



Member of the FM Global Group



American National Standard for Evaluating the Fire Performance of Insulated Building Panel Assemblies and Interior Finish Materials

ANSI FM 4880-2017

Approved January 3, 2017

January 2017

©2017 FM Approvals LLC. All rights reserved.

AVA Documents
Document Sharing Hub

Foreword

NOTE: This foreword is introductory only and is not part of American National Standard FM 4880.

This standard is intended to be used to evaluate the fire performance of insulated building panel assemblies and interior finish materials. The standard covers constructions installed to maximum heights of 30 ft (9.1 m), 50 ft (15.2 m), or unlimited heights. The combustibility of a core insulation or interior finish materials shall be identified as combustible or noncombustible when exposed to an ignition source simulating a building fire as described herein.

Appendix A to this American National Standard lists the required performance requirements based on the product type and the desired ratings. Appendix B to this American National Standard is informative and is not part of the requirements of the standard. Appendix C - F are test procedures and are informative for the performance of the tests and associated pass/fail criteria.

ANSI/FM 4880 was originally published in April 2001 and re-affirmed in December 2007. Changes in this edition are as follows:

- Updated all references and applicable documents;
- Added general requirements for the use of sealant, gaskets and/or chalking and formulation changes
- Added the performance requirements and a table which details which performance requirements are required based on the product type and the desired ratings (Appendix A)
- General editorial changes

This American National Standard has been developed by the canvass method of standards development of the American National Standards Institute (ANSI). FM Approvals is an ANSI-accredited standards developing organization (SDO).

Approval of an American National Standard requires verification by ANSI that the principles of openness and due process have been followed and that a consensus of those directly and materially affected by the standard has been achieved. Consensus requires that all views and objections be considered, and that a concerted effort be made toward their resolution. Consensus is established when, in the judgment of the ANSI Board of Standards Review, substantial agreement has been reached.

The American National Standards Institute does not develop standards nor will it in any circumstances give an interpretation of any American National Standard. Requests for interpretations of this test standard should be addressed to FM Approvals.

ANSI regulations require that this American National Standard shall be revised, reaffirmed or withdrawn within five years of the date of publication.

FM Approvals
1151 Boston-Providence Turnpike
P. O. Box 9102
Norwood, MA 02062
U. S. A.

Phone: 781-762-4300
Fax: 781-762-9375
E-mail: information@fmaprovals.com

TABLE OF CONTENTS

1. INTRODUCTION	4
1.1 Purpose.....	4
1.2 Scope.....	4
1.3 Basis for Requirements.....	4
1.4 System of Units	5
2. GENERAL INFORMATION	5
2.1 Product Information/Application	5
2.2 Requirements.....	5
3. APPLICABLE DOCUMENTS AND GLOSSARY	6
3.1 Applicable Documents	6
3.2 Terminology	6
4. GENERAL REQUIREMENTS	9
4.1 Markings	9
4.2 Instructions	9
4.3 Drawings/Formulations/Specifications Required.....	9
4.4 Use of Sealants, Gaskets, and/or Caulking	9
4.5 Formulation Changes.....	10
5. PERFORMANCE REQUIREMENTS.....	11
5.1 Room Test.....	11
5.2 Flammability Characterization.....	11
5.3 16 ft (4.9 m) High Parallel Panel Test.....	12
5.4 25 ft (7.6 m) High Corner Test	12
5.5 50 ft (15.2 m) High Corner Test	12
5.6 Density of Insulating Cores.....	12
5.7 Density of Plastic Panels or Panel Facings.....	13
5.8 Heat Content	13
5.9 Ash Content.....	13
5.10 Combustion	14
APPENDIX A: PERFORMANCE REQUIREMENTS BASED ON PRODUCT TYPE AND DESIRED RATINGS	15
APPENDIX B: CONVERSION OF MEASUREMENT UNITS	16
APPENDIX C: ROOM TEST.....	17
C-1. Test Equipment and Supplies	17
C-2. Fire Test Structure & Test Specimen.....	17
C-3. Thermocouple Locations	19
C-4. Test Procedure.....	20
APPENDIX D: 16 FT (4.9 M) HIGH PARALLEL PANEL TEST	22
D-1. Test Equipment.....	22
D-2. Test Sample	23
D-3. Test Procedure	24
APPENDIX E: 25 FT (7.6 M) HIGH CORNER TEST.....	26
E-1. Corner Test Structure	26
E-2. Sample Mounting.....	27
E-3. Procedure	27
APPENDIX F: 50 FT (15.2 M) HIGH CORNER TEST	29
F-1. Corner Test Structure	29
F-2. Sample Mounting	30
F-3. Procedure	30

