-129/default.html>.

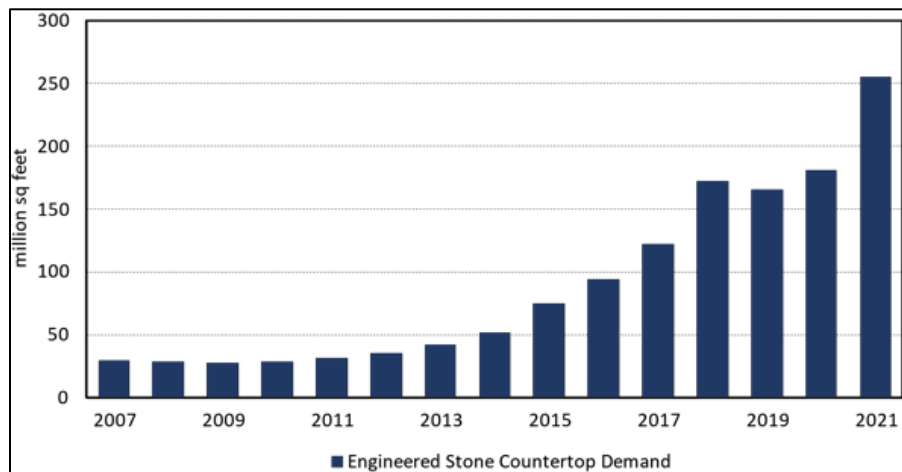
<sup>11</sup> Akgun M, et al. Silicosis Appears Inevitable. op. cit. <https://pubmed.ncbi.nlm.nih.gov/25654743/>.

<sup>12</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>13</sup> Carrieri M, et al (2020). Characterization of Silica Exposure. op. cit. <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7345731/>.

5) Artificial stone now dominates the U.S. market for stone countertops.

Over the last decade, artificial stone has emerged as the predominant material used in fabricating countertops in the U.S. (Figure 2). It is marketed on the basis of its longevity, its low maintenance and its 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.<sup>14</sup> U.S. demand for artificial 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>15</sup> Figure 2. U.S. Artificial Stone Countertop Demand, 2007-2021 (million square feet).<sup>16</sup>



6) There is an epidemic of silicosis occurring in California's artificial stone fabrication industry.

In July 2023, physicians and investigators with the University of California Los Angeles (UCLA) Olive View Medical Center and the CDPH) Occupational Health Branch (OHB) reported that between 2010 and 2022, they had identified 52 California workers with silicosis, all of whom worked in shops that fabricated countertops from artificial stone. The majority of these cases were identified in 2019 or later (Figure 3).<sup>17</sup>

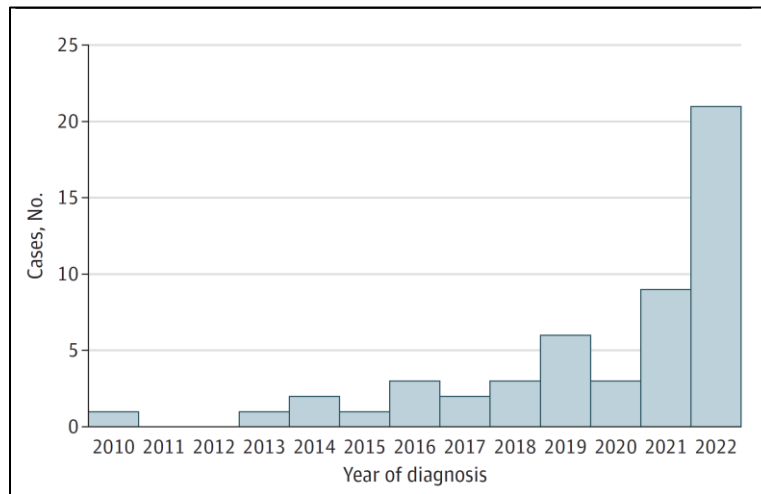
<sup>14</sup> Freedonia Group (Sept 2022). Industry Reports, United States. U.S. Engineered Stone Countertops. <https://www.freedoniagroup.com/industry-study/engineered-stone-countertops-4395.htm>. Accessed August 16, 2023

<sup>15</sup> Freedonia Group (Sept 2022), ibid. <https://www.freedoniagroup.com/industry-study/engineered-stone-countertops-4395.htm>.

<sup>16</sup> Freedonia Group (Sept 2022), ibid. <https://www.freedoniagroup.com/industry-study/engineered-stone-countertops-4395.htm>.

<sup>17</sup> Fazio J, et al. (2023) Silicosis Among Immigrant. op. cit. <https://jamanetwork.com/journals/jamainternalmedicine/article-abstract/2807615>.

Figure 3. Yearly Case Counts for 52 Patients with Artificial Stone-Associated Silicosis in California, 2010-2022.<sup>18</sup>



Investigators determined that these individuals developed silicosis as a result of exposure to RCS in the artificial stone fabrication shops where they worked.<sup>19</sup> In July 2023, OHB reported that there were no reported cases of silicosis associated with artificial stone prior to 2010. On July 25, CDPH issued a Health Advisory to healthcare providers and local health departments, entitled *Global Epidemic Comes to California: Silicosis in Countertop Workers*.<sup>20</sup>

In October 2023, OHB reported to Cal/OSHA that the total number of silicosis cases had increased 75%, from the 52 workers reported in July of 2023, to a total of 91.

7) The silicosis cases occurring in this industry are particularly aggressive and deadly.

The median age of the 52 patients identified by UCLA and CDPH was 45 years at diagnosis; 51 (98%) were Latino men. Twenty of the patients (38%) presented with advanced disease, characterized by massive pulmonary fibrosis, which caused a severe or very severe reduction in respiratory capacity. Ten of these patients (19%) died by the time investigators had collected and reported their findings. The median age at death was 46 years (interquartile range [IQR] of 38-51). The median work tenure was 15 years (IQR of 10-20). In addition, three underwent lung

<sup>18</sup> Fazio J, et. al. (2023), *ibid.* <https://jamanetwork.com/journals/jamainternalmedicine/article-abstract/2807615>.

<sup>19</sup> Fazio J, et. al. (2023), *ibid.* <https://jamanetwork.com/journals/jamainternalmedicine/article-abstract/2807615>.

<sup>20</sup> California Department of Public Health. Health Advisory. Global Epidemic Comes to California: Silicosis in Countertop Workers (July 25, 2023). <https://www.cdph.ca.gov/Programs/OPA/Pages/CAHAN/Global-Epidemic-Comes-to-California-Silicosis-in-Countertop-Workers.aspx>. Accessed November 2, 2023.

transplantation, which has a five-year survival rate of 59%.<sup>21</sup> Twenty-three patients (45%) reported that their shops had used water to suppress dust in an effort to prevent employee exposure to RCS.<sup>22</sup>

8) Similar cases of silicosis in this industry are occurring worldwide.

In addition to California, silicosis cases have appeared in other U.S. states and other nations among workers in the artificial stone fabrication industry.<sup>23, 24, 25, 26, 27</sup> Many of the affected workers were young and experienced a rapid onset of severe silicosis. The silicosis prevalence rate among artificial stone fabrication workers in California and worldwide is between 12% and 21%.<sup>28, 29, 30</sup>

9) Workers in this industry are uniquely vulnerable.

