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June 25, 1960

REPORT

on

FIRE HAZARD CLASSIFICATION
OF HIGH-PRESSURE DECORATIVE LAMINATES

United States Plywood Corp.
New York, New York

DESCRIPTION

MATERIAL COVERED BY THIS REPORT:

High-pressure decorative laminates applied by factory and field methods to a noncombustible surface and the same laminate without backing.

USE:

The material is intended for use as a building material and/or wall covering as permitted by authorities having jurisdiction.

PLAINTIFF'S
EXHIBIT

WH-199

EXAMINATION AND TEST RECORD

EXAMINATION OF MATERIAL:

The manufacturing process of high-pressure decorative laminates and the application methods used to apply the laminates to the noncombustible surfaces were witnessed by a staff member of Underwriters' Laboratories, Inc.

The noncombustible surfaces bore the fire hazard classification label of Underwriters' Laboratories, Inc. for asbestos cement board with the flame spread, fuel contributed and smoke developed factors of zero.

FIRE HAZARD CLASSIFICATION TESTS:

DESCRIPTION OF SAMPLES

The high-pressure decorative laminates were produced with the intent of providing samples having varying degrees of fire resistance.

All samples were prepared in 4 by 8 ft sheets and were cut by the manufacturer to an 8 ft by 20 in. width.

The samples used to evaluate the field application of the laminate were prepared manually using common tools and methods normally employed in gluing facings to partitions. Some of the samples prepared by this method had a butted joint down the center of the facing.

Samples used to evaluate the factory application of the laminate were prepared using normal factory methods.

METHOD

The tests were conducted in accordance with Underwriters' Laboratories, Inc.'s Standard Test Method for Fire Hazard Classification of Building Materials, (ASTM E84-50T, NFPA No. 255).

RESULTS

Figures 1-4 show the appearance of typical samples after fire exposure. Data on flame spread, fuel contributed and smoke developed appears in the following tabulations:

Flame Spread

The maximum distance the flame spreads along the length of the sample from the end of the ignition flame is determined by observation. The flame spread factor is derived by expressing the flame spread for this material as a percentage of the flame spread for untreated red oak, as follows:

Test	Maximum Flame Spread (in)	Factor for Classification
Untreated Red Oak	19-1/2	100
Asbestos Cement Board	0	0
<u>High-Pressure Laminate Without Backing</u>		
1. Standard Asbestos (Patterned)	6	30.8
2. Standard Asbestos (Patterned)	6	30.8
3. Standard Asbestos (Patterned)	5-1/2	28.2
4. Standard Asbestos (Solid Color)	5-1/2	33.3
5. Standard Asbestos (Solid Color)	6	30.8
6. Standard Asbestos (Solid Color)	5-1/2	28.2
7. H 5516 (Patterned)	5-1/2	28.2
8. H 5516 (Patterned)	5	25.6
9. H 5516 (Patterned)	5	25.6
10. H 5520 (Solid Color)	3-1/2	17.9
11. H 5520 (Solid Color)	3	15.4
12. H 5520 (Solid Color)	3	15.4
13. H 9896 (Solid Color)	3-1/2	17.9
14. H 9896 (Solid Color)	4	20.5
15. H 9896 (Solid Color)	3	15.4
16. H 9897 (Patterned)	4-1/2	23.1
17. H 9897 (Patterned)	4-1/2	23.1
18. H 9897 (Patterned)	2-1/2	15.4
19. Regular (Patterned)	19-1/2 (95 sec)	348
20. Regular (Patterned)	19-1/2 (97 sec)	339
21. Regular (Solid Color)	19-1/2 (103 sec)	320

SEE - 650 basing point

High Pressure
Constant class
From Hallant.

DATE DO NOT WRITE IN THESE SPACES
RECEIVED
13/99

(Table Continued)

