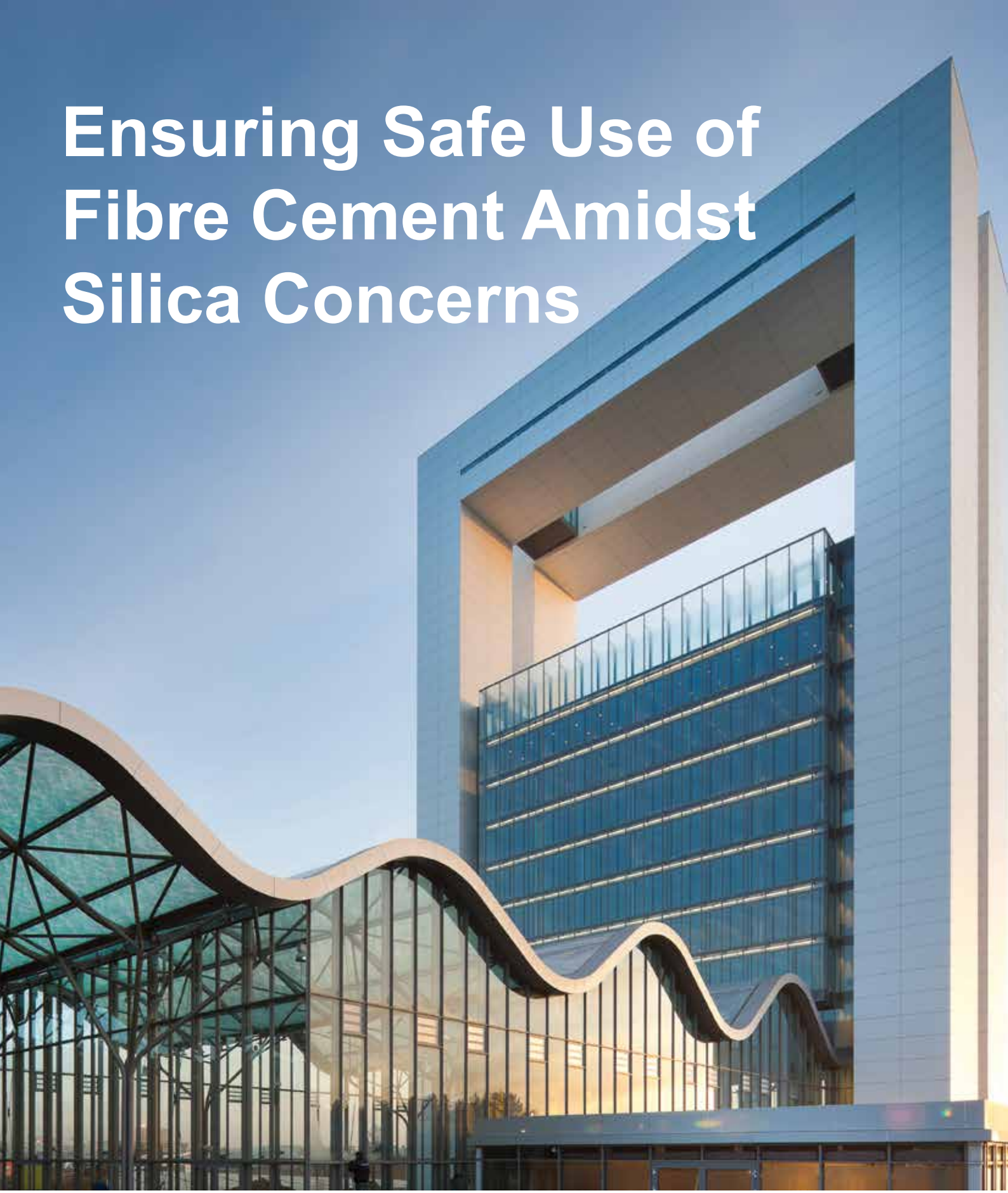
Ensuring Safe Use of Fibre Cement Amidst Silica Concerns

