



DRAFT

Code of Practice

HOW TO SAFELY REMOVE ASBESTOS



safe work australia

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FOREWORD

This Code of Practice (this Code) on how to manage and control asbestos in the workplace is an approved code of practice under section 274 of the *Work Health and Safety Act (WHS) Act*.

An approved code of practice is a practical guide to achieving the standards of health, safety and welfare required under the WHS Act and the Work Health and Safety Regulations (the WHS Regulations).

A code of practice applies to anyone who has a duty of care in the circumstances described in the code. In most cases, following an approved code of practice would achieve compliance with the health and safety duties in the WHS Act, in relation to the subject matter of the code. Like regulations, codes of practice deal with particular issues and do not cover all hazards or risks which may arise. The health and safety duties require duty holders to consider all risks associated with work, not only those for which regulations and codes of practice exist.

Codes of practice are admissible in court proceedings under the WHS Act and Regulations. Courts may regard a code of practice as evidence of what is known about a hazard, risk or control and may rely on the code in determining what is reasonably practicable in the circumstances to which the code relates.

The WHS Act and Regulations may be complied with by following another method, such as a technical or an industry standard, if it provides an equivalent or higher standard of work health and safety than the code.

An inspector may refer to an approved code of practice when issuing an improvement or prohibition notice.

This Code of Practice has been developed by Safe Work Australia as a model code of practice under the Council of Australian Governments' *Inter-Governmental Agreement for Regulatory and Operational Reform in Occupational Health and Safety* for adoption by the Commonwealth, state and territory governments.

A draft of this Code of Practice was released for public consultation on 7 December 2010 and was endorsed by the Workplace Relations Ministers Council on [to be completed].

How to use this code of practice

This Code includes references to both mandatory and non-mandatory actions. The references to legal requirements contained in the WHS Act and the WHS Regulations (highlighted in text boxes in this Code) are not exhaustive and are included for context only.

The words 'must', 'requires' or 'mandatory' indicate that legal requirements exist, which must be complied with.

The word 'should' indicates a recommended course of action, while 'may' indicates an optional course of action.

PURPOSE

This Code provides practical guidance for persons who have work health and safety duties under the WHS Act and the WHS Regulations to safely remove asbestos from all workplaces including buildings and structures, plant and equipment, and vehicles.

SCOPE

This Code provides specific guidance for asbestos removalists on the process to safely remove asbestos from a workplace, including those materials that contain asbestos in a workplace.

The decision to remove asbestos must be determined by conducting a risk assessment. Given this, it is important to read the *Code of Practice: How to Manage and Control Asbestos in a Workplace* as it provides specific guidance on conducting risk assessments and implementing control measures where removing asbestos is not the most appropriate action to take.

Duties in this Code apply to all asbestos removalists (including unlicensed removalist such as a tradesperson), unless it specifically states that it only related to a licensed removalist. Some chapters of this Code will apply to asbestos that is present in domestic premises where the premises becomes a workplace.

1. INTRODUCTION

1.1 Who should use this Code?

You should use this Code if you are a person conducting a business or undertaking who carries out asbestos removal work (removal work). This includes both asbestos removal companies and those persons who may carry out small asbestos removal jobs and may not have an asbestos licence, for example, tradespersons.

This Code has been written primarily for asbestos removalists (both licensed and unlicensed) who are removing asbestos from buildings, structures, plant and equipment, and vehicles. However, this Code may also be used by government inspectors and other persons associated with removal work.

It is recommended that other persons with responsibility, for example, a person conducting a business or undertaking who commissions removal work at a workplace (person who commissions removal work), should read this Code to ensure they are aware of mandatory requirements.

A person can have more than one duty and more than one person can concurrently have the same duty.

1.2 The meaning of key terms

Airborne asbestos fibres means any fibres of asbestos small enough to be made airborne. For the purposes of monitoring airborne asbestos fibres, only respirable asbestos fibres are counted.

Asbestos means the asbestiform varieties of mineral silicates belonging to the serpentine or amphibole groups of rock forming minerals including actinolite asbestos, grunerite (or amosite) asbestos (brown), anthophyllite asbestos, chrysotile asbestos (white), crocidolite asbestos (blue), and tremolite asbestos. For the purposes of this Code, the term asbestos also refers to any material or thing that contains asbestos.

Asbestos removalist means a person who is competent to remove asbestos. This person can be licensed or unlicensed (for example, a tradesperson) depending on the type of asbestos removal work being carried out.

Asbestos removal work means work involving the removal of asbestos or Class A removal work or Class B removal work.

Competent person in relation to carrying out clearance inspections and issuing clearance certificates means a person who is familiar with relevant asbestos industry practice, and holds a statement of attainment for the endorsed unit of competency for an asbestos assessor or a tertiary qualification in occupational health and safety, industrial hygiene, science, building, construction or environmental health. For all other purposes, competent person means a person who has acquired through training, qualification or experience, the knowledge and skills to carry out the task.

Exposure standard for asbestos is a respirable asbestos fibre level of 0.1 fibres/mL of air measured in a person's breathing zone and expressed as a time weighted average fibre concentration of asbestos calculated over an eight-hour working day and measured over a minimum period of four hours in accordance with:

- (a) the Membrane Filter Method, or
- (b) a method determined by the relevant regulator.

Friable asbestos means material that can be crumbled, pulverised or reduced to a powder by hand pressure when dry that contains asbestos.

Licensed assessor means a person who holds an asbestos assessor licence.

Licensed removalist means a person conducting a business or undertaking who is licensed under the [draft] WHS Regulations to carry out asbestos removal work.

Naturally occurring asbestos (NOA) means the natural geological occurrence of asbestos minerals found in association with geological deposits including rock, sediment or soil.

Non-friable asbestos means material containing asbestos that is not friable, including material containing asbestos fibres reinforced with a bonding component.

Respirable asbestos means an asbestos fibre that:

- (a) is less than 3 microns (μm) wide
- (b) more than 5 microns (μm) long, and
- (c) has a length to width ratio of more than 3:1.

Risk control means taking action to first eliminate health and safety risks so far as is reasonably practicable, and if that is not possible, minimising the risks so far as is reasonably practicable. Eliminating a hazard will also eliminate any risks associated with that hazard.

1.3 What are the potential health risks if exposed to asbestos?

Asbestos is a known carcinogen and poses a risk to health by inhalation whenever asbestos fibres become respirable and people are exposed to these fibres. The inhalation of these fibres can cause mesothelioma, lung cancer and asbestosis.

- **Malignant mesothelioma** is a cancer of the outer covering of the lung (the pleura) or the abdominal cavity (the peritoneum). It is usually fatal. Mesothelioma is caused by the inhalation of needle-like asbestos fibres deep into the lungs where they can damage mesothelial cells, potentially resulting in cancer. The latency period is generally between 35 and 40 years, but it may be longer, and the disease is very difficult to detect prior to the onset of illness.
- **Lung cancer** has been shown to be caused by all types of asbestos. The average latency period of the disease, from the first exposure to asbestos, ranges from 20 to 30 years. Lung cancer symptoms are rarely felt until the disease has developed to an advanced stage. People who smoke may have a greater risk of developing lung cancer from inhaling airborne asbestos fibres.
- **Asbestosis** is a form of lung disease (pneumoconiosis) directly caused by inhaling asbestos fibres, causing a scarring (fibrosis) of the lung tissue which decreases the ability of the lungs to transfer oxygen to the blood. The latency period of asbestosis is generally between 15 and 25 years.

The *Code of Practice: How to Manage and Control Asbestos in the Workplace* provides additional information on asbestos and a comprehensive list of potential asbestos materials.

1.4 How can you be exposed to asbestos?

When asbestos is processed and disturbed, the fibre bundles become progressively finer and more hazardous to health as they can become airborne and breathed in. Small fibres, known as respirable fibres, are invisible to the naked eye and when inhaled can penetrate the deepest part of the lungs.

Asbestos can release airborne fibres whenever it is disturbed, and especially during the following activities:

- direct action on asbestos, such as drilling, boring, cutting especially with power tools, filing, brushing, grinding, sanding, breaking, smashing or blowing with compressed air
- removing asbestos from workplaces

- maintaining or servicing materials containing asbestos from vehicles, plant, equipment or workplaces, or
- renovating or demolishing workplaces (or a part of a workplace) that contains asbestos.

Exposure to airborne asbestos fibres for workers and other persons must be either eliminated or minimised as far as is reasonably practicable, and that exposure is kept below the exposure standard for asbestos.

1.5 Why is it necessary to manage removal work?

The removal of asbestos can be a high risk process because there is often significant disturbance of the asbestos and therefore a potential for exposure to airborne asbestos fibres. A risk assessment must be conducted to determine the most appropriate action to take to manage the risks associated with asbestos. Unless it is not reasonably practicable, asbestos should be removed in the following circumstances.

- Before demolition or refurbishment work which may disturb any asbestos (whether friable or non-friable).
- Where a competent person indicates that removal is required due to significant risk of exposure, for example, where the asbestos is vulnerable to damage by the normal day-to-day activities in the workplace.
- Where the relevant regulator has directed the asbestos be removed.

Where removal is not necessary or is not reasonably practicable, control measures should be implemented to eliminate or minimise any risks associated with asbestos. This must be based on a risk assessment. The *Code of Practice: How to Manage and Control Asbestos in the Workplace* provides information on risk assessment associated with asbestos. The *Code of Practice: How to Manage Work Health and Safety Risks* provides general information on the risk management process.

2. ROLES AND RESPONSIBILITIES

2.1 What are the health and safety duties associated with removing asbestos?

The WHS Act requires all persons who conduct a business or undertaking to ensure, so far as is reasonably practicable, that workers and other persons are not put at risk from work carried out as part of the business or undertaking.

The [draft] WHS Regulations include specific obligations in relation to safely removing asbestos, summarised below:

Duty holder	Key responsibilities
Person conducting a business or undertaking (PCBU)	<ul style="list-style-type: none"> • must ensure, so far as reasonably practicable, the exposure of a person at the workplace to airborne asbestos fibres is eliminated. Exposure must be minimised if elimination is not reasonably practicable • must ensure the exposure standard for asbestos is not exceeded • must ensure health surveillance is provided to a worker who is carrying out licensed removal work or is carrying out maintenance work on asbestos and is determined to have been in an area of the workplace in which the exposure standard was likely to have been exceeded • must pay all expenses where required, obtain results and keep records of all health surveillance, and • must, if you are engaging workers who you believe will be carrying out removal work or maintenance work on asbestos, ensure those workers are trained in the identification and safe handling of, and appropriate controls for, asbestos.
PCBU who commissioned the removal work	<ul style="list-style-type: none"> • must ensure removal work is carried out by an asbestos removalist that is appropriately licensed (unless it is 10 square metres (m²) or less of non-friable asbestos that is being removed or asbestos-contaminated dust (ACD) that is no more than a minor contamination • where the work is carried out by a licensed removalist, must ensure access to the removal area is limited • for removal work requiring a Class A licence, must ensure a clearance inspection is carried out by a licensed assessor, and • for removal work requiring a Class A licence, must ensure air monitoring is carried out by a licensed assessor of the asbestos removal work area at the workplace and results are given to the appropriate people.
PCBU with management or control of a workplace	<ul style="list-style-type: none"> • must inform certain people about the removal work if informed by the licensed removalist, and • where the work is carried out by a licensed removalist, must ensure access to the removal area is limited.
Person carrying out the removal work (Asbestos removalist) <i>Note: This person may be a licensed or unlicensed</i>	<ul style="list-style-type: none"> • must obtain a copy of the asbestos register for a workplace before commencing removal work • must ensure the removal work area is signed and barricaded • must ensure there are facilities available to decontaminate the removal area, plant used, and workers carrying out the removal work • must ensure nothing that is likely to be contaminated with asbestos is

Duty holder	Key responsibilities
<p><i>removalist depending on the type of asbestos being removed</i></p>	<p>removed unless it has been decontaminated or sealed appropriately</p> <ul style="list-style-type: none"> • must ensure asbestos waste is contained and appropriately labelled before it is removed and is disposed of appropriately, and • must ensure personal protective equipment (PPE) and clothing is used, sealed appropriately before it is removed and disposed of or laundered.
<p>Licensed removalist</p> <p><i>Note: You must be licensed under the WHS Regulations</i></p>	<ul style="list-style-type: none"> • must ensure, for removal work requiring a Class A licence the asbestos removal supervisor is present at the removal area whenever removal work is being carried out • must ensure, for removal work requiring a Class B licence the asbestos removal supervisor is readily available to a worker carrying out removal work whenever the work is carried out • must not direct or allow a worker to carry out removal work unless the worker is qualified to carry out the class of removal work • must provide appropriate training to the worker carrying out the removal work and keep records of the training undertaken • must give specific information about the health risks of removal work before a worker is engaged • must develop an asbestos removal control plan for each asbestos removal job • if required, must notify the regulator about the removal work prior to carrying out the work • must tell the PCBU with management or control of the workplace about the removal work prior to the work being carried out • if the workplace is domestic premises, must tell people who may be affected by the removal work about the work • if the workplace is domestic premises, must ensure a clearance inspection is carried out • if the workplace is domestic premises and the removal work requires a Class A licence, must ensure air monitoring is carried out by a licensed assessor and results are given to the appropriate people • for removal work requiring a Class A licence, must take appropriate action based on the recorded fibres level, and • if removing friable asbestos, must ensure so far as reasonably practicable, the removal area is enclosed, tested for leaks (if negative pressure is used), the wet method is used, air monitoring is undertaken, any equipment is dismantled and disposed of safely and the enclosure is dismantled appropriately.
<p>Licensed Assessor or Competent Person</p>	<ul style="list-style-type: none"> • must carry out the clearance inspection and provide a clearance certificate before the workplace can be reoccupied • must check the removal area does not pose a risk to health and safety from exposure to risks associated with asbestos, and • must undertake air monitoring using the membrane filter method.

Deciding what is ‘reasonably practicable’ to protect people from harm requires weighing up certain matters, such as the likelihood of a hazard or risk occurring and the degree of harm that would result, and then making a judgment about what is reasonable in the circumstances.

Officers, such as company directors, have a duty to exercise due diligence to ensure that the business or undertaking complies with the WHS Act and [draft] WHS Regulations. This includes taking reasonable steps to ensure that the business or undertaking has and uses appropriate resources and processes to eliminate or minimise risks associated with asbestos.

Workers have a duty to take reasonable care for their own health and safety and that they do not adversely affect the health and safety of other persons. Workers must comply with any reasonable instruction and cooperate with any reasonable policy or procedure relating to health and safety at the workplace. If PPE is provided by the person conducting the business or undertaking, the worker must use them in accordance with the information, instruction and training provided on their use

2.2 Licensing requirements

The [draft] WHS Regulations require a person conducting a business or undertaking who commissions the removal of asbestos at the workplace to ensure that asbestos removal work is carried out only by a licensed removalist who is appropriately licensed to carry out the work, unless specified in the WHS Regulations that a licence is not required.

There are different licenses required depending on the types of asbestos to be removed. There are some circumstances where a licence is not required to remove asbestos.

Removal work requiring a licence

There are two types of licences that allow for the removal of asbestos:

Removal where a Class A licence is required	<p>A person holding a Class A licence can remove all types of asbestos, however, they are the only person who can remove:</p> <ul style="list-style-type: none"> • friable asbestos, and • asbestos contaminated dust (ACD) other than ACD that is: <ul style="list-style-type: none"> ○ associated with the removal of non-friable asbestos, or ○ not associated with the removal of asbestos that is no more than a minor contamination.
Removal where a Class A or B licence is required	<p>A person holding a Class A or Class B licence can remove the following types of asbestos:</p> <ul style="list-style-type: none"> • more than 10m² of non-friable asbestos, and • ACD associated with the removal of more than 10m² of non-friable asbestos. <p>A person with a Class B licence cannot remove friable asbestos.</p>

As a guide, a minor contamination of ACD is where:

- (a) for the entire removal job, the ACD can be removed within a period of time not exceeding 10 minutes in total and the total cumulative time over which all ACD jobs undertaken does not exceed one hour in any period of seven days. Where these time limits have been or are likely to be exceeded (consider job start and finish times), the job is greater than a minor contamination and an asbestos removalist appropriately licensed must remove the ACD unless it was associated with the removal of 10m² or less of non-friable asbestos, or
- (b) a competent person determines that ACD constitutes a minor contamination (even when the time limits in (a) are likely to be exceeded). When making a decision, the competent person must consider the likelihood of airborne asbestos fibre levels exceeding half the exposure standard during the removal process.

Removal work that does not require a licence

Removal of asbestos by a person who does not hold a Class A or Class B asbestos removal licence is permitted when the asbestos to be removed is:

- 10m² or less of non-friable asbestos (approximately the size of a small bathroom)
- contaminated soil associated with the removal of 10m² or less of non-friable asbestos
- is contained in dust which is not more than a minor contamination, or
- is contained in dust associated with the removal of 10m² or less of non-friable asbestos.

This type of removal work is usually undertaken by a tradesperson engaged in building renovation or refurbishment. It permits them to remove small amounts of non-friable asbestos using safe working methods and replace it with non-asbestos alternatives prior to undertaking other maintenance or building work.

Licensed asbestos assessor (licensed assessor)

The [draft] WHS Regulations require that a person must hold an asbestos assessor licence to conduct the following:

- air monitoring for removal work requiring a Class A licence (including where a clearance inspection is carried out for that work)
- clearance inspections for removal work requiring a Class A licence, and
- issuing clearance certificates in relation to work requiring a Class A licence.

If an exemption is granted by the relevant regulator, a competent person can carry out air monitoring in relation to Class A asbestos removal work. Further information on air monitoring is in **Chapter 6** of this Code.

To be qualified for an asbestos assessor licence (or a comparable competent person), the person must:

- be familiar with relevant asbestos industry practice, and
- hold:
 - a statement of attainment for the endorsed unit of competencies for an asbestos assessor, or
 - a tertiary qualification in occupational health and safety, industrial hygiene, science, building, construction or environmental management.

A licensed assessor can also carry out a number of other tasks including identifying asbestos, carrying out a risk assessment or reviewing an asbestos register.

Asbestos removal supervisors and workers

Removal licenses can only be held by a person conducting a business or undertaking. However, a worker, including an asbestos removal supervisor working for a licensed removalist must have completed the endorsed units of competency and have a statement of attainment for the class of removal prior to carrying out any removal work.

