



HPVA Laboratories
42777 Trade West Drive, Sterling, VA 20166
PHONE 703-435-2900 FAX 703-435-2537

Report On
Critical Radiant Flux of Floor-Covering Systems
Using a Radiant Heat Energy Source
As Determined By
ASTM E 648 Test Method

PREPARED FOR:

DuChateau

San Diego, CA

TEST NUMBER: FRP-1090

5/8" DuChâteau European Oak

Date of Issue:

9/11/2018



ACCREDITED[®]

Testing
Laboratory

TL-224



I. SCOPE

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

II. TEST METHOD

The test was conducted in accordance with ASTM Designation E 648-17, "Standard Method of Test for Critical Radiant Flux of Floor Covering Systems Using a Radiant Heat Energy Source." The test is also known as NFPA No. 253.

III. PURPOSE

The purpose of the test is to determine the critical radiant flux of horizontally-mounted floor covering systems exposed to a flaming ignition source in a graded radiant heat energy environment maintained in a test chamber. The specimen may be mounted over underlayment, a simulated concrete structural floor, bonded to a simulated structural floor, or otherwise mounted in a typical and representative way.

The test method provides a basis for estimating one aspect of fire exposure behavior for floor covering systems. The imposed radiant flux is designed to simulate the thermal radiation levels likely to impinge on the floors of a building whose upper surfaces are heated by flames and/or hot gases from fully developed fire in an adjacent room or compartment. The method was developed to simulate an important fire exposure component of fires which may develop in corridors or exit ways of buildings and is not intended for routine use in estimating flame spread behavior of floor covering in building areas other than corridors or exit ways.

IV. TEST PROCEDURE

The basic elements of the test chamber are: 1) an air-gas, fueled radiant heat energy panel inclined at 30° to and directed at 2) a horizontally-mounted floor covering system specimen. The radiant panel generates a radiant energy flux distribution ranging along the 100-cm length of the test specimen from a nominal maximum of 1.0 watts/cm² to a minimum of 0.1 watts/cm². The test is initiated by open flame ignition from a pilot burner. The distance burned to flame-out is converted to watts/cm² and reported as **critical radiant flux**.



**Report on Critical Radiant Flux of Floor Covering Systems Using a
 Radiant Heat Energy Source as Determined by the ASTM E 648 Flooring Radiant Panel**

Test Number: FRP-1090

Test Date: 09/07/18

Report Prepared For:	DuChateau San Diego, CA
Material Tested:	5/8" DuChâteau European Oak

Sample Information:	
Detailed Product Description:	Engineered Hardwood (WXYH18062-CA). Production Date: June 2018.
Sample Preparation:	The material was adhered to a 19/32" plywood backer at HPVA Laboratories using DuChâteau DUAG-87 adhesive.
Sample Selection By:	Client
Number of Samples:	3
Surface Exposed:	Surfaces (Faces Only)
Average Thickness (in.):	1.187
Flux Profile Run Date:	09/07/18
Conditioning Days:	9
Sample Color:	Brown
Average Weight (lbs):	10.40

Test Data			
	Burn 1	Burn 2	Burn 3
Preheat Time (min):	5:00	5:00	5:00
Starting Temp. (°C):	158	158	160
Burn Length (cm):	39.5	15.1	40.2
Time to Max Burn Length (min):	37.6	11.09	28.3

Test Results			
	Burn 1	Burn 2	Burn 3
Critical Radiant Flux (W/cm2):	0.47	0.89	0.45
Average Critical Radiant Flux (W/cm2):		0.6	
Standard Deviation:		0.25	
Coefficient of Variation:		41.17	

Observations:	None.
Remarks:	Reported weights and thicknesses include the 19/32" plywood backer.
Conclusions:	The product is classified as Class I (Critical Radiant Flux greater than 0.45 W/cm ²) by NFPA 101.☐
Test Operator:	CP

Report Prepared By:

Report Reviewed By:

Manager of Fire Testing – Engineer

Director – HPVA Laboratories

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 the materials and products when the description is provided by the client. This report is not a recommendation or a disapprobation by the HPVA of the material or product tested. While this report may be used for obtaining product acceptance, it may not be used in advertising.



HPVA Laboratories
42777 Trade West Drive, Sterling, VA 20166
PHONE 703-435-2900 FAX 703-435-2537

Report On
Critical Radiant Flux of Floor-Covering Systems
Using a Radiant Heat Energy Source
As Determined By
ASTM E 648 Test Method

PREPARED FOR:
DuChâteau
San Diego, CA

TEST NUMBER: FRP-1089

5/8" DuChâteau European Oak

Date of Issue:
9/11/2018





I. SCOPE

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

II. TEST METHOD

The test was conducted in accordance with ASTM Designation E 648-17, "Standard Method of Test for Critical Radiant Flux of Floor Covering Systems Using a Radiant Heat Energy Source." The test is also known as NFPA No. 253.

III. PURPOSE

The purpose of the test is to determine the critical radiant flux of horizontally-mounted floor covering systems exposed to a flaming ignition source in a graded radiant heat energy environment maintained in a test chamber. The specimen may be mounted over underlayment, a simulated concrete structural floor, bonded to a simulated structural floor, or otherwise mounted in a typical and representative way.

