



ASBESTOS TEM LABORATORIES, INC.

**AHERA Clearance
Transmission Electron Microscopy
Analytical Report**

Laboratory Job # 643-306

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ASBESTOS TEM LABORATORIES, INC

Accredited by
U.S. Dept. of Commerce

NVLAP
CA DOHS ELAP

Feb/19/2003

Mr. Jack Anderson
ABC Consultants
5499 West "A" Street
Burlingame, CA 94111

RE: LABORATORY JOB # 643-306

Transmission electron microscopy analytical results for 5 air sample(s).

Job Site: Sky West High School

Job No.: ABC-123

Enclosed please find results for the TEM analysis of one or more AHERA CLEARANCE air samples. The analytical procedures were performed according to the AHERA protocol described in 40 CFR Part 763, Appendix A to Subpart E regarding TEM clearance air samples from schools. The following table gives an average value of the test results.

Ave. Asbestos Structure Conc. per sq. mm
54.1

Prior to analysis, samples are checked for damage and disruption of the chain-of-custody seal. Samples are then logged-in, each given a unique laboratory number, and a hard copy containing all pertinent information is generated. This, and all other relevant paper work are kept with each sample throughout the analytical procedures to assure proper analysis.

Preparation of air filter cassettes is performed within a HEPA filtered, Class 100 air, laminar flow clean bench environment. Cassettes are wet-wiped to remove any external contamination prior to placement into the clean bench area. Sections of the filters are removed, placed onto glass microscope slides, and collapsed in acetone vapor. The collapsed filters are plasma etched, removing the surface of the filter to a depth of ten percent of its original thickness, then carbon coated. The filters are further sectioned and placed carbon side up onto 200-mesh copper TEM sample grids in an acetone wick washer to remove filter material. The grids are placed into labeled containers and loaded into the microscope for analysis.

TEM analysis is performed on a Philips EM-300 transmission electron microscope operating at 80 or 100 kV, with a magnification of 18,000X. A known area of the specimen surface is scanned for fibrous structures. All structures exhibiting an aspect ratio greater than or equal to 5 to 1, and a length greater than or equal to 0.5 um are subjected to detailed morphological and selected area diffraction (SAED) analysis. Structures indicated as asbestos, or potentially asbestos, are further analyzed by energy dispersive X-ray (EDX) analysis as needed. Analysis continues until 50 asbestiform structures are found, an analytical sensitivity of less than 0.005 structures per cubic centimeter of air is obtained, or 7 grid openings have been analyzed. Data is compiled into a standard AHERA report format and subjected to a thorough quality assurance check before the information is released to the client.

Sincerely Yours,

Laboratory Manager
ASBESTOS TEM LABORATORIES, INC.

--- These results relate only to the samples tested and must not be reproduced, except in full, with the approval of the laboratory. This report must not be used to claim product endorsement by NVLAP or any other agency of the U.S. Government. ---

TRANSMISSION ELECTRON MICROSCOPY ANALYTICAL REPORT

AHERA Analysis Method

Contact:	Mr. Jack Anderson	Report No.:	<u>34142</u>
Address:	ABC Consultants	Date:	<u>Oct-11-02</u>
	5499 West "A" Street	Date Received:	<u>Oct-10-02</u>
	Burlingame, CA 94111		
Job Site / No.	Sky West High School ABC-123	Total Samples Analyzed:	<u>5</u>

CLIENT SAMPLE #	<u>BL-IN-1</u>	SAMPLE LOCATION
Laboratory Sample #	<u>643-306-001</u>	<div style="border: 1px solid black; height: 20px; width: 100%;"></div>

AIR FILTER DATA		AIR PUMP DATA	
Type	<u>MCE0.45um</u>	Time (min)	<u> </u>
Diameter (mm)	<u>25</u>	Flow Rate (lpm)	<u> </u>
Area (sq mm)	<u>385</u>	Volume (liters)	<u>1064</u>

IDENTIFIED STRUCTURES				CALCULATED ASBESTOS STRUCTURE CONCENTRATION			
ASBESTOS		OTHER		Per CC Air			Per sq mm
CHRY.S.	AMPH.	AMBIG.	NON-ASB.	< 5um	> 5um	TOTAL	Filter
<u>3</u>	<u>2</u>	<u>ND</u>	<u>ND</u>	<u>0.014</u>	<u>0.009</u>	<u>0.023</u>	<u>64.4</u>