2.3 What is involved in managing risks associated with removing asbestos?

The WHS Act and [draft] WHS Regulations require that persons conducting a business or undertaking consult with workers, health and safety representatives (health and safety representatives) and others at the workplace to assist to manage work health and safety risks.

There are a number of specific duties in the [draft] WHS Regulations that require consultation with others throughout the removal process. Communicating and consulting with a range of people helps to increase the awareness of the potential health and safety risks of asbestos.

As an asbestos removalist, you must consult with persons that may be affected by the removal work as well as other responsible persons at the workplace to eliminate or minimise the exposure to the risks associated with asbestos, for example, site management or the project manager, workers, health and safety representatives, contractors, building occupants and others. This also includes speaking with neighbours and other businesses where the removal work is occurring at domestic premises.

As an example, a licensed removalist should consult with:

1. the person who commissioned the removal work to:

- obtain the asbestos register (if there is one)
- obtain the work specifications of the removal work
- provide an asbestos removal control plan
- ensure the site safety is managed
- inform the businesses and others (for example, neighbours) in the immediate vicinity of the workplace of the removal work
- engage a licensed assessor (if required)
- provide copies of previous clearance certificates applicable to the location of the removal work

2. the person with management or control at the workplace to:

- inform about the removal work if the asbestos is friable or more than 10m² of non-friable asbestos
- inform when the work is scheduled to commence

3. the asbestos removal supervisor (if you are not the same person) to:

- ensure the procedures for decontamination and management of the enclosures is understood
- ensure they know how to use and maintain tools, equipment and any PPE
- ensure they understand the procedures relating to waste management and removal

4. your workers and any other workers in the workplace to:

- advise who the asbestos removal supervisor is for the workplace
- provide a reminder of the health and safety risks and how to use the safety equipment
- ensure they understand their role and requirements of the asbestos removal control plan
- provide appropriate training
- ensure the workplace's emergency plan is understood

5. the licensed assessor to:

- ensure air monitoring of the removal area is being conducted, and

6. if the workplace is domestic premises, the occupier and owner of the premises and anyone in the immediate vicinity of the premises to:

- inform them about the removal work and commencement date.

Provision of information to job applicants

The [draft] WHS Regulations require a licensed removalist to give information on the health risks and effects associated with exposure to asbestos and the potential for medical examinations and health surveillance to people who are likely to be engaged to carry out removal work.

The information should include:

- how often and how long the removal activity will be carried out for
- the risk to health
- who is at risk
- the risk controls in place, and
- the need to undertake health surveillance.

2.4 Notifying the regulator of certain removal work

In addition to consultation requirements, the [draft] WHS Regulations require the licensed removalist to notify the regulator in writing of all proposed asbestos removal work, at least 5 days before commencing the removal of friable asbestos or more than 10m² of non-friable asbestos.

In limited circumstances, it may not be possible to provide 5 days notice and removal work may commence immediately. These circumstances include:

- a situation where there is a risk of exposure, for example, a sudden unexpected event, such as a burst pipe that was lagged with asbestos or a forklift crashing into an asbestos cement sheet wall, or
- an unexpected breakdown of an essential service such as gas, water, sewerage or telecommunications that requires immediate rectification.

If this is the case, the licensed removalist must give the regulator notice immediately by telephone and in writing within 24 hours.

The following information should be included in the notification:

<input checked="" type="checkbox"/>	Name, registered business name, Australian Business Number, licence number and business contact details of the licensed removalist.
<input checked="" type="checkbox"/>	Name and business contact details of the supervisor who will oversee the removal work.
<input checked="" type="checkbox"/>	Name of the licensed assessor or competent person engaged to undertake air monitoring and to issue the clearance certificate.
<input checked="" type="checkbox"/>	Client name and contact details.
<input checked="" type="checkbox"/>	Name, including registered business or corporate name, of the person with management or control of the workplace.
<input checked="" type="checkbox"/>	Address of the workplace, including the specific location if it is a large workplace.
<input checked="" type="checkbox"/>	Kind of workplace where the removal work will be performed (for example, whether it is an office building or construction site and the type of work that is carried out there, if any).
<input checked="" type="checkbox"/>	Date of notification.
<input checked="" type="checkbox"/>	The start date of the removal work and estimation of how long it will take.
<input checked="" type="checkbox"/>	Whether the asbestos to be removed is friable or non-friable.
<input checked="" type="checkbox"/>	The type of the asbestos (for example, AC sheeting, vinyl tiles, lagging, gaskets).
<input checked="" type="checkbox"/>	If the asbestos is friable – the way the removal area will be enclosed.
<input checked="" type="checkbox"/>	Estimated quantity of asbestos to be removed.
<input checked="" type="checkbox"/>	Number of workers who will perform the removal work and details of their competency to carry out removal work.

2.5 Training and competency responsibilities

The [draft] WHS Regulations require that a person conducting a business or undertaking at a workplace must ensure that workers engaged by the person who reasonably believes are going to be carrying out asbestos removal work or maintenance work are trained in the safe handling and identification of, and appropriate controls for, asbestos.

Information on training in the safe handling and identification of, and appropriate controls for, asbestos can be found in the *Code of Practice: How to Manage and Control Asbestos in the Workplace*.

Competency of workers carrying out removals that require a licence

The [draft] WHS Regulations require a licensed removalist to not direct or allow a worker to carry out removal work unless the removalist is satisfied the worker holds a statement of attainment for the endorsed unit of competency for asbestos removal relevant to the class of removal to be carried out by the worker.

The licensed removalist must provide appropriate training to a worker carrying out asbestos removal work at a workplace to ensure that the work is carried out in accordance with the asbestos removal control plan.

The licensed removalist must keep records of all training while the worker is carrying out the removal work and for a period of 5 years after the day the worker stopped carrying out the removal work for the asbestos removalist. The record must be accessible at the asbestos removal area.

A licensed removalist must confirm that workers, including the asbestos removal supervisor, hold a certification in relation to the specified unit of competency for the class of removal work to be carried out.

Registered training organisations conduct training and education for the certifications for the specific unit of competency for Class A - friable, Class B - non-friable and the removal supervisor unit. Class A competency based training also covers Class B removal work.

Additionally, all workers performing removal work that requires a licence must receive training, information and instruction to enable them to perform the work safely and without risk to health. All workers carrying out removal work including those that carry out work not requiring a licence, for instance, tradespersons who need to remove 10m² or less of non-friable asbestos when they encounter it when carrying out their work, must be trained in the identification and safe handling of, and appropriate controls for, asbestos.

A licensed removalist must provide workers with job-specific training before the commencement of each removal job. The training should include:

- the nature of the hazards and risks
- how asbestos can affect a person's health
- the risk from exposure to airborne asbestos fibres
- the controls in place and maintenance of the control plan for that job
- what methods and equipment will do the job properly
- how to choose, use and care for PPE
- decontamination of persons, equipment and the removal work area
- waste disposal procedures
- emergency procedures
- the necessity of wearing PPE and respiratory protective equipment (RPE), and
- any other regulatory requirements (for example, contaminated site and disposal of waste).

In addition to this, workers carrying out removal work may need to hold other licences, for example, demolition licences. If this is the case, they would need additional training to cover this type of work.

2.6 Health surveillance responsibilities

The [draft] WHS Regulations require persons conducting a business or undertaking to ensure health surveillance is provided to a worker if

- the worker is carrying out licensed asbestos removal work, or
- if the worker is determined to have been in the area of the workplace where the exposure standard was likely to have been exceeded and the worker was carrying out other removal work or carrying out maintenance work.

Health surveillance must occur prior to a worker who is undertaking removal work that requires a licence, and should occur every two years whilst the removal work is being carried out and when the worker ceases work. Workers should be told that health surveillance is necessary to ensure their ongoing health. Health surveillance must be paid for by the person conducting a business or undertaking.

The *Guidelines for Health Surveillance* [NOHSC: 7039 (1995)] provides additional information on health surveillance.

Who can carry out health surveillance?

Health surveillance must be performed by a medical practitioner who has completed the relevant competencies for health surveillance. The worker should be consulted prior to selecting the medical practitioner to supervise the health surveillance.

Health surveillance must take into consideration the worker's demographic, medical and occupational history, records of personal exposure and a physical examination. The medical examination should be performed in accordance with the *Guidelines for Health Surveillance* [NOHSC: 7039 (1995)].

Summary of results

A summary report must be obtained from the medical practitioner who supervised the health surveillance as soon as possible after the surveillance is carried out and a copy is provided to the worker as soon as reasonably practicable. The summary must include:

- any advice indicating a disease or adverse health effect
- any recommendations about the remedial measures the worker should take or whether the person is fit or not fit to continue the work which requires health surveillance (i.e. removal work or work involving the maintenance of asbestos), and
- whether any medical counselling is required in relation to work-related health risks.

Advising the relevant regulator of results

If a recommendation is provided in the health surveillance results, the person conducting the business or undertaking must ensure:

- a copy of the results is given to the relevant regulator as soon as practicable, and
- risk assessment and control measures are reviewed and, if necessary, revised.

Keeping records

All health surveillance results must be kept as confidential records and kept at the workplace for at least 40 years for each worker. The details of the record must not be disclosed to any person other than the worker unless that worker has provided their written consent or they are being disclosed to a person under a duty of professional confidentiality.

If the worker stops working for the person conducting a business or undertaking, the health surveillance results relating to the worker must be given to them. Similarly, if the person stops conducting the business or undertaking, they must ensure the results of any health surveillance are provided to the worker.

3. PLANNING FOR THE REMOVAL OF ASBESTOS

Removal work must be properly planned to ensure the right equipment, procedures, information and training are provided to facilitate safe and legal removal work. Planning can differ greatly, depending on the specific removal task, the type, location, quantity and condition of the asbestos to be removed, whether there are workers or other persons nearby and many other factors.

3.1 Planning prior to commencement of the removal

Planning for removal work begins when asbestos is first identified as being present (or presumed to be present) at the workplace and a decision is made to remove the asbestos. This decision is based on a risk assessment of the identified asbestos. The *Code of Practice: How to Manage and Control Asbestos in the Workplace* provides information on how to identify asbestos, conduct a risk assessment and develop an asbestos management plan (including an asbestos register).

Prior to commencing the removal work, an asbestos removalist must determine the extent and specifications of the work required to be undertaken. This information will help you to determine a safe method of removal, whether the removal requires a licence and any additional procedures that may need to be put into place including for waste removal, decontamination and arrangements for clearance inspections once the removal work is completed.

Planning for all types of removal work

Regardless of the type of removal work, an asbestos removalist should:

<input checked="" type="checkbox"/>	Consult with the person who commissioned the removal work and advise them of the commencement date.
<input checked="" type="checkbox"/>	Obtain a copy of the asbestos register (if one is available).
<input checked="" type="checkbox"/>	Obtain information on specifications of the removal, for example: <ul style="list-style-type: none">• details of materials to be left in place• dimensions of the surface or fitting (adequate drawings would suffice)• types of fittings and supports and whether removal and disposal of these items is part of the work specifications, and• location for the storage and disposal of waste.
<input checked="" type="checkbox"/>	Obtain information on the location of the asbestos, for example: <ul style="list-style-type: none">• whether the removal work will take place indoors or outdoors but protected or outdoors and exposed to weather• whether the removal work is enclosed in ducts (air conditioning or heater boxes) or trenches• unusual site conditions or access (work at heights) which would affect the selection of removal method• inaccessible areas that could contain asbestos (ceilings, wall cavities) or areas not assessed which could contain asbestos. These areas may require a further risk assessment and reassessment of the safe work procedures for dealing with unknown or unexpected asbestos found during the removal work, and• information on the adjacent properties which may impact on the removal work.
<input checked="" type="checkbox"/>	Conduct a risk assessment, taking into account: <ul style="list-style-type: none">• the type of asbestos or asbestos product, such as whether it contains amosite or crocidolite which are particularly hazardous to handle• the condition of the asbestos (sprayed coating and lagging are more friable, loose and crumbly than others) and whether loose material or dust is present• the type of work required (removal, encapsulation/sealing)• the types of tools and equipment to be used

	<ul style="list-style-type: none"> • the quantity of the asbestos in the workplace (more than 10m²) • the time the removal work will take • the impact of weather conditions on the removal job • what the most effective control measures will be in reducing the spread of dust and concentrations of respirable asbestos fibres, and • past experience and knowledge of the type of removal job.
<input checked="" type="checkbox"/>	<p>Identify other associated hazards, for example:</p> <ul style="list-style-type: none"> • normal working temperatures for the plant and ambient temperature within the asbestos removal area • details of residual heat in pipes, boilers, or refinery equipment to prevent burns • locations of electrical cables, switches and panels • brittle roofs and working at heights • site occupancy restrictions and conditions including access or egress, and • any issues with work schedules.
<input checked="" type="checkbox"/>	Ensure the proposed asbestos removal area and its surrounds will be unoccupied for the duration of the removal.
<input checked="" type="checkbox"/>	Prepare signs and barricades for the asbestos removal work area and site.
<input checked="" type="checkbox"/>	Establish a location for personal decontamination.
<input checked="" type="checkbox"/>	The first aid kit and first aid officer location and sufficient suitable fire extinguishers and hoses should be available at strategic locations.

Additional planning for removal work requiring a licence

In addition to the requirements outlined above, the licensed removalist should:

<input checked="" type="checkbox"/>	Provide the removalist licence to the person who commissioned the removal work.
<input checked="" type="checkbox"/>	<p>Provide notification and documentation about the removal work to:</p> <ul style="list-style-type: none"> • the regulator, and • provide a copy to the person who commissioned the removal work.
<input checked="" type="checkbox"/>	Ensure that they have inspected the certification for the endorsed units of competency for all workers, including the asbestos removal supervisor.
<input checked="" type="checkbox"/>	Advise all workers of their asbestos removal supervisor. Must also ensure the supervisor is available (for Class B) or on-site (for Class A) when work is being carried out depending on the class of asbestos is being removed.
<input checked="" type="checkbox"/>	Provide all workers with the information, instruction, training related to the site (on-site training) and the procedures to be followed. Ensure training documentation is kept at the removal site.
<input checked="" type="checkbox"/>	Ensure health surveillance is conducted.
<input checked="" type="checkbox"/>	Complete an asbestos removal control plan and convey this to all workers.
<input checked="" type="checkbox"/>	Complete a safe work method statement (if required by the WHS Regulations).
<input checked="" type="checkbox"/>	Ensure a licensed assessor (for Class A) or competent person (for Class B) is engaged for any air monitoring required and clearance inspection.
<input checked="" type="checkbox"/>	Establish emergency plans for prompt evacuation (such as for fire) and elevated airborne fibre detection.
<input checked="" type="checkbox"/>	Establish the type of decontamination facilities required, for example, units or remote.
<input checked="" type="checkbox"/>	If Class A removal work, establish the type of enclosure, for example, large or small, required for the removal and for Class B removal work if choosing to use an enclosure.

3.2 Identifying other hazards

As mentioned in the above checklist, an asbestos removalist needs to consider not only the direct hazards that are associated with the removal work but also those hazards related to the work activity and the work environment (for example, demolition or construction).

Confined spaces

Removing asbestos in a confined space should only be undertaken where it is not possible to avoid doing work in that space. A safe system of work should be developed for inclusion in the management plan or removal control plan.

Friable asbestos removal requires the use of enclosures which are designed to eliminate or minimise the release of airborne asbestos fibres spreading from the removal work area. Depending on the conditions inside the enclosure, an asbestos enclosure may also become a confined space.

Further information is available in the *Code of Practice: Confined Spaces* and the *AS 2865 Safe working in a confined space* sets out the requirements and procedures for the safety of persons entering and working in a confined space.

Working at height

Working at heights should not be undertaken if the task can be performed on the ground. If removal work must be undertaken at height then the [draft] WHS Regulations applies. Further information is available in the *Code of Practice: Fall Hazards*.

Heat stress

Heat related hazards are created from working in enclosures or confined spaces or using PPE. You should consider the factors that can lead to heat stress including temperature, humidity, air movement, exposure to a heat source, work activities and demands, how long the PPE must be worn, and individual physical factors.

Control measures include:

- selection of appropriate PPE fitted to reduce the build-up of heat
- adequate number of extraction units in enclosures
- cool cotton underclothing
- scheduling appropriate work breaks
- job rotation
- cool drinks readily available
- providing a cool, shaded rest area, and
- educating workers about heat stress risks and controls.

Further information is available in ISO 7933:2004 *Ergonomics of the thermal environment- analytical determination and interpretation of heat stress using calculation of the predicted heat strain* and ISO 7243: 1989 *Hot environments – estimation of the heat stress on working man, based on the WBGT-index (wet bulb globe temperature)*.

Electrical equipment

You should consider the risk of electrical injury when undertaking removal work. You must locate the electrical outlets and ensure that the risk associated with electrical equipment is controlled. You should follow the procedures set out below:

- De-energisation and removal from the removal work area. If the electrical equipment cannot be disconnected and removed they must be de-energised. The de-energised equipment must be secured so it cannot be inadvertently re-energised.

- Any electrical cabling or equipment remaining in the asbestos removal area must be labelled and protected from mechanical damage or the ingress of water, and in accordance with *AS/NZ3000:2000 Wiring rules*.
- A licensed electrician must safely remove and reinstall electrical cables and equipment.
- For electrical equipment such as fire detectors, smoke detectors and thermal detectors, only a person able to remove and isolate the circuits and heads as required prior to asbestos removal should be engaged to do that.
- Upon completion of the removal work, a person should replace, reactivate and test the system, prepare a certificate stating that the heads are operational and forward to the asbestos removalist.

All portable electrical tools and equipment, including flexible leads and any electrical installations utilised by workers during asbestos removal should comply with *AS/NZS 3012:2003 Electrical installations – construction and demolition sites*.

3.3 The asbestos removal control plan

The [draft] WHS Regulations requires that a licensed removalist must develop an asbestos removal control plan for any asbestos removal work the removalist is commissioned to undertake.

The licensed removalist must provide a copy of the asbestos removal control plan to the person who commissioned the asbestos removal work and ensure a copy is readily available.

As indicated in the above checklists, when the removal work can only be carried out by a licensed removalist, an asbestos removal control plan must be developed. The purpose of an asbestos removal control plan is to ensure the removal is well organised and carried out in a safe manner. It provides the detail of how the removal will occur and outlines the method to be used and the tools and equipment including the PPE to be used.

Although an asbestos removal control plan is only required to be developed for licensed removal work, one may be developed for other removal work to ensure that risks associated with the asbestos removal are managed.

