11.4.1.3.3
Outlets shall terminate at least 12 ft above the finished ground level.

Submitter Information Verification

Submitter Full Name: Chad Duffy
Organization: National Fire Protection Assoc
Street Address:
City:
State:
Zip:
Submittal Date: Wed Dec 11 08:52:35 EST 2013

Committee Statement

Committee Statement: This is a requirement from the International Fire Code (IFC). We actually do not know the origin of the 12 ft rule, but we know that many installers of fire pumps are missing this requirement that is buried in section 5704.2.7.3.3 of the IFC. Our goal is to consolidate the rules for the installation of fire pumps in one location so that everyone can find the applicable rules easily.

Response Message:
Public Input No. 123-NFPA 20-2013 [New Section after 11.4.1.2.8.3(B)]
11.4.2.6.4
Tanks shall be prevented from overfilling by one of the following:

(1) An automatic mechanism that sends an audible or visible signal to the person filling the tank when it reaches 90 percent of the tank's capacity and automatically shuts off the flow of liquid to the tank when it reaches 95 percent of the tank's capacity.

(2) A permanent sign at the fill point with the tank calibration chart and instructions about the filling procedure, which includes having the person performing the fill operation determine how full the tank is prior to filling and calculate the quantity of fuel (in gallons or liters) that it will take to get the tank to 90 percent of the tank's capacity. Where climatic conditions are such that the sign could be obscured by ice or snow, weathered beyond readability, or otherwise rendered unreadable, the procedures and chart shall be permitted to be located in an office window, lock box, or other location accessible to the person performing the filling of the tank.

(3) Any approved procedure for preventing the tank from being overfilled.

Submitter Information Verification

Submitter Full Name: Chad Duffy
Organization: National Fire Protection Assoc
Street Address:
City:
State:
Zip:
Submittal Date: Wed Dec 11 08:59:51 EST 2013

Committee Statement

Committee Statement: The tank needs to be protected from overfilling. This is a requirement from the International Fire Code (IFC). Many installers of fire pumps are missing this requirement that is buried in section 5704.2.9.7.6 of the IFC. Our goal is to consolidate the rules for the installation of fire pumps in one location so that everyone can find the applicable rules easily.

Response Message:
Public Input No. 124-NFPA 20-2013 [New Section after 11.4.2.6.3]
11.4.1.2* – Fuel Supply Tank and Capacity.

11.4.1.3 Fuel Supply Tank Capacity.

Fuel supply tank(s) shall have a capacity at least equal to 1 gal per hp (5.07 L per kW), plus 5 percent volume for expansion and 5 percent volume for sump.

Whether larger-capacity fuel supply tanks are required shall be determined by prevailing conditions, such as refill cycle and fuel heating due to recirculation, and shall be subject to special conditions in each case.

The fuel supply tank and fuel shall be reserved exclusively for the fire pump diesel engine.

There shall be a separate fuel supply tank for each engine.

There shall be a separate fuel supply and return line for each engine.

Means other than sight tubes for continuous indicating of the amount of fuel in each storage tank shall be provided.

A fuel level indicator shall be provided to activate at the two-thirds tank level.

The low fuel level condition shall initiate a supervisory signal.

Submitter Information Verification

Submitter Full Name: Chad Duffy
Organization: National Fire Protection Assoc
Street Address:
City:
State:
Zip:
Submittal Date: Wed Dec 11 09:14:58 EST 2013

Committee Statement

Committee Statement: These section numbers have been relocated for clarity. Renumbe...
14.2.4.1.2
For multistage multiport pumps, a copy of the manufacturer’s certified shop test data for each discharge outlet shall be available for comparison with the results of the field acceptance test.

Submitter Information Verification
Submitter Full Name: Chad Duffy
Organization: National Fire Protection Assoc

Committee Statement
Committee Statement: Part of multiple stage multiple port fire pump requirements.
Response Message:
Public Input No. 85-NFPA 20-2013 [New Section after 14.2.4.1]
### Chapter 2 Referenced Publications

#### 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.

#### 2.3 Other Publications.

##### 2.3.1 AGMA Publications.

##### 2.3.2 ANSI Publications.

##### 2.3.3 ASCE Publications.

##### 2.3.4 ASME Publications.
2.3.5 AWS Publications.
American Welding Society, 550 NW Le Jeune Road, Miami, FL 33126.

2.3.6 HI Publications.
Hydraulic Institute, 6 Campus Drive, First Floor North, Parsippany, NJ 07054-4406.

2.3.7 IEEE Publications.
Institute of Electrical and Electronics Engineers, Three Park Avenue, 17th Floor, New York, NY 10016-5997.

2.3.8 ISO Publications.
International Organization for Standardization, 1, ch. de la Voie-Creuse, Case postale 56, CH-1211 Geneva 20, Switzerland.

2.3.9 NEMA Publications.
National Electrical Manufacturers Association, 1300 North 17th Street, Suite 1752, Rosslyn, VA 22209.

2.3.10 UL Publications.
Underwriters Laboratories Inc., 333 Pfingsten Road, Northbrook, IL 60062-2096.
### 2.3.11 Other Publications


### 2.4 References for Extracts in Mandatory Sections


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**Submitter Information Verification**

- **Submitter Full Name:** Chad Duffy
- **Organization:** National Fire Protection Assoc
- **Submittal Date:** Thu Oct 17 15:10:06 EDT 2013

**Committee Statement**

Some of the referenced standards have been updated, the name of AGMA 390.03 has been changed, ANSI B15.1 has been superseded by ANSI B11.19, ANSI/IEEE62.1 has been withdrawn, and ANSI IEEE C62.41 has been superseded by ANSI/IEEE C62.41.1, and Hydraulic Institute Standards for Centrifugal, Rotary and Reciprocating Pumps has been split into multiple standards.
First Revision No. 1-NFPA 20-2013 [New Section after 3.3.38.10]

3.3.38.11* Multistage Multiport Pump.
A single-driver pump with multiple impellers operating in series where the discharge from each impeller, except the last impeller, is the suction for the next impeller, and discharge ports are provided after multiple impellers.

Supplemental Information

File Name: FR-1_A_3_3_38_10.docx

Submitter Information Verification

Submitter Full Name: [Not Specified]
Organization: [Not Specified]
Street Address: [Not Specified]
City: [Not Specified]
State: [Not Specified]
Zip: [Not Specified]
Submittal Date: Tue Oct 01 13:45:26 EDT 2013

Committee Statement

Committee Statement: NFPA 20 does not currently address multiple stage multiple port fire pumps. Add new definition of multiple stage multiple port fire pumps. Within this new definition explain that there may not be an outlet after each impeller. See new annex language A.3.3.38.11.

Response Message:

Public Input No. 76-NFPA 20-2013 [New Section after A.3.3.36]
Public Input No. 88-NFPA 20-2013 [New Section after 3.3.38.10]
3.3.41 Record Drawing (As-Built).
A design, working drawing, or as-built drawing that is submitted as the final record of documentation for the project. Drawings that document the installed layout, including piping and the location of all devices, appliances, wiring sequences, wiring methods, and connections to the components of the system as installed.

Submitter Information Verification
Submitter Full Name: [ Not Specified ]
Organization: [ Not Specified ]
Street Address: [ Not Specified ]
City: [ Not Specified ]
State: [ Not Specified ]
Zip: [ Not Specified ]
Submittal Date: Tue Oct 01 13:56:12 EDT 2013

Committee Statement
Committee Statement: Paragraph 14.3 refers to record drawings so the definition has been revised to be plural. It would be extremely rare that the design drawings could serve as the record drawings. The record drawings should indicate the as build (installed) condition. In searching for a better definition, it was noted that NFPA 72 already has a definition so it is proposed to extract the definition from NFPA 72. While there may be some text not exactly related to a fire pump installation, the definition still seems to be applicable. Partially extracted revised language from NFPA 72.

Response Message:
Public Input No. 63-NFPA 20-2013 [Section No. 3.3.41]
3.3.57.2 Low Suction Throttling Suction Pressure Regulating Valve.
A pilot-operated valve installed in discharge piping that maintains positive pressure in the suction piping, while monitoring pressure in the suction piping through a sensing line.

Submitter Information Verification

Submitter Full Name: [Not Specified]
Organization: [Not Specified]
Street Address:
City:
State:
Zip:

Submit Date: Tue Oct 01 13:57:36 EDT 2013

Committee Statement

Committee Statement: The proposed term provides consistancy with industry and the FM approval guide.
Response Message:

Public Input No. 15-NFPA 20-2013 [Section No. 3.3.57.2]
4.2.3.1

Plans shall be drawn to an indicated scale, on sheets of uniform size, and shall indicate, as a minimum, the items from the following list that pertain to the design of the system:

1. Name(s) of owner 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
7. Suction main size, length, location, weight, type and class/schedule of material, and point of connection to water supply, as well as size and type of valves, valve indicators, regulators, meters, and valve pits, and 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 capacity information including the following flow test information, if applicable:
   a. Location and elevation of static and residual test gauge with relation to the riser the elevation reference point
   b. Flow location
   c. Static pressure, psi (bar)
   d. Residual pressure, psi (bar)
   e. Flow, 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. Other sources of water supply, with pressure or elevation
12. Pump driver details including manufacturer, horsepower, voltage, or fuel system details and horsepower
13. Voltage for electric motor–driven pumps
14. Fuel system details for diesel-driven pumps
15. Controller manufacturer, type, and rating
16. Suction and discharge pipe, fitting, and valve types
17. Test connection piping and valves
18. Flow meter details (if used), if applicable
19. Jockey pressure maintenance pump and controller arrangement, including sensing line details

Submitter Information Verification

Submitter Full Name: [Not Specified]
Committee Statement

Committee Statement: The intent is to clean up the requirements so that they are applicable to fire pump installations. The following changes were made: 1. The weight of the suction piping was eliminated because that is not important. How many pounds of suction pipe are present is not an aspect of fire pump installations that should be subjected to plan review. 2. The "valves, regulators, meters, and valve pits" were moved to their own line with "if applicable" added to them because they are not always included in a fire pump installation and they should not be limited to suction piping. The AHJ should get this information about valves regarding the discharge valves as well. 3. The "valve indicators" was removed because the type of valve will be included with the description and size of the valve. We should not also have to described the size of the stem coming out of the valve to indicate that it is open. 4. The water supply information in part (8) (except for item "I" which was dealt with separately) was clarified to show that the list only applies to those situations where a flow test was run. 5. The "riser reference point" was changed to "elevation reference point" because a fire pump installation does not have a riser. 6. Item "I" was moved to its own item in the list because it does not pertain to a flow test. Flow and size information was added because this is an important point for items like tanks. 7. Voltage and fuel system requirements were separated to make them independent. 8. The term "if applicable" was added to the pressure maintenance pump information because they are not always provided and you should not have to provide information on a pressure maintenance pump that is not present.

