



Approval Standard for Cementitious Panel Roof Decks

Class Number 4472

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Foreword

The FM Approvals certification mark is intended to verify that the products and services described will meet stated conditions of performance, safety and quality useful to the ends of property conservation. The purpose of Approval Standards is to present the criteria for FM Approval of various types of products and services, as guidance for FM Approvals personnel, manufacturers, users and authorities having jurisdiction.

Products submitted for certification by FM Approvals shall demonstrate that they meet the intent of the Approval Standard, and that quality control in manufacturing shall ensure a consistently uniform and reliable product. Approval Standards strive to be performance-oriented. They are intended to facilitate technological development.

For examining equipment, materials and services, Approval Standards:

- a) must be useful to the ends of property conservation by preventing, limiting or not causing damage under the conditions stated by the Approval listing; and
- b) must be readily identifiable.

Continuance of Approval and listing depends on compliance with the Approval Agreement, satisfactory performance in the field, on successful re-examinations of equipment, materials, and services as appropriate, and on periodic follow-up audits of the manufacturing facility.

FM Approvals LLC reserves the right in its sole judgment to change or revise its standards, criteria, methods, or procedures.

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1 INTRODUCTION

1.1 Purpose

- 1.1.1 This standard states Approval requirements for cementitious panels for use as roof decking in Class 1 insulated roof construction.
- 1.1.2 Approval criteria may include, but are not limited to, performance requirements, marking requirements, examination of manufacturing facility(ies), audit of quality assurance procedures, and an Audit program.

1.2 Scope

- 1.2.1 Cementitious panel roof deck components, incorporated in a complete roof deck assembly, which exhibit low fire spread below the deck, adequate simulated wind uplift resistance, minimum heat damage potential and adequate strength during the Approval examination will qualify as a Class 1 assembly.
- 1.2.2 This standard applies to any component intended for use as a cementitious panel roof deck. Weatherability is not a part of the Approval evaluation. Roof cover performance is evaluated in accordance with FM Approval Standard for Class 1 Roof Covers (4470), Class 1 Panel Roofs (4471) or Class 1 Steep Slope Roof Covers (4475).
- 1.2.3 The performance of a cementitious panel roof deck depends in part on all components in the roof system makeup, and on how they interact. It is therefore necessary to evaluate the roof assembly as a whole when measuring the fire spread potential on the underside of the roof and its windstorm resistance classification.
- 1.2.4 This standard is intended to evaluate only those hazards investigated, and is not intended to determine suitability for the end use of a product.

1.3 Basis for Requirements

- 1.3.1 The requirements of this standard are based on experience, research and testing. The advice of manufacturers, users, trade associations, jurisdictions and/or loss control specialists was also considered
- 1.3.2 The requirements of this standard reflect tests and practices used to examine characteristics of Class 1 cementitious panel roof decking for the purpose of obtaining Approval. Cementitious panel roof decks having characteristics not anticipated by this standard may be FM Approved if performance equal, or superior, to that required by this Standard is demonstrated, or if the intent of the standard is met. Alternatively, cementitious panel roof decks which meet all of the requirements identified in this standard may not be FM Approved if other conditions which adversely affect performance exist, or if the intent of this standard is not met.

1.4 Basis for Approval

Approval is based upon satisfactory evaluation of the product and the manufacturer in the following major areas:

1.4.1 Examination and tests on production samples shall be performed to evaluate

- The suitability of the product;
- The performance of the product as specified by the manufacturer and required by FM Approvals; and as far as practical,
- The durability and reliability of the product.

1.4.2 An examination of the manufacturing facilities and audit of quality control procedures is made to evaluate the manufacturer's ability to consistently produce the product which is examined and tested, and the marking procedures used to identify the product. These examinations may be repeated as part of FM Approvals' Surveillance Audit program.

1.5 Basis for Continued Approval

Continued Approval is based upon:

- Production or availability of the product as currently FM Approved;
- The continued use of acceptable quality assurance procedures;
- Satisfactory field experience;
- Compliance with the terms stipulated in the Approval report;
- Satisfactory re-examination of production samples for continued conformity to requirements; and
- Satisfactory Surveillance Audits

Also, as a condition of retaining Approval, manufacturers may not change a product or service without prior authorization by FM Approvals.

1.6 Effective Date

The effective date of an Approval standard mandates that all products tested for Approval after the effective date shall satisfy the requirements of that standard. Products FM Approved under a previous edition shall comply with the new version by the effective date or else forfeit Approval.

