

Cancer Association of South Africa (CANSA)



Fact Sheet and Position Statement on Asbestos

Introduction

Asbestos is the name given to a group of minerals that occur naturally in the environment as bundles of fibres that can be separated into thin, durable threads. These fibres are resistant to heat, fire, and chemicals and do not conduct electricity. For these reasons, asbestos has been used widely in many industries.

[Picture Credit: Asbestos]

Chemically, asbestos minerals are silicate compounds, meaning they contain atoms of silicon and oxygen in their molecular structure.



Asbestos minerals are divided into two major groups: Serpentine asbestos and amphibole asbestos. Serpentine asbestos includes the mineral chrysotile, which has long, curly fibres that can be woven. Chrysotile asbestos is the form that has been used most widely in commercial applications. Amphibole asbestos includes the minerals actinolite, tremolite, anthophyllite, crocidolite, and amosite. Amphibole asbestos has straight, needle-like fibres that are more brittle than those of serpentine asbestos and are more limited in their ability to be fabricated (National Cancer Institute).

Asbestos is not only one of the most widely used minerals known to man, it is also one of the oldest. It was already in use more than 2000 years ago in China, Egypt, and Greece, and its name-derived from the Greek for 'inextinguishable flame'-indicates one of its earliest applications: as a virtually indestructible wick for oil lamps. This fireproof quality is still one of its most useful characteristics. (Hart, 1988).

The World Health Organization (WHO) estimates that worldwide there are more than 100 000 asbestos related deaths per year and that, currently, 125 million workers are exposed to the deadly fibre. In the United Kingdom, the death toll is estimated at approximately 3 500 per year and, in the USA, 10 000 per year. This is nothing less than a global epidemic! In South Africa about 200 mesothelioma cases are reported per year but this is most likely an underestimate considering the magnitude of mining and processing that took place in a country that was a leading global supplier of all types of asbestos.

Researched and Authored by Prof Michael C Herbst

[D Litt et Phil (Health Studies); D N Ed; M Art et Scien; B A Cur; Dip Occupational Health; Dip Genetic Counselling; Dip Audiometry and Noise Measurement; Diagnostic Radiographer; Medical Ethicist]

Approved by Ms Elize Joubert, Chief Executive Officer [BA Social Work (cum laude); MA Social Work]

August 2024

South Africa's incidence of mesothelioma ranks among the highest rates in the world, and researchers believe that diagnoses of the disease are drastically underreported. The hefty mesothelioma count stems from South Africa's extensive history of asbestos mining and production over more than a century. South Africa reports approximately 200 cases of mesothelioma per year. Nearly 30 percent of mesothelioma cases in South Africa are tied to environmental exposure, most commonly in the Northern Cape area. More than 70 percent of reported environmental cases affect women and children, who most likely were exposed when miners brought home the fibres on their hair and clothes. Diseases like HIV and tuberculosis are serious health issues for the country, so exposed workers who die of these conditions before developing mesothelioma can skew statistics on this rare cancer's true incidence.

López-Castro, R., Fuentes-Martín, Á., Medina Del Valle, A., García Peña, T., Soro García, J., López González, L. & Cilleruelo Ramos, Á. 2024.

"MPM stands as a rare malignancy necessitating improved therapeutic strategies due to its limited treatment choices and unfavorable prognosis. The advent of immune checkpoint inhibitors has heralded a paradigm shift in the therapeutic landscape of MPM, offering promising avenues across diverse clinical scenarios. In the context of advanced stages of the disease, Immune check-point inhibitors targeting programmed cell death protein 1 (PD-1) and cytotoxic T-lymphocyte-associated protein 4 (CTLA-4), have exhibited encouraging potential in clinical trials, particularly manifesting efficacy among patients exhibiting disease progression following chemotherapy regimens. Innovative combination regimens, exemplified by the concurrent administration of nivolumab and ipilimumab, have demonstrated marked improvement in survival and patient's benefits. A deeper comprehension of the intricate genetic underpinnings of MPM, encompassing key mutations such as cyclin-dependent kinase inhibitor 2A (CDKN2A), neurofibromin 2 (NF2), and BRCA1-associated protein 1 (BAP1) mutations, has elucidated novel avenues for targeted therapeutic interventions. This review accentuates the transformative capacity of immunotherapy in revolutionizing the therapeutic outlook for MPM, thereby potentially translating into augmented survival rates and offering glimpses of new approaches on the horizon. Despite the persisting challenges, the synergistic crossroads of interdisciplinary research and collaborative clinical endeavors portend a hopeful landscape for MPM treatment."

Bhandari, J., Thada, P.K. & Sedhai, Y.R. 2024.

"Asbestosis is an interstitial lung disease caused by inhaling asbestos fibers (See **Image**. X-ray, Lungs, Asbestos, Anterior View). These fibers are mineral silicates (mainly hydrated magnesium silicates) and are classified into 2 main categories based on their shape: serpentine and amphibole. Serpentine fibers include curly and flexible chrysotiles and are less pathogenic than amphibole fibers. Chrysotile, being more flexible, curvy, and soluble, settles in the upper part of the respiratory tract. The mucociliary function is more prominent in the upper respiratory tract, so chrysotile fibers are easily removed. Amphiboles (crocidolite, amosite, tremolite, and anthophyllite) are straight, stiff, more brittle fibers. They are more toxic than serpentine fibers, which are less soluble and straight. They usually align with the airstream and penetrate the epithelium deeper into the lungs and interstitium. Asbestos fibers have been historically chosen for construction, shipping, mining, and aerospace engineering commercial use because of their high electrical and thermal resistance and low cost."

Conflict of interest statement

Disclosure: Jenish Bhandari declares no relevant financial relationships with ineligible companies.

Disclosure: Pawan Thada declares no relevant financial relationships with ineligible companies.

Disclosure: Yub Raj Sedhai declares no relevant financial relationships with ineligible companies.

Asbestos Mining in South Africa

Asbestos mining began in earnest in South Africa during the 1930s. It soon attracted a multitude of individuals, small and big companies who were all interested in mining this unique mineral. Mining and production methods were crude, with the fibres being separated from the ore by hand, and in some cases the 'mines' were literally spade-and-wheelbarrow operations run by farmers who had found deposits on their land.

By 1981, the foreign companies had withdrawn from active asbestos mining in South Africa, and a long series of mergers and acquisitions had reduced the number of major producers to two: The Griqualand Exploration & Finance Company (Gefco) and Msauli Asbes. Gefco produced the amphiboles crocidolite and amosite – commonly known as blue and brown asbestos – in the then north-western Cape and in the then north-eastern Transvaal. Msauli produced chrysotile, or white asbestos, in the KanGwane homeland near Barberton (Hart, 1988).

On 8 March 2008 Environmental Affairs and Tourism Minister Marthinus van Schalkwyk announced that the use, manufacture and processing of asbestos is prohibited in South Africa with immediate effect. Even though asbestos mining officially ended in South Africa in 2008, many old mining sites remain as possible sources of exposure because of a lack of rehabilitation of these areas.

Types of Asbestos

The following types of asbestos have been identified:

Chrysotile



Amosite



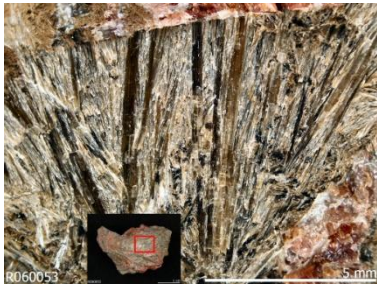
Crocidolite



Tremolite



Anthophyllite



Actinolite



Exposure to Asbestos

Asbestos exposure has been linked to the development of serious respiratory diseases and cancers, including mesothelioma, lung cancer, asbestosis and other conditions. For nearly 100 years, asbestos was one of the most commonly used materials in industries such as construction, shipbuilding and manufacturing.

It wasn't until the mid-20th century that researchers officially established the connection between asbestos exposure and serious respiratory conditions (although evidence was presented as early as the 1920s), but by then, millions of workers had already been exposed to asbestos fibres in the workplace and in other locations.