1. INTRODUCTION

1.1 Purpose

This standard states the test requirements for building panels or interior finish materials for interior applications where a Class 1 fire rating is needed for wall and/or ceiling constructions.

1.2 Scope

- 1.2.1 This standard sets the fire performance requirements for a Class 1 fire rating of building panel assemblies or interior finish materials with specific height installation requirements and combustibility ratings.
- 1.2.2 Building panels or interior finish materials shall be tested for installations:
- with a maximum height restriction of 30 ft (9.1 m),
 - with a maximum height restriction of 50 ft (15.2 m), or
 - without height restrictions (i.e. unlimited height).
- 1.2.3 The combustibility of a core insulation or interior finish materials shall be identified as combustible or noncombustible.
- 1.2.4 Building panels or interior finish materials include, but are not limited to:
- Insulated or non-insulated wall and/or ceiling panels with an inert or non-inert facer and combustible core or noncombustible core; and
 - Interior finish materials:
 - thermoplastic panels,
 - thermoset panels, and
 - coatings systems and exposed interior insulations.
- 1.2.5 Any component which may be used in the installation of a building panel or interior finish material such as, fasteners, adhesives, sealants, flashing, substrates, or any other accessories, is considered part of the scope of the product and must be evaluated in conjunction with the product. Any component that may affect the test performance must be included in the test sample construction.
- 1.2.6 This standard evaluates building panels or interior finish materials for an interior installation application only.
- 1.2.7 The results of tests conducted under the controlled conditions required by this standard shall not be used to describe or appraise performance under actual fire conditions.

1.3 Basis for Requirements

- 1.3.1 The requirements of this standard are based on experience, research and testing and/or the standards of other national and international organizations. The advice of manufacturers, users, trade associations and loss control specialists has also been considered.
- 1.3.2 The requirements of this standard reflect tests and practices used to examine characteristics of building panels and interior finish materials.

1.4 System of Units

Units of measurement are United States (U.S.) customary units. These are followed by their arithmetic equivalents in International System (SI) units, enclosed in parentheses. The first value stated shall be regarded as the requirement. The converted equivalent value may be approximate. Appendix B lists some of the selected units used in testing these products; conversions to SI units are included. Conversion of U.S. customary units is in accordance with American National Standards Institute (ANSI)/Institute of Electrical and Electronics Engineers (IEEE)/American Society for Testing Materials (ASTM) SI 10, "American National Standard for Metric Practice."

2. GENERAL INFORMATION

2.1 Product Information/Application

- 2.1.1 Insulated or non-insulated wall and/or ceiling panels are supplied in the form of field or factory fabricated panels. They consist of a core material and are faced with steel, aluminum (including foil), gypsum wallboard, plastic, masonry, or other materials. When assembled the panels are connected to one another and to the substrate with various types of closures and joint treatments.

The panels can be secured to a structural framework or designed as free-standing. Insulated wall and/or ceiling panels are installed to reduce heat (and sound) transmission through wall and/or ceiling constructions. They are not intended as, but may be, fire resistive structures. Insulated or non-insulated wall and/or ceiling panels shall be tested with the most critical composition (e.g. facer thickness, panel thickness, joint type, etc.) and most critical panel test assembly.