Contents of an asbestos removal control plan

The plan should include specifications and/or drawings which are relevant to the particular removal job and finalised in consultation with the person who commissioned the removal work. **Table 1** provides further detail of what to include on an asbestos removal control plan:

Table 1 – Information to be included in the asbestos removal control plan

		Building and structures		Plant and equipment	
		Friable	Non-Friable	Friable	Non-Friable
Notification					
A	Notification requirements have been met and required documentation will be on site (e.g. removal licence, control plan, training records)	Yes	Yes	Yes	Yes
Identification					
B	Details of asbestos to be removed (e.g. the locations, whether asbestos is friable/non-friable, its type, condition and quantity being removed).	Yes	Yes	Yes	Yes
Preparation					
C	Consult with relevant parties (health and safety representative; workers; person who commissioned the removal work, licensed assessors)	Yes	Yes	Yes	Yes

The information to be included in the asbestos removal control plan		Building and structures		Plant and equipment	
		Friable	Non-Friable	Friable	Non-Friable
D	Assigned responsibilities for the removal	Yes	Yes	Yes	Yes
E	Program commencement and completion dates	Yes	Yes	Yes	Yes
F	Emergency plans	Yes	Yes	Yes	Yes
G	Asbestos removal boundaries, including the type and extent of isolation required and the location of any signs and barriers	Yes	Yes	Yes	Yes
H	Control of other hazards including electrical and lighting installations	Yes	Yes	Yes	Yes
I	PPE to be used including RPE	Yes	Yes	Yes	Yes
Removal					
J	Details of air-monitoring program Control and clearance	Yes	No	Yes	No
K	Waste storage and disposal program	Yes	Yes	Yes	Yes
L	Method for removing the asbestos (wet and dry methods)	Yes	Yes	Yes	Yes
M	Asbestos removal equipment (e.g. spray equipment, asbestos vacuum cleaners, cutting tools).	Yes	Yes	Yes	Yes
N	Details of required enclosures, including their size, shape, structure etc, smoke testing enclosures and the location of negative pressure exhaust units.	Yes	No	Yes	No
O	Details on temporary buildings required by the asbestos removalist (e.g. decontamination units) including details on water, lighting and power requirements, negative pressure exhaust units and the locations of decontamination units.	Yes	May be required depending on the job	Yes	May be required depending on the job
P	Other risk control measures to prevent the release of airborne asbestos fibres from the area where asbestos removal is undertaken	Yes	Yes	Yes	Yes
Decontamination					
Q	Detailed procedures for workplace decontamination, the decontamination of tools and equipment, personal decontamination and the decontamination of non-disposable PPE and RPE.	Yes	Yes	Yes	Yes
Waste Disposal					
R	Method of disposing of asbestos wastes, including details on: The disposal of protective clothing	Yes	Yes	Yes	Yes
S	The structures used to enclose the removal area	Yes	No	Yes	Yes
Clearance and air monitoring					
T	Name of the licensed assessor engaged to conduct asbestos air monitoring (if any)	Yes	No	Yes	No
Consultation					
U	Consult with any people who may be affected by the removal work, including neighbours	Yes	Yes	Yes	Yes

Finalising the asbestos removal control plan

When preparing the asbestos removal control plan, the licensed removalist should be consulting with the person who commissioned the work, the person with management or control of the workplace (if not the same person), the workers and their health and safety representatives to finalise the plan and also to advise when removal work will commence.

For the same reasons, if licensed removal is being carried out at domestic premises, the licensed removalist should consult with the person who commissioned the removal work, the owner or the occupier (if not the same person).

Once the asbestos removal control plan is developed, a copy must be:

- provided to the person who commissioned the removal work, and
- readily accessible on-site for the duration of the removal work to:
 - the person conducting a business or undertaking at the workplace
 - workers and their health and safety representatives
 - the relevant regulator, and
 - the occupants of the premises (if domestic premises).

When developing the asbestos removal control plan, preparing a checklist similar to that of **Table 2** will assist you to implement all that you have planned for.

Table 2 – Example of an Asbestos Removal Site Checklist

ASBESTOS REMOVAL SITE CHECKLIST			
Site address:			
Name of client:			
Step no.		Checked by	Date checked
1	Barriers and signs erected		
2	Areas pre-cleaned (in/out of enclosure area)		
3	Enclosure inspection:		
	• Sealing checked – smoke test and visual		
	• Scaffold suitable – access/railing/kickboards		
	• Planks and scaffold fittings covered with plastic		
	• Walkways covered with plastic		
	• Emergency exits established and identified		
	• Fire extinguishers appropriately placed		
	• Enclosure drainage connected and filtered		
	• Bag disposal area/enclosure inspected		
	• Asbestos disposal bags in enclosure/area		
	• Bag ties/tools in enclosure/area		
	• Leak proof metal storage containers provided		
	• Electric equipment or cabling protected against water		
	• Air handling systems isolated and sealed off		
	• Negative air units functioning correctly, pressure drop appropriate		
4	Decontamination unit inspection:		
	• Hot and cold water connected and operating		
	• Change room/decontamination lighting operating		
	• Decontamination drainage system checked		
	• Contaminated clothes container provided		
5	Change Room:		
	• Clothing lockers provided		
	• Protective clothing and spares in change room		
	• Safety gumboots available		
	• Towels/soap/shampoo/nail cleaners in the change room		
	• Respirator storage and cleaning facilities provided		
6	All personnel trained in use and maintenance of PPE and emergency procedures		
7	Air monitoring in place		
8	Asbestos waste facilities available		
9	Vehicle available for waste transport		
10	Documentation required to be onsite:		
	• Training records		
	• Asbestos removal control plan		
	• Asbestos removal licence		
	• Copy of this Code		
Name of Supervisor		Date checked	

4. PREPARING FOR THE REMOVAL OF ASBESTOS

Once the asbestos removalist has planned the removal, the next step is to prepare the removal site by:

- isolating the area if licensed removal work is to be carried out
- ensure signs and barricades are used appropriately to alert persons about the presence of asbestos
- limiting access to only authorised persons if licensed removal is to be carried out
- providing adequate notice to the relevant regulator and the person with management and control of the workplace
- selecting and providing appropriate tools and equipment that will be used, and
- providing PPE and RPE to eliminate or minimise the exposure to airborne asbestos fibres.

4.1 Isolating the removal work area

For licensed removal work, the removal area must be isolated from surrounding areas. Plastic sheeting should be used to prevent the contamination of adjacent areas.

For removal work requiring a licence, the two asbestos removal boundaries are:

- removal work area – the immediate area where asbestos removal is carried out, and
- removal work site – the region surrounding, and adjacent to, the removal work area.

In determining the asbestos removal boundaries, consideration should be given to:

- the use and suitability of various types of enclosures and removal methods, and
- the impact of the removal work, including potential exposures, in the surrounding region.

All adjacent areas with the potential for contamination should be isolated to prevent persons accessing the area who are not directly associated with the removal work. This may mean isolating floors if the building is multi-storey.

4.2 Limiting access to the removal work area

The [draft] WHS Regulations require that access to the removal work area is limited if licensed removal work is being carried out.

The person who commissioned the removal work and the person with management or control of a workplace (if not the same person) and is aware that removal work is being carried out by a licensed removalist, must ensure that access to the removal area is limited to the following people, subject to any direction given by the licensed removalist:

- workers who are engaged to carry out the removal work
- other people who are associated with the removal work, and
- people who are allowed under the [draft] WHS Regulations or another law to be in the removal area (for example, inspector, emergency service workers).

Reliance on signs, barricades and labels alone to deny unauthorised access to the removal area is not sufficient. A combination of these may be necessary depending on the removal job, for example, preference may be given to fencing or locking access doors where it does not create an evacuation hazard. All people who have access to the removal area must comply with any direction given by a licensed removalist.

4.3 Display warning signs, barricades and labels

The [draft] WHS Regulations require that a person carrying out asbestos removal work ensures that signs alerting people about the presence of asbestos are placed to indicate where the asbestos removal work is being carried out and barricades are erected to delineate the asbestos area.

The asbestos removalist must use signs and barricades to clearly indicate the area where the removal work is being performed. Signs must be placed in positions so that people are aware of the removal work area and should remain in place until its completion and until clearance to re-occupy has been granted. Responsibilities for the security and safety of the asbestos removal site and removal work area should be specified in the asbestos removal control plan. This includes inaccessible areas that are likely to contain asbestos.

Warning signs

Warning signs must be placed so they inform all people nearby that removal work is taking place in the area. Signs should be placed at all of the main entry points to the removal work area where asbestos is present. For example, if floor tiles have been identified as containing asbestos, an appropriate warning sign, displayed on an adjacent wall, might read, '*Warning: Floor tiles contain asbestos*'.

These signs should be weatherproof, constructed of light-weight material and adequately secured so they remain in prominent locations. The signs should be in accordance with *AS 1319-1994 Safety signs for the occupational environment* for size, illumination, location and maintenance.

An example of an asbestos building sign is included below.

Barricades

The purpose of barricades is to delineate and isolate the removal area with appropriately placed durable signs and barricades using methods which may include temporary fencing, bollards, tape, rope or plastic sheeting. The use of barricades assists with traffic control and prevents access to the removal site and removal work area.

Barricades can take various forms, from tape to solid hoarding. The type of barricading needs to reflect the level of risk. For friable removal work, solid barricades need to be used. Tape may be appropriate for non-friable removal work of short duration.

The location of barricades will depend on the physical environment and the level of risk. An assessment of the removal work site should determine the appropriate placement of barricades.

For example, a non-friable asbestos cement removal job where the asbestos cement is in good condition may use a wall located three metres from the removal area as the barrier. A friable sprayed asbestos removal job being performed dry due to electrical restrictions may require a barricade 15 metres from the removal area.

In determining the distance between barriers and the asbestos removal area, you should consider:

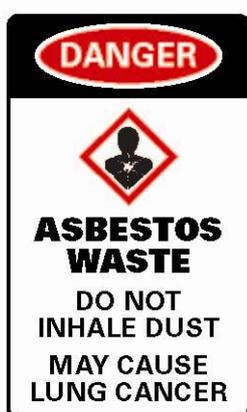
- whether the asbestos is friable or non-friable
- activity around the asbestos removal area (for example, other workers, visitors, neighbours, the public) to determine the risk of exposure to other people
- the methods of asbestos removal
- any existing barriers (walls, doors)
- the quantity of asbestos to be removed, and
- the type of barrier used (for example, hoarding or tape).

Labels for waste containers and drums

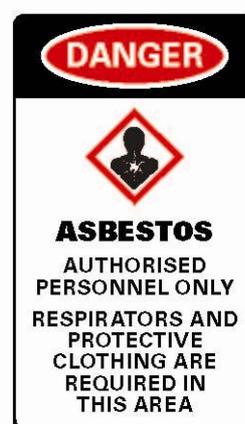
All containers containing a hazardous chemical such as asbestos must conform to the labelling elements of the Globally Harmonized System of Classification and Labelling of chemicals (GHS) 3rd edition Annex 1 Allocation of Label Elements signal word, pictogram hazard statement and precautionary statements.

The waste drums or bins should be lined with plastic (minimum 200 µm thickness), and labels warning of the asbestos waste should be placed on the top and side of each drum or bin, with the words, '*Danger: Asbestos Do not break seal*' or a similar warning.

An example of an asbestos waste bag label is included below.



Label 1: Sample asbestos waste bag



Sign 1: Sample asbestos building sign

4.4 Selecting the right tools and equipment

The [draft] WHS Regulations require a person conducting a business or undertaking must never use or direct or allow a worker to use a high pressure water spray or compressed air on asbestos.

A person conducting a business or undertaking must not use or direct or allow a worker to use any of the following equipment on asbestos unless the use of the equipment is controlled:

- power tools
- broom, and
- another implement that causes the release of airborne asbestos into the atmosphere.

The use of the equipment is considered to be controlled if, during use:

- the equipment is enclosed
- the equipment is designed to capture or suppress asbestos fibres, or
- the equipment is used in a way that is designed to capture or suppress asbestos fibres safely.

In addition to any equipment required to complete a particular task the following equipment may be required on-site before the work begins:

- disposable cleaning rags
- bucket of water and/or a misting spray bottle
- sealant
- suitable asbestos waste container, and
- warning signs and/or barrier tape.

Prohibited tools and equipment

Tools and equipment that generate dust must not be used on asbestos. These include:

- high speed abrasive power and pneumatic tools such as angle grinders, sanders, saws and high speed drills
- brooms and brushes (except where the brush is used for sealing and the sealing has been approved by the relevant regulator for friable asbestos)
- high pressure water spray, jets, power or similar tools and instruments on asbestos in the workplace, and
- compressed air.

The use of tools and equipment that cause the release of asbestos fibres including power tools and brooms, may be used on asbestos if the equipment is enclosed and/or designed to capture or suppress asbestos fibres and/or the equipment is used in a way that is designed to capture or suppress asbestos fibres safely, for example:

- enclosing the tool or instrument
- engineering controls such as extraction ventilation, or
- using the tools and instruments within an enclosed removal area (for example, full enclosure or small enclosure).

What tools can be used?

Tools and equipment which can be used during removal work include asbestos vacuum cleaners, manually operated hand tools and equipment, other than compressed air or high pressure water spray, that have been designed to capture or suppress respirable dust or are used in a way that is designed to capture or suppress respirable dust.

Asbestos vacuum cleaners

Asbestos vacuum cleaners can only be used for collecting small pieces of asbestos dust and debris. Larger pieces should be picked up and placed in suitable waste containers and should never be broken into smaller sizes for vacuuming.

Asbestos vacuum cleaners should comply with the Class H requirements in Australian Standard *AS/NZS 60335.2.69 Industrial vacuum cleaners* or its equivalent. Household vacuum cleaners must never be used where asbestos is or may be present, even if they have a high efficiency particulate air) HEPA filter.

Filters for these vacuum cleaners should conform to the requirements of *AS 4260-1997 High efficiency particulate air (HEPA) filters – Classification, construction and performance* or its equivalent.

The asbestos removalist should ensure that procedures are established for the general maintenance, including emptying, of asbestos vacuum cleaners in a controlled environment.

They should be cleaned externally with a wet cloth after each task, the hose and attachments should be stored in a labelled impervious bag and a cap should be placed over the opening to the asbestos vacuum cleaner when the attachments are removed.

PPE should be worn whenever an asbestos vacuum cleaner is opened to change the bag or filter or to perform other maintenance.

The emptying of asbestos vacuum cleaners can be hazardous if the correct procedures are not followed. Asbestos vacuum cleaners should only be emptied by a competent person with the correct PPE, in a controlled environment and in compliance with the manufacturer's instructions.

Whenever possible, asbestos vacuum cleaners should not be hired, as they can be difficult to fully decontaminate.

Hiring may be more viable in some instances if they are completely decontaminated, such as when a one-off maintenance task is required for asbestos. Asbestos vacuum cleaners should be hired only from organisations that provide vacuum cleaners specifically for work involving asbestos and the asbestos vacuum cleaner has been previously decontaminated. If hired, the asbestos vacuum cleaner should be decontaminated before it is returned.

Alternatively, the hire organisation may undertake the decontamination and maintenance of the filters and bags of the asbestos vacuum cleaner itself. In these cases, the asbestos vacuum cleaner should be hired out in a sealed storage container, with instructions that it may be removed from the container only when it is inside the removal work area and users are wearing appropriate PPE. When the minor maintenance work is completed the asbestos vacuum cleaner should be re-sealed in the storage container provided, and the sealed storage container should then be decontaminated, by wet wiping, before it is removed from the removal work area and returned to the hire organisation for decontamination and maintenance.

Organisations that hire out asbestos vacuum cleaners should ensure all their asbestos vacuum cleaners are decontaminated, maintained in good working order and the hirers are competent in their safe use.

At the completion of the removal work, the tools and equipment must be decontaminated, placed in sealed, labelled containers and disposed of as asbestos waste. The asbestos vacuum cleaner and attachments must be decontaminated and the bag and filter removed in accordance with the manufacturer's instructions and disposed of as asbestos waste.

Spray equipment

Spray equipment includes wet sprays with water mist or wetting solution. A constant low-pressure water supply is required for wetting down asbestos and related items to suppress airborne asbestos fibres.

Wet spray can be achieved with a mains-supplied garden hose fitted with a pistol grip. If no water supply is readily available, a portable pressurised vessel (such as a pump-up garden sprayer) may be used. For very small areas, a small spray water bottle may be sufficient. In all cases, the use of water needs to be in the form of a mist to minimise the potential to generate airborne dust.

4.5 Selecting and providing personal protective equipment

An asbestos removalist must provide all workers with PPE that is suitable for removal work. Workers must also use the PPE given to them by the asbestos removalists. PPE must be worn at all times during the work in the removal area. PPE includes clothing, for example, coveralls, gloves and safety footwear, as well as RPE. The appropriate PPE can be determined by conducting a risk assessment.

Personal protective clothing should be made from materials which provide protection against fibre penetration and not from wool or other materials that attract fibrous dusts.

All equipment used for the removal of asbestos should be inspected before the commencement of the removal work, after any repairs and at least once every 7 days when it is continually being used. A register with the details of these inspections, the state of the equipment and any repair details should be maintained.

At the end of the removal work and upon leaving the asbestos removal work area, all PPE must be disposed of as asbestos waste or decontaminated and stored in sealed double bags before being removed from the asbestos removal site to be laundered by a laundry with facilities for laundering asbestos-contaminated materials. PPE should be thoroughly wet before being placed in bags.

Coveralls

Disposable coveralls should be provided wherever reasonably practicable and should be:

- of a suitable standard to prevent tearing or penetration of asbestos fibres as far as practicable. Disposable coveralls rated type 5, category 3 (prEN ISO 13982–1) or equivalent would meet this standard
- one size too big as this will help prevent ripping at the seams
- fitted with hood and cuffs and ensure that:
 - if cuffs are loose, they are sealed with tape
 - coverall legs are worn over footwear as tucking them in lets the dust in, and
 - the fitted hood is worn over the respirator straps.

Coveralls should:

- not be made of material which is easily torn or have external pockets or velcro fastenings because these are easily contaminated and difficult to decontaminate
- never be taken home
- never be re-used, and
- be disposed of as asbestos waste after a single use.

If it is not reasonably practicable to provide coveralls that can be disposed of after a single use, the coveralls may be laundered at a commercial laundry equipped to launder asbestos-contaminated clothing, by prior arrangement. The coveralls must be sealed in a decontaminated container before they are removed from the removal work area. However, laundering of asbestos-contaminated protective clothing is not recommended because decontamination cannot be guaranteed. It is recommended that such re-usable coveralls should only be used in limited instances, for example, in emergency services where the coveralls must be inflammable to protect against fire hazards and continual disposal and replacement is not practicable.

