

Asbestos

Health and Safety at Workplaces



What is Asbestos?

The term 'asbestos' refers to a group of six types of naturally occurring minerals which are formed through the crystallization of molten rock which when cooled results in the formation of the different types of fibrous silicates.

Due to its desirable physical and chemical properties, up until 1999, the use of asbestos-containing materials (ACMs) in the construction and building industry and in ship repairs was very popular. In fact most of the buildings built in the 1950s until late in the 20th century contained asbestos. The use of asbestos ranged from use in construction materials to a number of other purposes including roofing and flooring products, gaskets and as decorative plasters.



Fig2

The asbestos building showing common locations of asbestos-containing materials.

Physical and Chemical properties of Asbestos

Asbestos fibres have extraordinary physical and chemical properties.

These include:

- Extremely resistant to various chemical attacks
- Do not burn
- Good thermal and electrical insulators
- Heightened mechanical tensile strength
- No detectible odour or taste

Asbestos types

There are six regulated types of asbestos, of which five are of the amphibole type and the remaining one is of the serpentine type. The different types of asbestos are shown in the table below.

Amphibole	Actinolite	
	Amosite	also referred to as 'brown asbestos'
	Anthophyllite	
	Crocidolite	also referred to as 'blue asbestos'
	Tremolite	
Serpentine	Chrysotile	also referred to as 'white asbestos'

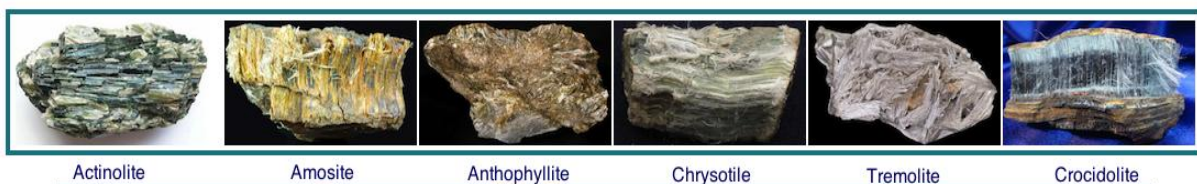


Fig3



Serpentine asbestos refers to asbestos made of long and curly fibres while amphibole asbestos refers to brittle, rod or needle-shaped fibres. Crocidolite (blue asbestos) and Amosite (brown asbestos) are considered to be the most dangerous forms of asbestos.

Different forms of ACMs

Various forms of ACMs exist, each having different uses. Some of these forms include:

- **Sprayed asbestos** – This form of asbestos was mainly applied as soundproofing and heatproofing as well as protection against fire and condensation on beams amongst other uses. This type of asbestos is particularly friable, and thus is less resistant to damage and more likely to release inhalable fibres.
- **Loose asbestos lagging** – This was also applied as heatproofing and soundproofing material and used to protect loft insulation, pipe ducts and insulation between floors from fire.
- **Thermal insulation/Lagging** – This was used to lag pressure vessels, boilers and pipes and was applied either in preformed pipe sections or as a composite.
- **Asbestos cloths, tapes and cords** – Asbestos cloths were used as gaskets, lagging, thermal insulation, packing and jointing. On the other hand, asbestos tapes and cords were mainly found as heatproof and soundproof sealing material as well as filling materials in expansion joints.
- **Asbestos board/panels** – These boards/ panels can contain a mixture of asbestos types and they were mainly used as fireproof coverings as well as in ducts, partitions, wall lining, ceiling tiles and infill panels.
- **Asbestos millboard, papers, cardboards, and gaskets** – These were particularly used for heat insulation and as fire protection in electrical appliances, to manufacture filter materials and to wrap electrical wires. Asbestos cardboard were used as under floor coverings while gaskets were used as sealing for acids, oils and under conditions of high temperature and pressure.
- **Asbestos containing textured coats and paints** – Textured coatings usually contain Chrysotile asbestos and can be found on ceilings and walls.