Asbestos exposure can occur in many different settings, with certain occupations, products, job sites and locations at a particularly high risk of exposure. Workers from practically all trades may have been exposed to asbestos fibres while working. Drywall tapers, electricians, firefighters, auto mechanics and many other occupations may have been, and are at risk for asbestos exposure.

Thousands of products were manufactured using asbestos fibres, as the material was known to be extremely strong and resistant to heat and fire. Asbestos may be found in insulation, drywall, ceiling and floor tiles, cements, paint and more.

Danger of Exposure to Asbestos

There are four main diseases caused by asbestos: mesothelioma (which is always fatal), lung cancer (almost always fatal), asbestosis (not always fatal, but it can be very debilitating) and diffuse pleural thickening (not fatal).

Asbestos related diseases do not affect the individual immediately but later on in life. It is also important to remember that people who smoke and are also exposed to asbestos fibres are at a much greater risk of developing lung cancer.

.

The International Classification of Disease 10th Version (ICD-10)

The International Classification of Diseases (ICD) is designed to promote international comparability in the collection, processing, classification, and presentation of mortality statistics. This includes providing a format for reporting causes of death on the death certificate.

Researched and Authored by Prof Michael C Herbst

[D Litt et Phil (Health Studies); D N Ed; M Art et Scien; B A Cur; Dip Occupational Health; Dip Genetic Counselling; Dip Audiometry and Noise Measurement; Diagnostic Radiographer; Medical Ethicist]

Approved by Ms Elize Joubert, Chief Executive Officer [BA Social Work (cum laude); MA Social Work]

August 2024

ICD serves a broad range of uses globally and provides critical knowledge on the extent, causes and consequences of human disease and death worldwide via data that is reported and coded with the ICD. Clinical terms coded with ICD are the main basis for health recording and statistics on disease in primary, secondary and tertiary care, as well as on cause of death certificates. These data and statistics support payment systems, service planning, administration of quality and safety, and health services research. Diagnostic guidance linked to categories of ICD also standardizes data collection and enables large scale research.

For more than a century, the International Classification of Diseases (ICD) has been the basis for comparable statistics on causes of mortality and morbidity between places and over time. Originating in the 19th century, the latest version of the ICD, ICD-11, was adopted by the 72nd World Health Assembly in 2019 and came into effect on 1st January 2022.

The ICD-10 Code for Mesothelioma, unspecified – C45.9.

Incidence of Mesothelioma in South Africa

There are no separate statistics for the different types of mesothelioma available in South Africa. According to the latest edition of the National Cancer Registry (2022) the following number of Mesothelioma cases was histologically diagnosed in South Africa during 2022. Histologically diagnosed means that a tissue sample (biopsy) was referred to a recognised laboratory where a specially trained pathologist confirmed the cancer diagnosis.

According to the latest edition of the National Cancer Registry (2022) the following number of mesothelioma cases was histologically diagnosed in South Africa during 2022:

Group - Males 2022	Actual No of Cases	Estimated Lifetime Risk	Percentage of All Cancers
All males	148	1:1 409	0,35%
Asian males	4	1:1 441	0,38%
Black males	46	1:2 790	0,31%
Coloured males	19	1:1 244	0,38%
White males	79	1:630	0,35%

Group - Females 2022	Actual No of Cases	Estimated Lifetime Risk	Percentage of All Cancers
All females	63	1:4 377	0,14%
Asian females	1	1:9 133	0,00%
Black females	19	1:8 889	0,09%
Coloured females	4	1:5 900	0,08%
White females	39	1:1 083	0,19%

The frequency of histologically diagnosed cases of mesothelioma in South Africa for 2022 were as follows (National Cancer Registry, 2022):

Researched and Authored by Prof Michael C Herbst

[D Litt et Phil (Health Studies); D N Ed; M Art et Scien; B A Cur; Dip Occupational Health; Dip Genetic Counselling; Dip Audiometry and Noise Measurement; Diagnostic Radiographer; Medical Ethicist]

Approved by Ms Elize Joubert, Chief Executive Officer [BA Social Work (cum laude); MA Social Work]

August 2024

Group - Males	0 – 19 Years	20 – 29 Years	30 – 39 Years	40 – 49 Years	50 – 59 Years	60 – 69 Years	70 – 79 Years	80+ Years
2022	2008	2008	2008	2008	2008	2008	2008	2008
All males	0	0	1	4	26	40	43	34
Asian males	0	0	0	0	1	1	1	0
Black males	0	0	1	1	13	17	7	7
Coloured males	0	0	0	0	5	4	7	3
White males	0	0	0	1	6	18	28	24

Group - Females	0 – 19 Years	20 – 29 Years	30 – 39 Years	40 – 49 Years	50 – 59 Years	60 – 69 Years	70 – 79 Years	80+ Years
2022	2008	2008	2008	2008	2008	2008	2008	2008
All females	0	0	1	1	11	19	24	7
Asian females	0	0	0	0	1	0	0	0
Black females	0	0	1	0	5	7	5	1
Coloured females	0	0	0	0	0	2	2	0
White females	0	0	0	1	5	10	17	6

N.B. In the event that the totals in any of the above tables do not tally, this may be the result of uncertainties as to the age, race or sex of the person. The totals for 'all males' and 'all females' are, however, always reflect the correct total.

Reducing the Risk of Exposure to Asbestos

Being exposed to asbestos is by far the biggest risk factor for mesothelioma, so the best way to reduce the risk is to limit exposure to asbestos in homes, in public buildings and at work.

Picture Credit: Appropriate Apparel to Work with Asbestos]



People who might be exposed to high levels of asbestos at work include some miners, factory workers, insulation manufacturers and installers, railroad and automotive workers, ship builders, gas mask manufacturers, and construction workers. If there is a chance of on-the-job exposure, such as during the renovation of old buildings, then one should use all protective equipment, work practices, and safety procedures designed for working around asbestos.

Older homes may have asbestos-containing insulation or other materials. A knowledgeable expert can check homes to find out if there is any asbestos and whether it poses any risk of exposure. This may mean testing the air for asbestos levels. Just because asbestos exists in a home does not necessarily mean that it needs to be removed. As long as the material is not damaged or disturbed, for example by drilling or remodelling, the fibres are not released into the air. If asbestos needs to be removed from a home, one should hire a qualified contractor to perform this job to avoid contaminating the home or causing any exposure to one's family or to the workers. One should not attempt to remove asbestos-containing material oneself.

Asbestos can also be found in some commercial and public buildings (including some schools), where the same basic principles apply. Intact, undisturbed asbestos-containing materials generally do not pose a health risk. They may pose a risk if they are damaged, are disturbed in some way, or deteriorate over time and release asbestos fibres into the air.

Researched and Authored by Prof Michael C Herbst

[D Litt et Phil (Health Studies); D N Ed; M Art et Scien; B A Cur; Dip Occupational Health; Dip Genetic Counselling; Dip Audiometry and Noise Measurement; Diagnostic Radiographer; Medical Ethicist]

Approved by Ms Elize Joubert, Chief Executive Officer [BA Social Work (cum laude); MA Social Work]

August 2024

Page 6

Correct and appropriate rehabilitation of all sites where asbestos has been mined is essential in preventing the risk of exposure to asbestos fibres.

CANSA's Position on Asbestos

CANSA believes that:

- When asbestos fibres are inhaled, they can lodge in and around the lungs, leading to the development of scarring, inflammation, and severe respiratory issues. This accumulation of fibres can have life-threatening consequences, like the development of mesothelioma, lung cancer, asbestosis and pleural thickening.
- When asbestos fibres are ingested, they can land anywhere in the body, leading to the development of scarring, inflammation of the affected body part(s). It is referred to as extrapulmonary mesothelioma and cases have been reported affecting abdominal peritonium, pericardium and testicles.
- No level of asbestos exposure is considered safe.

CANSA further believes that:

- No person shall be required or permitted to work in an environment in which he or she would be exposed to asbestos fibres.
- Persons who are required to work in an environment in which he or she could be exposed to asbestos fibres for whatever reason, must be provided with the necessary protective clothing and devices as described in the Asbestos Regulations, 2001.
- Disposal of all asbestos and asbestos waste shall be conducted in terms of the Asbestos Regulations, 2001.
- Demolition of any structure where there is a possibility of asbestos contamination or exposure shall be done in terms of the Asbestos Regulations, 2001.