Test	Maximum Flame Spread	Factor for Classification
<u>Field Application of High-Pressure Laminates</u>		
22. Standard Asbestos (Patterned)	3-1/2	17.9
23. Standard Asbestos (Patterned)	3-1/2	17.9
24. Standard Asbestos (Patterned)	3	15.4
25. Standard Asbestos (Solid Color) (Slit)	3-1/2	17.9
26. Standard Asbestos (Solid Color)	3	15.9
27. H 5519 (Patterned)	3	15.9
28. H 5520 (Solid Color)	3-1/2	17.9
29. H 5520 (Solid Color)	2-1/2	12.9
30. H 9896 (Solid Color)	3-1/2	17.9
31. H 9896 (Solid Color)	2-1/2	12.9
32. H 9897 (Patterned)	2-1/2	12.8
33. H 9897 (Patterned)	2-1/2	12.8
34. H 9897 (Patterned)	3	15.4
35. Regular (Patterned)	15	77.0
36. Regular (Solid Color)	10-1/2	53.9
37. Regular (Solid Color)	11-1/2	59.0
<u>Factory Application of High-Pressure Laminates</u>		
38. Standard Asbestos (Patterned)	3-1/2	17.9
39. Standard Asbestos (Patterned)	3	15.4
40. Standard Asbestos (Patterned)	3-1/2	15.4
41. Standard Asbestos (Solid Color)	3-1/2	17.9
42. Standard Asbestos (Solid Color)	3-1/2	17.9
43. Standard Asbestos (Solid Color)	3	15.4

(Table Continued)

Test			Maximum Flame Spread (Ft)	Factor for Classification
44.	H 5519	(Patterned)	3	15.4
45.	H 5519	(Patterned)	3	15.4
46.	H 5519	(Patterned)	3	15.4
47.	H 5520	(Solid Color)	3-1/2	17.0
48.	H 5520	(Solid Color)	3-1/2	15.4
49.	H 5580	(Solid Color)	3-1/2	12.8
50.	H 9896	(Solid Color)	3-1/2	15.4
51.	H 9896	(Solid Color)	3-1/2	12.8
52.	H 9897	(Patterned)	3-1/2	12.8
53.	H 9897	(Patterned)	3-1/2	12.8
54.	H 9897	(Patterned)	3-1/2	12.8
55.	Regular	(Patterned)	1 1/2	92.3
56.	Regular	(Patterned)	1 1/2	69.3
57.	Regular	(Solid Color)	1 1/2	64.1

Fuel Contributed

A time-temperature curve is developed by plotting the temperatures measured by a thermocouple located at the 23 ft point (vent end) in the furnace versus time. The fuel contributed factor is derived by expressing the net area under the curve for this material as a percentage of the net area under the curve for untreated red oak, as follows:

Test		Factor for Classification
Untreated Red Oak		100
Asbestos Cement Board		0
<u>High-Pressure Laminate Without Backing</u>		
1.	Standard Asbestos (Patterned)	22.6
2.	Standard Asbestos (Patterned)	15.2
3.	Standard Asbestos (Patterned)	7.5
4.	Standard Asbestos (Solid Color)	21.4
5.	Standard Asbestos (Solid Color)	5.2
6.	Standard Asbestos (Solid Color)	10.9

(Table Continued)

		Test	Factor for Classification
7.	H 5519	(Patterned)	13.1
8.	H 5519	(Patterned)	16.6
9.	H 5519	(Patterned)	16.8
10.	H 5520	(Solid Color)	16.3
11.	H 5520	(Solid Color)	5.1
12.	H 5520	(Solid Color)	10.3
13.	H 9896	(Solid Color)	15.3
14.	H 9896	(Solid Color)	21.4
15.	H 9896	(Solid Color)	9.2
16.	H 9897	(Patterned)	19.8
17.	H 9897	(Patterned)	16.2
18.	H 9897	(Patterned)	9.2
19.	Regular	(Patterned)	72.1
20.	Regular	(Patterned)	117.8
21.	Regular	(Solid Color)	41.7

Field Application on High Pressure Laminates

22.	Standard Asbestos	(Patterned)	14.1
23.	Standard Asbestos	(Patterned)	16.7
24.	Standard Asbestos	(Patterned)	15.4
25.	Standard Asbestos	(Solid Color) (Slit)	20.8
26.	Standard Asbestos	(Solid Color)	13.4
27.	H 5519	(Patterned)	18.3
28.	H 5520	(Solid Color)	19.2
29.	H 5520	(Solid Color)	13.2
30.	H 9896	(Solid Color)	15.5
31.	H 9896	(Solid Color)	12.7
32.	H 9897	(Patterned)	17.8
33.	H 9897	(Patterned)	15.6
34.	H 9897	(Patterned)	14.9
35.	Regular	(Patterned)	36.3
36.	Regular	(Solid Color)	32.8
37.	Regular	(Solid Color)	34.1

