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DATE: 1976

DOC#: TCA008

DOCUMENT DESCRIPTION: Consultant Inspection Test Report #1740A

REPORT

of

INDUSTRIAL HYGIENE TEST

for

ASBESTOS FIBERS

conducted at

TILE COUNCIL OF AMERICA

PRINCETON, N.J.

on

November 9, 1976

TEST REPORT #1740 A

Prepared by:

RC

ROSSNAGEL & ASSOCIATES

Engineering & Testing Consultants

1999 Rt. 70 • Cherry Hill, N.J. 08003

(609) 424-4440

Distribution:
Mr. F. Bernett,
Mgr. of Research
(2 copies)
Mr. Bob Kleinans,
Mgr. Technical
Service

Report Issued: December 3, 1976
Report Revised: January 28, 1977. Pages 1,2,3,4,6,7.1,7.2,8,9,10-10.55, 11,12

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I

INTRODUCTION

Tile Council of America requested ROSSNAGEL & ASSOCIATES to conduct industrial hygiene tests specifically for asbestos fibers at its plant in Princeton, N.J., as per Proposal #76-210, dated October 12, 1976.

The sampling was conducted on Tuesday, November 9, 1976. Samples were taken, by means of approved Personal Air Samplers, from an employee working in the Mixing Room to simulate mixing conditions. The exposure to Johns-Manville asbestos fiber (Crysotile) occurs when a dry powder of silica and asbestos is mixed.

Mr. Bill Cashel wore the Personal Sampling unit during the test.

The testing was done according to procedures established by O.S.H.A. as referenced in our paper entitled "O.S.H.A. Fiber & Mineral Dust Tests."

The RESULTS & CONCLUSIONS are in Section II. Section III contains a DESCRIPTION OF TEST. Section IV contains all the CALCULATIONS and Section V contains all the DATA SHEETS, including an Events Log.

ROSSNAGEL & ASSOCIATES wishes to thank Mr. Bill Cashel and Mr. Bob Kleinans who willingly assisted whenever requested.

ROSSNAGEL & ASSOCIATES issued Rev. A to this report following a helpful communication from Mr. F. Bernett.

Note: This report pertains only to the samples or sources tested. Information contained herein is not to be reproduced, outside of the Buyer's company, in whole or in part, without the prior written approval of ROSSNAGEL & ASSOCIATES, or the Buyer.

II

RESULTS & CONCLUSIONS

RESULTS

The results of the Asbestos Fiber Counting Test are shown in Table I below:

ASBESTOS FIBER COUNTING RESULTS

Sample No.	Personal Sample No.	Location/ Activity	FIBERS 5 μ or longer with an aspect ratio of at least 3:1					
			Total Fiber Count	Avg. Net Fiber Count	Concentration Fibers/ ml (1)	Allowable Limit Fibers/ ml	Extrapolated TWA Fibers/ ml (2)	Allowable Limit for TWA
1	P_1	Bill Cashel, 15 minutes, Mortar B	7	.058	.331	Ceiling Concentration ~~Limit~~ is 10 fibers/ ml since 7/1/76.		
2	P_2	Stationary Sample, 15 min. Mortar B	8	.080	.570			
3	P_3	Bill Cashel, 15 minutes, Mortar C	19	.158	.901			
4	P_4	Stationary Sample, 15 min. Mortar C	25	.178	1.01			
5	P_5	Bill Cashel, 15 minutes, Mortar A	8	.067	.382			
6	P_6	Station'y Sample 2 hrs., Mortar A	31	.310	.221		.221	2 fibers/ ml
7	P_7	Bill Cashel, Heavy Dust Cond. 15 min. Mortar A	60	.600	3.42			

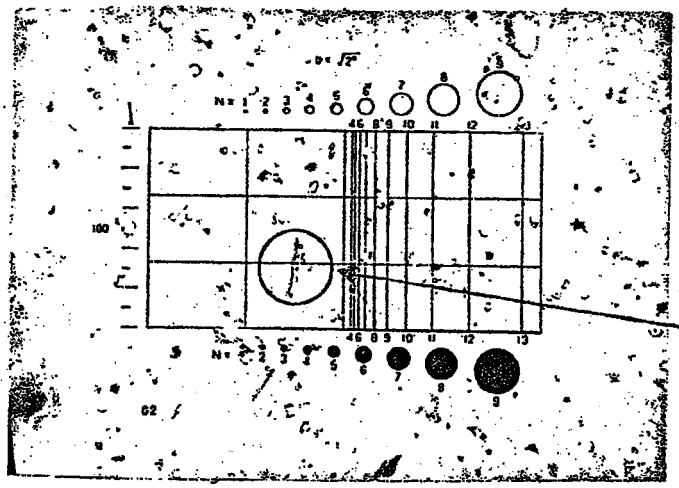
TABLE I

* Not Applicable

Notes: 1) Concentration of fibers/ml is calculated on basis of sample volume and area of membrane filter and microscope field area.

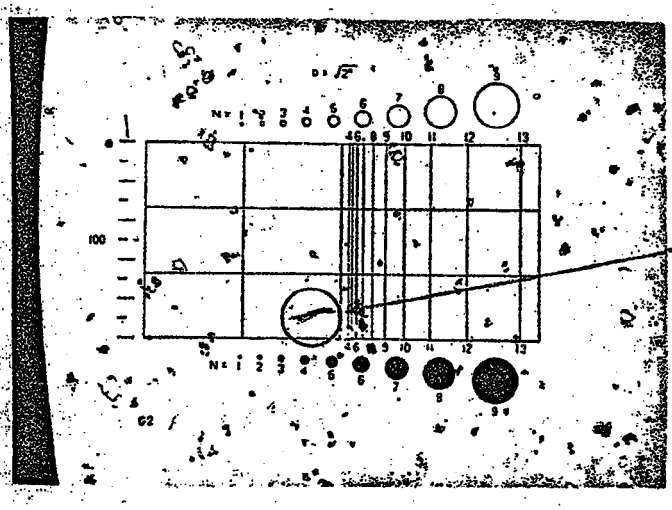
2) Extrapolated TWA is a mathematical calculation. TWA is Time Weighted Average.

TILE COUNCIL OF AMERICA
PRINCETON, N.J.



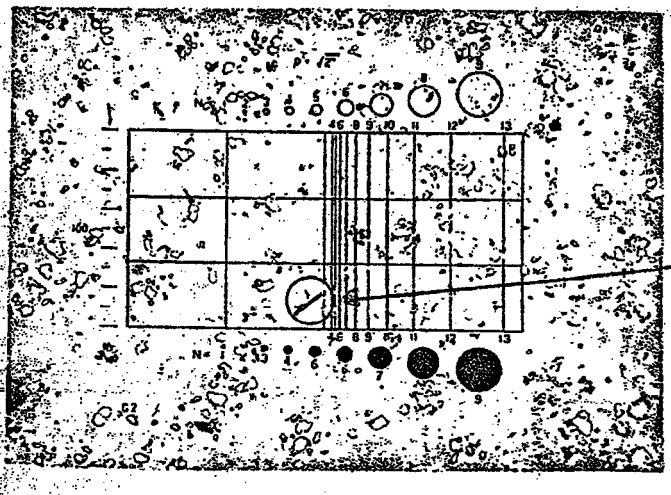
Photomicrograph showing an asbestos fiber and some background dust particles. Note the split at one end. Characteristic of asbestos.

This fiber is about 18 microns.



Photomicrograph showing a feathered asbestos fiber.

This fiber is about 16 microns.



Photomicrograph showing an asbestos fiber and numerous dust particles.

This fiber is about 12 microns.

All photomicrographs are taken at 520X magnification using phase contrast optics.

CONCLUSIONS

Table I shows that Samples #1 through #5 and #7 for the day sampled, November 9, 1976, are within the allowable limit of exposure to asbestos dust concentrations of ten fibers (ceiling concentration) for a minimum of 15 minutes in any hour of any working day. It also shows that Sample #6 (and others) is within the allowable Time Weighted Average exposure limit of 2 fibers/ml. The backup Time Weighted Average calculations are shown in Section IV for each run. It is based on asbestos exposure during the time sampled.

We have reviewed the Tile Council of America's letter, dated December 8, 1976, but can find no reason for the much lower fiber counts on P_5, P_6 and P_7 in this test as compared with the prior Test Report #1481.

We took the liberty in our reports of indicating that even a test of 15 minutes may be within the 2 fiber/ml limit for the longer TWA tests. Perhaps the confusion came because we provided the TWA results for all seven samples when it was only required for Sample #6.

The national emission standard effective July 1, 1976, for asbestos, published in FEDERAL REGISTER, Vol. 40, No. 197, Pages 47652-47665 by O.S.H.A., establishes the permissible exposure limit as two fibers for an 8-hour Time Weighted Average. These standards are now in effect.

O.S.H.A. presently requires periodic monitoring at intervals no longer than six months (membrane filter method). Medical surveillance is required for all workers who are exposed to asbestos as part of their work environment. Required components of a medical

surveillance program include periodic measurement of pulmonary function (forced vital capacity (FVC)), forced expiratory volume for 1 second (FEV_1) and periodic chest roentgenograms (posterior-anterior 14" x 17").

The use of respirators and protective clothing may vary depending on concentrations of asbestos dust at peak work intervals or based on Time Weighted Averages per testing interval. Recommendations for respirator types and protective clothing necessary when exposed to asbestos dust can be found in OCCUPATIONAL EXPOSURE TO ASBESTOS by NIOSH, 1972.

III

DESCRIPTION OF TEST

Mr. Edward Babiarz, Chemist/Biologist, and Mr. Don Frost, Lab Manager, conducted the sampling. They arrived at the plant at 10:45 A.M. The sampling was completed by 2:00 P.M. After a brief discussion with Mr. Frank Bernett and Mr. Bob Kleinans, Ed Babiarz and Don Frost left the plant.

Seven Millipore Membrane Filter Cassettes were utilized with the Bendix Personal Samplers to obtain the integrated samples. The membrane filter cassettes were returned to the lab for analysis. A representative section of the filter was cut, properly mounted on a glass microscope slide using a 1:1 mixture of dimethyl phthalate and diethyl oxalate and examined at a magnification of 400X using phase contrast optics. The number and length range of the fibers observed in a given area under the microscope was recorded and this figure was used to calculate the number of fibers per cubic centimeter (or milliliter) of air sampled.

Photomicrographs of asbestos fibers found were made to illustrate how the concentration of asbestos was visually counted. Fibers having an aspect ratio of 3:1 and which were 5 microns or larger were counted. A minimum of 20 fields was examined and then the fiber count totaled.

This is an exceedingly skilled and painstaking operation requiring 2-3 hours for each filter under microscopic examination.

IV

CALCULATIONS

Daily Time Weighted Average

Total Fiber Micron Size Distribution

Fiber Concentration

Field Offices
(215) 643-1650
(201) 839-4209

ROSSNAGEL & ASSOCIATES INC.

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Ohio Division
Envirolab Inc.
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Painesville, Ohio 44077
(216) 352-8318

Southeastern Division
250 Arizona Avenue N.E.
Atlanta, Georgia 30307
(404) 377-4248

AIR - WATER - NOISE
O.S.H.A. - ENERGY - WASTE

STACK & EXHAUST TESTING
DESIGN OF AIR / WATER / NOISE POLLUTION CONTROL SYSTEMS
- SPECIFICATIONS / DRAWINGS
- WATER POLLUTION TESTING
- CHEMICAL ANALYSIS
- GAS CHROMATOGRAPHY
- INDUSTRIAL HYGIENE (O.S.H.A.)