The effective date of this standard is September 30, 2017 for compliance with all requirements.

1.7 System of Units

Units of measurement used in this Standard 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 A lists the selected units and conversions to SI units for measures appearing in this standard. Conversion of U.S.

customary units is in accordance with the American National Standards Institute (ANSI)/Institute of Electrical and Electronics Engineers (IEEE)/American Society for Testing Materials (ASTM) SI 10-2010, "American National Standard for Metric Practice."

1.8 Applicable Documents

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

FM Approvals LLC

- *Approval Standard for Single-Ply , Polymer Modified Bitumen Sheet, Built-Up Roof (BUR) and Liquid Applied Roof Assemblies for use in Class 1 and Noncombustible Roof Deck Construction*, FM Standard 4470
- *Approval Standard for Class 1 Panel Roofs*, FM Standard 4471
- *Approval Standard for Class 1 Steep Slope Roof Covers*, FM Standard 4475
- *Approval Standard for Flexible Photovoltaic Modules*, FM Standard 4476
- *Approval Standard for Vegetative Roof Systems*, FM Standard 4477
- *Approval Standard for Class 1 Fire Ratings of Insulated Wall or Roof/Ceiling Panels, Interior Finish Materials or Coatings and Exterior Wall System*, FM Standard 4880
- *American National Standard for Evaluating the Simulated Wind Uplift Resistance of Roof Assemblies Using Static Positive and/or Negative Differential Pressures*, ANSI/FM Standard 4474
- *Test Method for Determining the Pull Out Resistance of Fasteners used to Secure Above Deck Components to Cementitious Panel Decking*, FM Standard 4472
- *Test Method for Determining the Pull Out Resistance and the Pull-Over Resistance of Fasteners used to Secure Cementitious Panel Roof Decking*, FM Standard 4472
- *Test Method for Determining Side Lap Securement Resistance when used with Cementitious Panel Roof Decking*, FM Standard 4472
- *Test Method for Determining Live Load Deflection of Cementitious Panel Roof Decking*, FM Standard 4472
- *Test Method for Determining the Susceptibility to Heat Damage of Roof Insulation*

FM Global

- *Wind Design*, FM Global Property Loss Prevention Data Sheet 1-28
- *Roof Deck Securement and Above-Deck Roof Components*, FM Global Property Loss Prevention data Sheet 1-29

National Fire Protection Association (NFPA)

- *Standard Method of Fire Tests for Determining the Heat Release Rate of Roofing Assemblies with Combustible Above-Deck Roofing Components*, NFPA 276

1.9 Definitions

For purposes of this standard, the following terms apply:

<i>Structure</i>	The building framework to which the roof deck is fastened.
<i>Span</i>	The distance between roof deck supports, measured center to center.
<i>Deck</i>	The structural component of the roof assembly to which the roof system is secured.
<i>Cementitious Panel Roof Deck</i>	A factory fabricated roof deck consisting of fibers (typically wood or fiberglass) and cementitious binder. Panels are supplied in various thickness with tongue and groove or butt side and end joints.
<i>Interlocking</i>	A mechanical securement achieved by joining adjacent panels of cementitious panel deck along the specially designed joints.
<i>Insulation</i> <i>Multi-Layer Insulations</i>	A material applied to reduce the flow of heat. Roof insulations installed in two or more layers with all joints offset between the upper and lower layers.
<i>Fasteners</i>	A mechanical securement device used alone or in combination with a stress distributor to secure various components of a roof assembly.
<i>Roof Cover</i>	The exterior surface of a roof assembly.
<i>Roof System</i>	An assembly of interacting roof components (NOT including the roof deck) designed to weatherproof, and normally, to insulate the building's top surface.
<i>Roof Assembly</i>	An assembly of interacting roof components (including the roof deck) designed to weatherproof, and normally, to insulate the building's top surface and to support anticipated loads.
<i>Rated Load</i>	The rated load is equal to two times the service load. The rated load is equal to the rating requested for FM Approval (i.e. the rated load is 90 psf [4.3 kPa] for a Class 1-90 rating).
<i>Mechanically Fastened</i>	Mechanically fastened describes roof covers, insulations or base sheets that have been attached to the substrate at defined intervals using fasteners with or without stress distributors.
<i>Fully Adhered</i>	Fully adhered describes components that have been bonded to the substrate using a compatible adhesive throughout the entire surface of the roof.
<i>Partially Adhered</i>	Components that have been bonded to the substrate using a compatible adhesive applied in spots or ribbons across the surface of the roof.