In some cases (particularly dusty jobs), double coveralls should be used with the outer coverall being removed a predetermined distance from the final decontamination area. Disposable coveralls should be wrapped in a double layer of plastic before disposal as asbestos contaminated waste after the removal task is completed.

Gloves

If significant quantities of asbestos fibres may be present, single-use disposable gloves should be worn. If latex gloves must be used, low protein (powder free) gloves should be used. If latex gloves are not available, disposable nitrile gloves can be used as an alternative.

Gloves used for removal work should be disposed of as asbestos waste and the workers should clean their hands and fingernails thoroughly whenever leaving the removal work area. However, as with coveralls, if it is not reasonably practicable to use disposable gloves, they may be laundered appropriately in limited circumstances.

Footwear

Safety footwear (for example, steel-capped, rubber-soled work shoes or gumboots) should be provided for all workers removing asbestos. Footwear should be laceless, as laces and eyelets can be contaminated and are difficult to clean. It should remain inside the barricaded area or dirty decontamination area for the duration of the removal work and should not be shared for hygiene reasons. Disposable overshoes should be avoided as they collect dust and are a slipping risk.

When safety footwear is not in use, it should be stored upside down to minimise asbestos-contamination inside the footwear. Storage facilities should be provided to allow for storage of the shoes. At the end of the removal work and each time the worker leaves the removal work area, safety footwear must be:

- decontaminated
- sealed in double bags for use on the next asbestos removal site (but not for any other type of work), or
- disposed as asbestos waste.

Respiratory protective equipment (RPE)

All workers engaged in removal work must wear RPE conforming to the requirements of AS/NZS 1716:2003 *Respiratory Protective Devices* or its equivalent.

The level of respiratory protection and supplied air respirators should be determined by a competent person. The selection of suitable RPE depends on the nature of the removal work, the probable maximum concentrations of asbestos fibres expected and any personal characteristics of the wearer that may affect the facial fit of the respirator (for example, facial hair and glasses).

Disposable RPE is not preferred, however if selected, it should be stored in a suitable and clean location before use and disposed of after a single use.

A competent person may change the level of RPE at any stage during the removal process following an assessment of the asbestos fibre levels experienced inside the removal work area, for example, this may occur during the final clean-up after the removal of friable asbestos when the use of air-lines is no longer considered necessary.

If a medical condition precludes the use of negative pressure respirators, workers should be provided with a continuous flow, positive pressure respirator wherever possible.

At every removal job, the workers should be reinstructed in the necessity to wear RPE correctly to guard against complacency.

A fit test should be performed to ensure the RPE fits the individual and provides a good face seal between the worker's skin and the face piece. Fit tests should be repeated when changing from different models of RPE or a different sized face piece.

Appendix A provides more information on selecting suitable RPE and fit tests.

Using and maintaining RPE

RPE must be worn at all times in the removal area and until the appropriate stage of personal decontamination.

Licensed removalists or asbestos removal supervisors must ensure all workers undertaking any removal work receive instruction and training in:

- fit testing/checking
- the importance of a correct facial fit
- the correct method of using their respirators

- the procedures for regular cleaning, inspection and maintenance of respirators before use, and
- when to stop removal work and leave the area if they think their RPE is not working properly.

The respirator must be worn in accordance with the manufacturer's instructions and the coverall hood must go over the respirator straps. It should be examined in accordance with the manufacturer's instructions before use to ensure that it is not damaged and is in good working order. Respirator defects should be reported immediately to the asbestos removal supervisor. The pre-use examination should include an inspection of:

- the condition of the straps and face piece including the seal and the nose piece
- the condition of the exhalation valve, and
- a fit check.

Non-disposable respirators should be cleaned and stored in a safe place away from the contaminated removal area.

The length of time a particulate filter can be used for the removal work depends on the resistance to breathing and damage to the filter. The filter should be replaced if damaged or when resistance increases. A damaged filter must be replaced before resistance begins to increase. The replacement should be according to the manufacturer's instructions.

Certain brands of filters may not be usable after being exposed to certain conditions such as a full decontamination shower. Specific advice should be sought from the supplier regarding the effectiveness of a filter after being subjected to certain conditions.

All parts, including filters, valves and seals, should be inspected before and after each use. Respirator defects should be reported immediately to the supervisor for repair or replacement. A system of regular cleaning, inspection and maintenance of non-disposable respirators should be in place to ensure they are clean and in a safe working condition.

Records of all respirator issues, uses and maintenance should be kept up-to-date.

At the end of a shift or at a break, as part of the decontamination process, ensure the respirator is taken off last.

Air-line respirators

Air-line respirators are used when the asbestos being removed is friable. When in use, the air-line should incorporate a belt mounted back-up filter. If a failure of the air supply system occurs, workers should leave the removal work area using normal decontamination procedures and the use of a back up belt mounted filter device allows for adequate respiratory protections during this process.

If the number of workers wearing air-line respirators inside an enclosure is likely to result in the tangling of air lines, manifolds should be provided to reduce this tangling and assist workers in moving around the enclosure.

The capacity of the compressor should be adequate for the number of air-lines, and the location of the compressor's air intake should be assessed to ensure appropriate air quality and avoid contamination. Air from a compressor must be filtered before supply to a respirator.

4.6 Decontamination procedures

The [draft] WHS Regulations require that an asbestos removalist must ensure decontamination facilities are available for the removal work area, any plant used in the removal area and workers carrying out the removal work.

Decontamination for the work area, workers, PPE and tools used in removal work is an important process in eliminating or minimising exposure to airborne asbestos fibres, particularly to persons outside the asbestos removal work area.

The measures adopted should be based on a risk assessment where the risks of each individual asbestos removal job are assessed to determine the appropriate decontamination procedure.

Decontamination of the removal work area

There are two types of decontamination processes:

- **wet decontamination**, or **wet wiping**, involves the use of damp rags to wipe down contaminated areas. Cleaning rags should only be used once, although they may be refolded to expose a clean surface. The rags should be used flat and should not be wadded. If a bucket of water is used, the rags should not be re-wetted in the bucket, as this will contaminate the water. Care should be taken to avoid any potential electrical hazards when using this procedure, and
- **dry decontamination** involves carefully rolling or folding up and sealing plastic sheeting and/or vacuuming the removal area with an asbestos vacuum cleaner. Dry decontamination should only be used where the wet method is not suitable or poses a risk because of other hazards such as electricity or slipping.

Contaminated items, tools, equipment and clothing must not be removed from the removal work area unless they have been decontaminated or contained.

If an item is not able to be decontaminated, or is not suitable for decontamination, it should be placed in a sealed container and disposed of in accordance with the [draft] WHS Regulations. The sealed container must be decontaminated before it is removed from the removal work area.

If removal work involves friable asbestos, the decontamination procedures should include decontamination units. Glove bag and wrap and cut methods are exceptions where personal decontamination procedures are likely to be satisfactory and units are not necessary. Mini enclosure removals may require a combination of personal decontamination and decontamination units.

Decontamination of tools

All tools used during removal work should be dismantled (where appropriate) and decontaminated, using either the wet or dry decontamination procedures described above, before they are removed from the removal work area. The method chosen will depend on its practicality, the level of contamination and the presence of any electrical hazards.

If tools cannot be decontaminated in the removal work area, or are to be reused at another removal work area, they should be:

- tagged to indicate asbestos contamination, and
- double bagged in asbestos labelled bags before removing from the removal work area.

The bags containing the tools must remain sealed until decontamination or the commencement of the next asbestos maintenance or service task where the equipment can be taken into the removal work area and reused under full control conditions.

PPE should be worn when opening the bag to clean or re-use the equipment or tools, and decontamination should only be performed in a controlled environment.

In some circumstances it may be better to dispose of contaminated tools and equipment depending on the level of contamination and the ease of replacement.

Personal decontamination procedures

Personal decontamination involves the removal of all visible asbestos dust/residue from PPE and RPE. Personal decontamination must be undertaken each time a worker leaves the removal work area and at the completion of the asbestos maintenance or service work. Personal decontamination should be done within the removal work area to avoid recontamination. Personal decontamination should be carried out where a personal decontamination unit is not necessary.

Asbestos-contaminated PPE should not be transported outside the removal work area except for disposal purposes. Before work clothes and footwear worn during removal work are removed from the removal work area for any reason, they should be thoroughly vacuumed with an asbestos vacuum cleaner to remove any asbestos fibres and the footwear should also be wet wiped.

RPE should be used until all contaminated disposable coveralls and clothing has been vacuum cleaned and/or removed and bagged for disposal, and personal washing has been completed. Any PPE used while carrying out removal work must not be taken home by a worker.

Personal hygiene and careful washing are essential. Particular attention should be paid to the hands, fingernails, face and head.

PERSONAL DECONTAMINATION CHECKLIST	
Never leave the removal work area until decontamination is complete. RPE must be worn	
<input checked="" type="checkbox"/>	Remove any visible asbestos dust/residue from protective clothing using an asbestos vacuum cleaner or wiping down with damp cloths. Warning: do not reuse or resoak damp cloths.
<input checked="" type="checkbox"/>	Disposable protective clothing is taken off carefully and placed into bags (RPE must still be worn)
<input checked="" type="checkbox"/>	Place cloths into disposal plastic bags (200µm thick).
<input checked="" type="checkbox"/>	Take disposable coveralls off and place into disposal bags (RPE must still be worn).
<input checked="" type="checkbox"/>	Use damp cloths to wipe down footwear and place cloths into disposal bag.
<input checked="" type="checkbox"/>	Seal all plastic bags with duct tape and place each into a second plastic bag.
<input checked="" type="checkbox"/>	Seal this second plastic bag and label/mark as 'Asbestos Waste'.
<input checked="" type="checkbox"/>	Use damp rags to wipe external surfaces of the disposal bags to remove any dust before it's removed from the removal work area.
<input checked="" type="checkbox"/>	Remove PPE and double bag, seal with duct tape and mark as 'Asbestos Waste'.
<input checked="" type="checkbox"/>	Remove RPE and double bag, seal with duct tape and mark as 'Asbestos Waste'.
<input checked="" type="checkbox"/>	Ensure the outside of the bags are decontaminated by using a damp cloth.
<input checked="" type="checkbox"/>	Place the damp cloth into disposable bags.
<input checked="" type="checkbox"/>	Dispose of asbestos waste at the appropriate waste facility.

Setting up personal decontamination areas outside the removal work area

The asbestos removalist must ensure particular areas are set up for people to personally decontaminate themselves and any tools and equipments when they are entering and leaving the removal work area to eliminate or minimise airborne asbestos fibres from being released from the removal work area.

These areas are:

1. A dirty decontamination area that includes:
 - a suitable rack for air-lines to be stored on at the entrance of the area
 - equipment for vacuum cleaning or hosing down (by use of a fine mist) contaminated clothing and footwear
 - storage for contaminated clothing and footwear
 - labelled waste bags/bins for disposing of protective clothing, and
 - shower area with an adequate supply of hot and cold water and toiletries.
2. A clean decontamination area that includes:
 - storage for individual RPE in containers or lockers
 - airflow towards the dirty decontamination area, and
 - shower area with an adequate supply of hot and cold water and toiletries.
3. A clean changing area that includes:
 - storage for clean clothing
 - separate storage for clean and dirty towels, and
 - airflow towards the clean decontamination area.

Below is an example of how a person would enter and leave a removal work area.

Entering the removal area

- Clean change area: Change into clean work clothes and put on clean protective clothing. Store any removed clothing in a dust-proof container. Move into clean decontamination area.
- Clean decontamination area: Put on RPE. Check that it is working properly and there is a good facial seal (for instance, fit check). Move to the dirty decontamination area.
- Dirty decontamination area: Put on any additional PPE that has been stored in the dirty decontamination area such as footwear. Connect to the RPE air supply if required. Move from the decontamination unit to the removal work area.

Leaving the removal area

- Asbestos removal area: Use an asbestos vacuum cleaner to remove any obvious signs of asbestos dust from protective clothing. Remove footwear and leave shoes/boots inside the asbestos removal area next to the decontamination unit (footwear needs to be stored upside down to minimise further contamination). Proceed into the dirty decontamination area.
- Dirty decontamination area: If shoes/boots have not already been removed, remove them and store upside down within the dirty decontamination area. Disconnect air-line respirator if being used. Shower while wearing protective clothing and RPE. Leaving RPE on, remove protective clothing and place in labelled waste bags. Remove wet underclothing, such as t-shirts or shorts, while showering and place in the storage unit provided within the dirty decontamination area. Pass through the airlock into the clean decontamination area.
- Clean decontamination area: Shower and remove RPE. Thoroughly wash hands, fingernails, face, head and respirator. Store RPE in a suitable container within the clean decontamination area. Move to the clean change area.
- Clean change area: Change into clean clothing.

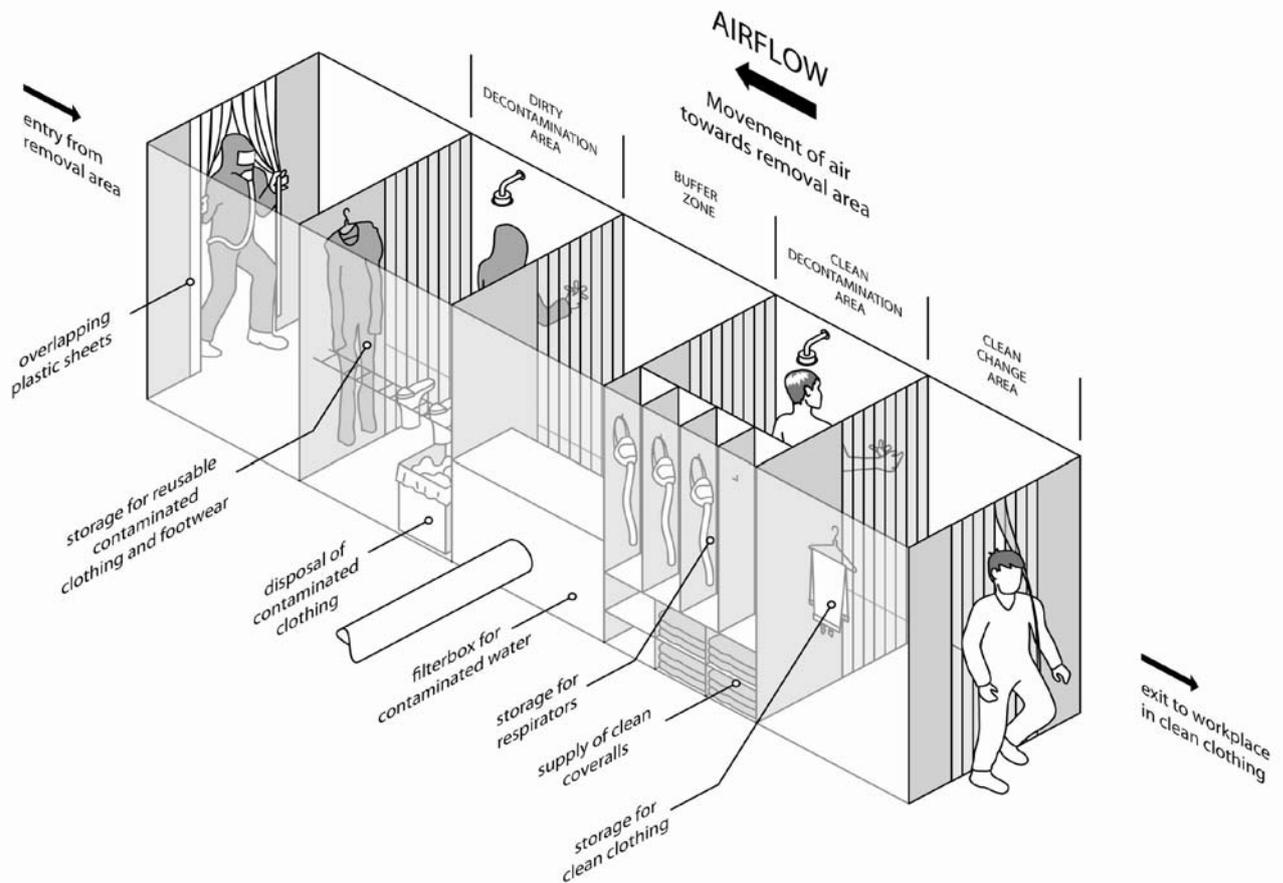


Diagram 1: Decontamination area

Decontamination units attached to an enclosure

A risk assessment should be conducted to determine the number of units required based on the number of workers in the removal work area. As a guide, one decontamination unit needs to be provided for every six workers in the asbestos area.

Where men and women are required to use the same decontamination unit, a system of work needs to be implemented to enable them to access the unit separately. In many instances, the only satisfactory way of providing appropriate changing facilities is to provide a mobile or specially constructed on-site decontamination unit.

The decontamination unit should be immediately adjacent to and directly connected with the enclosed removal work area. It should be located as far away as practicable from amenities and lunch rooms.

The decontamination unit should include a dirty decontamination area, a clean decontamination area, and a clean changing area. These areas need to:

- be large enough to enable workers to adequately decontaminate themselves
- be separated by suitable airlocks or buffer zones, and
- have doors with large openings with a hinged flap operating as a one-way valve to ensure there is sufficient airflow through the decontamination unit.

Towels and soap should be provided to allow workers to appropriately decontaminate themselves.

All water from the decontamination facility should pass through a particulate filter or other trap before it passes into sewer mains. The filter or trap should be capable of capturing particles down to 5 µm.

Workers should not smoke, eat or drink in any part of the decontamination unit.

The asbestos removalist may want to have a worker is stationed outside an enclosure, for the duration of the removal work to liaise with the project supervisor, communicate with personnel inside the work enclosure, and instigate emergency/evacuation procedures if necessary.

Records about these activities should be kept on a daily basis.

Remote decontamination units attached to an enclosure for friable asbestos removal

Remote decontamination units are decontamination units not attached to an enclosure when friable asbestos is being removed. Remote units are not located next to the removal work area and can only be used if a decontamination unit cannot be located immediately adjacent to the removal work area.

When a remote decontamination unit is to be used, the asbestos removalist would need to implement additional transiting procedures to minimise asbestos contamination of pathways leading from the enclosure to the decontamination unit. These procedures are longer and more complex than non-transiting. This involves the use of 'transiting' PPE and additional facilities to enable the worker to carry out preliminary decontamination before travelling to the decontamination unit for full decontamination.