AN ALTERNATIVE TO REMOVING SPRAYED-ON ASBESTOS CEILINGS

Where an asbestos ceiling is high enough to preclude deliberate damaging by vandalism, ROSSNAGEL & ASSOCIATES recommends an alternative to complete removal and replacement of the ceiling. This other option is the consolidation of the asbestos substrate by application of a Hydrophobic Polyguard Asbestos Treatment as provided by the K.R.C. Research Corporation, 315 N. Washington Avenue, Moorestown, NJ 08057. (609) 234-3060, Attn: Mr. Edmund Drazga. This treatment dries in two hours without odor. It can be applied for a reasonable cost of $ .50-.60 per square foot.

Where a school hallway ceiling is only 8 ft. or so high and there is a history of vandalism on it (and it is believed that tighter school discipline cannot prevent more vandalism), then the sprayed-on ceiling should best be removed. If this is done, it is suggested that the school utilize the detailed Asbestos Ceiling Removal & Cleanup Procedure prepared by ROSSNAGEL & ASSOCIATES. This details the technique learned from several years of asbestos removal operations in industry, apartments and schools. For example, this procedure details how the washing solution should contain a humectant rather than a surfactant. The humectant does not dry out - but continues to draw moisture from the air to reduce the contamination levels.

Finally, ROSSNAGEL & ASSOCIATES reiterates the findings of the Mt. Sinai Hospital Medical Experts - that an asbestos ceiling which is not being vandalized or otherwise disturbed and is not flaking or powdering - then that ceiling is perfectly safe. If you are in doubt, then we suggest additional testing or use of the aforementioned type of ceiling treatments.

WBR/di
Form #RA-215A

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AIR - WATER - NOISE

- STACK & EXHAUST TESTING
- DESIGN OF AIR/WATER/NOISE POLLUTION CONTROL SYSTEMS
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- GAS CHROMATOGRAPHY
- INDUSTRIAL HYGIENE (O.S.H.A.)
- WATER POLLUTION TESTING

FIBERS
Asbestos
Silk
Hemp
Cotton
Wool
Rock Wool
Dacron
Rayon
Acetate
Fiberglass
Nylon
Orlon
Linen
Flocking
and others

DUSTS
Cement
Stone
Asphalt
Sand
Coal
Gypsum
PVC
Arsenic
Lead
Flour
Powders
Metals
Wheat
Chaff
Carbon
Hops
Fertilizer
Salts
Ores
and others

FUMES
Metals
Oxides
Smoke
Welding
Toxic
Sulfates
and others

DO YOU REQUIRE INDUSTRIAL HYGIENE, DUST, FIBER, FUME, NOISE, ODOR, TOXIC MATERIAL OR OTHER HYGIENE OR CONTAMINATION TESTS?

If you require such tests because of an O.S.H.A. citation or if you wish a survey or test data on known or suspected O.S.H.A. violations in your plant or school, ROSSNAGEL & ASSOCIATES can solve your problems. We do the basic testing using O.S.H.A./N.I.O.S.H. approved procedures and equipment - then we are available to follow-up by providing engineering designs/specifications to provide the equipment which will resolve the problems. After installation of the hoods or control equipment or modification of the process or existing exhaust system, ROSSNAGEL & ASSOCIATES will provide tests to certify if the original deficiency has been properly corrected.

ROSSNAGEL & ASSOCIATES has experience and special expertise in the following types of contamination problems:

- Dusts: on over 80 different kinds of dusts
- Fibers: any kind from any source, including asbestos
- Fumes: metal fumes, organic fumes and solvent fumes
- Noise: any kind of impulse, cyclical or continuous noise
- Odors: either in-plant or external to plant
- Toxicity: from cutting oils to medicine packaging to dental products
- Hygiene: from bacteria cultures to personnel monitoring for toxic substances using Rodac plates, plate count techniques, etc.
- Solvents: analysis or concentration levels for chemical plants and processes, dry cleaning, printing inks, stripping, paints, lacquers or textile operations.

"TEST IT FIRST SO YOU REALLY KNOW WHAT THE PROBLEM IS"

ROSSNAGEL & ASSOCIATES uses:

1) Certified Industrial Hygienists (A.I.H.A.) as staff associates for consultation and certification.

2) O.S.H.A. approved test equipment at its N.J., Ga. and Ohio Divisions.

3) N.I.O.S.H. procedures where available. Where not available, ROSSNAGEL & ASSOCIATES utilizes ASTM, AIHA or Standard Metho

4) Its own procedures to supplement field tests and lab analyses.

All our test and lab analysis work is done by graduate chemists/ biologists or microbiologists. Our professional staff is available to travel by test van or fly (commercial or private aircraft) to your plant(s).

We can provide complete lab services in our own certified lab, including backup photomicrographs, gas chromatography and atomic absorption and other analyses. We have our own wind tunnel and orifices for calibrating Personal and Ambient Samplers.

Finally, our staff holds the industry record for promptly phoning the analysis results to our clients and then confirming in the test reports. Ninety percent of all our written test reports are sent out within ten days, sometimes in as few as 2 days after completion of the test.

Our staff has published papers and procedures on the several subjects involved with this work. Copies of the following are available upon request:

1) "O.S.H.A. Fiber & Mineral Dust Tests"
2) "Gas Chromatographic Analysis of Organic Emissions"
3) Procedure #113A, "Checklist for O.S.H.A. Personal Sampling"

For further information contact:

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Lab Mgr.
Cherry Hill Office
(609) 424-4440

Keith Bentley,
Southeastern Div. Mgr.
Atlanta Office
(404) 377-4248

Charles Hildebrecht,
Midwest Mgr.
Painesville Office
(216) 352-8318

or call, W. B. Rossnagel, President
(609) 424-4440

ROSSNAGEL & ASSOCIATES was the firm which did all the widely publicized asbestos testing in Jan., 1977, for the N.J.D.E.P. at the Ramtown School in Mowell Township, N.J.

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Engineering & Testing Consultants
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b # 1740
b # 579
b. Name
Tile Council

ROSSNAGEL & ASSOCIATES

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Date Nov. 30, 1976
Made by MLK/mp
Checked by [illegible]

Description DAILY TIME WEIGHTED AVERAGE EXPOSURE

FORMULA:

$$\frac{(\text{HOURS} \times \text{CONC. TASK A}) - (\text{HOUR} \times \text{CONC. TASK B}) + \text{ETC}}{8 \text{ HOURS (OR ACTUAL HOURS WORKED)}}$$

PERSONAL SAMPLER #PS- FILTER #P-1 - MORTAR B

$$\text{TWA} = \frac{.34 \text{ fibers/ml} \times 15 \text{ min}}{15 \text{ min.}}$$

TWA = .34 fibers/ml

PERSONAL SAMPLER #PS- FILTER #P-2 - MORTAR B

$$\text{TWA} = \frac{.57 \text{ fibers/ml} \times 15 \text{ min}}{15 \text{ min.}}$$

TWA = .57 fibers/ml

PERSONAL SAMPLER #PS- FILTER #P-3- MORTAR C

$$\text{TWA} = \frac{.91 \text{ fibers/ml} \times 15 \text{ min}}{15 \text{ min.}}$$

TWA = .91 fibers/ml

PERSONAL SAMPLER #PS- FILTER #P-4- MORTAR C

$$\text{TWA} = \frac{1.0 \text{ fibers/ml} \times 15 \text{ min}}{15 \text{ min.}}$$

TWA = 1.0 fibers/ml

PERSONAL SAMPLER #PS- FILTER #P-5- MORTAR A

$$\text{TWA} = \frac{.4 \text{ fibers/ml} \times 15 \text{ ml}}{15 \text{ min.}}$$

TWA = .4 fibers/ml

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Form #RA-73A

Job # 1740
Job # 579
Job Name
Tile Council

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Engineering & Technical Consultants
1999 Rt. 70 • Cherry Hill, N. J. 08003

Date Nov. 30, 1976
Made by MKM
Checked by WDR

Description DAILY TIME WEIGHTED AVERAGE EXPOSURE

FORMULA:

(HOURS X CONC. TASK A) - (HOUR X CONC. TASK B) + ETC
8 HOURS (OR ACTUAL HOURS WORKED)

PERSONAL SAMPLER #PS- FILTER #P-6 - MORTAR A

TWA = $\frac{.22 \text{ fibers/ml} \times 120 \text{ MIN.}}{120 \text{ MIN.}}$

TWA = .22 fibers/ml

PERSONAL SAMPLER #PS- FILTER #P-7- MORTAR A

TWA = $\frac{3.42 \text{ fibers/ml} \times 15 \text{ MIN.}}{15 \text{ MIN.}}$

TWA = 3.42 fibers/ml

PERSONAL SAMPLER #PS- FILTER #P-

TWA =

TWA =

PERSONAL SAMPLER #PS- FILTER #P-

TWA =

TWA =

PERSONAL SAMPLER #PS- FILTER #P-

TWA =

TWA =

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250 ARIZONA AVE., N.E.
ATLANTA, GA. 30307

Form #DA-23A

Job # 1740
Lab # 597
Job Name Tile Council

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1999 Rt. 70 • Cherry Hill, N. J. 08003

Date November 29 1976
Made by MK Kimp
Checked by DAF

Description MILLIPORE MEMBRANE FILTER: PERSONAL SAMPLER #5
FILTER P-1

TOTAL PARTICLE OF FIBER MICRON SIZE DISTRIBUTION BY COUNT

MAGNIFICATION: 400X
TYPE RETICLE: PORTON

CLASSIFICATION: ASBESTOS FIBER
OPERATION: MORTAR B

SAMPLING TIME: 15 MIN
NO. OF FIELDS: 120

	PARTICLE SIZE OR FIBER LENGTH						
	<.5μ	.5-5μ	5-10μ	10-20μ	20-50μ	50-100μ	>100μ
TOTALS	0	4	3	0	0	0	0
PERCENT	0	57.1	42.9	0	0	0	0

TOTAL AVERAGE FIBER COUNT: .06
TOTAL FIBERS COUNTED: 7

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Job # 1140
Lab # 597
Job Name Tile Council

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Date Nov. 30, 1976
Made by M L Kinip
Checked by DJF

Description MILLIPORE MEMBRANE FILTER : PERSONAL SAMPLER # 5

FILTER # P-1

FORMULA:

$$\frac{(\text{AVERAGE NET COUNT})(171{,}000)}{\text{AIR VOLUME SAMPLED, ML.}} = \text{FIBERS/ML.}$$

SAMPLING RATE: 2.0 LPM

SAMPLING TIME: 15 MIN

SAMPLING VOLUME: = RATE X TIME
= 2.0 LPM X 15 MIN.
= 30 LITERS
= 30,000 ML

TOTAL FIBERS COUNTED: 7

AVERAGE NET COUNT (120 FIELDS): .058

CALCULATION:

$$\text{FIBER CONCENTRATION (5}\mu\text{ OR LONGER)} = \frac{.058 \times 171{,}000}{30{,}000} = .331 \text{ FIBERS/ML.}$$

Form #RA-73A

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(404) 377-4248

Lab # 597
Job # 1740
Job Name Tile Council
Sample Personal Sampler #5, Filter #R1

Date November 18, 1976
Made by MH Kimp
Checked by TOF

PARTICLE OR FIBER MICRON SIZE DISTRIBUTION BY COUNT

Magnification 400X
Classification Asbestos Fiber
Type Reticle Porton
Operation MORTAR B
Sampling Method Membrane Filter Sample Time 15 MIN.

Field No.	Lat.	Long.	PARTICLE SIZE OR FIBER LENGTH <.5 μ	.5-5 μ	5-10 μ	10-20 μ	20-50 μ	50-100 μ	>100 μ
1	97	35							
2	97	37							
3	98	36							
4	98	35							
5	98	34							
6	99	37							
7	99	36							
8	99	35							
9	99	34							
10	99	33							
11	100	37							
12	100	36							
13	100	35							
14	100	34							
15	100	33							
16	101	38							
17	101	37							
18	101	36							
19	101	35							
20	101	34							
Totals			0	0	0	0	0	0	0
Percent			0	0	0	0	0	0	0

Note: 1. Must count at least 100 fibers or a minimum of 20 fields.
2. Count only fibers having an aspect ratio of at least 3:1 and a length of 5 microns or larger.
3. Latitude is left-to-right on filter. Longitude is in-and-out on filt
4. This distribution IS NOT on a weight basis.

