



Government of **Western Australia**
Department of **Health**

Guidance Note on Asbestos Cement Roofs

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1. Purpose

This Guidance Note provides advice on the identification and management of cement sheet roofs made with asbestos-containing materials (ACM) in residential settings. It is primarily for use by Local Government Environmental Health Officers (LG EHOs) as well as the public.

2. Guidance Note Summary

It is useful to know if a roof is ACM in case it is in a poor and potentially dangerous condition or may be disturbed by subsequent activities such as home repairs, renovation or demolition.

If a roof is made of cement sheeting, was installed before 1990 and has characteristic features then it is highly likely to be ACM and should be treated as such. However, only laboratory analysis can identify ACM for sure.

Many of the ACM roofs in Western Australia (WA) have deteriorated or been damaged after decades of use, and usually this is much more so than other ACM products such as fences and cladding due to roofs' heavy exposure to the elements. In most cases a roof is unlikely to present a risk to people but in certain circumstances they can. Where a risk occurs action should be taken and the **Department of Health considers that ACM roofs should be removed and replaced where practical or necessary.**

A Summary of the assessment and management process appears as Appendix 1.

3. ACM General Principles

- If suspect material satisfies age, use and appearance criteria for ACM, it is best to assume it is ACM until professionally assessed, or subject to laboratory analysis;
- Non-friable ACM (See Section 4.1) is unlikely to pose a risk if in a good condition and not physically disturbed;
- Even if in sound condition, early proper removal of ACM (which is aging) should be considered especially in conjunction with any other property renovations or development (as it has the potential to become a risk); and
- Any ACM removal should, and in some cases must, be undertaken by ACM professionals (See Section 5.6).

4. Background

ACM was extensively used in Australian products from the 1930s until about 1987 when its use ceased in the building industry, followed by a total ban on new use in 2003. Due to this use asbestos-related diseases incidence has steadily grown, resulting in Australia having one of the highest rates of mesothelioma in the world. Most of these diseases were due to high levels of asbestos exposure in the associated mining, milling and installation industries. However, in more recent times asbestos-related diseases are increasingly occurring among building maintenance workers such as carpenters, electricians and plumbers, and also members of the public undertaking home renovations personally.

4.1 What is Asbestos?

Asbestos is the term given to a group of naturally occurring fibrous minerals, the common types being chrysotile (white), crocidolite (blue), and amosite (brown), sometimes in products as mixtures.

When disturbed asbestos can release microscopic fibres which if inhaled tend to lodge in lung tissues and can give rise to significant and irreversible health effects, including asbestosis, mesothelioma (always fatal) and lung cancer.

ACM is classified as being friable (in a crumbled or powder form, or can be crumbled by hand pressure e.g. insulation material) or non-friable (e.g. bonded e.g. ACM cement). All forms of asbestos are potentially dangerous, but friable forms are of greater concern because asbestos fibres are more readily released by disturbance.

4.2 Occurrence of Asbestos in the Home

In Western Australia many pre-1990 residential and commercial buildings (possibly up to 75%) may contain asbestos, mainly as cement sheeting used in walls, ceilings, eaves, fences and roofs. Although use of ACM cement products had ceased by 1987, 1990 is commonly used as the cut-off point to allow for possible later use of backlogged/surplus material, unless there is some reason in a particular case that use may have continued a little longer. One of the most common uses of ACM in WA was as cement sheeting roofs as well as boundary fences.

