Approval Standard
for
Hose Houses and Outdoor Hose Cabinets

Class Number 2151

December 2015

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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1. INTRODUCTION

1.1 Purpose

1.1.1 This standard states Approval requirements for houses and outdoor cabinets designed to store fire hose and other firefighting equipment.

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 a follow-up program.

1.2 Scope

1.2.1 This standard sets performance requirements for the following product categories and associated class numbers:

Class Number	Product Category
2151	Hose Houses and Cabinets

1.2.2 This standard is applicable to houses and outdoor hose cabinets which provide readily accessible, well-protected storage of fire hose and other firefighting equipment.

1.2.3 Requirements for the installation, use, inspection, service testing, and replacement for such fire hose storage devices are detailed in the following National Fire Protection Association standards:

NFPA 14, *Standard for the Installation of Standpipe and Hose Systems.*

NFPA 1962, *Standard for the Care, Use, Inspection, Service Testing, and Replacement of Fire Hose, Couplings, Nozzles, and Fire Hose Appliances.*

1.2.4 Hose houses and outdoor cabinets of unusual design may be subjected to special tests to determine their suitability.

1.2.5 FM Approvals Standards are intended to verify that the product described will meet stated conditions of performance, safety, and quality useful to the ends of property conservation.

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, 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 hose houses or outdoor cabinets for the purpose of obtaining Approval. These requirements are intended primarily as guides, and strict conformity is not always mandatory. Hose houses and outdoor cabinets 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, hose houses and outdoor cabinets which do not 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 facility(ies) and audit of quality control procedures shall be made to evaluate the manufacturer's ability to produce the product as examined and tested, and the marking procedures used to identify the product. These examinations are repeated as part of FM Approvals' product follow-up 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 Agreement;
- satisfactory re-examination of production samples for continued conformity to requirements;
- satisfactory Surveillance Audits conducted as part of FM Approvals' product follow-up program.

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 forfeit Approval.

The effective date of this standard is **one year from publish date** for full 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) SI10-2010, *''American National Standard for Metric Practice.''*

1.8 Applicable Documents

The latest versions of the following standards, test methods, and practices are referenced in this standard:

ANSI/IEEE/ASTM SI 10 2010, *American National Standard for Metric Practice.*

FM Global property loss prevention data sheets.

NFPA 14, *Standard for the Installation of Standpipe and Hose Systems.*

National Fire Protection Association (NFPA) 1962, *Standard for the Care, Use, Inspection, Service Testing, and Replacement of Fire Hose, Couplings, Nozzles, and Fire Hose Appliances.*

National Fire Protection Association (NFPA) 1965, *Standard for Fire Hose Appliances.*

ASTM B117, *Standard Practice for Operating Salt Spray (Fog) Apparatus.*

1.9 Definitions

For purposes of this standard, the following terms apply:

Spanner Wrench

A special wrench designed to tighten/loosen fire hose couplings on water connections or other fire hose.

Standpipe

This term refers to the piping within a building that provides water supply to the hose connections and hose stations.

2. GENERAL INFORMATION

2.1 Product Information

2.1.1 Hose houses and outdoor cabinets provide readily accessible, well-protected storage of fire hose and other firefighting equipment. Houses are usually located over hydrants in a facility yard. Cabinets are suitable where space is limited, or where the usual hose house would not be desirable. Cabinets can be attached to a building wall, placed on legs, or fixed to a foundation near any hydrant.

2.1.2 In order to meet the intent of this standard, hose houses and outdoor cabinets must be examined on a model-by-model, type-by-type, manufacturer-by-manufacturer, and plant-by-plant basis. This is predicated on the basis that identical designs, fabricated in identical materials by different manufacturers or, even by different plants of the same manufacturer, have been seen to perform differently in testing. Sample hose houses and outdoor cabinets, selected in conformance to this criterion, shall satisfy all of the requirements of this Standard.

2.2 Approval Application Requirements

To apply for an Approval examination, the manufacturer or its authorized representative should submit a request to:

Fire Protection Manager
FM Approvals Hydraulics Laboratory
743A Reynolds Road
West Glocester, RI 02814
U.S.A.

The hose house or outdoor cabinet manufacturer shall provide the following preliminary information with any request for Approval consideration:

- a complete list of all trade names or designations, and sizes for the products or services being submitted for Approval consideration, and
- the number and location(s) of manufacturing facilities.

If the hose house or outdoor cabinet is being submitted for Approval as an assembly, the manufacturer shall specify the make and model of all components included in the assembly.

All documents shall identify the manufacturer's name, document number, or other form of reference, title, date of last revision, and revision level. All foreign language documents shall be provided with English translation.

