

23 January 2020

Daniel Friedman
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Re: EMSL Order ID: 042000629 (TEM Qualitative Filtration)

Daniel:

On 14 January, 2020, one (1) bulk sample was received at EMSL Analytical, Inc. in Cinnaminson, NJ. The sample was sent for analysis via TEM Qualitative Filtration. The sample was logged in following normal lab procedures. The sample was received under Chain of Custody and in good condition. A unique laboratory identification number was assigned to the sample. Below is a summary with a more detailed description.

Sample Number	EMSL Sample ID	Sample Description
0007	042000629-0007	Vermiculite, Zonolite

Analytical Approach

The sample was analyzed for asbestos TEM Qualitative Filtration.

Preparation 1- The sample is immersed in a container and agitated by sonication or physical shaking. An aliquot of the solution is either filtered through a secondary filter, or deposited directly onto pre-prepped TEM grids with a micro pipette.

This method is for the determination of asbestos content in bulk material, dust, soil, vermiculite, etc. by transmission electron microscopy (TEM).

The sample was put into a 250 mL sample container, 175 mL of fiber-free DI water was then added. The container is sealed and vigorously shaken for thirty to sixty seconds, and then left to settle until the majority of the sample has sunken to the bottom, and floated to the top of the container. An aliquot is then removed from the middle of the container and added to a 100 mL container and brought up to a volume of 100mL using fiber-free DI water. The solution is stirred and filtered through



0.45 μm MCE filter with a 5.0 μm MCE backing. The Filter is then dried, then collapsed onto a glass slide using acetone vapor and plasma etched. A thin layer of carbon was then deposited on the sample- bearing surface of the filter. The actual sample is thus imbedded in the carbon and the filter supporting the sample was dissolved on a Jaffe Wick using acetone. The carbon film is then left, suspended on a copper grid, ready for inspection in a TEM.

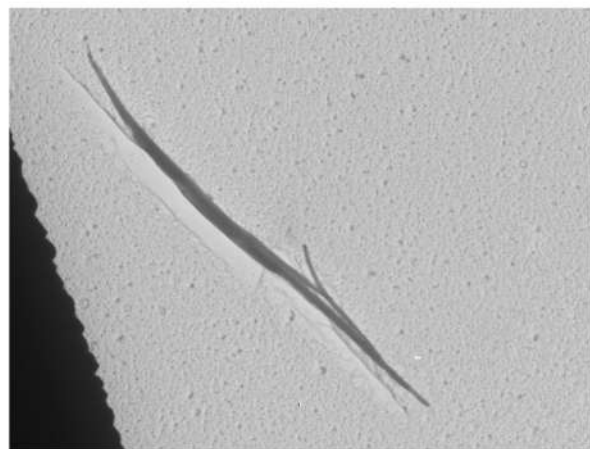
Results (TEM)

The samples were analyzed with a transmission electron microscope (TEM) at approximately 20,000 X magnification. Asbestos structures are identified by a combination of morphology, quantitative elemental chemistry via Energy Dispersive X-Ray Analysis (EDXA), and Selected Area Electron Diffraction (SAED).

042000629-0007

During TEM examination asbestos was detected on the sample.

Transmission Electron Microscopy (TEM)



Detection Limit and Interference

This examination is limited to the conditions and practices observed and information provided to EMSL Analytical, Inc. The method used, conclusions and recommendations are based on our experience. They are subject to the limitations and variability inherent to the approach used. This examination is limited to the defined scope and does not purport to set forth all hazards, nor indicate that other hazards do not exist.

The detection limit for Transmission Electron Microscopy (TEM) via EPA 600/R-93/116 is based on fiber dimensions, the density of the asbestos type(s) detected and the area analyzed. Interferences for this method include but are not limited to: Non-regulated asbestos minerals such as the two polymorphs of chrysotile, lizardite and antigorite; Non-regulated amphiboles such as winchite and richterite, and pyroxenes; cleavage fragments of the regulated asbestos types which may at times have morphologies and aspect ratios similar to the true asbestiform varieties; clay minerals that can have similar morphology to asbestos such as sepiolite and palygorskite; and all non-asbestos particulate, fibrous or not, which can partially or completely obscure asbestos fibers. Samples that were tested for this report are subject to the limitations expressed herein.

I certify that this data package is in compliance with the terms and conditions of the contract, both technically and for completeness, for other than the conditions detailed above. In addition, I certify, that to the best of my knowledge and belief, the data as reported are true and accurate. Release of the data contained in this data package has been authorized by the Laboratory Manager or his designee, as verified by the following signature.



Samantha Rundstrom | Asbestos Supervisor

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