



Asbestos Management

Objective/Scope

The purpose of this Procedure is to advise the process for the safe removal of asbestos and asbestos-containing materials (ACM) and are aware of the associated dangers and take the necessary precautions to reduce these risks. This Company Procedure applies to all KAEFER work places including maintenance and construction projects, Company workshops and stores, Company offices and other premises, regardless of the scope of works being carried out in that work place.

This Company Procedure has been produced and issued to inform KAEFER personnel of the minimum requirements to be implemented when undertaking the specified activity.

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1.0 INTRODUCTION

The aim of this procedure is to ensure that KAEFER personnel have an understanding:

- Of what Asbestos and ACM is;
- Of what it is and what it means for employees;
- Of the management controls that need to be implemented; and
- What the requirements are to comply with the Code of Practice for the Safe Removal of Asbestos 2nd Edition [NOHSC:2002(2005)] and Code of Practice for the Management and Control of Asbestos in Workplaces [NOHSC:2018(2005)].

2.0 REQUIREMENTS

2.1 What is Asbestos?

Asbestos is the fibrous form of mineral silicates belonging to the serpentine and amphibole groups of rock-forming minerals, including actinolite, amosite (brown asbestos), anthophyllite, chrysotile (white asbestos), crocidolite (blue asbestos), tremolite, or any mixture containing one or more of the mineral silicates belonging to the serpentine and amphibole groups.

2.2 Determining location of ACM

The client should give the asbestos removalist a copy of the workplace's register of ACM, developed in accordance with the Code of Practice for the Management and Control of Asbestos in Workplaces [NOHSC:2018(2005)], before any removal work commences.

It is the client's responsibility to identify ACM. This responsibility may not be abdicated to the asbestos removalist.

If there is no register of ACM, it is the client's responsibility to ensure a register is established before removal commences.

If no register is provided, it should be presumed by the client and the asbestos removalist that asbestos is present in all materials.

2.3 Asbestos Removal Control Plan

Prior to the commencement of any asbestos removal work a removal plan shall be completed by a competent person using Asbestos Removal Control Plan Form 1.

If required under State or Territory legislation, submitted to the State or Territory regulator with an application to remove Asbestos on the regulators form.

The Asbestos Removal Control Plan shall be made available to any and all relevant personnel involved in the works.

2.4 Notification

The KAEFER Supervisor will notify the regulator in writing at least five days before the licensed asbestos removal work commences. Emergency work will only be conducted with written approval by the regulator. In States and Territories where an asbestos removalist must hold a licence before being permitted to remove friable ACM, this licence must be held.

Notification of the State or Territory OHS authority of each removal task may also be required.

Some States and Territories require a licence and notification for the removal of specified quantities of ACM even if they are non-friable.

The relevant State or Territory OHS authority should be consulted prior to any ACM removal, to determine their requirements – *reference Appendix*.

Asbestos removalists must provide their licence details to their clients.

2.5 Supervision

When asbestos removal work is being carried out at a workplace, the asbestos removal supervisor must oversee the work. The licensed asbestos supervisor must have a certification appropriate to the type of licensed asbestos removal work. However, if the asbestos removal work requires a Class B licence, for example non-friable asbestos that is more than 10 m², then the asbestos removal supervisor must be readily available to a worker who is carrying out the work whenever it is being carried out. For example, if the supervisor is contactable by phone and able to arrive at the workplace within 20 minutes, this would be regarded as accessible.

All supervisory personnel must have a detailed knowledge of the precautions and procedures outlined in this code of practice.

The supervisory personnel should ensure that the client is reliably and regularly informed of the progress of the removal work.

2.6 Training and Competence

All persons involved in the removal of ACM must be competent for the tasks allocated to them. Some States and Territories regulate the competencies of asbestos removalists through licensing schemes. KAEFER require all Asbestos Removalists to have completed CPCCDE3015A Remove friable asbestos as a minimum. Supervisors must have completed CPCCBC4051A Supervise asbestos removal to acquire a certification to show they have the relevant training to be able to remove asbestos. Where required Asbestos Removalists and Supervisors must hold a relevant Licence to strip Asbestos that has been registered with the State and Territory Regulator.

Copies of licences and competencies will be kept on KMS, and/or hardcopies will be available onsite. Also, electronic and hardcopies of the applicable Codes of Practice will be kept and maintained onsite as stated in Section 6.0 References.

2.7 Health Aspects of Exposure to Airborne Asbestos Fibres

Asbestos is a known carcinogen. The inhalation of asbestos fibres is known to cause mesothelioma, lung cancer and asbestosis.

Mesothelioma was once rare, but its incidence is increasing throughout the industrial world as a result of past exposures to asbestos. Australia has the highest incidence rate in the world.

Health surveillance is an important part of the monitoring of exposure to hazardous substances, including asbestos, to ensure the health and safety of people in workplaces. Asbestos Removalists and Supervisors will have a Health Assessment every 2 years.

Health monitoring includes a medical examination to provide an initial baseline medical assessment and includes the following (unless another form of health monitoring is recommended by a registered medical practitioner):

- Consideration of the worker's demographic, medical and occupational history
- Consideration of records of the worker's personal exposure
- A physical examination of the worker with emphasis on the respiratory system, including standardised respiratory function tests, unless another form of health monitoring is recommended by a registered medical practitioner.

KAEFER will pay all expenses relating to health monitoring and will also provide a copy of the report, as soon as reasonably possibly after obtaining it from the medical practitioner, to:

- The worker
- The regulator, if the report contains:
 - Any test results that indicate the worker may have contracted a disease, injury or illness as a result of the work that triggered the need for health monitoring
 - Any recommended remedial measures, including whether the worker can continue to carry out the work
- All other persons conducting a business or undertaking who have a duty to provide health monitoring for that worker.

Reports will be kept as a confidential record for at least 40 years after the record is made and identified as a formal record for the particular worker in the HR System. The report and results must not be disclosed to anyone unless the worker has provided their written consent. However, if the person was releasing the record under a duty of professional confidentiality, the worker's written consent is not required.

2.8 Barricading and Signage

There are two 'asbestos removal boundaries' for asbestos removal work: the boundaries of the asbestos work area and the boundaries of the asbestos removal site. All Barricaded areas will be included in the Asbestos Removal Control Plan JSEA Form (HS-F-021).

The asbestos work area is the immediate area in which ACM removal work is taking place.

The asbestos removal site is the region surrounding, and adjacent to, this asbestos work area.

The asbestos work area and the asbestos removal site should be clearly defined.

The boundaries of the asbestos work area and the asbestos removal site should be determined by a competent person and should be based on a risk assessment.

All interested parties must agree on the asbestos removal boundaries before any asbestos removal work may commence.

If a workplace and the type of asbestos removal work involved are both similar to those at a previously determined site, the same boundaries can be applied, after a reassessment for each site.

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

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

Before carrying out asbestos removal work the Supervisor must ensure that signs indicate where the asbestos removal work is being carried out and barricades are erected to delineate the asbestos area. This will assist in limiting access to the asbestos removal work area and should remain in place until removal is completed and clearance to reoccupy has been granted. Responsibilities for the security and safety of the asbestos removal site and removal work area shall be specified in the Asbestos Removal Control Plan and JSEA Form (HS-F-021). This includes inaccessible areas that are likely to contain asbestos.

The person with management or control of the workplace is aware that licensed asbestos removal work is being carried out, they must ensure that access to the removal area is limited to the following people:

- Workers who are engaged to carry out the removal work
- Other people who are associated with the removal work
- People who are allowed under the WHS Regulations or another law to be in the asbestos removal area (for example, inspector, emergency service workers).

A combination of using signs and barricades may be necessary to limit access to the asbestos removal area, for example installing a fence and signs may be used as a method to inform people that it is the asbestos removal area. Using locking access doors may be appropriate as long it does not create an evacuation hazard.

All people who have access to the removal area should comply with any direction given by the licensed asbestos removalist.

Warning signs

Warning signs must be placed so they inform all people nearby that asbestos removal work is taking place in the area. Signs should be placed at all of the main entry points to the asbestos removal work area where asbestos is present.

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.

Barricades

The use of barricades assists with traffic control and prevents access to the asbestos removal site and removal work area.

The purpose of barricades is to delineate and isolate the asbestos removal area with appropriately placed barricades. Barricades can take various forms, from tape to solid hoarding. The type of barricading should reflect the level of risk. For friable asbestos removal work, solid barricades should be used. Tape may be appropriate for non-friable asbestos removal work of short duration.

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

In determining the distance between barriers and the asbestos removal area, the following should be considered:

- 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 method of asbestos removal
- Any existing barriers (walls, doors)
- The quantity of asbestos to be removed
- The type of barrier used (for example, hoarding or tape).

2.9 Clearance Inspection

The Asbestos Supervisor must ensure that, once the asbestos removal work has been completed, a clearance inspection is carried out and a clearance certificate is issued before the workplace can be re-occupied by:

- An independent licensed asbestos assessor, for work that must be carried out by a Class A licensed asbestos removalist (for example, if the removal work involved friable asbestos)
- An independent competent person, for asbestos work that is not required to be carried out by a Class A licensed asbestos removalist (for example, if removal work involved more than 10 m² of non-friable asbestos).

This also includes where the work is being carried out at domestic premises.

To be independent, the licensed asbestos assessor or competent person must not be involved in the removal of asbestos for that specific job and is not involved in a business or undertaking involved in the removal of the asbestos for that specific job.

The independent licensed assessor or competent person must not issue a clearance certificate unless they are satisfied that the asbestos removal area and the area immediately surrounding it are free from visible asbestos contamination. To do this, they can conduct a visual inspection for evidence of dust and debris. If air monitoring was also conducted, the results of that test must show that asbestos is below 0.01 fibres/ml.

