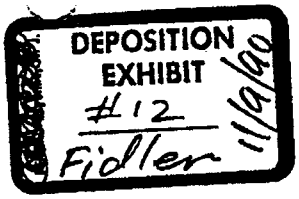
FILE NAME: Hercules Chemical (HERC)

DATE: 1983 Aug 3

DOC#: HERC018

DOCUMENT DESCRIPTION: Consultant Report - Furnace Cement - Hercules Product Examined Under Various Conditions for Release of Asbestos Fibers

Case Consulting Laboratories, Inc.



622 ROUTE TEN
WHIPPANY, NEW JERSEY 07981
(201) 428-9666

August 3, 1983

To: Mr. N. George Tucker
Vice President - Manufacturing
Hercules Industries Incorporated
One-Eleven South Street
Passaic, New Jersey 07055

From: Charles Anthony

Subject: Furnace Cement

In accordance with the authorized work plan, samples of the Hercules product, "For Heat's Sake," were examined under various conditions to determine if there could be a release of asbestos fibers. This report details the methods of evaluation and the findings.

METHODOLOGY

The as-received cement was used to make samples that would simulate different conditions of cure and use. The objective was to determine if any free asbestos fibers could be released in handling or use of the product in different states of cure.

As-received, the material is a thick, fluid mixture, grayish in color. Various molds were tried and a selection was made for use in forming test bar sections. The best choice mold consisted of a 3/4" diameter plastic pipe cut longitudinally to produce a half-round cross section about 2½" long. The inside surface was lined with thin vinyl sheeting to prevent adhesion of the cement to the mold. Three conditions were simulated for these determinations:

1. Fully cured in accordance with label instructions.

2. Partially cured.

3. Water diluted material dried on tools without any curing, just room temperature drying.

For conditions #1 and #2, as-received cement was troweled into the mold to form a half-round cross section.

SAMPLE PREPARATION

Duplicate samples were made and cured in the following fashion:

Fully Cured

Dry the cement in the mold for one hour @ 220°F, so that it could be removed from the mold and handled. The bar was then placed on a small glazed tile and transferred to a muffle furnace and held at 300 to 500°F for 25 minutes. The furnace was then raised to 1000°F and the sample exposed for an additional 30 minutes, removed and cooled to room temperature.

Partially Cured

The samples were cured in the same manner at 220°F and then held at 500°F for 20 to 25 minutes, before cooling to room temperature.

Air-Dried

A trowel and a putty knife were stirred in furnace cement that had been diluted one-third with water. These utensils were allowed to dry 48 hours at room temperature with the residual amounts of material on the working blades.

SAMPLE USE

After the samples were prepared, sample bars were broken over an open jar of distilled water which had been especially prepared by filtration through Millipore filters to remove any fiberous or particulate material.

The test bars were individually broken in half to simulate a worst case fraction of a cement lay-up. The spalled or released material was captured in the especially filtered water and immediately capped. Tool residues were sampled by rubbing the tools together over a water-containing receiver, simulating a cleaning motion of trying to scrape the blade to remove the deposit of cement. The cement had hardened so that only dust-like amounts were released this way.

DETERMINATION OF ASBESTOS FIBERS

The collected samples were then processed to isolate the fibers, treated to visualize them and determined by transmission electron microscope techniques in accordance with EPA procedures for detecting and estimating asbestos fibers. The identification of the fibers is made by morphology and electron diffraction patterns. A fiber is described as a particle with parallel sides and a length to width ratio of 3:1.

RESULTS AND DISCUSSION

The EPA method is the most rigorous and precise means of detecting and estimating the presence and concentration of asbestos fibers. The experimental procedures for collecting and examining samples of the furnace cement represents a very conservative worst case situation. Samples of substantial cross sections were broken so as to collect all of the fragmented material without benefit of air dilution or gravimetric settling. Therefore, any potential actual airborne exposure would be much lower than any values found by these procedures of collection.

The OSHA regulation for worker exposure to asbestos fibers has two standards. One is a time-weighted 8-hour average to which any employee may be exposed. It stipulates number and size of fibers; a maximum of 2 fibers, longer than 5 micrometers, per cc. of air. The other standard is a ceiling concentration which states that no employee shall be exposed at any time to airborne concentrations of asbestos fibers in excess of 10 fibers, longer than 5 micrometers, per cc. of air. This standard is not time-weighted.

In Exhibit I, attached, concentrations are expressed in total fibers per cubic meter and as fibers per cc. for each of the OSHA standards; work day and ceiling limit. A column is also given to show the concentration of fibers, 5 micrometers or more, for comparison with OSHA limits.