Response Message:

Public Input No. 133-NFPA 20-2013 [Section No. 4.2.3.1]
4.3.3.3 Qualified personnel shall include, but not be limited to, one or more of the following:

(1) Personnel who are factory trained and certified for fire pump system design installation of the specific type and brand of system being designed

(2) Personnel who are certified by a nationally recognized fire protection certification organization acceptable to the authority having jurisdiction

(3) Personnel who are registered, licensed, or certified by a state or local authority

Submitter Information Verification

Submitter Full Name: [Not Specified]
Organization: [Not Specified]
Street Address: [Not Specified]
City:
State:
Zip:
Submittal Date: Tue Oct 01 14:14:46 EDT 2013

Committee Statement

Committee Statement: Editorial correction.
Response Message:
4.3.4.2 Qualified personnel shall include, but not be limited to, one or more of the following:

1. Personnel who are factory trained and certified for fire pump system design servicing of the specific type and brand of system being designed.

2. Personnel who are certified by a nationally recognized fire protection certification organization acceptable to the authority having jurisdiction.

3. Personnel who are registered, licensed, or certified by a state or local authority.

4. Personnel who are employed and qualified by an organization listed by a nationally recognized testing laboratory for the servicing of fire protection systems.

Submitter Information Verification

Submitter Full Name: [Not Specified]
Organization: [Not Specified]
Street Address:
City:
State:
Zip:
Submittal Date: Tue Oct 01 14:16:13 EDT 2013

Committee Statement

Committee Statement: There is no need for the individual who services a fire pump to be trained in fire pump design. Servicing comes into effect after the fire pump system is designed and installed. Terminology correction.

Response Message:
For a multistage multiport pump, certified shop test data that include flow, pressure, and horsepower shall be provided for each outlet.

Submitter Information Verification

Submitter Full Name: [Not Specified]
Organization: [Not Specified]
Street Address:
City:
State:
Zip:
Submit Date: Tue Oct 01 14:17:38 EDT 2013

Committee Statement

Committee Statement: Part of needed changes to add multiple stage multiple port pumps to NFPA 20. There may not be an outlet after each impeller.

Response Message: Public Input No. 77-NFPA 20-2013 [New Section after 4.5.1.1]
4.6.5.3
The head described in 4.6.5.1 and 4.6.5.2 shall be as indicated by a flow test.

Submitter Information Verification

Submitter Full Name: [ Not Specified ]
Organization: [ Not Specified ]
Street Address: 
City: 
State: 
Zip: 
Submittal Date: Tue Oct 01 14:43:52 EDT 2013

Committee Statement

Committee Statement: Clause 4.6.5.1 is the main/initial requirement in Section 4.6.5, so it should be referenced as well as 4.5.6.2.

Response Message:
4.8 Multistage Multiport Pump.

4.8.1 Multistage multiport fire pumps shall be installed in accordance with this standard.

4.8.2 A shutoff valve shall not be required between the impellers of a multistage multiport pump.

Submitter Information Verification

Submitter Full Name: [Not Specified]
Organization: [Not Specified]
Street Address: [Not Specified]
City: [Not Specified]
State: [Not Specified]
Zip: [Not Specified]
Submittal Date: Tue Oct 01 14:45:42 EDT 2013

Committee Statement

Committee Statement: Part of multiple stage multiple port fire pump requirements.
Response Message:
Public Input No. 78-NFPA 20-2013 [New Section after 4.8]
Public Input No. 89-NFPA 20-2013 [New Section after 4.7.7.3.2]
# Automatic Relief Valve

## General Requirements

### 4.12.1.1

Where an electric variable speed pressure limiting controller is installed, the automatic circulation relief valve shall be set to a minimum of 5 psi (0.34 bar) below the operation set pressure.

### 4.12.1.2

Unless the requirements of 4.12.1.8 are met, each pump(s) shall have an automatic relief valve listed for the fire pump service installed and set below the shutoff pressure at minimum expected suction pressure.

### 4.12.1.3

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

#### 4.12.1.3.1

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.

### 4.12.1.4

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

### 4.12.1.5

Provisions shall be made for discharge to a drain.

### 4.12.1.6

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

### 4.12.1.7

The automatic relief valve shall have a nominal size of 0.75 in. (19 mm) for pumps with a rated capacity not exceeding 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).

### 4.12.1.8

The requirements of 4.12.1 shall not apply to engine-driven pumps for which engine cooling water is taken from the pump discharge.

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**Submitter Information Verification**

**Submitter Full Name:** [Not Specified]

**Organization:** [Not Specified]

**Street Address:**

**City:**

**State:**

**Zip:**

**Submittal Date:** Tue Oct 01 15:17:57 EDT 2013

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**Committee Statement**

Add new section 4.11.1.1 and renumber remaining section numbers. When the pressure set point is satisfied during churn, the variable speed drive runs at a minimum speed which is often set at 50% of rated motor full-speed. Not enough pressure is developed at this minimum speed to provide adequate water flow for cooling the pump. This is a concern since the pump can be running in churn for a period of time during a weekly or monthly test for example. Outside of the variable speed drive, the problem doesn’t exist since the motor is operating at full-speed during churn and is developing adequate pressure for flowing cooling water, unless of course, the relief valve isn’t properly set. Setting the circulation relief valve properly will provide the necessary cooling water without a solenoid valve. Part of multiple stage multiple port fire pump requirements.
Response
Message:
Public Input No. 125-NFPA 20-2013 [New Section after 4.11.1]
Public Input No. 90-NFPA 20-2013 [New Section after 4.11.1.2]
4.13.1.1 Indoor Fire Pump Units.
4.13.1.1.1 Fire pump units serving high-rise buildings shall be protected from surrounding occupancies by a minimum of 2-hour fire-rated construction or physically separated from the protected building by a minimum of 50 ft (15.3 m).

4.13.1.1.2 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 4.13.1.1.2.

<table>
<thead>
<tr>
<th>Pump Room/House</th>
<th>Building(s) Exposing Pump Room/House</th>
<th>Required Separation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Not sprinklered</td>
<td>Not sprinklered</td>
<td>2 hour fire-rated</td>
</tr>
<tr>
<td>Not sprinklered</td>
<td>Fully sprinklered</td>
<td>or</td>
</tr>
<tr>
<td>Fully sprinklered</td>
<td>Not sprinklered</td>
<td>50 ft (15.3 m)</td>
</tr>
<tr>
<td>Fully sprinklered</td>
<td>Fully sprinklered</td>
<td>1 hour fire-rated or</td>
</tr>
<tr>
<td></td>
<td></td>
<td>50 ft (15.3 m)</td>
</tr>
</tbody>
</table>

4.13.1.1.3 Fire pump units supplying a local application fire protection system(s) shall be physically separated from the hazard being protected in a manner that will prevent a fire associated with the hazard from directly exposing the pumping unit.

4.13.1.4 The location of and access to the fire pump room shall be preplanned with the fire department.

4.13.1.5 Except as permitted in 4.13.1.6, equipment related to domestic water distribution shall be permitted to be located within the same room as the fire pump equipment.

4.13.1.7 The pump room or pump house shall be sized to fit all of the components necessary for the operation of the fire pump and to accommodate the following:

1. Clearance between components for installation and maintenance
2. Clearance between a component and the wall for installation and maintenance
3. Clearance between energized electrical equipment and other equipment in accordance with NFPA 70, National Electrical Code
4. Orientation of the pump to the suction piping to allow compliance with 4.15.6.3

Supplemental Information

<table>
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<th>File Name</th>
<th>Description</th>
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<td>FR-29_A_4_12_1_1.docx</td>
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</tbody>
</table>

Submitter Information Verification

Submitter Full Name: [ Not Specified ]
### Committee Statement

<table>
<thead>
<tr>
<th>Committee Statement:</th>
<th>Added new section 4.12.1.1.3, requirements were needed for local application pumps. Added new annex section A.4.12.1.1.2.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Response Message:</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>
A.4.12.1.1.2 This section allows for the installation of special hazard fire protection systems such as local application water mist inside buildings that may or may not be otherwise protected. The concern is to assure a fire associated with the process being protected does not cause an immediate failure of the pumping system. It is not the intent of this section to provide protection for the entire building or to protect the process from an exposure fire involving the building section to provide protection for the entire building or to protect the process from an exposure fire involving the building.
4.13.1.3 Fire Pump Buildings or Rooms with Diesel Engines.

Fire pump buildings or rooms enclosing diesel engine pump drivers and day tanks shall be protected with an automatic sprinkler system installed in accordance with NFPA 13, *Standard for the Installation of Sprinkler Systems* as an Extra Hazard Group 2 occupancy.

4.13.1.4 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.

Submitter Information Verification

Submitter Full Name: [Not Specified]
Organization: [Not Specified]
Street Address:
City:
State:
Zip:
Submittal Date: Tue Oct 01 15:55:48 EDT 2013

Committee Statement

Committee Statement: Revise section 4.12.1.3 and add new section 4.12.1.4. This proposal is to add the appropriate design criteria to the requirement for installing sprinklers in the diesel driven fire pump rooms and to add a similar requirement for sprinklers in pump enclosures with electrically driven fire pumps. As noted in A.4.12.1.3, sprinklers are required in pump rooms in fully sprinklered buildings, so the standard should provide the appropriate design criteria.

Response Message:
4.13.2.1.1

Fire pump rooms not directly accessible from the outside shall be accessible through an enclosed passageway from an enclosed stairway or exterior exit.

4.13.2.1.1.1

Fire pump units supplying only local application fire protection systems shall be accessible by a path that is not subject to exposure from a fire in any hazard protected by the fire pump.

Submitter Information Verification

Submitter Full Name: [ Not Specified ]
Organization: [ Not Specified ]
Street Address:
City:
State:
Zip:
Submittal Date: Tue Oct 01 23:51:21 EDT 2013

Committee Statement

Committee Statement: Revise section 4.12.2.1.1 and add new section 4.12.2.1.1.1. Needed clarification for local application pumps.
Response Message:
First Revision No. 13-NFPA 20-2013 [New Section after 4.12.5.1]

4.13.5 Emergency Lighting.
4.13.5.1 Emergency lighting shall be provided in accordance with NFPA 101, Life Safety Code. Pump rooms shall be provided with emergency lighting.
4.13.5.2 The intensity of illumination in the pump room(s) shall be 3.0 ft-candles (32.3 lux), unless otherwise specified by a requirement recognized by the authority having jurisdiction.
4.13.5.3 Emergency lights shall not be connected to an engine-starting battery.
4.13.5.4 The emergency lighting shall be capable of maintaining the lighting level for a minimum of 2 hours.