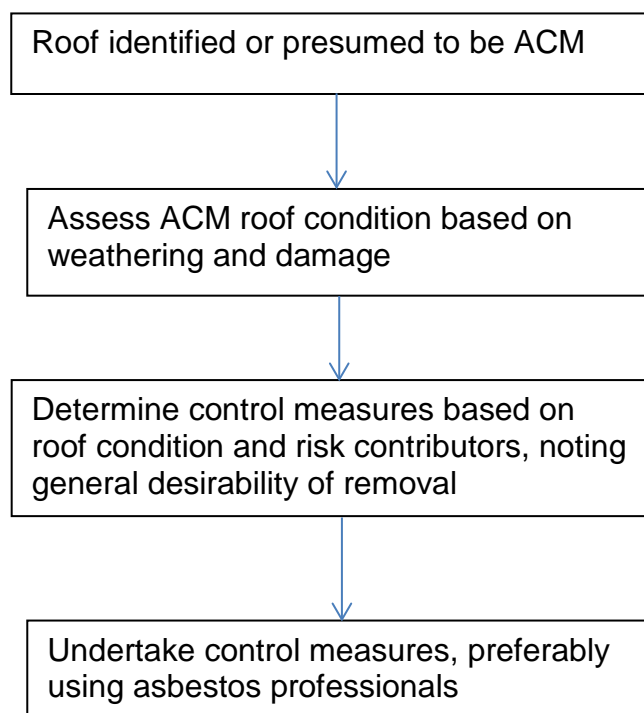
5. Managing an ACM Roof

If a residential property or its structures were built before 1990, it is recommended that it be assessed for the presence of ACM. This will then allow management actions to be taken if any ACM is in poor condition or may be disturbed by subsequent activities such as cleaning, repairs, renovation or demolition. For information on the identification of all ACM products around the house, see the Department of Health publication [Guidance Note on the Identification of Asbestos-Containing Material](#).

In the case of ACM roofs, the main steps in their management are identification, condition assessment and control measures if necessary, taking account of roof context. These steps are outlined in the subsequent sections, and Figure 1 provides a flow diagram of the process. Appendix 1 also attempts to provide a summary of each of the stages, as a reference field tool.

Depending on the situation some of this process may be undertaken by a householder with advice from your Local Government EHO. However, in the case of ACM roofs, in contrast to ACM fences, the elevated position and often poor condition increases the risk of investigation and therefore the need to use an asbestos professional. Higher risk situations include if the suspect ACM is highly weathered, badly broken or burnt, or is being removed.

Figure 1 – ACM Roof Management Process



5.1 Identification

The normal pre-requisites for a roof to be ACM are that it is made from cement-like sheeting, it was erected before 1990, and it has the visual features typical of this type of roof. The use of all types of cement roof sheeting was phased out at the same time as the use of ACMs, resulting in a higher likelihood that any cement sheeting identified in roofs will contain asbestos.

If a roof is made from cement-like sheeting it will normally be greyish in colour (unless painted or discoloured with age), about 7 mm thick, and corrugated. The most common other types of roofs (non-ACM) are metal, e.g. COLORBOND®, or tiles.

Other typical characteristic features of corrugated ACM roofs are:

- Brand name of “Super Six”;
- Usually 7 ridges per 1 metre wide panel; and
- Use of diamond shaped metal fasteners.

The associated ridge capping and cornices are also normally ACM, and sometimes the gutters and down pipes. More rarely the roof may be as flat or profiled sheeting or imitation slate tiles.



Photo 1. ACM corrugated roofing



Photo 2. ACM gutter and down pipe

While the above pre-requisites can give a strong indication as to whether a roof is ACM or not, only analysis of a sample undertaken by a NATA accredited laboratory can say for certain. (See contacts section). In the absence of testing, if there is a reasonable suspicion a roof is ACM it should be assumed to be so and managed accordingly.

The easiest way to have a sample analysed is to find a fragment and, using disposable gloves, double bag and label it for submission to a NATA laboratory. Alternatively, apply a piece of clear sticky tape to the surface of the roof which when removed may retain samples of any superficial debris or fibres. The tape should then be folded in on itself so the exposed sticky areas are married together and then put into a labelled sealable plastic bag and be submitted it as outlined above. To ensure that this process is done properly and that analysis will produce a meaningful result, **the NATA laboratory should be consulted first.**

5.2 Condition Assessment

Existing ACM roofs are now nearly at a minimum of 30 years old and have been subject to weathering by rain, sun, wind, hail, air pollution, moss/lichen growth and salt (for coastal properties), although painting or sealing may have afforded some protection.

In the case of ACM roofs, deterioration primarily comes from weathering which erodes away the cement matrix from around the asbestos fibres. This allows more ready release of those fibres as they lose their binding or are more easily exposed to breaking off. Although very slow it occurs much faster than fences (capping excluded) or other ACM cement products that are often protected by paint or a sheltered position. An indication of condition is the degree of raised fibre above the roof surface and also the amount of fibre “whiskers” or “dags” that collect at the downward edge of the roof, as seen in Photo 3.

It is also possible that the roof may be disturbed or damaged by adjacent vegetation including landing place for leaf and branch litter or the actions of people on it.



Photo 3. Asbestos fibre “whiskers” on roof lips

Photo 4. Surface flaking from weathering

As weathering progresses the roof may lose some of its water resistant properties and become more easily wetted and prone to development of mosses or lichens. These plants may weaken the cement even further, though also acting as a barrier to ongoing weathering and possibly to the release of asbestos dust.

In worse cases, flaking of the ACM surface may occur revealing lighter patches of less weathered material underneath (photo 4).

