

34 ASBESTOS



This chapter provides some brief information about asbestos in construction. If you encounter asbestos on the job, you will need more information. Here are the two main sources of further information on asbestos in Ontario construction:

The legal requirements for handling, working with, removing, and disposing of asbestos and asbestos-containing products are described in ***Designated Substance—Asbestos on Construction Projects and in Buildings and Repair Operations (Ontario Regulation 278/05)***. Read the regulation to get a full description of your legal duties. You can get a copy from IHSA or read it on our website (www.ihsa.ca).

In addition, IHSA publishes ***Asbestos: Controls for Construction, Renovation, and Demolition*** (DS037). It contains more information than what's in this chapter, and it tells you how to protect yourself. It can also help you understand the asbestos regulation. You can order a copy from IHSA or download it from our website.

What is Asbestos?

Asbestos is a naturally occurring material once used widely in the construction industry. Its strength, ability to withstand high temperatures, and resistance to many chemicals made it useful in hundreds of applications.

But asbestos can also kill. When inhaled, asbestos has been shown to cause the following diseases

- Asbestosis
- Lung cancer
- Mesothelioma (cancer of the lining of the chest and/or abdomen).

The early widespread use of asbestos has left a potentially dangerous legacy. Many older buildings have asbestos-containing materials (ACM) in various forms and in various states or conditions that can cause exposure to workers or occupants.

The improper handling of asbestos-containing products can release harmful amounts of asbestos fibre into the air.

Where is it Found?

Most structures built between 1930 and 1975 will contain products having substantial amounts of asbestos. (See Table 34-1 and Figures 34-1, 34-2, and 34-3 on the next few pages.)

Table 1: Asbestos Products in Construction

Product	Residential	Commercial/ Institutional	Industrial
Sprayed-On Fireproofing		XX*	
Pipe and Boiler Insulation	X	X	XX
Loose Fill Insulation	X**		X
Asbestos Cement Products	X	X	X
Acoustical Plaster	X	X	
Acoustical Tiles	X	XX	
Vinyl Asbestos	X	X	
Gaskets		X	XX
Roofing Felts	X	X	X
Asphalt/Asbestos Limpet Spray			X
Drywall Joint-Filling Compound	X	X	
Coatings and Mastics	X	X	X

*Denotes extensive use. **Vermiculite insulation.

xx - May contain vermiculite.

If you have any concerns about material that you believe may be asbestos, have it checked **before** work is started. Otherwise, treat the material as if it is asbestos.

Asbestos is a "designated substance" under Ontario health and safety legislation. This means that its exposure is prohibited, regulated, restricted, limited, or controlled. Owners must notify contractors of the presence of any designated substances on a project before work begins or tenders are submitted. Contractors also have a responsibility to advise subcontractors.

IHSA has developed a guide for creating this notification report. Owner's Duties: Designated Substances on Construction Projects (W130) is available to download for free from our website. It is also available in French (W130F).

Workers in the carpentry, plumbing, heating and air conditioning, drywall, resilient flooring, and acoustic and interior systems trades may encounter asbestos in

- light fixtures
- light troughs
- soffits
- transite tile over stairways
- soffits of plazas
- ceiling tile
- 2' x 2' porous tile
- exterior cladding
- insulation (wall and heating pipe)
- drywall joint compound (pre-1980)
- caulking materials
- gaskets and packings.

Sanding or machine cutting creates fine airborne dust, which may stay airborne for 24 hours or longer. Air movements created by heating and air-conditioning systems will spread these airborne fibre particles throughout the building unless the work area and ductwork is sealed off.

