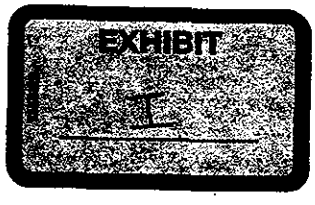
INDUSTRIAL HYGIENE
AND VENTILATION SURVEY

OWENS-CORNING FIBERGLAS CORPORATION
BERLIN, NEW JERSEY

June 8-12, 1970



Subsidiary of Sifkin Smelting and Refining Company, Inc
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JUL 27 1970

July 24, 1970

Dr. Jon L. Konzen
Medical Director
Owens-Corning Fiberglas Corporation
Toledo, Ohio 43601

Dear Dr. Konzen:

Presented herewith are two copies of our report covering the asbestos survey and ventilation study at the Berlin, New Jersey Plant. In accordance with your request, our recommendations resulting from this study are being forwarded with the report as a separate item.

This report contains the same basic information that was presented and discussed at our meeting at the Berlin Plant on July 10, and the recommendations have been changed very little as a result of that meeting.

If there are any questions concerning this study or the report, do not hesitate to contact us.

Very truly yours,

George D. Clayton
President

GDC:bh

INDUSTRIAL HYGIENE AND VENTILATION SURVEY
OWENS-CORNING FIBERGLAS CORPORATION
BERLIN, NEW JERSEY

PROBLEM

An extensive asbestos sampling survey was conducted at the Berlin, New Jersey Plant of Owens-Corning Fiberglas Corporation to identify areas where men are being over-exposed to asbestos fibers, and to measure the intensity of asbestos inhalation to men in various job classifications. At the time of the survey an evaluation was made of the Flatware Finishing Line ventilation to assess its performance in controlling sources of asbestos in the work-room. This survey was conducted by Messrs. John E. Mutchler and Henry J. Murenbe of George D. Clayton & Associates, Inc. during the week of June 8, 1970.

INTRODUCTION

The Berlin, New Jersey Plant of Owens-Corning Fiberglas Corporation produces an asbestos containing insulation material, Kaylo. The basic process consists of wet formulation, pouring, drying, sizing and packing, using various formulations and several different sizes and shapes of dried insulation material. Both chrysotile and amosite asbestos are used in the basic formulation, together with lime, silica, cement, diatomaceous earth, iron chromite, clay and reprocessed Kaylo dust.

Worker exposures were measured in the following plant areas:

Raw Material Handling
Batch Floor Operations
No. 1 Pouring Line
No. 2 Pouring Line
Miscellaneous Service Jobs
Semi-Molded Billet Finishing
Integrated Finishing Line
New Flatware Finishing Line
Band Saw Operations
Deutherm Control Room

ASBESTOS INHALATION

Until recently the standard method of sampling asbestos in the workroom was based on the number of particles per unit volume (millions of particles per cubic foot) determined by standard impinger sampling and 100X lightfield microscopy. For several years the Threshold Limit Value (ACGIH) was set at 5 mppcf. In 1969 the Threshold Limits Committee changed the TLV to a tentative value of 12 asbestos fibers per ml for fibers greater than 5μ in length, as determined by phase contrast microscopy at 430X. In 1970 the Committee reduced the TLV to a tentative value of 5 fibers per ml on the same basis. The British Occupational Hygiene Society has adopted a standard for chrysotile of 2 fibers per ml for 50 years of exposure, 4 fibers per ml for 25 years of exposure, or 10 fibers per ml for 10 years of exposure. These standards are, in the opinion of the experts, the best that can be drawn from existing data. These data are not ideal and, of course, the standards are subject to review in the light of new evidence and improved methods of measurement.

Good industrial hygiene practice suggests controlling exposures below the maximum allowable level, rather than maintenance at the maximum. In this connection, it is appropriate to design current engineering controls for an expected air-borne concentration of 2 fibers per ml in view of the trend downward in the acceptable exposure level and in accordance with good engineering practice.

SAMPLING PROCEDURES

In line with the latest sampling developments, those specified by the Threshold Limit Value, air samples were collected on pre-weighed cellulose ester membrane filters by the use of Mine Safety Appliances personal samplers. Three types of samples were taken: breathing zone, general area, and equipment locations. Sampling rates were 1.8-2.0 liters per minute and sampling periods varied between 5 and 150 minutes, depending upon the expected dust loading. At the conclusion of a sampling period the filter heads were removed and carried to a laboratory area where the filters were carefully transferred to sealed containers for transport back to the laboratories of Clayton & Associates.

FIBER COUNTING PROCEDURE

The method of counting asbestos fibers was that used by the U.S. Public Health Service for the enumeration of asbestos dust on membrane filters. The description of this method by G. M. Edwards and J. R. Lynch appeared in Ann. Occup. Hyg., 11, 1-6 (1968).

After weighing, sections of the sample are mounted on standard microscope slides using a high viscosity solution of membrane filter material in a 1:1 mixture of diethyl oxalate and dimethyl phthalate to render the filter transparent. Since the mount is stable for 30 days, 35 mm color slides are taken as permanent records of representative areas of each filter.

The asbestos fibers which lie on the surface of the filter are counted with phase contrast microscopy (as specified by the tentative Threshold Limit Value) using 10 x eyepiece and a 40 x phase contrast objective.

In mounting the sample, the transition of the dust-supporting substrate from translucent solid membrane filter cellulose ester material to a transparent, optically homogeneous gel is very gentle. Clearing of the filter is slow, requiring about 15 minutes, and at no time does a meniscus sweep across the dust deposit. The filter slowly softens from below causing no redistribution of the fibers.

Ten fields selected at random on the sample are counted and total fibers, fibers from 0 to 5μ, fibers greater than 5μ, and fibers greater than 10μ are recorded. Any particle having an aspect ratio of 3 or greater is considered to be a fiber.

RESULTS OF SAMPLING SURVEY

Table 1 records the results from the 95 samples taken during the survey, and lists the concentrations in terms of total dust, milligrams per cubic meter, and asbestos fiber concentration, fibers per milliliter. Three fiber length categories are included: "greater than 5 microns," "greater than 10 microns" and "total."

Table 2 tabulates the exposure by job classifications for each job studied. The exposures are categorized by intensity with numbers 1, 2 and 3, for both asbestos concentration

(fibers >5μ) and total dust concentration. The exposure intensity was obtained by averaging all breathing zone samples taken for a given job classification and comparing that average with the tentative Threshold Limit Values (ACGIH) for 1970 as follows:

Exposure Category	Average Concentration	
	Asbestos Fibers/ml (>5μ)	Total Dust Mg/M^3
1	≤4.99	≤9.99
2	5.00-9.99	10.00-19.99
3	≥10.00	≥20.00

Although the numbers do not necessarily reflect time-weighted average exposures, they do offer a useful index of relative exposures for all job classifications.

NEW FLATWARE FINISHING LINE VENTILATION

DESCRIPTION

The new dust collection and local exhaust system at the flatware finishing line consists of a rather complex multi-branched series of exhaust ducts leading from the new finishing line conveyor operations upward to a central exhaust duct that exits through the roof and northward to a baghouse collector located near the main plant building. The new flatware line runs continuously during the day shift with the exception of three "break" periods at 10:00 A.M., 12:00 noon and 2:00 P.M. At these times, the system is shut down, the baghouse is shaken, and the "baghouse checker" inspects the inside of the baghouse for excessive dust accumulation.

This control concept and the present mode of operation results in a decreased air flow and increased static pressure (less of suction) within the dust collection network as the fabric filters accumulate dust.

AIR FLOW VARIATION IN ROOF DUCT

On June 11 the static pressure and air flow rates were monitored in the 30" roof duct leading from the new flatware finishing line to the baghouse collector. A velometer, standard pitot tube, inclined gauge manometer and glass-stemmed thermometer were used for the measurements, conducted at a point about halfway between the roof exit and the collector. The results of these measurements are shown below:

Time		Static Pressure "W.G.	Duct Temp. °F	Avg. Velocity fpm	Flow Rate cfm
0925		-6.6			
0936		-6.6	80		
0943		-6.6	80		
0953		-6.5	80	3,870	19,002
1002	Shutdown				
1013	Startup	-8.4	79	4,074	20,003
1017		-8.2	80		
1022		-8.0	80		
1400		-6.0	86	3,762	18,471
1403	Shutdown		86		
1435	Startup	-8.8	86	4,128	20,268

As a result of these measurements, it may be seen that the air flow into the dust collector varies about 5-10% depending upon the degree of dust accumulation within the baghouse.

AIR FLOW VARIATION AT THE FINISHING LINE

On June 11 the static pressures were measured in six selected legs and the center line velocities were measured in four selected legs of the finishing line exhaust system prior to and following the noon break, during which the bag filters were cleaned. The results of these measurements are listed below in Table 3.

These measurements show that the variation in air flow rates is much greater at the finishing line than in the main duct leading to the baghouse collector. In some cases the duct velocity can drop below the accepted minimum dust carrying velocity of 3,500 fpm as a result of normal operations, prior to cleaning the dust filters.

OBSERVATIONS ON DUST CONTROL AT THE NEW FLATWARE LINE

1. At the flycutter operation the motor shaft protrudes through the housing with a 3/4" gap around the motor shaft. This results in a considerable amount of dust emitted through the opening by the centrifugal action of the rotating shaft.

2. At the flycutter exit position, a series of rubber deflecting baffles have been installed improperly, resulting in a 1/2" gap between the top of the flycutter housing and the top of the baffles which should serve to prevent dust particles being thrown outward by the rotating flycutter. As a result, a large amount of dust is being emitted to the workroom through this unnecessary opening.

3. At several conveyor line junctions, including that between the sanders, the underside exhaust hoods are improperly placed at the point where the conveyors reverse direction. As a result, dust which could be captured is carried along the conveyor and dumped onto the floor.

