



Report On  
Surface Burning Characteristics Determined By  
ASTM E84/ (UL 723) Twenty-Five Foot Tunnel  
Furnace Test Method

PREPARED FOR:  
Spirit Acoustics Inc.  
103 Sparta Road  
Stanhope, NJ 07874

TEST NUMBER T-14132

MATERIAL TESTED:

Radar R2310 Ceilint Tile Backed with 1/8" Shield Guard

DATE OF ISSUE 4/12/2013



## I. SCOPE

This report contains the reference to the test method, purpose, test procedure, rounding procedures, 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 E 84, "Standard Test Method for Surface Burning Characteristics of Building Materials." The 25-foot tunnel method is also described by NFPA 255 and UL 723.

## III. PURPOSE

The purpose of the test is to determine the relative performance of the test material under standardized fire exposure. Results are given for Flame Spread and Smoke Developed Index. The values obtained from burning the test material represent a comparison with that of 1/4" inorganic reinforced cement board expressed as zero and red oak flooring expressed as 100.

The flame spread 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. The most widely accepted classification system is epitomized by the National Fire Protection Association Life Safety Code, NFPA 101:

Class A*	0 - 25	flame spread	0-450	smoke developed
Class B*	26 - 75	flame spread	0-450	smoke developed
Class C*	76 - 200	flame spread	0-450	smoke developed

\*Class A, B and C correspond to I, II and III, respectively, in other code references.

This flame spread classification system is based on the premise that the higher the flame spread numbers, the greater the fire spread potential. The actual 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 a minimum of 150°F as measured by an 18 AWG thermocouple embedded in cement 1/8" below the floor surface of the chamber; 23-1/4' from the centerline of the ignition burners. The furnace was then cooled to 105°F ( $\pm 5^\circ\text{F}$ ) as measured by a thermocouple embedded 1/8" below the floor surface of the test chamber 13' from the fire end.

Prior 10-minute tests with 1/4" inorganic reinforced cement board provided the zero reference for flame spread. Periodic 10-minute tests with unfinished select grade red oak flooring provided for the 100 reference for flame spread and smoke developed as noted in Section III.



A. Flame Spread

The flame spread distance is observed and recorded at least every 15 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 as a function of the area under the curve relative to the standard red oak curve area. The value for flame spread classification for the tested material may be compared with that of inorganic reinforced cement board and select grade red oak flooring.

B. Smoke Developed

The smoke developed during the test is determined by the reduction in output of a photoelectric cell. A light beam vertically orientated across the furnace outlet duct is attenuated by the smoke passing through the duct. The output of the photoelectric cell is related to the obscuration of the light source through the duct caused by the smoke. A curve is developed by plotting photoelectric cell output against time. The value of 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 23/32" red oak flooring.

V. FLAME SPREAD AND SMOKE DEVELOPED ROUNDING PROCEDURES

Single test calculated flame spread and smoke developed values are rounded to the nearest multiple of 5 and reported as the Flame Spread or Smoke Developed Index. Actual test values are available on request.

For multiple tests, the individual calculated flame spread and smoke developed values are recorded, averaged, and the results rounded to the nearest multiple of 5. The averaged, rounded number is reported as the Flame Spread or Smoke Developed Index.

VI. 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 14" length of uncoated 16 gauge steel sheet is used to make up the remainder of the test specimen; it is placed at the fire end of the test chamber. Prior to testing, three 8' long sections of 1/4" inorganic reinforced cement board are placed on the back side of the specimens to protect the furnace lid assembly. Test specimens are conditioned at a controlled temperature of 73.4°F ( $\pm 5^\circ\text{F}$ ) and a controlled relative humidity of 50  $\pm$  5 percent.



**VII: MATERIAL TESTED**

- 1) Manufacturer: Spirit Acoustics Inc.  
Berkeley Heights NJ
- 2) Burn Number: 1
- 3) Average Thickness(in.): 0.704
- 4) Average Weight (lbs./sq.ft.): 1.680
- 5) Average Groove Depth (in.):
- 6) Product Description: Radar R2310 Ceilint Tile Backed with 1/8" Shield Guard  
USG ceiling tiles backed with 1/8" EVA material.
- 7) Color: White
- 8) Surface: Face Side Exposed
- 9) Sample Selection: Manufacturer
- 10) Date of Selection: 4/12/2013
- 11) Material Description By: Manufacturer
- 12) Method of Mounting: Self-Supporting
  
