

Standard for the Installation of Stationary Pumps for Fire Protection

2019



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 \triangle before a section number indicates that words within that section were deleted and a \triangle 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 \triangle 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[®] 20

Standard for the

Installation of Stationary Pumps for Fire Protection

2019 Edition

This edition of NFPA 20, *Standard for the Installation of Stationary Pumps for Fire Protection*, was prepared by the Technical Committee on Fire Pumps. 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 document has been amended by one or more Tentative Interim Amendments (TIAs) and/or Errata. See "Codes & Standards" at www.nfpa.org for more information.

This edition of NFPA 20 was approved as an American National Standard on May 24, 2018.

Origin and Development of NFPA 20

The first National Fire Protection Association standard for automatic sprinklers was published in 1896 and contained paragraphs on steam and rotary fire pumps.

The Committee on Fire Pumps was organized in 1899 with five members from underwriter associations. Modern committee membership has included representatives of Underwriters Laboratories of both the United States and Canada, Insurance Services Office, Factory Mutual, Industrial Risk Insurers, national trade associations, state governments, engineering organizations, and private individuals.

Early fire pumps were only secondary supplies for sprinklers, standpipes, and hydrants and were started manually. Today, fire pumps have greatly increased in number and in applications — many are the major or only water supply, and almost all are started automatically. Early pumps usually took suction by lift from standing or flowing water supplies because the famed National Standard Steam Fire Pump and rotary types suited that service. Ascendancy of the centrifugal pump resulted in positive head supply to horizontal shaft pumps from public water supplies and aboveground tanks. Later, vertical shaft turbine–type pumps were lowered into wells or into wet pits supplied from ponds or other belowground sources of water.

Gasoline engine–driven pumps first appeared in this standard in 1913. From an early status of relative unreliability and of supplementary use only, first spark-ignited gasoline engines and then compression ignition diesels have steadily developed engine-driven pumps to a place alongside electric-driven units for total reliability.

Fire protection now calls for larger pumps, higher pressures, and more varied units for a wide range of systems protecting both life and property. Hydraulically calculated and designed sprinkler and special fire protection systems have changed concepts of water supply completely.

Since the formation of this committee, each edition of NFPA 20 has incorporated appropriate provisions to cover new developments and has omitted obsolete provisions. NFPA action on successive editions has been taken in the following years: 1907, 1910–1913, 1915, 1918–1921, 1923–1929, 1931–1933, 1937, 1939, 1943, 1944, 1946–1948, 1951, 1953, 1955, 1957, 1959–1972, 1974, 1976, 1978, 1980, 1983, 1987, 1990, 1993, 1996, 1999, 2003, and 2007.

The 1990 edition included several amendments with regard to some of the key components associated with electric-driven fire pumps. In addition, amendments were made to allow the document to conform more closely to the NFPA *Manual of Style*.

The 1993 edition included significant revisions to chapters 6 and 7 with regard to the arrangement of the power supply to electric-driven fire pumps. These clarifications were intended to provide the necessary requirements to make the system as reliable as possible.

The 1996 edition continued the changes initiated in the 1993 edition, and chapters 6 and 7, which addressed electric drives and controllers, underwent significant revision. New information was

NFPA and National Fire Protection Association are registered trademarks of the National Fire Protection Association, Quincy, Massachusetts 02169.

also added regarding engine-cooling provisions, earthquake protection, and backflow preventers. Chapter 5, which addressed provisions for high-rise buildings, was removed, as were capacity limitations on in-line and end suction pumps. Additionally, provisions regarding suction pipe fittings were updated.

The 1999 edition of the standard included requirements for positive displacement pumps for both water mist and foam systems. The document title was revised to reflect this change, since the 1999 edition addressed requirements for pumps other than centrifugal. Enforceable language was added, particularly regarding protection of equipment.

Revisions for the 2003 edition included updating the document to conform with the latest edition of the *Manual of Style for NFPA Technical Committee Documents.* Provisions were also added to address the use of fire pump drivers using variable speed pressure limiting control. Acceptance test criteria were added to the document for replacement of critical path components of a fire pump installation.

