

# **Guidelines For Working With Asbestos**

---

**Manitoba Department of Labour & Immigration  
Workplace Safety & Health Division  
Workplace Safety & Health Branch**

---

**March 2000**

# **GUIDELINES FOR WORKING WITH ASBESTOS**

## **Preface**

This guideline has been developed to provide general information to employers, workers, consultants, abatement contractors and others concerned with the use, storage, handling, abatement and disposal of asbestos. This information is intended to establish minimum requirements to be considered when asbestos, or a material containing asbestos, is present in a workplace.

The Workplace Safety and Health Act, Chapter W210 of the Continuing Consolidation Of The Statutes Of Manitoba, the Workplace Hazardous Materials Information System Regulation (MR52/88), and the Workplace Health Hazard Regulation (MR53/88), establish duties that must be complied with when a potential health hazard is present in a workplace. This guideline expands upon those duties as it relates to asbestos. General areas, such as exposure limits, monitoring, personal protection, waste, and specific operation, such as abatement, asbestos cement products and friction materials are included.

# TABLE OF CONTENTS

<b>1. OBJECTIVES, APPLICATION AND DEFINITIONS.....</b>	<b>1</b>
1.1. OBJECTIVES.....	1
1.2. APPLICATION.....	1
1.3. DEFINITIONS.....	1
<b>2. GENERAL DUTIES .....</b>	<b>3</b>
2.1. GENERAL DUTIES OF EMPLOYERS.....	3
2.2. GENERAL DUTIES OF WORKERS .....	4
<b>3. EXPOSURE LIMITS.....</b>	<b>4</b>
3.1. OCCUPATIONAL EXPOSURE LIMIT .....	4
3.2. POST ABATEMENT EXPOSURE LIMIT.....	4
<b>4. MONITORING IN THE WORKPLACE .....</b>	<b>5</b>
4.1. GENERAL .....	5
4.2. MONITORING STRATEGY .....	5
4.3. AREA MONITORING.....	6
4.5. MEASUREMENT METHOD.....	7
4.6. RECORD KEEPING.....	7
4.7. APPLICATION OF MONITORING DATA.....	8
<b>5. GENERAL PREVENTIVE METHODS IN MANUFACTURING AND PROCESSING PLANTS .....</b>	<b>8</b>
5.1. ALTERNATIVE MATERIALS .....	8
5.2. METHODS OF CONTROL .....	8
5.3. CONTROL PROGRAM.....	9
5.4. DESIGN AND INSTALLATION .....	10
5.5. LOCAL EXHAUST VENTILATION .....	11
5.6. GENERAL VENTILATION.....	12
<b>6. INFORMATION, LABELING, EDUCATION AND TRAINING .....</b>	<b>12</b>
6.1. LABELING OF PRODUCTS AND OF RISK AREAS.....	12
6.2. EDUCATION AND TRAINING.....	13
<b>7. PERSONAL PROTECTIVE EQUIPMENT.....</b>	<b>13</b>
7.1. RESPIRATORY EQUIPMENT.....	13
7.2. PROTECTIVE CLOTHING .....	15
<b>8. CLEANING OF MANUFACTURING AND PROCESSING PLANTS.....</b>	<b>16</b>
8.1. GENERAL .....	16
8.2. FLOORS.....	17

8.3. WALLS.....	17
8.4. MACHINERY AND EQUIPMENT.....	17
8.5. OVERHEAD STRUCTURES.....	18
8.6. VACUUM CLEANING EQUIPMENT.....	18
<b>9. ASBESTOS CEMENT.....</b>	<b>18</b>
9.1. FINISHING OPERATIONS WITHIN THE WORKPLACE.....	18
<b>10. FRICTION MATERIALS.....</b>	<b>19</b>
10.1. USE OF FRICTION MATERIAL IN WORKSHOPS.....	19
10.2. SERVICING OF BRAKES AND CLUTCHES IN GARAGES AND WORKSHOPS.....	20
10.3. WASTE DISPOSAL.....	20
<b>11. DISPOSAL OF ASBESTOS WASTE.....</b>	<b>20</b>
11.1. WASTE MINIMIZATION.....	20
11.2. LOOSE FIBRE, CUTTINGS, AND FLOOR SWEEPINGS.....	21
11.3. WASTE MATERIALS FROM REPAIRING OR REMOVING THERMAL INSULATION.....	21
11.4. NON-FRIABLE ASBESTOS MATERIALS.....	21
11.5. LABELING AND ISOLATION OF WASTE.....	22
11.6. TRANSPORT OF WASTE.....	22
11.7. PROCEDURE AT THE DISPOSAL SITE.....	23
<b>12. PROCEDURES FOR ABATEMENT.....</b>	<b>24</b>
12.1. GENERAL.....	24
12.2. CLASSIFICATION OF WORK.....	24
12.3. PROCEDURES FOR TYPE 1 OPERATIONS.....	25
12.4. PROCEDURES FOR TYPE 2 OPERATIONS.....	27
12.5. PROCEDURES FOR TYPE 3 OPERATIONS.....	30
<b>13. MEDICAL SURVEILLANCE.....</b>	<b>37</b>
13.1. GENERAL REQUIREMENTS.....	37
13.2. PRE-PLACEMENT EXAMINATION.....	37
13.3. BIANNUAL FOLLOW-UP EXAMINATION.....	37

# GUIDELINES FOR WORKING WITH ASBESTOS

## 1. Objectives, Application And Definitions

### 1.1. Objectives

- 1.1.1. The objectives of this guideline are
- (a) to prevent exposure to airborne asbestos fibres at work;
  - (b) to prevent harmful effects on the health of workers arising from exposure to airborne asbestos fibres;
  - (c) to provide reasonably practicable control procedures and practices for minimizing occupational exposure to asbestos; and
  - (d) to provide specific procedures for asbestos abatement.

### 1.2. Application

- 1.2.1. This guideline applies to all workplaces where asbestos or asbestos-containing materials are used, stored or handled, where a fugitive emission is produced or disposed of, or where an asbestos waste is produced, stored or disposed of, and may include
- (a) manufacture of materials or products containing asbestos;
  - (b) use or application of asbestos-containing materials;
  - (c) stripping, repair or maintenance of asbestos-containing materials;
  - (d) demolition of a plant or structure containing asbestos materials;
  - (e) transportation, storage and handling of asbestos or asbestos-containing materials;
  - (f) custodial and service activities in buildings containing asbestos; and
  - (g) maintenance and renovation to ductwork/HVAC systems in buildings containing friable sprayed asbestos material.
- 1.2.2. The provisions of this guideline must be considered as the minimum requirements for the protection of the health of workers who are potentially exposed to airborne asbestos fibres.

### 1.3. Definitions

- 1.3.1. For the purposes of this guideline
- amended water means water with the addition of a non-ionic surfactant to enhance penetration, and usually consists of either 50% polyethylene ester and 50% polyethylene ether, or other non-sudsing type soap, at a concentration of approximately 50 ml/litre of water;

asbestos means the fibrous form of mineral silicates belonging to the serpentine and amphibole groups of rock-forming minerals, including: actinolite, amosite (brown asbestos, cummingtonite, grunnerite), anthophyllite, chrysotile (white asbestos), crocidolite (blue asbestos), tremolite or any mixture containing one or more of these;

asbestos-containing material means any non-friable material which contains 1% or greater asbestos, or any friable material which contains 0.1% or greater asbestos;

asbestos dust means particles of asbestos or settled particles of asbestos which may become airborne in the working environment;

asbestos fibre means a particle form of asbestos greater than five (5) micrometres in length, with a minimum length to diameter ratio of three (3) to one (1);

double-bagged in 6-mil polyethylene bags means that the material intended to be disposed of is placed into two polyethylene bags each of which is a minimum of 6-mils thick;

employer includes

- (a) every person who, by himself or herself or his or her agent or representative employs or engages one or more workers, and
- (b) the Crown and every agency of the government;

decontamination unit means a series of interconnected airlocks used to facilitate worker or waste decontamination;

friable material means a material that when dry can be crumbled, pulverized or powdered by hand pressure and includes material that is crumbled, pulverized or powdered;

HEPA filter means a high efficiency particulate air filter capable of removing 99.97% of a 0.3 micrometre aerosol;

negative pressure enclosure means a restricted area within a workplace where a reduced pressure is established by extracting air from within the enclosure and is discharged through a HEPA filter directly to the exterior of the building;

non-friable material means a material that when dry can not be crumbled, pulverized or powdered, and includes material such as vinyl asbestos floor tiles or sheets, ceiling tiles, gaskets, seals, packing, constructing mastics, cementitious asbestos-containing transite panels, siding, shingles, and wallboard, brake shoes, clutch plates or asbestos cement products;

regulation means a regulation made pursuant to The Workplace Safety and Health Act;

technically qualified person means a person who through education, training, and experience, understand the nature, monitoring, and control of any health hazard which may be associated with exposure to asbestos, and a Registered Occupational Hygienist (as registered by the Canadian Registration Board of Occupational Hygiene) or a Certified Industrial Hygienist (as certified by the American Board of Industrial Hygiene) is deemed to be a technically qualified person;

worker includes

- (a) any person who is employed by an employer to perform a service whether for gain or reward, or hope of gain or reward or not,
- (b) any person engaged by another person to perform services, whether under a contract of employment or not
  - (i) who performs work or services for another person for compensation or reward on such terms and conditions that the person is, in relation to that other person, in a position of economic dependence upon that person more closely resembling the relationship of any employee than that of an independent contractor, and
  - (ii) who works or performs services in a workplace which is owned or operated by the person who engages him or her to perform services,
- (c) any person undergoing training or serving an apprenticeship at an educational institution or at any other place;

workplace means any building, site, workshop, structure, mine, mobile vehicle, or any other premises or location whether indoors or outdoors in which one or more workers, or self-employed persons are engaged in work or have worked.