Average Fiber Count 0

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230 ARIZONA AVE., N.E.
ATLANTA, GA. 30307
(404) 377-4248

Lab # 597
Job # 1740
Job Name Tile Council
Sample Personal Sampler # 5 Filter # P-1

Date November 18 1976
Made by MY Kim
Checked by DFF

PARTICLE OR FIBER MICRON SIZE DISTRIBUTION BY COUNT

Magnification 400X
Classification Asbestos Filter
Type Reticle Porton
Operation MORTAR B
Sampling Method Membrane Filter Sample Time 15 min.

Field No.	Lat.	Long.	PARTICLE SIZE OR FIBER LENGTH						
			<.5 μ	.5-5 μ	5-10 μ	10-20 μ	20-50 μ	50-100 μ	>100 μ
1	101	33							
2	101	32							
3	102	38							
4	102	37							
5	102	36							
6	102	35							
7	102	34							
8	102	33							
9	102	32							
10	103	39							
11	103	38							
12	103	37							
13	103	36							
14	103	35							
15	103	34							
16	103	33							
17	103	32							
18	104	37							
19	104	36		1					
20	104	35							
Totals			0	1	0	0	0	0	0
Percent			0	100	0	0	0	0	0

Note: 1. Must count at least 100 fibers or a minimum of 20 fields.

2. Count only fibers having an aspect ratio of at least 3:1 and a length of 5 microns or larger.

3. Latitude is left-to-right on filter. Longitude is in-and-out on filte

4. This distribution IS NOT on a weight basis.

Average Fiber Count .05

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250 ARIZONA AVE., N.E.
ATLANTA, GA. 30307
(404) 377-4248

Lab # 597
Job # 1740
Job Name Tile Council
Sample Personal Sampler # 5, Filter # P-1

Date November 18, 1976
Made by MY Kimp
Checked by DJF

PARTICLE OR FIBER MICRON SIZE DISTRIBUTION BY COUNT

Magnification 400X
Type Reticle Paton
Classification Asbestos Filter
Operation MORTAR B
Sampling Method Membrane Filter
Sample Time 15 MIN.

Field No.	Lat.	Long.	PARTICLE SIZE OR FIBER LENGTH						
			<.5 μ	.5-5 μ	5-10 μ	10-20 μ	20-50 μ	50-100 μ	>100 μ
1	104	34							
2	104	33		1					
3	104	32							
4	105	39							
5	105	38							
6	105	37							
7	105	36							
8	105	35							
9	105	34							
10	105	33		1					
11	106	39							
12	106	38							
13	106	37							
14	106	36							
15	106	35							
16	106	34			1				
17	106	33							
18	106	32							
19	106	31							
20	107	39							
Totals			0	2	1	0	0	0	0
Percent			0	0	0	0	0	0	0

Note:
1. Must count at least 100 fibers or a minimum of 20 fields.
2. Count only fibers having an aspect ratio of at least 3:1 and a length of 5 microns or larger.
3. Latitude is left-to-right on filter. Longitude is in-and-out on filte
4. This distribution IS NOT on a weight basis.

Average Fiber Count .15

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ATLANTA, GA. 30307
(404) 377-4248

Lab # 597
Job # 1740
Job Name Tile Council
Sample Personal Sampler # 5, Filter # P-1

Date November 18, 1976
Made by M Y Kimp
Checked by D M F

PARTICLE OR FIBER MICRON SIZE DISTRIBUTION BY COUNT

Magnification 400X
Type Reticle Porton
Classification Asbestos Fiber
Operation MORTAR B
Sampling Method Membrane Filter
Sample Time 15 min

Field No.	Lat.	Long.	PARTICLE SIZE OR FIBER LENGTH						
			<.5 μ	.5-5 μ	5-10 μ	10-20 μ	20-50 μ	50-100 μ	>100 μ
1	107	38							
2	107	37							
3	107	36							
4	107	35							
5	107	34							
6	107	33							
7	107	32							
8	107	31							
9	108	39			1				
10	108	38							
11	108	37							
12	108	36							
13	108	35							
14	108	34							
15	108	33							
16	108	32							
17	109	39							
18	109	38							
19	109	37							
20	109	36							
Totals			0	0	1	0	0	0	0
Percent			0	0	100	0	0	0	0

Note:
1. Must count at least 100 fibers or a minimum of 20 fields.
2. Count only fibers having an aspect ratio of at least 3:1 and a length of 5 microns or larger.
3. Latitude is left-to-right on filter. Longitude is in-and-out on filter
4. This distribution IS NOT on a weight basis.

16.7

Average Fiber Count .05

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Lab # 397
Job # 1740
Job Name Tile Council
Sample Personal Sampler #5, Filter #P-1

Date November 18, 1976
Made by M & Kimp
Checked by DJF

PARTICLE OR FIBER MICRON SIZE DISTRIBUTION BY COUNT

Magnification 400X
Classification Asbestos Fiber
Type Reticle Paton
Operation MORTAR B
Sampling Method Membrane Filter
Sample Time 15 min

Field No.	Lat.	Long.	PARTICLE SIZE OR FIBER LENGTH						
			<.5 μ	.5-5 μ	5-10 μ	10-20 μ	20-50 μ	50-100 μ	>100 μ
1	109	35							
2	109	34							
3	109	33							
4	110	39							
5	110	38							
6	110	37							
7	110	36							
8	110	35							
9	110	34							
10	110	33							
11	111	39		1					
12	111	38							
13	111	37							
14	111	36							
15	111	35							
16	111	34							
17	111	33							
18	112	38							
19	112	37							
20	112	36							
Totals			0	1	0	0	0	0	0
Percent			0	100	0	0	0	0	0

Note: 1. Must count at least 100 fibers or a minimum of 20 fields.
2. Count only fibers having an aspect ratio of at least 3:1 and a length of 5 microns or larger.
3. Latitude is left-to-right on filter. Longitude is in-and-out on filte
4. This distribution IS NOT on a weight basis.

11.8 Average Fiber Count .05

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Lab # 597

Job # 1740

Job Name Tile Council

Sample Personal Sampler #5, Filter #P-1

Date November 18, 1976

Made by MK Kirp

Checked by DFF

PARTICLE OR FIBER MICRON SIZE DISTRIBUTION BY COUNT

Magnification 400X

Classification Asbestos Fiber

Type Reticle Porton

Operation MORTAR B

Sampling Method Membrane Filter Sample Time 15 min N.

Field No.	Lat.	Long.	PARTICLE SIZE OR FIBER LENGTH						
			<.5 μ	.5-5 μ	5-10 μ	10-20 μ	20-50 μ	50-100 μ	>100 μ
1	112	35							
2	112	34							
3	112	33							
4	113	39							
5	113	38							
6	113	37							
7	113	36							
8	113	35							
9	113	34							
10	113	33							
11	114	39							
12	114	38							
13	114	37							
14	114	36							
15	114	35			1				
16	114	34							
17	114	33							
18	115	38							
19	115	35							
20	115	33							
Totals			0	0	1	0	0	0	0
Percent			0	0	100	0	0	0	0

Note: 1. Must count at least 100 fibers or a minimum of 20 fields.

2. Count only fibers having an aspect ratio of at least 3:1 and a length of 5 microns or larger.

3. Latitude is left-to-right on filter. Longitude is in-and-out on filter

4. This distribution IS NOT on a weight basis.

16.9

Average Fiber Count .05

Job # 1740
Lab # 597
Job Name TLF Council

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Date Nov. 29 1976
Made by M Y Kim
Checked by DJF

Description MILLIPORE MEMBRANE FILTER: PERSONAL SAMPLER #6
FILTER # P-2

TOTAL PARTICLE OF FIBER MICRON SIZE DISTRIBUTION BY COUNT

MAGNIFICATION: 400X
TYPE RETICLE: PORTON

CLASSIFICATION: ASBESTOS FIBER
OPERATION: MORTAR B

SAMPLING TIME: 15 MIN.
NO. OF FIELDS: 100

	PARTICLE SIZE OR FIBER LENGTH						
	<.5μ	.5-5μ	5-10μ	10-20μ	20-50μ	50-100μ	>100μ
TOTALS	0	0	7	0	1	0	0
PERCENT	0	0	87.5	0	12.5	0	0

TOTAL AVERAGE FIBER COUNT: .08
TOTAL FIBERS COUNTED: 8

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Job # 1740
Lab # 597
Job Name Tile Council

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Date NOV. 30, 1976
Made by M & Kim J
Checked by DJF

Description MILLIPORE MEMBRANE FILTER : PERSONAL SAMPLER #6
Filter # P-2

FORMULA :

$$\frac{(\text{AVERAGE NET COUNT})(171{,}000)}{\text{AIR VOLUME SAMPLED, mL.}} = \text{FIBERS/mL.}$$

SAMPLING RATE : 1.6 LPM

SAMPLING TIME : 15 MIN.

SAMPLING VOLUME : RATE x TIME
= 1.6 LPM x 15 MIN.
= 24 LITERS
= 24,000 mL

TOTAL FIBERS COUNTED : 8

AVERAGE NET COUNT (100 FIELDS) : .08

CALCULATION :

FIBER CONCENTRATION (5μ OR LONGER) = $\frac{.08 \times 171{,}000}{24{,}000}$ = .570 FIBERS/mL.

Form #RA-73A

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ATLANTA, GA. 30307
(404) 377-4248

Lab # 597
Job # 1740
Job Name Tile Council
Sample Personal Sampler # 6, Filter # P-2

Date November 18, 1976
Made by M L Kimp
Checked by D JF

PARTICLE OR FIBER MICRON SIZE DISTRIBUTION BY COUNT

Magnification 400X
Classification Asbestos Fiber
Type Reticle Porton
Operation MORTAR B
Sampling Method Membrane Filter
Sample Time 15 min.

Field No.	Lat.	Long.	PARTICLE SIZE OR FIBER LENGTH						
			<.5 μ	.5-5 μ	5-10 μ	10-20 μ	20-50 μ	50-100 μ	>100 μ
1	101	39							
2	101	38							
3	101	37							
4	101	36							
5	102	36							
6	102	35			1				
7	103	44							
8	103	43							
9	103	42							
10	103	41							
11	103	40							
12	103	39							
13	103	38							
14	103	37							
15	104	45							
16	104	44							
17	104	43							
18	105	46			1				
19	105	45			1				
20	105	44							
Totals			0	0	3	0	0	0	0
Percent			0	0	100	0	0	0	0

Note: 1. Must count at least 100 fibers or a minimum of 20 fields.
2. Count only fibers having an aspect ratio of at least 3:1 and a length of 5 microns or larger.
3. Latitude is left-to-right on filter. Longitude is in-and-out on filter
4. This distribution IS NOT on a weight basis.

Average Fiber Count .15

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Lab # 597

Job # 1748

Job Name Tilo Council

Sample Personal Sampler #6, Filter #P-2

Date November 18, 1976

Made by MS Kimp

Checked by DJF

PARTICLE OR FIBER MICRON SIZE DISTRIBUTION BY COUNT

Magnification 400X

Classification Asbestos Fiber

Type Reticle Porton

Operation MORTARB

Sampling Method Membrane Filter Sample Time 15 min

Field No.	Lat.	Long.	PARTICLE SIZE OR FIBER LENGTH						
			<.5 μ	.5-5 μ	5-10 μ	10-20 μ	20-50 μ	50-100 μ	>100 μ
1	105	43							
2	105	42							
3	105	41							
4	106	45							
5	106	44			1				
6	106	43							
7	106	42							
8	106	41			1				
9	106	40							
10	107	41							
11	107	40							
12	107	39							
13	107	38							
14	107	37							
15	107	36			1				
16	107	35							
17	107	34			1				
18	108	47							
19	108	46							
20	108	45							
Totals			0	0	4	0	0	0	0
Percent			0	0	100	0	0	0	0

Note: 1. Must count at least 100 fibers or a minimum of 20 fields.