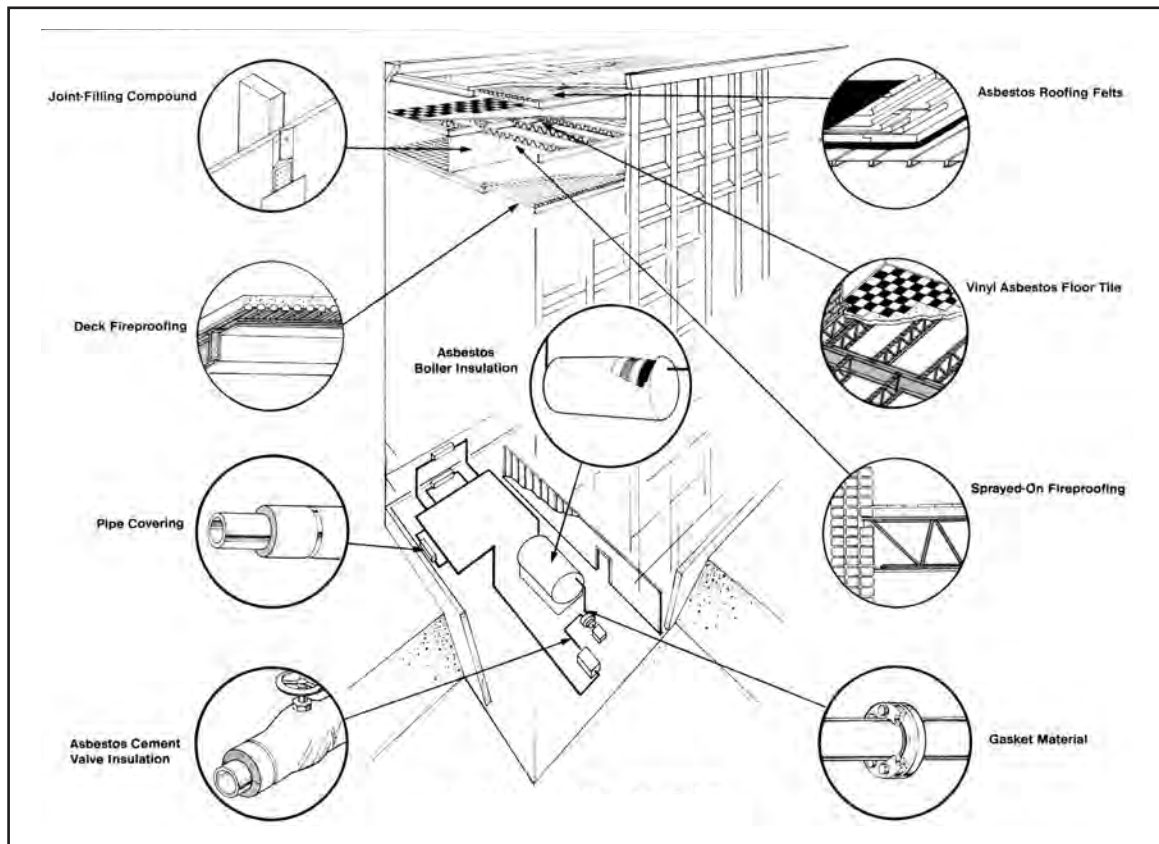


Figure 34-1: Asbestos Products and Locations in Commercial/Institutional Buildings