Submitter Information Verification

Submitter Full Name: [Not Specified]
Organization: [Not Specified]
Street Address:
City:
State:
Zip:
Submittal Date: Tue Oct 01 16:05:28 EDT 2013

Committee Statement

Committee Statement: Add new sections to section 4.12.5, delete existing section 4.12.5.1. The level of illumination required by NFPA 101 for emergency light is an average of 1 ft-candle and, at any point, not less than 0.1 ft-candle. While adequate for egress purposes, the level of illumination is not adequate for a person to work in a fire pump room should normal power be lost. The level of illumination recommended in this Public Input is consistent with a Level 1 EPS room (per NFPA 110). The Committee might also want to consider requirement battery-operated emergency light units consistent with the requirements in NFPA 110. The Committee may also want to give consideration to the duration of the emergency lighting system. NFPA 101 would require a minimum of 90 minutes and would the lighting level to degrade from the performance stated above during that time period. Whereas the water supply duration and operation of the fire pump may be in excess of 90 minutes, NFPA 20 may want to require emergency lighting for a longer period of time. Revised proposed language to be more consistent with NFPA 110.

Response Message:

Public Input No. 64-NFPA 20-2013 [New Section after 4.12.5.1]
4.13.8 Guards.
Couplings and flexible connecting shafts shall be installed with a coupling guard in accordance with Section 8.7 of ANSI B15.1 B11.19, Safety Standard for Mechanical Power Transmission Apparatus Performance Requirements for Safeguarding.

Submitter Information Verification
Submitter Full Name: [Not Specified]
Organization: [Not Specified]
Street Address:
City:
State:
Zip:
Submittal Date: Tue Oct 01 16:13:03 EDT 2013

Committee Statement
Committee Statement: ANSI B15.1 has been superseded by ANSI B11.19, updated reference to ANSI standard.
Response Message:
Public Input No. 6-NFPA 20-2013 [Section No. 4.12.8]
**4.14.5** Piping, Hangers, and Seismic Bracing.

Pipe, fittings, hangers, and seismic bracing for the fire pump unit, including the suction and discharge piping, shall comply with the applicable requirements of the *NFPA 13, Standard for the Installation of Sprinkler Systems*.

**4.14.5.1** The support of pipe and fittings shall comply with the requirements of 9.1 and 9.2 in *NFPA 13*.

**4.14.5.2** The seismic protection, where applicable, of pipe and fittings shall comply with the requirements of 9.3 in *NFPA 13*.

**Supplemental Information**

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<td>New annex language for 4.13.5.</td>
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**Submitter Information Verification**

- **Submitter Full Name**: Chad Duffy
- **Organization**: National Fire Protection Assoc
- **Street Address**:  
- **City**:  
- **State**:  
- **Zip**:  
- **Submittal Date**: Thu Oct 17 09:35:58 EDT 2013

**Committee Statement**

Gravity and earthquake loads are handled separately in NFPA 13 and should be handled separately in other documents that reference the NFPA 13 criteria. In addition, items such as the fire pump unit have not been given consideration for appropriate protection criteria by the TC on Hanging and Bracing of Water-Based Fire Protection Systems. It would not be adequate to point to the information currently in NFPA 13.
A.4.13.5 Currently, NFPA 13 requirements do not address fire pumps, controllers, driver, fuel tanks (including the trim), test header piping, relief valve piping, or exhaust mufflers.
4.15.4.2
For multistage multiport pumps, a bypass shall be installed between the pump suction and the first outlet port and between sequential outlet ports wherever the bypass can provide pressure that is of material value without the impeller. (See Figure A.4.15.4.)
4.16.2
For multistage multiport pumps, the discharge components for each port shall consist of pipe, valves, and fittings extending from the pump port discharge flange to the system side of the discharge valve for that port.

Submitter Information Verification

Submitter Full Name: [ Not Specified ]
Organization: [ Not Specified ]
Street Address:
City:
State:
Zip:
Submittal Date: Tue Oct 01 16:19:39 EDT 2013

Committee Statement

Committee Statement: Part of multiple stage multiple port fire pump requirements not currently covered in NFPA 20.
Response Message:
Public Input No. 92-NFPA 20-2013 [New Section after 4.15.1]
4.16.10.1
Low suction throttling valves or variable speed suction limiting controls for pump drivers Suction pressure regulating valves that are listed for fire pump service and that are suction pressure sensitive shall be permitted where the authority having jurisdiction requires positive pressure to be maintained on the suction piping.

4.16.10.2
When a low suction throttling valve is used, it shall be installed according to manufacturers' recommendations in the piping between the pump and the discharge check valve.

4.16.10.3
The size of the low suction throttling the suction pressure regulating valve shall not be less than that given for discharge piping in Section 4.27 4.26.

4.16.10.4
The friction loss through a low suction throttling a suction pressure regulating valve in the fully open position shall be taken into account in the design of the fire protection system.

4.16.10.5
System design shall be such that the low suction throttling the suction pressure regulating valve is in the fully open position at the system design point and at 100 percent of rated flow.

Submitter Information Verification

Submitter Full Name: [Not Specified]
Organization: [Not Specified]
Street Address: [Not Specified]
City:
State:
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Submittal Date: Wed Oct 02 22:52:35 EDT 2013

Committee Statement

Committee Statement: Make terminology consistent with industry and FM Approval Guide. Variable speed pressure limiting components are not installed on the fire pump discharge piping. NFPA 20 requires operation and testing of a fire pump at the higher of the system demand or 100% of rated flow. The throttling valve must be fully open to accomplish this.

Response Message:

Public Input No. 14-NFPA 20-2013 [Section No. 4.15.9.5]
Public Input No. 16-NFPA 20-2013 [Section No. 4.15.9.1]
Public Input No. 20-NFPA 20-2013 [Sections 4.15.9.1, 4.15.9.2, 4.15.9.3, 4.15.9.4, 4.15.9.5]
4.19.1.3.1
Where a variable speed pressure limiting control is used, the pressure 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.

Submitter Information Verification

Submitter Full Name: [ Not Specified ]
Organization: [ Not Specified ]
Street Address:
City:
State:
Zip:
Submittal Date: Tue Oct 01 17:09:39 EDT 2013

Committee Statement

Committee Statement: Add new section 4.18.1.3.1. Instability of the variable speed pressure limiting control can occur when the pressure relief valve is set too close to the set pressure of the variable speed pressure limiting control.

Response Message:
Public Input No. 135-NFPA 20-2013 [New Section after 4.18.1.3]
**First Revision No. 21-NFPA 20-2013 [Section No. 4.18.7.1]**

**4.19.7.1**
Where a pressure relief valve has been piped back to suction, a circulation relief valve sized in accordance with **4.12.1.7 4.11.1.6** and **4.19.7** and discharged to atmosphere shall be provided downstream of the 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.

**Submitter Information Verification**
- **Submitter Full Name:** [Not Specified]
- **Organization:** [Not Specified]
- **Street Address:**
- **City:**
- **State:**
- **Zip:**
- **Submittal Date:** Tue Oct 01 17:26:04 EDT 2013

**Committee Statement**
- **Committee Statement:** The proposed text update is needed to help clarify the operation of the circulating relief valve.
- **Response Message:** Clarification of legislative language

**Public Input No. 27-NFPA 20-2013 [New Section after 4.18.7.1]**
**Public Input No. 98-NFPA 20-2013 [Section No. 4.18.7.1]**
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 at 104°F (40°C) from the engine inlet of the heat exchanger water supply shall be sent to the fire pump controller, and the controller shall stop the engine provided that as required by 11.2.4.4.8 is received, provided there are no active emergency requirements for the pump to run.

Submitter Information Verification

Submitter Full Name: [Not Specified]
Organization: [Not Specified]
Street Address: 
City: 
State: 
Zip: 
Submittal Date: Wed Oct 02 16:10:03 EDT 2013

Committee Statement

Committee Statement: To provide the requirements of the signal from the engine to support the requirements of 12.4.1.4(11). We are removing the prescriptive requirement of 104°F (40°C) and making it a performance based requirement of the engine manufacturer.

Response Message:
Public Input No. 179-NFPA 20-2013 [Section No. 4.18.7.2 [Excluding any Sub-Sections]]
4.20.1.2
Within 20 seconds after a demand to start, pumps in series shall supply and maintain a stable discharge pressure (±10 percent) throughout the entire range of operation.

4.20.1.2.1
The discharge pressure shall be permitted to be adjusted and restabilized whenever the flow condition changes.
### 4.20.2 Series Fire Pump Unit Arrangement.  

#### 4.20.2.1*  
Except as permitted by 4.20.2.2, all the pumps that are a part of a series fire pump unit shall be located within the same fire pump room.

#### 4.20.2.2  
Pumps that are a part of a series fire pump unit shall be permitted to be located in separate pump rooms where all the following conditions are met:

1. Each pump shall be arranged so that all pumps operating in series can be manually stopped or started from all pump rooms housing the series fire pumps.
2. The suction and discharge pressures from all pumps operating in series shall be displayed in all pump rooms housing the series fire pumps.
3. The alarms and signals shall be annunciated in the other pump rooms for all pumps that are a part of the series fire pump unit in accordance with 4.20.2.8 and 4.20.2.9.
4. The interconnect control wiring between the controllers in different pump rooms shall comply with 4.20.2.7 and 4.20.2.8.
5. A pump room communication system that shall comply with 4.20.2.9 and 4.20.2.10.

#### 4.20.2.3  
No more than three pumps shall be allowed to operate in series as a part of a series fire pump unit.

#### 4.20.2.4  
No more than two variable speed pumps shall be allowed to operate in series as a part of a series fire pump unit.

#### 4.20.2.5  
No pump in a series pump unit shall be shut down automatically for any condition of suction pressure.

#### 4.20.2.6  
No pressure reducing or pressure regulating valves shall be installed between fire pumps arranged in series as a part of a series fire pump unit.

#### 4.20.2.7  
The pressure at any point in any pump in a series fire pump unit, with all pumps running at shutoff and rated speed at the maximum static suction supply, shall not exceed any pump suction, discharge, or case working pressure rating.

### 4.20.2.8 Protection of Control Wiring for Series Fire Pump Units.

#### 4.20.2.8.1*  
Interconnected control wiring of fire pumps in series that are not located in the same room and that affect the starting of the supply (lower zone) pump(s) shall be protected against fire and physical damage in the same manner as power conductors described in NFPA 70, Article 695.

#### 4.20.2.8.1.1  
The motor on the supply (lower zone) pump(s) shall start on the opening of the control circuit (remote start) loop.

