First Revision No. 112-NFPA 20-2022 [Detail]

Table C.9.2.10.1(h) Electric Event Messages

ID	Event Message
100	Flowmeter ~~Flow~~ ~~Meter~~ On
101	Flowmeter ~~Flow~~ ~~Meter~~ Off

Table C.9.2.10.1(i) Diesel Event Messages

ID	Event Message
29	Flowmeter ~~Flow~~ ~~Meter~~ On
30	Flowmeter ~~Flow~~ ~~Meter~~ Clear

Submitter Information Verification

Committee: FIM-AAA

Submittal Date: Thu Nov 10 09:15:49 EST 2022

Committee Statement

Committee Statement: Editorially revise 'flow meter' to 'flowmeter' in four locations for consistency throughout the document.

Response Message: FR-112-NFPA 20-2022

First Revision No. 29-NFPA 20-2022 [Detail]

[New 10.5.2.1.8.8 after existing 10.5.2.1.8.7]

10.5.2.1.8.8

A shutoff valve in the pressure-sensing line shall not be permitted.

Submitter Information Verification

Committee: FIM-AAA
Submittal Date: Thu Oct 27 10:29:04 EDT 2022

Committee Statement

Committee Statement: The proposal adds this new requirement to align with 12.7.2.1.8(1).
Response Message: FR-29-NFPA 20-2022

Public Input No. 40-NFPA 20-2022 [New Section after 10.5.2.1.8.7]

First Revision No. 73-NFPA 20-2022 [Detail]

4.13.6

Where an electric variable speed pump is installed, ~~the~~an additional~~automatic~~ circulation relief valve or temperature-actuated relief valve shall ~~open at the minimum speed~~be permitted to be used.

4.13.6.1*

The additional automatic circulation relief valve shall be set to open at the minimum operating speed.

A.4.13.6.1

Under no-flow conditions, the jockey pump might maintain the pressure in the system above the set pressure, causing the variable speed control to slow down. However, there is still a need to discharge a small amount of water to cool the pump.

4.13.6.2*

A restricting orifice shall be provided to restrict the flow to that needed to keep the pump cool at the minimum operating speed.

A.4.13.6.2

Since the setting required in 4.13.6 is much lower than it would be for the pump running in the bypass, the flow to the drain will be quite large in bypass mode. A restricting orifice is required because the flow in bypass mode can overwhelm the drain. The automatic circulation relief valve required by 4.13.1 is set the way a non-variable speed circulation relief valve pump would be set.

Submitter Information Verification

Committee: FIM-AAA

Submittal Date: Thu Oct 27 22:40:05 EDT 2022

Committee Statement

Committee Statement: The revision allows the additional valve as optional instead of required. The specifics of an installation, including drain capabilities, are different from one to another. The necessity of the additional valve shall be determined by those responsible for the installation.

Response Message: FR-73-NFPA 20-2022

Public Input No. 44-NFPA 20-2022 [Section No. 4.13.1.1]

Public Input No. 45-NFPA 20-2022 [Section No. A.4.13.1.1]

First Revision No. 1-NFPA 20-2022 [Chapter 2]

Chapter 2 Referenced Publications

2.1 General.

The documents or portions thereof listed in this chapter are referenced within this standard and shall be considered part of the requirements of this document.

2.2 NFPA Publications.

National Fire Protection Association, 1 Batterymarch Park, Quincy, MA 02169-7471.

NFPA 13, *Standard for the Installation of Sprinkler Systems,* ~~2022~~ 2025 edition.

NFPA 13R, *Standard for the Installation of Sprinkler Systems in Low-Rise Residential Occupancies,* 2025 edition.

NFPA 22, *Standard for Water Tanks for Private Fire Protection,* ~~2018~~ 2023 edition.

NFPA 24, *Standard for the Installation of Private Fire Service Mains and Their Appurtenances,* ~~2022~~ 2025 edition.

NFPA 25, *Standard for the Inspection, Testing, and Maintenance of Water-Based Fire Protection Systems,* ~~2020~~ 2023 edition.

NFPA 37, *Standard for the Installation and Use of Stationary Combustion Engines and Gas Turbines,* ~~2021~~ 2024 edition.

NFPA 51B, *Standard for Fire Prevention During Welding, Cutting, and Other Hot Work,* ~~2019~~ 2024 edition.

NFPA 70®, National Electrical Code®, ~~2020~~ 2023 edition.

NFPA 70E®, Standard for Electrical Safety in the Workplace®, ~~2021~~ 2024 edition.

NFPA 72®, National Fire Alarm and Signaling Code®, ~~2022~~ 2025 edition.

NFPA 110, *Standard for Emergency and Standby Power Systems,* ~~2022~~ 2025 edition.

NFPA 1963, *Standard for Fire Hose Connections,* 2019 edition.

2.3 Other Publications.

2.3.1 AGMA Publications.

American Gear Manufacturers Association, 1001 N. Fairfax Street, Suite 500, Alexandria, VA 22314-1587.

ANSI/AGMA 2011-B14, *Cylindrical Wormgearing Tolerance and Inspection Methods*, ~~2014~~ 2019 .

2.3.2 ANSI Publications.

American National Standards Institute, Inc., 25 West 43rd Street, 4th Floor, New York, NY 10036.

ANSI B11.19, *Performance Requirements for Risk Reduction Measures: Safeguarding and Other Means of Reducing Risk* , ~~2010~~ 2019 .

2.3.3 ASCE Publications.

American Society of Civil Engineers, 1801 Alexander Bell Drive, Reston, VA 20191-4400.

ASCE/SEI 7, *Minimum Design Loads and Associated Criteria for Buildings and Other Structures*, ~~2016~~ 2022 .

2.3.4 ASME Publications.

~~ASME International~~ American Society of Mechanical Engineers , Two Park Avenue, New York, NY 10016-5990.

Boiler and Pressure Vessel Code, ~~2019~~ 2021 .

2.3.5 ASTM Publications.

ASTM International, 100 Barr Harbor Drive, P.O. Box C700, West ~~Conshohoken~~ Conshohocken , PA 19428-2959.

ASTM SI10, *IEEE/ASTM SI 10 American National Standard for Metric Practice*, 2016.

2.3.6 AWS Publications.

American Welding Society, 8669 NW 36 Street, Suite 130, Miami, FL 33166-6672.

AWS D1.1/D1.1M, *Structural Welding Code — Steel*, 2015.

2.3.7 HI Publications.

Hydraulic Institute, ~~6 Campus Drive, First Floor North~~ 300 Interpace Parkway, Building A, 3rd Floor , Parsippany, NJ 07054-4406.

ANSI/HI 1.4, *Rotodynamic ~~Centrifugal~~ Pumps for ~~Manuals Describing~~ Installation, Operation, and Maintenance*, ~~2014~~ 2018 .

ANSI/HI 3.6, *Rotary Pump Tests*, ~~2016~~ 2022 .

2.3.8 IEEE Publications.

IEEE, Three Park Avenue, 17th Floor, New York, NY 10016-5997.

IEEE C62.1, *IEEE Standard for Gapped Silicon-Carbide Surge Arresters for AC Power Circuits*, 1989.

IEEE C62.11, *IEEE Standard for Metal-Oxide Surge Arresters for ~~Alternating Current~~ AC Power Circuits (>1 kV)*, ~~2012~~ 2020 .

IEEE C62.41, *IEEE Recommended Practice for Surge Voltages in Low-Voltage AC Power Circuits*, 1991.

2.3.9 ISO Publications.

International Organization for Standardization, ISO Central Secretariat, BIBC II, Chemin de Blandonnet 8, CP 401, 1214 Vernier, Geneva, Switzerland.

ISO 15540, *Ships and Marine Technology — Fire Resistance of Non-Metallic Hose Assemblies and Non-Metallic Compensators — Test Methods,*~~2nd edition,~~ 2016, reconfirmed 2022 .

2.3.10 NEMA Publications.

National Electrical Manufacturers Association, 1300 North 17th Street, Suite 900, Arlington, VA 22209.

NEMA MG-1, *Motors and Generators*, ~~2018~~ 2021 .

2.3.11 UL Publications.

Underwriters Laboratories Inc., 333 Pfingsten Road, Northbrook, IL 60062-2096.

UL 142, *Steel Aboveground Tanks for Flammable and Combustible Liquids,* 2019, revised 2021 .

UL 508, *Industrial Control Equipment*, 2018, revised 2021 .

UL 1449, *Surge Protective Devices*, ~~2018~~ 2021 .

2.3.12 Other Publications.

Merriam-Webster's Collegiate Dictionary, 11th edition, Merriam-Webster, Inc., Springfield, MA, ~~2003~~ 2020 .

2.4 References for Extracts in Mandatory Sections.

NFPA 14, *Standard for the Installation of Standpipe and Hose Systems,* ~~2019~~ 2023 edition.

NFPA 37, *Standard for the Installation and Use of Stationary Combustion Engines and Gas Turbines,* ~~2018~~ 2024 edition.

NFPA 70®, National Electrical Code®, ~~2020~~ 2023 edition.

NFPA 110, *Standard for Emergency and Standby Power Systems,* ~~2019~~ 2025 edition.

NFPA 1451, *Standard for a Fire and Emergency Service Vehicle Operations Training Program,* 2018 edition.

NFPA 5000®, Building Construction and Safety Code®, ~~2021~~ 2024 edition.

Submitter Information Verification

Committee: FIM-AAA

Submittal Date: Fri Oct 21 16:49:58 EDT 2022

Committee Statement

Committee Statement: Updates to dates of mandatory references to comply with the Manual of Style.

Response Message: FR-1-NFPA 20-2022

Public Input No. 94-NFPA 20-2022 [Section No. 2.3.11]

First Revision No. 5-NFPA 20-2022 [Section No. 3.3.11.1]

3.3.11.1 Branch Circuit (Branch-Circuit) .

The circuit conductors between the final overcurrent device protecting the circuit and the outlet(s). [~~**70:** 100~~ **70,** 2023]

Submitter Information Verification

Committee: FIM-AAA
Submittal Date: Mon Oct 24 16:14:15 EDT 2022

Committee Statement

Committee Statement: Update to NFPA 70 extract to comply with the NFPA Manual of Style.
Response Message: FR-5-NFPA 20-2022

First Revision No. 4-NFPA 20-2022 [Section No. 3.3.32]

3.3.32 In Sight From (Within Sight From~~,~~) (Within Sight).

~~Where this Code specifies that one equipment shall be "in sight from," "within sight from," or "within sight of," and so forth, another equipment, the specified equipment is to be~~ Equipment that is visible and not more than 15 m (50 ft) distant from ~~the~~ other equipment is *in sight from* that other equipment . [~~**70:** 100~~ **70,** 2023]

Submitter Information Verification

Committee: FIM-AAA

Submittal Date: Mon Oct 24 15:49:26 EDT 2022

Committee Statement

Committee Statement: Update to NFPA 70 extract to comply with the NFPA Manual of Style.

Response Message: FR-4-NFPA 20-2022

First Revision No. 6-NFPA 20-2022 [Section No. 3.3.48.2]

3.3.48.2 Facility, On-Site Power Production ~~Facility~~ . (On-Site Power Production Facility)

~~An on-site~~ The normal supply of electric power for the site that is expected to be constantly producing power. [~~**70:** 695.2~~ **70,** 2023]

Submitter Information Verification

Committee: FIM-AAA
Submittal Date: Mon Oct 24 16:16:43 EDT 2022

Committee Statement

Committee Statement: Update to NFPA 70 extract to comply with the NFPA Manual of Style.
Response Message: FR-6-NFPA 20-2022

First Revision No. 7-NFPA 20-2022 [Section No. 3.3.48.3]

3.3.48.3 Generator, On-Site Standby ~~Generator.~~ . (On-Site Standby Generator)

A facility producing electric power on site as the alternate supply of electric power. It differs from an on-site power production facility~~,~~ in that it is not constantly producing power.
[~~**70:** 695.2~~ **70,** 2023]

Submitter Information Verification

Committee: FIM-AAA
Submittal Date: Mon Oct 24 16:18:20 EDT 2022

Committee Statement

Committee Statement: Update to NFPA 70 extract to comply with the NFPA Manual of Style.
Response Message: FR-7-NFPA 20-2022

First Revision No. 27-NFPA 20-2022 [New Section after 3.3.50]

3.3.51 Pressure-Sensing Device.

A pressure-actuated switch or electronic pressure sensor that has adjustable high- and low-calibrated set points.

Submitter Information Verification

Committee: FIM-AAA

Submittal Date: Thu Oct 27 10:24:08 EDT 2022

Committee Statement

Committee Statement: This definition is needed as the term “Pressure-Sensing Device” is used in multiple locations throughout the document.

Response Message: FR-27-NFPA 20-2022

First Revision No. 8-NFPA 20-2022 [Section No. 3.3.58]

3.3.59* Service.

The conductors and equipment ~~for delivering electric energy from~~ connecting the serving utility to the wiring system of the premises served. [~~**70:** 100~~ **70,** 2023]

A.3.3.59 Service.

For more information, see Article 100 of *NFPA 70*~~, Article 100~~ .

Submitter Information Verification

Committee: FIM-AAA

Submittal Date: Mon Oct 24 16:20:25 EDT 2022

Committee Statement

Committee Statement: Update to NFPA 70 extract to comply with the NFPA Manual of Style.

Response Message: FR-8-NFPA 20-2022

First Revision No. 9-NFPA 20-2022 [Section No. 3.3.59]

3.3.60* Service Equipment.

The necessary equipment, ~~usually~~ consisting of a circuit breaker(s) or switch(es) and fuse(s) and their accessories, connected to the ~~load end of service conductors to a building or other structure, or an otherwise designated area,~~ serving utility and intended to constitute the main control and ~~cutoff~~ disconnect of the ~~supply~~ serving utility . [~~**70:** 100~~ **70,** 2023]

A.3.3.60 Service Equipment.

For more information, see Article 100 of *NFPA 70*~~, Article 100~~ .

Submitter Information Verification

Committee: FIM-AAA
Submittal Date: Mon Oct 24 16:21:43 EDT 2022

Committee Statement

Committee Statement: Update to NFPA 70 extract to comply with the NFPA Manual of Style.
Response Message: FR-9-NFPA 20-2022

First Revision No. 110-NFPA 20-2022 [New Section after 3.3.77.4.1]

3.3.78.4.2 Main Relief Valve.

A relief valve designed to automatically relieve excessive pressure caused by an overspeed condition in the driver or engine by discharging water to the environment or back to suction.

Submitter Information Verification

Committee: FIM-AAA

Submittal Date: Thu Nov 03 10:55:16 EDT 2022

Committee Statement

Committee Statement: A definition of "main relief valve" is necessary to differentiate the requirements for circulation relief and main relief valves in the standard. Additionally, "main relief valve" is the more commonly accepted term used within the industry.

Response Message: FR-110-NFPA 20-2022

First Revision No. 61-NFPA 20-2022 [Section No. 3.3.77.4.1]

3.3.78.4.1 Circulation Relief Valve.

A valve, separate from and independent of the main relief valve, used to cool a pump by discharging a small quantity of water. ~~This valve is separate from and independent of the main relief valve.~~

Submitter Information Verification

Committee: FIM-AAA

Submittal Date: Thu Oct 27 15:04:39 EDT 2022

Committee Statement

Committee Statement: The revised language is reconfigured to give clarification to the definition.

Response Message: FR-61-NFPA 20-2022

Public Input No. 17-NFPA 20-2022 [Section No. 3.3.77.4.1]

First Revision No. 80-NFPA 20-2022 [Section No. 3.3.78.2]

3.3.79.2* Self-Regulating Variable Speed Fire Pump Unit.

A factory-built integrated fire pump unit consisting of centrifugal pump, driver, and variable speed control unit, configured to maintain the set pressure until the maximum pump brake horsepower is reached, while acting as a variable speed pressure limiting control and/or a variable speed suction limiting control.

Submitter Information Verification

Committee: FIM-AAA

Submittal Date: Fri Oct 28 08:42:22 EDT 2022

Committee Statement

Committee Statement: This revision clarifies that the definition of 'self-regulating variable speed fire pump unit' when added to the standard considered applications for centrifugal pumps only.

Response Message: FR-80-NFPA 20-2022

First Revision No. 62-NFPA 20-2022 [Section No. 4.2.3.2]

4.2.3.2

Plans shall indicate, at a minimum, the items from the following list that pertain to the design of the system:

(1) Name(s) of owner(s) ~~and occupant~~

(2) Location, including street address

(3) Point of compass

(4) Name and address of installing contractor

(5) Pump make and model number

(6) Pump rating _____ ~~gpm @~~ _____ ~~psi~~ _____ ~~rpm~~ including flow, pressure, and speed

(7) Suction main size, length, location, type and class/schedule of material, and point of connection to water supply, as well as depth to top of pipe below grade

(8) Water storage tank, if applicable

(9) Size and type of valves, regulators, meters, and valve pits, if applicable

(10) Water supply information, including the following flow test information, if applicable:

- (a) Location and elevation of static and residual test gauge with relation to the elevation reference point
- (b) Flow location
- (c) Static pressure, psi (bar)
- (d) Residual pressure, psi (bar)
- (e) Flow rate , gpm (L/min)
- (f) Date
- (g) Time
- (h) Name of person who conducted the test or supplied the information
- (i) Other sources of water supply, with pressure or elevation

(11) Pump driver details, including manufacturer and horsepower

(12) Voltage for electric-motor-driven pumps

(13) Fuel system details for diesel-driven pumps

(14) Controller manufacturer, type, and rating

(15) Suction and discharge pipe, fitting, and valve types

(16) Test connection piping and valves

(17) ~~Flow meter~~ Flowmeter details, if applicable

(18) Pressure maintenance pump and controller arrangement, including sensing line details, if applicable

Supplemental Information

File Name	Description	Approved

Chapter_4_4_2_3_2_FR-62.docx Chapter 4_4_2_3_2_FR-62.docx

Submitter Information Verification

Committee: FIM-AAA

Submittal Date: Thu Oct 27 15:09:33 EDT 2022

Committee Statement

Committee Statement: The revision generalizes the pump rating information which can be given in imperial units or SI.

Response Message: FR-62-NFPA 20-2022

Public Input No. 18-NFPA 20-2022 [Section No. 4.2.3.2]

First Revision No. 63-NFPA 20-2022 [Section No. 4.3.4]

~~4.3.4*~~ ~~Service Personnel Qualifications and Experience.~~

~~A.4.3.4~~

~~Service personnel should be able to do the following:~~

- ~~Understand the requirements contained in this standard and in NFPA 25 and the fire pump requirements contained in *NFPA 70*~~
- ~~Understand basic job site safety laws and requirements~~
- ~~Apply troubleshooting techniques and determine the cause of fire protection system trouble conditions~~
- ~~Understand equipment-specific requirements, such as programming, application, and compatibility~~
- ~~Read and interpret fire protection system design documentation and manufacturers' inspection, testing, and maintenance guidelines~~
- ~~Properly use tools and equipment required for testing and maintenance of fire protection systems and their components~~
- ~~Properly apply the test methods required by this standard and NFPA 25~~

~~4.3.4.1~~

~~Service personnel shall be qualified and experienced in the inspection, testing, and maintenance of fire protection systems.~~

~~4.3.4.2~~

~~Qualified personnel shall include, but not be limited to, one or more of the following:~~

- ~~Personnel who are factory trained and certified for fire pump system servicing of the specific type and brand of system being designed~~
- ~~* Personnel who are certified by a nationally recognized fire protection certification organization acceptable to the authority having jurisdiction~~

~~A.4.3.4.2(2)~~ –

~~See A.4.3.2.3(2) .~~

- ~~Personnel who are registered, licensed, or certified by a state or local authority~~
- ~~Personnel who are employed and qualified by an organization listed by a nationally recognized testing laboratory for the servicing of fire protection systems~~

~~4.3.4.3~~

~~Additional evidence of qualification or certification shall be permitted to be required by the authority having jurisdiction.~~

Submitter Information Verification

Committee: FIM-AAA

Submittal Date: Thu Oct 27 16:16:39 EDT 2022

Committee Statement

Committee Statement: Qualifications of ITM personnel are outside the scope of NFPA 20.

Response Message: FR-63-NFPA 20-2022

Public Input No. 6-NFPA 20-2022 [Section No. 4.3.4.2]

First Revision No. 64-NFPA 20-2022 [Section No. 4.5.1.5]

4.5.1.5*

For self-regulating variable speed fire pump units, two additional certified test curves showing the flow, net pressure, power, and speed shall be provided for each pump operating under the following conditions:

(1) In self-regulating variable speed mode with the pump unit operating at constant discharge pressure, as measured by the discharge pressure transducer, ~~through the design duty, and~~ all flow rates from churn to beyond 150 percent of rated flow until the maximum pump brake horsepower is reached

(2) In self-regulating variable speed mode with the pump unit operating at constant boost pressure, ~~through the design duty, and~~ all flow rates from churn to beyond 150 percent of rated flow until the maximum pump brake horsepower is reached

Submitter Information Verification

Committee: FIM-AAA

Submittal Date: Thu Oct 27 16:40:03 EDT 2022

Committee Statement

Committee Statement: The word “to” is added in the two locations as editorial corrections. Additionally, the term “design duty” is not defined and has been eliminated to reduce confusion.

