

SAFE WORK PRACTICES FOR HANDLING **ASBESTOS**



WORK SAFE BC

WORKING TO MAKE A DIFFERENCE
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WORKERS' COMPENSATION BOARD OF B.C.

About WorkSafeBC

WorkSafeBC (the Workers' Compensation Board) is an independent provincial statutory agency governed by a Board of Directors. It is funded by insurance premiums paid by registered employers and by investment returns. In administering the *Workers Compensation Act*, WorkSafeBC remains separate and distinct from government; however, it is accountable to the public through government in its role of protecting and maintaining the overall well-being of the workers' compensation system.

WorkSafeBC was born out of a compromise between B.C.'s workers and employers in 1917 where workers gave up the right to sue their employers or fellow workers for injuries on the job in return for a no-fault insurance program fully paid for by employers. WorkSafeBC is committed to a safe and healthy workplace, and to providing return-to-work rehabilitation and legislated compensation benefits to workers injured as a result of their employment.

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FOR HANDLING
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Many publications are available on the WorkSafeBC web site. The Occupational Health and Safety Regulation and associated policies and guidelines, as well as excerpts and summaries of the *Workers Compensation Act*, are also available on the web site: WorkSafeBC.com.

Some publications are also available for purchase in print:

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Introduction

Asbestos is a group of naturally occurring minerals used in many products because it adds strength, heat-resistance, and chemical-resistance. Despite its many uses, asbestos is a hazardous material. If employers and workers do not take proper precautions for work around asbestos, workers may develop serious chronic health problems. To prevent these health problems, WorkSafeBC has developed requirements detailed in the Occupational Health and Safety Regulation.

Who should read this manual?

This manual is mainly for two groups: employers whose operations may require workers to handle or work in an environment with asbestos or asbestos-containing materials; and workers who work with asbestos (removing and cleaning up asbestos waste materials or, very occasionally, installing asbestos).

Employers will find information to help them comply with the Occupational Health and Safety Regulation and to ensure a safe environment for workers and others who may be affected by asbestos removal or clean-up. Workers will find information to help them work safely with asbestos products or waste materials.

This manual provides information about asbestos and assists employers in developing suitable work procedures. For company owners who are required to have asbestos abatement carried out on their premises, the sections in this manual describing procedures for low-risk, moderate-risk, and high-risk work activities will provide an idea of the scope of such a project. These sections will also give company owners, property managers, and those who are not experienced with asbestos a better idea of the type of work done by asbestos abatement contractors.

What does *regular* mean?

In some places in this manual, the term *regular* is used (for example, “regular worksite inspections,” “regular health and safety meetings”). The word is used in these cases because circumstances vary with each worksite and it is not possible to provide more specific requirements.

Some employers may find it necessary to conduct inspections every work shift (during a continuous, high-risk removal), while other employers may only need to do monthly inspections (on sites where circumstances do not

change very often). Some employers may need to hold safety meetings daily (if the workforce changes every day), while other employers may hold meetings monthly (in usual circumstances). A qualified health and safety professional must decide what *regular* means in each particular circumstance involving asbestos.

ALARA

The ALARA principle governs worker exposure to asbestos – all exposures must be kept as low as reasonably achievable. Although the Regulation specifies exposure limits and action levels, every employer must further reduce or eliminate worker exposure *if it can reasonably be done*. Where possible, asbestos-containing materials should be replaced with products that do not contain asbestos (for example, replacing asbestos gaskets with a non-asbestos material).

Improvements in technology, and new work practices and procedures will help employers to decrease worker exposures and move closer to the ultimate goal of zero exposure to designated (in other words, hazardous) substances.

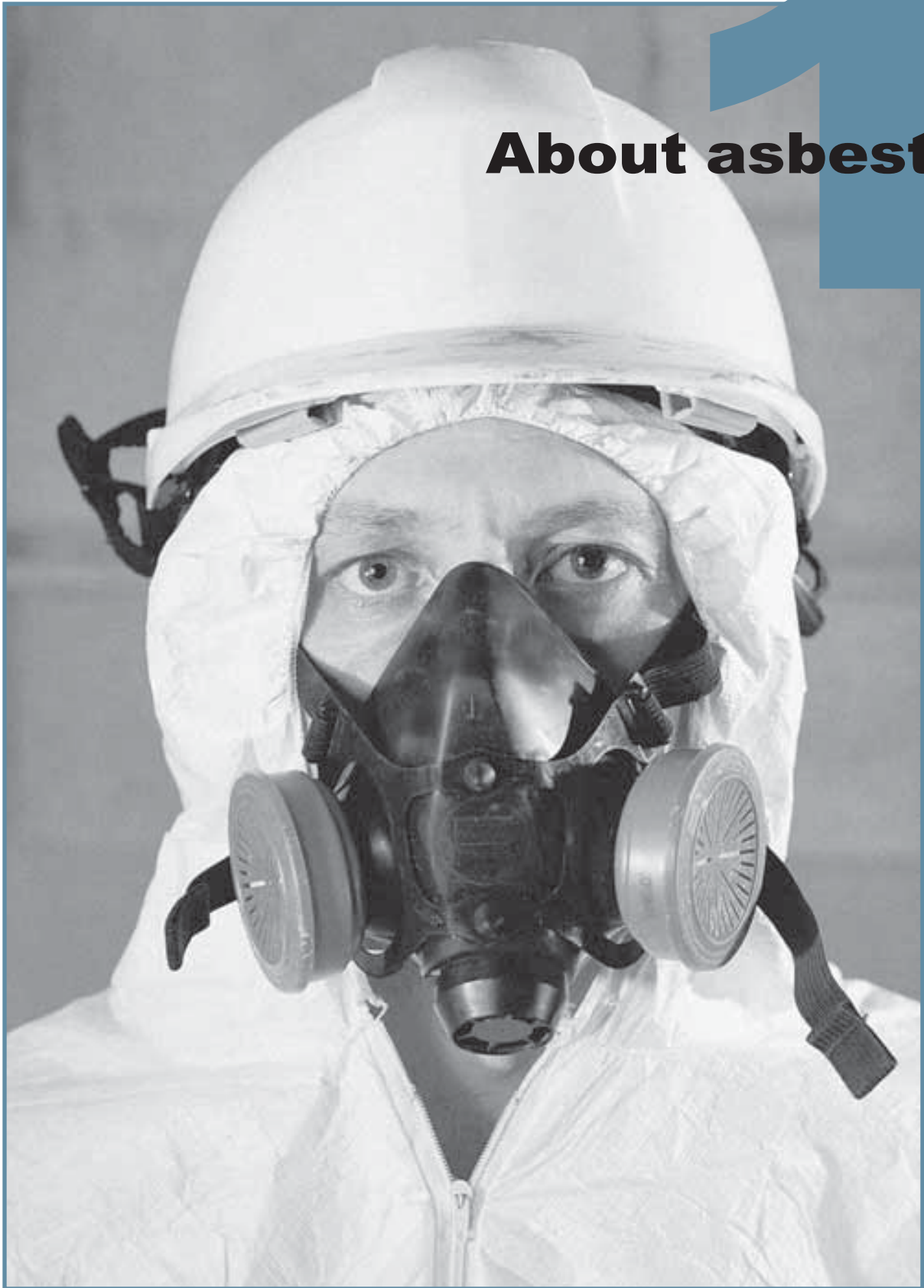
Use this manual as a starting point

This manual provides generic information that employers can use to develop their own site-specific procedures. If a worker is or may be exposed to potentially harmful levels of asbestos, the employer must develop and implement an exposure control plan meeting the requirements of Section 5.54. The employer must also ensure that a risk assessment is conducted by a qualified person on asbestos-containing material. Specific procedures must be based upon the risk assessment.

The word *must* used in this manual means that a particular safety step is required by the Occupational Health and Safety Regulation. The word *should* indicates that a particular action, although not specified in the Regulation, will improve safety in the workplace. Please note also that the word *worker* includes supervisors, managers, and workers.

WorkSafeBC has produced a number of related safe practices manuals, such as *Breathe Safer*, a respirator manual. For copies, visit WorkSafeBC.com or contact the WorkSafeBC Bookstore (see the front of this manual).

This manual is not a definitive guide and does not replace the Occupational Health and Safety Regulation. It complements the Regulation and is a tool to help industry work safely.



1

About asbestos

What is asbestos?

Asbestos is the term used to describe a group of naturally occurring fibrous mineral silicates. Three types of asbestos have been used commercially:

Chrysotile (white asbestos) is the most commonly used form of asbestos.

Amosite (brown asbestos) has been used in sprayed coatings, in heat insulation products, and in asbestos cement products where greater structural strength is required.

Crocidolite (blue asbestos) is no longer used in B.C. and is rarely found. Before 1973 it was commonly used in sprayed coatings on structural steelwork for fire protection and for heat or noise insulation. It was also used in gasket materials and asbestos cement pipe.

Other types of asbestos are actinolite, anthophyllite, and tremolite. These usually have had little commercial value or use.

Defining asbestos-containing material

The Occupational Health and Safety Regulation defines asbestos-containing material as containing 1% or more asbestos by weight at the time of manufacture, or which contains 1% or more asbestos as determined by polarized light microscopy, electron microscopy, or gravimetric analysis (examples include NIOSH Method 9002, EPA Method 600/R-93-116).

Some materials (such as vermiculite) may contain less than 1% asbestos, by weight or volume, and still pose a risk to workers if improperly handled. The analytical method used for these materials should be able to determine the level of asbestos to below 1% (for example NIOSH Method 9000, EPA Method 600IR-04/004).

