

UL 1821

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Thermoplastic Sprinkler Pipe and Fittings for Fire Protection Service



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December 29, 1994

Standard for

Thermoplastic Sprinkler Pipe and Fittings for Fire Protection Service

UL 1821, First Edition

Accompanying this transmittal notice is a copy of the First edition of UL 1821.

A CHANGE IS INDICATED BY A SMALL PRINT NOTE FOLLOWING THE AFFECTED ITEM.

THIS EDITION OF THE STANDARD IS NOW IN EFFECT EXCEPT FOR SECTIONS 19 AND 23 WHICH BECOME EFFECTIVE JUNE 28, 1996 AS INDICATED IN THE SMALL PRINT NOTE FOLLOWING THE AFFECTED ITEMS.

New product submittals made prior to a specified future effective date will be judged under all of the requirements in this standard unless the applicant specifically requests that the product be judged under the current requirements. However, should the applicant elect this option, it should be noted that compliance with all the requirements in this standard will be required as a condition of continued Listing and Follow-Up Services after the effective date and understanding of this should be signified in writing.

The requirements in this standard are substantially in accordance with UL's bulletin on this subject dated March 11, 1994. This bulletin is now obsolete and may be discarded.

Revised and/or additional pages may be issued from time to time.

DECEMBER 29, 1994

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UL 1821

Standard for

**Thermoplastic Sprinkler Pipe and Fittings
for Fire Protection Service**

Prior to the first edition, the requirements for the products covered by this standard were included in the Outline of Investigation for Thermoplastic Sprinkler Pipe and Fittings for Fire Protection Service, Subject 1821.

First Edition

December 29, 1994

Revisions of this standard will be made by issuing revised or additional pages bearing their date of issue. A UL Standard is current only if it incorporates the most recently adopted revisions, all of which are itemized on the transmittal notice that accompanies the latest published set of revision pages.

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FOREWORD

A. This Standard contains basic requirements for products covered by Underwriters Laboratories Inc. (UL) under its Follow-Up Service for this category within the limitations given below and in the Scope section of this Standard. These requirements are based upon sound engineering principles, research, records of tests and field experience, and an appreciation of the problems of manufacture, installation, and use derived from consultation with and information obtained from manufacturers, users, inspection authorities, and others having specialized experience. They are subject to revision as further experience and investigation may show is necessary or desirable.

B. The observance of the requirements of this Standard by a manufacturer is one of the conditions of the continued coverage of the manufacturer's product.

C. A product which complies with the text of this Standard will not necessarily be judged to comply with the Standard if, when examined and tested, it is found to have other features which impair the level of safety contemplated by these requirements.

D. A product employing materials or having forms of construction differing from those detailed in the requirements of this Standard may be examined and tested according to the intent of the requirements and, if found to be substantially equivalent, may be judged to comply with the Standard.

E. UL, in performing its functions in accordance with its objectives, does not assume or undertake to discharge any responsibility of the manufacturer or any other party. The opinions and findings of UL represent its professional judgment given with due consideration to the necessary limitations of practical operation and state of the art at the time the Standard is processed. UL shall not be responsible to anyone for the use of or reliance upon this Standard by anyone. UL shall not incur any obligation or liability for damages, including consequential damages, arising out of or in connection with the use, interpretation of, or reliance upon this Standard.

F. Many tests required by the Standards of UL are inherently hazardous and adequate safeguards for personnel and property shall be employed in conducting such tests.

INTRODUCTION

1 Scope

1.1 These requirements cover thermoplastic pipe and fittings for use in sprinkler systems for fire protection service.

1.2 Thermoplastic piping and fittings covered by these requirements are intended for use in sprinkler systems in the following types of occupancies:

- a) Light hazard occupancies as defined in the Standard for Installation of Sprinkler Systems, NFPA 13.
- b) Residential occupancies as defined in the Standard for Installation of Sprinkler Systems in One and Two Family Dwellings, NFPA 13D.
- c) Residential occupancies as defined in the Standard for Installation of Sprinkler Systems in Residential Occupancies Up to Four Stories in Height, NFPA 13R.

1.3 The pipe and fittings covered by these requirements are intended to be installed in accordance with the Standard for Sprinkler Systems in One and Two Family Dwellings, NFPA 13D; the Standard for Sprinkler Systems in Residential Occupancies Up to Four Stories in Height, NFPA 13R; and the Standard for Installation of Sprinkler Systems, NFPA 13.