It is important to note that roof deterioration can be directional. For instance if the prevailing wind and rain comes from the ocean the roof may be more weathered on that side of the house, or possibly on the northern side due to more direct sunshine. In such cases it is recommended that the condition assessment be based on the most degraded part of the roof.

To estimate the condition of a roof the following scale has been developed by WA Health as shown in the accompanying table. In the case of roofs, the best condition rating is “reasonable”, because they are nearly always worse off than other ACM cement products around the home.

The ratings and the basis for them should be regarded only as a guide and not a definitive system.

RATING	DESCRIPTIVE EXAMPLES*
Unsound	Roofs that are so badly damaged by physical action or fire that the structure is substantially not weatherproof and therefore not habitable.
Very Poor	More numerous cracks and even holes. Or easily seen raised asbestos fibres across most of the surface. Or some flaking of cement surface and easily scratched. Or substantial appearance “whiskers” on downward edges of sheets. Or extensive signs of water leakage under roof. Or having many of the “Poor” damage features.
Poor	Some small breakages or some larger cracks. Or signs of weathering breaking down (roughening) the surface cement matrix and revealing fibres. Or significant appearance “whiskers” on downward edges of sheets. Or flaking of previously applied paint. Or signs of water leakage under roof.

Reasonable	Limited visible deterioration, discolouration or damage. Some scratches, physical marks, a few small breakages on edge of panels possible. Little sign of breakdown of the ACM cement surface through weathering or minimal appearance “whiskers on downward edges of sheets. May be associated with previous effective application of paint or sealant.
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*Lichen is not used as a condition indicator due to uncertainty whether it increases or decreases the ACM hazard

Where there is any uncertainty in regard to the condition of an ACM roof, advice should be sought from an ACM competent person or occupational hygienist (see section 5.6). Sometimes your Local Government (or Department of Health) may be willing to assist in assessing the condition of your ACM roof or even that of a neighbour if access is permitted, as it has some responsibilities and knowledge in the area as indicated in section 5.5.

5.3 Other Risk Contributors

In addition to the roof’s condition rating, a number of other risk factors may or are likely to be present which will affect the overall risk from the roof.

5.3.1 Contaminated Runoff

As indicated above, weathering of the roof results in release of asbestos fibre which can increase as the condition of the roof deteriorates. Research indicates that most of the fibre released in is through the physical action of rain and water runoff rather than by wind or hail. Consequently the bulk of the fibre will end up in the drainage system including gutters, downpipes and soak wells or stormwater systems.

If the roof has no or compromised guttering (photo 5), or if the downpipe outflow is on the ground surface (photo 6), the fibres and asbestos debris will deposit on the adjacent ground. This process is dangerous as it brings the fibre down into the area where people may be more likely exposed. If the rainwater feeds into a storage tank the dangers associated with any transferred fibre become more complicated, depending on the use of the water. The concern would be if the water is used in such a way that it evaporates and leaves the fibre as residue such as for watering plants.



Photo 5. Part un-guttered painted ACM roof

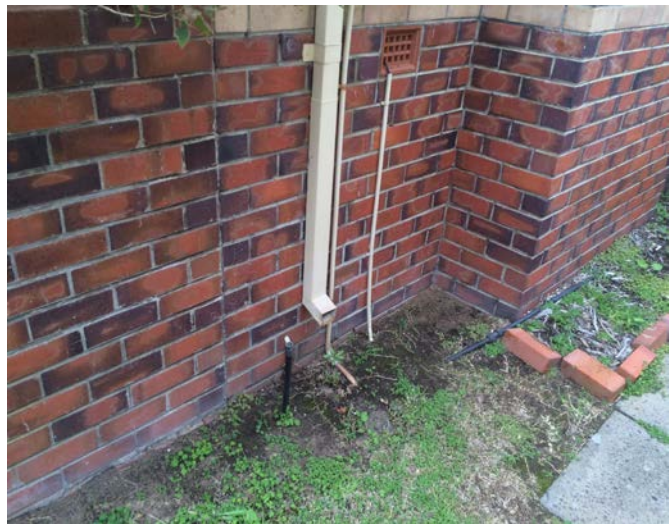


Photo 6. Down pipe to ground from ACM roof

5.3.2 Structural Weakening

Also as the ACM roof ages and the sheet thickness reduces it becomes both weaker and more brittle, and so more prone to collapse if subject to physical damage. The primary concern here is the possibility of people falling through the roof if they walk on it. But weakness also means that it will more easily break from other causes (photo 7), such as hail or falling branches and so release fibres. These weakened roofs are also more likely to shatter explosively and contaminate adjacent areas if they are subject to fire or internal explosions, such as in photo 8.



