



Sampling for asbestos

Bulk sample collection and analysis

Bulk sample analysis

Methods currently accepted by WorkSafeBC for asbestos bulk sample analysis include the following:

- Asbestos, Chrysotile by XRD, NIOSH Method 9000 (Issue 2, dated August 15, 1994) in the *NIOSH Manual of Analytical Methods*, published by the United States National Institute for Occupational Safety and Health, Centers for Disease Control and Prevention
- Asbestos (bulk) by PLM, NIOSH Method 9002 (Issue 2, dated August 15, 1994)
- Test Method for the Determination of Asbestos in Bulk Building Materials (EPA/600/R-93/116, dated July 1993), published by the United States Environmental Protection Agency (EPA)
- Research Method for Sampling and Analysis of Fibrous Amphibole in Vermiculite Attic Insulation (EPA/600/R-04/004, dated January 2004), published by the EPA

These methods include requirements for laboratory equipment, calibration, quality control, and results reporting. Samples should be analyzed by an accredited asbestos laboratory. At a minimum, the laboratory must be a participant in a quality-control program.

Laboratory reporting

Laboratories should clearly report what method they are using (for example, EPA 600/R-93/116 or NIOSH 9002), and the method must be one of those listed above.

EPA 600/M4-82-020 (a 1982 interim asbestos bulk analysis method) is not acceptable and is not referenced in the Occupational Health and Safety Regulation. The 1993 method is an improvement over the 1982 method because it includes a requirement to analyze multiple layers as well as an enhanced analysis for floor tiles and materials that contain low concentrations of asbestos.

Use of laboratories outside of B.C.

Laboratories outside of British Columbia must be informed that materials containing 0.5% asbestos or more are considered asbestos-containing materials in B.C.

Most laboratories include explanatory notes with each analytical result, which should be seriously considered. For example: “This sample was analyzed without gravimetric reduction prior to point counting. It is recommended that the sample be further analyzed by gravimetric point counting.”

How to quantify asbestos percentages below 0.5%

To quantify asbestos percentages below 0.5%, one of the following analytical procedures should be used:

- 400-point count plus gravimetric reduction
- 1,000-point count
- Analytical transmission electron microscopy (TEM) plus gravimetric reduction

A 200-point count (a standard analytical technique offered by many laboratories outside of B.C.) would not be acceptable because the limit of detection is only 0.5%. Using this method, a result of less than 0.5% would still be considered asbestos containing in B.C.

Confidence intervals should be included or be available upon request. For example, a result of 0.3% asbestos with 95% confidence limits of $\pm 0.3\%$ may be considered asbestos containing due to analytical variation ($0.3\% + 0.3\% = 0.6\%$).

Point counting does not apply to the EPA vermiculite method. Any Libby amphiboles detected using this method would identify the material as asbestos containing. This would include actinolite and tremolite asbestos, as well as other asbestiform mineral types, such as richterite and winchite.

In order to confirm a “no asbestos detected” result for a vermiculite sample, transmission electron microscopy (TEM) or scanning electron microscopy (SEM) must be used as described in the EPA vermiculite method.

Bulk sample collection

In order to ensure adequate material is collected for the laboratory to perform bulk asbestos analysis, the amounts listed in the table below should be submitted:

Material	Minimum amount
Asphalt shingles	5 cm x 5 cm (2 in. x 2 in.)
Roofing felt	5 cm x 5 cm (2 in. x 2 in.) — All layers must be collected, down to the sheathing.
Asbestos cement board	5 cm x 5 cm (2 in. x 2 in.)
Floor tile, linoleum, asphalt flooring	5 cm x 5 cm (2 in. x 2 in.)
Ceiling tiles	5 cm x 5 cm (2 in. x 2 in.)
Mechanical insulation (piping)	50 cm ³ (3 cu. in.) — All layers must be collected, down to the pipe.
Asbestos ropes, gaskets, wires, etc.	5 linear cm (2 linear in.) or 5 cm x 5 cm (2 in. x 2 in.)
Levelling compounds and mortars	50 cm ³ (3 cu. in.)
Mastics and putties	15 cm ³ (1 cu. in.)
Texture coats and stuccoes	50 cm ³ (3 cu. in.)
Drywall mud	5 cm x 5 cm (2 in. x 2 in.) — Mud only, do not include gypsum board or drywall tape.
Vermiculite insulation	4 L (1 gal.) — Collect from the top to the bottom of the application to get a representative sample.
Sprayed insulation (for example, sprayed fireproofing)	50 cm ³ (3 cu. in.)
Other sprayed materials	1 full, small zip-lock bag
Other non-friable products	5 cm x 5 cm (2 in. x 2 in.)

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