



HARDWOOD PLYWOOD & VENEER ASSOCIATION
LABORATORY AND TESTING SERVICE

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Report On
Critical Radiant Flux
Of Floor Covering Systems
Using A Radiant Heat Energy Source

Determined By

ASTM E 648

Test Method

PREPARED FOR:

Armstrong World Industries, Inc
Innovation Center
Lancaster, PA

TEST NUMBER FRP-734

MATERIAL TESTED:

Armstrong Vinyl Floor Tile

DATE OF ISSUE 05/23/07

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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 a 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 exitways of buildings and is not intended for routine use in estimating flame spread behavior of floor covering in building areas other than corridors or exitways.

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.

V. PREPARATION AND CONDITIONING OF TEST SAMPLES

The test specimen is 42" long and 10" wide and is mounted in a stainless steel holder which exposes 100 cm. x 20 cm. The floor covering system specimen should simulate actual installation practices. Typical examples follow:

- a) A carpet mounted over the standard cushion or the standard simulated concrete floor.
- b) A carpet with or without integral cushion pad bonded to high density inorganic sheet simulating a concrete subfloor.
- c) A resilient floor bonded to a high density inorganic sheet simulating a concrete subfloor.
- d) A hardwood floor nailed to a plywood subfloor, then sanded and finished according to standard practice.

A minimum of three specimens per sample are tested after conditioning to standard laboratory conditions of $70^{\circ}\text{F} \pm 5^{\circ}\text{F}$ and $50\% \text{ RH} \pm 5\%$.



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MATERIAL TESTED

- 1 Manufacturer: Armstrong World Industries, Inc.
Lancaster, PA
- 2) Nominal Dimensions N/A
(inches)
- 3) Average Thickness .374 .374 .376
(inches)
- 4) Average Density 2.640 2.640 2.640
(lbs/sq ft)
- 5) Product Description: Lot #268 = Armstrong Natural Creations
Luxury Vinyl Tile with .040" wear layer applied to 1/4" cement
board using Armstrong S-599 adhesive and S-51 trowel according
to Armstrong's instructions.
- 6) Color Brown
- 7) Surface Face side exposed
- 8) Sample Selection Manufacturer
- 9) Material Description by Manufacturer
- 10) Date of Selection 05/07
- Purpose of Test Critical Radiant Flux Determination
- 12) Method Of Mounting: Backed with 1/2" mill board.

REMARKS: Thickness and density measurements include 1/4"
cement board and adhesive.



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MATERIAL TESTED:

DATE OF TEST 05/15/2007

Armstrong Vinyl Floor Tile

VII. OPERATING DATA

| Burn Number | 1 | 2 | 3 |
|---|----------|----------|----------|
| 1) Days in Conditioning | 07 | 07 | 07 |
| 2) Date Flux Profile Run | 05/15/07 | 05/15/07 | 05/15/07 |
| 3) Specimen Preheat Time (min) | 5:00 | 5:00 | 5:00 |
| 4) Initial Chamber Temperatures (degrees C) | 139 | 137 | 139 |
| 5) Room Temperature (degrees F) | 72 | 72 | 72 |
| 6) Total Burn Length (cm) | 19.5 | 23.0 | 19.5 |
| 7) Time to Maximum Burn Length (minutes) | 8:29 | 7:42 | 7:48 |

VIII. TEST RESULTS

| Burn Number | 1 | 2 | 3 |
|----------------------------------|-----|-----|-----|
| 1 Critical Radiant Flux | .94 | .85 | .94 |
| 2) Average Critical Radiant Flux | .91 | | |
| 3 Standard Deviation | .05 | | |
| 4) Coefficient of Variation (%) | 5 | | |

REMARKS: Samples extinguished before pilot was removed at 10:00.

REPORT PREPARED BY:

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REPORT REVIEWED BY:

BRIAN SAUSE
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