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## THE DEPARTMENT OF FIRE TECHNOLOGY

INVESTIGATION OF THE SURFACE BURNING  
CHARACTERISTICS OF A TWO-COATING SYSTEM  
APPLIED TO DOUGLAS FIR LUMBER:  
BURN BARRIER™ NO. 20-20 OVERCOATED WITH  
BURN BARRIER™ NO 40-40 TOPCOAT

SWRI PROJECT NO. 01-3779-424

FINAL REPORT

SEPTEMBER 4, 1991

Prepared for:

FIRE RETARDANTS INC.  
123 Columbia Court North • Suite 201  
Chaska, MN 55318



## SOUTHWEST RESEARCH INSTITUTE

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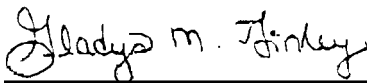
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## INTRODUCTION

This report presents the results of ASTM E84 flame spread tunnel tests on material submitted by the Client. It contains a description of the materials tested, the preparation and conditioning of the specimens, the test procedure, and the test results.

Materials are tested under ASTM E84-90, “Standard Method of Test for Surface Burning Characteristics of Building Materials.” This test method is similar to the test method specified in NFPA NO. 255, UL No. 723 and UBC No. 42-1. ASTM E84 is a test procedure method only and does not set requirements for materials. Therefore, SWRI does not assign a classification to the material tested. The building code having jurisdiction in the location a material is to be used will determine compliance of the test results.

The results apply specifically to the specimens tested, in the manner tested, and not to the entire production of these or similar materials, nor to the performance when used in combination with other materials. All test data are on file and are available for review by authorized persons.

The purpose of the test is to evaluate performance of the test specimens in relation to that of glass-reinforced cement board and red oak flooring under similar fire exposure. The results are expressed in terms of flame spread and smoke developed during a 10-minute exposure and are recorded as a ratio with glass-reinforced cement board 0 and red oak flooring 100.

The following pages represent a summary of the information obtained during the evaluation of the submitted material.



## **SWRI Project No. 01-3779-424**

These summary pages and graphs are not to be used separately in lieu of this complete final report.

### **DESCRIPTION AND PREPARATION OF MATERIALS**

Each material submitted or evaluation is reported separately. The description of the tested sample, preparation procedure and cure time are listed in the Description section of the appropriate summary page.

Each specimen measures at least 21-in. x 24-ft (0.53 x 7.32-m) and is prepared in accordance with standard procedures and the Client's instructions. Exceptions to the standard procedure are noted in the Description section on the summary page. The specimens are conditioned in an atmosphere maintained between 68 and 78°F (20 and 26°C) temperature and 45- to 55-percent relative humidity.

### **TEST PROCEDURE**

Each specimen to be evaluated is tested in accordance with the standard procedure. Reference data are obtained and furnace operation checked by conducting a 10-minute test with glass-reinforced cement board on the day of the test and by periodic tests with red oak flooring. These tests provide the 0 and 100 references for flame spread and smoke developed.

### **TEST RESULTS**

The test results are calculated on the basis of observed flame travel and the measurement of areas under the curves of flame travel and smoke developed. To allow for possible variations in results due to limitations of the test method, the numerical results are adjusted to the nearest figure divisible by 5. Results for each test are presented in the appropriate summary page.

### **OBSERVATIONS DURING AND AFTER TESTS**

The observations made during and after each test are presented on the summary page.

### **GRAPHICAL DATA**

Recorded data for flame spread, smoke developed and temperature of each specimen are shown in the figures following the summary page as a solid line on each graph.

**DESCRIPTION**

Company: BURN BARRIER™ Coatings, Incorporated  
Trade Name: BURN BARRIER™ No. 20-20/BURN BARRIER™ No. 40-40 (Top Coat)  
Description: Two-coating system consisting of intumescent base coat (BURN BARRIER™ No. 20-20) and a Latex base topcoat (BURN BARRIER™ No. 40-40)

**BASE COAT**

Trade Name: BURN BARRIER™ No. 20-20 Flat Fire Retardant Paint  
Type: Intumescent coating  
Application: One coat at a coverage rate of 190 sq.ft/gal with a roller  
Drying Time: 3 days  
Color: White

**TOP COAT**

Trade Name: BURN BARRIER™ No. 40-40 Low-gloss Fire Retardant Overcoat  
Type: Latex base coating  
Application: One coat at a coverage rate of 625 sq.ft/gal with a roller  
Drying Time: One day at ambient conditions, followed by 21 days at 70°F and 50% relative humidity  
Color: White

**PREPARATION AND CONDITIONING**

Substrate Used: Douglas Fir Lumber  
Preparation Dates: Base Coat; August 5, 1991  
Top Coat: August 9, 1991  
Preparation: One coat of BURN BARRIER™ No. 20-20 was applied at a coverage rate of 190 sq.ft/gal to two 21 x 144-in. (0.53 x 3.66-m) sections of Douglas Fir lumber with a roller, and allowed to dry for three days. The top coat consisted of BURN BARRIER™ No. 40-40 applied at a coverage rate of 625 sq.ft/gallon with a roller. The top coat was allowed to dry for 8 hours and then placed in conditioning.  
Conditioning: 21 days, 70°F and 50% relative humidity  
Support Used: None. The day of the test, the two coated sections of Douglas Fir lumber were placed end-to-end in the furnace with the coated side exposed to the flames. No other support or preparation was required.



## TEST RESULTS

Test Date:	08/30/91
Test Time:	16:50:17
<u>Flame Spread Index:</u>	20
<u>Smoke Developed:</u>	40

## OBSERVATIONS DURING TEST

Steady ignition, min:s	0:42		
Maximum Flame Front, min:s	9:59		
Position	6.40	ft	(1.95 m)
After flame Top, min:s	0:02		

## OBSERVATIONS AFTER TEST

Severe Char To	9.00	ft	(2.745 m)
Surface Char To	12.0	ft	(3.660 m)

