



UNDERWRITERS LABORATORIES INC. ®

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*an independent, not-for-profit organization testing for public safety*

File R13250  
Project 88SC15801

April 6, 1989

REPORT

ON

SURFACE BURNING CHARACTERISTICS  
OF FIRE RETARDANT COATING

Rockwood International Inc.  
Los Angeles, California

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Look For The ® Listing or Classification Mark On The Product

D E S C R I P T I O N

PRODUCT COVERED:

The products covered by this Report is a fire retardant coating material intended for spray or dip application. Designated by the manufacturer as "Wood Bliss I" (Type WB-I).

USE:

The fire retardant coating covered by this Report is intended for use as a building material as authorized by the authorities having jurisdiction.

C O N C L U S I O N

The following conclusions represent the judgment of Underwriters Laboratories Inc. based on the results of the examination and tests described in this Report as they relate to previously established engineering principles.

CLASSIFICATION:

The following classification is established for the product covered by this Report.

Surface Burning Characteristics

Surface	Type WB-I
Flame Spread	Douglas Fir
Smoke developed	15
Number of preliminary coats	5
Rated per coat (Sq ft per gal)	None
Number of fire-retardant coats	-
Rate per coat (Sq ft per gal)	2
Number of overcoats	350
Rated per coat (Sq ft per gal)	None
Flash point of liquid coating:	-
Fire-retardant coating:	Closed cup, no flash.

FOLLOW-UP PROGRAM:

The product covered by this Report will be placed under the Follow-Up Service Program of Underwriters Laboratories Inc.

The Classification Marking of Underwriters Laboratories Inc. attached to the product is the only evidence provided by Underwriters Laboratories Inc. that such product has been produced under the Follow-Up Service Program. The Classification Marking will bear the following information:

UNDERWRITERS LABORATORIES INC. (R)

CLASSIFIED

FIRE RETARDANT COATING

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Report by:

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GENERAL

The purpose of this investigation was to evaluate the surface burning characteristics of the subject material by establishing the specific classification in accordance with UL Standard "Test for Surface Burning Characteristics of Building Materials," UL 723.

The surface burning characteristics per UL 723-83 develops a classification for Flame Spread Index and Smoke Developed Index. The test results are established in comparison with a combustible (red oak lumber) and a noncombustible inorganic reinforced cement board.

Various physical and chemical tests were conducted on the finished product and its constituents to establish specifications for use in the Follow-Up Service Program.

This Report includes a description of the inspection and sample selection, the sample preparation and conditioning, the test results and the Follow-Up Service Program.

The Classification Marking of Underwriters Laboratories Inc. attached to the product is the only method provided by UL to identify the material covered by this investigation and Report as produced under the Follow-Up Service Program.

T E S T R E C O R D N O 1EXAMINATION OF MATERIAL:

The material used in this investigation was produced under the observation of a representative of Underwriters Laboratories Inc. from materials considered representative of those normally used by the manufacturer. They were produced under what were considered normal manufacturing conditions.

During observation of the production of the fire retardant coating from which test samples were selected, information was recorded with regard to the manufacturing processes, component material identification, application rate and other quality control information. The formulas and technical data involved are of a proprietary nature and are on file at the Laboratories for use in the Follow-Up Service Program.

The personnel involved in the production of the test samples were under the supervision or in the employment of the manufacturer. The production techniques, equipment, materials, and workmanship are judged to represent accepted industry practice.

SUPPLEMENTAL TESTS:

Various chemical, physical and small scale tests were conducted on the finished product and its constituents for use in the Follow-Up Service Program.

TEST METHOD:

## GENERAL

The tests were conducted in accordance with UL Standard "Test for Surface Burning Characteristics of Building Materials, " UL 723.

The test determines the surface burning characteristics of the test material, specifically Flame Spread Index and Smoke Developed Index when exposed to fire. This test provides a basis for comparing the surface burning characteristics of different materials. This test evaluates the performance of the product during the test exposure.

#### TEST DATA:

##### SAMPLE DESCRIPTION

The test samples consisted of a fire retardant coating spray applied in accordance with the manufacturer's instruction on two coats to Douglas fir tongue and grooved flooring at 350 sq ft per gal. Prior to the first coat the flooring was conditioned (washed) with a 25% solution of the fire retardant coating.

In addition to the coated Douglas fir flooring one series of panels were uncoated.

Each test consisted of three 22 in. wide by 96 in long Douglas fir test decks. Each desk was constructed of seven nom. 4 by 1 in boards laid side by side and secured with four nailing strips spaced approximately 3 ft apart.

The test decks were laid across the tunnel with their edges resting on the tunnel ledges and their ends butt-jointed to form a 24 ft continuous test surface. To complete the 25 ft tunnel length a 14 x 24 in. steel plate was placed upstream of the burners.

##### RESULTS

##### Surface Burning Characteristics

The data on Flame Spread Index and Smoke Developed Index appear in the following tabulation.

### Flame Spread Index

The maximum distance along the sample length to which the flame spreads from the end of the igniting flame was determined by observation. The Flame Spread Index is derived by plotting the progress-on of the flame front on a time-distance basis; no allowance is made for flame front recession. The Flame Spread Index is calculated according to the following:

- A. Flame Spread Index =  $0.515 A_t$   
When  $A_t$  is less than or equal to 97.5 Min-Ft.
- B. Flame Spread Index =  $4900/195-A$   
When  $A_t$  is greater than 97.5 Min-Ft.

Where  $A_t$  = The total area under the time-distance curve expressed in minute-feet

<u>Material</u>	<u>Maximum Flame Spread ft</u>	<u>Time of maximum Flame Spread min sec</u>	<u>Calculated Total Area Under the Time Distance Curve min-ft</u>	<u>Calculated Value For Flame Spread Inc</u>
uncoated Douglas fir	15	6:04	120.0	65.3
Fire Retardant Coated Douglas fir	5	9:24	31.2	16.1
"	" 5	9:31	30.7	15.8
"	" 5	9:32	31.0	16.0

### Smoke Developed Index

The smoke developed during the test is monitored by a photoelectric circuit operating across the furnace flue. A curve is developed by plotting values of light obscuration as measured in decreased cell output versus time. The Smoke Developed Index is obtained by expressing the area under the curve developed for the sample material as a percentage of the area under the curve developed for untreated red oak.

The Smoke Developed Index is expressed as:

$$\text{Smoke Developed Index} = \frac{A_m}{A_{ro}} \times 100$$

Where:

$A_m$  = The area under the curve for the test material.

$A_{ro}$  = The area under the curve for untreated red oak.

<u>Material</u>	<u>Calculated Value for Smoke Developed Index</u>
uncoated Douglas fir	67.8
Fire Retardant coated Douglas fir	9.7
" "	7.1
" "	5.4