



Member of the FM Global Group

Approval Standard for Fire-Retardant Paints and Coatings Over Combustible Surfaces

Class Number 4975

July 1974

Foreword

The FM Approvals certification mark is intended to verify that the products and services described will meet FM Approvals' 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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I INTRODUCTION

- 1.1 A fire-retardant paint or coating is intended to delay ignition and reduce the surface burning rate of a combustible wood, cellulosic fiber or cellular plastic building material for a short period of time. It may be applied as a thick protective covering by trowel or as a fire-retardant paint by brush, spray, or roller. The reduction of burning rate usually depends on the applied thickness. In the case of a fire-retardant paint exposed to fire, the paint may intumesce, forming an insulating blanket which retards surface ignition and reduces the burning rate of the combustible material on the coated side.
- 1.2 Fire-retardant coatings will effectively reduce the burning rate of a combustible surface for a period of about 10-15 minutes. Their use is particularly applicable in very low hazard occupancies not requiring sprinkler protection, where occupancy is not likely to change and the only hazard is that of exposed, interior finish materials. THESE COATINGS ARE NOT INTENDED AS A SUBSTITUTE FOR AUTOMATIC SPRINKLERS.
- 1.3 This standard is applicable to any fire-retardant coating proposed for this use which meets the Approval requirements. These requirements include fire tests, specific application instructions, and inspection of the product manufacturing facility.
- 1.4 Meeting these requirements does not assure Approval, as other factors may govern. Continued Approval depends on satisfactory field performance and application. Approval is applicable only when the coating is applied at the Approved rates of coverage.

II TEST PANELS

- 2.1 The submitter shall furnish a sufficient quantity of fire-retardant coating material of production run consistency to coat two 4½ ft × 5 ft (1.37 × 1.52 m) panels. These panels will be fire tested on the FM Approvals Construction Materials Calorimeter. The panels will be prepared by FM Approvals and the coating applied in accordance with the manufacturer's recommended application rate and procedures.
- 2.2 For Approval of a fire-retardant coating over any wood or cellulosic fiber building material, the coating must perform satisfactorily in two tests; one test on matched boards, and the second on cellulosic ceiling tile. If Approval is desired for the protection of only one specific material, such as a cellular plastic, two successful tests will be required with a low decomposition temperature (200-250°F) cellular plastic insulation as the basis for protection of cellular plastics in general.
- 2.3 The test materials used as a basis for Approval are defined as follows: Douglas fir matched boards nominal 1 in. × 4 in. (2.54 × 10.16 cm); Douglas fir plywood 5/8 in. (1.59 cm) thick, interior grade A-C; ceiling tile, ½ in. (1.27 cm) thick perforated, 12 in. × 12 in. (30.48 × 30.48 cm) units, having a factory-applied painted face. Prior to coating these materials with the fire-retardant finish, they will be conditioned to a moisture content of 6.8%.
- 2.4 These materials are not intended to represent all types of combustible building products. Other building materials may have higher burning rates and require greater protection.

- 2.5 Each panel is constructed by securing the uncoated combustible substrate to a solid backing of two layers of noncombustible 1/4 in. (0.635 cm) asbestos board. The fire-retardant coating is then applied to the face of the panel by brush, spray, roller, or trowel at the specified rate and allowed to cure under controlled conditions for a period of not more than 14 days before testing, unless otherwise agreed to by the manufacturer.
- 2.6 The method of attaching matched boards, plywood, and ceiling tile to structural elements is not a part of this standard. Mounting on furring strips or against a solid backing are acceptable means of attachment.

III FIRE TESTS

- 3.1 The panels will be fire tested for 10 minutes on the FM Construction Materials Calorimeter. The Calorimeter is a horizontal furnace of rectangular cross section, having a firing chamber at one end, where fuel and air are introduced, a test panel exposure chamber, a mixing chamber, and a flue at the other end.

The panel is placed on the Calorimeter and subjected to a standard fire exposure (Appendix Sheet 1) under controlled conditions. The temperature resulting from the combined burning of the test panel and the exposure fuel is recorded by thermocouples in the flue to form a time-temperature curve for the 10 minute test duration.

- 3.2 This curve is then evaluated as follows to determine the maximum burning rates of the test panel:

The test is duplicated using a noncombustible refractory panel on the Calorimeter with the same standard fire exposure. Metered propane fuel is substituted for the burning panel through auxiliary burners as the evaluating test progresses. The temperature resulting from the combined burning of the fire exposure and the added propane will coincide with the time-temperature curve created originally.

- 3.3 The various propane fuel rates and their time of occurrence are recorded and tabulated. With this data and the known heat value of the evaluating fuel, maximum heat contribution rates are computed which represent the burning rates of the test panel.

IV CONDITIONS OF ACCEPTANCE

- 4.1 The following rates are the maximum allowable burning rates acceptable for Approval. These rates are representative of commonly used building materials such as mineral ceiling tile and fire-retardant treated lumber, both of which are considered products of low combustibility.

<i>Material</i>	<i>Allowable Maximum Average Heat Release Rates Btu/sq. ft/min. for Any Time Period Listed Below (kg-cal/sq. meter/min.)</i>		
	1 minute	2 Minute	3 Minute
Fire-retardant Coating	125 (338.6)	120 (325)	110 (298)
(Max. Allowable Deviation)	+25	+20	+20

- 4.2 For foamed plastic protection, the coating must remain intact, must not fall away exposing the foam, and must provide sufficient resistance to thermal conductivity such that no more than 1% of the specimen area (4 ft × 4 ft) (1.22 × 1.22 m) is decomposed during the test period.
- 4.3 Repeated washing and exposure to high humidity may diminish the effectiveness of the fire-retardant layer. To assure continued protection, the fire-retardant paint or coating thickness must be maintained.

V QUALITY ASSURANCE FOLLOW-UP INSPECTIONS

- 5.1 An inspection of the product manufacturing facility is part of the Approval investigation. Its purpose is to determine that equipment, procedures, and manufacturing controls are properly maintained to produce the same quality of coating as the tested product.
- 5.2 Periodic follow-up inspections will be conducted to assure continued quality control and product uniformity.

VI MARKING

- 6.1 Containers shall bear the manufacturer's name, product identification, date of manufacture, application rate as tested, and the combustible building materials over which the fire-retardant coating is Approved.

VII RE-EXAMINATION TESTS

- 7.1 A retest will be conducted periodically on the Approved coating to determine that the quality and uniformity of the fire-retardant product has been maintained and will provide the same level of protection as originally Approved.

VIII MANUFACTURER'S RESPONSIBILITY

- 8.1 The manufacturer agrees that use of the FM Approval name or certification mark is subject to the conditions and limitations of the FM Approval. Such conditions and limitations must be included in all references to FM Approval. Advertising of any nature, including sales and promotional literature using the FM Approval name or certification mark must first be reviewed and Approved in writing by FM Approvals before publication.

- 8.2 The manufacturer shall notify FM Approvals of any change in the Approved product prior to general sale and distribution.
- 8.3 The manufacturer shall make every reasonable effort to supply all necessary instructions and other assistance to the installer to insure proper installation.

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