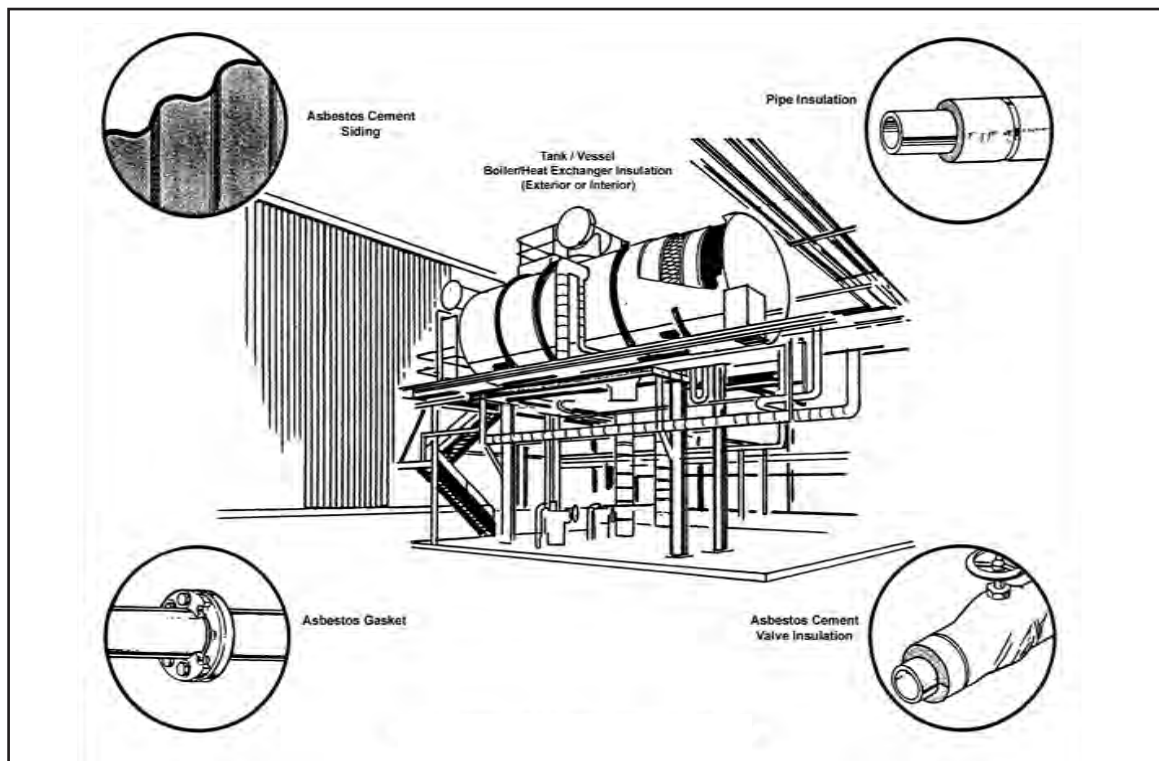


Figure 34-2: Asbestos Products and Locations in Industrial Work

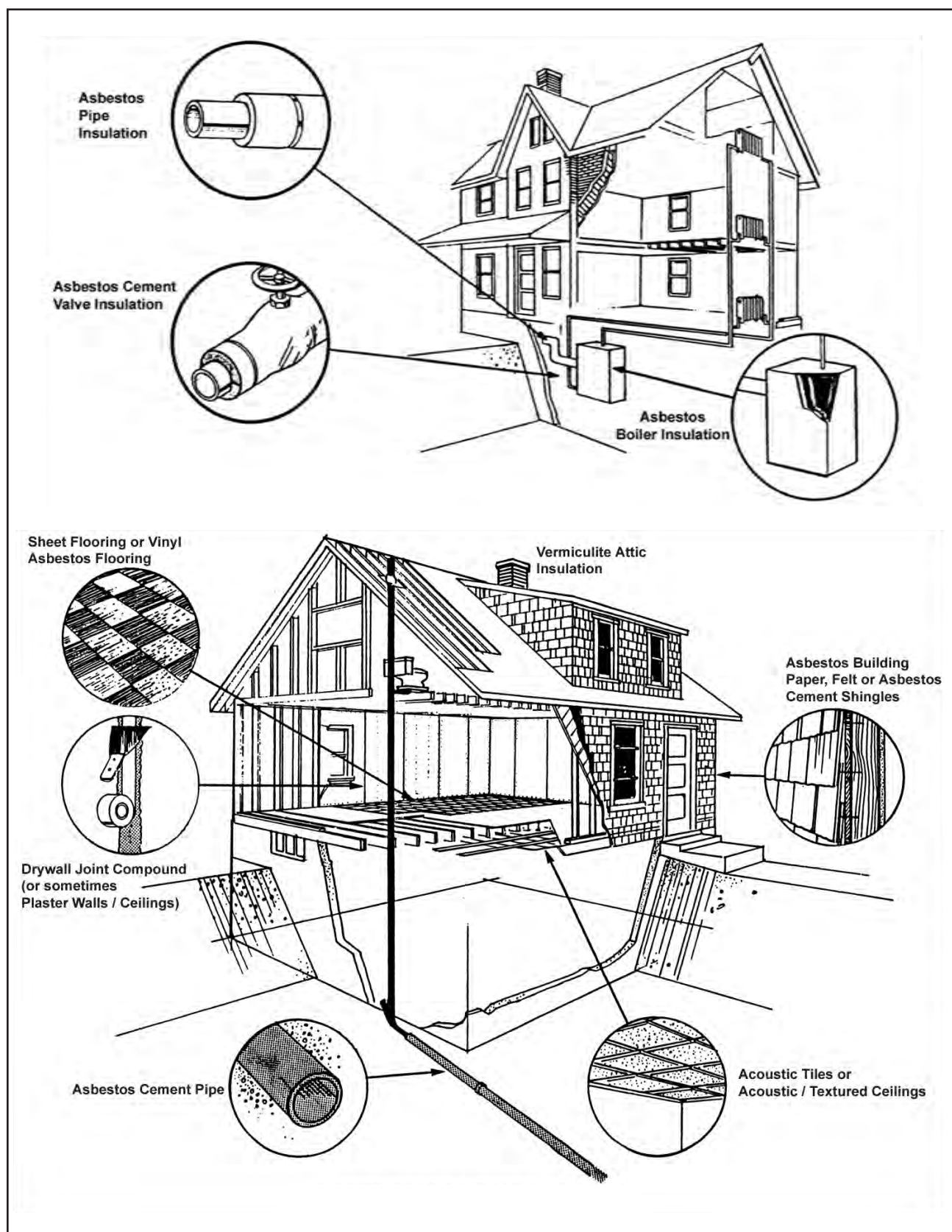


Figure 34-3: Asbestos Products in Residential Buildings

Classes of Asbestos

Two classes of asbestos products were widely used in the past. The first includes materials easily crumbled or loose in composition. These are referred to as “friable.”

The second type includes materials much more durable because they are held together by a binder such as cement, vinyl, or asphalt. These products are termed “non-friable.”

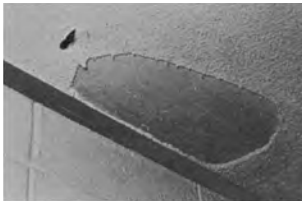
Friable material was widely used to fireproof steel structures. It can be found on beams, columns, trusses, hoists, and steel pan floors. Sprayed material was also used as a decorative finish and as acoustical insulation on ceilings.

The material can be loose, fluffy, and lumpy in texture or, if more gypsum was used, it may be quite hard and durable.

Friable Materials



Approved Fireproofing



Acoustical Coating



Sprayed Fireproofing



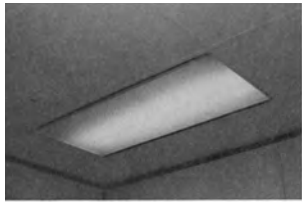
Air-Cell Pipe Insulation



Non-Friable Materials



Suspended Ceiling Concealing Fireproofing



Vinyl Asbestos Floor Tile



Asbestos-Cement Siding

Certification and Training

Whenever work is planned at a location where asbestos is present, constructors and employers must inform workers about

- The location of asbestos-containing materials or materials assumed to contain asbestos
- Whether the material is friable or non-friable, and
- The type of asbestos (e.g., chrysotile, amosite, tremolite, etc.) if the material is sprayed.

Constructors and employers must then ensure that workers are trained on asbestos hazards and controls as detailed in this section.

Employers performing regular service or maintenance work on behalf of owners have these same training requirements. Such employers should develop safe work practices. They should also become familiar with the owner’s asbestos procedures and communicate them to their employees.

Certification: Type 3 Operations