4. At several conveyor junctions, including the flycutter-sander and side and end trim positions, there is no underside exhaust for dust being carried along the conveyor, resulting in significant quantities of dust being dropped on the floor when the conveyor belt reverses direction.

5. At the slitter saw position, there is an unnecessarily large gap around the shaft which allows excess dust to be thrown outward by the saw's rotating action.

6. Following the slitter saw position a rotating brush has been installed to clean the moving flatware before it is packed. The brush is not positioned properly and the flatware product moves to the final conveyor section with considerable dust on its upper surface. As a consequence, when the flatware products are pushed into the boxes by the packers, copious amounts of dust are entrained into the breathing zone of these men.

7. There is presently no exhaust ventilation at or near the packers on the new flatware line, although there is a clear need for such local exhaust ventilation.

8. At the feeder position a canopy hood with a face area of 16 square feet hangs above the conveyor approximately 14" above the conveyor belt. This hood is exhausted to a different collector than the other local exhaust hoods in the flatware ventilation network. The face velocities at this

hood were measured twice; first with the nearby portable fan running and second, with the fan off. In the first case, the face velocity averaged 83 fpm with a total flow rate of 1,330 cfm. In the second case, the face velocity averaged 150 fpm with a total flow of 2,400 cfm. Both of these conditions represent unacceptable control for the dust entrained in the breathing zone of the feeder during his normal work operations. The canopy hood is a second choice of control for this application, but if used, a flow rate of 4,200 cfm would be required.

SAMPLING AT FLATWARE FINISHING LINE EQUIPMENT

Six samples were taken near the flycutter, sanders and slitter saw on the flatware line conveyor, to assess the significance of these unit operations as sources of dust in the workroom. The results are as follows:

	No. of Samples	Total Dust mg/M^3	Asbestos Fibers/ml $<5\mu$
Flycutter Inlet	1	32.77	4.80
Flycutter Exit	2	23.47	1.13
Between Sanders	2	21.28	1.11
Slitter-saw	1	11.67	5.55

It may be concluded that efforts to lower the dust concentrations near the Flatware Line are not aided by the present state of operation for the above items.

This report prepared by: John E. Mutchler

John E. Mutchler
Chief, Engineering Services

TABLE 1
GEORGE D. CLAYTON & ASSOCIATES, INC.
FIBER SAMPLING SUMMARY

Fibrous Material Asbestos — Plant Berlin

1970 Date	Sample No.	Description	Sampling Period Start	Sampling Period Stop	Sample Weight mg	Sample Volume litere	Concentration mg/M³	Concentration Fibers/ml >5μ	Concentration Fibers/ml >10μ	Concentration Fibers/ml To
6-8/11	1570	Batch Floor Control Panel	1458	1514	27.47	19,512	1.41	too heavy to count		
6-8	1571	Lunch Room	1605	1703	0.06	108	0.55	0.43	0.25	0.
6-8	1572	Line Service Man, Flatware	1606	1654	0.42	92	4.57	0.86	0.48	0.
6-8	1573	Plant Sweeper	1555	1631	0.33	68	4.65	0.80	0.33	0.
6-8	1574	#1 Line Service Man	1625	1706	0.61	82	7.44	1.59	0.54	2.
6-8	1575	#2 Line Service Man	1629	1708	0.58	78	7.45	5.10	1.47	3.
6-8	1576	Cylinder Service Man	1655	1712	0.50	74	6.76	1.17	0.50	1.
6-9	1577	#2 Line Pour Service Man	0855	0923	0.49	56	8.75	2.54	1.40	3.
6-9	1578	#2 Line Stripper A	0855	0914	0.92	38	24.21	14.19	7.95	15.
6-9	1584	#2 Line Stripper B	0855	0915	1.41	56	59.17	11.56	6.86	13.
6-9	1581	#2 Line Oiler	0855	0912	1.66	34	48.82	9.42	4.55	11.
6-9	1582	#2 Line Desk	0856	0925	0.86	58	14.82	3.16	1.64	3.
6-9	1583	#2 Line Strip Service Man	0855	0915	1.26	40	31.58	10.04	4.90	11.
6-9	1580	#2 Line Pourer	0855	0920	0.71	50	14.20	1.54	0.84	1.
6-9	1585	#2 Line Screeder	0855	0917	0.85	44	19.32	0.74	0.38	0.

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Date	Sample No.	Description	Sampling Period Start	Sampling Period Stop	Sample Weight mg	Sample Volume liters	Concentration mg/M³	Concentration Fibers/ml >5μ	Concentration Fibers/ml >10μ	Concentration Fibers/ml Total
6-9	1587	Raw MaterialTrucker (diatomite)	0921	0952	1.07	62	17.25	0.24	0.11	0.2
6-9	1588	Bowthorn Control Room Desk	0930	1115	0.71	210	3.38	0.05	0.03	0.0
6-9	1590	Baghouse Cleaner	0950	1015	0.48	45	10.67	6.87	2.87	8.5
6-9	1591	Mixer's Desk, Batch Floor	0959	1025	0.58	52	11.15	1.36	0.49	1.8
6-9	1592	#1 Line Stripper	1020	1046	1.78	52	34.23	15.10	9.51	16.2
6-9	1593	Lab Bench (near batch floor)	1005	1235	0.48	292.5	1.64	0.12	0.05	0.1
6-9	1594	#1 Line Strip Service Man	1020	1054	0.63	68	9.26	3.00	1.45	3.4
6-9	1595	#1 Line Pourer	1020	1055	0.56	63	8.89	2.18	0.89	2.5
6-9	1596	Storage Area Across from #1 Line	1027	1059	0.73	64	11.40	1.87	0.98	2.1
6-9	1597	#1 Line Desk	1022	1058	0.60	72	8.33	1.68	0.44	2.1
6-9	1598	#1 Line Pour Service Man	1020	1057	0.76	74	10.27	1.94	0.86	2.2
6-9	1599	#1 Line Oiler	1036	1100	0.70	48	14.58	3.97	1.97	4.6
6-9	1600	Trimmer Saw Position, Integrated Line	1050	1140	0.67	100	6.70	1.90	1.00	2.13
6-9	1602	Raw Material Trucker(amosite)	1114	1144	0.51	60	8.50	2.42	1.09	2.82
6-9	1603	C-Saw off-bearer, Integrated Line	1124	1138	0.53	28	18.93	11.09	6.33	13.12

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Date	Sample No.	Description	Sampling Period Start	Sampling Period Stop	Sample Weight mg	Sample Volume liters	Concentration mg/M³	Concentration Fibers/ml >5μ	Concentration Fibers/ml >10μ	Concentration Fibers/ml To
6-9	1604	C-Saw Feeder, Integrated Line	1123	1141	0.63	35.1	17.95	9.25	0.83	10.(
6-9	1605	Packing Service Man - New Flatware Line	1257	1339	0.50	84	5.95	1.22	0.16	1.3
6-9	1606	Wrapper/Packer, Integrated Line	1429	1453	0.56	21.6	25.93	10.07	1.04	11.1
6-9	1607	Desk near Flatware Packers	1432	1500	0.42	50.4	8.33	1.85	0.94	2.7
6-9	1608	Crew Leader, New Flatware Line	1307	1335	0.59	56	10.54	8.21	1.45	9.(
6-9	1609	Feeder, New Flatware Line	1301	1327	1.01	52	19.42	6.53	0.74	7.2
6-9	1610	Wrapper/Packer - New Flatware Line	1310	1336	0.48	49.4	9.72	1.08	0.13	1.1
6-9	1611	Band Saw Operator (Cutting legs)	1316	1329	0.60	26	13.04	10.66	5.90	11.8
6-9	1612	Packing Service Man, Integrated Line	1447	1456	1.12	55.1	20.33	1.12	0.14	1.2
6-9	1613	Wrapper/Packer- Integrated Line	1430	1453	0.62	46	13.48	11.94	1.52	13.4
6-9	1614	Flycutter Exit Position - New Flatware Line	1436	1501	0.33	47.5	6.94	1.33	0.73	1.4
6-9	1615	Carton Man, Integrated Line	1426	1458	0.49	64	7.65	2.06	1.32	2.4
6-9	1617	Between Top and Bottom Sanders- New Flatware Line	1439	1502	0.33	43.7	7.56	1.05	0.52	1.1
6-9	1618	Crew Leader's Desk, Flatware Line	1441	1503	0.37	44	8.41	0.70	0.14	0.8
6-9	1619	North General Area, Batch Floor	1341	1402	0.40	42	9.52	0.64	0.32	0.8

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Date	Sample No.	Description	Sampling Period Start	Sampling Period Stop	Sample Weight mg	Sample Volume liters	Concentration mg/M³	Concentration Fibers/ml >5μ	Concentration Fibers/ml >10μ	Concentration Fibers/ml Total
6-9	1620	Batch mixer (Dumping Diatomite)	1630	1648	0.60	36.4	17.58	0.99	0.32	1.23
6-9	1621	Slitter position New Flatware line	1447	1503	0.42	36	11.67	5.55	2.50	6.70
6-10	1622	Router-cutter position- Billet line	0954	1006	0.45	24	18.75	8.96	3.89	10.40
6-9	1623	Ass't. Batch Mixer (Dumping Amosite)	1633	1646	0.45	26	17.31	6.67	3.20	7.70
6-10	1624	Ass't. Batch Mixer (Dumping Amosite)	0841	0852	0.26	18	14.44	4.45	2.13	5.12
6-10	1625	Batch Mixer	0841	0856	<0.05	30	<1.67	0.17	0.04	0.32
6-10	1626	Wrapper/Packer - Billet Line	0922	0930	<0.05	56	<0.89	24.90	2.28	27.20
6-10	1627	Carton man - Billet Line	0920	0951	0.15	62	2.42	0.78	0.40	0.90
6-10	1628	Wrapper/Packer - Billet Line	0924	0951	0.20	51.3	3.90	1.19	0.50	1.38
6-10	1630	Desk at Billet Line	0953	1008	0.20	30	6.33	0.79	0.45	0.98
6-10	1631	Ass't. Batch Mixer (Dumping Amosite)	0854	0904	0.48	20	24.00	86.90	58.30	95.00
6-9	1632	Mixer's Desk-Batch Floor	0858	0909	0.77	22	35.00	0.49	0.14	0.64
6-10	1633	General area in front of SID Cylinders	1014	1025	1.23	22	55.91	11.61	5.03	15.27
6-10	1634	End trimming position - Billet Line	0928	0935	0.70	54	12.96	0.37	0.20	0.50
6-10	1635	Dryer Service Man	0936	1003	1.17	54	21.67	23.78	11.91	28.5?

