



**Examination Standard
for
Class 1 Interior Wall and
Ceiling Materials or Systems
for Smoke Sensitive
Occupancies**

Class Number 4882

December 2021

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 Class 1 interior wall and ceiling materials or systems for smoke sensitive occupancies.
- 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 follow-up program.

1.2 Scope

- 1.2.1 This standard applies to interior wall and ceiling materials or systems used in cleanrooms, pharmaceutical manufacturing and storage areas, food preparation and storage areas and similar occupancies or other occupancies which are susceptible to smoke damage. Wall and ceiling materials or systems which are categorized for use in cleanrooms meet the requirements of Examination Standard for FM Approvals Cleanroom Materials Flammability Test Protocol, Class Number 4910 and American National Standard for Clean Room Materials Flammability Test Protocol ANSI/FM Approvals 4910 in addition to the other requirements of this standard. These materials or systems produce low levels of smoke. Wall and ceiling materials which meet the requirements of this Standard and which are categorized for use in pharmaceutical manufacturing and storage areas, food preparation and storage areas and similar occupancies produce somewhat higher levels of smoke (when compared to those materials or systems which were evaluated for cleanrooms) but produce less smoke than materials and systems evaluated to the Examination Standard for Class 1 Fire Rating of Insulated Wall or Wall and Roof/Ceiling Panels, Interior Finish Materials or Coatings, Class Number 4880 or Examination Standard for Class 1 Exterior Wall Systems, Class Number 4881.

1.3 Basis for Requirements

- 1.3.1 The requirements of this standard are based on experience, research and testing, , Approval Standard for Class 1 Fire Rating of Building Panels or Interior Finish Materials, Class Number 4880, Examination Standard for FM Approvals Cleanroom Materials Flammability Test Protocol, Class Number 4910 and American National Standard for Clean Room Materials Flammability Test Protocol ANSI/FM Approvals 4910. The advice of manufacturers, users, trade associations and loss control specialists was also considered.
- 1.3.2 The requirements of this standard reflect tests and practices used to examine characteristics of interior wall and ceiling materials or systems used in smoke sensitive occupancies for the purpose of obtaining certification. Interior wall and ceiling materials or systems used in smoke sensitive occupancies 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 product;
 - 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 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. 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 agencies 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 International System (SI) units. These are followed by their arithmetic equivalents in United States (U.S.) customary units, enclosed in parentheses. The first value stated shall be regarded as the requirement. The converted equivalent value may be approximate. Conversion of SI 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.

American National Standard for Evaluating the Fire Performance of Insulated Building Panel Assemblies and Interior Finish Materials ANSI FM 4880

American National Standard for Clean Room Materials Flammability Test Protocol ANSI/FM Approvals 4910.

ASTM International, 100 Barr Harbor Drive, West Conshohocken, PA, 19428

ASTM E84, Test Method for Surface Burning Characteristics of Building Materials,

ASTM C167, Standard Test Methods for Thickness and Density of Blanket or Batt Thermal Insulations.

ASTM C303, Standard Test Method for Dimensions and Density of Preformed Block and Board-Type Thermal Insulation.

ASTM D482, Standard Test Method for Ash from Petroleum Products

ASTM D792, Standard Test Method for Specific Gravity (Relative Density) and Density of Plastics by Displacement

ASTM D1505, Test Method for Density of Plastics by the Density-Gradient Technique

ASTM D1622, Standard Test Method for Apparent Density of Rigid Cellular Plastics

ASTM D1929, Test Method for Determining Ignition Temperature of Plastics

ASTM E2058, Standard Test Methods for Measurement of Synthetic Polymer Material Flammability Using a Fire Propagation Apparatus (FPA)

ISO 1716: Reaction-To-Fire Tests for Building Products - Determination of the Heat of Combustion, International Organization for Standardization, Geneva, Switzerland.

1.9 Terms and Definitions

For purposes of this standard, the following terms apply:

Average Smoke Emission Rate (\dot{G}_{smoke}) - Total smoke emitted in mg divided by the time period during which smoke is emitted in s.

