Australian Government
Asbestos and Silica Safety and Eradication Agency

SILICA SAFETY

Silica facts and figures

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Introduction

What is the purpose of this resource?

This document synthesises key facts and explanatory information about silica and the associated health risks into a central resource, to facilitate consistent, accurate and clear communication. It explains various terms, provides evidence-based statements on silica-related topics and includes references to authoritative sources for further information.

This resource can be used by anyone who needs to reference and/or communicate key messages, facts and data about the health impacts of exposure to respirable crystalline silica (commonly referred to as silica dust) in a clear and consistent manner. This includes work health and safety (WHS) regulators, unions and worker representatives, industry bodies, occupational hygienists, workplace advisers, training organisations, silica-related disease advocacy and support groups, medical and health professionals.

A level of background knowledge is useful to support understanding and communication, with the Silica National Strategic Plan 2024–30 Companion providing the context for Australia's response to the re-emergence of silicosis.*

This resource was developed in consultation with state and territory government agencies and non-government organisations.

Note: Although this resource refers to regulatory requirements where relevant; it is not regulatory guidance, does not provide comprehensive advice on how to comply with legal requirements and should not be used for this purpose.

There may also be differences in jurisdictional implementation of regulations related to silica, since Australian, state and territory governments are each responsible for making their own WHS laws. *(see **Appendix A** for jurisdiction-specific information)*

Feedback

This document will be reviewed and updated regularly based on evolving research, new information and knowledge. Feedback can be sent to engage@asbestossafety.gov.au with the subject line 'Feedback - Silica facts and figures.'

* www.asbestossafety.gov.au/silicasafety/silica-national-strategic-plan-2024-30-companion

Key terms and definitions

This section defines and explains specific terms, presented in order of how useful they are to understanding silica and the information presented in this resource, instead of in alphabetical order.

Silica

Silica is an informal term for the chemical silicon dioxide, a naturally occurring and widely abundant mineral that is a major component of most rocks, sand and soils. It is present in natural stone, like granite and sandstone, and is used to make common building materials like concrete, bricks, tiles and engineered stone (e.g. for benchtops).

There are crystalline and non-crystalline (amorphous) forms of silica. These forms refer to how the silica is chemically structured. Crystalline silica is generally considered more hazardous than non-crystalline (amorphous) silica.[1]

Crystalline silica

This term refers to the crystalline forms of silica and includes quartz, cristobalite, tridymite and tripoli. The most common form of crystalline silica is quartz[1], so the terms are sometimes used interchangeably.

Natural stones and building materials like engineered stone all contain varying amounts of crystalline silica. For example, granite contains 25–50% crystalline silica, sandstone contains 52–95% crystalline silica and engineered stone contains up to 97% crystalline silica.[2]

Silica dust or respirable crystalline silica

Silica dust is the term commonly given to respirable crystalline silica (RCS), and the terms are used interchangeably. Silica dust is generated through mechanical processes such as crushing, cutting, drilling, grinding, sanding, sawing, or polishing of natural stone or crystalline silica-containing building products.

Silica dust particles are less than 10 micrometres (μm) in diameter (i.e. one-hundredth of a millimetre, equivalent to approximately one-tenth the width of a human hair or 100 times smaller than a single grain of sand) and cannot be seen with the naked eye. These particles are called respirable crystalline silica because they are small enough to inhale and penetrate deep into the lungs.[2]

Crystalline silica substance

A ‘crystalline silica substance’ is a regulatory term referring to substances or materials containing at least 1% crystalline silica determined as a weight/weight (w/w) concentration. Examples of crystalline silica substances include:

- natural stone products such as granite benchtops
- legacy engineered stone
- sintered stone
- porcelain and ceramic products
- sandstone
- asphalt
- mortar, grout and render
- bricks, pavers and tiles
- concrete and cement-based products
- most rocks, sands, and clays
- composite dental fillings.