If a clearance certificate has not been obtained, the asbestos 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.

Unauthorised persons cannot enter the asbestos removal work area prior to a clearance certificate being issued and any protective barricades should remain in place until the completion of all licensed asbestos removal work and the final clearance certificate is issued.

2.10 Electrical and Lighting

The risk of an electrical injury, particularly when water is involved, must be addressed prior to any ACM removal.

The best control is the de-energisation and removal of electrical installations from the asbestos work area.

If electrical installations cannot be disconnected and removed, they must, at the very least, be de-energised.

The de-energised installation must be tagged and locked out 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/NZ 3000:2018 (wiring rules).

A licensed electrician must perform the safe removal and reinstallation of electrical cables and electrical equipment and ensure any electrical cabling or equipment is safe prior to re-energisation.

If there are fire detectors in the asbestos work area a competent person should isolate the circuits, as required, prior to the ACM removal.

Similarly, if there are smoke or thermal detector heads in the asbestos work area a competent person should remove the heads and isolate the circuits prior to any ACM removal work.

Upon the completion of the asbestos removal work a competent person should replace the heads, reactivate and test the system, prepare a certificate stating that the heads are operational and forward it to the person with control.

All portable electrical tools and equipment, including flexible leads, and any electrical installations utilised by workers during the asbestos removal should comply with AS/NZS 3012:2010 Electrical Installations – Construction and Demolition Sites.

2.11 Preparation

Preparation activities include minimising the number of people present and gathering the correct tools, PPE, decontamination materials, barricades, warning signs, etc at the workplace before any work commences.

Before removal tasks commence plastic sheeting (for containment) may need to be placed on the floor or other surfaces that may become contaminated with asbestos dust. If the removal work is not being carried out in an enclosure, the surfaces to be worked on should be cleaned, by either wet wiping or vacuuming, to minimise exposure from the disturbance of asbestos fibres that might be on the surfaces prior to the commencement of removal task

2.12 Wet and Dry Methods for Removing ACM

Wherever possible, dry ACM should **NOT** be worked on.

Techniques that prevent the generation of airborne asbestos fibres should be used.

The following methods should be used for removing ACM, except when cleaning up asbestos-cement debris from soil

2.12.1 Wet spray method (most preferred)

The ACM should be saturated through its full depth and maintained in a wet condition.

In many instances it is helpful if a wetting agent (surfactant), such as detergent, is added to the water, as this facilitates more rapid wetting of the ACM.

A manually controlled, consistent low pressure, coarse spray, such as from an adjustable pistol-grip garden hose, is recommended for this purpose.

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

With this method, a water spray should be applied in a manner that:

- Ensures the entire surface of the ACM is saturated; but
- Minimises runoff.

While the water spray should be copious, it should not be so forceful that the water droplets generate dust when they hit the surface of the ACM.

When cutting equipment is being used to remove an ACM that is friable, the water spray should be directed at the site of the cut and the wetted material should be removed as the cut progresses.

The wetted ACM should be removed in sections, immediately placed in suitably labelled asbestos waste containers and properly sealed. Any small sections that might be dislodged should be collected and properly disposed of as asbestos waste.

This is the preferred removal method. It should only be used, however, if:

- The ACM is not covered with other materials such as calico or metal cladding, which require prior removal;
- There is no reinforcing wire or other similar restriction on removal;
- The ACM is not coated with paint or mastic;
- Any rapid temperature drop caused by excessive water will not damage heated metal components; and
- No live electrical conductors are present and no damage to electrical equipment can arise from the ingress of water.

Although airborne asbestos fibres are significantly suppressed when the wet spray method is used, they are not entirely eliminated, so effective respiratory protection is also essential.

2.12.2 Dry Removal Method (least preferred)

The dry removal method should be used only if:

- The wet spray method is not suitable (e.g. if there are live electrical conductors or if major electrical equipment could be permanently damaged or made dangerous by contact with water); and
- Prior approval has been obtained from the relevant State or Territory OHS authority (if this approval is required, as it is in some States and Territories).

There is a much greater potential for airborne asbestos fibres to be generated with the dry removal method than with the wet spray method.

Accordingly, if the dry removal method has to be used the following factors must be considered and employed, as determined by a risk assessment:

- The work area should be fully enclosed with plastic sheeting (at least 200 µm thick) and maintained at a negative pressure (at least 12 Pa water gauge).
- All personnel involved in the removal operation should wear full-face, positive pressure, supplied air respirators.
- The ACM should be removed in small, pre-cut sections with minimal disturbance, so as to reduce the generation of airborne asbestos fibres as much as possible.
- Waste material should be immediately placed in appropriate wetted containers.
- In some situations, asbestos vacuum cleaners can be used to minimise airborne asbestos fibres. If it is possible to use asbestos vacuum cleaners, shadow vacuuming techniques should be employed. In order to achieve the required efficiency, the air speed at the extraction point should be at least 1 m/sec and the nozzle should be large enough and placed close enough (at a distance not more than the diameter of the nozzle) to provide efficient collection of airborne fibres.

2.13 Asbestos Removal Equipment

2.13.1 Tools

Care should be taken in selecting tools for asbestos removal tasks.

In addition to having to be suitable for these tasks, all tools should prevent or minimise the generation and dispersion of airborne asbestos fibres as much as possible.

The use of power tools in asbestos removal work should be avoided because of the possibility of internal contamination, which commonly occurs with such devices.

In general, manually operated hand tools are preferred.

If manually operated hand tools are not sufficient, low-speed battery powered tools, which may be used in conjunction with wet methods for dust control, are preferred

Battery-powered tools should be fitted with a local exhaust ventilation (LEV) dust control hood wherever other dust control methods (e.g. use of wet removal methods) are determined to be unsuitable. Consideration should be

given to the use of shadow-vacuuming techniques if a LEV dust control hood cannot be attached and no other dust control method is used.

Some State and Territory OHS authorities prohibit the use of power tools in certain circumstances, so the relevant authority should be consulted before power tools are used. At the end of the removal work, all tools should be:

Decontaminated (i.e. fully dismantled and cleaned under controlled conditions as described in section 9.9.2), or

Placed in sealed containers (and used only for asbestos removal work); or

Disposed of as asbestos waste.

Warning: High-speed abrasive power or pneumatic tools such as angle grinders, sanders, saws and high speed drills must never be used.

2.13.2 Spray equipment

A constant low-pressure water supply is required for wetting down asbestos. 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 able to be used.

Warning: High-pressure spray equipment must never be used

2.13.3 Asbestos vacuum cleaners

Asbestos vacuum cleaners should comply with the requirements of AS/NZS 60335.2.69:2017 Household and similar electrical appliances – Safety – Particular requirements for wet and dry vacuum cleaners, including power brush, for commercial use and AS 4260:1997 (R2018) High Efficiency Particulate Air Filters (HEPA) – Classification, Construction and Performance.

Warning: domestic vacuum cleaners are unsuitable and should never be used, even if they have a HEPA filter.

Asbestos vacuum cleaners should only be used for collecting small pieces of asbestos dust and debris. Larger pieces should never be broken into smaller sizes so they can be vacuumed.

Asbestos vacuum cleaners should not be used for vacuuming wet materials because this can damage the HEPA filter.

Use the correct attachment to the asbestos vacuum cleaner for the type of surface you are cleaning.

Procedures should be established for the general maintenance 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 or decontamination.

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.

If hiring is necessary, they should be hired only from organisations that provide vacuum cleaners specifically for work with asbestos. 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 asbestos work area and users are wearing appropriate PPE.

When the work is completed, the asbestos vacuum cleaner should be decontaminated — with the bag and filter being removed in accordance with the manufacturer's instructions and disposed of as asbestos waste, and the inside and outside of the vacuum cleaner being wet wiped — and the asbestos vacuum cleaner should be re-sealed in the storage container provided. The sealed storage container should then be decontaminated by wet wiping before being removed from the asbestos work area and returned to the hire organisation.

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

2.13.4 Inspection of Equipment

All equipment used for the removal of ACM should be inspected before the commencement of the removal work, after any repairs and at least once every seven days when it is continually being used.

A register with details of these inspections, the state of the equipment and any repairs should be maintained.

2.14 Personal Protective Equipment (PPE)

2.14.1 Respiratory Protective Equipment

All persons engaged in asbestos removal work should wear respiratory protective equipment (RPE) conforming to the requirements of AS/NZS 1716:2012 Respiratory Protective Devices.

The selection, use and maintenance of respirators should be in accordance with AS/NZS 1715:2009 Selection, Use and Maintenance of Respiratory Protective Devices.

Respirators should be issued to individuals for their exclusive use. A system of regular cleaning, inspection and maintenance should be provided for respirators on extended personal issue, and records of all respirator issues and uses should be established and maintained.

The level of respiratory protection required (e.g. P1, P2 and P3 supplied air respirators) should be determined by a competent person in accordance with the asbestos removal task to be undertaken.

Systems of work should be established for the cleaning, maintenance and storage of respirators in accordance with AS/NZS 1715:2009. Respirators should be maintained in a clean and good working condition by the person designated by the supervisor of the removal job to look after and be responsible for the safe working condition of respiratory equipment. Respirator defects should be reported immediately to the supervisor of the removal job for repair or replacement.

Workers should receive instruction and training in the correct method of using their respirators, the importance of a correct facial fit and the requirements of the system of regular cleaning, inspection and maintenance.

All workers should undergo a 'fit test' in order to determine their suitability to wear negative pressure respirators. Persons with beards or other facial hair or stubble will not be protected properly by 'negative pressure' respirators that require a facial seal, so all asbestos removal workers using respirators that require a facial seal should be clean-shaven.