Convective Flame Spread Parameter (FSP_c) - $FSP_c = Q_c / (TRP * A)$ 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 area of the combustion sample used to determine Q_c .

Critical Heat Flux (CHF) - the maximum heat flux at or below which there is no ignition.

Fire Propagation Index (FPI) - ratio of the one-third power of the radiative fraction of the chemical heat release rate per unit of width of a sample to the ignition resistance of the sample, defined as the Thermal Response Parameter (TRP). It is an indicator of the propensity of the material to support fire propagation.

Ignition Zone - the area of the surface of a material heated by an outside source resulting in ignition.

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

PCHRR - peak chemical heat release rate.

Smoke Development Index - Smoke Yield (y_s) multiplied by Fire Propagation Index (FPI). It is an indicator of the potential for smoke contamination during fire propagation.

Smoke Sensitive Occupancy – an occupancy which is susceptible to property loss due to smoke infiltration or contamination.

Smoke Yield (y_s) - ratio of the total mass of smoke released to the total mass of the material vaporized.

Thermal Response Parameter (TRP) - indicator of the ignition resistance or the thermal inertia of a material.

Thermosetting - capable of becoming permanently rigid when heated or cured.

Thermoplastic - capable of softening when heated and of hardening again when cooled.

2. GENERAL INFORMATION

2.1 Product Information

Class 1 interior wall and ceiling materials or systems for use in smoke sensitive occupancies are usually supplied in sheet form or in the form of field or factory fabricated panels which are connected to one another and to the substrate with various types of closures, adhesives and joint treatments. They may consist of a homogeneous material, a reinforced plastic material or an insulating core material (usually rigid plastic foam or mineral fiber batts) faced with plastic (reinforced or unreinforced), aluminum, steel, gypsum wallboard, plastic, masonry or other cementitious materials. They are not intended as fire barriers. They may be designed as load bearing members or may be secured through the substrate over which they are installed to a structural framework or directly to the substrate. They are tested at the maximum thickness and over the most critical substrate for which certification is sought.

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;
- General assembly drawings, manufacturing drawings, materials list, anticipated marking format, formulations, brochures, sales literature, spec. sheets, installation instructions; and 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.

2.3 Requirements for Samples for Examination

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

- Sample requirements to be determined by the certification agency.
- A representative of the certification agency shall inspect the manufacturing facility for, witness the production of, and place their mark on, each sample wall and/or ceiling material to be evaluated.
- If a wall or ceiling material or system has one or more plastic components, production of the plastic component(s), including the blending of foam or resin systems, shall be witnessed by a representative of 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.

3. GENERAL REQUIREMENTS

3.1 Review of Documentation

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 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,
- model number or product identification,
- “Must be installed in accordance with the certified installation provided with the panels”

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 Instructions

3.3.1 The manufacturer shall

- prepare instructions for the installation, maintenance, and operation of the product;
- provide facilities for repair of the product and supply replacement parts, if applicable; and
- 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 As part of the certification examination, and at the discretion of the certification agency, at least one inspection of a field installation during and/or after completion may be required. In some cases, a continued program of inspections shall be necessary to assess the application procedures or changes within the application techniques.

3.3.3 The manufacturer shall supply written information to the installer detailing the specific installation requirements.

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.

4. PERFORMANCE REQUIREMENTS

4.1 Class 1 Fire Rating of Interior Wall and Ceiling Materials or Systems for Smoke Sensitive Occupancies to a Maximum Installed Height of 3m (10 ft), 9.1m (30 ft), 15.2m (50 ft) or Without Height Restriction

4.1.1 Requirements

- A. A Room Test is used as a criterion for allowing a maximum installed height of 3 m (10 ft). For Class 1 certification to the maximum height of 3 m (10 ft), wall and ceiling materials or systems covered by this standard shall meet the conditions of acceptance of ANSI FM 4880.
- B. A 7.6 m (25 ft) High Corner Test is used as a criterion for allowing a maximum installed height of 9.1 m (30 ft). For Class 1 certification to the maximum height of 9.1 m (30 ft), wall and ceiling materials or systems covered by this standard shall 1) have met the requirements for Class 1 Certification to the maximum height of 3 m (10 ft) in A above and 2) not support a self-propagating fire which reaches any of the limits of the 7.6 m (25 ft) high corner test structure as evidenced by flaming or material damage. The 7.6 m (25 ft) High Corner Test is required only if recognition is sought for installed heights greater than 3 m (10 ft).

