

# SOUTHWEST RESEARCH INSTITUTE

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CHEMISTRY AND CHEMICAL ENGINEERING DIVISION  
DEPARTMENT OF FIRE TECHNOLOGY  
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INVESTIGATION OF THE SURFACE BURNING  
CHARACTERISTICS OF A NO. 2 SOUTHERN  
YELLOW PINE (VACUUM PRESSURED  
IMPREGNATED)  
MATERIAL ID: NO. 2 YELLOW PINE

SwRI PROJECT NO.: 01-2303-137a

FINAL REPORT

TEST DATE: 15-JAN-1999

REPORT DATE: 2-FEB-1999

Prepared for:

FLAME SAFE WOOD PRODUCTS  
2653 WARFIELD AVENUE  
FORT WORTH, TEXAS 76106

By:

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## INTRODUCTION

This report presents the results of a UL 1256, August 30, 1993 Edition, test on a specimen submitted by the Client. The test is conducted in general accordance with the procedure outlined in UL 1256, "Standard for Fire Test of Roof Deck Construction."

Normally, these requirements detail a method of test intended to evaluate fire performance of metallic and nonmetallic roof deck constructions subjected to an internal (under deck) small scale fire exposure for 30 minutes for the purpose of determining the contribution of the roof covering material, insulation, and other components of the roofing system to the spread of fire within a building. As the extent of flame propagation, thermal degradation, and combustive damage are determined after roof deck construction are exposed to controlled laboratory fire conditions as provided by a horizontal tunnel furnace, these requirements are not intended for use in describing or defining the fire hazard or risk of fire under actual fire conditions. For this test, the specimen consisted of fabric-covered wall panels exposed to the burner flame for 20 minutes or terminated earlier at the request of the Client.

The purpose of this test method is to determine the relative burning behavior of the material by observing the flame spread along the specimen. Flame Spread and Smoke Developed Indices are reported. However, there is not necessarily a relationship between these two measurements.

The specimen may consist of a continuous, unbroken length, or of sections joined end-to-end. The specimen was prepared and tested as received by Client. The specimen was conditioned in an atmosphere maintained between 68 and 78°F and 45 to 55% relative humidity.

Immediately prior to the test, the specimen is placed into the furnace and centered on the interior width so that the flame is evenly distributed over the width of the specimen and engulfs the test specimen at the 'fire end'.

The flame front position and light obscuration are recorded throughout the 30-minute test. The Flame Spread and Smoke Developed indices are calculated over the first 10-minutes of the test only. The temperature at 24 ft is also recorded.

The Flame Spread and Smoke Developed indices reported herein are relative to the results obtained for mineral fiber-reinforced cement board and select grade red oak (moisture content between 6 and 8%). The mineral fiber-reinforced cement board is the calibration material used to obtain 0 values for Flame Spread and Smoke; red oak decks are used to obtain 100 values for Flame Spread and Smoke.

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.

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**This standard should be used to measure and describe the properties of materials, products, or assemblies in response to heat and flame under controlled laboratory conditions and should not be used to describe or appraise the fire hazard or fire risk of materials, products, or assemblies under actual fire conditions. However, results of this test may be used as elements of a fire risk assessment which takes into account all of the factors which are pertinent to an assessment of the fire hazard of a particular end use.**

FLAME SAFE WOOD PRODUCTS

**UL 1256 REPORT**

CLIENT: FLAME SAFE WOOD PRODUCTS  
SWRI PROJECT NO: 01-2303-137a  
DAILY TEST NO: 5

**DESCRIPTION OF SPECIMEN**

DATE RECEIVED: 11-Jan-1999 (received ready-to-test)  
MATERIAL ID: No. 2 Southern Yellow Pine  
DESCRIPTION: Southern yellow pine (vacuum pressured impregnated)  
THICKNESS: 2.25 in. (nominal)  
COLOR: Beige  
SPECIMEN SIZE: Three decks 24.0 in. wide x 95.5 in. long  
CONDITIONING TIME: 4 days at 70°F and 50% relative humidity  
SUPPORT USED: None  
WITNESSED BY: Mr. Vince Mancini of Chicago Flameproof  
Mr. Louis Jacobini of Flame Safe Wood Products

\* From Client's material description

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TEST RESULTS (ROUNDED TO NEAREST 5)

FLAME SPREAD INDEX (FSI): 10<sup>1</sup>  
SMOKE DEVELOPED INDEX (SDI): 230<sup>1</sup>  
AVERAGE OPTICAL DENSITY: 0.08  
MAXIMUM OPTICAL DENSITY: 0.14