If a medical condition precludes the use of negative pressure respirators, individuals should be provided with a continuous flow, positive pressure respirator wherever possible. The suitability of these individuals for work in the asbestos removal industry should be assessed by a qualified medical practitioner.

Persons requiring the use of prescription spectacles may not be able to use full-face respirators, because of the loss of seal around the spectacle arms. If their spectacles cannot be modified so that they do not need the support of the ears, these people should not use full-face respirators and should wear air supply hoods instead. It is important, however, to be sure these hoods will provide a sufficient level of protection.

Where air-lines are used, the air-line should incorporate a belt mounted back-up filter. Where a failure of the air supply system occurs, workers should leave the work area using normal decontamination procedures. The use of a backup 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.

A competent person may change the level of respiratory protection at any stage during the removal process following a thorough assessment of the fibre levels actually experienced inside the asbestos work area. Typically, this may occur during the final clean-up after the removal of friable ACM, when the use of air lines is no longer considered necessary.

All filters used while working with asbestos should be disposed of as asbestos waste.

2.14.2 Protective Clothing and Footwear

Protective clothing should be provided and worn at all times during all work in the asbestos work area prior to the final clearance inspection.

Protective clothing should be made from materials which provide adequate protection against fibre penetration. Coveralls should not have external pockets or velcro fastenings because these features are easily contaminated and difficult to decontaminate.

Disposable coveralls are preferred. They should never be reused, and must be disposed of as asbestos waste.

In some limited circumstances — for example, if there is a fire hazard — disposable protective clothing is not appropriate and re-usable types may be used.

Laundering of asbestos contaminated protective clothing is not recommended, because decontamination cannot be guaranteed. The otherwise reusable coveralls etc. should instead be disposed of as asbestos waste.

If re-usable protective clothing is to be laundered, notwithstanding these recommendations, the clothing should be completely wetted before it is double bagged and sent to a laundering facility capable of laundering asbestos contaminated clothing. In some States and Territories notification requirements apply. The laundering of contaminated protective clothing in workers' homes is strictly prohibited.

Clothing made from wool or other materials that attract fibrous dusts should not be worn in the asbestos removal site.

Special attention should be paid to the risks of heat stress from working in very hot environments. A competent person should determine the most suitable protective clothing and decontamination procedures for workers in these situations.

The use of protective gloves should be determined by a risk assessment. If significant quantities of asbestos fibres may be present, disposable gloves

should be worn. Protective gloves can be unsuitable, however, if dexterity is required. All gloves used for asbestos removal work must be disposed of as asbestos waste.

Regardless of whether gloves are used, asbestos removal workers must clean their hands and fingernails thoroughly after work.

Appropriate safety footwear (i.e. steel-capped rubber-soled work shoes or gumboots) should be provided for all asbestos removal workers. This footwear should be laceless, because laces and eyelets are easily contaminated, and should remain inside the asbestos work area or dirty decontamination area for the duration of the asbestos removal work. When not in use, the safety footwear should be stored upside down to minimise asbestos-contamination inside the footwear. Storage facilities should be provided to allow this.

Safety footwear must be decontaminated at the end of the job and upon leaving the work area, or sealed in double bags for use on the next asbestos removal site (but not for any other type of work). Work boots cannot be effectively decontaminated must be disposed of as asbestos waste.

2.15 Air Monitoring

Air monitoring should be performed whenever ACM are being removed, to ensure the control measures are effective.

In most cases only control monitoring, rather than exposure monitoring, is required, because the risks to all asbestos removal workers should already have been assessed and effective respiratory protection etc. should already be provided.

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

A competent person, who is independent from the person responsible for the removal work, should determine all air monitoring requirements. Among other things, they should decide:

- The location, rate and frequency of sampling;
- Whether is necessary to monitor air quality in areas adjacent to, above and below the asbestos work area, taking account of the potential exposures of occupants of these areas; and
- Whether additional routine air sampling is warranted in (for example) nearby high-occupancy areas.

Written air monitoring programs should be developed by this competent person for all indoor removals of friable ACM, and also for all outdoor removals of friable ACM where there might be a risk to other persons.

The air monitoring program should include requirements for clearance monitoring.

Although an air monitoring program is not always necessary for the removal of non-friable ACM, it is nonetheless good occupational hygiene practice.

Air monitoring should be performed in accordance with the NOHSC Guidance Note on the Membrane Filter Method for Estimating Airborne Asbestos Fibres [NOHSC:3003 (2005)].

Asbestos removal work must not commence until the air monitoring has commenced.

Static air samplers should generally be placed in the middle of the sampling area, away from areas where there may be poor air mixing (e.g. close to walls, corners or large objects) or fast air movements (e.g. in front of air-conditioning inlets or exhausts).

If an enclosure is used, air monitoring should occur:

- Prior to any work (background monitoring);
- At least daily at the boundary of the asbestos work area;
- As part of preliminary clearance monitoring, following a satisfactory visual inspection; • during dismantling of the enclosure, and
- As part of the final clearance inspection.
- If an enclosure and a decontamination unit are used, air quality should be monitoring at the following locations:
 - The clean side of the decontamination unit;
 - The change area;
 - The lunch room (where applicable);
 - The laundry; and
 - The surroundings of the asbestos work area including in the vicinity of the negative air exhaust (where possible).

Note: Air monitoring of the exhaust from the extraction unit is a specialised task. The membrane filter method (MFM) is unsuitable, because the results obtained do not always truly reflect actual fibre concentrations in the exhaust air, and air monitoring devices should not be positioned at the exit point of a negative pressure exhaust air unit, because this can lead to unwarranted confidence in the filter's integrity. If the exhaust is to be monitored directly, isokinetic sampling techniques should be used.

The results of all air monitoring should be provided to all relevant parties as soon as possible.

The relevant State or Territory OHS authority should be consulted for further information on air monitoring requirements.

2.15.1 'Control levels' for monitored airborne asbestos fibres

'Control levels' are airborne asbestos fibre concentrations which, if exceeded, indicate there is a need to review current control measures or take other action.

These control levels are occupational hygiene 'best practice', and are not health-based standards (they are below the concentration set in the NES for asbestos).

The control levels shown in **Table 2** should be used for the purposes of determining the effectiveness of control measures:

Table 2 – Control levels and required actions

Control level (airborne asbestos fibres/mL)	Control / Action
< 0.01	Continue with control measures
≥ 0.01	Review control measures
≥ 0.02	Stop removal work and find the cause

2.16 Decontamination

When carrying out asbestos removal work, the licensed asbestos removalist must ensure decontamination facilities are available for the asbestos removal work area, any plant used in that area and workers carrying out the asbestos removal work.

The type of decontamination required will depend on the type of asbestos (i.e. friable or non-friable); the work method used, and site conditions. Decontamination must include the asbestos work area, all tools and equipment and personal decontamination.

All contaminated materials, including cleaning rags, plastic sheeting and PPE etc, must be disposed of as asbestos waste.

Some asbestos removal work necessitates the use of decontamination units.

2.16.1 Workplace Decontamination

Any asbestos dust or debris must be collected in a safe manner and the asbestos work area decontaminated, paying attention to all walls, ledges, fittings and furnishings.

Two types of decontamination procedures may be used: wet and dry decontamination:

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 re-folded 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.

Dry decontamination should be only used where wet methods are not suitable or pose a risk because of other hazards such as electricity or slipping. Dry decontamination procedures include carefully rolling or folding up and sealing plastic sheeting and/or vacuuming the asbestos work area with an asbestos vacuum cleaner. Large pieces of asbestos debris should be wetted and picked up by hand rather than vacuumed.

Whenever the asbestos work area cannot be decontaminated using either the wet or dry method — for example, if there is rough sawn wood that cannot be fully decontaminated by wet wiping or vacuuming — pigmented polyvinyl acetate (PVA) may be used to seal the contaminated sections of the asbestos work area, including any plant or equipment where practicable.

2.16.2 Decontamination of Equipment and Tools

All tools and equipment used during the removal task should be decontaminated using either the wet or dry decontamination procedures described above, before they are removed from the asbestos work area. The method chosen should depend on its practicality and the presence of any electrical hazards.

If tools and equipment cannot be decontaminated in the asbestos work area, or are to be reused at another asbestos work area, they should be tagged to indicate asbestos contamination and double bagged in asbestos waste bags before being removed from the asbestos work area. This equipment and 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 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. Bags containing asbestos contaminated equipment and tools should be clearly labelled with an appropriate warning statement.

2.16.3 Decontamination of Soil

In some circumstances soil can become contaminated with ACM. This can occur, for example, during the removal of ACM, at landfill sites or if the ACM are damaged.

If there is a risk of soil contamination the area should be visually inspected, and if any ACM are detected the soil must be decontaminated.

The methods used for this decontamination should be based on a risk assessment. The use of professional site remediation advice and/or services should be considered.

During soil decontamination the topsoil should be dampened down, to minimise the generation of dust, and all visible pieces of ACM debris should be picked up individually, so that the risk of asbestos fibre inhalation is effectively eliminated.

If this is not practicable, the contaminated topsoil should be removed to a depth that has no visible contamination or asbestos debris.

The contaminated soil must be disposed of as asbestos waste.

2.16.4 Personal Decontamination

Personal decontamination must be undertaken each time workers leave the asbestos work area and at the completion of the asbestos maintenance or service work. Personal decontamination should be done within the asbestos work area where re-contamination cannot occur.

Asbestos-contaminated PPE should not be transported outside the asbestos work area except for disposal purposes.

Before work clothes and footwear worn during asbestos work are removed from the asbestos work area for any reason, they should be thoroughly vacuumed with an asbestos vacuum cleaner to remove any asbestos fibres (see section 9.6.3), and the footwear should also be wet wiped.