Please refer to the Annexure: Asbestos Regulations, 2001.

Where to Find Assistance

The Occupational Hygiene Section of the National Institute for Occupational Health (NIOH) provides a comprehensive range of asbestos-related services and advice throughout Southern Africa, including consultation, training, asbestos surveys, monitoring and evaluation.

Contact details are provided below.

Mr Gabriel Mizan

Tel: +27(0)11-712-6457

Fax: +27(0)11-712-6405

E-mail: gaby.mizan@nioh.nhls.ac.za

Medical Disclaimer

This Fact Sheet and Position Statement is intended to provide general information only and, as such, should not be considered as a substitute for advice, medically or otherwise, covering any specific situation. Users should seek appropriate advice before taking or refraining from taking any action in reliance on any information contained in this Fact Sheet. So far as permissible by law, the Cancer Association of South Africa (CANSA) does not accept any liability to any person (or his/her dependants/estate/heirs) relating to the use of any information contained in this Fact Sheet.

Whilst the Cancer Association of South Africa (CANSA) has taken every precaution in compiling this Fact Sheet, neither it, nor any contributor(s) to this Fact Sheet can be held responsible for any action (or the lack thereof) taken by any person or organisation wherever they shall be based, as a result, direct or otherwise, of information contained in, or accessed through, this Fact Sheet.



The South African Asbestos Regulations

DEPARTMENT OF LABOUR

Government Notice. R: 155

10 February 2002

OCCUPATIONAL HEALTH AND SAFETY ACT, 1993 (ACT NO. 85 OF 1993)

Asbestos Regulations, 2001

The Minister of Labour has under section 43 of the Occupational Health and Safety Act, 1993 (Act No. 85 of 1993), after consultation with the Advisory Council for Occupational Health and Safety, made the regulations in the Schedule.

SCHEDULE

Definitions

1. In these Regulations, any word or expression to which a meaning has been assigned in the Act shall have the meaning so assigned and, unless the text otherwise indicates—

- “approved asbestos inspection authority” means an approved inspection authority for the monitoring of asbestos concentrations in the air;
- “asbestos” means any of the following minerals:
 - (a) Amosite
 - (b) Chrysotile
 - (c) Crocidolite
 - (d) Fibrous actinolite
 - (e) Fibrous anthophyllite; and
 - (f) Fibrous tremolite,or any mixture containing any of these minerals;
- “asbestos dust” means airborne or settled dust, which contains or is likely to contain regulated asbestos fibres;
- “asbestos waste” means an undesirable or superfluous asbestos-containing by-product, emission or residue of any process or activity that has been—
 - (a) discarded by any person;
 - (b) accumulated and stored by any person with the purpose of eventually discarding it with or without prior treatment connected with the discarding thereof; or
 - (c) stored by any person with the purpose of recycling, re-using or extracting a usable product from such matter.
- “asbestos work” means work that exposes or is likely to expose any person to asbestos dust;
- “demolition work” includes demolition, alteration, stripping, removing, repair, gleaning of any spilt asbestos, or high-pressure water jetting of any structure containing asbestos lagging or insulation, but does not include work performed on asbestos cement sheeting and related products and asbestos cement products that form part of the structure of a workplace, building, plant or premises;
- “exposed to asbestos” means exposed or likely to be exposed to asbestos dust while at the workplace, and “exposure” has a corresponding meaning;

Researched and Authored by Prof Michael C Herbst

[D Litt et Phil (Health Studies); D N Ed; M Art et Scien; B A Cur; Dip Occupational Health; Dip Genetic Counselling; Dip Audiometry and Noise Measurement; Diagnostic Radiographer; Medical Ethicist]

Approved by Ms Elize Joubert, Chief Executive Officer [BA Social Work (cum laude); MA Social Work]

August 2024

- “HSG 173” means the Monitoring Strategies for Toxic Substances, HSG 173, published by the Health and Safety Executive of the United Kingdom;
- “MDHS 39/4” means the Methods for the Determination of Hazardous Substances 39/4 of the Health and Safety Executive of the United Kingdom: *Asbestos fibres in air, sampling and evaluation by phase contrast microscopy (PCM)* under the Control of Asbestos at Work Regulations, 1995 HSE ISBN 0 7176 0913 8, as revised from time to time;
- “measurement programme” means a programme according to the monitoring strategy as contemplated in OESSM and HSG 173;
- “monitoring” means the planning and carrying out of a measurement programme and the recording of the results thereof;
- “occupational exposure limit” or “OEL” means a limit value set by the Minister for a stress factor in the workplace;
- “OESSM” means the *Occupational Exposure Sampling Strategy Manual*, published by the National Institute for Occupational Safety and Health (NIOSH), United States of America: Department of Health, Education and Welfare;
- “occupational exposure limit for asbestos” means an occupational exposure limit of 0,2 regulated asbestos fibres per milliliter of air averaged over any continuous period of four hours measured in accordance with MDHS 39/4;
- “provincial director” means the provincial director as defined in regulation 1 of the General Administrative Regulations published under Government Notice R. 1449 of September 1996;
- “registered asbestos contractor” means a mandatory or employer conducting demolition work, who is registered with the chief inspector;
- “regulated asbestos fibre” means a particle of asbestos with a length-to-diameter ratio greater than 3 to 1, a length greater than 5 micrometres and a diameter less than 3 micrometres;
- “respiratory protective equipment” means a device which is worn over at least the mouth and nose to prevent the inhalation of air that is not safe, and which device conforms to a standard approved by the Minister;
- “respirator zone” means a respirator zone contemplated in regulation 10(a);
- “SABS 0228” means the Code of Practice for the Identification and Classification of Dangerous Substances and Goods, SABS 0228, published by the South African Bureau of Standards (SABS);
- “SABS 0229” means the Code of Practice for Packaging of Dangerous Goods for Road and Rail Transportation in South Africa, SABS 0229, published by the South African Bureau of Standards (SABS);
- “short-term exposure limit” means the concentration to which workers can be exposed continuously for a short period of time, which is a 10-minute Time-Weighted Average (TWA) exposure for asbestos, which should not be exceeded at any time during the working day even if the 4-hour TWA is within the OEL-TWA;
- “short term exposure limit for asbestos” means an exposure limit of 0,6 regulated asbestos fibres per milliliter of air averaged over any 10 minutes;
- “the Act” means the Occupational Health and Safety Act, 1993 (Act No. 85 of 1993).

Scope of application

2.(1) Subject to sub-regulation 2, these Regulations shall apply to every employer and self-employed person who carries out work at a workplace that may expose any person to asbestos dust at that workplace.

(2) Regulations 5(1), 5(2), 5(3), 5(4), 5(6), 7(2), 8, 9, 11(2)(f), 14(2), 14(3), 14(4) 16(c), 16(f) and 17(6) shall not apply in the case of self-employed persons.

Notification of asbestos work

3. No employer or self-employed person shall carry out any asbestos work unless he or she has notified the provincial director in writing thereof prior to the commencement of such work.

Exposure to asbestos

4. Subject to regulation 17(1) no employer or self-employed person shall require or permit any person to work in an environment in which he or she would be exposed to asbestos in excess of the prescribed occupational exposure limit.

