



**ASBESTOS TEM LABORATORIES, INC.**

**ASTM D5755 Microvac Dust Method  
Transmission Electron Microscopy  
Analytical Report**

**Laboratory Report # 34715**

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ASBESTOS TEM LABORATORIES, INC

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NVLAP  
CA DOHS ELAP

Feb/20/2003

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

RE: LABORATORY REPORT # 34715

Transmission electron microscopy analytical results for 3 microvac dust sample(s).  
Job Site: 1900 East Fairway Drive, Menlo Park, CA  
Job No.: 346-798

Enclosed please find results for the TEM analyses of one or more microvac dust samples. The analytical procedures followed during the analyses were performed according to the ASTM D5755-95 "Standard Test Method for Microvacuum Sampling and Indirect Analysis of Dust by Transmission Electron Microscopy for Asbestos Structure Number Concentrations".

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. The dust from inside the cassette is then transferred into a glass specimen bottle by a series of rinses using a 50/50 mixture of particle free water and reagent alcohol which are screened through a 1mm X 1mm screen. The volume of liquid is brought up to 50-100ml and the pH of the suspension is adjusted to between 3 to 4 using a 10% acetic acid solution. The solution is then filtered through a clean glass filtration apparatus onto a 25 mm diam. MCE filter with a 0.22um pore size. The filters are removed from the apparatus and dried. After drying, a section of the filter is removed, placed onto a glass microscope slide, 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 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 an analytical sensitivity of 1000 asbestos structures per sq. cm is achieved, or 100 asbestiform structures are found, or 10 grid openings have been analyzed. Data is compiled into a standard report format and subjected to a thorough quality assurance check before the information is released to the client.

Sincerely Yours,

Laboratory Manager

--- 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

ASTM METHOD D5755 - MICROVAC DUST

Contact: Mr. Jack Anderson	REPORT NO. <b>34715</b>
Address: ABC Consultants 5499 West "A" Street Burlingame, CA 94111	Date: <u>Nov-22-02</u>
Job Site / No. 1900 East Fairway Drive, Menlo Park, CA 346-798	Date Received: <u>Nov-21-02</u>
Total Samples Analyzed: 3	

SAMPLE DESCRIPTION	
Client Sample # <span style="border: 1px solid black; padding: 2px;">077-MV-001</span>	Surface dust; above, West entry to kitchen
Laboratory Sample # <span style="border: 1px solid black; padding: 2px;">628-014-001</span>	

SAMPLE PREPARATION PARAMETERS			
Area Sampled (sq.cm.):	<u>100</u>	Filter Type & Pore Size	<u>MCE 0.22um</u>
Volume of Suspension Solution (ml):	<u>50</u>	Effective Filter Area (sq.mm):	<u>201</u>
Volume of Suspension Filtered (ml):	<u>15</u>		

ASBESTOS STRUCTURES DETECTED IN SCAN AREA		CALCULATED ASBESTOS STRUCTURE CONCENTRATION PER SQ. CM.		
<b>CHRYBOTILE</b>	<b>AMPHIBOLE</b>	<b>CHRYBOTILE</b>	<b>AMPHIBOLE</b>	<b>TOTAL</b>
<b>NSD</b>	<b>73</b>	<b>&lt; 276</b>	<b>5037</b>	<b>5037</b>

**COMMENTS**

Amosite Asbestos Detected

TEM / ANALYTICAL PARAMETERS			
Grid Ops. Scanned	<u>10</u>	Grid Op.Area (sq.mm)	<u>0.0097</u>
		Scan Area (sq.mm)	<u>0.097</u>
Analytical Sensitivity (Asb. Struc./sq.cm.)	<u>69</u>	Detection Limit* (Asb. Struc. / sq.cm. )	<u>276</u>
		Magnification:	<u>18,000X</u>

\* The ASTM 5755 method defines the detection limit as a count of a minimum of four asbestos structures.

**NOTATION KEY**

Chrys. - Chrysotile Asbestos	1 mg = 1 milligram
Amph. - Amphibole Asbestos	1 ml = 1 milliliter
NSD - None Detected	1 pg = 1 picogram = 1billionth of a gram
NA - Not Applicable	1 cm = 0.01 meter= 10 mm
Non-Asb. - Non-Asbestos	

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**Analyst Signature**

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**Lab Manager Signature**

# TRANSMISSION ELECTRON MICROSCOPY ANALYTICAL REPORT

ASTM METHOD D5755 - MICROVAC DUST

Contact: Mr. Jack Anderson	REPORT NO. <b>34715</b>
Address: ABC Consultants 5499 West "A" Street Burlingame, CA 94111	Date: <u>Nov-22-02</u>
Job Site / No. 1900 East Fairway Drive, Menlo Park, CA 346-798	Date Received: <u>Nov-21-02</u>
Total Samples Analyzed: 3	