Exception 1: The 7.6 m (25 ft) High Corner Test is waived for inert faced thermosetting plastic foam core panels if the bare thermosetting plastic foam core has a convective flame spread parameter (FSP_C) of less than or equal to $0.39 \text{ s}^{-1/2}$.

Exception 2: For wall and wall and ceiling panels other than those with thermoplastic foam cores, the 7.6 m (25 ft) High Corner Test is waived if the peak chemical heat release rate (PCHRR) during a 4.9 m (16 ft) parallel panel fire test with a propane gas ignition source of 360 kW is less than, or equal to, 1100 kW for combustible walls with a noncombustible ceiling or less than, or equal to, 830 kW for combustible walls with a combustible ceiling.

Note - See also Exception 3 below for inert faced panels with noncombustible cores.

- C. A 15.2 m (50 ft) High Corner Test is used as a criterion for allowing a maximum installed height of 15.2 m (50 ft) or without height restriction. For Class 1 certification to the maximum height of 15.2 m (50 ft), wall and ceiling materials or systems covered by this standard shall 1) have met the requirements for Class 1 Certification to the maximum heights of 3 m (10 ft) in A above and 9.1 m (30 ft) in B above and 2) not support a self-propagating fire which reaches any of the limits of the 15.2 m (50 ft) high corner test structure as evidenced by flaming or material damage. For Class 1 Certification with no height restriction, wall and ceiling materials or systems covered by this standard shall 1) have met the requirements for Class 1 Certification to the maximum height of 9.1 m (30 ft) in B above, 2) the assembly shall not support a self-propagating fire which reaches any of the limits of the 15.2 m (50 ft) high corner test structure as evidenced by flaming or material damage and 3) ignition of the ceiling of the assembly in the 15.2 m (50 ft) high corner test shall not occur. A 15.2 m (50 ft) High Corner Test is required only if recognition is sought for installed heights greater than 9.1 m (30 ft).

Exception 3: Both the 15.2 m (50 ft) High Corner Test and the 7.6 m (25 ft) High Corner Test are waived for inert faced panels with noncombustible cores provided all of the following criteria are met:

1. The core material has a minimum ash content of 90% when tested without adhesive or facers. Where a single test produces a result of less than, but close to 90%, two additional tests shall be conducted and the results of the three tests shall be averaged and the average shall meet the minimum ash content of 90%.

- 2 The core material has a maximum gross heat of combustion of 2.0 kJ/g (860 BTU/lb) when tested without adhesive or facers. Where a single test produces a result of greater than, but close to 2.0 kJ/g (860 BTU/lb), two additional tests shall be conducted and the results of the three tests shall be averaged and the average shall meet the maximum gross heat of combustion of 2.0 kJ/g (860 BTU/lb).
- 3 The core material shows no visible flaming when tested at an applied heat flux of 50 kW/m² in air enriched to 40% oxygen without adhesive or facers:
 - a. for 15 minutes from the start of the combustion test or
 - b. until mass loss from the sample has ceased if mass loss from the sample has not ceased by 15 minutes after the start of the combustion test or
 - c. until visible vapors have ceased to be generated if visible vapors are being generated by the sample 15 minutes after the start of the combustion test.

Exception 4: For wall and wall and ceiling panels other than those with thermoplastic foam cores, the 7.6 m (50 ft) High Corner Test is waived for Certification without height restriction if the peak chemical heat release rate (PCHRR) during a 4.9 m (16 ft) parallel panel fire test with a propane gas ignition source of 360 kW is less than, or equal to, 830 kW for combustible walls with a noncombustible ceiling or combustible walls with a combustible ceiling.