- 13) Days in Conditioning: 0

**VIII: TEST CONDITIONS AND DATA**

- 1) Specimen Preheat Time (min.) 2:00
- 2) Tunnel Brick Temp (deg. F): 110
- 3) Ignition Time (seconds): 29
- 4) Time to End of Tunnel  
or Flamefront Distance: 2' @ 1:00
- 5) Time-Distance Curve Area  
(min./ft.): 19.1
- 6) Fuel and Temperature
  - a) Fuel (cu.ft./min.): 5.654
  - b) Max. Vent End Temp. (deg.F): 643
  - c) Time to Max. Temp (min.): 9:28
- 7) After Flaming: No



**IX: TEST RESULTS**

Test results calculated on the basis of the area under the curves of flame spread distance and smoke developed versus time are provided in the table below for calibration materials and for:

Radar R2310 Ceilint Tile Backed with 1/8" Shield Guard

Material Description	Flame Spread Index	Smoke Developed Index
High Density Inorganic Reinforced Cement Board	0	0
Red Oak Flooring	100	100
T-14132	10	5

Observations:

Charring and cracking to 16'.

Remarks:

The sample consisted of 6 pieces, 48" long, laid end-to-end.

Conclusions:

Meets Class A, Flame Spread Index 25 or less and Smoke Developed Index 450 or less.

REPORT PREPARED BY:

Tom Wilson

Manager of Fire Testing and Field Inspections

REPORT REVIEWED BY:

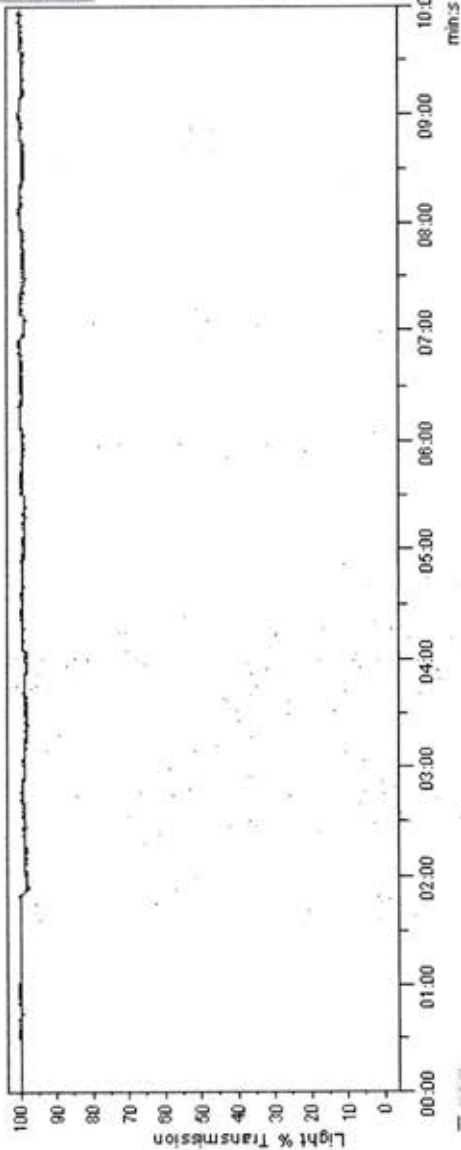
Brian Sause

Director of Testing, Certification, & Standards

Conformance to the test standard is verified by a registered professional engineer. This is a factual report of the results obtained from laboratory tests of sample products. The results may be applied only to the products tested and should not be construed as applicable to other similar products of the manufacturer. The HPVA does not verify the description of materials and products when the description is provided by the client. The report is not a recommendation or a disapprobation by the Hardwood Plywood and Veneer Association of the material or product tested. While this report may be used for obtaining product acceptance; it may not be used in advertising.



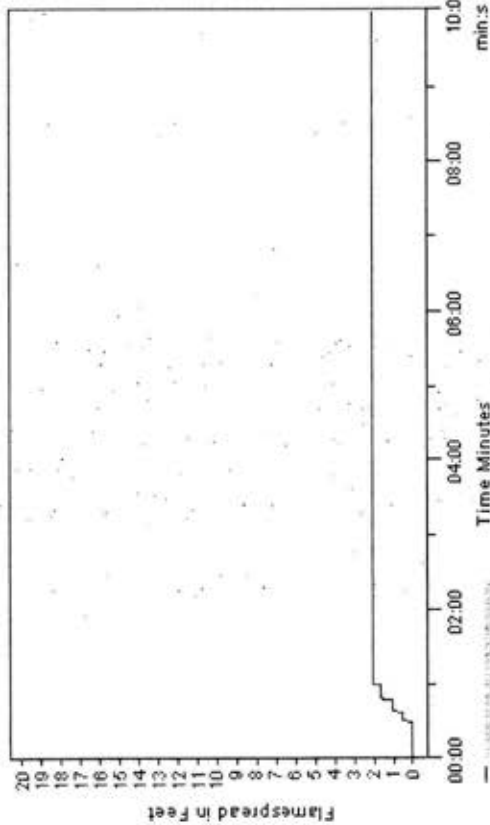
Test Time	600	FS Counts	19.1
seconds		Fuel Counts	802
STOP Early		Smk Cts	14
NEW TEST			
program			



