

Use this Section to specify removal of materials containing asbestos, as listed below. Always use in conjunction with Section 02 82 01 - Asbestos Control General Requirements. Use with Section 02 82 05 - Asbestos Containment Procedures, if full containment procedures are required.

Edit, remove from or add to this Section only in consultation with Infrastructure specialists in asbestos control procedures. Additional removal procedures exist, contact Infrastructure specialist in hazardous materials for additional information.

This Section does not include requirements for dry removal of asbestos materials. Special approval is required from Alberta Labour, before dry removal of asbestos is permitted. Dry removal should only be considered in areas where wet removal methods would cause severe damage or where electrical systems are present which cannot be isolated as specified during the asbestos removal work.

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1. General

1.1 INTENT

- .1 Read this Section in conjunction with Section 02 82 01 - Asbestos Control General Requirements.

1.2 RELATED SECTIONS

- .1 Asbestos Containment Procedures: Section 02 82 05.
- .2 Asbestos Encapsulation: Section 02 82 15.

2. Products

2.1 MATERIALS AND EQUIPMENT

- .1 required equipment and materials shall include the following
 - .1 portable HEPA-filtered exhaust units with extra fuses;
 - .2 replacement HEPA filters;
 - .3 flexible or rigid duct;
 - .4 vacuum cleaners fitted with HEPA filters;
 - .5 electrical extension cords;
 - .6 portable ground fault circuit interrupter (GFCI);
 - .7 garden hose and hand pump garden sprayer to wet asbestos;
 - .8 wetting agent (50 per cent polyoxyethylene ether and 50 per cent polyoxyethylene, or equivalent);
 - .9 scrapers, nylon brushes, dust pans, shovels, etc.;
 - .10 scaffolds with railings;
 - .11 duct tape or an alternative tape with similar or better adhesive qualities;
 - .12 polyethylene sheeting having a minimum six mil thickness;
 - .13 six mil thick labelled asbestos disposal bags;
 - .14 barriers and warning signs;
 - .15 mops and/or rags, water and other supplies for clean-up;
 - .16 encapsulant for sealing edges;

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- .17 manometer, pumps and smoke generator;
- .18 fire extinguisher; and
- .19 appropriate first aid kit
- .20 glovebags, zippered: prefabricated PVC bag, gloves and elasticized valve port, minimum 250 micrometre thickness, and with reversible double-pull, double-throw top zipper with protective flap of 250 micrometer thick PVC.

SPEC NOTE: Include following clause when Contractor will be given the option of both types.

- .21 glovebags, non-zippered: prefabricated PVC bag, gloves and elasticized valve port, minimum 150 micrometre thickness, and with protective flap of 150 micrometer thick PVC.

SPEC NOTE: Verify that location and extent of material to be removed is clearly indicated on schedule, drawings or a combination of both.

3. Execution

3.1 REMOVAL, GENERALLY

- .1 Remove saturated asbestos materials in a systematic manner. Do not use aggregate blasting or other abrasive removal methods.
- .2 Keep contaminated debris, created by removal operation, damp using amended water to prevent asbestos fibres from becoming airborne. If contaminated debris dries out, re-soak before continuing with removal operation.
- .3 Collect contaminants upon removal and put into asbestos disposal containers. Do not permit asbestos waste to accumulate.
- .4 Ensure contaminants are completely removed from substrates and that asbestos debris and dust are removed from pipes, ducts, fixtures and other items.
- .5 Prior to sealing, purge work area air with fine spray of amended water solution.
- .6 Spray exposed surfaces with asbestos sealer for lock down after removal is complete and all visible asbestos is removed, in order to seal any remaining invisible asbestos fibres to the surface. Ensure that surfaces are dry prior to spraying.

SPEC NOTE: Delete any of the following articles that are not applicable. More asbestos removal procedures exist with Infrastructure. Consult with Infrastructure specialists before specifying a removal procedure.