(Table Continued)

Test		Factor for Classification
<u>Factory Application of High-Pressure Laminates</u>		
38.	Standard Asbestos (Patterned)	16.8
39.	Standard Asbestos (Patterned)	21.6
40.	Standard Asbestos (Patterned)	16.9
41.	Standard Asbestos (Solid Color)	23.7
42.	Standard Asbestos (Solid Color)	12.2
43.	Standard Asbestos (Solid Color)	17.0
44.	H 5519 (Patterned)	17.4
45.	H 5519 (Patterned)	23.4
46.	H 5519 (Patterned)	17.1
47.	H 5520 (Solid Color)	19.8
48.	H 5520 (Solid Color)	11.5
49.	H 5520 (Solid Color)	11.0
50.	H 9896 (Solid Color)	22.9
51.	H 9896 (Solid Color)	18.8
52.	H 9897 (Patterned)	15.9
53.	H 9897 (Patterned)	17.0
54.	H 9897 (Patterned)	14.8
55.	Regular (Patterned)	46.5
56.	Regular (Patterned)	35.7
57.	Regular (Solid Color)	44.3

Smoke Developed

The smoke developed during the test is indicated by the output of a photoelectric circuit operating across the furnace test pipe. A curve is developed by plotting values of light absorption (decrease in cell output) against time. The smoke developed factor is derived by expressing the net area under the curve for this material as a percentage of the net area under the curve for untreated red oak, as follows:

Test	Factor for Classification
Untreated Red Oak	100
Asbestos Cement Board	31.2

(Table Continued)

Test		Factor for Classification
<u>High-Pressure Laminate Without Backing</u>		
1.	Standard Asbestos (Patterned)	7.0
2.	Standard Asbestos (Patterned)	5.8
3.	Standard Asbestos (Patterned)	10.5
4.	Standard Asbestos (Solid Color)	10.5
5.	Standard Asbestos (Solid Color)	10.5
6.	Standard Asbestos (Solid Color)	10.5
7.	H 5519 (Patterned)	10.5
8.	H 5519 (Patterned)	10.5
9.	H 5519 (Patterned)	20.1
10.	H 5520 (Solid Color)	12.4
11.	H 5520 (Solid Color)	11.4
12.	H 5520 (Solid Color)	25.0
13.	H 9896 (Solid Color)	21.1
14.	H 9896 (Solid Color)	10.0
15.	H 9896 (Solid Color)	11.3
16.	H 9897 (Patterned)	22.4
17.	H 9897 (Patterned)	10.5
18.	H 9897 (Patterned)	25.0
19.	Regular (Patterned)	24.8
20.	Regular (Patterned)	25.8
21.	Regular (Solid Color)	10.8

Field Application of High-Pressure Laminates

22.	Standard Asbestos (Patterned)	7.7
23.	Standard Asbestos (Patterned)	7.7
24.	Standard Asbestos (Patterned)	2.8
25.	Standard Asbestos (Solid Color) (Slit)	7.7
26.	Standard Asbestos (Solid Color)	3.8
27.	H 5519 (Patterned)	10.3
28.	H 5520 (Solid Color)	2.0
29.	H 5520 (Solid Color)	1.0
30.	H 9896 (Solid Color)	6.0
31.	H 9896 (Solid Color)	5.7
32.	H 9897 (Patterned)	12.4
33.	H 9897 (Patterned)	8.8
34.	H 9897 (Patterned)	0.1
35.	Regular (Patterned)	13.5
36.	Regular (Solid Color)	10.9
37.	Regular (Solid Color)	7.7

(Table Continued)

Test		Factor for Classification
Factory Application of High-Pressure Laminates		
38.	Standard Asbestos (Patterned)	10.9
39.	Standard Asbestos (Patterned)	6.7
40.	Standard Asbestos (Patterned)	4.0
41.	Standard Asbestos (Solid Color)	9.6
42.	Standard Asbestos (Solid Color)	3.8
43.	Standard Asbestos (Solid Color)	5.0
44.	H 5519 (Patterned)	0.4
45.	H 5519 (Patterned)	5.0
46.	H 5519 (Patterned)	11.5
47.	H 5520 (Solid Color)	4.2
48.	H 5520 (Solid Color)	2.9
49.	H 5520 (Solid Color)	1.9
50.	H 9896 (Solid Color)	3.8
51.	H 9896 (Solid Color)	6.1
52.	H 9897 (Patterned)	9.7
53.	H 9897 (Patterned)	4.4
54.	H 9897 (Patterned)	7.6
55.	Regular (Patterned)	15.5
56.	Regular (Patterned)	15.3
57.	Regular (Solid Color)	22.0

ANALYSIS OF GASEOUS PRODUCTS OF COMBUSTION:

Tests were not considered necessary on this product because of similarity to previously investigated products.