The evidence to date suggests that in California, 98% of the workers with silicosis in this industry are Latino men; most are foreign-born. Spanish or an indigenous language is their primary language. About 20% are uninsured, and 40% are covered under restricted-scope Medi-Cal, meaning they are able to access emergency medical care only.<sup>31</sup> Nearly half of UCLA's Olive View Medical Center's 52 patients (48%) presented initially to an emergency department. A delay in diagnosing silicosis occurred in 58% of these patients, who were mistakenly

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<sup>21</sup> Bos S, et al. Survival in adult lung transplantation: where are we in 2020? *Curr Opin Organ Transplant*. 2020; 25(3):268-273. <https://pubmed.ncbi.nlm.nih.gov/32332197/>. Accessed November 2, 2023.

<sup>22</sup> Fazio J, et. al. (2023), *ibid*. <https://jamanetwork.com/journals/jamainternalmedicine/article-abstract/2807615>.

<sup>23</sup> Heinzerling A, et al. 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>24</sup> Leso V, et al. 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>25</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>26</sup> Tustin AW, et al. 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>27</sup> Paolucci V, et al. 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>28</sup> Heinzerling A, et al (2021). Radiographic screening. *op. cit.* <https://pubmed.ncbi.nlm.nih.gov/33207123/>.

<sup>29</sup> Hoy RF, et al. 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>30</sup> Newbiggin K, et al. 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>31</sup> Fazio J, et. al. (2023). Silicosis Among Immigrant. *op. cit.* <https://jamanetwork.com/journals/jamainternalmedicine/article-abstract/2807615>.



diagnosed with bacterial pneumonia or tuberculosis. Only 7% of workers with silicosis in the artificial stone countertop industry received workers compensation.

These workers live with significant economic insecurity: there is no evidence to suggest that they are represented by a labor union. They face the possibility of retaliation if they report workplace hazards to California Division of Occupational Safety and Health (Cal/OSHA) or file workers' compensation claims.<sup>32, 33</sup> They have little ability to advocate with their employer for workplace improvements, including in preventing exposure to RCS.

#### 10) The dust from artificial stone dust is uniquely hazardous, compared to natural stone.

A 2020 epidemiological study by Na Wu, et al. reported on 18 patients with artificial stone-associated silicosis and 63 with natural stone-associated silicosis.<sup>34</sup> The median duration of exposure prior to the onset of symptoms of silicosis was about six years for patients who had been exposed to artificial stone dust versus about 30 years for onset of symptoms for patients who had been exposed to natural stone, a five-fold difference. Four of the 18 patients (22%) exposed to artificial stone experienced rapid deterioration in lung function over the follow-up period of just six to 12 months. About 40% of the patients with artificial stone-associated silicosis were in need of lung transplants, and 28% died, whereas about 3% of natural stone-associated silicosis cases needed lung transplants, and none died. The investigators concluded that, compared to natural stone-associated silicosis, artificial stone-associated silicosis was characterized by short disease latency, rapid radiological progression, accelerated decline in lung function and high mortality.

In a 2020 epidemiological study by Antonio León-Jiménez, et al., investigators followed 106 workers with advanced silicosis that had resulted from exposure to dust generated during the manufacture and installation of artificial stone countertops.<sup>35</sup> All patients were removed from exposure; however, one-third of workers with simple pneumoconiosis advanced to progressive massive fibrosis after an average of only four years. The proportion of workers with abnormal spirometry also increased from one-quarter to nearly one-half of all workers over the same time period. These high rates of disease progression are in contrast to the lower rate seen in

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<sup>32</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>33</sup> Rose C, et al (2019). Severe silicosis in engineered stone. op. cit. <https://www.cdc.gov/mmwr/volumes/68/wr/mm6838a1.htm>.

<sup>34</sup> Wu N, et al. Artificial stone-associated silicosis in China: A prospective comparison with natural stone-associated silicosis. *Respirology* (2020) 25, 518–524. <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7187561/>. Accessed August 16, 2023.

<sup>35</sup> León-Jiménez A, et al. Artificial stone silicosis: rapid progression after exposure cessation. *Chest* (2020);158(3):1060-1068. <https://pubmed.ncbi.nlm.nih.gov/32563682/>. Accessed August 16, 2023.

granite workers or in former coal miners where, in one study, 10% advanced to progressive massive fibrosis over an average of 22 years. The investigators concluded that silicosis from exposure to artificial stone RCS is aggressive and exhibits rapid disease progression in a high proportion of affected individuals.

A 2023 toxicological study by Chandnee Ramkissoon, et al. reported that the hazardous volatile organic compounds (VOCs) phthalic anhydride, styrene, benzene, ethylbenzene and toluene are released during cutting, grinding, polishing and other tasks required during fabrication of artificial stone products.<sup>36</sup> Phthalic anhydride made up 26%–85% of the total VOC content of artificial stone emissions. Phthalic anhydride and styrene are respiratory irritants. These VOCs are released from the resins that make up the binding agent in artificial stone.

A 2022 toxicological study by Chandnee Ramkissoon, et al. found that 80% of the mass of dust produced from dry-machining artificial stone under controlled conditions consisted of RCS, whereas cutting natural stone (granite) produced RCS concentrations ranging from 4% to 30% of the dust mass.<sup>37</sup> Both artificial stone and granite produced high concentrations of very fine particles (<1 µm). More than 90% of the dust particles had diameters ranging from 0.19 to 0.83 µm, making them uniquely able to reach the deep lung. In this same study, researchers found that artificial stone particles showed more irregular shapes compared to natural stone dust particles, with sharp edges and fractures along the surfaces (see Figure 2 in Ramkissoon, 2022). This could increase the rate at which artificial stone RCS particles cause cell damage in the lungs, which produces scarring and, eventually, silicosis.

A 2020 toxicological study by Mariella Carrieri, et al. evaluated the RCS content of bulk dust in artificial stone compared to granite.<sup>38</sup> The percent RCS in the dust was 53% for artificial stone and only 8% for granite, indicating that a greater percentage of particles generated by artificial stone would penetrate much more readily into the lungs, compared to dust generated from granite.

A 2016 toxicological study by Cristina Pavan, et al. found that RCS particles generated from artificial stone were more reactive and fibrogenic (likely to break into fibers, which are more

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<sup>36</sup> Ramkissoon C, et al. Engineered Stone Fabrication Work Releases Volatile Organic Compounds Classified as Lung Irritants. *Annals of Work Exposures and Health* (2023); 67(2) 288–293. <https://pubmed.ncbi.nlm.nih.gov/36239208/>. Accessed August 16, 2023.

<sup>37</sup> Ramkissoon C, et al. Characterisation of dust emissions from machined engineered stones to understand the hazard for accelerated silicosis. *Nature Portfolio* 12:42351 (2022). <https://www.nature.com/articles/s41598-022-08378-8>. Accessed August 16, 2022.

<sup>38</sup> Carrieri M, et al (2020)., Characterization of Silica Exposure. op. cit. <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7345731/>.

harmful to the lungs than other shapes), compared to reference quartz.<sup>39</sup> Artificial stone particles contained higher levels of metal transition ions (primarily iron, copper and titanium), which could explain the higher reactivity of artificial stone RCS. Dry cutting of artificial stone produced carboxyl radicals in dusts that were up to 10 times more reactive than the dust produced from dry cutting reference quartz; wet processing suppressed this activity.

11) There is evidence of widespread non-compliance with title 8 standards in the artificial stone fabrication industry.

In January 2019, Cal/OSHA initiated a Special Emphasis Program (SEP) in the artificial stone fabrication industry to enforce compliance with CCR title 8, section 5204, Occupational Exposures to Respirable Crystalline Silica.<sup>40</sup> Cal/OSHA identified 281 active artificial stone fabrication sites; of these, Cal/OSHA opened inspections at 106 sites (38%) and conducted personal air sampling of workers at 47 sites (44%). A CDPH analysis of Cal/OSHA's findings for 152 employees at these 47 sites showed "widespread RCS overexposure among workers and numerous Cal/OSHA standard violation citations:"<sup>41</sup>

- 34 of 47 (72%) workplaces were cited for one or more violation(s) of the silica standard, section 5204.
- 27 workplaces (57%) were cited for one or more violations of the respiratory protection standard, section 5144.
- 24 workplaces (51%) had one or more exposures above the permissible exposure limit (PEL).
- 7 workplaces (15%) had one or more exposures between the action level (AL) and PEL.