Photo 7. ACM roof breakages



Photo 8. Shattered ACM roof resulting from fire

5.3.3 Blue Asbestos Presence

As well as more likely to be in a very poor condition, roofs older than 50 years have a high probability of containing blue asbestos (crocidolite) which is the most dangerous form of asbestos and was sourced from Wittenoom up to about 1967 to help waterproof for cement products such as roofs.

5.3.4 Sub-roof Contamination

ACM roofs have been associated with ACM dust contamination of unlined sub-roof areas, likely due to the abrading of overlapping ACM sheet edges with temperature changes. This has been detected in larger commercial and public buildings such as sports halls where the lack of a ceiling resulted in ACM dust contamination of underlying occupied areas (photo 9). In the case of residences such contamination is more likely to be confined to the ceiling space and based on size may be less, but will increase in level and associated hazard the longer the roof stays in place.

5.3.5 Abrading Vegetation

If trees branches are in contact with the roof it is possible that their movement with the wind will abrade the panels and capping and result in the release asbestos fibres. Large trees tend to be quite common in association with era of ACM houses because of the block size then and the opportunity to have grown large enough in the meantime (photo 10).



Photo 9. ACM dust settlement from sports hall roof Photo 10. Tree causing damage to ACM roof

5.3.6 Human Exposure

All these factors only become a risk if people are exposed to the fibre released as a result of them. If the fibre release was only limited to ambient air at a roof top level then the risk would be very low. However in some situations as previously mentioned any released fibre may result in more direct human exposure e.g. contaminated roof rain runoff to ground surface.

In addition, sometimes a second floor occupied area (e.g. bedroom) may be adjacent to an ACM roof. Normally this would not be an issue but may become so in unfavourable circumstances such as a very poor condition large ACM roof (such as on a commercial property) which is close to and down-wind (prevailing) from the area involved.

In situations where there may be many people involved and for extended time periods, particularly children, then the risk level would be further heightened.

5.4 Control Measures

The relatively poor condition of ACM roofs, the range of elevated risk factors associated with them, and the usually limited lifespan that may remain for ACM roofs indicates that many of them should be removed and replaced.

Although removal is preferred, other controls can include repair, maintenance and monitoring. The control measures addressed below include ones which should always apply and also some further ones that should apply in particular situations.

5.4.1 Standard Control Measures

Some control measures should apply to any building with an ongoing ACM roof, with some variation of degree depending on the particular circumstances. Normally the poorer condition the roof the more rigorously should the control measure be applied.

Integrity of drainage - The greatest priority for action is for any ACM roof which has rain runoff that goes on to the ground surface. **In cases of runoff induced surface contamination, the drainage system must be repaired and the contamination removed and validated.** This clean-up must be undertaken by an asbestos professional, and a Local Government

Environmental Health Officer may direct that this occur (see section 5.5).

Even if a drainage system is sound it is important that it is not disrupted over time by the accumulation of leaf litter or other material, lest it then overflow to ground. Consequently the gutters may require periodic cleaning (usually at least once per year). When this is done it is preferable that it is done by an asbestos professional or competent tradesman. Any cleaning by these people or if necessary by the householder should be done in a way that minimises release of fibre, employs protective equipment for the people undertaking the task, and ensures that the waste material is properly wrapped and labelled and disposed of as ACM waste. Appendix 2 provides an outline of the correct safe cleaning procedure as appears in the Safework Australia *Code of Practice – How to Manage and Control Asbestos in the Workplace – 2016*.

Access to roof-space – As a roof space can become contaminated by asbestos dust due to the expansion and contraction of ACM roof panels, it is recommended that access and activities be minimised, that a P1 or P2 dust mask be worn and that hands, clothes (unless a disposable suit is worn) and hair be washed as soon as practical after exiting.

External Roof Access – Where there is a need to go onto the roof it is recommended the frequency and duration of this be minimised and that care be taken not to damage the roof and also not to fall through it if it is in a brittle and weathered condition. Safe roof contact practices may include only walking on areas where retaining bolts and therefore support beam are apparent and/or the use of walking planks or ladders. Additional safeguards are required if the fall heights are more than one storey. Some personal protection measures such as outlined under roof-space access may be appropriate, including cleaning of footwear, depending on the condition of the roof and the type and duration of the activity undertaken

Roof Monitoring – It is recommended that the ACM roof and drainage system be visually checked regularly (at least once per year) for damage, blockages or presence of abrading vegetation. This may be done from the top of a ladder rather than by getting on to the roof.

