



Asbestos

Incident Management

Key Points

Fire

- non flammable and non combustible under normal conditions
- chemically inert under normal conditions
- in the event of a fire involving asbestos, use fine water spray and liquid-tight protective clothing with breathing apparatus

Health

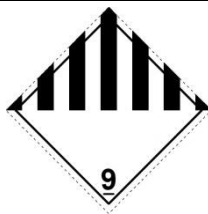
- the most common route of exposure is by inhalation
- acute inhalation may cause local irritation
- skin and eye irritation may occur from fibres

Environment



- avoid release to the environment; inform the Environment Agency of substantial incidents where appropriate

Hazard Identification

Standard (UK) dangerous goods emergency action codes

UN		2212 & 2590	Asbestos, Amphibole (amosite, tremolite, actinolite, anthophyllite, crocidolite) & Asbestos, Chrysotile	
EAC		2X	Use fine water spray. Wear liquid-tight chemical protective clothing in combination with breathing apparatus*. Spillages and decontamination run-off should be prevented from entering drains and watercourses.	
APP		–	–	
Hazards	Class	9	Miscellaneous dangerous substances and articles	
	Sub-risks	–	–	
HIN		90	Environmentally hazardous substance; miscellaneous dangerous substances	
<p>UN – United Nations number, EAC – emergency action code, APP – additional personal protection, HIN – hazard identification number</p> <p>* Liquid-tight chemical protective clothing (BS 8428) in combination with self-contained open circuit positive pressure compressed air breathing apparatus (BS EN 137)</p> <p>Reference</p> <p>Dangerous Goods Emergency Action Code List, National Chemical Emergency Centre (NCEC) Part of Ricardo-AEA. The Stationery Office, 2017.</p>				

Classification, labelling and packaging (CLP)*

Hazard class and category	Carc. 1A	Carcinogen, category 1A	
	STOT RE 1	Specific target organ toxicity (repeated exposure), category 1	
Hazard statement	H350	May cause cancer	
	H372	Causes damage to organs through prolonged or repeated exposure	
Signal words	Danger		
<p>* Implemented in the EU on 20 January 2009</p> <p>Reference European Commission. Harmonised classification – Annexe VI to Regulation (EC) No. 1272/2008 on Classification, Labelling and Packaging of Substances and Mixtures. http://echa.europa.eu/information-on-chemicals/cl-inventory-database (accessed 07/2017).</p>			

Physicochemical Properties

Serpentine asbestos

Chemical Name	Chrysotile
CAS number	12001-29-5
Molecular weight	Variable
Formula	$Mg_3(Si_2O_5)(OH)_4$
Common synonyms	White asbestos; serpentine asbestos
State at room temperature	White, grey or green fibrous solid
Volatility	Non-volatile at 20°C
Specific gravity	2.55 (water = 1)
Flammability	Non flammable
Lower explosive limit	Data not available
Upper explosive limit	Data not available
Water solubility	Insoluble
Reactivity	Stable under normal conditions. Reacts slowly with organic acids.
Odour	Odourless
References	
Asbestos. In: TOMES ® System (electronic version). Truven Healthcare Analytics Inc, Greenwood Village, Colorado, USA Available at: http://www.micromedexsolutions.com/ (accessed 07/2017).	
Hazardous Substances Data Bank. Chrysotile HSDB No. 2966 (last revision date 23/06/2005). US National Library of Medicine: Bethesda MD. http://toxnet.nlm.nih.gov/cgi-bin/sis/htmlgen?HSDB (accessed 07/2017)	
International Programme on Chemical Safety. International Chemical Safety Card entry for Chrysotile. ICSC 0014, 2010. World Health Organization: Geneva.	

Amphibole asbestos

Chemical Name	Crocidolite	Amosite	Anthophyllite	Tremolite	Actinolite
CAS number	12001-28-4	12172-73-5	77536-67-5	77536-68-6	77536-66-4
Molecular weight	Variable	Variable	Variable	Variable	Variable
Formula (Repeating Unit)	$\text{NaFe}_3\text{Fe}_2\text{Si}_8\text{O}_{22}(\text{OH})_2$	$(\text{Mg,Fe})_7\text{Si}_8\text{O}_{22}(\text{OH})_2$	$\text{Mg}_7(\text{Si}_8\text{O}_{22})(\text{OH})_2$	$\text{Ca}_2\text{Mg}_5(\text{Si}_8\text{O}_{22})(\text{OH})_2$	$\text{Ca}_2\text{Mg}_3\text{Si}_8\text{O}_{22}(\text{OH})_2\text{Fe}^{2+}_2$
Common synonyms	Blue asbestos Riebeckite	Brown asbestos; mysorite	Azbofen asbestos; ferroantho- phyllite	Silicic acid; calcium magnesium salt (8:4)	
State at room temperature	Lavender, blue or green fibrous solid	Brown, grey or greenish fibrous solid	Grey or brown-grey fibrous solid	White to pale green fibrous solid	Green fibrous solid
Volatility	Non-volatile at 20°C				
Specific gravity	3.37 (water = 1)	3.43 (water = 1)	2.9 – 3.1 (water = 1)	2.9 - 3.2 (water = 1)	3.0 - 3.2 (water = 1)
Flammability	Non flammable				
Lower explosive limit	Data not available				
Upper explosive limit	Data not available				
Water solubility	Insoluble in water				
Reactivity	Stable under normal conditions.				
Odour	Odourless				
References	<p>Agency for Toxic Substances and Disease Registry. Toxicological Profile for Asbestos. 2001.</p> <p>International Agency for Research on Cancer. Monographs on the Evaluation of Carcinogenic Risks to Humans. Asbestos. Volume 100C 2012.</p>				

Reported Effect Levels from Authoritative Sources

Asbestos is thought to be of low acute toxicity.