Among results for individual workers:

- 38 of 152 workers (25%) had exposures well above the PEL of 50  $\mu\text{g}/\text{m}^3$  (median = 90  $\mu\text{g}/\text{m}^3$ ; range = 50–670  $\mu\text{g}/\text{m}^3$ ).
- 17 workers (11%) had exposures between the AL of 25  $\mu\text{g}/\text{m}^3$  and the PEL.

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<sup>39</sup> Pavan C, et al. Abrasion of Artificial Stones as a New Cause of an Ancient Disease. Physicochemical Features and Cellular Responses. *Toxicological Sciences*. (2016) 153(1), 4–17.

<https://academic.oup.com/toxsci/article/153/1/4/2223603?login=false>. Accessed August 16, 2023.

<sup>40</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.

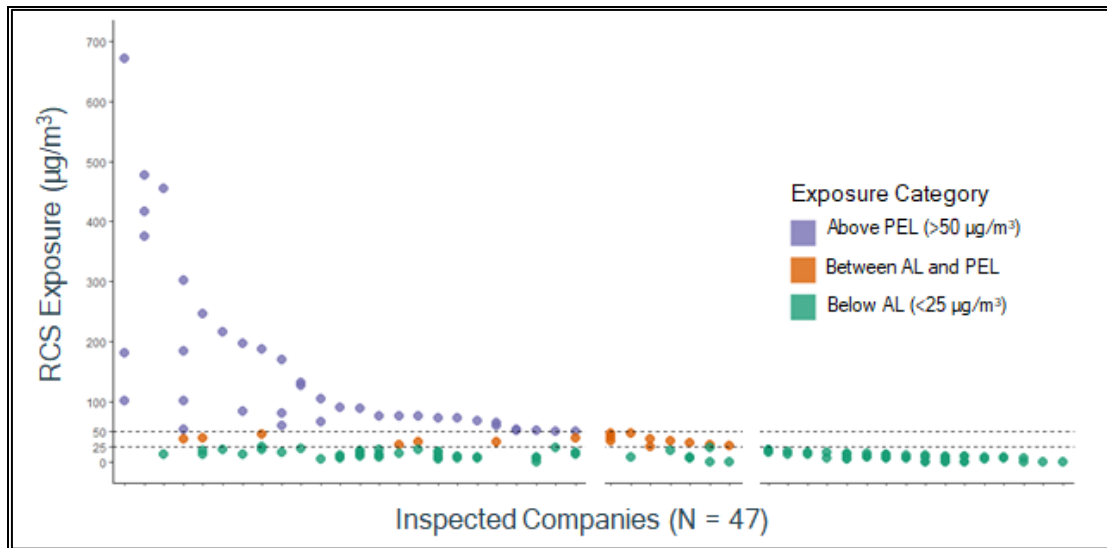
<https://www.dir.ca.gov/DOSHPol/DOSH-PP-SEP-on-Silica.pdf>. Accessed April 27, 2023.

<sup>41</sup> Surasi K, 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.

These findings are illustrated in Figure 4.

FIGURE 4. RCS personal air sampling measurements of workers at artificial 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>42</sup>



12) Individual workers in this industry report high levels of employer non-compliance with title 8 requirements.

As part of the SEP, Cal/OSHA interviewed and administered a questionnaire in both English and Spanish to a subset of workers at each worksite. Cal/OSHA provided CDPH with completed questionnaires from 92 workers at 33 inspected shops (70% of 47 shops inspected). CDPH reported the following findings:<sup>43</sup>

- 84 of 92 workers (91%) reported performing tasks with artificial stone that generate RCS, including cutting, grinding, laminating and polishing.
- 22 workers (26%) 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.
- 63 workers (68%) reported that their employer had not informed them of the results of silica air monitoring performed at their workplace.

<sup>42</sup> Surasi K, et al (2022). Elevated exposures. *ibid.* <https://pubmed.ncbi.nlm.nih.gov/35899403/>.

<sup>43</sup> Spiegel A, et al. 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.

- 18 workers (20%) reported completing a respirator fit test within the previous 12 months.
- 5 workers (5%) reported that their employers had sent them or their co-workers for required silica medical examinations.

These findings are consistent with Cal/OSHA's citations issued under the 2019 SEP, which found 72% of employers in violation of the silica standard, as described above.

13) The existing silica standard is not well suited to the artificial stone fabrication industry.

The evidence of widespread non-compliance identified by Cal/OSHA in the 2019 SEP, combined with the emergence of serious silicosis cases and deaths among workers in this industry, suggests that section 5204 is not well-calibrated to the needs of the artificial stone fabrication industry.

This industry is made up primarily of small shops: it consists of about 808 fabrication shops, each of which operates with a median of five employees (range 1 to 30).<sup>44, 45</sup> Section 5204 is primarily a performance-based standard that relies on the employer to conduct relatively sophisticated exposure assessments to determine required silica exposure controls. This approach is best suited to well-resourced, large employers; it is less effective for small businesses, which typically do not have the capacity (and may lack the willingness) to conduct technically sound assessments.

Sixty eight percent of artificial stone fabrication employers inspected in the 2019 SEP did not conduct a silica exposure assessment.<sup>46</sup> Where the employer has not conducted an exposure assessment, Cal/OSHA must conduct its own full-shift exposure assessments, which is time-consuming, highly variable and easily manipulated by employers. For example, in Cal/OSHA's experience, employers have reduced production or reassigned workers on days when sampling by Cal/OSHA will be conducted. This requires Cal/OSHA to reschedule sampling, or it results in low sampling results that do not reflect the normal conditions in the shop; in either case, Cal/OSHA is prevented from enforcing the silica standard and requiring exposure prevention measures.

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<sup>44</sup> Surasi K, et al (2022), Elevated exposures. op. cit. <https://pubmed.ncbi.nlm.nih.gov/35899403/>

<sup>45</sup> An August 2023 an internal CDPH Occupational Health Branch (OHB) analysis of the OHB dataset on artificial stone fabrication shops confirmed that the median number of employees is 5, based on a sample of 653 shops evaluated.

<sup>46</sup> August 2023 CDPH OHB analysis. *ibid.*

In addition, section 5204 contains three loopholes that limit its effectiveness:

- *Feasibility*: section 5204 allows employers to avoid implementing key protections in the standard by claiming that those protections are infeasible [see subsections (f)(1), (h)(1)(A), (h)(1)(B), (h)(1)(C), (i)(1) and (i)(2)(B)].
- *Objective data*: section 5204 allows employers to exempt themselves from the standard in its entirety by claiming that RCS exposures are likely below the AL, without actually having to conduct exposure monitoring [see subsection (a)(2)].
- *Monitoring*: section 5204 allows employers to conduct air monitoring on a single day and exempt themselves from the standard for that task, from that point onward, if the results show exposures are below the AL [see subsection (d)(3)(B)].

14) On the current trajectory, many workers in this industry will develop silicosis and die.