For the 2007 edition, requirements for variable speed drives were refined, requirements for break tanks were added, and component replacement testing tables were included.

The 2010 edition included a new chapter on fire pumps for high-rise buildings. Requirements for pumps arranged in series were also added to the general requirements chapter. Chapter 11 of the standard was reorganized.

The 2013 edition clarified and added new requirements for water mist positive displacement pumping units. Chapter 5 of the standard was reorganized. Limited service controller requirements were revised, and the component replacement table was removed.

The 2016 edition of NFPA 20 provided new requirements for pumps in series relative to protection of control wiring, status signals, and communications. NFPA 20 recognized the potential use of multistage, multiport pumps in fire suppression systems and provided requirements specific to that application. Break tank criteria were removed and are now in accordance with NFPA 22, *Standard for Water Tanks for Private Fire Protection*. A new annex, Annex C, was added to provide guidance on controller security where a controller is connected to the Internet. New requirements were added to address use of an automatic fuel maintenance system with a diesel fire pump installation. In addition, protection criteria for both a diesel fire pump room and an electric fire pump room were defined in Chapter 4.

The 2019 edition of NFPA 20 is revised to recognize new technologies, including automated inspection and testing, distance monitoring, automated valves, and self-regulating variable speed fire pump units. Provisions are added to require that a single entity be responsible for acceptable fire pump unit performance. A new definition for *lowest permissible suction pressure* is added to provide a better understanding of the maximum available flow by connecting it to a suction pressure. Requirements are added to clarify where manifolding of fire pump test piping is permitted, as well as where combining fire pump test piping with relief valve discharge piping is permitted. New definitions are added to differentiate between *standby power* and *alternate power* and to ensure proper application of these terms throughout the document. The term *very tall building* is defined and the requirements pertaining to these buildings are expanded, including those for automatic tank refill valves. New requirements and annex material are added to help package designers through the evaluation of mass elastic systems. The requirements for hydraulic cranking systems are revised to distinguish between systems used as primary cranking systems and those used as secondary cranking systems. Annex C is revised significantly to make data formatting more universal.

Technical Committee on Fire Pumps

Gayle Pennel, Chair JENSEN HUGHES, IL [SE]

R. T. Leicht, *Secretary* State of Delaware, DE [E] Rep. International Fire Marshals Association

Michael E. Aaron, Wiss Janney Elstner Associates, Inc., IL [SE] Timothy Ballengee, Peerless Pump Company, NC [M] James A. Beals, Jacobs Engineering, VA [SE] Marinus Both, APi Group Inc., MA [IM] Pat D. Brock, Oklahoma State University, OK [SE] Brian Buscher, AC Fire Pump Systems, IL [M] John D. Campbell, Global Fire Protection Group, LLC, MO [SE] Stephen A. Clark, Jr., Allianz Risk Consulting, LLC, VA [I] Bradford T. Cronin, Newport Fire Department, RI [E] Mohammad Dadgardoust, LRI Engineering Inc., Canada [SE] Mike Dawson, Cummins Sales and Service, WI [M] Alan A. Dorini, Gulfstream Pump & Equipment, Inc., FL [IM] Byron E. Ellis, Entergy Corporation, LA [U] Rep. Edison Electric Institute Christina F. Francis, The Procter & Gamble Company, AL [M] David B. Fuller, FM Approvals, RI [I] Bill M. Harvey, Harvey & Associates, Inc., SC [IM] Rep. American Fire Sprinkler Association Stephen M. Jaskolka, The DuPont Company, Inc., DE [U] Rep. NFPA Industrial Fire Protection Section Hatem Ezzat Kheir, Kheir Group, Egypt [IM] John R. Kovacik, UL LLC, IL [RT] Jennifer A. McGrath, Pentair, IL [M]