All workers who perform Type 3 asbestos operations—and the supervisors of these workers—must be certified to do their work. (Type 3 operations are discussed later in this chapter.)

This certification requirement is contained in Ontario Regulation 278/05. There are two certification programs: one for workers and one for supervisors. Supervisors must complete both the worker program and the supervisor program.

The certification programs must comply with the Ministry of Training, Colleges, and Universities’ training standards. IHSA’s *Asbestos Abatement Supervisor* and *Asbestos Abatement Worker* courses meet the MTCU standard and qualify participants to take the MTCU certification tests.



Training for any “Type” of Asbestos Operation

Workers in **any “Type”** of asbestos operation—as well as other workers who could be exposed to asbestos—must be trained by a competent person on the following:

- The hazards of asbestos exposure
- The purpose, inspection, maintenance, use, fitting, cleaning, disinfecting, and limitations of respirators
- Personal hygiene and correct procedures for work with asbestos
- How to use, clean, and dispose of protective clothing.

Note: The above applies to facility owners and tenants whose employees undertake work involving the removal or disturbance of asbestos-containing material or who contract with other employers to do so.

Training should also include

- Methods of recognizing asbestos, including identification of building materials that contain asbestos
- The relationship between smoking, asbestos, and lung cancer
- The kinds of operations that could result in exposure to asbestos
- Classification of Type 1, Type 2, and Type 3 operations
- Required work procedures and controls to minimize exposure, including engineering controls, work practices, respirators, housekeeping procedures, hygiene facilities, protective clothing, decontamination procedures, emergency procedures, and waste disposal procedures
- The requirements of the medical-surveillance program
- The requirements for signs and labels.