#### 4.20.2.8.1.2  
The installed controllers shall meet the requirements of 10.5.2.5 or 12.7.2.5 as applicable.

### 4.20.2.9 Status Signals for Series Fire Pump Units.

#### 4.20.2.9.1  
Audible and visual status signals shall be provided in each pump room indicating the status of the associated series pump(s) not located in the same pump room.
4.20.2.9.1.1
The following audible and visual signals shall be provided in each pump room for each series electric fire pump(s).

1) Pump running in accordance with 10.4.7.2.1
2) Phase loss in accordance with 10.4.7.2.2
3) Phase reversal in accordance with 10.4.7.2.3
4) Controller connected to alternative source in accordance with 10.4.7.2.4
5) Alternate circuit breaker open or tripped in accordance with 10.8.3.12.1
6) Low suction pressure — suction pressure more than 10 psi (0.68 bar) below the design suction pressure on any downstream series pump(s).

4.20.2.9.1.2
The following audible and visual signals shall be provided in each pump room for each series diesel fire pump(s).

1) Pump running in accordance with 12.4.3 (1)
2) Control switch in off or manual position in accordance with 12.4.2.3 (2)
3) Trouble on controller or engine in accordance with 12.4.3 (3)
4) Low suction pressure — suction pressure more than 10 psi (0.68 bar) below the design suction pressure on any downstream series pump(s).

4.20.2.9.2
Series fire pump controller(s) shall be provided with the extra contacts for remote indication in accordance with 4.20.2.9.1.1 or 4.20.2.9.1.2.

4.20.2.10
Communications for Series Fire Pump Units.
4.20.2.10.1
A two-way, in-building emergency services communications system in accordance with NFPA 72 shall be provided in each pump room where pumps in series are not located in the same room.

4.20.2.10.1.1
The communication system shall meet the survivability requirements of NFPA 72.
Statement: not located in the same pump room developed during the ROC stage last cycle. Removes the requirement that the pump suction needs to be flooded.

Response Message:
Public Input No. 8-NFPA 20-2013 [Section No. 4.19.2.1]
Public Input No. 26-NFPA 20-2013 [New Section after 4.19.2.4]
A.4.19.2.1 Where pumps are installed in series and are located in the same pump room, the discharge pressure from the second (or third) pump is typically at a pressure that is too high for the outlets on a fire sprinkler or standpipe system on the lower floors of the building. Rather than use this high discharge pressure with pressure reducing valves, it is a common, and accepted practice, to take the fire protection supply from the discharge of the preceding pump through a connection between that pump and subsequent pump(s) as shown in Figure A.4.19.2.1.
4.20.2.8 Protection of Control Wiring for Series Fire Pump Units.

4.20.2.8.1* Interconnected control wiring of fire pumps in series that are not located in the same room and that affect the starting of the supply (lower zone) pump(s) shall be protected against fire and physical damage in the same manner as power conductors described in NFPA 70, Article 695.

4.20.2.8.1.1 The motor on the supply (lower zone) pump(s) shall start on the opening of the control circuit (remote start) loop.

4.20.2.8.1.2 The installed controllers shall meet the requirements of 10.5.2.5 or 12.7.2.5 as applicable.

Supplemental Information

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<th>Description</th>
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Submitter Information Verification

Submitter Full Name: [Not Specified]
Organization: [Not Specified]
Street Address: [Not Specified]
City: [Not Specified]
State: [Not Specified]
Zip: [Not Specified]
Submittal Date: Wed Oct 02 07:28:11 EDT 2013

Committee Statement

Committee Statement: The revision incorporates the communication and connectivity requirements for pumps in series not located in the same pump room developed during the ROC stage last cycle.
A.4.19.2.8.1 The following methods should be considered acceptable:
(1) Be encased in a minimum 50 mm (2 in.) of concrete
(2) Be protected by a fire-rated assembly listed to achieve a minimum fire rating of 2 hours and dedicated to the fire pump circuit(s)
(3) Be a listed electrical circuit protective system with a minimum 2-hour fire rating
(4) Be protected by a listed fire-rated assembly that has a minimum fire rating of 2 hours and contains only emergency alarm and/or control wiring circuits dedicated to fire pumps or emergency systems generators or legally required generators, and no power wiring circuits
4.20.2.9 Status Signals for Series Fire Pump Units.

4.20.2.9.1 Audible and visual status signals shall be provided in each pump room indicating the status of the associated series pump(s) not located in the same pump room.

4.20.2.9.1.1 The following audible and visual signals shall be provided in each pump room for each series electric fire pump(s).

1. Pump running in accordance with 10.4.7.2.1
2. Phase loss in accordance with 10.4.7.2.2
3. Phase reversal in accordance with 10.4.7.2.3
4. Controller connected to alternative source in accordance with 10.4.7.2.4
5. Alternate circuit breaker open or tripped in accordance with 10.8.3.12.1
6. Low suction pressure — suction pressure more than 10 psi (0.68 bar) below the design suction pressure on any downstream series pump(s).

4.20.2.9.1.2 The following audible and visual signals shall be provided in each pump room for each series diesel fire pump(s).

1. Pump running in accordance with 12.4.3 (1)
2. Control switch in off or manual position in accordance with 12.4.2.3 (2)
3. Trouble on controller or engine in accordance with 12.4.3 (3)
4. Low suction pressure — suction pressure more than 10 psi (0.68 bar) below the design suction pressure on any downstream series pump(s).

4.20.2.9.2 Series fire pump controller(s) shall be provided with the extra contacts for remote indication in accordance with 4.20.2.9.1.1 or 4.20.2.9.1.2.

Submitter Information Verification

Submitter Full Name: [Not Specified]
Organization: [Not Specified]
Street Address:
City:
State:
Zip:
Submittal Date: Wed Oct 02 07:38:24 EDT 2013

Committee Statement

Committee Statement: The revision incorporates the communication and connectivity requirements for pumps in series not located in the same pump room developed during the ROC stage last cycle.
4.20.2.10 Communications for Series Fire Pump Units.

4.20.2.10.1 A two-way, in-building emergency services communications system in accordance with NFPA 72 shall be provided in each pump room where pumps in series are not located in the same room.

4.20.2.10.1.1 The communication system shall meet the survivability requirements of NFPA 72.

Submitter Information Verification

Submitter Full Name: [Not Specified]
Organization: [Not Specified]
Street Address:
City:
State:
Zip:
Submittal Date: Wed Oct 02 07:44:15 EDT 2013

Committee Statement

Committee Statement: The revision incorporates the communication and connectivity requirements for pumps in series not located in the same pump room developed during the ROC stage last cycle.
Response Message:
4.25.1
For pressure-actuated fire pumps, a means to maintain the pressure in the fire protection system shall be provided in accordance with one of the following:

1. A pressure maintenance (jockey) pump
2. A water mist positive displacement pumping unit in accordance with 8.5.7.2
3. Another approved means that is not the main fire pump

Submitter Information Verification

Submitter Full Name: [Not Specified]
Organization: [Not Specified]
Street Address: [Not Specified]
City: [Not Specified]
State: [Not Specified]
Zip: [Not Specified]
Submittal Date: Tue Oct 01 17:59:47 EDT 2013

Committee Statement

Committee Statement: Add new section 4.25.1 and renumber subsequent sections. The addition of new 4.25.1 clarifies in the standard that pressure maintenance is required for pressure-actuated fire pumps however, a pressure maintenance pump may not necessarily be required and that other forms of pressure maintenance may be used. This is supported by the annex language of A.4.25 which reads as follows: "Pressure maintenance (jockey or make-up) pumps should be used where it is desirable to maintain a uniform or relatively high pressure on the fire protection system".

Response Message:
Public Input No. 142-NFPA 20-2013 [New Section after 4.25.1]
4.27 Summary of Centrifugal Fire Pump Data.
The sizes indicated in Table 4.27(a), Table 4.26(a), and Table 4.27(b), Table 4.26(b) shall be used as a minimum.

### Table 4.27(a) Summary of Centrifugal Fire Pump Data (U.S. Customary)

<table>
<thead>
<tr>
<th>Pump Rating (gpm)</th>
<th>Minimum Pipe Sizes (Nominal) (in.)</th>
<th>Relief Valve Discharge</th>
<th>Meter Device</th>
<th>Number and Size of Hose Valves</th>
<th>Hose Header Supply</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Suction a,b,c</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>25</td>
<td>1</td>
<td>¾</td>
<td>1</td>
<td>1—1½</td>
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</table>

Notes:

1. The pressure relief valve shall be permitted to be sized in accordance with 4.18.2.1
2. The pressure relief valve discharge shall be permitted to be sized in accordance with 4.18.6.2
3. The flowmeter device shall be permitted to be sized in accordance with 4.19.2.2
4. The hose header supply shall be permitted to be sized in accordance with 4.19.3.4

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 4.14.3.4

c. Suction pipe sizes in Table 4.26(a), Table 4.27(a), and Table 4.26(b) are based on a maximum velocity at 150 percent rated capacity to 15 ft/sec (4.6 m/sec) in most cases.

### Table 4.27(b) Summary of Centrifugal Fire Pump Data (Metric)

<table>
<thead>
<tr>
<th>Pump Rating (L/min)</th>
<th>Minimum Pipe Sizes (Nominal) (mm)</th>
<th>Relief Valve Discharge</th>
<th>Meter Device</th>
<th>Number and Size of Hose Valves</th>
<th>Hose Header Supply</th>
</tr>
</thead>
<tbody>
<tr>
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<td>50</td>
<td>1—38</td>
</tr>
<tr>
<td>Pump Rating (L/min)</td>
<td>Minimum Pipe Sizes (Nominal) (mm)</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>---------------------</td>
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<td></td>
<td></td>
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</tr>
<tr>
<td></td>
<td>Suction&lt;sup&gt;a,b,c&lt;/sup&gt;</td>
<td>Discharge&lt;sup&gt;a&lt;/sup&gt;</td>
<td>Relief Valve</td>
<td>Relief Valve Discharge</td>
<td>Meter Device</td>
</tr>
</tbody>
</table>

Notes:

1. The pressure relief valve shall be is permitted to be sized in accordance with 4.18.2.1 4.19.2.1.

2. The pressure relief valve discharge shall be is permitted to be sized in accordance with 4.18.6.2 4.19.6.2.

3. The flow meter device shall be is permitted to be sized in accordance with 4.19.2.2 4.21.2.2.

4. The hose header supply shall be is permitted to be sized in accordance with 4.19.3.4 4.21.3.4.

<sup>a</sup>Actual diameter of pump flange is permitted to be different from pipe diameter.

<sup>b</sup>Applies only to that portion of suction pipe specified in 4.14.3.4 4.15.3.3.

<sup>c</sup>Suction pipe sizes in Table 4.26(a) and Table 4.26(b) Table 4.27(b) are based on a maximum velocity at 150 percent rated capacity to 15 ft/sec (4.6 m/sec) in most cases.