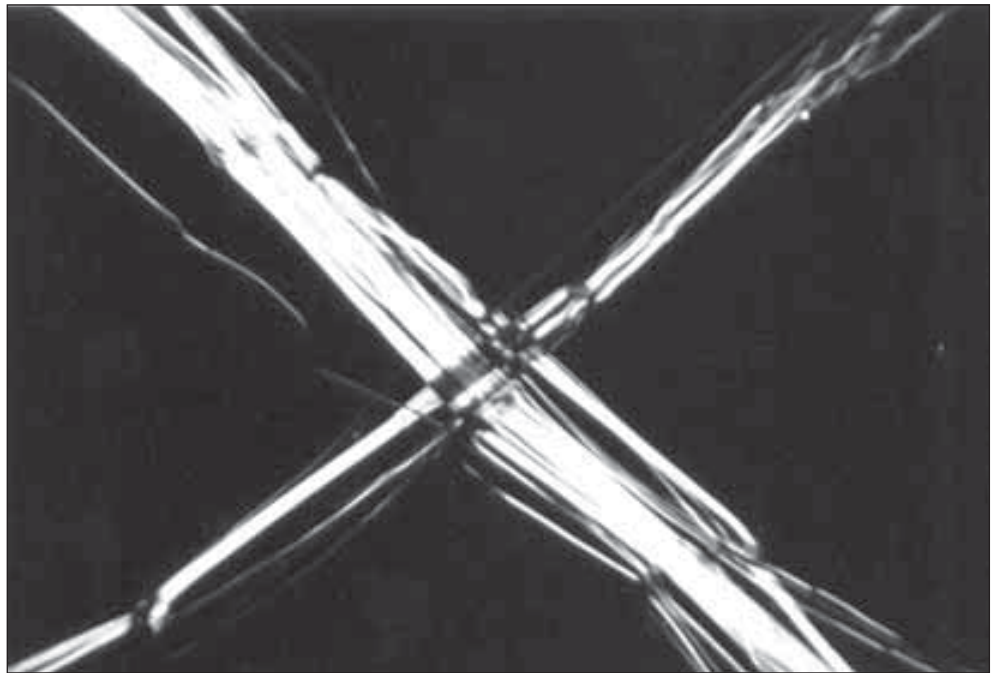
Health hazards of asbestos

Asbestos is a hazardous material. Its fibres are extremely fine and can remain suspended in the air for hours; workers exposed to asbestos-contaminated air can inhale the fibres. If handled without caution, asbestos may cause serious chronic health problems.

Asbestosis is a chronic lung disease resulting from prolonged exposure to asbestos dust. The fibres gradually cause the lung to become scarred and stiff, making breathing difficult.

Lung cancer may be caused by asbestos fibres in the lung. No one knows exactly how asbestos causes lung cancer. Researchers have shown, however, that the combination of smoking tobacco and inhaling asbestos fibres greatly increases the risk of lung cancer.

Mesothelioma is a rare but very malignant form of cancer affecting the lining of the chest or the abdominal cavity. There is a strong link between asbestos exposure and mesothelioma.



Asbestos fibres magnified many times.

Industry terms

This manual uses some words and phrases specific to the asbestos industry.

Asbestos-containing materials

Any manufactured articles or other materials that contain 1% or more asbestos by weight at the time of manufacture.

Asbestos management program

A workplace program that includes inventory and identification of asbestos-containing materials, hazard control, exposure control, risk assessment, and worker education and training. Program components are detailed further on page 14.

Containment

An isolation system designed to effectively contain asbestos fibres within a designated work area where asbestos-containing materials are handled, removed, encapsulated, or enclosed. Glove bags are a type of containment.

Encapsulation

A process in which a material containing asbestos is treated with a product that penetrates the material and prevents the fibres from being released.

Enclosure

A physical barrier made of materials such as gyproc (gypsum wallboard), plywood, metal, or polyethylene (poly) sheeting used to separate a friable material containing asbestos from the habitable environment.

Friable materials

Materials that, when dry, can be easily crumbled or powdered by hand. This term may also refer to materials that are already crumbled and powdered. Even some non-friable materials, such as vinyl-asbestos floor tile or asbestos cement products have the potential to become friable if handled in an aggressive manner (for example, sanded with a power sander) or dropped from a height.

Friable materials containing asbestos may appear:

- Fluffy or spongy (usually applied by spraying)
- Irregular, with a soft surface (usually applied by spraying)
- Textured, dense, with a fairly firm surface (usually applied by trowelling)
- Chalky, with a firm surface in preformed, fitted sections (placed around pipes as an insulation)

When used for respiratory protection, HEPA filters are now referred to as *NIOSH 100 series filters*, or “100” filters for short.

HEPA filter

Defined in the Occupational Health and Safety Regulation as a high efficiency particulate air filter that is at least 99.97% efficient in collecting an aerosol particle 0.3 micrometre in size. Any HEPA filters used for asbestos applications must be at least 99.97% efficient. When used for respiratory protection, HEPA filters are now referred to as *NIOSH 100 series filters*, or “100” filters for short.

Negative air unit

A cabinet, usually portable, that contains a fan and one or more HEPA filters. Negative air units are used to exhaust air from an enclosure, reducing the risk of contaminated air escaping into the workplace through a leak in the enclosure. Negative air unit efficiency must be tested using a suitable indicator chemical, such as dioctyl phthalate (DOP) or polyalphaolefin (PAO) aerosols.

NIOSH 100 series filter

A high efficiency particulate air (HEPA) filter used for respiratory protection. These HEPA filters, called “100” filters for short, are at least 99.97% efficient in collecting an aerosol particle 0.3 micrometre in size, and carry an N, R, or P designation that specifies where and for how long the filter can be used.

| Filter designation | For use in . . . | Time-use limitations |
|---------------------------|--|--|
| N = No oil | Oil-free atmospheres only (atmospheres containing no oil mist) | May be re-used only after considering cleanliness, filter damage, and increased breathing resistance |
| R = Oil-resistant | Oily atmospheres | A single shift only (or eight hours of continuous or intermittent use) |
| P = Oil-proof | Oily atmospheres | Check the manufacturer’s specified time-use limitations for each P-type filter |

Qualified person

A qualified person is an occupational health and safety professional with experience in the practice of occupational hygiene as it relates to asbestos management. Persons performing risk assessments and work activity classifications (moderate or high risk) must be certified and educated as follows, in order:

1. Certified Industrial Hygienist (CIH) or Registered Occupational Hygienist (ROH) *with education specific to asbestos management and work procedures*
2. Certified Safety Professional (CSP), Canadian Registered Safety Professional (CRSP), or a Professional Engineer, with education specific to asbestos management and work procedures
3. Other combinations of education, training, and experience specific to asbestos management and work procedures

The following activities should also be conducted by a qualified person:

- Preparation of asbestos work procedures
- Collection of samples of materials suspected of containing asbestos
- Collection and interpretation of air samples to determine the concentration of asbestos fibres in the air
- Conduction of regular worksite inspections for high-risk work
- Conduction of post-abatement clearance inspections

Respirator

A device worn to prevent the inhalation of hazardous airborne substances. There are two basic types of respirators: air-purifying and air-supplying. So-called “single-use” or “disposable” respirators are not acceptable for working with asbestos.

Risk of exposure to asbestos fibres

The likelihood of being exposed to airborne asbestos fibres when using or handling materials containing asbestos, or being in proximity to such work. There is a much greater risk of exposure to asbestos fibres when handling friable asbestos materials than when handling hard, well-bonded asbestos materials such as vinyl-asbestos floor tile or asbestos cement products.

For more information on respirators and respirator programs, see the WorkSafeBC manual *Breathe Safer*.

2 Employer's responsibilities



Health and safety programs

According to the Occupational Health and Safety Regulation, employers must develop and implement an effective health and safety program for their workplace, and train workers and supervisors in relevant sections of the program.

A health and safety program helps ensure a safe, productive workplace by describing specific tasks and responsibilities for many different aspects of an employer's operation. An effective health and safety program for any workplace in which asbestos is handled or present must include:

- A written occupational health and safety policy that:
 - States the employer's commitment to health and safety
 - States the program's objectives
 - Defines the responsibilities and roles of the employer, supervisors, and workers
- Written safe work procedures and emergency response procedures
- Training for supervisors and workers
- Regular worksite inspections (the definition of "regular" depends on the conditions and number of shifts for each individual site)
- Regular health and safety meetings
- Accident investigation
- Records and statistics
- A joint health and safety committee or representative, if required

It is important to remember that every worksite is different. Although these general elements may be common to health and safety programs across the province, employers cannot expect to copy a program from another worksite. Instead, they must develop and implement a health and safety program unique to their own operation.

Asbestos management programs

An effective asbestos management program consists of several elements. Employers, building owners, or property managers must:

- Keep an up-to-date inventory of all asbestos-containing materials in the workplace
- Ensure that all asbestos-containing materials are clearly identified
- Conduct a risk assessment of the potential for exposure to any of the asbestos-containing materials (should only be conducted by a qualified person)
- Develop safe work procedures, including the correct use of personal protective equipment, for workers who may work near asbestos-containing materials (should only be conducted by a qualified person)
- Instruct all workers who could be exposed in all aspects of the asbestos management program
- Make manufacturers' manuals and instructions available to workers
- Prepare written work procedures specific to each job site and make them available to all workers required to follow the procedures
- Ensure that work is carried out under the supervision of experienced and qualified supervisors (should only be conducted by a qualified person)
- Keep accurate and complete records regarding asbestos management

In addition to implementing an asbestos management program, employers or building owners must ensure that all friable asbestos-containing materials are either removed from the workplace (using procedures similar to those outlined in this manual), encapsulated, or enclosed. Asbestos-containing materials that are hidden from view but still accessible (such as materials above a T-bar ceiling) are not considered to be enclosed.

