

BATTELLE COLUMBUS LABORATORIES' TESTS FOR THE
EVALUATION OF ENCAPSULANTS
FOR FRIABLE ASBESTOS-CONTAINING MATERIALS

Battelle Columbus Laboratories, under contract from the U.S. Environmental Protection Agency (EPA), has evaluated 100 commercially available encapsulants for friable asbestos-containing materials in buildings. Manufacturers of encapsulants were invited to submit their products to Battelle in an advertisement placed in the Commerce Business Daily on February 10, 1978.

To test the encapsulants, Battelle used a mineral wool insulation material which was spray-applied to plywood. This mineral wool insulation was designed to simulate friable asbestos-containing insulation material. Sections of the materials were mounted on an overhead panel, and a different encapsulant was applied to each section. Each encapsulant was applied in three coats by airless spray.

Since the material on which the encapsulants were tested did not actually contain asbestos, the results of the tests should not be interpreted as indicating the probable results if the encapsulants were applied to asbestos-containing insulation. Rather, the tests were designed to indicate the relative quality of the various products.

On the basis of its laboratory tests, Battelle judged eleven of the 100 encapsulants to be "acceptable," and rated twenty-three others "marginally acceptable." These terms should not be construed to imply that the use of any of the encapsulants is acceptable or advisable in a given situation. Whether a given encapsulant, or any encapsulant, is appropriate in a given situation depends on a number of variables, many of which are beyond the scope of Battelle's study.

This table shows certain information about the thirty-four encapsulants judged by Battelle to be "acceptable" or "marginally acceptable" on the basis of its laboratory tests. The information here was taken from Battelle's "Draft Final Report on Evaluation of Encapsulants for Sprayed-On Asbestos-Containing Materials in Buildings," as revised at meetings between Battelle and EPA personnel on June 8, 1981.

IMPORTANT NOTE

This table has not been reviewed or approved by the United States Environmental Protection Agency and should not, therefore, be construed as a reflection of EPA policy. The inclusion of an encapsulant in this table may also not be construed as an endorsement of that product either by Battelle or by the EPA. Similarly, the exclusion of a given product from this list does

not necessarily imply that that product is an unsatisfactory encapsulant.

The table is divided into twelve columns; a brief explanation of each column is given below.

- 1) indicates whether the encapsulant was classified by Battelle as a bridging encapsulant (B) or a penetrating encapsulant (P).
- 2) shows the brand name of the encapsulant. The number in parentheses after the name is the code number given to the encapsulant by Battelle.
- 3) shows the name, address, and telephone number of the encapsulant's manufacturer.
- 4) shows the viscosity of the encapsulant in centipoises as measured by Battelle.
- 5) shows the encapsulant's percent solid content by weight as determined by Battelle.
- 6) shows the penetration in inches achieved by the encapsulant when it was applied by airless spray to the mineral wool test matrix.
- 7) and 8) show the minimum and maximum impact resistance of the encapsulated test matrix, measured in inch-pounds. For this test, the sample holder and anvil were removed from a Gardner impact tester, and a small block of encapsulated mineral wool was placed directly under the dropping load. The figures in columns 7 and 8 show the minimum and maximum number of inch-pounds required to penetrate 0.5 inches into the encapsulated test block.
- 9) indicates the amount of smoke generated when the encapsulated matrix was subjected to an open flame. In this test, a flame of approximately 1500° F was applied to the lower edge of a specimen of encapsulated mineral wool for ten minutes. The density of the resultant smoke was measured with a General Electric CR7505 Smoke Density Indicator. The number given in the table shows the percent opacity caused by the smoke which the burning test matrix generated; the higher the percentage the greater the generation of smoke.
- 10) also indicates the amount of smoke generated by a specimen of the encapsulated mineral wool. In this test, however, a heated electrical coil of approximately 1000° F, rather than an open flame, was applied to the sample for ten minutes. The density of

the resultant smoke was measured in the same manner as in the test described in #9.

- 11) shows the flame spread index of the encapsulated test matrix as determined by Battelle in a test based on ASTM method E 162. A high flame spread index indicates a lower fire resistance classification; the scale runs from 0 to 200, with an index of less than 26 yielding a fire rating of Class "A" and an index between 26 + 75 yielding a fire rating of Class "B."
- 12) shows the heat evolved from the test matrix in Battelle's tests for encapsulant flammability, measured in British thermal units per minute per square foot during the test described in #11.