Information and training

5.(1) An employer shall, before any employee is exposed or may be exposed to asbestos dust, after consultation with the health and safety committee established for that section of the workplace, ensure that the employee is adequately and comprehensively informed and trained, on both practical aspects and theoretical knowledge, with regard to—

- (a) the contents and scope of these Regulations;
- (b) the potential sources of exposure, including the recognition of derelict asbestos-containing materials;
- (c) the potential health risk caused by exposure to asbestos, including the health risks to employees' families and others, which could result from taking home asbestos contaminated equipment and clothing, and the dramatically increased risk of lung cancer for asbestos workers who smoke;
- (d) the measures taken by the employer to protect an employee against any risk from exposure;
- (e) the precautions to be taken by the employee to protect himself or herself against the health risks associated with the exposure, which precautions include the wearing and use of protective clothing and respiratory protective equipment;
- (f) the necessity, correct use, maintenance and limitations of protective equipment, facilities and engineering control measures provided;
- (g) the assessment of exposure, the purpose of air sampling, the necessity for medical surveillance and the long term benefits and limitations thereof;
- (h) the occupational exposure limit and its meaning;
- (i) the importance of good housekeeping at the workplace and personal hygiene;

- (j) the safe working procedures regarding the use, handling, processing, and storage of any material containing asbestos, which procedures include the correct use of control measures to limit the spread of asbestos dust outside the work area, and to limit the exposure of workers inside the work area as far as is reasonably practicable;
- (k) procedures to be followed in the event of an accidental spillage or any other similar emergency situation likely to result in the release of asbestos dust;
- (l) procedures for reporting and correcting defects likely to result in the release of asbestos dust;
- (m) safe disposal of asbestos waste;
- (n) procedures for record keeping; and
- (o) matters contemplated in regulation 6.

(2) Refresher training on matters contemplated in subregulation (1) shall be given at least every year or at more frequent intervals that may be recommended by the health and safety committee.

(3) Training should be given more frequently than once a year if—

- (a) work methods change;
- (b) the type of work carried out changes significantly; or
- (c) the type of equipment used to control exposure changes.

(4) Training shall be provided by somebody who is competent to provide it and has adequate personal practical experience and theoretical knowledge of all aspects of the work being carried out by the employer.

(5) An employer or a self-employed person shall ensure, as far as is reasonably practicable, that his or her mandatory or any person other than employees who may be exposed to asbestos at the workplace are given adequate information, instruction and training.

(6) An employer shall keep a record of any training, both practical and theoretical, that was given to an employee.

(7) An employer or a self-employed person shall give instructions in writing of the procedures contemplated in subregulation (1)(k) to the drivers of vehicles carrying asbestos or asbestos-containing material, that has the potential of causing environmental pollution or affecting human health.

Duties of persons who may be exposed

6. Any person who is or may be exposed to asbestos in the workplace, shall obey any lawful instruction given by or on behalf of the employer or a self-employed person, regarding—

- (a) the prevention of asbestos dust from becoming airborne;
- (b) the wearing and use of personal protective equipment and clothing;
- (c) the wearing of monitoring equipment to measure personal exposure to asbestos;
- (d) the reporting for medical surveillance as required by Regulation 9;
- (e) the cleaning up and disposal of any material containing asbestos;

- (f) housekeeping at the workplace, personal hygiene, good environmental and health practices, including eating, drinking and smoking in designated places provided; and
- (g) information and training received contemplated in regulation 5.

Assessment of potential exposure

7.(1) An employer or self-employed person shall cause—

- (a) his or her undertaking to be assessed within six months after the commencement of these regulations, and thereafter at intervals not exceeding two years, to determine if any person may be exposed to asbestos; and
- (b) the assessment results contemplated in paragraph (a) to be recorded as required by regulation 16.

(2) An employer contemplated in subregulation (1) shall, before causing an assessment to be made, consult with the relevant health and safety representative or relevant health and safety committee and thereafter inform them in writing of the arrangements made for the assessment, give them reasonable time to comment thereon and ensure that the results of the assessment are made available to them for comment.

(3) When making the assessment contemplated in subregulation (1)(a), the employer or self-employed person shall take the following into account:

- (a) The presence of any material containing asbestos being used, processed, handled or stored;
- (b) where asbestos may be present, the ease with which the asbestos dust may be released and the extent to which a person may be exposed;
- (c) the nature of the work, process and any likely deterioration in or failure of any control measures;
- (d) the details of expected exposures, in particular—
 - (i) whether the expected exposure is above the OEL for asbestos, so that the appropriate respiratory protective equipment can be selected pending the implementation of engineering control measures;
 - (ii) whether such exposures are intermittent, including the frequency and duration of exposures;
 - (iii) the number of employees exposed and any other person who may be exposed, and their expected exposure values; and
 - (iv) where applicable, results which may be available from any previous monitoring performed at that workplace;
- (e) the steps to be taken to reduce exposure to the lowest level reasonably practicable and the steps to be taken to reduce the release of asbestos dust into the environment;
- (f) procedures for dealing with emergencies; and
- (g) procedures for the removal of asbestos waste from the workplace, and the disposal thereof.

(4) If the assessment or any of its reviews made in accordance with subregulation (1) and (5) indicates that any person is likely to be exposed to asbestos, the employer or self-employed person shall ensure that the exposure is adequately controlled as contemplated in regulation 11.

(5) An employer or self-employed person shall forthwith review the assessment required by subregulation (1) if—

- (a) there is reason to believe that the previous assessment is no longer valid;
- (b) control measures are no longer efficient;
- (c) technological or scientific advances allow for more efficient control methods; or
- (d) there has been a significant change in—
 - (i) work methods;
 - (ii) the type of work carried out; or
 - (iii) the type of equipment used to control exposure;

and subregulations (2) and (3) shall apply.

Air monitoring

8.(1) Where exposure is in excess of half the OEL for asbestos, an employer shall ensure that a measurement programme of the concentration of airborne regulated asbestos fibres to which an employee is exposed, is—

- (a) carried out in accordance with these Regulations;
- (b) carried out only after the relevant health and safety representative or relevant health and safety committee has been informed thereof and was given a reasonable opportunity, as mutually agreed upon, to comment thereon;
- (c) carried out by—
 - (i) an approved asbestos inspection authority; or
 - (ii) a person whose ability to do the measurements is verified by an approved asbestos inspection authority;
- (d) representative of the exposure of employees to the airborne asbestos fibres in accordance with subregulation (2); and
- (e) verified in accordance with subregulation (3) if the measurements are carried out by a person contemplated in subregulation (1)(c)(ii).

(2) In order to comply with the provisions of subregulation (1)(d), an employer shall ensure—

- (a) that the measurement programme—
 - (i) in the case of a group measurement, makes provision for the selection of the number of persons for a sample to be done as contemplated in chapters 3 and 4 and table A-2 of Technical Appendix A of the OESSM: Provided that measurements of exposure shall be by personal sampling taken in accordance with MDHS 39/4: Provided further that in so far as any provision of the OESSM and the MDHS 39/4 is repugnant to a provision of the Occupational Health and Safety Act, 1993, and these Regulations, the provisions of the Act and these Regulations shall take precedence; and
 - (ii) if in the case of the most exposed employee measurement, the exposure exceeds the OEL for asbestos, then any other employee whose exposure

could be above the OEL for asbestos is identified and that measurements representative of typical exposure shall be carried out on every employee identified; and

- (b) that representative measurements contemplated in subregulation 1(d) are carried out at least every 12 months: Provided that whenever the OEL for asbestos is exceeded, regulation 11 shall apply.

(3) In order to comply with subregulation (1)(e), an employer shall obtain the services of an approved asbestos inspection authority who shall, at intervals not exceeding 12 months, do the required verification—

- (a) by examining the measurement and analysis equipment of the employer;
- (b) by questioning the person contemplated in subregulation (1)(c)(ii) regarding the measurement programme;
- (c) by carrying out, together with the person contemplated in subregulation (1)(c)(ii), the measurement programme required by subregulation (2) for any one group; and
- (d) by ensuring that the results of the measurement and investigation as contemplated in subregulation (2) and (3) respectively, have been recorded as required by regulation 16.

Medical surveillance

9.(1) An employer shall ensure that an employee is under the medical surveillance of an occupational medical practitioner if—

- (a) an employee is exposed or is likely to be exposed to asbestos dust exceeding the OEL for asbestos; or
- (b) an occupational medicine practitioner certifies that the relevant employee should be under medical surveillance.

(2) In order to comply with subregulation (1), an employer shall, as far as is reasonably practicable, ensure that a structured medical surveillance programme be drawn up by an occupational medicine practitioner which shall include at least the following:

- (a) An initial health evaluation, carried out by an occupational health practitioner immediately or within 14 days after a person commences employment, which comprises—
 - (i) an evaluation of the employee's medical and occupational history;
 - (ii) medical examinations and tests which should include chest X-rays, pulmonary function testing and an appropriate physical examination; and
 - (iii) any other essential medical examination which in the opinion of the occupational medicine practitioner is necessary in order to enable such practitioner to do a proper evaluation; and
- (b) subsequent to the initial health evaluation contemplated in paragraph (a), evaluations of the relevant employee as contemplated in paragraph (a)(ii) and (iii), at intervals not exceeding two years, or at shorter intervals specified by an occupational medicine practitioner.