Written safe work procedures

A health and safety program is an overall program that describes, in writing, a number of individual safe work procedures and specific smaller programs. Written safe work procedures and programs tell workers how to perform their duties safely. Employers must ensure that all workers understand these procedures well enough to perform their duties competently. Employers and workers must jointly review all written safe work and emergency procedures at the start of each new job.

Exposure control plan

Written exposure control plans explain the work procedures and other controls that will be used to reduce workers' risk of exposure to asbestos. Exposure control plans must be used if workers are or may be exposed to airborne asbestos fibres exceeding one-half of the current allowable occupational exposure limit or time-weighted average (Table 5-4 in the Occupational Health and Safety Regulation).

Exposure control plans must detail steps to eliminate risk or to control and reduce risk by either:

- Substituting with safer materials, where feasible
or
- Using engineering controls, administrative controls, or personal protective equipment

Strict adherence to the ALARA principle as well as exposure limits and appropriate respiratory and skin protection are essential elements of exposure control plans. Employers must also ensure that qualified persons perform a formal risk assessment to determine which workers may be exposed to asbestos and the extent of any exposure. Risk assessment applies not only to the asbestos itself, but also to the methods used to remove or handle it. For more information about the elements of exposure control plans, see Section 5.54 of the Regulation.

For more detailed information on controlling exposure by using respiratory, eye, and skin protection, see Part 4 of this manual, "Personal protective equipment."

Risk assessment

A risk assessment must be conducted prior to the disturbance, repair, or removal of asbestos-containing materials. The purpose is to gauge the location and condition of the material, prior to the work, as well as any other potential hazards that might affect the workers. Risk assessments would include:

- Type of asbestos present and percentage
- Friability of the material
- Condition of the material (good, poor, debris present, etc.)
- Potential for worker exposure (e.g., any air monitoring required)
- Potential for occupant exposure
- Other potential hazards present (biological, chemical, electrical, confined spaces, heat or cold, etc.)
- Risk rating or classification (and rationale)
- Personal protective equipment to be used
- How the work area will be isolated from any occupants
- Person completing the risk assessment, signature, date, and phone number

The risk assessment should only be conducted by a qualified person.

Respiratory protection program (personal protective equipment)

Providing protective equipment and ensuring that workers use it are essential to any effective occupational health and safety program. Employers must develop and implement a written respiratory protection program that is acceptable to WorkSafeBC and that meets the requirements of the Regulation. For more information on personal protective equipment and clothing, see Part 8 of the Regulation.

Employers must ensure that workers are trained in proper use and care of respirators. Employers must also provide fit-testing (using a WorkSafeBC-accepted protocol, such as described in *CSA Standard Z94.4-02*) when a worker is first fitted with a respirator, and once a year thereafter.

Fit-test kits are available from respirator suppliers. One type of test, the qualitative fit-test, determines if the worker can detect any amount of a test compound leaking through the respirator. Employers must keep records of these tests and the fit-test program.

For more detailed information on respiratory protection, see “Respiratory protection,” page 50. You can also find more information on respiratory protection programs in other WorkSafeBC safe practices guides, available through WorkSafeBC.com or through the WorkSafeBC Bookstore (see the front of this manual).

Written emergency procedures

Employers must conduct a risk assessment and prepare for emergencies. Written emergency procedures must describe what to do in the event of any likely incident (for example, what to do if a worker’s air supply fails, how to avoid contamination if a fire breaks out, how to deal with an injury). For more information on written emergency procedures, see “Preparing for emergencies,” page 57.

Safe handling of asbestos: Where to look in the Regulation

Employers can include information about the safe handling of asbestos in several elements of their health and safety program. For asbestos-specific requirements, see Sections 6.1–6.32. Other key elements (and their location in the Regulation) are:

- Exposure control (Part 5)
- Respiratory protection (Part 8)
- Emergency preparedness (Parts 4–6)

Training, instruction, and supervision

Although workers may have special certification or other external training, employers are responsible for providing them with thorough, site-specific training and continued instruction in the programs and procedures outlined above. Written safe work procedures must form the basis of an employer's ongoing training program. Employers must also document training and instruction and ensure effective supervision on all worksites.

Training should be conducted by a qualified person (see page 9).

Employers must ensure:

- Workers are trained and instructed in the safe handling, use, and disposal of any substances used in working with asbestos
- Workers are provided with Material Safety Data Sheets (MSDSs) for these substances
- Workers are informed of the health hazards associated with exposure to asbestos fibres and other materials used in the workplace
- Workers can demonstrate competency in doing their work according to the safe work procedures

Thermal stress

The human body naturally maintains temperatures between 36°C and 38°C. *Thermal stress* can occur when the body's core temperature rises above or falls below this range.

Any worker who shows or reports signs or symptoms of thermal stress (heat or cold) must be removed from further exposure and examined by either a physician or a Level 2 or 3 first aid attendant. Employers must ensure adequate access to this level of care.

Heat stress

When a person's body temperature rises above the normal range, the body will try to get rid of the excess heat. However, if the body continues to gain heat faster than it can get rid of it, the body temperature will increase and the person will experience *heat stress*. Health problems that result from heat stress are known as *heat-related disorders*.

The tight-fitting, impervious nature of protective clothing used when working with asbestos may make workers susceptible to heat stress and heat-related disorders such as heat stroke or heat exhaustion.

On all jobs, employers must assess the risk of workers being exposed to conditions that exceed the heat action levels or the clothing correction values specified in Section 7.28 of the Regulation. If the risk assessment indicates the possibility of workers being exposed to unacceptable heat action levels, employers must implement an exposure control plan. The plan must include measuring the thermal index, keeping records of the results, and ensuring that workers are informed of the results. Employers must also ensure that workers know how to recognize the signs and symptoms of heat-related disorders and how to prevent them.

Cold stress

Similar requirements exist when a worker may be exposed to conditions that could cause the body's core temperature to drop below 36°C, which can result in *cold stress*. Health problems that can result from cold stress include hypothermia and cold-related injuries such as frostbite.

The requirements for risk assessment, implementation of an exposure control plan, and instruction and training of workers are the same as for heat stress. In addition, if the thermal environment has an equivalent chill temperature below -7°C, a heated shelter must be provided. This may be necessary when workers are working on the exterior of a building or in an unheated building during winter.

Inspection and testing of equipment

Employers must ensure:

- Equipment is inspected before being used in the work process
- HEPA filters in vacuum cleaners or negative air systems are assessed using a suitable indicator chemical (e.g., DOP or PAO)

Record keeping

Work that involves the handling of asbestos-containing materials can range from major (a large friable-asbestos removal project) to minor (the replacement of a non-friable gasket). But whatever the size of the project, employers need to keep records of the actions taken to prevent exposure to asbestos fibres. Employers must:

- Keep records of asbestos inventories, risk assessments, inspections, and air-monitoring results for at least 10 years
- Keep records of corrective actions, Notices of Project (NOPs), and training and instruction of workers for at least 3 years

Note: Despite the 10-year and 3-year time limits identified in the Occupational Health and Safety Regulation, employers are advised to keep all records for as long as the company exists because a WorkSafeBC officer may ask to see records at any time. If employers cannot produce records proving, for example, that they have trained workers or conducted risk assessments in the past, they may have to retrain workers or redo risk assessments.

Notice of Project (NOP)

The owner or prime contractor must ensure that WorkSafeBC receives a Notice of Project (NOP) at least 24 hours before starting any of the construction projects outlined in Section 20.2 (1) (c) of the Regulation. A copy of the completed form must be posted at the worksite.

If the work needs to be done immediately, as in the case of emergency repair or clean-up, work may start immediately, but the NOP must be filed as soon after as possible. Every reasonable effort must be made to contact the local WorkSafeBC office if the NOP cannot be filed before the work starts.

A NOP must be filed if the construction activity includes:

- The removal, encapsulation, or enclosure of friable asbestos materials or
- The demolition, dismantling, or repair of any part of a building or structure in which materials containing asbestos have been used, or in which asbestos products have been manufactured

The NOP must include:

- The name and address of the owner and the prime contractor (if any)
- The municipal address of the project
- The starting date and anticipated duration of the project
- The estimated total cost of labour and materials for the project
- Detailed written work procedures, specific to the task and to the worksite, that will be used to minimize the risk of asbestos exposure to workers

A copy of the asbestos risk assessment should be included with the NOP.

