

23 January 2020

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Re: EMSL Order ID: 042000629 (PLM NYS 198.6 NOB and TEM NYS 198.4 NOB)

Daniel:

On 14 January, 2020, two (2) bulk samples were received at EMSL Analytical, Inc. in Cinnaminson, NJ. The samples were sent for analysis via PLM NYS 198.6 (<1%) & TEM NYS 198.4 (<1%). The samples were logged in following normal lab procedures. The samples were received under Chain of Custody and in good condition. A unique laboratory identification number was assigned to each sample tested. A summary is below with more detailed description.

Sample Number	EMSL Sample ID	Sample Description
006-Floor Tile	042000629-0006	Kennett Floor Tile
006-Mastic	042000629-0006A	Mastic

Analytical Approach

These sample were analyzed for asbestos by PLM NYS 198.6 (<1%) & TEM NYS 198.4 (<1%).

Phase 1- Subsamples was taken from each sample and were then analyzed by PLM NYS 198.6 (<1%) for the presence or absence and quantification (if any) of asbestos

Phase 2- If asbestos was not detected on the PLM analysis at a level greater than 1%, a subsample was taken from each non-organically bound sample and gravimetrically reduced. The gravimetrically reduced material was analyzed by TEM NYS 198.4 (<1%).



The method employed is typically used for the determination of asbestos concentrations in bulk building material by polarized light microscopy (PLM) or by transmission electron microscopy (TEM).

For PLM, samples are initially examined under low magnification using stereo microscopy. Initial observations note gross material appearance (homogeneity, fibrous/non-fibrous) and physical characteristics (color, texture, friable/non-friable). Preparation using various techniques, including, but not limited to, pinch mounts which is followed by analysis by polarized light microscopy (PLM) are used for the positive identification of suspect fibers and quantitation. Positive identification of asbestos requires the determination of optical property characteristics of the six types of regulated asbestos: chrysotile, amosite (grunerite), crocidolite (riebeckite), anthophyllite, tremolite and actinolite asbestos.

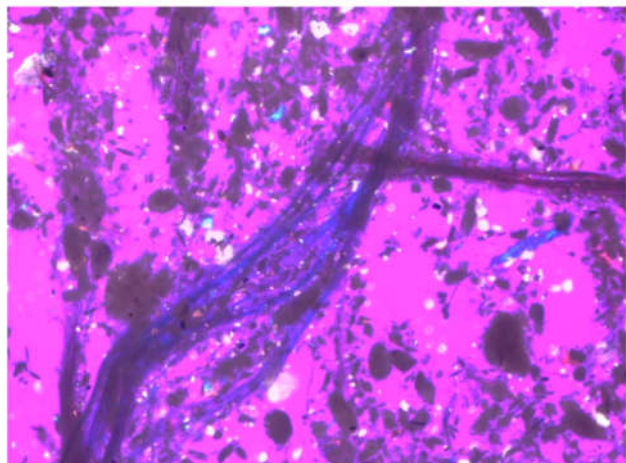
For TEM, an aliquot of the material is organically reduced. This is performed on the sample by ashing (using a muffle furnace), followed by acid digestion to remove the carbonate mineral. Mass determinations are recorded after each step, determining the percent loss for each type of matrix material. The reduced sample is analyzed for asbestos following TEM analysis by being dropped mounted on a copper grid.

Phase 1 Results (PLM)

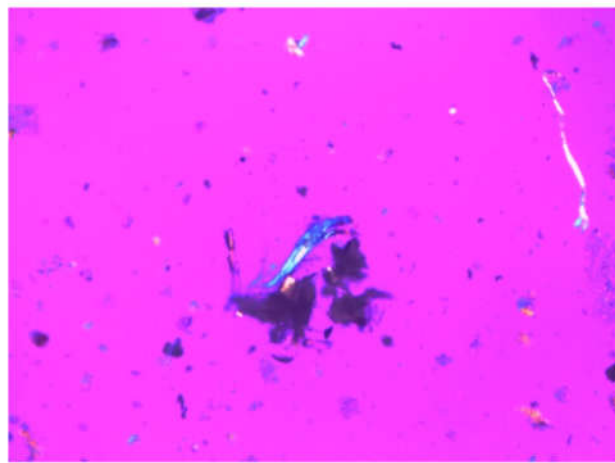
During PLM examination asbestos structures were observed on samples three, four, five, and nine. And, no asbestos was detected on samples one, two, eight, ten, eleven, twelve, thirteen, and fourteen as described in EPA/600/R-93/116, Appendix A (Please see attached report).



