

ASBESTOS IN BUILDINGS

An overview for owners and occupiers of residences constructed using asbestos products



This Building Technology Resource explains what asbestos is, how and where it is used in building materials, and why it is hazardous to health.

The health risks associated with asbestos products have been known for some time. Asbestos has not been used in major building materials in Australia since the late 1980s, and its new use has been banned since 2003. However, significant quantities of asbestos products were installed before that time, and their removal from buildings has become widespread. Perceived risks of asbestos products often outweigh the real risks, so that home owners do not readily appreciate they are able to choose between costly removal and managing the products in place until the building has met its service life.

Relevant government agencies have produced a range of guidelines on how home owners should deal with asbestos products. By being better informed, building owners and occupiers can ensure that asbestos products are identified, monitored and managed, where necessary, by qualified contractors.

WHAT IS ASBESTOS?

The term 'asbestos' describes the fibrous forms of several silicate rocks that separate into long, fine fibres when crushed (Figure 1), a property described as asbestiform. Those fibres, which have diameters of less than 3 μm , can lodge in the lungs and cause a range of lung diseases (1 μm is one-millionth of a metre; for comparison, human hair has a diameter of 20 μm or more).

The most common types of asbestos used worldwide in commercial applications were:

- ▶ white asbestos (also known as chrysotile)
- ▶ blue asbestos (crocidolite)
- ▶ brown asbestos (amosite).

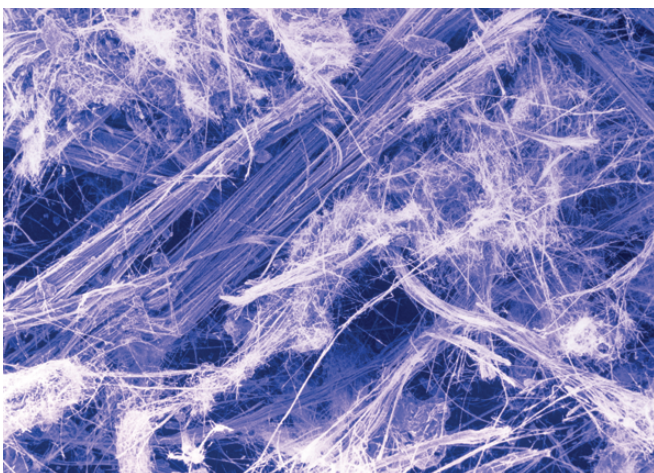


FIGURE 1 Crocidolite (blue) asbestos viewed with a scanning electron microscope (SEM). (Dr Jeremy Burgess/Science Photo Library)

Because of their high strength and resistance to heat and chemicals, asbestos fibres were used in different product types according to their particular properties. For example, white asbestos fibres tend to be more flexible and can be woven, so they were used in heat-resistant textiles. White asbestos was also the type most widely mined and was used in asbestos-cement building products (in combination with smaller proportions of blue or brown asbestos). Blue and brown asbestos have good chemical resistance, and so were used in chemical processing.

HEALTH RISKS OF ASBESTOS

Asbestos is a risk to health if the fibres become airborne and are inhaled. The risk of ill health increases with the amount of asbestos inhaled and the duration of inhalation. People who were exposed to asbestos in the workplace – such as in its mining, manufacture or installation – are at greater risk than people who occupy buildings constructed with asbestos products.

Inhaling large amounts of asbestos fibre can lead to asbestosis – a scarring of lung tissue that interferes with oxygen transfer – and to lung cancer similar to that caused by smoking tobacco. Asbestos exposure can also lead to mesothelioma, normally a very rare cancer of the membrane around the lungs, abdomen or heart. Mesothelioma occurrence is now related mostly to asbestos exposure and is a concern for people who have lived near or handled asbestos and asbestos products. Because the background risk of mesothelioma in the absence of asbestos is extremely small, the relative increase in the risk of developing mesothelioma is comparatively high even if only low amounts of asbestos fibre are inhaled. Mesothelioma is usually diagnosed decades after exposure and is fatal soon after diagnosis. Because diagnosis can occur long after asbestos inhalation, it can be difficult to assign specific risk factors to environmental exposure. In the absence of asbestos exposure, the incidence of mesothelioma is ~3 cases per million people per year. The overall incidence in Australian males is ~10 times higher (30 cases per million people per year), an increase that is much more than that found in many other countries, suggesting a link with the relatively high usage of asbestos products in Australia.