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Date	Sample No.	Description	Sampling Period Start	Sampling Period Stop	Sample Weight mg	Sample Volume liters	Concentration mg/M³	Concentration Fibers/ml >5μ	Concentration Fibers/ml >10μ	Concentration Fibers/ml Tot
6-10	1636	Baghouse Cleaner	0950	1010	0.54	38	14.21	1.55	0.62	1.6
6-10	1637	Line Service Man - Semi-Molded Billets	0926	0954	0.68	56	12.14	1.80	1.08	2.2
6-10	1638	Plant Sweeper	0915	0942	0.73	54	13.51	2.26	1.13	2.6
6-10	1639	Feeder, Semi-Molded Billets	0921	0951	0.68	51.3	13.25	1.86	1.31	1.9
6-10	1640	Discharge end of "Roteblast"	1407	1431	0.56	21.6	25.92	1.91	0.98	2.2
6-10	1641	Feed end of "Roteblast"	1408	1433	0.49	45	10.88	0.57	0.38	0.6
6-11	1642	#2 Line Strip Service Man	0816	0829	0.66	26	38.46	1.15	0.76	1.3
6-11	1643	#1 Line Desk	0834	0859	0.65	50	13.00	1.98	0.88	2.3
6-10	1644	General Area, @ Center of Finishing Room	1142	1223	0.54	82	6.58	0.69	0.41	0.7
6-10	1645	Feeder, New Flatware Line	1125	1134	0.65	18	36.11	19.61	12.16	21.9
6-10	1646	Packer A, New Flatware Line	1140	1146	0.61	12	50.83	22.68	11.36	25.6
6-10	1648	Packer B, New Flatware Line	1137	1145	0.24	16	15.00	26.52	15.32	30.4
6-10	1649	Crew Leader's Desk, New Flatware Line	1127	1150	0.78	43.7	17.84	1.61	0.77	2.0
6-10	1650	Band Saw Operator	1123	1132	0.43	18	23.88	2.92	1.51	3.2
6-10	1651	B-Sawyer, Integrated Line	1108	1117	0.77	18	42.77	10.63	6.58	11.9

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Date	Sample No.	Description	Sampling Period Start	Sampling Period Stop	Sample Weight mg	Sample Volume liters	Concentration mg/m³	Concentration Fibers/ml >5μ	Concentration Fibers/ml >10μ	Concentration Fibers/ml Tot
6-11	1652	#1 Line Stripper (hand held)	0905	0910	0.48	10	48.00	3.26	0.64	3.9
6-11	1653	#2 Line Oiler	0816	0828	0.57	24	23.75	3.14	1.70	3.4
6-11	1655	#2 Line Desk	0817	0830	0.55	26	21.15	1.77	0.76	2.2
6-11	1656	#1 Line Stripper	0858	0905	0.64	14	45.71	18.66	11.2	21.1
6-11	1657	Packer, New Flatware Line	1131	1137	<0.05	12	<4.17	6.66	4.21	7.3
6-10	1659	Desk in NW Laminating Area	1325	1355	0.56	60	9.33	1.33	0.37	1.7
6-11	1660	#2 Line Stripper B	0816	0825	0.63	18	35.00	7.47	4.76	8.3
6-11	1661	#1 Line Oiler	0858	0908	0.49	20	24.50	0.99	0.29	1.41
6-11	1662	#1 Line Strip Service Man	0858	0907	0.72	18	40.00	2.38	1.06	3.02
6-11	1663	#2 Line Stripper A	0816	0826	0.60	20	30.00	9.41	5.15	11.32
6-11	1665	Inlet to Flycutter, New Flatware Line	1056	1105	0.59	18	32.77	4.80	2.13	6.29
6-11	1666	Mixer's Desk, Batch Floor	1325	1342	0.67	35.7	18.76	4.34	1.80	5.21
6-11	1667	Feeder, New Flatware Line	1502	1507	0.63	10	63.00	7.04	4.03	8.06
6-11	1668	Inlet to Top Sander, New Flatware Line	1055	1104	0.63	18	35.00	1.17	0.78	1.24
6-11	1669	Flycutter Exit, Flatware Line	1055	1104	0.72	18	40.00	0.96	0.50	1.3

GEORGE D. CLAYTON & ASSOCIATES, INC.
FIBER SAMPLING SUMMARY

Fibrous Material Asbestos

Plant Berlin

Date	Sample No.	Description	Sampling Period		Sample Weight	Sample Volume	Concentration			
			Start	Stop	mg	liters	mg/M³	Fibers/ml		
								>5μ	>10μ	Tot
6-9	1670	Line Service Man-New Flatware	1249	1330	1.06	80	13.25	4.01	2.44	4
6-9	1671	Packer A-New Flatware Line	1305	1333	2.00	56	35.71	26.69	17.52	29
6-9	1672	Packer B-New Flatware Line	1304	1333	5.61	55.1	101.8	Too heavy to count		
6-9	1673	Wrapper/Packer, Flatware Line	1308	1335	0.90	48.6	18.51	10.42	3.28	12
6-9	1674	Area between band saws.	1328	1342	0.72	28	25.71	2.97	1.60	3

TABLE 2
EXPOSURE BY JOB CLASSIFICATIONS
BERLIN, NEW JERSEY PLANT
OWENS-CORNING FIBERGLAS CORPORATION

June, 1970

	Asbestos >5μ	Total Dust
Raw Material Handling		
Raw Material Trucker	1*	2*
Raw Material Unloader	NS	NS
Batch Floor Operations		
Batch Mixer	1	2
Assistant Batch Mixer	3	2
No. 1 Pouring Line (Flatware)		
Strip Service Man	1	3
Stripper	3	3
Mold Oiler	1	2
Line Service Man	1	1
Pourer	1	1
Pour Service Man (Screeder)	1	2
No. 2 Pouring Line		
Strip Service Man	2	3
Strippers	3	3
Mold Oilers	3	3
Line Service Man	1	1
Pourer	1	2
Pour Service Man	1	1
Screeder	1	2
Miscellaneous Service Jobs		
Baghouse Checker	1	2
SID Cylinder Service Man	1	1
Plant Sweeper	1	1
Dryer Service Man	3	3
Semi-Molded Billet Finishing		
Feeder	1	2
Wrapper-Packers	3	1
Carton Man	1	1
Line Service Man	1	2

* 1: E< TLV
2: TLV <E< 2 TLV
3: E> 2 TLV
NS: Not Sampled

EXPOSURE BY JOB CLASSIFICATIONS
(Continued)

	Asbestos >5μ	Total Dust
Integrated Line		
B-Saw Operator	3	3
C-Saw Operator	2	2
C-Saw Off-Bearer	3	2
Wrapper-Packers	3	3
Packing Service Man	1	3
Carton Man	1	1
New Flatware Finishing Line		
Feeder	3	3
Carton Man (Wrapper-Packer)	2	2
Packers	3	3
Crew Leader	2	2
Line Service Man	1	1
Packing Service Man	1	1
Band Saw Operations		
Band Saw Operators	2	3
Boythern Control Room		
Control Room Operator	1	1

AIR FLOW VARIATION AT THE NEW FINISHING LINE

TABLE 3

Exhaust Leg	Time	Static Pressure, "W.G.	Center-line Velocity, fpm
Top Sander, West Lateral Exhaust	1050	-3.1	
	1115	-4.3	
	1140	-3.0	
	1155	-3.7	
	1225	-4.8	
North Floor Pick-up	1110(closed)	-3.0	
	1150(closed)	-4.7	
	1200(open)		2,832
	1220(open)		3,756
	1225(closed)	-3.3	
Flycutter Underside Exhaust, West Side	1110	-4.2	
	1150	-4.7	
	1200		Completely plugged, plus large hole in flexible duct.
	1220	-3.2	
Bottom Sander, Main Vertical	1105	-4.5	
	1145	-3.9	
	1200		3,738
	1220	-3.2	4,008
Bottom Sander, North Leg of Underside Exhaust	1103	-4.3	
	1145	-3.4	
	1200	-3.3	2,658
	1220	-4.6	4,008
Bottom Sander, South Leg of Underside Exhaust	1105	-3.4	
	1145	-4.3	
	1200	-4.1	4,200
	1220	-3.7	4,296

RECOMMENDATIONS
OWENS-CORNING FIBERGLAS CORPORATION
BERLIN, NEW JERSEY

1. A significant contribution to the over-all dust problem at the Berlin plant results from traffic, both pedestrian and lift-truck, in areas where large amounts of settled dust have accumulated, especially on the batch floor, near the pouring lines and the finishing lines. A greater amount of attention must be devoted to removing these accumulations of dust on a frequent basis, both with the mechanized sweeper and with local house-cleaning efforts, including wet methods or other dust suppression measures. A permanent, central vacuum cleaning system could undoubtedly be used to effect a cleaner, less dusty over-all condition.