- **Asbestos-containing bitumen/tar** – This was used as joint sealant, casting compound, humidity insulating paint on the outer walls of cellars, in the manufacture of roofing felt and as a coating for flat roofs and guttering.
- **Asbestos-containing floor coverings** – These either consisted as thermoplastic vinyl-asbestos tiles which normally contained Chrysotile asbestos or as asbestos-paper backed PVC flooring.
- **Asbestos cement products** – These are formed as a mixture of cement and asbestos fibres. The most common type of asbestos found in asbestos cement is Chrysotile. Main uses of asbestos cement include tiles and slates, profiled sheets, semi-compressed and fully compressed flat sheet and partition board and pre-formed moulded products.

Exposure to asbestos – When is it dangerous?

Asbestos containing material is not considered to be harmful unless it is releasing dust or fibres into the air where it can be ingested or inhaled. This usually occurs when the ACM is in a bad state and has been deteriorated or disturbed. Many of the fibres will become trapped in the mucous membranes of the nose and throat where they can then be removed, but some may pass deep into the lungs, or, if swallowed, into the digestive tract. Once they are trapped in the body, the fibres can cause health problems.

Friable asbestos is the most hazardous form of asbestos. This type of asbestos can be crumbled, pulverized, or reduced to powder by the pressure of an ordinary human hand. Moreover, damage and deterioration will increase the friability of asbestos-containing materials. Aging, continual vibration and physical impact such as drilling, cutting and sawing, are all factors that increase the likelihood of fibre release.



Practically everyone is exposed to asbestos from the outside air and although no level of asbestos exposure is considered safe, problems related to asbestos exposure often arise after heavy and repeated exposure. Due to the popular use of asbestos in building material, heavy exposure to asbestos occurs mainly during home renovations and construction works.

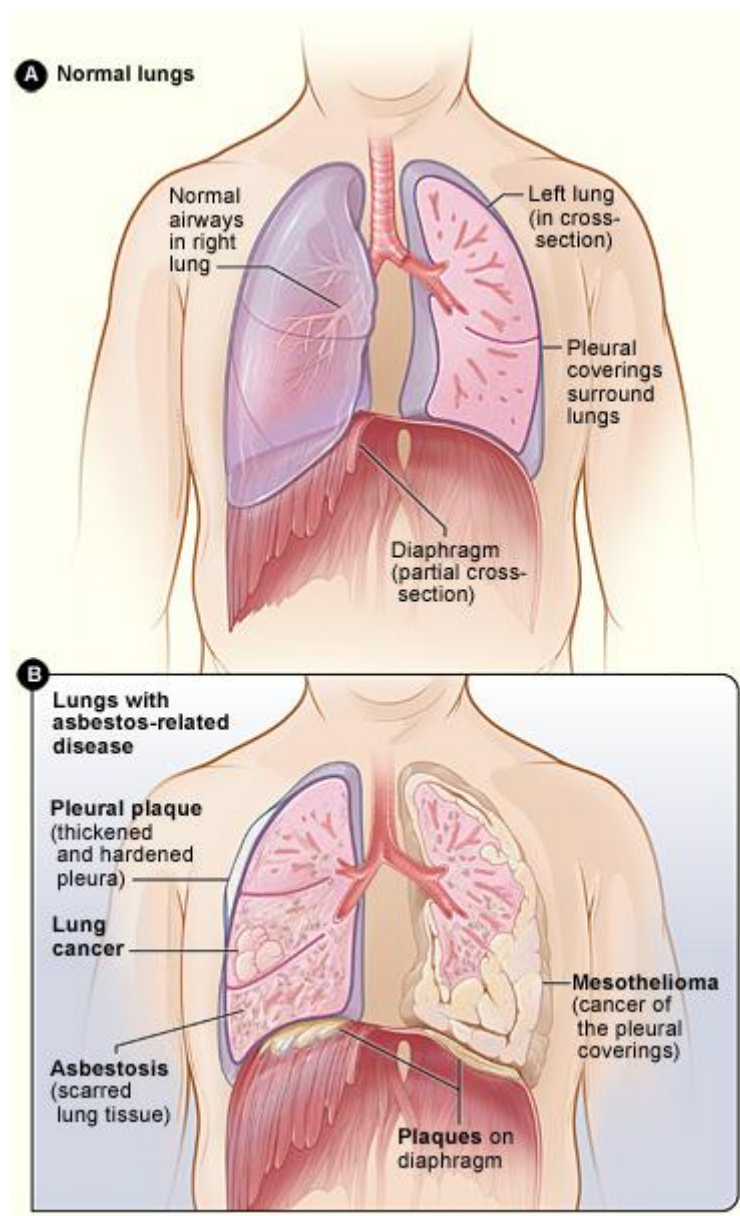


Fig4

What are the health effects?