The requirements for a rating of "acceptable" are as follows:

1. A Class "A" fire resistance rating (i.e., a flame spread index of 25 or less); see column 11.
2. A maximum of 50% capacity resulting from smoke generation in the flame smoke generation test, and a maximum of 50% capacity resulting from smoke generation in the glow-wire smoke generation test; see columns 9 and 10.
3. Toxic gas release on burning less than the "possible problem" levels set by the National Academy of Sciences. All products which appear on this list had toxic gas releases well below NAS's "possible problem" levels.
4. Good surface integrity capable either of sealing the fibrous surface (as a bridging encapsulant) or of binding the fibers together by penetrating 0.5 inches or more into the test matrix (as a penetrating encapsulant).

Given the fact that Battelle's tests were run only once on each encapsulant and are subject, like any test, to statistical error, products which were within 20% of "acceptability" according to each of these requirements were rated as "marginally acceptable."

It should be stressed again that Battelle's tests were conducted on a mineral wool matrix which did not contain asbestos, and that the results of these tests will not necessarily duplicate the results achieved when an encapsulant is applied to an asbestos-containing material.

1 2 3 4 5 6 7 8 9 10 11

P Advertiser 2000
(35-A)
Aplica Products, Inc.
P.O. Box 262
Oakhurst, NJ 07755
201-280-0400

P Advertiser EW225
(30-B)
McLobby International, Inc.
1043 Broadway
W. Long Branch, NJ 07764
201-229-5500

B Cable Coating 2-B
(35-U)
American Coatings Corp.
5235 N. Elston
Chicago, IL 60630
312-286-6610

P Calco-Dorv-Beal
(19-A)
U.S. Mineral Products Co.
Stanhope, NJ 07874
201-347-1200

B Decoder Firecheck
(4-A)
Fontagon Plastics, Ltd.
905 N. Railroad Avenue
W. Palm Beach, FL 33401
305-655-2111

B EX-64-2
(13-B-J)
Lghman Brothers Corp.
22 Halladay St.
Jersey City, NJ 07304
201-434-1882

B PRC-ARH
(52-A)
PRC Composites, Ltd.
1993 Leslie Street
Don Mills, Ontario M3B 2M3
416-449-1405

Lehman Bros. (Ox-Line Paints)
Div. S. S. Pierce Co. Purchased
in Dec., 1982 by California Products
Corporation, Cambridge, MA 02139
(617-547-5300)

5,100 508 0.200 16 20 68 58 15

6,250 568 0.156 60 >60 158 228 20

52,000 608 0.125 60 >60 338 NA 16

10 128 0.750 46 60 38 NA 5

100 648 0.188 52 60 408 488 17

10 228 0.500 50 60 28 28 17

8 218 1.000 46 60 58 58 2

ENCLOSURE (FORM) TO BE ACCEPTABLE ON THE BASIS OF BATTLEFIELD LABORATORY TESTS

	1	2	3	4	5	6	7	8	9	10	11
B	Ocean 666 (42-A)		Plasma-Crete Co. of Canada 1072 Cyrville Road Ottawa, Ontario K1J 7B5 613-741-4243	3,600	420	0.100	14	16	300	441	10
P	Probot 011-6625-503-9 (34-C)		Heterosium Industries, Inc. 5212 Industrial Court Beyrissa, GA 30080 404-351-7173	13	00	0.625	50	>60	50	30	6
P	BK-13 Emulsion 360-0017 (42-C)		National Cellulose Corp. P.O. Box 45006 12315 Hoblin Boulevard Houston, TX 77045 713-433-6701	20	450	0.500	50	60	00	00	13
P	32-20 and 32-21 (21-A)		H.B. Fuller Co. Foster Products Division P.O. Box 625 Springhouse, PA 19477 215-620-2600	5	100	0.875	50	60	30	30	2