(3) An employer shall not permit or allow an employee who has been certified unfit for work by an occupational medicine practitioner to work in a workplace or part of a workplace in which he or she will be exposed or is likely to be exposed to asbestos dust: Provided that the relevant employee may be permitted to return to work if he or she is certified fit for that work beforehand by an occupational medicine practitioner.

(4) Where the reason for the employee being certified unfit as contemplated in subregulation (3) is as a result of exposure to asbestos in that workplace, the employer shall record and investigate the incident in compliance with regulation 8 of the General Administrative Regulations.

Respirator zone

10. An employer or self-employed person shall ensure that—

- (a) any workplace or part of a workplace under his or her control, where the concentration of regulated asbestos fibres in the air is, or may be, such that the exposure of persons in that workplace exceeds the OEL for asbestos without the wearing of respiratory protective equipment, is zoned as a respirator zone;
- (b) a respirator zone is clearly demarcated and identified by notice indicating that the relevant area is a respirator zone and that the respiratory protective equipment and protective clothing contemplated in regulation 17 must be worn there;
- (c) no person enters or remains in a respirator zone unless he or she wears the required respiratory protective equipment and protective clothing; and
- (d) the reason why the OEL for asbestos is exceeded is identified and action is taken, as soon as is reasonably practicable, to lower the concentration of asbestos in the air by means other than respiratory protective equipment, so that it does not exceed the OEL for asbestos.

Control of exposure to asbestos

11.(1) An employer or self-employed person shall ensure that the exposure of a person to asbestos is either prevented, or, where this is not reasonably practicable, adequately controlled: Provided that the control of the exposure shall be regarded as adequate if the level of exposure is—

- (a) at or below the OEL for asbestos; or
- (b) above the OEL for asbestos but the reason has been identified and action is taken, as soon as is reasonably practicable to lower exposure by means other than respiratory protective equipment, so that it does not exceed the OEL for asbestos.

(2) Where reasonably practicable, an employer or self-employed person shall control the exposure of a person—

- (a) by using a substitute for asbestos;
- (b) by limiting the number of persons who will be exposed or may be exposed;
- (c) by limiting the period during which persons will be exposed or may be exposed;
- (d) by limiting the amount of asbestos dust that may contaminate the working environment;
- (e) by introducing, inter alia, the following engineering control measures for the control of exposure:
 - (i) Process separation, automation or enclosure;

- (ii) bonding of asbestos fibres with other material to prevent the release of asbestos dust;
 - (iii) the installation of local extraction ventilation systems to processes, equipment or tools for the control of emissions of asbestos dust;
 - (iv) the use of wet methods where appropriate;
 - (v) separate workplaces for carrying out different processes; and
 - (vi) a fault indicator to enable early corrective action to be taken; and
- (f) by introducing appropriate written work procedures that an employee must follow to ensure that —
- (i) asbestos is safely handled, used and disposed of;
 - (ii) process machinery, installations, equipment, tools and local extraction and general ventilation systems are safely used and maintained; and
 - (iii) early corrective action regarding the control exposure.

Cleanliness of premises and plant

12. Every employer or self-employed person shall take steps to ensure, as far as is reasonably practicable, that—

- (a) workplaces are maintained in a clean state and are free of asbestos waste and, whenever asbestos is accidentally spilled or asbestos dust is accidentally released into the workplace, that remedial measures are taken immediately before work is resumed;
- (b) machinery, plant and equipment, as well as external surfaces of ventilation equipment and internal surfaces of buildings, are kept free of asbestos dust;
- (c) cleaning is carried out by vacuum-cleaning equipment with a filtration efficiency of at least 99 per cent for particles one micrometre in size, or in such other manner that asbestos dust neither escapes nor is discharged into the air to such an extent that it contaminates any workplace or the environment;
- (d) the vacuum-cleaning equipment is regularly serviced and its external surfaces are kept in a clean state and free from asbestos dust; and
- (e) where the use of vacuum-cleaning equipment is impracticable, the relevant surfaces are first dampened and that persons undertaking such cleaning are wearing appropriate protective clothing and respiratory protective equipment.

Control of exposure to asbestos of persons other than employees

13.(1) An employer or self-employed person shall ensure that the release of asbestos dust into any environment or water system complies with the provisions of the Atmospheric Pollution Prevention Act, 1965 (Act No. 45 of 1965), the Environment Conservation Act, 1989 (Act No. 73 of 1989), the National Water Act, 1998 (Act No. 36 of 1998), and the National Environmental Management Act, 1998 (Act No. 107 of 1998).

(2) In respect of asbestos dust which may be released from a workplace into any environment or water system which may affect the health of persons other than persons at his or her workplace, an employer or self-employed person shall ensure—

- (a) with regard to airborne emissions—
 - (i) that all work performed with asbestos be controlled as far as is reasonably practicable; and
 - (ii) that suitable filtration systems are used to control the release of asbestos dust into the environment to levels as low as is reasonably practicable;
- (b) with regard to the contamination of water with asbestos—
 - (i) that any water that is contaminated with asbestos as a result of work being performed is passed through a filtration system before being released into any environment or water system; and
 - (ii) that a suitable water filtration system is used which will ensure that the asbestos being released or entering into any environment or water system are reduced as far as is reasonably practicable;
- (c) that contaminated parts of the filtration system, when discarded, are disposed of as asbestos waste; and
- (d) that appropriate measures are taken to prevent the release of asbestos dust into the environment arising from the transport of asbestos.

Asbestos that forms part of structure of workplace, building, plant or premises

14.(1) Where asbestos forms part of the structure of a workplace, building, plant or premises, the employer or self-employed person shall—

- (a) take reasonable steps to ensure that he or she determines the location of asbestos in such workplace, buildings, plant or premises, where that asbestos is likely to release asbestos dust that could impact on health or pollute the environment;
- (b) make and maintain a written inventory of the location of asbestos in such workplace, buildings, plant or premises.

(2) An employer shall inform the relevant health and safety representative or relevant health and safety committee in writing of the arrangements made for the identification and location procedure contemplated in subregulation (1), give them reasonable time to comment thereon and ensure that the asbestos inventory is made available to the relevant representative or committee who may comment thereon.

(3) The health or safety representative, or a person nominated by the health and safety committee, shall be entitled to take part in the identification and location procedure contemplated in subregulation (1).

(4) With regard to any dispute as to whether any substance is in fact asbestos, the health and safety representative or a person nominated by the employees may require that a sample of that substance be taken and the true nature of the substance be determined by an approved asbestos inspection authority: Provided that the cost of the identification shall be borne by the employer.

(5) The employer or self-employed person shall regularly examine the condition of asbestos recorded in the inventory for deterioration or damage.

(6) The employer or self-employed person shall assess the risk of exposure to such asbestos as contemplated in subregulation (1) and document the action necessary to ensure that—

- (a) information about the location and condition of material containing asbestos is given to anyone likely to disturb it;
- (b) any material containing asbestos is maintained in a good state of repair and that, where necessary, a planned maintenance program is implemented;
- (c) any material containing asbestos and which may create a risk of exposure because of its state and location, is repaired or, if necessary, removed: Provided that, if the removal constitutes demolition work, the asbestos shall be removed in accordance with regulation 21; and
- (d) procedures and arrangements are in place so that work that may disturb the material complies with all other requirements of these Regulations.