Response Message: FR-64-NFPA 20-2022

Public Input No. 20-NFPA 20-2022 [Section No. 4.5.1.5]

First Revision No. 65-NFPA 20-2022 [Section No. 4.5.2]

~~4.5.2~~

~~The purchaser shall furnish the data required in~~ 4.5.1 ~~to the authority having jurisdiction.~~

Submitter Information Verification

Committee: FIM-AAA

Submittal Date: Thu Oct 27 16:43:18 EDT 2022

Committee Statement

Committee Statement: This is already a requirement of 14.2.4.1 and the certified pump curve will not be available at the time of plan review. Keeping this section in Chapter 4 will only confuse the the user of the standard as to the appropriate time when the certified pump curves will be available.

Response Message: FR-65-NFPA 20-2022

Public Input No. 21-NFPA 20-2022 [Section No. 4.5.2]

First Revision No. 66-NFPA 20-2022 [Section No. 4.7.6]

4.7.6*

The driver shall be selected in accordance with 9.5.2{ for electric motors} , 11.2.2{ for diesel engines} , or 13.1.2{ for steam turbines} to provide the required power to operate the pump at rated speed and maximum pump load ~~under any flow condition~~ up to 175 percent rated flow .

A.4.7.6

For centrifugal and turbine pumps, the maximum brake horsepower required to drive the pump typically occurs at a flow beyond 150 percent of the rated capacity. For positive displacement pumps, the maximum brake horsepower required to drive the pump typically occurs when the relief valve is flowing 100 percent of the rated pump capacity. Pumps connected to variable speed drivers can operate at lower speeds, but the driver needs to be selected based upon the power required to drive the pump at rated speed and maximum pump load ~~under any flow condition~~ up to 175 percent rated flow .

Submitter Information Verification

Committee: FIM-AAA

Submittal Date: Thu Oct 27 17:07:02 EDT 2022

Committee Statement

Committee Statement: The current requirement grossly oversizes the power requirements for fire pumps. Pumps are only designed up to 150 percent capacity and past that point the liquid supply could be insufficient and the motor should not need to run past that point (plus a safety factor).

Response Message: FR-66-NFPA 20-2022

Public Input No. 22-NFPA 20-2022 [Section No. 4.7.6]

Public Input No. 23-NFPA 20-2022 [Section No. A.4.7.6]

First Revision No. 67-NFPA 20-2022 [Section No. 4.13]

4.13 Circulation Relief Valve.

4.13.1 ~~General Requirements.~~

~~Unless the requirements of~~ 4.13.1.8 ~~are met, each pump(s) shall have an~~ An automatic circulation relief valve listed for the fire pump service shall be installed on each fire pump. ~~and set below the shutoff pressure at minimum expected suction pressure.~~

4.13.1.1

An automatic circulation relief valve shall not be required for a vertical lineshaft turbine installation taking water from a non-pressurized tank or can.

4.13.1.2

~~The requirements of~~ 4.13.1 An automatic circulation relief valve shall not ~~apply to~~ be required for an engine-driven pump~~s~~ for which engine cooling water is taken from the pump discharge.

4.13.2

The ~~automatic~~ circulation relief valve shall have a nominal size of 0.75 in. (19 mm) for pumps with a rated capacity ~~not exceeding~~ equal to or less than 2500 gpm (9462 L/min) and have a nominal size of 1 in. (25 mm) for pumps with a rated capacity of 3000 gpm to 5000 gpm (11,355 L/min to 18,925 L/min).

4.13.3

The circulation relief valve shall be installed on the discharge side of the pump before the discharge check valve.

4.13.4

For multistage multiport pumps, the automatic circulation relief valve shall be installed before the discharge check valve for the last port and set below the churn pressure of the first port.

4.13.5

The operating pressure of the circulation relief valve shall be set below the shutoff pressure at minimum expected suction pressure.

Detail FR-73

4.13.6

Where an electric variable speed pump is installed, ~~the~~ an additional ~~automatic~~ circulation relief valve or temperature-actuated relief valve shall ~~open at the minimum speed~~ be permitted to be used .

4.13.6.1*

The additional automatic circulation relief valve shall be set to open at the minimum operating speed.

4.13.6.2*

A restricting orifice shall be provided to restrict the flow to that needed to keep the pump cool at the minimum operating speed.

4.13.7

The circulation relief valve shall provide sufficient water flow to prevent the pump from overheating when operating with no discharge.

4.13.8

Provisions shall be made for discharge to a drain.

4.13.9

Circulation relief valves shall not be tied in with the packing box or drip rim drains.

4.13.10

The discharge from the drain shall be visible to verify flow.

Supplemental Information

File Name	Description	Approved
Chapter_4_4_13_FR-67.docx	Chapter 4 _4_13_FR-67.docx	

Submitter Information Verification

Committee: FIM-AAA

Submittal Date: Thu Oct 27 17:11:06 EDT 2022

Committee Statement

Committee Statement: The current section leads some designers to confuse a main relief valve with a circulation relief valve. The proposed text changes all instances where the valve is referenced to "circulation relief valve" for clarity and restructured the section to meet the manual of style.Line shaft turbine pumps that sit in a non-pressurized tank or can are surrounded by water so the additional cooling provided by the casing relief valve is not needed.

Response Message: FR-67-NFPA 20-2022

Public Input No. 7-NFPA 20-2022 [Section No. 4.13]

Public Input No. 46-NFPA 20-2022 [Section No. 4.13.1.2]

First Revision No. 68-NFPA 20-2022 [Section No. 4.14.1.1.2]

4.14.1.1.2*

Except as permitted in 4.14.1.1.3, indoor fire pump rooms in non-high-rise buildings or in separate fire pump buildings shall be physically separated or protected by fire-rated construction in accordance with Table 4.14.1.1.2.

Table 4.14.1.1.2 ~~Equipment~~ Pump Room Protection

Pump Room/House	Building(s) Exposing Pump Room/House	Required Separation
~~Not sprinklered~~	~~Not sprinklered~~	~~2 hour fire-rated~~
~~Not sprinklered~~	~~Fully sprinklered~~	~~or~~
Fully sprinklered in accordance with NFPA 13 or NFPA 13R	Not sprinklered	2 hour fire-rated or 50 ft (15.3 m)
Fully sprinklered in accordance with NFPA 13 or NFPA 13R	Fully sprinklered in accordance with NFPA 13 or NFPA 13R	1 hour fire-rated or 50 ft (15.3 m)

Supplemental Information

File Name	Description	Approved
Chapter_4_4_14_1_1_2_FR68.docx	Chapter 4_4_14_1_1_2_FR68.docx	

Submitter Information Verification

Committee: FIM-AAA

Submittal Date: Thu Oct 27 17:49:06 EDT 2022

Committee Statement

Committee Statement: Revises title to clarify that the protection is required for the fire pump room and only gives credit for fully sprinklered when installed in accordance with NFPA 13 or NFPA 13R.

Response Message: FR-68-NFPA 20-2022

Public Input No. 24-NFPA 20-2022 [Section No. 4.14.1.1.2]

First Revision No. 69-NFPA 20-2022 [Sections 4.14.1.3, 4.14.1.4]

4.14.1.3 ~~Fire Pump Buildings or Rooms with Diesel Engines~~ Sprinkler Systems .

~~Fire pump buildings or rooms enclosing diesel engine pump drivers and fuel tanks shall be protected with an automatic sprinkler system installed in accordance with~~ NFPA 13 ~~as an Extra Hazard Group 2 occupancy.~~

4.14.1.3.1

Sprinklers shall be installed in accordance with NFPA 13 .

4.14.1.3.2

~~Fire pump buildings or~~ Pump rooms enclosing diesel engine pump drivers and fuel tanks shall be ~~protected with an automatic sprinkler system installed in accordance with~~ ~~NFPA 13~~ classified as ~~an~~ Extra Hazard (Group 2) ~~occupancy~~ occupancies .

4.14.1.3.3

~~For buildings that are required to be sprinklered, fire pump buildings or~~ Pump rooms enclosing electric fire pump drivers shall be ~~protected with an automatic sprinkler system installed in accordance with~~ NFPA 13 classified as ~~an~~ Ordinary Hazard (Group 1) ~~occupancy~~ occupancies .

4.14.1.4 ~~Fire Pump Buildings or Rooms with Electric Drivers.~~

~~For buildings that are required to be sprinklered, fire pump buildings or rooms enclosing electric fire pump drivers shall be protected with an automatic sprinkler system installed in accordance with~~ NFPA 13 ~~as an Ordinary Hazard Group 1 occupancy.~~

Supplemental Information

File Name	Description	Approved
Chapter_4_4_14_1_3_FR-69.docx	Chapter 4_4_14_1_3_FR-69.docx	

Submitter Information Verification

Committee: FIM-AAA

Submittal Date: Thu Oct 27 17:50:31 EDT 2022

Committee Statement

Committee Statement: The previous language did not require electric pump rooms to be sprinklered. If a pump is present, sprinklers need to be installed. Section was also cleaned up to correlate with language used in NFPA 13 and other standards.

Response Message: FR-69-NFPA 20-2022

Public Input No. 26-NFPA 20-2022 [Sections 4.14.1.3, 4.14.1.4]

First Revision No. 70-NFPA 20-2022 [Section No. 4.15.2.1]

4.15.2.1

Sections of steel piping shall be joined by means of screwed, flanged, welded, mechanical, or grooved joints or other approved fittings.

Submitter Information Verification

Committee: FIM-AAA

Submittal Date: Thu Oct 27 17:51:22 EDT 2022

Committee Statement

Committee Statement: This revision adds missing commas and adds welded pipe as an acceptable option.

Response Message: FR-70-NFPA 20-2022

Public Input No. 27-NFPA 20-2022 [Section No. 4.15.2.1]

First Revision No. 72-NFPA 20-2022 [Section No. 4.17.1]

4.17.1

The discharge components shall consist of pipe, valves, and fittings extending from the pump discharge flange to the system side of the discharge valve.

4.17.1.1

Nonmetallic flexible pump connection fittings in the discharge piping shall not be permitted.

Submitter Information Verification

Committee: FIM-AAA

Submittal Date: Thu Oct 27 18:10:35 EDT 2022

Committee Statement

Committee Statement: Due to the failure possibility of a nonmetallic flexible pump connection fitting, these fittings are required to be metallic. These flexible pump connections shall not be used to correct for misalignment.

Response Message: FR-72-NFPA 20-2022

Public Input No. 9-NFPA 20-2022 [Section No. 4.17]

First Revision No. 105-NFPA 20-2022 [Section No. 4.20]

4.20 Main Relief Valves for Centrifugal Pumps.

4.20.1* General.

A.4.20.1

The pressure is required to be evaluated at 121 percent of the net rated shutoff pressure because the pressure is proportional to the square of the speed that the pump is turned. A diesel engine governor is required to be capable of limiting the maximum engine speed to 110 percent, creating a pressure of 121 percent. Since the only time that a ~~pressure~~ main relief valve is required by ~~the~~ this standard to be installed is when the diesel engine is turning faster than normal, and since this is a relatively rare event, it is permitted for the discharge from the ~~pressure~~ main relief valve to be piped back to the suction side of the pump.

4.20.1.1*

~~Pressure~~ Main relief valves shall be used only where specifically permitted by this standard.

A.4.20.1.1

In situations where the required system pressure is close to the pressure rating of the system components and the water supply pressure varies significantly over time, ~~to eliminate system overpressurization,~~ it might be necessary to use one of the following to eliminate system overpressurization :

(1) A tank between the water supply and the pump suction, in lieu of directly connecting to the water supply piping

(2) A variable speed pressure-limiting control device

4.20.1.2

Where a diesel engine fire pump is installed and ~~where~~ a total of 121 percent of the net rated shutoff (churn) pressure plus the maximum static suction pressure, adjusted for elevation, exceeds the pressure ~~for which~~ rating of the system components are rated, a ~~pressure~~ main relief valve shall be installed.

4.20.1.3

Where an electric variable speed pump or a diesel pressure-limiting driver is installed~~,~~ and the maximum total discharge head, adjusted for elevation, with the pump operating at shutoff and rated speed exceeds the pressure rating of the system components, a ~~pressure~~ main relief valve shall be installed.

4.20.1.3.1

Where an electric variable speed pump or diesel pressure-limiting driver is used, the ~~pressure~~ main relief valve shall be set to a minimum of 10 psi (0.68 bar) above the set pressure of the variable speed pressure-limiting control.

4.20.2 Size.

The main relief valve size shall be determined by one of the methods specified in 4.20.2.1 or 4.20.2.2.

4.20.2.1*

The main relief valve shall be permitted to be sized hydraulically to discharge sufficient water to prevent the pump discharge pressure, adjusted for elevation, from exceeding the pressure rating of the system components.

A.4.20.2.1

See Figure A.4.20.2.1.

Figure A.4.20.2.1 Sample ~~Pressure~~ Main Relief Valve Calculation.

SAMPLE PRESSURE RELIEF VALVE CALCULATION
DISCHARGE TO ATMOSPHERE
For a 1,500 gpm at 100 psi Fire Pump

1.	Pressure rating of the system components			175
2.	Maximum pump over speed			110%
3.	Pump size			1,500
4.	Rated pump pressure			100
			Normal Static Pressure (at rated speed)	Maximum Pressure Static (at Max Pump Over speed)
5.	Pump net pressure (rated pressure at 100%)		100	121.0
6.	Pump net churn pressure (0 flow)		120	145.2
7.	Pump net pressure @ 150% of rated flow		65	78.7
8.	Maximum static pressure at pump suction		50	50
9.	Available flow at pump suction		1,320	1,320
10.	Residual pressure at pump suction		45	45
11.	Maximum pump discharge pressure at churn		170	195.2
12.	Maximum allowable net discharge pressure			125
13.	Pump flow rate at maximum net pressure adjusted to normal speed [#12/(#2*#2)] = 103.3 psi			1,360.4
14.	Required flow rate through the pressure relief valve (pump flow rate at 125 psi and overspeed or [#13*#2])			1,496.5
15.	Set pressure for pressure relief valve			175
16.	Pressure relief valve size			4
17.	Pressure relief valve pipe size			4.026
18.	Nozzle (pipe) discharge coefficient			0.9
19.	C factor			120
20.	Pressure relief valve Cv ($P=[Q/Cv]^2$)			240
21.	**Pressure Relief Valve Fittings**	Type Fitting	Number of Fittings	Equivalent Length	Total Equivalent Length
		45°	1	4	4
		Ells	2	10	20
		LRE	0	6	0
22.	Pressure relief valve pipe length				30
23.	Total equivalent length				54
24.	Friction loss per foot in pipe at flow #14				0.594
25.	Total loss in pressure relief valve piping (#23 × #24)				32.1
26.	Friction loss in pressure relief valve at estimated flow (valve wide open) ($[\#14/\#20]^2$)				38.9
27.	Pressure at pressure relief valve discharge (#1 – #25 – #26)				104.1
28.	Elevation difference (0.433*Elev difference in feet)				0
29.	Required pressure at relief piping discharge (pitot pressure at a flow of #14) ($(\#14/[29.83 \times \#18 \times \#17^2])^2$)				11.8

Conclusion: The discharge pressure at the pressure relief piping (with the pressure relief valve wide open) exceeds the pitot pressure required for the flow; therefore the pressure relief components are adequately sized.

SAMPLE MAIN RELIEF VALVE CALCULATION
DISCHARGE TO ATMOSPHERE
For a 1,500 gpm at 100 psi Fire Pump

1. Pressure rating of the system components			175
2. Maximum pump over speed			110%
3. Pump size			1,500
4. Rated pump pressure			100
		Normal Static Pressure (at rated speed)	Maximum Pressure Static (at Max Pump Over speed)
5. Pump net pressure (rated pressure at 100%)		100	121.0
6. Pump net churn pressure (0 flow)		120	145.2
7. Pump net pressure @ 150% of rated flow		65	78.7
8. Maximum static pressure at pump suction		50	50
9. Available flow at pump suction		1,320	1,320
10. Residual pressure at pump suction		45	45
11. Maximum pump discharge pressure at churn		170	195.2
12. Maximum allowable net discharge pressure			125
13. Pump flow rate at maximum net pressure adjusted to normal speed [#12/(#2*#2)] = 103.3 psi			1,360.4
14. Required flow rate through the main relief valve (pump flow rate at 125 psi and overspeed or [#13*#2])			1,496.5
15. Set pressure for main relief valve			175
16. Main relief valve size			4
17. Main relief valve pipe size			4.026
18. Nozzle (pipe) discharge coefficient			0.9
19. C factor			120
20. Main relief valve Cv ($P=[Q/Cv]^2$)			240
21. Main Relief Valve Fittings	Type Fitting	Number of Fittings	Equivalent Length	Total Equivalent Length
	45°	1	4	4
	Ells	2	10	20
	LRE	0	6	0
22. Main relief valve pipe length				30
23. Total equivalent length				54
24. Friction loss per foot in pipe at flow #14				0.594
25. Total loss in main relief valve piping (#23 × #24)				32.1
26. Friction loss in main relief valve at estimated flow (valve wide open) ($[\#14/\#20]^2$)				38.9
27. Pressure at main relief valve discharge (#1 – #25 – #26)				104.1
28. Elevation difference (0.433*Elev difference in feet)				0
29. Required pressure at main relief piping discharge (pitot pressure at a flow of #14) ($[\#14/[29.83 \times \#18 \times \#17^2]]^2$)				11.8

Conclusion: The discharge pressure at the main relief piping (with the main relief valve wide open) exceeds the pitot pressure required for the flow; therefore the main relief components are adequately sized.

4.20.2.2

If the main relief valve is not sized hydraulically, ~~the relief valve~~ its size shall ~~not~~ be ~~less than~~ at least that ~~given~~ provided in Section 4.28. *(See also 4.20.7 and A.4.20.7 for conditions that affect size.)*

4.20.3 Location.

~~The relief valve shall be located between the pump and the pump discharge check valve and shall be so attached that it can be readily removed for repairs without disturbing the piping.~~

4.20.3.1

The main relief valve shall be located between the pump and the pump discharge check valve.

4.20.3.2

The main relief valve shall be ~~so~~ attached such that it can be readily removed for repairs without disturbing the piping.

4.20.4 Type.

4.20.4.1

~~Pressure~~ Main relief valves shall be either a listed spring-loaded or a pilot-operated diaphragm type.

4.20.4.2

Pilot-operated ~~pressure~~ main relief valves, where attached to vertical shaft turbine pumps, shall be arranged to prevent relieving of water at water pressures less than the ~~pressure~~ main relief setting of the valve.

4.20.5* Discharge.

A.4.20.5

The main relief valve cone should be piped to a point where water can be freely discharged, preferably outside the building. If the main relief valve discharge pipe is connected to an underground drain, ~~care should be taken that~~ no steam drains should enter near enough to work back through the cone and into the pump room.

4.20.5.1

The main relief valve shall discharge into an open pipe or into a cone or funnel secured to the outlet of the valve.

4.20.5.2

Water discharge from the main relief valve shall be readily visible or easily detectable by the pump operator.

4.20.5.3

Splashing of water into the pump room shall be avoided.

4.20.5.4

If a closed-type cone is used, it shall be provided with means for detecting motion of water through the cone.

4.20.5.5

If the main relief valve is provided with means for detecting motion (flow) of water through the valve, then cones or funnels at its outlet shall not be required.

4.20.6 Discharge Piping.

4.20.6.1

Except as permitted in 4.20.6.2, the size of the main relief valve discharge pipe shall be ~~of a size not less than~~ at least that ~~given~~ provided in Section 4.28.

4.20.6.1.1

If the pipe employs more than one elbow, the next larger pipe size shall be used.

4.20.6.2

The discharge pipe shall be permitted to be sized hydraulically to discharge sufficient water to prevent the pump discharge pressure, adjusted for elevation, from exceeding the pressure rating of the system components.

4.20.6.3

~~Relief~~ Main relief valve discharge piping returning water back to the supply source, such as an aboveground storage tank, shall be run independently and not be combined with the discharge from other relief valves.

4.20.6.4

~~Relief~~ Main relief valve discharge piping from a single fire pump returning water back to the supply source shall be permitted to be combined with fire pump test piping downstream of any control valve in a manner that complies with 4.20.6, 4.22.2, and 4.22.3.

4.20.6.5

The discharge piping from multiple main relief valves shall not be combined with fire pump test piping.

4.20.6.6

Isolation of the test header piping from the ~~pressure~~ main relief valve discharge shall be possible.

4.20.7* Discharge to Source of Supply.

Where the main relief valve is piped back to the source of supply, the main relief valve and piping shall have sufficient capacity to prevent pressure from exceeding ~~that for which~~ the pressure rating of the system components ~~are rated~~ .

A.4.20.7

Where the main relief valve discharges back to the source of supply, the back pressure capabilities and limitations of the valve to be used should be determined. It might be necessary to increase the size of the main relief valve and piping above the minimum to obtain adequate relief capacity due to back pressure restriction.