The Joint Health and Safety Committee or the Health and Safety Representative must be informed about when and where the training will take place.



Encapsulation or Removal

In dealing with asbestos that may be encountered in applications such as fireproofing and cement, the decision whether to encapsulate the material, remove it, or leave it in place rests with the client/owner.

Many owners of asbestos-containing buildings have decided to reduce the risk of exposure to asbestos. The procedure is normally either removal or encapsulation. Encapsulation means spraying an approved sealant onto or into the material or protecting it with an impervious cover to prevent the release of fibres into the air in the building.

Encapsulation is permitted only if the asbestos will not be damaged further in the process.

Removal of asbestos is a more permanent solution to the problem. Most removal projects employ the **wet removal** method. Water and a wetting agent are sprayed onto the asbestos. This effectively reduces the quantity of fibres released when the material is removed.

Dry removal is normally done only when wet removal is unsafe or impractical—for instance in computer rooms or other areas where there is a chance of water damage to delicate equipment. Dry removal causes excessively high concentrations of asbestos fibres (in excess of 100 fibres per cubic centimetre) and may contaminate other previously “clean” areas.

During dry removal projects, use an extensive filtered exhaust system to create a slight negative air pressure in the work area. This will reduce the chance of spreading asbestos fibres. The requirements for negative air pressure are specified in the asbestos regulation.

Another solution is to enclose the asbestos with a physical barrier such as drywall. This is normally done where the area is not going to be entered frequently or altered later.

The asbestos regulation specifies what precautions must be taken during removal, encapsulation, or enclosure.



Figure 34-4: Spraying ACM with Amended Water Before Wet Removal

Types of Asbestos Operations

Under Ontario law, asbestos operations are classified as Type 1, Type 2, or Type 3.

Type 1 – generally presents minimal hazard to workers or bystanders (for example, hand removal of vinyl asbestos tile).

Type 2 – may create exposure exceeding acceptable limits (e.g., removing six square inches of asbestos fireproofing to attach a new pipe hanger).

Type 3 – major exposures—exceeding acceptable limits—involving frequent or prolonged exposure, and posing serious risks to both workers and to bystanders (e.g., full-scale removal of sprayed asbestos fireproofing in an occupied building).

Ontario Regulation 278/05 (*Designated Substance—Asbestos on Construction Projects and in Buildings and Repair Operations*) outlines safe work procedures and respiratory protection for workers who may encounter asbestos in the course of their work. IHSA produces a manual called *Asbestos: Controls for Construction, Renovation, and Demolition* (DS037). It shows how workers can protect themselves and describes correct procedures for asbestos operations. It also helps employers and constructors understand their legal responsibilities.

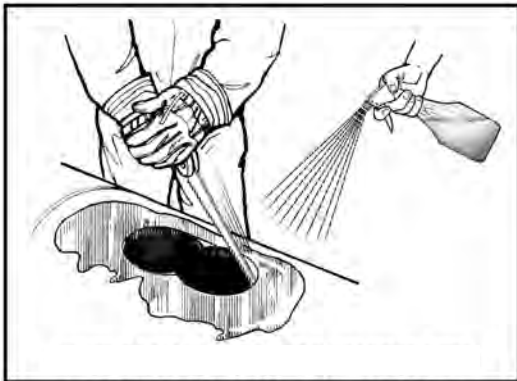


Figure 34-5: Hand Sawing Asbestos Cement Pipe



Figure 34-6: Using Manual Pipe Cutter

Type 1 Operations

Type 1 operations include the following:

- 1) Installing or removing less than 7.5 square metres of ceiling tile containing asbestos (81 square feet, or ten 4-foot x 2-foot ceiling tiles) without it being broken, cut, drilled, abraded, ground, sanded, or vibrated.
- 2) Installing or removing non-friable asbestos-containing material, other than ceiling tiles, without it being broken, cut, drilled, abraded, ground, sanded, or vibrated.
- 3) Breaking, cutting, drilling, abrading, grinding, sanding, or vibrating non-friable asbestos-containing material if
 - a) you wet the material, and
 - b) you use only non-powered hand-held tools.
- 4) Removing less than one square metre of drywall where asbestos joint-filling compound was used.

