

Working with Asbestos – Personal Safety Hazards

Asbestos is a descriptor for a group of naturally-occurring minerals of a crystalline structure and with a fibrous character. Asbestos has been used in many products like heat resistant materials, asbestos cement products like sheeting and pipes, in fitters, insulation, brakes, gaskets and floor tiles.

Background

The three main types of asbestos that can be found in industry and domestic buildings are:

- chrysotile (white asbestos)
- amosite (brown asbestos)
- crocidolite (blue asbestos)

Each of these materials is harmful to the lungs, and there is a current New Zealand Workplace Exposure Standard of 1 for chrysotile or 0.1 fibre/ml for other types set by Worksafe New Zealand. (See website <http://www.business.govt.nz/worksafe/information-guidance/all-guidance-items/workplace-exposure-standards-and-biological-exposure-indices> for more detailed information on Exposure Standards). Exposure to airborne asbestos occurs primarily during dust forming operations such as handling, sawing, sanding, grinding, drilling or similar operations upon materials containing asbestos. The level of exposure will vary depending on the type of asbestos product and the way it is handled, as well as the location.

Friable asbestos material is any material that contains asbestos and is in the form of a powder or can be crumbled, pulverised or reduced to powder by hand pressure when dry.

Bonded (non-friable) asbestos was made by mixing asbestos with other solid



materials to give a hard, durable product e.g. mixed with resin to make a fireproof composite board (like Lebah, Zelemite) or when mixed with cement to form fibro type sheeting, asbestos cement pipes etc.

Respiratory Health Effects

While there may be asbestos containing material in the workplace, the risk to health only occurs when this material becomes airborne and can be inhaled.

Significant health effects can arise from the inhalation of airborne fibres due to their effects on the lungs. Asbestos is very durable and chemically resistant - so the natural lung breakdown and clearance mechanisms do not work effectively. This means fibres can stay in the body for many years causing damage before they are cleared from the lungs.

The three major occupational lung diseases caused by inhalation of asbestos fibres are:

- Asbestosis - sections of lung become fibrotic and are no longer able to absorb oxygen into the bloodstream.
- Lung cancer - can form in the lung structures.
- Pleural Mesothelioma - cancer of the linings of the lung - closely associated with exposure to blue asbestos.

Who is at risk of exposure to asbestos?

Individuals at risk from asbestos exposure are those carrying out demolition, maintenance, repair or refurbishment work or asbestos removal in buildings built or refurbished before 2002, for example:

builders, carpenters, plumbers, electricians, cable installers. Home renovators also have the potential to be exposed to asbestos when working on older homes.

Occurrence at Work

Industrial use of asbestos has diminished considerably in the last 15–20 years. However there remains a legacy of many tonnes of asbestos still in place in workplaces, buildings and homes across the country. Asbestos cement products e.g. old fibro, cement pipes etc are everywhere and will not be removed in the foreseeable future. All workplaces should be inspected for asbestos and appropriate action taken according to relevant government Regulations and Guidelines - see websites listed over page for further information.

The rebuilding effort in Christchurch will necessarily involve the demolition and repair of many structures that may contain asbestos in many forms and products.

Occurrence at home

Older homes are likely to have some asbestos in them. The exterior wall coverings (e.g. fibro), insulation, gaskets, tiles, pipes etc may contain amounts of asbestos. Homeowners need to be aware but not alarmed by the presence of these materials and learn how to deal with them appropriately. There is guidance on management and removal of asbestos from Worksafe New Zealand and the management of asbestos in the non-occupational environment by the Ministry of Health - see the websites of these organisations for further information.

Respiratory Protection

Persons involved in asbestos work or even those working around asbestos materials need to be aware of the relevant information as it applies in their situation. Worksafe NZ has regulations and guidance material relating to the identification, monitoring, care and removal of asbestos. Recommendations of appropriate respiratory protection to use for various

types of asbestos work are also given - see over page for more information.

Handling and removal of asbestos-containing materials requires specialist skills and must only be undertaken by appropriately qualified personnel. For workers, respiratory protection is required when working directly with asbestos. If there is significant risk of exposure, a full Respiratory Protection Programme must be implemented by the employer. This should follow the comprehensive guidance given in the Australian/New Zealand Standard AS/NZS1715:2009 “Selection Use & Maintenance of Respiratory Protective Devices”.

Recommended Respiratory Equipment - New Zealand Government Guidelines

Any respirator selection should be done with referral to the relevant Worksafe NZ Guidelines to ensure the type of product and protection level selected is suitable for the tasks to be undertaken. Appendix C of the *New Zealand Guidelines for the Management and Removal of Asbestos (3rd Ed)** and the Fact Sheet “PPE to use when working with asbestos” ** indicate various work procedures and suitable respirator types for use - some examples of this recommended respiratory equipment are shown below, however, there are many other options so please see the complete list for the full list of work procedures and associated recommended respiratory equipment. Information on the issues associated with use, cleaning, maintenance and storage of respirators is available in the PPE fact sheet from Worksafe NZ ** and also given in AS/NZS 1715.