Submitter Information Verification

Submitter Full Name: [Not Specified]
Organization: [Not Specified]
Street Address: [Not Specified]
City: 
State: 
Zip: 
Submittal Date: Tue Oct 01 17:46:52 EDT 2013

Committee Statement

Committee Statement: Current references are incorrect.
Response Message:
Retroactive installation of a backflow prevention device shall not reduce the suction pressure below that permitted in this standard and accepted by the authority having jurisdiction.

Retroactive installation of a backflow prevention device shall not result in a discharge pressure that does not meet the maximum system demand.

Submitter Information Verification

Submitter Full Name: [ Not Specified ]
Organization: [ Not Specified ]
Street Address:
City:
State:
Zip:
Submittal Date: Wed Oct 02 07:56:26 EDT 2013

Committee Statement

Retrofit of backflow preventers is common on fire pump systems. When the backflow device is installed on the suction side, we need to make sure that the backflow device does not impair the fire pump and that the backflow device will not impair the fire protection system. When the backflow device is installed on the discharge side, we need to make sure that it does not impair the fire protection system. These same requirements are in other NFPA standards, but the scope of NFPA 20 keeps the suction and discharge piping out of the scope of other standards, so technically, they don't apply. Therefore, these requirements need to be included in NFPA 20 so that they apply whenever a backflow device is retrofitted on suction or discharge piping.

Response Message:

Public Input No. 59-NFPA 20-2013 [New Section after 4.27.4.5]
4.29 Earthquake Protection.

4.29.1 General.

Where water-based fire protection systems to be protected against damage from earthquakes, 4.29.2 and 4.29.3 shall apply.

4.29.1.1 Where local codes require fire protection systems to be protected from damage subject to earthquakes, 4.28.2 and 4.28.3 shall apply.

4.29.1.2 Horizontal seismic loads shall be based on NFPA 13, Standard for the Installation of Sprinkler Systems, SEI/ASCE 7, Minimum Design Loads for Buildings and Other Structures, local, state, or international codes, or other sources acceptable to the authority having jurisdiction.

4.29.2 Seismic Loads.

Horizontal seismic loads shall be determined in accordance with NFPA 13; SEI/ASCE 7, Minimum Design Loads for Buildings and Other Structures; local, state, or international codes; or other sources acceptable to the authority having jurisdiction.

4.29.3 Pump Driver and Controller.

The fire pump, driver, diesel fuel tank (where installed), and fire pump controller shall be attached to their foundations with materials capable of resisting lateral movement from horizontal applicable seismic loads.

4.29.3.1 Pumps with high centers of gravity, such as vertical in-line pumps, shall be mounted at their base and braced above their center of gravity.

4.29.3.2 Pumps with high centers of gravity, such as vertical in-line pumps, shall be mounted at their base and braced above their center of gravity.

4.29.3.3 Pipe and Fittings.

Pipe and fittings shall be protected in accordance with NFPA 13.

4.29.3.4 Appurtenances.

Seismic protection of appurtenances, including trim pieces, shall be required where they are essential for post-earthquake operation of the fire pump.

4.29.3.4.1 Where seismically protecting smaller diameter trim lines, restraint shall be sufficient.

4.29.4 Piping and Fittings.

Pipe and fittings shall be protected in accordance with NFPA 13.

4.29.4.2 Where the system riser is also a part of the fire pump discharge piping, a flexible pipe coupling shall be installed at the base of the system riser.

Supplemental Information

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Submitter Information Verification

Submitter Full Name: Chad Duffy
Organization: National Fire Protection Assoc
Street Address: 110 Station Street, Quincy, MA 02169-7471
<table>
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<th>Committee Statement</th>
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</thead>
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<tr>
<td>Committee Statement: Referencing NFPA 13 for guidance is useful for pipe and fittings. However, additional components need to be properly protected. It is important to provide further guidance on pumps with high centers of gravity as well as addressing many appurtenances that need to be protected in order for the fire pump to operate properly post-earthquake. NFPA 13 will be expanding the restraint table information in order to address ½-inch diameter lines that are frequent in the trim piping. Add new annex language see attached.</td>
</tr>
</tbody>
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<tr>
<th>Response Message:</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
</tr>
</tbody>
</table>
A.4.28.3.2 The bracing for these pumps will connect to the pump above its center of gravity. The other end of the bracing can connect to the floor or mounting structure for the pump.

A.4.28.3.3 The exhaust piping from diesel fire pumps can be handled with the criteria in NFPA 13, *Standard for the Installation of Sprinkler Systems*.

A.4.28.3.4.1 Hangers that offer lateral restraint on these smaller diameter trim lines should be sufficient.
The interior floor of a package pump house shall be of solid construction, with grading to provide for proper drainage for the fire pump components.

The interior floor shall be permitted to be provided with grouting in accordance with 4.30.8 or installed after the packaged pump house is set in place in accordance with 4.30.10.

The structural frame for a packaged pump house shall be mounted on an engineered footing designed to withstand the live loads of the packaged unit and the applicable wind loading requirements.

The foundation footings of a package pump house shall include the necessary anchor points required to secure the package to the foundation.

A highly skid-resistant, solid structural plate floor with grout holes shall be permitted to be used where protection from corrosion and drainage is provided for all incidental pump room spillage or leakage.
4.31.1 Every multistage multiport pump for each discharge port shall have its own individual pressure sensing line connected to the fire pump controller.

4.31.1.1 The pressure maintenance pump controller for each discharge port shall have its own individual pressure sensing line.
First Revision No. 38-NFPA 20-2013 [Section No. 4.30.4.1]

4.31.4.1
Where the requirements of 4.31.4.2 [4.30.4.2] are not met, there shall be two bronze or stainless steel check valves shall be installed in the pressure sensing line at least 5 ft (1.52 m) apart with a nominal 0.09375 \( \frac{1}{32} \) in. (2.4 mm) hole drilled in the bronze or stainless steel clapper to serve as dampening.

[See Figure A.4.31(a) Figure A.4.30(a) and Figure A.4.31(b) Figure A.4.30(b).]

Submitter Information Verification

Submitter Full Name: [Not Specified]
Organization: [Not Specified]
Street Address: [Not Specified]
City: [Not Specified]
State: [Not Specified]
Zip: [Not Specified]
Submittal Date: Wed Oct 02 08:13:40 EDT 2013

Committee Statement

Committee Statement: A bronze check valve with a bronze clapper is needed to minimize corrosion which narrow or close the orifice. Added stainless steel as an appropriate material. Change the decimal reference to a fraction, fractions are the commonly referenced term in the industry.

Response Message:
4.31.4.2
Where the water is clean, ground-face unions with noncorrosive diaphragms drilled with a nominal 0.09375\(\frac{3}{32}\) in. (2.4 mm) orifice shall be permitted in place of the check valves.

Submitter Information Verification

Submitter Full Name: Chad Duffy
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Street Address: 
City: 
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Submittal Date: Mon Oct 21 13:49:23 EDT 2013

Committee Statement

Committee Statement: Change the decimal reference to a fraction, fractions are the commonly referenced term in the industry.
Response Message:
4.32 Break Tanks.
Where a break tank is used to provide the pump suction water supply, the installation shall comply with Section 4.31 NFPA 22.

4.32.1 Application.
Break tanks shall be used for one or more of the following reasons:

1. As a backflow prevention device between the water supply and the fire pump suction pipe
2. To eliminate fluctuations in the water supply pressure and provide a steady suction pressure to the fire pump
3. To provide a quantity of stored water on site where the normal water supply will not provide the required quantity of water required by the fire protection system

4.32.2 Break Tank Size.
The tank shall be sized for a minimum duration of 15 minutes with the fire pump operating at 150 percent of rated capacity.

4.32.3 Refill Mechanism.
The refill mechanism shall be listed and arranged for automatic operation.

4.32.3.1 If the break tank capacity is less than the maximum system demand for 30 minutes, the refill mechanism shall meet the requirements in 4.32.3.1.1 through 4.32.3.1.5.

4.32.3.1.1 Dual automatic refill lines, each capable of refilling the tank at a minimum rate of 150 percent of the fire pump(s) capacity, shall be installed.

4.32.3.1.2 If available supplies do not permit refilling the tank at a minimum rate of 150 percent of the rated pump capacity, each refill line shall be capable of refilling the tank at a rate that meets or exceeds 110 percent of the maximum fire protection system design flow.

4.32.3.1.3 A manual tank fill bypass designed for and capable of refilling the tank at a minimum rate of 150 percent of the fire pump(s) capacity shall be provided.

4.32.3.1.4 If available supplies do not permit refilling the tank at a minimum rate of 150 percent of the rated pump capacity, the manual fill bypass shall be capable of refilling the tank at a rate that meets or exceeds 110 percent of the maximum fire protection system design flow.

4.32.3.1.5 A local visible and audible low liquid level signal shall be provided in the vicinity of the tank fill mechanism.

4.32.3.2 If the break tank is sized to provide a minimum duration of 30 minutes of the maximum system demand, the refill mechanism shall meet the requirements in 4.32.3.2.1 and 4.32.3.2.2.

4.32.3.2.1 The refill mechanism shall be designed for and capable of refilling the tank at 110 percent of the rate required to provide the total fire protection system demand \[110 \times (\text{total demand} - \text{tank capacity}) / \text{duration}\].

4.32.3.2.2 A manual tank fill bypass shall be designed for and capable of refilling the tank at 110 percent of the rate required to provide the total fire protection system demand \[110 \times (\text{total demand} - \text{tank capacity}) / \text{duration}\].
4.32.3.3
The pipe between the municipal connection and the automatic fill valve shall be installed in accordance with NFPA 24, Standard for the Installation of Private Fire Service Mains and Their Appurtenances.

4.32.3.4
The automatic filling mechanism shall be maintained at a minimum temperature of 40°F (4.4°C).

4.32.3.5
The automatic filling mechanism shall activate a maximum of 6 in. (152 mm) below the overflow level.

4.32.4 Installation Standard.
The break tank shall be installed in accordance with NFPA 22, Standard for Water Tanks for Private Fire Protection.

Submitter Information Verification

Submitter Full Name: [Not Specified]
Organization: [Not Specified]
Street Address: [Not Specified]
City:
State:
Zip:
Submittal Date: Wed Oct 02 08:16:34 EDT 2013

Committee Statement

Committee Statement: The requirements for Break Tanks has been picked up in the 2013 edition of NFPA 22 and should be removed from NFPA 20.
Response Message: Public Input No. 94-NFPA 20-2013 [Section No. 4.31]
5.5 Auxiliary Power.
Where electric motors are used and the height of the structure is beyond the pumping capability of the fire department apparatus, a reliable emergency source of power in accordance with Section 9.6 shall be provided for the fire pump installation.