Cleaning of the ACM roof panel surface should not occur unless really necessary as this will release asbestos fibres. A justification for surface cleaning, in a safe manner, may be as a prerequisite to sealing it as discussed in the next section.

5.4.2 Situation-based General Response

For ACM roofs non-standard control actions will depend on the condition of the roof as well as the presence or not of other contributing factors to risk. The following table indicates the general types of response for the different rated roof condition/risk factor combinations. Specifically they include removal, repair and/or surface treatment. Finally in section 5.4.3 a fuller description is provided on the process associated with each of particular measure.

RATING	REMEDIAL RESPONSE (subject to risk contributors)
Unsound	If a residential building is substantially no longer weatherproof then it will be deemed not habitable and the ACM roof must be removed before this can be reversed. A Local Government Environmental Health Officer will direct removal to occur (see Section 5.5). Other situation-based control measures are not necessary except perhaps non-habitability signage at the building entrance.
Very Poor	These roofs are strongly recommended to be removed as soon as possible and in some cases a Local Government Environmental Health Officer may

	direct this to occur. Removal will be especially important if some of the risk contributors also apply such as presence of blue ACM and significant potential human exposure. Use of other control measures may not be worthwhile because this can only be an interim measure and their use will have costs and risks associated with them.
Poor	Removal is still recommended or at least its removal be planned for in the short to medium term. If this is not possible then some control measures may be useful to minimise any interim associated. This can include removing fragments, repair of cracks or holes and/or applying a surface treatment. The presence of other risk contributors increases the need for stronger actions.
Reasonable	The roofs planned removal is still desirable, although other things being equal it normally will only pose a very low risk. Situation-based control measures may be implemented although primarily for aesthetic purposes or to help prolong the lifespan of the roof. .

5.4.3 Particular Situation-based Control Measures

Removal – This should (and in cases of paid work must) only be undertaken by a licenced asbestos removalist as indicated in section 5.6.

Any removal should comply with the *Code of Practice for the Safe Removal of Asbestos 2005* (section 5.6). Appendix 3 also includes details of a removal process relating to ACM roofs.

It is important that the clean-up of the roof-space address any historical contamination as well as contamination associated with the removal. This may require the replacement of existing insulation if the building is to remain. In the case of residential buildings which will be demolished after ACM roof removal, the roof space clean-up can be confined to removal of ACM fragments.

Repair – This relates primarily to filling cracks and small holes. It does not involve the replacement of a damaged panel because the sourcing of another ACM panel for this purpose is illegal (there is a total prohibition on the new use and re-use of asbestos in Australia) and it is hard to use a non-ACM panel due to differences in their profiles.

For repairing cracks and small holes, the damaged material edges should first be wetted to minimise fibre release and then they and any gaps be sealed with an outdoor silicone product.

Surface treatment – This may require a pre-clean of the surface especially if it is weathered or has build-up of lichen or moss. In the case of vegetative growth a biocide should be first applied. The cleaning should be gentle wet scrubbing. No dry brushes should be used and the use of high pressure cleaning devices is very dangerous and illegal as it can cover surrounding areas in ACM sludge and cause extensive contamination. In addition to posing a risk to health, the clean-up associated with this type of contamination is costly.

The treatment agent itself should be chosen with the following factors in mind: penetration and binding, durability (which may be indicated by a warranty), ease of re-coating (without a major re-clean) and also cost. Bondcrete-type products can be used for this purpose. Some products also indicate that they can be used effectively even over lichen. Application of the treatment should be with a brush/roller or high volume low pressure sprayer.

Encapsulation – This consists of covering the roof with another non-ACM roof. This should be avoided because at a substantial cost it simply postpones the removal of the ACM indefinitely. It could also result in future exposures when others are unaware that the existing ACM roof is still present. In addition it also does not address the risks that may be associated with the potentially contaminated roof-space.

5.5 Regulatory Requirements

Under the *Health (Asbestos) Regulations 1992*, an *Authorised Person* has the power to issue directions about any ACM that may pose a public health hazard. This could include the requirement that a roof to be repaired or removed. However, such actions would normally only be necessary for roofs in an unsound or bad condition, based on the guidance provided above, or if contaminated runoff was occurring into areas where human exposure could occur.

The main groups of Authorised Persons are EHOs from the Local Government, but can include Department of Health officers as indicated in the contacts section.

In the case of commercial properties or workplaces then Occupational Health and Safety legislation will primarily apply, as administered by WorkSafe WA.