Work health and safety (WHS) laws have specific requirements for working with crystalline silica substances to control the risk of being exposed to respirable crystalline silica and reduce the risk of health effects. When not mechanically processed and in solid (non-airborne) form, crystalline silica products are not harmful to human health.[3]

Note: the terms ‘substances’ or ‘materials’ or ‘products’ that contain crystalline silica are used interchangeably.

Engineered stone

A material which is created by combining natural stone materials with other chemical constituents (such as water, resins, or pigments) and becomes hardened. Engineered stone is also known as reconstituted, artificial or manufactured stone.

Prohibited engineered stone

Engineered stone products that are prohibited in Australia are benchtops, panels and slabs that contain at least 1% crystalline silica as a weight/weight (w/w) concentration.

Engineered stone **does not** include:

- concrete and cement products
- bricks, pavers, and other similar blocks
- ceramic wall and floor tiles
- sintered stone (provided it does not contain resin)
- porcelain products (provided they do not contain resin)
- roof tiles
- grout, mortar, render, and
- plasterboard.[4]

Legacy engineered stone

Legacy engineered stone includes any engineered stone benchtop, panel or slab that was already installed prior to the prohibition of these products and, for the purposes of disposal, includes engineered stone benchtops, panels and slabs whether installed or not installed (such as a stockpile).

Silicosis

Silicosis refers to a group of occupational lung diseases caused by breathing in silica dust leading to lung inflammation and scarring. There are three different types of silicosis:

- Acute silicosis can develop within weeks of very high exposure to silica. The lungs are filled with a fluid containing a lot of protein, which causes severe breathlessness.
- Accelerated silicosis is also associated with high exposures where there is a rapid increase of scarring in the lung (fibrosis) within 10 years of first exposure.
- Chronic silicosis, the most common form of silicosis, where fibrosis occurs more slowly over 10–30 years after first being exposed.[5, 6]

Silica-related diseases

In addition to silicosis there are other conditions that can be caused by exposure to silica dust including:

- Chronic Obstructive Pulmonary Disease (COPD), including chronic bronchitis
- lung cancer
- autoimmune diseases, such as scleroderma and rheumatoid arthritis.[5, 6]

Silica awareness

Silica awareness refers to improving knowledge and behaviours of target populations (e.g. workers, employers, health professionals) by providing information on the health risks of exposure to silica dust and how to eliminate or reduce the risk of exposure.[7]

Silica safety

Silica safety describes the implementation of control measures that eliminate or reduce the risk of exposure to silica dust.[7]

Personal air monitoring

Personal air monitoring involves measuring the level of an airborne contaminant in the breathing zone of workers using a personal sampler during their usual work activities. Air monitoring is used to check that workers' exposures to an airborne hazard (like silica dust/RCS) do not exceed the exposure limit and/or pose a risk to health. Air monitoring should be conducted by a competent person such as an occupational hygienist.[8]

Occupational hygienist

An occupational hygienist, also known as an industrial hygienist, is a health professional who applies scientific knowledge, technology and engineering principles to identify, assess and develop/recommend control measures for workplace hazards—such as chemicals, dust, noise, and radiation—to protect the health and safety of workers in a workplace.[9, 10]

Health screening

Health screening involves identifying indicators of disease through tests, examinations or other procedures that can be applied rapidly across an asymptomatic population (e.g. workers in high-risk industries). The purpose is to identify people in an apparently healthy population who are at higher risk of a health problem or condition, to enable early treatments or interventions and thereby reduce the incidence and/or mortality of the health problem or condition within the population.[11]

Health surveillance

Health surveillance refers to the continuous systematic collection, analysis and interpretation of health-related data (e.g. health screening data) in a population over time. This information is used to guide the planning, implementation and evaluation of health interventions and systems.[12]