Submitter Information Verification
Submitter Full Name: [ Not Specified ]
Organization: [ Not Specified ]
Street Address:
City:
State:
Zip:
Submittal Date: Wed Oct 02 09:01:29 EDT 2013

Committee Statement
Committee Statement: Eliminating the structure height aligns NFPA 20 with 101 and 5000 requirements but the committee did not see a reason to require the pressure maintenance pump to be on auxiliary power as it is not a required system component and therefore is not an essential part of the system.

Response Message:
Public Input No. 65-NFPA 20-2013 [Section No. 5.5]
5.6.1.4
Each refill valve shall be sized and arranged to independently supply the system fire protection demand refill the tank in a maximum time of 8 hours.

Submitter Information Verification
Submitter Full Name: [ Not Specified ]
Organization: [ Not Specified ]
Street Address:
City:
State:
Zip:
Submittal Date: Wed Oct 02 13:05:48 EDT 2013

Committee Statement
Committee Statement: The current requirement to supply the system demand is very impractical and it is excessive. This water supply requirement, calls for the refilling a water storage tank as quickly as the water would be used during a fire. This defeats the whole purpose of installing a water storage/suction tank, as the reason for using one, (with a volume equal to the fire protection demand), would be because of the difficulty in getting a sufficient water flow rate up to those high elevations. As per NFPA 14, the “system demand” is the “flow rate and residual pressure required …”. Therefore, in a fully sprinklered building, with three or more risers, the required standpipe system flow rate would be 1000 gpm, so NFPA 20 is mandating a 1000 gpm water refill rate. If the water supply was sufficient to supply a demand such as that, there would be no need for a water storage/pump suction tank. Instead, a fire pump could just be connected in series to the fill lines. If it is within their scope (which seems doubtful), and the committee believes that the refill time for very tall buildings must be less than the 8 hours allowed by NFPA 22, they should determine a minimum time. Alternately, if the committee would like a minimum pipe size for the fill lines, they should determine the minimum size. However a storage tank refill rate should not be expected to be as excessively large as the "system fire protection demand", which could be as large as 1000 gpm for the required standpipe system.

Response Message:
6.2.1.1 Each discharge outlet in a multistage multiport pump shall furnish not less than 150 percent of rated capacity at not less than 65 percent of total rated head. (See Figure A.6.2.)

Submitter Information Verification

Submitter Full Name: [Not Specified]
Organization: [Not Specified]
Street Address: 
City: 
State: 
Zip: 
Submital Date: Wed Oct 02 08:19:45 EDT 2013

Committee Statement

Committee Statement: Part of multiple stage multiple port fire pump requirements
Response Message: 
Public Input No. 84-NFPA 20-2013 [New Section after 6.2.1]
6.2.2.1
For each discharge outlet in a multistage multiport pump, the shutoff head shall not exceed 140 percent of rated head for any type pump. (See Figure A.6.2.)
First Revision No. 67-NFPA 20-2013 [Section No. 6.5.1.1]

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Supplemental Information

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Submitter Information Verification

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Committee Statement

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<td>Response Message:</td>
<td>Public Input No. 165-NFPA 20-2013 [Sections 6.5.1.1, 6.5.1.2]</td>
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</table>
A.6.5.1.2 The listing information includes critical requirements for proper use and installation including whether the coupling or connecting shaft is listed for use with only electric motor or diesel engine drivers, or both electric motor and diesel engine drivers.
7.1.1* Suitability Application
Where the water supply is located below the discharge flange centerline and the water supply pressure is insufficient for getting to deliver the water to the fire pump, a vertical shaft turbine–type pump shall be used.

Committee Statement
Committee Statement: Consistency with Section 6.1.2. If the Committee prefers “suitability” then revise Section 6.1.2. It should be noted that Chapter 8 uses both suitability and application and the statement in Chapter 7 seems to be more closely related to the application statement in Chapter 8.

Response Message:
Public Input No. 61-NFPA 20-2013 [Section No. 7.1.1]
7.1.2 Characteristics \( \text{Factory and Field Performance} \)

7.1.2.1 Pumps shall furnish not less than 150 percent of rated capacity at a total head of not less than 65 percent of the total rated head. (See Figure A.6.2.)

7.1.2.2 The total shutoff head shall not exceed 140 percent of the total rated head on vertical turbine pumps. (See Figure A.6.2.)

7.1.2.3 The vertical turbine–type pump shall be designed to operate in a vertical position with all parts in correct alignment.

Submitter Information Verification

Submitter Full Name: Chad Duffy
Organization: National Fire Protection Assoc
Street Address:
City:
State:
Zip:
Submittal Date: Mon Oct 21 14:08:36 EDT 2013

Committee Statement

Committee Statement: Consistency with 6.2. If the Committee prefers "Characteristics", then revise 6.2.
Response Message:
Public Input No. 62-NFPA 20-2013 [Section No. 7.1.2]
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<td>The vertical turbine-type pump shall be designed to operate in a vertical position with all parts in correct alignment.</td>
</tr>
</tbody>
</table>

### Submitter Information Verification

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<th>[ Not Specified ]</th>
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<td>[ Not Specified ]</td>
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<tr>
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<td></td>
</tr>
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<td>Submittal Date:</td>
<td>Wed Oct 02 22:11:54 EDT 2013</td>
</tr>
</tbody>
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### Committee Statement

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</thead>
<tbody>
<tr>
<td>This requirement is currently located in Section 7.2.3 for “Well Construction”. A more suitable location for the text is in the more “General” Section 7.1.2 for “Characteristics” of a vertical shaft turbine-type pump. Renumber section 7.2.3 accordingly.</td>
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</table>

<table>
<thead>
<tr>
<th>Response Message:</th>
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</tbody>
</table>
First Revision No. 99-NFPA 20-2013 [ Section No. 7.5.1.8.1 ]

7.5.1.8.1
Unless the requirements of 7.5.1.4 are met, engines shall be connected to vertical shaft pumps by means of a right-angle gear drive with a listed flexible connecting shaft, which will prevent undue strain on both the engine and the gear drive.

7.5.1.8.2
The flexible connecting shaft shall be listed for this diesel fire pump service.

7.5.1.8.3
The operating angle for the flexible connecting shaft shall not exceed the limits specified by the manufacturer for the speed and horsepower transmitted under any static or operating conditions.

7.5.1.8.4
The requirements of 7.5.1.8.1 shall not apply to diesel engines and steam turbines designed and listed for vertical installation with vertical shaft turbine-type pumps, which shall be permitted to employ solid shafts, shall not require a right-angle drive, but shall require a non-reverse ratchet.

Submitter Information Verification
Submitter Full Name: [ Not Specified ]
Organization: [ Not Specified ]
Street Address:
City:
State:
Zip:
Submittal Date: Wed Oct 02 23:14:40 EDT 2013

Committee Statement
Committee Statement: There are no new requirements proposed in any of the proposed changes, only relocation of requirements to provide improved clarity and user friendliness. New par. Numbers as shown above. 6.5.1.1 Relocation requirements from 11.2.3.1.1 to provide a single place in the standard defining the coupling requirement for separately coupled pumps. 6.5.1.2 Modified to provide more clarity of listing requirements of flexible couplings and flexible connecting shafts for electric motor or diesel pump drivers. 7.5.1.8.1 Relocation of requirements from Chapter 11 to Chapter 7 where other vertical turbine pump drive requirements are located. 7.5.1.8.2 Renumber. Plus change text for clarity. 7.5.1.8.3 Renumber. 11.2.3.1 This section now applies to the engine power take-off connection for all types of pumps. 11.2.3.1.1 Provide clarity that this requiremetn does not apply to vertical shaft engines that area are allowed for VT pumps, and add torsional damping coupling which is a requirement of 7.5.1.6.4.

Response Message:
Public Input No. 166-NFPA 20-2013 [Sections 7.5.1.8.1, 7.5.1.8.2]
Committee Statement:

Adding allowance for safety relief valve to be piped to tank return line since tank connections are often limited. Revision to annex material required to correlate code material and annex material. See new annex details.

Response Message:

Public Input No. 103-NFPA 20-2013 [Section No. 8.5.3]
Public Input No. 104-NFPA 20-2013 [New Section after 8.5.3]
Public Input No. 105-NFPA 20-2013 [New Section after 8.5.3]
8.5.4* Relief Valves for Water Mist Pumps.

8.5.4.1 For Except as provided in 8.5.4.2, safety relief valves on positive displacement water mist pumps shall discharge to a drain or to a water supply at atmospheric pressure.

8.5.4.2 A means of preventing overheating shall be provided when the relief valve is plumbed safety relief valve shall be permitted to discharge into the pump suction where conditions meet both of the following:

1. A means is provided to prevent overheating.
2. The safety relief valve and pump driver are sized to accommodate the back pressure in the pump suction.

Submitter Information Verification

Submitter Full Name: Chad Duffy
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Submittal Date: Thu Oct 17 09:14:01 EDT 2013

Committee Statement

Committee Statement: The revised text eliminates conflict between 8.5.4.1 and 8.5.4.2 and provides criteria for situations where the relief valve is piped back to the pump suction.
First Revision No. 146-NFPA 20-2013 [ Section No. 9.2.3 ]

9.2.3
For fire pump installations using the arrangement of 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 disconnecting means and associated overcurrent protection device shall be installed in the power supply to the fire pump controller.

9.2.3.1
Where the disconnecting means permitted by 9.2.3 is installed, the disconnecting means shall meet all of the following requirements:

(1) They shall be identified as being suitable for use as service equipment.
(2) They shall be lockable in both the closed position and the open position.
(3)* They shall be located remote from other building disconnecting means.
(4)* They shall be located remote from other fire pump source disconnecting means.
(5) They shall be marked “Fire Pump Disconnecting Means” in letters that are no less than 1 in. (25 mm) in height and that can be seen without opening enclosure doors or covers.

9.2.3.2
Where the disconnecting means permitted by 9.2.3 is installed, a placard shall be placed adjacent to the fire pump controller stating the location of this disconnecting means and the location of any key needed to unlock the disconnect.

9.2.3.3
Where the disconnecting means permitted by 9.2.3 is installed, the disconnect shall be supervised in the closed position by one of the following methods:

(1) Central station, proprietary, or remote station signal device
(2) Local signaling service that will cause the sounding of an audible signal at a constantly attended location
(3) Locking the disconnecting means in the closed position
(4) Sealing of Where the disconnecting means and approved weekly recorded inspections where the disconnecting means are located within fenced enclosures or in buildings under the control of the owner, sealing the disconnecting means and performing approved weekly recorded inspections

9.2.3.4
Where the overcurrent protection permitted by 9.2.3 is installed, the overcurrent protection device shall be rated to carry indefinitely the sum of the locked rotor current of the largest pump motor and the full-load current of all of the other pump motors and accessory equipment.