Asbestos is a Category 1 carcinogen and all six types of asbestos can lead to cancer. There is no cure for asbestos-related diseases yet. Following exposure to asbestos, a person may develop one of the following diseases:

Asbestosis: Scarring of the tissue caused by deep penetrating of fibres into the lung. This restricts breathing and leads to decreased lung volume and increased resistance in the airway.

Lung cancer (asbestos-related): A nasty tumour of the lungs' air passages which grows through surrounding tissue, affecting and often blocking air passages. The risk of developing such cancer is greatly increased by smoking.

Mesothelioma: Cancer of the cells which can form either on the lining of the lungs as well as around the lining of the abdomen or heart. The symptoms of this cancer can take from 20 up to 50 years after asbestos exposure to appear and when such cancer is diagnosed it is usually always fatal.

Other cancers (ovarian & laryngeal cancers) can also be caused, however the asbestos-related risk is much higher for lung cancer and mesothelioma than for other cancers.

The likelihood of developing a disease depends on many factors such as; the asbestos type, the dose or number of fibres inhaled, the age at first exposure (the younger you are when exposed the greater the chance to develop a disease), the number of cigarettes smoked and duration of exposure to smoking (smokers are 50 times more likely to develop a disease).



Health and Safety Measures

As stated in Legal Notice 323 of 2006, any risk of exposure to dust, which may arise from asbestos or ACMs, must be assessed in order to determine the nature and degree of the workers' exposure to such dust.

Handling asbestos-containing material requires the prior authorisation of the Occupational Health and Safety Authority (OHSA), which will only authorise such works if the following documentation is forwarded to it:

- 1) All activities involving asbestos/ACMs must be covered by a **notification system** administered by the OHSA, and no work involving asbestos or of material containing asbestos may commence before the Authority is thus notified. This form can be accessed from OHSA's website <http://ohsa.org.mt> under the 'Forms' section.
- 2) An official **letter of Engagement by Client** need to be submitted as a proof that the company responsible for asbestos/ACM removal works is appointed by the client who required these works.
- 3) A formal written **risk assessment** has to be prepared and submitted to the Authority. The risk assessment must take into account all the features of that particular site and the activities to be performed and it needs to include a sufficient basis for the estimate of possible exposure and considers exposure of all those who may be affected. Moreover the risk assessment shall be revised and re-submitted whenever there is unclear, incorrect or not enough information or if there is a change in the work carried out.



- 4) A detailed **plan and methods of work** used by the employer needs to be prepared and submitted to the Authority. The plan of work must be sufficiently detailed and relates to the particular site and activities. Any preparatory work that needs to be done (e.g. prior to setting up an enclosure), details regarding the number of workers exposed and the health surveillance programme instituted for them, as well as a clear site diagram showing the location of the equipment, exit routes etc are to be included in the plan of work.
- 5) Copies of **Health Surveillance reports** of workers who are to carry out asbestos/ACM removal activities must be sent to the Occupational Physician of the Authority, under strict confidential cover, to provide proof that such assessments have been carried out,
- 6) Once the decision to dismantle asbestos is taken by the employer, the local authority responsible for Environmental Protection must be approached for its authorization as to how and where the asbestos is to be disposed off. **No dismantling can commence prior to the issue of such an authorization which must be given in writing.**

With regards to dismantling activities, it is advisable that, before any decision is taken to dismantle any asbestos containing material, an assessment of the level of deterioration of the asbestos material is made by a competent person. If the level of deterioration is such that it affords no risk, the removal of the asbestos may result in greater risks to health than if it were to be left in place. In such circumstances, no action other than the application of a suitable oil-based or polyurethane paint to the asbestos material needs to be taken.