4.20.7.1

Where a ~~pressure~~ main relief valve has been piped back to suction, a circulation relief valve sized in accordance with 4.13.2 and 4.20.7 and discharged to atmosphere shall be provided downstream of the main ~~pressure~~ relief valve. ~~The circulating relief valve shall actuate below the opening set point of the pressure relief valve to ensure cooling of the pump during churn operation.~~

4.20.7.2

The circulating relief valve shall actuate below the opening set point of the ~~pressure~~ main relief valve to ensure cooling of the pump during churn operation.

4.20.7.3

Where pump discharge water is piped back to pump suction and the pump is driven by a diesel engine with heat exchanger cooling, the controller shall provide a visual indicator and audible alarm and stop the engine when a high cooling water temperature signal as required by 11.2.4.4.8 is received~~, provided~~ if there are no active emergency requirements for the pump to run.

4.20.7.3.1

The requirements of ~~4.20.7.2~~ 4.20.7.3 shall not apply when pump discharge water is being piped back to a water storage reservoir.

4.20.8* Discharge to Suction Reservoir.

Where the supply of water to the pump is taken from a suction reservoir of limited capacity, the drain pipe shall discharge into the reservoir at a point as far from the pump suction as is necessary to prevent the pump from drafting air introduced by the drain pipe discharge.

4.20.9 Shutoff Valve.

A shutoff valve shall not be installed in the main relief valve supply or discharge piping.

Submitter Information Verification

Committee: FIM-AAA

Submittal Date: Fri Oct 28 15:03:33 EDT 2022

Committee Statement

Committee Statement: The term "Relief valve" is ambiguous and this section only applies to the main relief valve that is installed on the fire pump assembly. Main relief valve is the appropriate term as described in the definitions of "relief valve" and "circulation relief valve".

Response Message: FR-105-NFPA 20-2022

Public Input No. 90-NFPA 20-2022 [Section No. 4.20]

First Revision No. 102-NFPA 20-2022 [Section No. 4.22.2.10.1]

4.22.2.10.1

The alternate means of measuring flow shall be located downstream of and in series with the ~~flow meter~~ flowmeter .

Submitter Information Verification

Committee: FIM-AAA
Submittal Date: Fri Oct 28 11:41:33 EDT 2022

Committee Statement

Committee Statement: Revised the term 'flow meter' to one word for consistency.
Response Message: FR-102-NFPA 20-2022

First Revision No. 75-NFPA 20-2022 [Section No. 4.28]

4.28 Summary of Centrifugal Fire Pump Data.

The sizes indicated in Table 4.28(a) and Table 4.28(b) shall be used as a minimum.

Table 4.28(a) Summary of Centrifugal Fire Pump Data (U.S. Customary)

Pump Rating (gpm)	Minimum Pipe Sizes (Nominal) (in.)							
	Suction[a,b,c]	Discharge[a]	Main Relief Valve	Main Relief Valve Discharge	Meter Device	Number and Size of Hose Valves	Number and Size of Nonthreaded Connections	Hose Header Supply
25	1	1	¾	1	1¼	1 — 1½	1 — 2½	1
50	1½	1¼	1¼	1½	2	1 — 1½	1 — 2½	1½
100	2	2	1½	2	2½	1 — 2½	1 — 2½	2½
150	2½	2½	2	2½	3	1 — 2½	1 — 2½	2½
200	3	3	2	2½	3	1 — 2½	1 — 2½	2½
250	3½	3	2	2½	3½	1 — 2½	1 — 2½	3
300	4	4	2½	3½	3½	1 — 2½	1 — 2½	3
400	4	4	3	5	4	2 — 2½	1 — 5	4
450	5	5	3	5	4	2 — 2½	1 — 5	4
500	5	5	3	5	5	2 — 2½	1 — 5	4
750	6	6	4	6	5	3 — 2½	1 — 5	6
1000	8	6	4	8	6	4 — 2½	1 — 5	6
1250	8	8	6	8	6	6 — 2½	1 — 5	8
1500	8	8	6	8	8	6 — 2½	1 — 5	8
2000	10	10	6	10	8	6 — 2½	2 — 5[d]	8
2500	10	10	6	10	8	8 — 2½	2 — 5[d]	10
3000	12	12	8	12	8	12 — 2½	2 — 5[d]	10
3500	12	12	8	12	10	12 — 2½	3 — 5[d]	12
4000	14	12	8	14	10	16 — 2½	3 — 5[d]	12
4500	16	14	8	14	10	16 — 2½	3 — 5[d]	12

Pump Rating (gpm)	Minimum Pipe Sizes (Nominal) (in.)							
	Suction[a,b,c]	Discharge[a]	Main Relief Valve	Main Relief Valve Discharge	Meter Device	Number and Size of Hose Valves	Number and Size of Nonthreaded Connections	Hose Header Supply
5000	16	14	8	14	10	20 — 2½	3 — 5[d]	12

Notes:

(1) The ~~pressure~~ main relief valve is permitted to be sized in accordance with 4.20.2.1.

(2) The ~~pressure~~ main relief valve discharge is permitted to be sized in accordance with 4.20.6.2.

(3) The flowmeter device is permitted to be sized in accordance with 4.22.2.3.

(4) The hose header supply is permitted to be sized in accordance with 4.22.3.4.

(5) Other types of test outlets, sizes, and quantities are permitted ~~when~~ where approved ~~by the authority having jurisdiction~~ .

[a]Actual diameter of pump flange is permitted to be different from pipe diameter.

[b]Applies only to that portion of suction pipe specified in 4.16.3.3.

[c]Suction pipe sizes in Table 4.28(a) are based on a maximum velocity at 150 percent rated capacity to 15 ft/sec ~~(4.6 m/sec)~~ in most cases.

[d]Provide a control valve on each outlet where more than one nonthreaded connection is required.

Table 4.28(b) Summary of Centrifugal Fire Pump Data (Metric)

Pump Rating (L/min)	Minimum Pipe Sizes (Nominal) (mm)							
	Suction[a,b,c]	Discharge[a]	Main Relief Valve	Main Relief Valve Discharge	Meter Device	Number and Size of Hose Valves	Number and Size of Nonthreaded Connections	Hose Header Supply
95	25	25	19	25	32	1 — 38	1 — 65	25
189	38	32	32	38	50	1 — 38	1 — 65	38
379	50	50	38	50	65	1 — 65	1 — 65	65
568	65	65	50	65	75	1 — 65	1 — 65	65
757	75	75	50	65	75	1 — 65	1 — 65	65
946	85	75	50	65	85	1 — 65	1 — 65	75
1,136	100	100	65	85	85	1 — 65	1 — 65	75
1,514	100	100	75	125	100	2 — 65	1 — 125	100
1,703	125	125	75	125	100	2 — 65	1 — 125	100

Pump Rating (L/min)	Minimum Pipe Sizes (Nominal) (mm)							
	Suction[a,b,c]	Discharge[a]	Main Relief Valve	Main Relief Valve Discharge	Meter Device	Number and Size of Hose Valves	Number and Size of Nonthreaded Connections	Hose Header Supply
1,892	125	125	75	125	125	2 — 65	1 — 125	100
2,839	150	150	100	150	125	3 — 65	1 — 125	150
3,785	200	150	100	200	150	4 — 65	1 — 125	150
4,731	200	200	150	200	150	6 — 65	1 — 125	200
5,677	200	200	150	200	200	6 — 65	1 — 125	200
7,570	250	250	150	250	200	6 — 65	2 — 125[d]	200
9,462	250	250	150	250	200	8 — 65	2 — 125[d]	250
11,355	300	300	200	300	200	12 — 65	2 — 125[d]	250
13,247	300	300	200	300	250	12 — 65	3 — 125[d]	300
15,140	350	300	200	350	250	16 — 65	3 — 125[d]	300
17,032	400	350	200	350	250	16 — 65	3 — 125[d]	300
18,925	400	350	200	350	250	20 — 65	3 — 125[d]	300

Notes:

(1) The ~~pressure~~ main relief valve is permitted to be sized in accordance with 4.20.2.1.

(2) The ~~pressure~~ main relief valve discharge is permitted to be sized in accordance with 4.20.6.2.

(3) The flowmeter device is permitted to be sized in accordance with 4.22.2.3.

(4) The hose header supply is permitted to be sized in accordance with 4.22.3.4.

(5) Other types of test outlets are permitted ~~when~~ where approved ~~by the authority having jurisdiction~~ .

[a]Actual diameter of pump flange is permitted to be different from pipe diameter.

[b]Applies only to that portion of suction pipe specified in 4.16.3.3.

[c]Suction pipe sizes in Table 4.28(b) are based on a maximum velocity at 150 percent rated capacity to ~~15 ft/sec (~~ 4.6 m/sec~~)~~ in most cases.

[d]Provide a control valve on each outlet where more than one nonthreaded connection is required.

Submitter Information Verification

Committee: FIM-AAA

Submittal Date: Fri Oct 28 08:08:30 EDT 2022

Committee Statement

Committee Statement: Revisions to table titles and notes to clarify the relief valve is intended to be the Main Relief Valve.

Response Message: FR-75-NFPA 20-2022

Public Input No. 105-NFPA 20-2022 [Section No. 4.28]

First Revision No. 78-NFPA 20-2022 [Section No. 6.4.1]

6.4.1*

Overhung impeller and impeller between bearings design pumps and driver shall be mounted on a common grouted base plate in accordance with the manufacturer's instructions .

Submitter Information Verification

Committee: FIM-AAA

Submittal Date: Fri Oct 28 08:17:50 EDT 2022

Committee Statement

Committee Statement: Base grouting is one of the most commonly missed features of the fire pump installation. The grouted base needs to be installed in accordance with the manufacturer's instructions (if necessary).

Response Message: FR-78-NFPA 20-2022

Public Input No. 91-NFPA 20-2022 [Section No. 6.4.1]

First Revision No. 106-NFPA 20-2022 [Section No. 8.4.3]

8.4.3

Water mist positive displacement pumping units shall include pumps, a driver(s), and a single controller as a complete operating unit.

Submitter Information Verification

Committee: FIM-AAA

Submittal Date: Fri Oct 28 15:21:39 EDT 2022

Committee Statement

Committee Statement: Section 10.5.2.5 applies to starting sequence of pumps with multiple controllers. Since a water mist positive displacement pumping unit (WMPDPU) can only have one controller the requirements of 8.4.4 only need apply. Adding single controller requirement to 8.4.3 to clarify that the definition of a WMPDPU includes a single controller

Response Message: FR-106-NFPA 20-2022

First Revision No. 10-NFPA 20-2022 [New Section after 8.4.6]

8.4.6.1

Where a redundant motor and pump are provided to satisfy the requirement in 8.4.6(2) , the following shall apply:

(1) Load isolation in accordance with 10.10.4 shall not be required for the variable speed pump.

(2) Circuit protection in accordance with 10.10.5.1 shall be provided between the line side of the variable speed drive and the load side of the isolating switch.

(3) If the isolating switch required by 10.4.2 has self-protecting instantaneous short-circuit overcurrent protection, the circuit protection required by 10.10.5.2 shall be coordinated such that the isolating switch does not trip due to a fault condition in the variable speed drive.

Submitter Information Verification

Committee: FIM-AAA

Submittal Date: Thu Oct 27 08:42:36 EDT 2022

Committee Statement

Committee Statement: The line isolation requirements of 10.10.4 are necessary to keep the VFD off-line when not in use. Since the equipment is generally connected to the Service on a continuous basis, damaging surges are always present. By keeping the VFD off-line until needed, the risk of damage due to surges is greatly reduced. Additionally, the circuit protection for the VFD needs to be coordinated with the instantaneous trip function of the isolating switch, if provided.

Response Message: FR-10-NFPA 20-2022

Public Input No. 80-NFPA 20-2022 [Section No. 8.4.6]

First Revision No. 11-NFPA 20-2022 [Section No. 8.4.8]

8.4.8

The requirement in 10.3.4.3 shall apply to each individual motor and the entire unit as follows:

(1) Where motors are fed from a common point, the voltage shall be permitted to be monitored at the common point.

(2) Each line current for each motor shall be monitored.

(3) Monitoring the total of all line currents where motors are fed from a common point shall not be required.

Submitter Information Verification

Committee: FIM-AAA

Submittal Date: Thu Oct 27 08:46:55 EDT 2022

Committee Statement

Committee Statement: It is not necessary to monitor all line currents for the entire unit when all line currents for all motors are monitored.

Response Message: FR-11-NFPA 20-2022

Public Input No. 75-NFPA 20-2022 [Section No. 8.4.8]

First Revision No. 107-NFPA 20-2022 [New Section after 8.4.11]

8.4.12

The requirements of 10.5.2.5 shall not apply for the starting sequence of the pumps within a single water mist positive displacement pumping unit.

Submitter Information Verification

Committee: FIM-AAA

Submittal Date: Fri Oct 28 15:24:56 EDT 2022

Committee Statement

Committee Statement: Section 10.5.2.5 applies to starting sequence of pumps with multiple controllers. Since a water mist positive displacement pumping unit (WMPDPU) can only have one controller the requirements of 8.4.4 only need apply. Adding single controller requirement to 8.4.3 to clarify that the definition of a WMPDPU includes a single controller.

Response Message: FR-107-NFPA 20-2022

Public Input No. 84-NFPA 20-2022 [New Section after 8.4.11]

First Revision No. 12-NFPA 20-2022 [Section No. 8.4.11]

8.4.11

The phase reversal requirements in 10.4.6.2.1, 10.4.6.2.2, ~~and~~ 10.4.7.2.3, 10.8.3.6.4 , and 14.2.6.12 shall not be applicable to positive displacement pumps that are able to deliver the required flow and pressure regardless of direction of rotation.

Submitter Information Verification

Committee: FIM-AAA

Submittal Date: Thu Oct 27 08:49:45 EDT 2022

Committee Statement

Committee Statement: Where positive displacement pumps are able to deliver the required flow and pressure regardless of direction of rotation, monitoring for phase reversal and the test for phase reversal in Chapter 14 are not required. Therefore, the requirements in 10.8.3.6.4 and 14.2.6.12 do not apply.

Response Message: FR-12-NFPA 20-2022

Public Input No. 77-NFPA 20-2022 [New Section after 8.4.11]

Public Input No. 79-NFPA 20-2022 [Section No. 8.4.11]

First Revision No. 87-NFPA 20-2022 [Section No. 8.8.1]

8.8.1

The pump and driver shall be mounted on a common grouted base plate in accordance with the manufacturer's instructions .

Submitter Information Verification

Committee: FIM-AAA

Submittal Date: Fri Oct 28 10:00:44 EDT 2022

Committee Statement

Committee Statement: Base grouting is one of the most commonly missed features of the fire pump installation. The grouted base needs to be installed in accordance with the manufacturer's instructions (if necessary).

Response Message: FR-87-NFPA 20-2022

First Revision No. 103-NFPA 20-2022 [Section No. 8.10.2]

8.10.2

Additive pumping systems shall be equipped with a ~~flow meter~~ flowmeter or orifice plate installed in a test loop back to the additive supply tank.

Submitter Information Verification

Committee: FIM-AAA
Submittal Date: Fri Oct 28 11:42:35 EDT 2022

Committee Statement

Committee Statement: Revised the term flow meter to one word for consistency.
Response Message: FR-103-NFPA 20-2022

First Revision No. 57-NFPA 20-2022 [Section No. 9.1.8.1]

9.1.8.1

~~No~~ A ground-fault interruption means ~~shall be installed in any~~ that opens or disconnects the fire pump ~~control or power circuit~~ motor at current levels less than those required to protect conductors from damage shall not be permitted *(see 10.4.5.8)* .

Submitter Information Verification

Committee: FIM-AAA

Submittal Date: Thu Oct 27 14:14:34 EDT 2022

Committee Statement

Committee Statement: This revision adds a new clause to clarify that ground fault protection for a short circuit to ground is a normal function of the overcurrent protection device. Ground fault protection for equipment is what is not permitted. This aligns with a similar requirement in 10.4.5.8.

Response Message: FR-57-NFPA 20-2022

First Revision No. 18-NFPA 20-2022 [Section No. 9.1.8.3]

~~**9.1.8.3**~~

~~Arc-resistant equipment shall be permitted.~~

Submitter Information Verification

Committee: FIM-AAA

Submittal Date: Thu Oct 27 09:18:12 EDT 2022

Committee Statement

Committee Statement: This clause is deleted as it is in conflict with revised 9.2.3.4.24 and existing 10.1.4.2.

Response Message: FR-18-NFPA 20-2022

First Revision No. 13-NFPA 20-2022 [Section No. 9.2.3 [Excluding any Sub-Sections]]

For fire pump installations using the arrangement in 9.2.2(1), 9.2.2(2), 9.2.2(3), or 9.2.2(5) for the normal source of power, ~~no more than one~~ a single disconnecting means and associated overcurrent protection device shall be permitted to be installed in the power supply to the fire pump controller.

Submitter Information Verification

Committee: FIM-AAA

Submittal Date: Thu Oct 27 09:00:12 EDT 2022

Committee Statement

Committee Statement: The revised language does not change the requirement, but clarifies the current text.

Response Message: FR-13-NFPA 20-2022

Public Input No. 92-NFPA 20-2022 [Section No. 9.2.3 [Excluding any Sub-Sections]]

First Revision No. 14-NFPA 20-2022 [Section No. 9.2.3.4.1]

9.2.3.4.1

Alternatively, compliance with 9.2.3.4 shall be based on an assembly listed for fire pump service that complies with all of the following:

(1) The overcurrent protection device shall not open within 2 minutes at 600 percent full-load current.

(2) The overcurrent protection device shall not open with a restart transient of 24 times the full-load current.

(3) The overcurrent protection device shall not open within 10 minutes at 300 percent full-load current.

(4) The trip point for circuit breakers shall not be field adjustable.

(5) The overcurrent protection device shall be identified as being “Suitable for ~~use~~ Use as Service Equipment.”

(6) Where used as service equipment, the disconnecting means shall be marked “Service Disconnect.”

~~An instantaneous trip circuit breaker shall be permitted.~~

9.2.3.4.1.1

An instantaneous trip circuit breaker shall be permitted to be part of the assembly described in 9.2.3.4.1 .

Submitter Information Verification

Committee: FIM-AAA

Submittal Date: Thu Oct 27 09:03:22 EDT 2022

Committee Statement

Committee Statement: List item 7 is being moved to new 9.2.3.4.1.1 to improve clarity regarding the intent of the permissive requirement to use an instantaneous trip circuit breaker. All the provisions of 9.2.3.4.1 are intended to apply.

Response Message: FR-14-NFPA 20-2022

First Revision No. 15-NFPA 20-2022 [Section No. 9.2.3.4.2]

~~**9.2.3.4.2** Overcurrent Device Selection.~~

~~An instantaneous trip circuit breaker shall be permitted in lieu of the overcurrent devices specified in 10.8.2.2(2) provided it is part of a transfer switch assembly listed for fire pump service and complies with 9.2.3.4.1 .~~

Submitter Information Verification

Committee: FIM-AAA

Submittal Date: Thu Oct 27 09:10:08 EDT 2022

Committee Statement

Committee Statement: Clause 9.2.3.4.2 is not needed since item (7) of 9.2.3.4.1, which has been moved to new 9.2.3.4.1.1, is coupled to 9.2.3.4 by reference and 10.8.2.2(2) refers to 9.2.3.4.

Response Message: FR-15-NFPA 20-2022

Public Input No. 35-NFPA 20-2022 [Section No. 9.2.3.4.2]

First Revision No. 17-NFPA 20-2022 [New Section after 9.2.3.4.3]

9.2.3.4.2

Arc-resistant rated equipment shall be provided for the overcurrent protection device required by 9.2.3.4 or 9.2.3.4.1 .

Submitter Information Verification

Committee: FIM-AAA

Submittal Date: Thu Oct 27 09:15:34 EDT 2022

Committee Statement

Committee Statement: Arc flash mitigation for personnel protection should be provided for all electrical equipment that fire pump testing and maintenance personnel operate on the line side of the fire pump controller.

Public Input No. 51-NFPA 20-2022 [New Section after 9.2.3.4.3]

First Revision No. 16-NFPA 20-2022 [Section No. 9.2.3.4.3]

~~9.2.3.4.4~~

~~An instantaneous trip circuit breaker shall be permitted in lieu of the overcurrent device specified in 9.2.3.4 provided it is part of an assembly listed for fire pump service and complies with 9.2.3.4.1 .~~

Submitter Information Verification

Committee: FIM-AAA

Submittal Date: Thu Oct 27 09:11:23 EDT 2022

Committee Statement

Committee Statement: Clause 9.2.3.4.3 is not needed since item (7) of 9.2.3.4.1, which has been moved to new 9.2.3.4.1.1, is coupled to 9.2.3.4 by reference and 10.8.2.2(2) refers to 9.2.3.4.