9.2.3.4.1
Alternatively, compliance with 9.2.3.4 shall be based on an assembly listed for fire pump service complying with 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) Trip point for circuit breakers shall not be field adjustable.

9.2.3.4.2
Overcurrent Device Selection
An instantaneous trip circuit breaker shall be permitted in lieu of the overcurrent devices specified in 9.8.2.2 (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

* They shall be located remote from other fire pump source disconnecting means.
Committee Statement

The term “Listed fire pump power transfer switch assembly” was added to Appendix A of the 2013 Edition of NFPA 20, but not referred to in the body of the standard. Reference Figure A.10.8, Arrangement II. The intent was to recognize the use of a fire pump power transfer switch assembly which could include an isolating switch and overcurrent protection for the transfer switch in the same enclosure as the transfer switch. As a fire pump transfer switch is required to be located in the pump room, the overcurrent protection and isolating switch, when provided as part of the transfer switch assembly, would not be remote from the fire pump controller. When the subject of a transfer switch assembly was discussed during the last code cycle, it was anticipated that the overcurrent protection and isolating switch, when provided as part of the transfer switch assembly, would not be the one disconnecting means and associated overcurrent protection device permitted by 9.2.3. In order to allow an additional disconnecting means and associated overcurrent protection device to be remote from the pump room in such installations, the added text is necessary. The addition of section 9.2.3.4.2 reflects NEC CMP-13 Comment actions 13-37, Log #434 pertaining to (695.3 (F)).

Response Message:

Public Input No. 128-NFPA 20-2013 [New Section after 9.2.3.4.1]
Public Input No. 131-NFPA 20-2013 [Section No. 9.2.3]
Public Input No. 160-NFPA 20-2013 [Section No. 9.2.3.1]
Public Input No. 162-NFPA 20-2013 [New Section after 9.2.3.4.1]
9.3.1

Except for an **unless** there is an **installed** power arrangement as described in 9.3.3, at least one **alternative** source of power shall be provided for high-rise buildings or where the height of the structure is beyond the pumping capacity of the fire department apparatus.

Submitter Information Verification

Submitter Full Name: Chad Duffy  
Organization: National Fire Protection Assoc  
Street Address:  
City:  
State:  
Zip:  
Submittal Date: Mon Oct 21 14:46:54 EDT 2013

Committee Statement

Committee: Coordination with NFPA 101 and NFPA 5000 and the Public Input submitted on Section 5.5.  
Response Message: Public Input No. 66-NFPA 20-2013 [Section No. 9.3.1]
9.5.1.1
All motors shall comply with NEMA MG-1, *Motors and Generators*, and shall be marked as complying with NEMA Design B standards for three-phase motors or NEMA Design N or L standards for single-phase motors, and shall be specifically listed for fire pump service. *(See Table 9.5.1.1(a) Table 9.5.1.1(b), and Table 9.5.1.1(c).)*

Table 9.5.1.1(a) Horsepower and Locked Rotor Current Motor Designation for Three-Phase NEMA Design B Motors

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* Locked rotor current values are maximums.

Table 9.5.1.1(b) Horsepower and Locked Rotor Current Motor Designation for Single Phase NEMA Design N and L Motors

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<th>Locked Rotor Current Single-Phase</th>
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1/13/2014 1:38 PM
Table 9.5.1.1(c) Horsepower and Locked Rotor Current Motor Designation for Three-Phase, 380 V, 50 Hertz, NEMA Design B Motors

<table>
<thead>
<tr>
<th>Rated Horsepower</th>
<th>Locked Rotor Current Single-Phase 115 V at 60 Hertz (A)*</th>
<th>Locked Rotor Current Single-Phase 230 V at 60 Hertz (A)*</th>
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</table>

*Locked rotor current values are maximums.

Table 9.5.1.1(c) Horsepower and Locked Rotor Current Motor Designation for Three-Phase, 380 V, 50 Hertz, NEMA Design B Motors

<table>
<thead>
<tr>
<th>Rated Horsepower</th>
<th>Locked Rotor Current Three-Phase 380 V at 50 Hertz (A)*</th>
<th>Motor Designation (NFPA 70 Locked Rotor Indicating Code Letter) “F” to and Including</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>20</td>
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<tr>
<td>1 1/4</td>
<td>27</td>
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<td>84</td>
<td>J</td>
</tr>
<tr>
<td>10</td>
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<td>60</td>
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<td>75</td>
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<td>125</td>
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<tr>
<td>150</td>
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</tr>
<tr>
<td>500</td>
<td>5069</td>
<td>H</td>
</tr>
</tbody>
</table>

*Locked rotor current values are maximums.

9.5.1.1.1

Single-phase motors shall be used only in across-the-line starting applications.
Supplemental Information

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Submitter Information Verification

Submitter Full Name: [ Not Specified ]
Organization: [ Not Specified ]
Street Address: 
City: 
State: 
Zip: 
Submittal Date: Thu Oct 03 00:10:31 EDT 2013

Committee Statement

Committee Statement: Revise section 9.5.1.1, add new section 9.5.1.1.1 and insert new tables 9.5.1.1(a), 9.5.1.1(b) and 9.5.1.1(c). Complies with NEMA MG-1. Added 380 50 HZ and Code letters, LRC values are Maximum.

Response Message:

Public Input No. 157-NFPA 20-2013 [Section No. 9.5.1.1]
Table 9.5.1.1 (a) Horsepower and Locked Rotor Current Motor Designation for Three Phase NEMA Design B Motors

<table>
<thead>
<tr>
<th>Rated Horsepower</th>
<th>Locked Rotor Current Three-Phase 460 230 V at 60 Hertz (A)</th>
<th>Motor Designation (NFPA 70, Locked Rotor Indicating Code Letter) “F” to and Including</th>
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<td>10</td>
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<td>Rated Horsepower</td>
<td>Locked Rotor Current Single Phase 115 V at 60 Hertz (A)</td>
<td>Locked Rotor Current Single Phase 230 V at 60 Hertz (A)</td>
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*a Locked rotor current values are maximums.
Table 9.5.1.1 (c) Horsepower and Locked Rotor Current Motor Designation for Three Phase, 380 V, 50 Hertz, NEMA Design B Motors

<table>
<thead>
<tr>
<th>Rated Horsepower</th>
<th>Locked Rotor Current Three-Phase 380 V at 50 Hertz (A)(a)</th>
<th>Motor Designation (NFPA 70 Locked Rotor Indicating Code Letter) “F” to and Including</th>
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<td>500</td>
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<td></td>
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*a Locked rotor current values are maximums.*
9.6.5* Protective Devices.

Protective devices installed in the on-site power source circuits at the generator shall allow instantaneous pickup of the full pump room load and shall comply with *NFPA 70*, *National Electrical Code*, Section 700.27.

9.6.5.1 Protective devices installed in the on-site power source circuits at the generator shall allow instantaneous pickup of the full pump room load and shall comply with *NFPA 70*, Section 700.27.

9.6.5.2 Circuit breakers shall have supervision by remote monitoring.

9.6.5.3 The fire pump circuit breaker shall not be required to be coordinated with the generator power source protective device provided it is used as a branch circuit breaker and is coordinated with all other line side protective devices.

Submitter Information Verification

Submitter Full Name: [Not Specified]
Organization: [Not Specified]
Street Address:
City:
State:
Zip:
Submittal Date: Wed Oct 02 10:24:30 EDT 2013

Committee Statement

Committee Statement: This makes the installation much safer as it is very easy for a shunt-trip breaker to accidentally be placed in the "tripped" condition.

Response Message:
Public Input No. 115-NFPA 20-2013 [Section No. 9.6.5]
Public Input No. 143-NFPA 20-2013 [Section No. 9.6.5]
9.7 Junction Boxes.
Where fire pump wiring to or from a fire pump controller is routed through a junction box, the following requirements shall be met:

1. The junction box shall be securely mounted.

2. Mounting and installation of a junction box shall not violate the enclosure type rating of the fire pump controller(s).

3. Mounting and installation of a junction box shall not violate the integrity of the fire pump controller(s) and shall not affect the short circuit rating of the controller(s).

4. As a minimum, a Type 2, dripproof enclosure (junction box) shall be used. The enclosure shall be listed to match the fire pump controller enclosure type rating.

5. Terminals, junction blocks, and splices, where used, shall be listed.

6. Neither a fire pump controller nor a fire pump power transfer switch, where provided, shall not be used as a junction box to supply other equipment, including a pressure maintenance (jockey) pump(s). (See 10.3.4.5.1 and 10.3.4.6.)

7. Neither a fire pump controller nor a fire pump power transfer switch shall be used as a junction box for wire splices.

Submitter Information Verification

Submitter Full Name: [Not Specified]
Organization: [Not Specified]
Street Address:
City:
State:
Zip:
Submittal Date: Wed Oct 02 10:37:07 EDT 2013

Committee Statement

Committee Statement: A junction box is the proper location to splice wires, not the fire pump controller or transfer switch controller. There isn't enough wire bending space for this and the additional cables may interfere with the maintenance and repair of the controller.

Response Message:
Public Input No. 144-NFPA 20-2013 [Section No. 9.7]
First Revision No. 51-NFPA 20-2013 [Section No. 9.9.5]

9.9.5
Where the raceway (conduit) between the controller and motor is not capable of conducting ground fault current sufficient to trip the circuit breaker when a ground fault occurs, a separate equipment grounding conductor shall be installed between the controller and motor.

Submitter Information Verification

Submitter Full Name: [Not Specified]
Organization: [Not Specified]
Street Address:
City:
State:
Zip:
Submittal Date: Wed Oct 02 10:43:10 EDT 2013

Committee Statement

Committee Statement: Clause 9.9.5 was added to NFPA 2013 at the Comment stage of the process. Subsequently, I submitted a proposal for the 2014 NEC to include this same requirement in Article 695 which covers electrical installation requirements for fire pumps. At the ROP meeting, Code Panel 13 decided this requirement was not enforceable since there is no way for an AHJ to determine when a raceway (conduit) between the controller and motor is not capable of conducting ground fault current sufficient to trip the circuit breaker when a ground fault occurs. The Panel modified the proposal to require an equipment grounding conductor in all installations between the controller and motor (redundant grounding). The panel substantiated that if conducting ground fault current may be a concern with any installation, mandating the use of an equipment grounding conductor will remove that concern. At the ROC meeting, the Panel reversed its position and decided there is insufficient substantiation to require redundant grounding and decided to make no changes to Article 695 for the 2014 NEC. Based on the actions of Code Panel 13, it is proposed to delete 9.9.5. Further to this subject, it is questionable whether this requirement belongs in NFPA 20 as NEC Article 695 has responsibility for electrical installation requirements for fire pumps.