Phase 1- Polarized Light Microscopy (PLM)



Sample 6-Floor Tile



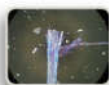
Sample 6-Mastic

Phase 2 Results (TEM)

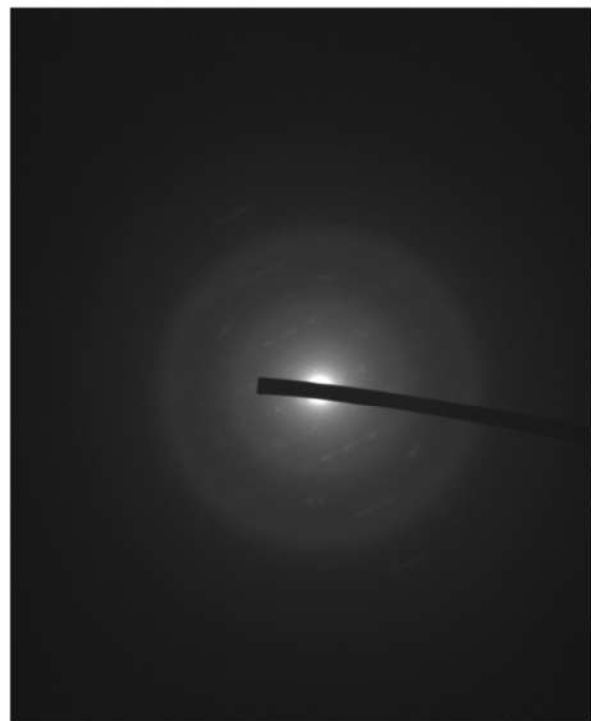
The non-organically bound samples were analyzed with a transmission electron microscope (TEM) at approximately 20,000 X magnification. Asbestos structures are identified by a combination of morphology, quantitative elemental chemistry via Energy Dispersive X-Ray Analysis (EDXA), and Selected Area Electron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

042000629-0006A

During TEM examination Chrysotile asbestos was detected. The total concentration was <1% (see attached report).



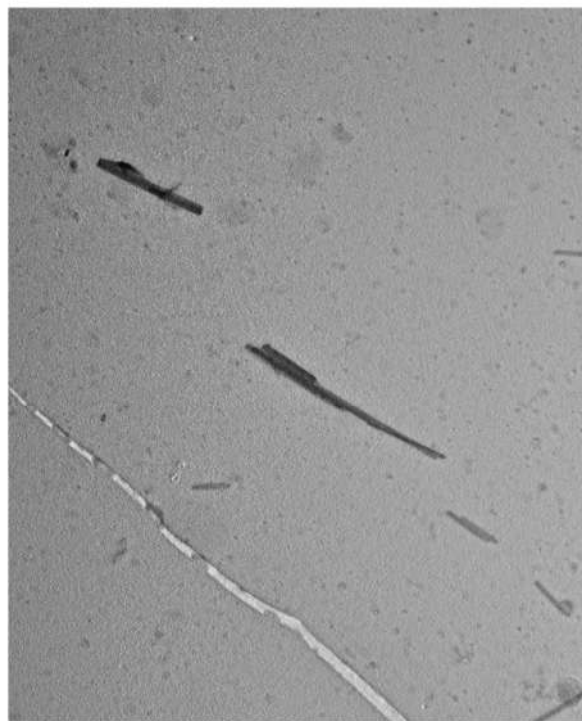
Phase 2- Transmission Electron Microscopy (TEM)



sbestos_125
42000629
006A
8:43:35 1/23/2020
Microscopist: pharrison

0.2 (1/Å)
Cam Len: 1.0000 m
AMT Camera System

Sample 6-Mastic



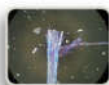
sbestos_126
42000629
006A
8:52:55 1/23/2020
Microscopist: pharrison

600 nm
Direct Mag: 25000x
AMT Camera System

Sample 6-Mastic

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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