Extract from Worksafe NZ		
<i>(For a full list refer to the Appendix C of the New Zealand Guidelines for the Management and Removal of Asbestos (3rd Ed))*</i>		
Work Procedure	Required Respirator	Filter Type
Maintenance work involving removal of small quantities of asbestos (e.g. replacement of asbestos gaskets and insulation)	<ul style="list-style-type: none"> • Full face-piece particulate filter powered respirator or • Full face-piece positive pressure demand air-line respirator • Full suit or hood continuous flow air-line respirator 	P3
Maintenance work near installed asbestos insulation – no direct handling but possible asbestos disturbance	<ul style="list-style-type: none"> • Full face-piece particulate filter, cartridge respirator 	P3

Respirator Face Fit

Any tight fitting respirator (either half face or full face configuration) needs to fit the individual wearer - note that one size does not fit all. There is too much variation in face size for one respirator size/model to get a suitable fit for every person. To get a suitable size, users must undergo a fit test - a standard protocol where the fit of the selected respirator on the face of the individual is tested to determine if the quality of this fit is satisfactory. If the respirator does not fit the face properly, a different model or style of respirator should then be selected and tested.

Fit testing must be carried out by a competent fit tester. There are two forms of fit testing:

- 1) Qualitative Fit Testing - used for testing the fit of half face respirators. 3M sell fit testing kits for these (FT-10 and FT-30).
- 2) Quantitative Fit Testing - used for testing the fit of full face respirators which provide higher



levels of protection. This type of testing uses specialised particle counting equipment such as the TSI PortaCount®.

Note also that all users of tight fitting respirators must be clean shaven at the beginning of the work shift - any facial hair that grows or is caught between the faceseal of the respirator and the face will lift the respirator off the face and can create significant leak paths and degraded protection. See AS/NZS 1715 for more details on fit testing and fitting of respirators.

* “New Zealand Guidelines for the management and removal of asbestos- 3rd edition”: www.business.govt.nz/worksafe/information-guidance/all-guidance-items/new-zealand-guidelines-for-the-management-and-removal-of-asbestos-3rd-edition

** “Personal protective equipment to use when working with asbestos (Information Sheet)s” - on the Worksafe NZ website - www.business.govt.nz/worksafe.

Body Protection

When working with asbestos containing materials, protection from fibre contamination plays an important part in your PPE. Wearing a suitable coverall will help minimise contamination of the body or any secondary clothing. 3M offers a variety of disposable coveralls providing different levels of protection, features and benefits. 3M body protection solutions include:

- 4515 Coverall - breathable material and is ideal for use to protect against asbestos fibres.
- 4520 Coverall - constructed of high quality 5-layered breathable material designed to offer protection against hazardous particulates like asbestos.

If protective coveralls are required, a breathable and suitably protective coverall should be selected. 3M can also provide coveralls intended to help reduce the risk of heat stress to the wearer. e.g. 4520, 4540+.



4520

Eye Protection

Work related eye injuries remain an important problem among workers across New Zealand. Eye and face injuries are a common cause of work-related injury, resulting in more than 4000 recorded eye injuries at work annually (NZ Dept. of Labour). Most injuries involve foreign bodies on or in the eye, particularly the cornea.

Asbestos fibres can cause eye irritation - like any particle, the more that gets into the eyes the more irritation will occur. The exposure is likely related to the type of tasks being undertaken and processes that can release particles, dusts and many fibres or bundles of fibres. It is not a common issue, but the needle-like structure of the asbestos fibres can even become lodged in the eye.

While many eye injuries occur when individuals are not wearing any eye protection, surprisingly, a considerable proportion of cases occur when some sort of protective eyewear is being worn. This supports the need to ensure that the protective eyewear selected fits the individual wearer as well as possible ie gaps between the frames and the face are minimised. 3M Secure Fit™ protective eyewear are designed to hold securely to the wearer's face and provide medium impact protection using patented constant tension technology. For work where falling dust and debris are an issue, a pair of tight fitting goggles like the 3M Gogglegear™ that seal directly on the wearer's face can provide an effective barrier to protect the eyes. A full face reusable respirator with a high impact protection rating like the 3M Full Face Respirator 6000 Series will protect the eyes as well as the lungs.



3M Secure Fit™ 200 Series



3M Lexa™ Gogglegear™

Decontamination

Decontamination of all equipment including PPE used during asbestos handling operations is critical to prevent any further fibre release and exposure.

All respiratory equipment used for asbestos work needs to be fully understood, properly inspected, discarded or cleaned and decontaminated after each use to remove any residual asbestos fibres - the cleaned units can then be stored, ready for the next use. Certain PPE e.g. full face respirators can be fully disassembled, cleaned and reassembled, ready for reuse. For light duty asbestos related tasks, like inspection or working in area adjacent to asbestos, some enclosed filters with hard external cases (e.g. the 3M Particulate Filter 6035 or 3M Canisters) can be suitably wiped clean, stored and reused. Other filters, where the filter material is open and fibres can be disturbed and released, should be discarded in the asbestos waste stream after use. Other equipment e.g. some filters, disposable coveralls etc cannot be effectively decontaminated and so must be disposed of appropriately, along with the other asbestos contaminated waste, to a suitable asbestos waste disposal facility. Normal work clothing can be very difficult to fully decontaminate, and any washing of these should be done in an asbestos specific cleaning facility, **not** at home or in a normal laundry operation. This is why disposable coveralls are used routinely across the asbestos industry - the issue of washing is avoided by disposal of the contaminated coveralls.

For further information

More information and assistance with various aspects of asbestos removal, including the selection of suitable respiratory protection can be found by calling the 3M TechAssist Helpline on 0800 364 357 during business hours.

For government guidelines and information, refer to Worksafe NZ - see links at bottom of page 3.

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Updated July 2015
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