2. Count only fibers having an aspect ratio of at least 3:1 and a length of 5 microns or larger.

3. Latitude is left-to-right on filter. Longitude is in-and-out on filter

4. This distribution IS NOT on a weight basis.

Average Fiber Count .2

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Lab # 597

Job # 1740

Job Name Tile Council

Sample Personal Samples #6, Filter # R-2

Date November 18, 1976

Made by MY Kimp

Checked by DJF

PARTICLE OR FIBER MICRON SIZE DISTRIBUTION BY COUNT

Magnification 400x

Classification Asbestos Fiber

Type Reticle Porton

Operation MORTARS

Sampling Method Membrane Filter

Sample Time 15 min

Field No.	Lat.	Long.	PARTICLE SIZE OR FIBER LENGTH						
			<.5 μ	.5-5 μ	5-10 μ	10-20 μ	20-50 μ	50-100 μ	>100 μ
1	109	50							
2	109	49							
3	109	48							
4	109	47							
5	109	46							
6	109	45							
7	109	44							
8	109	41							
9	109	40							
10	109	38							
11	109	37							
12	109	36							
13	109	35							
14	109	34							
15	109	33							
16	109	332							
17	110	45							
18	110	44							
19	110	43							
20	110	42							
Totals			0	0	0	0	0	0	0
Percent			0	0	0	0	0	0	0

Note: 1. Must count at least 100 fibers or a minimum of 20 fields.

2. Count only fibers having an aspect ratio of at least 3:1 and a length of 5 microns or larger.

3. Latitude is left-to-right on filter. Longitude is in-and-out on filte

4. This distribution IS NOT on a weight basis.

Average Fiber Count 0

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Lab # 597

Job # 1740

Job Name Tile Council

Sample Personal Sampler #6, Filter #P-2

Date November 18, 1976

Made by MY Kimp

Checked by DJF

PARTICLE OR FIBER MICRON SIZE DISTRIBUTION BY COUNT

Magnification 400X

Classification Asbestos Fiber

Type Reticle Porton

Operation MORTAR B

Sampling Method Membrane Filter Sample Time 15 MIN

Field No.	Lat.	Long.	PARTICLE SIZE OR FIBER LENGTH						
			<.5 μ	.5-5 μ	5-10 μ	10-20 μ	20-50 μ	50-100 μ	>100 μ
1	110	41							
2	111	46							
3	111	45							
4	111	44							
5	111	43							
6	111	42							
7	111	41							
8	111	40							
9	111	39							
10	111	38							
11	111	37							
12	111	36							
13	111	35							
14	111	34							
15	112	43							
16	112	42							
17	112	41							
18	112	40							
19	112	39							
20	112	38							
Totals			0	0	0	0	0	0	0
Percent			0	0	0	0	0	0	0

Note: 1. Must count at least 100 fibers or a minimum of 20 fields.

2. Count only fibers having an aspect ratio of at least 3:1 and a length of 5 microns or larger.

3. Latitude is left-to-right on filter. Longitude is in-and-out on filte

4. This distribution IS NOT on a weight basis.

Average Fiber Count 0

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Lab # 597

Job # 1740

Job Name Tile Council

Sample Personal Sample # 6, Filter # P-2

Date November 18, 1976

Made by MD Kimp

Checked by DJF

PARTICLE OR FIBER MICRON SIZE DISTRIBUTION BY COUNT

Magnification 400X

Classification Asbestos Fiber

Type Reticle Porton

Operation MORTAR B

Sampling Method Membrane Filter

Sample Time 15 min.

Field No.	Lat.	Long.	PARTICLE SIZE OR FIBER LENGTH						
			<.5 μ	.5-5 μ	5-10 μ	10-20 μ	20-50 μ	50-100 μ	>100 μ
1	112	37							
2	113	42							
3	113	41							
4	113	40							
5	113	39							
6	113	38							
7	113	37							
8	113	36							
9	113	35							
10	114	40							
11	114	39							
12	114	38							
13	114	37							
14	114	36							
15	115	42							
16	115	41							
17	115	40							
18	115	39							
19	116	40					1		
20	116	39							
Totals			0	0	0	0	1	0	0
Percent			0	0	0	0	100	0	0

Note: 1. Must count at least 100 fibers or a minimum of 20 fields.

2. Count only fibers having an aspect ratio of at least 3:1 and a length of 5 microns or larger.

3. Latitude is left-to-right on filter. Longitude is in-and-out on filter

4. This distribution IS NOT on a weight basis.

Average Fiber Count .05

Job # 1740.
Lab # 597
Job Name TILE COUNCIL

ROSSNAGEL & ASSOCIATES

Engineering & Technical Consultants

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Date NOV. 29 1976
Made by MH KIMO
Checked by DAE

Description MILLIPORE MEMBRANE FILTER: Personal Sampler #3
FILTER # P-3

TOTAL PARTICLE OF FIBER MICRON SIZE DISTRIBUTION BY COUNT

MAGNIFICATION: 400X
TYPE RETICLE: PORTON

CLASSIFICATION: ASBESTOS FIBER
OPERATION: MORTAR C.

SAMPLING TIME: 15 min.
NO. OF FIELDS: 120

	PARTICLE SIZE OR FIBER LENGTH						
	<.5μ	.5-5μ	5-10μ	10-20μ	20-50μ	50-100μ	>100μ
TOTALS	0	3	8	8	2	0	0
PERCENT	0	14.3	38.1	38.1	9.5	0	0

TOTAL AVERAGE FIBER COUNT: .175
TOTAL FIBERS COUNTED: 21

Job # 1740
Lab # 547
Job Name Tile Council

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Date Nov. 30 1976
Made by MK
Checked by DAF

Description MILLIPORE MEMBRANE FILTER : PERSONAL SAMPLER #5

FILTER #P-3

FORMULA :

$$\frac{(\text{AVERAGE NET COUNT})(171{,}000)}{\text{AIR VOLUME SAMPLED, mL.}} = \text{FIBERS/mL.}$$

SAMPLING RATE: 2.0 LPm

SAMPLING TIME: 15 min.

SAMPLING VOLUME: = RATE X TIME
= 2.0 LPm X 15 min
= 30 LITERS
= 30,000 mL

TOTAL FIBERS COUNTED: 21

AVERAGE NET COUNT (120 FIELDS): .175

CALCULATION:

$$\text{FIBER CONCENTRATION (5}\mu\text{ OR LONGER)} = \frac{.175 \times 171{,}000}{30{,}000} = .998 \text{ FIBERS/mL.}$$

Form #RA-73A

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Lab # 597
Job # 1740
Job Name Tile Council
Sample Personal Sampler #5 Filter # P-3

Date November 24, 1976
Made by MH King
Checked by DJF

PARTICLE OR FIBER MICRON SIZE DISTRIBUTION BY COUNT

Magnification 400X
Classification Asbestos Fiber
Type Reticle Porton
Operation MORTAR C
Sampling Method Membrane Filter Sample Time 15 min.

Field No.	Lat.	Long.	PARTICLE SIZE OR FIBER LENGTH						
			<.5 μ	.5-5 μ	5-10 μ	10-20 μ	20-50 μ	50-100 μ	>100 μ
1	97	38							
2	97	39							
3	97	37			1				
4	98	39							
5	98	38							
6	99	40							
7	99	39							
8	99	38							
9	99	37							
10	100	40							
11	100	39							
12	100	38							
13	100	37			1				
14	100	36							
15	101	41							
16	101	40							
17	101	39							
18	101	38							
19	101	37							
20	101	36							
Totals			0	0	2	0	0	0	0
Percent			0	0	100	0	0	0	0

Note: 1. Must count at least 100 fibers or a minimum of 20 fields.
2. Count only fibers having an aspect ratio of at least 3:1 and a length of 5 microns or larger.
3. Latitude is left-to-right on filter. Longitude is in-and-out on filter
4. This distribution IS NOT on a weight basis.

Average Fiber Count .1

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Lab # 597
Job # 1740
Job Name Tile Council
Sample Personal Samples #5, Filter #P3

Date November 24, 1976
Made by MK King
Checked by DJF

PARTICLE OR FIBER MICRON SIZE DISTRIBUTION BY COUNT

Magnification 400x
Type Reticle Porton
Classification Asbestos Fiber
Operation Mortar C
Sampling Method Membrane Filter Sample Time 15 min.

Field No.	Lat.	Long.	PARTICLE SIZE OR FIBER LENGTH						
			<.5 μ	.5-5 μ	5-10 μ	10-20 μ	20-50 μ	50-100 μ	>100 μ
1	102	42							
2	102	41							
3	102	40							
4	102	39							
5	102	38			1				
6	102	37							
7	102	36							
8	103	42							
9	103	41							
10	103	40							
11	103	39							
12	103	38							
13	103	37				1			
14	103	36							
15	103	35							
16	104	42							
17	104	41							
18	104	40							
19	104	39							
20	104	38							
Totals			0	0	1	1	0	0	0
Percent			0	0	50	50	0	0	0

Note: 1. Must count at least 100 fibers or a minimum of 20 fields.
2. Count only fibers having an aspect ratio of at least 3:1 and a length of 5 microns or larger.
3. Latitude is left-to-right on filter. Longitude is in-and-out on filter
4. This distribution IS NOT on a weight basis.

Average Fiber Count .1

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Lab # 597

Job # 1740

Job Name Tile Council

Sample Personal Sampler # 5 Filter #3

Date November 24, 1976

Made by MK Kimp

Checked by DJF

PARTICLE OR FIBER MICRON SIZE DISTRIBUTION BY COUNT

Magnification 400X

Classification Asbestos Fiber

Type Reticle Porton

Operation MORTAR C

Sampling Method Membrane Filter

Sample Time 15 min.

Field No.	Lat.	Long.	PARTICLE SIZE OR FIBER LENGTH						
			<.5 μ	.5-5 μ	5-10 μ	10-20 μ	20-50 μ	50-100 μ	>100 μ
1	104	37							
2	104	36							
3	104	35							
4	105	42							
5	105	41							
6	105	40							
7	105	39							
8	105	38							
9	105	37			1				
10	105	36							
11	105	35							
12	106	42							
13	106	41							
14	106	40							
15	106	39							
16	106	38							
17	106	37							
18	106	36							
19	106	35			1				
20	107	42							
Totals			0	0	2	0	0	0	0
Percent			0	0	100	0	0	0	0

Note: 1. Must count at least 100 fibers or a minimum of 20 fields.

2. Count only fibers having an aspect ratio of at least 3:1 and a length of 5 microns or larger.

3. Latitude is left-to-right on filter. Longitude is in-and-out on filte

4. This distribution IS NOT on a weight basis.

Average Fiber Count .1

Total Fibers Counted 2

Form PA #130D 10.21

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Lab # 597
Job # 1740
Job Name Tile Council
Sample Personal Sample # 5 Filter # P-3

Date November 24 1976
Made by M Kemp
Checked by DGF

PARTICLE OR FIBER MICRON SIZE DISTRIBUTION BY COUNT

Magnification 400X
Type Reticle Patton
Classification Asbestos Fiber
Operation MORTAR C
Sampling Method Membrane Filter
Sample Time 15 min.