## **2. General Duties**

### **2.1. General duties of employers**

- 2.1.1. The Workplace Safety and Health Act, Section 4 establishes the general duties of the employer.
- 2.1.2. The Workplace Hazardous Materials Information System Regulation (MR 52/88) and the Workplace Health Hazard Regulation (MR 53/88) establish further duties of the employer.
- 2.1.3. The employer must inform contractors and subcontractors of the appropriate

regulations and safety precautions and must ensure, so far as is reasonably practicable, that persons present at the workplace who are not under his direct control follow such regulations and take the necessary safety precautions.

## **2.2. General duties of workers**

2.2.1. The Workplace Safety and Health Act, Section 5 establishes the general duties of workers.

2.2.2. The Workplace Hazardous Materials Information System Regulation (MR 52/88) and the Workplace Health Hazard Regulation (MR 53/88) establish further duties of the workers.

2.2.3. Workers should draw to the attention of management any change of circumstance in the work process which might give rise to asbestos dust exposure.

## **3. Exposure Limits**

### **3.1. Occupational exposure limit**

3.1.1. Asbestos is identified as a designated material by the Workplace Health Hazard Regulation and therefore is automatically declared as posing a potential health hazard as per Section 18(2).

3.1.2. The Workplace Health Hazard Regulation (MR 53/88), Section 19(2), defines the occupational exposure limit of a designated material as the level as close to zero as is reasonably practicable but shall not exceed the Threshold Limit Value established by the American Conference of Governmental Industrial Hygienists, ACGIH.

3.1.3. Workplace Safety and Health recognizes the level as close to zero as is reasonably practicable for all forms of asbestos as 0.1 fibres per cubic centimetre of air.

### **3.2. Post abatement exposure limit**

3.2.1. Airborne asbestos fibre concentrations must be reduced to a maximum of 0.01 fibres per cubic centimetre of air for all forms of asbestos before abatement isolation is removed and workers and others are allowed to reoccupy an area where asbestos has been abated.



## **4. Monitoring In The Workplace**

### **4.1. General**

- 4.1.1. The concentration of airborne asbestos fibres must be measured at locations where a risk of exposure to airborne asbestos fibres might occur, and the monitoring strategies must be consistent with those established in the Workplace Health Hazard Regulation (MR53/88).
- 4.1.2. Area and personal monitoring must be carried out to identify the sources of asbestos emission and to determine the extent of exposure to airborne asbestos fibres, when asbestos or asbestos-containing material are produced, handled or used in such a manner as to be liable to emit airborne dust.
- 4.1.3. Bulk analysis of materials should be performed if composition data are not available.
- 4.1.4. Manufacturers of asbestos-containing materials should make available the monitoring results of representative exposures that could result from the foreseeable use and misuse of their product.
- 4.1.5. The employer may use the manufacturer's monitoring data of representative exposures when assessing workers' exposure.

### **4.2. Monitoring strategy**

- 4.2.1. A systematic measuring program should be drawn up to determine whether exposure of workers to airborne asbestos fibres is being kept under control.
- 4.2.2. Personal monitoring and area monitoring should be performed to measure individual worker's exposure.
- 4.2.3. Objectives of the monitoring program are
  - (a) to ensure that the health of the workers is protected;
  - (b) to ensure that the preventive actions which have been taken are still effective;
  - (c) to ensure that the concentration of airborne asbestos fibres, as measured previously, remain unchanged or fall;
  - (d) to ensure that any changes made in manufacturing processes or work practices do not lead to an excessive exposure to airborne asbestos fibres; and
  - (e) to promote the implementation of more effective preventive measures.

- 4.2.4. A preliminary survey should be performed to
- (a) determine sources of exposure to airborne asbestos fibres;
  - (b) to decide whether a major survey or a continuous monitoring program is needed; and
  - (c) to establish the place and time at which samples are to be taken.

4.2.5. The employer must, upon request of any worker, allow for an observer as established by the Workplace Health Hazard Regulation (MR 53/88), Section 26(1).

4.2.6. Any changes in equipment, materials or work practices likely to bring about any alteration in levels of exposure to airborne asbestos fibres must be considered in accordance with the Workplace Health Hazard Regulation (MR 53/88), Section 22, for purposes of re-evaluating potential health hazards from exposure.

### **4.3. Area Monitoring**

- 4.3.1. Area monitoring should be performed to obtain an indication of the distribution of asbestos dust throughout the general atmosphere of the working area
- (a) close to the source of emission, to evaluate dust concentrations or the effectiveness of engineering controls;
  - (b) at the perimeter of each work area, to ensure containment of airborne fibres;
  - (c) at various places in the working area, to identify locations of potential asbestos contamination; and
  - (d) from various working areas that represent typical exposures.

### **4.4. Personal monitoring**

4.4.1. Personal air sampling should be performed in the worker's breathing zone to evaluate the risk to the individual worker.

4.4.2. Personal air sampling must be carried out while the work process is in operation.

4.4.3. Personal air sampling must be done in such a manner that the average, and in any case the maximum, level of exposure of each individual worker can be determined when the concentration of airborne asbestos fibres may vary from one work operation or phase to another.

4.4.4. Personal sampling should be carried out at various times throughout the work shift and, where appropriate, should be supplemented by short term sampling during periods of peak emission.

4.4.5. Exposure profiles of particular jobs or occupational categories should be constructed from the air sampling data of different operations and from the workers' exposure times in these jobs.

#### **4.5. Measurement method**

4.5.1. The concentration of asbestos must be measured in accordance with NIOSH Manual of Analytical Methods, 3rd Edition, U.S. Department of Health and Human Services, Public Health Service, Centres for Disease Control, National Institute for Occupational Safety and Health, Division of Physical Sciences and Engineering

- (a) Method 7400 for airborne asbestos exposure analysis; and
- (b) Method 9002 for bulk asbestos analysis.

4.5.2. Direct reading instruments, such as particle counters and dust photometers, should be used only for area monitoring and engineering applications.

4.5.3. Direct reading instruments must be calibrated according to the manufacturer's recommendations.

4.5.4. Monitoring results from direct reading instruments should be compared regularly to the method referenced in 4.5.1. (a).

#### **4.6. Record keeping**

4.6.1. The employer must keep records on all aspects of asbestos exposure monitoring.

4.6.2. Records must be clearly marked by date, work area and plant location.

4.6.3. All relevant data from measurements of airborne asbestos fibres in the working environment should be systematically recorded.

4.6.4. Any worker, member of the workplace safety and health committee or the worker safety and health representative shall have access to these records.

4.6.5. Besides the numerical results of measurements, the monitoring data should include

- (a) the composition and trade names of materials containing asbestos;
- (b) the location, nature, dimensions and other distinctive features of the workplace where area measurements were made;
- (c) the exact location at which personal monitoring measurements were made and the names and job titles of the workers involved;
- (d) the source or sources of airborne asbestos fibres, their location and the type of work being performed during sampling;
- (e) relevant information on the functioning of the process, engineering controls, ventilation and weather conditions with respect to emission of

- airborne asbestos fibres;
- (f) the date, exact time of sampling and duration of each sampling period;
- (g) the duration of the worker's exposure;
- (h) the use or non-use of respiratory protection; and
- (i) the name of the person responsible for the sampling and analytical analysis.

4.6.6. Individual results of concentration measurements and time-weighted averages must be calculated and recorded.

4.6.7. All monitoring records must be compiled, maintained, stored and preserved by the employer for 30 years.

#### **4.7. Application of monitoring data**

4.7.1. Corrective action must be taken without delay if the occupational exposure limit is exceeded.

4.7.2. Monitoring must be continued until it can be determined with reasonable accuracy that no worker is or is likely thereafter to be exposed in excess of the occupational exposure limit.

4.7.3. In the event that monitoring results discloses levels which are in excess of the occupational exposure limit, the employer must inform workers, the workplace safety and health committee or the worker safety and health representative of the excess and of the action(s) to be taken.

4.7.4. Warning signs and instructions for appropriate means of protection must be provided at each location where the concentration of airborne asbestos fibres exceeds the occupational exposure limit.

