



HPVA Laboratories  
1825 Michael Faraday Drive, Reston, VA 20190-5350  
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:  
**Armstrong World Industries, Inc. Innovation Center**  
Lancaster, PA  
TEST NUMBER: FRP-917  
Armstrong LinoArt™ Linoleum Sheet Flooring

Date of Issue:  
10/27/2014





#### 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, "Standard Method of Test for Critical Radiant Flux of Floor Covering Systems Using a Radiant Heat Energy Source." The test is also described by 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/cm<sup>2</sup> to a minimum of 0.1 watts/cm<sup>2</sup>. The test is initiated by open flame ignition from a pilot burner. The distance burned to flame-out is converted to watts/cm<sup>2</sup> 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-917**

**Test Date: 10/15/14**

<b>Report Prepared For:</b>	<b>Armstrong World Industries, Inc. Innovation Center Lancaster, PA</b>
<b>Material Tested:</b>	<b>Armstrong LinoArt™ Linoleum Sheet Flooring</b>

<b>Sample Information:</b>			
<b>Detailed Product Description:</b>	Sample 1: Armstrong LinoArt™ Linoleum Sheet Flooring (Marmorette™, Rhythmics™, Linorette™, Colorette™)		
<b>Sample Preparation:</b>	Samples were adhered to 1/4" cement board by the manufacturer using Armstrong S-240 adhesive. Weights and thicknesses include 1/4" cement board backer.		
<b>Sample Selection By:</b>	Manufacturer	<b>Flux Profile Run Date:</b>	10/14/14
<b>Number of Samples:</b>	3	<b>Conditioning Days:</b>	13
<b>Surface Exposed:</b>	Surfaces (Faces Only)	<b>Sample Color:</b>	Green
<b>Average Thickness (in.):</b>	0.372	<b>Average Density ( lbs/ft^2):</b>	2.089

<b>Test Data</b>			
	<b>Burn 1</b>	<b>Burn 2</b>	<b>Burn 3</b>
<b>Preheat Time (min):</b>	2:00	2:00	2:00
<b>Starting Temp. (°C):</b>	133	132	133
<b>Burn Length (cm):</b>	30.4	32.8	34
<b>Time to Max Burn Length (min):</b>	36.73	46.43	51.42

<b>Test Results</b>			
	<b>Burn 1</b>	<b>Burn 2</b>	<b>Burn 3</b>
<b>Critical Radiant Flux (W/cm2):</b>	.69	.64	.62
<b>Average Critical Radiant Flux (W/cm2):</b>		0.65	
<b>Standard Deviation:</b>		0.04	
<b>Coefficient of Variation:</b>		600%	

<b>Observations:</b>	None.		
<b>Remarks:</b>	None.		
<b>Test Operator:</b>	CP		

Report Prepared By: \_\_\_\_\_

Report Reviewed By: \_\_\_\_\_

Manager of Fire Testing

Director of Testing, Certification, and Standards

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.