Building owners and occupiers should be aware of the estimated risk of passive exposure to asbestos in buildings. According to research by the Health Effects Institute (1991), for every million occupants of buildings constructed with asbestos products, 4–60 would die prematurely from cancer. To put this into perspective, consider the lifetime risk per million people of dying from other everyday events in Australia: bee sting, 7; lightning, 25; electrocution, 140; and road accidents, 3500.

Health authorities commonly consider that the general population should not be exposed to a hazard that confers an increase in the

lifetime risk of cancer of greater than 10 people per million, and government regulations regarding the control of asbestos hazards may be based on this target.

COMMON TYPES OF ASBESTOS-CONTAINING BUILDING MATERIALS

Asbestos was a constituent of thousands of products for consumer, commercial and industrial use (Figure 2). Its use in Australia was gradually phased out from the late 1970s in response to concerns about its health risks. In 2003, Australia banned the importation, manufacture and use of all forms of asbestos and asbestos-containing products.

Even after asbestos usage ceased, concerns remained about what actions to take with asbestos products that had already been installed in buildings. These materials may vary from weak, fluffy materials with high asbestos content and little binder that easily release dust in response to light contact (e.g. insulation products), to partly bound materials that release less dust (e.g. weathered asbestos-cement sheeting), to firmly bound products that require mechanical abrasion or cutting to release dust (e.g. asbestos-filled plastics such as vinyl floor tiles).

Examples of asbestos-containing building products include:

- ▶ asbestos-cement sheeting and forms: used extensively as interior/exterior wall and roof cladding and guttering, as underlay in wet areas, as fencing (especially in Perth), as heating flues, and in many other products. After more than 20 years of external use, the cement binder on the product's surface may deteriorate to expose unbound asbestos fibres (Figures 3 and 4).
- ▶ sprayed asbestos insulation: used mostly in commercial buildings for providing steel and concrete elements with fire resistance, but also in community buildings for noise and condensation control. These products contain little binding material and are easily crushed to produce dust (i.e. friable). Most friable products have probably been removed in recent decades.
- ▶ asbestos 'fluff' insulation: used as loose fill, without any binder, and blown into roof spaces for thermal insulation. The use of brown or blue asbestos fluff in ACT in the 1960s and 1970s led

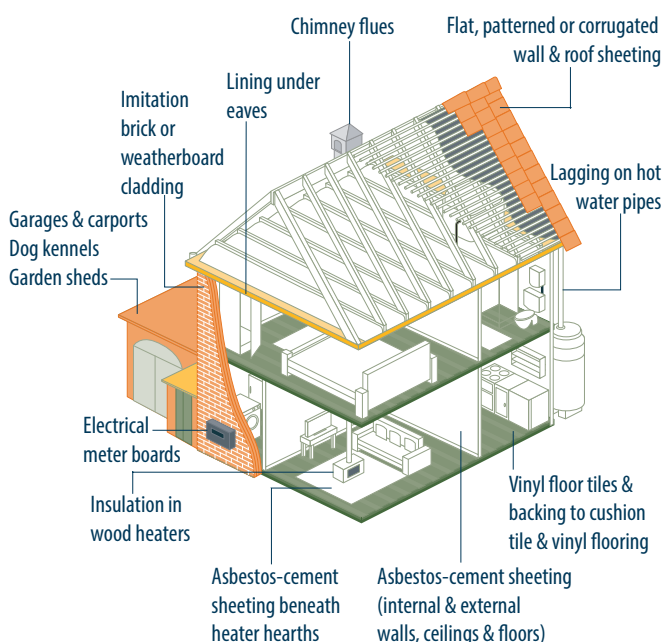


FIGURE 2 Common locations and uses of asbestos-containing building products in the home.