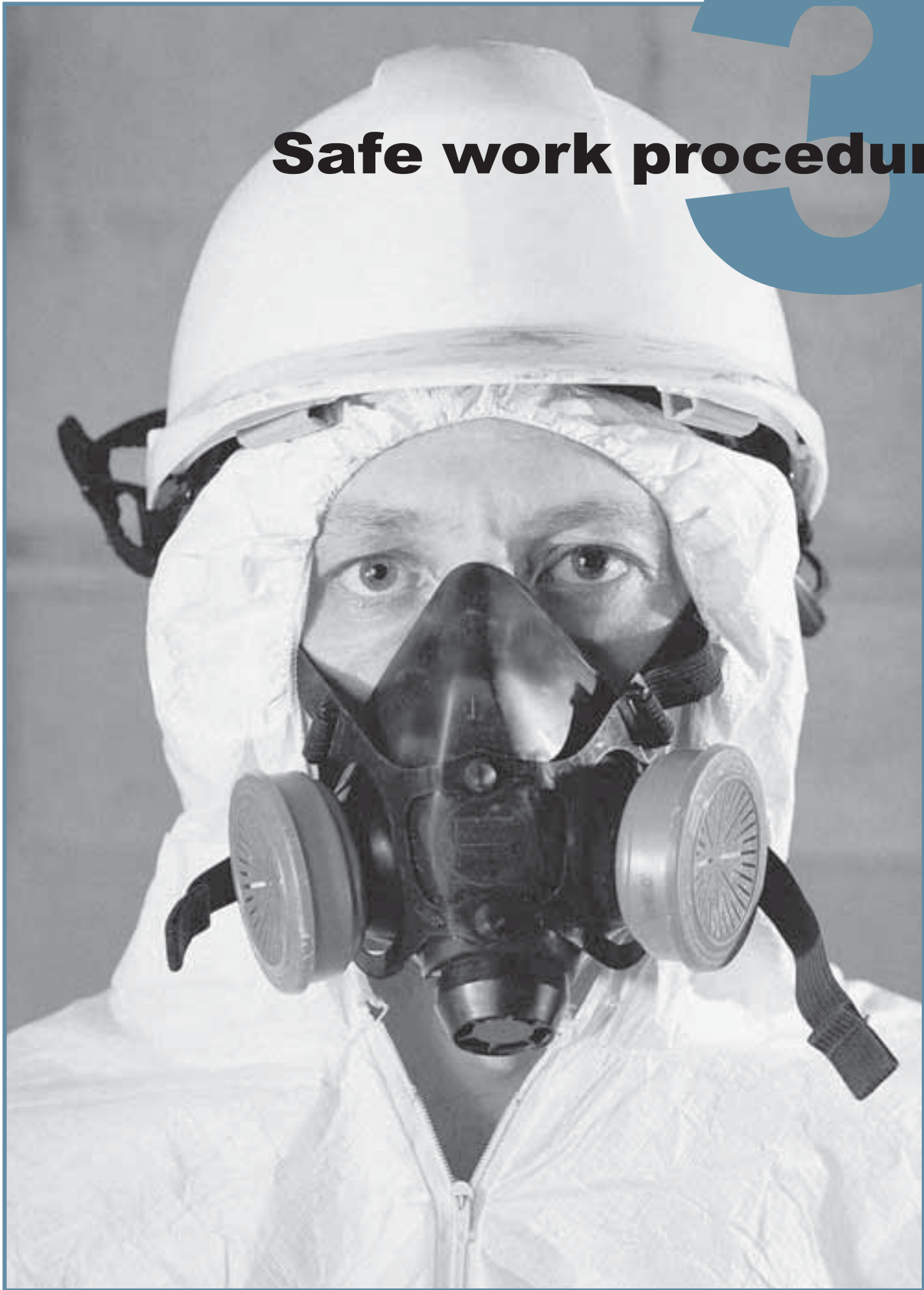
Contracting out projects

An employer or the owner or property manager of a firm or building may contract out a project involving asbestos-containing materials. When a project involves the services of two or more contractors and their workers, the prime contractor (or owner if there is no prime contractor) must coordinate the work activities of subcontractors on the worksite if those work activities may affect workers of more than one company. The prime contractor or owner must ensure:

- There is a written agreement between the prime contractor or owner and the other contractors that clearly establishes the responsibilities for the health and safety of workers, instruction and training of workers, supervision of work on the project, and any necessary air sampling and testing
- The project is adequately planned, and all contractors know and understand their responsibilities
- Each contractor complies with the requirements of the Occupational Health and Safety Regulation as they apply to the project
- The work of contractors is carried out in such a way that it does not cause undue risk of injury or occupational disease to workers who are not involved in the project but are working nearby or are affected by the project

Safe work procedures

3



Low-risk work activities

Low-risk work activities include working adjacent to undisturbed asbestos-containing materials. Another example is moving asbestos-containing waste material that is contained within a cleaned, properly sealed bag and then double-bagged (as described on page 40.) Workers involved in such activities should have some knowledge of the hazards of asbestos and the location of the materials.

Employers must clearly identify all locations of asbestos-containing materials, and ensure that all workers have been instructed in any work procedure restrictions needed to prevent contact with asbestos-containing materials.

All decisions about what constitutes a low-risk, moderate-risk, or high-risk work activity must be made by a *qualified person* through a proper risk assessment. For a definition of qualified person, see page 9.

Procedures for moderate-risk work activities

Moderate-risk work activities require specific procedures to ensure the safety of workers and others who may be affected by the activities.

Increased risks require upgraded controls

If the risk assessment performed by a qualified person identifies increased risks in activities normally considered moderate-risk, employers must upgrade controls to effectively address these risks. This may include implementing high-risk controls.

Moderate-risk activities

Activities that carry a moderate risk of exposure to airborne asbestos fibres include:

- Using hand tools to cut, shape, drill, grind, or remove non-friable manufactured products containing asbestos, e.g., asbestos cement pipe
- Drilling or cutting (with wetting agents, or with local exhaust ventilation) through non-friable asbestos-containing materials
- Backing mounting screws out of asbestos cement products and removing the boards or tiles intact
- Buffing floor tiles with a coarse disc
- Collecting asbestos samples for laboratory analysis (see “Collecting bulk samples of materials suspected of containing asbestos,” page 43)
- Removing any part of a false ceiling to gain access to a work area (for example, during inspection) when friable asbestos-containing materials are, or are likely to be, lying on the surface of the false ceiling
- Removing drywall materials where joint-filling materials containing asbestos have been used
- Removing vinyl-asbestos floor coverings or other non-friable materials where the procedures do not create any friable waste
- Removing an entire piece of equipment or pipe with the asbestos-containing material remaining effectively intact (“wrap and cut” procedure)
- Demolishing a block wall (of cement, for instance) that has asbestos debris in its cavity, provided the asbestos concentration in the debris is less than 1%
- Dismantling a treated enclosure at completion of an asbestos removal project

-
- Setting up and removing a glove-bag apparatus for the removal of pipe insulation
 - Using a prefabricated glove bag to remove asbestos insulation from piping systems

Note: While the area outside a glove bag is considered a moderate-risk area, the work activity inside a glove bag is considered high-risk; if a glove bag is torn or punctured, the risk level *outside* the bag automatically increases and the site-specific emergency procedures must be implemented.

Clean-up activities that carry a moderate risk of exposure to airborne asbestos fibres include:

- Using a HEPA-filter vacuum to clean ceiling tiles or light fixtures with light to moderate contamination
- Using a HEPA-filter vacuum to clean an area before setting up an enclosure

If any work process causes non-friable materials to become friable, the work activity classification immediately changes to high-risk, unless previously addressed in a risk assessment.

Emergency spill clean-up

Cleaning up an asbestos spill may require a high level of control. Because of the urgent nature of spill clean-up, however, the spill area should be isolated and cleaned immediately.

These procedures provide an outline only, and are not specific to any one workplace. Each individual owner, employer, or contractor must adapt the procedures to provide specific work instructions for each individual job.

Moderate-risk procedures

Anyone involved in any moderate-risk work activity must follow written work procedures similar to those described here.

To ensure that anyone in or near the work area is not exposed to airborne asbestos fibres, the following must be done:

1. Clearly mark the designated work area boundary by placing barricades, fences, or similar structures around the work area.
2. Place signs around the work area warning people not to enter the work area unless authorized to do so.
3. Wear appropriate protective clothing:
 - Clothing material must *resist* penetration by asbestos fibres. Clothing must be *impervious* to penetration by asbestos fibres if workers are permitted to wear street clothing underneath.
 - Clothing must cover the body and fit snugly at the neck, wrists, and ankles.
 - Clothing must include head covering and laceless rubber boots that are acceptable for the specific worksite conditions.
 - Immediately repair or replace torn clothing.
4. Wear a respirator fitted with a “100” (HEPA) filter. For more information about respirators, see “Respiratory protection,” page 50.
5. Do not use compressed air to clean up or remove dust or materials from work surfaces or clothing.
6. Use polyethylene (poly) drop sheets and seal windows, doorways, and other openings to prevent the spread of asbestos dust to other work areas.
7. Before starting any work that is likely to disturb asbestos-containing materials on the surfaces of anything in the work area, clean up the materials by damp-wiping or using a vacuum cleaner equipped with a HEPA-filtered exhaust.
8. During the work, clean up dust and waste (wetted if possible) using a vacuum cleaner equipped with a HEPA-filtered exhaust, or by wet-sweeping or mopping.

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9. Immediately upon finishing the work, complete the following tasks:
 - Wet drop sheets and barriers.
 - Fold them to contain any remaining dust.
 - Bag or place them in a sealable container.
 - Dispose of them as asbestos waste.
 10. Before leaving the work area, complete the following tasks:
 - Clean protective equipment and clothing by damp-wiping or using a vacuum cleaner equipped with a HEPA-filtered exhaust before taking them outside the contaminated work area.
 - Leave any protective clothing worn in the work area in the designated storage area or facility for cleaning, or place disposable protective clothing in a sealable container and dispose of it as asbestos waste.
 - Launder non-disposable clothing as described on page 40.
 11. Place asbestos waste in a sealable container and label the container to identify its contents, hazard(s), and the necessary precautions for handling the waste materials. To prevent any interference with the work activity, do not allow containers of asbestos waste to accumulate in the work area. Remove containers from the work area at the end of each work shift, if not more often, and ensure that the containers remain under effective control if they are stored at the worksite before being disposed of.
 12. Before removing asbestos waste containers from the work area, clean their external surfaces by wiping with a damp cloth or using a vacuum cleaner equipped with a HEPA-filtered exhaust. Double-bagging is a good practice and an industry standard.

Procedures for high-risk work activities

High-risk work activities require specific procedures to ensure the safety of workers and others who may be affected by the activities.

Increased risks require upgraded controls

If the risk assessment performed by a qualified person identifies increased risks in activities normally considered moderate-risk, employers must upgrade controls to effectively address these risks. This may include implementing some elements of high-risk controls.