Health monitoring

Health monitoring involves the use of medical tests and other forms of investigation to identify changes in a person's health status arising from exposure to hazardous chemicals. The purpose is to detect health changes at an early, asymptomatic stage, so that interventions to protect worker's health can be applied before symptomatic clinical disease develops. Health monitoring also helps determine the effectiveness of control measures in a workplace.[13] Health monitoring for silica exposed workers should be conducted by a trained competent person, such as an occupational and environmental physician.[14]

Occupational and environmental physicians

Medical specialists with expertise in all aspects of the interface between (physical and psychological) health and work, including environmental factors as a determinant of health.[15]

Silica National Strategic Plan

The Silica National Strategic Plan 2024–30 (SNSP) was developed in response to the re-emergence of silicosis in Australia. The SNSP aims to drive nationally coordinated action to:

- eliminate silica-related diseases in Australia
- support workers and others who are affected by silica-related diseases, and
- provide international leadership in preventing silica-related diseases.[7]

Communicating silica facts and figures

General information

What is silica?

Key messages

- Silica, or silicon dioxide (SiO2), is a naturally occurring and widely abundant mineral that is a major component of most rocks and soils.
- It exists in both non-crystalline (amorphous) and crystalline forms.
- Quartz is the most common form of crystalline silica.
- Crystalline silica is generally considered more hazardous than non-crystalline silica.

(Sources [1, 2, 16, 17])

Further information

- IARC (Monograph 68, 1997 and Monograph 100, 2012), NIOSH, (2002) and ATSDR (2019) note that three principal crystalline forms of silica—quartz, cristobalite, and tridymite—are the most relevant to human health hazards.*
  - Other naturally occurring crystalline forms of silica include coesite, stishovite, and moganite.
  - Synthetic forms of crystalline silica include keatite and porosils.
- Amorphous forms of silica include naturally occurring forms such as opal, biogenic silica, diatomaceous earths, silica fibres (bio-genic), vitreous silica; and synthetic forms such as fused silica, pyrogenic or fumed silica, precipitated silica, colloidal silica, silica gel.

* https://publications.iarc.who.int/Book-And-Report-Series/Iarc-Monographs-On-The-Identification-Of-Carcinogenic-Hazards-To-Humans/Silica-Some-Silicates-Coal-Dust-And-Em-Para-Em--Aramid-Fibrils-1997; https://publications.iarc.who.int/Book-And-Report-Series/Iarc-Monographs-On-The-Identification-Of-Carcinogenic-Hazards-To-Humans/Arsenic-Metals-Fibres-And-Dusts-2012; https://www.cdc.gov/niosh/docs/2002-129/default.html; https://wwwn.cdc.gov/TSP/ToxProfiles/ToxProfiles.aspx?id=1483&tid=290

When is silica harmful to health?

Key messages

- Crystalline silica becomes a risk to health when very fine, airborne silica dust is generated by processes such as crushing, cutting, drilling, grinding, sanding, sawing, polishing or any other process that generates dust.
- Silica dust particles are 100 times smaller than a single grain of sand and can remain airborne for a long time.
- When inhaled, silica dust can penetrate deep into the lungs causing irreversible lung damage and serious diseases.
- The higher the airborne concentration of silica dust released when crystalline silica-containing material is being processed, the greater the risk of exposure to silica dust and the greater risk of developing a silica-related disease.
- The non-crystalline (amorphous) forms of silica are considered less hazardous but can also cause lung damage at high exposure levels.

(Sources [18, 19])

Further information

- Any activity that has the potential to generate and expose workers or others at the workplace to silica dust is considered 'processing' of a crystalline silica material. For further guidance on how to control the risks when processing crystalline silica see: Processing of a crystalline silica substance: Risk management process - Working with crystalline silica substances | Safe Work Australia*
- Working in dusty environments and disturbing settled dust using methods such as dry-sweeping, compressed air or general-purpose vacuum cleaners also creates a risk of silica dust exposure. For further information see How silica dust is produced - Working with crystalline silica substances | Safe Work Australia†

* www.safeworkaustralia.gov.au/doc/css-guide-resources-processing-crystalline-silica-substance-risk-management-process

†www.safeworkaustralia.gov.au/doc/css-guide-resources-how-silica-dust-produced)

Materials containing crystalline silica

Key messages

- Crystalline silica-containing materials are used to make common building products like bricks, pavers, concrete, cement, grout, artificial stone products and tiles.
- Crystalline silica is also used in porcelain, ceramics and found in products made from natural stone such as granite and sandstone.