To support a new Cal/OSHA SEP in 2023, the CDPH OHB identified all artificial 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, 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:

- About 4,040 workers are employed in California's stone fabrication shops.<sup>47</sup>
- About 500 to 850 cases of silicosis will likely occur among these 4,040 workers.<sup>48</sup>
- About 90 to 160 of these workers will likely die of silicosis.<sup>49</sup>

Based on the experience of the 2019 SEP, Cal/OSHA expects that hundreds of shops are likely out of compliance with the title 8 standards. Applying the 2019 SEP findings to the 808 shops and 4,040 workers in the industry shows that:

- 600 shops (72%) are likely in violation of the silica standard.<sup>50</sup>

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<sup>47</sup> 808 sites \* 5 workers/site = 4,040 workers. An analysis of NAICS codes shows that the number of employees could range as high as 9,663 if 46 large shops are included that employ an average of 127 workers. It's unclear how many of these workers would be exposed to RCS, versus the number in management and clerical positions. Further analysis of employment patterns in this industry is needed.

<sup>48</sup> A 12-21% silicosis prevalence rate = 485 to 848 workers with silicosis from a population of 4,040 ~ 500 to 850 with rounding.

<sup>49</sup> A 19% fatality rate for 485 to 848 workers = 92 to 161 silicosis deaths ~ 90 to 160 with rounding.

<sup>50</sup> 0.72 \* 808 workplaces = 582 workplaces ~ 600 with rounding.

- 500 shops (57%) are likely in violation of one or more respiratory protection requirements.<sup>51</sup>
- 400 shops (51%) likely have one or more silica exposures above the PEL.<sup>52</sup>
- 1,000 workers (25%) likely have silica exposures above the PEL of 50  $\mu\text{g}/\text{m}^3$ .<sup>53</sup>

15) An emergency regulation is necessary to protect workers in this industry.

California workers in the artificial stone fabrication industry are currently being exposed to hazardous levels of RCS that will kill and permanently disable a substantial part of the workforce from silicosis and other illnesses unless action is taken immediately to stop these exposures. Immediate action to stop these exposures cannot be done with the existing regulation – an emergency regulation is needed now to save the lives and well-being of these workers.

A large number of California workers in the artificial stone fabrication industry have already become sick or have died from silicosis, an entirely preventable disease. This is a new and emerging crisis that has come about with the introduction and large expansion of the use of artificial stone in countertops and similar products. If an emergency regulation is not implemented, California will experience an industrial disaster on a scale not seen since the silicosis disasters of the 1930s.

Workers exposed to RCS in the artificial stone fabrication industry are developing silicosis 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 updated silica standards were promulgated in 2016.

This is occurring because workers in this industry are facing a unique RCS hazard in artificial stone, on account of its very high silica content, and because the majority of employers in the industry are unable or unwilling to comply with title 8 requirements to prevent RCS exposures in the workplace.

In addition, the great majority of workers in this industry have very little 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

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<sup>51</sup> 0.57 \* 808 workplaces = 461 workplaces ~ 500 with rounding.

<sup>52</sup> 0.51 \* 808 workplaces = 412 workplaces ~ 400 with rounding.

<sup>53</sup> 0.25 \* 4,040 workers = 1,001 workers ~ 1,000 with rounding.

is that California is facing a statewide epidemic of silicosis among artificial stone fabrication workers.

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 California's artificial stone fabrication industry today. Section 5204 was designed as a performance-based standard that is most applicable to large, well-resourced employers who are able to conduct relatively sophisticated exposure assessments and implement protective measures based on the findings of those assessments. In Cal/OSHA's experience, the current regulation is inefficient and difficult to enforce, and in many cases has resulted in Cal/OSHA being unable to require appropriate silica controls.

Accordingly, an emergency standard is needed that adopts the principles of section 5204 but applies them more prescriptively in today's artificial stone fabrication industry. A proactive approach that requires safety measures when highly hazardous work is performed, regardless of an exposure assessment, will more effectively protect workers in the industry, will be simpler for employers to implement and will be more efficient for Cal/OSHA to enforce. At its most basic, this approach will make it clear to employers that providing effective RCS exposure controls is integral to the business of opening and operating an artificial stone fabrication shop.

In addition, in order to prevent the potential substitution of artificial stone with natural stone that might contain hazardous levels of silica, the emergency standard proposes to include natural stone with a silica content of 10% or more under the new protections proposed for employees who handle artificial stone. This action is based on evidence demonstrating that under certain conditions, silica exposures from natural stone can result in the rapid onset of silicosis that appears to match that of silicosis that results from exposures to artificial stone. As noted above, for example, a four-year follow-up study of 83 former sandblasters, from an initial worker population of 145, found that about 6% had died in the intervening four-year period, at an average age of 24 years. Among the 74 former sandblasters still alive and available for reexamination, the prevalence of silicosis had increased from 55% to 96%, despite short-term exposures and a disease latency of only four years.<sup>54</sup>

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<sup>54</sup> Akgun M, et al. Silicosis Appears Inevitable. op. cit. <https://pubmed.ncbi.nlm.nih.gov/25654743/>.



## **AUTHORITY AND REFERENCE CITATIONS**

These regulations are submitted pursuant to the Board's authority under California Labor Code (LC) section 142.3.

LC section 142.3 establishes that the Board may adopt, amend or repeal occupational safety and health standards or orders. Section 142.3 permits the Board to prescribe suitable protective equipment and control or technological procedures to be used in connection with occupational hazards and to provide for monitoring or measuring employee exposure for the protection of employees.

LC section 144.6 requires the Board, when dealing with standards for toxic materials and harmful physical agents, to “adopt that standard which most adequately assures, to the extent feasible, that no employee will suffer material impairment of health or functional capacity even if such employee has regular exposure to a hazard regulated by such standard for the period of his working life.” Section 144.6 also requires that the Board base standards on research, demonstrations, experiments and other appropriate information, taking into consideration the latest scientific literature, the reasonableness of the standards, and the experience gained under the health and safety laws.

LC section 9020 requires that the Board “adopt standards for carcinogens at least as restrictive as the federal requirements for use of carcinogens promulgated under Section 6 of the Occupational Safety and Health Act of 1970 (P.L. 91-596),” and that “it is the intent of the Legislature that the state shall exercise strong leadership in preventing employees, employers, and other persons from being exposed to carcinogens.”<sup>55</sup>

LC section 9030 requires that the Board “adopt one or more standards requiring each employer which uses any carcinogen, including asbestos and vinyl chloride, to submit a written report regarding the use or any incident which results in the release of a potentially hazardous amount of a carcinogen into any area where employees may be exposed.”<sup>56</sup>

LC section 9040 requires that “every employer using carcinogens shall provide for medical examinations of affected employees where required by standards adopted pursuant to subdivision (b) of Section 142.3.”<sup>57</sup>

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<sup>55</sup> California Labor Code Section 9020. [https://california.public.law/codes/ca\\_lab\\_code\\_section\\_9020](https://california.public.law/codes/ca_lab_code_section_9020).

<sup>56</sup> California Labor Code Section 9030. <https://law.justia.com/codes/california/2020/code-lab/division-5/part-10/chapter-4/section-9030/>.

<sup>57</sup> California Labor Code Section 9040. [https://california.public.law/codes/ca\\_lab\\_code\\_section\\_9040](https://california.public.law/codes/ca_lab_code_section_9040).

Authority: Labor Code sections 142.3, 144.6, 9020, 9030, 9040

Reference: Labor Code sections 142.3, 144.6, 9004(d), 9009, 9020, 9030, 9031, 9040

## **INFORMATIVE DIGEST OF PROPOSED ACTION/ POLICY STATEMENT OVERVIEW**

### **Summary of Existing Regulations and the Effect of the Proposed Regulation**

LC sections 60.5 and 6308 provide that Cal/OSHA is charged with the administration and enforcement of the provisions of the California Occupational Safety and Health Act, commencing with LC section 6300, as well as other provisions of law affecting the health and safety of employees in the State of California.