This may include a three-stage airlock isolated changing area which should be specially constructed and made of polythene sheeting. The area should be attached to the enclosure and should comprise of three compartments separated by weighted sheets to minimise the spread of dust between the compartments.

Before workers enter this changing area, all obvious signs of asbestos dust need to be removed from their protective clothing using an asbestos vacuum cleaner. The isolated changing area is then used to discard outer garments, including coveralls and overshoes before workers can put on fresh outer/protective clothing for the journey to the decontamination unit. RPE should be worn until the appropriate phase of the decontamination procedure within the remote decontamination unit.

The route of access from the asbestos removal area to the decontamination unit should be suitably signposted and barricaded to restrict public access.

Air monitoring must be conducted in the immediate vicinity of this access route and at other suitable locations outside the asbestos removal area.

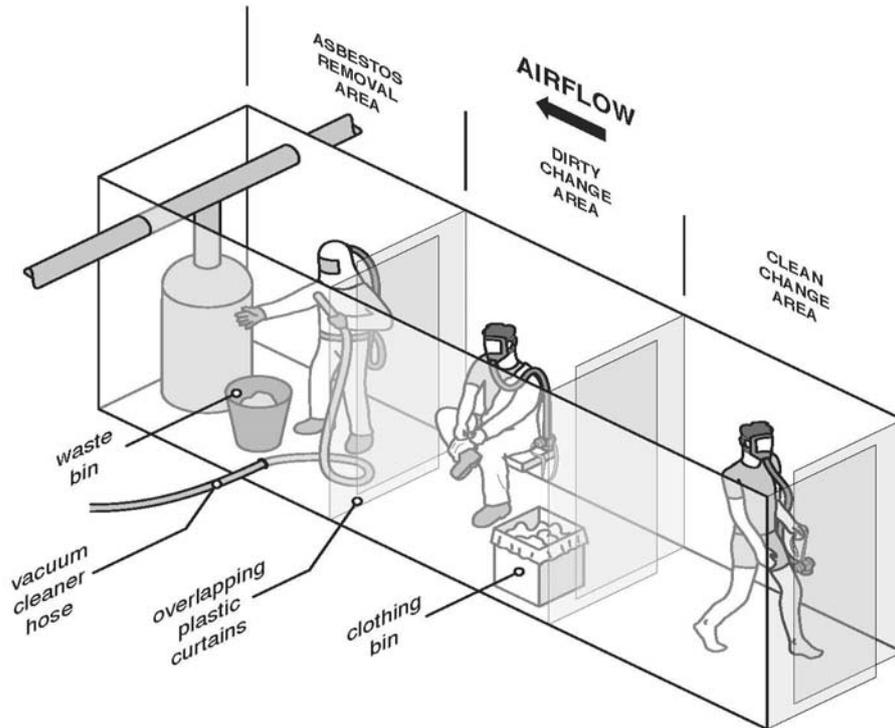


Diagram 2: Decontamination area

4.7 Laundering contaminated clothing

The [draft] WHS Regulations require an asbestos removalist to ensure that personal protective clothing used in asbestos removal work and contaminated with asbestos:

- is sealed in a container, and the exterior of the container is decontaminated, and labelled to indicate the presence of asbestos before being removed
- so far as reasonably practicable, is disposed of at the end of the asbestos removal work at a site authorised to accept asbestos waste, and
- If it is not reasonably practicable to dispose of the clothing – is laundered at a laundry equipped to launder asbestos-contaminated clothing.

Disposable coveralls should be used as protective clothing unless it is not reasonably practicable to do so. When non-disposable protective clothing is used, the contaminated clothing must be laundered in a suitable laundering facility that is equipped to launder asbestos-contaminated clothing. Contaminated protective clothing must not be laundered in homes.

The laundering facility that is equipped to launder asbestos-contaminated clothing:

- should be informed of the asbestos contamination
- should have a management plan in place to control the release of respirable fibres
- should be constructed of smooth surfaces that are able to be lined with polythene sheeting or easily wiped clean
- may use conventional washing machines provided they are not used for other clothing
- may need to have a laundry room that is under negative pressure to eliminate or minimise the release of airborne asbestos fibres during the laundering process – this can be determined during the risk assessment, and
- should have procedures established for cleaning up spills and for the prevention of flooding of neighbouring areas.

The contaminated clothing should:

- be removed damp and thoroughly wet, then placed in impermeable containers or bags the outside of which are decontaminated and labelled to indicate the presence of asbestos before being sent to the commercial laundering facility, and
- not be allowed to dry out before washing.

At the laundry facility:

- the containers and bags holding the asbestos contaminated clothing should be opened in the washing machine while being further saturated. As a minimum, P1 respiratory protection must be worn while unloading clothes into the washing machine, and
- the empty containers or bags should be disposed of as asbestos waste. Waste water should be filtered and the filtering medium disposed of as asbestos waste.

4.8 Waste containment and disposal procedures

The [draft] WHS Regulations require the asbestos removalist to contain and label to indicate the presence of asbestos waste before it is removed from the asbestos removal work area and is disposed of as soon as reasonably practicable at a site authorised to accept asbestos waste.

An asbestos removalist should design the route for removal of the asbestos waste bags or containers through the removal work area prior to commencement of the removal work. Only unused bags and polythene sheeting can be used. Bags labelled for asbestos waste should not be used for any other purpose.

When developing a waste disposal program the following should be taken into account:

- the containment of waste so as to eliminate the release of airborne asbestos fibres
- details of any material to be left in place
- the types of fittings and supports and whether removal and disposal of these items is part of the work specifications
- the location and security of waste storage on site
- the transport of waste within the site and off site
- the location of the waste disposal site
- ensure that the proposed location for the storage and asbestos removal work area and the surrounding area will be unoccupied for the duration of the removal
- approvals needed from the relevant local disposal authority, and
- any local disposal authority requirements that may apply to the amount and dimensions of asbestos waste.

The development of the waste disposal program and methods used to transport waste through a building need to be determined by a competent person following discussions with the person with management or control. In occupied workplaces, all movement of waste containers through a building should take place outside normal working hours.

Removal work area waste containment

The waste disposal program should be included in the asbestos removal control plan and specify the method of transport and routes to be used for removing waste from the asbestos removal area before the commencement of each removal.

Loose asbestos waste must not accumulate within the asbestos removal work area by containing the waste in labelled asbestos waste bags or wrapped in plastic. Once the asbestos waste has been removed from the asbestos removal area, it should either be placed in a solid waste drum, bin or skip for secure storage and eventual disposal, or removed immediately from the site by an environmental protection agency (EPA) approved/licensed carrier for disposal.

The asbestos waste must be disposed of at a licensed asbestos waste disposal site. The disposal process must be in a manner that eliminates the release of airborne asbestos fibres by ensuring:

- bagged asbestos waste is securely packaged in labelled containers
- waste containers are secure during transport, and
- the method of unloading the waste is according to waste disposal procedures so that tearing of the plastic lining at the landfill site is prevented.

The asbestos waste must be disposed of as soon as reasonably practicable, whether that be:

- at the end of the removal job
- when the waste containers are full, or
- at the end of each day if the asbestos waste cannot be secured at the removal site.

Asbestos waste bags

All asbestos waste, friable asbestos and small pieces of non-friable asbestos must be contained in heavy-duty 200 µm (minimum thickness) polythene bags that are no more than 1200mm-long and 900mm-wide to prevent manual task injuries.

Controlled wetting of the asbestos waste should be carried out to reduce asbestos-dust emissions during bag/polythene sealing or any subsequent rupture of the bag or wrapped bundles. The bags must be twisted tightly and have the neck folded over and secured with adhesive tape (referred to as goose-necking).

To minimise the risk of a bag tearing or splitting and to assist in manual handling, asbestos waste bags should not be filled more than half full (depending on the weight of the items) and excess air should be gently evacuated from the waste bag in a way that does not cause the release of dust.

The bags should be labelled with appropriate signage stating that they contain asbestos and that dust creation and inhalation should be avoided. An example of a warning statement is:

CAUTION – ASBESTOS
DO NOT INHALE DUST
DO NOT DAMAGE OR OPEN BAG
CANCER AND LUNG DISEASE HAZARD

The external surface of each bag should be cleaned to remove any adhering dust before the bag is removed from the removal work area and double bagged outside the removal areas immediately following the decontamination process.

Polythene sheeting for containing asbestos waste

You should ensure that asbestos sheeting and redundant asbestos-lagged pipes and equipment are contained in heavy-duty 200 µm (minimum thickness) polythene sheeting.

Asbestos sheeting should be new (not recycled) as recycled sheeting can have flaws in it. Once wrapped in plastic, the bundles need to be labelled to indicate they contain asbestos so they can be treated appropriately.

Asbestos sheeting and redundant asbestos-lagged pipes and equipment should be double wrapped in the polythene sheeting and adhesive tape applied to the entire length of every overlap to secure the bundles to minimise the risk of the polythene sheeting tearing or splitting.

Removing waste from the removal work area

Once the waste has been removed from the asbestos removal work area, it should either be:

- placed in a solid waste drum, bin or skip for secure storage and eventual disposal, or

- immediately removed from the site by the relevant EPA approved/licensed carrier for disposal.

Asbestos waste drums or bins

You should ensure that all drums or bins used for the storage and disposal of asbestos waste are in good condition with lids and rims in good working order and free of hazardous residue.

The drums or bins should:

- be placed in the asbestos removal work area or located as close to the asbestos removal work area as possible, before removal work commences
- be lined with plastic (minimum 200 µm thickness) and labels warning of the asbestos waste must be placed on the exterior of each drum or bin, and
- have their rims sealed and their outer surfaces wet-wiped and inspected before they are removed from the asbestos removal work area.

Controlled wetting of the waste during drum or bin filling should be carried out to reduce asbestos dust emissions.

Drums or bins used to store asbestos waste must be stored in a secure location when they are not in use. They should not be moved manually once they have been filled. Trolleys or drum lifters should be used.

If the drum or bin is to be re-used, the asbestos waste should be packed and sealed so that when the drum or bin is emptied there is no residual asbestos contamination. The drum or bin should be inspected after use to ensure there is no asbestos residue.

Asbestos waste skips, vehicle trays and similar containers

If the volume or size of the asbestos waste cannot be contained in asbestos waste bags you may use drums or bins, a waste skip, vehicle tray or similar container in good condition.

The asbestos should be sealed in double-lined, heavy-duty plastic sheeting or double bagged before it is placed in the skip. However, non-friable asbestos waste may be placed directly into a skip or vehicle tray that has been double-lined with heavy-duty plastic sheeting (200 µm minimum thickness) provided it is kept damp to minimise the generation of airborne asbestos

Once the skip is full, its contents should be completely sealed with the plastic sheeting. If the skip is emptied at a waste disposal site procedures for containment of the plastic lining to prevent tearing should be developed.

If asbestos waste cannot be disposed of immediately, the skip may be used for storing the asbestos waste on site over a period of time provided that the contents are secured (for example, using a lockable lid or locating the skip in a secure area) to prevent unauthorised access.

Transport and disposal of asbestos waste

Disposal of asbestos waste is the final step in the process of asbestos removal work. It is therefore the last point at which the exposure to risks associated with asbestos is likely to occur. You must dispose of asbestos waste as soon as is practicable at a licensed asbestos disposal site.

The transport of asbestos waste of residential origin is covered under EPA legislation. Disposal sites are regulated by the EPA and local government regulations.

5. REMOVAL METHODS

5.1 Asbestos removal methods

An asbestos removalist must use techniques to eliminate or minimise the generation of asbestos fibres so far as is reasonably practicable. They must choose the method of asbestos removal which is most effective at reducing fibre release at the source. The removal methods are listed in preferred order:

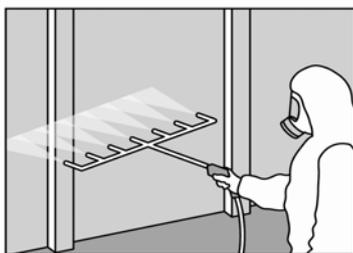
- Wet spray method - the asbestos fibres are significantly suppressed however, they are not entirely eliminated so the use of RPE is as essential.
- Saturation and water injection method (friable removal).
- Dry method - can only be used if the wet spray method is not suitable, for example, if there are live electrical conductors or if equipment could be permanently damaged or made dangerous by contact with water.

Wet spray method (preferred)

The [draft] WHS Regulations require that where friable asbestos is being removed, the licensed removalist carrying out the work must ensure as far as is reasonably practicable that only the wet method of asbestos removal is used.

The wet spray method is the preferred removal method and should be used for the removal of asbestos from buildings, structures, ships and plant. The wet spray method requires the use of a constant low-pressure water supply for wetting down asbestos and related items to suppress respirable asbestos fibres. This can be achieved with a mains-supplied garden hose fitted with a pistol grip. If no water supply is readily available, a portable pressurised vessel (such as a pump-up garden sprayer) may be used.

The design of the spraying equipment will depend on the availability of a water supply and access to the area to be sprayed.



The wet spray method involves applying a fine water spray to the asbestos in a manner that ensures the entire surface of the asbestos is saturated and the run-off is minimised. The asbestos should be maintained in a wet condition throughout the removal.

A wetting agent (surfactant), such as detergent, may be added to the water to facilitate more rapid wetting of the asbestos. A manually controlled, consistent low-pressure, fine spray (such as from an adjustable pistol-grip garden hose) is recommended.

For very small areas, a small spray water bottle may be sufficient. In all cases, the use of water needs to be in the form of a mist to minimise the potential to generate respirable dust.

The asbestos should be wetted through to its full depth and the water spray should be directed at the site of the cut. The wetted material should be removed as the cut is progressed.

Immediately after the asbestos is removed from its fixed/installed position, spray should be directed on sides previously not exposed.

The wet friable asbestos removed in sections should immediately be placed in suitably labelled asbestos waste containers and properly sealed along with any small sections dislodged as the asbestos is cut.

Wherever reasonably practicable, a HEPA-fitted vacuum cleaner should be used in conjunction with the wet spray method. The HEPA vacuum cleaner should be used prior to spraying asbestos with water and for the collection of any dust spread over a large area.

Airborne asbestos fibres are significantly suppressed when the wet spray method is used however they are not entirely eliminated so effective RPE is also essential.

Soaking method water injection method

The soaking method with total saturation should be used if the asbestos is so thick that the spray method will not suppress the asbestos significantly. This method involves injecting water or a water-based solution directly into friable asbestos. It is a process that requires specific training in relation to the use of the equipment and the process.



The asbestos is soaked by the introduction of water or other wetting agents through an appropriate applicator that consists of an injection head with numerous side holes or outlets through which the water or wetting agent is fed to the asbestos.

To facilitate more rapid wetting of the asbestos, holes or cuts should be made in the outer covering to enable the water or wetting agent to be injected in such a manner as to ensure that asbestos is saturated but not just washed out through a liquid passage.

The soaking should be done before removal. The quantity of water or wetting agent and the time to soak will depend on the thickness of the asbestos, access to the asbestos and location of the holes.

The saturated asbestos should then be removed in sections, placed in properly labelled container, sealed and disposed of as with the spray method.

Consideration should be given to applying a PVA emulsion as it may be more effective than water (with a wetting agent) in reducing fibre release. For example, PVA can be applied and allowed to dry on asbestos cement roofing prior to its removal as an alternative method to prevent slip hazards.

Dry method (not preferred)

The dry method is not preferred as there is a much greater potential for airborne asbestos fibres to be generated. The dry removal method can only be used if the wet spray or soaking methods are not suitable, for instance, if there are live electrical conductors or if major electrical equipment could be permanently damaged or made dangerous by contact with water.

If the dry removal method is used, you should implement the following controls:

- Non-friable removal - Enclose the asbestos removal work area as far as reasonably practicable.
- Friable removal - Fully enclose the asbestos removal work area with plastic sheeting (a minimum 200 µm thick) and maintain at a negative pressure (at least 12Pa water gauge). Ensure all workers involved in the removal operation wear full-face positive-pressure supplied air-line respirators.

- Friable and non-friable removal - The asbestos should be removed in small, pre-cut sections with minimal disturbance to reduce the generation of airborne asbestos fibres as much as possible. Wherever reasonably practicable, a HEPA-fitted vacuum cleaner should be used.
- All waste material should be immediately placed in appropriate wet containers.

5.2 Removal methods for large scale removal work

Large scale asbestos removal can occur on a frequent basis, is generally of a longer duration, and usually generates a significant amount of airborne asbestos fibres and may pose a serious risk both to workers and others.

Where friable asbestos or more than 10m² of non-friable asbestos is being removed, a licensed removalist that holds a Class A licence must remove the asbestos. The licensed removalist must ensure, so far as is reasonably practicable, the asbestos removal work area (sometimes referred to as the 'bubble') is enclosed to eliminate or minimise the release of airborne asbestos fibres.

Designing and installing the enclosure

The design and installation of the enclosure should consider:

- methods used to contain the asbestos removal work area
- provision and locations of decontamination/changing facilities and negative pressure exhaust units
- precautions to be implemented to eliminate or minimise the spread of asbestos contamination outside the asbestos removal work area
- air quality within the enclosure
- types of lighting natural or artificial
- temperature within the enclosure to avoid heat stress, and
- any other hazards in the enclosure (these must be identified and the risks controlled before any removal work commences).

The following list outlines how an enclosure for large scale removal work can be designed, installed and used.

☑	<p>The enclosure should:</p> <ul style="list-style-type: none"> • be constructed of heavy-duty plastic sheeting (200 µm minimum thickness) and enclose all the walls, windows and doors. Wooden cleats may be used to anchor the plastic sheeting to walls re-milled plastic sheeting should not be used. • have viewing panels placed in appropriate locations so that the removal work area can be seen from outside the enclosure, and • have adequate lighting within the enclosure, either: <ul style="list-style-type: none"> ○ naturally, using clear plastic or perspex panels in the enclosure walls, or ○ artificially, preferably from outside the enclosure using clear plastic or perspex panels.
☑	During the masking up and later removal of the sheeting, all persons must wear appropriate PPE, e.g. coveralls and as a minimum, a half-face respirator with P1 filters.
☑	Where the asbestos removal work area connects either to the outside environment or to the rest of the building (e.g. windows, ducts, wall cavities, lift entrances), it should be enclosed so that an airtight seal is maintained for the duration of the removal work.
☑	All movable items should be removed from the removal area. If this is not possible, move the items from the immediate asbestos removal work area and cover with two layers of plastic sheeting with a minimum overlap of 300mm between the layers. Both layers should be double taped.
☑	All non-movable items such as fixtures and fittings should be covered with plastic sheeting and the joints sealed.