TEST DATA

UNROUNDED FSI: 9.9<sup>1</sup>  
UNROUNDED SDI: 229.9<sup>1</sup>  
FS\*TIME AREA (Ft\*Min): 19.3<sup>1</sup>  
SMOKE AREA (%\*Min): 168.7<sup>1</sup>  
FUEL AREA (°F\*Min): 18060.5

<sup>1</sup> = data generated at 10 minutes

OBSERVATIONS DURING TEST

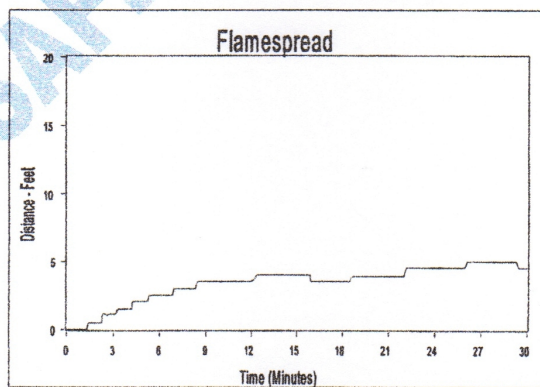
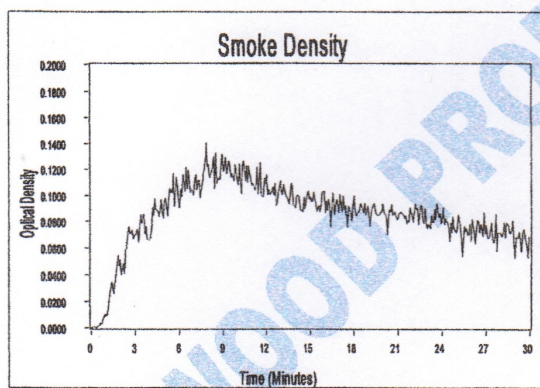
IGNITION TIME (Min:Sec): 1:02  
MAXIMUM FLAME FRONT ADVANCE (Ft): 5.0  
TIME TO MAXIMUM ADVANCE (Min:Sec): 27:20  
MAXIMUM TEMP. AT EXPOSED TC (°F): 674  
TIME TO MAXIMUM TEMP. (Min:Sec): 29:35  
TOTAL FUEL BURNED (Cu. Ft.): 157.7  
DRIPPING (Min:Sec): None  
FLAMING ON FLOOR (Min:Sec): None  
AFTERFLAME TOP (Min:Sec): 1:19  
AFTERFLAME FLOOR (Min:Sec): None

CALIBRATION DATA (LAST RED OAK)

RED OAK SMOKE AREA (%\*Min): 96.3  
RED OAK FUEL AREA (°F\*Min): 8065.2  
GRC BOARD FUEL AREA (°F\*Min): 5072.2

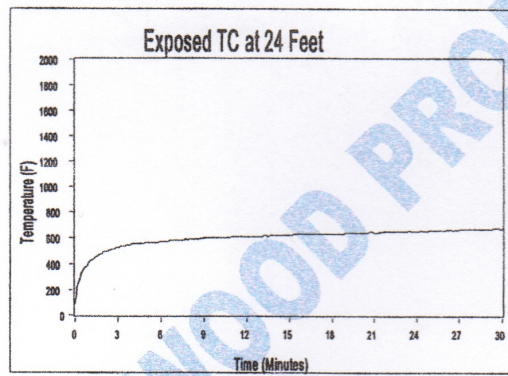
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UL 1256 REPORT

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FLAME SAFE WOOD PRODUCTS

Commencement Date: April 24, 1997

### 1.0 MATERIAL TO BE TESTED

The test specimens are comprised of 2 x 4's No. 2 southern yellow pine lumber treated with Flame Safe Chemical Corporation's fire retardant identified as Flame Safe XT (FSXT), for exterior applications.

### 2.0 TREATMENT PROCESS

The lumber was loaded into the treating cylinder. The cylinder door was closed and locked. The cylinder was then evacuated to 27 hg of mercury and held for ten (10) minutes. A valve was opened on the piping line to the tank containing the FSXT treating solution allowing the cylinder to fill and completely submerge the lumber in the fire retardant solution. The valve was then closed. The vacuum in the tank reduced to 15 hgs of mercury within twenty (20) minutes. The pressure in the cylinder was raised to 125 psi and maintained at 125 psi for thirty (30) minutes. Pressure in the cylinder was reduced to 15 psi, the valve to the FSXT treating solution tank was opened forcing the remainder of the FSXT treating solution back into it's holding tank. The valve was then closed. The cylinder was then evacuated to 27 hg of mercury and held for twenty (20) minutes to remove the excess fire retardant solution from the treated lumber (pre-drying). A relief valve was opened on the cylinder, pressure in the tank stabilized and the remainder of the FSXT was pumped into it's holding tank. The treated lumber was removed.