SAMPLE DESCRIPTION	
Client Sample # <span style="border: 1px solid black; padding: 2px;">077-MV-002</span>	Surface dust; above, North side freezer
Laboratory Sample # <span style="border: 1px solid black; padding: 2px;">628-014-002</span>	

SAMPLE PREPARATION PARAMETERS			
Area Sampled (sq.cm.):	<u>100</u>	Filter Type & Pore Size	<u>MCE 0.22um</u>
Volume of Suspension Solution (ml):	<u>50</u>	Effective Filter Area (sq.mm):	<u>201</u>
Volume of Suspension Filtered (ml):	<u>1</u>		

ASBESTOS STRUCTURES DETECTED IN SCAN AREA		CALCULATED ASBESTOS STRUCTURE CONCENTRATION PER SQ. CM.		
<b>CHRYBOTILE</b>	<b>AMPHIBOLE</b>	<b>CHRYBOTILE</b>	<b>AMPHIBOLE</b>	<b>TOTAL</b>
<b>NSD</b>	<b>NSD</b>	<b>&lt; 4144</b>	<b>&lt; 4144</b>	<b>&lt; 4144</b>

**COMMENTS**

No Asbestos Detected

TEM / ANALYTICAL PARAMETERS			
Grid Ops. Scanned	<u>10</u>	Grid Op.Area (sq.mm)	<u>0.0097</u>
		Scan Area (sq.mm)	<u>0.097</u>
Analytical Sensitivity (Asb. Struc./sq.cm.)	<u>1036</u>	Detection Limit * (Asb. Struc. / sq.cm. )	<u>4144</u>
		Magnification:	<u>18,000X</u>

\* The ASTM 5755 method defines the detection limit as a count of a minimum of four asbestos structures.

**NOTATION KEY**

Chrys. - Chrysotile Asbestos	1 mg = 1 milligram
Amph. - Amphibole Asbestos	1 ml = 1 milliliter
NSD - None Detected	1 pg = 1 picogram = 1billionth of a gram
NA - Not Applicable	1 cm = 0.01 meter= 10 mm
Non-Asb. - Non-Asbestos	

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**Analyst Signature**

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**Lab Manager Signature**

# TRANSMISSION ELECTRON MICROSCOPY ANALYTICAL REPORT

ASTM METHOD D5755 - MICROVAC DUST

Contact: Mr. Jack Anderson	REPORT NO. <b>34715</b>
Address: ABC Consultants 5499 West "A" Street Burlingame, CA 94111	Date: <u>Nov-22-02</u>
Job Site / No. 1900 East Fairway Drive, Menlo Park, CA 346-798	Date Received: <u>Nov-21-02</u>
Total Samples Analyzed: 3	

SAMPLE DESCRIPTION	
Client Sample # <span style="border: 1px solid black; padding: 2px;">077-MV-003</span>	Surface dust; above, East entry to kitchen
Laboratory Sample # <span style="border: 1px solid black; padding: 2px;">628-014-003</span>	

SAMPLE PREPARATION PARAMETERS			
Area Sampled (sq.cm.):	<u>100</u>	Filter Type & Pore Size	<u>MCE 0.22um</u>
Volume of Suspension Solution (ml):	<u>50</u>	Effective Filter Area (sq.mm):	<u>201</u>
Volume of Suspension Filtered (ml):	<u>1</u>		

ASBESTOS STRUCTURES DETECTED IN SCAN AREA		CALCULATED ASBESTOS STRUCTURE CONCENTRATION PER SQ. CM.		
<b>CHRYBOTILE</b>	<b>AMPHIBOLE</b>	<b>CHRYBOTILE</b>	<b>AMPHIBOLE</b>	<b>TOTAL</b>
<b>NSD</b>	<b>123</b>	<b>&lt; 10360</b>	<b>318570</b>	<b>318570</b>

**COMMENTS**

Amosite Asbestos Detected

TEM / ANALYTICAL PARAMETERS			
Grid Ops. Scanned	<u>4</u>	Grid Op.Area (sq.mm)	<u>0.0097</u>
		Scan Area (sq.mm)	<u>0.0388</u>
Analytical Sensitivity (Asb. Struc./sq.cm.)	<u>2590</u>	Detection Limit * (Asb. Struc. / sq.cm. )	<u>10360</u>
		Magnification:	<u>18,000X</u>

\* The ASTM 5755 method defines the detection limit as a count of a minimum of four asbestos structures.

**NOTATION KEY**

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Amph. - Amphibole Asbestos	1 ml = 1 milliliter
NSD - None Detected	1 pg = 1 picogram = 1billionth of a gram
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**Analyst Signature**

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**Lab Manager Signature**