

NFPA®

24

**Standard for
the Installation of Private
Fire Service Mains and
Their Appurtenances**

2019



This is a preview. [Click here to purchase the full publication.](#)

IMPORTANT NOTICES AND DISCLAIMERS CONCERNING NFPA® STANDARDS

NOTICE AND DISCLAIMER OF LIABILITY CONCERNING THE USE OF NFPA STANDARDS

NFPA® codes, standards, recommended practices, and guides (“NFPA Standards”), of which the document contained herein is one, are developed through a consensus standards development process approved by the American National Standards Institute. This process brings together volunteers representing varied viewpoints and interests to achieve consensus on fire and other safety issues. While the NFPA administers the process and establishes rules to promote fairness in the development of consensus, it does not independently test, evaluate, or verify the accuracy of any information or the soundness of any judgments contained in NFPA Standards.

The NFPA disclaims liability for any personal injury, property, or other damages of any nature whatsoever, whether special, indirect, consequential or compensatory, directly or indirectly resulting from the publication, use of, or reliance on NFPA Standards. The NFPA also makes no guaranty or warranty as to the accuracy or completeness of any information published herein.

In issuing and making NFPA Standards available, the NFPA is not undertaking to render professional or other services for or on behalf of any person or entity. Nor is the NFPA undertaking to perform any duty owed by any person or entity to someone else. Anyone using this document should rely on his or her own independent judgment or, as appropriate, seek the advice of a competent professional in determining the exercise of reasonable care in any given circumstances.

The NFPA has no power, nor does it undertake, to police or enforce compliance with the contents of NFPA Standards. Nor does the NFPA list, certify, test, or inspect products, designs, or installations for compliance with this document. Any certification or other statement of compliance with the requirements of this document shall not be attributable to the NFPA and is solely the responsibility of the certifier or maker of the statement.

REVISION SYMBOLS IDENTIFYING CHANGES FROM THE PREVIOUS EDITION

Text revisions are shaded. A **Δ** before a section number indicates that words within that section were deleted and a **Δ** to the left of a table or figure number indicates a revision to an existing table or figure. When a chapter was heavily revised, the entire chapter is marked throughout with the **Δ** symbol. Where one or more sections were deleted, a **•** is placed between the remaining sections. Chapters, annexes, sections, figures, and tables that are new are indicated with an **N**.

Note that these indicators are a guide. Rearrangement of sections may not be captured in the markup, but users can view complete revision details in the First and Second Draft Reports located in the archived revision information section of each code at www.nfpa.org/docinfo. Any subsequent changes from the NFPA Technical Meeting, Tentative Interim Amendments, and Errata are also located there.

REMINDER: UPDATING OF NFPA STANDARDS

Users of NFPA codes, standards, recommended practices, and guides (“NFPA Standards”) should be aware that NFPA Standards may be amended from time to time through the issuance of a Tentative Interim Amendment (TIA) or corrected by Errata. An official NFPA Standard at any point in time consists of the current edition of the document together with any TIAs and Errata then in effect.

To determine whether an NFPA Standard has been amended through the issuance of Tentative Interim Amendments or corrected by Errata, go to www.nfpa.org/docinfo to choose from the list of NFPA Standards or use the search feature to select the NFPA Standard number (e.g., NFPA 13). The document information page provides up-to-date document-specific information as well as postings of all existing TIAs and Errata. It also includes the option to register for an “Alert” feature to receive an automatic email notification when new updates and other information are posted regarding the document.

IMPORTANT NOTICES AND DISCLAIMERS CONCERNING NFPA® STANDARDS

ADDITIONAL NOTICES AND DISCLAIMERS

Updating of NFPA Standards

Users of NFPA codes, standards, recommended practices, and guides (“NFPA Standards”) should be aware that these documents may be superseded at any time by the issuance of new editions or may be amended from time to time through the issuance of Tentative Interim Amendments or corrected by Errata. An official NFPA Standard at any point in time consists of the current edition of the document together with any Tentative Interim Amendments and any Errata then in effect. In order to determine whether a given document is the current edition and whether it has been amended through the issuance of Tentative Interim Amendments or corrected through the issuance of Errata, consult appropriate NFPA publications such as the National Fire Codes® Subscription Service, visit the NFPA website at www.nfpa.org, or contact the NFPA at the address listed below.

Interpretations of NFPA Standards

A statement, written or oral, that is not processed in accordance with Section 6 of the Regulations Governing the Development of NFPA Standards shall not be considered the official position of NFPA or any of its Committees and shall not be considered to be, nor be relied upon as, a Formal Interpretation.