2. A thorough study should be made of ways and methods of optimizing the production lay-out in terms of material flow patterns and automation of certain operations which presently generate significant quantities of dust, including the batch floor operations.

3. The assistant Batch Mixer's dumping station must be re-designed to incorporate adequate local ventilation.

4. The Strippers, Oilers and Strip Service Men on the pouring lines are receiving excessive exposure to asbestos and total dust, and steps must be taken immediately to reduce these exposures to an acceptable level. The extent to which ventilation should be used for control should be carefully studied as well as other techniques.

5. The Dryer Service Man should have his exposure documented, and if it is as high as presently estimated, he should be equipped with an enclosed, filtered air cabin for his lift-truck.

6. All Wrapper-Packers and Packers on the finishing lines (Carton Man on New Flatware Line) must be protected through local exhaust ventilation at their job stations.

7. The Integrated Finishing Line, when moved to its new location, must be equipped with adequate local ventilation to protect the Saw Operators and the Packing Service Man.

8. The dust control system at the band saws near the new Flatware Finishing Line must be thoroughly cleaned, repaired and maintained to provide suitable control of air-borne dust for the saw operators.

9. The problems outlined in the section "New Flatware Finishing Line Ventilation" should be corrected as soon as possible, since each of the enumerated problems is a rather easily corrected, but significant contributor to the dust contamination around the Flatware Finishing Line.

10. The canopy hood at the Feeder's work position on the Flatware Finishing Line should be removed and replaced with a properly designed slotted, lateral exhaust hood which will remove dust from the man's breathing zone.

The dust control system for the new Flatware Finishing Line, even though it is new, has design problems which will render its performance marginal even under the best conditions, and in our opinion will undoubtedly prove to be unacceptable after a period of normal use; it should therefore be re-designed.

INDUSTRIAL HYGIENE SURVEY
OWENS-CORNING FIBERGLAS CORPORATION

Berlin, New Jersey

August, 1971

Division of Marlennan Management Systems, Inc.
25711 Southfield Road, Southfield, Michigan 48075 • Telephone: 313-352-3120

October 22, 1971

Mr. Gerald E. Devitt
Industrial Hygienist
OWENS-CORNING FIBERGLAS CORPORATION
P.O. Box 901
Toledo, Ohio 43659

Dear Jerry:

Presented herewith is the report of the industrial hygiene survey at the Berlin, New Jersey Plant.

The dust survey conducted in the plant revealed no excessive airborne concentrations of asbestos or other fibrous materials. Oil mist concentrations in the SID and Number 2 Pouring Line areas, however, were quite high. All other contaminants and stresses measured are discussed in the body of the report.

Very truly yours,

George D. Clayton
President

GDC:bj
Enclosure

cc: S. H. Thomas

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INDUSTRIAL HYGIENE SURVEY
OWENS-CORNING FIBERGLAS CORPORATION
BERLIN, NEW JERSEY

INTRODUCTION

During the week of August 16-20, 1971, an industrial hygiene survey was conducted at the Owens-Corning Fiberglas plant in Berlin, New Jersey. The participants in this survey were Messrs. Jack A. Berton and Frederick M. Tocs of George D. Clayton and Associates. The purpose of this survey was to evaluate environmental stresses throughout the plant, particularly these arising from exposure to noise, dusts, fumes, gases, vapors and heat.

The following discussion is limited to those operations where environmental stresses in excess of acceptable levels were measured. Summary data sheets follow for all measurements taken in the survey.

SUMMARY AND RECOMMENDATIONS

NOISE

Representative sound pressure level measurements were made throughout the plant. Octave band analyses were made at locations where the sound pressure level was in excess of 85 dBA. Impact noise measurements were made in the Mold Shop and at the pouring lines.

Boiler Room

Noise levels at two locations in the Boiler Room representing about half of the room work area and near each of the two boilers exceeded the Walsh-Healy 8-hour exposure standard (90 dBA). No personnel routinely stay in this area a significant amount of time. Hearing protectors should, however, be worn by maintenance or other personnel who may be scheduled to work near the boilers longer than 4 to 5 hours during any day.

Mold Shop

A noise level of 102 dBA was recorded at the mold repair station where a man does a considerable amount of abrasive grinding of welded seams on molds. The total time spent

while grinding usually exceeds 1-1/2 hours per day. Hearing protectors should be worn by personnel stationed at work locations within approximately 10 feet of the mold repair station.

SID Control Area

A noise hazard exists in the SID area. Noise from high pressure steam leaks was found to be a common occurence. The general background noise is that of steam flowing through piping. Operations personnel stationed in the SID Control Area should be provided with a protective enclosure to accommodate a desk in a small office area that will effectively reduce the noise exposure at their desk to less than 85 dBA. All personnel who are required to work in the immediate area of the SID's should be required to wear hearing protectors.

DUST SURVEY

A dust survey was conducted throughout the plant. This survey included samples for total dust, welding fume and asbestos. Two samples collected in the batch floor were analyzed for percentage of free silica. Selected samples were analyzed for asbestos fibers using the technique described by Edwards and Lynch in the "Annals of Occupational Hygiene," Volume 11, pp. 1-6 (1968).

It is worthy of mention that in no samples analyzed were asbestos concentrations found to be in excess of the threshold limit value.

Batch Floor

Two samples collected at the west side and at the south side of the batch floor between two dumping hoppers indicate that dust concentrations may at times exceed the threshold limit value by a considerable margin (52.4 mg/M^3 and 23.4 mg/M^3 respectively). Dust filter masks approved by the Bureau of Mines should be worn by operations personnel when dumping material into the hoppers.

Gas and Vapor Survey

The survey for gaseous contaminants was conducted in selected areas of the plant. The contaminants to be sampled were determined by the nature of the operation in the area being surveyed and included carbon monoxide, Dowtherm A and oil mist.

Carbon Monoxide

Carbon monoxide concentrations in areas frequented by lift trucks did not present a potential health hazard at the time of the survey. A potential health hazard may exist, however, during the winter months when dilution ventilation may be at a minimum as some doorways and openings will be closed. An industrial hygiene survey to determine carbon monoxide exposures should be conducted during winter months.

Oil Mist

Oil mist concentrations found in the SID Control Area, SID loading area and #2 Pouring Line area were consistently above the threshold limit value (5 mg/M^3). Concentrations in the range of 8.2 mg/M^3 to 104 mg/M^3 were found. The 5 mg/M^3 limit is recommended as an index of good industrial practice. Better control of the oil-steam leakage from the SID cylinders and preharderers is required, together with better procedural controls on the excess oil applied to the pans at the pouring lines.

Heat Stress

The heat stress survey was conducted using the wet globe thermometer technique developed by J. H. Botsford. Wet globe thermometer (WGT) readings were correlated with wet bulb globe temperature (WBGT) values by use of the formula (WGT = 0.958 WBGT - 3.2) developed by Brief and Confer. WBGT values were then compared with limits for occupational heat exposures proposed by the American Conference of Governmental Industrial Hygienists.

Batch Floor

The potential for excessive heat stress exists at the third floor level of the Batch Floor for moderate and heavier work. A work-rest regimen of 75% work and 25% rest is recommended for moderate work loads.

SID Area

The potential for excessive heat stress exists in the general areas near the SID's for light and heavier work loads. A work-rest regimen of 25% work and 75% rest is recommended for light work loads in the area above the SID's. A work-rest regimen of 50% work and 50% rest is recommended for moderate work loads in the area along the south end of the SID's.

This report prepared by: Jack A. Barton

J. A. Barton,
Industrial Hygienist

GEORGE D. CLAY[illegible] & ASSOCIATES
NOISE SU[illegible]EY DATA SHEET

Plant OCF-Berlin, New Jersey Date August 17, 1971 Study by F.M.T.

Area or Department Batch Floor Instrument B&K

Operating Conditions _____ Remarks _____

Test No.	Time	Location of Microphone	Weighting Network			Sound Pressure Level (dB) re 0.0002 Microbar									
						Octave-Band Frequency (Hertz)									
			A		Lin.	31.5	63	125	250	500	1000	2000	4000	8000	16000
1	14:15	South side of room	80												
2	14:20	East center of room	82												
3	14:25	North side of room (Fan on)	85												
4	14:30	North side of room	83												
5	14:35	North side with mixer on	86			87	88.5	87	86	83	80	75.5	71		
		with bulk separator on	94												

FORM A-2-1

GEORGE D. CLAYTON & ASSOCIATES
NOISE SURVEY DATA SHEET

OWENS-CORNING FIBERGLAS

Plant Berlin, New Jersey Date 8-18-71 Study by JAB

Area or Department Boiler Room Instrument B & K 2204/1613

Operating Conditions Normal Remarks

Test No.	Time	Location of Microphone	Weighting Network			Sound Pressure Level (dB) re 0.0002 Microbar Octave Band Frequency (Hertz)									
			A		Lin.	31.5	63	125	250	500	1000	2000	4000	8000	16000
1	07:35	East end of boiler room	89		98	95	90	86	87	84	81	81	82	80	68
2	07:40	25' South of north door, 10' West of Wicks boiler	93		101										
3	07:42	West end of boiler room at work bench	86		95										
4	07:46	West end of B. & W. boiler	93		97	90	85	86	87	90	88	86	84	84	72

TABLE A-3-1

GEORGE D. CLAUSEN & ASSOCIATES

NOISE SURVEY DATA SHEET

Plant OWENS-CORNING FIBERGLAS Berlin, New Jersey Date 8-18-71 Study by JAB

Area or Department Dowtherm Storage & Transfer Area Instrument B & K 2204/1613

Operating Conditions Normal Remarks

Test No.	Time	Location of Microphone	Weighting Network			Sound Pressure Level (dB re 0.0002 Microbar Octave-Band Frequency (Hertz)									
			A		Lin.	31.5	63	125	250	500	1000	2000	4000	8000	16000
1	15:45	Outside east, 15' from north end, center	84		92										
2	15:48	Outside east, 15' from south end, center	87		92	84	83	81	82	86	84	78	76	74	72