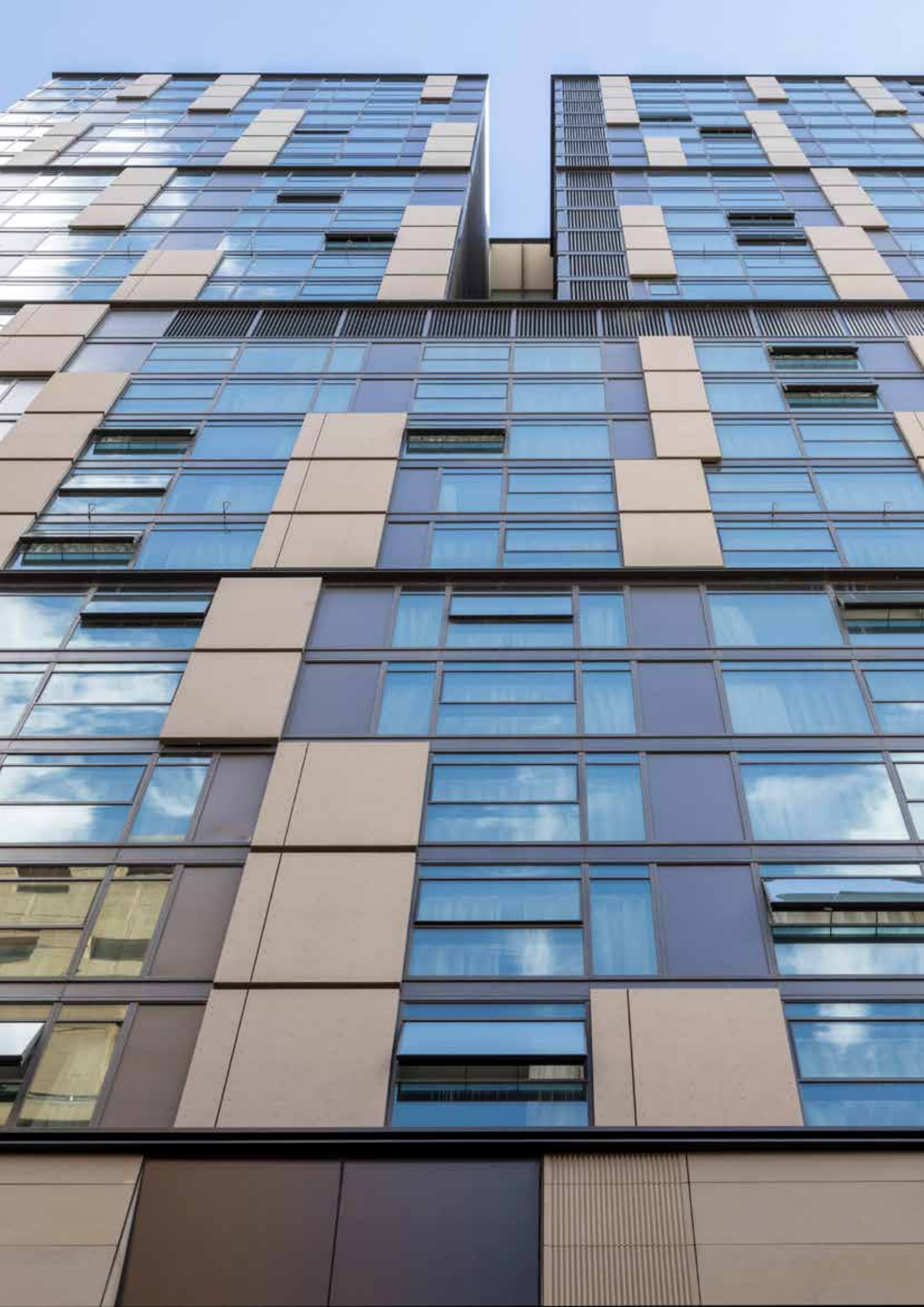


EQUITONE
Fibre cement facade materials

INTRODUCTION

Safety in construction is paramount due to its inherently high-risk and dynamic nature. One of the growing concerns is workers' exposure to hazardous materials, such as respirable crystalline silica, which poses serious health risks. Silica is a common substance in many essential construction materials, including concrete, brick, mortar, autoclaved-aerated concrete, fibre cement, pavers, tiles, and engineered stone. To mitigate this risk, regulatory bodies in Australia have decided to ban engineered stone from July 2024 due to its high silica content.

This white paper aims to educate stakeholders on why the ban applies specifically to engineered stone and to explain why fibre cement, despite containing silica, is considered safe when proper safety procedures are followed. It also highlights the comprehensive measures that ensure the continued safe use of fibre cement.