Respiratory protective equipment 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 asbestos work must not be taken home.

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

If **friable ACM** are being removed, the decontamination procedures must be followed. However, if only small quantities of **non-friable ACM** are being removed, a competent person may decide, on the basis of a risk assessment, that the following personal decontamination procedure can safely be used, instead of a full decontamination unit:

- First, all visible asbestos dust/residue is removed from protective clothing, using an asbestos vacuum cleaner and/or wet wiping.
- Second, the protective clothing is taken off (while still using a respirator) and placed in an asbestos waste bag. (Disposable protective clothing is preferred. If non-disposable clothing is used, it should be completely wetted before double bagging, labelled and sent to a laundering facility capable of laundering asbestos-contaminated clothing. In some States and Territories notification requirements apply. The laundering of contaminated protective clothing in workers' homes is strictly prohibited.)

- Third, clothing and footwear worn during the removal should be vacuumed using an asbestos vacuum cleaner and the footwear should also be wet wiped.
- Disposable respirators should then be discarded as asbestos waste. Non-disposable respirators should be removed and thoroughly cleaned.
- After removing the respirator, workers should wash their face and hands, paying particular attention to their fingernails.

This form of personal decontamination might be suitable, for example, following the removal of:

- An asbestos gasket;
- An asbestos (zelemite) electrical switchboard; • small amounts of asbestos-cement sheeting or vinyl floor covering;
- Minor amounts of asbestos debris;
- Asbestos-cement conduits and in-ground surface pits; or
- Asbestos friction materials.

However, some of these forms of ACM could be friable, making more extensive decontamination procedures necessary. The measures adopted should always address the risks of each individual asbestos removal job.

2.17 Waste containment and disposal

When carrying out licensed asbestos removal work, the licensed asbestos removalist must ensure that asbestos waste is contained and labelled in accordance with the GHS before the waste is removed from the asbestos removal area. It must be disposed of as soon as is practicable at a site authorised to accept asbestos waste.

PPE

Disposable PPE that has been used in the asbestos work area and is contaminated with asbestos must be sealed and labelled in a container and disposed of upon completion of the asbestos removal work.

In some cases, it may not be reasonably practicable to dispose of PPE that is clothing. In this case, the clothing must be laundered at a laundry that is equipped to launder asbestos-contaminated clothing. If this cannot be done, the clothing must be sealed in a container until it is reused for asbestos removal purposes.

It may also not be reasonably practicable to dispose of PPE that is not clothing. If this is the case, the clothing must be decontaminated prior to it being removed from the asbestos removal area. If this cannot be done, the PPE must be sealed in a container until it is reused for asbestos removal purposes.

Where a sealed container has been used, it must be decontaminated and labelled in accordance with the GHS prior to it being removed from the asbestos removal area to indicate that it contains asbestos.

2.17.1 Waste Disposal Program

A waste disposal program should be developed, taking account of:

- Waste containment,
- The location for waste storage on site, • the transport of wastes within the site and off-site,
- The location of the waste disposal site,
- Approvals needed from the relevant local disposal authority,
- Any local disposal authority requirements that may apply to the amount and dimensions of asbestos waste, and
- Any state or territory requirements that may apply to the amount and dimensions of asbestos waste.

Loose asbestos waste should not be allowed to accumulate within the asbestos work area.

Asbestos waste may be collected and disposed of in an asbestos waste, a drum or bin or a waste skip.

If asbestos waste cannot be disposed of immediately (e.g. because of volume requirements for disposal), it should be stored in a solid waste drum, bin or skip and sealed and secured upon the completion of each day's work so that unauthorised access is prevented.

2.17.2 Waste Bags

Asbestos waste should be collected in heavy-duty 200 µm (minimum thickness) polythene bags that are no more than 1200 mm long and 900 mm wide.

The bags should be labelled with an appropriate warning, clearly stating that they contain asbestos and that dust creation and inhalation should be avoided.

An example of a warning statement which might be used is:

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

Controlled wetting of the waste should be employed to reduce asbestos dust emissions during bag sealing or any subsequent rupture of a bag.

Only unused bags should be used, and bags marked for asbestos waste should not be used for any other purpose.

Hard and sharp asbestos waste requires preliminary sealing or a protective covering before it is placed in the waste bags, to minimise the risk of damage to the bags.

In order to further minimise the risk of a bag's tearing or splitting, and also to assist in manual handling, asbestos waste bags should not be filled more than half full and excess air should be gently evacuated from the waste bag, in a manner that does not cause the release of dust.

The bags should then be twisted tightly, folded over and the neck secured in the folded position with adhesive tape or any other effective method. The external surface of each bag should be cleaned to remove any adhering dust before the bag is removed from the asbestos work area.

All asbestos waste should be double bagged outside the work area immediately following the decontamination process.

The routes used for removing waste from the asbestos work area should be designated in the asbestos removal control plan before the commencement of each removal. The methods used to transport wastes through a building should be determined by a competent person following discussions with the asbestos removalist. In occupied buildings, all movements of waste bags should be outside normal working hours.

Once the waste bags have been removed from the asbestos work area, they should either:

- Be placed in a solid waste drum, bin or skip (see sections 9.10.3 and 9.10.4); or
- Be removed from the site by an approved and licensed carrier.

Waste bags should not be stored at the asbestos removal site if they are not placed in an asbestos waste drum, bin or skip.

If a decontamination unit is being used for the asbestos removal work (see sections 10.2.3 and 10.2.4), asbestos waste bags should be removed from the asbestos work area through the decontamination unit using the following 'production line' operation:

- One worker is located in each section of the decontamination unit.
- The waste bags are passed from cubicle to cubicle and 'showered out' to remove any asbestos residue.

- Once they have been removed from the decontamination unit, the waste bags are double bagged prior to disposal.

2.17.3 Asbestos Waste Drums or Bins

All drums or bins used for the storage and disposal of asbestos waste should be in a good condition, with lids and rims in good working order, and free of hazardous residues.

The 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.

If the drum or bin is to be re-used, the asbestos waste must be packed and sealed so that when the drum or bin is emptied there is no residual asbestos contamination.

Controlled wetting of the waste should be used to reduce asbestos dust emissions.

Where possible, the drums or bins should be placed in the asbestos work area before work on ACM begins. The drums or bins should have their rims sealed and their outer surfaces wet wiped and inspected before they are removed from the asbestos work area. If it is not possible to locate the drums or bins inside the asbestos work area, they should be located as close to the work area as possible. Routes for moving the waste from the asbestos work area to the waste drums or bins should be designated prior to the commencement of each task. A competent person should decide the best means of moving the waste through the building. In occupied buildings, all movement of bags from the work area to the waste drums or bins should be performed out of normal working hours.

Drums or bins used to store asbestos waste should be stored in a secure location when they are not in use.

Drums or bins should not be moved manually once they have been filled. Trolleys or drum lifters should be used.

Vacuum suction (Super Suckers) may be used to collect removed ACM. A competent person should assess the process to prevent asbestos-contamination. Air from the vacuum system must pass through a HEPA filter before it is released outside the asbestos work area.

2.17.4 Asbestos Waste Skips & Etcetera

If it is not feasible to use asbestos waste bags, drums or bins, because of the volume or size of the asbestos wastes, a waste skip, vehicle tray or similar container may be used.

Skips should be in good condition.

The ACM should be sealed in double-lined, heavy-duty plastic sheeting or double bagged before they are 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 fibres.

Once the skip is full its contents should be completely sealed with the plastic sheeting.

If the skip is to be used for storing the asbestos waste its contents must be able to be secured (e.g. using a lockable lid).

2.17.5 Disposal of Asbestos Waste

All asbestos waste should be removed from the workplace by a competent person and transported and disposed of in accordance with all relevant State or Territory legislation and guidelines for the transport and disposal of asbestos waste.

In some States and Territories, a licence from environmental and/or waste disposal authorities is required for the transport and disposal of asbestos waste.

Further information on the transport and disposal of asbestos waste, including licensing requirements and designated asbestos waste dumps, may be obtained from local councils or the relevant environmental protection authority or waste disposal authority.

3.0 INSPECTION CHECK SHEETS AND LOGS

All relevant inspections are carried out by the nominated site Supervisor(s). All records will be entered accurately and kept on site available for monitoring.

- HS-F-022 Asbestos Enclosure Inspection Record
- HS-F-023 Daily Inspection Record -Exhaust Extractors
- HS-F-024 Daily Inspection Record -Vacuums
- HS-F-025 Daily Inspection Record- Hygiene Decontamination Unit
- HS-F-026 Daily Inspection Record -Respirator (Mask Filtering Type)
- HS-F-027 Asbestos Enclosure Inspection-Three Stage Clearance
- HS-F-028 Daily Inspection Record –Respirator- Power Assisted Personal Respirator (PAPR)
- HS-F-029 Daily Inspection Record -Asbestos Strip Multi Point Injection Machine
- HS-F-030 Asbestos Operations Pre-Start Log Continuation Sheet
- HS-F-031 Enclosure Entry and Exit Log (Asbestos)

4.0 ADDITIONAL REQUIREMENTS FOR THE REMOVAL OF FRIABLE ACM

The methods used to remove ACM must prevent the release of asbestos fibres into the atmosphere, both during and after the removal operation.

Choices of removal methods will therefore depend on the nature, condition, quantity and location of the ACM and any other health or safety hazards present.

This **Part** describes the controls commonly required for the removal of friable ACM, in addition to the controls required for all asbestos removals.

ACM that are friable should be removed using wet methods, wherever possible, and within an enclosed area.