FORM A-4-1

GEORGE D. CLAYTON & ASSOCIATES
NOISE SURVEY DATA SHEET

OWENS-CORNING FIBERGLAS
Plant Berlin, New Jersey Date 8-18-71 Study by JAB

Area or Department Finishing Area Instrument B & K 2204/1613

Operating Conditions F-2 & F-4 Down, Otherwise Normal Remarks

Test No.	Time	Location of Microphone	Weighting Network			Sound Pressure Level (dB)-re 0.0002 Microbar Octave-Band Frequency (Hertz)									
			A		Lin.	31.5	63	125	250	500	1000	2000	4000	8000	16000
1	13:15	Finishing area office	60		78										
2	13:18	Integrated line-box filling	80		85										
3	13:20	North East corner, finishing area	77		84										
4	13:22	At F-1 feed hood station	82		86										
5	13:25	10' West of F-1 feed hood station	77		86										
6	13:28	At F-1 side trimmer	91		92	75	78	77	84	86	83	84	85	80	72
7	13:30	At F-1 length slitter	86		88										
8	13:33	At F-1 box filling station	84		95	80	78	84	80	80	75	76	76	73	60
9	13:35	South East corner, finishing area	80		86										
10	13:38	South West corner, box sealing machine	77		83										
11	13:40	Center, finishing area	74		81										
12	13:42	At F-3 loading station	74		83										
13	13:45	At F-3 box filling station	80		86										
14	13:47	Between F-3& F-4 box making station	78		84										

Table A-4-7

GEORGE D. CLAY[illegible] & ASSOCIATES
NOISE SURVEY DATA SHEET

Plant OWENS-CORNING FIBERGLAS Berlin, New Jersey Date 8-18-71 Study by JAB

Area or Department Finishing Area Instrument B & K 2204/1613

Operating Conditions _____ Remarks _____

Test No.	Time	Location of Microphone	Weighting Network			Sound Pressure Level (dB)-re 0.0002 Microbar Octave-Band Frequency (Hertz)									
			A		Lin.	31.5	63	125	250	500	1000	2000	4000	8000	16000
15	13:49	South East corner, special	75		82										
		materials assembly													
16	13:50	South West corner, special	76		83										
		materials assembly													
17	13:52	North of special materials	74		82										
		assembly													
18	13:54	Inside Quality Control Laboratory	59		79										
		(no activity)													

GEORGE D. CLAYTON & ASSOCIATES
NOISE S[illegible]EY DATA SHEET

Plant OWENS-CORNING FIBERGLAS Berlin, New Jersey Date 8-19-71 Study by JAB

Area or Department Maintenance Shop Instrument B & K 2204/1613

Operating Conditions _____ Remarks _____

Test No.	Time	Location of Microphone	Weighting Network			Sound Pressure Level (dB)-re 0.0002 Microbar Octave-Band Frequency (Hertz)									
			A		Lin.	31.5	63	125	250	500	1000	2000	4000	8000	16000
1	14:20	At lathe operator, west end of shop, no activity	72		78										
2	14:21	Center of shop, no activity	71		80										
3	14:24	East end of shop, lift truck maintenance	70		78										
4	14:25	Center carpenter shop, no activity	72		83										
5	14:27	Center welding shop, no activity	70		78										

GEORGE D. CLAYTON & ASSOCIATES
NOISE SURVEY DATA SHEET

Plant OWENS-CORNING FIBERGLAS Berlin, New Jersey Date 8-19-71 Study by JAB

Area or Department Mold Shop Instrument B & K 2204/1613

Operating Conditions Normal Remarks

Test No.	Time	Location of Microphone	Weighting Network			Sound Pressure Level (dB)-re 0.0002 Microbar Octave-Band Frequency (Hertz)									
			A	Imp	Lin.	31.5	63	125	250	500	1000	2000	4000	8000	16000
1	14:31	Center, blast hood operating	84		92										
2	14:33	At mold repair station, grinding, etc.	102												
3	14:35	Center of shop at mold unloading	93												
		station (grinding 30' away)													
4	14:37	At mold unloading station, west	87		95	78	90	88	86	83	73	78	74	74	62
		end of hood													
5	14:40	At hood loading station	86		95										
6	14:45	Maximum impact, at mold repair		114											
		bench													

GEORGE D. CLA[illegible]N & ASSOCIATES
NOISE [illegible]VEY DATA SHEET

Plant OWENS-CORNING FIBERGLAS Berlin, New Jersey Date 8-18-71 Study by JAB

Area or Department Pouring Lines Instrument B & K 2204/1613

Operating Conditions Normal Remarks

Test No.	Time	Location of Microphone	Weighting Network			Sound Pressure Level (dB) re 0.0002 Microbar Octave-Band Frequency (Hertz)									
			A	IMP	Lin.	31.5	63	125	250	500	1000	2000	4000	8000	16000
1	14:10	Center, #1 flatware pouring line	84		92										
2	14:14	Center, #2 flatware pouring line	82		97										
		(fan on)													
3	14:15	Outside, waste loading dock	82		86										
		(noise from dust collector)													
4	14:20	#2 pouring line-mold stripping	85		93	83	85	83	81	84	83	74	71	66	55
		station													
5	14:28	Peak impact level, #2 pouring line-		129											
		mold stripping station													
6	14:30	At semi-billet line boxing station	81		86										
7	14:34	At semi-billet line loading station	89		91	72	83	83	81	80	80	81	84	84	71
8	14:37	At #2 press mold station	82		89										
9	14:39	At #1 press mold station	84		90										
10	14:43	Center of building, 20' north of north pre-hardener	84		91										

GEORGE D. CLAY[illegible] & ASSOCIATES
NOISE SU[illegible]EY DATA SHEET

Plant OWENS-CORNING FIBERGLAS Berlin, New Jersey Date 8-18-71 Study by JAB

Area or Department Pouring Lines Instrument B & K 2204/1613

Operating Conditions Normal Remarks

Test No.	Time	Location of Microphone	Weighting Network			Sound Pressure Level (dB)-re 0.0002 Microbar Octave-Band Frequency (Hertz)									
			A		Lin.	31.5	63	125	250	500	1000	2000	4000	8000	16000
11	14:45	Center of building, 15' east of	90		94	83	83	91	84	83	81	82	84	84	74
		center pre-hardener													
12	14:48	30' East of north east corner of	92		97	80	81	88	95	87	85	83	83	80	78
		finishing area													
13	14:55	Integrated pipe finishing area,	92		93	84	85	86	80	80	82	84	86	82	71
		leg saw station													

TABLE A-8-1

GEORGE D. CLAYY & ASSOCIATES
NOISE SURVEY DATA SHEET

Plant OWENS-CORNING FIBERGLAS Berlin, New Jersey Date 8-18-71 Study by JAB

Area or Department SID Control Area Instrument B & K 2204/1613

Operating Conditions SID #'s. 1,5,6,8,9,12,13,14 Down Remarks

Test No.	Time	Location of Microphone	Weighting Network			Sound Pressure Level (dB) re 0.0002 Microbar Octave-Band Frequency (Hertz)									
			A		Lin.	31.5	63	125	250	500	1000	2000	4000	8000	16000
1	15:08	Center of building, 30' east of	84		90										
		drying ovens													
2	15:10	South east corner of building, 50'	82		87										
		south of SID control area													
3	15:12	#16 SID, 20' north of south end of	93		96	82	77	81	81	83	85	88	90	89	77
		control area													
4	15:15	Between #15 and #16 SID	93		95										
5	15:18	15' west of #16 SID	97		97										
6	15:20	15' west of #12 SID (steam leak)	104		104	84	81	84	88	93	94	97	100	102	93
7	15:24	Inside control area, opposite	84		86										
		#15 SID													
8	15:26	East end of #12 SID	94		95										
9	15:29	Operator's desk, east end of #9 SID	92		95	85	80	86	80	82	82	84	86	89	79
10	15:33	East of #5 SID, center	91		94										

TABLE A-8-7

GEORGE D. CLAYTON & ASSOCIATES
NOISE SURVEY DATA SHEET

Plant OWENS-CORNING FIBERGLAS Berlin, New Jersey Date 8-18-71 Study by JAB

Area or Department SID Control Area Instrument B & K 2204/1613

Operating Conditions SID #'s. 1, 5, 6, 8, 9, 12, 13 Down Remarks

Test No.	Time	Location of Microphone	Weighting Network			Sound Pressure Level (dB)-re 0.0002 Microbar Octave-Band Frequency (Hertz)									
			A		Lin.	31.5	63	125	250	500	1000	2000	4000	8000	16000
11	15:36	15' west of #9 SID	104		104										
12	15:40	15' west of #5 SID	94		96										
13	15:43	15' west of #1 SID	85		91	83	83	80	82	82	79	75	76	76	67