(Source [2])

Further information

- Information on how much and what forms of crystalline silica a manufactured product contains may be obtained by referring to the label, safety data sheet or product information from the manufacturer or supplier (e.g. MSDS – Island Block & Paving).*

* www.islandblock.com.au/msds/

Australia's response to the re-emergence of silicosis

Key messages

The significant rise in silicosis cases in Australia occurred due to the increased importation and use of engineered stone.

Australia's response to the re-emergence of silicosis and other silica-related diseases has involved the following main steps:

- 1 July 2024: Banning the manufacture, supply, processing and installation of engineered stone (containing 1% or more crystalline silica) benchtops, panels and slabs across Australia. This prohibition does not apply to engineered stone products that are not benchtops, panels and slabs; nor does it apply to the repair, minor modification, removal, or disposal of engineered stone installed prior to the prohibition (legacy engineered stone).
- 1 September 2024: Amending the model WHS laws for crystalline silica substances to strengthen protection for workers across all industries. The amendments provide stronger regulation of work with all materials containing at least 1% crystalline silica and require:
  - controlled processing of all crystalline silica substances
  - assessing the risk of work involving processing of a crystalline silica substance, and
  - additional duties for any processing of engineered stone that is assessed as high risk, including preparing a silica risk control plan.
- 1 January 2025: Banning the importation of engineered stone (containing 1% or more crystalline silica) benchtops, panels or slabs.
- Developing the Silica National Strategic Plan 2024–30 (SNSP) which aims to eliminate silica-related diseases through coordinated national actions across Australia.

(Sources [7, 20-23])

Further information

- The National Dust Disease Taskforce Final Report recommended finalising a strategy to drive coordinated national action to address increasing rates of silicosis.*
- The SNSP is based on a draft National Silicosis Prevention Strategy and associated National Action Plan developed by the Lung Foundation Australia for the Department of Health and Aged Care, under the guidance of an Expert Steering Committee during 2021 and 2022.†
- The SNSP also supports work to achieve the Australian Work Health and Safety Strategy 2023–33 target of no new cases of accelerated silicosis by 2033.‡

* www.health.gov.au/resources/publications/national-dust-disease-taskforce-final-report
† www.asbestossafety.gov.au/silicasafety/silica-national-strategic-plan/silica-national-strategic-plan-2024-30/about-snsp-2024-30-plan
‡ www.safeworkaustralia.gov.au/awhs-strategy_23-33

Silica-related laws

Key messages

The laws that specifically apply to silica safety are:

- Under WHS laws persons conducting a business or undertaking have duties to manage risks associated with hazardous chemicals, including respirable crystalline silica. WHS regulations also specifically prohibit the manufacture, supply, processing and installation of engineered stone benchtops, panels and slabs and place requirements on working with crystalline silica substances.
- A new regulation 5M under the *Customs (Prohibited Imports) Regulations 1956* (Commonwealth) which prohibits the import of engineered stone benchtops, panels and slabs, unless a valid permit or exemption applies.*

(Sources [21, 24, 25])

Further information

- Safe Work Australia is a national policy body responsible for the development and evaluation of the model WHS laws.
- While the model WHS regulations for silica have been adopted in most jurisdictions, some jurisdictions have made variations in their respective WHS laws compared with the model WHS laws.
- The ASSEA CEO may grant permission to import engineered stone benchtops, panels or slabs if the importation is for genuine research and analysis and/or sampling to identify engineered stone, or if there are exceptional circumstances that justify the importation.†