In addition:

- All ventilation and air-conditioning networks servicing the asbestos work area should be closed down for the duration of the asbestos removal work and all vents thoroughly sealed to prevent the entry of airborne asbestos fibres into the duct network;
- Upon completion, and after final cleaning of the asbestos work area, all mechanical ventilation filters for recirculated air should be replaced; and
- Care should be taken to ensure that airborne asbestos fibres cannot escape at points where pipes and conduits pass out of the asbestos work area (greater attention to sealing and testing is required in these regions, particularly if service riser shafts pass through the asbestos work area).

The methods described below are commonly used for the removal of sprayed asbestos thermal and acoustic insulation from buildings and structures and the removal of ACM from plant and equipment, including steampipes, boilers and other industrial plant.

4.1 Negative Pressure Exhaust Units

To prevent the escape of airborne asbestos fibres from an enclosed asbestos work area, an exhaust extraction fan should be installed so as to create a 'negative' air pressure of approximately 12 Pa (water gauge) within the enclosed asbestos work area.

Ideally, the negative pressure exhaust unit should be positioned opposite the decontamination unit to enable laminar (smooth) air flow. In this arrangement, most of the air entering the asbestos work area passes through the decontamination unit or point of entry, while the air extracted by this system passes through a HEPA filter to remove any asbestos dust before it is discharged to the outside atmosphere at a location distant from other working areas, air-conditioning inlets or breathing air compressors.

The extraction equipment should be operated continuously (i.e. 24 hours a day) until all asbestos removal and decontamination tasks within the enclosure have been completed. The HEPA filter must comply with AS 4260:1997 (2018) High Efficiency

Particulate Air Filters (HEPA) – Classification, Construction and Performance. 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.

Procedures should be established for changing these HEPA filters so that areas outside of the enclosure are not contaminated.

The most satisfactory method for assessing the integrity of the HEPA filter and seal fittings is regular inspection, in conjunction with a static pressure alarm to indicate any failure in the system.

4.1.1 Enclosures for Large-scale Asbestos Removal Work

Wherever practicable, enclosed 'negative pressure' asbestos work areas should be established for any large-scale removal of friable ACM.

Similar large enclosures can also be used for the removal of non-friable ACM, if a risk assessment concludes that enclosure is an effective control for the risks involved.

The design and installation of the enclosure should take account of:

- The methods used to contain the asbestos work area;
- The provision and locations of decontamination and changing facilities;
- The precautions which must be implemented to prevent the spread of asbestos-contamination outside the asbestos work area;
- Air quality within the enclosure (e.g. there must always be sufficient oxygen, and machinery emitting any fumes or potentially dangerous gases must be placed outside the enclosure, well away from any intake for the enclosure);
- The temperature within the enclosure (especially to avoid heat stress); and
- Any other hazards in the enclosure (these must be identified and control measures established before any asbestos removal work commences).

Work methods may also need to be adapted for the work environment within the enclosure. For example, rest breaks should be based a risk assessment, taking account of factors such as the weather and heating/cooling requirements.

4.1.2 The Enclosure

Heavy-duty plastic sheeting (200 µm minimum thickness) should be used for the enclosure. Re-milled plastic must not be used.

Every location where the asbestos work area connects to the outside environment or the rest of the building (e.g. windows, ducts, wall cavities, conduits and lift entrances) should be enclosed, so that an airtight seal is maintained for the duration of the asbestos removal work. The plastic sheeting should enclose all the walls, windows and doors. Wooden cleats may be able to be used to anchor the plastic sheeting to walls.

Viewing panels should be placed in appropriate locations.

Adequate lighting needs to be provided within the enclosure, either naturally, using clear plastic or perspex panels in the enclosure walls, or artificially, preferably from outside the enclosure and again using clear plastic or perspex panels. Lights within an enclosure can increase the temperature within the enclosure.

All non-movable items (i.e. fixtures and fittings) should be covered with plastic sheeting and all the joints sealed.

All movable items should be removed from the asbestos work area or, if this is not possible, moved to a convenient location and covered with two layers of plastic sheeting, with a minimum overlap of 300 mm between the layers. Both of these layers should be double taped.

Air locks should be provided at the entry points to the change area. These air locks should be 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. It is important for penetration to be prevented. The joints should be lapped 300 mm and sealed with double-sided tape and duct tape.

Ceiling spaces may be sealed by constructing a plastic-lined frame within the ceiling space. This frame should be removed only after completion of the final clearance inspection.

If the asbestos work area is adjacent to areas occupied by unprotected persons, priority should be given to performing the removal work during periods when these areas are unoccupied or to a greater isolation of the removal area. In addition, hoarding should be constructed to form a barrier between the asbestos work area and the adjoining occupied areas. A plastic-lined barrier should be erected within this hoarding. A buffer area should be reserved between the hoarding and the occupied areas.

Any platforms and/or fixed scaffolding required for the safe removal of the ACM should be erected during the early stages of the work. Ideally these structures should be erected on the outside of the enclosed area. However, where it is necessary, to construct platforms and or fixed scaffolding within the enclosed area, decontamination and visual inspection of these structures will be necessary at the end of the removal work with appropriate PPE and as a minimum, a half face respirator with a P1 or P2 filter worn.

All tools and electrical equipment, including asbestos vacuum cleaners and power tools, should remain within the asbestos work area until the completion of the removal work. When this equipment is removed it should be decontaminated.

All the plastic, tape, etc used for the enclosure must be disposed of as asbestos waste.

4.1.3 Testing the Effectiveness of the Enclosure

When the asbestos removalist is satisfied that the enclosure is complete, a competent person should carry out a visual inspection and smoke test prior to the commencement of the asbestos removal work.

The asbestos removalist should notify the client before the visual inspection and smoke test, giving them adequate notice.

Negative pressure exhaust units should not be used while the smoke test is being conducted. Only smoke generating devices incorporating non-oil-based, non-toxic smoke fluids should be used. Flares should not be used. Smoke (fire) detection devices in the immediate vicinity of the work area should be isolated for the duration of the smoke test.

Work should not proceed if any leaks or other deficiencies in the enclosure are found during the testing.

The effectiveness of the enclosure should be regularly monitored while asbestos removal work is underway.

If air monitoring or visual examinations of the enclosure and items of equipment indicate that asbestos dust might be escaping from the enclosure, asbestos removal work should be stopped until any defects have been rectified.

Following any such an incident, before work recommences it is essential to:

- Identify the source of the leak(s);
- Prevent further release of fibres;
- Re-test the enclosure;
- Clean any contaminated areas;
- Conduct a visual inspection;
- Conduct monitoring tests specific to the incident (see section 9.8);
- Notify the relevant State or Territory OHS authority, where applicable; and
- Reassess the boundaries of the asbestos work area and asbestos removal site.

Persons investigating a leak must use appropriate PPE.

Any leaks in the enclosure should be sealed and the smoke test repeated until the enclosure is shown to be effectively sealed again. A supply of expandable foam sealant, polyester insulation or equivalent should be maintained on the site to aid in sealing leaks.

4.1.4 Decontamination Unit

In many instances, the only satisfactory way of providing appropriate changing facilities is to provide a mobile or specially constructed on-site decontamination unit.

This decontamination unit should be immediately adjacent to, and directly connected with, the enclosed asbestos work area. It should be divided into three distinct areas:

- A dirty decontamination area;
- A clean decontamination area; and
- A clean changing area.

These areas should be separated by suitable airlocks or buffer zones.

Normally these airlocks have spring-loaded doors, or two or more overlapping sheets of plastic sheet, positioned so as to define the boundary between each segment of the decontamination unit, while allowing personnel access and an airflow towards the asbestos work area. To ensure there is sufficient airflow through the decontamination unit, if doors are used they should have large openings with a hinged flap operating as a one-way valve.

A typical layout is shown in **Figure 1**.

No more than six persons should use any one decontamination unit.

The dirty decontamination area should provide for:

- Vacuum cleaning or hosing down of contaminated clothing and footwear;
- The storage of contaminated clothing and footwear;
- Labelled waste bags/bins for disposable protective clothing; and
- A shower area with an adequate supply of warm water.

The clean decontamination area should provide for:

- The storage of individual respirators in containers or lockers;
- Airflow towards the dirty decontamination area; and
- A shower area with an adequate supply of warm water.

The clean changing area should provide for:

- The storage of clean clothing;
- Separate storage of clean and dirty towels; and
- Airflow towards the clean decontamination area.

All water from the decontamination facility should pass through a high efficiency particulate capturing particles down to 5µm.