### **5. General Preventive Methods In Manufacturing And Processing Plants**

#### **5.1. Alternative materials**

5.1.1. Whenever possible, asbestos should be replaced by substances which offer the same technical advantages but which are harmless or less harmful.

5.1.2. All health hazards associated with the manufacture, handling, use, transportation, storage and disposal of the alternative materials should be reviewed when an alternative material is considered.

#### **5.2. Methods of control**

5.2.1. All appropriate and practicable measures of engineering, work practice and

administrative control must be taken to eliminate or to reduce workers' exposure to airborne asbestos fibres in the working environment to the lowest reasonably practicable level.

- 5.2.2. Engineering controls should include mechanical handling, ventilation and redesign of the process to eliminate, contain or collect asbestos dust by such means as
- (a) process separation, automation or enclosure;
  - (b) bonding asbestos fibres with other materials to prevent dust generation;
  - (c) general ventilation of the working area with clean air;
  - (d) local ventilation of processes, operations, equipment and tools for the prevention of dust generation;
  - (e) treating of contaminated air before discharge to the environment;
  - (f) use of wet methods where appropriate; and
  - (g) separating workplaces for certain processes.

- 5.2.3. Appropriate work practices must be followed where materials or processes are used which may result in the production of airborne asbestos fibres.

- 5.2.4. Such work practices should include
- (a) requiring the use of and maintaining process machinery, installations, equipment, tools, local exhausts and ventilation systems in accordance with instructions;
  - (b) wetting of asbestos products and materials at workplaces before processing, handling, using, machining, cleaning, stripping or removing;
  - (c) regular cleaning of machinery and work areas by appropriate methods; and
  - (d) requiring the proper use of personal protective equipment.

### **5.3. Control program**

- 5.3.1. Each employer must, in consultation with the workplace safety and health committee or the worker safety and health representative, develop and implement a prevention plan designed to reduce the exposure of workers to airborne asbestos fibres in accordance with the Workplace Health Hazard Regulation (MR 53/88), Section 33.

- 5.3.2. The prevention program should include, in written form
- (a) a description of each operation in which airborne asbestos fibres are emitted, including the processes and machinery used, the materials handled, the control devices, the number of exposed workers, the job responsibilities of each worker, the operating procedures and the maintenance practices;
  - (b) a description of the specific means for controlling exposure to airborne asbestos fibres, including a description of the work practices or administrative controls;
  - (c) engineering plans, material safety data sheets, study reports or other relevant technical information;

- (d) air monitoring data on the efficiency of control measures; and
- (e) a detailed schedule for implementation of the control program.

5.3.3. A copy of the prevention plan must be posted in the workplace, furnished to the workplace safety and health committee or worker safety and health representative and presented to every worker who is or may be exposed to airborne asbestos fibres.

5.3.4. The prevention plan must be revised regularly and updated to reflect the current status of technical and other developments.

5.3.5. Where appropriate in large enterprises, specified departments, branches or persons should have special duties in the implementation of the control program, particularly in connection with

- (a) the design of new buildings, equipment, processes and materials;
- (b) the purchase of materials, products, machinery or equipment;
- (c) the contracting for the supply and maintenance of ventilation systems and other engineering controls;
- (d) the information and training given to the workers;
- (e) the purchase and maintenance of personal protective equipment and the provision of instructions in regards to its use; and
- (f) the co-ordination, supervision and monitoring of maintenance, renovation or demolition activities that have the potential to disturb asbestos.

#### **5.4. Design and installation**

5.4.1. The materials, processes and equipment should be designed so that exposure to airborne asbestos fibres is eliminated or reduced to the lowest practicable level.

5.4.2. Work areas must be designed, built and maintained in such a manner as to

- (a) separate the hazardous operations from the remainder of the premises;
- (b) reduce as far as possible surfaces on which asbestos dust and waste may accumulate;
- (c) facilitate the cleaning of floors, walls, ceilings and machinery; and
- (d) facilitate the collection of asbestos dust that may escape in the event of an incident.

5.4.3. Direct handling of asbestos or asbestos-containing materials should be avoided by the use, where practicable, of automatic processes or by remote control systems.

5.4.4. Where applicable, total process enclosures, which prevent the emission of airborne asbestos fibres, should be designed and constructed.

5.4.5. Total process enclosures should be supplemented with internal exhaust ventilation to create negative pressure inside the enclosure.

5.4.6. Asbestos-containing building materials, such as boards, sheets, and plates should be designed, prefabricated and packed in the workplace so that no further cutting, drilling or other machining of the material is required.

**5.5. Local exhaust ventilation**

5.5.1. Local exhaust ventilation equipment should be provided and maintained where total enclosure of the dust-proofing process is not practicable.

5.5.2. The local exhaust ventilation must be located as close as possible to the source of dust emission by the use of capture hoods, booths or enclosures.

5.5.3. The local exhaust system must be designed to collect and remove all dust-laden air.

5.5.4. All exhausted air must be passed through a HEPA filter and must be discharged to the exterior of the building.

5.5.5. Openings in enclosures must be as small as possible while still allowing access to the necessary work operation.

5.5.6. Ventilation equipment must be constructed so that air turbulence and eddies created by the work process or by the workers do not impair the effective removal of dust.

5.5.7. Local exhaust ventilation, or other effective methods, should be used for workplace operations such as

- (a) feeding, conveying, crushing, milling, screening, mixing or bagging of asbestos materials;
- (b) carding, spinning, weaving, sewing and cutting of asbestos textiles; and
- (c) cutting, punching, drilling, sawing, grinding or machining of asbestos cement and friction materials.

5.5.8. The design of local exhaust ventilation systems for any particular process requires special expertise and must therefore be referred to a technically qualified person.

- 5.5.9. Checks on the performance of the exhaust system must be made periodically with smoke tests or air flow measurements, or by comparing static pressure readings in the system with readings recorded at the same points when the system was known to be operating efficiently.
- 5.5.10. Asbestos dust collected by the filtration equipment must be removed regularly under conditions that have strict regard for occupational safety and health.
- 5.5.11. A technically qualified person must inspect all types of dust control equipment.

## **5.6. General ventilation**

- 5.6.1. The work area must be supplied with clean air to replace the exhausted air and to reduce the concentration of airborne asbestos fibres.
- 5.6.2. General ventilation should not be used to control exposure to airborne asbestos fibres unless local exhaust is also present.
- 5.6.3. The general ventilation flow rate must be sufficient to change the air of the workplace at least four times per hour.
- 5.6.4. The exhausted air must be passed through a HEPA filter and must not be recirculated back to the working environment, except when the following provisions are fulfilled
  - (a) the concentration of airborne asbestos fibres is substantially less than the occupational exposure limit of 0.1 fibre per cubic centimetre of air and does not add to worker exposure;
  - (b) the filtration and ventilation system is regularly checked and maintained;
  - (c) the air quality is monitored by adequate instruments; and
  - (d) the director of the Workplace Safety and Health Branch has approved the process.

## **6. Information, Labeling, Education And Training**

### **6.1. Labeling of products and of risk areas**

- 6.1.1. All containers of asbestos-containing materials or wastes must be labeled in accordance with the Hazardous Products Act (Canada), the Controlled Products Regulations, the Manitoba Workplace Hazardous Materials Information System Regulation or the Manitoba Workplace Health Hazard Regulation.



- 6.1.2. All asbestos-containing materials, including waste, must be accompanied by a material safety data sheet as required by the Controlled Products Regulation (Canada), the Manitoba Workplace Hazardous Materials Information System Regulation or the Manitoba Workplace Health Hazard Regulation.
- 6.1.3. All areas where asbestos or asbestos-containing materials could cause a hazard must be clearly indicated as an asbestos exposure area through the use of signs that clearly identify the hazard and the associated health effects.
- 6.1.4. The information on warning labels and signs must be understandable to the workers and be in accordance with the Workplace Health Hazard Regulation, Section 12.

## **6.2. Education and training**

- 6.2.1. The employer must provide education and training in the following areas to all workers who work with asbestos or asbestos-containing materials, or who work in proximity to asbestos or asbestos-containing materials
  - (a) sources of asbestos exposure;
  - (b) potential health effects;
  - (c) information contained on the label;
  - (d) information contained in the material safety data sheet;
  - (e) work procedures for the safe use, storage, handling and disposal of asbestos,;
  - (f) work procedures to be followed where asbestos is present; and
  - (g) work procedures to be followed in case of emergency involving asbestos.
- 6.2.2. Specific information regarding the significance of cigarette smoking as a risk factor in asbestos related diseases must be provided to all workers concerned with occupational exposure to airborne asbestos fibres.
- 6.2.3. A written, oral, visual or worker participation approach must be used to ensure workers are aware of health risks, methods of prevention and proper work practices.

## **7. Personal Protective Equipment**

### **7.1. Respiratory equipment**

- 7.1.1. The use of respirators must be regarded only as a temporary or emergency measure and not as a long-term alternative to effective engineering control.
- 7.1.2. A suitable supply of respirators must be available in the workplace.