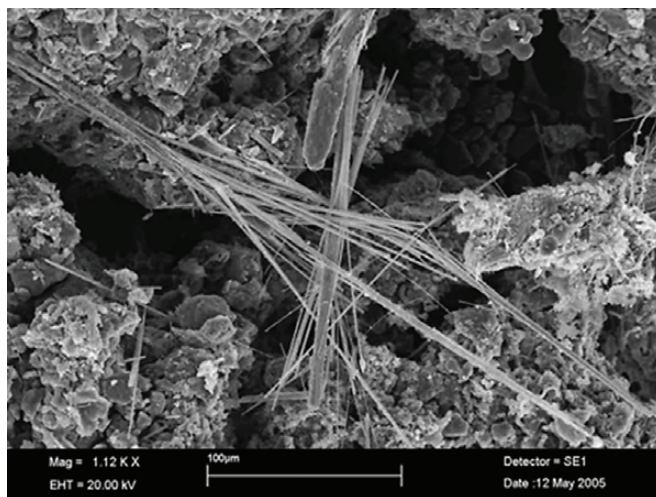


FIGURE 3 SEM image of amosite fibres from a weathered asbestos-cement roof. (Campopiano A, Ramires D, Zakrzewska AM, Ferri R, D'annibale A, Pizzutelli G (2009) Risk assessment of the decay of asbestos cement roofs. *The Annals of Occupational Hygiene* 53(6), 627–638. <https://doi.org/10.1093/annhyg/mep036>. With permission from Oxford University Press)

to the creation of an Asbestos Response Taskforce in 2014 to coordinate the acquisition and demolition of almost 1000 'Mr Fluffy' properties. In other regions, loose-fill fibrous insulation in ceiling spaces will most likely be glass wool or rockwool – non-asbestos products that have been used in hundreds of thousands of houses. Glass wool and rockwool fibres have a relatively uniform diameter and a cotton-wool appearance, whereas asbestos fibres vary from very fine strands to clumps and have a shaggy appearance (Figure 5).

- ▶ asbestos-containing vinyl tiles and 'cushion' vinyl products: used as flooring. Although asbestos tends to be firmly bound in these products, fibres can be released by mechanical abrasion when flooring is removed or replaced, so adequate procedures must be followed.
- ▶ asbestos insulation board: used next to hot appliances or electrical boards to provide fire resistance. These products are generally high in asbestos content and semi-friable.

Despite the phase-out and subsequent ban of asbestos-containing building materials in Australia, buildings may still contain asbestos products. Buildings constructed before the 1980s (especially in the 1970s) are highly likely to contain asbestos, while those constructed after 1990 are unlikely to contain asbestos. Note that many asbestos products manufactured before the 1980s may look similar to asbestos-free products that were made more recently. It is also possible that imported 'asbestos-free' products actually contain trace amounts, as some foreign regulations classify materials with <1% of asbestos by weight as non-asbestos products. While Australian regulations require the absence of detectable asbestos, it should not be assumed that import procedures will test or capture every product. Thus, if the age or source of a building material is unknown, it may require scientific identification by an accredited laboratory to confirm the presence or absence of asbestos.

REMOVING OR MANAGING ASBESTOS

The presence of asbestos does not necessarily cause a high risk to health, and its removal is not always necessary. Any risk assessment must take into account the factors that influence a building occupant's exposure to airborne asbestos dust, which include:

- ▶ the type and volume of asbestos in the building material
- ▶ the physical characteristics of the material



FIGURE 4 Asbestos fibres visible on severely weathered roofing. (Tunatura/Shutterstock)



FIGURE 5 Asbestos fibres – seen here in sprayed asbestos insulation – have a shaggy appearance. (Stock.com/Brasil2)

- ▶ the quantity of material installed
- ▶ the potential for physical disturbance of the material.

