



Member of the FM Global Group

Examination Standard for Roof Maintenance Coatings

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Foreword

This standard 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 this standard is to present the criteria for examination of various types of products and services.

Examination in accordance with this standard shall demonstrate compliance and verify that quality control in manufacturing shall ensure a consistent and reliable product.

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1 INTRODUCTION

1.1 Purpose

- 1.1.1 This standard states testing and certification requirements for roof maintenance coatings.
- 1.1.2 Testing and certification criteria may include, but are not limited to, performance requirements, marking requirements, examination of manufacturing facility(ies), audit of quality assurance procedures, and a surveillance program.

1.2 Scope

- 1.2.1 This standard applies to liquid applied products with or without reinforcements that are applied over existing, functioning certified roof systems. Certified roof maintenance coatings must be used in conjunction with previously installed certified roofs. Maintenance coatings do not increase the fire, wind, leakage or hail resistance performance of the existing roof.
- 1.2.2 This standard is intended to evaluate only those hazards investigated and is not intended to determine suitability for the end use of a product.
- 1.2.3 This standard shall not be used to qualify roof cover products.

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 organizations. 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 maintenance coatings for the purpose of obtaining Certification. Maintenance coatings having characteristics not anticipated by this standard may be certified if performance equal, or superior, to that required by this standard is demonstrated.

1.4 Basis for Certification

Certification 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 maintenance coating when used with a certified roof assembly
 - the performance of the product as specified by the manufacturer and required for certification; 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 may be 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. Subsequent surveillance may be required by the certification agency in accordance with the certification scheme to ensure ongoing compliance.

1.5 Basis for Continued Certification

The basis for continual certification may include, but is not limited to, the following based upon the certification scheme and requirements of the certification agency:

- production or availability of the product as currently certified;
- the continued use of acceptable quality assurance procedures;
- satisfactory field experience;
- compliance with the terms stipulated by the certification;
- satisfactory re-examination of production samples for continued conformity to requirements; and
- satisfactory surveillance audits conducted as part of the certification agency's product surveillance program.

1.6 Effective Date

The effective date of this certification standard mandates that all products tested for certification after the effective date shall satisfy the requirements of this standard.

The effective date of this standard is eighteen (18) months after the publication date of the standard 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. Conversion of U.S. customary units is in accordance with ANSI/IEEE/ASTM SI 10.

1.8 Normative References

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document. For dated references, only the cited edition applies.

ANSI/IEEE/ASTM SI 10, *American National Standard for Metric Practice*

ASTM International (American Society for Testing and Materials)

- *Standard Test Method for Fire Tests of Roof Coverings*, ASTM E108
- *Standard Practice for General Techniques for Obtaining Infrared Spectra for Qualitative Analysis*, ASTM E1252
- *Standard Practice for General Techniques of Gas Chromatography Infrared (GC/IR) Analysis*, ASTM E1642

1.9 Terms and Definitions

For purposes of this standard, the following terms apply:

Built-Up Roof (BUR) - A continuous semi-flexible roof cover consisting of multiple plies of saturated felts, coated felts, fabrics, or mats assembled in place with alternate layers of bitumen or cold adhesive.

Deck - The structural components of the roof assembly to which the roof system is secured.

Fully Adhered - Describes roof components that have been bonded to the substrate using a compatible adhesive throughout the entire surface of the roof.

Liquid Applied Roof Cover - Arrive on the roof in a liquid state and are spray, brush or roller applied using proprietary procedures and could include a reinforcing fabric.

Maintenance Coating – A liquid applied product with or without reinforcements that is applied over a functioning roof system. Maintenance coatings do not increase the fire, wind, leakage or hail resistance performance of the existing roof.

Metal Panel – (1) A single metal sheet formed into a specific profile. (2) A composite assembly formed to a specified profile and consisting of an insulating core or batt material with an exterior metal skin.

Multi-Ply Roof Cover - A system consisting of zero or one base ply layer, zero to many plies and zero or one cap ply layer adhered to each other with an adhesive and together form a thick multi-layer weatherproof roof covering. For assemblies with base sheets (mechanically attached), the base sheet is not included when defining the number of plies of the roof cover. Multi-ply covers contain a minimum of two plies.

Polymer modified Bitumen Roof Cover - Factory produced sheets which generally consist of an asphaltic and rubber or plastic blend reinforced with glass and/or polyester mats.

Roof Assembly - A system of interacting roof components (including the roof deck) designed to weatherproof and, normally, to insulate a building's top surface.

Roof Cover - The layer of a roof assembly designed to protect the building components from the weather.