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3.2 REMOVAL OF SPRAY APPLIED ASBESTOS (High-Risk Asbestos Removal Procedure) (Greater than 1 square foot (ft²))

- .1 Remove spray applied asbestos including overspray, dust and debris under full containment conditions in accordance with Section 02 82 05.
- .2 Pierce covering material such as paint or sealant to permit saturation of contaminant and contaminated material with amended water.
- .3 Immediately prior to commencing removal, spray materials with amended water until saturated, using an airless spray applicator. Continue wetting material during removal and clean up phases.
- .4 Wet isolation barriers, fold toward inside, sides facing work area. Prepare for disposal and dispose of as contaminated waste.
- .5 Air monitoring in removal area and a visual inspection by the [Province's own forces] [Environmental Consultant] must be completed prior to acceptance of the work.

3.3 REMOVAL OF CEILING TEXTURE (High-Risk Asbestos Removal Procedure) (Greater than 1 square foot (ft²))

- .1 Use full containment procedures in accordance with Section 02 82 05.
- .2 Completely remove ceiling texture, including over-spray dust and debris.
- .3 Saturate materials with amended water immediately before and during removal.
- .4 Where texture is covered with a coating and where practicable, pierce coating to permit saturation of contaminant with amended water. Where saturation is not possible, provide a continuous misting of amended water on affected areas during removal.
- .5 Wet isolation barriers, fold toward inside, sides facing work area. Prepare for disposal and dispose of as contaminated waste.
- .6 Air monitoring in removal area and a visual inspection by the [Province's own forces] [Environmental Consultant] must be completed prior to acceptance of the work.

3.4 REMOVAL OF CEILING TILES (High-Risk Asbestos Removal Procedure) (Greater than 100 square foot (ft²))

- .1 Remove ceiling tiles, dust and debris under full containment conditions in accordance with Section 02 82 05.
- .2 Lightly mist tile surfaces with amended water to contain fibres during removal and continue to wet materials during removal and cleanup.
- .3 Wet isolation barriers, fold toward inside, sides facing work area. Prepare for disposal and dispose of as contaminated waste.
- .4 Air monitoring in removal area and a visual inspection by the [Province's own forces] [Environmental Consultant] must be completed prior to acceptance of the work.

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- 3.5 REMOVAL OF VINYL ASBESTOS SHEET FLOORING (High-Risk Asbestos Removal Procedure) (Greater than 100 square foot (ft²))**
- .1 Use full containment procedures in accordance with Section 02 82 05, Containment Procedures.
 - .2 Cover adjacent flooring within containment area with minimum 150 micrometers thick sheet polyethylene. Continuously tape perimeter and joints.
 - .3 Remove contaminated flooring systematically.
 - .4 Remove sheet flooring with backing layer as follows:
 - .1 cut flooring into approximately 600 mm x 600 mm squares.
 - .2 wet thoroughly with amended water and let soak for minimum one hour. Re-wet if drying before removal.
 - .3 carefully peel up squares and place into asbestos disposal bags.
 - .4 manually remove backing layer, using hand scraper and immediately place into asbestos disposal bags. Continue to wet flooring with amended water during removal.
 - .5 use VOC free glue remover to remove what cannot be scrapped.
 - .6 leave no remnants adhered to subfloor.
 - .5 Wet isolation barriers, fold toward inside, sides facing work area. Prepare for disposal and dispose of as contaminated waste.
 - .6 Air monitoring in removal area and a visual inspection by the [Province's own forces] [Environmental Consultant] must be completed prior to acceptance of the work.
- 3.6 REMOVAL OF DRYWALL CONTAINING ASBESTOS JOINTING CEMENT (High-Risk Asbestos Removal Procedure) (Greater than 100 square foot (ft²))**
- .1 Use full containment procedures in accordance with Section 02 82 05.
 - .2 All people within the work area shall be wearing Tyvek disposable coveralls and half face negative air respirator equipped with P100 filters.
 - .3 Lightly saturate materials with amended water immediately before and during removal using an airless spray applicator. Where saturation is not possible, provide a continuous misting of amended water on affected areas during removal.
 - .4 Once work is complete, all workers should remove Tyvek disposable coverall and discard as asbestos debris into double 150 micrometer asbestos disposal bags. Workers should then wash head, face and exterior of respirator thoroughly before removing the respirator.
 - .5 Dispose of all asbestos debris bags at the nearest sanitary landfill site which accepts asbestos.
 - .6 Air monitoring in removal area and a visual inspection by the [Province's own forces] [Environmental Consultant] must be completed prior to acceptance of the work.