- 7.1.3. Respirators must be provided to all workers in any situation where the concentration of airborne asbestos fibres exceed or is likely to exceed the occupational exposure limit of 0.1 fibre per cubic centimetre of air.
- 7.1.4. Respirators must be issued for the exclusive use of the workers to whom they are supplied.
- 7.1.5. All respirators must be provided and maintained by the employer without cost to the worker.
- 7.1.6. Only those types of respirators tested and certified by the National Institute for Occupational Safety and Health in accordance with Canadian Standards Association Standard CSA Z94.4 - 93 or approved by the Director of Workplace Safety and Health may be used.
- 7.1.7. All air purifying respirators must be equipped with a HEPA filter.
- 7.1.8. A respirator must be selected with an appropriate protection factor such that the wearer's exposure does not exceed 0.1 fibres per cubic centimetre of air.
- 7.1.9. The protection factors adopted in CSA Standard Z94.4 - 93, as presented in Table 1 of this Guideline, must be used when selecting a respirator.
- 7.1.10. The maximum use concentration of a respiratory device shall be the assigned protection factor multiplied by the occupational exposure limit of 0.1 fibre per cubic centimetre of air.
- 7.1.11. The maximum use concentration for each type of respirator shall be the concentration listed in Table 2.
- 7.1.12. The employer must provide supervision to ensure that the respirator is properly used.
- 7.1.13. Workers required to wear a respirator must be fully instructed in the use, care and maintenance of that respirator.
- 7.1.14. Instruction must be given on the following points
- (a) the reasons for the use of the respirator and the importance of using it conscientiously;
  - (b) when to use the respirator;
  - (c) how the respirator works;
  - (d) how to check for proper fit;
  - (e) how to perform regular servicing; and

- (f) the name of the Respiratory Protection Program Coordinator in the event that any problems are encountered.
- 7.1.15. A record of training and instruction in the use of the respirator must be maintained for each worker.
- 7.1.16. Respirators must be regularly cleaned and serviced by appropriately trained operators before reissue.
- 7.1.17. A suitable container, such as a metal box or polyethylene bag, must be provided for the storage of individual respirators when the respirator is not in use.
- 7.1.18. Respirators must be maintained in accordance with the procedures prescribed in Canadian Standards Association Standard CSA Z94.4 - 93.
- 7.1.19. A record must be kept for each worker who is required to wear a respirator showing the type of respirator issued, the date on which it is cleaned and serviced and the date of installation of new filters.
- 7.1.20. Where respiratory protection is used, this fact should be recorded on the monitoring records of exposure of the particular job.
- 7.2. Protective clothing**
- 7.2.1. Where personal clothing may become contaminated with asbestos the employer must provide appropriate work clothing.
- 7.2.2. Where the concentration of airborne asbestos fibres necessitates the use of a respirator, protective clothing must also be provided and worn.
- 7.2.3. Protective clothing, including suitable head covering, must completely cover all work clothing.
- 7.2.4. Separate clean and contaminated clothing locker rooms must be available so that personal clothing can be stored separated from protective clothing.
- 7.2.5. Personal clothing must be removed, stored or put on only in the clean locker room.
- 7.2.6. A shower and washroom facility must be provided in every workplace where the concentration of airborne asbestos fibres exceeds or is likely to exceed the occupational exposure limit, and must be located between the contaminated work area and clean locker rooms.

- 7.2.7. A vacuum cleaner equipped with a HEPA filter must be located at the entrance to the shower room where protective clothing is to be removed.
- 7.2.8. Regular inspection and cleaning of the shower and locker rooms must be performed to ensure no accumulation of asbestos occurs.
- 7.2.9. Protective clothing must not be worn outside the contaminated work area or locker rooms.
- 7.2.10. The employer must make provision for the laundering of protective clothing where the protective clothing is intended to be reused.
- 7.2.11. Reusable protective clothing must be laundered under controlled conditions to prevent the emission of airborne asbestos fibres during handling, transport and laundering.
- 7.2.12. Contaminated protective clothing that is sent for laundering outside the workplace must be double-bagged in 6-mil polyethylene bags.
- 7.2.13. The polyethylene bags must be clearly identified as containing asbestos-contaminated clothing.
- 7.2.14. When a contract laundry is employed, the employer must ensure that the contractor fully understands the precautions necessary for handling asbestos-contaminated clothing.
- 7.2.15. The laundering of protective clothing in workers' homes is strictly prohibited.

## **8. Cleaning Of Manufacturing And Processing Plants**

### **8.1. General**

- 8.1.1. Every employer must ensure, as far as is practicable, that work areas are maintained in a clean state and are free of asbestos waste.
- 8.1.2. All equipment and internal surfaces of the building must be kept free from accumulation of asbestos dust.
- 8.1.3. Cleaning must be performed with a vacuum cleaner equipped with a HEPA filter; or by wet mopping, wet sweeping or wet wiping.

- 8.1.4. Protective clothing and respirators must be worn when the cleaning process results in, or may result in, an exposure in excess of the occupational exposure limit.
- 8.1.5. Where practicable, cleaning should be carried out when no other workers are present.
- 8.1.6. Where it is necessary for other workers to be present, those workers must also wear protective equipment.

## **8.2. Floors**

- 8.2.1. Floors must be regularly cleaned of accumulated asbestos and waste materials.
- 8.2.2. Floor cleaning must be carried out with a vacuum cleaner equipped with a HEPA filter; or by wet mopping, wet sweeping or wet wiping.
- 8.2.3. Floor surfaces must be kept in good repair.
- 8.2.4. Cracked or broken floor surfaces must be repaired.
- 8.2.5. Concrete surfaces should be treated to produce a surface that can be satisfactorily cleaned.

## **8.3. Walls**

- 8.3.1. New buildings should be constructed so that their walls have smooth surfaces.
- 8.3.2. Walls of existing buildings should be rendered smooth as far as is practicable.
- 8.3.3. Walls should be cleaned either with a vacuum cleaner equipped with a HEPA filter, or by other means that does not create airborne asbestos.
- 8.3.4. Care must be taken that wastewater does not dry out before disposal.

## **8.4. Machinery and equipment**

- 8.4.1. Cleaning should be carried out, wherever practicable, with a vacuum cleaner equipped with a HEPA filter, or by wet mopping or wet wiping.
- 8.4.2. Where machinery is fitted with exhaust equipment, the exhaust ventilation must be in operation while cleaning is being performed.

## **8.5. Overhead structures**

- 8.5.1. The overhead structures of new buildings should be constructed with smooth surfaces, and high ledges should be avoided.
- 8.5.2. Accumulated asbestos and waste material should be removed with a vacuum cleaner equipped with a HEPA filter, or by wet mopping, wet sweeping or wet wiping.
- 8.5.3. Polyethylene sheeting should be used to cover equipment and surfaces below when overhead cleaning is being performed.

## **8.6. Vacuum cleaning equipment**

- 8.6.1. Only a vacuum cleaner equipped with a HEPA filter may be used for collecting asbestos dust and waste, and such equipment must be designed so that the dust cannot escape from the equipment back into the workplace.
- 8.6.2. The collection bags within the vacuum cleaning units should be disposable.
- 8.6.3. The vacuum cleaner must be removed from the workplace immediately if the collection bag bursts.
- 8.6.4. All burst bags and their contents must be double-bagged in 6-mil polyethylene bags by an operator wearing protective clothing and respiratory equipment.
- 8.6.5. The interior of the vacuum cleaner must then be cleared of asbestos with the use of another a vacuum cleaner equipped with a HEPA filter or by wet wiping.
- 8.6.6. The collected material must be disposed of in accordance with the provisions of this guideline.

## **9. Asbestos Cement**

### **9.1. Finishing operations within the workplace**

- 9.1.1. All high speed sawing, drilling, sanding or milling equipment must be fitted with a local exhaust system equipped with a HEPA filter.
- 9.1.2. Low volume, high velocity air systems are usually the most suitable for this purpose.

- 9.1.3. The equipment should be designed to remove loose asbestos waste from the cut edges.
- 9.1.4. All unfinished edges of asbestos cement boards should be treated with a sealing solution.
- 9.1.5. Where practicable, hand tools or slow-running tools that produce coarse particles or chips should be used rather than high-speed machines or those that cut by abrading the material.
- 9.1.6. Abrasive or masonry discs should not be used for cutting asbestos material.

## **10. Friction Materials**

### **10.1. Use of friction material in workshops**

- 10.1.1. Where practicable, friction materials should be supplied pre-fabricated, machined or drilled to requirements.
- 10.1.2. Where practicable, hand tools or slow-running tools that produce coarse dust or chips should be used rather than high-speed machines or those that cut by abrading the material.
- 10.1.3. Fixed workstations or machines should have a suitable local exhaust ventilation system installed.
- 10.1.4. Portable tools should be fitted with built-in local exhaust units.
- 10.1.5. Low-volume, high-velocity systems are the most appropriate for this purpose.
- 10.1.6. All local exhaust ventilation must be fitted with a HEPA filter.
- 10.1.7. Dust extraction equipment should be installed at workstations where linings, blocks and clutch facings are riveted.
- 10.1.8. All exhaust ventilation equipment should be inspected and tested by a competent person at regular intervals not exceeding seven calendar days.
- 10.1.9. A record of every inspection should be made and retained.