- 2.1.2 Interior finish materials include:

2.1.2.1 Thermoplastic or thermoset plastics/panels, which are usually supplied in sheet form and may be reinforced or unreinforced. They are usually installed over combustible materials such as thermoplastic or thermoset plastic foams, or noncombustible materials such as masonry block, brick, precast concrete, or gypsum board where a smooth washable surface is required to comply with sanitary requirements. They are not intended as fire barriers. They are usually secured through the substrate over which they are installed to a structural framework or directly to the substrate and are therefore not designed as load bearing members. Interior finish materials shall be tested with the most critical composition (e.g. thickness) over the most critical substrate.

2.1.2.2 Coating systems and exposed interior insulations include; fire retardant treated cellulose, mineral or glass fiber insulations, and intumescent paints and mastics. They are typically used as interior finish or insulation to reduce heat or sound transmission through a wall and/or ceiling assemblies. They are applied over combustible or noncombustible substrates by trowel, brush, spray, or roller. Installers are typically licensed or approved by the coating manufacturer. The protection afforded to combustible substrates is generally proportional to the thickness of the application but the coatings are not intended as long-term fire barriers. Their use over combustible substrates is particularly applicable to low hazard areas containing limited combustible materials. Interior wall/ceiling coating systems shall be tested with the most critical composition (e.g. thickness) over the most critical substrate.

2.2 Requirements

Class 1 fire rated building panel or interior finish material shall satisfy the performance requirements which are based on the type of product(s) and desired ratings. Testing requirements for each type of

product and rating are outlined in Appendix A.

3. APPLICABLE DOCUMENTS AND GLOSSARY

3.1 Applicable Documents

The following are standards, test methods and practices referenced in this standard.

- 3.1.1 National Fire Protection Association, NFPA, 1 Batterymarch Park, Quincy, MA 02169
NFPA 265, Standard Methods of Fire Tests for Evaluating Room Fire Growth Contribution of Textile Coverings on Full Height Panels and Walls
NFPA 286, Standard Methods of Fire Tests for Evaluating Contribution of Wall and Ceiling Interior Finish to Room Fire Growth
- 3.1.2 International Organization for Standardization, Case Postale 56, CH1211 Geneva 20, Switzerland
ISO 1716, Reaction-To-Fire Tests for Building Products - Determination of the Heat of Combustion
ISO 9705, Fire Tests – Full Scale Room Test for Surface Products
- 3.1.3 Annual Book of ASTM Standards, ASTM, 100 Barr Harbor Drive, West Conshohocken, Pennsylvania 19428, Current edition of Standard
ANSI/IEEE/ASTM SI 10, Standard for Use of the International System of Units (SI): The Modern Metric System
ASTM D482, Standard Test Method for Ash of Petroleum Products.
ASTM D4809, Standard Test Method for Heat of Combustion of Liquid Hydrocarbon Fuels by Bomb Calorimeter (Intermediate Precision Method)
ASTM E711, Standard Test Method for Gross Calorific Value of Refuse-Derived Fuel by the Bomb Calorimeter
ASTM D792, Standard Test Method for Density and Specific Gravity (Relative Density) of Plastics by Displacement
ASTM D1505, Test Method for Density of Plastics by the Density-Gradient Technique
ASTM E2058, Standard Test Methods for Measurement of Synthetic Polymer Material Flammability Using a Fire Propagation Apparatus (FPA)

3.2 Terminology

For purposes of this standard, the following terms apply:

Caulking

A filler used to seal openings and joints in wall and/or ceiling assemblies. Caulking is typically

not intended for fire-resistance and typically does not react with heat from a fire.

Combustible Core or Combustible Interior Finish Material

A combustible core or combustible interior finish material is one that has not been tested for or does not pass the requirements listed in Appendix A for a noncombustible rating.

Combustibility of Core or Interior Finish Material

The combustibility of a core insulation or interior finish material will be identified as “Combustible” or “Noncombustible.” A rating shall only be obtaining from successfully completing the requirements listed in Appendix A.