James S. Nasby, Columbia Engineering, IL [SE] Peter Placidus Petrus, Indonesian Fire & Rescue Foundation, Indonesia [E] Damon T. Pietraz, Underwood Fire Equipment, Inc., MI [IM] Milosh T. Puchovsky, Worcester Polytechnic Institute, MA [SE] Edward A. Ramirez, Chicago Bridge Iron Company, TX [SE] Thomas Reser, Fire Lion Global LLC, WA [M] Jeffrey R. Roberts, Global Asset Protection Services, LLC, MS [I] Vincent Rodriguez, Apex Pumping Equipment, Inc., IL [M] Rep. Illinois Fire Prevention Association Michael A. Rothmier, UA Joint Apprenticeship Committee LU 669, CO [L] Rep. United Assn. of Journeymen & Apprentices of the Plumbing & Pipe Fitting Industry Joseph R. Sanford, Liberty Mutual Property Risk Engineering, MA [I] Darrell A. Snyder, Patterson Pump Company, GA [M] Rep. Hydraulic Institute William F. Stelter, Master Control Systems, Inc., IL [M] Rep. National Electrical Manufacturers Association Terry L. Victor, Johnson Controls/Tyco/SimplexGrinnell, MD [IM] Rep. National Fire Sprinkler Association John Whitney, Clarke Fire Protection Products, Inc., OH [M]

Alternates

Gregory A. Bartels, Sprinkler Fitters LU 669-JATC, MD [L] (Alt. to Michael A. Rothmier) Kerry M. Bell, UL LLC, IL [RT] (Alt. to John R. Kovacik) Tom de Nooij, Riskonet B.V., The Netherlands [SE] (Alt. to John D. Campbell) Brandon W. Frakes, Global Asset Protection Services, LLC, NC [I] (Alt. to Jeffrey R. Roberts) Leroy Franklin, Pentair, IL [M] (Alt. to Jennifer A. McGrath) Aaron Grode, Cummins Sales and Service, WI [M] (Alt. to Mike Dawson) Louis Guerrazzi, National Fire Sprinkler Association, MD [IM] (Alt. to Terry L. Victor) Andrew C. Higgins, Allianz Risk Consulting, LLC, NC [I] (Alt. to Stephen A. Clark, Jr.) Richard A. Holub, The DuPont Company, Inc., DE [U] (Alt. to Stephen M. Jaskolka) Steven D. Holzkopf, APEX Pumping Equipment, Inc., IL [M] (Alt. to Vincent Rodriguez) Kenneth E. Isman, University of Maryland, MD [SE] (Alt. to Milosh T. Puchovsky) Robert W. Johnson, Liberty Mutual Commercial Markets, MI [I] (Alt. to Joseph R. Sanford)

Mohamed Ezzat Kheir, Kheir Group, Egypt [IM] (Alt. to Hatem Ezzat Kheir) Michael Koska, National Fire Suppression/Western States Fire Protection Company, KS [IM] (Alt. to Marinus Both) Timothy J. LaRose, JENSEN HUGHES, RI [SE] (Alt. to Gayle Pennel) Floyd Luinstra, Oklahoma State University, OK [SE] (Alt. to Pat D. Brock) Roger Meuer, Alliant Energy, IA [U] (Alt. to Byron E. Ellis) Michael R. Moran, State of Delaware, DE [E] (Alt. to R. T. Leicht) Michael J. Spaziani, FM Global, MA [I] (Alt. to David B. Fuller) Douglas A. Stephens, ASCO Power Technologies, NC [M] (Alt. to William F. Stelter) Kyle J. Tingle, Clarke Fire Protection, IA [M] (Alt. to John Whitney) Shawn C. Yates, Jacobs Engineering Group Inc., TX [SE] (Alt. to James A. Beals) Marvin F. Yoder, Jr., HSI/Premierflow, OK [IM] (Alt. to Alan A. Dorini)

Nonvoting

Edward D. Leedy, Naperville, IL (Member Emeritus)

Janna E. Shapiro, NFPA 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.

Committee Scope: This Committee shall have primary responsibility for documents on the selection and installation of stationary pumps supplying water or special additives including but not limited to foam concentrates for private fire protection, including suction piping, valves and auxiliary equipment, electric drive and control equipment, and internal combustion engine drive and control equipment.