The test method provides a basis for estimating one aspect of fire exposure behavior for floor covering systems. The imposed radiant flux is designed to simulate the thermal radiation levels likely to impinge on the floors of a building whose upper surfaces are heated by flames and/or hot gases from fully developed fire in an adjacent room or compartment. The method was developed to simulate an important fire exposure component of fires which may develop in corridors or exit ways of buildings and is not intended for routine use in estimating flame spread behavior of floor covering in building areas other than corridors or exit ways.

IV. TEST PROCEDURE

The basic elements of the test chamber are: 1) an air-gas, fueled radiant heat energy panel inclined at 30° to and directed at 2) a horizontally-mounted floor covering system specimen. The radiant panel generates a radiant energy flux distribution ranging along the 100-cm length of the test specimen from a nominal maximum of 1.0 watts/cm² to a minimum of 0.1 watts/cm². The test is initiated by open flame ignition from a pilot burner. The distance burned to flame-out is converted to watts/cm² and reported as **critical radiant flux**.



**Report on Critical Radiant Flux of Floor Covering Systems Using a
 Radiant Heat Energy Source as Determined by the ASTM E 648 Flooring Radiant Panel**

Test Number: FRP-1089

Test Date: 09/06/18

Report Prepared For:	DuChâteau San Diego, CA
Material Tested:	5/8" DuChâteau European Oak

Sample Information:	
Detailed Product Description:	Engineered Hardwood (WXYH18062-CA). Production Date: June 2018.
Sample Preparation:	The material was adhered to a 1/4" cement board backer at HPVA Laboratories using DuChâteau DUAG-87 adhesive.
Sample Selection By:	Client
Number of Samples:	3
Surface Exposed:	Surfaces (Faces Only)
Average Thickness (in.):	0.865
Flux Profile Run Date:	09/06/18
Conditioning Days:	8
Sample Color:	Brown
Average Weight (lbs):	10.13

Test Data			
	Burn 1	Burn 2	Burn 3
Preheat Time (min):	5:00	5:00	5:00
Starting Temp. (°C):	158	159	158
Burn Length (cm):	41.3	19.4	31.1
Time to Max Burn Length (min):	33.92	19.58	30.06

Test Results			
	Burn 1	Burn 2	Burn 3
Critical Radiant Flux (W/cm2):	0.46	0.88	0.64
Average Critical Radiant Flux (W/cm2):		0.66	
Standard Deviation:		0.21	
Coefficient of Variation:		31.61	

Observations:	None.
Remarks:	Reported weights and thicknesses include the 1/4" cement board backer.
Conclusions:	The product is classified as Class I (Critical Radiant Flux greater than 0.45 W/cm ²) by NFPA 101.☐
Test Operator:	CK

Report Prepared By:

Report Reviewed By:

Manager of Fire Testing – Engineer

Director – HPVA Laboratories

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 the materials and products when the description is provided by the client. This report is not a recommendation or a disapprobation by the HPVA of the material or product tested. While this report may be used for obtaining product acceptance, it may not be used in advertising.



HPVA LABORATORIES

42777 Trade West Drive, Sterling, VA 20166 703-435-2900

Report On
Surface Burning Characteristics of Building Materials
As Determined By
ASTM E84 Test Method

Prepared For:

Test Number:

Date of Issue:



ACCREDITED®

Testing
Laboratory

TL - 224



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 84-17, "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 International Code Council (ICC) and National Fire Protection Association (NFPA) 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 historical codes such as UBC and BOCA.

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 (± 5°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 18mm red oak flooring.

V. FLAME SPREAD RATING AND SMOKE DEVELOPED CLASSIFICATION

Single test calculated flame spread and smoke developed values are averaged and rounded to the nearest multiple of 5 and reported as the Flame Spread Index and 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" - 24" wide and 24' long. Materials 8' in length may be tested by using three sections 20" - 24" 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 ± 5°F and a controlled relative humidity of 50 ± 5 percent.

VII. LABORATORY ACCREDITATION

HPVA Laboratories is an internationally accredited testing laboratory according to ISO/IEC 17025 and recognized by state and local building code jurisdictions. International Accreditation Service (IAS) Accredited Testing Laboratory Number: TL-224.





HPVA LABORATORIES

42777 Trade West Drive, Sterling, VA 20166 703-435-2900

Test Number:

Test Date:

Report Prepared For:	
Material Tested:	

Sample Information:			
Detailed Product Description:			
Mounting Method:			
Sample Selection:		Conditioning Days:	
Surface Exposed:		Sample Color:	
Average Thickness (in.):		Total Weight (lbs.):	

Test Results	
Ignition Time (seconds):	Flame Spread Index:
Max. Temperature (F):	Smoke Developed Index:
Max. Flame Spread Distance (ft):	Class Rating:

Observations:	
Remarks:	
Test Operator:	Reader:

Report Prepared By:

Report Reviewed By:

Manager of Fire Testing - Engineer

Director of HPVA Laboratories

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 the materials and products when the description is provided by the client. This report is not a recommendation or a disapprobation by the HPVA of the material or product tested. While this report may be used for obtaining product acceptance, it may not be used in advertising.



HPVA LABORATORIES

42777 Trade West Drive, Sterling, VA 20166 703-435-2900