✓	Airlocks should be placed at the entry points to the change area and constructed using double sets of overlapping plastic with suitable provisions for ensuring a seal.
✓	All floors should be protected with at least one layer of woven plastic to prevent penetration during the removal work. The joints should be lapped 300mm and sealed with double-sided tape and duct tape.
✓	If hoarding barriers are used, plastic-lined barrier should be erected within this hoarding and a buffer area reserved between the hoarding and occupied areas.
✓	Platforms and fixed scaffolding should be erected during the early stages of the work. Ideally these structures should be erected on the outside of the enclosed area. Any platforms or fixed scaffolding within the enclosed area must be decontaminated and visually inspected at the end of the removal work.
✓	All tools and equipment used for removal work, including asbestos vacuum cleaners, must remain within the asbestos removal work area until the completion of the job.
✓	All the plastic and tape used for the enclosure must be disposed of as asbestos waste. Any temporary structures must be disposed of as asbestos waste if they cannot be decontaminated. An inspected by a competent person will confirm if the structures are free of any visible asbestos.
✓	Work methods should be adapted for the work environment within the enclosure. For example, rest breaks need to be based on a risk assessment taking into account factors such as the weather and heating/cooling requirements.
✓	When large scale friable asbestos removal work is being undertaken, the asbestos removal work areas should be enclosed and under 'negative pressure' with the use of negative air pressure units.

Testing the enclosure

Prior to the removal work commencing, the licensed removalist should ensure the enclosure is tested by a licensed assessor.

✓	<p>A licensed assessor should visually inspect, test and smoke the enclosure prior to commencement of the removal work.</p> <ul style="list-style-type: none"> • While smoke is generated within the enclosure, a worker should be outside the enclosure to check for leaks. • Only smoke-generating devices incorporating non-oil-based, non-toxic smoke fluids can be used. Flares should not be used. • Smoke (fire) detection devices in the immediate vicinity of the removal area should be isolated for the duration of the smoke test. • The results of the smoke test are documented and a copy provided to the licensed removalist.
✓	<p>If during the initial testing of the enclosure:</p> <ul style="list-style-type: none"> • leaks or deficiencies are found, these must be rectified (an expandable foam sealant, tape or equivalent may be used) and another smoke test performed until no leaks or deficiencies are identified.
✓	<p>Following a visual examination of the enclosure and surrounding area, if a leak of asbestos is detected:</p> <ul style="list-style-type: none"> • the removal work must stop until any defects have been rectified • before work recommences, it is essential to: <ul style="list-style-type: none"> ○ identify the source of the leak/s ○ eliminate or minimise further release of airborne asbestos fibres ○ seal the leaks in the enclosure ○ re-test the enclosure by smoke testing until the enclosure is effective again ○ clean any contaminated areas ○ conduct visual inspections ○ conduct air monitoring test specific to the incident (air monitoring) ○ notify the relevant authority where applicable, and ○ re-assess the boundaries of the removal work area and site, and

	<ul style="list-style-type: none"> a supply of expandable foam sealant, polyester insulation or equivalent should be kept on site for sealing leaks.
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Information on pressure exhaust units (negative air units)

When large scale friable asbestos removal is undertaken, the removal work areas should be enclosed and under 'negative pressure' with the use of negative air pressure units.

☑	An exhaust extraction fan should be installed in the enclosure to create a 'negative' air pressure of approximately 12 Pa (water gauge) within the enclosed removal work area. This may require the use of more than one negative pressure exhaust unit.
☑	Units should incorporate warning devices for filter integrity/overload and power failure and should have a manometer or magnohelic gauge and an audible and visual alarm system.
☑	<p>The negative pressure exhaust unit should be positioned opposite the decontamination unit to enable laminar (smooth) air flow.</p> <ul style="list-style-type: none"> The air entering the asbestos removal work area passes through the decontamination unit or point of entry while the air extracted passes through a HEPA filter to remove any asbestos before it is discharged to the outside. If this is not possible, consideration should be given to how to set up the enclosure, decontamination unit and negative pressure exhaust unit to enable optimum smooth flow of air through the enclosure so as to minimise dead air pockets. Discharge of the air from the enclosure needs to be at a location away from other working areas, air conditioning inlets or breathing air compressors.
☑	<p>The HEPA filter must comply with <i>AS 4260:1997 High efficiency particulate air (HEPA) filters – Classification, construction and performance</i> or its equivalent.</p> <ul style="list-style-type: none"> A coarse pre-filter should be installed on the air intake side of the negative air unit to prolong the useful life of the HEPA filter. These pre-filters may need to be changed once per work shift or more frequently depending on dust loads. Used pre-filters must be disposed of as asbestos waste. A process of regular inspection of the integrity of the HEPA filter and seal fittings in conjunction with a static pressure alarm should indicate failures in the system.
☑	The negative air units should operate continuously (24 hours a day) until all removal work and decontamination within the enclosure has been completed and dismantled. If the units stop during removal work, the licensed removalist must ensure all removal work ceases immediately until the problem is rectified and the required number of units are in operation. To minimise the risk of airborne asbestos fibres escaping the enclosure, the delay should be as short as possible to avoid interruption. Consideration should be given to backup negative pressure exhaust units and the use of a generator.
☑	Maintenance work on these units should only be performed after they have been thoroughly decontaminated, or the work may be carried out under controlled conditions, such as in an asbestos removal enclosure while wearing appropriate PPE.

5.3 Removal methods for small scale removal work

Small scale friable asbestos removal work usually generates enough airborne asbestos fibres to require the use of PPE and generally is carried out only in short periods, for example, minor maintenance work. Small scale removal work involves using mini-enclosures, 'glove bag' and 'wrap and cut' techniques.

Mini-enclosures

Mini-enclosures are suitable for removal work in areas with restricted access, such as ceiling spaces, and for emergency asbestos removals.

Building the mini-enclosure

To build a mini-enclosure, the below process should be followed:

✓	Off-the-shelf mini-enclosure can be used or alternatively timber or other materials can be used to build a frame. The frame of a mini-enclosure can be made from a variety of materials, but has to be strong enough to support the plastic sheeting that forms the enclosure
✓	Heavy-duty plastic sheeting (200 µm minimum thickness) should be used for making the enclosure.
✓	Make the enclosure large enough to do the work safely allowing for movement inside the enclosure and all the equipment needed for the removal work such as tools for the task - bucket of water, rags, sprayer, vacuum cleaner nozzle and hose. Machinery that emits exhaust fumes should not be placed in a mini-enclosure.
✓	Attach the polythene sheeting inside the frame with duct tape.
✓	Attach the polythene sheeting to the ceiling with masking tape only. Attach it to non-asbestos surfaces with duct tape. The tape used to connect the plastic to the frame should be strong enough to securely hold the plastic to the frame.
✓	Make an entry slit in one wall of the enclosure and reinforce this with duct tape from inside the enclosure. Attach a polythene sheet above the entry slit, to cover it.
✓	Check all seals inside the enclosures for leaks with a smoke test using smoke tubes for mini enclosures. The competent person outside the enclosure should check for leaks outside the enclosure and seals all leaks.

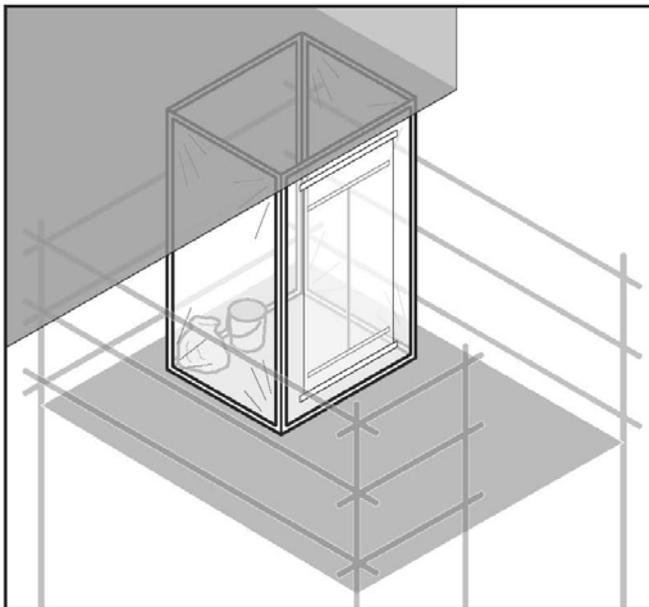


Diagram 3: Building and using the enclosure

Dismantling the mini enclosure

To eliminate or minimise airborne asbestos fibres escaping when dismantling the mini-enclosure, the below process should be followed:

<input checked="" type="checkbox"/>	Put the asbestos waste in a clear bag with an asbestos warning sign or label to indicate the presence of asbestos.
<input checked="" type="checkbox"/>	Clean the enclosed area with the asbestos vacuum cleaner.
<input checked="" type="checkbox"/>	Clean the equipment and polythene sheeting with damp rags.
<input checked="" type="checkbox"/>	Personal decontamination according to the procedures. Workers leaving a mini-enclosure should follow personal decontamination procedures.
<input checked="" type="checkbox"/>	Inspect the enclosure visually for cleanliness.
<input checked="" type="checkbox"/>	Spray the polythene sheeting with PVA sealant.
<input checked="" type="checkbox"/>	Remove the sheeting from the framework and put it in the labelled asbestos waste container.
<input checked="" type="checkbox"/>	Remove PPE and put it in the labelled asbestos waste container taping the container closed.
<input checked="" type="checkbox"/>	If the framework was fully protected and it been decontaminated and inspected by the asbestos removalist, it can be re-used.

Glove bag removal work

The glove bag removal technique is suitable for the removal of asbestos lagging from individual valves, joints and piping. Glove bags:

- are designed to isolate small removal jobs from the general working environment and provide a flexible, easily installed and quickly dismantled temporary enclosure for small removal work
- are single-use bags constructed from transparent, heavy-duty polyethylene with built-in arms and access ports. Glove bags are about one metre wide and 1.5 metres deep
- contain all waste and contamination within them, eliminating the need for extensive PPE and decontamination. A limitation in using glove bags is the volume of waste material they are able to contain. Care should be taken to prevent overfilling the bag with waste, and
- should not be used for hot pipe work due to difficulties in sealing the glove bag to the pipe or maintaining a seal.

The below process should be followed when using the glove bag removal technique:

<input checked="" type="checkbox"/>	Equipment and removal tools for the removal work should be placed into the glove bag at the start of the job. The tools used to remove the asbestos depend on the nature of the material to be removed.
<input checked="" type="checkbox"/>	A P1 filtered respirator and disposable coveralls need to be worn as a minimum while using glove bags in case a bag ruptures or leaks.
<input checked="" type="checkbox"/>	The glove bag should completely cover the pipe or object. The lagging on either side of the bag should be sound enough to support the weight of the bag and its wet contents.
<input checked="" type="checkbox"/>	Cut the sides of the glove bag to fit the size of the pipe from which asbestos is to be removed. Attach the glove bag to the pipe by folding the open edges together and securely sealing them with duct tape or an equivalent.
<input checked="" type="checkbox"/>	Seal all openings in the glove bag with the tape, including the bottom and side seams to prevent any leakage if there is a defect in a seam.
<input checked="" type="checkbox"/>	Saturate the asbestos with a wetting agent and then remove it from the pipe, beam or other surface. The wetting agent should be applied with an airless sprayer through a pre-cut port, as provided in most glove bags, or through a small hole cut in the bag. Asbestos that has fallen into the bag should be thoroughly saturated.
<input checked="" type="checkbox"/>	Cut the wire mesh from the asbestos underneath. If asbestos is dry, it should be re-sprayed with the wetting agent before it is removed.

✓	Clean the pipe or surface from once the asbestos has been removed with a wire brush or similar tool and wet-wipe it until no traces of the asbestos can be seen. Wash down the upper section of the bag to remove any adhering asbestos.
✓	Seal edges of asbestos exposed by the removal or by maintenance activity to ensure the edges do not release respirable asbestos fibres after the glove bag is removed.
✓	When the asbestos has been removed and sealed, insert a vacuum hose from an asbestos vacuum cleaner into the glove bag through the access port to remove any air in the bag that might contain respirable asbestos fibres. When the bag has been evacuated, squeeze it tightly (as close to the top as possible) and twist and seal it with tape, keeping the asbestos safely in the bottom of the bag.
✓	Remove the vacuum line from the bag and then remove the glove bag from the workplace for disposal as asbestos waste.
✓	When the removal is complete, the worker must follow the procedures to personally decontaminate and decontaminate tools according to the decontamination requirements. The asbestos waste in the bag should be sealed and disposed of according to the waste disposal procedures.

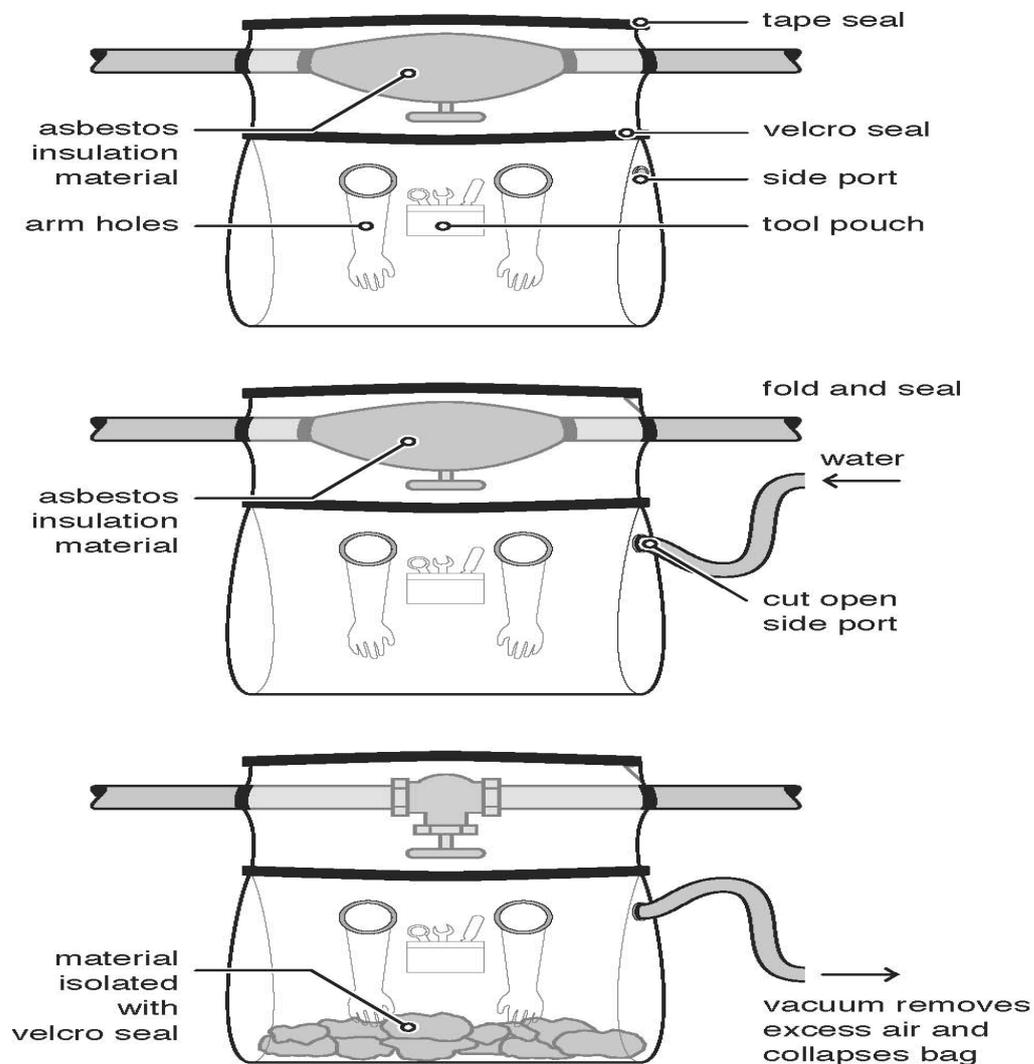


Diagram 4: Example of Glove bag

Wrap and cut removal work

The 'wrap and cut' technique of removal produces the lowest levels of respirable asbestos fibres and is used instead of full containment procedures when the asbestos is a small amount of non-friable asbestos in good condition and not damaged. This method is most appropriate when the entire component is to be removed, such as redundant plant and equipment covered with lagging. If lagging has to be removed to allow a pipe to be cut, the glove bag removal method may be used to expose the metal at the point to be cut and for a sufficient length on either side. The pipe should be cut at the centre of the exposed section.

The below process should be followed when using the wrap and cut removal technique:

<input checked="" type="checkbox"/>	The plant or equipment to be removed should be vacuumed with a HEPA-fitted vacuum cleaner and/or wiped with damp rags (which should be disposed of as asbestos waste).
<input checked="" type="checkbox"/>	The plant or equipment should be double wrapped with 200 µm thick plastic and taped so that the asbestos is totally sealed within the plastic. The wrapped plant or equipment is cut from the rest of the plant and equipment using mechanical shears or oxy-cutting tools.
<input checked="" type="checkbox"/>	Only exposed metal can be cut and care should be taken to ensure the plastic wrapping is not punctured or melted. The cut section is then removed as asbestos waste.
<input checked="" type="checkbox"/>	If lagging has to be removed to allow a pipe to be cut, the glove bag removal method may be used to expose the metal at the point to be cut and for a sufficient length on either side. The pipe is then cut at the centre of the exposed section.
<input checked="" type="checkbox"/>	A P1 filtered respirator and disposable coveralls should be worn as a minimum while doing wrap and cut removal work. If the lagging is in very poor condition such that significant airborne asbestos fibres may be generated, a higher level of respiratory protection may be required or the method of removal reconsidered.
<input checked="" type="checkbox"/>	On completion of the removal, workers need to follow the personal decontamination procedures and dispose of asbestos waste.

5.4 Removing asbestos contaminated soil

Asbestos-contaminated soil comprises of non-attached pieces of asbestos cement products and other material containing asbestos uncovered in soil during other work activities. Contamination can be detected during building and road construction and excavation, waste disposal, damage following a severe weather event such as a hail storm, weathering over time or when asbestos is poorly handled or damaged during removal.

A risk assessment by a licensed assessor or competent person should determine the most appropriate control measure.