4.1.2 Tests/Verification

- A. The room test is conducted per Appendix C of ANSI FM 4880.
- B. The 7.6 m (25 ft) High Corner Test is conducted per Appendix E of ANSI FM 4880. For Exception 1, Flammability Characterization is conducted per ANSI FM 4880. For Exception 2, the 16 ft. High Parallel Panel Test is conducted per Appendix D ANSI FM 4880.
- C. The 15.2 m (50 ft) High Corner Test is conducted per ANSI FM 4880 Appendix F. For Exception 3, ASTM D482, Standard Test Method for Ash from Petroleum Products for ash content, ISO 1716: Reaction-To-Fire Tests for Building Products - Determination of the Heat of Combustion for gross heat of combustion and ASTM E2058, Standard Test Methods for Measurement of Synthetic Polymer Material Flammability Using a Fire Propagation Apparatus (FPA) for the combustion test. For Exception 4, the 16 ft. High Parallel Panel Test is conducted per Appendix D ANSI FM 4880.

4.2 Wall and Ceiling Materials or Systems Certified for Use in Cleanroom or Similar Occupancies

4.2.1 Requirements

- A. The requirements of paragraph 4.1 above are used as the criteria for maximum installed height of wall and ceiling materials or systems.
- B. Fire Propagation Index (FPI) $\leq 6 \text{ (m/s}^{1/2}\text{)/(kW/m}^{2/3}$ (when rounded to the nearest whole number (6, 7, etc)) in the fire propagation apparatus tests of materials which can be evaluated in accordance with ASTM E 2058. The FPI value is the maximum value for the 15 s running average of the data. For materials which can not be evaluated in accordance with ASTM E 2058 such as, but not limited, to composite building panels or materials adhered to a substrate, a 2.44 m (8 ft) parallel panel fire test with a propane gas ignition source of 60 kW shall be conducted. The requirements of specimens tested utilizing the 8 ft parallel panel shall be:
 - Visual propagation height shall be $\leq 1830 \text{ mm}$ (6 ft)
 - Maximum heat flux at 1220 mm (4 ft) of 40 kW/m²
 - Decay of at least half of the maximum chemical heat release rate 1 minute after the

burner has been terminated. The maximum chemical heat release rate for this calculation shall be the maximum chemical heat release rate within 10 seconds prior to burner termination

- Decay of at least a factor of 4 of the maximum chemical heat release rate 2 minutes after the burner has been terminated. The maximum chemical heat release rate for this calculation shall be the maximum chemical heat release rate within 10 seconds prior to burner termination.
- C. Smoke Development Index (SDI) $\leq 0.40 [(m/s^{1/2})/(kW/m)^{2/3}] [g/g]$ (when rounded to the nearest tenth (0.4, 0.5, etc)) in the fire propagation apparatus tests for materials which can be evaluated in accordance with ASTM E 2058. For materials which can not be evaluated in accordance with ASTM E 2058-03 such as, but not limited, to composite building panels or materials adhered to a substrate, a 2.44 m (8 ft) parallel panel fire test with a propane gas ignition source of 60 kW shall be conducted. The requirements of specimens tested utilizing the 2.44 m (8 ft) parallel panel shall be:
- Maximum smoke generation rate ≤ 0.23 g/s
 - Smoke generation rate at 12 minutes ≤ 0.07 g/s
 - Total smoke generated ≤ 60 g
- D. The average smoke emission rate (\dot{G}_{smoke}) of the installed wall system shall be ≤ 120 mg/s during a 4.9 m (16 ft) parallel panel fire test with a propane gas ignition source of 360 kW.
- E. Optional test: ASTM E84, Standard Test Method for Surface Burning Characteristics of Building Materials.

4.2.2 Tests/Verification

- A. See paragraph 4.1.2 above.
- B. American National Standard for Clean Room Materials Flammability Test Protocol ANSI/FM Approvals 4910, November 2021.
- C. American National Standard for Clean Room Materials Flammability Test Protocol ANSI/FM Approvals 4910, November 2021.
- D. The 16 ft. High Parallel Panel Test per ANSI FM 4880 Appendix D.
- E. Optional test: ASTM E84, Standard Test Method for Surface Burning Characteristics of Building Materials.