Existing law, title 8, section 342, Reporting Work-Connected Fatalities and Serious Injuries, requires employers to report immediately to the Division any serious injury or illness or death of an employee occurring in a place of employment or in connection with any employment.

Existing law, title 8, section 5203, Carcinogen Report of Use Requirements, requires all employers who use a regulated carcinogen to report that use in writing to the Chief of Cal/OSHA. Crystalline silica is included in the definition of regulated carcinogens under subsection 5203(b).

Existing law, title 8, section 5204, Occupational Exposures to Respirable Crystalline Silica, contains requirements for occupational exposure to crystalline silica for employees working in general industry. Subsections (a), (e), (f)(1), (f)(2), (g), (h) and (i) address the scope of the regulation, regulated areas, engineering and work practice controls, written exposure control plan, respiratory protection and housekeeping, respectively.

Existing law, title 8, section 1532.3, Occupational Exposures to Respirable Crystalline Silica, contains requirements to protect employees working in the construction industry, including requirements that employers must take when employees are exposed to respirable crystalline silica above the AL of 25 micrograms per cubic meter of air (25 µg/m<sup>3</sup>) as an 8-hour time-weighted average (TWA).

Existing law, title 8, section 3203, Injury and Illness Prevention Program, establishes a general framework for the identification, evaluation and correction of unsafe or unhealthy work conditions and practices, communication with employees and employee safety and health training.

Existing law, title 8, section 5140, Definitions, states that a “harmful exposure” is an “exposure to dusts, fumes, mists, vapors, or gases” which is either “(a) In excess of any permissible limit prescribed by section 5155; or (b) of such a nature by inhalation as to result in, or have a probability to result in, injury, illness, disease, impairment, or loss of function.” The PEL for respirable crystalline silica is 50 µg/m<sup>3</sup>.

Existing law, title 8, section 5141, Control of Harmful Exposure to Employees, lists the hierarchy of controls that employers shall follow to address employee exposure to harmful air contaminants. Employers shall first rely on engineering controls whenever feasible, but if engineering controls are not feasible or do not achieve full compliance, administrative controls shall be implemented “if practicable.” When engineering and administrative controls fail to achieve full compliance, then respiratory protective equipment shall be used.

Existing law, title 8, section 5144, Respiratory Protection, requires respirators to be used to protect the health of employees when effective engineering controls to prevent harmful atmospheres are not feasible.

Existing law, title 8, section 3362, General Requirements (specific to Sanitation), requires that workplaces be kept in a clean and sanitary condition. It also requires that buildings be cleaned and maintained to prevent harmful exposures (defined in section 5140 – see above).

Existing law, title 8, section 3366, Washing Facilities, requires that washing facilities be reasonably accessible to all employees.

### **Federal Regulations and Statutes**

The federal Occupational Safety and Health Administration (OSHA) regulations specific to silica are identical to their counterpart in the California Code of Regulations, title 8, as listed below. The title 8 regulations were adopted pursuant to LC section 142.3(a)(3), which applies to 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.
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Other federal OSHA regulations, such as those governing respiratory protection (29 Code of Federal Regulations (CFR) section 1910.134), sanitation and washing facilities (29 CFR section 1910.141), and PPE (29 CFR sections 1910.132, 1910.133 and 1910.138), are similar to their counterpart regulations in title 8, discussed above.

### **Proposed Amendments to Section 5204, Occupational Exposures to Respirable Crystalline Silica**

#### **Subsection (a) Scope and application.**

- Numbering has been modified for consistency with current formatting.
- The proposed emergency regulation would add a new “Exception” to subsection (a)(2), as follows: “EXCEPTION: Subsection (a)(2) does not apply to high-exposure trigger tasks, as defined in subsection (b).”
- The existing subsection (a)(2) allows employers to avoid complying with section 5204 by using “objective data” to demonstrate 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.”
  - “Objective data” is defined in subsection (b)(10) as information, such as “industry-wide surveys or calculations,” that the employer can use to characterize employee exposure to RCS during a specific process, task or activity. For example, the employer could show that industrial hygiene studies for a specific task in the same industry do not result in RCS exposures above the AL. If the employer’s operation uses those same tasks, the employer could claim that their employee exposures will be below the AL, and therefore section 5204 does not apply.
- The proposed “Exception” to subsection (a)(2) removes this regulatory gap from section 5204 for “high-exposure trigger tasks,” as defined in the proposal. The effect of this proposed addition is to prevent employers from using subsection (a)(2) as a way to avoid complying with section 5204.
- The proposed emergency regulation would add a new subsection (a)(3), as follows: “High-exposure trigger tasks are covered by this section regardless of employee exposures, exposure assessments, or objective data.”
- This addition is necessary to ensure that employers whose employees perform any “high-exposure trigger tasks” with artificial stone (>0.1% silica) or natural stone (>10% silica) are expressly covered by section 5204. This addition prevents the employer from

using “objective data” or their own exposure assessments to claim that “high-exposure trigger tasks,” as defined, do not expose employees to RCS above the AL or PEL.

#### Subsection (b) Definitions.

- Numbering and quotes around defined terms have been added to all definitions for consistency with current formatting.
- New subsection (b)(2), definition for “artificial stone.”
  - This new definition is necessary to clarify the meaning of the term “artificial stone,” for which the proposed amendments to section 5204 apply.
- Revised subsection (b)(3), definition for “chief.”
  - This change is necessary to clarify that the term “Division,” as used throughout the proposed emergency regulation, refers to the Division of Occupational Safety and Health.
- New subsection (b)(4), definition for “confirmed silicosis.”
  - This new definition states that a confirmed case of silicosis is established by meeting any one of the following three criteria: (A) a written diagnosis by a licensed physician, with specific clinical findings; (B) a death certificate listing silicosis or pneumoconiosis as an underlying or contributing cause of death; or (C) exposure to airborne RCS, accompanied by a chest radiograph or lung histopathology, with certain clinical findings.
  - The effect of this proposed addition is to clarify the meaning of “confirmed silicosis” as used in the proposed amendments to section 5204.
- New subsection (b)(6), definition for “effective,” “effectively,” and “effectiveness.”
  - The new definition is necessary to clarify the meaning of “effective” and its various tenses as used in the proposed amendments to section 5204.
- New subsection (b)(9), definition for “high-exposure trigger tasks.”
  - High-exposure trigger tasks are those in which employees work with artificial stone that contains more than 0.1% silica, or with natural stone that contains more than 10% silica. The effect of this proposed addition is to establish that these tasks present unique health risks to employees and therefore require specific workplace protections described throughout the proposed changes, irrespective of monitoring data obtained by the employer, or “objective data” claimed by the employer, or feasibility considerations, all of which give employers the ability to avoid implementing certain workplace protections under the existing language of section 5204.
  - An exception is made for geologic field research, where employees might handle natural stone that contains more than 10% silica for less than 30 days in a 12-month period. This exception is necessary because employees working in

geologic field research are not able to install many of the protections required under the proposed revisions to section 5204.