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3.7 REMOVAL OF PIPE AND EQUIPMENT INSULATION (High-Risk Asbestos Removal Procedure) (Greater than 1 square foot (ft²))

- .1 Remove insulation using full containment procedures in accordance with Section 02 82 05.
- .2 Preclean any asbestos debris with HEPA vacuum and wet wiping if previous damage found.
- .3 Remove insulation in small sections.
- .4 Vacuum visible debris from insulation jacket and saturate insulation with amended water.
- .5 Cut and remove insulation jacket, applying a mist of amended water to contaminated surfaces as jacket is removed to keep airborne asbestos fibres at the lowest practicable level. Keep surfaces wet during this operation.
- .6 Immediately place contaminated jacket into disposal bag and resoak asbestos insulation.
- .7 Where applicable, remove wire mesh holding insulation together. Dispose of wire mesh as asbestos waste.
- .8 Wet isolation barriers, fold toward inside, sides facing work area. Prepare for disposal and dispose of as contaminated waste.
- .9 Air monitoring in removal area and a visual inspection by the [Province's own forces] [Environmental Consultant] must be completed prior to acceptance of the work.

3.8 REMOVAL OF VERMICULITE INSULATION (High-Risk Asbestos Removal Procedure) (Greater than 1 square foot (ft²))

SPEC NOTE: Seek Structural Engineer's advice if concrete block walls will be damaged or demolished to access vermiculite in wall cores.

- .1 Remove vermiculite insulation, dust and debris under full containment procedures in accordance with Section 02 82 05.
- .2 Seal all penetrations to prevent vermiculite insulation release.
- .3 Bulk removal can be done by HEPA filtered vacuum truck, or hand shoveling insulation into asbestos disposal containers. If hand shoveling, use amended water to mist removal area as insulation is being removed (to reduce fibre and dust levels).
- .4 Removal of vermiculite insulation within concrete block walls an asbestos waste bag is taped to the wall to catch the draining material. Then a hole is made in the concrete block wall. As insulation drains into the bag, the waste in the bag should be wetted down.
- .5 After bulk removal is completed, remove residual vermiculite insulation and dust by:
 - Wet cleaning thoroughly with amended water and / or, HEPA vacuuming (using portable vacuums).
- .6 Ensure no vermiculite insulation debris and dust remains on any surfaces.
- .7 Wet isolation barriers, fold toward inside, sides facing work area. Prepare for disposal and dispose of as contaminated waste.

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- .8 Air monitoring in removal area and a visual inspection by the [Province's own forces] [Environmental Consultant] must be completed prior to acceptance of the work.

3.9 REMOVAL OF FLOOR LEVELLING COMPOUND (High-Risk Asbestos Removal Procedure) (Greater than 1 square foot (ft²))

- .1 Remove floor levelling compound including covering adhesives, dust and debris under full containment conditions in accordance with Section 02 82 05.
- .2 Pierce covering material such as adhesives to permit saturation of contaminated material with amended water.
- .3 Immediately prior to commencing removal, spray materials with amended water until saturated, using an airless spray applicator. Continue wetting material during removal and clean up phases.
- .4 Use non-powered hand scrapers to remove floor levelling compound. Continue to wet floor levelling compound with amended water during removal.
- .5 Bag floor levelling compound as it is removed.
- .6 After removal, clean removal area with damp mop or HEPA vacuum.
- .7 Air monitoring in removal area and a visual inspection by the [Province's own forces] [Environmental Consultant] must be completed prior to acceptance of the work.

