



# COMMERCIAL TESTING COMPANY

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Standard Method of Test for  
Critical Radiant Flux of Floor-Covering Systems  
Using a Radiant Heat Energy Source

ASTM International E648-19

**Tuflex**

Report Number 19-10046

Test Number 5478-3905  
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Roppe Holding Company  
Fostoria, Ohio

Commercial Testing Company

(Authorized Signature)

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## INTRODUCTION

This test report is a presentation of results of a flammability test on a material submitted by Roppe Holding Company, Fostoria, Ohio. The test was conducted in accordance with the ASTM International fire test response standard E648-19, *Critical Radiant Flux of Floor-Covering Systems Using a Radiant Heat Energy Source*. This method is sometimes referred to as the flooring radiant panel.

This test method, which has been approved for use by agencies of the Department of Defense and for listing in the DoD *Index of Specifications and Standards*, is technically identical to the method described in NFPA Number 253. It measures the critical radiant flux at flame-out of horizontally mounted complete flooring-covering systems that duplicate or simulate accepted installation practices. Tests on individual components are of limited value and are not valid for certification purposes.

This standard is used to measure and describe the response of materials, products, or assemblies to heat and flame under controlled conditions, but does not by itself incorporate all factors required for fire-hazard or fire-risk assessment of materials, products, or assemblies under actual fire conditions.

## PURPOSE

The flooring radiant panel test measures the level of incident radiant heat energy at flame-out of a floor-covering system. It provides a basis for estimating one aspect of fire behavior of systems installed in corridors or exitways. Imposed radiant flux simulates thermal radiation levels likely to impinge on the floors of a building whose upper surfaces are heated by flames or hot gases, or both, from a fully developed fire in an adjacent room or compartment.

## TEST PROCEDURE

A gas and air fueled radiant heat energy panel is mounted in the test chamber at a 30° angle to the horizontal plane of the specimen. The panel generates an energy flux distribution ranging along the length of the test specimen from a nominal maximum of 1.0 W/cm<sup>2</sup> to a minimum of 0.1 W/cm<sup>2</sup>. Air flow through the chamber is controlled at a velocity of 250 feet per minute. The test is initiated using a gas pilot burner brought into contact with the specimen and extinguished after a specified time.

The floor-covering system, fully described in Table I, is tested in triplicate, each specimen measuring 20 cm wide by 100 cm long. Prepared specimens are conditioned a minimum of 96 hours in an atmosphere maintained at 71 ± 2°F and 50 ± 3% relative humidity. Chamber operating conditions are verified on the day of the test by measuring the flux level at the 40 cm mark. An incident flux level of 0.50 ± 0.02 W/cm<sup>2</sup> indicates proper operation and calibration of the test chamber.

Specimens are placed in the chamber and allowed to preheat for 5.0 minutes followed by a 5.0-minute application of the pilot burner. The specimens are allowed to burn until they self-extinguish, at which time they are removed from the test chamber and the farthest point of flame propagation measured. The critical radiant flux is determined from the flux profile determined during calibration of the test instrument.

## TEST RESULT

The test result is presented as the average value of the three specimens tested expressed in terms of Critical Radiant Flux in units of W/cm<sup>2</sup>. All pertinent individual specimen data are presented in Table II. The flux profile shown in the figure is typical of that determined during calibration of the flooring radiant panel instrument used for this test.

**TABLE I. FLOOR COVERING SYSTEM**

Floor Covering:

Identification: Tuflex  
 Type Material: 27" x 27" Rubber Flooring Tile  
 Nominal Thickness: 3/8-inch

Floor Covering System:

Installation: Glue Down  
 Subfloor: Simulated Concrete Subfloor  
 Adhesive: EW-710-Epoxy

**TABLE II. TEST RESULT**

Test Data	#1	#2	#3
Maximum Burn Distance (cm)	35.5	34.9	35.8
Time to Flame Out (min)	78.1	62.8	73.4
Critical Radiant Flux (W/cm <sup>2</sup> )	0.58	0.59	0.58
Standard Deviation = 0.01			

**Average Critical Radiant Flux** **0.58 W/cm<sup>2</sup>**

The NFPA 101 *Life Safety Code* states in Section 10.2.7.2 that floor coverings other than carpets shall have a minimum critical radiant flux of 0.1 W/cm<sup>2</sup>.

NFPA 101 Classification Class I

**Note Concerning Tiles:** The tiles tested measured 27 inches by 27 inches. The test result reported herein is applicable to the size tested and to identical tiles of smaller dimensions, (Reference Section 9.1.1).

**TYPICAL FLUX PROFILE**