- Revised subsection (b)(11), definition of “Physician or Other Licensed Health Care Professional (PLHCP)”.
  - This change is necessary because the phrase “him or her” has generally been replaced with the term “them” in modern phraseology.
- Revised subsection (b)(12), definition of “Regulated Area.”
  - This change clarifies that the term “PEL” refers to “permissible exposure limit,” which is further defined in subsection (c).
- New subsection (b)(15), definition for “suspected silicosis.”
  - This new definition includes three possible classifications of silicosis based on signs and symptoms, radiological findings or abnormal spirometry.
  - This definition is necessary to clarify the meaning of “suspected silicosis” as it applies to the proposed amendments to section 5204. Suspected silicosis can be identified in each of these three ways; it is not necessary, for example, to await radiological confirmation. This definition allows for early action to protect an employee from continued exposure, and to ensure proper medical support, rather than waiting for radiological confirmation of disease, at which point serious damage to the lungs has likely already taken place.
- New subsection (b)(17), definition for “wet methods.”
  - This new definition describes three wet methods for effectively suppressing dust (A) Applying water directly onto the work object; (B) submersing the work object under water; or (C) using a water jet cutting tool.
  - The effect of this proposed addition is to clarify that only certain types of wet methods qualify as such under the proposed amendments to section 5204. Ineffective wet methods that rely on an inadequate volume of water, for example, would be prohibited under the revised section 5204.

#### Subsection (d) Exposure assessment.

- The proposed emergency regulation would add a new sentence to subsection (d)(1), which would require employers to assess employee exposures to RCS, as described in (d)(3), regardless of exposures or expected exposures, if employees perform high-exposure trigger tasks. The effect of this proposed addition is to ensure that employers conduct regular monitoring in order to assess the effectiveness of engineering controls in eliminating or greatly reducing employee exposures to RCS. This monitoring will inform whether engineering controls or work practices should be improved to reduce exposure levels. Monitoring must be conducted irrespective of previous monitoring data obtained by the employer, or “objective data” claimed by the employer, or whether the

employer anticipates that employees might or might not be exposed above the AL, each of which give employers the ability to avoid implementing certain workplace protections under the existing language of section 5204.

- The proposed emergency regulation would add a new sentence to subsection (d)(2), which prohibits employers from using the performance option set out in subsection (d)(2) for high-exposure trigger tasks. This exemption is necessary because the full complement of workplace protections required under the proposed changes to section 5204 must be implemented when employees are engaged in high-exposure trigger tasks, as defined, irrespective of monitoring data obtained by the employer, or “objective data” claimed by the employer, or feasibility considerations, all of which give employers the ability to avoid implementing certain workplace protections under the existing language of section 5204.
- The proposed emergency regulation would add the phrase at subsection (d)(3)(A) “...on the same material...” This addition is necessary because the silica content can vary greatly between different materials handled by employees covered by this section. This subsection pertains to exposure monitoring conducted by the employer to determine whether ongoing monitoring is needed. This addition helps ensure the veracity of these assessments.
- The proposed emergency regulation would add a new sentence within subsection (d)(3)(B) which requires the employer to continue conducting exposure monitoring every 12 months when employees are engaged in high-exposure trigger tasks. The effect of this proposed addition is to prevent employers from discontinuing monitoring when employees are engaged in high-exposure trigger tasks. This will ensure that the employer conducts air monitoring to determine if the protections required during high-exposure trigger tasks are actually maintaining exposure levels below the AL. This addition is also needed because monitoring results can vary based on minor changes in work practices, tools and materials, so more frequent monitoring helps improve the reliability of the results.
- The proposed emergency regulation would add a new sentence to subsection (d)(3)(E), which requires the employer to continue conducting exposure monitoring every 12 months, or more frequently, whenever employees engage in high-exposure trigger tasks, regardless of the findings of the employer’s exposure monitoring. The effect of this proposed addition is to prevent employers from discontinuing monitoring when employees are engaged in high-exposure trigger tasks. This will ensure that the employer conducts air monitoring to determine if the protections required during high-exposure trigger tasks are actually maintaining exposure levels below the AL. This addition is also needed because monitoring results can vary based on minor changes in

work practices and materials, so more frequent monitoring helps improve the reliability of the results.

#### Subsection (e) Regulated areas.

- The proposed emergency regulation would add a new sentence at subsection (e)(1) that requires all high-exposure trigger tasks to be conducted in a “regulated area,” regardless of the employer’s measured exposure levels or objective data. The existing regulation requires the employer to establish “regulated areas” whenever an employee’s exposure to RCS is likely to exceed the PEL; therefore, under the existing regulation, the use of regulated areas is subject to the findings of the employer’s exposure assessments, which are highly variable, difficult to perform properly, and easily manipulated. The effect of this addition is to ensure that all high-exposure trigger tasks will be conducted inside a “regulated area,” regardless of the employer’s exposure monitoring findings. This approach assumes that high-exposure trigger tasks will produce RCS exposure levels over the PEL and should therefore always be performed in the facility’s “regulated area,” as defined.
- At subsection (e)(2)(B), the proposal changes “subsection (j)(2)” to “subsection (k)(2)” because a new subsection (g), Imminent Hazards, has been added, which requires renumbering.
- At subsection (e)(4), the proposal changes “subsection (g)” to “subsection (h)” because a new subsection (g), Imminent Hazards, has been added, which requires renumbering.

#### Subsection (f) Methods of compliance.

- Numbering has been modified for consistency with current formatting.
- The proposed emergency regulation would add several new provisions in lieu of existing subsection (f)(1) and instead require that certain tasks be performed with specific protections, as established by this subsection. The proposal does this by adding the following sentence: “Subsection (f)(1) does not apply to high-exposure trigger tasks, which are covered by subsection (f)(2).”
- The existing subsection (f)(1) allows the employer to avoid using “engineering and work practice controls to reduce and maintain employee exposure to respirable crystalline silica to or below the PEL” if the employer can demonstrate that “such controls are not feasible.” This feasibility exception weakens existing section 5204 in its entirety, and it limits its effectiveness in protecting workers from RCS.
- At subsection (f)(1), the proposal changes “subsection (g)” to “subsection (h)” because a new subsection (g), Imminent Hazards, has been added, which requires renumbering.
- The proposed emergency regulation would add a new subsection (f)(2) requiring specific “engineering controls and work practices for all high-exposure trigger tasks, regardless



of employee exposures, exposure assessments, or objective data.” The effect of this addition is to ensure that the employer implements the proper protections, as required, when employees engage in high-exposure trigger tasks.

- The proposed emergency regulation would add a new subsection (f)(2)(A) entitled “Engineering Controls” that would require effective wet methods to be used pursuant to subsection (f)(2)(A)1., as defined in subsection (b). This provision is necessary because wet methods are the most effective means of protecting employees and capturing silica dust that is generated during high-exposure trigger tasks.
- The proposed emergency regulation would add a new subsection (f)(2)(B) entitled “Housekeeping and Hygiene.”
  - New subsection (f)(2)(B)1., would require that dust and other materials generated from high-exposure trigger tasks be promptly cleaned up and placed into leak-tight containers to ensure there is no visible dust build-up in the workplace.
  - New subsection (f)(2)(B)2., would require that wet methods or vacuum cleaners equipped with HEPA filters be used to clean up dust and other materials to ensure airborne silica is not generated during housekeeping activities.
  - New subsection (f)(2)(B)3., would require that employees involved in housekeeping tasks be provided with appropriate respiratory protection, in accordance with subsection (h).
  - New subsection (f)(2)(B)4., would require employers to provide washing facilities in accordance with existing title 8, section 3366.
- These provisions are necessary because silica dust on work surfaces is an important source of secondary exposure to RCS if it is not properly cleaned up and contained. Respiratory protection is necessary because cleaning surfaces and handling debris that contains silica dust can expose employees to RCS. Washing facilities are necessary to allow employees to clean silica dusts from their hands.
- The proposed emergency regulation would add a new subsection (f)(2)(C) that clarifies Cal/OSHA’s authority to protect employees by issuing an Order to Take Special Action.
- The effect of this addition is to facilitate Cal/OSHA’s ability to efficiently mitigate a unique hazardous condition, on a case-by-case basis, that is not specifically addressed in the text of the proposed emergency standard.
- The proposed emergency regulation would add a new subsection (f)(2)(D) entitled “Prohibitions” that describes specific work practices that are expressly prohibited for high-exposure trigger tasks, regardless of measured employee exposure levels.
- These prohibitions include the following:
  - New subsection (f)(2)(D)1., use of compressed air on surfaces, clothing, or to back-flush filters;