3.10 GLOVEBAG REMOVAL OF PIPE INSULATION (Moderate-Risk Asbestos Removal Procedure)

- .1 Remove pipe insulation using glovebag method in accordance with glovebag manufacturer's recommendations and "Safe Work Procedures". Take care to avoid cutting glovebags.
- .2 Use zippered Glovebag as follows:
- .1 to remove asbestos material from live feed and condensate steam lines, and other piping transmitting fluids at similar temperatures.
- .2 to sequentially remove contaminated material from more than one glovebag length along piping.
- .3 Otherwise use either zippered or non-zippered glovebags, at Contractor's option.
- .4 Install drop sheet beneath work area prior to commencing work.
- .5 When ready to dispose of glovebag, pull disposal bag over glove bag attached to pipe. Undo zipper to open top of glove bag and fold it down into disposal bag.
- .6 When stripping is complete, spray surfaces from which asbestos pipe insulation has been removed (prior to removal of bag from pipe) with asbestos sealer lock down to seal any asbestos fibres left on surface. Ensure surfaces are dry prior to spraying. Clean up with HEPA vacuum and wet wiping.
- .7 Air monitoring in glove bag removal area and a visual inspection by the [Province's own forces] [Environmental Consultant] must be completed prior to acceptance of the work.

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3.11 REMOVAL OF ASBESTOS BASE SHEET FROM ASPHALT SHINGLE ROOFS (Moderate-Risk Asbestos Removal Procedure)

- .1 Remove asphalt shingles and building paper layers. Avoid disturbing contaminated base sheet. Discard shingles and building paper as normal construction debris.
- .2 Immediately place into asbestos disposal containers, any asbestos base sheet which is disturbed.
- .3 Prevent asbestos contaminated material from blowing off the roof.
- .4 Starting at ends, remove dry contaminated base sheet material by rolling up the layers. As the material is rolled up, pick up debris and nails and place into the roll.
- .5 Immediately place rolled contaminated base sheet into asbestos disposal containers.
- .6 Carefully remove residual mechanically fastened pieces of base sheet and place into asbestos disposal containers.
- .7 Apply new asphalt to provide a complete seal over difficult to remove adhered base sheet material.
- .8 Air monitoring in removal area and a visual inspection by the [Province's own forces] [Environmental Consultant] must be completed prior to acceptance of the work.

3.12 REMOVAL OF DRYWALL CONTAINING ASBESTOS JOINTING CEMENT (Moderate-Risk Asbestos Removal Procedure) (Less than 100 square foot (ft²))

- .1 Cordon off work area using barricade tape and signage or close door to work area. No one is allowed into area during work unless wearing personal equipment as described in 5.
- .2 Drape door openings in work area with 150 micrometre polyethylene sheeting and duct tape.
- .3 Provide 150 micrometre polyethylene drop sheet directly below area where drywall is to be removed to catch debris.
- .4 Pre-mark area of drywall to be removed.
- .5 All people within the work area shall be wearing Tyvek disposable coveralls and half face negative air respirator equipped with P100 filters.
- .6 Lightly wet drywall to be removed with amended water. Use non powered hand tools to cut out and remove drywall. Continue wetting cut line with amended water as drywall is cut out.
- .7 Clean up all debris and dust on polyethylene sheeting by wet wiping techniques, fold polyethylene in upon itself and remove polyethylene from work area. Dispose of polyethylene sheeting as asbestos debris in double 150 micrometer asbestos disposal bags and duct tape seal.
- .8 HEPA vacuum or wet wipe work area, and all people within work area (for decontamination), before exiting the area.
- .9 Once work is complete, all workers should remove Tyvek disposable coverall and discard as asbestos debris into double 150 micrometer asbestos disposal bags. Workers should then wash head, face and exterior of respirator thoroughly before removing the respirator.

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- .10 Dispose of all asbestos debris bags at the nearest sanitary landfill site which accepts asbestos.
- .11 Air monitoring in removal area and a visual inspection by the [Province's own forces] [Environmental Consultant] must be completed prior to acceptance of the work.

3.13 CUT AND WRAP REMOVAL OF INSULATED PIPE FITTINGS (Low-Risk Asbestos Removal Procedure)

SPEC NOTE: Asbestos insulation is typically found at pipe fittings, with straight runs often being non-asbestos insulation, e.g., glass fibre.