TABLE B-1-1
GEORGE D. CLAYTON & ASSOCIATES
INDUSTRIAL HYGIENE SAMPLING SUMMARY

Plant OCF - Berlin, New Jersey — Material Total Dust, Asbestos, Silica

1971 Date	Sample No.	Description	Sampling Period		Sample Weight	Sample Volume	Concentration			
			Start	Stop	(mg)	Litere	Total Dust (mg/M³)	Fibers/ml >5μ	>10μ	Tota
8/16	9214AA	Batch Floor, northwest side of batch floor opposite	1327	1650	<0.10	516	<0.19	0.10	0.06	0.
		dumping operation (on passage way)								
8/16	9202AA	Batch Floor, north side between two dumping hoppers	1300	1645	2.39	3632	0.66			(%Si 9.
8/16	9200AA	Batch Floor, south side between two dumping hoppers	1310	1647	0.19	1751	0.11			
8/17	9208AA	Batch Floor, north side opposite dumping operation	0803	1320	3.55	5117	0.69			(%Si 11.
8/17	9364AA	Batch Floor, south side opposite dumping operation	0805	1318	0.97	2526	0.38			
8/17	9222AA	Batch Floor, west side	1317	1710	31.00	592	52.4			(%Si 5.
8/17	9221AA	Batch Floor, south side between two dumping hoppers	1318	1714	44.62	1905	23.4			(%Si 25.
8/17	9224AA	Batch Floor, north side between two dumping hoppers	1320	1717	3.66	3826	0.96			(%Si 9.
		Threshold Limit Value (Asbestos)						5.0		
		Threshold Limit Value (Total Dust)					2.0			
		30 mg/M³ / % quartz + 3								

TABLE B-2-1
GEORGE D. CLAYTON & ASSOCIATES
INDUSTRIAL HYGIENE SAMPLING SUMMARY

Plant OCF - Berlin, New Jersey — Material Total Dust, Asbestos

1971 Date	Sample No.	Description	Sampling Period		Sample Weight	Sample Volume	Concentration			
			Start	Stop	(mg)	Liters	Total Dust (mg/M^3)	Fibers/ml >5μ	>10μ	Total
		Finishing Area								
8/17	9227AA	At the southwest end of the integrated line	1105	1643	0.08	788	0.10	0.26	0.21	0.2
8/17	9205AA	At the southwest end of the integrated line	1120	1645	0.38	647	0.59			
8/17	9225AA	At southwest end of SMB Line	1056	1640	<0.10	853	<0.12	0.40	0.25	0.4
8/18	9343AA	10' East of F-1 Boxing Oper.	0953	1246	0.11	413	0.27	0.07	0.05	0.0
8/18	9362AA	10' East of F-1 Boxing Oper.	1248	1625	<0.10	519	<0.19			
8/18	9344AA	on F-1 horizontal slit saw	0959	1241	<0.10	352	<0.28	0.76	0.52	0.7
8/18	9369AA	on F-1 horizontal slit saw	1243	1632	0.18	497	0.36			
8/18	9345AA	head level, on front of F-1 box filler (fan blowing from behind)	1005	1244	0.30	324	0.93	0.36	0.27	0.3
8/18	9361AA	head level, on front of F-1 box filler (fan blowing from behind)	1245	1629	<0.10	424	<0.24			
8/18	9353AA	at north end of F-3 line, feed area	1025	1250	0.25	325	0.77	0.20	0.13	0.2
8/18	9370AA	at north end of F-3 line, feed area	1251	1638	0.25	508	0.49			
8/18	9365AA	At F-3 Line Box Fill Station	1256	1640	0.40	563	0.71			

TABLE B-2-2
GEORGE D. CLAYTON & ASSOCIATES
INDUSTRIAL HYGIENE SAMPLING SUMMARY

Plant OCF - Berlin, New Jersey — Material Total Dust, Asbestos

1971 Date	Sample No.	Description	Sampling Period		Sample Weight	Sample Volume	Concentration			
			Start	Stop	(mg)	Liters	Total Dust (mg/M^3)	Fibers/ml >5μ	>10μ	Tota
		Finishing Area								
8/18	9355AA	Center, Special Materials Fabrication Area	1038	1258	0.13	344	0.38	0.21	0.15	0.2
8/18	9360AA	Center, Special Materials Fabrication Area	1259	1644	0.70	523	1.3			
8/18	9356AA	Special Materials Laminating Area - glue only this date.	1047	1300	0.04	317	0.13			
8/18	9366AA	Special Materials Laminating Area - glue only this date.	1301	1646	<0.10	526	<0.19			
8/18	9357AA	Automatic boxing, south of F-4	1055	1625	0.31	746	0.42			
8/18	9358AA	50' from north and east walls of Finishing Area, near SID area.	1104	1235	<0.10	196	<0.51			
8/18	9368AA	50' from north and east walls of Finishing Area, near SID area.	1237	1642	<0.10	522	<0.19			
8/18	9359AA	At head level on F-1 feed hood	1020	1238	0.03	351	0.09	0.44	0.35	0.4
8/18	9367AA	At head level on F-1 feed hood	1240	1634	0.32	594	0.54			
		Threshold Limit Value						5.0		

TABLE B-3-1
GEORGE D. CLAYTON & ASSOCIATES
INDUSTRIAL HYGIENE SAMPLING SUMMARY

Plant OCF - Berlin, New Jersey — Materiel Total Dust, Asbestos

1971 Date	Sample No.	Description	Sampling Period		Sample Weight	Sample Volume	Concentration			
			Start	Stop	(mg)	Liters	Total Dust (mg/M^3)	Fibers/ml >5μ	Fibers/ml >10μ	Fibers/ml Tota
		LIFT TRUCKS								
8/19	9349AA	TK#43 - Finishing Area	0830	1050	.0.28	344	0.81	0.14	0.09	0.1
8/19	8396A	TK#45 - Finishing Area	0836	1555	0.04	384	0.10			
8/19	8398A	TK#43 - Finishing Area	1050	1337	0.35	761	0.46			
8/19	8400A	TK#45 - Finishing Area	1055	1345	0.32	800	0.40			
8/19	8404A	TK#50 - Loading Area	0900	1200	0.35	394	0.89			
8/19	9319AA	TK#50 - Loading Area	1201	1530	0.50	451	1.1	0.62	0.36	0.7
8/19	9348AA	TK#56 - Pouring Lines	0917	1250	0.23	541	0.43	0.44	0.26	0.4
8/19	8403A	TK#44 - Pouring Lines	0925	1100	<0.10	243	<0.41			
8/19	9314AA	TK#56 - Pouring Lines	1250	1400	0.04	169	0.24	0.19	0.12	0.2
8/19	8402A	TK#44 - Pouring Lines	1100	1545	0.08	730	0.11			

TABLE B-3-2
GEORGE D. CLAYTON & ASSOCIATES
INDUSTRIAL HYGIENE SAMPLING SUMMARY

Plant OCF - Berlin, New Jersey — Material Total Dust, Asbestos

1971 Date	Sample No.	Description	Sampling Period		Sample Weight	Sample Volume	Concentration			
			Start	Stop	(mg)	Liters	Total Dust (mg/M^3)	Fibers/ml >5μ	>10μ	Tota
		LIFT TRUCKS								
8/19	9350AA	TK#41 & Warehouse	0930	1255	<0.10	463	<0.22	0.09	0.06	0.1
8/19	9318AA	TK#41 - Warehouse	1256	1541	<0.10	373	<0.27	0.20	0.12	0.2
		Threshold Limit Value						5.0		

TABLE B-4-1
GEORGE D. CLAYTON & ASSOCIATES
INDUSTRIAL HYGIENE SAMPLING SUMMARY

Plant OCP - Berlin, New Jersey — Material Total Dust

1971 Date	Sample No.	Description	Sampling Period		Sample Weight	Sample Volume	Concentration			
			Start	Stop	(mg)	Liters	Total Dust (mg/M^3)	Fibers/ml >5μ	>10μ	Tota
		Maintenance Group								
8/19	9346AA	Electric Welder's Breathing Zone (iron) in shop (no exhaust ventilation)	0901	1138	1.33	361	3.9			
8/19	9316AA	Welder's breathing zone in shop - burning with acetylene	1235	1609	0.68	464	1.5			
8/19	9347AA	Welder's breathing zone (iron) working on SID front in A.M., as machinist on SID #9 in P.M.	1050	1611	1.55	748	2.1			
8/19	8382A	northeast corner of maintenance shop, lathe work	0910	1515	4.86	5845	0.83			
8/19	9322AA	northeast corner of maintenance shop, lathe work	1516	1632	0.32	1104	0.29			
8/19	8383A	East center of main shop, pipe fitting	0915	1518	0.42	3408	0.12			
8/19	9324AA	East center of main shop, pipe fitting	1520	1638	0.08	693	0.12			
		Threshold Limit Value					10.0			

TABLE B-5-1
GEORGE D. CLAYTON & ASSOCIATES
INDUSTRIAL HYGIENE SAMPLING SUMMARY

Plant OCF - Berlin, New Jersey — Material Total Dust, Asbestos

1971 Date	Sample No.	Description	Sampling Period		Sample Weight	Sample Volume	Concentration			
			Start	Stop	(mg)	Liters	Total Dust (mg/M^3)	Fibers/ml >5μ	>10μ	Tota
		Mold Shop								
8/19	8182A	East end of automatic shot blast hood, feed operator working	0927	1246	8.59	3,32	2.7			
8/19	8397A	West end of blast hood, loading platform	1253	1619	3.53	3872	0.91			
8/19	8395A	On foreman's desk, center of shop	0931	1354	1.28	660	1.9			
8/19	9321AA	On Foreman's desk, center of shop	1355	1616	0.17	47	3.6	4.2	3.7	4.3
8/19	9323AA	Breathing zone of welder (electric on iron)	1243	1614	0.92	454	2.0			
8/19	9320AA	At west end of blast hood, loading platform	1358	1619	0.27	337	0.80	0.79	0.66	0.8
		Threshold Limit Value						5.0		