## **10.2. Servicing of brakes and clutches in garages and workshops**

- 10.2.1. The blowing of compressed air or dry brushing must not be used to remove accumulated dust from brake and clutch assemblies when worn friction materials are being removed, except when this is carried out within an extraction box equipped with local exhaust ventilation.
- 10.2.2. Dust should be removed with a vacuum cleaner equipped with a HEPA filter.
- 10.2.3. If such a vacuum cleaner is not available, dust must be removed with a cloth moistened with a suitable dust suppressant.
- 10.2.4. Where practicable, friction materials should be cut to length with shears.
- 10.2.5. Power saws or abrasive discs must not be used unless the equipment is equipped with suitable local exhaust ventilation.
- 10.2.6. Where products are machined, a suitable local exhaust ventilation system must be installed.
- 10.2.7. All local exhaust ventilation must be fitted with a HEPA filter.
- 10.2.8. Before applying adhesive to bond segments to brake shoes, surface dust should be removed with a cloth moistened with a suitable dust suppressant.
- 10.2.9. Dust must not be removed by tapping or by blowing compressed air.
- 10.2.10. Loose cuttings and dust should be removed from the workplace with a vacuum cleaner equipped with a HEPA filter, or by wet sweeping or wet mopping.

## **10.3. Waste disposal**

- 10.3.1. Loose cuttings and dust collected from fabrication processes, and broken and worn linings must be doubled-bagged 6-mil polyethylene bags.
- 10.3.2. The bags must be disposed of in accordance with the provisions of this guideline.

## **11. Disposal Of Asbestos Waste**

### **11.1. Waste minimization**

- 11.1.1. The creation of asbestos waste should be minimized by the adoption of the most effective production techniques.



**11.2. Loose fibre, cuttings, and floor sweepings**

- 11.2.1. Loose fibre collected by fixed extraction systems should be returned to the production process.
- 11.2.2. Cuttings accumulating around and under machinery should be collected with a vacuum cleaner equipped with a HEPA filter, or by wet mopping, wet sweeping, or wet wiping.
- 11.2.3. Loose material collected by other means should be double-bagged in 6-mil polyethylene bags.

**11.3. Waste materials from repairing or removing thermal insulation**

- 11.3.1. Asbestos waste must be placed in suitable containers immediately on removal.
- 11.3.2. Polyethylene bags must not be used where debris may puncture the bag.
- 11.3.3. Where polyethylene bags are used, the waste must be double-bagged in 6-mil polyethylene bags.
- 11.3.4. Full containers must be sealed immediately to prevent the escape of airborne asbestos fibres.
- 11.3.5. Asbestos waste must not be allowed to dry out on floors or other surfaces of the work area.
- 11.3.6. The external surface of all containers must be cleaned with a vacuum cleaner equipped with a HEPA filter, or by wet wiping.
- 11.3.7. The cleaned containers should be removed to an area set aside for such waste.
- 11.3.8. Both the containers and the waste storage area must be clearly identified as containing asbestos.

**11.4. Non-friable asbestos materials**

- 11.4.1. The requirements listed below are not applicable to vinyl asbestos floor tiles or sheets provided that the abatement procedure established in this guideline is adhered to.
- 11.4.2. Non-friable asbestos waste, including ceiling tiles, gaskets, seals, packing, construction mastics, panels, siding, shingles, wallboard, brake shoes and clutch plates, asbestos cement products, and joint compounds must be stored in such a manner to ensure that it will not be abraded or crushed while awaiting disposal.

- 11.4.3. Non-friable asbestos waste must be either double-bagged in 6-mil polyethylene bags, wrapped in 6-mil polyethylene sheeting, or placed into another suitable impermeable container.
- 11.4.4. Wherever practicable, provision should be made in the design of machines for the automatic removal and collection of scraps in disposable receptacles that can be sealed and removed.
- 11.4.5. Where scraps and rejects need to be broken down for disposal, this should be done under suitable local exhaust ventilation.
- 11.4.6. Non-friable asbestos waste should be wetted in order to minimize the generation of airborne asbestos fibres.

**11.5. Labeling and isolation of waste**

- 11.5.1. All containers of asbestos waste must be adequately labeled in accordance with the Workplace Health Hazard Regulation (MR 53/88), Section 11.
- 11.5.2. The label on containers of asbestos waste should contain the following;

**Caution  
Contains Asbestos Fibres  
Avoid Creating Dust  
Breathing Asbestos May Cause Serious Bodily Harm**

- 11.5.3. Asbestos waste awaiting disposal must be stored in such a way that waste containers will not become damaged.
- 11.5.4. Asbestos waste must not be mixed with other waste for which there are no special disposal requirements.

**11.6. Transport of waste**

- 11.6.1. Asbestos waste must be transported to the disposal point in such a way that no airborne asbestos fibres are emitted into the air during transport.
- 11.6.2. All vehicles used for the transport of asbestos waste must be cleaned with a vacuum cleaner equipped with a HEPA filter; or by wet mopping or wet wiping after they have been unloaded.
- 11.6.3. Cleanup procedures must be taken immediately in the event of accidental spillage during transport to the disposal site.

- 11.6.4. Where the amount of spilled material is small, the waste should be collected into its original receptacle and reloaded without delay.
- 11.6.5. If the spillage is substantial and the material may become airborne, it must be wetted and cover immediately.
- 11.6.6. Workers performing the cleanup of a substantial spill must wear protective clothing and respiratory protection equipment.
- 11.6.7. Written instructions on the actions to be taken in the event of an accidental spill must be issued to drivers of vehicles carrying asbestos waste.

**11.7. Procedure at the disposal site**

- 11.7.1. Approval for the disposal of asbestos waste at a disposal site must be obtained from the municipal authority and the Manitoba Departments of Conservation and Labour (Workplace Safety and Health) before a disposal site is used.
- 11.7.2. The disposal site chosen must have vehicular access to the working face or to a hole or trench dug specifically to receive the asbestos waste.
- 11.7.3. The waste should be deposited at the foot of the working face of the landfill site or at the bottom of an excavation dug to receive it.
- 11.7.4. Care must be taken to prevent breakage of the bags or containers when the waste is being disposed of.
- 11.7.5. All friable waste must be
  - (a) covered to a depth of 20 to 25 cm as soon as possible; and
  - (b) covered to a minimum depth of 2 meters by the end of a working day.
- 11.7.6. Care must be taken to ensure that non-friable waste is not broken by the passage of vehicles over it when it is deposited on a dry site.
- 11.7.7. Vehicles, reusable receptacles and covers that have been in contact with asbestos waste must be cleaned after use by means of a vacuum cleaner equipped with a HEPA filter, or by wet mopping or wet wiping.
- 11.7.8. The employer must provide suitable protective clothing, respiratory equipment and training to those workers who are involved in the collection, transport or disposal of asbestos waste.

## **12. Procedures For Abatement**

### **12.1. General**

- 12.1.1. The presence, type, and degree of friability of asbestos should be positively confirmed before the handling, removal or repair of building materials thought to contain asbestos is planned.
- 12.1.2. All friable asbestos that may be disturbed in a building must be removed before any demolition is performed in that building or location.
- 12.1.3. The building owner, employer or contractor should review applicable building codes, or other similar codes, prior to the abatement activity to determine if the activity is regulated by those codes.
- 12.1.4. The building owner or employer must notify all workers who may be potentially exposed when friable asbestos is likely to be disturbed or when work is to be carried out on or in proximity to friable asbestos.
- 12.1.5. Asbestos-containing material should be considered for removal
  - (a) when it is breaking away from the surface to which it is applied;
  - (b) when the material is likely to be abraded or otherwise damaged;
  - (c) when the asbestos is friable;
  - (d) when the concentration of airborne asbestos fibres is above the occupational exposure limit; or
  - (e) prior to renovation or demolition.

### **12.2. Classification of work**

- 12.2.1. For the purposes of this guideline, operations that may result in a worker's exposure to asbestos are classified as Type 1 (low risk), Type 2 (medium risk) or Type 3 (high risk).
- 12.2.2. Type 1 operations include
  - (a) the installation or removal of non-friable manufactured products that contain asbestos such as vinyl asbestos floor tiles or sheets, ceiling tiles, gaskets, seals, packing, construction mastics, cementitious asbestos-containing transite panels, siding, shingles and wallboard, brake shoes, clutch plates or asbestos cement products;
  - (b) the cutting or otherwise shaping of the asbestos-containing materials mentioned in (a) above with hand tools only; or

- (c) the cutting, grinding, drilling, sanding or otherwise abrading of the asbestos-containing materials mentioned in (a) above with a power tool equipped with a HEPA filter.