- .1 Install drop sheet beneath work area prior to commencing work.
- .2 Remove sections of non-asbestos insulation 150-300 mm beyond both ends of asbestos-containing insulation.
- .3 Wrap entire contaminated insulated fitting with minimum two layers of 150 micrometre thick sheet polyethylene. Tape seal joints and around pipe exposed by removal of non-asbestos insulation.
- .4 Cut through pipe to permit removal of polyethylene wrapped, insulated fitting.
- .5 Clean up contaminated debris using a HEPA filtered vacuum or by wet cleaning.
- .6 Air monitoring in removal area and a visual inspection by the [Province's own forces] [Environmental Consultant] must be completed prior to acceptance of the work.

3.14 REMOVAL OF VINYL ASBESTOS TILE FLOORING (Low-Risk Asbestos Removal Procedure)

- .1 De-activate HVAC system or, subject to Province's approval, isolate part of HVAC system in affected area.
- .2 Provide sheet polyethylene isolation barriers. Tape over openings in walls, ceilings and floors to prevent the spread of asbestos fibres to other work areas.
- .3 Wet floor tiles with amended water before removing.
- .4 Use non-powered hand scrapers to remove floor tile. Continue to wet floor tile with amended water during removal.
- .5 Bag contaminated floor tile as it is removed.
- .6 After removal, clean removal area with damp mop or HEPA vacuum.
- .7 Wet isolation barriers, fold toward inside, sides facing work area. Prepare for disposal and dispose of as contaminated waste.

3.15 REMOVAL OF ASBESTOS BLACK ROOF TAR (Low-Risk Asbestos Removal Procedure)

- .1 Wet roofing materials with amended water before removing.

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- .2 Remove roofing materials down to concrete structure. Immediately place into asbestos disposal containers.
- .3 Prevent asbestos contaminated material from blowing off the roof.
- .4 After removal, clean removal area with HEPA vacuum or damp mop.

3.16 REMOVAL OF ASBESTOS EXTERIOR CAULKING (Low-Risk Asbestos Removal Procedure)

- .1 Provide sheet polyethylene isolation barriers. Tape over openings in scaffolding to prevent the spread of asbestos fibres to other work areas on the levels below.
- .2 Wet caulking with amended water before removing.
- .3 Use non-powered hand scrapers or hook knives to remove caulking. Continue to wet caulking with amended water during removal.
- .4 Bag contaminated caulking as it is removed.
- .5 After removal, clean removal area with damp mop or HEPA vacuum.
- .6 Wet isolation barriers, fold toward inside, sides facing work area. Prepare for disposal and dispose of as contaminated waste.

3.17 OUTDOOR REMOVAL

- .1 Ensure weather conditions are safe for workers performing the removal. For more information, refer to the following Government of Alberta publication: Best Practice – Working Safely in Heat and Cold (GS006).
- .2 Mobile decontamination facilities, special work platforms and other specialized equipment may be required for outdoor removal.
- .3 Air monitoring to be taken by the [Province’s own forces] [Environmental Consultant] for each shift including downwind from removal area and around workers in removal area. Personal sampling of workers performing the outside removal is also taken at least once a day.

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3.18 ASBESTOS REMOVAL SCHEDULE

Location	Substrate	Type of Application	Asbestos Type & Percentage	Removal Method
[]	[]	[]	[]	[Full containment] [or] [Glovebag] []

SPEC NOTE: Specify locations in terms which are easily identifiable, such as room number, major building areas or other identification methods which are used on drawings to delineate asbestos control area.

SPEC NOTE: Identify substrate from which asbestos is to be removed, for example: walls, ceilings, mechanical piping, columns, beams, joists, and underside of decking.

SPEC NOTE: Identify type of asbestos application which is to be removed, for example:

- Spray Applied Fireproofing
- Ceiling Tiles
- Pipe Insulation
- Equipment Insulation

SPEC NOTE: Identify type of asbestos and percentage of material by weight, for example, 30% Chrysotile, 10% Amosite, 5% Crocidolite.

SPEC NOTE: Specify Contractor options for removal method. If no option allowed, indicate method to be used. Coordinate with articles specifying type of material to be removed.

END OF SECTION