All decisions about what constitutes a low-risk, moderate-risk, or high-risk work activity must be made by a *qualified person*. For a definition of *qualified person*, see page 9.

High-risk activities

Activities that carry a high risk of exposure to airborne asbestos fibres include:

- Removing, encapsulating, or enclosing friable asbestos-containing materials during the repair, alteration, maintenance, demolition, or dismantling of any part of a building, structure, machine, or piece of equipment
- Cleaning, maintaining, or removing air-handling equipment in buildings where sprayed fireproofing materials containing asbestos have been applied to the airways or ventilation ducts or have been used as spray-on insulation
- Repairing, altering, or dismantling any part of a boiler, furnace, kiln, or similar device in which insulating materials containing asbestos have been used or applied
- Removing non-friable materials in circumstances where the materials will be damaged, resulting in friable asbestos waste or a significant release of fibres

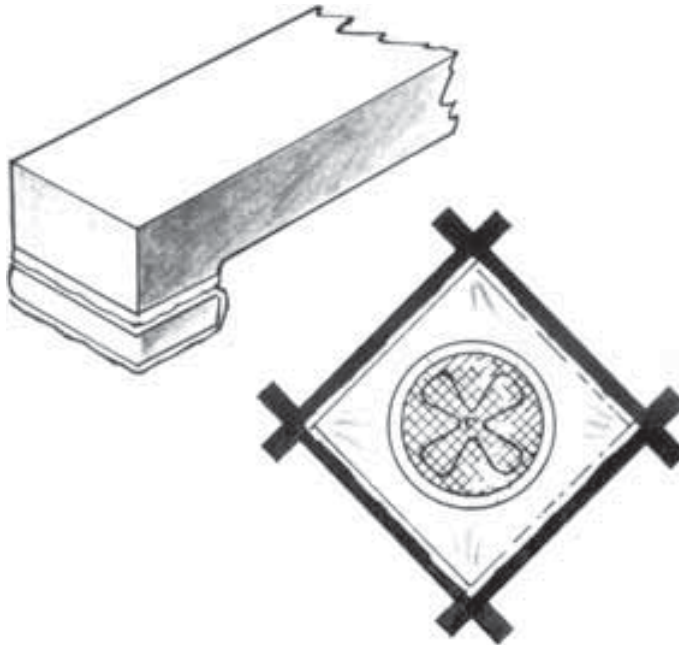
Anyone involved in any high-risk work activity must follow written work procedures similar to those described in the following sections.

Procedure: Isolating the asbestos work area

To ensure that the designated asbestos work area is properly isolated, the following must be done:

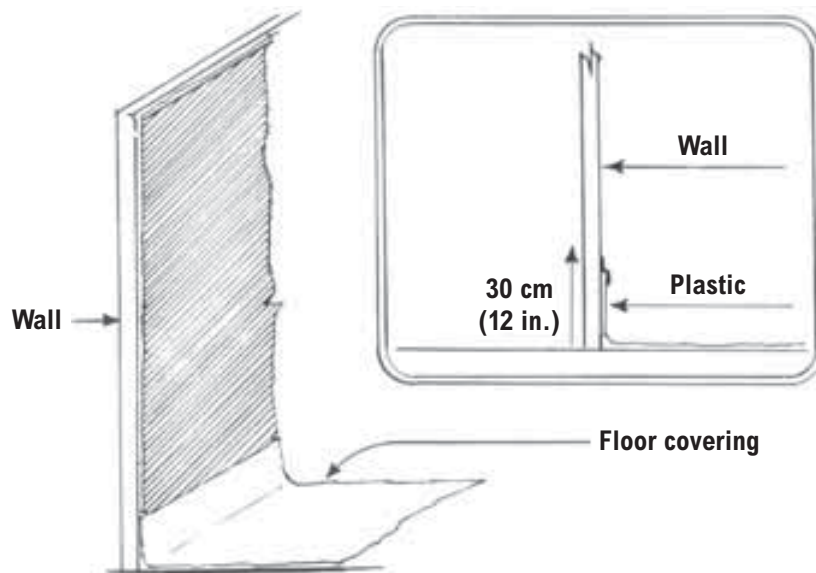
1. Place signs around the work area warning people not to enter the work area unless authorized to do so.
2. Form an airtight containment by enclosing the entire work area to prevent the escape of asbestos fibres. The most common way to do this is by enclosing the work area with polyethylene (poly) sheeting – at least 0.15 mm (0.006 in., or 6 mil) thick – or a similar impervious material, held in place with duct tape.
 - Where such a containment is impracticable, specify the alternative work procedures that will be used to minimize the risk of asbestos exposure to workers.
 - When removing pipe insulation, workers may use a glove-bag apparatus as a containment system to isolate the work operations causing asbestos fibre release.
3. Maintain a lower air pressure (negative pressure) in the containment than in the surrounding area so that air always flows into the contaminated area from the clean outside areas.
 - Maintain negative pressure in the containment until site decontamination work is complete and visual inspection and air monitoring (as described in step 2 of “Inspecting and monitoring the work environment,” page 41) confirm that fibre levels are low enough to permit dismantling of the containment.
 - Discharge exhaust air to the outdoors through HEPA filter(s).
 - Ensure that the air flow pattern in the work area is such that the decontamination facility’s clean room and shower room are safe for workers not wearing respirators.
4. Seal off stairways, elevators, and any other openings with poly sheeting and tape.
5. Shut down and lock out the air heating and ventilation system to the containment area and seal the ducts with poly sheeting.

The high-risk procedures described in these sections provide an outline only, and are not specific to any one workplace. Each individual owner, employer, or contractor must adapt the procedures to provide specific work instructions for each individual job.



Seal heating ducts and outside vents with poly sheeting to ensure that the asbestos work area is properly isolated.

6. Clean and completely cover or enclose with poly sheeting all non-removable fixtures, such as lockers, large machinery, and equipment. Clean all fixtures and equipment that can be reasonably removed by damp-wiping or using a vacuum cleaner equipped with a HEPA-filtered exhaust, and remove them from the containment area.
7. Cover the floor with poly sheeting. Fasten the poly sheeting at least 30 cm (12 in.) up the wall.



Make sure that the poly sheeting covering the floor extends at least 30 cm (12 in.) up the wall.

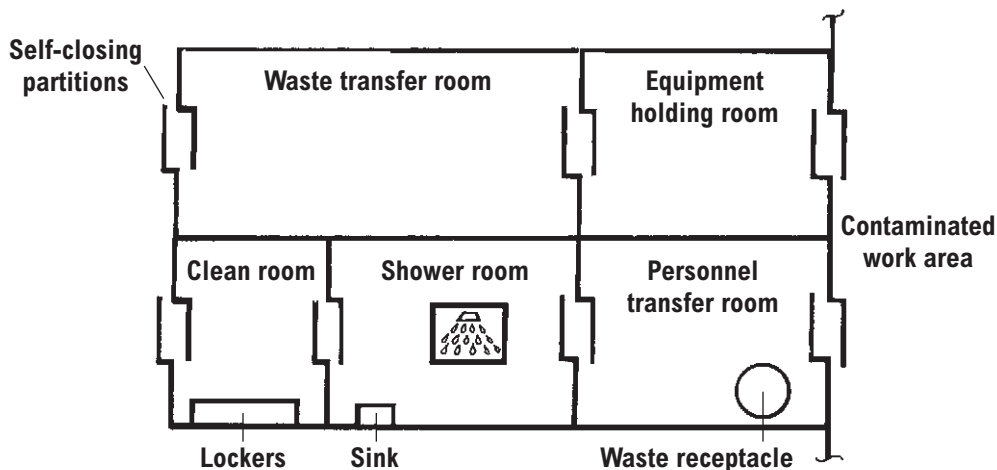
8. Whenever there is a danger of electrical shock, such as during wet removal or encapsulation of friable asbestos-containing materials, take appropriate precautions. Use power sources with ground fault circuit interrupters (GFCIs) or equivalent protection against electrical shock for all electrical equipment operated inside the containment. As required, physically lock out all existing electrical circuits or lighting to prevent electric shock or unintentional start-up of electrical equipment inside the containment.

If existing lighting is to be used, clearly specify this in the work procedures submitted with the NOP and include additional safety precautions that will be used to keep moisture away from the live contacts.

9. Inspect the containment isolating the asbestos work area at least daily; the containment must be inspected during every work shift for gaps, leaks, or breaks. Correct any defects immediately.

Procedure: Decontaminating workers

The designated work area must include a decontamination facility that enables workers to leave the area without carrying any asbestos fibres on their bodies or their clothing.



A decontamination facility consists of a shower room and a series of connected rooms separated by air locks.

To ensure that proper decontamination is achieved, workers must follow these steps:

Entering the contaminated work area

1. Enter the clean room, remove all street clothes and personal belongings, leave them in the clean room, and change into protective clothing (disposable coveralls).
2. Put on a respirator and ensure that it fits and works properly.
3. Pass through the shower room into the personnel transfer room and finish putting on any other personal protective equipment required for the work, such as footwear or safety headgear.
4. Enter the contaminated work area to perform the work activities.

Note: Protective clothing worn throughout the job may be stored and put on in the personnel transfer room, as long as acceptable laundering facilities exist and appropriate time intervals for cleaning protective work clothing are established.