* www.legislation.gov.au/F1996B03651/latest/versions

† www.asbestossafety.gov.au/silicasafety/imports/engineered-stone-ban/confirmations-exemptions-and-permissions

Silica dust and the impact on health

Silica-related diseases

Key messages

- Silica dust is a confirmed human carcinogen, with sufficient evidence showing that inhalation of silica dust increases the risk of lung cancer.
- The inhalation of silica dust increases the risk of a range of other diseases, including:
  - acute, accelerated, and chronic silicosis
  - Chronic Obstructive Pulmonary Disease (COPD), including chronic bronchitis
  - sarcoidosis and pulmonary tuberculosis
  - autoimmune scleroderma and rheumatoid arthritis
  - chronic renal diseases.
- Diseases associated with silica dust exposure may not appear for years, although the latency varies.

(Sources [1, 16, 17, 26–30])

Further information

- The Asbestos and Silica Dust Diseases Research Institute Silicosis Hub provides detailed information on silicosis as well as resources and guidance for anyone affected by silica-related disease.*

* silicosis.org.au

Risk of exposure

Key messages

- There is a risk of exposure to significant levels of respirable crystalline silica when airborne dust is generated by processes such as crushing, cutting, drilling, grinding, sanding, sawing, or polishing materials that contain crystalline silica. Dry cutting is a particular high-risk task and when uncontrolled, is prohibited.
- Workers in manufacturing, construction, mining, quarrying, tunnelling and agriculture are at higher risk of exposure to significant levels of silica dust.
- Primary exposure to silica dust impacts workers who are carrying out the task that is making it airborne. Secondary exposure may occur to anyone in or near the work area where these processes are being undertaken or have recently been undertaken, and where they are not protected by adequate controls, e.g. cleaners, administrative staff.

Further information

- In 2011 research, it was estimated that about 587,000 Australian workers were exposed to silica dust, and that 5700 of them will develop lung cancer over their lifetime.*

* https://oem.bmj.com/content/71/1/55

Risk of disease

Key messages

- The risk of developing a silica-related disease depends on the intensity and duration of exposure to silica dust.
- The total amount of silica dust to which someone is exposed (cumulative dose) is determined by the concentration of silica dust and how long the exposure lasted, including the length of all exposures combined (years, months, or days).
- The higher the cumulative dose, the greater the probability of developing a disease.
- Silicosis may continue to progress even after exposure stops, making prevention essential and requiring health surveillance to provide the best patient outcomes.
- Some people develop disease from relatively low levels of cumulative exposure, and it is not possible to determine who will or will not get disease.
- The only way to eliminate the risk of disease is to eliminate exposure to silica dust.

(Sources [7, 16, 21, 23–27])

Further information

- In 2025 research based on 2,000 workers who serviced Queensland tunnel projects, it was estimated that between 20 and 30 cases of lung cancer and between 200 and 300 cases of silicosis would develop over their lifetime as a result of exposure to silica dust.*
- In 2016 research, it was estimated that without intervention one per cent (about 10,390 cases) of future lung cancer cases would be attributable to occupational silica dust exposure.†
  - Also, between 83,000 and 104,000 future silicosis cases were projected to result from occupational silica dust exposure.

For details on animal experiments and epidemiological studies that consistently show long-term exposure to silica dust significantly increases the incidence of lung tumours and silicosis, see *Silica Dust, Crystalline, in the form of Quartz or Cristobalite* in IARC Publications Website - Arsenic, Metals, Fibres, and Dusts.‡

* https://academic.oup.com/annweh/article/69/9/917/8108101

† https://research-repository.uwa.edu.au/en/publications/the-future-burden-of-lung-cancer-and-silicosis-from-occupational-/

‡ https://publications.iarc.who.int/Book-And-Report-Series/Iarc-Monographs-On-The-Identification-Of-Carcinogenic-Hazards-To-Humans/Arsenic-Metals-Fibres-And-Dusts-2012