Response Message: FR-16-NFPA 20-2022

Public Input No. 36-NFPA 20-2022 [Section No. 9.2.3.4.3]

First Revision No. 19-NFPA 20-2022 [Section No. 9.3.1]

9.3.1

Unless there is an installed power arrangement as described in ~~9.3.3~~ 9.3.2, at least one alternative source of power shall be provided ~~for high-rise buildings.~~ when either of the following conditions exist:

(1)* Where the normal source of power is not reliable

A.9.3.1(1)

A reliable power source possesses the following characteristics:

(1) The source power plant has not experienced any shutdowns longer than 10 continuous hours in the year prior to plan submittal. NFPA 25 requires special undertakings (i.e., fire watches) when a water-based fire protection system is taken out of service for longer than 10 hours. If the normal source power plant has been intentionally shut down for longer than 10 hours in the past, it is reasonable to require a backup source of power.

(2) Power outages have not routinely been experienced in the area of the protected facility caused by failures in generation or transmission. This standard ~~is~~ does not ~~intended to~~ require that the normal source of power be infallible to deem the power reliable~~.~~ ~~NFPA 20~~ , nor does ~~not~~ it intend to require a backup source of power for every installation using an electric-motor-driven fire pump.

(3) The normal source of power is not supplied by overhead conductors outside the protected facility. Fire departments responding to an incident at the protected facility will not operate aerial apparatus near live overhead power lines, without exception. A backup source of power is required in case this scenario occurs and the normal source of power must be shut off. Additionally, many utility providers will remove power to the protected facility by physically cutting the overhead conductors. If the normal source of power is provided by overhead conductors, which will not be identified, the utility provider could mistakenly cut the overhead conductor supplying the fire pump.

(4) Only the disconnect switches and overcurrent protection devices permitted by 9.2.3 are installed in the normal source of power. Power disconnection and activated overcurrent protection should occur only in the fire pump controller. The ~~provisions~~ requirements of 9.2.2 for the disconnect switch and overcurrent protection essentially require disconnection and overcurrent protection to occur in the fire pump controller. If unanticipated disconnect switches or overcurrent protection devices are installed in the normal source of power that do not meet the requirements of 9.2.2, the normal source of power must be considered not reliable and a backup source of power is necessary.

Typical methods of routing power from the source to the motor are shown in Figure A.9.2. Other configurations are also acceptable. The determination of the reliability of a service is left up to the discretion of the authority having jurisdiction.

For more information on the determination of reliability, see the following publications:

(1) IEEE 493, *IEEE Recommended Practice for the Design of Reliable Industrial and Commercial Power Systems*

(2) “Reliability engineering applied to Critical Operations Power Systems (COPS),” ~~a paper presented at the~~ *2011 IEEE Industrial and Commercial Power Systems Conference (I&CPS)*

(3) “Reliability ~~analysis~~ Analysis for ~~power~~ Power to ~~fire pump using~~ Fire Pump Using Fault Tree and RBD,” ~~in~~ *IEEE Transactions on Industry Applications*

(4) “Risk ~~analysis~~ Analysis for NEC Article 708 Critical Operations Power Systems,” ~~paper presented at the~~ 2009 Industry Applications Society Annual Meeting, ~~and~~ published by IEEE

(5) “NEC Article 708,” ~~in~~ *IEEE Industry Application Magazine*, ~~Jan.-Feb~~ January-February 2011

(2) Where the power is for a high-rise buildings~~s~~

~~**9.3.2** Other Sources.~~

~~Except for an arrangement described in 9.3.3 , at least one alternate source of power shall be provided where the normal source is not reliable.~~

Supplemental Information

File Name	Description	Approved
Chapter_9_9_3_1_FR-19.docx	Chapter 9 9_3_1_FR-19.docx	

Submitter Information Verification

Committee: FIM-AAA

Submittal Date: Thu Oct 27 09:22:18 EDT 2022

Committee Statement

Committee Statement: This revision combines 9.3.1 and 9.3.2 together for clarity. Current 9.3.3 becomes 9.3.2. Remaining sections after 9.3.2 shall be renumbered. Relocate existing annex from 9.3.2 to 9.3.1(1).

Response Message: FR-19-NFPA 20-2022

Public Input No. 37-NFPA 20-2022 [Sections 9.3.1, 9.3.2]

First Revision No. 20-NFPA 20-2022 [New Section after 9.3.6.2]

9.3.5.3

The power transfer switch shall be installed in accordance with 10.8.2.2 .

Submitter Information Verification

Committee: FIM-AAA

Submittal Date: Thu Oct 27 09:28:03 EDT 2022

Committee Statement

Committee Statement: The additional transfer switch for the additional source is a critical device in the alternate source of power for a fire pump so it should be installed as an Arrangement II transfer switch.

Response Message: FR-20-NFPA 20-2022

Public Input No. 52-NFPA 20-2022 [New Section after 9.3.6.2]

First Revision No. 109-NFPA 20-2022 [Section No. 9.5.3.3]

9.5.3.3

Fire pump motors ~~that are also listed as inverter duty motors~~ shall be marked with the maximum allowable service factor ~~amps~~ amperes that can be used ~~when connected to a variable frequency drive (VFD)~~ .

9.5.3.3.1

Where the motor is also listed as inverter duty the maximum allowable service factor amperes that can be used when connected to a variable frequency drive (VFD) shall be marked.

Supplemental Information

File Name	Description	Approved
Chapter_9_9_5_3_3_FR-109.docx	Chapter 9_9_5_3_3_FR-109.docx	

Submitter Information Verification

Committee: FIM-AAA

Submittal Date: Thu Nov 03 09:24:22 EDT 2022

Committee Statement

Committee Statement: Clauses 14.2.6.7.1 and 14.2.6.7.2 require that the FLA times the service factor not be exceeded. However, this has led to motors being rejected by the AHJ when the motors are running at the maximum Service Factor. Since the Service Factor is the amount of additional horsepower that is allowed, not the additional current, the formula to use the FLA times the SF is an approximation. The precise rating to use is the Service Factor Amps for all motors, not just inverter duty motors.

Response Message: FR-109-NFPA 20-2022

Public Input No. 38-NFPA 20-2022 [Section No. 9.5.3.3]

First Revision No. 22-NFPA 20-2022 [Section No. 9.6.5.1]

9.6.5.1

Protective devices installed in the fire pump circuits of the on-site generator power source shall allow instantaneous pickup of the full pump room load and shall comply with ~~*NFPA 70*~~ ~~,~~ ~~Section 700.28~~ 700.32 of *NFPA 70* .

Submitter Information Verification

Committee: FIM-AAA

Submittal Date: Thu Oct 27 09:32:08 EDT 2022

Committee Statement

Committee Statement: The requirements for selective coordination, previously in NEC 700.28, are now located in NEC 700.32.

Response Message: FR-22-NFPA 20-2022

Public Input No. 1-NFPA 20-2021 [Section No. 9.6.5.1]

First Revision No. 94-NFPA 20-2022 [Section No. 10.1.2.5.1]

10.1.2.5.1

All controllers shall be marked “Electric Fire Pump Controller” and ~~shall~~ show plainly the name of the manufacturer, identifying designation, maximum ~~operating~~ rated pressure, enclosure type designation, and complete electrical rating.

Submitter Information Verification

Committee: FIM-AAA

Submittal Date: Fri Oct 28 11:02:41 EDT 2022

Committee Statement

Committee Statement: Reference to maximum rated pressure aligns with the listing standard as the maximum pressure that can be put into the controller.

Response Message: FR-94-NFPA 20-2022

First Revision No. 98-NFPA 20-2022 [Section No. 10.3.3.3]

10.3.3.3

Where ~~the equipment is located outside, or where~~ special environments exist, ~~suitably~~ rated enclosures suitable for the environments shall be used.

Submitter Information Verification

Committee: FIM-AAA

Submittal Date: Fri Oct 28 11:15:44 EDT 2022

Committee Statement

Committee Statement: The language has been updated to direct the user for selecting the correct enclosure for the environment in which it is installed.

Response Message: FR-98-NFPA 20-2022

First Revision No. 23-NFPA 20-2022 [Section No. 10.4.2.4.1]

10.4.2.4.1

Unless the requirements of 10.4.2.4.2.1 or 10.4.2.4.2 are met, the following warning shall appear on or immediately adjacent to the isolating switch:

WARNING

DO NOT OPEN OR CLOSE THIS SWITCH WHILE THE CIRCUIT BREAKER (DISCONNECTING MEANS) IS IN CLOSED POSITION.

Submitter Information Verification

Committee: FIM-AAA

Submittal Date: Thu Oct 27 09:34:40 EDT 2022

Committee Statement

Committee Statement: The warning label is for an isolating switch that is not capable of opening the motor locked rotor current. Since a molded case switch is suitable for interrupting the motor locked rotor current, the warning label is not required.

Response Message: FR-23-NFPA 20-2022

Public Input No. 87-NFPA 20-2022 [Section No. 10.4.2.4.1]

First Revision No. 55-NFPA 20-2022 [Section No. 10.4.5.8]

10.4.5.8*

~~No ground fault protection (tripping) shall be allowed~~ Ground-fault protection for equipment that opens or disconnects the fire pump motor at current levels less than those required to protect conductors from damage shall not be permitted .

A.10.4.5.8

Ground-fault or earth-leakage modules for circuit breakers, ground-fault devices, earth-leakage devices, or other devices that trip the circuit breaker or disconnect the fire pump motor as a result of low-level ground or leakage currents are not permitted due to the possibility of tripping during an emergency. The fire pump motor and other components in the fire pump circuit can generally tolerate low levels of ground current without damage and should be allowed to operate under these conditions.

Submitter Information Verification

Committee: FIM-AAA

Submittal Date: Thu Oct 27 14:08:29 EDT 2022

Committee Statement

Committee Statement: Ground fault protection for a short circuit to ground is a normal function of the circuit breaker. This revision clarifies ground fault protection for equipment is what is not permitted. New Annex material for 10.4.5.8 is added to clarify why ground fault protection for equipment is not permitted.

Response Message: FR-55-NFPA 20-2022

First Revision No. 56-NFPA 20-2022 [Section No. 10.4.5.9]

10.4.5.9

~~A~~ Monitoring of ground-fault ~~alarm~~ conditions shall be permitted if it does not result in tripping of the circuit breaker .

Submitter Information Verification

Committee: FIM-AAA

Submittal Date: Thu Oct 27 14:12:04 EDT 2022

Committee Statement

Committee Statement: This revision clarifies that monitoring ground fault conditions is acceptable. The means of permitted monitoring is not specified.

Response Message: FR-56-NFPA 20-2022

First Revision No. 24-NFPA 20-2022 [Section No. 10.5.2.1.3.1]

10.5.2.1.3.1*

Where the electronic pressure sensor reading exceeds the higher of 10 psi (0.68 bar) or 3.33 percent of the maximum controller rated pressure during any automatic pump start that was initiated by the solenoid drain valve, as required by 10.5.2.7.3, the controller shall activate a visual and audible ~~alarm~~ signal that can be silenced.

Submitter Information Verification

Committee: FIM-AAA

Submittal Date: Thu Oct 27 09:44:53 EDT 2022

Committee Statement

Committee Statement: This revision allows for a higher drop on high pressure systems but maintains the same percent of rated pressure. Reference to maximum controller rated pressure aligns with the listing standard as the maximum pressure that can be put into the controller. Alarm is changed to signal as these conditions do not require immediate action.

Response Message: FR-24-NFPA 20-2022

Public Input No. 53-NFPA 20-2022 [Section No. 10.5.2.1.3.1]

First Revision No. 25-NFPA 20-2022 [Section No. 10.5.2.1.3.2]

10.5.2.1.3.2*

Where an electronic pressure sensor is used to control fire pump operation, the fire pump controller shall monitor and provide ~~a~~ an audible and visual signal for the following ~~electronic pressure sensor~~ conditions:

(1) Any time the electronic pressure sensor output is less than 10 percent of rated span or below its rated zero pressure output

(2) Any time the electronic pressure sensor reading is more than 10 percent above its rated full-scale output

Submitter Information Verification

Committee: FIM-AAA

Submittal Date: Thu Oct 27 10:20:27 EDT 2022

Committee Statement

Committee Statement: The standard lacks specificity as to the type of signal required, which may be audible, visual, or other types. This revision specifies the type of signals the controller is required to provide and represents present day designs. “Electronic pressure sensor” removed as it is considered redundant.

Response Message: FR-25-NFPA 20-2022

Public Input No. 39-NFPA 20-2022 [Section No. 10.5.2.1.3.2]

First Revision No. 26-NFPA 20-2022 [Section No. 10.5.2.1.4]

10.5.2.1.4

There shall be no valve or other restrictions ~~within~~ as part of the controller ahead of the pressure-sensing device.

Submitter Information Verification

Committee: FIM-AAA

Submittal Date: Thu Oct 27 10:21:42 EDT 2022

Committee Statement

Committee Statement: This revision is compatible with 10.5.2.1.1.2 since water piping is no longer allowed inside the controller.

Response Message: FR-26-NFPA 20-2022

Public Input No. 54-NFPA 20-2022 [Section No. 10.5.2.1.4]

First Revision No. 97-NFPA 20-2022 [Section No. 10.5.2.1.6]

10.5.2.1.6

The pressure-sensing device shall be capable of withstanding a momentary surge pressure of 400 psi (27.6 bar) or 133 percent of fire pump maximum controller rated ~~operating~~ pressure, whichever is higher, without losing its accuracy.

Submitter Information Verification

Committee: FIM-AAA

Submittal Date: Fri Oct 28 11:09:54 EDT 2022

Committee Statement

Committee Statement: Reference to maximum controller rated pressure aligns with the listing standard as the maximum pressure that can be put into the controller.

Response Message: FR-97-NFPA 20-2022

First Revision No. 28-NFPA 20-2022 [Section No. 10.5.2.1.8]

10.5.2.1.8

Water pressure control shall be in accordance with 10.5.2.1.8.1 through 10.5.2.1.8.8 ~~10.5.2.1.8.7~~ .

10.5.2.1.8.1

~~Pressure -sensing element of the~~ The pressure-sensing device at the low adjustment setting shall initiate the pump starting sequence ~~(~~ if the pump is not already in operation~~)~~ .

10.5.2.1.8.2*

A pressure-recording device shall record the pressure in each fire pump controller pressure-sensing line at the input to the controller.

10.5.2.1.8.3

The pressure recorder shall be listed as part of the controller or ~~shall~~ be a separately listed unit installed to sense the pressure at the input of the controller.

10.5.2.1.8.4

The recorder shall be capable of storing events for at least 7 days.

10.5.2.1.8.5

The pressure-sensing element of the recorder shall be capable of withstanding a momentary surge pressure of at least 400 psi (27.6 bar) or 133 percent of fire pump controller rated operating pressure, whichever is greater, without losing its accuracy.

10.5.2.1.8.6

For variable speed pressure-limiting control, the following shall apply: ~~a 1½ in. (12.7 mm) nominal size inside diameter pressure line shall be connected to the discharge piping at a point recommended by the variable speed control manufacturer. The connection shall be between the discharge check valve and the discharge control valve.~~

(1) A ½ in. (12.7 mm) nominal size inside diameter pressure line shall be connected to the discharge piping at a point recommended by the variable speed control manufacturer.

(2) The connection shall be between the discharge check valve and the discharge control valve.

10.5.2.1.8.7

Access to the recorder data shall not require opening the controller nor ~~require~~ taking the controller out of service.

Detail FR-29

10.5.2.1.8.8

A shutoff valve in the pressure-sensing line shall not be permitted.

Submitter Information Verification

Committee: FIM-AAA

Submittal Date: Thu Oct 27 10:26:45 EDT 2022

Committee Statement

Committee Statement:	This revision corrects the range of requirements referenced in 10.5.2.1.8 and aligns 10.5.2.1.8.1 with the text in 12.7.2.1.8(2). The term “sensing element” is changed to “pressure-sensing device” to clarify that it is the “pressure-sensing device” that initiates the pump starting sequence, not just the “pressure sensing element.”
Response Message:	FR-28-NFPA 20-2022

Public Input No. 41-NFPA 20-2022 [Section No. 10.5.2.1.8]

First Revision No. 30-NFPA 20-2022 [Section No. 10.5.2.2.2]

10.5.2.2.2

~~The~~ A pressure ~~switch~~ -sensing device shall not be required.

Submitter Information Verification

Committee: FIM-AAA

Submittal Date: Thu Oct 27 10:31:19 EDT 2022

Committee Statement

Committee Statement: Presently, the standard does not recognize the use of a pressure switch and electronic pressure sensor. The revision replaces the term“pressure-actuated switch”with “pressure-sensing device” to allow for this type of device.

Response Message: FR-30-NFPA 20-2022

Public Input No. 42-NFPA 20-2022 [Section No. 10.5.2.2.2]

First Revision No. 31-NFPA 20-2022 [Section No. 10.5.2.3.1]

10.5.2.3.1

Where the pump supplies special water control equipment (deluge valves, dry pipe valves, etc.), it shall be permitted to start the motor before the ~~pressure-actuated switch(es)~~ pressure-sensing device(s) would do so.

Submitter Information Verification

Committee: FIM-AAA

Submittal Date: Thu Oct 27 10:32:03 EDT 2022

Committee Statement

Committee Statement: Presently, the standard does not recognize the use of a pressure switch and electronic pressure sensor. The revision replaces the term “pressure-actuated switch(es)” with “pressure-sensing device(s)” to allow for this type of device.

Response Message: FR-31-NFPA 20-2022

Public Input No. 43-NFPA 20-2022 [Section No. 10.5.2.3.1]

First Revision No. 37-NFPA 20-2022 [Section No. 10.5.2.7]

10.5.2.7 Automatic Testing.

10.5.2.7.1

The controller equipment shall be arranged to automatically start, run, and shut down the motor at the minimum no-flow test frequency and duration required by NFPA 25.

10.5.2.7.2

Performance of the automatic testing shall be recorded as a pressure drop indication on the pressure recorder.

10.5.2.7.3

A solenoid valve drain on the pressure control line shall be the initiating means.

10.5.2.7.4

The motor shall shut down from motor overload when the motor current exceeds 120 percent of full load amperes for 10 seconds.

10.5.2.7.5

If a starting cause occurs after shutdown, the controller shall override the motor overload shutdown, restart, and run in accordance with 10.4.4 .

10.5.2.7.6

In a non-pressure-actuated controller, the automatic testing shall be permitted to be initiated by a means other than a solenoid valve.

10.5.2.7.7

A visible indicator and audible alarm shall be provided when the controller fails to start from the automatic mode.

10.5.2.8 Remote Automatic Testing.

10.5.2.8.1

Automatic remote testing shall be permitted through a secure connection from authorized users.

10.5.2.8.2

Additional safety shutdowns shall be allowed if the controller overrides the shutdown and restarts in the event of a starting cause.

10.5.2.8.3

Remote stop shall be allowed if the controller overrides the stop signal and restarts in the event of a starting cause.

10.5.2.8.4

Upon starting a remote test, a watchdog timer shall be set to stop all remote testing operations and return the system to standby if it is not reset remotely and locally once every minute.

10.5.2.8.5

After 30 minutes, the controller shall stop all remote testing activities, even if still occurring, and return to standby mode.

Supplemental Information

File Name	Description	Approved
20_A2024_10_5_2_7_FR37.docx	20_A2024_10_5_2_7_FR37.docx	

Submitter Information Verification

Committee: FIM-AAA

Submittal Date: Thu Oct 27 11:00:39 EDT 2022

Committee Statement

Committee Statement: This revision provides details on controller functionality in regards to remote testing.

Response Message: FR-37-NFPA 20-2022

Public Input No. 85-NFPA 20-2022 [Section No. 10.5.2.7.1]

First Revision No. 32-NFPA 20-2022 [Section No. 10.5.3.1.1]

10.5.3.1.1

There shall be a manually operated switch on the control panel so arranged that, when the motor is started manually, its operation cannot be affected by the pressure-~~actuated switch~~ sensing device .

Submitter Information Verification

Committee: FIM-AAA

Submittal Date: Thu Oct 27 10:36:30 EDT 2022

Committee Statement

Committee Statement: Presently, the standard does not recognize the use of a pressure switch and electronic pressure sensor. The revision replaces the term “pressure-actuated switch” with “pressure-sensing device” to allow for this type of device.

Response Message: FR-32-NFPA 20-2022

Public Input No. 70-NFPA 20-2022 [Section No. 10.5.3.1.1]

First Revision No. 96-NFPA 20-2022 [Section No. 10.7.2.1]

10.7.2.1

In lieu of 10.1.2.5.1, each controller shall be marked “Limited Service Controller” and ~~shall~~ show plainly the name of the manufacturer, the identifying designation, the maximum ~~operating~~ rated pressure, the enclosure type designation, and the complete electrical rating.

Submitter Information Verification

Committee: FIM-AAA

Submittal Date: Fri Oct 28 11:08:31 EDT 2022

Committee Statement

Committee Statement: Reference to maximum rated pressure aligns with the listing standard as the maximum pressure that can be put into the controller.