(Table Continued)

Test		Factor for Classification
Factory Application of High-Pressure Laminates		
38.	Standard Asbestos (Patterned)	10.9
39.	Standard Asbestos (Patterned)	5.7
40.	Standard Asbestos (Patterned)	4.0
41.	Standard Asbestos (Solid Color)	9.6
42.	Standard Asbestos (Solid Color)	3.8
43.	Standard Asbestos (Solid Color)	4.0
44.	H 5519 (Patterned)	9.4
45.	H 5519 (Patterned)	5.0
46.	H 5519 (Patterned)	11.5
47.	H 5520 (Solid Color)	4.2
48.	H 5520 (Solid Color)	2.9
49.	H 5520 (Solid Color)	1.0
50.	H 9896 (Solid Color)	3.8
51.	H 9896 (Solid Color)	6.1
52.	H 9897 (Patterned)	9.7
53.	H 9897 (Patterned)	4.4
54.	H 9897 (Patterned)	7.6
55.	Regular (Patterned)	15.5
56.	Regular (Patterned)	15.3
57.	Regular (Solid Color)	22.0

ANALYSIS OF GASEOUS PRODUCTS OF COMBUSTION:

Tests were not considered necessary on this product because of similarity to previously investigated products.

PRODUCED IN MISSILES 3/18/92

CONCLUSIONSFIRE HAZARD CLASSIFICATION:

The following fire hazard classification is established for the standard asbestos to be listed as a "Wall Covering" in comparison with untreated red oak as 100:

	Without Backing	Secured to a Noncombustible Backing †
Flame spread		15
Fuel contributed	15	15
Smoke developed	10	5

† - Secured with an adhesive in accordance with application instructions enclosed with the material.

The following fire hazard classification is established for this material to be listed as a "Building Unit", in comparison with untreated red oak as 100:

	Standard Asbestos	Regular
Flame spread	15	65-90
Fuel contributed	20	40
Smoke developed	5	20

TOXICITY OF GASEOUS PRODUCTS OF COMBUSTION

Analysis of gaseous products evolved during combustion of products of similar composition indicates that the toxic hazard would be no greater than that presented by the burning of untreated lumber under similar conditions. Under fire conditions, the life hazard will depend upon the quantities of material involved and upon the degree of confinement, if any, of the fumes.

SUPERVISION OF PRODUCT BY UNDERWRITERS' LABORATORIES, INC.:

Each material made like those investigated and found acceptable, and produced under Underwriters' Laboratories, Inc.'s Factory Inspection Service will bear an Underwriters' Laboratories, Inc.'s label like one of those shown below.

This section to contain manufacturer's name plate

data

UNDERWRITERS' LABORATORIES, INC.

INSPECTED

WALL COVERING MATERIAL

1/2 FT.

ISSUE NO. _____

FLAME HAZARD CLASSIFICATION

BASED ON 300 FOR UNTREATED RED OAK)

	WITHOUT BACKING	WITH NONCOM- BUSTIBLE BACKING †
--	--------------------	------------------------------------

FLAME SPREAD	30	15
FUEL CONSUMPTION	15	15
SMOKE DEVELOPED	10	5

† SECURED WITH ADHESIVE IN ACCORDANCE WITH
MANUFACTURER'S INSTRUCTIONS.

OF

3/18/92

File R4286

Sec. Conclusion

This section to contain manufacturer's name plate data

UNDERWRITERS' LABORATORIES, INC.

Q

INSPECTED
BUILDING UNIT

FIRE HAZARD CLASSIFICATION
(BASED ON: 100 FOR UNTREATED RED OAK)

STANDARD
ASBESTOS

REGULAR

FLAME SPREAD

15

65-90

FUEL CONTRIBUTED

20

40

SMOKE DEVELOPED

5

20

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PRODUCED BY THE MISSISSIPPI STATE FIRE PROTECTION DEPARTMENT
IN MISSISSIPPI 3/18/92