Diagnosing silica-related diseases

Key messages

- Where there is significant risk to a worker's health arising from ongoing work involving exposure to silica dust, including when carrying out high risk processing of a crystalline silica substance, the worker must be provided with health monitoring.
- Workers may show no obvious symptoms at the time of diagnosis, making routine health screening essential.
- Diagnosis of silicosis requires a combination of occupational exposure history, lung function testing and radiological findings (high-resolution CT).
- Chest X-rays have low sensitivity for diagnosing early silicosis, particularly in engineered stone workers; CT scans are more effective in detecting the early signs of disease.

(Sources [21, 24, 29–31])

Further information

For guidance on health monitoring see: Health monitoring for persons conducting a business or undertaking guide | Safe Work Australia and Health monitoring for crystalline silica | Safe Work Australia.*

For information on diagnosing silicosis see: Investigating a possible silicosis diagnosis: What to expect | Lung Foundation Australia and Silicosis Hub.†

For more information on health professional training see: Managing Occupational Lung Disease: Early Detection, Management and Support - Lung Foundation Australia.‡

* www.safeworkaustralia.gov.au/doc/health-monitoring-persons-conducting-business-or-undertaking-guide; www.safeworkaustralia.gov.au/doc/health-monitoring-crystalline-silica

† https://lungfoundation.com.au/articles/investigating-a-possible-silicosis-diagnosis/; silicosis.org.au/

‡ https://lungfoundation.com.au/training/managing-occupational-lung-disease-early-detection-management-and-support/

Reporting silica-related diseases

Key messages

- It is mandatory for occupational and environmental medicine physicians and respiratory and sleep medicine physicians to report cases of silicosis to the National Occupational Respiratory Disease Registry (National Registry).
- It is also mandatory for an employer or person conducting a business or undertaking for whom a worker is carrying out work that requires health monitoring to provide the health monitoring report to the jurisdictional WHS regulator if it contains advice that the worker may have developed a disease as a result of carrying out the work.
- From May 2024 (when the National Registry commenced) to December 2025, a total of 197 notifications were made to the National Registry, of which 157 notifications had silica dust as the main disease-causing agent. There were 148 notifications of silicosis.

(Source [32])

Further information

- The National Occupational Respiratory Disease Registry | Australian Centre for Disease Control launched on 22 May 2024 and stores information relating to individuals who have been diagnosed with an occupational respiratory disease, including silicosis.*
- This information can be used to understand how common and widespread occupational respiratory diseases are, bring to attention any new exposures and help reduce worker exposure.
- The publicly available data dashboard summarises the information collected since the National Registry began.† The dashboard is updated on the first day of each month. It provides an analysis of notifications by:
  - main disease-causing agent
  - disease name
  - industry of main exposure
  - occupation of main exposure
  - job task of main exposure
  - state or territory of residence
  - sex at birth.

* www.cdc.gov.au/topics/nordr
† www.cdc.gov.au/resources/apps-and-tools/national-occupational-respiratory-disease-registry-monthly-data)

Estimated deaths from silica-related diseases in Australia

Key messages

- An estimated 253 Australians died from occupational exposure to silica in 2023 (approximately 190 in males and 63 in females) based on the Global Burden of Disease (GBD) study.
  - 242 of these deaths were attributed to lung cancer and 11 to silicosis.
  - The trend in estimated figures from 1990 to 2023 reveals a year-on-year increase in the number of deaths. This is attributed to the rapid rise in engineered stone-associated silicosis cases, particularly among younger workers.

(Sources [33–36])

Further information

- In the absence of data from death notifications, modelled estimates of the number of deaths from silica-related diseases in Australia are reported from data produced by the GBD study.*

* www.healthdata.org/research-analysis/gbd.