2.3 Requirements for Samples for Examination

Following set-up and authorization of an Approval examination, the manufacturer shall submit samples for examination and testing. Sample requirements are to be determined by FM Approvals following review of the preliminary information. Sample requirements may vary depending on design features, results of prior testing, and results of the foregoing tests. It is the manufacturer's responsibility to submit samples representative of production. Any decision to use data generated utilizing prototypes is at the discretion of FM Approvals. The manufacturer shall provide any special test fixtures that may be required to evaluate the hose house or outdoor cabinet.

3. GENERAL REQUIREMENTS

3.1 Review of Documentation

During the initial investigation and prior to physical testing, the manufacturer's specifications, technical data sheets, and design details shall be reviewed to assess the ease and practicality of installation and use. The product shall be capable of being used within the limits of the Approval investigation.

3.2 Physical or Structural Features

3.2.1 Hose houses and outdoor cabinets shall:

- have capacity for storing the following equipment, at minimum:
  - 2 ½" nominal diameter fire hose – two, 100 ft. length
  - 1 ½" nominal diameter fire hose – one, 100 ft. length
  - Gated 2 ½" by 1 ½" by 1 ½" WYE valve
  - Adjustable spray nozzles – two 2 ½" size and one 1 ½" size
  - Adaptor fittings – two 2 ½" to 1 ½" adaptors
  - Two hydrant wrenches, two spanner wrenches for 1 ½" hose, and four spanner wrenches for 2 ½" hose
  - A hose house shall have room for the hydrant in addition to the equipment stated above
- be of practical design. Access to the hydrant and equipment and removal shall be easy and safe. A single operator should be able to open the structure and remove equipment.
- be of sufficient durability to resist damage from normal wear and abuse as well as expected snow and wind loads.
- be constructed of corrosion resistant materials or be treated with protective coatings.
- have means for secure anchorage.
- be weather-tight.
- have adequate vent openings for air circulation past stored hose.
- have a door or lid arrangement for closing and locking, and equipped with stops for keeping them in the open position.

3.2.2 In the case of a hose house accommodating a hydrant, it shall be possible to lay out 100 ft. of stored 2 ½" hose pre-connected to the hydrant with ease and without obstructions.

3.3 Materials

All materials shall be suitable for the intended application. Any materials used in these products shall have physical properties necessary to render them suitable for their intended use. When unusual materials are used, special tests may be necessary to verify their suitability.

3.4 Assemblies

Hose houses or outdoor cabinets may be Approved as a stand-alone device or as an assembly including any or all of the firefighting equipment listed in Section 3.2.1. The manufacturer shall be able to supply the

components included in the assembly. All components must be FM Approved for the assembly to be eligible for Approval. The manufacturer must specify the make and model of all components and FM Approvals must be notified of any changes.

3.5 Markings

3.5.1 Each hose house or outdoor cabinet shall be permanently marked on its external surface with the following information:

- manufacturer's name or identifying symbol,
- trade name or model designation,
- the words "FIRE HOSE" in letters at least 3 in. high,
- the FM Approvals Certification Mark.

3.5.3 The trade name or designation shall correspond with the manufacturer's catalog designation and shall uniquely identify the product as FM Approved. The manufacturer shall not place this model or type identification on any other product unless covered by a separate agreement.

3.5.4 The Approval Mark shall be displayed visibly and permanently on the product. The manufacturer shall not use this Mark on any other product unless such product is covered by separate agreement with FM Approvals.

3.5.5 All markings shall be legible and durable.

3.6 Manufacturer's Installation and Operation Instructions

Maintenance, operation, and installation instructions, including any special dimension requirements, shall be furnished by the manufacturer. Instructions shall be provided with each hose house or outdoor cabinet.

3.7 Calibration

All equipment used to verify the test parameters shall be calibrated within an interval determined on the basis of stability, purpose, and usage or the equipment. A copy of the calibration certificate for each piece of test equipment in required for FM Approvals' records, indicating that the calibration was performed against working standards whose calibration is certified as traceable to the National Institute of Standards and Technology (NIST) or to other acceptable reference standards and certified by a ISO 17025 calibration laboratory. The test equipment must be clearly identified by label or sticker showing the last date of the calibration and the next due date. A copy of the service accreditation certificate as an ISO 17025, "General Requirements for the Competence of Testing and Calibration Laboratories", calibration laboratory is required for FM Approvals' records.

The calibration of recently purchased new equipment is also required. Documentation indicating either the date of purchase or date of shipment, equipment description, model and serial number is required for identification. The period from the time the equipment was put into service to the date of testing must be within an interval that does not require the equipment to be calibrated as determined on the basis of the parameters mentioned above.

3.8 Tolerances

Tolerance on units of measure shall be as described in Appendix B, unless otherwise specified.

4. PERFORMANCE REQUIREMENTS

4.1 Examination

4.1.1 Requirements

The hose house or outdoor cabinet shall conform to the manufacturer's specifications and to FM Approvals requirements.