COMMENTS

Chrysotile and Amosite Asbestos Detected	FILTER LOADING: MODERATE SAED PHOTO ID #s.
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TEM / ANALYTICAL PARAMETERS			
Magnification:	<u>18,000X</u>	<u>ANALYTICAL SENSITIVITY</u>	
Grid Openings Scanned	<u>8</u>	Structures/sq mm	<u>12.9</u>
Grid Opening Area (sq.mm.)	<u>0.0097</u>	Structures/cc	<u>0.005</u>
Scan Area (sq.mm.)	<u>0.08</u>		

NOTATION KEY

Chrys. - Chrysotile Asbestos	ND - None Detected	
Amph. - Amphibole Asbestos	1 um = 1 micron = 0.001 mm	<u>ANALYST SIGNATURE</u>
Ambig. - Ambiguos ID	1 mm = 1 millimeter	
Non-Asb. - Non-Asbestos	1 cc = 1 cubic centimeter	<u>LAB MANAGER SIGNATURE</u>
	1 sq.mm = 1 square millimeter	

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CLIENT SAMPLE #	<u>BL-IN-2</u>	SAMPLE LOCATION
Laboratory Sample #	<u>643-306-002</u>	

AIR FILTER DATA		AIR PUMP DATA	
Type	<u>MCE0.45um</u>	Time (min)	<u> </u>
Diameter (mm)	<u>25</u>	Flow Rate (lpm)	<u> </u>
Area (sq mm)	<u>385</u>	Volume (liters)	<u>1064</u>

IDENTIFIED STRUCTURES				CALCULATED ASBESTOS STRUCTURE CONCENTRATION			
ASBESTOS		OTHER		Per CC Air			Per sq mm
CHRY.S.	AMPH.	AMBIG.	NON-ASB.	< 5um	> 5um	TOTAL	Filter
<u>4</u>	<u>ND</u>	<u>ND</u>	<u>ND</u>	<u>0.019</u>	<u>< 0.005</u>	<u>0.019</u>	<u>51.5</u>
COMMENTS							
Chrysotile Asbestos Detected				FILTER LOADING: MODERATE SAED PHOTO ID #s.			

TEM / ANALYTICAL PARAMETERS			
Magnification:	<u>18,000X</u>	<u>ANALYTICAL SENSITIVITY</u>	
Grid Openings Scanned	<u>8</u>	Structures/sq mm	<u>12.9</u>
Grid Opening Area (sq.mm.)	<u>0.0097</u>	Structures/cc	<u>0.005</u>
Scan Area (sq.mm.)	<u>0.08</u>		

NOTATION KEY

Chrys. - Chrysotile Asbestos	ND - None Detected	
Amph. - Amphibole Asbestos	1 um = 1 micron = 0.001 mm	<u>ANALYST SIGNATURE</u>
Ambig. - Ambiguos ID	1 mm = 1 millimeter	
Non-Asb. - Non-Asbestos	1 cc = 1 cubic centimeter	<u>LAB MANAGER SIGNATURE</u>
1 sq.mm = 1 square millimeter		

TRANSMISSION ELECTRON MICROSCOPY ANALYTICAL REPORT

AHERA Analysis Method

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CLIENT SAMPLE #	<u>BL-IN-3</u>	SAMPLE LOCATION
Laboratory Sample #	<u>643-306-003</u>	

AIR FILTER DATA		AIR PUMP DATA	
Type	<u>MCE0.45um</u>	Time (min)	<u> </u>
Diameter (mm)	<u>25</u>	Flow Rate (lpm)	<u> </u>
Area (sq mm)	<u>385</u>	Volume (liters)	<u>1064</u>

IDENTIFIED STRUCTURES				CALCULATED ASBESTOS STRUCTURE CONCENTRATION			
ASBESTOS		OTHER		Per CC Air			Per sq mm
CHRY.S.	AMPH.	AMBIG.	NON-ASB.	< 5um	> 5um	TOTAL	Filter
<u>4</u>	<u>ND</u>	<u>ND</u>	<u>ND</u>	<u>0.019</u>	<u>< 0.005</u>	<u>0.019</u>	<u>51.5</u>
COMMENTS							
Chrysotile Asbestos Detected				FILTER LOADING: HEAVY SAED PHOTO ID #s.			