12.2.3. Type 2 operations include

- (a) the removal of part or all of a false ceiling where there is friable asbestos material lying on the surface of the false ceiling;
- (b) the enclosure of friable asbestos-containing material;
- (c) the minor removal or disturbance of less than 1 square metre of friable asbestos-containing material during the repair, alteration, maintenance or demolition of a building, any machinery or equipment (other than air-handling equipment in a building which has sprayed asbestos fireproofing) that can be completed within a 3 hour period; or
- (d) any other operation not mention as a Type 1 or 3 operation that may result in a worker exposure to airborne asbestos fibres in excess of the occupational exposure limit of 0.1 fibre per cubic centimetre of air.

12.2.4. Type 3 operations include

- (a) the removal of greater than 1 square metre of friable asbestos-containing material during the repair, alteration, maintenance or demolition of a building, any machinery or any equipment;
- (b) the removal or disturbance of less than 1 square metre of friable asbestos-containing material during the repair, alteration, maintenance or demolition of a building, any machinery or equipment that cannot be completed within a 3 hour period;
- (c) the spray application of a sealant or encapsulant to greater than 1 square metre of friable asbestos-containing material;
- (d) the cleaning or removal of air-handling equipment, including rigid ducting, in a building which has sprayed asbestos fireproofing;
- (e) the repair, alteration or demolition of any equipment made in part of refractory materials containing asbestos; or
- (f) the grinding, cutting, drilling, sanding or otherwise abrading on any asbestos-containing material involved in Type 1 operation with a power tool not equipped with a HEPA filter.

### **12.3. Procedures for Type 1 Operations**

12.3.1. Eating, drinking, chewing or smoking is prohibited in the work area.

12.3.2. All asbestos dust and contaminated debris must be removed by means of a vacuum cleaner equipped with a HEPA filter, or by wet mopping, wet sweeping or wet wiping.

- 12.3.3. Compressed air must not be used to clean up or remove dust and debris from contaminated surfaces.
- 12.3.4. Wet handling techniques must be used to control dust on the surfaces of any asbestos-containing materials mentioned in 12.2.2, unless wetting creates a hazard or causes damage.
- 12.3.5. Where the surfaces mentioned above can not be wetted, a vacuum cleaner equipped with a HEPA filter, or other means that does not create airborne asbestos fibres, must be used to control the spread of dust.
- 12.3.6. The spread of asbestos from the work area must be controlled by appropriate means, including the use of polyethylene sheeting.
- 12.3.7. The polyethylene sheeting mentioned above must be either frequently cleaned with the use of a vacuum cleaner equipped with a HEPA filter, or wetted, to control the spread of asbestos.
- 12.3.8. The polyethylene sheeting mentioned above must be double-bagged in 6-mil polyethylene bags and disposed of as asbestos waste at the end of the abatement activity.
- 12.3.9. An employer must provide appropriate respiratory protection and protective clothing to any worker who on reasonable grounds requests such equipment.
- 12.3.10. Washing facilities for hand and face must be made available to workers in the work area, and workers must wash before leaving the work area.
- 12.3.11. The following procedures must be used for the removal of vinyl asbestos flooring material
- (a) resilient flooring material and tiles, including the backing material and adhesive, must be assumed to contain asbestos if it was manufactured before 1980, unless the material has been analyzed using a method specified in this guideline, and proven not to contain asbestos;
  - (b) “rip-up” of vinyl asbestos flooring is prohibited;
  - (c) sanding and cutting of the vinyl asbestos flooring surface, backing material or adhesive with high rpm equipment is prohibited unless performed as a Type 2 or 3 operation;
  - (d) mechanical chipping is prohibited unless performed as a Type 2 or 3 operation;
  - (e) sheet flooring must be cut into strips with a width not to exceed 15 centimetres;
  - (f) where possible tiles must be removed intact;

- (g) the strips, or tiles, and backing must be wetted and then scraped up with the use of a scraper, shovel, trowel, or other hand tools;
- (h) wetting may be omitted for tiles that are heated and removed intact;
- (i) residual adhesive and backing material must also be scraped off under wet conditions;
- (j) the removed strips or tiles, backing material, and adhesive must be immediately double-bagged in 6-mil polyethylene bags, securely tied and disposed of as asbestos waste;
- (k) all debris must be cleaned up with the use of a vacuum cleaner equipped with a HEPA filter, or by wet mopping, wet sweeping or wet wiping and disposed of as asbestos waste; and
- (l) dry sweeping is prohibited.

12.3.12. The following procedures must be used for the removal of cementitious asbestos-containing transit panels, siding, shingles, and wallboard

- (a) grinding, cutting, drilling, sanding or otherwise abrading of the asbestos-containing material mentioned above with a power tool is prohibited unless the power tool is equipped with a HEPA filter;
- (b) the asbestos-containing material mentioned above must be wetted prior to removal;
- (c) care must be taken to remove the material with minimal breakage; and
- (d) the asbestos-containing material mentioned above must be either
  - (i) immediately lowered to the ground, in a manner which will not result in breaking of the material, and then either wrapped in polyethylene sheeting, or double-bagged in 6-mil polyethylene bags and disposed of as asbestos waste, or
  - (ii) wrapped in polyethylene sheeting or double-bagged 6-mil polyethylene bags immediately and lowered to the ground no later than the end of the shift and disposed of as asbestos waste.

## **12.4. Procedures for Type 2 Operations**

12.4.1. Eating, drinking, chewing or smoking is prohibited in the work area.

12.4.2. The contaminated area must be identified by clearly visible signs warning of the asbestos work and hazards.

12.4.3. Before any work is performed, all asbestos dust and contaminated debris must be removed by means of a vacuum cleaner equipped with a HEPA filter or by wet mopping, wet sweeping or wet wiping.

12.4.4. Compressed air must not be used to clean up or remove dust and debris from contaminated surfaces.

- 12.4.5. Where an operation described in 12.2.3 is conducted indoors and where walls do not already enclose the operation, the spread of asbestos from the work area must be prevented by the construction of a small walk-in negative pressure enclosure which will accommodate no more than two persons.
- 12.4.6. The negative pressure enclosure must be constructed of two layers of a minimum of 6-mil polyethylene, or other suitable material, with reinforced polyethylene on the floor.
- 12.4.7. The negative pressure enclosure must be kept at a minimum pressure differential of -0.02 inches of water gauge relative to the air outside of the enclosure at all times during the operation by use of a vacuum cleaner equipped with a HEPA filter or similar ventilation unit.
- 12.4.8. All mechanical ventilation in the contaminated area, except that required to maintain the negative pressure, must be disabled.
- 12.4.9. At least two layers of 6-mil polyethylene must be placed over all openings in the contaminated area.
- 12.4.10. Wet handling techniques must be used to control dust on the surfaces of any asbestos-containing materials mentioned in 12.2.3, unless wetting creates a hazard or causes damage.
- 12.4.11. Electrical circuits inside the contaminated area must be deactivated unless equipped with ground-fault circuit interrupters.
- 12.4.12. Where the surfaces mentioned above can not be wetted, a vacuum cleaner equipped with a HEPA filter, or other means that does not create airborne asbestos fibres, must be used to control the spread of dust.
- 12.4.13. All dust and waste containing asbestos must be cleaned up frequently and immediately upon completion of the work by wet sweeping or wet mopping and must be double-bagged in 6-mil polyethylene bags, securely tied and disposed of as asbestos waste.
- 12.4.14. All surfaces inside the negative pressure enclosure must be wet wiped prior to dismantling of the negative pressure enclosure.
- 12.4.15. All polyethylene sheets used to form the negative pressure enclosure and covering all openings inside the contaminated area must be folded to contain any remaining debris and double-bagged in 6-mil polyethylene bags, securely tied and disposed of as asbestos waste.