Asbestos cement sheeting and related products

15.(1) An employer or self-employed person who erect, maintain, alter, renovate, repair, dismantle or add asbestos-cement roof sheeting, wall paneling, gutters, fascia boards and related products to a building shall ensure that—

- (a) if any roof work is performed, suitable roof ladders or duckboards or crawling boards are used in accordance with regulation 12 of the General Safety Regulations published by Government Notice No. R. 1031 of 30 May 1986;
- (b) written work procedures are laid down and followed to prevent the release of asbestos dust into the environment;
- (c) any water which contains asbestos dust as a result of the activities contemplated in sub-regulation (1), shall be treated in accordance with regulation 13(2)(b) and (c);
- (d) the work procedures contemplated in paragraph (b) shall be available for perusal by the relevant health and safety representative or relevant health and safety committee and for inspection by an inspector;
- (e) removal work is conducted under controlled conditions in accordance with regulations 11 and 13;
- (f) cutting or drilling is performed under controlled conditions in accordance with regulation 11 and 13, including the use of wet methods where possible, and a suitable slow-speed cutter is used, provided that a respirator shall be used by the operator and others at risk of exposure;
- (g) asbestos waste of any form, including dust, is collected and disposed of in accordance with regulation 20;
- (h) once installed and where reasonably practicable, the relevant items are painted or otherwise sealed with a protective coating to limit the release of asbestos dust, combat weathering and inhibit growth of lichen or moss;
- (i) cleaning is done under controlled conditions ensuring that—
 - (i) dry-brushing, scraping, sanding or abrasion techniques are not used;
 - (ii) where reasonably practicable, high-pressure water jetting is not used unless in conjunction with a suitable profiled hood that limits dispersal of contaminated water and, if the said jetting is used, that suitable control methods are used in accordance with regulation 13(2)(b); and
 - (iii) when fungicidal solution or moss killer is applied, a standing time of 24 hours or any other period specified by the manufacturer is allowed, and a low-

pressure hose is used after such period to keep the sheets wet whilst employing a stiff broom or any similar means to remove any moss or lichens.

Records

16. An employer shall—

- (a) keep records of the results of all assessments, air monitoring, medical surveillance reports and the asbestos inventory required by regulations 7, 8, 9 and 14(1)(b), respectively: Provided that personal medical records shall only be made available to an occupational health practitioner;
- (b) subject to paragraph (c), make the records contemplated in paragraph (a), excluding personal medical records, available for inspection by an inspector;
- (c) allow any person, subject to formal consent in writing of an employee, to peruse the records with respect to that particular employee;
- (d) make the records of all assessments and air monitoring, and the asbestos inventory available for perusal by the relevant health and safety representative or relevant health and safety committee;
- (e) keep all records of assessments and air monitoring, and the asbestos inventory for a minimum period of 40 years;
- (f) keep all medical surveillance records for a minimum period of 40 years and, if the employer ceases activities relating to asbestos work, shall hand over or forward by registered post all these records to the relevant provincial director: Provided that those records contain at least the following information:
 - (i) Surname, forenames, gender, date of birth, name of spouse or closest relative and where available, permanent address and postal code;
 - (ii) a record of types of work carried out with asbestos and, where relevant, its location, the starting and ending dates of exposure and average duration of exposure in hours per week;
 - (iii) a record of any work with asbestos prior to this employment; and
 - (iv) dates of medical surveillance reports;
- (g) keep a record of the tests and investigations carried out in terms of regulation 18 (b) and of any repairs resulting from the relevant tests and investigations, and keep that record for at least three years; and
- (h) keep a record of training given to an employee in terms of regulation 5(5) for as long as the employee remains employed at the workplace in which he or she is being exposed to asbestos.

Personal protective equipment and facilities

17.(1) An employer or self-employed person shall provide—

- (a) all persons exposed to asbestos at the workplace with suitable protective clothing; and
- (b) a person with suitable respiratory protective equipment to ensure that the person's exposure is adequately controlled as contemplated in regulation 11(1).

(2) Where respiratory protective equipment is provided, the employer or self-employed person shall ensure that—

- (a) the relevant equipment is capable of keeping the exposure level at or below the OEL for asbestos;
- (b) the relevant equipment is correctly and properly used;
- (c) information, instruction, training and supervision that are necessary with regard to the use of the equipment are provided to the persons; and
- (d) the equipment is kept in good condition and efficient working order.

(3) An employer or self-employed person shall, as far as is reasonably practicable—

- (a) issue no personal protective equipment to a person, unless such equipment is cleaned, decontaminated and, where appropriate, sterilised;
- (b) provide separate containers or storage facilities for personal protective equipment when not in use; and
- (c) ensure that all personal protective equipment not in use is stored only in the place provided.

(4) An employer or self-employed person shall, as far as is reasonably practicable, ensure that all personal protective equipment contaminated with asbestos dust is cleaned and handled in accordance with the following procedures:

- (a) Where the equipment is cleaned on the premises of the employer or self-employed person, care shall be taken to prevent contamination during handling, transport and cleaning;
- (b) Where the equipment is sent off the premises to a contractor for cleaning purposes—
 - (i) the equipment shall be packed in impermeable containers;
 - (ii) the container shall be tightly sealed and clearly labeled in the form of Annexure 1; and
 - (iii) the relevant contractor shall be informed of these Regulations and the precautions to be taken for the handling of the asbestos contaminated equipment; and
- (c) water that is used for decontamination or cleaning of equipment shall be filtered in accordance with regulation 13(2)(b) before being released into any water system.

(5) Subject to sub-regulation (4)(b), an employer or self-employed person shall ensure that no person removes dirty or contaminated personal protective equipment from the workplace: Provided that where personal protective equipment contaminated with asbestos dust has to be disposed of, it shall be treated as asbestos waste as contemplated in regulation 20.

(6) Subject to the provisions of the Facilities Regulations published by Government notice R. 1593 of 12 August 1988, the employer shall, where reasonably practical, provide employees who use personal protective equipment as contemplated in sub-regulation (1), with—

- (a) adequate washing facilities which are readily accessible and located in an area where the facilities will not become contaminated, in order to enable the employees to meet a standard of personal hygiene consistent with the adequate control of exposure, and to avoid the spread of asbestos dust;

- (b) two separate lockers labelled “protective clothing” and “personal clothing” respectively, and shall ensure that the clothing is kept separately in the lockers concerned; and
- (c) separate change rooms labelled “clean change room” and “dirty change room”, with suitable barrier and bathing facilities between to prevent the contamination of personal clothes with asbestos dust.

Maintenance of control measures

- 18.** An employer or self-employed person shall ensure that—
- (a) all control equipment and facilities provided in terms of regulations 11, 12, 13, and 17 are maintained in good working order; and
 - (b) examinations and tests of engineering control measures are carried out at intervals not exceeding 24 months by an approved inspection authority or by a person whose ability to do such examinations and tests is verified by an approved inspection authority.

Labelling, packaging, transportation and storage

- 19.** An employer or self-employed person shall, in order to avoid the spread of asbestos dust, take steps, as far as is reasonably practicable, to ensure that—
- (a) the asbestos in storage or being distributed is properly identified, classified and handled in accordance with SABS 0228;
 - (b) a container or a vehicle in which asbestos is transported is clearly identified, classified and packed in accordance with SABS 0228 and SABS 0229; and
 - (c) any article or substance which contains asbestos is clearly labeled, in the form of Annexure 1.

Disposal of asbestos

- 20.** An employer or self-employed person shall as far as is reasonably practicable ensure that—
- (a) all asbestos waste is placed in containers that will prevent the likelihood of exposure during handling;
 - (b) all vehicles, re-usable containers or any other similar articles which have been in contact with asbestos waste are cleaned and decontaminated after use, in such a way that such vehicles, containers or similar articles do not cause a hazard inside or outside the workplace concerned;
 - (c) all asbestos waste which can cause exposure, is disposed of only on sites specifically designated for this purpose in terms of the Environment Conservation Act, 1989 (Act No. 73 of 1989), and the National Environmental Management Act, 1998 (Act No. 107 of 1998), and in such a manner that it does not cause a hazard inside or outside the site concerned;

- (d) all persons occupied in the collection, transport and disposal of asbestos waste, who may be exposed to that waste, are provided with suitable personal protective equipment; and
- (e) where the services of a contractor for the disposal of asbestos waste are used, a provision is incorporated into the contract stating that the contractor shall also comply with the provisions of these Regulations.