Field No.	Lat.	Long.	PARTICLE SIZE OR FIBER LENGTH						
			<.5 μ	.5-5 μ	5-10 μ	10-20 μ	20-50 μ	50-100 μ	>100 μ
1	107	41							
2	107	40							
3	107	39			1				
4	107	38							
5	107	37							
6	107	36							
7	107	35							
8	108	42							
9	108	41							
10	108	40							
11	108	39							
12	108	38							
13	108	37							
14	108	36							
15	109	44							
16	109	43							
17	109	42							
18	109	41							
19	109	40							
20	109	39							
Totals			0	0	1	0	0	0	0
Percent			0	0	100	0	0	0	0

Note: 1. Must count at least 100 fibers or a minimum of 20 fields.

2. Count only fibers having an aspect ratio of at least 3:1 and a length of 5 microns or larger.

3. Latitude is left-to-right on filter. Longitude is in-and-out on filter

4. This distribution IS NOT on a weight basis.

Average Fiber Count .05

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Lab # 597
Job # 1740
Job Name Tile Council
Sample Personal Sampler #5, Filter #P-3

Date November 24, 1976
Made by MH Vino
Checked by DJF

PARTICLE OR FIBER MICRON SIZE DISTRIBUTION BY COUNT

Magnification 400X
Classification Asbestos Fiber
Type Reticle Porton
Operation MORTAR
Sampling Method Membrane Filter
Sample Time 15 min

Field No.	Lat.	Long.	PARTICLE SIZE OR FIBER LENGTH						
			<.5 μ	.5-5 μ	5-10 μ	10-20 μ	20-50 μ	50-100 μ	>100 μ
1	109	38							
2	109	37							
3	110	44							
4	110	43				1			
5	110	42							
6	110	41							
7	110	40				1	1		
8	110	39		1					
9	110	38				1			
10	110	37							
11	111	44							
12	111	43							
13	111	42							
14	111	41				1			
15	111	40							
16	111	39							
17	111	38							
18	111	37							
19	111	36							
20	111	35							
Totals			0	1	0	4	1	0	0
Percent			0	16.7	0	66.7	16.7	0	0

Note: 1. Must count at least 100 fibers or a minimum of 20 fields.
2. Count only fibers having an aspect ratio of at least 3:1 and a length of 5 microns or larger.
3. Latitude is left-to-right on filter. Longitude is in-and-out on filte
4. This distribution IS NOT on a weight basis.

Average Fiber Count 3

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Lab # 597
Job # 1740
Job Name Tile Council
Sample Personal Sampler # 5, Filter # P-3

Date November 24, 1976
Made by MY Kinyo
Checked by DFF

PARTICLE OR FIBER MICRON SIZE DISTRIBUTION BY COUNT

Magnification 400X
Type Reticle Porton
Classification Asbestos Fiber
Operation Mortar C
Sampling Method Membrane Filter
Sample Time 15 min

Field No.	Lat.	Long.	PARTICLE SIZE OR FIBER LENGTH						
			<.5 μ	.5-5 μ	5-10 μ	10-20 μ	20-50 μ	50-100 μ	>100 μ
1	112	45							
2	112	44							
3	112	43		1					
4	112	42					1		
5	112	41				1			
6	112	40							
7	112	39		1					
8	112	38							
9	112	37							
10	112	36			1				
11	113	43				1			
12	113	42							
13	113	41							
14	113	40							
15	113	39							
16	113	38							
17	113	37			1				
18	113	36				1			
19	113	35							
20	113	34							
Totals			0	2	2	3	1	0	0
Percent			0	28.6	28.6	42.9	14.3	0	0

Note: 1. Must count at least 100 fibers or a minimum of 20 fields.
2. Count only fibers having an aspect ratio of at least 3:1 and a length of 5 microns or larger.
3. Latitude is left-to-right on filter. Longitude is in-and-out on filte
4. This distribution IS NOT on a weight basis.

Average Fiber Count .14

Job # 1748
Lab # 597
Job Name
TILE COUNCIL

ROSSNAGEL & ASSOCIATES

Engineering & Technical Consultants

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Date Nov. 29 1976
Made by MYKINO
Checked by DJF

Description MILLIPORE MEMBRANE FILTER: PERSONAL Sampler #8
FILTER #P-4

TOTAL PARTICLE OF FIBER MICRON SIZE DISTIBUTION BY COUNT

MAGNIFICATION: 400X
TYPE RETICLE: PORTON

CLASSIFICATION: ASBESTOS FIBER
OPERATION: MORTARC

SAMPLING TIME: 15 MIN
NO. OF FIELDS: 140

	PARTICLE SIZE OR FIBER LENGTH						
	<.5μ	.5-5μ	5-10μ	10-20μ	20-50μ	50-100μ	>100μ
TOTALS	0	7	5	10	3	0	0
PERCENT	0	28	20	40	12	0	0

TOTAL AVERAGE FIBER COUNT: .178
TOTAL FIBERS COUNTED: 25

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Form #RA-73A

Job # 1140
Lab # 592
Job Name Tile Council

ROSSNAGEL & ASSOCIATES

Engineering & Technical Consultants

1999 Rt. 70 • Cherry Hill, N. J. 08003

Date Nov. 30 1976
Made by MH Ki...
Checked by DJF

Description MILLIPORE MEMBRANE FILTER : PERSONAL SAMPLER # 8
FILTER # P-4

FORMULA:

$$\frac{(\text{AVERAGE NET COUNT})(171{,}000)}{\text{AIR VOLUME SAMPLED, ML.}} = \text{FIBERS/ml.}$$

SAMPLING RATE: 2.0 LPM

SAMPLING TIME: 15 MIN

SAMPLING VOLUME: = RATE X TIME
= 2.0 LPM X 15 MIN.
= 30 LITERS
= 30,000 ML

TOTAL FIBERS COUNTED: 25

AVERAGE NET COUNT (140 FIELDS): .178

CALCULATION:

$$\text{FIBER CONCENTRATION (5}\mu\text{ OR LONGER)} = \frac{.178 \times 171{,}000}{30{,}000} = 1.01 \text{ FIBERS/ml.}$$

Form #RA-73A

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ATLANTA, GA. 30307
(404) 377-4218

Lab # 597
Job # 1740
Job Name Tile Council
Sample Personal Sampler #8, Filter #P-4

Date November 24 1976
Made by M & Kimp
Checked by DJF

PARTICLE OR FIBER MICRON SIZE DISTRIBUTION BY COUNT

Magnification 400X
Classification Asbestos Fiber
Type Reticle Paton
Operation MORTAR C
Sampling Method Membrane Filter
Sample Time 15 min

Field No.	Lat.	Long.	PARTICLE SIZE OR FIBER LENGTH						
			<.5 μ	.5-5 μ	5-10 μ	10-20 μ	20-50 μ	50-100 μ	>100 μ
1	101	39							
2	101	38							
3	102	43				1			
4	102	42		1					
5	102	41							
6	102	40							
7	102	39							
8	102	38				1			
9	102	37							
10	103	44							
11	103	43							
12	103	42					1		
13	103	41				1			
14	103	40							
15	103	39			1				
16	103	38							
17	103	37					1		
18	104	43		1					
19	104	42		1					
20	104	41							
Totals			0	3	1	3	2	0	0
Percent			0	33.3	11.1	33.3	22.2	0	0

Note: 1. Must count at least 100 fibers or a minimum of 20 fields.
2. Count only fibers having an aspect ratio of at least 3:1 and a length of 5 microns or larger.
3. Latitude is left-to-right on filter. Longitude is in-and-out on filte
4. This distribution IS NOT on a weight basis.

Average Fiber Count 45
Total Fibers Counted 9

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(404) 377-4248

Lab # 597

Job # 1740

Job Name Tile Council

Sample Personal Samples #8, Filter #P-4

Date November 24, 1976

Made by MY Kim

Checked by DJF

PARTICLE OR FIBER MICRON SIZE DISTRIBUTION BY COUNT

Magnification 400X

Classification Asbestos Fiber

Type Reticle Porton

Operation MORTAR

Sampling Method _____

Sample Time 15 min

Field No.	Lat.	Long.	PARTICLE SIZE OR FIBER LENGTH						
			<.5 μ	.5-5 μ	5-10 μ	10-20 μ	20-50 μ	50-100 μ	>100 μ
1	104	40							
2	104	39		1					
3	104	38							
4	104	37							
5	104	36							
6	105	44							
7	105	43							
8	105	42							
9	105	41							
10	105	40							
11	105	39							
12	105	38							
13	105	37							
14	105	36					1		
15	105	35							
16	106	45		2					
17	106	44							
18	106	43							
19	106	42							
20	106	41							
Totals			0	3	0	0	1	0	0
Percent			0	75.0	0	0	25.0	0	0

Note: 1. Must count at least 100 fibers or a minimum of 20 fields.

2. Count only fibers having an aspect ratio of at least 3:1 and a length of 5 microns or larger.

3. Latitude is left-to-right on filter. Longitude is in-and-out on filte

4. This distribution IS NOT on a weight basis.

Average Fiber Count .2

Form PA #1300 10-28 Total Fibers Counted 4

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Lab # 597

Job # 1740

Job Name Tile Council

Sample Personal Sampler # 8, Filter # P-4

Date November 24, 1976

Made by M L King

Checked by DJF

PARTICLE OR FIBER MICRON SIZE DISTRIBUTION BY COUNT

Magnification 400X

Classification Asbestos Fiber

Type Reticle Porton

Operation MORTAR C

Sampling Method Membrane Filter

Sample Time 15 min

Field No.	Lat.	Long.	PARTICLE SIZE OR FIBER LENGTH						
			<.5 μ	.5-5 μ	5-10 μ	10-20 μ	20-50 μ	50-100 μ	>100 μ
1	106	40							
2	106	39			2				
3	106	38							
4	106	37							
5	106	36							
6	107	43							
7	107	42							
8	107	41							
9	107	40							
10	107	39				1			
11	107	38							
12	107	37							
13	107	36							
14	107	35							
15	108	44							
16	108	43							
17	108	42							
18	108	41							
19	108	40							
20	108	39				1			
Totals			0	0	2	2	0	0	0
Percent			0	0	50.0	50.0	0	0	0

Note: 1. Must count at least 100 fibers or a minimum of 20 fields.

2. Count only fibers having an aspect ratio of at least 3:1 and a length of 5 microns or larger.

3. Latitude is left-to-right on filter. Longitude is in-and-out on filte

4. This distribution IS NOT on a weight basis.

Average Fiber Count 2

Total Fibers Counted 4

Form RA #130D 10-2-8

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Lab # 597

Job # 1740

Job Name Tile Council

Sample Personal Sampler #8, Filter #P-4

Date November 24, 1976

Made by MY Kimp

Checked by DJF

PARTICLE OR FIBER MICRON SIZE DISTRIBUTION BY COUNT

Magnification 400X

Classification ASBESTOS FIBER

Type Reticle Porton

Operation MORTAR C

Sampling Method Membrane Filter

Sample Time 15 min

Field No.	Lat.	Long.	PARTICLE SIZE OR FIBER LENGTH						
			<.5 μ	.5-5 μ	5-10 μ	10-20 μ	20-50 μ	50-100 μ	>100 μ
1	108	38							
2	108	37							
3	108	36							
4	109	45							
5	109	44							
6	109	43							
7	109	42							
8	109	41							
9	109	40							
10	109	39							
11	109	38							
12	109	37							
13	109	36							
14	110	45							
15	110	44							
16	110	43							
17	110	42			1				
18	110	41							
19	110	40							
20	110	39							
Totals			0	0	1	0	0	0	0
Percent			0	0	100	0	0	0	0

Note: 1. Must count at least 100 fibers or a minimum of 20 fields.