- 12.4.16. Only persons wearing protective clothing and respiratory protection are allowed to enter the contaminated area.
- 12.4.17. Unless personal monitoring is performed inside the contaminated area to determine the actual exposure to airborne asbestos fibres, and an appropriate respirator is then selected from Table 2, all persons inside the contaminated area must wear at a minimum
- (a) a full face powered air purifying respirator with HEPA cartridges while working on wetted asbestos-containing materials; or
  - (b) a full face supplied air respirator or self-contained breathing apparatus, complete with a reserve escape bottle, operating in the continuous flow mode while working on dry asbestos-containing materials.
- 12.4.18. All persons must decontaminate their protective clothing and respirators by using a vacuum cleaner equipped with a HEPA filter, or by wet wiping after completing the work and before leaving the contaminated area.
- 12.4.19. Contaminated protective clothing that will not be re-use must be disposed of as asbestos waste.
- 12.4.20. Washing facilities for hand and face must be made available to workers in the work area, and workers must wash before leaving the work area.
- 12.4.21. A glovebag may be used to remove asbestos-containing material from piping in accordance with the following procedures
- (a) the glovebag must be made of a minimum of 6-mil polyethylene and must be seamless at the bottom;
  - (b) the glovebag must be disposed of once full and may not be re-use;
  - (c) before beginning work, all insulation must be wetted with amended water;
  - (d) insulation material that has fallen from the pipe must be cleaned up by using a vacuum cleaner equipped with a HEPA filter, or by wet mopping or wet sweeping, prior to the attaching of the glovebag;
  - (e) all damaged areas of the pipe must be fully wrapped with polyethylene prior to removal;
  - (f) a glovebag properly designed for each task must be used;
  - (g) preformed insulation blocks must be cut at the joints to minimize fibre generation;
  - (h) freshly exposed insulation must be wetted frequently during work;
  - (i) contaminated tools must be removed in an inverted glove for transfer to the next glovebag;
  - (j) accumulated debris must be cleaned up prior to removal of the glovebag;
  - (k) stable elevated platforms and scaffolding must be provided where needed;
  - (l) where the insulation is not fully wrapped with polyethylene, the insulation must be banded with tape at the places where the glovebag is to be

attached in order to provide a clean surface for affixing the tape that seals the glovebag and to prevent damage to the insulation when the sealing tape is removed;

- (m) a smoke test should be performed inside the glovebag periodically to assure that the glovebag has been installed correctly;
- (n) care must be taken when metal bands, wires or metal jacketing are encountered to avoid lacerations to the hands or to the glovebag;
- (o) whenever possible, sharp edges must be folded in, and the items placed in the bottom of the bag;
- (p) the accumulation of debris and water in the glovebag must not exceed the ability of the workers to safely manipulate the glovebag;
- (q) a vacuum cleaner equipped with a HEPA filter must be used to evacuate the air from inside of the glovebag to ensure that no asbestos fibres are released during all bag opening procedures;
- (r) the ends of the insulation must be sealed with an encapsulating material when partial removal creates exposed ends;
- (s) the work area must be thoroughly decontaminated by using a vacuum cleaner equipped with a HEPA filter, or by wet wiping, wet sweeping or wet mopping, after the completion of the removal;
- (t) removal of pipe insulation from salvaged or reclaimed pipe must be done in an enclosure or room with suitable controls to prevent the release of airborne asbestos fibres to the environment; and
- (u) where outdoor work is performed, barricades must be placed around the working area.

## **12.5. Procedures for Type 3 Operations**

12.5.1. Before any Type 3 operation is performed, the contractor or employer, as the case may be, must notify the Workplace Safety and Health Branch in writing at least 5 working days before the start of work, and must include:

- (a) the name, address, and telephone number of the person giving notice;
- (b) the name, address, and telephone number of the owner of the building, or agent of the owner, where the work will be performed;
- (c) the address or municipal location of the building where the work will be performed;
- (d) the name, address, and telephone number of the company performing the work;
- (e) a description of the work to be performed;
- (f) the start date and expected completion date of the work; and
- (g) the name, address, and telephone number of the supervisor in charge of the work.

12.5.2. Eating, drinking, chewing or smoking is prohibited in the work area.

- 12.5.3. Before starting work, suitable barriers and clearly visible signs warning of the asbestos work and hazards must be set up at a distance from the work site.
- 12.5.4. Before any work is performed, all asbestos dust and contaminated debris must be removed by means of a vacuum cleaner equipped with a HEPA filter; or by wet mopping, wet sweeping or wet wiping.
- 12.5.5. Compressed air must not be used to clean up or remove dust and debris from contaminated surfaces.
- 12.5.6. Movable equipment within the work area must be cleaned with a vacuum cleaner equipped with a HEPA filter, or wet wiping, and then removed from the work site.
- 12.5.7. Fixed equipment within the work area must be cleaned with a vacuum cleaner equipped with a HEPA filter; or wet wiping, and then covered with impermeable sheeting and sealed with tape.
- 12.5.8. Where a Type 3 operation is conducted indoors where walls do not already enclose the operation, the spread of asbestos from the work area must be prevented by the construction of a negative pressure enclosure.
- 12.5.9. The negative pressure enclosure must be constructed of two layers of a minimum of 6-mil polyethylene or other suitable material, with reinforced polyethylene on the floors.
- 12.5.10. The negative pressure enclosure must have at least 4 air changes per hour and a minimum pressure differential of -0.02 inches of water gauge relative to the air outside of the enclosure must be maintained.
- 12.5.11. The negative pressure enclosure must be kept under negative pressure for the duration of the operation.
- 12.5.12. All air exhausted from the negative pressure enclosure must pass through a HEPA filter and then be vented to the outside of the building.
- 12.5.13. All mechanical ventilation in the contaminated area, except that required to provide the negative air pressure, must be disabled and a barrier of at least two layers of 6-mil polyethylene placed over all openings in the contaminated area.
- 12.5.14. All openings from the contaminated area, including windows and doors, must be adequately sealed with adhesive tape or isolated by two layers of 6-mil polyethylene sheeting.
- 12.5.15. Care must be taken to ensure that asbestos dust cannot escape at points where

pipes and conduits pass out of the working area.

- 12.5.16. All entry points to the work site must carry prominently displayed warning notices that identify an asbestos activity, and forbid entry to anyone not wearing appropriate respiratory protection and protective clothing.
- 12.5.17. A worker decontamination unit must be connected to the work site, or as close as is reasonably practicable to the work site.
- 12.5.18. The worker decontamination unit must consist of a series of interconnecting rooms including
- (a) a clean room suitable for changing into or from street clothes and for storing clean clothing and equipment;
  - (b) a shower room; and
  - (c) an equipment room suitable for changing into protective clothing and for storage of contaminated protective clothing and equipment.
- 12.5.19. The worker decontamination unit must be constructed such that overlapping curtains of polyethylene sheeting or other suitable material are fitted to each side of the entrance or exit to each room.
- 12.5.20. The worker decontamination unit must be arranged in sequence and constructed so that every person entering or leaving the work area must pass through each room of the decontamination unit.
- 12.5.21. The shower room in the worker decontamination unit
- (a) must be provided with an adequate supply of hot and cold water or water of a constant temperature that is not less than 40° Celsius or more than 50° Celsius;
  - (b) must have individual controls inside the room to regulate water flow or temperature if there is hot and cold water; and
  - (c) must be provided with clean towels.
- 12.5.22. The negative pressure enclosure must be tested on a daily basis to ensure that no asbestos will escape by the use of
- (a) a smoke generator operating inside the enclosure and no visible smoke outside the enclosure,
  - (b) a recording manometer to ensure that a minimum pressure differential of - 0.02 inches of water gauge relative to the air outside of the enclosure is being maintained at all times; or
  - (c) daily perimeter air monitoring to ensure that background concentrations of airborne asbestos fibres are not exceeded.

- 12.5.23. A competent person must inspect the work area for defects in the enclosure, barriers, and worker decontamination unit
- (a) at the beginning of each shift;
  - (b) at the end of a shift where there is no shift beginning immediately following the shift that is ending; and
  - (c) at least once each day on days when there are no shifts,
- 12.5.24. Any defect found on inspection must be remedied immediately, and no work, other than necessary repair work, shall be performed in the contaminated area until the repair work is completed.
- 12.5.25. Only persons wearing appropriate protective clothing and respiratory protection are allowed to enter the contaminated work area.
- 12.5.26. Unless personal monitoring is performed inside the contaminated work area to determine the actual exposure to airborne asbestos fibres and an appropriate respirator is then selected from Table 2, all persons inside the contaminated area must wear at a minimum
- (a) a full face powered air purifying respirator with HEPA cartridges while working on wetted asbestos-containing materials; or
  - (b) a full face supplied air respirator or self-contained breathing apparatus, complete with a reserve escape bottle, operating in the continuous flow mode while working on dry asbestos-containing materials.
- 12.5.27. When entering the work area workers must
- (a) enter the clean room of the worker decontamination unit, remove all street clothing, store it in the lockers provided and put on clean, appropriate respiratory protection and protective clothing;
  - (b) pass through the shower room to the equipment room; and
  - (c) leave the equipment room to enter the work area.
- 12.5.28. At the end of work workers must
- (a) remove gross visible contamination from their protective clothing and respiratory protection in the work area;
  - (b) enter the equipment room of the worker decontamination unit and remove all loose asbestos fibre from their respiratory protection equipment with the use of a vacuum cleaner equipped with a HEPA filter and
    - (i) where the protective clothing will be reused, remove all loose asbestos fibre from their work clothing with the use of a vacuum cleaner equipped with a HEPA filter, then remove all clothing, and store it in a suitable manner; or

- (ii) where the protective clothing is not intended to be reused, double-bag it in 6-mil polyethylene bags and dispose of it as asbestos waste;
- (c) pass into the shower room and without removing the respiratory protection, shower thoroughly;
- (d) remove and thoroughly clean the respiratory protection equipment, store it appropriately; and
- (e) pass into the clean area, dry, dress and leave through the clean area door.