Demolition

- 21.** Any person who intends to have demolition work carried out, shall—
- (a) before the commencement of that work, take steps to ensure that—
 - (i) demolition work is carried out by a person who is a registered asbestos contractor;
 - (ii) all asbestos materials likely to become airborne are identified;
 - (iii) a plan of work is submitted for approval at least 30 days prior to the commencement of that work to an approved asbestos inspection authority who may at its discretion allow a shorter period of time for such submission and may approve standardised procedures for routine alterations or repairs: Provided that the stipulated time period shall not apply if the plan of work is drawn up by an approved asbestos inspection authority;
 - (iv) a copy of the approved plan of that work, which has been signed by the approved asbestos inspection authority, the employer and, if the person performing that work is not the employer or self-employed person, the mandatory of the employer or self-employed person, is submitted to the provincial director at least 14 days prior to commencement of such demolition work: Provided that an inspector may allow a shorter period for such submission; and
 - (v) copies of approved standardised procedures for demolition work are submitted to the provincial director at least 14 days prior to commencement of that work; and
 - (b) during and after the completion of demolition work, take steps to ensure that—
 - (i) all asbestos and materials containing asbestos are handled and disposed of in accordance with these regulations;
 - (ii) all persons exposed to or likely to be exposed to asbestos are issued with appropriate personal protective equipment and that such equipment is used properly; and
 - (iii) the premises, structure or area are thoroughly checked to ensure that all asbestos waste has been removed.

Prohibition

- 22.** No person shall—
- (a) use compressed air or permit the use of compressed air to remove asbestos dust from any surface or person;

- (b) smoke, eat, drink or keep food or beverages in an area not specifically designated for it or require or permit any other person to smoke, eat, drink or keep food or beverages in such area; or
- (c) apply asbestos by means of spraying or any other similar process or require or permit any other person to apply asbestos by means of such process.

Offences and penalties

23. Any person who contravenes or fails to comply with any provision of regulations 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13(2), 14, 15, 16, 17, 18, 19, 20, 21 or 22 shall be guilty of an offence and liable on conviction to a fine not exceeding R1000 or imprisonment for a period not exceeding 12 months and, in the case of a continuous offence, to an additional fine of R200 for each day on which the offence continues or to additional imprisonment of one day for each day on which the offence continues: Provided that the period of such additional imprisonment shall in no case exceed 90 days.

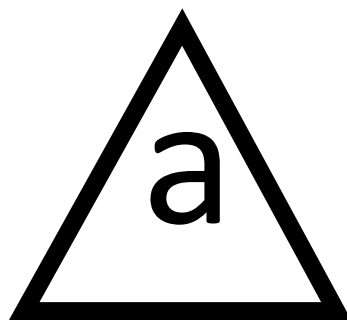
Repeal of regulations

24. The Asbestos Regulations published under Government Notice No. R. 773 of 10 April 1987, as Government notice No. R. 1637 of 4 August 1989, are hereby repealed.

Short title

25. These Regulations shall be called the Asbestos Regulations, 2001.

ANNEXURE 1 OCCUPATIONAL HEALTH AND SAFETY ACT, 1993



**WARNING!!! ASBESTOS
INHALATION OF ASBESTOS DUST IS DANGEROUS TO HEALTH.
FOLLOW THE SAFETY INSTRUCTIONS**

Sources and References Consulted or Utilised

Actinolite

https://www.google.co.za/search?q=actinolite&source=lnms&tbm=isch&sa=X&ei=1wTUUZzuD9KrhQeF14DYBQ&sqi=2&ved=0CAcQ_AUoAQ&biw=942&bih=464#facrc=_&imgdii=_&imgsrc=ro8CjTyb1z-xM%3A%3BD83ch1ulWg_T4M%3Bhttp%253A%252F%252Fapi.ning.com%252Ffiles%252FscCjgZ4NPVDIWL7c9Y8hkaUTKXq0zKRDpJMq7u6Wmi2f4pJ5qbneFDC63Dd8L3np-caM*Kgfi2*oSrTm87P0qfPF0AAS88Bi%252Factinolite.jpg%3Bhttp%253A%252F%252Flovepeaceandharmony.org%252Fgroup%252Fcrystalsandgemstones%252Fforum%252Ftopics%252Factinolite-1%3B864%3B648

Amosite

https://www.google.co.za/search?q=amosite&source=lnms&tbm=isch&sa=X&ei=CwHUUYDd42xhAeHzIHQDQ&sqi=2&ved=0CAcQ_AUoAQ&biw=942&bih=464#facrc=_&imgdii=_&imgsrc=JqavGYeFiOOH2M%3A%3BI4Mx5GFgLaFfpM%3Bhttp%253A%252F%252Ffaecinc-usa.com%252Fimages%252Frock.jpg%3Bhttp%253A%252F%252Ffaecinc-usa.com%252Fasbestos.html%3B320%3B240

Anthophyllite

https://www.google.co.za/search?q=anthophyllite&source=lnms&tbm=isch&sa=X&ei=NwTUUA-jlY2BhQflvYH4Cw&sqi=2&ved=0CAcQ_AUoAQ&biw=942&bih=464#facrc=_&imgdii=_&imgsrc=sU3bu8qB67BKxM%3A%3BaLRY5np076GOMM%3Bhttp%253A%252F%252Fwebmineral.com%252Fspecimens%252Fphotos%252Fprotoferro-anthophyllite.jpg%3Bhttp%253A%252F%252Fwebmineral.com%252Fspecimens%252Fpicshow.php%253Fid%253D3989%3B1024%3B768

Appropriate Apparel to Work with Asbestos

https://www.google.co.za/search?q=asbestos+suit&source=lnms&tbm=isch&sa=X&ei=cDm1U-G0PIGV7AbJioGQDw&sqi=2&ved=0CAYQ_AUoAQ&biw=1517&bih=714&dpr=0.9#facrc=_&imgdii=iCH3FwGOpk3Z9M%3A%3BUAtLw3rpeG8YTM%3BiCH3FwGOpk3Z9M%3A&imgsrc=iCH3FwGOpk3Z9M%253A%3BfTe18pwAtnfjsM%3Bhttp%253A%252F%252Fwww.colourbox.com%252Fpreview%252F568146-571735-person-in-protective-suit-removing-asbestos.jpg%3Bhttp%253A%252F%252Fwww.colourbox.com%252Fimage%252Fperson-in-protective-suit-removing-asbestos-image-568146%3B307%3B460

Asbestos

https://www.google.co.za/search?q=asbestos&source=lnms&tbm=isch&sa=X&ei=tC-cUsmVGsTQygPYxYH4BA&sqi=2&ved=0CAcQ_AUoAQ&biw=1517&bih=713&dpr=0.9#facrc=_&imgdii=_&imgsrc=3eID-r9DBFAKAM%3A%3BfVYGQknA24boUM%3Bhttp%253A%252F%252Fwww.cmse.ie%252Fimages%252Fasbestos3.jpg%3Bhttp%253A%252F%252Fwww.cmse.ie%252Fasbestos_Consultancy-129.html%3B336%3B298

Asbestos.com

<http://www.asbestos.com/mesothelioma/causes.php>
<http://www.asbestos.com/exposure/>
<http://www.asbestos.com/mesothelioma/south-africa/>

Berry, T.A., Belluso, E., Vigliaturo, R., Gieré, R., Emmett, E.A., Testa, J.R., Steinhorn, G. & Wallis, S.L. 2022. Asbestos and Other Hazardous Fibrous Minerals: Potential Exposure Pathways and Associated Health Risks. *Int J Environ Res Public Health*. 2022 Mar 29;19(7):4031.

Bhandari, J., Thada, P.K. & Sedhai, Y.R. 2024. Asbestosis. *In*: StatPearls [Internet]. Treasure Island (FL): StatPearls Publishing; 2024 Jan. 2022 Sep 19.

Bofetta, P., Donato, F., Pira, E., Luu, H.N. & La Vecchia, C. 2019. Risk of mesothelioma after cessation of asbestos exposure: a systematic review and meta-regression. *Int Arch Occup Environ Health*. 2019 Apr 15. doi: 10.1007/s00420-019-01433-4. [Epub ahead of print]

Buzzle

<http://www.buzzle.com/articles/mesothelioma-staging.html>

Caceres, J.D. & Venkata, A.N. 2023. Asbestos-associated pulmonary disease. *Curr Opin Pulm Med*. 2023 Mar 1;29(2):76-82.

