

Approval Standard for Fire Hose

Class Number 2111

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1. INTRODUCTION

1.1 Purpose

- 1.1.1 This standard states FM Approval criteria for 1½, 1¾, 2, and 2½ in. (38, 44, 51, and 65 mm) single-jacket occupant-use hose and single-jacket, double-jacket and covered lined fire hose; and 3 in. (76 mm) single-jacket, double-jacket and covered lined fire hose.
- 1.1.2 FM 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 is applicable to single-jacket occupant-use hose designed to be used by occupants of a building to fight incipient fires prior to the arrival of trained fire fighters or fire brigade members.
- 1.2.2 Single-jacket hose is designed for use on standpipes, fire hydrants and other such places where it will not be subject to chafing or being dragged over rough or sharp surfaces.
- 1.2.3 Double-jacket and covered hose is designed for use on pumpers or other areas where the extra protection afforded by the outer jacket or cover is desired.
- 1.2.4 While in service, fire hose tested and Approved to this Standard should be maintained and tested periodically to a nationally recognized standard, such as NFPA 1962, *Care, Use and Maintenance of Fire Hose Including Connections and Nozzles*.
- 1.2.5 In cases where metric sized fire hose is to be examined for Approval, test criteria comparable to the equivalent or nearest nominal inch size shall be used. Fire hose of unusual design may be subjected to special tests to determine their suitability.
- 1.2.6 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 fire hose for the purpose of obtaining FM Approval. These requirements are intended primarily as guides, and strict conformity is not always mandatory. Fire hose having characteristics not anticipated by this Standard may be Approved if performance equal, or superior, to that required by this Standard is demonstrated, or if the intent of the Standard is met. Alternatively, fire hose which does meet all of the requirements identified in this Standard may not be Approved if other conditions which adversely affect performance exist or if the intent of this Standard is not met.

1.4 Basis for FM Approval

FM 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 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; and
- satisfactory Facilities and Procedures Audits (F&PAs) 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 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 **July 31, 2000** 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) SI 10-97, "*Standard for Use of the International System of Units (SI): The Modern Metric System.*"

1.8 Applicable Documents

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

ANSI/IEEE/ASTM SI 10-97, *Standard for Use of the International System of Units (SI): The Modern Metric System*.

FM Global property loss prevention data sheets

National Fire Protection Association (NFPA) 1962, *Care, Use and Maintenance of Fire Hose Including Connections and Nozzles*

ASTM D 412, *Test Method for Rubber Properties in Tension, Method A*.

ASTM D 573, *Test Method for Rubber Deterioration in an Air Oven*.

1.9 Definitions

For purposes of this standard, the following terms apply:

Approval Mark

The FM Approval Mark is detailed in Appendix B. Its use is mandatory on all lengths of Approved hose. These registered marks cannot be used except as authorized by FM Approvals via the granting of Approval to a specific product.

Approved

This term refers to products FM Approved. Such products are listed in the Approval Guide. All products so listed have been successfully examined by FM Approvals, and their manufacturers have signed and returned an Approval Agreement to FM Approvals. This form obligates the manufacturer to allow re-examination of the product and audit of facilities and procedures at FM Approvals discretion. It further requires the manufacturer not to deviate from the as-Approved configuration of the product without review by, and agreement of, FM Approvals.

Degrees of Twist per Foot

The degrees per foot (degrees per meter) of twist shall be calculated by counting the number of turns of the free end as the hose is being pressurized to the proof pressure. The number of turns measured to the nearest one eighth turn shall be multiplied by 360° and the result divided by the initial length at 10 psi (70 kPa).

Percent Elongation

The percent elongation shall be calculated by dividing the initial length at 10 psi (70 kPa) by the length measured at the proof pressure. All measurements shall be taken to the nearest inch (centimeter). If the hose warps appreciably while the pressure is being increased, the length at proof pressure shall be determined by measuring along the contour of the hose.

Proof Pressure

The hydrostatic pressure to which a sample of new production hose is tested to indicate its acceptability for a specific normal maximum operating pressure. The proof pressure shall not be less than twice the service test pressure. Proof pressure tests shall only be conducted at the point of manufacture or by a laboratory qualified by FM Approvals.

Rise

As the hose is being pressurized from 10 psi (70 kPa) to the proof pressure it may rise off the test surface. The distance between the bottom of the hose and the test surface is the rise. If the hose rises in several places along its length the greatest measurement will be considered the rise. The rise shall be measured to the nearest inch (centimeter).

Service Test

A hydrostatic test conducted periodically by users on all in-service fire hose to determine suitability for continued service. The service test pressure shall be at least 10 percent greater than the normal highest operating pressure.

Warp

For hose having a nominal length of 50 ft (15 m), the warp is the maximum deviation between the centerline of the sample and a straight line drawn between the centerline of the couplings. For hose having a nominal length greater than 50 ft (15 m), but not exceeding 100 ft (30 m), the warp is the maximum deviation between the centerline of the sample and each of two straight lines. One line shall be drawn between the coupling or fitting at the fixed end to a point on the hose 50 ft (15 m) from that fitting. The other line shall be drawn from the coupling or fitting on the relief end to a point on the hose 50 ft (15 m) from that fitting. All measurements shall be taken along the centerline of the hose and couplings or fittings.