2. Count only fibers having an aspect ratio of at least 3:1 and a length of 5 microns or larger.

3. Latitude is left-to-right on filter. Longitude is in-and-out on filter

4. This distribution IS NOT on a weight basis.

Average Fiber Count .05

Total Fibers Counted 1

Form RA #130D 10.32

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Lab # 597

Job # 1740

Job Name Tile Council

Sample Personal Sampler # 8 Filter # P-4

Date November 24, 1976

Made by M L Kemp

Checked by DAF

PARTICLE OR FIBER MICRON SIZE DISTRIBUTION BY COUNT

Magnification 400X

Classification Asbestos Fiber

Type Reticle Porton

Operation Mortar C

Sampling Method Membrane Filter

Sample Time 15 min

Field No.	Lat.	Long.	PARTICLE SIZE OR FIBER LENGTH						
			<.5 μ	.5-5 μ	5-10 μ	10-20 μ	20-50 μ	50-100 μ	>100 μ
1	110	38				1			
2	110	37							
3	110	36							
4	110	35							
5	111	44							
6	111	43							
7	111	42							
8	111	40							
9	111	39							
10	111	38							
11	111	37							
12	111	36							
13	112	45							
14	112	44							
15	112	43							
16	112	42							
17	112	41							
18	112	39							
19	112	38				1			
20	112	37				1			
Totals			0	0	0	3	0	0	0
Percent			0	0	0	100	0	0	0

Note: 1. Must count at least 100 fibers or a minimum of 20 fields.

2. Count only fibers having an aspect ratio of at least 3:1 and a length of 5 microns or larger.

3. Latitude is left-to-right on filter. Longitude is in-and-out on filte

4. This distribution IS NOT on a weight basis.

Average Fiber Count .15

Total Fibers Counted 3

Form PA #130D 12-31

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Lab # 597
Job # 1740
Job Name Tile Council
Sample Personal Sampler #8, Filter #P-4

Date November 24, 1976
Made by M L Kimp
Checked by D JF

PARTICLE OR FIBER MICRON SIZE DISTRIBUTION BY COUNT

Magnification 400X
Classification Asbestos Fiber
Type Reticle Porton
Operation MORTAR C
Sampling Method Membrane Filter
Sample Time 15 min

Field No.	Lat.	Long.	PARTICLE SIZE OR FIBER LENGTH						
			<.5 μ	.5-5 μ	5-10 μ	10-20 μ	20-50 μ	50-100 μ	>100 μ
1	113	45							
2	113	44							
3	113	43							
4	113	42							
5	113	41				1			
6	113	40							
7	113	39							
8	113	38							
9	113	37							
10	113	36							
11	113	35				1			
12	114	45							
13	114	44							
14	114	43							
15	114	42							
16	114	41							
17	114	40							
18	114	39							
19	114	38							
20	114	39							
Totals			0	0	0	2	0	0	0
Percent			0	0	0	100	0	0	0

te: 1. Must count at least 100 fibers or a minimum of 20 fields.

2. Count only fibers having an aspect ratio of at least 3:1 and a length of 5 microns or larger.

3. Latitude is left-to-right on filter. Longitude is in-and-out on filte

4. This distribution IS NOT on a weight basis.

Average Fiber Count .1
Total Fibers Counted 2

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Lab # 597
Job # 1740
Job Name Tile Council
Sample Personal Sample #8 Filter #P-4

Date November 24 1976
Made by MY Kinp
Checked by DJF

PARTICLE OR FIBER MICRON SIZE DISTRIBUTION BY COUNT

Magnification 400X
Type Reticle Porton
Classification Asbestos Fiber
Operation MONTAR C
Sampling Method Membrane Filter Sample Time 15 min

Field No.	Lat.	Long.	PARTICLE SIZE OR FIBER LENGTH						
			<.5 μ	.5-5 μ	5-10 μ	10-20 μ	20-50 μ	50-100 μ	>100 μ
1	114	38							
2	114	37							
3	114	36							
4	115	45							
5	115	44							
6	115	43							
7	115	42							
8	115	41							
9	115	40							
10	115	39							
11	115	38							
12	115	37		1					
13	115	36							
14	116	44							
15	116	43							
16	116	42			1				
17	116	41							
18	116	40							
19	116	39							
20	116	38							
Totals			0	1	1	0	0	0	0
Percent			0	50	50	0	0	0	0

Note: 1. Must count at least 100 fibers or a minimum of 20 fields.
2. Count only fibers having an aspect ratio of at least 3:1 and a length of 5 microns or larger.
3. Latitude is left-to-right on filter. Longitude is in-and-out on filter.
4. This distribution IS NOT on a weight basis.

Average Fiber Count .1
Metal Fibers Counted 2

Job # 1740
Lab # 579
Job Name ILE Council

ROSSNAGEL & ASSOCIATES

Engineering & Technical Consultants

1999 Rt. 70 • Cherry Hill, N. J. 08003

Date Nov. 29, 1976
Made by M.K. Kim
Checked by DAF

Description MILLIPORE MEMBRANE FILTER: Personal Sampler #5
FILTER # P-5

TOTAL PARTICLE OF FIBER MICRON SIZE DISTRIBUTION BY COUNT

MAGNIFICATION: 400X
TYPE RETICLE: PORTON
CLASSIFICATION: ASBESTOS FIBER
OPERATION: MORTAR A
SAMPLING TIME: 15 MIN
NO. OF FIELDS: 120

	PARTICLE SIZE OR FIBER LENGTH						
	<.5μ	.5-5μ	5-10μ	10-20μ	20-50μ	50-100μ	>100μ
TOTALS	0	0	6	1	1	0	0
PERCENT	0	0	75.0	12.5	12.5	0	0

TOTAL AVERAGE FIBER COUNT: .067
TOTAL FIBERS COUNTED: 8

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10.34

Job # 1170
Lab # 579
Job Name
Tile Council

ROSSNAGEL & ASSOCIATES

Engineering & Technical Consultants

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Date Nov. 30, 197[illegible]
Made by [illegible]
Checked by [illegible]

Description MILLIPORE MEMBRANE FILTER : PERSONAL SAMPLER # 5

FILTER # P-5

FORMULA:

$$\frac{(\text{AVERAGE NET COUNT})(171{,}000)}{\text{AIR VOLUME SAMPLED, ML.}} = \text{FIBERS/ML.}$$

SAMPLING RATE: 2.0 LPM

SAMPLING TIME: 15 MIN

SAMPLING VOLUME: = RATE X TIME
= 2.0 LPM X 15 MIN
= 30 LITERS
= 30,000 MCS

TOTAL FIBERS COUNTED: 8

AVERAGE NET COUNT (120 FIELDS): .067

CALCULATION:

$$\text{FIBER CONCENTRATION (5}\mu\text{ OR LONGER)} = \frac{.067 \times 171{,}000}{30{,}000} = .382 \text{ FIBERS/ML.}$$

Form #RA-73A

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Lab # 579

Job # 1740

Job Name Tile Council

Sample Personal Sampler # Filter # P-5

Date November 24, 1976

Made by M L Kimp

Checked by DJF

PARTICLE OR FIBER MICRON SIZE DISTRIBUTION BY COUNT

Magnification 400X

Classification Asbestos Fiber

Type Reticle Proton

Operation MORTARA

Sampling Method Membrane Filter

Sample Time 15 min

Field No.	Lat.	Long.	PARTICLE SIZE OR FIBER LENGTH						
			<.5 μ	.5-5 μ	5-10 μ	10-20 μ	20-50 μ	50-100 μ	>100 μ
1	98	42							
2	99	41							
3	100	44							
4	100	43							
5	100	42							
6	100	41							
7	100	40							
8	101	44							
9	101	43							
10	101	42							
11	101	41							
12	101	40							
13	101	39							
14	102	44							
15	102	43							
16	102	42							
17	02	41							
18	102	40							
19	102	39							
20	103	45							
Totals			0	0	0	0	0	0	0
Percent			0	0	0	0	0	0	0

Note: 1. Must count at least 100 fibers or a minimum of 20 fields.

2. Count only fibers having an aspect ratio of at least 3:1 and a length of 5 microns or larger.

3. Latitude is left-to-right on filter. Longitude is in-and-out on filter

4. This distribution IS NOT on a weight basis.

Average Fiber Count 0

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ATLANTA, GA. 30307
(404) 377-4248

Lab # 579
Job # 1748
Job Name Tile Council
Sample Personal Sampler # Filter #P-5

Date November 24, 1976
Made by MY Kim
Checked by DAF

PARTICLE OR FIBER MICRON SIZE DISTRIBUTION BY COUNT

Magnification 400X
Classification Asbestos Fiber
Type Reticle Porton
Operation MORTAR A
Sampling Method Membrane Filter Sample Time 15 min.

Field No.	Lat.	Long.	PARTICLE SIZE OR FIBER LENGTH						
			<.5 μ	.5-5 μ	5-10 μ	10-20 μ	20-50 μ	50-100 μ	>100 μ
1	103	44							
2	103	43							
3	103	42							
4	103	41							
5	103	40							
6	103	39							
7	103	38							
8	104	46							
9	104	45							
10	104	44							
11	104	42							
12	104	40							
13	104	41							
14	104	40							
15	104	39							
16	104	38							
17	105	44							
18	105	43			1				
19	105	42							
20	105	41							
Totals			0	0	1	0	0	0	0
Percent			0	0	100	0	0	0	0

Note: 1. Must count at least 100 fibers or a minimum of 20 fields.

2. Count only fibers having an aspect ratio of at least 3:1 and a length of 5 microns or larger.

3. Latitude is left-to-right on filter. Longitude is in-and-out on filter.

4. This distribution IS NOT on a weight basis.

Average Fiber Count .05

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Lab # 579

Job # 1740

Job Name Tile Council

Sample Personal Sampler # Filter #P-5

Date November 24 1976

Made by MZ Kimp

Checked by D JF

PARTICLE OR FIBER MICRON SIZE DISTRIBUTION BY COUNT

Magnification 400x

Classification Asbestos Fiber

Type Reticle Porton

Operation MORTAR A

Sampling Method Membrane Filter

Sample Time 15 min

Field No.	Lat.	Long.	PARTICLE SIZE OR FIBER LENGTH						
			<.5 μ	.5-5 μ	5-10 μ	10-20 μ	20-50 μ	50-100 μ	>100 μ
1	105	40							
2	105	39							
3	105	38							
4	105	37							
5	106	45							
6	106	44					1		
7	106	43							
8	106	42							
9	106	41							
10	106	40			1				
11	106	39							
12	106	38							
13	106	37							
14	106	36							
15	107	47			1				
16	107	46							
17	107	45			1				
18	107	44							
19	107	43							
20	107	42							
Totals			0	0	3	0	1	0	0
Percent			0	0	75	0	20	0	0

Note: 1. Must count at least 100 fibers or a minimum of 20 fields.

2. Count only fibers having an aspect ratio of at least 3:1 and a length of 5 microns or larger.

3. Latitude is left-to-right on filter. Longitude is in-and-out on filte

4. This distribution IS NOT on a weight basis.

Average Fiber Count .2

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(404) 377-4248

Lab # 579
Job # 1740
Job Name Tilo Council
Sample Personal Sampler # Filter # P-5

Date November 24, 1976
Made by M & Kimb
Checked by DJF

PARTICLE OR FIBER MICRON SIZE DISTRIBUTION BY COUNT

Magnification 400X
Type Reticle Porton
Classification Asbestos Fiber
Operation MORTAR A
Sampling Method Membrane Filter Sample Time 15 min

Field No.	Lat.	Long.	PARTICLE SIZE OR FIBER LENGTH						
			<.5 μ	.5-5 μ	5-10 μ	10-20 μ	20-50 μ	50-100 μ	>100 μ
1	107	41							
2	107	40							
3	107	39							
4	107	38							
5	107	37							
6	107	36							
7	108	47							
8	108	46							
9	108	45							
10	108	44							
11	108	43							
12	108	42							
13	108	41							
14	108	40							
15	108	39							
16	108	38							
17	108	37			1				
18	108	36							
19	109	46							
20	109	45							
Totals			0	0	1	0	0	0	0
Percent			0	0	100	0	0	0	0

Note: 1. Must count at least 100 fibers or a minimum of 20 fields.

