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8/24
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PLAINTIFF'S EXHIBIT
UC-226

Johns-Manville Corporation
Greenwood Plaza
Denver, Colorado 80217

Environmental Affairs Department

September 21, 1973

Mr. Harry B. Rhodes
Union Carbide Corporation
Mining and Metals Division
P.O. Box 579
Niagara Falls, New York 14302

Dear Harry:

As we discussed in our telephone conversation recently, I am enclosing a copy of a report dated April 17, 1973, prepared for Johns-Manville by Walter C. McCrone Associates, examining tremolite migration from food packaging materials.

As you will note from reading McCrone's report, the results of the migration tests using the addressograph-multilith machine are not reliable due to an obvious contamination problem. However, you will note that McCrone found no tremolite migration whatsoever in meat samples wrapped or sandwiched in between paper containing tremolitic talc. We are presently conducting further tremolite migration studies using dry food substances, as suggested to us by the Food and Drug Administration. As soon as the results of these tests are available, I will forward a copy of our Research Center's report to you.

If I can be of any further assistance to you in this area, please let me know.

Very truly yours,

Richard P. Carter, Director
Government Relations

RPC/emr

Enc.

A 17978

9/27/73
CC JLM
WCT

Johns Manville Products Corporation
Greenwood Plaza
Denver, Colorado 80217

EXAMINATION OF TREMOLITE MIGRATION

Date: 17 April 1973

MA Number: 3017

Copy 1 of 6

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walter c. mccrone associates, inc.
2820 SOUTH MICHIGAN AVENUE • CHICAGO, ILLINOIS 60616

EXAMINTION OF TREMOLITE MIGRATION

Introduction

Johns Manville Products Corporation produces two talc-based products, "CYCLO-FIL" and "CYCLO-SORB", which are used in the manufacture of food wrapping papers. At the present time there is concern over the health hazards of asbestos, and since one form of tremolite has been classed as an asbestiform mineral and tremolite is a constituent of the talcs used in these products, Johns Manville are particularly interested in determining whether any migration or transfer of the tremolite in the talc may occur from the paper to the food stuff in normal use. Johns Manville therefore requested the assistance of McCrone Associates in determining how much transfer or migration of tremolite, if any, might take place.

Materials and Methods for Conducting Tests

A number of samples of papers which had been experimentally produced for Johns Manville Products Corporation by the Department of Paper Science and Engineering, Western Michigan University, Kalamazoo, Michigan, in which different loadings of the products "CYCLO-FIL" and "CYCLO-SORB" have been used were provided by Johns Manville Products Corporation. "CYCLO-FIL" and "CYCLO-SORB" are trade names for commercially produced talc (hydrated magnesium silicates): "CYCLO-FIL" contains 20-30% tremolite and "CYCLO-SORB" 2-5% tremolite by volume. Also provided were portions of Scotch Tape with adherent particles which had been obtained by running 500 sheets of the experimental paper through a lithographic machine with a water-wet roller. The philosophy behind these tests was that the wet roller would pick up any migrant tremolite particles from the paper surface, transfer them to the roller, and thus, by stripping the dried roller with Scotch Tape, these migrant particles

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could be collected. On each tape three areas of the roller were stripped to give particle loading equivalent to that which would be obtained from superimposing 1500 sheets. A detailed list of the samples is given in Appendix 1 to this report.

Several tests were performed on these samples by McCrone Associates as follows:

(1) The Scotch Tape was examined microscopically and particle counts were made on selected samples. The examination was performed using a 45X objective and 25X eyepiece to give a field of view 200 μm in diameter. The samples were carefully examined for uniformity of distribution of the particles then 5 fields of view were selected at random and the tremolite fibers were counted. Tremolite was identified by its optical properties and by prior familiarization with the appearance of tremolite under the microscope using a standard tremolite sample.

(2) Samples of the paper were sandwiched between meat slices, frozen and allowed to stand for several days. The meat slices were then unfrozen, the paper carefully removed, and the contact surfaces of the meat were thinly sliced, mounted on microscope slides and ashed in a low-temperature asher so that the particulate material collected from the paper could be examined on the microscope.

(3) A number of samples of meat were wrapped in samples of the paper, kept frozen for several days, thawed, unwrapped, and thin slices were taken from the surfaces which had been in contact with the paper. These thin surface slices were then examined microscopically to determine whether any particles had been picked up from the paper.

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Results

To verify that the microscopic identification of tremolite fibers was correct, samples of pure "CYCLO-FIL" and "CYCLO-SORB" powders were examined and the amount of tremolite in each was determined. This examination indicated that "CYCLO-FIL" contained approximately 30% tremolite particles by volume and "CYCLO-SORB" approximately 5% by volume. These figures are in excellent agreement with Johns Manville Products Corporation's specifications for these products.

Table 1 records the results of the examination of the Scotch Tape samples. The results are split into numbers of fibers greater than 5 μm and less than 5 μm. This figure was selected on the basis of the O.S.H.A. regulations for airborne asbestos which excludes particles less than 5 μm. In most instances only about one-third of the particles are greater than 5 μm. The total number of fibers is also recorded.

The control sample 2CC for the series 2CC, 2BC, 2A shows approximately three times the particle count as the other two controls, 1-Z and 2-AC, suggesting contamination during this series of tests. The series 2CC, 2BC and 2A is, therefore, not included in the discussion of the results.