UNDERSTANDING SILICA AND ITS HEALTH RISKS

Crystalline silica is a naturally occurring mineral found in materials such as sand, stone, and concrete. When these materials are processed (e.g., cutting, grinding, drilling), respirable crystalline silica (RCS) dust can be released. Prolonged exposure to crystalline silica dust, even at low to moderate levels, or short-term exposure at high levels, can result in severe health issues, including silicosis. Silicosis is a progressive and often fatal lung disease caused by inhaling fine silica dust particle. [1][8]

The widespread presence of silica in various construction materials highlights the critical importance of adhering to the manufacturer's safety datasheets to effectively mitigate health risks. [1][8]

UNDERSTANDING SILICA AND ITS ROLE IN CONSTRUCTION MATERIALS

Benefits and Usage of Silica in Construction Materials

Crystalline silica is widely used in the construction industry because it imparts several beneficial properties to construction materials, including:

- **Durability**: Silica enhances the hardness and longevity of materials, making them more resistant to wear and tear. [8]
- **Strength**: The addition of silica increases the compressive strength of concrete and mortar, essential for constructing robust structures. [8]
- **Workability**: Silica improves the workability of cement and concrete, facilitating easier handling and application during construction. [8]

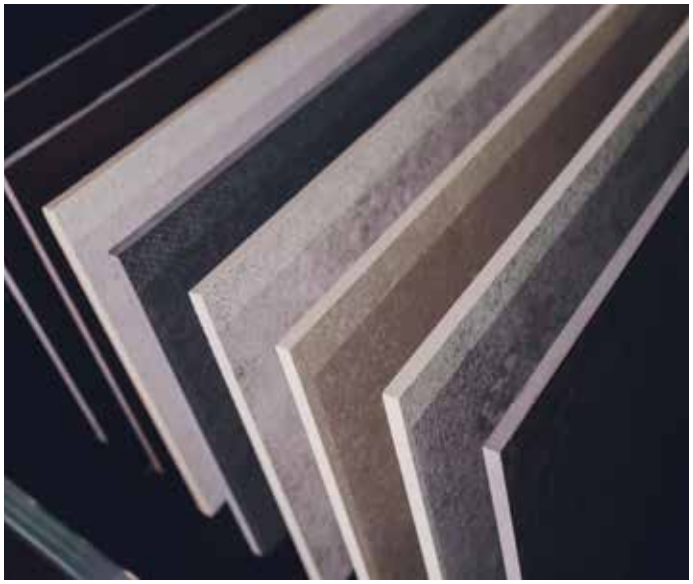
Silica in Various Construction Materials

Silica is present in many staple construction materials such as:

- **Masonry**: Bricks and mortar can contain up to 30% crystalline silica, contributing to their strength and durability. [7]
- **Concrete**: Widely used in construction, concrete contains silica from its sand and aggregate components, which are critical for its structural properties. [7]
- **Tiles**: Ceramic and porcelain tiles, used extensively for flooring and walls, can contain significant levels of silica, enhancing their hardness and resistance to abrasion. [7]
- **Fibre Cement**: Used for cladding, roofing, and other applications, most fibre cement materials contain silica which is critical in their durability and performance. [8]
- **Autoclaved Aerated Concrete (AAC)**: A lightweight, precast foam concrete building material, AAC contains silica, contributing to its strength and insulating properties. [7]

THE BAN ON ENGINEERED STONE

Engineered stone, used extensively for countertops, contains up to 97% crystalline silica. The high silica content and intensive mechanical processes involved in cutting and polishing engineered stone release significant amounts of RCS. Despite safety measures like wet cutting and local exhaust ventilation (LEV), the risk of overexposure remains high, leading to a surge in silicosis cases among workers. Consequently, regulatory bodies in Australia have decided to ban engineered stone from July 2024 to protect worker health. [1][4][6]



EQUITONE FIBRE CEMENT: A SAFE CONSTRUCTION MATERIAL

Fibre cement materials, widely used for internal wall and ceiling linings, external cladding, and various other applications, typically contain silica content that can reach up to 60%. [8] There are generally two types of fibre cement materials: autoclaved and air-cured. The latter typically contains less silica content, and some materials, like EQUITONE [natura] and [pictura], contain no silica as an intended ingredient. Autoclaved fibre cement, which generally contains higher silica content compared to air-cured fibre cement, are also considered safe. This is because their silica content is significantly lower than that of materials like engineered stone. Additionally, unlike engineered stone, the fabrication of fibre cement involves less intensive mechanical processing, and effective dust control measures can significantly mitigate the release of RCS.