ENCAPSULANTS FOUND TO BE MARSH IN ACCEPTABLE ON THE BASIS OF DARTMOUTH'S LAW ONLY TESTS

	1	2	3	4	5	6	7	8	9	10	11
P	Apuraloid 15-10 (29-C)		Essox Chemical Corporation 125 Blackstone Ave. Jamestown, NY 14701 716-665-6311	700	14%	0.250	50	60	1%	4%	22
P	Chemex Ultra Seal (12-B)		Chemex Chemical and Coating Co., Chemical Division P.O. Box 5072 Tampa, FL 33675 813-248-6104	8	15%	1.000	42	48	5%	2%	16
B	C-1019 (41-C)		California Products Corp. 169 Waverly Street Cambridge, MA 02139 617-547-5300	4,600	49%	0.125	10	14	20%	40%	30
P	Dust-Set (36-B)		Mateson Chemical Corp. 1025 Montgomery Ave. Philadelphia, PA 19125 215-423-3200	100	10%	0.250	54	60	0%	1%	6
D	PRC-IREPC (52-B)		PRC Composites, Ltd. 1993 Kastle Street Don Mills, Ontario M3B 2M3 416-449-1405	130	46%	0.150	14	16	7%	4%	12
D	Hygienecote (48-A)		Acalor Chemical Construction 33 Kenbar Drive Weston, Ontario M9L 1M9 416-749-2265	5,500	52%	0.125	20	26	48%	51%	28

ENCAPSULANTS FOUND TO BE MARGINALLY ACCEPTABLE ON THE BASIS OF DARTMOUTH'S LABORATORY TESTS

	1	2	3	4	5	6	7	8	9	10	11
D Thermanak (53-A)			Protect Manufacturing 520 S. Muskego Ave. Milwaukee, WI 53208 414-643-7689	53	418	0.100	4	6	118	18	0
P TCI-750 (50-A)			Therma-Cometics P.O. Box 190 Colton, CA 92324 714-783-0462	380	438	0.250	6	8	48	158	22
P Ultra Lok 40-871 (31-A)			Cellin Manufacturing, Inc. P.O. Box 600 Springfield, VA 22150 703-550-7277	8	408	0.188	60	>60	28	28	18
P Water-based Polyester (15-C)			Dow Chemical Co. P.O. Box 1847 2040 Dow Center Midland, MI 48640 517-636-0952	20	308	0.375	55	>60	88	58	25
P Water-based XD-DG (21-D)			Dow Chemical Co. P.O. Box 1847 2040 Dow Center Midland, MI 48640 517-636-0952	475	248	0.375	50	60	108	0	20
P #207 Special Sealer (27-A)			Makus Development Corp. P.O. Box 31 Mercer Island, WA 98040 206-641-7373	10	598	0.500	60	>60	18	98	
P 25-2355 (51-A)			Nat'l Starch and Chemical Corp. 1164 N. Great Southwest Pkwy. Grand Prairie, TX 75050 214-647-9222	35	478	0.300	6	10	88	278	16

ENCAPSULANTS FOUND TO BE marginally acceptable on the basis of Duffell's Laboratory tests

	1	2	3	4	5	6	7	8	9	10	11
B	L241-43 Part A & B (47-A)	Carbolite Co. 350 Hanley Industrial Court St. Louis, MO 63144 314-644-1000	NA	NA	0.100	8	10	45%	30%	17	
P	Metro-shield (42-B)	Dartelbon Associates, Inc. 8 Delwood Lane Tinton Falls, NJ 07724 201-542-6393	10	29%	0.350	14	20	7%	53%	21	
P	Mono-therm P-100 (37-C)	Mono-therm Industries, Inc. 10819 120th Ave. NE Kirkland, WA 98033 800-425-8080	8	42%	0.250	52	60	2%	2%	13	
P	Parra 200 (33-C)	United Coatings E. 1130 Sprague Ave. Spokane, WA 99202 509-535-4131	24	26%	0.250	50	52	27%	9%	15	
B	Product No. 1593 (43-A)	H.B. Fuller Co. Roster Division P.O. Box 625 Springhouse, PA 19477 800-523-6017	21,000	63%	0.080	10	14	42%	42%	21	
B	Pyrokote-MX (28-A)	Development Services International 2021 K St. NW, Suite 305 Washington, DC 20006 202-331-7371	NA	NA	0.125	50	58	0%	0%	1	
P	Super Chemsal (47-C)	Chemray Coatings Corp. 150 Lincoln Blvd. Middletown, NJ 08046 201-469-1110	33	49%	0.500	10	14	20%	26%	16	