The treated lumber was placed in a gas fired forced air kiln for 36 hours at 135°F. The moisture content of the treated lumber did not exceed 19% after drying (KDAT 19).

Commencement Date: April 28, 1997

### 3.0 PREPARATION OF TEST PANELS

Twenty-one 2 x 4s 8' were randomly selected from the load of FSXT treated lumber. Three panels measuring 24" x 96" (2' x 8') each were fabricated using seven (7) 2 x 4's 8' secured on one side with three (3) 1 x 4 #2SYP cleats fastened to each 2 x 4 with a 2" number 8 steel screw.

4.0 TEST APPARATUS was fabricated to conform to the requirements set forth in the ASTM D2898 Accelerated Weathering of Fire-Retardant-Treated Wood for Fire Testing, Method A. The slope of each panel was set at 4 inches in 12 inches. Half inch copper water lines were installed four feet above and common to the surface of each test panel. Each water line had two copper T's spaced two and one-half feet on either side of the centerline at 90 degrees common to the centerline of the test panels, and two Y's inverted downwards attached to each T to accommodate four (4) adjustable spray nozzles.

### 5.0 EXPOSURE CYCLE

Each panel was subjected to 12 one week cycles, each cycle consisting of 96 hours of water exposure and 72 hours of drying. The water was applied using four adjustable spray nozzles positioned above each panel to exhibit a uniform spray over the entire exposed surface of each panel at the rate of .438 gallons per hour per square foot (.0073 gal/min•ft<sup>2</sup>), at a temperature between 51°F and 56°F. The water used for the water exposure of each cycle was accumulated in the tank below the specimen panels\*. The water was not recirculated or re-used.

Each panel was dried in a gas fired forced air kiln at a temperature of 136°F to 138°F measured 1" above the surface of each panel. The air movement above each panel was maintained at seventy-two feet per minute measured at the centerline longitudinally.

At the end of each cycle the position of each panel was reversed within the apparatus and rotated 180 degrees.

\* The ph of the water used for exposure was in the range of 6.97 to 7.03. A sample of the exposure water was recovered after each cycle for testing to determine if any leaching occurred. No measurable amount of leaching could be determined.

Note: After completion, the test panels were stored uncovered in the storage yard before being shipped to Southwest Research Institute on January 7, 1999 for testing.





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**REPORT OF  
 FLAME SAFE WOOD SAFE MIXING PROCEDURE**

**CLIENT:** CANBO, INC.  
 990 RUE, FELIX-LINDSAY C.P. 8  
 MR. DENIS GIRARD  
 DOLBEAU  
 QUEBEC, CANADA, G8L2 P9

**PROJECT:** Test Witnessing and Inspection  
 FlameSafe Wood Safe Fire  
 Retardant Coating

PAGE 1 OF 1

PROJECT NO.: 1103702777  
 REPORT NO.: 720304  
 DATE OF SERVICE: 4/24/97  
 AUTHORIZATION: Mr. Denis Girard  
 REPORT DATE: 4/26/97

**SERVICES:** Witness the mixing procedure of FlameSafe Wood Safe Fire Retardant Coatings per FlameSafe Procedure and verify the manufacturing process description and formulation, per client request.

**REPORT OF INSPECTION**


At the request of Mr. Louis Jacobini of FlameSafe, Mr. Les Hall, S.E.T. of Maxim Technologies, Inc. witnessed the batch mixing process of FlameSafe Wood Safe Fire Retardant Coating by FlameSafe plant personnel to verify compliance with FlameSafe Procedure Specifications on April 24, 1997. A sample of the batch was obtained and is being held at Maxim Technologies, Inc.; Fort Worth location. This sample will be maintained until April, 1998.

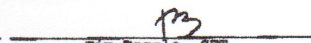
Maxim Technologies is satisfied that FlameSafe Wood Safe Fire Retardant Coating Batch Lot NS042497-5 complies with written FlameSafe Procedure Specifications and Formulation. As per the witnessing request, FlameSafe written procedure is not documented as a part of this report. However, a copy of the procedure is being maintained at the manufacturing location.

On April 24, 25 and 28 the treatment of the wood samples, for testing and shipping to Mr. Denis Girard, was witnessed by Mr. Les Hall, S.E.T. of Maxim Technologies. Five (5) sets of three (3) were tested for flame spread and smoke development. Four (4) sets of three (3) were shipped to Canbo.

**Technician:** Les Hall, SET  
 NICET 040729, Level IV  
**Report Distribution:**  
 (2) CANBO, INC.

MAXIM TECH. • SOUTHWESTERN LABS

  
 Les Hall, SET  
 NICET 040729, Level IV

  
 Tim Begole, CRT  
 Office Manager

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