In general, government guidelines should help building owners and occupiers to determine whether asbestos-containing building materials are present and what actions are necessary (if any). Such action might require that the materials be inspected by certified asbestos assessors to assess their physical condition, location and accessibility to occupants. In cases where a material is not considered hazardous (in terms of producing asbestos dust), government guidelines generally recommend that the material is managed in place – in other words, left as is, but inspected at regular intervals to ensure that it remains undamaged and unlikely to expose occupants to asbestos dust. In some cases, materials might be sealed or otherwise protected to prevent exposing occupants to asbestos dust.

In cases where a material is considered hazardous, it must be removed by government-registered contractors who use adequate procedures to protect themselves and others from asbestos exposure, to contain asbestos dust to the work area, to clean up residues from the site, and to dispose of the removed materials and waste to a licensed asbestos disposal facility. (Note that removal contractors are not usually certified.) Regulations and guidelines regarding these procedures are state- or territory-based and may vary between regions, so the relevant organisations (e.g. safe work agency, health department,

environment protection agency) should be consulted before taking specific action. It is worth noting that the removal of some asbestos products may lead to higher levels of exposure to airborne dust (albeit still very low), probably due to difficulties in containing disturbed dusts.

MORE INFORMATION

Additional information can be found in the following resources. Please check your local authorities for specific legislation, codes and guidelines, as they can vary between states and territories.

Asbestos Safety and Eradication Agency (2018) Sydney: Australian Government. <www.asbestossafety.gov.au>

Environmental Health Standing Committee (2013) Asbestos: A guide for householders and the general public. Canberra: Australian Health Protection Principal Committee. <www.health.gov.au/internet/main/publishing.nsf/Content/ohp-enhealth-asbestos-may2012.htm>

Health Effects Institute (1991) Asbestos in public and commercial buildings. Cambridge, USA: Health Effects Institute. <<https://www.healtheffects.org/publication/asbestos-public-and-commercial-buildings>>

KGH Border Services (2016) Asbestos importation review report, Ref. No. 1600018. <<https://www.homeaffairs.gov.au/reports-and-pubs/files/asbestos-importation-review.pdf>>

Safe Work Australia (2018) Asbestos. Canberra: Safe Work Australia. <www.safeworkaustralia.gov.au/asbestos>

Check the Safe Work Australia website in your state or territory for additional resources relating to working safely with asbestos.

The following resources are relevant to specific states or territories:

Asbestos Response Taskforce (2018) Canberra: ACT Government. <www.asbestostaskforce.act.gov.au>

Asbestos.vic.gov.au (2018) Melbourne: Department of Health, EPA Victoria and WorkSafe Victoria. <www.asbestos.vic.gov.au>

Department of Health (2018) Asbestos fire contamination. Perth: Government of Western Australia. <www.agric.wa.gov.au/sites/gateway/files/Asbestos%20fire%20contamination.pdf>

Department of Water and Environmental Regulation (2018) Asbestos. Perth: Government of Western Australia. <www.der.wa.gov.au/your-environment/contaminated-sites/59-asbestos>

EPA South Australia (2018) Wastes containing asbestos – removal, transport and disposal. Adelaide: Environmental Protection Authority South Australia. <www.epa.sa.gov.au/files/47711_guide_asbestos.pdf>

Northern Territory Government (2019) Asbestos and building. Darwin: Northern Territory Government. <<https://nt.gov.au/property/building-and-development/asbestos-and-building>>

NT WorkSafe (2019) Electrical switchboard panels and meter panels containing asbestos. Darwin: NT WorkSafe. <<https://worksafe.nt.gov.au/forms-and-resources/bulletins/electrical-switchboard-panels-and-meter-panels-containing-asbestos>>

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