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

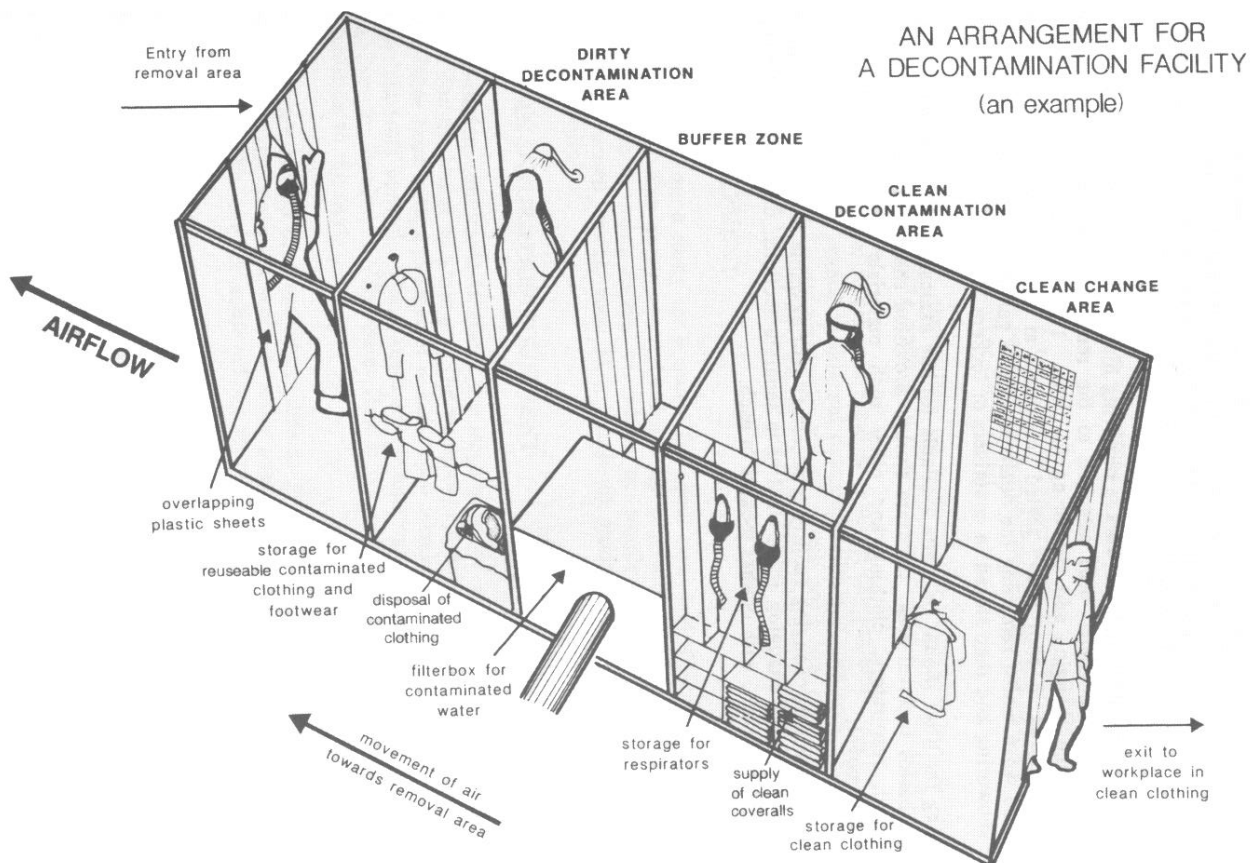


Figure 1

4.1.5 Remote Decontamination Units

Remote decontamination units are decontamination units that are not located next to the asbestos work area.

They should only be used if a decontamination unit cannot be located immediately adjacent to the asbestos work area.

When a remote decontamination unit is to be used, the asbestos removalist may need to implement additional procedures to minimise asbestos-contamination, including methods for the connection and disconnection of air-line respirators.

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

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

An isolated changing area should be attached to the asbestos work area. Before workers enter this changing area, all obvious signs of asbestos dust should 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, and to dress in fresh outer/protective clothing for the journey to the decontamination unit.

Respiratory protection should continue to be worn until the appropriate phase of the decontamination procedure within the remote decontamination unit.

4.1.6 Entering the Asbestos Work Area

The procedure for persons entering the asbestos work area should be as follows:

- a) Clean change area: Change into clean work clothes and put on clean protective clothing. Store any removed clothing in a dust-proof container. Pass through the airlock into the clean decontamination area.
- b) Adequate supplies of undergarments and socks (disposable or reusable) should be provided for all personnel entering the asbestos work area. Adequate supplies of shorts and t-shirts should also be made available to all workers.
- c) Clean decontamination area: Put on respirator. Check that it is working properly and there is a good facial seal. Move to the dirty decontamination area.
- d) Dirty decontamination area: Put on any additional protective equipment that has been stored in the dirty decontamination area, such as footwear. Connect to the air supply. Pass out of the decontamination unit into the asbestos work area.

4.1.7 Decontamination Procedures

The decontamination procedure for persons leaving the asbestos work area should be as follows:

- a) Asbestos work 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 work area, adjacent to the decontamination unit (footwear should be stored upside down to minimise further contamination). Proceed into the dirty decontamination area.

- b) Dirty decontamination area: If shoes/boots have not already been removed, remove them and store them (upside down) within the dirty decontamination area. Disconnect air-line respirator. Shower while wearing protective clothing and respirator. Leaving the respirator on, remove protective clothing and place it in labelled waste bags. Remove wet underclothing, such as t-shirts or shorts, while showering and place it in the storage unit provided within the dirty decontamination area. Pass through the airlock into the clean decontamination area.
- c) Clean decontamination area: Commence showering and remove respirator. Thoroughly wash hands, fingernails, face, head and respirator. Store respirator in a suitable container within the clean decontamination area. Move to the clean change area
- d) Clean change area: Change into clean clothing.

4.1.8 Person Outside the Enclosure

The asbestos removalist should ensure a worker is stationed outside the asbestos work area, for the duration of the asbestos 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.

4.1.9 Sealing the Enclosure Unit on Completion of Asbestos Removal Work

After the removal work has been completed all plant and equipment within the asbestos work area and the decontamination unit, including any remaining non-movable items, should be vacuumed and/or wet wiped to remove any residual dust.

Once a competent person is satisfied that the asbestos work area and decontamination unit are clean, all of the cleaned surfaces should be sprayed with pigmented PVA using airless spray equipment. Items of equipment that may be damaged by the application of pigmented PVA can be screened with plastic sheeting.

Any layer of plastic forming the inner surface of the enclosed work area or decontamination unit should also be sprayed with pigmented PVA.

After the pigmented PVA has dried, a competent person should perform control monitoring in the asbestos work area and decontamination unit.

The final layer of any plastic enclosing the asbestos work area and decontamination unit should not be taken down until a visual inspection has found no visible asbestos residue and clearance monitoring indicates airborne

asbestos fibre levels are below 0.01 fibres/ml. Settled dust sampling may also be considered as an indicator of cleanliness.

Plastic sheeting and any similar materials used for the enclosure should be treated as asbestos waste. This need not apply to scaffolding used to add strength to the enclosure, but any such scaffolding should be vacuumed, damp wiped and sprayed with pigmented PVA as part of the clean-up process.

Ropes, warning signs and protective plastic isolating public areas should not be removed until the asbestos work area and decontamination unit have had a satisfactory clearance inspection

4.1.10 Mini-enclosures for Small-scale Asbestos Removal Work

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

The mini-enclosure has to be large enough to allow movement inside the enclosure and contain all the equipment needed for the asbestos removal work.

Machinery that emits exhaust fumes must not be placed in a mini-enclosure.

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. Recycled plastic, including re-milled plastic, must not be used.

The tape used to connect the plastic to the frame needs to be strong enough to securely hold the plastic to the frame. A smoke tube should be used to check the sealing of the plastic sheeting.

A slit will have to be made in the plastic sheeting to allow entry. This slit can then be taped from inside the enclosure.

A typical layout is shown in **Figure 2**.

The hazards and work procedures that need to be considered for large enclosures, discussed in section 10.2, also need to be taken into account for all mini-enclosures.

Workers leaving a mini-enclosure must follow the personal decontamination procedures described in section 9.9.4.

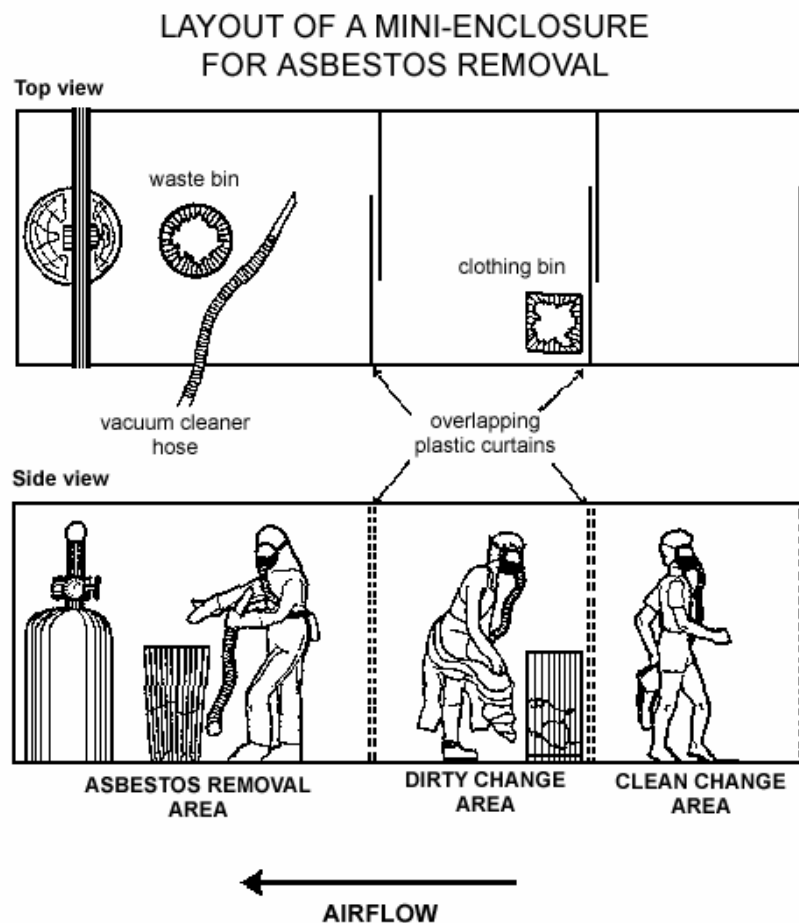


Figure 2

4.1.11 Glove Bag Removal Method

Glove bags are single-use bags, constructed from transparent, heavy-duty plastic, with built-in arms and access ports.

Generally, these glove bags are approximately 1 metre wide and 1.5 metres deep.

Glove bags are designed to isolate small removal jobs from the general working environment. As such, they provide a flexible, easily installed and quickly dismantled temporary enclosure for small asbestos removal jobs.