4.1.2 Test/Verification

Samples shall be examined and compared to the specifications. It shall be verified that the sample conforms to the physical and structural requirements described in Section 3, General Requirements.

4.2 Equipment Load

4.2.1 Requirements

There shall be no damage or deformation to shelves or equipment brackets when subjected to an applied load of twice the manufacturer's rating.

4.2.2 Test/Verification

The hose house or outdoor cabinet shall be mounted as intended. A static load equal to twice the manufacturer's rating shall be applied to all shelves and equipment brackets within the hose house or outdoor cabinet. The load shall be applied for a minimum of 24 hours. Subsequently, observations of any damage or deformation to the hose house or outdoor cabinet shall be made.

4.3 Snow Load

4.3.1 Requirements

The roof of a hose house or outdoor cabinet shall be able to withstand a load of 20 psf (146 kg/m^2) without any damage or deformation.

4.3.2 Test/Verification

A static load equal to 20 lb_f per square foot (146 kg_f per square meter) of the roof surface area of the hose house or outdoor cabinet shall be applied for a minimum of 24 hours. The load shall be evenly distributed over the entire surface. Subsequently, observations of any damage or deformation to the hose house or outdoor cabinet shall be made.

4.4 Wind Load

4.4.1 Requirements

A hose house or outdoor cabinet shall not be damaged or deformed and shall be capable of remaining in place when subjected to a simulated load of 40 psf (195 kg/m^2) on its projected area.

4.4.2 Test/Verification

The hose house or outdoor cabinet shall be mounted as intended. A static load equal to 40 lbs_f per

square foot (195 kg_f per square meter) of the wall surface shall be supplied. The force shall be applied for a duration of 5 minutes and in a direction perpendicular to the mounting means of the structure. The load shall be evenly distributed over the entire surface. Subsequently, observations of any damage, deformation, or movement from the mounting position shall be made.

4.5 Weatherability

4.5.1 Requirements

A hose house or outdoor cabinet shall be water-tight and shall operate freely following exposure at a temperature of -40°F (-40°C).

4.5.2 Test/Verification

The hose house or cabinet shall be subjected to a water spray at a rate of 0.6 in./min (15mm/min) from above for 5 minutes. This is to simulate a heavy rainfall. Observations of any collection of water inside the hose house or cabinet shall be made. Subsequently, the hose house or cabinet shall be conditioned at -40°F (-40°C) for a period of 24 hours. Upon removal from the chamber, the hose house or cabinet doors and latches shall operate freely as intended.

4.6 Functionality Tests

4.6.1 Requirements

A. The arrangement of shelves and equipment brackets or hooks shall allow for items to be easily stored and accessed. It shall be possible for a single operator to store and access all equipment with ease and without any obstructions.

B. Hose houses or outdoor cabinets intended to accommodate a hydrant or standpipe connection, shall be capable of allowing a 100 ft. length, 2 ½" nominal diameter fire hose to be laid out quickly without any snagging, binding, or chafing.

C. Hose houses intended to accommodate a hydrant shall have sufficient working space to effectively operate the hydrant.

4.6.2 Test/Verification

A. A hose house or outdoor cabinet shall be fully equipped with all intended firefighting hardware. A single operator shall remove each item and restore it to its original position. Observations of any difficulty in accessing, removing, and/or storing any equipment shall be made.

B. A hose house or outdoor cabinet shall be fully equipped with all intended firefighting hardware. One end of a 100 ft. length, 2 ½" nominal diameter fire hose shall be secured inside the hose house or cabinet and the hose laid out by a single operator as quickly as possible. Observations of any snagging, binding, or chafing of the hose shall be made.

C. A fully equipped hose house shall be installed on a hydrant. Observations of sufficient working space to effectively operate the hydrant with a wrench shall be made.

4.7 Corrosion – Salt Spray

4.7.1 Requirements

Hose house or outdoor cabinet construction materials shall withstand a 240 hour exposure to the

processes described in 4.5.2 without incurring excessive corrosion damage that would impair function.

4.7.2 Tests/Verification

Hose houses or outdoor cabinets shall be exposed to salt spray (fog) as specified in the latest version of ASTM B 117, *Standard Practice for Operating Salt Spray (Fog) Apparatus.* The salt solution shall consist of 20 percent (by weight) of common salt (NaCl) dissolved in deionized water with a pH between 6.5 and 7.2 and a specific gravity between 1.126 and 1.157.

Following the exposure period, the hose house or outdoor cabinet shall be inspected for corrosion damage that would impair proper function. Doors and latches shall operate freely as intended.

4.8 Additional Tests

Additional tests may be required, depending on design features, results of any tests, material application, or to verify the integrity and reliability of the hose house or outdoor cabinet, at the discretion of FM Approvals.