Response Message: FR-96-NFPA 20-2022

First Revision No. 33-NFPA 20-2022 [Section No. 10.8.2.1.6]

~~10.8.2.1.6~~

~~For fire pump installations using one disconnecting means and associated overcurrent protection device installed in the normal power supply to the fire pump controller as permitted in 9.2.3 , an instantaneous-trip circuit breaker shall be permitted in lieu of the overcurrent device specified in 9.2.3.4 provided it is part of an assembly listed for fire pump service and complies with 9.2.3.4 .~~

Submitter Information Verification

Committee: FIM-AAA

Submittal Date: Thu Oct 27 10:37:46 EDT 2022

Committee Statement

Committee Statement: Clause 10.8.2.1.6 is not needed since item (7) of 9.2.3.4.1, which has been moved to new 9.2.3.4.1.1, is coupled to 9.2.3.4 by reference and 10.8.2.2(2) refers to 9.2.3.4.

Response Message: FR-33-NFPA 20-2022

Public Input No. 71-NFPA 20-2022 [Section No. 10.8.2.1.6]

First Revision No. 38-NFPA 20-2022 [Section No. 10.8.2.2]

10.8.2.2 Arrangement II-A (Individually Listed Power Transfer Switch and Fire Pump Controller ~~and Power Transfer Switch~~) or Arrangement II-B (Individually Listed Power Transfer Switch and Listed Combination Fire Pump Controller and Power Transfer Switch) .

~~The~~ Where an arrangement consists of an individually listed power transfer switch and fire pump controller or an individually listed power transfer switch and listed combination fire pump controller and power transfer switch, the following requirements shall ~~be provided~~ apply :

(1) A fire pump controller power transfer switch complying with Sections 9.6 and 10.8 and a fire pump controller or combination fire pump controller and power transfer switch shall be provided. ~~The overcurrent protection required by 10.8.2.2(2) and the isolating switch required by 10.8.2.2(3) shall be permitted to be provided in a separate enclosure upstream of the transfer switch.~~

(2) The individually listed power transfer switch overcurrent protection for both the normal and alternate sources shall comply with 9.2.3.4 ~~or 9.2.3.4.1~~ .

(3) The overcurrent protection required by 10.8.2.2(2) and the isolating switch ~~required by~~ in accordance with 10.8.2.2(4) shall be permitted to be provided in a separate enclosure ~~upstream~~ on the line side of the transfer switch.

~~An instantaneous trip circuit breaker shall be permitted in lieu of the overcurrent devices specified in 10.8.2.2(2) provided it is part of a transfer switch assembly listed for fire pump service and complies with 9.2.3.4.1 .~~

(4) An isolating switch ahead of both normal and alternate sources input terminals of the individually listed power transfer switch shall be permitted.

(5) ~~An~~ The circuit breaker, fuses, and disconnecting means or isolating switch ~~ahead of the alternate source input terminals of the transfer switch~~ , where provided, shall meet the following requirements:

(a) ~~The isolating switch~~ They shall be externally operable and lockable in both the closed and ~~the~~ open position~~s~~ .

(b) A placard with letters at least 1 in. (25 mm) in height shall be externally installed ~~on the isolating switch stating “Fire Pump Isolating Switch,” with letters at least 1 in. (25 mm) in height.~~ in accordance with the following:

i. On the isolating switch, stating “Fire Pump Isolating Switch~~,~~ ”

ii. On the circuit breaker or disconnecting means, stating “Fire Pump Disconnecting Means”

(c) A placard shall be placed adjacent to the fire pump controller stating the location of the circuit breaker and disconnecting means or isolating switch, where provided, and the location of the key (if ~~the isolating switch is~~ locked).

(d) The circuit breaker, fuses, and disconnecting means or isolating switch, where provided, shall be supervised by one of the following methods to indicate when it is not closed:

i. Central ~~station~~ , proprietary, or remote station signal service

ii. Local signaling service that will cause the sounding of an audible signal at a constantly attended point

iii. Locking the circuit breaker, fuses, and disconnecting means or isolating switch, where provided, closed

iv. Sealing of circuit breaker, fuses, and disconnecting means or isolating switches, where provided, ~~and approved weekly recorded inspections~~ where ~~isolating switches are~~ located within fenced enclosures or in buildings under the control of the owner

(e) ~~This~~ Where the circuit breaker, fuses and disconnecting means or isolating switch, where provided, are part of an individually listed power transfer switch, the supervision required by 10.8.2.2(5)(d) shall operate ~~an audible and~~ a visible and audible signal on the transfer switch and permit monitoring at a remote point~~, where required~~ .

(6) The isolation switch shall not have short-circuit, ~~or~~ overcurrent, or self-protecting instantaneous protection as part of the switching mechanism of the isolating switch.

(7) The transfer switch shall be the delayed transition type with a maximum delay time of 3 seconds.

Supplemental Information

File Name	Description	Approved
Chapter_10_10_8_2_2_FR38.docx	Chapter 10_10_8_2_2 FR38	

Submitter Information Verification

Committee: FIM-AAA

Submittal Date: Thu Oct 27 11:13:04 EDT 2022

Committee Statement

Committee Statement: The standard needs to recognize that a power transfer switch with a combination fire pump controller and power transfer switch is also an arrangement II configuration. Also, since 10.8.2.2(2) requires that the normal and emergency sources have overcurrent protection in accordance with section 9.2.3.4, the normal and emergency isolating switches can be optional. Further, no type of tripping is allowed for the isolating switch, including a “self-protecting instantaneous trip.” The reference to 9.2.3.4.1 for an instantaneous trip circuit breaker is not needed since item (7) of 9.2.3.4.1, which has been moved to new 9.2.3.4.1.1, is coupled to 9.2.3.4 by reference and 10.8.2.2(2) refers to section 9.2.3.4. As in 9.2.3.3, all circuit breakers or fuses and disconnecting means and isolating switches should be required to be supervised.

Response Message: FR-38-NFPA 20-2022

Public Input No. 72-NFPA 20-2022 [Section No. 10.8.2.2]

First Revision No. 34-NFPA 20-2022 [Section No. 10.8.3.6.2]

10.8.3.6.2

Where the voltage on any phase of the normal source falls below 85 percent of motor-rated voltage, the power transfer switch shall automatically initiate starting of the standby generator, ~~if~~ where provided ~~and not running~~ , and initiate transfer to the alternate source.

Submitter Information Verification

Committee: FIM-AAA

Submittal Date: Thu Oct 27 10:40:02 EDT 2022

Committee Statement

Committee Statement: The transfer switch always initiates a start when the voltage on the normal source falls below 85 percent. It's not selective based on whether the standby generator is running or not. Even if the generator is running, the transfer switch should still initiate starting to make certain the generator continues to run if other causes of starting that originally started the generator are removed.

Response Message: FR-34-NFPA 20-2022

Public Input No. 47-NFPA 20-2022 [Section No. 10.8.3.6.2]

First Revision No. 35-NFPA 20-2022 [Section No. 10.8.3.11]

10.8.3.11* Overcurrent Protection.

The power transfer switch shall not have short-circuit ~~or~~ protection, overcurrent protection, or self-protecting instantaneous trips as part of the switching mechanism of the transfer switch.

Submitter Information Verification

Committee: FIM-AAA

Submittal Date: Thu Oct 27 10:42:21 EDT 2022

Committee Statement

Committee Statement: Some transfer switches use Molded Case Switches, but even though they are called switches they may or may not have "self-protecting instantaneous trips" in them. This makes it clear that the transfer switch shall not have any type of tripping device in them.

Response Message: FR-35-NFPA 20-2022

Public Input No. 55-NFPA 20-2022 [Section No. 10.8.3.11]

First Revision No. 36-NFPA 20-2022 [Section No. 10.10.3.1 [Excluding any Sub-Sections]]

When the variable frequency drive is not at line frequency, and upon failure of the variable speed pressure-limiting control to keep the system pressure within 10 percent of the set pressure of the variable speed pressure-limiting control system for more than ~~15~~ 20 seconds, the controller shall bypass and isolate the variable speed pressure-limiting control system and operate the pump at rated speed.

Submitter Information Verification

Committee: FIM-AAA

Submittal Date: Thu Oct 27 10:45:22 EDT 2022

Committee Statement

Committee Statement: Field experience has shown that 15 seconds of variable frequency drive failure to perform its intended function is insufficient to determine if the bypass operation should occur for controllers equipped with variable speed pressure limiting control or variable speed suction limiting control. If the variable speed pressure-limiting control fails to keep the system pressure within 10 percent of the set pressure of the variable speed pressure-limiting control system for more than 20 seconds, it is reasonable that the bypass operation shall occur.

Response Message: FR-36-NFPA 20-2022

Public Input No. 81-NFPA 20-2022 [Section No. 10.10.3.1 [Excluding any Sub-Sections]]

First Revision No. 39-NFPA 20-2022 [Section No. 10.10.3.1.1]

10.10.3.1.1* Low-Pressure Bypass.

If the system pressure remains below ~~this~~ the low- pressure bypass setting for more than ~~15~~ 20 seconds, the bypass operation shall occur.

Submitter Information Verification

Committee: FIM-AAA

Submittal Date: Thu Oct 27 11:16:05 EDT 2022

Committee Statement

Committee Statement: The standard should be more specific in terms of which pressure applies. This revision defines what “this pressure” is.

Field experience has shown that the system pressure being below the low-pressure bypass setting for 15 seconds is insufficient to determine if the bypass operation should occur for controllers equipped with variable speed pressure limiting control or variable speed suction limiting control. If the system pressure remains below the low-pressure bypass setting for more than 20 seconds, it is reasonable that the bypass operation shall occur.

Response Message: FR-39-NFPA 20-2022

Public Input No. 74-NFPA 20-2022 [Section No. 10.10.3.1.1]

Public Input No. 82-NFPA 20-2022 [Section No. 10.10.3.1.1]

First Revision No. 54-NFPA 20-2022 [Section No. 10.10.3.1.2]

10.10.3.1.2* Drive Not Operational.

If the variable speed drive indicates that it is not operational within ~~5~~ 7 seconds, the bypass operation shall occur.

Submitter Information Verification

Committee: FIM-AAA

Submittal Date: Thu Oct 27 14:02:20 EDT 2022

Committee Statement

Committee Statement: Field experience has shown that the variable frequency drive not being operational for 5 seconds is insufficient to determine if the bypass operation should occur for controllers equipped with variable speed pressure limiting control or variable speed suction limiting control. If the variable speed drive is not operational for more than 7 seconds, it is reasonable that the bypass operation shall occur.

Response Message: FR-54-NFPA 20-2022

First Revision No. 58-NFPA 20-2022 [Section No. 10.10.5.2]

10.10.5.2

The circuit protection required in 10.10.5.1 shall be coordinated such that the circuit breaker in 10.4.3 does not trip due to a fault condition in the variable speed ~~circuitry~~ drive .

Submitter Information Verification

Committee: FIM-AAA

Submittal Date: Thu Oct 27 14:17:42 EDT 2022

Committee Statement

Committee Statement: This revision clarifies that the fault occurs in the variable speed drive and does not include other components of the variable speed drive circuit. This aligns with existing A.10.10.5.

Response Message: FR-58-NFPA 20-2022

First Revision No. 81-NFPA 20-2022 [Section No. 11.2.4.2.3.4(B)]

(B)

Where special environments exist, ~~suitably~~ rated enclosures suitable for the environments shall be used.

Submitter Information Verification

Committee: FIM-AAA
Submittal Date: Fri Oct 28 08:50:11 EDT 2022

Committee Statement

Committee Statement: This revision editorially corrects the text within the standard.
Response Message: FR-81-NFPA 20-2022

Public Input No. 98-NFPA 20-2022 [Section No. 11.2.4.2.3.4(B)]

First Revision No. 82-NFPA 20-2022 [Section No. 11.2.4.3]

11.2.4.3 Variable Speed Pressure-Limiting Control or Variable Speed Suction-Limiting Control ~~(Optional)~~ .

11.2.4.3.1

Where provided, variable speed pressure-limiting control or variable speed suction-limiting control systems shall meet the requirements of 11.2.4.3 .

11.2.4.3.2

Variable speed pressure-limiting control or variable speed suction-limiting control systems used on diesel engines for fire pump drive shall be listed for fire pump service and be capable of limiting the pump output total rated head (pressure) or suction pressure by reducing pump speed.

11.2.4.3.3

Variable speed control systems shall not replace the engine governor as defined in 11.2.4.1.

11.2.4.3.4

In the event of a failure of the variable speed control system, the engine shall operate at pump-rated speed with the governor defined in 11.2.4.1.

11.2.4.3.5 Pressure-Sensing Line.

11.2.4.3.5.1

Unless modified by 11.2.4.3.5 , pressure-sensing lines shall be installed in accordance with Section 4.32 .

11.2.4.3.5.2

A pressure-sensing line shall be provided to the engine with a ½ in. (12.7 mm) nominal size inside diameter line.

11.2.4.3.5.3

For pressure-limiting control, a sensing line shall be installed from a connection between the pump discharge flange and the discharge check valve to the engine.

11.2.4.3.5.4*

If the pressure-sensing line is installed where sediment could enter, a drop-down trap and a cleanout shall be installed.

11.2.4.3.5.5

For suction-limiting control, a sensing line shall be installed from a connection at the pump inlet flange to the engine.

11.2.4.3.6

Within 20 seconds after a demand to start, pumps shall supply and maintain a stable discharge pressure ~~(~~ ±10 percent~~)~~ throughout the entire range of operation.

11.2.4.3.6.1

The discharge pressure shall restabilize within 20 seconds whenever the flow condition changes.

Supplemental Information

File Name	Description	Approved
Chapter_11_11_2_4_3_FR-82.docx	Chapter 11_11_2_4_3_FR-82.docx	

Submitter Information Verification

Committee: FIM-AAA

Submittal Date: Fri Oct 28 09:08:18 EDT 2022

Committee Statement

Committee Statement: The charging statement was added to make the requirements of this section enforceable when pressure limiting variable speed control is used. This revision also ensures that materials used for pressure sensing lines are in compliance with section 4.32.3.

Response Message: FR-82-NFPA 20-2022

Public Input No. 101-NFPA 20-2022 [Section No. 11.2.4.3.4]

Public Input No. 99-NFPA 20-2022 [Section No. 11.2.4.3]

First Revision No. 104-NFPA 20-2022 [Sections 11.2.7.4.4.7, 11.2.7.4.4.8, 11.2.7.4.4.9]

~~**11.2.7.4.4.7**~~

~~Where used as a secondary cranking system, the first start attempt shall be automatic from the signaling source with 45 seconds of crank duration.~~

11.2.7.4.4.7

Where used as a secondary cranking system, the ~~second~~ start attempt shall be manually activated from either engine or controller, only cranking while the button is held in.

11.2.7.4.4.8

There shall be a separate, powered automatic air compressor or means of obtaining air at the required air pressure from some other reliable system.

11.2.7.4.4.9

Where used as a primary cranking system, there shall be an air compressor driven by the fire pump engine.

Supplemental Information

File Name	Description	Approved
Chapter_11_11_2_7_4_4_7_FR-104.docx	Chapter 11_11_2_7_4_4_7_FR-104.docx	

Submitter Information Verification

Committee: FIM-AAA

Submittal Date: Fri Oct 28 11:51:54 EDT 2022

Committee Statement

Committee Statement: The revision clarifies separation of requirements for primary and secondary air starting systems.

Response Message: FR-104-NFPA 20-2022

First Revision No. 83-NFPA 20-2022 [Section No. 11.2.8.5.3.8]

11.2.8.5.3.8 Potable Water Separation ~~(Optional)~~ .

Where two levels of separation for possible contaminants to the ground or potable water source are required by the authority having jurisdiction, dual spring-loaded check valves or backflow preventers shall be installed.

(A)*

The spring-loaded check valve(s) shall replace the second indicating manual shutoff valve(s) in the cooling loop assembly as stated in 11.2.8.5.3.3.

(B)*

If backflow preventers are used, the devices shall be listed for fire protection service and installed in parallel in the water supply and water supply bypass assembly.

(C)

Where the authority having jurisdiction requires the installation of backflow prevention devices in connection with the engine, special consideration shall be given to the increased pressure loss, which will require that the cooling loop pipe size be evaluated and documented by engineering calculations to demonstrate compliance with the engine manufacturer's recommendation.

Submitter Information Verification

Committee: FIM-AAA

Submittal Date: Fri Oct 28 09:22:15 EDT 2022

Committee Statement

Committee Statement: The term Optional is not needed it is ambiguous, the option for potable water separation is already allowed in the existing text.

Response Message: FR-83-NFPA 20-2022

Public Input No. 100-NFPA 20-2022 [Section No. 11.2.8.5.3.8]

First Revision No. 84-NFPA 20-2022 [New Section after 11.3.1]

11.3.2*

Where the requirements of Section 11.3 rely on a source of power and the normal source of power is unreliable, an alternate source of power shall be provided for those electrically operated components.

A.11.3.2

Examples of building functions that might require normal power are electrically operated ventilation or unit heaters within the pump room. Unreliable sources of power should be determined based on the recommendations in A.9.3.2.

Submitter Information Verification

Committee: FIM-AAA

Submittal Date: Fri Oct 28 09:30:46 EDT 2022

Committee Statement

Committee Statement: This revision assures that other equipment required by diesel driver to properly operate is functional during a loss of power.

Response Message: FR-84-NFPA 20-2022

Public Input No. 16-NFPA 20-2022 [New Section after 11.3.1]

First Revision No. 85-NFPA 20-2022 [Section No. 11.4.1.5.2]

11.4.1.5.2

Each tank shall have a drain connection.

11.4.1.5.2.1

A drain connection located in the lowest point of the tank shall be 1 in. (25 mm) NPT.

11.4.1.5.2.2

The tank shall be pitched to drain to the drain connection.

Submitter Information Verification

Committee: FIM-AAA

Submittal Date: Fri Oct 28 09:43:10 EDT 2022

Committee Statement

Committee Statement: The revised language will ensure that the tank is positioned in such a way such that water and debris will collect at the drain.

Response Message: FR-85-NFPA 20-2022

Public Input No. 102-NFPA 20-2022 [Section No. 11.4.1.5.2]

First Revision No. 3-NFPA 20-2022 [Section No. 11.5.3.5]

11.5.3.5

Exhaust systems equipped with spark-arresting mufflers shall be permitted to terminate in Division 2 locations or Zone 2 locations, as defined in Article 500 and Article 505 of *NFPA 70*. [**37:**8.2.3.3]

Submitter Information Verification

Committee: FIM-AAA
Submittal Date: Mon Oct 24 15:38:48 EDT 2022

Committee Statement

Committee Statement: Updates to NFPA 37 extract to comply with the NFPA Manual of Style.
Response Message: FR-3-NFPA 20-2022

First Revision No. 95-NFPA 20-2022 [Section No. 12.1.3.3.1]

12.1.3.3.1

All controllers shall be marked “Diesel Engine Fire Pump Controller” and ~~shall~~ show plainly the name of the manufacturer, ~~the~~ identifying designation, maximum rated ~~operating~~ pressure, enclosure type designation, and complete electrical rating.

Submitter Information Verification

Committee: FIM-AAA

Submittal Date: Fri Oct 28 11:04:59 EDT 2022

Committee Statement

Committee Statement: Reference to maximum rated pressure aligns with the listing standard as the maximum pressure that can be put into the controller.

Response Message: FR-95-NFPA 20-2022

First Revision No. 99-NFPA 20-2022 [Section No. 12.3.3.1.2]

12.3.3.1.2

Where ~~the equipment is located outside or~~ special environments exist, ~~suitably~~ rated enclosures suitable for the environments shall be used.

Submitter Information Verification

Committee: FIM-AAA

Submittal Date: Fri Oct 28 11:21:50 EDT 2022

Committee Statement

Committee Statement: The language has been updated to direct the user for selecting the correct enclosure for the environment in which it is installed.

Response Message: FR-99-NFPA 20-2022

First Revision No. 60-NFPA 20-2022 [Section No. 12.6]

12.6 Battery Chargers.

The requirements for battery chargers shall be as follows:

(1) Chargers shall be specifically listed for fire pump service and be part of the diesel fire pump controller.

(2) Additional chargers also listed for fire pump service shall be permitted to be installed external to the diesel fire pump controller for added capacity or redundancy.

(3) The rectifier shall be a semiconductor type.

(4) The charger for a lead-acid battery shall be a type that automatically reduces the charging rate to less than 500 mA when the battery reaches a full charge condition.

(5) The battery charger at its rated voltage shall be capable of delivering energy into a fully discharged battery in such a manner that it will not damage the battery.

(6) The battery charger shall restore to the battery 100 percent of the battery's reserve capacity or ampere-hour rating within 24 hours.

(7) The charger shall be marked with the reserve capacity or ampere-hour rating of the largest capacity battery that it can recharge in compliance with ~~12.6(4)~~ 12.6(6) .

(8) Means shall be provided on the exterior of the controller to read the voltage and charging current of each battery within an accuracy of ±2 percent.

(9) The charger shall be designed such that it will not be damaged or blow fuses during the cranking cycle of the engine when operated by an automatic or manual controller.

(10) The charger shall automatically charge at the maximum rate whenever required by the state of charge of the battery.

