MASSACHUSETTS DEPARTMENT OF
LABOR STANDARDS

TEM Analysis of Non Friable Asbestos In Schools
Frequently-Asked Questions

Is TEM required to analyze non-friable bulk samples in schools?

If schools are going to sample non-friable organically bound (NOB) materials, the use of Transmission Electron Microscopy (TEM) would be the state-of-the-art industry standard. TEM has been used to complement Polarized Light Microscopy (PLM) analysis, and in some states, both are required to classify a material as non-asbestos (i.e., NY ELAP 198.4).

The volume of complaints regarding floor tiles in schools has escalated, and maintenance staff need assurance from the LEA that they are not being exposed during the course of their duties.

It would be perfectly acceptable to assume that non-friable materials are ACM, such as floor tiles, and only test them if they are damaged and need to be replaced. A product information sheet indicating the floor tile content is also acceptable for new tiles.

Why is TEM being used to analyze nonfriable materials?

1. **Accuracy**

   TEM is a highly accurate method for asbestos analysis that can identify asbestos fibers in challenging organically bound materials. This method is particularly useful when dealing with materials where asbestos, if present, is tightly bound to the matrix material, making it difficult to isolate and detect through PLM.

2. **Fiber Morphology**

   The PLM method may not detect asbestos fibers smaller than 0.2 microns in diameter. As NOB materials often contain fine, thin asbestos fibers less than 0.1 microns in diameter, TEM analysis (such as the NY ELAP 198.4 method), which uses TEM at higher magnification, is crucial for accurate detection.

3. **Concentration**

   When the concentration of asbestos fibers is low (less than 10%), particularly in NOB materials, detection of these fibers, which may be heavily coated by the matrix, could result in a false negative using PLM.

Do all non-friable materials analyzed by PLM need to be re-analyzed by TEM?

It is not necessary to resample non-friable materials that tested positive for asbestos by PLM. It is also acceptable to assume all non-friable materials are ACM.

In cases where NOBs tested negative for asbestos using PLM, or were assumed ACM, and those materials are damaged or will be disturbed during removal or repair, those materials would be analyzed by TEM.

Due to the accuracy of TEM in identifying the small thin fibers that are difficult to isolate when deeply embedded in a matrix, the use of this method can minimize false negative results. Ultimately, the protection of building occupants is the goal, and TEM analysis provides assurance to school or municipal employees who maintain, repair or replace floor tiles that they are not being exposed to asbestos materials.

Can we still use PLM to analyze non-friable ACM?

Yes, PLM can be used as identification if the material shall remain in place undisturbed. However, prior to any disturbance, such as renovation, alteration, demolition or removal, these materials must have confirmatory sampling performed by TEM. This policy is consistent with the EPA March 14, 2024, guidance document indicating the statistical variance and unreliable quantitative results of PLM analysis of non-friable ACM.

How many samples are required for TEM bulk sample analysis?

The sampling protocols in 454 CMR 28.13(3)(b)5,6 should be followed when collecting samples for TEM analysis. The licensed inspector must collect bulk samples from each homogeneous area of miscellaneous materials and non-friable materials in a manner sufficient to determine whether the material is ACM or not ACM. Therefore, more than one sample would be collected from a homogeneous area.