This combination of lower silica content, less intensive processing, and efficient dust control measures makes fibre cement a safe construction material when proper safety procedures are followed. [3][8]

Key Safety Measures for Fibre Cement

1. **Dust Collection**: Using dust-collecting tools and vacuums is critical. Studies by the National Institute for Occupational Safety and Health (NIOSH) and the Centres for Disease Control and Prevention (CDC) have shown that connecting a shop vacuum, fitted with a proper air filter, to a dust-collecting circular saw can significantly reduce airborne dust levels. [2][3]
2. **Personal Protective Equipment (PPE)**: The minimum mask grade recommended by Safe Work Australia for working with materials containing crystalline silica is a P2 efficiency half-face respirator. This recommendation ensures that workers are adequately protected from respirable crystalline silica (RCS) dust. [4] Dust masks must be clean and certified to relevant Australian/New Zealand Standards.
3. **Outdoor Processing**: Whenever feasible, perform cutting, drilling, sanding, and other dust-generating activities outdoors. This helps to disperse silica dust, reducing its concentration in the breathing zone and thereby lowering exposure risks. [5]
4. **Local Exhaust Ventilation (LEV)**: For indoor mechanical processing of fibre cement, LEV systems can help capture dust at the source, preventing it from becoming airborne. These systems have proven to reduce RCS exposure by up to 95% when properly implemented. [5]
5. **Administrative Controls**: Regular training on the hazards of silica exposure and proper dust control methods, combined with routine maintenance of dust control equipment, are critical in mitigating health risks. [3] [6] Rotating workers involved in the fabrication process throughout a shift is also considered an effective best practice for reducing individual exposure to dust. Additionally, establishing an exclusion zone of at least 2 meters around the area where fibre cement panel fabrication is taking place significantly reduces the risk of RCS exposure to nearby personnel.

Effective Dust Control Measures

While wet cutting is effective, it is not common practice for fibre cement. Instead, emphasis is placed on the following measures:

1. **Using Dust-Collecting Tools**: Tools designed with dust collection systems significantly reduce dust exposure. [2][3]
2. **Utilising Correct Equipment:** EQUITONE fibre cement blades and drill bits generate less dust compared to many other types of blades and bits. The polycrystalline diamond (PCD) tips of the blade and the specifically designed solid carbide-tipped bit are engineered for cutting and drilling high-density fibre cement. This type of blade and drill bit reduces the amount of dust generated during the fabrication process, ensuring a safer and cleaner working environment. [3] [5]
3. **Proper Vacuum Systems**: Attaching a vacuum with a high-efficiency particulate air filter (HEPA M Class or higher) to cutting tools can capture and contain the majority of silica dust. Field studies have shown this method effectively keeps dust levels below recommended limit. [6]
4. **Proper Disposal and Cleaning**: Avoiding dry sweeping of dust and instead using vacuums ensures that dust is not re-aerosolised. Proper disposal methods for dust and debris further reduce exposure risks. [6]

REGULATORY FRAMEWORK AND STANDARDS

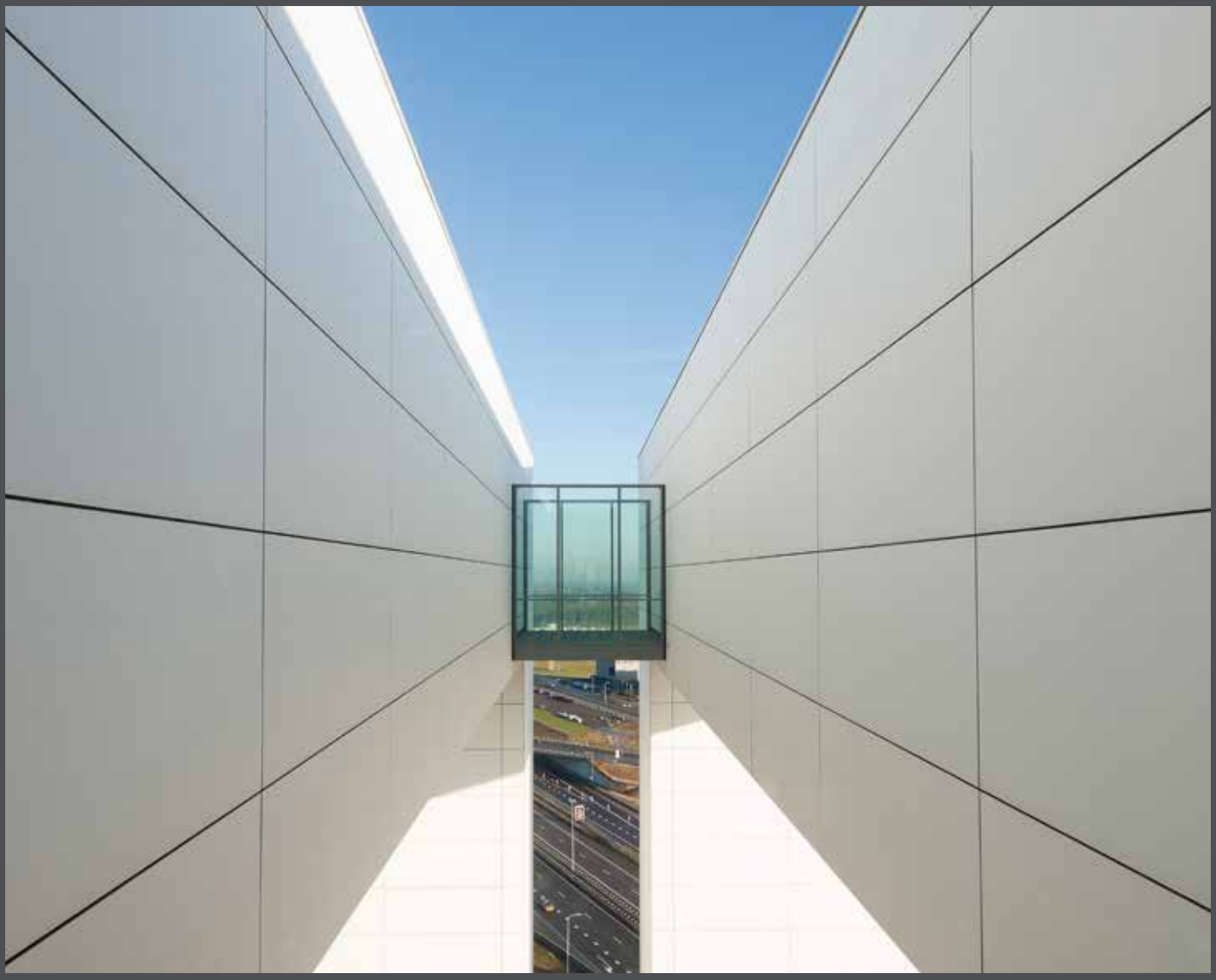
Australia has robust occupational health and safety regulations aimed at controlling RCS exposure. Standards such as the Model Work Health and Safety (WHS) Regulations provide comprehensive guidelines for managing risks associated with crystalline silica. Employers are required to implement control measures such as substitution, isolation, engineering controls, and, if necessary, administrative controls and PPE. [1][4]