5.6 Asbestos Professionals

For difficult, large or risky tasks, especially involving badly damaged ACM, use of an ACM professional is highly recommended. ACM professionals can include ACM competent persons¹, occupational hygienists (ACM identification and risk advice) and licensed asbestos removalists, depending on the task. Listings of these may be found at yellowpages.com.au under “asbestos”. For ACM identification, the most relevant subcategories are “asbestos inspections”, “asbestos survey” and “asbestos testing”, which may all include many of the same companies. Depending on the task, other relevant subcategories may be “asbestos removals” and “asbestos disposal”.

In choosing and using an ACM professional important considerations include that:

- The choice is the result of at least three detailed quotes and discussions, to help compare prices and asbestos competencies;
- They can demonstrate they have the necessary asbestos competency based on their qualifications, experience and skills. Larger established firms may more easily do this;
- They can outline a process or plan for doing the work, and will provide a report or completion document after the task;
- In the case of an ACM removal, they have either a restricted (>10m² ACM) or unrestricted (>10m² or friable ACM) asbestos licence from WorkSafe WA. Ask for their licence number and check it at: www.commerce.wa.gov.au/worksafe/find-asbestos-licence-holder; and
- You understand and monitor the work so it is done properly and with necessary precautions e.g. use of dust suppression or containment measures. If in doubt, contact the Department of Health or Local Government as listed under Contacts.

¹ Note that an asbestos (or ACM) competent person is an occupational health term which “means a person possessing adequate qualifications, such as suitable training and sufficient knowledge, experience and skill, for the safe performance of the specific work.” There is no formal accreditation or licensing of such persons in Western Australia.

In the case of a roof removal the minimum proper procedures in general terms would include but not be restricted to:

- Advising the neighbours (not a WorkSafe requirement);
- Wetting down the roof progressively as it is removed, or preferably spray with PVA or bondcrete before removal;
- Workers wearing respirator, gloves and overalls;
- Excluding uninvolved people from the area;
- The roof being disassembled with minimal damage, no power tools, and being gently and safely lowered to the ground;
- The panels being wrapped or bagged in two layers of heavy duty plastic which is labelled with an asbestos warning;
- Removing any above surface associated contamination such as gutters and downpipe;
- Decontaminating the roof-space;
- No roof fragments or debris being left at site after the removal; and
- The bagged material being moved as soon as practical to disposal facility suitable for ACM, as per Department of Environment Regulation guidance at:
www.der.wa.gov.au/images/documents/our-work/controlled-waste/cw-fs-asbestos.pdf;

The primary guidance in regard to workers undertaking asbestos removal as required by WorkSafe WA is the *Code of Practice for the Safe Removal of Asbestos, 2005*:

www.commerce.wa.gov.au/sites/default/files/atoms/files/saferemoval_ofasbestos2ndeditionnoh.pdf

6. Contact Information

Department of Health, Environmental Health Directorate – For information and advice on asbestos in relation to public health: 08 93884999 or <mailto:ehinfo@health.wa.gov.au> and at the website: http://www.public.health.wa.gov.au/3/1143/2/asbestos_and_public_health.pm

For Local Government advice contact the relevant one on the following site and ask for the Environmental Health Officer:

www.dlqc.wa.gov.au/AdviceSupport/Pages/Local%20Government%20Directory.aspx

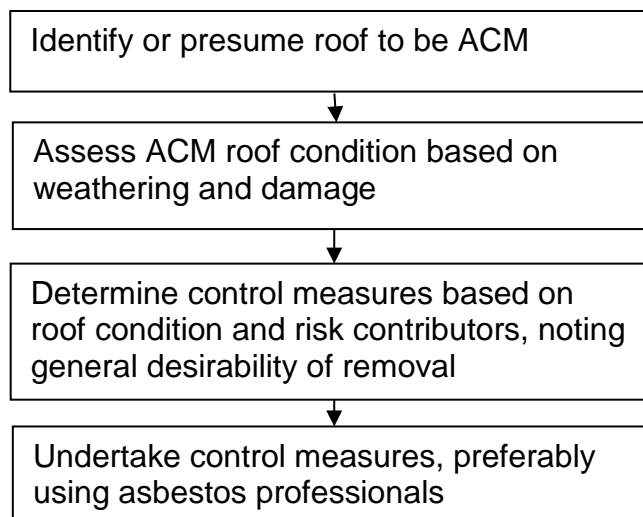
To find a NATA accredited asbestos analytical laboratories search for asbestos at: <http://www.nata.com.au/nata/orgs-and-facilities/advanced-facilities-search>

WorkSafe (WA Department of Commerce) - For work-related information on asbestos relevant contact details are: 1300307877 or safety@commerce.wa.gov.au or search for asbestos under www.commerce.wa.gov.au/Worksafe.