- New subsection (f)(2)(D)2., activities that involve handling dry dust that is likely to contain crystalline silica;
  - New subsection (f)(2)(D)3., relying on employee rotation to reduce employee exposure to RCS; and
  - New subsection (f)(2)(D)4., walking or moving equipment through any material that may contain crystalline silica.
- This provision is necessary because the dust generated during fabrication of artificial stone and certain natural stones is uniquely hazardous, and the activities listed are likely to result in significant employee exposures to RCS. Providing the express prohibitions listed here will improve understanding among employers and employees regarding the risks associated with these tasks.
  - The proposed emergency regulation would amend the existing subsection (f)(2), Written exposure control plan, to a renumbered (f)(3) that includes a new subsection (f)(3)(D) that requires additional elements in the written exposure control plan.
  - These elements include the following:
    - New subsection (f)(3)(D)1., a record of exposure measurements demonstrating that exposure levels are continuously below the AL. This element is necessary to ensure that RCS exposure controls are working effectively.
    - New subsection (f)(3)(D)2., procedures for proper donning and doffing of work clothing and respiratory protection. This element is necessary because these activities can cause significant employee exposure to RCS if done improperly.
    - New subsection (f)(3)(D)3., documentation that the employer has registered their operations with Cal/OSHA in accordance with section 5203, Carcinogen Report of Use Requirements. This element is necessary to allow Cal/OSHA to identify and track stone fabrication shops.
    - New subsection (f)(3)(D)4., procedures the employer will use to ensure that employees are properly trained to prevent silica exposures in accordance with subsection (k)(4). This is necessary to ensure that training procedures are formally adopted into the employer's written exposure control plan, which improves their effectiveness.

New subsection (g) Imminent Hazards.

- The proposed emergency regulation would add a new subsection (g) titled “Imminent Hazards” that lists specific activities associated with high-exposure trigger tasks. If observed by a Cal/OSHA Compliance Safety and Health Officer (CSHO), these activities would trigger either a mandatory Order Prohibiting Use (OPU), in the case of a violation of subsection (f)(2)(A) regarding wet methods, or an optional OPU, in the case of violations of subsection (f)(2)(D), Prohibitions; and subsection (h), Respiratory Protection. The optional OPU list also includes violations of subsection (l) Reporting of silicosis and the Carcinogen Reporting requirements of section 5203.
- This provision is necessary because the dust generated by working with artificial stone and certain natural stones is uniquely hazardous; as such, it is essential that Cal/OSHA be able to take immediate action when a violation is observed that is causing employee exposure to RCS. The OPU allows Cal/OSHA to take immediate steps to stop a hazardous process or close the facility itself until the hazardous condition is abated, without having to conduct air sampling for RCS, which is time and resource-intensive and can be manipulated by employers in order to artificially reduce the exposure findings.

Amended subsection (h) Respiratory protection.

- Existing subsection (g) would be renumbered to (h).
- Numbering has been modified for consistency with current formatting.
- The proposed emergency regulation would amend subsection (h) with several new provisions.
- New subsection (h)(2) would establish that high-exposure trigger tasks must follow requirements in new subsection (h)(3) in lieu of following the less protective requirement in existing subsection (h)(1). The existing subsection contains a feasibility exception that weakens the respiratory protection elements of section 5204 and severely limits its effectiveness in protecting employees from RCS.
- New subsection (h)(3) would require employers to provide respiratory protection to employees who perform high-exposure trigger tasks or other work in regulated areas where high-exposure trigger tasks occur.
- New subsection (h)(3)(A) requires that employers provide a full face, tight-fitting powered-air purifying respirator (PAPR) or a respirator providing equal or greater protection equipped with a HEPA, N100, R100, or P100 filter. For artificial stone only, an organic vapor (OV) cartridge is also required. There is an exception to providing OV cartridges if the employer demonstrates that OV exposure levels are below the permissible exposure limit established in existing title 8 section 5155. A second exception allows for the use of a loose-fitting PAPR, a full facepiece air-purifying respirator, or another respirator providing equal or greater protection where the

employer demonstrates that employee exposures to RCS are continuously maintained below the AL through representative air sampling conducted at least once every six months in accordance with subsection (d)(3)(A). This exception does not apply if the PLHCP or specialist recommends use of a full face, tight-fitting PAPR, or another, more protective respirator.

- This is necessary because engineering controls, even when properly implemented, are not always effective at protecting employees from exposure to RCS. The OV cartridge is necessary because emissions generated by artificial stone include RCS as well as high concentrations of hazardous VOCs, including phthalic anhydride, styrene, benzene, ethylbenzene, and toluene. Phthalic anhydride and styrene are respiratory irritants.
- New subsection (h)(3)(B) would require employers to provide a supplied-air respirator to employees who have been diagnosed with silicosis or suspected silicosis, or as recommended by the PLHCP or specialist. The subsection would require the employer to locate the air source supplying this respirator in an area that is free of RCS and other airborne contaminants. The effect of this addition is to ensure maximum protection for workers who are likely already on the path to silicosis.

Amended and renumbered subsection (i) Housekeeping.

- Existing subsection (h) would be renumbered to (i).
- New subsection (i)(3) would negate the feasibility exceptions in the existing 5204 that prohibit dry sweeping/brushing and use of compressed air for high-exposure trigger tasks covered by subsection (f)(2).
- This is necessary because the feasibility exceptions diminish employee protections and severely limit the effectiveness of the regulation in protecting workers from RCS.

Subsection (k) (formerly subsection (j)) Communication of respirable crystalline silica hazards to employees.

- Numbering has been modified for consistency with current formatting.
- New subsection (k)(1) would require that training and communications materials be provided in a language and at a literacy level appropriate for the employees. This is necessary to ensure that information on the risks of silicosis are effectively communicated to employees.
- Renumbered subsection (k)(2) refers to renumbered subsection (k)(4) in place of (j)(3).
- Renumbered subsection (k)(3) would amend the text of signage that the employer is required to post at entrances to “regulated areas.” The text removes the phrase “Causes damage to lungs,” due to the addition of a more detailed phrase, “Causes permanent lung damage that may lead to death,” which would be required in both English and

Spanish. This change is necessary to communicate the health risks of RCS exposure and make sure it is communicated adequately to employees.