(11) The battery charger shall be arranged to indicate loss of current output on the load side of the direct current (dc) overcurrent protective device where not connected through a control panel. *[See 12.4.1.4(2).]*

(12) The charger(s) shall remain in float mode or switch from equalize to float mode while the batteries are under the loads in 11.2.7.2.5.2.

(13) The alternator shall be the primary means of charging when the engine is running.

Submitter Information Verification

Committee: FIM-AAA

Submittal Date: Thu Oct 27 14:41:53 EDT 2022

Committee Statement

Committee Statement: In clause (7), the reference should be to clause 12.6(6) but was never corrected when additional clauses were added. See NFPA 20-1996 or 1999.

Response Message: FR-60-NFPA 20-2022

First Revision No. 40-NFPA 20-2022 [Section No. 12.7.2.1.1]

12.7.2.1.1 Pressure-Sensing Device ~~Actuated Switch~~ .

12.7.2.1.1.1

A pressure-~~actuated switch or electronic pressure sensor~~ sensing device ~~having~~ that has adjustable high- and low-calibrated set points as part of the controller shall be provided.

12.7.2.1.1.2*

Water piping shall not be extended into the controller.

12.7.2.1.1.3

For multistage multiport pumps, a dedicated pressure-~~actuated switch or electronic pressure sensor~~ sensing device as described in 12.7.2.1.1.1 shall be provided for each discharge port of the pump as part of the controller.

12.7.2.1.1.4

For multistage multiport pumps, a dedicated pressure recorder as described in 12.4.4.1 shall be provided for each discharge port of the pump as part of the controller.

12.7.2.1.1.5

The requirements of 12.7.2.1.1.1, ~~and~~ 12.7.2.1.1.3, and 12.7.2.1.1.4 shall not apply to a non-pressure-actuated controller~~, where the pressure-actuated switch or pressure responsive means shall not be required~~ .

Submitter Information Verification

Committee: FIM-AAA

Submittal Date: Thu Oct 27 11:21:15 EDT 2022

Committee Statement

Committee Statement: The revised text aligns with 10.5.2.1.1, 10.5.2.1.1.1, 10.5.2.1.1.3, 10.5.2.1.1.5 and clarifies which requirements do not apply to a non-pressure-actuated controller.

Response Message: FR-40-NFPA 20-2022

Public Input No. 56-NFPA 20-2022 [Section No. 12.7.2.1.1.3]

Public Input No. 57-NFPA 20-2022 [Section No. 12.7.2.1.1.5]

Public Input No. 58-NFPA 20-2022 [Section No. 12.7.2.1.1]

First Revision No. 41-NFPA 20-2022 [Section No. 12.7.2.1.2]

12.7.2.1.2

There shall be no pressure snubber or restrictive orifice employed within the pressure ~~switch or pressure responsive means~~ -sensing device .

Submitter Information Verification

Committee: FIM-AAA
Submittal Date: Thu Oct 27 11:26:26 EDT 2022

Committee Statement

Committee Statement: The revised text aligns with 10.5.2.1.2.
Response Message: FR-41-NFPA 20-2022

Public Input No. 59-NFPA 20-2022 [Section No. 12.7.2.1.2]

First Revision No. 42-NFPA 20-2022 [Section No. 12.7.2.1.3 [Excluding any Sub-Sections]]

Where an electronic pressure sensor is used to automatically control fire pump operation, the fire pump controller shall monitor the ~~transducer~~ electronic pressure sensor during automatic testing.

Submitter Information Verification

Committee: FIM-AAA

Submittal Date: Thu Oct 27 11:28:39 EDT 2022

Committee Statement

Committee Statement: The revised text aligns with 10.5.2.1.3.

Response Message: FR-42-NFPA 20-2022

Public Input No. 62-NFPA 20-2022 [Section No. 12.7.2.1.3 [Excluding any Sub-Sections]]

First Revision No. 93-NFPA 20-2022 [Section No. 12.7.2.1.3.1]

12.7.2.1.3.1*

~~When~~ Where the ~~transducer~~ electronic pressure sensor reading exceeds the higher of 10 psi (0.68 bar) or 3.33 percent of the maximum controller rated pressure during any automatic pump start~~that~~ that was ~~where~~ initiated by the solenoid drain valve, as required by 12.7.2.7.3, the controller shall activate a visual and audible ~~alarm~~ signal that can be silenced.

Submitter Information Verification

Committee: FIM-AAA

Submittal Date: Fri Oct 28 10:54:19 EDT 2022

Committee Statement

Committee Statement: This revision allows for a higher drop on high pressure systems but maintains the same percent of rated pressure. Reference to maximum controller rated pressure aligns with the listing standard as the maximum pressure that can be put into the controller. Alarm is changed to signal as these conditions do not require immediate action.

Response Message: FR-93-NFPA 20-2022

Public Input No. 60-NFPA 20-2022 [Section No. 12.7.2.1.3.1]

First Revision No. 43-NFPA 20-2022 [Section No. 12.7.2.1.3.2]

12.7.2.1.3.2*

Where an electronic pressure sensor is used to control fire pump operation, the fire pump controller shall monitor ~~for~~ and provide a visual and audible signal that can be silenced for the following ~~electronic pressure sensor~~ conditions~~.~~ :

(1) Any time the ~~transducer~~ electronic pressure sensor output is less than 10 percent of rated span or below its rated zero pressure output

(2) Any time the electronic pressure ~~transducer~~ sensor reading is more than 10 percent above its rated full-scale output

Submitter Information Verification

Committee: FIM-AAA

Submittal Date: Thu Oct 27 11:31:57 EDT 2022

Committee Statement

Committee Statement: The revised text aligns with 10.5.2.1.3.2 (as revised). Second “Electronic pressure sensor” removed as it is considered redundant.

Response Message: FR-43-NFPA 20-2022

Public Input No. 61-NFPA 20-2022 [Section No. 12.7.2.1.3.2]

First Revision No. 44-NFPA 20-2022 [Section No. 12.7.2.1.4]

12.7.2.1.4

There shall be no valve or other restrictions ~~within~~ as part of the controller ahead of the pressure ~~switch or pressure responsive means~~ -sensing device .

Submitter Information Verification

Committee: FIM-AAA
Submittal Date: Thu Oct 27 11:33:43 EDT 2022

Committee Statement

Committee Statement: The revised text aligns with 10.5.2.1.4 (as revised).
Response Message: FR-44-NFPA 20-2022

Public Input No. 63-NFPA 20-2022 [Section No. 12.7.2.1.4]

First Revision No. 45-NFPA 20-2022 [Section No. 12.7.2.1.5]

12.7.2.1.5

~~This~~ The ~~switch~~ pressure-sensing device shall be responsive to water pressure in the fire protection system.

Submitter Information Verification

Committee: FIM-AAA
Submittal Date: Thu Oct 27 11:34:44 EDT 2022

Committee Statement

Committee Statement: The revised text aligns with 10.5.2.1.5.
Response Message: FR-45-NFPA 20-2022

Public Input No. 64-NFPA 20-2022 [Section No. 12.7.2.1.5]

First Revision No. 46-NFPA 20-2022 [Section No. 12.7.2.1.6]

12.7.2.1.6

The pressure-sensing ~~element of the switch~~ device shall be capable of withstanding a momentary surge pressure of 400 psi (27.6 bar) or 133 percent of fire pump maximum controller rated ~~operating~~ pressure, whichever is higher, without losing its accuracy.

Submitter Information Verification

Committee: FIM-AAA

Submittal Date: Thu Oct 27 11:35:30 EDT 2022

Committee Statement

Committee Statement: The revised text aligns with 10.5.2.1.6. Reference to maximum rated pressure aligns with the listing standard as the maximum pressure that can be put into the controller.

Response Message: FR-46-NFPA 20-2022

Public Input No. 65-NFPA 20-2022 [Section No. 12.7.2.1.6]

First Revision No. 47-NFPA 20-2022 [Section No. 12.7.2.1.7]

12.7.2.1.7

~~Suitable provision~~ Provision shall be made for relieving pressure to the pressure-~~actuated switch~~ sensing device to allow testing of the operation of the controller and the pumping unit. *[See Figure A.4.32(a) and Figure A.4.32(b).]*

Submitter Information Verification

Committee: FIM-AAA

Submittal Date: Thu Oct 27 11:37:29 EDT 2022

Committee Statement

Committee Statement: The revised text aligns with 10.5.2.1.7. 'Suitable' has been deleted as it is vague and unenforceable.

Response Message: FR-47-NFPA 20-2022

Public Input No. 66-NFPA 20-2022 [Section No. 12.7.2.1.7]

First Revision No. 48-NFPA 20-2022 [Section No. 12.7.2.1.8]

12.7.2.1.8

Water pressure control shall be as follows:

(1) There shall be no shutoff valve in the pressure-sensing line.

(2) ~~Pressure switch actuation~~ The pressure-sensing device at the low adjustment setting shall initiate the pump starting sequence if the pump is not already in operation.

Submitter Information Verification

Committee: FIM-AAA

Submittal Date: Thu Oct 27 11:39:55 EDT 2022

Committee Statement

Committee Statement: The revised text aligns with 10.5.2.1.8.1.

Response Message: FR-48-NFPA 20-2022

Public Input No. 67-NFPA 20-2022 [Section No. 12.7.2.1.8]

First Revision No. 88-NFPA 20-2022 [Section No. 14.1.1.1]

14.1.1.1

~~Suction~~ Underground portions of suction piping shall be flushed at a flow rate not less than indicated in Table 14.1.1.1 or at the hydraulically calculated water demand rate of the system, whichever is greater.

Table 14.1.1.1 Minimum Flow Rates for Flushing Suction Piping

Nominal Pipe Size (in.)	Flow rate (gpm)	Nominal Pipe Size (mm)	Flow Rate (L/min)
1	37	25	140
1½	85	38	330
2	150	50	570
2½	229	65	870
3	330	75	1,250
3½	450	85	1,710
4	590	100	2,240
5	920	125	3,490
6	1,360	150	5,150
8	2,350	200	8,900
10	3,670	250	13,900
12	5,290	300	20,100
14	7,200	350	27,300
16	9,400	400	35,600

Supplemental Information

File Name	Description	Approved
Chapter_14_14_1_1_1_FR-88.docx	Table Edits	

Submitter Information Verification

Committee: FIM-AAA

Submittal Date: Fri Oct 28 10:06:23 EDT 2022

Committee Statement

Committee Statement: Flushing of suction piping only applies to the underground portion to remove any soil, stones, or other debris that may have entered the piping during installation. Flushing overhead piping isn't necessary and can be extremely difficult for suction piping in a high-rise building. Commas are removed from the flow rates in L/min to conform to standard SI numerals.

Response Message: FR-88-NFPA 20-2022

Public Input No. 31-NFPA 20-2022 [Section No. 14.1.1.1]

First Revision No. 108-NFPA 20-2022 [Section No. 14.1.2.2]

14.1.2.1

Suction and discharge piping shall be hydrostatically tested at not less than 200 psi (13.8 bar) pressure or at 50 psi (3.4 bar) in excess of the maximum pressure to be maintained in the system, whichever is greater.

14.1.2.1.1

The pressure required in 14.1.2.1 shall be maintained without loss for 2 hours.

14.1.2.1.2

Loss shall be determined by a drop in gauge pressure or visual leakage.

14.1.2.2

Packaged fire pump assemblies, including packaged pump houses and pump skids, shall be hydrostatically tested by the packaging facility in accordance with 14.1.2.1 .

14.1.2.2.1

Leakage and loss of pressure through the packing glands shall be permitted.

14.1.2.2.2

The system shall be continuously repressurized to make up for leakage through the pump packing.

14.1.2.2.3

No other leakage or pressure drop shall be permitted.

Submitter Information Verification

Committee: FIM-AAA

Submittal Date: Fri Oct 28 15:35:14 EDT 2022

Committee Statement

Committee Statement: Pass/fail criteria is added for the hydrostatic testing of above ground piping within the fire pump assembly. Additional criteria is added for packaged fire pump assemblies. The hydrostatic test for these assemblies is witnessed and certified by a third party.

Response Message: FR-108-NFPA 20-2022

Public Input No. 10-NFPA 20-2022 [Section No. 14.1.2.2]

First Revision No. 49-NFPA 20-2022 [Section No. 14.2.6.7.1]

14.2.6.7.1

For electric motors operating at rated voltage and frequency, the ampere demand on each phase shall not exceed the ~~product of the full-load ampere rating times the allowable service factor as stamped on the motor nameplate~~ service factor amperes provided on the motor nameplate or manufacturer's documentation .

14.2.6.7.1.1

Where service factor amperes are not provided, the product of the motor full-load amperes from Table 430.248 or 430.250 of *NFPA 70* times the allowable service factor shall not be exceeded.

Submitter Information Verification

Committee: FIM-AAA

Submittal Date: Thu Oct 27 11:41:44 EDT 2022

Committee Statement

Committee Statement: The Service Factor Amps (SFA) marked on the motor or in the manufacturer's documentation should be the primary source for obtaining the SFA. The motor Service Factor applies to the extra horsepower that can be drawn from the motor under normal conditions. The amps drawn at the service factor horsepower is the SFA. It's not precisely the FLA times the service factor, so if the FLA times the SF is to be used as the approximate SFA, the FLA should be taken from the NEC tables.

Response Message: FR-49-NFPA 20-2022

Public Input No. 68-NFPA 20-2022 [Section No. 14.2.6.7.1]

First Revision No. 50-NFPA 20-2022 [Section No. 14.2.6.7.2]

14.2.6.7.2*

For electric motors operating under varying voltage, the product of the actual voltage and current demand on each phase shall not exceed the product of the rated voltage ~~and rated full-load current times the allowable service factor~~ service factor amperes provided on the motor nameplate or manufacturer's documentation .

14.2.6.7.2.1

Where service factor amperes are not provided, the product of the rated voltage and motor full-load amperes from Table 430.248 or 430.250 of *NFPA 70* times the allowable service factor shall not be exceeded.

Submitter Information Verification

Committee: FIM-AAA

Submittal Date: Thu Oct 27 12:30:06 EDT 2022

Committee Statement

Committee Statement: The Service Factor Amps (SFA) marked on the motor or in the manufacturer's documentation should be the primary source for obtaining the SFA. The motor Service Factor applies to the extra horsepower that can be drawn from the motor under normal conditions. The amps drawn at the service factor horsepower is the SFA. It's not precisely the FLA times the service factor, so if the FLA times the SF is to be used as the approximate SFA, the FLA should be taken from the NEC tables.

Response Message: FR-50-NFPA 20-2022

Public Input No. 69-NFPA 20-2022 [Section No. 14.2.6.7.2]

First Revision No. 52-NFPA 20-2022 [Section No. 14.2.8.1]

14.2.8.1

On installations with an alternate source of power and an automatic transfer switch, loss of ~~primary~~ the normal source of power shall be simulated to automatically initiate starting of the standby generator, where provided, and transfer ~~shall occur~~ of power while the pump is operating at peak load.

14.2.8.1.1

Where two or more alternate sources are provided, loss of the normal source of power shall be simulated for each additional alternate source to automatically initiate starting of the standby generator, where provided, and transfer of power while the pump is operating at peak load.

Submitter Information Verification

Committee: FIM-AAA

Submittal Date: Thu Oct 27 13:55:58 EDT 2022

Committee Statement

Committee Statement: The revised text assures that the standby generator is started by the loss of the normal source of power to the alternate source or additional alternate source. Where two or more alternate sources are provided transfer to the alternate source of power shall be to a standby generator or utility. The term “primary source” is changed to “normal source of power” for consistency with the use of the term in Chapter 9.

Response Message: FR-52-NFPA 20-2022

Public Input No. 48-NFPA 20-2022 [Section No. 14.2.8.1]

First Revision No. 92-NFPA 20-2022 [Section No. A.4.6.1]

A.4.6.1

For water supply capacity and pressure requirements, see the following documents:

(1) NFPA 1
(2) NFPA 11
(3) NFPA 13
(4) NFPA 14
(5) NFPA 15
~~NFPA 16~~
(6) NFPA 750

Submitter Information Verification

Committee: FIM-AAA
Submittal Date: Fri Oct 28 10:40:15 EDT 2022

Committee Statement

Committee Statement: NFPA 16 has been withdrawn and the requirements merged into NFPA 11.
Response Message: FR-92-NFPA 20-2022

First Revision No. 76-NFPA 20-2022 [Section No. A.4.15.2]

~~**A.4.15.2**~~

~~Flanges welded to pipe are preferred.~~

Submitter Information Verification

Committee: FIM-AAA

Submittal Date: Fri Oct 28 08:10:04 EDT 2022

Committee Statement

Committee Statement: Flanges welded to the pipe are no longer the preferred method of install.

Response Message: FR-76-NFPA 20-2022

Public Input No. 28-NFPA 20-2022 [Section No. A.4.15.2]

First Revision No. 77-NFPA 20-2022 [Section No. A.4.22.3.4(3)]

A.4.22.3.4(3)

See Figure A.4.22.3.4(3).

Figure A.4.22.3.4(3) Sample Pump Test Header Calculation.

SAMPLE PUMP TEST HEADER SIZE CALCULATION

Pump size			1500		
Number of test hose streams			6		
Size of hose			2½		
Feet of hose per test hose			50		
Nozzle size			1.75		
Nozzle coefficient			0.97		
Pump test header pipe size			8.071		
C factor			120		
Pump Test Header Pipe Fittings	Type Fitting	Number	Equiv. Length	Total Equiv. Length	
	45∞	1	9	9	
	E	1	18	18	
	LRE	0	13	0	
	T	1	35	35	
	BV	0	12	0	
	GV	1	4	4	
	SW	1	45	45	
Pump test header pipe length				30	
Total equivalent length				141	
Maximum test flow				2250	
Friction loss per ft in pipe				0.0392	
Total loss in pump test header pipe					5.5
Flow in each hose				375	
Friction loss in 100 ft of hose				28.125	
Total friction loss in hose					14.1
Equivalent pipe length 2½ in. valve				7	
Friction loss in 2½ in. pipe				0.4561	
Friction loss through 2½ in. valve					3.2
Required pitot pressure					18
Elevation difference					0
Required pump discharge					40.8

SAMPLE PUMP TEST HEADER SIZE CALCULATION

Pump size			1500	gpm	
Number of test hose streams			6		
Size of hose			2½	in.	
Length of hose per test hose			50	ft	
Nozzle size			1.75	in.	
Nozzle coefficient			0.97		
Pump test header pipe size			8.071	in.	
C factor			100		
Pump Test Header Pipe Fittings	**Type Fitting**	**Number**	**Equiv. Length**	**Total Equiv. Length**	
	45 EL	1	9	9	ft
	90 EL	1	18	18	ft
	LTE	0	13	0	ft
	TEE	1	35	35	ft
	BTFLY	0	12	0	ft
	GATE	1	4	4	ft
	CHK	1	45	45	ft
	Total length			111	ft
Pump test header pipe length				30	ft
Total equivalent length				109.1	ft
Maximum flow				2250	gpm
Friction loss per ft in pipe				0.055	psi/ft
Total loss in pump test header pipe				6.0	psi
Flow in each hose				375	gpm
Friction loss in 100 ft of hose				28.125	psi
Total friction loss in hose				14.1	psi
Equivalent pipe length 2½ in. valve				31	ft
Friction loss per foot in 2½ in. pipe				0.639	psi/ft
Friction loss through 2½ in. valve				19.8	psi
Required pitot pressure				18	psi
Elevation difference				0	psi
Required pump discharge				57.9	gpm

Supplemental Information

File Name	Description	Approved

Annex_A_A_4_22_3_4_3_FR-77.pdf Figure edits.

Submitter Information Verification

Committee: FIM-AAA

Submittal Date: Fri Oct 28 08:16:03 EDT 2022

Committee Statement

Committee Statement: The current example utilizes an equivalent length of 7 ft for a 2-1/2 in. valve. That is the equivalent length of a butterfly valve and it would be more appropriate to utilize the standard equivalent length of an angle or hose valve -- 31 ft -- to emphasize the point that the friction loss through a hose valve must be accounted for. This would increase the Friction Loss through the 2-1/2 in. valve to 14.1 psi and increase the required pump discharge pressure to 51.7 psi. Additionally, calculation needs to consider the wet pipe from the discharge flange to the test header control valve and the pipe from the test header control valve to the discharge of the water flow separately as one has a C-value of 120, and the other has a C-value of 100, respectively.