The Australian Code of Practice for managing risks of RCS mandates regular air monitoring and health surveillance for workers exposed to silica dust. These measures ensure early detection and intervention, reducing the long-term health impacts of silica exposure. The workplace exposure standard (WES) for respirable crystalline silica (RCS) is set at 0.05 mg/m^3, averaged over an eight-hour workday. It is imperative that no individual is exposed to RCS levels exceeding this standard. [1]

For more detailed information, please refer to Safe Work Australia's website: Safe Work Australia - Crystalline Silica and Silicosis.

CONCLUSION

Fibre cement remains a safe material in the construction industry when appropriate safety measures are implemented. The lower silica content and effective dust control methods distinguish it from engineered stone which poses higher health risks due to its high silica content and intensive processing requirements. Processing EQUITONE fibre cement materials is deemed low risk when workers are properly trained, correct equipment is used and maintained according to manufacturer specifications, and all recommended control measures are effectively implemented.



REFERENCES

1. WorkSafe Victoria, “Preventing exposure to crystalline silica dust” https://www.worksafe.vic.gov.au/crystalline-silica-safety-basics
2. NIOSH, “Engineering Controls for Respirable Crystalline Silica Hazards” https://synergist.aiha.org/202204-engineering-controls-silica
3. CDC, “Reducing Hazardous Dust Exposure When Cutting Fiber-Cement Siding” https://www.cdc.gov/niosh/docs/wp-solutions/2015-185/pdfs/2015-185.pdf
4. Safe Work Australia, “Managing the risks of respirable crystalline silica at work” https://www.safeworkaustralia.gov.au/safety-topic/hazards/crystalline-silica-and-silicosis
5. eLCOSH, “Reducing Hazardous Dust Exposure When Cutting Fiber-Cement Siding” https://www.elcosh.org/document/3944/d001373/Reducing+Hazardous+Dust+Exposure+When+Cutting+Fiber-Cement+Siding.html
6. Amerisafe Group, “Reducing Silica Exposure in Fiber-Cement Siding Installation” https://amerisafegroup.com/new-approach-prevent-silica-exposure-fiber-cement-siding-installation/
7. Stone Initiatives, “Measuring crystalline silica in stone: determine your stone’s risk” https://stonemtg.com.au/2023/06/23/measuring-crystalline-silica-in-stone/
8. Abodo, “The Dangers of Silica Dust – Fibre Cement Board Products” https://www.abodo.co.nz/resources/articles/the-dangers-of-silica-dust-fibre-cement-board-products

All information provided correct as of July 2024

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