If these operations are done properly, it is unlikely that exposure will exceed acceptable limits (Figures 34-5, 34-6, and 34-7).

See the respirator selection chart at the end of the chapter to determine the respirator you require. You must also follow the control procedures described in Regulation 278/05. See IHSA's asbestos manual (DS037) for details.

Wetting agent

Water alone is not sufficient to control dust and fibres. You must add a "wetting agent" to reduce the water's surface tension. This increases the water's ability to penetrate material and get into nooks and crannies.

To make this "amended water," you can use ordinary dishwashing detergent: 1 cup detergent for every 20 litres of water.

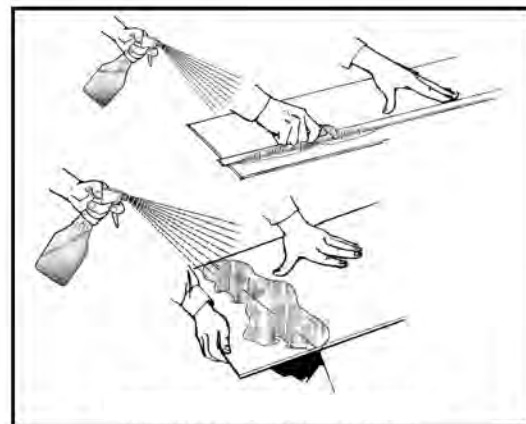


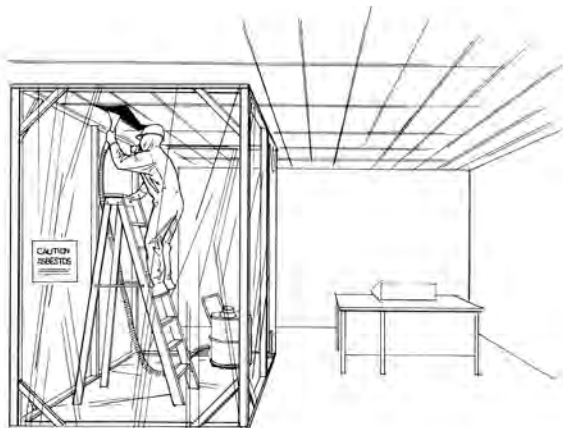
Figure 34-7: Scribing and Breaking Asbestos Cement

Type 2 Operations

Exposure to asbestos is likely in Type 2 operations. You need controls to protect workers and others nearby.

Type 2 operations include the following:

- 1) Removing all or part of a false ceiling in buildings containing sprayed asbestos fireproofing if it is likely that asbestos dust is resting on top of the ceiling (Figure 34-8). This is likely when fireproofing is deteriorating or damaged.



**Figure 34-8: Type 2 Operation—
Removing Asbestos Dust from Ceiling**

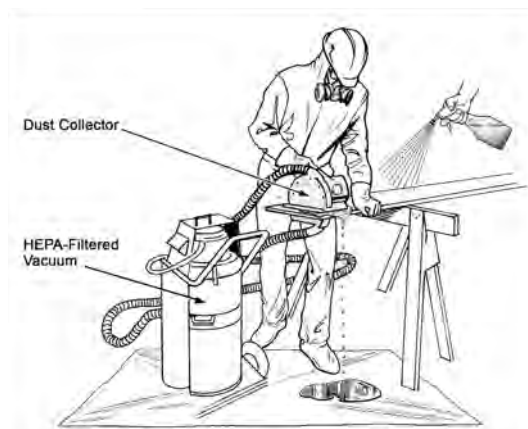
- 2) Removing or disturbing less than 1 square metre of friable asbestos materials—for example, repairing an insulated pipe joint or removing some fireproofing to fasten a new pipe hanger.
- 3) Enclosing friable asbestos insulation to prevent further damage or deterioration.
- 4) Applying tape, sealant, or other covering (by means other than spraying) to pipe or boiler insulation.
- 5) Installing or removing more than 7.5 square metres of ceiling tile containing asbestos, without it being broken, cut, drilled, abraded, ground, sanded, or vibrated.
- 6) Breaking, cutting, drilling, abrading, grinding, sanding, or vibrating non-friable asbestos-containing material if the material is not wetted and the work is done only with non-powered hand-held tools.
- 7) Removing one square metre or more of drywall where the joint-filling compound contains asbestos.

