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REPORT ON SURFACE BURNING CHARACTERISTICS

DETERMINED BY

ASTM E-84 TWENTY-FIVE FOOT TUNNEL FURNACE TEST METHOD

PREPARED FOR

RENEER FILMS CORPORATION

AUBURN, PENNSYLVANIA
(CITY, STATE)

T - 1785
(TEST NO.)

7 MIL. VINYL LAMINATED ON
3/16" A. C. BOARD, #1
(MATERIAL)

AUGUST 25, 1977
(DATE)

I. SCOPE

This report contains the reference to the test method, purpose, test procedure, preparation and conditioning of specimens, description of materials, test and post test observation data, and test results.

II. TEST METHOD

The test was conducted in accordance with ASTM Designation E84-76a, "Standard Method of Test for Surface Burning Characteristics of Building Materials." The 25-foot tunnel method is also described by ANSI No. 2.5, NFPA No. 255, UL No. 723, and UBC No. 42-1.

III. PURPOSE

The purpose of the test is to determine the relative performance of the test material to that of asbestos-cement board and red oak flooring under similar test conditions. Results are given for flamespread, fuel contributed, and smoke developed. The values obtained from burning the test material represents a comparison with that of asbestos-cement board expressed as zero and red oak flooring expressed as 100.

The flamespread results of 25-foot tunnel tests are frequently used by building code officials and regulatory agencies in the acceptance of interior finish material for various applications. While the flamespread numbers for classification purposes may

vary slightly, the most widely accepted classification system is epitomized by the National Fire Protection Association Life Safety Code, NFPA No. 101:

Class A	0	to	25	Flamespread
Class B	26	to	75	Flamespread
Class C	76	to	200	Flamespread
Class D	201	to	500	Flamespread
Class E	Over 500			Flamespread

These flamespread classification systems are based on the premise that the higher the flamespread numbers, the greater the fire hazard. The relationship between the numbers developed under this test and life safety from fire has not been adequately established.

IV. TEST PROCEDURE NOTES

The furnace was preheated to 150°F ($\pm$5°F) as measured by a 18 AWG thermocouple embedded 1/8" below the floor surface of the test chamber, 24' from the fire end of the test sample. The furnace was then cooled to 105°F ($\pm$5°F) as measured by a thermocouple embedded 1/8" below the floor surface of the test chamber 14' from the fire end.

Prior 10-minute tests with asbestos-cement board provided the zero reference for flamespread, fuel contributed, and smoke density. Periodic 10-minute tests with unfinished select grade red oak flooring provided the 100 reference for the three parameters.

A. Flamespread

The flame spread distance is observed and recorded at least every 30 seconds or every 2 feet of progression. The peak distance is noted at the time of occurrence. The flame spread distance is plotted over time. The total area under the flame spread distance-time curve is determined; flame front recessions are ignored. The flame spread is then calculated. The value for flamespread classification for this material may be compared with that of asbestos-cement board (0) and select grade red oak flooring (100).

B. Fuel Contributed

A time-temperature curve is developed by plotting the temperature measured by a thermocouple located at the 24-foot point (vent end) in the furnace. The value for fuel contributed is derived by calculating the net area under the curve for the test material and comparing this area with the net area under the curve for unfinished select grade 3/4" red oak flooring.

C. Smoke Developed

The smoke developed during the test is determined by the output of a photoelectric circuit operating across the furnace outlet pipe. A curve is developed by plotting against time the values of the decrease in photoelectric cell output due to obscuration of the light source across the pipe caused by the smoke.

The value for smoke developed is derived by calculating the net area under the curve for the test material and comparing this area with the net area under the curve for unfinished select grade 3/4" red oak flooring.

V. PREPARATION AND CONDITIONING OF TEST SAMPLES

Three or four sections are generally used in the preparation of a complete test specimen which is 20-1/2" wide and 24' long. Materials 8' in length may be tested by using three sections 20-1/2" wide by 8' long for a total specimen length of 24'. A 1' section of asbestos-cement board is used to make up the remainder of the test specimen; it is placed behind the burners and does not become involved during the test. Test specimens are conditioned at a controlled temperature of 70°F (±5°F) and a controlled relative humidity of 35 to 40 percent.

TEST NO. T - 1785 DATE OF TEST AUGUST 19, 1977

I. MATERIAL TESTED: 7 MIL. VINYL LAMINATED ON 3/16" A.C. BOARD - #1

MANUFACTURER: RENEER FILMS CORPORATION
AUBURN, PENNSYLVANIA

	Burn Number
1) Nominal Dimensions	3/16"
2) Average Thickness	.190"
3) Average Weight - lbs./ft.^{2}	WEIGHTS NOT RECORDED
4) Product Description	7 MIL. VINYL LAMINATED ON 3/16" A.C. BOARD - #1; BORDEN E-8825 ADHESIVE; 7 MIL. RENEER OTPL-3 VINYL.**
5) Color	DARK BROWN SIMULATED WOODGRAIN
6) Surface	VINYL
7) Sample Selection	MANUFACTURER
8) Material Description By	MANUFACTURER
9) Date of Selection	7/77
10) Purpose of Test	FLAMESPREAD DETERMINATION
11) Method of Sample Mounting	SELF-SUPPORTING - ON LEDGES

REMARKS: *OVERALL THICKNESS INCLUDING VINYL.
**ADHESIVE AND VINYL IDENTIFIED BY MANUFACTURER.

TEST NO. T - 1785 DATE OF TEST AUGUST 19, 1977

VII. CONDITIONING, TEST, AND POST TEST OBSERVATION DATA

	Burn Number
Conditioning	
1) Number of Days in Conditioning Area	21
2) Moisture Content - As Tested	-
Conditions at Test	
1) Specimen Preheat Time (Min.)	2
2) Tunnel (Brick) Temperature (F°)	108
Test Data	
) Time	
a) Ignition Time (Seconds)	35
b) Flamefront - Time to End of Tunnel or Flamefront Distance	7' @ 1:15
c) Area Under Time-Distance Curve (Min.-Ft.)	22.8
d) Time of Test (Min.)	10
) Fuel and Temperature	
a) Fuel (Cu.Ft./Min.)	4.932
b) Maximum Vent-End Temperature (F°)	582
c) Time to Maximum Temperature (Min.)	9:15
bservations of Burned Specimens	
After Flaming	No
Length of Burnthrough (Ft.)	VINYL BURNED THROUGH TO 3.5'.
Delamination-Condition of Surface Veneer (Delaminated, Loose, Tight)	NONE

MARKS:

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VIII. TEST RESULTS. Test results calculated on the basis of the areas under the curves of flame spread distance-time, furnace temperature, and smoke density are provided in the Classification Table below:

Classification Table

Test Specimen	Flamespread Value	Fuel Contributed Factor	Smoke Density Factor
Asbestos-Cement Board	0	0	0
Red Oak Flooring	100	100	100
7 MIL. VINYL LAMINATED ON 3/16" A.C. BOARD #1	13 13*	10	3

CONCLUSION: BASED ON ONE TEST, MEETS THE FLAMESPREAD CRITERIA FOR CLASS A MATERIAL - 25 OR UNDER FLAMESPREAD.

*FLAMESPREAD BASED ON FORMER ASTM CALCULATION METHOD (BEFORE APRIL 5, 1976).

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is is a factual report of the results obtained from laboratory tests of sample prod-
ts. The results may be applied only to the products tested and should not be con-
rued as applicable to other similar products of the manufacturer. The HPMA does not
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