Appendix 1 - ACM Roof Identification, Assessment and Management Summary

This document is a cross-referenced summary of the operational elements from the accompanying Guidance Note, which is intended to be an in-the-field tool.

ACM Roof Management Process



Identification (Section 5.1, pages 3-4)

If the roof is cement-like, and is or could be pre-1990, then it is likely to be ACM. The typical characteristic features of ACM roofs (particularly when in combination) are:

- Brand name of “Super Six”;
- Usually 7 corrugation ridges per 1 metre wide panel; and
- Use of diamond shaped metal fasteners.

Condition Assessment (Section 5.2, pages 5-6)

RATING	DESCRIPTIVE EXAMPLES*
Unsound	Roofs that are so badly damaged by physical action or fire that the structure is substantially not weatherproof and therefore not habitable.
Very Poor	More numerous cracks and even holes. Or easily seen raised asbestos fibres across most of the surface. Or some flaking of cement surface and easily scratched. Or substantial appearance “whiskers” on downward edges of sheets. Or extensive signs of water leakage under roof. Or having many of the “Poor” damage features.
Poor	Some small breakages or some larger cracks. Or signs of weathering breaking down (roughening) the surface cement matrix and revealing fibres. Or significant appearance “whiskers” on downward edges of sheets. Or flaking of previously applied paint. Or signs of water leakage under roof.
Reasonable	Limited visible deterioration, discolouration or damage. Some scratches, physical marks, a few small breakages on edge of panels possible. Little sign of breakdown of the ACM cement surface through weathering or minimal appearance “whiskers on downward edges of sheets. May be associated with previous effective application of paint or sealant.

*Lichen is not used as a condition indicator due to uncertainty whether it increases or decreases the ACM hazard

Other Risk Contributors (Section 5.3, pages 6-8)

In addition to the roof's condition rating, a number of other risk factors may or are likely to be present which will affect the overall risk from the roof:

- Contaminated runoff
- Structural weakening
- Blue asbestos presence
- Sub-roof contamination
- Abrading vegetation
- **Human exposure**

Control Measures (Section 5.4, pages 9-11)

The relatively poor condition of ACM roofs, the range of elevated risk factors associated with them, and the usually limited lifespan that may remain for ACM roofs indicates that many of them should be removed and replaced.

Standard Control Measures

Some control measures should apply to any building with an ongoing ACM roof, with some variation of degree depending on the particular circumstances. Normally the poorer condition the roof the more rigorously should the control measure apply:

- Integrity of Drainage – **any rain (and hence fibre) runoff to ground surface must prevented and associated contamination remediated**
- Roof- space access – needs to be managed due to potential ACM dust contamination
- External roof access – needs to be managed due to minimise further damage and prevent falls
- Roof monitoring – should occur regularly to identify and manage emergent problems

Situation-based General Response

For ACM roofs non-standard control actions will depend on the condition of the roof as well as the presence or not of other contributing factors to risk.

RATING	REMEDIAL RESPONSE <small>(subject to risk contributors)</small>
Unsound	If a residential building is substantially no longer weatherproof then it will be deemed not habitable and the ACM roof must be removed before this can be reversed. A Local Government Environmental Health Officer will direct removal to occur (see Section 5.4). Other situation-based control measures are not necessary except perhaps non-habitability signage at the building entrance.
Very Poor	These roofs are strongly recommended to be removed as soon as possible and in some cases a Local Government Environmental Health Officer may direct this to occur. Removal will be especially important if some of the risk contributors also apply such as presence of blue ACM and significant potential human exposure. Use of other control measures may not be worthwhile because this can only be an interim measure and their use will have costs and risks associated with them.

Poor	Removal is still recommended or at least its removal be planned for in the short to medium term. If this is not possible then some control measures may be useful to minimise any interim associated. This can include removing fragments, repair of cracks or holes and/or applying a surface treatment. The presence of other risk contributors increases the need for stronger actions.
Reasonable	Its planned removal is still desirable, although other things being equal it normally will only pose a very low risk. Situation-based control measures may be implemented although primarily for aesthetic purposes or to help prolong the lifespan of the roof. .