Roof System - A system of interacting roof components (not including the roof deck) designed to weatherproof and, normally, to insulate a building's top surface.

Single Ply Roof Cover - Factory produced sheets typically consisting of EPDM, PVC, TPO or several variations of these. Modified bitumen covers applied in a single layer (no base or ply sheets) are considered single ply roof covers.

Solar Reflectance – The fraction of incident solar radiation upon a surface that is reflected from the surface.

Structure - Is the building framework to which the roof deck, or in some instances the roof cover, is fastened.

Surfacing - Is the top layer or layers of a roof assembly, specified or designed to protect the underlying roofing from direct exposure to the weather.

2 GENERAL INFORMATION

2.1 Product Information

Maintenance coatings are liquid applied products with or without reinforcements that are applied over existing, functioning certified roof systems.

2.2 Certification Application Requirements

The manufacturer shall provide the following preliminary information with any request for certification consideration:

- A complete list of all models, types, sizes, and options for the products or services being submitted for certification consideration;
- The components that make up a maintenance coating. All components must be identified by manufacturer, product trade name and method of installation;
- The number and location of manufacturing facilities.
- All documents shall identify the manufacturer's name, document number or other form of reference, title, date of last revision, and revision level. All documents shall be provided with English translation.
- Existing roof cover types and materials for which certification is sought.
- Manufacturer's Specifications and Technical Bulletins may be needed to confirm certifications requested are in compliance with Paragraph 3.3.2.

2.3 Requirements for Samples for Examination

2.3.1 Following authorization of an certification examination, the manufacturer shall submit samples for examination and testing based on the following:

- Sample requirements to be determined by the certification agency

2.3.2 Requirements for samples may vary depending on design features, results of prior or similar testing, and results of any foregoing tests.

2.3.3 The manufacturer shall submit samples representative of production. Any decision to use data generated using prototypes is at the discretion of the certification agency.

2.3.4 It is the manufacturer's responsibility to provide any necessary test fixtures or special tools, such as those which may be required to evaluate the products for certification.

3 GENERAL REQUIREMENTS

3.1 Review of Documentation

3.1.1 During the initial investigation and prior to physical testing, the manufacturer's specifications and details shall be reviewed to assess the ease and practicality of installation and use. The certification examination results may further define the limits of the final certification.

3.2 Markings

3.2.1 Marking on the product or, if not possible due to size, 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;
- model number or tradename

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

3.2.2 The model or type identification shall correspond with the manufacturer's catalog designation and shall uniquely identify the certification agency's mark of conformity.

3.2.3 The certification agency's mark of conformity shall be displayed visibly and permanently on the product and/or packaging as appropriate and in accordance with the requirements of the certification agency. The manufacturer shall exercise control of this mark as specified by the certification agency and the certification scheme

3.2.4 All markings shall be legible and durable.

3.3 Manufacturer's Installation and Operation Instructions

3.3.1 The manufacturer shall:

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

3.3.2 No certification will be granted if it is in conflict with the manufacturer's specifications and/or other written documentation such as technical bulletins.

3.4 Calibration

3.4.1 Each piece of equipment used to verify the test parameters shall be calibrated within an interval determined on the basis of stability, purpose, and usage. A copy of the calibration certificate for each piece of test equipment is required. The certificate shall indicate that the calibration was performed against working standards whose calibration is certified and traceable to an acceptable reference standard and certified by an ISO/IEC 17025 accredited calibration laboratory. The test equipment shall be clearly identified by label or sticker showing the last date of the calibration and the next due date. A

copy of the service provider's accreditation certificate as an ISO/IEC 17025 accredited calibration laboratory should be available.

- 3.4.2 When the inspection equipment and/or environment is not suitable for labels or stickers, other methods such as etching of control numbers on the measuring device are allowed, provided documentation is maintained on the calibration status of this equipment.

3.5 Test Sample Production

All products submitted for testing shall be representative of production run material. The need to monitor the manufacturer of the test specimens shall be at the sole discretion of the certification agency.

4 PERFORMANCE REQUIREMENTS

4.1 Combustibility From Above the Roof Deck

Testing for combustibility from above the roof deck shall be in accordance with Standard Test Methods for Fire Tests of Roof Coverings, ASTM E108, ASTM International. The tests shall include spread of flame, intermittent flame and burning brand as applicable.