Patents

The NFPA does not take any position with respect to the validity of any patent rights referenced in, related to, or asserted in connection with an NFPA Standard. The users of NFPA Standards bear the sole responsibility for determining the validity of any such patent rights, as well as the risk of infringement of such rights, and the NFPA disclaims liability for the infringement of any patent resulting from the use of or reliance on NFPA Standards.

NFPA adheres to the policy of the American National Standards Institute (ANSI) regarding the inclusion of patents in American National Standards (“the ANSI Patent Policy”), and hereby gives the following notice pursuant to that policy:

NOTICE: The user’s attention is called to the possibility that compliance with an NFPA Standard may require use of an invention covered by patent rights. NFPA takes no position as to the validity of any such patent rights or as to whether such patent rights constitute or include essential patent claims under the ANSI Patent Policy. If, in connection with the ANSI Patent Policy, a patent holder has filed a statement of willingness to grant licenses under these rights on reasonable and nondiscriminatory terms and conditions to applicants desiring to obtain such a license, copies of such filed statements can be obtained, on request, from NFPA. For further information, contact the NFPA at the address listed below.

Law and Regulations

Users of NFPA Standards should consult applicable federal, state, and local laws and regulations. NFPA does not, by the publication of its codes, standards, recommended practices, and guides, intend to urge action that is not in compliance with applicable laws, and these documents may not be construed as doing so.

Copyrights

NFPA Standards are copyrighted. They are made available for a wide variety of both public and private uses. These include both use, by reference, in laws and regulations, and use in private self-regulation, standardization, and the promotion of safe practices and methods. By making these documents available for use and adoption by public authorities and private users, the NFPA does not waive any rights in copyright to these documents.

Use of NFPA Standards for regulatory purposes should be accomplished through adoption by reference. The term “adoption by reference” means the citing of title, edition, and publishing information only. Any deletions, additions, and changes desired by the adopting authority should be noted separately in the adopting instrument. In order to assist NFPA in following the uses made of its documents, adopting authorities are requested to notify the NFPA (Attention: Secretary, Standards Council) in writing of such use. For technical assistance and questions concerning adoption of NFPA Standards, contact NFPA at the address below.

For Further Information

All questions or other communications relating to NFPA Standards and all requests for information on NFPA procedures governing its codes and standards development process, including information on the procedures for requesting Formal Interpretations, for proposing Tentative Interim Amendments, and for proposing revisions to NFPA standards during regular revision cycles, should be sent to NFPA headquarters, addressed to the attention of the Secretary, Standards Council, NFPA, 1 Batterymarch Park, P.O. Box 9101, Quincy, MA 02269-9101; email: stds_admin@nfpa.org.

For more information about NFPA, visit the NFPA website at www.nfpa.org. All NFPA codes and standards can be viewed at no cost at www.nfpa.org/docinfo.

Copyright © 2018 National Fire Protection Association®. All Rights Reserved.

NFPA® 24

Standard for the

Installation of Private Fire Service Mains and Their Appurtenances

2019 Edition

This edition of NFPA 24, *Standard for the Installation of Private Fire Service Mains and Their Appurtenances*, was prepared by the Technical Committee on Private Water Supply Piping Systems and released by the Correlating Committee on Automatic Sprinkler Systems. It was issued by the Standards Council on May 4, 2018, with an effective date of May 24, 2018, and supersedes all previous editions.

This edition of NFPA 24 was approved as an American National Standard on May 24, 2018.

Origin and Development of NFPA 24

In 1903, the NFPA Committee on Hose and Hydrants first presented *Specifications for Mill Yard Hose Houses*, taken substantially from a standard published by the Eastern Factory Insurance Association. This text was revised and adopted in 1904. The NFPA Committee on Field Practice amended the Specifications in 1926, published as NFPA 25.

In 1925, the Committee on Field Practice prepared a *Standard on Outside Protection, Private Underground Piping Systems Supplying Water for Fire Extinguishment*, which was adopted by NFPA. It was largely taken from the 1920 edition of the *NFPA Automatic Sprinkler Standard*, Section M on Underground Pipes and Fittings. In September 1931, a revision was made, with the resulting standard designated as NFPA 24. In the 1981 edition, the title was changed from *Standard for Outside Protection* to *Standard for the Installation of Private Fire Service Mains and Their Appurtenances*.