Estimated deaths from silica-related diseases worldwide

Key messages

- An estimated 65,000 died globally from occupational exposure to silica in 2023 (approximately 51,000 deaths in males and 14,000 deaths in females) based on the Global Burden of Disease (GBD) study. Of these deaths:
  - 54,000 were attributed to lung cancer (with approximately 41,000 in males and 13,000 in females)
  - 11,000 were attributed to silicosis (10,250 in males and 750 in females

(Source [33])

Further information

- The estimated mortality rate, which provides a measure that is relative to the size of a specific population, was a little higher in Australia compared to the global rate (0.94 per 100,000 of the population versus 0.81).
- The estimated mortality rate from lung cancer attributable to occupational silica exposure was also higher in Australia compared to the global rate (0.90 per 100,000 of the population versus 0.67).

Preventing Exposure

Engineered stone ban

Key messages

- A world-first ban on engineered stone was introduced in response to the rise of silicosis cases in engineered stone workers.
- On 1 July 2024, the manufacture, supply, processing and installation of engineered stone (containing 1% or more crystalline silica) benchtops, panels and slabs was banned in all states and territories of Australia.
- A ban on the importation of engineered stone (containing 1% or more crystalline silica) benchtops, panels or slabs took effect on the 1 January 2025.

Further information

- Under WHS laws an employer or person conducting a business or undertaking must not carry out, or direct or allow a worker to carry out, work that involves manufacturing, supplying, processing or installing engineered stone (containing 1% or more crystalline silica) benchtops, panels or slabs. This prohibition does not apply to repair, minor modification, removal, or disposal of engineered stone installed prior to the prohibition, provided legal requirements are followed. Further information is available on the Safe Work Australia website engineered stone ban information page.*
- The import prohibition is enforced by the Australian Border Force (ABF) under the new regulation 5M of the Customs (Prohibited Imports) Regulations 1956 (Cth). Further information is available on the ABF website engineered stone information page.† There are limited exceptions to these rules.

* www.safeworkaustralia.gov.au/esban
† www.abf.gov.au/prohibited-goods-subsite/Pages/engineered-stone.aspx

Identifying the hazard

Key messages

- Information on how much and what forms of crystalline silica a manufactured product contains may be obtained by referring to the label, safety data sheet or product information from the manufacturer or supplier.

Further information

For information on the types of materials that may contain silica and how to measure whether materials contain silica see the SILICA Resource Hub – Australian Institute of Occupational Hygienists.*

For guidance on how to identify, assess and control silica dust risks see the Model Code of Practice: Managing risks of respirable crystalline silica in the workplace | Safe Work Australia.†

* www.aioh.org.au/resources/silica-resource-hub/
† www.safeworkaustralia.gov.au/doc/model-code-practice-managing-risks-respirable-crystalline-silica-workplace

Assessing the risk

Key messages

- Before processing materials that contain crystalline silica, the work must first be assessed to determine whether it is high risk, as per the WHS regulatory definition. This includes considering all of the following factors:
  - the specific processing that will be undertaken
  - the form or forms of crystalline silica present in the material
  - the proportion of crystalline silica contained in the material determined as a weight/weight (w/w) concentration
  - the hazards associated with the work, including the likely frequency and duration that a person will be exposed to respirable crystalline silica
  - whether the airborne concentration of respirable crystalline silica that is present at the workplace is reasonably likely to exceed half the workplace exposure standard
  - any relevant air and health monitoring previously undertaken at the workplace, and
  - any previous incidents, illnesses or diseases associated with exposure to silica dust at the workplace.