Component

A component is a part or element of a building panel, interior finish material, foam system, etc., and/or part or element of an assembly of a building panel or interior finish material. Examples of components are, but not limited to, foam systems, ingredients of foam systems (e.g. polyol or isocyanate), noncombustible cores, and/or joint sealants.

Fire-resistant Caulking, Gaskets, or Sealants

Fire-resistant caulking, gaskets, or sealants are made of various components and may be used to seal openings and/or joints in wall and/or ceiling assemblies. Fire-resistant caulking, gaskets, or sealants may react with heat from a fire. Examples include, but are not limited to, firestops and intumescent materials.

EPS

Expanded polystyrene (EPS) is a thermoplastic, rigid cellular plastic or closed-cell foam which can be used as an insulation for insulated wall and/or ceiling panels.

FSP_C

The convective flame spread parameter (FSP_C). The $FSP_C = Q_C / (TRP \cdot a)$ where Q_C is the 5 second average peak convective heat release rate and TRP is the thermal response parameter determined per ASTM E2058 and a is the total surface area of the combustion sample used to determine Q_C .

Gasket

A shaped piece of rubber or other material used to seal openings and/or joints in wall and/or ceiling assemblies. A gasket is typically not intended for fire-resistance and typically does not react with heat from a fire.

Inert Faced

Faced with a material which is considered noncombustible (e.g. steel, aluminum, gypsum wall board, cement board, masonry).

Intumescent

The act of swelling when heated by a fire. Intumescent materials (e.g. firestop sealant) are typically used with the intention of sealing an opening and/or joint in order to protect the material underneath.

Joint Treatment

A material used for sealing joints in wall and/or ceiling assemblies. Examples for joint treatments are caulking, gaskets, and/or sealants.

Multiple Ingredient Change

A multiple ingredient change is two or more significant component changes from the original formulation utilized for satisfying all required performance tests. One component change may be considered a multiple ingredient change if it is the second ingredient change from the original

formulation utilized for satisfying all required performance tests. Insignificant changes are not considered a multiple ingredient change.

Noncombustible Core or Noncombustible Interior Finish Material

A noncombustible core or noncombustible interior finish material is one that has met the requirements listed in Appendix A for a noncombustible rating.

Non-Intumescent

Materials which do not expand when exposed to heat from a fire. Non-intumescent materials (e.g. silicone or butyl sealant) are typically used with the intention of sealing an opening and/or joints.

PIR

Polyisocyanurate (PIR) is a thermoset plastic commonly used as an insulation for insulated wall and/or ceiling panels.

PUR

Polyurethane (PUR) is a thermoset plastic commonly used as an insulation for insulated wall and/or ceiling panels.

Sealant

A material made of one or more components used for sealing openings and/or joints in wall and/or ceiling assemblies. A sealant may or may not be intended for fire-resistant.

Significant Ingredient Change

A change to a formulation which has been categorized as either a single ingredient change or a multiple ingredient change. Significant ingredient changes include, but are not limited to, changing an ingredient, changing a supplier of an ingredient, and/or changing manufacturing tolerances of ingredients.

Silicone

A synthetic material made of one or more components used to seal openings and/or joints in wall and/or ceiling assemblies. Silicone is not intended for fire-resistance and does not react with heat from a fire.

Single Ingredient Change

A single ingredient change is one significant component change from the original formulation utilized for satisfying all required performance tests. Insignificant changes are not considered a single ingredient change.

Thermoset

Capable of becoming permanently rigid when heated or cured. (e.g. PIR or PUR insulated foam system)

Thermoplastic

Capable of softening when heated and of hardening again when cooled. (e.g. EPS)

Wall and/or Ceiling Panels

Building panels or interior finish materials that are installed to form adjoining wall and/or ceiling surfaces.

Wall/Ceiling Coatings

Coatings that are installed over adjoining wall and/or ceiling surfaces.