Cancer Research UK

Researched and Authored by Prof Michael C Herbst

[D Litt et Phil (Health Studies); D N Ed; M Art et Scien; B A Cur; Dip Occupational Health; Dip Genetic Counselling; Dip Audiometry and Noise Measurement; Diagnostic Radiographer; Medical Ethicist]

Approved by Ms Elize Joubert, Chief Executive Officer [BA Social Work (cum laude); MA Social Work]

August 2024

<http://www.cancerresearchuk.org/cancer-help/type/mesothelioma/treatment/the-stages-of-mesothelioma>

Chrysotile

https://www.google.co.za/search?q=chrysotile&source=lnms&tbn=isch&sa=X&ei=ZQDUUYmyL5LwhQehloCYAw&sqi=2&ved=0CAcQ_AUoAQ&biw=942&bih=464#facrc=_&imgdii=_&imgsrc=KEMxxkmlFsZHyM%3A%3BvBDJHSEvHiBLAM%3Bhttp%253A%252F%252F3.bp.blogspot.com%252F-YmM2TWwKT3s%252FUAWgHKThHYI%252FAAAAAAAGU%252FOzZ0HreFmcA%252Fs1600%252Fasbestos1.jpg%3Bhttp%253A%252F%252Ftota-2020.blogspot.com%252F2012%252F07%252Fstudies-have-shown-that-exposure-to.html%3B500%3B447

Chun, C.P., Song, L.X., Zhang, H.P., Guo, D.D., Xu, G.X., Li, Y., Xin, X., Cao, J. & Li, F. 2023. Malignant peritoneal mesothelioma. *Am J Med Sci.* 2023 Jan;365(1):99-103.

Clin, B., Gramond, C., Thaon, I., Brochard, P., Delva, F., Chammings, S., Gislard, A., Laurent, F., Paris, C., Lacourt, A. & Pairon, J.C. 2022. Head and neck cancer and asbestos exposure. *Occup Environ Med.* 2022 Oct;79(10):690-696.

Crocidolite

https://www.google.co.za/search?q=crocidolite&source=lnms&tbn=isch&sa=X&ei=1QHUUe3vEZO2hAfZt4DwCw&sqi=2&ved=0CAcQ_AUoAQ&biw=942&bih=464#facrc=_&imgdii=_&imgsrc=jd9KBEIL_idxtM%3A%3B0T7Jgi8QhDuyIM%3Bhttp%253A%252F%252Fwww.mesotheliomasos.com%252Fimages%252Fpics%252Fcrocidolite.jpg%3Bhttp%253A%252F%252Fwww.mesotheliomasos.com%252FpicturesCrocidolite.php%3B375%3B250

Daisgaard, S.B., Würtz, E.T., Hansen, J., Røe, O.D. & Omland, Ø. 2019. Environmental asbestos exposure in childhood and risk of mesothelioma later in life: a long-term follow-up register-based cohort study. *Occup Environ Med.* 2019 Feb 25. pii: oemed-2018-105392. doi: 10.1136/oemed-2018-105392. [Epub ahead of print]

Darnton, L. 2023. Quantitative assessment of mesothelioma and lung cancer risk based on Phase Contrast Microscopy (PCM) estimates of fibre exposure: an update of 2000 asbestos cohort data. *Environ Res.* 2023 Aug 1;230:114753.

Encyclopaedia Britannica

<http://global.britannica.com/EBchecked/topic/580067/taconite>

Hart, H.P. 1988. Asbestos in South Africa. *JS Afr Insti Min Metall*, 88(6):185-198.

Health and Safety Executive, UK

<http://www.hse.gov.uk/asbestos/dangerous.htm>

<http://www.hse.gov.uk/asbestos/bacs.pdf>

Huang, Q. & Lan, Y.-J. 2020. Colorectal cancer and asbestos exposure – an overview. *Ind Health.* 2020 Jun 9;58(3):200-211.

Jain, S.V. & Wallen, J.M. 2023. Malignant mesothelioma. *In: StatPearls* [Internet]. Treasure Island (FL): StatPearls Publishing; 2023 Jan. 2022 Jul 4.

Kwak, K., Kang, D. & Paek, D. 2022. Environmental exposure to asbestos and the risk of lung cancer: a systematic review and meta-analysis. *Occup Environ Med.* 2022 Mar;79(3):207-214.

López-Castro, R., Fuentes-Martín, Á., Medina Del Valle, A., García Peña, T., Soro García, J., López González, L. & Cilleruelo Ramos, Á. 2024. Advances in Immunotherapy for Malignant Pleural Mesothelioma: From Emerging Strategies to Translational Insights. *Open Respir Arch.* 2024 Apr 5;6(3):100323.

Marsch, G.M., Riordan, A.S. Keeton, K.A. & Benson, S.M. 2017. Non-occupational exposure to asbestos and risk of pleural mesothelioma: review and meta-analysis. *Occup Environ Med.* 2017 Nov;74(11):838-846. doi: 10.1136/oemed-2017-104383. Epub 2017 Sep 21.

Mesothelioma-causes

<http://www.mesothelioma-causes.co/>

Mesothelioma.com

http://www.mesothelioma.com/glossary/peritoneal_mesothelioma.htm

Researched and Authored by Prof Michael C Herbst

[D Litt et Phil (Health Studies); D N Ed; M Art et Scien; B A Cur; Dip Occupational Health; Dip Genetic Counselling; Dip Audiometry and Noise Measurement; Diagnostic Radiographer; Medical Ethicist]

Approved by Ms Elize Joubert, Chief Executive Officer [BA Social Work (cum laude); MA Social Work]

August 2024

Mesotheliomaweb

<http://www.mesotheliomaweb.org/mesothelioma/types/peritoneal>

National Cancer Institute

<http://www.cancer.gov/clinicaltrials/learningabout/what-are-clinical-trials>

<http://www.cancer.gov/cancertopics/factsheet/Risk/asbestos>

National Institute for Occupational Health

<http://www.nioh.ac.za/?page=asbestos&id=26>

Pericardialmesothelioma.org

<http://www.pericardialmesothelioma.org/>

PleuralMesothelioma.com

<http://www.pleuralmesothelioma.com/treatment/>

South Africa Info

<http://www.southafrica.info/services/health/asbestos-280308.htm#.U-y3EvmSySo>

South African Asbestos Regulations

DEPARTMENT OF LABOUR. Government Notice. R: 155. 10 February 2002. OCCUPATIONAL HEALTH AND SAFETY ACT, 1993 (ACT NO. 85 OF 1993)

South African Oncology Consortium (SAOC)

<http://www.saoc.org.za/links.php>

SV40 Cancer Foundation

<http://sv40foundation.org/>

Thewatersedge

<http://savethewatersedge.com/health-risks-associated.html>

Tremolite

https://www.google.co.za/search?q=tremolite&source=lnms&tbm=isch&sa=X&ei=igLUUdiBMI2ChQejmYGABw&sqi=2&ved=0CAcQ_AUoAQ&biw=942&bih=464#facrc=_&imgdii=muUM-p9toyerVM%3A%3BFW-FowfrCeGfxM%3BmuUM-p9toyerVM%3A&imgsrc=muUM-p9toyerVM%3A%3B4OKh7vwQP-2D8M%3Bhttp%253A%252F%252Fupload.wikimedia.org%252Fwikipedia%252Fcommons%252Fb%252Fb9%252FTremolite_Campolungo.jpg%3Bhttp%253A%252F%252Fcommons.wikimedia.org%252Fwiki%252FFile%253ATremolite_Campolungo.jpg%3B4438%3B2746

Visonà, S.D., Crespi, E., Belluso, E., Capella, S., De Matteis, S., Filippi, F., Lai, M., Loscerbo, R., Meloni, F., Pilia, I., Cocco, P. & Colosio, C. 2022. Reconstructing historical exposure to asbestos: the validation of 'educated guesses'. *Occup Med (Lond)*. 2022 Dec 7;72(8):534-540.