Response Message: FR-77-NFPA 20-2022

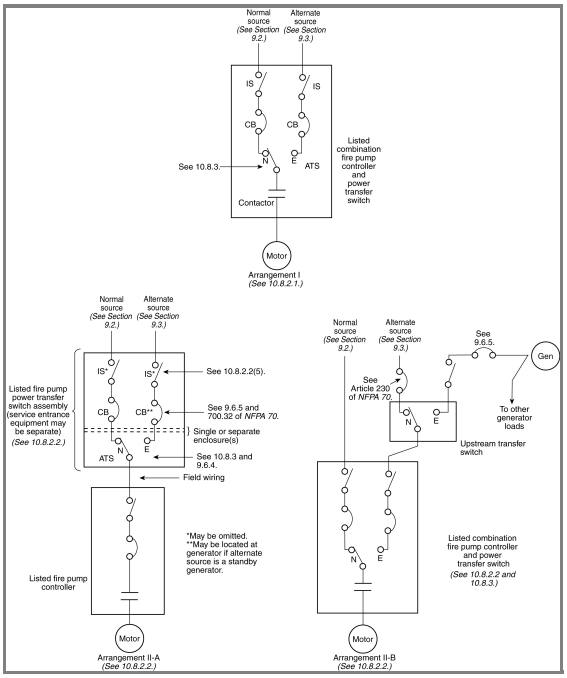
Public Input No. 4-NFPA 20-2021 [Section No. A.4.22.3.4(3)]

First Revision No. 51-NFPA 20-2022 [Section No. A.10.8]

A.10.8

Typical fire pump controller and transfer switch arrangements are shown in Figure A.10.8. Other configurations can also be acceptable.

Figure A.10.8 Typical Fire Pump Controller and Transfer Switch Arrangements.



Supplemental Information

File Name	Description	Approved
Annex_A_A_10_8_FR51.pdf	Figure edits	

Submitter Information Verification

Committee: FIM-AAA

Submittal Date: Thu Oct 27 12:58:18 EDT 2022

Committee Statement

Committee Statement: The standard needs to recognize that a power transfer switch with a combination fire pump controller and power transfer switch is also an arrangement II configuration. Also, since 10.8.2.2(2) requires that the normal and emergency sources have overcurrent protection in accordance with section 9.2.3.4, the normal and emergency isolating switches can be optional. Further, no type of tripping is allowed for the isolating switch, including a “self-protecting instantaneous trip.” The reference to 9.2.3.4.1 for an instantaneous trip circuit breaker is not needed since item (7) of 9.2.3.4.1, which has been moved to new 9.2.3.4.1.1, is coupled to 9.2.3.4 by reference and 10.8.2.2(2) refers to section 9.2.3.4. As in 9.2.3.3, all circuit breakers or fuses and disconnecting means and isolating switches should be required to be supervised.

9.2.3.4.2 is not needed since item (7) has been added to 9.2.3.4.1 and 10.8.2.2(2) refers to section 9.2.3.4.1

As in 9.2.3.3, all circuit breakers or fuses and disconnecting means and isolating switches should be required to be supervised

Response Message: FR-51-NFPA 20-2022

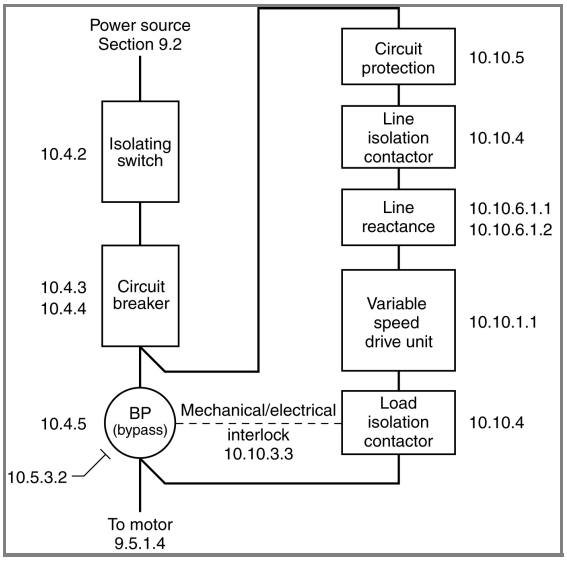
Public Input No. 73-NFPA 20-2022 [Section No. A.10.8]

First Revision No. 53-NFPA 20-2022 [Section No. A.10.10]

A.10.10

See Figure A.10.10.

Figure A.10.10 Variable Speed Pressure Limiting Control.



Supplemental Information

File Name	Description	Approved
Annex_A_A_10_10_FR-53.pdf	Figure edits.	

Submitter Information Verification

Committee: FIM-AAA

Submittal Date: Thu Oct 27 13:57:30 EDT 2022

Committee Statement

Committee Statement: This revision corrects cross references in Figure A.10.10.

Response Message: FR-53-NFPA 20-2022

Public Input No. 49-NFPA 20-2022 [Section No. A.10.10]

First Revision No. 90-NFPA 20-2022 [Section No. A.14.1.3]

A.14.1.3

See Figure A.14.1.3(a) for a sample of a contractor's material and test certificate for fire pumps and Figure A.14.1.3(b) for a sample certificate for private fire service mains.

Figure A.14.1.3(a) Sample of Contractor's Material Test Certificate for Fire Pump Systems.

Contractor's Material and Test Certificate for Fire Pump Systems

PROCEDURE Upon completion of work, inspection and tests shall be made by the contractor's representative and witnessed by an owner's representative. All defects shall be corrected and system left in service before contractor's personnel finally leave the job.

A certificate shall be filled out and signed by both representatives. Copies shall be prepared for approving authorities, owners, and contractor. It is understood the owner's representative's signature in no way prejudices any claim against contractor for faulty material, poor workmanship, or failure to comply with approving authority's requirements or local ordinances.

PROPERTY NAME		DATE	
PROPERTY ADDRESS			
PLANS	ACCEPTED BY APPROVING AUTHORITIES (NAMES)		
	ADDRESS		
	INSTALLATION CONFORMS TO ACCEPTED PLANS	☐ YES	☐ NO
	ALL EQUIPMENT USED IS APPROVED FOR FIRE SYSTEM SERVICE IF NO, STATE DEVIATIONS	☐ YES	☐ NO
INSTRUCTIONS	HAS PERSON IN CHARGE OF FIRE PUMP EQUIPMENT BEEN INSTRUCTED AS TO LOCATION OF SYSTEM CONTROL VALVES AND CARE AND MAINTENANCE OF THIS NEW EQUIPMENT? IF NO, EXPLAIN	☐ YES	☐ NO
	HAVE COPIES OF APPROPRIATE INSTRUCTIONS AND CARE AND MAINTENANCE CHARTS BEEN LEFT ON PREMISES? IF NO, EXPLAIN	☐ YES	☐ NO
LOCATION	SUPPLIES BUILDING(S) (CAMPUS, WAREHOUSE, HIGH RISE) EXPLAIN		
PUMP ROOM EQUIPMENT	IS THE PUMP ROOM EQUIPMENT PER THE PLANS AND SPECS?	☐ YES	☐ NO
	IS THE FIRE PUMP PROPERLY MOUNTED AND ANCHORED TO THE FOUNDATION? IF NO, EXPLAIN	☐ YES	☐ NO
	IS THE FIRE PUMP BASE PROPERLY GROUTED? IF NO, EXPLAIN	☐ YES	☐ NO
	DOES THE PUMP ROOM HAVE THE PROPER FLOOR DRAINS? IF NO, EXPLAIN	☐ YES	☐ NO
	IS THE SUCTION AND DISCHARGE PIPING PROPERLY SUPPORTED?	☐ YES	☐ NO
	IS THE PUMP ROOM HEATED AND VENTILATED PER NFPA 20?	☐ YES	☐ NO
PIPES AND FITTINGS	PIPE TYPES AND CLASS		
	PIPE CONFORMS TO _____ STANDARD FITTINGS CONFORM TO _____ STANDARD IF NO, EXPLAIN	☐ YES ☐ YES	☐ NO ☐ NO
	SUCTION AND DISCHARGE PIPING ANCHORED OR RESTRAINED?:	☐ YES	☐ NO
PRE-PACKAGED PUMP HOUSE	IS THIS A PACKAGE OR SKID MOUNTED PUMP?	☐ YES	☐ NO
	IS THE PACKAGE/SKID PROPERLY ANCHORED TO A CONCRETE FOUNDATION? IF NO, EXPLAIN	☐ YES	☐ NO
	IS THE STRUCTURAL FOUNDATION FRAME FILLED WITH CONCRETE TO FORM A FINISHED FLOOR?	☐ YES	☐ NO
	IS THERE A FLOOR DRAIN INSTALLED?	☐ YES	☐ NO
TEST DESCRIPTION	HYDROSTATIC: Hydrostatic tests shall be made at not less than 200 psi (13.8 bar) for 2 hours or 50 psi (3.4 bar) above static pressure in excess of 200 psi (13.8 bar) for 2 hours.		
	HYDROSTATIC TEST: ALL NEW PIPING HYDROSTATICALLY TESTED AT: _____ PSI/BAR FOR _____ HOURS		NO LEAKAGE ALLOWED
FLUSHING TESTS	FLUSHING: Flow the required rate until water is clear as indicated by no collection of foreign material in burlap bags at outlets such as hydrants and blowoffs. Flush at flows not less than 390 gpm (1476 L/min) for 4 in. pipe, 610 gpm (2309 L/min) for 5 in. pipe, 880 gpm (3331 L/min) for 6 in. pipe, 1560 gpm (5905 L/min) for 8 in. pipe, 2440 gpm (9235 L/min) for 10 in. pipe, and 3520 gpm (13,323 L/min) for 12 in. pipe. When supply cannot produce stipulated flow rates, obtain maximum available.		

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Contractor's Material and Test Certificate for Fire Pump Systems

PROCEDURE Upon completion of work, inspection and tests shall be made by the contractor's representative and witnessed by an owner's representative. All defects shall be corrected and system left in service before contractor's personnel finally leave the job.

A certificate shall be filled out and signed by both representatives. Copies shall be prepared for approving authorities, owners, and contractor. It is understood the owner's representative's signature in no way prejudices any claim against contractor for faulty material, poor workmanship, or failure to comply with approving authority's requirements or local ordinances.

PROPERTY NAME		DATE	
PROPERTY ADDRESS			
PLANS	ACCEPTED BY APPROVING AUTHORITIES (NAMES)		
	ADDRESS		
	INSTALLATION CONFORMS TO ACCEPTED PLANS	☐ YES	☐ NO
	ALL EQUIPMENT USED IS APPROVED FOR FIRE SYSTEM SERVICE IF NO, STATE DEVIATIONS	☐ YES	☐ NO
INSTRUCTIONS	HAS PERSON IN CHARGE OF FIRE PUMP EQUIPMENT BEEN INSTRUCTED AS TO LOCATION OF SYSTEM CONTROL VALVES AND CARE AND MAINTENANCE OF THIS NEW EQUIPMENT? IF NO, EXPLAIN	☐ YES	☐ NO
	HAVE COPIES OF APPROPRIATE INSTRUCTIONS AND CARE AND MAINTENANCE CHARTS BEEN LEFT ON PREMISES? IF NO, EXPLAIN	☐ YES	☐ NO
LOCATION	SUPPLIES BUILDING(S) (CAMPUS, WAREHOUSE, HIGH RISE) EXPLAIN		
PUMP ROOM EQUIPMENT	IS THE PUMP ROOM EQUIPMENT PER THE PLANS AND SPECS?	☐ YES	☐ NO
	IS THE FIRE PUMP PROPERLY MOUNTED AND ANCHORED TO THE FOUNDATION? IF NO, EXPLAIN	☐ YES	☐ NO
	IS THE FIRE PUMP BASE PROPERLY GROUTED? IF NO, EXPLAIN	☐ YES	☐ NO
	DOES THE PUMP ROOM HAVE THE PROPER FLOOR DRAINS? IF NO, EXPLAIN	☐ YES	☐ NO
	IS THE SUCTION AND DISCHARGE PIPING PROPERLY SUPPORTED?	☐ YES	☐ NO
	IS THE PUMP ROOM HEATED AND VENTILATED PER NFPA 20?	☐ YES	☐ NO
PIPES AND FITTINGS	PIPE TYPES AND CLASS		
	PIPE CONFORMS TO _____ STANDARD FITTINGS CONFORM TO _____ STANDARD IF NO, EXPLAIN	☐ YES ☐ YES	☐ NO ☐ NO
	SUCTION AND DISCHARGE PIPING ANCHORED OR RESTRAINED?:	☐ YES	☐ NO
PRE-PACKAGED PUMP HOUSE	IS THIS A PACKAGE OR SKID MOUNTED PUMP?	☐ YES	☐ NO
	IS THE PACKAGE/SKID PROPERLY ANCHORED TO A CONCRETE FOUNDATION? IF NO, EXPLAIN	☐ YES	☐ NO
	IS THE STRUCTURAL FOUNDATION FRAME FILLED WITH CONCRETE TO FORM A FINISHED FLOOR?	☐ YES	☐ NO
	IS THERE A FLOOR DRAIN INSTALLED?	☐ YES	☐ NO
TEST DESCRIPTION	HYDROSTATIC: Hydrostatic tests shall be made at not less than 200 psi (13.8 bar) for 2 hours or 50 psi (3.4 bar) above static pressure in excess of 200 psi (13.8 bar) for 2 hours.		
	HYDROSTATIC TEST: ALL NEW PIPING HYDROSTATICALLY TESTED AT: _____ PSI/BAR FOR _____ HOURS		NO PRESSURE DROP OR VISUAL LEAKAGE ALLOWED

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FLUSHING TESTS *(continued)*	NEW PIPING FLUSHED ACCORDING TO _____ STANDARD ☐ YES ☐ NO BY (COMPANY) _____ IF NO, EXPLAIN HOW FLUSHING FLOW WAS OBTAINED ☐ PUBLIC WATER ☐ TANK OR RESERVOIR ☐ OTHER (EXPLAIN) — THROUGH WHAT TYPE OPENING ☐ TEST HEADER ☐ OPEN PIPE LEAD-INS FLUSHED ACCORDING TO _____ STANDARD ☐ YES ☐ NO BY (COMPANY) IF NO, EXPLAIN HOW FLUSHING FLOW WAS OBTAINED ☐ PUBLIC WATER ☐ TANK OR RESERVOIR ☐ OTHER (EXPLAIN) — THROUGH WHAT TYPE OPENING ☐ Y CONNECTION TO FLANGE & SPIGOT ☐ OPEN PIPE
FIELD ACCEPTANCE TEST	ALL EQUIPMENT APPROVED? ☐ YES ☐ NO ALL REQUIRED REPRESENTATIVES PRESENT FOR TEST ☐ YES ☐ NO AHJ AND OWNER'S REPRESENTATIVE PRESENT FOR TEST ☐ YES ☐ NO IF NO, EXPLAIN ALL ELECTRICAL WIRING COMPLETE AND PER *NFPA 70* AND NFPA 20 ☐ YES ☐ NO IF NO, EXPLAIN CALIBRATE TEST EQUIPMENT USED ☐ YES ☐ NO CALIBRATION DATE _____ FLOW TESTS PUMP DESIGN _____ GPM _____ PSI DOES THE PUMP MEET OR EXCEED THE CERTIFIED CURVE? ☐ YES ☐ NO PUMP TYPE ☐ HORIZONTAL ☐ VERTICAL TURBINE ☐ OTHER PUMP MAKE _____ MODEL # _____ SERIAL # _____ COMMENTS _____ ELECTRIC DRIVER OPERATIONAL TEST SATISFACTORY ☐ YES ☐ NO ELEC. DRIVER _____ MODEL # _____ SERIAL # _____ VOLTAGE _____ VAC @ _____ HP _____ RPM _____ FLA ENGINE DRIVEN ☐ YES ☐ NO ENGINE MAKE _____ MODEL # _____ SERIAL # _____ _____ HP _____ RPM SPEED DIESEL DRIVER OPERATIONAL TEST SATISFACTORY? ☐ YES ☐ NO OTHER EXPLAIN CONTROLLER MAKE _____ MODEL # _____ SERIAL # _____ VARIABLE SPEED PRESSURE LIMITING CONTROL ☐ YES ☐ NO TESTED AT MINIMUM, RATED, AND PEAK FLOW ☐ YES ☐ NO CONTROLLER TEST: ☐ YES ☐ NO SIX AUTO STARTS ☐ YES ☐ NO SIX MANUAL STARTS ☐ YES ☐ NO PHASE REVERSAL TEST PERFORMED (ELECTRIC ONLY) ☐ YES ☐ NO ALTERNATE POWER SOURCE TESTED (ELECTRIC ONLY) ☐ YES ☐ NO ELECTRONIC FUEL MANAGEMENT (ECM) FUNCTION TEST PERFORMED (DIESEL ONLY) ☐ YES ☐ NO
CONTROL VALVES	SYSTEM CONTROL VALVES LEFT WIDE OPEN ☐ YES ☐ NO IF NO, STATE REASON HOSE THREADS OF FIRE DEPARTMENT CONNECTIONS AND HYDRANTS ☐ YES ☐ NO INTERCHANGEABLE WITH THOSE OF FIRE DEPARTMENT ANSWERING ALARM
REMARKS	DATE LEFT IN SERVICE _____ ADDITIONAL COMMENTS:
SIGNATURES	NAME OF INSTALLING CONTRACTOR TESTS WITNESSED BY FOR PROPERTY OWNER (SIGNED) TITLE DATE FOR INSTALLING CONTRACTOR (SIGNED) TITLE DATE
ADDITIONAL COMMENTS AND NOTES:	

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Figure A.14.1.3(b) Sample of Contractor's Material and Test Certificate for Private Fire Service Mains Feeding Fire Pump(s).

Contractor's Material and Test Certificate for Private Fire Service Mains Feeding Fire Pump(s)

PROCEDURE Upon completion of work, inspection and tests shall be made by the contractor's representative and witnessed by an owner's representative. All defects shall be corrected and system left in service before contractor's personnel finally leave the job.

A certificate shall be filled out and signed by both representatives. Copies shall be prepared for approving authorities, owners, and contractor. It is understood the owner's representative's signature in no way prejudices any claim against contractor for faulty material, poor workmanship, or failure to comply with approving authority's requirements or local ordinances.

PROPERTY NAME		DATE
PROPERTY ADDRESS		
PLANS	ACCEPTED BY APPROVING AUTHORITIES (NAMES)	
	ADDRESS	
	INSTALLATION CONFORMS TO ACCEPTED PLANS	☐ YES ☐ NO
	EQUIPMENT USED IS APPROVED IF NO, STATE DEVIATIONS	☐ YES ☐ NO
INSTRUCTIONS	HAS PERSON IN CHARGE OF FIRE EQUIPMENT BEEN INSTRUCTED AS TO LOCATION OF CONTROL VALVES AND CARE AND MAINTENANCE OF THIS NEW EQUIPMENT? IF NO, EXPLAIN	☐ YES ☐ NO
	HAVE COPIES OF APPROPRIATE INSTRUCTIONS AND CARE AND MAINTENANCE CHARTS BEEN LEFT ON PREMISES? IF NO, EXPLAIN	☐ YES ☐ NO
LOCATION	SUPPLIES BUILDINGS	
PIPES AND JOINTS	PIPE TYPES AND CLASS	TYPE JOINT
	PIPE CONFORMS TO _____ STANDARD FITTINGS CONFORM TO _____ STANDARD IF NO, EXPLAIN	☐ YES ☐ NO ☐ YES ☐ NO
	BURIED JOINTS NEEDING ANCHORAGE CLAMPED, STRAPPED, OR BLOCKED IN ACCORDANCE WITH _____ STANDARD IF NO, EXPLAIN	☐ YES ☐ NO
TEST DESCRIPTION	FLUSHING: Flow the required rate until water is clear as indicated by no collection of foreign material in burlap bags at outlets such as hydrants and blowoffs. Flush at flow not less than 37 gpm for 1 in. pipe (140 L/min for 25 mm pipe), 85 gpm for 1½ in. pipe (330 L/min for 38 mm pipe), 150 gpm for 2 in. pipe (570 L/min for 50 mm pipe), 229 gpm for 2½ in. pipe (870 L/min for 65 mm pipe), 330 gpm for 3 in. pipe (1250 L/min for 75 mm pipe), 450 gpm for 3½ in. pipe (1710 L/min for 85 mm pipe), 590 gpm for 4 in. pipe (2240 L/min for 100 mm pipe), 920 gpm for 5 in. pipe (3490 L/min for 125 mm pipe), 1360 gpm for 6 in. pipe (5150 L/min for 150 mm pipe), 2350 gpm for 8 in. pipe (8900 L/min for 200 mm pipe), 3670 gpm for 10 in. pipe (13,900 L/min for 250 mm pipe), 5290 gpm for 12 in. pipe (20,100 L/min for 300 mm pipe), 7200 gpm for 14 in. pipe (27,300 L/min for 350 mm pipe), and 9400 gpm for 16 in. pipe (35,600 L/min for 400 mm pipe). When supply cannot produce stipulated flow rates, comply with 14.1.1.3. HYDROSTATIC: Hydrostatic tests shall be made at not less than 200 psi (13.8 bar) for 2 hours or 50 psi (3.4 bar) above static pressure in excess of 150 psi (10.3 bar) for 2 hours. LEAKAGE: New pipe laid with rubber gasketed joints shall, if the workmanship is satisfactory, have little or no leakage at the joints. The amount of leakage at the joints shall not exceed 2 qt/hr (1.89 L/hr) per 100 joints irrespective of pipe diameter. The amount of allowable leakage specified above can be increased by 1 fl oz per inch valve diameter per hour (30 mL/25 mm/hr) for each metal seated valve isolating the test section. If dry barrel hydrants are tested with the main valve open, so the hydrants are under pressure, an additional 5 oz per minute (150 mL/min) leakage is permitted for each hydrant.	