Contents

Chapter	1 Administration	20 – 7
1.1	Scope	20 – 7
1.2	Purpose	20 – 7
1.3	Application	20 – 7
1.4	Retroactivity.	20 – 7
1.5	Equivalency.	20 – 7
1.6	Units.	20 – 7
Chapter	2 Referenced Publications	20– 8
2.1	General	20– 8
2.2	NFPA Publications.	20– 8
2.3	Other Publications.	20– 8
2.4	References for Extracts in Mandatory Sections	20– 9
Chapter	3 Definitions	20 – 9
3.1	General.	20 -9
3.2	NFPA Official Definitions.	20 -9
3.3	General Definitions.	20 – 9
Chapter	4 General Requirements	20 –13
4.1	Pumps.	20 – 13
4.2	Approval Required.	20 – 13
4.3	Pump Operation.	20-14
4.4	Fire Pump Unit Performance.	20 – 14
4.5	Certified Shop Test.	20 - 15
4.6	Liquid Supplies.	20-15
4.7	Pumps, Drivers, and Controllers.	20-15
4.8	Self-Regulating variable Speed Fire Pump Units.	20-10
4.9	Contribution Fine Prove Constitution	20-17
4.10	Nemenlete	20-17
4.11	Recognize Courses	20-17
4.12	Circulation Boliof Valvo	20-17 90 17
4.13	Equipment Protection	20-17 90 17
4.14	Pipe and Fittings	20 -17 90 -19
4 16	Suction Pipe and Fittings	20 -10 90 -10
4.17	Discharge Pipe and Fittings	20 - 13 90 - 91
4 18	Valve Supervision	20 - 21 20 - 91
4 19	Protection of Pining Against Damage Due to	40-41
	Movement.	20– 21
4.20	Relief Valves for Centrifugal Pumps.	20 – 21
4.21	Pumps Arranged in Series.	20 – 22
4.22	Water Flow Test Devices.	20 – 23
4.23	Steam Power Supply Dependability.	20– 24
4.24	Shop Tests.	20– 24
4.25	Pump Shaft Rotation.	20– 25
4.26	Other Signals.	20– 25
4.27	Pressure Maintenance (Jockey or Make-Up)	
	Pumps	20– 25
4.28	Summary of Centrifugal Fire Pump Data	20– 25
4.29	Backflow Preventers and Check Valves	20– 25
4.30	Earthquake Protection.	20– 26
4.31	Packaged Fire Pump Assemblies	20– 27
4.32	Pressure Actuated Controller Pressure Sensing	
	Lines	20 – 28
4.33	Break Tanks	20– 28
4.34	Field Acceptance Test of Pump Units	20– 28
4.35	Automated Inspection, Testing, and Distance	90 90
	monitoring of Devices, meters, and Equipment	40 – 28
Chapter	5 Fire Pumps for High-Rise Buildings	20– 28
5.1	General	20– 28
5.2	Equipment Access	20– 28
5.3	Water Supply Tanks	20– 28
5.4	Fire Pump Test Arrangement.	20– 28
5.5	Alternate Power.	20 – 28

