

MSHA'S RECENT UPDATE TO SAFETY RULES FOR RESPIRABLE CRYSTALLINE SILICA

JEROME E. SPEAR, CSP, CIH, FAIHA



Crystalline silica, an extremely common material found in most soils and rock formations, is a dangerous occupational hazard for workers in industries like mining and construction. These particles are very fine and, once inhaled, easily travel through the respiratory system. Deposits of this material in the lungs cause serious and often irreversible lung diseases, including silicosis, lung cancer, and chronic bronchitis.

Regulations to protect miners have not been officially updated since the 1970s, with standard levels set higher than recommended practices. Recent updates to these regulations from the Mine Safety and Health Administration (MSHA) aim to provide greater protection for miners. The recent rule covers new standards for safe levels of crystalline silica and regulates activities for monitoring and responding to exposures.

What is crystalline silica?

Crystalline silica, also known as respirable crystalline silica (RCS), silica dust, or quartz dust, is a significant occupational hazard, particularly for coal and metal/nonmetal (MNM) miners. Composed of silicon and oxygen, crystalline silica is a common component of rock, found in at least trace amounts in all soils and in most minerals. This material is so common,

it accounts for nearly 12% of the Earth's crust by volume.

Due to its small size—100 times smaller than typical sand particles—silica dust can be easily inhaled. Once inhaled, it moves through the lungs and forms deposits in small airways and air sacs. OSHA estimates 2.3 million people are exposed to RCS through work. Prolonged exposure to this dust can lead to serious health risks.

What are the hazards of respirable crystalline silica?

The International Agency for Research on Cancer classifies RCS as a human carcinogen. This dangerous substance can lead to serious, even fatal, lung diseases. The dust embeds itself in the lungs, causing them to harden. The lungs cannot function properly, making breathing more difficult. Once the lungs are affected in this way, quality of life is severely affected – simple daily tasks, such as walking or climbing stairs, become extremely difficult.

Common diseases and complications linked to silica exposure include silicosis, tuberculosis, lung cancer, chronic bronchitis, autoimmune disorders, and kidney disease. Some of these diseases, including silicosis, are incurable, with only treatments of

symptoms available.

Prevention through effective occupational safety measures saves workers from these negative health consequences, which can be life-altering or even fatal.

What is the history of silica exposure standards in the U.S. mining industry?

Standards regulating exposure to RCS have been in place since the 1970s and have largely remained unchanged for 50 years. In coal mines, the Federal Coal Mine Health and Safety Act of 1969 controlled exposure by lowering the respirable coal mine dust standard when quartz was present to 100 micrograms per cubic meter of air. For metal and nonmetal (MNM) mines, the Department of the Interior's Bureau of Mines implemented protections in 1974 to shield miners from the most dangerous levels of exposure, which included establishing permissible exposure limits (PELs) specific to MNM operations. These PELs were 100 micrograms per cubic meter of air for quartz and 50 micrograms per cubic meter of air for cristobalite and tridymite. Around the time these standards were implemented, the National Institute for Occupational Safety and Health (NIOSH) recommended reducing the exposure level further to 50 micrograms/m³ for

RCS. However, this recommendation was not codified into regulation until 30+ years later.

In 2016, the Occupational Safety and Health Administration (OSHA) set a new PEL of 50 micrograms/m³ of air and an action level of 25 micrograms/m³ for general industry, construction, and maritime sectors. However, these lower PELs did not apply to both MNM and coal miners.

Summary of MSHA's respirable crystalline silica final rule

In 2024, the Mine Safety and Health Administration (MSHA) amended existing standards to lower existing standards for RCS. The final rule, effective June 17, 2024, aims to provide a uniform, streamlined framework to ensure protection for the mining sector consistent with rules established for other industries.

The following outlines the major provisions included in the final rule, including establishing a uniform PEL and action level, and requirements for exposure monitoring and response.

1. Establishes a uniform PEL and action level for all mines

The new standard is a PEL of 50 micrograms/m³ of air for a full shift. The action level is 25 micrograms/m³ over a full shift. These limits are calculated as an 8-hour total weight average (TWA).

References

Mine Safety and Health Administration (MSHA). (2024). Lowering Miners' Exposure to Respirable Crystalline Silica and Improving Respiratory Protection. (30 CFR Parts 56,57, 60, 70, 71, 72, 75, 90). Updated April 28, 2024.

Occupational Safety and Health Administration (OSHA). "Silica, Crystalline." OSHA.gov. Retrieved from: <https://www.osha.gov/silica-crystalline>.

American Lung Association. (2024). "Learn About Silicosis." Lung.org. Retrieved from: <https://www.lung.org/lung-health-diseases/lung-disease-lookup/silicosis/learn-about-silicosis>. Last updated June 7, 2024.

2. Requires exposure monitoring for respirable crystalline silica

Operators are required to sample environments to assess exposure risk for key activities that could effect exposures.

3. Updates the standard for respirable crystalline silica sampling

Sampling activities must be performed using a respirable particle sizes-selective sampler that conforms to ISO 7708:1995 standards. These samplers filter out particles by size and deposit them on filter paper for analysis. Respirable-size particles are defined as having mass median aerodynamic diameter (MMAD) of 4 µm. This definition represents an international consensus, harmonizes with the standards used by the American Conference of Governmental Industrial Hygienists (ACGIH), the Occupational Safety and Health Administration (OSHA), the National Institute for Occupational Safety and Health (NIOSH) and the European Committee for Standardization (CEN), and eliminates inconsistencies in the former standards for MNM and coal mines.

4. Requires immediate reporting and corrective action to remedy overexposures.

When identified, overexposure must be reported to MSHA and corrective action must be taken to bring levels at or below compliance levels. After

corrective actions restore safe levels, operators must resample the environment to ensure safety. Documentation for all sampling and actions taken is required.

5. Specifies methods of controlling respirable crystalline silica.

Feasible engineering controls should be the primary method for controlling levels of RCS. Administrative controls should only be used as supplementary methods.

6. Requires temporary use of respirators at MNM mines when miners must work in concentrations above the PEL.

Respirators must be used as a temporary protective measure when the PEL cannot be reached. These situations may occur when engineering controls are not fully implemented or because of the nature of the work.

7. Updates the respiratory protection standard.

Operators must have a written respiratory protection program to protect miners from airborne contaminants.

8. Requires medical surveillance at MNM mines.

Operators must provide regular medical examinations performed by a physician or licensed healthcare professional, at no cost to the miner.

When is the effective and compliance date of this rule?

This rule's effective date is June 17, 2024. Compliance with the final rule is required on April 14, 2025, for coal mines and April 8, 2026, for MNM mines. These dates balance the need for immediate improvements to protect miner safety while allowing operators enough time to implement improvements properly.

RCS remains a significant occupational hazard, particularly in the mining industry, where exposure can lead to life-threatening diseases. The recent final rule by the Mine Safety and Health Administration (MSHA) represents a critical step toward reducing health risks for miners. By implementing stricter permissible exposure limits and requiring enhanced monitoring and safety measures, these regulations aim to protect workers and improve overall workplace safety.

Make sure your operations comply with the new standards by the deadline. Contact us with questions about the impact of MSHA's new rule on your business.