Drywall joint-filling compound

Early drywall joint-filling compounds contained significant amounts of asbestos fibre. This particular use was specifically prohibited in 1980. Still, it may be found in buildings constructed several years afterwards.

- 8) Working on non-friable asbestos with power tools that are attached to dust-collecting devices equipped with HEPA filters (Figure 34-9). If you need to power-grind or to machine the asbestos product and your tools are not equipped with HEPA-filtered dust collectors, refer to IHSA's *Asbestos: Controls for Construction, Renovation, Demolition*, Section 12.9.

To prevent electric shock, any power tools used around water must be equipped with a ground fault circuit interrupter (GFCI) and be maintained properly.



**Figure 34-9: Type 2 Operation—
Using Dust Collector with HEPA Filter**

- 9) Using a glove bag to remove asbestos-containing materials from pipes, ducts, or similar structures.
- 10) Cleaning or removing filters used in air-handling equipment in a building with sprayed asbestos fireproofing.
- 11) An operation that is not Type 1 or Type 3.

See the respirator selection chart at the end of the chapter to determine the respirator you require. You must also follow the control procedures described in Regulation 278/05. See IHSA's asbestos manual (DS037) for details.

Type 3 Operations

These operations require the most precautions because they can release substantial amounts of asbestos dust (Figure 34-10).

Every worker and supervisor involved in a Type 3 operation must be certified to do their work. See the section on “Certification and Training” earlier in this chapter.

Type 3 operations include the following:

- 1) Removing or disturbing more than 1 square metre of friable asbestos-containing material.
- 2) Spraying a sealant onto friable asbestos material.
- 3) Cleaning or removing air-handling equipment in buildings with sprayed asbestos fireproofing.
- 4) Repair, alteration, or demolition of kilns, metallurgical furnaces, and other installations with asbestos refractory materials.
- 5) Disturbing non-friable asbestos material in any way with power tools not equipped with dust collectors and HEPA vacuums.
- 6) Repair, alteration, or demolition of buildings which are or were used to manufacture asbestos products unless the asbestos was cleaned up and removed before March 16, 1986.

See the respirator selection chart at the end of the chapter to determine the respirator you require. You must also follow the control procedures described in Regulation 278/05. See IHSA’s asbestos manual (DS037) for details.

Asbestos Waste Management

The off-site handling and disposal of asbestos waste is governed by the *Environmental Protection Act*. Regulations regarding the transportation of dangerous goods under either Transport Canada (federal) or the Ontario Ministry of Transportation may also apply.

Some municipalities may not accept asbestos waste at landfill operations. Contractors are urged to check with local authorities for the nearest disposal site and with the district office of the Ministry of the Environment.

Equivalent Measures and Procedures

A contractor may use measures and procedures other than those described in this chapter if the proposed measures and procedures offer the same or better protection for workers.

A written notice of this variance must be given in advance to the joint health and safety committee or the health and safety representative for the workplace.

