

York University Asbestos Air Sampling Protocol June 14, 2006

This protocol explains the process and the standards used by York University in determining the airborne asbestos concentration. The fundamental principle informing the protocol is the health and safety of the University community.

Where asbestos air testing is required under the legislation, it will be conducted in accordance with the prescribed methods in the *Regulation respecting Asbestos (O.Reg.837)* and the *Regulation on Asbestos on Construction Projects and in Buildings and Repair Operations (O.Reg.278/05)* made under the *Occupational Health and Safety Act*.

Air sampling is used to test for the concentration of airborne asbestos in and around the workplace. Air sampling often involves two steps: (a) capturing all air borne fibres of a certain size on a filter; and (b) a laboratory analysis of the fibre samples to determine the quantity and/or types of fibres. Air sampling for asbestos can also be performed using direct reading equipment.

1. Air Sampling Methods for Asbestos:

Phase Contrast Microscopy (PCM)

A pre-calibrated pump is used to draw in a steady amount of air through a filter, which collects airborne fibres. The filter is then sent to a laboratory and examined using phase contrast microscopy. This method counts all fibres (e.g., asbestos, cellulose, fiberglass etc.) and will not distinguish between fibre types. Results (expressed in the number of fibres per cubic centimeter of air) can be obtained in a few days. This technique is described in the O.Reg.278/05 for clearance air testing in Type 3 asbestos operations and in O.Reg.837 for determining occupational exposure level.

Transmission Electron Microscopy (TEM)

TEM samples are collected in a similar manner to PCM. It uses higher magnification and can determine the types of asbestos fibres. This method is expensive and not widely available. Currently filter samples are sent to the United States for analysis. Results can be obtained in days or weeks. This technique is described in the O.Reg.278/05 for clearance air testing in Type 3 asbestos operations.

Fibrous Aerosol Monitor (FAM)

In addition to the PCM and TEM microscopy method, fibres can also be sampled by a device called the Fibrous Aerosol Monitor (FAM) which is described in the Ontario Ministry of Labour *Designated Substances in the Workplace: A Guide to the Asbestos Regulation for Construction Projects, Buildings and Repair Operations*.

The Fibrous Aerosol Monitor (FAM) is a delicate portable device that instantaneously analyses the fibre content in the air. The device counts all fibres, includes asbestos and non-asbestos and will not distinguish fibre types. This device is used in the industry when instantaneous (e.g., 10-minute sample) or continuous measurement (e.g., 100-minute sample) may be useful, e.g., monitoring the integrity of an enclosure by placing the FAM machine outside the enclosure; immediate checking for fibre contamination level; determining area for evacuation and seal-up etc. This method is referred to in the Ontario Ministry of Labour guideline but not in the regulation.

2. Exposure Limits to Asbestos

According to the *Regulation respecting Asbestos (O.Reg.837)*, the time-weighted average exposure of a worker to any of the forms of airborne asbestos shall not exceed 0.1 fibres/cc of air.

(The Ontario Time-weighted average exposure for asbestos is identical to the Threshold Limit Value (TLV) enforced by the U.S. Occupational Safety and Health Administration. The TLV is defined as the average airborne concentration under which it is believed that nearly all workers may be repeatedly exposed, day after day, over a working lifetime, without adverse health effects.)

In the case of Type 3 asbestos operations, clearance air tests prescribed under the *Regulation on Asbestos on Construction Projects and in Buildings and Repair Operations (O.Reg.278/05)* must show a concentration of asbestos fibres in all samples collected which *does not* exceed 0.01 fibres/cc of air.

3. Protocols

In accordance with the Occupational Health and Safety Act, every reasonable effort will be made to provide sufficient advance notice to relevant Joint Health and Safety Committee (JHSC) worker members or representatives of air testing in order to enable them to be present at the beginning of the testing.

3.1. Clearance Air Testing for Type 3 asbestos operation

York University will follow the detailed procedure as outlined in the regulation O.Reg.278/05 sec. 18(6)(1-7) using the **PCM** method.

As stated in the regulation, forced air will be used and at least 2,400 litres of air will be collected inside the enclosure. The number of samples to be collected will be in accordance to the regulation. If the area inside the enclosure fails the first test, the samples will be subjected to a second analysis using **TEM**. In such a circumstance, the work area inside the enclosure will be deemed to have “passed” the clearance air test only if every air sample collected has a concentration of asbestos fibres which does not exceed the legislated limit of 0.01 f/cc of air.

If the work area inside the enclosure fails the clearance air test, the enclosure will remain in place. The inner surface of the enclosure and the work area inside the enclosure will be cleaned by a thorough washing or by vacuuming using a High Efficiency Particulate Air (HEPA) filter. Equipment and tools shall either be cleaned with a damp cloth or a HEPA vacuum or placed in a labeled dust tight container. Before another test is carried out, the work area will be visually inspected and allowed to dry.

Once the clearance air test has “passed,” the enclosure will be removed and the area will be clear for occupancy.

Within 24 hours after the clearance air testing results are received and, where relevant and practicable, in the morning before the start of classes, a copy of the results will be posted on the Facilities Services and DOHS websites. A copy of the results will also be provided to the relevant JHSC or health and safety representative.

3.2. Air testing for situations other than as prescribed for Type 3 asbestos operations

Although there are no legislative requirements to conduct air monitoring for work other than type 3, the University may conduct air monitoring after type 2 work involving maintenance and/or renovation work, depending on the nature and scope of the work.

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Air sampling will be undertaken using PCM or FAM in accordance with the Department of Occupational Health and Safety Protocol (Refer to I. Air Sampling Methods for Asbestos above).

For such testing, an “action” threshold of 0.05 fibre/cc will be used, as this concentration is 50% of the permissible occupational exposure level of 0.1 fibre/cc. If the test result indicates that total fibre concentration exceeds 0.05 f/cc, all work possibly disturbing asbestos will be stopped and the area will be thoroughly cleaned and retested. The area will continue to be re-cleaned and retested until the concentration of asbestos fibres is at or below 0.05 f/cc.

In the event that the initial PCM or FAM test shows a concentration of airborne fibers higher than 0.1 f/cc, the area will be evacuated and will be cleared for re-occupancy only once the concentration of airborne fibers is shown to be no greater than 0.1 f/cc.

Within 24 hours following receipt of air testing results and, where relevant and practicable, in the morning before the start of classes, a copy of the results will be posted on the Facilities Services and DOHS website. In addition, a hard copy of the test results will be provided to the relevant JHSC or health and safety representative.