Examination of the dimensions of the fibers measured in the samples shows that all of the fibers in samples 1, 2, 3 and 4 are less than 3.5 micrometers in length. In sample 5, the maximum length noted was 3.2 micrometers. Sample 6 had a few fibers larger than 3.5 micrometers, but only 1 percent of the total was above 5 micrometers in length, equal to 24 fibers/cc.

On this basis, samples 1, 2, 3, 4 and 5 would meet the OSHA requirements even for an extended 8-hour work period exposure on either a fiber concentration or size basis. Sample 6 would fall outside this same standard, based on an 8-hour exposure. It would also exceed the ceiling value of 10 fibers.

To put this in perspective, though, it is necessary to interpret the numerical data with respect to realistic happenings. Samples 5 and 6 represent uncured material obtained by vigorously scraping dried, retained amounts on tools. This would not be a full work day circumstance. The dried material adheres very well to trowels and blades so that vigorous scraping has not removed it from those surfaces.

From a practical standpoint, it would seem, based on this data, that no realistic hazard exists. The most probable possibility could arise from sanding the cured cement or vigorous scraping of cement deposits on tools. As a precaution, it may be useful to advise that tools be cleaned before the residue dries and that no sanding of the dried or cured material be done without proper particulate mask protection.

Respectfully submitted,

Charles Anthony
CASE CONSULTING LABORATORIES, INC.

Charles Anthony
President

Attachment

ra

Sample Number	Sample Conditions	Total Fiber Concentration Per m^3	Per cc.
1	Fully cured	3.32×10^5	0.33
2	Fully cured	3.87×10^4	0.39
3	Partially cured	9.95×10^4	0.10
4	Partially cured	4.21×10^5	0.42
5	Uncured	3.06×10^9	3,000
6	Uncured	2.36×10^9	2,360

Source: Case Consulting Laboratories, Inc.

09/20/01 THU 15:36 FAX 701 237 9035 BOECHLER, P.C. →→→ THOMPSON, P.C. 202

EXHIBIT I
Hercules Industries Incorporated
FIBER CONCENTRATION COMPARISONS

Fiber Concentrations Longer Than 5 µm Per cc.	Maximum OSHA Standards, Per cc. 8-Hour	Ceiling
None	2	10
None	2	10
None	2	10
None	2	10
None	2	10
24	2	10

DEPOSITION EXHIBIT #13 Fidler 11/9/90
PENROD-Bayonne, N.J.

09/20/01 THU 15:36 FAX 701 237 9035 BOECHLER, P.C. →→→ THOMPSON, P.C. 203
NOV-09-90 FRI 11:19 HERCULES CHEMICAL CO. P.02

HERCULES FURNACE CEMENT

	1949	1950	1951	1952	1953	1954	1955	1956	1957	1958	1959	1960
JAN.	238	266	339	444	327			596	542	580	~~624~~ 642	615
FEB.	91	185	119	256	213			407	476	346	385	408
MAR.	103	177	451	215	288			215	379	262		326
								-				
APR.	80	134	174	92	183			327	325	486		324
MAY	192	171	165	140	278			515	[illegible]	340	312	338
JUN.	336	130	167	268	298			215	[illegible]	351	377	319
								2488		2365		
JUL.	206	135	230	190	168			[illegible]15		651	340	493
AUG.	403	551	388	}		621		579		308	723	675
SEPT.	580	885	576	1098		1117		1116		1700	1118	1508
								1428				
OCT.	798	900	969	1,296	912			1131		2043	2032	1196
NOV.	528	791	470	658				1338		1113	949	1160
DEC.	299	232	392	310				610			535	457
												5.
TOTAL	3,744	4,607	4,840	5012				7507				7819

~~15,000~~ 16,000 Mo.

09/20/01 THU 15:37 FAX 701 237 9035 BOECHLER, P.C. →→→ THOMPSON, P.C. 204
NOV-09-99 FRI 11:20 HERCULES CHEMICAL CO P.03

FURNACE CEMENT

	1960	1961	1962	1963	1964	1965	1966	1967	1968	1969	1970	1971
Jan.	615	710	494	591	754	848	1192					
Feb.	408	347	285	717	314	768	903					
Mar.	326	419	349	460	536	769						
						2385						
Apr.	324	316	536	360	315	720						
May	338	440	393	590	311	452						
Jun.	319	288	212	450	577	442						
Jul.	493	522	449	634	624	909						
Aug.	675	314	784	920	973	1190						
Sept.	1508	1073	1212	1548	1815	1413						
Oct.	1196	1769	2096	1963	1807	2864						
Nov.	1160	1320	1245	1006	1194	1446						
Dec.	457	706	571	937	936	936						
TOTAL				10128	10246							