4. GENERAL REQUIREMENTS

4.1 Markings

4.1.1 Markings on the product or, if not possible, on its packaging or label accompanying the product, shall include the following information:

- name and address of the manufacturer or marking traceable to the manufacturer,
- date of manufacture or code traceable to date of manufacture or lot identification, and
- model number or product identification.

4.1.2 When hazard warnings are needed, the markings shall be universally recognizable.

4.1.3 All markings shall be legible and durable until installation.

4.2 Instructions

The manufacturer shall provide the user with:

- instructions for the installation, maintenance, and operation of the product; and
- services to ensure proper installation, inspection, or maintenance for products of such nature that it would not be unreasonable to expect the average user to be able to provide such installation, inspection, or maintenance.

4.3 Drawings/Formulations/Specifications Required

The manufacturer shall provide assembly drawings, materials lists, brochures, sales literature, specification sheets, technical data sheets, and safety data sheets for each building panel or interior finish material, and all components of the product (e.g. foam systems, sealants, etc).

4.4 Use of Sealants, Gaskets, and/or Caulking

4.4.1 All sealants, gaskets, and/or caulking that may be used in the installation of a building panel or interior finish material assembly shall be evaluated in conjunction of the product.

4.4.2 Sealants, gaskets, and/or caulking may affect the results of the test performance and shall be included in the test sample construction as detailed in Table 4.4.2 for the following Performance Test assemblies:

- Section 5.1/Appendix C - Room Test
- Section 5.3/Appendix D - 16 ft (4.9 m) High Parallel Panel Test
- Section 5.4/Appendix E - 25 ft (7.6 m) High Corner Test
- Section 5.5/Appendix F - 50 ft (15.2 m) High Corner Test

Table 4.4.2. Test samples and installation requirements for sealant, gaskets, and/or caulking

Sealant, Gasket, and/or Caulking Product Type	Included in Test Sample Assemblies	Installations Requirements
Non-intumescent or non-fire resistant (e.g. butyl, silicone)	Yes	Must be used in all installations
	No	Optional use
Intumescent or fire-resistant	Yes	Must be used in all installations
	No	Not permitted for use

- 4.4.3 If multiple sealants, gaskets, and/or caulking are desired, an insulated pan combustion test per ASTM E2058 shall be used to determine the most critical sealant, gasket, and/or caulking. The most critical must be used for the test listed in Section 4.4.2.
- 4.4.4 Application instructions and requirements of sealants, gaskets, and/or caulking must be detailed in an building panel or interior finish material manufacturer's installation and operation instructions.

4.5 Formulation Changes

- 4.5.1 All formulation changes of a previously tested building panel or interior finish material shall be evaluated prior to implementing a change. Formulation changes include, but are not limited to:
- ingredient change(s),
 - changing manufacturing tolerances of ingredients of an previously tested formulation more than +/- 5% of the original quantity.

All formulation changes shall be categorized as either a single or multiple ingredient change.

- 4.5.1.1 A single ingredient change is one significant component change from the original formulation utilized for satisfying all required performance tests. A single ingredient change shall require:
- a Flammability Characterization test, and
 - a Density of Panel Insulating Cores test or Density of Plastic Panels or Panel Facings test (as applicable).

The convective flame spread parameter (FSP_c) from the Flammability Characterization test shall be less than or equal to the FSP_c of the original formulation utilized for satisfying all required performance tests. If the single ingredient change results in a greater FSP_c than the original formulation, all remaining performance tests (applicable to product type) are required.

In addition, the density test results shall be +/- 5% of the original formulation density utilized for satisfying all required performance tests. If the density test results varies beyond the original formulation density by +/- 5%, all remaining performance tests (applicable to product type) are required.

Only one single significant ingredient change shall be allowed from the original formulation utilized for satisfying all required performance tests. Any further ingredient changes shall be considered a multiple ingredient change.

- 4.5.1.2 A multiple ingredient change is two or more significant components changes from the original formulation utilized for satisfying all required performance tests. A multiple ingredient change requires all performance tests (applicable to product type) to be conducted.