2. Count only fibers having an aspect ratio of at least 3:1 and a length of 5 microns or larger.

3. Latitude is left-to-right on filter. Longitude is in-and-out on filter

4. This distribution IS NOT on a weight basis.

Average Fiber Count .05
Metal Fibers Counted 1

Form P-1 #130D

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(404) 377-4248

Lab # 579

Job # 1740

Job Name Tilo Council

Sample Personal Sampler Filter #P-5

Date November 29 1976

Made by MY King

Checked by CAF

PARTICLE OR FIBER MICRON SIZE DISTRIBUTION BY COUNT

Magnification 400X

Classification Asbestos Fiber

Type Reticle Paton

Operation MORTAR A

Sampling Method Millipore Filter Sample Time 15 MIN.

Field No.	Lat.	Long.	PARTICLE SIZE OR FIBER LENGTH						
			<.5 μ	.5-5 μ	5-10 μ	10-20 μ	20-50 μ	50-100 μ	>100 μ
1	109	44							
2	109	43							
3	109	42							
4	109	41							
5	109	40							
6	109	39							
7	109	38							
8	109	37							
9	109	36							
10	109	35							
11	115	45							
12	110	44							
13	110	42							
14	110	41							
15	110	40							
16	110	39							
17	110	38							
18	110	37							
19	110	36							
20	111	45							
Totals			0	0	0	0	0	0	0
Percent			0	0	0	0	0	0	0

Note: 1. Must count at least 100 fibers or a minimum of 20 fields.

2. Count only fibers having an aspect ratio of at least 3:1 and a length of 5 microns or larger.

3. Latitude is left-to-right on filter. Longitude is in-and-out on filter

4. This distribution IS NOT on a weight basis.

Average Fiber Count 0

Total Fibers Counted 0

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ATLANTA, GA. 30307
(404) 377-4248

Lab # 579
Job # 1740
Job Name Tile Council
Sample Personal Samples # Filter #P-5

Date November 29, 1976
Made by MH Kinnip
Checked by DFF

PARTICLE OR FIBER MICRON SIZE DISTRIBUTION BY COUNT

Magnification 400x
Type Reticle Porton
Classification Asbestos Fiber
Operation MORTAR A
Sampling Method Membrane Filter
Sample Time 15 MIN

Field No.	Lat.	Long.	PARTICLE SIZE OR FIBER LENGTH						
			<.5 μ	.5-5 μ	5-10 μ	10-20 μ	20-50 μ	50-100 μ	>100 μ
1	111	44							
2	111	43							
3	111	42							
4	111	41							
5	111	40							
6	111	39							
7	111	38							
8	112	45							
9	112	44							
10	112	43							
11	112	42							
12	112	41							
13	112	40							
14	113	45				1			
15	113	44			1				
16	113	43							
17	113	42							
18	114	45							
19	114	44							
20	114	43							
Totals			0	0	1	1	0	0	0
Percent			0	0	50	50	0	0	0

Note: 1. Must count at least 100 fibers or a minimum of 20 fields.

2. Count only fibers having an aspect ratio of at least 3:1 and a length of 5 microns or larger.

3. Latitude is left-to-right on filter. Longitude is in-and-out on filte

4. This distribution IS NOT on a weight basis.

Average Fiber Count 1

Job # 1741
Lab # 579
Job Name Tile Council

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Date Nov. 30 1976
Made by MYKimp
Checked by DAF

Description MILLIPORE MEMBRANE FILTER: Personal Sampler #8
FILTER # P-6

TOTAL PARTICLE OF FIBER MICRON SIZE DISTRIBUTION BY COUNT

MAGNIFICATION: 400X
TYPE RETICLE: PORTON
CLASSIFICATION: ASBESTOS FIBER
OPERATION: MURTARA

SAMPLING TIME: 120 min
NO. OF FIELDS: 100

	PARTICLE SIZE OR FIBER LENGTH						
	<.5μ	.5-5μ	5-10μ	10-20μ	20-50μ	50-100μ	>100μ
TOTALS	0	9	13	9	0	0	0
PERCENT	0	29.0	41.9	29.0	0	0	0

TOTAL AVERAGE FIBER COUNT: .31
TOTAL FIBERS COUNTED: 31

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Form #RA-73A

Job # 1740
Lab # 579
Job Name
Tile Council

ROSSNAGEL & ASSOCIATES

Engineering & Technical Consultants

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Date Nov. 30, 1976
Made by M L Kimp
Checked by DJF

Description MILLIPORE MEMBRANE FILTER : PERSONAL SAMPLER # 8

FORMULA:

FILTER # P-6

$$\frac{(\text{AVERAGE NET COUNT})(171{,}000)}{\text{AIR VOLUME SAMPLED, ML.}} = \text{FIBERS/ML.}$$

SAMPLING RATE: 2.0 LPm

SAMPLING TIME: 120 MIN.

SAMPLING VOLUME: = RATE X TIME
= 2.0 LPm X 120 MIN.
= 240 LITERS
= 240,000 ML

TOTAL FIBERS COUNTED: 31

AVERAGE NET COUNT (100 FIELDS): .31

CALCULATION:

$$\text{FIBER CONCENTRATION (5}\mu\text{ OR LONGER)} = \frac{.31 \times 171{,}000}{240{,}000 \text{ ml}} = .221 \text{ FIBERS/ML.}$$

Form #RA-73A

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ATLANTA, GA. 30307
(404) 377-4248

Lab # 579
Job # 1740
Job Name Tile Council
Sample Personal Sampler #8, Filter # P-6

Date November 29, 1972
Made by MY Kimp
Checked by DJF

PARTICLE OR FIBER MICRON SIZE DISTRIBUTION BY COUNT

Magnification 400X
Type Reticle Porton
Classification Asbestos Fiber
Operation MORTAR A
Sampling Method Membrane Filter Sample Time 129 min.

Field No.	Lat.	Long.	PARTICLE SIZE OR FIBER LENGTH						
			<.5 μ	.5-5 μ	5-10 μ	10-20 μ	20-50 μ	50-100 μ	>100 μ
1	100	39			2				
2	101	38							
3	102	41			1				
4	102	40							
5	102	39							
6	102	38							
7	102	37							
8	103	41							
9	103	40							
10	103	39							
11	103	38							
12	103	37							
13	104	42			1	1			
14	104	41							
15	104	40							
16	104	39							
17	104	37							
18	105	43							
19	105	42							
20	105	41							
Totals			0	0	4	1	0	0	0
Percent			0	0	75	25	0	0	0

Note: 1. Must count at least 100 fibers or a minimum of 20 fields.

2. Count only fibers having an aspect ratio of at least 3:1 and a length of 5 microns or larger.

3. Latitude is left-to-right on filter. Longitude is in-and-out on filter

4. This distribution IS NOT on a weight basis.

Average Fiber Count 25

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Lab # 579

Job # 1740

Job Name Tile Council

Sample Personal Sampler # 8, Filter # P-6

Date November 29 1976

Made by M.Y. Kemp

Checked by DFF

PARTICLE OR FIBER MICRON SIZE DISTRIBUTION BY COUNT

Magnification 400X

Classification Asbestos Fiber

Type Reticle Porton

Operation MORTAR A

Sampling Method Membrane Filter

Sample Time 120 min.

Field No.	Lat.	Long.	PARTICLE SIZE OR FIBER LENGTH						
			<.5 μ	.5-5 μ	5-10 μ	10-20 μ	20-50 μ	50-100 μ	>100 μ
1	105	40							
2	105	39							
3	105	38							
4	105	37							
5	105	36							
6	106	42			2				
7	106	41		1					
8	106	40							
9	106	39		1					
10	106	38							
11	106	37							
12	106	36				1			
13	106	35							
14	107	42							
15	107	41							
16	107	40							
17	107	39		1					
18	107	38							
19	107	37							
20	107	36							
Totals			0	3	2	1	0	0	0
Percent			0	50	33.3	16.7	0	0	0

Note: 1. Must count at least 100 fibers or a minimum of 20 fields.

2. Count only fibers having an aspect ratio of at least 3:1 and a length of 5 microns or larger.

3. Latitude is left-to-right on filter. Longitude is in-and-out on filter

4. This distribution IS NOT on a weight basis.

Average Fiber Count 3

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(404) 377-4248

Lab # 579
Job # 1740
Job Name Tile Council
Sample Personal Samples #8 Filter P-6

Date November 29 1976
Made by M L Kirp
Checked by DJF

PARTICLE OR FIBER MICRON SIZE DISTRIBUTION BY COUNT

Magnification 400X
Classification Asbestos Fiber
Type Reticle Porton
Operation MORTAR A
Sampling Method Membrane Filter
Sample Time 120 min

Field No.	Lat.	Long.	PARTICLE SIZE OR FIBER LENGTH						
			<.5 μ	.5-5 μ	5-10 μ	10-20 μ	20-50 μ	50-100 μ	>100 μ
1	108	42							
2	108	41							
3	108	40							
4	108	39			1				
5	108	38							
6	108	37							
7	108	36							
8	109	42		1					
9	109	41		1					
10	109	40							
11	109	39							
12	109	38		1					
13	109	37							
14	109	36							
15	109	35							
16	110	42							
17	110	41							
18	110	40							
19	110	39							
20	110	38							
Totals			0	3	1	0	0	0	0
Percent			0	75	25	0	0	0	0

Note: 1. Must count at least 100 fibers or a minimum of 20 fields.
2. Count only fibers having an aspect ratio of at least 3:1 and a length of 5 microns or larger.
3. Latitude is left-to-right on filter. Longitude is in-and-out on filter
4. This distribution IS NOT on a weight basis.

Average Fiber Count 2

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Lab # 579

Job # 1740

Job Name Tile Council

Sample Personal Sampler # 8 Filter # P-6

Date November 29, 1976

Made by M L King

Checked by DJF

PARTICLE OR FIBER MICRON SIZE DISTRIBUTION BY COUNT

Magnification 400X

Classification Asbestos Fiber

Type Reticle Porton

Operation MORTAR A

Sampling Method Membrane Filter Sample Time 120 min.

Field No.	Lat.	Long.	PARTICLE SIZE OR FIBER LENGTH						
			<.5 μ	.5-5 μ	5-10 μ	10-20 μ	20-50 μ	50-100 μ	>100 μ
1	111	42		1					
2	111	41							
3	111	40			1				
4	111	39							
5	111	38							
6	111	37							
7	112	42				1			
8	112	41							
9	112	40							
10	112	39							
11	112	38							
12	112	37							
13	113	42							
14	113	41							
15	113	40							
16	113	39				1			
17	113	38							
18	113	37							
19	114	41							
20	114	40				1			
Totals			0	1	1	3	0	0	0
Percent			0	20	20	60	0	0	0

Note: 1. Must count at least 100 fibers or a minimum of 20 fields.

2. Count only fibers having an aspect ratio of at least 3:1 and a length of 5 microns or larger.

3. Latitude is left-to-right on filter. Longitude is in-and-out on filter.

4. This distribution IS NOT on a weight basis.

Average Fiber Count .25

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Lab # 579
Job # 1748
Job Name Tile Council
Sample Personal Sample #8 Filter #P-6

Date November 29, 1976
Made by MLY Kimp
Checked by DOF

PARTICLE OR FIBER MICRON SIZE DISTRIBUTION BY COUNT

Magnification 400X
Type Reticle Porton
Classification Asbestos Fiber
Operation MORTAR A
Sampling Method Membrane Filter
Sample Time 120 min

Field No.	Lat.	Long.	PARTICLE SIZE OR FIBER LENGTH						
			<.5 μ	.5-5 μ	5-10 μ	10-20 μ	20-50 μ	50-100 μ	>100 μ
1	114	39		1					
2	114	38							
3	114	37							
4	114	36			1				
5	114	35			1				
6	115	41				4			
7	115	40							
8	115	39							
9	115	38							
10	115	37							
11	116	41							
12	116	40							
13	116	39							
14	116	38							
15	116	37							
16	116	36		1					
17	116	35			2				
18	117	40							
19	117	39							
20	117	38			1				
Totals			0	2	5	4	0	0	0
Percent			0	18.2	45.5	36.4	0	0	0

Note: 1. Must count at least 100 fibers or a minimum of 20 fields.
2. Count only fibers having an aspect ratio of at least 3:1 and a length of 5 microns or larger.
3. Latitude is left-to-right on filter. Longitude is in-and-out on filter
4. This distribution IS NOT on a weight basis.