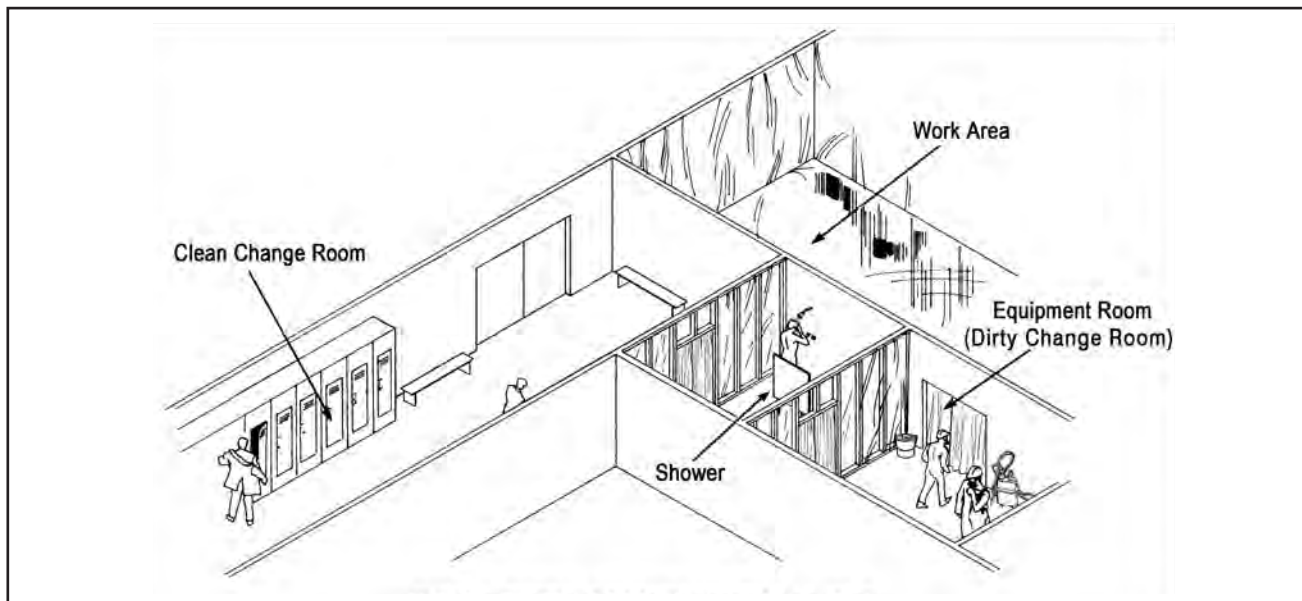


Figure 34-10: Typical Entry/Decontamination Layout for Type 3 Operations

RESPIRATOR CHART FOR ASBESTOS WORK

“ACM” means asbestos-containing material.

Description of work		Required respirator
Type 1 operations		
All Type 1 operations		If worker asks employer to provide a respirator: A
Type 2 operations		
Removing all or part of a false ceiling to obtain access to a work area, if ACM is likely to be lying on the surface of the false ceiling.		B
Breaking, cutting, drilling, abrading, grinding, sanding, or vibrating non-friable ACM if the work is done by means of power tools that are attached to dust-collecting devices equipped with HEPA filters.	Material is not wetted	B
	Material is wetted to control fibres	A
All other Type 2 operations*		A
Type 3 operations		
Breaking, cutting, drilling, abrading, grinding, sanding, or vibrating non-friable ACM using power tools, if the tool is not attached to a dust-collecting device equipped with a HEPA filter.	Material is not wetted	C
	Material is wetted to control fibres	B
<ul style="list-style-type: none"> ➤ Removing or disturbing more than one square metre of friable ACM during the repair, alteration, maintenance, or demolition of all or part of a building, aircraft, ship, locomotive, railway car or vehicle, or any machinery or equipment. ➤ Spraying sealant on friable ACM. ➤ Cleaning or removing air-handling equipment, including rigid ducting but not including filters, in a building where sprayed fireproofing is ACM. ➤ Repairing, altering, or demolishing all or part of a kiln, metallurgical furnace, or similar structure that is made in part of refractory ACM. ➤ Repairing, altering, or demolishing all or part of any building in which asbestos is or was used in the manufacture of products, unless the asbestos was cleaned up and removed before 16 March 1986. 	Material is not wetted	D
	Friable ACM other than chrysotile was applied or installed by spraying, and is wetted to control fibres	C
	Friable chrysotile ACM was applied or installed by spraying, and is wetted to control fibres	B
	Friable ACM was not applied or installed by spraying, and is wetted to control fibres	B

* **Warning:** For any **Type 2** operation in which wetting is required but would cause a greater hazard or damage, then dry work is permitted. Dry work, however, usually results in more airborne fibres. IHSA recommends that you select a category B respirator (see below).

KEY TO RESPIRATOR CHART

A	B	C	D
Air-purifying half-mask respirator with N-100, R-100, or P-100 particulate filter. If the worker requests the respirator from the employer, then the worker must wear it.	Choose any of the following: <ul style="list-style-type: none"> ➤ Air-purifying full-facepiece respirator with N-100, R-100, or P-100 particulate filter. ➤ Powered air-purifying respirator with a tight-fitting facepiece (either full or half facepiece) and a high-efficiency filter. ➤ Negative-pressure (demand) supplied-air respirator with a full facepiece. ➤ Continuous-flow supplied-air respirator with a tight-fitting facepiece (full or half facepiece). 	Pressure-demand supplied-air respirator with a half facepiece.	Pressure-demand supplied-air respirator with a full facepiece.

Disposable respirators or dust masks are not recommended for avoiding exposure to asbestos fibres because it's difficult to perform negative-pressure and positive-pressure seal checks.