4.3 Wall and Ceiling Materials or Systems Approved for Use in Pharmaceutical Manufacturing and Storage Areas, Food Preparation and Storage Areas or Similar Occupancies

4.3.1 Requirements

- A. The requirements of paragraph 4.1 above are used as the criteria for maximum installed height of wall and ceiling materials or systems.
- B. The average smoke emission rate (\dot{G}_{smoke}) of the installed wall system shall be ≤ 300 mg/s during a 4.9 m (16 ft) parallel panel fire test with a propane gas ignition source of 360 kW.
- C. Optional test: ASTM E84, Standard Test Method for Surface Burning Characteristics of Building Materials.

4.3.2 Tests/Verification

- A. See paragraph 4.1.2 above.
- B. The 16 ft. High Parallel Panel Test per ANSI FM 4880 Appendix D.
- C. Optional test: ASTM E84, Standard Test Method for Surface Burning Characteristics of Building Materials.

4.4 Small Scale Core and Plastic Identification Testing

Note: The following tests are conducted to satisfy building code requirements or for identification purposes. The certification agency places no limits on the values obtained.

4.4.1 Density of Insulating Cores

4.4.1.1 Requirement

For insulated building panels, the density of the bare insulating core shall be determined and reported.

4.4.1.2 Tests/Verification

ASTM C167, Test Methods for Thickness and Density of Blanket or Batt Thermal Insulations, ASTM C303, Test Method for Dimensions Density of Preformed Block- and Broad-Type Thermal Insulation or ASTM D1622, Test Method for Apparent Density of Rigid Cellular Plastics

4.4.2 Density of Plastic Panels or Panel Facings

4.4.2.1 Requirement

For plastic or plastic faced building panels, the density of the panel or facings shall be determined and reported.

4.4.2.2 Tests/Verification

ASTM D792, Test Method for Specific Gravity (Relative Density) and Density of Plastics by Displacement or ASTM D1505, Test Method for Density of Plastics by the Density-Gradient Technique

4.4.3 Ignition Properties of Plastic Materials or System Components (optional test)

4.4.3.1 Requirement

For plastic materials or plastic system components (foam core, facings), the self-ignition and flash-ignition temperatures of the plastic materials or plastic system components shall be determined and reported.

4.4.3.2 Tests/Verification

ASTM D1929, Test Method for Determining Ignition Temperature of Plastics

4.4.4 Heat Content of Plastic Materials or System Components (optional test)

4.4.4.1 Requirement

For plastic materials or systems with a plastic component (foam core, facings), the heat content of the plastic materials or panel components shall be determined by oxygen bomb calorimetry and reported.

4.4.4.2 Test/Verification

ISO 1716: Reaction-To-Fire Tests for Building Products - Determination of the Heat of Combustion

4.4.5 Ash Content of Plastic Materials or System Components (optional test)

4.4.5.1 Requirement

For plastic materials or systems with a plastic component (foam core, facings) the total ash content of the plastic material or system components shall be determined and reported.

4.4.5.2 Test/Verification

ASTM D482, Test Method for Ash from Petroleum Products

4.5 Additional Tests

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

4.5.2 A re-test following a failure shall be acceptable only at the discretion of the certification agency and with a technical justification of the conditions or reasons for failure.

5. OPERATIONS REQUIREMENTS

5.1 Demonstrated Quality Control Program

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

- Design quality is determined during the examination and tests, and is documented in the certification report.
- Continued conformance to this standard is verified by the certifier's 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 ensure 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 FM Approvals of changes in product construction, components, raw materials, physical characteristics, coatings, component formulation or quality assurance procedures prior to implementation.

5.5 Manufacturing and Production Tests

Manufacturing and production tests shall be as indicated in the audit manual prepared by the certification agency for each manufacturing location.

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