In 1953, on recommendation of the Committee on Standpipes and Outside Protection, the two standards (NFPA 24 and NFPA 25) were completely revised and adopted as NFPA 24. Amendments were made leading to separate editions in 1955, 1959, 1962, 1963, 1965, 1966, 1968, 1969, 1970, 1973, 1977, 1981, 1983, and 1987.

The 1992 edition included amendments to further delineate the point at which the water supply stops and the fixed fire protection system begins. Minor changes were made concerning special topics such as thrust restraint and equipment provisions in valve pits.

The 1995 edition clarified requirements for aboveground and buried piping. Revisions were made to provide additional information regarding listing requirements, signage, valves, valve supervision, hydrant outlets, system attachments, piping materials, and thrust blocks. User friendliness of the document was also addressed.

The 2002 edition represented a complete revision of NFPA 24. Changes included reorganization and editorial modifications to comply with the *Manual of Style for NFPA Technical Committee Documents*. Additionally, all of the underground piping requirements were relocated into a new Chapter 10.

The 2007 edition was revised in five major areas: Chapter 10 was updated editorially, and minor technical changes were made. Newly established leakage test criteria, as well as updated requirements for thrust blocks and restrained joints, were added to Chapter 10. Two annexes were new to this edition: Annex C, *Recommended Practice for Fire Flow Testing*, and Annex D, *Recommended Practice for Marking of Hydrants*. These two annexes were developed based on the 2002 edition of NFPA 291.

The 2010 edition was revised in three major areas: the provisions for location and identification of fire department connections, valves controlling water supply, and protection of fire service mains entering the building.

The 2013 edition of NFPA 24 included clarifications on the requirements for running piping under buildings, including annex figures depicting clearances. The Contractors Material and Test

Certificate for Underground Piping (Figure 10.10.1) was modified to include confirmation that the forward flow test of the backflow preventer had been conducted. A provision requiring the automatic drip valve to be located in an accessible location that permits inspections in accordance with NFPA 25 was also added.

NFPA 24 underwent a structural rewrite for the 2016 edition. The hydrant definitions were clarified to describe the type of hydrant in question, as opposed to describing when and where they would be used. The valve arrangement requirements were rewritten for clarity, and annex figures added to provide figures that are consistent with NFPA 13. The title of Chapter 6 was changed from “Valves” to “Water Supply Connections” to better describe the material covered in the chapter. Revisions to Section 6.1 more clearly call out the permitted exceptions to indicating valves and permit nonlisted tapping sleeve and valve assemblies in connections to municipal water supplies. The center of hose outlet measurements was updated to include clear minimum and maximum values for the location of the outlet, along with the appropriate measurement for a hose house installation. The steel underground piping references have been removed from the table in Chapter 10 because steel pipe is required to be listed other than in the FDC line. A statement also was added to allow underground fittings to be used above ground to transition to aboveground piping.

The 2019 edition includes minor changes related to trenching and backfill. Acceptance testing requirements for aboveground piping have been included. The standard has also been revised to clarify the unacceptable use of steel piping for underground service.

Correlating Committee on Automatic Sprinkler Systems

Kenneth W. Linder, *Chair*
Swiss Re, CT [I]

Jose R. Baz, JRB Associates Group Inc., FL [M]
Rep. NFPA Latin American Section

Kerry M. Bell, UL LLC, IL [RT]

Tracey D. Bellamy, Telgian Corporation, GA [U]
Rep. The Home Depot

Scott T. Franson, The Viking Corporation, MI [M]

Michael J. Friedman, Friedman Consulting, Inc., MD [SE]

Luke Hilton, Liberty Mutual Property, NC [I]

Alex Hoffman, Viking Fire Protection Inc., Canada [IM]
Rep. Canadian Automatic Sprinkler Association

Mark Hopkins, National Fire Sprinkler Association, MD [M]
Rep. National Fire Sprinkler Association

Roland J. Huggins, American Fire Sprinkler Association, Inc., TX [IM]

Sultan M. Javeri, SC Engineering, France [IM]

Charles W. Ketner, National Automatic Sprinkler Fitters LU 669, MD [L]

Rep. United Assn. of Journeymen & Apprentices of the Plumbing & Pipe Fitting Industry

John A. LeBlanc, FM Global, MA [I]

David O. Lowrey, City of Boulder Fire Rescue, CO [E]

Brock Mitchell, Extended Stay Hotels, NC [U]

Garner A. Palenske, Jensen Hughes/AON Fire Protection Engineering, CA [SE]