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Contractor's Material and Test Certificate for Private Fire Service Mains Feeding Fire Pump(s)

PROCEDURE Upon completion of work, inspection and tests shall be made by the contractor's representative and witnessed by an owner's representative. All defects shall be corrected and system left in service before contractor's personnel finally leave the job.

A certificate shall be filled out and signed by both representatives. Copies shall be prepared for approving authorities, owners, and contractor. It is understood the owner's representative's signature in no way prejudices any claim against contractor for faulty material, poor workmanship, or failure to comply with approving authority's requirements or local ordinances.

PROPERTY NAME		DATE
PROPERTY ADDRESS		
PLANS	ACCEPTED BY APPROVING AUTHORITIES (NAMES)	
	ADDRESS	
	INSTALLATION CONFORMS TO ACCEPTED PLANS	☐ YES ☐ NO
	EQUIPMENT USED IS APPROVED IF NO, STATE DEVIATIONS	☐ YES ☐ NO
INSTRUCTIONS	HAS PERSON IN CHARGE OF FIRE EQUIPMENT BEEN INSTRUCTED AS TO LOCATION OF CONTROL VALVES AND CARE AND MAINTENANCE OF THIS NEW EQUIPMENT? IF NO, EXPLAIN	☐ YES ☐ NO
	HAVE COPIES OF APPROPRIATE INSTRUCTIONS AND CARE AND MAINTENANCE CHARTS BEEN LEFT ON PREMISES? IF NO, EXPLAIN	☐ YES ☐ NO
LOCATION	SUPPLIES BUILDINGS	
PIPES AND JOINTS	PIPE TYPES AND CLASS	TYPE JOINT
	PIPE CONFORMS TO _____ STANDARD FITTINGS CONFORM TO _____ STANDARD IF NO, EXPLAIN	☐ YES ☐ NO ☐ YES ☐ NO
	BURIED JOINTS NEEDING ANCHORAGE CLAMPED, STRAPPED, OR BLOCKED IN ACCORDANCE WITH _____ STANDARD IF NO, EXPLAIN	☐ YES ☐ NO
TEST DESCRIPTION	FLUSHING: Flow the required rate until water is clear as indicated by no collection of foreign material in burlap bags at outlets such as hydrants and blowoffs. Flush at a rate not less than that shown in Table 14.1.1.1. HYDROSTATIC: Hydrostatically test all piping and attached appurtenances subjected to system working pressure at a gauge pressure of 200 psi (14 bar) or 50 psi (3.4 bar) in excess of the system working pressure, whichever is greater, and maintain that pressure at a gauge pressure of ±5 psi (0.3 bar) for 2 hours. LEAKAGE: Determine successful test results by indication of either a pressure loss less than a gauge pressure of 5 psi (0.3 bar) or by no visual leakage.	

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FLUSHING TESTS	NEW PIPING FLUSHED ACCORDING TO BY (COMPANY) IF NO, EXPLAIN	——— STANDARD ☐ YES ☐ NO
	HOW FLUSHING FLOW WAS OBTAINED PUBLIC WATER ☐ TANK OR RESERVOIR ☐ FIRE PUMP	THROUGH WHAT TYPE OPENING ☐ HYDRANT BUTT ☐ OPEN PIPE
	LEAD-INS FLUSHED ACCORDING TO BY (COMPANY) IF NO, EXPLAIN	——— STANDARD ☐ YES ☐ NO
	HOW FLUSHING FLOW WAS OBTAINED PUBLIC WATER ☐ TANK OR RESERVOIR ☐ FIRE PUMP	THROUGH WHAT TYPE OPENING ☐ Y CONNECTION TO FLANGE & SPIGOT ☐ OPEN PIPE
HYDROSTATIC TEST	ALL NEW PIPING HYDROSTATICALLY TESTED AT ——— PSI FOR ——— HOURS	BURIED JOINTS COVERED ☐ YES ☐ NO
LEAKAGE TEST	TOTAL AMOUNT OF LEAKAGE MEASURED ——— GALLONS ——— HOURS	NO LEAKAGE ALLOWED FOR VISIBLE JOINTS
	ALLOWABLE LEAKAGE (BURIED) ——— GALLONS ——— HOURS	NO LEAKAGE ALLOWED FOR VISIBLE JOINTS
HYDRANTS	NUMBER INSTALLED	TYPE AND MAKE / ALL OPERATE SATISFACTORILY ☐ YES ☐ NO
CONTROL VALVES	WATER CONTROL VALVES LEFT WIDE OPEN IF NO, STATE REASON	☐ YES ☐ NO
	HOSE THREADS OF FIRE DEPARTMENT CONNECTIONS AND HYDRANTS INTERCHANGEABLE WITH THOSE OF FIRE DEPARTMENT ANSWERING ALARM	☐ YES ☐ NO
REMARKS	DATE LEFT IN SERVICE ——— ADDITIONAL COMMENTS: ———	
SIGNATURES	NAME OF INSTALLING CONTRACTOR	
	TESTS WITNESSED BY	
	FOR PROPERTY OWNER (SIGNED)	TITLE / DATE
	FOR INSTALLING CONTRACTOR (SIGNED)	TITLE / DATE
ADDITIONAL EXPLANATION AND NOTES		

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FLUSHING TESTS	NEW PIPING FLUSHED ACCORDING TO BY (COMPANY) IF NO, EXPLAIN	——— STANDARD ☐ YES ☐ NO
	HOW FLUSHING FLOW WAS OBTAINED PUBLIC WATER ☐ TANK OR RESERVOIR ☐ FIRE PUMP	THROUGH WHAT TYPE OPENING ☐ HYDRANT BUTT ☐ OPEN PIPE
	LEAD-INS FLUSHED ACCORDING TO BY (COMPANY) IF NO, EXPLAIN	——— STANDARD ☐ YES ☐ NO
	HOW FLUSHING FLOW WAS OBTAINED PUBLIC WATER ☐ TANK OR RESERVOIR ☐ FIRE PUMP	THROUGH WHAT TYPE OPENING ☐ Y CONNECTION TO FLANGE & SPIGOT ☐ OPEN PIPE
HYDROSTATIC TEST	ALL NEW PIPING HYDROSTATICALLY TESTED AT ——— PSI FOR ——— HOURS	BURIED JOINTS COVERED ☐ YES ☐ NO
LEAKAGE TEST	TOTAL AMOUNT OF LEAKAGE MEASURED ——— GALLONS ——— HOURS	NO LEAKAGE ALLOWED FOR VISIBLE JOINTS
	ALLOWABLE LEAKAGE (BURIED) ——— GALLONS ——— HOURS	NO LEAKAGE ALLOWED FOR VISIBLE JOINTS
HYDRANTS	NUMBER INSTALLED	TYPE AND MAKE / ALL OPERATE SATISFACTORILY ☐ YES ☐ NO
CONTROL VALVES	WATER CONTROL VALVES LEFT WIDE OPEN IF NO, STATE REASON	☐ YES ☐ NO
	HOSE THREADS OF FIRE DEPARTMENT CONNECTIONS AND HYDRANTS INTERCHANGEABLE WITH THOSE OF FIRE DEPARTMENT ANSWERING ALARM	☐ YES ☐ NO
REMARKS	DATE LEFT IN SERVICE ——— ADDITIONAL COMMENTS: ———	
SIGNATURES	NAME OF INSTALLING CONTRACTOR	
	TESTS WITNESSED BY	
	FOR PROPERTY OWNER (SIGNED)	TITLE / DATE
	FOR INSTALLING CONTRACTOR (SIGNED)	TITLE / DATE
ADDITIONAL EXPLANATION AND NOTES		

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Supplemental Information

File Name	Description	Approved
Annex_A_A_14_1_3_FR-90.docx	Edits to figures	

Submitter Information Verification

Committee: FIM-AAA

Submittal Date: Fri Oct 28 10:13:03 EDT 2022

Committee Statement

Committee Statement: The test certificates have been updated to reflect several changes.

In Figure A.14.1.3(a), the sample of a contractor's material and test certificate for fire pumps the acceptance criteria for the hydrostatic test was updated and the flushing section for above ground suction piping was deleted.

In Figure A.14.1.3(b), the sample certificate for private fire service mains, the flush rates were deleted, and reference made instead to Table 14.1.1.1. Acceptance criteria for hydrostatic testing and flushing of underground piping were extracted from the 2022 edition of NFPA 24.

Response Message: FR-90-NFPA 20-2022

Public Input No. 104-NFPA 20-2022 [Section No. A.14.1.3]

First Revision No. 91-NFPA 20-2022 [Section No. A.14.2.6]

A.14.2.6

The fire pump operation is as follows:

(1) *Motor-Driven Pump.* To start a motor-driven pump, the following steps should be taken in the following order:

(a) See that pump is completely primed.

(b) Close isolating switch and then close circuit breaker.

(c) Automatic controller will start pump if system demand is not satisfied (e.g., pressure low, deluge tripped).

(d) For manual operation, activate switch, pushbutton, or manual start handle. Circuit breaker tripping mechanism should be set so that it will not operate when current in circuit is excessively large.

(2) *Steam-Driven Pump.* A steam turbine driving a fire pump should always be kept warmed up to permit instant operation at full-rated speed. The automatic starting of the turbine should not be dependent on any manual valve operation or period of low-speed operation. If the pop safety valve on the casing blows, steam should be shut off and the exhaust piping examined for a possible closed valve or an obstructed portion of piping. Steam turbines are provided with governors to maintain speed at a predetermined point, with some adjustment for higher or lower speeds. Desired speeds below this range can be obtained by throttling the main throttle valve.

(3) *Diesel Engine–Driven Pump.* To start a diesel engine–driven pump, the operator should be familiar beforehand with the operation of this type of equipment~~. The~~ ; the instruction books issued by the engine and control manufacturer should be studied to ~~this~~ that end. The storage batteries should always be maintained in good order to ensure prompt, satisfactory operation of this equipment (~~i.e.~~ e.g. , check electrolyte level and specific gravity, inspect cable conditions, check for corrosion~~, etc.~~).

(4) *Fire Pump Settings.* The fire pump system, when started by pressure drop, should be arranged as follows:

(a) The jockey pump stop point should equal the pump churn pressure plus the minimum static supply pressure.

(b) The jockey pump start point should be at least 10 psi (0.68 bar) less than the jockey pump stop point.

(c) The fire pump start point should be ~~5~~ 10 psi (~~0.34~~ 0.68 bar) less than the jockey pump start point. Use 10 psi (0.68 bar) increments for each additional pump.

(d) Where minimum run times are provided, the pump will continue to operate after attaining these pressures. The final pressures should not exceed the pressure rating of the system.

(e) Where the operating differential of pressure switches does not permit these settings, the settings should be as close as equipment will permit. The settings should be established by pressures observed on test gauges.

(f) ~~Examples~~ The following are examples of fire pump settings ~~follow~~ (for SI units, 1 psi = 0.0689 bar):

i. Pump: 1000 gpm, 100 psi pump with churn pressure of 115 psi

ii. Suction supply: 50 psi from city — minimum static; 60 psi from city — maximum static

iii. Jockey pump stop = 115 psi + 50 psi = 165 psi

iv. Jockey pump start = 165 psi −10 psi = 155 psi

v. Fire pump stop = 115 psi + 50 psi = 165 psi

vi. Fire pump start = 155 psi ~~−5~~ 10 psi = ~~150~~ 145 psi

vii. Fire pump maximum churn = 115 psi + 60 psi = 175 psi

(g) Where minimum-run timers are provided, the pumps will continue to operate at churn pressure beyond the stop setting. The final pressures should not exceed the pressure rating of the system components.

(5) *Automatic Recorder.* The performance of all fire pumps should be automatically indicated on a pressure recorder to provide a record of pump operation and assistance in fire loss investigation.

Supplemental Information

File Name	Description	Approved
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Submitter Information Verification

Committee: FIM-AAA

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Committee Statement

Committee Statement: The fire pump controller start point is typically set 10 psi below the jockey controller start point to avoid unintended starts of the fire pump and to avoid nuisance alarms.

Response Message: FR-91-NFPA 20-2022

Public Input No. 50-NFPA 20-2022 [Section No. A.14.2.6]

First Revision No. 2-NFPA 20-2022 [Chapter E]

Annex E Informational References

E.1 Referenced Publications.

The documents or portions thereof listed in this annex are referenced within the informational sections of this standard and are not part of the requirements of this document unless also listed in Chapter 2 for other reasons.

E.1.1 NFPA Publications.

National Fire Protection Association, 1 Batterymarch Park, Quincy, MA 02169-7471.

NFPA 1, *Fire Code*, ~~2021~~ 2024 edition.

NFPA 11 , *Standard for Low-, Medium-, and High-Expansion Foam* , 2024 edition.

NFPA 13, *Standard for the Installation of Sprinkler Systems*, ~~2022~~ 2025 edition.

NFPA 14, *Standard for the Installation of Standpipe and Hose Systems*, ~~2019~~ 2023 edition.

NFPA 15, *Standard for Water Spray Fixed Systems for Fire Protection*, 2022 edition.

~~NFPA 16 , *Standard for the Installation of Foam-Water Sprinkler and Foam-Water Spray Systems* , 2019 edition.~~

NFPA 24, *Standard for the Installation of Private Fire Service Mains and Their Appurtenances*, ~~2022~~ 2025 edition.

NFPA 25, *Standard for the Inspection, Testing, and Maintenance of Water-Based Fire Protection Systems*, ~~2020~~ 2023 edition.

NFPA 31, *Standard for the Installation of Oil-Burning Equipment*, ~~2020~~ 2024 edition.

NFPA 70®, *National Electrical Code®*, ~~2020~~ 2023 edition.

NFPA 77, *Recommended Practice on Static Electricity*, ~~2019~~ 2024 edition.

NFPA 750, *Standard on Water Mist Fire Protection Systems*, ~~2019~~ 2023 edition.

E.1.2 Other Publications.

E.1.2.1 ASCE Publications.

American Society of Civil Engineers, 1801 Alexander Bell Drive, Reston, VA 20191-4400.

ASCE/SEI 7, *Minimum Design Loads and Associated Criteria for Buildings and Other Structures*, ~~2016~~ 2022 .

E.1.2.2 AWWA Publications.

American Water Works Association, 6666 West Quincy Avenue, Denver, CO 80235.

AWWA C104/A21.4 , *Cement-Mortar Lining for Ductile-Iron Pipe and Fittings*, ~~2013~~ 2016 .

E.1.2.3 HI Publications.

Hydraulic Institute, 300 Interpace Parkway, Building A, 3rd Floor, ~~6 Campus Drive, First Floor North,~~ Parsippany, NJ 07054-4406.

ANSI/HI 1.4, *Rotodynamic ~~Centrifugal~~ Pumps for ~~Manuals Describing~~ Installation, Operation, and Maintenance*, ~~2014~~ 2018 .

ANSI/HI 3.6, *Rotary Pump Tests*, ~~2016~~ 2022 .

ANSI/HI 9.6.4, *Rotodynamic ~~(Centrifugal and Vertical)~~ Pumps for Vibration Measurement and Allowable Values*, ~~2016~~ 2022 .

ANSI/HI 9.6.6, *Rotodynamic Pumps for Pump Piping*, 2016.

ANSI/HI 9.8, *Rotodynamic Pumps for Pump Intake Design*, 2018.

E.1.2.4 IEEE Publications.

IEEE, Three Park Avenue, 17th Floor, New York, NY 10016-5997.

~~ANSI/~~ IEEE C62.11, *IEEE Standard for Metal-Oxide Surge Arresters for ~~Alternating Current~~ AC Power Circuits (>1 kV),~~2012~~ 2020* .

IEEE 141, *IEEE Recommended Practice for Electric Power Distribution for Industrial Plants*, ~~1986~~ 1993 .

IEEE 241, *IEEE Recommended Practice for Electric Systems ~~for~~ in Commercial Buildings*, 1990.

IEEE 493, *IEEE Recommended Practice for the Design of Reliable Industrial and Commercial Power Systems*, 2007.

IEEE 802.3, *IEEE Standard for Ethernet*, 2018.

IEEE 802.11, *IEEE Standard for Information Technology — Telecommunications and ~~information exchange between systems Local and metropolitan area networks~~ Information Exchange Between Systems — Local and Metropolitan Area Networks — Specific ~~requirements~~ Requirements — Part 11: Wireless LAN Medium Access Control (MAC) and Physical Layer (PHY) Specifications*, ~~2016~~ 2020 .

Anthony, M., et al, “Reliability Analysis for Power to Fire Pump Using Fault Tree and RBD,” *IEEE Transactions on Industry Applications*, Vol. 49, No. 2, March-April 2013, pp. 997–1003.

Anthony, M., et al, “Reliability engineering applied to Critical Operations Power Systems (COPS),” *~~Proc.~~ 2011 Industrial and Commercial Power Systems Technical Conference (I&CPS)*, ~~1-5~~ 1–5 May 2011, pp. 1–8.

Arno, R.G., E. Stoyas, and R. Schuerger, “NEC Article 708,” *IEEE Industry Application Magazine*, ~~IEEE,~~ Vol. 17, No. 1, ~~Jan.-Feb~~ January-February . 2011, pp. 20–25.

Arno, R.G., E. Stoyas, and R. Schuerger, “Risk Analysis for NEC Article 708 Critical Operations Power Systems,” Industry Applications Society Annual Meeting, IEEE, ~~4-8~~ 4–8 ~~Oct.~~ October 2009, pp. 1–7.

E.1.2.5 ISO Publications.

International Organization for Standardization, ISO Central Secretariat, BIBC II, Chemin de Blandonnet 8, CP 401, 1214 Vernier, Geneva, Switzerland.

ISO 8601, *Data Elements and Interchange Formats — Information Interchange — Representation of Dates and Times,* 2010.

E.1.2.6 NEMA Publications.

National Electrical Manufacturers Association, 1300 North 17th Street, Suite 900, Arlington, VA 22209.

NEMA ICS 14, *Application Guide for Electric Fire Pump Controllers*, 2015.

NEMA 250, *Enclosures for Electrical Equipment (1,000 Volts Maximum)* , ~~2018~~ 2020 .

E.1.2.7 SAE Publications.

SAE International, Society of Automotive Engineers, 400 Commonwealth Drive, Warrendale, PA 15096.

SAE J-1349, *Engine Power Test Code — Spark Ignition and Compression Ignition — As Installed Net Power Rating ~~Engine~~* , 2011.

E.1.2.8 SFPE Publications.

Society of Fire Protection Engineers, 9711 Washingtonian Blvd, Suite 380, Gaithersburg, MD 20878.

SFPE Engineering Guide: Fire Safety for Very Tall Buildings,~~2013~~ 2021 .

E.1.2.9 UL Publications.

Underwriters Laboratories Inc., 333 Pfingsten Road, Northbrook, IL 60062-2096.

UL 218, *Fire Pump Controllers,* 2015, revised 2020 .

UL 508, *Industrial Control Equipment*, 2018, revised 2021 .

UL 1008, *Transfer Switch Equipment*, ~~2018~~ 2022 .

E.2 Informational References.

The following documents or portions thereof are listed here as informational resources only. They are not a part of the requirements of this document.

E.2.1 HI Publications.

Hydraulic Institute, ~~6 Campus Drive, First Floor North~~ 300 Interpace Parkway, Building A, 3rd Floor , Parsippany, NJ 07054-4406.

ANSI/HI 14 .1–14 .2, *Rotodynamic ~~Centrifugal~~ Pumps for Nomenclature and Definitions*, ~~2014~~ 2019 .

ANSI/HI 14 .3, *Rotodynamic ~~Centrifugal~~ Pumps for Design and Application*, ~~2013~~ 2019 .

ANSI/HI 2.1–2.2, *Rotodynamic Vertical Pumps ~~for~~ of Radial, Mixed, and Axial Flow Types for Nomenclature and Definitions*, 2014.

ANSI/HI 2.3, *Rotodynamic Vertical Pumps ~~for~~ of Radial, Mixed, and Axial Flow Types for Design and Application*, 2013.

ANSI/HI 3.1–3.5, *Rotary Pumps for Nomenclature, Definitions, Application, and Operation*, 2015.

ANSI/HI 14.6, *Rotodynamic Pumps for Hydraulic Performance Acceptance Tests*, 2016.

E.2.2 UL Publications.

Underwriters Laboratories Inc., 333 Pfingsten Road, Northbrook, IL 60062-2096.

UL 80, *Steel Tanks for Oil- Burner Fuels and Other Combustible Liquids,* 2007, revised ~~2014~~ 2019 .

UL 2080, *Fire Resistant Tanks for Flammable and Combustible Liquids,* 2000.

UL 2085, *Protected Aboveground Tanks for Flammable and Combustible Liquids,* 2010.

E.3 References for Extracts in Informational Sections. (Reserved)

Submitter Information Verification

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Committee Statement

Committee Statement: Update dates of informational references to comply with the Manual of Style.
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Public Input No. 95-NFPA 20-2022 [Section No. E.1.2.9]