Asbestos-contaminated soil is also subject to requirements of other regulatory agencies such as the EPA, Public Health and local governments. Instances of asbestos-contaminated soil should be referred to the Environmental Protection Heritage Council (EPHC) and National Environmental Protection Measure (NEPM) for remediation of contaminated sites.

Removal of asbestos from contaminated soil will require a Class A licensed removalist for any friable asbestos to be removed, or a Class B licensed removalist if more than 10m² of non-friable asbestos is to be removed. A person who does not have a licence can remove 10m² or less of non-friable asbestos. Where there is uncertainty as to whether the amount of non-friable asbestos is more or less than 10m², a Class A or Class B licensed removalist should be engaged. If you are unsure, you should contact the relevant regulator.

For all asbestos removal requiring a Class A removal licence, an air monitoring program must be implemented to ensure the removal control measures contain the release of airborne asbestos

fibre. When all visible asbestos has been removed, and the air monitoring program indicates that the level of respirable asbestos fibres does not exceed 0.01f/mL (10 per cent of the asbestos exposure standard), the licensed assessor must complete the clearance certificate.

All asbestos and any contaminated soil removed must be disposed of as asbestos waste according to the EPA and the requirements of the local licensed waste disposal facility.

Immediate action

If the soil is suspected of containing asbestos, the person with management or control of the workplace must presume the soil contains asbestos and cease work immediately. A competent person should take samples of the material for analysis to confirm or refute that assumption.

If confirmed, the person with management or control of the workplace must ensure control measures are implemented to minimise the release of airborne asbestos fibres. The control measures include:

- preparation of an asbestos management plan for the site
- setting the boundaries of the contamination as determined by a licensed assessor or competent person
- ensuring there is minimal disturbance of the contaminated soil until the asbestos management procedures have been implemented
- isolating and securing the removal work site using signs and barriers
- controlling dust with dust suppression techniques (such as water and wetting agents)
- providing PPE based on the level of contamination and the control measures implemented
- sampling and/or air monitoring
- providing education and training for workers on hazards and safe work practices to minimise airborne dust exposure, and
- implementing decontamination procedures for the workers and the equipment.

5.5 Removing friable asbestos from hot surfaces

Friable asbestos in or on hot metal or machinery presents one of the worst conditions for removal as airborne asbestos fibres can spread on convection currents in the air and the potential for burns is high.

Removal work from hot surfaces should be avoided. If possible, the removal should be scheduled and planned around shutdowns, with sufficient time being allowed for the metal or machinery to cool down before removal is attempted. Hot metal removal should be used only in emergency situations and where the use of water sprays may create steam making the removal task unsafe or more difficult.

In the limited circumstances where the dry removal of asbestos from hot surfaces is the only option (for instance, emergency situations), particular care should be taken in the selection of dust extraction equipment to cope with the convection currents involved, and the selection of appropriate PPE also becomes even more important.

Heat stress should be considered when preparing the asbestos removal control plan, particularly in the selection of PPE and the design of the work program.

Arrangements for the removal of asbestos from hot plant and equipment should be factored into the asbestos management plan for the workplace. This should include cooling requirements and/or the shutdown periods required to achieve adequate cooling.

5.6 Removing asbestos in plant and pipes or pits

Asbestos products include gaskets reinforced with asbestos that are used in plant and equipment between flanges on pipes to control the temperature and pressure. Asbestos rope was used for lagging pipes and valves and for sealing hatches. Asbestos is also found in friction products such as brake linings and cylinders.

It is likely that the asbestos in gaskets and rope and friction products will be friable. This type of plant and equipment is subject to the removal of friable asbestos and may be removed using the 'glove bag' or 'wrap and cut' method. If the plant contains non-friable asbestos, a Class B licensed removalist can conduct the removal (which could also be removed by an asbestos removalist that does not have a licence).

Telecommunication pits were in the past constructed using asbestos and at the access points there is a potential for exposure to airborne asbestos fibres when accessing these pits.

Work installing or modifying telecommunication lines in these pits may require cutting and removal. Where no other asbestos-related removal work is required and the asbestos is non-friable, a Class B licensed removalist can remove the asbestos, however, a Class A licensed removalist may also carry out the removal work. If the amount of non-friable asbestos to be removed is less than 10m², it may be removed by a person who does not have a licence.

6. AIR MONITORING

The [draft] WHS Regulations require a person conducting a business or undertaking must ensure that the exposure standard is never exceeded at the workplace.

A person who commissioned asbestos removal work which requires a Class A licence must ensure that an independent licensed assessor undertakes air monitoring of the asbestos removal area at the workplace. The person who commissioned the work must also ensure the results of the air monitoring are given to the following persons:

- workers at the workplace
- health and safety representatives for the workplace
- persons conducting businesses or undertakings at the workplace, and
- other persons at the workplace.

If the workplace is domestic premises and friable asbestos is being removed, for instance, removal requiring a Class A licence, the licensed removalist must ensure that an independent licensed assessor undertakes air monitoring of the asbestos removal area at the premises. The licensed removalist must also ensure the results of the air monitoring are given to the following persons:

- the person who commissioned the work
- workers at the workplace
- health and safety representatives for the workplace
- persons conducting businesses or undertakings at the workplace
- the occupier of the domestic premises
- the owner of the domestic premises, and
- other persons at the workplace.

Where the results show that asbestos fibre levels exceed high the exposure standard for asbestos, action must be taken immediately to stop the exposure and control the level of airborne asbestos fibres.

Air monitoring involves sampling airborne asbestos fibres to assist in assessing exposure to a hazardous substance and the effectiveness of implemented control measures. It should be conducted in accordance with the Guidance Note for *Membrane filter method for estimating airborne asbestos dust* 2nd Edition [NOHSC: 3003 (2005)].

6.1 When is air monitoring required?

Air monitoring requirements will vary depending on the types of asbestos being removed, the location and position of the asbestos, the use of enclosures and whether the removal work is within a building or outside.

- Friable asbestos removal - Air monitoring is mandatory for all friable asbestos removal. It must be conducted before and during removal work. However, it is not required before friable asbestos removal work commences when the glove bag removal technique is undertaken. Air monitoring must be carried out as part of the clearance inspection.
- More than 10m² of non-friable asbestos removal - Air monitoring is not required but may be recommended to be carried out by a licensed assessor or competent person to ensure compliance with the duty to eliminate or minimise exposure to airborne asbestos fibres and to ensure the exposure standard is not exceeded.
- Personal air monitoring – Air monitoring should be carried out at other times to determine worker's exposure to airborne asbestos fibres if, based on reasonable grounds, there is uncertainty as to whether the exposure standard may be exceeded and a risk assessment by a competent person indicates it is necessary. Since most uses of asbestos are prohibited, personal exposure monitoring should not be required frequently.

- Public Location - Air monitoring should also be considered where the removal work is being undertaken in or next to a public location.

Air monitoring may be required when:

- it is not clear whether new or existing risk controls are effective
- the risk is largely managed through administrative controls (for instance, safe work methods or systems of work) and workers do not always follow these practices (perhaps due to lack of training or supervision)
- there is evidence (for example, dust deposits in the removal work area) the risk controls have deteriorated as a result of poor maintenance
- modifications or changes in work methods have occurred that may adversely affect worker exposure, or
- there has been an uncontrolled disturbance of asbestos at the workplace.

6.2 Who can conduct air monitoring?

In relation to removal work requiring a licence:

- Friable asbestos removal - A licensed assessor must be engaged to carry out air monitoring when it is required.
- Non-friable asbestos removal (more than 10m²) - A licensed assessor or competent person must be engaged to carry out air monitoring when it is required.

Where air monitoring is otherwise required, for instance, to determine whether the exposure standard has been exceeded following an uncontrolled disturbance or release of asbestos at the workplace, a licensed assessor or competent person may carry it out. However, where it is known the release involves friable asbestos, only a licensed assessor should carry out the air monitoring.

Air monitoring is not mandatory for removals that do not require a licence, for example, 10m² or less of non-friable asbestos. However, if you wish to carry out air monitoring in these situations, you can engage either a licensed assessor or competent person.

The licensed assessor must be independent of the licensed removalist and the person who commissioned the removal work. If it is not possible for the licensed assessor to be independent, approval must be sought from the relevant regulator for them to carry out the work. To be independent, the licensed assessor must not be involved in the removal of asbestos for that removal job and is not involved in a business or undertaking involved in the removal of the asbestos for that removal job.

6.3 What are the air monitoring action levels?

Once the results of the air monitoring are received, a licensed removalist should take action depending on the action level. **Table 3** below provides detail on the action that should be taken.

Table 3 Air monitoring action levels

Action level	Control	Action
Less than 0.01 fibres/mL	No new control measures are necessary	Continue with control measures
At 0.01 fibres/mL or more than 0.01 fibres/mL but less than or equal to 0.02 fibres/mL	1. Review	Review control measures
	2. Investigate	Investigate the cause
	3. Implement	Implement controls to eliminate or minimise exposure and prevent further release

Table 3 Air monitoring action levels (cont)

Action level	Control	Action
More than 0.02 fibres/mL	1. Stop removal work	Stop removal work
	2. Notify regulator	Notify the relevant regulator by phone followed by fax or written statement that work has ceased and the results of the air monitoring
	3. Investigate the cause	Conduct a thorough visual inspection of the enclosure (if used) and associated equipment in consultation with all workers involved with the removal work
	4. Implement controls to eliminate or minimise exposure and prevent further release	Extend the isolated/barricaded area around the removal area/enclosure as far as reasonably practicable (until fibre levels are at or below 0.01 fibres/mL, wet wipe and vacuum the surrounding area, seal any identified leaks (e.g. with expandable foam or tape) and smoke test the enclosure until it is satisfactorily sealed.
	5. Do not recommence removal work until further air monitoring is conducted	Do not recommence until fibre levels are at or below 0.01 fibres/mL

Any information that is gathered from these actions can be referred to during future removal jobs (where applicable).

6.4 Clearance inspection and clearance certificate

A person conducting a business or undertaking who commissioned licensed removal work, or if the removal was carried out at domestic premises - the licensed removalist must ensure that at the end of the removal work, a clearance inspection is carried out and a clearance certificate is issued by:

- a licensed assessor (if the removal work involved friable asbestos), or
- a competent person (if removal work involved more than 10m² of non-friable asbestos).

The licensed assessor or competent person must not issue a clearance certificate until after they have conducted a visual inspection for evidence of dust and debris and/or conducted clearance air monitoring to verify that the concentration of respirable asbestos fibres is below 0.01 fibres/ml. A visual inspection and air monitoring must be completed as part of the clearance inspection following removal of friable asbestos.

The clearance certificate must include the results of the air monitoring which indicate that the area has been cleaned dry and the fibre levels are less than 0.01 fibres/mL. A copy of the results of the air monitoring must be provided to the licensed removalist and the person who commissioned the removal work. Each person conducting a business or undertaking at the workplace must ensure the results of the air monitoring are given to the workers and their health and safety representatives and other people at the workplace.

If a clearance certificate has not been obtained, the removal area must not be re-occupied for normal use or other work activities. A clearance certificate must be issued before the area can be re-occupied for demolition or other work.

No unauthorised person can enter the removal work are prior to a clearance certificate being issued and any protective barrier between the asbestos removal area and public areas should remain intact until completion of all removal work and the final clearance certificate is issued.

Appendix B provides an example of a clearance certificate.

APPENDIX A – RESPIRATORY PROTECTIVE EQUIPMENT

When selecting RPE, you should also refer to the *AS/NZS 1715:1994 Selection, use and maintenance of respiratory protective devices* and *AS1716:2003 Respiratory protective devices*.

The diagrams below provide examples of some respirators that can be used. The protection afforded by each device depends not only on the design and fit of the respirator but also upon the efficiency of the filters (for instance, P1, P2 or P3). These diagrams are indicative only. In order to show the correct respirator fit they do not show the use of hoods. Respirators must always be worn under a hood.

- Figure (A) - disposable, half-face particulate respirator
- Figure (B) - half-face, particulate filter (cartridge) respirator
- Figure (C) - powered, air-purifying, ventilated helmet respirator
- Figure (D) - full-face, particulate, filter (cartridge) respirator
- Figure (E) - full-face, powered air-purifying particulate respirator
- Figure (F) - full-face, positive pressure demand air-line respirator



(A) Disposable, half-face particulate respirator



(B) Half-face, particulate filter (cartridge) respirator



(C) Powered, air-purifying, ventilated respirator



(D) Full-face, particulate filter (cartridge) respirator



(E) Full-face, powered air-purifying particulate respirator



(F) Full-face, positive pressure demand air-line respirator

Selection of RPE

The most efficient respirator and filter for the task should be used. Proper fit is critical and especially with a disposable half-face respirator is difficult. Consideration should be given to upgrading to a non-disposable half-face respirator.

Table 4 provides guidance for the selection of appropriate respiratory protection for different tasks, assuming the correct work procedures are being followed. This table does not take into account personal features including facial hair or where glasses are worn. Full protection cannot be achieved if either of these factors interferes with the face seal.

Workers should be consulted on the selection of RPE to ensure individual fit and medical factors have been considered.

Table 4 Selecting RPE

Work Procedure	Required respirator	Filter type
Simple enclosure erection for containing undamaged asbestos materials to prevent damage – no direct handling but possible disturbance of asbestos	Disposable, half-face particulate respirators OR Half-face, particulate filter (cartridge) respirator	P1 or P2
Inspection of the condition of any installed friable asbestos, which appears in poor condition or has been disturbed	Disposable, half-face particulate respirators OR Half-face, particulate filter (cartridge) respirator	P1 or P2
Sampling material for the purpose of identifying asbestos	Disposable, half-face particulate respirators OR Half-face, particulate filter (cartridge) respirator	P1 or P2
Removal of non-friable asbestos (e.g. asbestos cement sheets, ceiling tiles and vinyl tiles)	Disposable, half-face particulate respirators OR Half-face, particulate filter (cartridge) respirator	P1 or P2
Extensive sample operations on friable asbestos	Full-face, particulate, filter (cartridge) respirator	P3
Maintenance work involving the removal of small quantities of friable asbestos (e.g. replacement of friable asbestos gaskets and insulation)	Full-face, particulate, filter (cartridge) respirator	P3
Certain forms of wet stripping in which wetting is prolonged and effective, and certain small-scale dry stripping operations	Full-face, powered air-purifying particulate respirator OR Full-face, positive pressure demand air-line respirator	P3
Certain forms of dry stripping and ineffective wet stripping (light wetting, no time given to saturate)	Full-face, powered air-purifying particulate respirator OR Full-face, positive pressure demand air-line respirator No lesser respirator will suffice	P3
Dry stripping in confined areas	Full suit or hood, positive pressure demand continuous flow air-line respirator No lesser respirator will suffice	P3 only as a backup

Fit testing of face pieces

The fit of a negative-pressure respirator to a worker's face is critical. A fit test, in accordance with *AS/NZS 1715:1994 Selection, use and maintenance of respiratory protective devices* and the manufacturer's instructions, should be performed to assist in determining the best fit respirator for the individual worker immediately before commencing work and a fit check performed each time the respirator is to be used.

The performance of RPE depends on a good contact between the wearer's skin and the face seal of the mask so that the mask is a tight fitting face piece or full mask. A good face seal can only be achieved if the wearer is clean-shaven in the region of the seal and the face piece is the correct size and the shape to fit the wearer's face.

Workers using negative-pressure respirators must also be clean shaven to ensure a good face seal. Workers with beards, stubble or facial hair should use a continuous flow positive pressure respirator.

Workers wearing prescription glasses with side arms may not be able to use full-face respirators because of the loss of seal around the spectacle arms. If their glasses cannot be modified so they do not need the support of the ears, these workers should not use full-face respirators and should wear air supply hoods instead. Ensure that these hoods will provide a sufficient level of protection.

Where the half-face respirator has been selected as providing the most appropriate protection and a seal or fit is not achievable from non-disposable respirators, a disposable respirator may be used.

To conduct a full or half-face respirator fit check:

- close off inlet to filter
- inhale gently
- hold for 10 seconds, and
- check that face piece remains slightly collapsed as it should.



APPENDIX B – EXAMPLE OF A CLEARANCE CERTIFICATE

SECTION A – CLEARANCE INSPECTION DETAILS

Note: Where asbestos removal work requires a Class A licence, a licensed asbestos assessor must carry out the clearance inspection and complete an asbestos removal clearance certificate if satisfied that the area is safe to reoccupy

Client details	
Name of client:	
Client contact details:	
Removal work details	
Date removal work carried out:	
Site address where removal work is being carried out:	
Details of the specific asbestos removal work area(s):	
Name of licensed asbestos removalist:	
Name and contact details of licensed asbestos removalist supervisor (if different to removalist):	
Inspection details	
Date of clearance inspection:	
Time of clearance inspection:	

SECTION B – ASBESTOS REMOVAL WORK PAPERWORK

	Yes	No
Do you have a copy of the asbestos removal control plan?		
Do you have a copy of the notification form?		
Is the removal work consistent with the control plan and the notification form? (e.g. use of enclosures, decontamination facilities, waste facilities)		

SECTION C – ASBESTOS REMOVAL WORK AREA

1. Visual Inspection

	Yes	No
Inspection of the specific area detailed in Section A <u>found no visible asbestos</u> remaining as a result of the asbestos removal work carried out.		
Is air monitoring required (if no, proceed to Section E)		
Can the area be reoccupied?		
Has additional information been attached? (e.g. photos, drawings, plans)		

2. Air monitoring

	Yes	No
Air monitoring was carried out as part of the clearance inspection. <u>The result was below 0.01f/ml.</u>		
Has the air monitoring sample been analysed by a NATA-accredited laboratory?		
Is the air monitoring report attached?		
Can the area be reoccupied?		

SECTION D – ENCLOSURES

1. Prior to dismantling the enclosure

	Yes	No
The area within the enclosure and the area immediately surrounding the enclosure was inspected and <u>no visible asbestos was found.</u>		
Air monitoring was carried out as part of the clearance inspection. <u>The result was below 0.01f/ml.</u>		
Is the air monitoring report attached?		
Can the enclosure be dismantled?		

Number of samples collected: _____

	Sample 1	Sample 2	Sample 3	Sample 4	Sample 5
RESULTS					

2. After the enclosure was dismantled and removed

	Yes	No
An inspection of the area in which the enclosure was erected and the area immediately surrounding the area where the enclosure was erected was inspected and <u>no visible asbestos was found.</u>		
Air monitoring was carried out as part of the clearance inspection. <u>The result was below 0.01f/ml.</u>		
Is the air monitoring report attached?		
Can the enclosure be dismantled?		
Can the area be reoccupied?		