4.1.1 Conditions of Acceptance for Combustibility from Above the Roof Deck

4.1.1.1 Spread of Flame Test

- For Class A, the maximum flame spread of the sample materials shall not exceed 72 in. (1830 mm).
- For Class B, the maximum flame spread of the sample materials shall not exceed 96 in. (2440 mm).
- For Class C, the maximum flame spread of the sample materials shall not exceed 156 in. (3960 mm).
- There shall be no excessive lateral flame spread which is defined as flames extending to the two lateral edges of the exposed roof covering or coating beyond 12 in. (305 mm) from the ignition source.
- There shall be no portion of the roof covering material blown or falling off of the test deck in the form of flaming or glowing brands that continue to glow after reaching the floor.
- There shall be no portion of the roof deck that fall in the form of particles that continue to glow after reaching the floor.

4.1.1.2 Intermittent Spread of Flame and Burning Brand tests for Classes A, B, or C

- There shall be no portion of the roof covering or coating material blown or falling off of the test deck in the form of flaming or glowing brands that continue to glow after reaching the floor.
- There shall be no exposure of the deck or sustained flaming on the underside of the deck.
- There shall be no portion of the roof deck that fall in the form of particles that continue to glow after reaching the floor.

4.2 Identification Tests - Standard Practice for General Techniques for Obtaining Infrared Spectra for Qualitative Analysis, ASTM E1252

4.2.1 Requirement:

At the sole discretion of the certification agency, FTIR spectra may be determined and reported.

4.2.2 Test/Verification:

Standard Practice for General Techniques for Obtaining Infrared Spectra for Qualitative Analysis, ASTM E1252

Note 1: These tests are conducted for identification purposes. No limits are placed on the values obtained.

4.3 Identification Test – FM Approvals Thermal Desorption Gas Chromatography Mass Spectrometry (TD/GC/MS)

4.3.1 Requirement:

At the sole discretion of the certification agency, TD/GC/MS may be conducted and reported.

4.3.2 Test/Verification:

Standard Practice for General Techniques of Gas Chromatography Infrared (GC/IR) Analysis.
ASTM E1642

Note 1: These tests are conducted for identification purposes. No limits are placed on the values obtained.

4.4 Additional Tests

Additional tests may be required, at the discretion of the certification agency, depending on design features and results of any foregoing tests.

5 OPERATIONS REQUIREMENTS

5.1 Demonstrated Quality Control Program

5.1.1 A quality assurance program is required to assure that subsequent products produced by the manufacturer shall present the same quality and reliability as the specific products examined. Design quality, conformance to design, and performance are the areas of primary concern.

- Design quality is determined during the examination and tests and may be documented in the certification report.
- Continued conformance to this standard is verified by the certifiers surveillance program.
- Quality of performance is determined by field performance and by periodic re-examination and testing.

5.1.2 The manufacturer shall demonstrate a quality assurance program which specifies controls for at least the following areas:

- existence of corporate quality assurance guidelines;
- incoming quality assurance, including testing;
- in-process quality assurance, including testing;
- final inspection and tests;
- equipment calibration;
- drawing and change control;
- packaging and shipping; and
- handling and disposition of non-conforming materials.

5.1.3 Documentation/Manual

There should be an authoritative collection of procedures/policies. It should provide an accurate description of the quality management system while serving as a permanent reference for implementation and maintenance of that system. The system should require that sufficient records are maintained to demonstrate achievement of the required quality and verify operation of the quality system.

5.1.4 Records

To assure adequate traceability of materials and products, the manufacturer shall maintain a record of all quality assurance tests performed, for a minimum period of two years from the date of manufacture.

5.1.5 Drawing and Change Control

- The manufacturer shall establish a system of product configuration control that shall allow no unauthorized changes to the product. Changes to critical documents, identified in the certification report, may be required to be reported to, and authorized by the certification agency prior to implementation for production.
- Records of all revisions to all certified products shall be maintained.

5.2 Surveillance Audit

5.2.1 An audit of the manufacturing facility may be part of the certification agencies surveillance requirements to verify implementation of the quality assurance program. Its purpose is to determine that the manufacturer's equipment, procedures, and quality program are maintained to insure a uniform product consistent with that which was tested and certified.

5.2.2 Certified products or services shall be produced or provided at, or provided from, location(s) disclosed as part of the certification examination. Manufacture of products bearing a certification mark is not permitted at any other location prior to disclosure to the certification agency.

5.3 Installation Inspections

Field inspections may be conducted to review an installation. The inspections are conducted to assess ease of application, and conformance to written specifications. When more than one application technique is used, one or all may be inspected at the sole discretion of the certification agency.

5.4 Manufacturer's Responsibilities

The manufacturer shall notify the certification agency of changes in product construction, components, raw materials, physical characteristics, coatings, component formulation or quality assurance procedures prior to implementation.

6 BIBLIOGRAPHY

ISO/IEC 17025, *General Requirements for the Competence of Testing and Calibration Laboratories*.