TEM / ANALYTICAL PARAMETERS			
Magnification:	<u>18,000X</u>	<u>ANALYTICAL SENSITIVITY</u>	
Grid Openings Scanned	<u>8</u>	Structures/sq mm	<u>12.9</u>
Grid Opening Area (sq.mm.)	<u>0.0097</u>	Structures/cc	<u>0.005</u>
Scan Area (sq.mm.)	<u>0.08</u>		

NOTATION KEY

Chrys. - Chrysotile Asbestos	ND - None Detected	
Amph. - Amphibole Asbestos	1 um = 1 micron = 0.001 mm	ANALYST SIGNATURE
Ambig. - Ambiguos ID	1 mm = 1 millimeter	
Non-Asb. - Non-Asbestos	1 cc = 1 cubic centimeter	LAB MANAGER SIGNATURE
1 sq.mm = 1 square millimeter		

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CLIENT SAMPLE #	<u>BL-IN-4</u>	SAMPLE LOCATION
Laboratory Sample #	<u>643-306-004</u>	

AIR FILTER DATA		AIR PUMP DATA	
Type	<u>MCE0.45um</u>	Time (min)	<u> </u>
Diameter (mm)	<u>25</u>	Flow Rate (lpm)	<u> </u>
Area (sq mm)	<u>385</u>	Volume (liters)	<u>1064</u>

IDENTIFIED STRUCTURES				CALCULATED ASBESTOS STRUCTURE CONCENTRATION			
ASBESTOS		OTHER		Per CC Air			Per sq mm
CHRY.S.	AMPH.	AMBIG.	NON-ASB.	< 5um	> 5um	TOTAL	Filter
<u>6</u>	<u>ND</u>	<u>ND</u>	<u>ND</u>	<u>0.028</u>	<u>< 0.005</u>	<u>0.028</u>	<u>77.3</u>
COMMENTS							
<u>Chrysotile Asbestos Detected</u>				<u>FILTER LOADING: HEAVY SAED PHOTO ID #s.</u>			

TEM / ANALYTICAL PARAMETERS			
Magnification:	<u>18,000X</u>	<u>ANALYTICAL SENSITIVITY</u>	
Grid Openings Scanned	<u>8</u>	Structures/sq mm	<u>12.9</u>
Grid Opening Area (sq.mm.)	<u>0.0097</u>	Structures/cc	<u>0.005</u>
Scan Area (sq.mm.)	<u>0.08</u>		

NOTATION KEY

Chrys. - Chrysotile Asbestos	ND - None Detected	
Amph. - Amphibole Asbestos	1 um = 1 micron = 0.001 mm	<u>ANALYST SIGNATURE</u>
Ambig. - Ambiguos ID	1 mm = 1 millimeter	
Non-Asb. - Non-Asbestos	1 cc = 1 cubic centimeter	<u>LAB MANAGER SIGNATURE</u>
1 sq.mm = 1 square millimeter		

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	5499 West "A" Street	Date Received:	<u>Oct-10-02</u>
Burlingame, CA 94111	Total Samples Analyzed:		<u>5</u>
Job Site / No.	Sky West High School ABC-123		

CLIENT SAMPLE #	<u>BL-IN-5</u>	SAMPLE LOCATION
Laboratory Sample #	<u>643-306-005</u>	

AIR FILTER DATA		AIR PUMP DATA	
Type	<u>MCE0.45um</u>	Time (min)	<u> </u>
Diameter (mm)	<u>25</u>	Flow Rate (lpm)	<u> </u>
Area (sq mm)	<u>385</u>	Volume (liters)	<u>1064</u>

IDENTIFIED STRUCTURES				CALCULATED ASBESTOS STRUCTURE CONCENTRATION			
ASBESTOS		OTHER		Per CC Air			Per sq mm
CHRYS.	AMPH.	AMBIG.	NON-ASB.	< 5um	> 5um	TOTAL	Filter
<u>2</u>	<u>ND</u>	<u>ND</u>	<u>ND</u>	<u>0.009</u>	<u>< 0.005</u>	<u>0.009</u>	<u>25.8</u>
COMMENTS							
Chrysotile Asbestos Detected				FILTER LOADING: HEAVY SAED PHOTO ID #s.			

TEM / ANALYTICAL PARAMETERS			
Magnification:	<u>18,000X</u>	<u>ANALYTICAL SENSITIVITY</u>	
Grid Openings Scanned	<u>8</u>	Structures/sq mm	<u>12.9</u>
Grid Opening Area (sq.mm.)	<u>0.0097</u>	Structures/cc	<u>0.005</u>
Scan Area (sq.mm.)	<u>0.08</u>		

NOTATION KEY

Chrys. - Chrysotile Asbestos	ND - None Detected	
Amph. - Amphibole Asbestos	1 um = 1 micron = 0.001 mm	<u>ANALYST SIGNATURE</u>
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