1.4 A product that contains features, characteristics, components, materials, or systems new or different from those in use when the standard was developed, and that involves a risk of fire, electric shock, or injury to persons shall be evaluated using the appropriate additional component and end-product requirements as determined necessary to maintain the acceptable level of safety as originally anticipated by the intent of this standard. A product whose features, characteristics, components, materials, or systems conflict with specific requirements or provisions of this Standard cannot be judged to comply with this Standard. Where considered appropriate, revision of requirements shall be proposed and adopted in conformance with the methods employed for development, revision, and implementation of this Standard.

2 General

2.1 Components

2.1.1 Except as indicated in 2.1.2, a component of a product covered by this standard shall comply with the requirements for that component.

2.1.2 A component need not comply with a specific requirement that:

- a) Involves a feature or characteristic not needed in the application of the component in the product covered by this standard, or
- b) Is superseded by a requirement in this standard.

2.1.3 A component shall be used in accordance with its recognized rating established for the intended conditions of use.

2.1.4 Specific components are recognized as being incomplete in construction features or restricted in performance capabilities. Such components are intended for use only under limited conditions, such as certain temperatures not exceeding specified limits and shall be used only under those specific conditions for which they have been recognized.

2.2 Units of measurement

2.2.1 If a value for measurement is followed by a value in other units in parentheses, the second value may be only approximate. The first stated value is the requirement.

2.3 Undated references

2.3.1 Any undated reference to a code or standard appearing in the requirements of this standard shall be interpreted as referring to the latest edition of that code or standard.

2.4 Terminology

2.4.1 The term "product" as used in these requirements refers to all thermoplastic pipe or fittings or any part thereof covered by these requirements unless specifically noted otherwise. Also, the term "pipe" or "piping" as used in the requirements is intended to include, where applicable, fittings as well.

3 Glossary

3.1 For the purposes of these requirements, the following definitions apply.

3.2 FLEXIBLE THERMOPLASTIC PIPE – A fire sprinkler pipe that has sufficient flexibility to achieve directional changes, provided turns are not made with the pipe using a bending radius less than the minimum specified by the manufacturer.

3.3 RATED TEMPERATURE – The maximum ambient temperature for which the piping is intended to be exposed for the fire sprinkler application.

3.4 RATED PRESSURE – The maximum internal water pressure to which the piping is intended to be subjected to in the sprinkler system.

3.5 THERMOPLASTIC – A plastic capable of being repeatedly softened by heating and hardened by cooling through a particular temperature range that is characteristic of the plastic. In the softened state, it can be shaped by processes such as molding or extrusion.

4 Use in Environmental Air Handling Spaces

4.1 Thermoplastic pipe intended for use in ceiling cavity environmental air handling spaces shall be tested in accordance with the requirements in the Standard for Fire Test of Plastic Sprinkler Pipe for Flame and Smoke Characteristics, UL 1887 and comply with the applicable requirements of the Standard for the Installation of Air Conditioning and Ventilating Systems, ANSI/NFPA 90A-1993.

5 Installation and Design Manual

5.1 A copy of the installation and design manual shall be provided for use as a guide in the examination and testing of pipe and fittings.

5.2 The installation and design manual shall reference the information required for proper installation of the piping and shall include at least the following items:

- a) A description of the pipe, fittings, and equipment needed for assembling a sprinkler system using the thermoplastic piping.
- b) Detailed instructions and illustrations for assembling sections of pipe, fittings and the attachment of sprinklers.
- c) Maximum rated pressure.
- d) Maximum rated temperature for which the pipe and fittings are to be installed and information on methods that can be used to reduce the exposure temperature.
- e) Description of the methods to be used to inspect and test the piping system after installation.
- f) Information regarding proper storage of the pipe and fittings prior to installation.
- g) Friction loss characteristics of the pipe and fittings.
- h) Description of all limitations and special installation and design criteria associated with the use of the product, including at least the following:
 - 1) Pipe hanger spacing,
 - 2) Type of pipe hangers to be used,
 - 3) Requirements for piping and sprinkler restraint,
 - 4) Temperature rating classification of sprinklers,
 - 5) Restrictions on piping location within the building, including a statement that the piping is to be installed at least 24 inches (610 mm) from air return grilles or other openings in the ceiling,
 - 6) For flexible pipe, the minimum bending radius values,
 - 7) Occupancy use,
 - 8) Information on the minimum required protection for the piping as determined by the Fire Exposure Test, Section 10.
- i) The name of the manufacturer or private labeler, or equivalent designation.
- j) Issue date of the installation and design manual.

CONSTRUCTION

6 General

6.1 Sprinkler pipe and fittings shall be in sizes 3/4 inch (19.1 mm) and larger diameter and free from visible cracks, holes, foreign inclusions or other defects.