- New subsection (k)(4)(A)(2) would require the employer to ensure that each employee can demonstrate understanding of the symptoms of exposure to RCS, including cough, difficult breathing and others. This is necessary to ensure that employees are alerted as early as possible to symptoms that could indicate silicosis, which allows employees to take actions to reduce exposures and seek medical attention. These actions could save an employee from permanent disability or death.
- Renumbered subsections (k)(4)(A)3. and 4. would require the employer to ensure that each employee can demonstrate understanding that high-exposure trigger tasks could result in exposure to RCS, and that the employer has implemented protections to prevent employee exposure to RCS during high-exposure trigger tasks. These provisions are necessary to ensure that employees are aware of the risks associated with high-exposure trigger tasks and the reasons behind workplace controls to prevent exposures.
- Subsection (k)(4)(A)5. would require that employees be trained in the use and implementation of engineering controls, work practices and respiratory protection. The effect of this addition is to ensure that employees understand the hazards of RCS and take steps to prevent exposure.
- Renumbered subsection (k)(4)(A)7. refers to renumbered subsection (j) in place of (i).
- Subsection (k)(4)(A)8. would require that employees be trained to understand the increased risk of death that results from the combined effects of smoking and silica exposure. The effect of this addition is to ensure that employees understand the added benefits to their health of avoiding smoking, particularly with respect to dying from occupational silicosis.
- Subsection (k)(4)(A)9. would require that employees be trained to understand that tuberculosis can become active as a result of silica exposure. The effect of this addition is to ensure that employees understand that an activation of tuberculosis could be related to occupational exposure to silica.
- New subsection (k)(4)(C) would require employers to encourage employees to report symptoms related to RCS exposure, without fear of reprisal, and it prohibits employers from taking any adverse action against an employee who reports symptoms or who suffers from a silica-related illness. The effect of this addition is to encourage reporting, which will ensure that employers are aware as early as possible that one or more employees may be developing silicosis. This will allow the employer to take action to improve protections for employees by ensuring the effectiveness of exposure controls.

New subsection (l) Reporting of silicosis.

- New subsection (l) titled “Reporting of silicosis” would require the employer to report certain information listed within subsections (l)(1)(A) through (l)(1)(K) to the CDPH and to Cal/OSHA within 24 hours of receiving notification of a confirmed silicosis or lung cancer case related to silica exposure. This provision allows CDPH and Cal/OSHA to take early action to prevent further cases and to track the incidence and prevalence of cases statewide.
- New subsection (l)(2) would require PLHCPs and specialists to report confirmed cases of silicosis to Cal/OSHA with certain information listed within subsections (l)(2)(A) through (l)(2)(F). This provision provides a second vehicle that allows Cal/OSHA to take early action to prevent further cases and to track the incidence and prevalence of cases statewide.

Renumbering of subsection (k) to (m) Recordkeeping.

- Renumbered subsection (m)(3)(A) refers to renumbered subsection (j) in place of (i).

Deletion of former subsection (l) Dates.

- Former subsection (l) would be deleted as all the implementation dates listed have passed and the subsection has no effect.

**Policy Statement and Anticipated Benefits**

The Board is proposing these emergency regulations to title 8, section 5204, Occupational Exposures to Respirable Crystalline Silica, to preserve worker health and safety and, in response to an epidemic of silicosis in the stone fabrication industry, to strengthen the obligations of employers to protect employees from exposure to RCS.

These emergency regulations are also proposed in response to the Board’s decision to partially grant Petition 597, to protect employees in California’s stone industry from exposure to RCS.<sup>58</sup>

The existing title 8, subsection 5204, is not properly calibrated to the small shops and hazardous conditions that are characteristic of the artificial stone fabrication industry. Section 5204 requires complex and highly variable exposure assessments as the entry point for further actions by employers to protect employees from RCS exposure. Not surprisingly, Cal/OSHA has found widespread non-compliance among employers in the artificial stone fabrication industry. As a result, the existing regulation is not sufficiently protective of employees, given the

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<sup>58</sup> See Petition File No. 597 Amended Adopted Decision (ca.gov).  
<https://www.dir.ca.gov/oshsb/documents/petition-597-amended-adopteddecision.pdf>.

disabling—and frequently deadly—consequences of exposure to RCS. The existing regulation also impedes the ability of Cal/OSHA to quickly identify RCS hazards and take efficient actions to protect employee safety and health, and it requires Cal/OSHA to devote large resources to air monitoring and laboratory analyses, and to gathering evidence of violations in shops where harmful RCS exposures are clearly taking place.

As a result, conditions in the artificial stone fabrication industry are such that workers are unnecessarily exposed to a deadly workplace hazard; employers are unclear as to their obligations to protect employees; and Cal/OSHA is unable to effectively enforce the requirements of title 8 and take efficient actions to protect worker safety and health.

The emergency regulations will provide clear and specific requirements to remedy these conditions. Emergency rulemaking is required in this matter to address the threat to employees of RCS exposure, which often results in silicosis, a permanently disabling disease that can cause death at an early age, particularly when exposures occurred while working with artificial stone. Regular rulemaking, which requires a fiscal analysis and approval from the Department of Finance, cannot be completed in time to address the risks to workers presented by the current epidemic.

The proposed changes to section 5204 will reduce worker exposures to RCS; make compliance clearer and more straightforward for employers; and improve the efficiency of Cal/OSHA's compliance program by:

1. Defining specific high-exposure trigger tasks that require special exposure protections;
  2. Removing air monitoring requirements as a prerequisite for employers to implement essential RCS exposure prevention measures;
  3. Removing existing provisions that give employers opportunities to declare that well-recognized RCS exposure prevention strategies are infeasible;
  4. Removing existing provisions that allow employers to rely on "objective data" to avoid implementing RCS exposure prevention measures;
  5. Providing clarity on tasks that are expressly prohibited;
  6. Updating the signage in "regulated areas" to convey the risk of death from RCS exposure;
  7. Providing clarity on engineering and work practice controls that are expressly required;
  8. Providing procedures for training of employees on the risks of exposure to RCS, the causes of silicosis, and how to implement protections in the workplace;
  9. Requiring effective respiratory protection, even when engineering controls are in place;
- and,

10. Providing a means for Cal/OSHA to quickly identify RCS hazards and efficiently stop certain operations in a shop or shut down the shop itself, pending abatement of those hazards.

For these reasons, the proposed regulation is expected to substantially reduce the number of silicosis cases in California. This in turn will reduce the financial costs associated with medical care, lost wages and benefits, lost lifetime productivity, and premature disability and death that result from silicosis, all of which are borne by employees, their families, employers, insurers and public benefits programs.

Thus, the benefits of the proposed emergency regulation are two-fold:

- 1) Non-monetary benefits, including a reduction in the pain and suffering associated with disease, disability and premature death for those affected, directly or indirectly, by silicosis and other RCS-attributable diseases; and
- 2) Monetary benefits, including lowered costs to employers, insurers, employees, their families and public benefits programs.

#### **Evaluation of Inconsistency/Incompatibility with Existing State Regulations**

Under LC 142.3, the Board is the only agency in the state authorized to adopt occupational safety and health standards. The Board has reviewed existing regulations on this topic and has concluded that the proposed regulations are not inconsistent or incompatible with existing state regulations.

#### **DOCUMENTS INCORPORATED BY REFERENCE**

None.

#### **TECHNICAL, THEORETICAL, OR EMPIRICAL STUDIES, REPORTS, OR DOCUMENTS RELIED UPON**

The Board has relied upon the following documents as part of this emergency action:

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These documents are available for review BY APPOINTMENT Monday through Friday, from 8:00 a.m. to 4:30 p.m., at the Standards Board’s office at 2520 Venture Oaks Way, Suite 350, Sacramento, California 95833. Appointments can be scheduled via email at [oshsb@dir.ca.gov](mailto:oshsb@dir.ca.gov) or by calling (916) 274-5721.

**MANDATE ON LOCAL AGENCIES OR SCHOOL DISTRICTS**

The Board has determined that the proposed changes to section 5204 do not impose a mandate on local agencies or school districts requiring reimbursement by the State pursuant to Part 7 of Division 4 of the Government Code (commencing with section 17500).

**COST ESTIMATES OF PROPOSED ACTION**

**Costs or Savings to State Agencies**

None.

**Costs to Any Local Agency or School District Which Must be Reimbursed in Accordance with Government Code Sections 17500 through 17630:**

None.

**Other Nondiscretionary Cost or Savings Imposed on Local Agencies:**

None.

**Costs or Savings in Federal Funding to the State:**

None.