TABLE B-6-1
GEORGE D. CLAYTON & ASSOCIATES
INDUSTRIAL HYGIENE SAMPLING SUMMARY

Plant OCF - Berlin, New Jersey — Material Total Dust, Asbestos

1971 Date	Sample No.	Description	Sampling Period		Sample Weight	Sample Volume	Concentration			
			Start	Stop	(mg)	Liters	Total Dust (mg/M^3)	Fibers/ml >5μ	>10μ	To
8/16	9195AA	Pouring Line #2 - on the west side, north end	1350	1701	<0.10	426	<0.23	0.30	0.18	0.
8/16	9197AA	Pouring Line #2 - on the east side, north end	1415	1700	0.25	299	0.77			
8/16	9196AA	Pouring Line #1 - on the east side behind molder gun	1450	1704	1.11	2163	0.31			
		operator.								
8/16	9201AA	Pouring Line #1 - on the east side behind molder gun	1500	1707	<0.10	854	<0.12			
		operator.								
8/17	9226AA	Pouring Line #2 - east side, north end	0821	1310	0.54	549	0.98			
8/17	9198AA	Pouring Line #2 - west side, center	0822	1708	1.02	1173	0.87			
8/17	9199AA	Pouring Line #2 - east side behind the molder gun operator	0830	1306	0.22	624	0.35			
8/17	9415AA	Pouring Line #1 - east side behind the molder gun operator	0832	1303	3.04	4375	0.69			
8/17	9212AA	Pouring Line #1 - south side on east end	0833	1653	2.05	3365	0.61			
8/17	9223AA	Pouring Line #2 - east side behind molder gun operator	1307	1705	<0.10	538	<0.19			
8/17	9210AA	Pouring Line #2 - east side behind molder gun operator	1310	1706	1.01	448	2.3			
		Threshold Limit Value						5.0		

TABLE B-7-1
GEORGE D. CLAYTON & ASSOCIATES
INDUSTRIAL HYGIENE SAMPLING SUMMARY

Plant OCF - Berlin, New Jersey — Material Total Dust, Asbestos

1971 Date	Sample No.	Description	Sampling Period		Sample Weight	Sample Volume	Concentration			
			Start	Stop	(mg)	Liters	Total Dust (mg/M^3)	Fibers/ml >5μ	Fibers/ml >10μ	Fibers/ml Tot
8/16	9209AA	Filter Press Area, on post opposite center line, facing west	1335	1650	<0.10	454	<0.22	0.37	0.24	0
8/16	9213AA	Ceiling above where finished pieces are loaded on the east end.	1345	1658	0.02	409	0.05			

TABLE B-7-2
GEORGE D. CLAYTON & ASSOCIATES
INDUSTRIAL HYGIENE SAMPLING SUMMARY

Plant OCF - Berlin, New Jersey — Material Total Dust, Asbestos

1971 Date	Sample No.	Description	Sampling Period		Sample Weight	Sample Volume	Concentration			
			Start	Stop	(mg)	Liters	Total Dust (mg/M^3)	Fibers/ml >5μ	>10μ	Tot
8/17	9206AA	Filter Press Area, on post opposite center line, facing west	0815	1315	0.39	585	0.67			
8/17	9211AA	Ceiling above where finished pieces are loaded on the east end	0819	1633	0.14	1000	0.14			
8/17	9363AA	Filter Press Area, on post opposite center line, facing west	1315	1635	<0.10	449	<0.22			
		Threshold Limit Value						5.0		

TABLE B-8-1
GEORGE D. CLAYTON & ASSOCIATES
INDUSTRIAL HYGIENE SAMPLING SUMMARY

Plant OCF - Berlin, New Jersey Material Silica

1971 Date	Sample No.	Description	Sampling Period		Sample Weight	Sample Volume	Concentration		
			Start	Stop			SiO_2 %		
8/19	16446	Random picked piece of					<1.0		
		finished Kaylo insulating							
		material							

TABLE C-1-1
GEORGE D. CLAYTON & ASSOCIATES
INDUSTRIAL HYGIENE SAMPLING SUMMARY

Plant OCF - Berlin, New Jersey — Material Carbon Monoxide

1971 Date	Sample No.	Description	Sampling Period		Sample Weight	Sample Volume	Concentration		
			Start	Stop			ppm		
		Lift Trucks							
8/19	CO-1	On lift truck #60, Press-SID hood area	14:30				60		
8/19	CO-2	Opposite pre-hardening ovens no truck in area	13:50				25		
8/19	CO-3	SID loading area, opposite #6 SID, center of room	13:50				50		
8/19	CO-4	Near ovens, one truck idling	13:53				40		
8/19	CO-5	General area, walking	13:55				40		
8/19	CO-6	Warehouse opposite stall 36-10 and line	14:00				<10		
8/19	CO-7	On truck #32 at pouring line	14:13				40		
8/19	CO-8	On truck #14 at finishing oven	14:30				30		
8/19	CO-9	On truck #39 on warehouse	14:37				25		
8/19	CO-10	On truck #58, SID hood area	14:45				50		
8/19	CO-11	On hatch floor near operator's desk	14:50				<10		
		Threshold Limit Value					50		

TABLE C-2-1
GEORGE D. CLAYTON & ASSOCIATES
INDUSTRIAL HYGIENE SAMPLING SUMMARY

Plant OWENS-CORNING FIBERGLAS Berlin, New Jersey Material Carbon Monoxide

1971 Date	Sample No.	Maintenance and Mold Shops Description	Sampling Period Start	Sampling Period Stop	Sample Weight	Sample Volume	Concentration CO ppm	Concentration	Concentration
8-19	1	Maintenance shop, lift truck	13:16				< 10		
8-19	2	Maintenance shop, lift truck	13:20				< 10		
8-19	3	Maintenance shop, lift truck	13:22				< 10		
8-19	4	Center, maintenance shop	13:23				< 10		
8-19	5	West end of maintenance shop	13:25				10		
8-19	6	West end of mold shop	13:30				50		
		(lift truck in area)							
8-19	7	West end of mold shop	13:32				10		
		(lift truck in area)							
8-19	8	West end of mold shop	13:34				< 10		
		(lift truck in area)							
8-19	9	East of center of mold shop	13:36				< 10		
		Threshold Limit Value					50		
		Note: Garage doors open at ends of both shops.	both						

TABLE C-3-1
GEORGE D. CLAYTON & ASSOCIATES
INDUSTRIAL HYGIENE SAMPLING SUMMARY

Plant OCF - Berlin, New Jersey Material Oil Mist, Dowtherm A

1971 Date	Sample No.	Description	Sampling Period		Sample Weight	Sample Volume	Concentration		
			Start	Stop		Liters	Oil Mist mg/M3	Dowtherm A mg/M3	
8/17	ISO-1	SID Control area, opposite SID #6 on cat walk	0957	1458		692	15.9	3.0	
8/17	ISO-2	SID Control Area, opposite SID #6 on cat walk	0958	1459		692	47.9	6.9	
8/17	ISO-3	SID Control Area, opposite SID #15 on cat walk	1004	1501		603	8.2	1.3	
8/17	ISO-4	SID Control Area, opposite SID #15 on cat walk	1005	1502		582	20.5	2.4	
8/17	ISO-5	On Control Operater's Desk, Opposite SID #9	1010	1505		696	26.1	2.2	
8/17	ISO-6	SID Control Area, opposite SID #10 on cat walk	1015	1430		556	34.0	7.2	

TABLE C-3-2
GEORGE D. CLAYTON & ASSOCIATES
INDUSTRIAL HYGIENE SAMPLING SUMMARY

Plant OCF - Berlin, New Jersey Material Oil Mist

1971 Date	Sample No.	Description	Sampling Period		Sample Weight	Sample Volume	Concentration		
			Start	Stop		Liters	Oil Mist mg/M^3		
8/19	ISO-10	SID Loading Area, lift TK-40	0850	1205		448	42.8		
8/19	ISO-11	SID Loading Area, lift TK-50	0900	1200		382	95.2		
8/19	ISO-12	Pouring line #2	1000	1455		381	104		
8/19	ISO-13	Pouring line #2	1001	1456		620	24.6		
8/19	ISO-14	Pouring line #2	1245	1630		418	19.8		
		Threshold Limit Value					5.0		

TABLE D-1-A

GEORGE D. CLAYT & ASSOCIATES

HEAT STRESS SURVEY SUMMARY

PLANT OCF - Berlin, New Jersey DATE August 16, 1971

Sample No.	Time	Location	WGT °F	Equivalent WBGT °F	ACGIH Proposed Max. Values	
					Work Load	Work-Rest Regimen
HS-1	15:55	Batch Floor, 2nd Level, West Side (Fan On)	71.5	78.0	Moderate	Continuous Work
HS-2	16:07	Batch Floor, 3rd Level, west side opposite stairs to tank top cat walk	74	81.0	Moderate	75% Work 25% Rest
HS-3	16:15	SID Control Area, north end opposite control panel and SID #9	78	84.8	Light	Continuous Work
HS-4	16:24	SID Control Area at operator's desk	76	82.7	Light	Continuous Work
HS-5	16:30	SID Control Area, south end, opposite SID #15	77.5	84.2	Moderate	50% Work 50% Rest
HS-6	16:36	On cat walk above SID #15	84.5	91.5	Light	25% Work 75% Rest
HS-7	16:43	On cat walk above SID #6	88.5	95.7	Light	<25% Work >75% Rest

INDUSTRIAL HYGIENE SURVEY

OWENS-CORNING FIBERGLAS CORPORATION
Berlin, New Jersey

September 14, 1972

George D Clayton & Associates Division of Martenson Management Systems, Inc.
26711 Southfield Road, Southfield, Michigan 48076 • Telephone: 313-352-3120

for better environment

November 1, 1972

Mr. Gerald R. Devitt
Chief, Industrial Hygienist
OWENS-CORNING FIBERGLAS CORPORATION
Fiberglas Towers
Toledo, Ohio 43659

Dear Mr. Devitt:

Presented herewith are three copies of a report summarizing the results of the industrial hygiene survey conducted at your plant in Berlin, New Jersey on September 14, 1972 by Mr. Paul Carlson and the undersigned.