(Source [21])

Further information

For detailed guidance on managing the risks of processing materials that contain crystalline silica, see:

Silica - Silica resources | Safe Work Australia.*

* www.safeworkaustralia.gov.au/safety-topic/hazards/silica/silica-resources

Controlling the risk

Key messages

- The risk of exposure to silica dust must be managed in all circumstances, not just for high risk crystalline silica work.
- Businesses must manage the health and safety risks from silica dust at work by using the hierarchy of control measures. This ranks control measures from the highest level of protection and reliability to the lowest:
  1. Elimination, e.g. stop processing crystalline silica-containing materials
  2. Substitution e.g. products that contain no crystalline silica or less crystalline silica or do not require processing
  3. Isolation, e.g. physical barriers, enclosed processing areas, exclusion zones
  4. Engineering controls, e.g. wet-cutting tools, dust extraction, ventilation systems at processing areas
  5. Administrative controls, e.g. written procedures, signage, worker training and supervision, and good housekeeping
  6. Personal protective equipment, e.g. respiratory protective equipment. This is considered the least effective form of controlling dust exposure and relies on correct fit and use by the worker, as well as adequate supervision. It can be effective at minimising residual risk when used in conjunction with higher order controls.
- For all high risk crystalline silica work, a *silica risk control plan* must be developed and training must be provided to workers at risk of exposure to silica dust.

Further information

For detailed guidance on the hierarchy of controls related to crystalline silica, see:

Silica - Silica resources | Safe Work Australia.*

* www.safeworkaustralia.gov.au/safety-topic/hazards/silica/silica-resources

Workplace Exposure Standard/Limit

Key messages

- The Workplace Exposure Standard (WES) for silica dust in Australia is 0.05 mg/m³, averaged over an eight-hour workday. This means that workers must not be exposed to air that contains more than this concentration of silica dust over an eight-hour period.
- Compliance with the WES is required under WHS laws and is achieved with personal air monitoring.
- Static air monitoring cannot be used to monitor compliance with the WES, but it helps identify areas of hazard generation as part of the risk management process.
- The WES is a legal maximum limit, but evidence shows that exposure below this limit can still increase the risk of silica-related disease. Therefore, the risk of exposure to silica dust must always be reduced to a level that is as low as is reasonably practicable, if not eliminated.

(Sources [37–41])

Further information

- Workplace Exposure Standards will be replaced with Workplace Exposure Limits from 1 December 2026.
- The WES or WEL for silica dust/RCS is measured as the respirable fraction of each of the following forms of airborne crystalline silica: quartz, cristobalite, tridymite, and tripoli.
- Neither the WES nor the WEL is the dividing line between a healthy and unhealthy work environment. Some people may experience adverse health effects at levels below the WES or WEL, either due to individual biological differences or existing health conditions.

Further information: Workplace exposure standard for respirable crystalline silica | Safe Work Australia.*

* www.safeworkaustralia.gov.au/safety-topic/hazards/silica/whs-duties-silica/workplace-exposure-standard-respirable-crystalline-silica

Appendix A

Jurisdiction-specific information

Jurisdiction-specific information on silica can be found through state-based WHS regulator webpages:

Crystalline silica | Comcare
www.comcare.gov.au/safe-healthy-work/dust-conditions/silica

Silica dust | WorkSafe ACT
www.worksafe.act.gov.au/health-and-safety-portal/safety-topics/dangerous-goods-and-hazardous-substances/silica-dust

Crystalline silica | SafeWork NSW
www.safework.nsw.gov.au/hazards-a-z/hazardous-chemical/priority-chemicals/crystalline-silica

Crystalline silica and silicosis | NT WorkSafe
worksafe.nt.gov.au/safety-and-prevention/crystalline-silica-and-silicosis

Respirable crystalline silica | WorkSafe Qld
www.worksafe.qld.gov.au/safety-and-prevention/hazards/hazardous-exposures/respirable-crystalline-silica

Respirable crystalline silica | SafeWork SA
www.safework.sa.gov.au/workplaces/chemicals-and-substances/storage,-use-and-transport-of-hazardous-chemicals/silica

Silica and Dust Diseases | WorkSafe Tas
worksafe.tas.gov.au/silicasafe

Crystalline silica | WorkSafe Victoria
www.worksafe.vic.gov.au/crystalline-silica

Silica | WorkSafe WA
www.worksafe.wa.gov.au/silica-0

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