Number of samples collected: _____

	Sample 1	Sample 2	Sample 3	Sample 4	Sample 5
RESULTS					

SECTION E – CLEARANCE DECLARATION

- I declare that:
- the former enclosure, asbestos removal work area and the surrounding area are free from any visible asbestos
 - the transit route and waste routes are free from any asbestos, and
 - all asbestos in the scope of the removal work has been removed and any known asbestos is intact.

.....
Signature of licensed assessor/competent person

.....
Assessor licence number (if applicable)

.....
Name of licensed assessor /competent person

APPENDIX C – EXAMPLES OF SPECIFIC REMOVAL WORK

Note: This appendix does not address hazards other than asbestos, including fall from heights or electrical hazards. These hazards also need to be identified and the associated risk controlled.

This appendix provides guidance on how to perform a specific task associated with asbestos removal work.

Asbestos cement products

Asbestos cement products consist of approximately 15 per cent asbestos fibres by weight. A wide range of products have been commonly found including roofing, shingles, exterior cladding on industrial, public and some domestic premises, corrugated/profile sheets as well as flat sheets that have been used for exterior flexible building boards.

If possible, you should remove the asbestos cement products whole. If some sections have been damaged prior to removal, these may be strengthened by applying duct tape.

Identify the method in which the asbestos cement product is held in place, then use a method that would minimise airborne dust generation in removing the product. For example:

- fasteners: dampen then carefully remove using a chisel
- bolts: dampen then use bolt cutters (or an oxy torch) – do not use an angle grinder
- screws: dampen then carefully unscrew with a screwdriver, and
- nails: dampen then carefully lever the panel or punch through if absolutely necessary.

Avoid breaking the asbestos cement products. If breakage is absolutely necessary to remove/dislodge the product, dampen the material and minimise breakage.

Remove the asbestos cement product wet/damp by applying a fine water spray unless this creates an electrical risk.

Once removed from its position, spray the back of the product with a fine water spray. Frequent application of a fine water spray may be required depending on circumstances (for example, a very hot day) but be careful not to create a slip hazard.

Personal decontamination should be carried out in accordance with the [draft] WHS Regulations and this Code.

Asbestos cement roof sheeting

Asbestos-cement can become brittle with age, so any removal work on roofs should address the risk of fall hazards. If lichen is encountered on roof sheeting, caution should be exercised in the use of water and the choice of workers' footwear because lichen can be slippery, especially when it is wet.

The removal of asbestos-cement roofing should be performed in accordance with the [draft] WHS Regulations.

Angle grinders should not be used, because of the potential for damage to the asbestos-cement and subsequent fibre release. Anchoring screws/bolts should be removed from the roofing sheets using an oxy torch or another suitable device that will not significantly damage the sheet.

If the system of removal involves walking on the roof to remove roof sheeting (this should be the last option when choosing a method to remove roof sheeting), spray the asbestos cement roof sheeting with a PVA solution prior to removal. Ensure the PVA is dry before removing it so as to

avoid a slip hazard. Once removed, spray the back (underside) of the asbestos cement with either a fine water spray or the PVA solution.

Where the asbestos cement product requires lowering to the ground, ensure this is done in a manner that will minimise the generation of respirable dust. Do not use chutes, ramps or similar gravity dependent devices. Examples of appropriate lowering methods for roof sheeting include:

- by hand – over short distances
- slings
- using scissor lifts or similar devices, and
- using scaffolds.

You should follow the cleaning, decontamination, waste removal and disposal procedures in this Code once the asbestos sheeting has been removed.

Where the area to be removed is greater than the size of an average domestic house or where considerable dust will be generated, you should use of a full decontamination unit.

Ensure that clearance of the area has been completed and a clearance certificate has been issued prior to reoccupation of the area.

Personal decontamination should be carried out in accordance with the [draft] WHS Regulations and this Code.

Removal of floor tiles

Flooring products include Polyvinyl chloride (PVC or vinyl) tiles often contain a few per cent (5–7 per cent) of very fine chrysotile. Black and brown thermoplastic tiles containing larger amounts and often visible clumps of chrysotile were also produced. Sheet floor coverings were sometimes backed with a thin layer of chrysotile paper. Some underfelts, such as hessian underlays for carpets and linoleum were also manufactured containing asbestos. The mastics which were used to bond the floor covering to the surface could also contain asbestos. Some hard-wearing composite floors (for example, magnesium oxychloride) also contain about 2 per cent of mineral fibres which could be asbestos.

Place a tool (such as a scraper or wide blade) between the tiles and lift the tile away from the floor being careful to minimise breakage. A hammer or mallet can be used to tap the tool under firmly adhered tiles to assist separating the tiles from the floor.

Minimise dust by spraying fine water mist under tiles as they are lifted.

Place the tiles into a 200 µm plastic waste bag or suitable alternate waste container dedicated for asbestos waste that is clearly labelled with an appropriate warning sign indicating asbestos waste.

Use the scraper to remove any adhesive that is left adhered to the floor after each tile has been removed and place this waste into the asbestos waste bag or suitable waste container.

The vinyl can be cut into strips prior to its removal, to facilitate bagging, or it can be rolled into one roll and wrapped securely with plastic, making sure it is totally sealed.

If a heat source is used to soften the adhesive beneath a vinyl tile, care should be taken not to scorch or burn the tile. Burning or scorching vinyl tiles can result in the release of toxic decomposition products and generate a fire hazard. In some cases the adhesive may contain asbestos.

Follow the cleaning, decontamination, waste removal and disposal procedures once the tiles have been removed.

Ensure that clearance of the area has been completed prior to reoccupation of the area.

Personal decontamination should be carried out in accordance with the [draft] WHS Regulations and this Code.

Removing bituminous (malthoid) products

This material is generally regarded as non-friable and includes bitumen products such as roofing felts and damp-proof courses which have been widely reinforced by the addition of asbestos, usually in the form of chrysotile paper. Bitumen-based wall and floor coverings were also produced.

Some mastics used to stick the bitumen products commonly had asbestos added to them for flexibility. Other sealants also had asbestos added to improve the performance of the product. When removing bituminous products:

- Seal access points (for example, skylights) with material such as 200 µm plastic sheeting and duct tape.
- Where there are exhaust vents from gas fired equipment in the area it is dangerous to seal over them. Turn the gas off if possible.
- Cut and remove manageable sections. Place cut pieces in a lined skip or wrap in plastic sheeting.
- Remove adhering material by dampening and gently scraping. Consider using an industrial vacuum cleaner fitted with a HEPA filter while scraping.
- Mastics are flexible and removal of mastics by using scraping and chipping tools. The pieces removed should be kept as intact as possible.
- If heating is used to soften the material, to enable the material to be peeled, it is important not to burn the material, as this can release respirable asbestos fibres. Excessive heating is also likely to generate toxic fumes and gases and generate a fire hazard.
- Collect all debris and dispose of waste according to the waste disposal procedures.

Personal decontamination should be carried out in accordance with the [draft] WHS Regulations and this Code.

Removal of ceiling tiles

False ceiling tiles or suspended ceilings sometimes need to be removed so maintenance work can be performed. If asbestos has been used on structural materials above a false ceiling there could be contamination on the upper surface of the tiles.

The minimum respiratory protection suitable for this operation is a P1 or P2 filter with a half-face piece respirator. If considerable amounts of asbestos dust or debris are likely to be involved, full-face air-purifying positive pressure respirators should be worn.

Any surface below the tiles that might be contaminated should be covered with plastic sheeting.

The first tile should be lifted carefully to minimise the disturbance of any asbestos fibres. The top of each tile should be thoroughly vacuumed and wet wiped, where possible, prior to removing subsequent tiles.

Where non-asbestos ceiling tiles are to be reused, they should be covered with plastic as they are removed from the ceiling, to prevent further dust settling on them.

Wrap the asbestos ceiling tiles in a double layer of heavy duty, 200µm thick plastic sheeting.

Waste containment, disposal and clearance are in accordance with this Code. Personal decontamination should be carried out in accordance with the [draft] WHS Regulations and this Code.

Removal of gaskets and rope seals

This material is generally regarded as friable. If there is any doubt, advice needs to be sought from a person with knowledge and experience in dealing with asbestos.

Gaskets reinforced with asbestos were once used extensively in plant and equipment exposed to high temperatures and/or pressures. These gaskets were typically used between the flanges of pipes.

Asbestos rope was often used for lagging pipes and valves and for sealing hatches. It is likely that the asbestos in gaskets and rope from plant and equipment will be friable. When removing gaskets and rope seals:

- Ensure the plant or equipment is shut down and isolated.
- Dismantle the equipment carefully. Protect any other components with plastic sheeting.
- Ensure the plant and equipment has been made safe (pipework emptied, electrical supply isolated, equipment shutdown, etc).
- Unbolt or unscrew the flange or dismantle the equipment.
- Once accessible, dampen the asbestos with a fine water mist or similar. Continue dampening the asbestos as more of it is exposed/accessible.
- Ease the gasket or rope seal away with the scraper and place into the waste container positioned directly beside/beneath it. Keep the area damp and scrape away any residue.
- Consider using an industrial vacuum cleaner fitted with a HEPA filter while scraping.

Personal decontamination should be carried out in accordance with the [draft] WHS Regulations and this Code.

Removal of pipe lagging using a glove bag (small section)

Asbestos was widely used to insulate pipes, boilers and heat exchangers.

There are several types and forms of insulation, often with multi-layer construction. Pre-formed sections of asbestos insulation were made to fit the diameter of the pipe. These would be strapped on and calico-wrapped and sometimes painted (for example, 'Decadex' finish), or sealed with a hard plaster (often asbestos-containing) to protect against knocks and abrasion. Other types of asbestos-containing felts, blankets, tapes, ropes and corrugated papers were also used. For bends and joins, ensure the plant and equipment has been made safe (for example, pipework emptied, electrical supply isolated, equipment shut down).

Set-up/attach glove bag and perform removal work as described in this Code. Remove and dispose of waste according to the relevant sections of this Code. Personal decontamination should be carried out in accordance with the [draft] WHS Regulations and this Code.

Fire retardant material

These are normally homogeneous coatings sprayed or trowelled onto reinforced concrete or steel columns or beams as fireproofing. Sprays were also commonly used on the underside of ceilings for fireproofing and sound and thermal insulation in many high-rise premises. Warehouses and factories commonly had sprayed asbestos applied to walls, ceilings and metal support structures for fireproofing.

Some fire doors contained loose asbestos insulation sandwiched between the wooden or metal facings to give them the appropriate fire rating. Loose asbestos was also packed around electrical cables, sometimes using chicken wire to contain it.

Mattresses containing loose asbestos were widely manufactured for thermal insulation. Acoustic insulation has been provided between floors by the use of loose asbestos in paper bags, and in some areas near removal works it is not unknown for loose asbestos to have been used as a readily available form of loft insulation.

Asbestos textiles were manufactured for primary heat (for example, insulation tapes and ropes) or fire protection uses (for example, fire blankets, fire curtains, fire-resistant clothing). Textiles were also used widely as a reinforcing material in friction products/composites.

It will depend on where the fire retardant material is located and the quantity of the material as to how the removal process is conducted, however the asbestos is friable and a Class A licensed removalist must perform the removal work.

For large ceiling space, an asbestos removal control plan must be developed. You should:

- Establish the extent of the removal area and move all items out of the area or cover them with 200 µm plastic sheeting if they could be contaminated during the removal work.
- Develop an enclosure that allows smooth flow of air from the decontamination unit to the negative air units. In constructing the enclosure, pay particular attention to penetrations through the floor and ceiling/roof. Set up the enclosure, decontamination unit, remove and dispose of asbestos.
- Ensure all air-conditioning equipment has been shut and isolated/blanked from this area. Maintain regular checks on the negative air unit, decontamination unit and a licensed assessor must conduct control air monitoring throughout the removal work.
- Clearance monitoring by a licensed assessor and the issue of a clearance certificate is required before re-entry into the removal work area.

Personal decontamination should be carried out in accordance with the [draft] WHS Regulations and this Code.

Asbestos millboard

Since asbestos millboard is typically 100 per cent asbestos and very friable, a full enclosure, with negative air extraction units, must be used for this type of removal.

The asbestos millboard should be wetted down as the vinyl is peeled from the floor, preferably with the millboard attached.

The vinyl can be cut into strips prior to its removal, to facilitate bagging, or it can be rolled into one roll and wrapped securely with plastic, making sure it is totally sealed.

If the vinyl sheeting cannot be removed without leaving some of the asbestos millboard on the floor surface, the remaining asbestos millboard should be wetted down and, when thoroughly soaked, scraped off the floor surface.

Sufficient water should be used to dampen the asbestos millboard, but not so much that run-off or pools of contaminated water will occur.

If a heat source is used to soften the adhesive beneath a vinyl tile, care should be taken not to scorch or burn the tile. Burning or scorching vinyl tiles can result in the release of toxic decomposition products and generate a fire hazard.

Alternative removal methods should only be used if they do not result in excessive fibre release from the asbestos millboard and do not result in any additional hazard.

Personal decontamination should be carried out in accordance with the [draft] WHS Regulations and this Code.

Working with asbestos friction materials

The risk of exposure to significant amounts of dust that contains asbestos fibres may exist while removing and repairing brakes, clutches and high-temperature gaskets on motor vehicles. If the following simple controls are applied carefully, it generally should not be necessary to carry out air monitoring in the workshop while servicing vehicle brakes, clutches and cylinder head/exhaust gaskets.

A HEPA-filter industrial vacuum cleaner should be certified by the manufacturer as fit for removal work and can be used to clean all asbestos dust from components and other parts in the immediate vicinity. It may be necessary to purchase or fabricate special hose nozzles to reach difficult areas to ensure components are effectively cleaned of asbestos. Any remaining dust needs to be removed with a wet rag.

A fine spray of water on the dust will dampen it and prevent it being dispersed. The component and parts in the immediate vicinity can then be wiped down with a wet rag. The rag can only be used once. It then needs to be placed in a plastic bag and into an asbestos waste disposal bin. Any spillage onto the workshop floor needs to be wiped up and disposed of in the same way. It is important that only a gentle misting spray is used as a coarse spray will disperse the asbestos fibres into the air.

A respirator certified by the manufacturer as suitable for asbestos dust (for example, a P1 or P2 disposable respirator) needs to be worn during the above cleaning processes.

Compressed air, water hoses and aerosol cans must not be used to clean asbestos dust off components in the open workshop as they will disperse large numbers of fibres into the air.

Personal decontamination should be carried out in accordance with the [draft] WHS Regulations and this Code.

Dedicated asbestos-handling area

To minimise risks to other people, the area where asbestos components are cleaned and removed needs to be segregated and in a location where wind or cooling fans etc will not disturb any dust. All workers must be provided with information and training on asbestos hazards, its presence and the safety procedures that must be followed.

For all removal:

- segregate the vehicle from surrounding removal work areas. Try to have at least 3 metres separation and avoid windy locations and cooling fans etc
- use portable signs to indicate that asbestos removal is going on, and
- wear a P1 or P2 disposable respirator
- Personal decontamination should be carried out in accordance with the [draft] WHS Regulations and this Code.

Brake assembly repairs – vacuum method

- Use a HEPA-filter vacuum cleaner to clean the wheel prior to undoing the wheel nuts.
- Remove the wheel and vacuum any remaining dust on the wheel.
- Vacuum all dust off the brake assembly.
- Use a wet rag to wipe down all parts and remove final traces of dust.

- Vacuum any additional dust that is exposed during disassembly.
- Place the component and rags etc into a plastic bag, seal or tie it and then place it into a marked plastic-lined disposal bin or skip.
- Personal decontamination should be carried out in accordance with the [draft] WHS Regulations and this Code.

Brake assembly removal – wet method

- Place a tray or tape plastic sheeting on the floor under the removal area to catch spillage and assist in the clean up.
- Use a saturated rag to wet down the wheel and wipe off dust prior to removing the wheel nuts.
- Remove the wheel and clean off any remaining dust with the wet rag.
- Use a saturated rag and gentle water mist to thoroughly damp down any dust on the brake assembly.
- Personal decontamination should be carried out in accordance with the [draft] WHS Regulations and this Code.

Brake disc pads

- Use a saturated rag to wipe off exposed dust and dust exposed during disassembly. Wipe up any spillage on the floor.
- Place the component and rags etc into a plastic bag, seal or tie it and then place it into a marked plastic lined disposal bin or skip.
- Personal decontamination should be carried out in accordance with the [draft] WHS Regulations and this Code.

Clutch removal and repairs

- After separating the gearbox from the engine, vacuum/wet-wipe inside the bell housing and around the pressure plate.
- On removal of the pressure plate and clutch plate, vacuum/wet-wipe the flywheel, housing and components; place used rags and removed components in a plastic bag and seal.
- Place this plastic bag into a marked plastic-lined disposal bin or skip.
- Personal decontamination should be carried out in accordance with the [draft] WHS Regulations and this Code.

Cylinder head and exhaust gaskets

- If the gasket is damaged during separation of the components, wet it with water to control asbestos fibres.
- Keep the gasket wet and carefully remove it without using power tools.
- Wipe down the joint faces and the immediate area with a wet rag.
- Place the gasket and rag into a plastic bag and seal or tie it.
- Place this plastic bag into a marked plastic lined disposal bin or skip
- Personal decontamination should be carried out in accordance with the [draft] WHS Regulations and this Code.

Brake shoe

The process of removing asbestos-containing linings from brake shoes and clutch parts has the potential to release large quantities of asbestos fibres. All work involving power tools should be carried out within an enclosure that is fitted with an effective dust extraction and filtration system that will eliminate or minimise the release of airborne asbestos fibres. If components are to be hand worked carry out the following procedure:

- Undertake the work in a separate area away from other workers, preferably in a purpose-built enclosure.
- Thoroughly wet down the component to control dust/fibres.

- Wear PPE and RPE.
- Use local extraction to minimise the spread of dust/fibres.
- Control air monitoring must be carried out to determine respirable asbestos fibre exposure levels and the suitability of PPE.
- Clean up after removal with a vacuum cleaner and wet rag.
- Place waste asbestos into a plastic bag and seal or tie it.
- Place this plastic bag into a marked disposal bag, tie or seal it and place the bag into the disposal bin or skip (see disposal section below).
- Used respirators and overalls should not be worn away from the removal work area and need to be disposed of in the same way as asbestos waste.
- Personal decontamination should be carried out in accordance with the [draft] WHS Regulations and this Code.