The following comments are based on observations and measurements made by field team during the survey and represent their overall impressions of the plant. Particular areas in which a need exists for either implementation of corrective measures or further investigation have been noted.

1. Comparison of noise measurements with current Occupational Safety and Health standards indicate that a potential exists for overexposure of workers to noise near the SID cylinders (see Table IV). A comprehensive hearing conservation program should be implemented.

2. Total dust concentrations ranged from 2.2 to 64.4 mg/M^3 in those areas of the plant studied. The Occupational Safety and Health standard of 15 mg/M^3 for total nuisance dust concentrations was exceeded at most work stations (see Table I).

3. The concentrations of airborne fibrous material greater than 5 micrometers in length were found to be less than 5 fibers per milliliter. One of the five samples evaluated for fiber concentration indicated a level in excess of the 2 fibers/ml standard intended for use by 1976.

4. The exposures of batch floor operators to siliceous dust were found to be within acceptable limits based on the determination of free silica content of the dust (see Table II).

5. A single short-term sample collected during a welding operation indicated concentrations of iron oxide of 16.2 mg/M^3 and total dust of 40.0 mg/M^3. Although these results may not be representative of the workers' 8-hour time-weighted average exposure, they do indicate a need for control of dusts and fumes generated by welding.

6. Comparison of heat stress measurements made at the SIB cylinder area with the current proposed ACGIH threshold limit value (WBGT index) indicates that a 25% work - 75% rest regiment is appropriate for the light work loads which characterize this area.

7. The exhaust fan on the number 4 pre-hardner ventilation hood was not working allowing hot gases and mist to escape into the adjacent work area. It was understood that the lubricant used for the shaft periodically dries out or degrades causing the shaft to "freeze." A lubricant which is compatible with the gases and mists evolved by this operation should be used.

Very truly yours,

Russel L. Witzke
Industrial Hygienist

RLW/e

TABLE 1.

GEORGE D. CLAYTON & ASSOCIATES

OWENS-CORNING FIBERGLAS INDUSTRIAL HYGIENE SAMPLING SUMMARY

Plant Berlin, New Jersey Material Total Dust

1972 Date	Sample No.	Description	Sampling Period Start	Sampling Period Stop	Sample Weight mg	Sample Volume liters	Concentration Total Dust mg/M³		
		BATCH FLOOR							
9-14	30175A	Hydro-Pulper Operator	10:25	11:48	2.5	206	12.1		
9-14	30166A	Asbestos Tanks Operator	10:27	11:48	3.0	205	14.6		
9-14	30163A	Batch Mix - Operator for Filter Presses	10:30	12:02	2.9	174	16.7		
		FILTER PRESSES							
9-14	30176A	Filter Press No.2 Operator	13:14	15:10	3.3	282	11.7		
9-14	30167A	Filter Press No.3 Operator	10:34	11:50	2.5	197	12.7		
9-14	30180A	Stripper for Filter Presses	13:18	15:12	8.9	287	31.0		
		Pour Line No.1							
9-14	26362AA	Stripper	13:18	14:08	2.1	121	7.4		
		Pour Line No. 2							
9-14	30161A	HiLow Driver Line Service	10:40	11:52	4.0	174	23.0		
9-14	30165A	Stripper	10:38	11:53	10.8	180	60.0		
9-14	30172A	Feeder	10:42	11:52	11.2	174	64.4		
9-14	30179A	Unloader	13:21	15:13	2.7	272	9.9		
		Acceptable limit for 8-hour time-weighted average exposure (OSHA)					15		

TABLE 1B

GEORGE D. CLAYTON & ASSOCIATES

OWENS-CORNING FIBERGLAS INDUSTRIAL HYGIENE SAMPLING SUMMARY

Plant Berlin, New Jersey Material Total Dust

1972 Date	Sample No.	Description	Sampling Period Start	Sampling Period Stop	Sample Weight mg	Sample Volume liters	Concentration Total Dust mg/M3		
9-14	30174A	Pole 6' off Floor General area Rear Line #2	10:44	11:54	2.4	170	14.1		
		Finish Line #2 - MPC							
9-14	30160A	MPC - B Saw Feeder	13:24	15:17	2.9	274	10.6		
9-14	30148A	MPC - Packer	10:45	11:56	0.4	182	2.2		
		Flatware Finish Line #1							
9-14	30170A	Feeder	10:28	11:50	3.9	184	21.2		
9-14	30173A	Packer	10:29	11:51	3.4	208	16.3		
9-14	30168A	Packer	10:29	11:51	3.3	198	16.7		
		Finish Line #3							
9-14	30169A	Line Feeder	10:34	11:53	3.1	138	22.5		
9-14	30164A	Packer	10:37	11:55	3.2	132	21.1		
9-14	30146A	Packer	10:39	11:55	5.2	168	31.0		
		Acceptable limit for 8-hour time-weighted average					15		
		exposure (OSHA)							

TABLE 1C
GEORGE D. CLAYTON & ASSOCIATES

OWENS-CORNING FIBERGLAS INDUSTRIAL HYGIENE SAMPLING SUMMARY

Plant Berlin, New Jersey — Material Total Dust / Iron Oxide

1972 Date	Sample No.	Description	Sampling Period Start	Sampling Period Stop	Sample Weight mg	Sample Volume liters	Concentration Total Dust mg/M³	Concentration Iron Oxide mg/M³	
		Finish Line #4							
9-14	28171A	Packer	10:43	11:55	2.9	180	16.1	—	
		Between SID #8 & Pre-Hardner							
9-14	28182A	General Area	13:47	15:50	7.6	1830	4.2	—	
9-14	26369AA	Maintenance Shop - Welder	13:29	13:35	0.4	10	40	16.2	
		Acceptable limit for 8-hour time-weighted average exposure (OSHA)					15	10	

TABLE I.

GEORGE D. CLAYTON & ASSOCIATES

OWENS-CORNING FIBERGLAS INDUSTRIAL HYGIENE SAMPLING SUMMARY

Plant Berlin, New Jersey — Material Fiber Sizing* Silica

1972 Date	Sample No.	Description	Sampling Period Start	Sampling Period Stop	Sample Weight mg	Sample Volume liters	Concentration Total* Fibers per ml	Concentration Fibers >5 μm per ml	Concentration SiO_2 %
9-14	26367AA	Batch Floor-Operator's Desk	13:12	13:50	—	71	0.45	0.45	—
9-14	26365AA	Four Line #2, Stripping	13:15	14:05	—	108	2.6	2.2	—
9-14	26362AA	Four Line #1, Stripping	13:18	14:08	—	121	3.0	1.6	—
9-14	26360AA	Flatware Finish Line #1	13:22	14:06	—	66	0.85	0.72	—
9-14	26368AA	Finish Line #3, Packing	13:25	14:07	—	96	0.32	0.27	—,
						OSHA Limit Value		5	
		* Fibrous material consisted of both glass fiber and asbestos, no attempt was made to distinguish between the various fiber particles.							
		BATCH FLOOR							
9-14	27089BP	Hydro-Pulper	10:52	13:05	2.6	4080	0.6		<1.0
9-14	27083BP	Asbestos Mix Tanks	10:55	13:11	11.2	2580	4.3		<1.0
		Acceptable limit for 8-hour time-weighted average exposure (OSHA)					15		

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TABLE .I

GEORGE D. CLAYTON & ASSOCIATES
HEAT STRESS SURVEY SUMMARY

Plant OWENS-CORNING FIBERGLAS Berlin, New Jersey

Area Surveyed SID Pre-Hardner

1972 Date	Time	Description	Air Temp. °F	Wet Bulb Temp. °F	Black Globe Temp. °F	Air Velocity (FPM)	WBGT Index	ACGIH Proposed Max. Values	
								Work Load	Work-Rest Regimen
9-14	15:13	10ft. North of SID #11	99	82	102	70	86	Light	50% work 50% rest
9-14	15:47	Between Pre-Hardners & SID 8 & 9	105	84	108	80	91	Light	25% work* 75% rest
9-14	16:17	Between SID 7 & 8, front side	117	94	125	40	103	Light	25% work* 75% rest
		WBGT Index:							
		WBGT = 0.7WB + 0.2GT + 0.1DB							

*[illegible] surveillance for any new employee until

TABLE

GEORGE D. CLAYTON & ASSOCIATES, INC.
NOISE SURVEY DATA SHEET

Plant OWENS-CORNING FIBERGLAS Berlin, New Jersey Date 9-14-72 Study by RW

Area or Department SID & Pre-Hardners Instrument GR 1565A

Operating Conditions _____ Remarks _____

Test No.	Time	Location of Microphone	Weighting Network			Sound Pressure Level (dB)-re 0.0002 Microbar Octave-Band Frequency (Hertz)										
			A	C	Lin.	31.5	63	125	250	500	1000	2000	4000	8000	16000	
1	14:56	Back, Back of SID #2	90	92												
2	14:56	Between SID 12 & 11, Backside	91	93												
3	14:49	Front of SID #2	109	110												
4	14:59	Between SID #12 & Pre-Hardner	95	96												
12	15:20	40ft. West of SID #16	95	95												
13	15:22	Front of SID #16	102	102												
5	14:59	30ft. North of Pre-Hardner	87	93												
6	15:00	Pour Line #2, Stripping	84	92												
7	15:01	Pour Line #2, Pourer	83	94												
8	15:02	Pour Line #1, Pourer	86	92												
9	15:05	Pour Line #1, Stripping	89	92												
10	15:15	Filter Press #1	87	93												
11	15:22	20ft. East of Pour Line #1	88	92												
14	15:27	Batch Floor - Mix Tank	82	90												