Leaving the contaminated work area

1. Before entering the personnel transfer room, remove all gross asbestos materials using wet wipe-down procedures or a vacuum cleaner equipped with a HEPA-filtered exhaust.
2. In the personnel transfer room, remove all protective clothing and equipment except the respirator. Place disposable protective clothing and any waste materials in poly bags for disposal.
3. Enter the shower room and shower while wearing the respirator. After having an initial shower and thoroughly rinsing the respirator facepiece and its harness, remove the respirator and finish showering. (An adequate supply of tempered water and soap must be provided.)
4. Enter the clean room and dress in street clothes. Thoroughly clean and disinfect the respirator, then store it in the clean room until its next use.

Note: Wet filters are not normally reused (see the respirator's manufacturer's instructions). Filters may be disposed of in the work area or taped and taken out of the work area for disposal.

5. Keep hand tools and supplies in the equipment holding room. Use this room as well when transferring asbestos waste containers or any equipment that has been decontaminated to the waste transfer room.

Note: Partitions between rooms in the decontamination facility (see the illustration on page 36) must be self-closing so that each room can function as an air lock. These partitions are normally constructed of overlapping sheets of heavyweight poly sheeting suspended to form a curtain. Workers must not open more than one such partition per room at any one time.

Procedure: Controlling airborne asbestos fibres

To ensure that the release of airborne asbestos fibres is properly controlled, the following must be done:

1. Never remove dry friable asbestos-containing materials without prior approval from WorkSafeBC.
2. Saturate asbestos-containing materials with water before handling or removing them. Surfactants (wetting agents) must be used with the water to help thoroughly wet asbestos-containing materials.
3. Do not use dry-sweeping to clean up asbestos-containing materials. Never use compressed air for any cleaning purposes.
4. Pass air from the negative air unit through a HEPA filter and discharge the air outdoors.
5. When cleaning up small amounts of asbestos-containing materials, use only vacuum cleaners equipped with a HEPA-filtered exhaust, or wet-mop or wipe the materials. Gross amounts of asbestos materials inside an asbestos containment can be shovelled into bags.
6. Use water to continually mist the air near workers who are removing asbestos or cleaning up waste materials.
7. Clean all surfaces exposed to asbestos contamination by vacuuming or damp-wiping.
8. After removing asbestos-containing materials, wash or vacuum exposed surfaces and treat with a sealant or glue designed to seal invisible residual fibres to the substrate.
9. Control water streams and application of sealants or encapsulants to prevent excessive fibre generation. Use airless or low-pressure application systems.
10. If asbestos is encapsulated, test encapsulated asbestos materials to ensure that the encapsulant has penetrated the materials and that the encapsulant has not disturbed the bond between the friable asbestos materials and their supporting surface.

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11. Identify encapsulated asbestos materials. Identification must indicate both the dangers and the precautions to be taken while working on or near the materials.
 12. Ensure that any permanent enclosure of asbestos-containing materials is effectively airtight. Do not locate electrical, plumbing, or ventilation services inside a permanent asbestos enclosure.
 13. Place warning signs at all access points into the permanent enclosure. The signs must warn of the danger from asbestos-containing materials and should identify appropriate precautions.
 14. When repairing asbestos-containing materials:
 - Disturb the least possible amount of the materials
 - Seal exposed friable ends or edges that have resulted from repair or maintenance procedures *before* removing the work enclosure
 - Wash any surfaces that will remain exposed after repair work is complete, then vacuum and treat the surfaces with an effective sealant or glue
 15. Complete a final decontamination, including washing down and vacuuming the enclosure, to remove all visible signs of asbestos contamination from the enclosure and the equipment. Complete this decontamination before sealing the surfaces from which asbestos has been removed.
 16. Complete a final visual inspection of the entire enclosure.
 17. Before dismantling the enclosure, take final air clearance measurements of airborne asbestos fibres.

On-site laundry facilities are preferable to commercial laundries or public laundry facilities.

Procedure: Laundering contaminated clothing

Employers must ensure that workers who launder contaminated clothes, whether on-site or at a separate business, are informed of the hazards of asbestos and the procedures required for handling contaminated clothing.

Before sending contaminated clothing to a laundry facility, follow these steps:

1. Clean the clothing using a vacuum cleaner equipped with a HEPA-filtered exhaust.
2. Place the clothing in waterproof poly bags.
3. Seal and label the bags.

Cleaned clothing should be packaged and used only for asbestos work.

Procedure: Disposing of asbestos waste materials

To ensure that asbestos waste is properly disposed of, the following must be done:

1. Place waste materials in impervious containers – poly bags at least 0.15 mm (0.006 in., or 6 mil) thick – inside the enclosed asbestos work area, seal the containers, and label or tag them “ASBESTOS.”
2. Before removing the sealed containers from the equipment holding room and before removing them from the waste transfer room, decontaminate the outside of the containers by cleaning with a vacuum equipped with a HEPA-filtered exhaust or damp-wiping.
3. In the equipment holding room, package the sealed impervious containers so that they will not be punctured during handling and transportation to the disposal site. This is normally done by double-bagging them.
4. Ensure that a continuous clean-up and disposal program is in place to prevent unnecessary accumulation of waste materials containing asbestos. By the end of each workday, and preferably by the end of each work shift, place all asbestos waste materials in sealed containers.

Make prior arrangements with appropriate authorities to deliver asbestos waste to assigned dump sites. Inform transport drivers of precautions they must take. Transport vehicles may be required to display signs or placards specifying the nature of the cargo (see the *Transport of Dangerous Goods Act*).

5. Ensure that disposal sites conform to provincial and municipal requirements. (Check with the regional office of the British Columbia Ministry of Environment.)

Procedure: Inspecting and monitoring the work environment

To ensure that work areas are properly inspected and monitored, the following must be done:

1. Inspect the containment and all decontamination facility rooms for gaps and breaks *at least* daily. Complete a visual check as well as a smoke-tube test to ensure that air flows from the clean areas into the contaminated areas. Measuring the air pressure differential between clean and contaminated areas is also recommended. Keep a record of such inspections for at least 10 years.
2. Take air samples to determine asbestos fibre concentration, both during the asbestos work and before the containment is removed. The minimum sampling requirements are as follows:
 - On a daily basis, take samples outside the containment when there are unprotected persons in the immediate vicinity of the containment.
 - During every shift, sample the air in the *clean room* during removal and clean-up operations. Sampling must cover at least half of the total duration of the work shift and at least one decontamination sequence at the end of the work shift. Analyze filters and notify workers of the results within 24 hours.
 - Take “occupational” air samples to determine or assess the adequacy of work procedures and controls, or when changes to work procedures occur.
 - Before the containment is dismantled, take samples inside the containment. To determine whether the work area is suitable for re-occupancy, collect at least one sample for every 270 m³ (9,600 ft.³) of containment. If the containment is 270 m³ or

less, collect at least two samples. The level of asbestos in the containment after all the asbestos waste is removed and the area is decontaminated **must not be more than 0.02 fibres per millilitre**.

Note: Workers must wear appropriate respiratory protection while demolishing the containment (for information on choosing the appropriate respirator, see page 52).

3. As soon as possible, but no later than 24 hours after samples are collected, make all sampling results available to the workers involved and to the occupational health and safety committee, if any, at the worksite. Make the sampling results available to a WorkSafeBC officer upon request.
4. Always use sampling and analysis procedures acceptable to WorkSafeBC, such as NIOSH Method 7400, "Asbestos and Other Fibers by PCM."

Collecting bulk samples of materials suspected of containing asbestos

For a definition of *qualified person* see page 9.

Bulk samples of materials suspected of containing asbestos must be collected by a qualified person and sent for laboratory analysis to determine their content. The qualified person will do the following:

- Use appropriate moderate-risk activity precautions and work area preparations.
- Sample materials when the immediate area is not in use and all unprotected workers have been moved to a safe location.

Note: Only the persons doing the sampling may be present in the immediate area.

- Spray the materials with a light mist of water to prevent the release of fibres during sampling.
- Avoid disturbing the materials more than necessary.
- Take a representative sample from within the materials suspected of containing asbestos by penetrating the entire depth of the materials (since the materials may have been applied in more than one layer or covered with paint or another protective coating).
- Take one sample for each floor or area of materials having the same colour or texture to ensure that materials of a different appearance are sampled separately. Some materials (e.g., drywall taping compound) may have to be sampled at multiple locations to assure that the original product has been collected (other than patches or repairs)
- Place samples in sealable, impervious containers and label them as laboratory samples.
- Seal exposed surfaces after the samples have been collected.



When taking bulk samples, wear appropriate personal protective equipment and keep a spray bottle handy.

If pieces of materials break off during sampling, clean the contaminated area using a vacuum cleaner equipped with a HEPA-filtered exhaust or by wet-cleaning. Where necessary, cover the area with poly drop sheets to catch and contain loose waste materials generated during sampling. Place any small amounts of the waste materials in poly bags or impervious containers, label and seal the bags or containers, and dispose of as asbestos waste.

In addition, any worker near the sampling area must use a respirator. Depending upon the condition of the materials, sampling can generate significant amounts of airborne fibres.

Removing asbestos-containing pipe insulation

The removal of asbestos-containing pipe insulation is a form of high-risk procedure that does not require the usual decontamination steps *as long as* workers use glove bags – prefabricated bags equipped with integral gloves – according to the manufacturer’s instructions. A glove bag is a containment device installed on the pipe using straps to seal the ends of the bag around the pipe. Some glove bags are designed for and allow progressive movement along the pipe, and are also considered to be a form of containment.



When using glove bags, follow the manufacturer’s instructions and wear appropriate personal protective equipment.

