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Synthetic Mineral Fibres (SMF)

What are synthetic mineral fibres?

Synthetic Mineral Fibre is a general term used to describe a number of fibrous materials made from glass, rock, alumina and silica. Some of these products are composed of a mixture of fibres in a multitude of sizes. Generally referred to as SMF, they are also known as Man Made Mineral Fibres (MMMFs).

SMF have been widely used as alternatives to asbestos in insulation and fire-rating products and as reinforcement in cement, plaster and plastic materials. SMF products are used extensively in commercial and residential buildings for insulation from temperature and sound.

There are four main groups of SMF:

1. **Continuous Glass Filaments** used in textiles, reinforced plastics and concrete, and as electrical insulation and plumbing materials.
2. **Fibreglass, glass fibre or glasswool** used mainly in insulation mats.
3. **Rockwool** used in formed insulation, in limp materials, such as acoustic insulation and fire-rating materials.
4. **Ceramic Fibres** used as insulation blankets and for high temperature applications and fire-rated products.

Health effects of SMFs

For some years, there were concerns that SMF may be associated with health effects similar to those found with asbestos. This was because of the similarities of appearance, as well as the industrial application, of SMFs and asbestos. Now there is a large amount of scientific data from various studies, including epidemiological studies of workers in SMF industries. Reviews of these results show a number of health effects from exposure to various SMF.

Short-term exposure can result in:

- **Skin and eye irritation** - more likely in workers having direct contact with SMF products for the first time or after a period of absence. May involve reddening, burning, itching, prickling, scaling, thickening and inflammation around the fingernails.
- **Upper respiratory tract irritation** - likely during exposure to very high concentrations of SMF in the air.

Long-term exposure to SMF was shown to be associated with a slightly increased risk of lung cancer among exposed workers in early SMF industries. Animal studies have shown the potential of SMF to cause mesothelioma, but no cases of this lung disease were reported from studies in the fibreglass and rockwool manufacturing industries.

Animal studies and epidemiological results have led the World Health Organisation (WHO) International Agency for Research on Cancer to classify fibres such as rockwool, ceramic and glass fibre as Class 2B carcinogens. That is, they are possibly carcinogenic to humans.

With other cancer-causing substances (carcinogens), we know that there is no safe level of exposure -that is, there is no low level that can be guaranteed not to cause an increased cancer risk. However, Current scientific opinion is that SMF caused chronic health effects will not occur under typical "modern-day" operations, provided adequate precautions are taken in the workplace.

In particular fibrous dust is less easy to limit and control on construction sites and it is very important to ensure that workers in the construction, as well as the manufacturing, industry are protected from over exposure.

Occupational exposure standards

The current national exposure standard set by Worksafe Australia is 0.5 fibres per millilitre of air for all types of SMF. This is the average concentration of fibres in the air measured and calculated over a normal eight-hour working day. Due to the limitations of available data on which to set a health-based exposure standard, another standard is applied alongside. This secondary standard recommends 2 mg/m³ of inspirable dust to minimise upper respiratory tract irritation from the larger sized fibres.

This Australian exposure standard is considered the most

stringent value for SMF exposures in the world.

Legal requirements

In NSW the most important laws covering Synthetic Removal Fibres are the [NSW Occupational Health and Safety Act 2000](#) and the [NSW Occupational Health and Safety Regulation 2001](#).

The NSW WorkCover [Code of Practice for the Safe Use of Synthetic Mineral Fibres](#) and the National Occupational Health and Safety Commission's [National Code of Practice for the Safe Use of Synthetic Mineral Fibres](#) provide guidance on how to achieve a safe level of exposure at work. Compliance with these Codes of Practice is a minimum requirement to ensure the health and safety of employees and reduce the risk of exposure to SMF.

Workplace Control Measures

Suitable methods should be applied for each job involving SMF so that the level of respirable fibres in the workplace atmosphere is eliminated or adequately controlled. The National Code of Practice outlines safe work practices and general responsibilities when handling SMF. It applies to all applications involving SMF and activities involving their manufacture, installation, removal or other related handling.

Some of the measures described in the National Code of Practice are outlined below. The Code provides separate schedules for working safely with rockwool, ceramic fibre and glasswool. All workplaces using SMF should therefore consult the Code for more details on these provisions.

- **Employers should select products containing the least amount of respirable fibres.** For example, ceramic fibres should be avoided and where possible, non-fibrous safer products should replace fibrous products.
- **Plants manufacturing SMF need a design process that ensures the lowest amount of fibre particles becoming airborne.**
- **Hand tools are preferred for cutting SMF material.** If power tools need to be used, they should be fitted with local exhaust ventilation at the point of dust generation.
- **A regular clean up** should be done to remove any build up of fibres and/or dust. Wet mopping and wiping or an industrial vacuum cleaner are recommended. Never do dry sweeping or use

compressed air or high pressure water jets for cleaning.

- **SMF waste must be collected in plastic bags** to prevent fibre and/or dust emissions and disposed of according to regulations.
- **Adequate washing facilities for workers should be available on site.**
- **SMF material should be stored in intact containers or under sheet covers.**

Personal Protective Equipment (PPE)

When exposure levels are above the exposure standard and when engineering controls and safe work practices are not adequate, personal protective equipment is required. However, PPE is not a substitute for control measures to reduce exposure levels.

If you are working with SMF, your employer should provide you with the correct PPE and explain how to use it. The employer should also ensure that PPE is stored separately from a worker's other clothing.

- **Lightweight, loose-fitting clothing (long sleeves and full length trousers) and gloves** should be worn when handling SMF. Cloth can be tucked into collars to minimise skin irritations by preventing fibres entering shirt.
- **An approved respirator** (complying with Australian Standards AS 1715 and AS 1716) should be selected according to the type of SMF and its exposure level in the workplace. For most SMF work, half-face P1 or P2 dust masks will be suitable.
- **Safety goggles or face shields** can prevent eye irritation or injury
- **PPE must be removed and face and hands washed thoroughly with soap and water before eating or smoking.** It is very important to keep rest rooms and recreation areas completely free of contamination by fibrous dust.

Personal protective equipment is not a substitute for dust control by substitution, engineering controls and safe work methods. There are severe limitations to the protection offered by PPE and it should only be used if other controls are not possible or as an interim measure while other controls are being implemented.

Air monitoring

If effective control measures are in place, SMF exposure levels may not be a concern. However, if there is reasonable concern about airborne fibre levels in any work involving SMF, the employer should take steps, as outlined in the National Code, regarding air monitoring.

The air sampling should be undertaken by an adequately trained person using the SMF membrane filter method. Records of all air monitoring must be kept by the employer, who should inform all workers using SMF about the results and about any risk control measures.

Training and supervision

Workers using SMF and supervisors should be given adequate information, instruction and training about working safely with SMF. This should include health related information on SMF, controlling fibre/dust exposures and the levels associated with their type of work and how safe work practices can be used effectively. Supervisors should receive specific training in their legal responsibilities and duties as supervisors of SMF work.

Trained, experienced supervisors must closely supervise all work involving the use of SMF products.

This Fact Sheet is courtesy of the Workers Health Centre. To visit their website click [here](#)

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