Unexplainable failures shall not be permitted. A re-test shall only be acceptable at the discretion of FM Approvals and with adequate technical justification of the conditions and reasons for failure.

5. OPERATIONS REQUIREMENTS

A quality assurance program is required to ensure that subsequent hose houses or outdoor cabinets produced by the manufacturer at an authorized location present the same quality and reliability as the specific products that were examined. Design quality, conformance to design, and performance are the areas of primary concern. Design quality is determined during the Approval examination and tests, and is covered in the Approval Report. Conformance to design is verified by control of quality and is covered in the Surveillance Audits. Quality of performance is determined by field performances and by periodic re-examination and testing.

5.1 Demonstrated Quality Control Program

5.1.1 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;
- handling and disposition of non-conformance materials.

5.1.2 Documentation/Manual

There shall be an authoritative collection of quality procedures and policies. Such documentation shall provide an accurate description of the quality management system and serve 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.

5.1.3 Records

In order to ensure adequate traceability of materials and products, the manufacturer shall maintain records of all quality control tests pre-formed, and shall maintain these records for a minimum period of two years from the date of manufacture.

5.1.4 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 Approval Report, must be reported to, and authorized by, FM Approvals prior to implementation for production. The manufacturer shall assign an appropriate person or group to be responsible for reporting proposed changes to Approved or Listed products to FM Approvals prior to implementation. The manufacturer shall notify FM Approvals of changes in the product or of persons responsible for keeping FM Approvals advised by means of the *FM Approved Product/Specification Tested Revision Request Form*. Records of all revisions to all FM Approved products shall be maintained.

5.2 Surveillance Audits

5.2.1 An initial surveillance audit of the manufacturing facility(ies) is part of the Approval examination to verify implementation of the quality control program. Its purpose is to determine that the manufacturer's equipment, procedures, and quality program are implemented and maintained to ensure uniform and reliable product consistent with that tested and FM Approved. Initial inspections of facilities already producing similar FM Approved products may be waived at the discretion of FM Approvals.

5.2.2 Each facility shall then remain part of the FM Approvals Surveillance Audit program as a condition of ongoing Approval. Surveillance audits shall be conducted at least annually by FM Approvals, or its representative, to determine continued compliance. More frequent audits may be required by FM Approvals or jurisdictional requirements.

5.2.3 The client shall manufacture the product or service only at the location(s) audited by FM Approvals and as specified in the Approval Report. Manufacture of products bearing the FM Approval Mark is not permitted at any other locations without prior written authorization by FM Approvals.

5.3 Manufacturer's Responsibilities

The manufacturer shall notify FM Approvals of changes in product construction, design, components, raw materials, physical characteristics, coatings, component formulation or quality assurance procedures prior to implementation of such changes.

APPENDIX A: Units of Measurement

LENGTH:	in. - ‘‘inches’’; (mm - ‘‘millimeters’’) mm = in. × 25.4 ft - ‘‘feet’’; (m -‘‘meters’’) m = ft × 0.3048
MASS:	lb - ‘‘pounds’’; (kg -‘‘kilograms’’) kg = lb x 0.453
FLOW:	gal/min - ‘‘gallons per minute’’; (L/min -‘‘Liters per minute’’) L/min = gal/min x 3.7854
PRESSURE:	psi - ‘‘pounds per square inch’’; (kPa -‘‘kilopascals’’) kPa = psi x 6.895 bar - ‘‘bar’’; (kPa -‘‘kilopascals’’) bar = kPa x 0.01 bar = psi x 0.06895
AREA:	in^2 - ‘‘square inches’’ (mm^2 -‘‘square millimeters’’) $mm^2 = in^2 \times 6.4516 \times 10^2$ ft^2 - ‘‘square feet’’ (m^2 - ‘‘square meters’’) $m^2 = ft^2 \times 0.0929$
TEMPERATURE:	°F - ‘‘degrees Fahrenheit’’ (°C-‘‘degrees Celsius’’) °C= (°F - 32) × 0.556
TORQUE/MOVEMENT:	ft·lb – “foot pound” (N·m – “Newton-meters”) N·m = lb·ft x 1.356
FORCE:	lb – “pounds”, (N – Newtons) N = lb x 4.448

APPENDIX B: Tolerances

Unless otherwise stated, the following tolerances shall apply:

Angle:	± 2°
Flow:	± 3% of value
Frequency (Hz):	± 5% of value
Length:	± 2% of value
Volume:	± 5% of value
Force:	± 2% of value
Torque:	± 2% of value
Rotation:	± 1 RPM
Pressure:	± 5% of value
Temperature:	± 5% of value
Time:	+ 5/-0 seconds + 0.1/-0 minutes + 0.1/-0 hours + 0.25/-0 days

Unless stated otherwise, all tests shall be carried out at a room (ambient) temperature of 68°F ± 18°F (20°C ± 10°C).