The glove bag removal method is especially suited to the removal of asbestos lagging from individual valves, joints, piping, etc.

A major advantage of glove bags is that they contain all waste and contamination within the bag, thereby eliminating the need for extensive PPE and decontamination.

The only significant limitation on the use of glove bags is the volume of waste material they are able to contain. Care needs to be exercised to prevent overfilling of the bag with water or waste.

Glove bags should be used as follows (see **Figure 3**):

- a) Cutting and removal tools that will be used in the removal should be placed into the glove bag at the start of the job. When the removal is complete, tools used should be either disposed of as asbestos waste or sealed for reuse in future removal jobs.
- b) The glove bag should completely cover the pipe or object on which the asbestos removal work is to be performed. The lagging on either side of the bag must be sound enough to support the weight of the bag and its wet contents.
- c) 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. Seal all openings in the glove bag with duct tape or an equivalent. The bottom and side seams of the glove bag should also be sealed with duct tape or an equivalent, to prevent any leakage if there is a defect in a seam.
- d) Thoroughly saturate the ACM 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. ACM that has fallen into the bag should be thoroughly saturated. The choice of tool to remove the ACM depends on the nature of the material to be removed. ACM are generally covered with painted canvas and/or wire mesh. Any canvas should be cut and peeled away from the ACM underneath. If this ACM is dry, it should be re-sprayed with the wetting agent before it is removed.
- e) Thoroughly clean the pipe or surface from which the asbestos has been removed with a wire brush and wet-wipe it until no traces of the ACM can be seen. Wash down
- f) Seal any edges of ACM that have been exposed by the removal or by any maintenance activity, to ensure these edges do not release airborne asbestos fibres after the glove bag is removed.
- g) Once the ACM 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 airborne asbestos fibres. Once the bag has been evacuated, squeeze it tightly, as close to the top as possible, twist it and seal it with tape, keeping the ACM safely in the bottom of the bag. Remove the vacuum line from the bag, and then remove the glove bag from the workplace for proper disposal as asbestos waste.

USE OF GLOVE BAGS

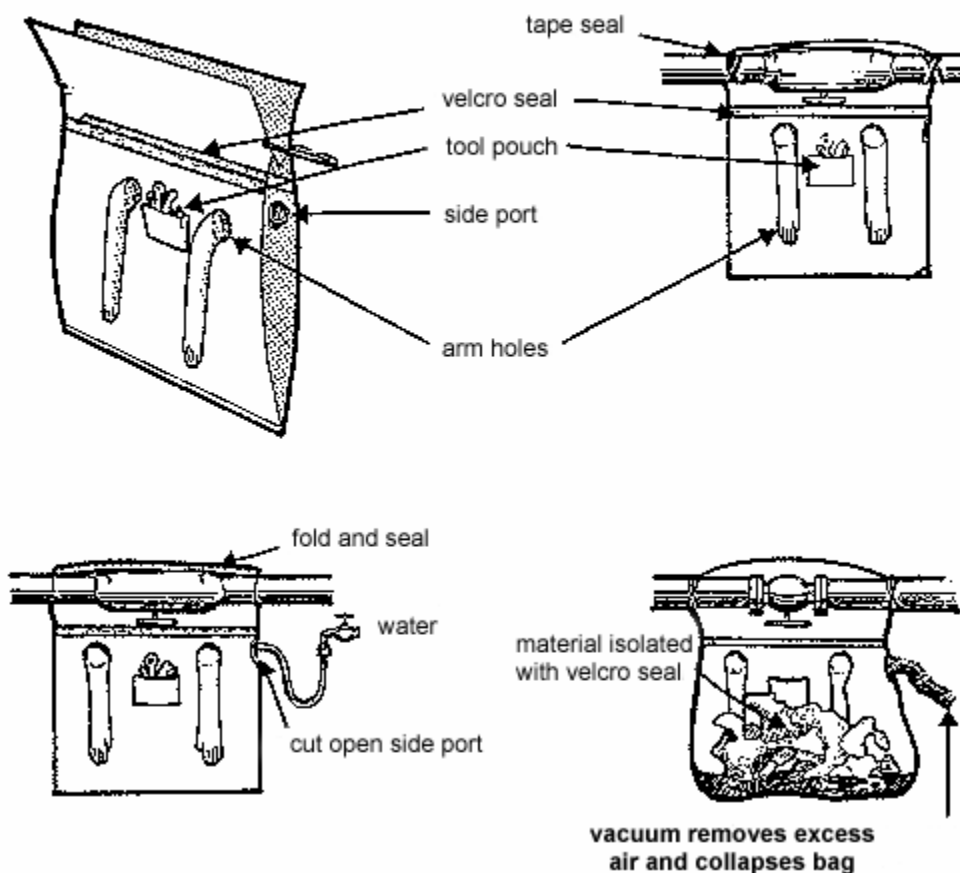


Figure 3

4.1.12 'Wrap and Cut' Removal Method

This method of removal produces the lowest levels of airborne asbestos fibres and is most appropriate for redundant plant and equipment.

The plant or equipment to be removed should be double wrapped with 200 µm thick plastic and taped so that the ACM are totally sealed within the plastic. The wrapped plant or equipment can then be cut from the rest of the plant and equipment using mechanical shears or oxy-cutting tools. Only exposed metal should be cut, and care should be taken to ensure the plastic wrapping is not punctured and/or melted.

If lagging has to be removed to allow a pipe to be cut, the glove bag removal method should be used to expose the metal at the point to be cut and for a sufficient length on either side. The insulation should be wet thoroughly, bagged and disposed of as asbestos waste. The pipe should then be cut at the centre of the exposed section.

4.2 Clearance to Reoccupy an Asbestos Work Area

Before clearance is granted for an asbestos work area to be re-occupied there must be a thorough clearance inspection.

The clearance inspection must be conducted by competent person who is independent from the person responsible for the removal work

Following the final clearance inspection, a clearance certificate must be issued by a competent person, who is independent from the person responsible for the removal work, if this is requested by the relevant State or Territory OHS authority.

Any protective barrier between the asbestos work area and public areas should remain intact until completion of all asbestos removal work and successful completion of the clearance inspection.

4.2.1 Visual inspections

Visual inspections involve an examination of the asbestos work area, prior to the resumption of normal work in the area by unprotected personnel, to confirm that the asbestos removal work has been completed and there is no visual evidence of dust and debris.

Particular attention should be paid to ledges, the tops of air-conditioning ducts, cracks in the floor, folds in plastic sheeting and crevices or other areas which may have been overlooked during the initial clean-up.

A satisfactory visual inspection does not remove the need to perform clearance monitoring.

4.2.2 Clearance monitoring

The need for clearance monitoring should be assessed as part of the planning and conduct of asbestos removal works.

Monitoring results and experience with similar removals in the past will assist in determining whether clearance monitoring will be required.

Clearance monitoring should be undertaken by a competent person who is independent from the person responsible for the removal work, after cleaning has been completed and the area dried, to check that fibre levels are below 0.01 fibres/mL

Air samples should be taken in the asbestos work area. For jobs involving an enclosed area, this should be done within the enclosed area, following the completion of the removal work but prior to the removal of the enclosure, and again after the removal of the enclosure (for a final clearance inspection).

The removal work should not be considered completed until an airborne fibre level of less than 0.01 fibres/mL has been achieved, as determined by the clearance monitoring.

4.2.3 Settled Dust Sampling

Settled dust sampling may also be useful as part of a clearance inspection.

Settled dust sampling can, however, only provide an indication of cleanliness.

Settled dust sampling should not be used as an indicator of risk to health.

Any settled dust sampling should be determined by the competent person undertaking the visual inspection.

5.0 DEFINITIONS

Air Monitoring means airborne asbestos fibre sampling to assist in assessing exposures and the effectiveness of control measures. Air monitoring includes exposure monitoring, control monitoring and clearance monitoring.

Note: Air monitoring should be undertaken in accordance with the Guidance Note on the Membrane Filter Method for Estimating Airborne Asbestos Fibres [NOHSC:3003 (2005)]

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 (those fibres less than 3 µm wide, more than 5 µm long and with a length to width ratio of more than 3 to 1) are counted.

Note: Airborne asbestos fibres are generated by the mechanical disintegration of Asbestos-Containing Materials (ACM) and subsequent dispersion of the fibres into the air from activities such as mining and the use, removal and disposal of asbestos and ACM. Airborne dust has the potential to contain respirable asbestos fibres.

Air-line respirator means a device through which air, at greater than atmospheric pressure, from a source of compressed air capable of providing breathing air, is supplied to the wearer by means of an air-line.

Asbestos means the fibrous form of mineral silicates belonging to the serpentine and amphibole groups of rock-forming minerals, including actinolite, amosite (brown asbestos), anthophyllite, chrysotile (white asbestos), crocidolite (blue asbestos), tremolite, or any mixture containing one or more of the mineral silicates belonging to the serpentine and amphibole groups.

Asbestos-Cement (AC) means products consisting of sand aggregate and cement reinforced with asbestos fibres (e.g. asbestos cement pipes and flat or corrugated asbestos cement sheets).

Asbestos-Containing Material (ACM) means any material, object, product or debris that contains asbestos.

Asbestos Removalist means a competent person who performs asbestos removal work.

Note: An asbestos removal licence is required in all State and Territory jurisdictions for the removal of friable ACM. Some States and Territories also require a licence for removal of

specified quantities of ACM, regardless of whether they are friable, and relevant OHS authorities should be consulted prior to any removal work.

Asbestos Removal Control Plan means a document which identifies the control measures which will be implemented to ensure workers and other persons are not at risk when asbestos removal work is being conducted.