When using a glove bag to remove asbestos-containing pipe insulation, workers must follow these steps:

1. Thoroughly clean any surfaces exposed by the removal of the asbestos insulation. After removing each section of asbestos insulation, immediately clean the surfaces with a vacuum cleaner equipped with a HEPA filter. If a proper vacuum cleaner is not available, use damp cloths or sponges.
2. Keep the surfaces free of wet sludge that could, after drying, release asbestos fibres.
3. Treat all cloths, sponges, rags, wire brushes, and so on as asbestos waste.
4. Remove the glove bag and repeat vacuum cleaning of all surfaces in the work area, including waste containers, reusable tools, and equipment.
5. Seal the exposed ends of the remaining asbestos insulation. Inspect and seal the pipe with glue.

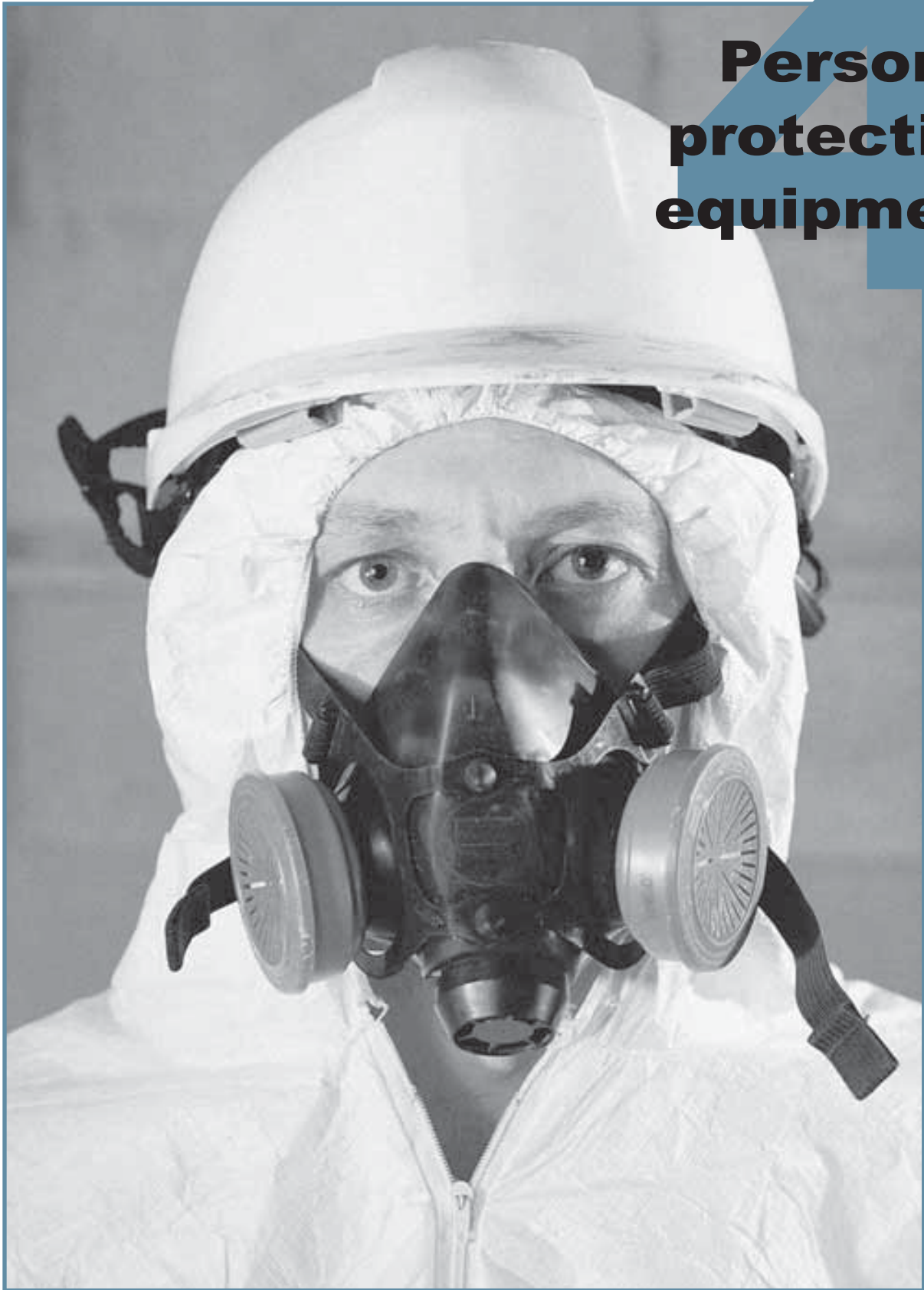
When removing pipe insulation *without* a glove bag, workers must follow all the procedures for high-risk work activities (see pages 32–42).

Work on “hot” pipe systems should be discussed with the local occupational hygiene officer before submitting work procedures with the NOP.

Demolition and renovation activities

For guidance on procedures for demolition and renovation activities, please see OHS Guideline G6.8, “Procedures for abatement of asbestos-containing material (ACM) during house and building demolition/renovation.” This guideline presents a number of different scenarios with suggested work procedures. Employers may develop other acceptable procedures based on a site-specific risk assessment. The guideline is available on WorkSafeBC.com or from your local WorkSafeBC office (see inside back cover).

Personal protective equipment



Protective clothing

All workers must wear protective clothing that:

- Is made of a material that resists penetration by asbestos fibres
- Covers the body and fits snugly at the neck, wrists, and ankles
- Covers the head
- Covers the feet (laceless rubber boots are strongly recommended)
- Can be immediately repaired or replaced if torn

The use of disposable protective clothing is recommended.

When working with asbestos, workers often have to wear tight-fitting, impervious protective clothing while working in confined spaces where there is not a lot of air movement. As a result, asbestos workers may be at a higher risk of experiencing heat stress and resulting heat-related disorders. For more information on heat stress, see “Thermal stress,” page 19.

Reduce exposure with personal protective equipment

Personal protective equipment, including respirators and protective clothing, is essential in controlling worker exposure to asbestos. Workers should be familiar with and understand the equipment requirements of their employer’s written exposure control program.

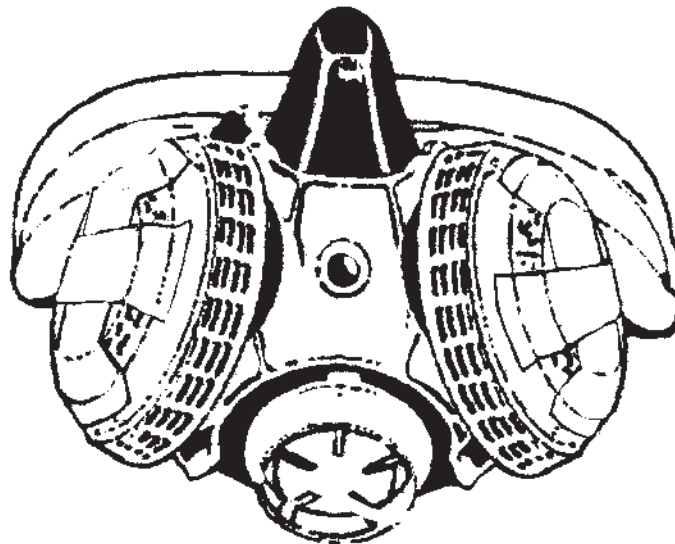
Despite the necessity of personal protective equipment, employers and workers should remember that personal protective equipment is always a supplementary line of defence and should not be relied upon solely. The other controls mentioned in this manual must also be used to minimize exposure to airborne asbestos.

Respiratory protection

In most cases, workers must use respirators during all stages of a project in which the risk of exposure to airborne asbestos fibres exists or could develop. During initial set-up at a site, however, the type of asbestos and the amount of contamination in the area will determine the need for a respirator. For example, with non-friable materials such as vinyl asbestos tile, workers normally do not need a respirator until the actual work begins. With other materials, workers may need a respirator even during survey and set-up.

The need for and type of respirators are two of the elements that will have been determined during the risk assessment, which establishes whether the work involves low-risk, moderate-risk, or high-risk activity, and during the development of the exposure control plan and the site work procedures.

Respirators for use around asbestos fall into one of two categories: air-purifying respirators or air-supplying respirators. So-called “single-use” or “disposable” respirators are not acceptable for working around asbestos.



Workers can use half-facepiece, dual-cartridge respirators with “100” (HEPA) filters in asbestos concentrations up to 1 fibre per millilitre.

Air-purifying respirators (APRs and PAPRs)

Air-purifying respirators (APRs) for protection against asbestos have “100” (HEPA) filters to remove asbestos fibres from the air around workers and protect them from breathing in asbestos fibres. Powered air-purifying respirators (PAPRs) use a battery-powered blower to continuously pull air through the “100” (HEPA) filter and into the facepiece. Both APRs and PAPRs may be either half-facepiece or full-facepiece respirators, and will have different assigned protection factors (see the *Breathe Safer* manual and Part 8 of the Regulation).



Workers can use full-facepiece PAPRs with “100” (HEPA) filters in asbestos concentrations up to 10 fibres per millilitre.

All types of air-supplying respirators used for protection against asbestos fibres must be equipped with backup “100” (HEPA) filters or an escape bottle in case the air source is cut off.

Air-supplying respirators (SARs and SCBAs)

Unlike air-purifying respirators, air-supplying respirators provide an attached supply of breathing air. The two basic types of air-supplying respirators are supplied-air respirators (SARs, or airline respirators) and self-contained breathing apparatus (SCBAs):

1. *Supplied-air respirators* feed clean air through a hose called an airline, which is attached to either an air tank or an air compressor. Supplied-air respirators may be either pressure-demand or continuous-flow types:
 - Pressure-demand respirators maintain a positive pressure in the facepiece, which allows clean air to leak out without allowing contaminated air to leak in.
 - Continuous-flow respirators deliver a constant supply of air to the facepiece, which also maintains a positive pressure.
2. *Self-contained breathing apparatus* provide a supply of air from a cylinder. Asbestos-related activities rarely require the use of SCBAs. When they do, however, asbestos-related activities require pressure-demand SCBAs, which draw air into the facepiece whenever pressure reduces in the facepiece due to leakage or inhalation.