Published Emergency Response Guidelines

Emergency response planning guideline (ERPG) values

	Listed value (ppm)	Calculated value (mg/m ³)
ERPG-1*	No guideline given as asbestos is thought to be of low acute toxicity	
ERPG-2[†]		
ERPG-3[‡]		
<p>* Maximum airborne concentration below which it is believed that nearly all individuals could be exposed for up to 1 hour without experiencing other than mild transient adverse health effects or perceiving a clearly defined, objectionable odour</p> <p>[†] Maximum airborne concentration below which it is believed that nearly all individuals could be exposed for up to 1 hour without experiencing or developing irreversible or other serious health effects or symptoms which could impair an individual's ability to take protective action</p> <p>[‡] Maximum airborne concentration below which it is believed that nearly all individuals could be exposed for up to 1 hour without experiencing or developing life-threatening health effects</p>		

Acute exposure guideline levels (AEGLs)

	ppm				
	10 min	30 min	60 min	4 hours	8 hours
AEGL-1*	No guideline given as asbestos is thought to be of low acute toxicity				
AEGL-2[†]					
AEGL-3[‡]					
<p>* Level of the chemical in air at or above which the general population could experience notable discomfort</p> <p>[†] Level of the chemical in air at or above which there may be irreversible or other serious long-lasting effects or impaired ability to escape</p> <p>[‡] Level of the chemical in air at or above which the general population could experience life-threatening health effects or death</p>					

Exposure Standards, Guidelines or Regulations

The Control of Asbestos Regulations 2012

The control limit for asbestos is 0.1 asbestos fibres per cubic centimetre of air (0.1 f/cm³), averaged over a continuous period of 4 hours. The control limit is not a 'safe' level and exposure from work activities involving asbestos must be reduced to as far below the control limit as possible.

Public health guidelines

Drinking water standard WHO guideline value	No Standard Have not set a guideline, stating that there is no consistent evidence that ingested asbestos is hazardous to health
Air quality guideline	Guideline value not given
Soil guideline values and health criteria values	Guideline value not given
Reference WHO. Guidelines for Drinking-Water Quality, 4th Edition, 2011. World Health Organization: Geneva.	

Health Effects

Major route of exposure

- the most common route of exposure is by inhalation

Immediate signs or symptoms of acute exposure

Route	Signs and symptoms
Inhalation	Acute inhalation of dust is likely to cause only local irritation
Ingestion	Not expected following ingestion. Possibility of obstruction
Dermal/Ocular	Irritation may occur from fibres
Reference TOXBASE. Asbestos, 02/2014 http://www.toxbase.org (accessed 07/2017).	

Decontamination at the Scene

The approach used for decontamination at the scene will depend upon the incident, location of the casualties and the chemicals involved. Therefore, a risk assessment should be conducted to decide on the most appropriate method of decontamination.

Following exposure to asbestos it is important to try and prevent the dispersal of dust and fibres. **Do not** rub exposed areas as this can disturb the fibres. Remove all visible dust and fibres from the body, clothing and footwear by wet wiping with a damp cloth using a gentle patting action. Remove any contaminated clothing (not over the head) and place in a bag and seal.

Emergency services and public health professionals can obtain further advice from Public Health England (Centre for Radiation, Chemical and Environmental Hazards) using the 24-hour chemical hotline number: 0344 892 0555.

Clinical Decontamination and First Aid

Clinical decontamination is the process where trained healthcare professionals using purpose-designed decontamination equipment treat contaminated people individually.

Detailed information on clinical management can be found on TOXBASE – www.toxbase.org.

Important note

- prevent dispersal of dust and avoid all contact
- damp down any friable/exposed areas to avoid dust cloud
- for further information please see the Health and Safety Executive website
- liaise with your local public health team

Dermal exposure

- wash any potential sites of skin contact with copious amounts of water or soapy water
- other measures as indicated by the patients clinical condition

Ocular exposure

- if symptomatic, immediately irrigate the affected eye thoroughly
- for patients at home, use lukewarm tap water, trickled into the eye or in a small cup held over the eye socket; an eye dropper is an alternative
- in hospital, 1,000 mL 0.9% saline at room temperature by an infusion bag with a giving set is appropriate, irrigate for 10–15 minutes
- refer for ophthalmological assessment if there is doubt regarding the management of corneal damage
- other supportive measures as indicated by the patient's clinical condition

Inhalation

- treatment other than symptomatic management is unlikely to be required after acute exposure

Ingestion

- treatment is unlikely to be required following acute ingestion

Health effects and decontamination references

- TOXBASE <http://www.toxbase.org> (accessed 07/2017)
TOXBASE Asbestos, 02/2014
TOXBASE Eye irritants – features and management, 01/2016

This document from the PHE Centre for Radiation, Chemical and Environmental Hazards reflects understanding and evaluation of the current scientific evidence as presented and referenced here.

First published: July 2017

For queries relating to this document, please contact: chemcompendium@phe.gov.uk

For all other enquiries, please contact: phe.enquiries@phe.gov.uk

© Crown copyright 2017, www.gov.uk/phe

Re-use of Crown copyright material (excluding logos) is allowed under the terms of the Open Government Licence, visit www.nationalarchives.gov.uk/doc/open-government-licence/version/3/ for terms and conditions.