Asbestos Removal Site means the Asbestos Work Area and the region surrounding and adjacent to the Asbestos Work Area that may be affected by Asbestos Removal Work. It includes any area where there is a potential for exposure to asbestos.

Asbestos Removal Work means the removal of ACM.

Asbestos Vacuum Cleaner means a vacuum cleaner that is fitted with a High Efficiency Particulate Air (HEPA) Filter and complies with AS/NZS 60335.2.69:2017 Household and similar electrical appliances – Safety – Particular requirements for wet and dry vacuum cleaners, including power brush, for commercial use. A domestic vacuum cleaner is not suitable for use with asbestos.

Asbestos Waste means all removed ACM and disposable items used during the asbestos removal work, such as plastic sheeting used for an enclosure or to cover surfaces in the asbestos work area, disposable coveralls, disposable respirators and rags used for cleaning.

Asbestos Work Area means the immediate area in which work on ACM is taking place. The boundaries of the Asbestos Work Area must be determined by a risk assessment.

Note: The asbestos work area should include the boundaries of an enclosure or barriers set up to warn or restrict access to the area where the asbestos work is being undertaken.

Breathing Zone means a hemisphere extending in front of a person's face, with a radius of 300 mm from the midpoint of an imaginary line between the ears.

Clearance Inspection means an inspection, carried out by a competent person, to verify that an asbestos work area is safe to be returned to normal use after work involving the disturbance of ACM has taken place. A clearance inspection must include a visual inspection, and may also include clearance monitoring and/or settled dust sampling.

Note: A clearance inspection should only be carried out when the asbestos work area is dry.

Clearance Monitoring means air monitoring using static or positional samples to measure the level of airborne asbestos fibres in an area following work on ACM. An area is 'cleared' when the level of airborne asbestos fibres is measured as being below 0.01 fibres/mL.

Note: Static or positional samples are taken at fixed locations which are usually between one and two metres above floor level,

Client means any person with control who commissions Asbestos Removal Work.

Note: In some circumstances the Client may be the Asbestos Removalist or may work for the same employer as the Asbestos Removalist.

Competent Person means a person possessing adequate qualifications, such as suitable training and sufficient knowledge, experience and skill, for the safe performance of the specific work.

Note: A licence may be required for some of the tasks described in this document as requiring a competent person.

Control Level means the airborne concentration of a particular substance which, if exceeded, indicates a need to implement a control, action or other requirement. Control levels are generally set at no more than half the NES for the substance. Control levels are occupational hygiene 'best practice', and are not health-based standards.

Note: The first Control Level for Asbestos is set at 0.01 fibres/mL of air.

Control Monitoring means air monitoring, using static or positional to measure the level of airborne asbestos fibres in an area during work on ACM. Control monitoring is designed to assist in assessing the effectiveness of control measures. Its results are not representative of actual occupational exposures, and should not be used for that purpose.

Note: Static or positional samples are taken at fixed locations which are usually between one and two metres above floor level,

Dust and Debris means visible particles, fragments or chunks of material, large and heavy enough to have settled in the work area, that are likely to have originated from ACM.

Exposure Monitoring means air monitoring to determine a person's likely exposure to a hazardous substance. Exposure monitoring is designed to reliably estimate the person's exposure, so that it may be compared with the NES.

Note: Exposure monitoring includes airborne asbestos fibre sampling, analysis, estimation of time-weighted average exposure and interpretation. Samples are taken within the breathing zone and are usually obtained by fastening the filter holder to the worker's jacket lapel.

Friable (Asbestos) means asbestos-containing material which, when dry, is or may become crumbled, pulverised or reduced to powder by hand pressure.

Note: This may include ACM that have been subjected to conditions that leave them in a state where they meet the above definition, such as weathering, physical damage, water damage etc.

Hazard means any matter, thing, process or practice that may cause death, injury, illness or disease.

Health Surveillance means the monitoring of a person to identify any changes in their health as a result of exposure to a hazardous substance. It does not include Exposure Monitoring.

High Efficiency Particulate Air (HEPA) Filter means a disposable, extended media, dry type filter, in a rigid frame, with a minimum filtration efficiency of 99.97% for nominal 0.3 µm diameter thermally generated dioctylphthalata (DOP) particles or an equivalent efficiency for a specified alternative aerosol and with an initial maximum resistance to airflow of 250 pa when tested at its rated airflow capacity (see Australian Standard 4260:1997 (R2018) High Efficiency Particulate (HEPA) Filters – Classification, Construction and Performance).

In situ means fixed or installed in its original position, not having been moved.

Inaccessible Areas means areas which are difficult to access, such as wall cavities and the interiors of plant and equipment.

Membrane Filter Method (MFM) means the technique outlined in the NOHSC Guidance Note on the Membrane Filter Method for Estimating Airborne Asbestos Fibres [NOHSC:3003 (2005)]

National Exposure Standard (NES) means an airborne concentration of a particular substance, within the worker's breathing zone, which according to current knowledge, should not cause adverse health effects or undue discomfort to nearly all workers. NES are established, from time to time, by the National Occupational Health and Safety Commission (NOHSC) and are published on the NOHSC website (see **Appendix D**).

Note: The NES for all forms of asbestos is 0.1 fibres/mL of air, measured using the Membrane Filter Method (MFM).

Person with Control means, in relation to premises, a person who has control of premises used as a workplace. The person with control may be:

- (a) the owner of the premises;
- (b) a person who has, under any contract or lease, an obligation to maintain or repair the premises;
- (c) a person who is occupying the premises;
- (d) a person who is able to make decisions about work undertaken at the premises; or
- (e) an employer at the premises.

Personal Protective Equipment (PPE) means equipment and clothing that is used or worn by an individual person to protect themselves against, or minimise their exposure to, workplace risks. It includes items such as facemasks and respirators, coveralls, goggles, helmets, gloves and footwear (see Section 9.7).

Respirable Asbestos Fibre means a fibre of Asbestos small enough to penetrate into the gas exchange regions of the lungs. Respirable asbestos fibres are technically defined as fibres that are less than 3 µm wide, more than 5 µm in length and have a length to width ratio of more than 3 to 1.

Risk means the likelihood of a hazard causing harm to a person.

Note: In this code of practice, Risk relates to illness or disease arising from exposure to Airborne Asbestos Fibres.

Settled Dust Sampling means the sampling and analysis of settled surface dust to provide an indication of cleanliness following disturbance of ACM. Settled dust sampling does not provide an indication of risk to health. Sampling techniques include the use of adhesive tape, wipe or micro-vacuum (using an air sampling pump and filter). Analysis can be by polarised light microscopy (PLM) or transmission electron microscopy (TEM).

Note: Contamination may occur as a result of deterioration of, or work processes involving ACM.

Shadow Vacuuming means the operation of an asbestos vacuum cleaner that is either directly attached to a tool or hand-held by a second worker as close as possible to the source of released Asbestos fibres throughout the use of the tool.

Structure means any construction, whether temporary or permanent.

Note: A structure includes a bridge, erection, edifice, wall, chimney, fence, earth works, reclamation, ship, floating structure or tunnel.

Work means any activity, physical or mental, carried out in the course of a business, industry, commerce, an occupation or a profession.

Worker means a person who does work, whether or not for reward or recognition.

Note: 'Workers' include persons working under contracts of employment, apprenticeships, traineeships and other contracts of service, but they also include other persons subject to direction by persons with control, such as volunteers and work experience students.

Workplace means any place where a person works.

6.0 REFERENCES

Legislation:

This Company Procedure is to ensure compliance with all Occupational Health and Safety Acts and Regulations relevant to each individual State. Where one State places a higher duty, then that duty shall become the norm for use by KAEFER employees in all States and the relevant procedure shall reflect this.

Standards:

AS 1319:1994 (R2018)	Safety Signs for the Occupational Environment
AS/NZS 1715:2009	Selection, Use and Maintenance of Respiratory Protective Devices
AS/NZS 1716:2012	Respiratory Protective Devices

- AS/NZS 3000:2018** Electrical Installations (known as the Australian/New Zealand Wiring Rules)
- AS/NZS 3012:2010** Electrical Installations – Construction and Demolition Sites
- AS 4260:1997 (R2018)** High Efficiency Particulate Air (HEPA) Filters – Classification, Construction and Performance
- AS/NZS 60335.2.69:2017** Household and similar electrical appliances – Safety – Particular requirements for wet and dry vacuum cleaners, including power brush, for commercial use (IEC 60335-2-69 ED 4, MOD)

Codes of Practice:

- NOHSC:3003(2005)** Guidance Note on the Membrane Filter Method for Estimating Airborne Asbestos Fibres 2nd Edition
- NOHSC:2018(2005)** Management and Control of Asbestos in Workplaces
- NOHSC:2002(2005)** Safe Removal of Asbestos 2nd Edition

APPENDIX: STATE & TERRITORY GOVERNING LEGISLATION

State/ Territory	Act	Regulations
QLD	Workplace Health and Safety Act 2011	Workplace Health and Safety Regulations 2011
NSW	Workplace Health and Safety Act 2011	Workplace Health and Safety Regulations 2011
ACT	Workplace Health and Safety Act 2011	Workplace Health and Safety Regulations 2011
VIC	Occupational Health and Safety Act 2004	Occupational Health and Safety Regulations 2007
TAS	Workplace Health and Safety Act 2012	Workplace Health and Safety Regulations 2012
SA	Workplace Health and Safety Act 2012	Workplace Health and Safety Regulations 2012
WA	Occupational Safety and Health Act 1984	Occupational Safety and Health Regulations 1996
NT	Workplace Health and Safety (National Uniform) Legislation Act 2011	Workplace Health and Safety (National Uniform) Legislation Regulations