Average Fiber Count .55

Job # 1740
Lab # 577
Job Name
Tile Council

ROSSNAGEL & ASSOCIATES

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1999 Rt. 70 • Cherry Hill, N. J. 08003

Date Nov. 29 1975
Made by MY King
Checked by PJF

Description MILLIPORE MEMBRANE FILTER: Personal Sampler #5
Filter # P-7

TOTAL PARTICLE OF FIBER MICRON SIZE DISTIBUTION BY COUNT

MAGNIFICATION: 400X
TYPE RETICLE: Porton

CLASSIFICATION: ASBESTOS FIBER
OPERATION: MORTARA

SAMPLING TIME: 15 min.
NO. OF FIELDS: 100

	PARTICLE SIZE OR FIBER LENGTH						
	<.5μ	.5-5μ	5-10μ	10-20μ	20-50μ	50-100μ	>100μ
TOTALS	0	23	27	10	0	0	0
PERCENT	0	38.3	45	16.7	0	0	0

TOTAL AVERAGE FIBER COUNT: .6
TOTAL FIBERS COUNTED: 60

Southeastern Division
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Job # 1740
Lab # 579
Job Name Tile Council

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1999 Rt. 70 • Cherry Hill, N. J. 08003

Date Nov. 29, 1976
Made by MKW
Checked by DMF

Description MILLIPORE MEMBRANE FILTER : PERSONAL SAMPLER # 5

FILTER # P-7

FORMULA :

$$\frac{(\text{AVERAGE NET COUNT})(171{,}000)}{\text{AIR VOLUME SAMPLED, mL.}} = \text{FIBERS/mL.}$$

SAMPLING RATE : 2.0 LPm

SAMPLING TIME : 15 min.

SAMPLING VOLUME : = RATE × TIME
= 2.0 LPm × 15 min.
= 3.0 LITERS
= 30,000 mL

TOTAL FIBERS COUNTED : 60

AVERAGE NET COUNT (100 FIELDS) : .6

CALCULATION :

$$\text{FIBER CONCENTRATION (5}\mu\text{ OR LONGER)} = \frac{.6 \times 171{,}000}{30{,}000 \text{ mL}} = 3.42 \text{ FIBERS/mL.}$$

Form #RA-73A

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ATLANTA, GA. 30307
(404) 377-4248

Lab # 579

Job # 1740

Job Name Tile Council

Sample Personal Samples #5, Filter #P-7

Date November 29 1976

Made by M L Kimp

Checked by DAF

PARTICLE OR FIBER MICRON SIZE DISTRIBUTION BY COUNT

Magnification 400X

Classification Asbestos Fiber

Type Reticle Paton

Operation MORTAR A

Sampling Method Membrane Filter

Sample Time 15 min

Field No.	Lat.	Long.	PARTICLE SIZE OR FIBER LENGTH						
			<.5 μ	.5-5 μ	5-10 μ	10-20 μ	20-50 μ	50-100 μ	>100 μ
1	98	38							
2	99	38							
3	100	40							
4	100	39							
5	100	38			1				
6	101	40			1				
7	101	39							
8	101	38							
9	101	37							
10	101	36							
11	102	41				1			
12	102	40							
13	102	39				1			
14	102	38			1				
15	102	37							
16	102	36							
17	103	40							
18	103	39			1				
19	103	38			1				
20	103	37							
Totals			0	0	5	2	0	0	0
Percent			0	0	71.4	28.6	0	0	0

Note: 1. Must count at least 100 fibers or a minimum of 20 fields.

2. Count only fibers having an aspect ratio of at least 3:1 and a length of 5 microns or larger.

3. Latitude is left-to-right on filter. Longitude is in-and-out on filter

4. This distribution IS NOT on a weight basis.

Average Fiber Count .35

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Lab # 579

Job # 1740

Job Name Tile Council

Sample Personal Sample #5 Filter #P-7

Date November 29 1971

Made by MLK Kimp

Checked by DJF

PARTICLE OR FIBER MICRON SIZE DISTRIBUTION BY COUNT

Magnification 400X

Classification Asbestos Fiber

Type Reticle Porton

Operation MORTAR A

Sampling Method Membrane Filter Sample Time 15 min.

Field No.	Lat.	Long.	PARTICLE SIZE OR FIBER LENGTH						
			<.5 μ	.5-5 μ	5-10 μ	10-20 μ	20-50 μ	50-100 μ	>100 μ
1	103	36				1			
2	104	41			2				
3	104	40							
4	104	39			2				
5	104	38		1					
6	104	37							
7	104	36							
8	105	41							
9	105	40			1				
10	105	39							
11	105	38		3					
12	105	37							
13	105	36		1					
14	106	41							
15	106	40							
16	106	39							
17	106	38							
18	106	37				1			
19	106	36							
20	106	35		1					
Totals			0	6	5	2	0	0	0
Percent			0	46.15	38.5	15.4	0	0	0

Note: 1. Must count at least 100 fibers or a minimum of 20 fields.

2. Count only fibers having an aspect ratio of at least 3:1 and a length of 5 microns or larger.

3. Latitude is left-to-right on filter. Longitude is in-and-out on filter

4. This distribution IS NOT on a weight basis.

Average Fiber Count .65

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Lab # 579

Job # 1740

Job Name Tile Council

Sample Personal Samples #5, Filter #P-7

Date November 29, 1976

Made by M A Kinup

Checked by DAF

PARTICLE OR FIBER MICRON SIZE DISTRIBUTION BY COUNT

Magnification 400X

Classification Asbestos Fiber

Type Reticle Patton

Operation MORTAR A

Sampling Method Membrane Filter Sample Time 15 min

Field No.	Lat.	Long.	PARTICLE SIZE OR FIBER LENGTH						
			<.5 μ	.5-5 μ	5-10 μ	10-20 μ	20-50 μ	50-100 μ	>100 μ
1	107	42							
2	107	41							
3	107	40				1			
4	107	39			1				
5	107	38				1			
6	107	37							
7	107	36				2			
8	107	35			1				
9	108	41		1					
10	108	40							
11	108	39							
12	108	38				1			
13	108	37		2					
14	108	36		1					
15	108	35							
16	109	42			2				
17	109	41			1				
18	109	40			2				
19	109	39			1				
20	109	38			1				
Totals			0	4	9	5	0	0	0
Percent			0	22.2	50	27.8	0	0	0

Note:
1. Must count at least 100 fibers or a minimum of 20 fields.
2. Count only fibers having an aspect ratio of at least 3:1 and a length of 5 microns or larger.
3. Latitude is left-to-right on filter. Longitude is in-and-out on filter
4. This distribution IS NOT on a weight basis.

Average Fiber Count .9

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Lab # 579
Job # 1740
Job Name Tile Council
Sample Personal Samples #5 Filter #P-7

Date November 29 1976
Made by M Y King
Checked by DJF

PARTICLE OR FIBER MICRON SIZE DISTRIBUTION BY COUNT

Magnification 400X
Classification Asbestos Fiber
Type Reticle Paton
Operation MOCTARA
Sampling Method Membrane Filter
Sample Time 15 min.

Field No.	Lat.	Long.	PARTICLE SIZE OR FIBER LENGTH <.5 µ	.5-5 µ	5-10 µ	10-20 µ	20-50 µ	50-100 µ	>100 µ
1	109	37							
2	109	36							
3	109	35							
4	110	43		1					
5	110	42							
6	110	41		1					
7	110	40							
8	110	39		1					
9	110	38							
10	110	37		1					
11	110	36			1				
12	110	35		1					
13	110	34		1					
14	111	43		3	2				
15	111	42							
16	111	41							
17	111	40							
18	111	39		1					
19	111	38							
20	111	37							
Totals			0	10	3	0	0	0	0
Percent			0	76.9	23.0	0	0	0	0

Note: 1. Must count at least 100 fibers or a minimum of 20 fields.
2. Count only fibers having an aspect ratio of at least 3:1 and a length of 5 microns or larger.
3. Latitude is left-to-right on filter. Longitude is in-and-out on filter
4. This distribution IS NOT on a weight basis.

Average Fiber Count .65

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(404) 377-4248

Lab # 579
Job # 1740
Job Name Tile Council
Sample Personal Sampler # 5, Filter #P-7

Date November 29, 1976
Made by M L King
Checked by DJF

PARTICLE OR FIBER MICRON SIZE DISTRIBUTION BY COUNT

Magnification 400X
Type Reticle Porton
Classification Asbestos Fiber
Operation MORTAR A
Sampling Method Membrane Filter
Sample Time 15 min

Field No.	Lat.	Long.	PARTICLE SIZE OR FIBER LENGTH <.5 μ	.5-5 μ	5-10 μ	10-20 μ	20-50 μ	50-100 μ	>100 μ
1	111	36							
2	111	35							
3	112	41		2	1				
4	112	40							
5	112	39							
6	112	38			1				
7	112	37							
8	112	36							
9	112	35							
10	113	41		1					
11	113	40							
12	113	39			1				
13	113	38							
14	113	37			1				
15	113	36							
16	113	35							
17	114	40							
18	114	37							
19	114	35			1				
20	115	36				1			
Totals			0	3	5	1	0	0	0
Percent			0	33.3	55.6	11.1	0	0	0

Note: 1. Must count at least 100 fibers or a minimum of 20 fields.
2. Count only fibers having an aspect ratio of at least 3:1 and a length of 5 microns or larger.
3. Latitude is left-to-right on filter. Longitude is in-and-out on filter.
4. This distribution IS NOT on a weight basis.

Average Fiber Count .45
Total Fibers Counted 9

V

DATA SHEETS

Events Log

TILE COUNCIL JOB

PRINCETON, NJ. LOCATION

DAY TUESDAY

DATE 11-9-76

EVENTS LOG

TIME	EVENT
10:45 AM	arrive at site
10:55 AM	PS #5 - OPERATOR START P-1 2.0 LPM
10:55 AM	PS #6 - AREA SAMPLER - START MORTAR B 1.6 LPM P-2
11:10 AM	PS #5 - OPERATOR - STOP
11:10 AM	PS #6 - AREA SAMPLER - STOP
11:27 AM	PS #5 - OPERATOR START - P-3 2 - LPM
11:27 AM	PS #8 - AREA SAMPLER - START P-4 MORTAR C 2 - LPM
11:42 AM	PS #5 - STOP
11:42 AM	PS #8 - STOP
12:05 PM	PS #5 OPERATOR - START P-5 MORTAR A 2 LPM
12:05 PM	PS #8 AREA SAMPLER - START P-6 2 LPM
12:20 PM	PS #5 - STOP
1:30 PM	PS #5 - OPERATOR START P-7 Mortar A 2 LPM
1:45 PM	PS #5 - Stop

ISOKINETIC PARAMETER

T_M = ____
$\%H_2O$ = ____ } C = ____
P_s/P_M = ____

T_S = ____ THEO.
NOZZLE = ____ PITOT = ____

T_M = ____
$\%H_2O$ = ____ } C = ____
P_s/P_M = ____

T_S = ____ THEO
NOZZLE = ____ PITOT = ____

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