Rep. JENSEN HUGHES

Adam Seghi, Coda Risk Analysis, TX [I]

Douglas Paul Stultz, U.S. Department of the Navy, VA [E]

J. Michael Thompson, GHD/The Protection Engineering Group, PC, VA [SE]

Alternates

Roland A. Asp, National Fire Sprinkler Association, Inc., MD [M]
(Alt. to Mark Hopkins)

Ralph E. Bless, Jr., Telgian Corporation, GA [U]
(Alt. to Tracey D. Bellamy)

James P. Carroll, Liberty Mutual Insurance, FL [I]
(Alt. to Luke Hilton)

Bruce H. Clarke, American International Group, Inc. (AIG), NC [I]
(Alt. to Adam Seghi)

Russell P. Fleming, Northeast Fire Suppression Associates, LLC, NH [SE]
(Alt. to Michael J. Friedman)

David B. Fuller, FM Approvals, RI [I]
(Alt. to John A. LeBlanc)

Jeffrey E. Harper, JENSEN HUGHES, IL [SE]
(Alt. to Garner A. Palenske)

Jeff Hebenstreit, UL LLC, IL [RT]
(Alt. to Kerry M. Bell)

Scott T. Martorano, The Viking Corporation, MI [M]
(Alt. to Scott T. Franson)

Jack A. Medovich, Fire & Life Safety America, MD [IM]
(Alt. to Roland J. Huggins)

John G. O'Neill, GHD/The Protection Engineering Group, PC, VA [SE]
(Alt. to J. Michael Thompson)

Lawrence Richard Phillips, U.S. Department of the Navy, VA [E]
(Alt. to Douglas Paul Stultz)

Donato A. Pirro, Electro Sistemas De Panama, S.A., Panama [M]
(Alt. to Jose R. Baz)

Jason W. Ryckman, Canadian Automatic Sprinkler Association, Canada [IM]
(Alt. to Alex Hoffman)

Joseph Su, National Research Council of Canada, Canada [RT]
(Voting Alt.)

Nonvoting

James B. Biggins, TUV SUD America Inc./Global Risk Consultants Corporation, IL [SE]
Rep. TC on Hanging & Bracing of Water-Based Systems

Robert G. Caputo, Fire & Life Safety America, AZ [M]
Rep. TC on Foam-Water Sprinklers

Raymond A. Grill, Arup, DC [SE]
Rep. TC on Sprinkler System Installation Criteria

Kenneth E. Isman, University of Maryland, MD [SE]
Rep. TC on Residential Sprinkler Systems

William E. Koffel, Koffel Associates, Inc., MD [SE]
Rep. Safety to Life Correlating Committee

David R. Hague, NFPA Staff Liaison

Chad Duffy, NFPA Co-Staff Liaison

Russell B. Leavitt, Telgian Corporation, AZ [U]
Rep. TC on Sprinkler System Discharge Criteria

Kenneth W. Wagoner, Parsley Consulting Engineers, CA [SE]
Rep. TC on Private Water Supply Piping Systems

John J. Walsh, UA Joint Apprenticeship Committee Local 669, MD [SE]
Rep. United Assn. of Journeymen & Apprentices of the Plumbing & Pipe Fitting Industry
(Member Emeritus)

This list represents the membership at the time the Committee was balloted on the final text of this edition. Since that time, changes in the membership may have occurred. A key to classifications is found at the back of the document.

NOTE: Membership on a committee shall not in and of itself constitute an endorsement of the Association or any document developed by the committee on which the member serves.

Committee Scope: This Committee shall have overall responsibility for documents that pertain to the criteria for the design and installation of automatic, open and foam-water sprinkler systems including the character and adequacy of water supplies, and the selection of sprinklers, piping, valves, and all materials and accessories. This Committee does not cover the installation of tanks and towers, nor the installation, maintenance, and use of central station, proprietary, auxiliary, and local signaling systems for watchmen, fire alarm, supervisory service, nor the design of fire department hose connections.