5.6	Very Tall Buildings	20– 29
Chapter	6 Centrifugal Pumps	20 – 29
6.1	General.	20 – 29
6.2	Factory and Field Performance.	20 – 29
6.3	Fittings	20 – 30
6.4	Foundation and Setting	20 - 30
6.5	Connection to Driver and Alignment.	20 – 30
Chapter	7 Vertical Shaft Turbine–Type Pumps	20 – 30
7.1	General.	20 – 30
7.2	Water Supply.	20– 30
7.3	Pump.	20– 31
7.4	Installation.	20 – 32
7.5	Driver	20 – 33
7.6	Operation and Maintenance.	20– 34
Chapter	8 Positive Displacement Pumps	20– 34
8.1	General.	20– 34
8.2	Foam Concentrate and Additive Pumps	20 – 35
8.3	Water Mist System Pumps.	20 – 35
8.4	Water Mist Positive Displacement Pumping	
	Units.	20– 35
8.5	Fittings.	20 – 35
8.6	Pump Drivers.	20 – 36
8.7	Controllers.	20 – 36
8.8	Foundation and Setting.	20 – 36
8.9	Driver Connection and Alignment.	20 – 36
8.10	Flow Test Devices	20 – 36
~		
Chapter	9 Electric Drive for Pumps	20 – 36
9.1	General.	20 – 36
9.2	Normal Power.	20-37
9.3	Alternate Power.	20-37
9.4	Voltage Drop	20-38
9.5	Motors.	20-38
9.6	On-Site Standby Generator Systems.	20 – 39
9.7	Junction Boxes.	20– 40
9.8	Listed Electrical Circuit Protective System to	aa 40
0.0	Controller Wiring.	20 -40
9.9	Raceway Terminations.	20– 40
Chapter	10 Electric-Drive Controllers and Accessories	20– 40
10.1	General	20– 40
10.2	Location.	20– 41
10.3	Construction.	20– 41
10.4	Components	20– 42
10.5	Starting and Control.	20– 44
10.6	Controllers Rated in Excess of 600 V.	20– 46
10.7	Limited Service Controllers.	20– 47
10.8	Power Transfer for Alternate Power Supply	20– 47
10.9	Controllers for Additive Pump Motors.	20– 49
10.10	Controllers with Variable Speed Pressure	
	Limiting Control or Variable Speed Suction	
	Limiting Control.	20– 49
Chapter	11 Diesel Engine Drive	20– 51
11.1	General.	20– 51
11.2	Engines	20– 51
11.3	Pump Room.	20– 56
11.4	Fuel Supply and Arrangement.	20– 57
11.5	Engine Exhaust.	20– 59
11.6	Diesel Engine Driver System Operation	20– 59
Chapter	12 Engine Drive Controllers	20 – 60
12.1	Application.	20 - 60
12.2	Location.	20 – 60

12.3	Construction.	20– 60
12.4	Components.	20– 61
12.5	Battery Recharging.	20– 62
12.6	Battery Chargers.	20– 62
12.7	Starting and Control	20– 62
12.8	Air-Starting Engine Controllers.	20– 64
	5 5	
Chapter	13 Steam Turbine Drive	20– 65
13.1	General	20– 65
13.2	Turbine	20– 65
13.3	Installation	20– 66
C1 (
Chapter	14 Acceptance Testing, Performance, and	
	Maintenance	20– 66
14.1	Hydrostatic Tests and Flushing	20– 66
14.2	Field Acceptance Tests.	20– 66

14.3	Record Drawings, Test Reports, Manuals, Special	
	Tools, and Spare Parts.	20– 69
14.4	Periodic Inspection, Testing, and Maintenance	20– 69
14.5	Component Replacement.	20– 69
Annex A	Explanatory Material	20 – 70
Annex 1	B Possible Causes of Pump Troubles	20– 119
Annex	C Fire Pump Room Connectivity	20– 122
Annex 1	Material Extracted by NFPA 70, Article 695	20 – 177
Annex 1	E Informational References	20 – 180
Index		20– 182

NFPA 20

Standard for the

Installation of Stationary Pumps for Fire Protection

2019 Edition

IMPORTANT NOTE: This NFPA document is made available for use subject to important notices and legal disclaimers. These notices and disclaimers appear in all publications containing this document and may be found under the heading "Important Notices and Disclaimers Concerning NFPA Standards." They can also be viewed at www.nfpa.org/disclaimers or obtained on request from NFPA.