12.5.29. Where it is not practical to locate the worker decontamination unit adjacent to the work area and passage through a non-contaminated zone is necessary, a two-room worker decontamination unit must be located at both the work site and at the remote worker decontamination unit, and the following procedure used to enter and exit the area

- (a) when starting work workers must
  - (i) enter the clean room of the remote worker decontamination unit, remove all street clothing, store it in the lockers provided and put on appropriate clean protective clothing,
  - (ii) pass through the shower room, and proceed to the decontamination unit attached to the work site,
  - (iii) enter the clean room of the worker decontamination unit attached to the work site, and put on appropriate respiratory protection, and
  - (iv) pass through the equipment room, and enter the work area;
- (b) at the end of work workers must
  - (i) remove visible gross contamination in the work area,
  - (ii) enter the equipment room of the worker decontamination unit attached to the work area, remove all loose asbestos fibre from respiratory protection with the use of a vacuum cleaner equipped with a HEPA filter, and
    - 1) where the protective clothing will be reused, remove all loose asbestos fibre with the use of a vacuum cleaner equipped with a HEPA filter, and then remove the protective clothing, and store it in a suitable manner, or
    - 2) where the protective clothing is not intended to be reused, double-bag it in 6-mil polyethylene bags and dispose of it as asbestos waste,
  - (iii) proceed into the clean room and put on appropriate clean protective clothing and remove the respiratory protection and store it appropriately,
  - (iv) proceed immediately to the remote worker decontamination unit,
  - (v) enter the shower area of to the remote worker decontamination unit and remove their protective clothing, and shower thoroughly, and

- (vi) pass into the clean area, dry, dress in street clothes and leave through the clean area.
- 12.5.30. Electrical circuits inside the contaminated area must be deactivated unless equipped with ground-fault circuit interrupters.
- 12.5.31. Wet handling techniques must be used to control dust on the surfaces of any asbestos-containing materials mentioned in 12.2.4, unless wetting creates a hazard or causes damage.
- 12.5.32. Dry stripping is associated with very high levels of airborne asbestos fibres and therefore should be used only
- (a) where wet methods may be injurious to workers;
  - (b) where live electrical apparatus might be made dangerous by contact with water; or
  - (c) where hot metal is to be stripped and the use of water may be damaging.
- 12.5.33. Where the surfaces mentioned above can not be wetted, a vacuum cleaner equipped with a HEPA filter, or by other means that does not create airborne asbestos fibres, must be used to control the spread of dust.
- 12.5.34. All waste containing asbestos must be cleaned up frequently and immediately upon completion of the work by wet sweeping or wet mopping and double-bagged in 6-mil polyethylene bags, and disposed of as asbestos waste.
- 12.5.35. Waste containing asbestos must be kept wet.
- 12.5.36. Where the surfaces mentioned above can not be wetted, a vacuum cleaner equipped with a HEPA filter, or other means that does not create airborne asbestos fibres, must be used to control the spread of dust.
- 12.5.37. All bags of waste asbestos and contaminated protective clothing must be removed from the work area through a waste decontamination unit connected to the negative pressure enclosure.
- 12.5.38. The waste decontamination unit must consist of a series of interconnecting rooms including
- (a) a container clean room;
  - (b) a holding room; and
  - (c) a transfer room.
- 12.5.39. The waste decontamination unit must be constructed such that overlapping curtains of polyethylene sheeting, or other suitable material, are fitted to each side of the entrance or exit to each room.

- 12.5.40. Bags of asbestos waste and contaminated protective clothing must be removed from the work area by the following procedure
- (a) remove visible contamination from the bags in the work area;
  - (b) transfer the bag into the container cleaning room;
  - (c) clean the bags with a damp cloth or sponge, place the bag into a second 6-mil polyethylene bag, seal the outer bag, and transfer the double-bagged waste to the holding room;
  - (d) worker(s) performing the activities described in (b) and (c) must wear the same protective clothing and respiratory protection as those workers in the contaminated work area;
  - (e) workers performing the activities described in (b) and (c) must exit by the worker decontamination unit;
  - (f) the double-bagged waste is then moved from the holding room to the container clean room, without entering the holding room, and then outside the waste decontamination unit by a worker who enters from the waste container clean room; and
  - (g) workers performing the activity described in (f) do not require respiratory protection or protective clothing.
- 12.5.41. Contaminated equipment, tools, and other items used in the work area must be cleaned with a damp cloth and by vacuuming with a vacuum equipped with a HEPA filter and removed from the work area through the waste decontamination unit by the same method as described for asbestos waste.
- 12.5.42. Before the negative pressure enclosure, worker decontamination unit, and waste decontamination unit may be remove or altered
- (a) the contaminated areas must be decontaminated by a combination of wet cleaning and vacuuming with vacuum cleaner equipped with a HEPA;
  - (b) there must be no visible trace of asbestos dust; and
  - (c) a final air monitoring clearance test of the area inside the negative pressure enclosure must be performed, and the concentration of airborne asbestos fibres inside the enclosure must not exceed 0.01 fibres per cubic centimeter.
- 12.5.43. All polyethylene sheets used to form the negative pressure enclosure, the worker decontamination unit(s), the waste decontamination unit and covering all openings inside the contaminated area must be folded to contain any remaining debris and double-bagged in 6-mil polyethylene bags, securely tied and disposed of as asbestos waste.
- 12.5.44. When an activity described in 12.2.4(a) is being carried out out-of-doors, the procedures described in this section, with the exception of the building and operating of a negative pressure enclosure, worker decontamination unit, and waste decontamination unit, must be followed.



## **13. Medical Surveillance**

### **13.1. General requirements**

- 13.1.1. The employer must implement a medical surveillance program, consisting of a pre-placement and biannual follow-up examination, for all workers who are
- (a) exposed to an airborne concentration of asbestos in excess of 0.1 fibre per cubic centimetre;
  - (b) exposed to asbestos for 50 hours or more per month; or
  - (c) anticipated to be exposed to asbestos for at least 100 hours in a consecutive 12 month period.
- 13.1.2. The medical examinations and procedures must be performed by or under the supervision of a licensed physician.
- 13.1.3. The medical examinations must be performed without cost to the worker and at a reasonable time and place.
- 13.1.4. The attending physician must report the development of any significant signs and symptoms and/or radiographic changes to the Chief Occupational Medical Officer of the Workplace Safety and Health Division.

### **13.2. Pre-placement examination**

- 13.2.1. The pre-placement examination must include
- (a) a screening chest radiograph;
  - (b) a lung function test, including
    - (i) FEV<sub>1</sub>,
    - (ii) FVC,
    - (iii) recording for at least 10 seconds, and
    - (iv) written trace;
  - (c) a medical examination;
  - (d) an occupational exposure history; and
  - (e) a health questionnaire.

### **13.3. Biannual follow-up examination**

- 13.3.1. The biannual follow-up examination must include
- (a) a screening chest radiograph;
  - (b) a lung function test, including
    - (i) FEV<sub>1</sub>,
    - (ii) FVC,
    - (iii) recording for at least 10 seconds, and

- (iv) written trace;
- (c) an occupational exposure history; and
- (d) a health questionnaire.

**TABLE 1**  
**Assigned Protection Factors**

Type of Respirator	Type of Facepiece			
	Half Face	Full Face	Helmet/Hood	Loose Fitting Facepiece
Air Purifying (HEPA)	10	100		
Atmosphere Supplying SCBA (Demand)*	10	100		
Airline (Demand)	10	100		
Powered Air Purifying (HEPA)	50	1000**	1000*	25
Atmosphere Supplying Airline-Pressure Demand	50	1000	--	--
Continuous Flow	50	1000	--	--
SCBA (Pressure Demand or Open/Closed Circuit)	--	***	--	--

\* SCBA of the demand-type shall not be used in IDLH situations.

\*\* Assigned Protection Factors (APF) that are listed in this table are for respirators used with high efficiency particulate air filters (HEPA), combination HEPA, and sorbent cartridges and canisters. Protection factors of 100 are to be assigned when using dust, mist or fume filters (DMF).

\*\*\* Positive-Pressure SCBA is presently regarded as providing the highest degree of protection. Limited recent simulated workplace studies have concluded that all users may not be able to achieve protection factors of 10,000. Therefore, based upon this limited data, a definitive assigned protection factor could not be assigned for positive-pressure SCBA. When potential hazardous concentrations can be estimated, an assigned protection factor of no greater than 10,000 should be used.

**TABLE 2****Maximum Use Concentration (fibres/cc)**

Type of Respirator	Type of Facepiece			
	Half Face	Full Face	Helmet/Hood	Loose Fitting Facepiece
Air Purifying (HEPA)	1	10		
Atmosphere Supplying SCBA (Demand)	1	10		
Airline (Demand)	1	10		
Powered Air Purifying (HEPA)	5	100	100	2.5
Atmosphere Supplying Airline-Pressure Demand	5	100	--	--
Continuous Flow	5	100	--	--
SCBA (Pressure Demand or Open/Closed Circuit)	--	--	--	--