Choosing the right respirator

Employers must establish a respiratory protection standard for a specific job by selecting an appropriate respirator based on anticipated or established airborne asbestos concentrations for that job. The following table outlines appropriate respirator choices, which are determined by maximum use concentrations as detailed in Section 8.34 of the Regulation.

As the asbestos fibre concentration approaches the maximum use concentration for the respirator being used, workers must switch to a respirator with a higher protection factor.

| Asbestos (all types) maximum use concentration (in fibres per millilitre*) | Minimum respirator choice for the specified maximum use concentration | |
|---|--|--|
| | Air-purifying respirators with “100” (HEPA) filters | Air-supplying respirators |
| Up to 1 f/mL | Half-facepiece respirator | — |
| Up to 5 f/mL | Full-facepiece respirator | — |
| Up to 10 f/mL | Powered full-facepiece respirator | — |
| Up to 100 f/mL | — | Pressure-demand full-facepiece supplied-air respirator |
| Up to 100 f/mL | — | Continuous-flow full-facepiece supplied-air respirator |
| Up to 1,000 f/mL | — | Pressure-demand SCBA |

* *Fibres per millilitre (f/mL) is equivalent to fibres per cubic centimetre.*

When using respirator air filters, workers must use NIOSH 100 series filters (HEPA filters). Before workers can use respirators that are not NIOSH-approved or MSHA-approved, the respirators must meet other standards acceptable to WorkSafeBC. Employers must submit the respirator in question and its documentation to WorkSafeBC.

Workers must be clean-shaven where the respirator facepiece seals with the face to ensure a proper fit.

Checking for proper operation and fit

Employers must provide fit-testing when a worker is first fitted with a respirator and once a year thereafter. For more detail on employer fit-testing responsibilities, see “Respiratory protection program,” page 16.

Workers must check the operation and fit of respirators before each use using one of the following procedures.

Non-powered air-purifying respirators (APRs)

1. Check the fit of the APR using one of the following methods:
 - Block the inhalation valves by placing your hands over the filters and inhaling. If the respirator is sealed correctly, cutting off the air supply will cause the facepiece to collapse.
 - or
 - Block the exhalation valve and blow into the respirator. If the respirator is sealed correctly, the facepiece will bulge.
2. If the facepiece does not collapse or bulge, either it is not sealed correctly or the valves are leaking. Correct the problem and recheck.

Powered air-purifying respirators (PAPRs)

1. Install a new battery onto the blower unit and remove the blower hose from the facepiece.
2. Test the battery using a PAPR flow tester to ensure an adequate flow of air.
3. Install filters in the PAPR unit and retest it on the flow tester to ensure that the filters are not plugged. Dispose of the filters as asbestos waste if the flow tester indicates inadequate air flow or if the cartridges become wet. Re-attach the blower hose to the facepiece.
4. Put on the facepiece and adjust the straps to ensure a proper fit.
5. Switch the PAPR on and hold the palm of one hand over one facepiece exhaust port. With the other hand, feel the release of air from the other exhaust port. If no air is released, take a deep breath and blow sharply into the facepiece. This should free the stuck diaphragm in the exhaust port and allow air to be released. Repeat step 5 for both exhaust ports.

5 Emergencies and incidents



Preparing for emergencies

Employers must prepare a written emergency plan for each individual worksite. This plan must include written procedures for evacuating workers from the contaminated work area in the event of a medical emergency. Employers must develop these procedures in consultation with emergency response agencies such as ambulance and fire departments. Employers must also assign a worker (for example, an occupational first aid attendant) to coordinate the implementation of the procedures.

As soon as a written emergency plan is developed, employers must:

- Conduct emergency drills to determine whether the procedures work in practice and to thoroughly familiarize workers with their roles in an actual emergency
- Keep records of emergency drills to monitor efficiency
- Provide each worker with a copy of the plan and provide enough training to ensure that workers clearly understand the procedures
- Post the procedures and other relevant information (such as telephone numbers) in appropriate, conspicuous locations

Medical emergency procedures

If a medical emergency occurs in an asbestos work area as a result of an incident or collapse, standard protective measures may be temporarily ignored if they would otherwise cause an immediate threat to the worker's life or recovery. For example, a worker's respirator may be immediately removed so that mouth-to-mouth resuscitation can be performed, or a worker's contaminated clothing may be left on if a spinal injury is suspected.

If protective equipment and clothing can be left in place without interfering with the emergency care of the injured worker in a contaminated area, they should not be removed until the worker has been brought to an uncontaminated area. On-site decontamination procedures should be carried out only if they do not interfere with medical emergency procedures.

When first aid, ambulance, or other emergency personnel have to enter a contaminated area, they must be warned of the hazard and be provided with, and told how to use, respirators, coveralls, and head protection before entering the area. (In view of the hazard, some emergency responders may refuse to enter the contaminated area.)

Employers must ensure that emergency procedures and preparations provide emergency personnel with clear instructions, provisions, and the means to adequately decontaminate or clean up themselves and the injured worker before leaving the worksite. For example, first aid or ambulance personnel accompanying an injured worker can remove contaminated equipment and clothing in the equipment holding room to minimize the risk of contaminating other areas outside the containment area.

Injured workers who have not been decontaminated must be covered in such a way as to minimize contamination of clean areas. The cover should not hinder access to the worker by first aid or ambulance personnel. Someone familiar with the handling and disposal of asbestos-contaminated clothing should accompany the injured worker to the hospital. If the worker is still contaminated with asbestos upon arrival at the hospital, the employer must inform hospital staff of this and instruct them on the appropriate disposal of contaminated clothing. The employer's written emergency procedures must detail the collection and handling of contaminated materials in such a situation.

Investigating incidents

Investigation of incidents is important for preventing accidents. As far as possible, the investigation must:

- Determine the cause of the incident
- Identify any unsafe conditions, acts, or procedures that contributed to the incident
- Recommend corrective action to prevent similar incidents

| What is an incident? |
|---|
| The Occupational Health and Safety Regulation defines an <i>incident</i> as “an accident or other occurrence which resulted in or had the potential for causing an injury or occupational disease.” |

Employers must conduct a formal investigation to discover the causes of an incident. Any of the following should be considered an incident:

- An individual encounters asbestos unexpectedly.
- An air sample indicates high asbestos levels in a clean room or outside area.
- An individual sustains an exposure that has the potential to cause serious injury or death.

Note: Because the health effects of asbestos tend to show up years after exposure, the seriousness of an exposure should not be judged by whether or not the individual requires immediate medical attention.

The formal investigation must also examine measures that will prevent similar situations in the future. Employers must forward copies of the investigation report to their occupational health and safety committee and to WorkSafeBC.

Emergency information

Fill in this information now, *before* an emergency occurs:

| | |
|---|-----------|
| Ambulance telephone | |
| Fire department telephone | |
| Doctor/first aid telephone | |
| Hospital telephone | |
| Contacts to notify in emergency situations | |
| Name | Telephone |
| Name | Telephone |
| Name | Telephone |
| Name | Telephone |
| Name | Telephone |
| Name | Telephone |
| Name | Telephone |
| Name | Telephone |
| Name | Telephone |
| Name | Telephone |
| Name | Telephone |
| Name | Telephone |

WorkSafeBC Offices

Visit our web site at WorkSafeBC.com.

Abbotsford

2774 Trethewey Street V2T 3R1
Phone 604 276-3100
1 800 292-2219
Fax 604 556-2077

Burnaby

450 – 6450 Roberts Street V5G 4E1
Phone 604 276-3100
1 888 621-7233
Fax 604 232-5950

Coquitlam

104 – 3020 Lincoln Avenue V3B 6B4
Phone 604 276-3100
1 888 967-5377
Fax 604 232-1946

Courtenay

801 30th Street V9N 8G6
Phone 250 334-8765
1 800 663-7921
Fax 250 334-8757

Kamloops

321 Battle Street V2C 6P1
Phone 250 371-6003
1 800 663-3935
Fax 250 371-6031

Kelowna

110 – 2045 Enterprise Way V1Y 9T5
Phone 250 717-4313
1 888 922-4466
Fax 250 717-4380

Nanaimo

4980 Wills Road V9T 6C6
Phone 250 751-8040
1 800 663-7382
Fax 250 751-8046

Nelson

524 Kootenay Street V1L 6B4
Phone 250 352-2824
1 800 663-4962
Fax 250 352-1816

North Vancouver

400 – 224 Esplanade Ave. W. V7M 1A4
Phone 604 276-3100
1 888 875-6999
Fax 604 232-1558

Prince George

1066 Vancouver Street V2L 5M4
Phone 250 561-3700
1 800 663-6623
Fax 250 561-3710

Surrey

100 – 5500 152 Street V3S 5J9
Phone 604 276-3100
1 888 621-7233
Fax 604 232-7077

Terrace

4450 Lakelse Avenue V8G 1P2
Phone 250 615-6605
1 800 663-3871
Fax 250 615-6633

Victoria

4514 Chatterton Way V8X 5H2
Phone 250 881-3418
1 800 663-7593
Fax 250 881-3482

Head Office / Richmond

Prevention Information Line:

Phone 604 276-3100
1 888 621-7233 (621-SAFE)

Administration:

6951 Westminster Highway
Phone 604 273-2266

Mailing Address:

PO Box 5350 Stn Terminal
Vancouver BC V6B 5L5

After Hours

Health & Safety Emergency

604 273-7711
1 866 922-4357 (WCB-HELP)