UPDATES, ALERTS, AND FUTURE EDITIONS: New editions of NFPA codes, standards, recommended practices, and guides (i.e., NFPA Standards) are released on scheduled revision cycles. This edition may be superseded by a later one, or it may be amended outside of its scheduled revision cycle through the issuance of Tentative Interim Amendments (TIAs). An official NFPA Standard at any point in time consists of the current edition of the document, together with all TIAs and Errata in effect. To verify that this document is the current edition or to determine if it has been amended by TIAs or Errata, please consult the National Fire Codes[®] Subscription Service or the "List of NFPA Codes & Standards" at www.nfpa.org/docinfo. In addition to TIAs and Errata, the document information pages also include the option to sign up for alerts for individual documents and to be involved in the development of the next edition.

NOTICE: An asterisk (*) following the number or letter designating a paragraph indicates that explanatory material on the paragraph can be found in Annex A.

A reference in brackets [] following a section or paragraph indicates material that has been extracted from another NFPA document. As an aid to the user, the complete title and edition of the source documents for extracts in mandatory sections of the document are given in Chapter 2 and those for extracts in informational sections are given in Annex E. Extracted text may be edited for consistency and style and may include the revision of internal paragraph references and other references as appropriate. Requests for interpretations or revisions of extracted text shall be sent to the technical committee responsible for the source document.

Information on referenced publications can be found in Chapter 2 and Annex E.

Chapter 1 Administration

1.1* Scope.

1.1.1 This standard deals with the selection and installation of pumps supplying liquid for private fire protection.

1.1.2 The scope of this document shall include liquid supplies; suction, discharge, and auxiliary equipment; power supplies, including power supply arrangements; electric drive and control; diesel engine drive and control; steam turbine drive and control; and acceptance tests and operation.

1.1.3 This standard does not cover system liquid supply capacity and pressure requirements, nor does it cover requirements for periodic inspection, testing, and maintenance of fire pump systems.

1.1.4 This standard does not cover the requirements for installation wiring of fire pump units.

1.2 Purpose. The purpose of this standard is to provide a reasonable degree of protection for life and property from fire through installation requirements for stationary pumps for fire protection based upon sound engineering principles, test data, and field experience.

1.3 Application.

1.3.1 This standard shall apply to centrifugal single-stage and multistage pumps of the horizontal or vertical shaft design and positive displacement pumps of the horizontal or vertical shaft design.

1.3.2 Requirements are established for the design and installation of single-stage and multistage pumps, pump drivers, and associated equipment.

1.4 Retroactivity. The provisions of this standard reflect a consensus of what is necessary to provide an acceptable degree of protection from the hazards addressed in this standard at the time the standard was issued.

1.4.1 Unless otherwise specified, the provisions of this standard shall not apply to facilities, equipment, structures, or installations that existed or were approved for construction or installation prior to the effective date of the standard. Where specified, the provisions of this standard shall be retroactive.

1.4.2 In those cases where the authority having jurisdiction determines that the existing situation presents an unacceptable degree of risk, the authority having jurisdiction shall be permitted to apply retroactively any portions of this standard deemed appropriate.

1.4.3 The retroactive requirements of this standard shall be permitted to be modified if their application clearly would be impractical in the judgment of the authority having jurisdiction, and only where it is clearly evident that a reasonable degree of safety is provided.

1.5 Equivalency. Nothing in this standard is intended to prevent the use of systems, methods, or devices of equivalent or superior quality, strength, fire resistance, effectiveness, durability, and safety over those prescribed by this standard.

1.5.1 Technical documentation shall be submitted to the authority having jurisdiction to demonstrate equivalency.

1.5.2 The system, method, or device shall be approved for the intended purpose by the authority having jurisdiction.

1.6 Units.

1.6.1 Metric units of measurement in this standard are in accordance with the modernized metric system known as the International System of Units (SI).

1.6.2 *Liter* and *bar* in this standard are outside of but recognized by SI.

1.6.3 Units are listed in Table 1.6.3 with conversion factors.

1.6.4 Conversion. The conversion procedure is to multiply the quantity by the conversion factor and then round the result to an appropriate number of significant digits.

1.6.5 Trade Sizes. Where industry utilizes nominal dimensions to represent materials, products, or performance, direct

Shaded text = Revisions. Δ = Text deletions and figure/table revisions. • = Section deletions. N = New material.