Fig5

Health Surveillance

An assessment of each worker's state of health, including a specific examination of the chest, must be carried out prior to the beginning of exposure to dust arising from asbestos or materials containing asbestos at the place of work.

A new assessment must be carried out at least once every three years for as long as exposure continues, and a record of the health of each individual thus examined must be established by the doctor: Provided that the doctor shall pass to the employer the results of these assessments and any recommendations made, under strict confidential cover, and the employer shall give to the worker copies of such assessments and recommendations to the worker concerned. Both the worker concerned and the employer may request a review of these assessments.

Following the clinical surveillance referred to in this regulation, the doctor responsible for the medical surveillance of the workers should advise on, or determine any individual protective or preventive measures to be taken; these may include, where appropriate, the withdrawal of the worker concerned from all exposure to asbestos. The doctor may refer any particular case to the Authority for specific instructions.

Information and advice must be given to workers regarding any assessment of their health which they may undergo following the end of exposure. The doctor may indicate that medical surveillance must continue after the end of exposure for as long as is considered necessary to safeguard the health of the person concerned.



Other Requirements

Training

The dismantling of asbestos products must be carried out by persons who have been instructed about the hazards associated with asbestos removal have received training about how to handle asbestos safely and without risk, and who have been informed of the inherent dangers of the material. They must also be adequately protected and continuously supervised by a suitably qualified person.

Segregation of the area

The area in which asbestos material is to be removed must be designated as a hazardous zone, and entry into it is to be restricted to suitably clad workers. This hazardous zone must be physically separated from adjacent areas where no such work is being carried out, by suitable means such as plastic sheeting. Moreover, no eating, drinking or smoking is to be permitted in this zone.

Personal Protective Equipment

The minimum level of personal protection that is required must include:

- a) Disposable whole body suits, with tight wrist, ankle and face opening elasticized bands;
- b) Disposable gloves and overshoes;
- c) Safety helmet and safety boots;
- d) Appropriate facemasks suitable for working with asbestos.





Fig6

Site cleaning

There must be provided a suitable number of vacuum cleaners fitted with H.E.P.A. filters and confirming to BS 5415 type H. These cleaners must be used properly at all times when asbestos material is handled. Moreover, they must also be used to clean the protective clothing before the workers remove it.

Any asbestos material removed must be immediately placed into appropriately labelled red polythene bags of suitable strength. At the end of each working shift, vacuuming of all surfaces in the work area must be carried out. All filters that are to be discarded must be placed in the same containers that will contain the asbestos material. Moreover the company can additionally be requested to make use of other protective measures, such as the use of suitable 'air showers', which may also cause changes in the actual work practice.

References

Asbestos-containing Materials (ACMs) in Workplaces – Practical Guidelines on ACM Management and Abatement. [online] Available at:
http://www.hsa.ie/eng/Publications_and_Forms/Publications/Chemical_and_Hazardous_Substances/Asbestos_Guidelines.pdf [Accessed 8 Dec. 2016].

Image sources

Fig1. <http://www.freshandclear.com.au/wp-content/uploads/2015/10/Asbestos-Removal-in-Perth-WA.png>

Fig2. <http://har.ie/wp-content/uploads/2010/10/Asbestos-Survey-Ireland-02.jpg>

Fig3. <https://www.treatmesothelioma.org/wp-content/uploads/2016/02/6-Types-of-Asbestos-e1479869013722.jpg>

Fig4. https://upload.wikimedia.org/wikipedia/commons/3/3a/Asbestos_effect.jpg

Fig5.

<http://d35gqh05wwjv5k.cloudfront.net/media/catalog/product/cache/4/image/85e4522595efc69f496374d01ef2bf13/1419954506/a/s/asbestos-warning-signs-caution-asbestos-hazard-l3168-lg.jpg>

Fig6. <http://fireplug.co.uk/ekmps/shops/jupaprint/images/pv3-respair-disposable-masks-5024-p.jpg>

Legal Notices

Protection of workers from the risks related to exposure to asbestos at work regulations, Subsidiary Legislation 424.23.