Technical Committee on Private Water Supply Piping Systems

Kenneth W. Wagoner, *Chair*

Parsley Consulting Engineers, CA [SE]

Roland A. Asp, National Fire Sprinkler Association, Inc., MD [M]
Rep. National Fire Sprinkler Association

James B. Biggins, TUV SUD America Inc./Global Risk Consultants Corporation, IL [SE]

James A. Charrette, Allan Automatic Sprinkler of So. California, CA [IM]

Rep. National Fire Sprinkler Association

Flora F. Chen, Hayward Fire Department, California, CA [E]

Stephen A. Clark, Jr., Allianz Risk Consulting, LLC, VA [I]

Jeffrey T. Dudley, National Aeronautics & Space Administration, FL [U]

Byron E. Ellis, Entergy Corporation, LA [U]
Rep. Edison Electric Institute

Brandon W. Frakes, Global Asset Protection Services, LLC, NC [I]

Robert M. Gagnon, Gagnon Engineering, MD [SE]

LaMar Hayward, 3-D Fire Protection, Inc., ID [IM]

Jeff Hebenstreit, UL LLC, IL [RT]

Kevin J. Kelly, Victaulic, PA [M]
Rep. National Fire Sprinkler Association

Alan R. Laguna, Merit Sprinkler Company, Inc., LA [IM]

John Lake, City of Gainesville, FL [E]

Michael Larsen, Amway Inc., MI [U]

James M. Maddry, James M. Maddry, P.E., GA [SE]

Donald McGriff, ISCO Industries, AL [M]

Bob D. Morgan, Fort Worth Fire Department, TX [E]

Thomas William Noble, American Fire Sprinkler Association, TX [IM]

Dale H. O'Dell, National Automatic Sprinkler Fitters LU 669, CA [L]

Rep. United Assn. of Journeymen & Apprentices of the Plumbing & Pipe Fitting Industry

Shawn C. Olson, Clackamas County Fire District #1, OR [E]

Dion Powell, Liberty Mutual, IL [I]

James R. Richardson, Lisle Woodridge Fire District, IL [E]

Daniel Sanchez, City of Los Angeles, CA [E]

James R. Schifiliti, Fire Safety Consultants, Inc., IL [IM]
Rep. Illinois Fire Prevention Association

Peter T. Schwab, Wayne Automatic Fire Sprinklers, Inc., FL [IM]

Austin L. Smith, Consolidated Nuclear Security, LLC, Y-12, TN [U]

Michael J. Spaziani, FM Global, MA [I]

Chen-Hsiang Su, JENSEN HUGHES/AON, IL [SE]
Rep. JENSEN HUGHES

Alternates

Jon R. Ackley, Dalmatian Fire, Inc., IN [M]
(Alt. to Roland A. Asp)

Marinus Both, Western States Fire Protection Company, NV [IM]
(Alt. to James A. Charrette)

Mark A. Bowman, Global Asset Protection Services, LLC, OH [I]
(Alt. to Brandon W. Frakes)

Hossein Davoodi, Duke Energy, NC [U]
(Alt. to Byron E. Ellis)

William J. Gotto, TUV SUD America Inc./Global Risk Consultants Corporation, NJ [SE]
(Alt. to James B. Biggins)

Andrew C. Higgins, Allianz Risk Consulting, LLC, NC [I]
(Alt. to Stephen A. Clark, Jr.)

Luke Hilton, Liberty Mutual Property, NC [I]
(Alt. to Dion Powell)

Larry Keeping, PLC Fire Safety Solutions, Canada [SE]
(Voting Alt.)

Charles W. Ketner, National Automatic Sprinkler Fitters LU 669, MD [L]
(Alt. to Dale H. O'Dell)

Kevin D. Maughan, Globe Fire, MI [M]
(Alt. to Kevin J. Kelly)

Michael G. McCormick, UL LLC, IL [RT]
(Alt. to Jeff Hebenstreit)

Angele Morcos, FM Global, MA [I]
(Alt. to Michael J. Spaziani)

William Overton, Consolidated Nuclear Security, LLC, Y-12, TN [U]
(Alt. to Austin L. Smith)

John H. Pecot, Tyco Simplexgrinnell, TX [M]
(Voting Alt.)

Martin Ramos, Environmental Systems Design, Inc., IL [SE]
(Voting Alt.)

Jeffrey J. Rovegno, Mr. Sprinkler Fire Protection, CA [IM]
(Alt. to Thomas William Noble)

James A. Zimmerman, JENSEN HUGHES, IL [SE]
(Alt. to Chen-Hsiang Su)

Nonvoting

Frans Alferink, Wavin Overseas, Netherlands [U]

David R. Hague, NFPA Staff Liaison

Chad Duffy, NFPA Co-Staff Liaison

This list represents the membership at the time the Committee was balloted on the final text of this edition. Since that time, changes in the membership may have occurred. A key to classifications is found at the back of the document.

NOTE: Membership on a committee shall not in and of itself constitute an endorsement of the Association or any document developed by the committee on which the member serves.