Particular Situation-based Control Measures

- Removal – this should only be done by an asbestos professional, normally being a WorkSafe licensed removalist working to the *Code of Practice for the Safe Removal of Asbestos 2005*
- Repair - for repairing cracks and small holes, sealing the edges of the wetted down material would be the first step and then the gap could be filled with an outdoor silicone product. Does not include panel replacement
- Surface treatment – may include gentle pre-cleaning. Importance of treatment penetration/binding, durability, ease of re-coating and cost effectiveness
- Encapsulation – normally not recommended

Appendix 2 - Cleaning Leaf Litter From Gutters Of Asbestos Cement Roofs

(Extract from *Code of Practice – How to Manage and Control Asbestos in the Workplace – 2016*)

SAFE WORK PRACTICE 3 – CLEANING LEAF LITTER FROM GUTTERS OF ASBESTOS CEMENT ROOFS	
Equipment that may be required prior to starting work (in addition to what is needed for the task)	<ul style="list-style-type: none"> • A bucket of water, or more as appropriate, and detergent • A watering can or garden spray • A hand trowel or scoop • Disposable cleaning rags • A suitable asbestos waste container • Warning signs and/or barrier tape • An asbestos vacuum cleaner.
PPE	<ul style="list-style-type: none"> • Protective clothing and RPE (see AS1715, AS 1716). It is likely that a class P1 or P2 half face respirator will be adequate for this task, provided the recommended safe work procedure is followed.
Preparing the asbestos work area	<ul style="list-style-type: none"> • Since the work is to be carried out at a height, appropriate precautions must be taken to prevent the risk of falls. • Ensure appropriately marked asbestos waste disposal containers are available. • Segregate the asbestos work area to ensure unauthorised personnel are restricted from entry (e.g. use warning signs and/or barrier tape at all entry points). The distance for segregation should be determined by a risk assessment. • Segregate the area below. • Avoid working in windy environments where asbestos fibres can be redistributed. • If using a bucket of water, do not resoak used rags in the bucket as this will contaminate the water. Instead, either fold the rag so a clean surface is exposed or use another rag.
Gutter cleaning	<ul style="list-style-type: none"> • Disconnect or re-route the downpipes to prevent any entry of contaminated water into the waste water system and ensure there is a suitable container to collect contaminated runoff. Contaminated water must be disposed of as asbestos waste. • Mix the water and detergent. • Using the watering can or garden spray, pour the water and detergent mixture into the gutter but avoid over-wetting as this will create a slurry. • Remove the debris using a scoop or trowel. Do not allow debris or slurry to enter the water system. • Wet the debris again if dry material is uncovered. • Place the removed debris straight into the asbestos waste container.
Decontaminating the asbestos work area and equipment	<ul style="list-style-type: none"> • Use damp rags to wipe down all equipment used. • Use damp rags to wipe down the guttering. • Where practicable, and if necessary, use an asbestos vacuum cleaner to vacuum the area below. • Place debris, used rags and other waste in the asbestos waste container. • Wet wipe the external surfaces of the asbestos waste container to remove any adhering dust before it is removed from the asbestos work area.

<p>Personal decontamination should be carried out in a designated area</p>	<ul style="list-style-type: none"> • If disposable coveralls are worn, clean the coveralls while still wearing RPE using a HEPA vacuum, damp rag or fine-water spray. RPE can be cleaned with a wet rag or cloth. • While still wearing RPE, remove coveralls, turning them inside-out to entrap any remaining contamination and then place them into a labelled asbestos waste bag. • Remove RPE. If non-disposable, inspect it to ensure it is free from contamination, clean it with a wet rag and store in a clean container. If disposable, cleaning is not required but RPE should be placed in a labelled asbestos waste bag or waste container. <p>Refer to the Code of Practice: How to Safely Remove Asbestos for more information.</p>
<p>Clearance procedure</p>	<ul style="list-style-type: none"> • Visually inspect the asbestos work area to make sure it has been properly cleaned. • Clearance air monitoring is not normally required for this task. • Dispose of all waste as asbestos waste. <p>Refer to the Code of Practice: How to Safely Remove Asbestos for more information.</p>

Appendix 3 - Removing ACM Cement Roof Sheeting

(Extract from *Code of Practice- How to Safely Remove Asbestos – 2016*)

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

The removal of asbestos cement roofing must be performed in accordance with the WHS Regulations.

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

If the system of removal involves walking on the roof to remove roof sheeting (this should be the last option when choosing a method to remove roof sheeting), spray the asbestos cement roof sheeting with a PVA solution prior to removal. Ensure the PVA is dry before removing it so as to avoid a slip hazard. Once removed, spray the back (underside) of the asbestos cement with either a fine water spray or the PVA solution.

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

- by hand, over short distances
- loading the wrapped sheets on to a cradle for support
- using scissor lifts or similar devices
- using scaffolds.

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

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

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

Personal decontamination must be carried out in accordance with the WHS Regulations and this Code.



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