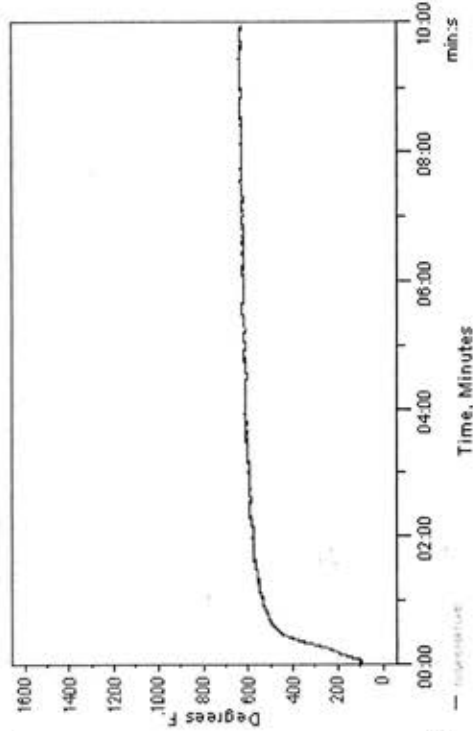
Max Temp = 643  
@ Time = 568

Flame Progression, Feet 11.43  
Smoke MV 9.00  
24 Ft. Temp, Deg. F 630  
13 Ft. Temp, Deg. F 216  
24 Foot Floor TC, Deg. F 124

### Smoke Data



### Flamespread Data



### Fuel Data

test ON/OFF  
Test ON  
Cool





**LABORATORY ACCREDITATION**

The HPVA has met the requirements of the International Accreditation Service, Inc. (IAS) Accreditation Criteria for Testing Laboratories (AC89), has demonstrated compliance with ANSI/ISO/IEC Standard 17025:2005, *General criteria for the competence of testing and calibration laboratories*, and is accredited for the ASTM E84 and other test methods listed in the approved scope of accreditation: Testing Laboratory TL-224.


The HPVA's product certifications, inspections, and test procedures are accredited by IAS and the HPVA has demonstrated compliance with ISO/IEC 17025, 17020, and Guide 65. These accreditations and the HPVA's test reports are recognized by the International Code Council (ICC) to satisfy testing requirements specified in the model building codes adopted by state and local jurisdictions which include but are not limited to The International Building Code (IBC), International Residential Codes (IRC), and International Fire Code (IFC).

**HPVA FLAME SPREAD PROPERTY VERIFICATION PROGRAM**

The Hardwood Plywood & Veneer Association provides a product property verification program for flame spread properties. This program is based on the selection and testing of panels within a given marketing line on the basis of that combination of factors that theoretically should give the highest flame spread values. Such factors as panel thickness, specific gravity, color of stain, type of lamination, surface texture, and product mix are taken into consideration in the selection of flame spread samples.

While it is standard procedure to include smoke developed values in test reports, the HPVA label identifies only the flame spread class. The HPVA label is evidence that the marketing line has been tested and inspected in accordance with the HPVA Flame Spread Inspection and Verification Program Procedures.

The HPVA label displayed below indicates conformance of the tested samples to the Type II glue bond requirements as set forth in ANSI/HPVA HP-1-2009 Standard For Hardwood And Decorative Plywood, and conformance to Flame Spread Class C (200 or less) as determined by the test procedures described in ASTM E 84. Depending on the type of product, the label may also include other information such as structural and formaldehyde emission ratings.

<b>HARDWOOD PLYWOOD VENEER ASSOCIATION</b>		
<b>BOND LINE          TYPE II          ANSI/HPVA          HP-1-2009</b>		<b>FLAME SPREAD          200 OR LESS          CLASS C          ASTM E 84</b>
		<b>SIMULATED          DECORATIVE          FINISH ON          PLYWOOD</b>
<b>MILL 00          SPECIALTY GRADE</b>		