Considering these results, it must be remembered that these represent a fiber loading equivalent to passing 1500 sheets of paper through the test apparatus, thus, even in the worst case, the wire side of the 100% "CYCLO-FIL" sample, the average number of fibers per field of view works out at about one fiber for each forty sheets of paper. That is, the probability of finding a migrant tremolite fiber in a microscopic field of view selected at random from one sheet of paper is 0.025. Furthermore, the presence of tremolite fibers in the blank control samples, 1Z and 2 AC proves that some contamination has occurred. It is logical to assume that similar contamination

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is also increasing the counts in the other samples. Thus, in my opinion papers made with levels of "CYCLO-FIL" up to 40% and levels of "CYCLO-SORB" up to 100% are substantially free from tremolite migration when tested using the wet-test method.

Several meat samples that had been in contact with the filled papers were examined after low-temperature ashing. The samples which were specifically examined in detail were 1F and 1G, both 40% "CYCLO-FIL" samples, the latter with 8% tub size starch; Sample 2A, the 20% "CYCLO-SORB" material; and Sample R379, a presently available commercial paper manufactured by Longview Fiber Corporation and containing 1.2% "CYCLO-SORB" — a comparatively high level for a commercial paper. The meat samples which had been in contact with both the wire side and the felt side of the paper were examined after ashing using a light microscope at magnification up to 420X. Even though in some instances the paper had been completely saturated by the natural juices from the meat, there was no identifiable transfer of tremolite from the paper to the meat. That is to say, no fibers or particles identifiable as tremolite were observed. Several small particles which were present were of a type which also occur in blank meat specimens and are probably oxalate crystals which are frequently seen in tissue samples.

Finally, larger samples of meat were submitted to simulated wrapping tests. The object of these wrapping tests was to subject the paper to folding and handling stresses similar to those which it would undergo in normal use and which might result in greater degradation of the paper, and hence greater migration of the tremolite than would the sandwich tests described above. After unwrapping these samples, thin slices were cut from the surfaces of the meat which had been in contact with the paper and were examined microscopically. Again, no tremolite was detected by microscopical examination. In view of the earlier work, only the two 40% samples, 1F, 40% "CYCLO-FIL" and 2G, 40% "CYCLO-SORB" were examined in detail.

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Conclusions

It is my opinion that no significant migration of tremolite takes place from papers in which "CYCLO-FIL" or "CYCLO-SORB" are used as filler at levels of these fillers up to 40%. At the level of 100%, the papers made with "CYCLO-SORB" appear still to be stable, but those made with "CYCLO-FIL" show signs of degradation of the paper, as evidenced by numerous cellulose fibers appearing on the sample. Papers made with a pigment (60% "CYCLO-FIL", 40% TiO_2) levels up to 20% similarly show no significant migration of these fillers.

Respectfully submitted,

Ian M. Stewart

Ian M. Stewart
Manager, Electron Optics Group

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APPENDIX 1

Experimental Paper Samples

Sample	Description	
Monday, 10/23		
1Z	Control	1% rosin, 2% alum
1A	Cyclo-Fil	5%
1B	Cyclo-Fil	10%
1C	Cyclo-Fil	20%
1D	Cyclo-Fil	20% + 8% tub size starch
1E	Cyclo-Fil	30%
1F	Cyclo-Fil	40%
1G	Cyclo-Fil	40% + 8% tub size starch
1H	Cyclo-Fil	80%
1I	Cyclo-Fil	100%
1J	Cyclo-Fil	200%
Tuesday, 10/24		
2CC	Control	0% size, 2% alum
2BC	Cyclo-Fil	20%
2A	Cyclo-Sorb	20%
2AC	Control	1% rosin, 2% alum
2B	Cyclo-Sorb	5%
2C	Cyclo-Sorb	10%
2D	Cyclo-Sorb	20%
2E	Cyclo-Sorb	20% + 8% tub size starch
2F	Cyclo-Sorb	30%
2G	Cyclo-Sorb	40%
2H	Cyclo-Sorb	40% + 8% tub size starch
2I	Cyclo-Sorb	80%
2J	Cyclo-Sorb	100%
2K	Cyclo-Sorb	200%
4A	5% pigment	Slurry of 30 lbs Cyclo-Fil 20 lbs A - TiO_2 at 2 lbs/gallon.
4B	10% pigment	
4C	20% pigment	
4D	30% pigment	

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TABLE 1

Tremolite Particles/Field of View/1500 Sheets - Lithographic Machine Samples*

Samples	Description	Average fibers/field of view/1500 Sheets					
		Felt side			Wire side		
		<5μm	>5μm	Total	<5μm	>5μm	Total
1-Z	Control (1% Rosin, 2% Alum)	3	1.6	4.6	3	2	5
1-A	Cyclo-Fil 5%	10	2	12	10	1.8	11.8
1-C	Cyclo-Fil 20%	5	1	6	3	1.4	4.4
1-F	Cyclo-Fil 40%	25	8	33	25	9	34
1-G	Cyclo-Fil 40% +8% tub size starch	21	6	27	22	7	29
1-I	Cyclo-Fil 100%	19.8	11	30.8	25.9	11.8	37.7
2-CC	Control (0% Size, 2% Alum)	10.2	5	15.2	12	3.1	15.1
2-BC	Cyclo-Fil 20%	31	7.8	38.8	35	8	43
2-A	Cyclo-Sorb 20%	11	7	18	15	7	22
2-AC	Control (1% Rosin, 2% Alum)	3.8	1.4	5.2	3.4	1.4	4.8
2-D	Cyclo-Sorb 20%	5.4	2.6	8.0	9.8	3.1	12.9
2-H	Cyclo-Sorb 40% +8% tub size starch	8	3.8	11.8	4.6	1.8	6.4
2-J	Cyclo-Sorb 100%	3.1	1	4.1	8.4	6.2	14.6
4-A	5% Pigment	5	2.8	7.8	6.8	2.4	9.2
4-C	20% Pigment	8.2	2.6	10.8	8.2	3.2	11.4

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