Response Message:
Public Input No. 130-NFPA 20-2013 [Section No. 9.9.5]
10.3.4.5.3
Except as provided in 4.20.2.3, remote shutdown or interlock to prevent normal operation shall not be permitted unless approved by the authority having jurisdiction.

Submitter Information Verification

Submitter Full Name: [Not Specified]
Organization: [Not Specified]
Street Address:
City:
State:
Zip:
Submit Date: Wed Oct 02 10:51:19 EDT 2013

Committee Statement

Committee Statement:
This has always been the intent of the committee based on past action, but is not stated anywhere in the standard. The acceptance reference, references the newly proposed 4.19.2.2.

Response Message:
Public Input No. 145-NFPA 20-2013 [New Section after 10.3.4.5.2]
First Revision No. 126-NFPA 20-2013 [Sections 10.5.2.1.1.1, 10.5.2.1.1.2]

10.5.2.1.1.1
A pressure-actuated switch or electronic pressure sensor having adjustable high- and low-calibrated set-points shall be provided as part of the controller.

10.5.2.1.1.2
For multistage multiport pumps, a separate pressure-actuated switch or electronic pressure sensor as described in 10.5.2.1.1.1 shall be provided as part of the controller having adjustable high- and low-calibrated set-points for each discharge port of the pump as part of the controller.

10.5.2.1.1.3
The requirements of 10.5.2.1.1.1 and 10.5.2.1.1.2 shall not apply in a nonpressure non-pressure-actuated controller, where the pressure-actuated switch shall not be required.

Submitter Information Verification

Submitter Full Name: Chad Duffy
Organization: National Fire Protection Assoc
Street Address: 
City: 
State: 
Zip: 
Submittal Date: Thu Oct 17 14:54:18 EDT 2013

Committee Statement

Committee Statement: This requirement is part of the addition of multistage multiport pumps to the standard, providing requirements for the pressure sensing arrangement.

Response Message:
First Revision No. 53-NFPA 20-2013 [ New Section after 10.5.2.1.2 ]

10.5.2.1.3*
Where an electronic pressure sensor is used to automatically control fire pump operation, the fire pump controller shall monitor the transducer during automatic testing.

10.5.2.1.3.1*
Where the transducer pressure reading exceeds 10 psi (0.68 bar) during any automatic pump start that was initiated by the solenoid drain valve, as required by 10.5.2.1.8.3, the controller shall activate a visual and audible alarm, that can be silenced.

10.5.2.1.3.2*
Where an electronic pressure sensor is used to control fire pump operation, the fire pump controller shall monitor for and provide a signal for the following electronic pressure sensor conditions:

1. Any time the transducer output is less than 10 percent of rated span or below its rated zero pressure output
2. Any time the pressure transducer reading is more than 10 percent above its rated full-scale output

Supplemental Information

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Submitter Information Verification

Submitter Full Name: [ Not Specified ]
Organization: [ Not Specified ]
Street Address:
City:
State:
Zip:
Submittal Date: Wed Oct 02 11:09:22 EDT 2013

Committee Statement

Committee Statement: Monitor electric pressure transducers for drifting, which over time has been a proven problem.
Response Message: Renumber following sections. See attached annex language for further guidance.

Public Input No. 22-NFPA 20-2013 [New Section after 10.5.2.1.7.6]
Public Input No. 24-NFPA 20-2013 [New Section after A.4.10.2]
Public Input No. 146-NFPA 20-2013 [New Section after 10.5.2.1.2]
Public Input No. 147-NFPA 20-2013 [New Section after A.10.5.2.1]
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.

Submitter Information Verification

Submitter Full Name: [ Not Specified ]
Organization: [ Not Specified ]
Street Address: [ Not Specified ]
City: [ Not Specified ]
State: [ Not Specified ]
Zip: [ Not Specified ]

Committee Statement

Committee Statement: Personnel safety and maintenance of premise fire protection.
Response Message: [ Not Specified ]
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  In a non-pressure-actuated controller, the automatic testing shall be permitted to be initiated by a means other than a solenoid valve.

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

---

**Submitter Information Verification**

- **Submitter Full Name:** [Not Specified]
- **Organization:** [Not Specified]
- **Street Address:**
- **City:**
- **State:**
- **Zip:**
- **Submittal Date:** Wed Oct 02 12:19:16 EDT 2013

**Committee Statement**

**Committee Statement:** Section 10.5.2.7 has been revised to clarify that automatic starting and shutdown are permitted for testing purposes. Monitor electric pressure transducers for drifting, which over time has been a proven problem.

**Response Message:** Public Input No. 148-NFPA 20-2013 [New Section after 10.5.2.6.3]
### Manual Testing of Automatic Operation

1. **Manual Testing of Automatic Operation.**
2. **The controller shall be arranged to manually start the motor by opening the solenoid valve drain when so initiated by the operator.**
3. **For a non-pressure-actuated controller, the manual test shall be permitted to be initiated by a means other than a solenoid valve.**

---

**Submitter Information Verification**

- **Submitter Full Name:** [Not Specified]
- **Organization:** [Not Specified]
- **Street Address:**
- **City:**
- **State:**
- **Zip:**
- **Submittal Date:** Wed Oct 02 12:18:43 EDT 2013

**Committee Statement**

- **Committee Statement:** Monitor electric pressure transducers for drifting, which over time which has been a proven problem.
- **Response Message:**

  **Public Input No. 149-NFPA 20-2013 [New Section after 10.5.3.2.4]**
First Revision No. 59-NFPA 20-2013 [Section No. 10.5.4.2]

10.5.4.2 Automatic Shutdown After Automatic Start.
Where provided, automatic shutdown after automatic start shall comply with the following:

Unless the requirements of 10.5.4.2 (3) are met, automatic shutdown shall be permitted only where the controller is arranged for automatic shutdown after all starting and running causes have returned to normal.

A running period timer set for at least 10 minutes running time shall be permitted to commence at initial operation.

The requirements of 10.5.4.2 (1) shall not apply and automatic shutdown shall not be permitted where the pump constitutes the sole supply of a fire sprinkler or standpipe system or where the authority having jurisdiction has required manual shutdown.

Automatic shutdown shall not be permitted if starting and running causes are present.

10.5.4.2.1 Automatic shutdown shall be permitted only in the following circumstances:

(1) During automatic testing in accordance with 10.5.2.7

(2) Where approved by the authority having jurisdiction for non-testing conditions

10.5.4.2.2 Where automatic shutdown after automatic start is permitted, a minimum run timer set for at least 10 minutes shall be used.

Submitter Information Verification

Submitter Full Name: [Not Specified]
Organization: [Not Specified]
Street Address:
City:
State:
Zip:
Submittal Date: Wed Oct 02 12:24:16 EDT 2013

Committee Statement

Committee Statement: Section 10.5.4.2 has been revised to clarify that automatic starting and shutdown are permitted for testing purposes.
Response Message:
Public Input No. 150-NFPA 20-2013 [Section No. 10.5.4.2]
10.8.2.2 Arrangement II (Individually Listed Fire Pump Controller and Power Transfer Switch).

The following shall be provided:

(1) A fire pump controller power transfer switch complying with Sections 9.6 and 10.8 and a fire pump controller shall be provided. The overcurrent protection required by 10.8.2.2(2) and the isolating switch required by 10.8.2.2(4) shall be permitted to be provided in a separate enclosures upstream of the transfer switch.

(2) The transfer switch overcurrent protection for both the normal and alternate sources shall comply with 9.2.3.4.2.

(3) The transfer switch overcurrent protection shall be selected or set to indefinitely carry the locked rotor current of the fire pump motor where the alternate source is supplied by a second utility.

(4) 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.

(5) An isolating switch ahead of the alternate source input terminals of the transfer switch shall meet the following requirements:

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

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

(c) A placard shall be placed adjacent to the fire pump controller stating the location of the isolating switch and the location of the key (if the isolating switch is locked).

(d) The isolating switch 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 isolating switch closed

   iv. Sealing of isolating switches and approved weekly recorded inspections where isolating switches are located within fenced enclosures or in buildings under the control of the owner

(e) This supervision shall operate an audible and visible 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 protection as part of the switching mechanism of the isolating switch.
Committee Statement

Committee Statement: The added text allows the overcurrent protection and the isolating switch for the stand-alone transfer switch to be provided in separate enclosures. The intent to allow this was added to Appendix A of the 2013 Edition of NFPA 20, but not covered in the body of the standard. Reference Figure A.10.8, Arrangement II.

Response Message:

Public Input No. 129-NFPA 20-2013 [Section No. 10.8.2.2]
Public Input No. 132-NFPA 20-2013 [Section No. 10.8.2.2]
Public Input No. 161-NFPA 20-2013 [Section No. 10.8.2.2]
Public Input No. 163-NFPA 20-2013 [Section No. 10.8.2.2]
10.10.1.4
Controllers for motors driving constant torque loads, such as positive displacement water mist or additive (foam) pumps shall be rated for constant torque applications, and the variable frequency drive (VFD) unit in such controllers shall be rated for constant torque motor load.

Submitter Information Verification

Submitter Full Name: [ Not Specified ]
Organization: [ Not Specified ]
Street Address:
City:
State:
Zip:
Submittal Date: Wed Oct 02 22:28:35 EDT 2013

Committee Statement

Committee Statement: Add new section 10.10.1.4. Standard VFD units are rated for variable torque loads, such as centrifugal pumps, fans or blowers. VFD manufacturers state that constant torque loads require a higher rating. This usually requires a one horse power increase in VFD size (rating)

Response Message:
10.10.6.2
Where higher system voltages or longer cable lengths exist, the cable length and motor requirements shall be coordinated.

10.10.6.3
Coordination shall not be required where the system voltage does not exceed 480 V and cable lengths between the motor and controller do not exceed 100 ft (30.5 m) (see 10.10.6.2 10.10.6.3).

10.10.6.3
Where higher system voltages or longer cable lengths exist, the cable length and motor requirements shall be coordinated.

Submitter Information Verification
Submitter Full Name: [Not Specified]
Organization: [Not Specified]
Street Address:
City:
State:
Zip:
Submittal Date: Wed Oct 02 22:31:58 EDT 2013

Committee Statement
Committee Statement: Extant clause 10.10.6.2 doesn’t relate to clause 10.10.6.1 while extant 10.10.6.3 does.
Response Message:
### First Revision No. 27-NFPA 20-2013 [ New Section after 10.10.10.3 ]

<table>
<thead>
<tr>
<th><strong>10.10.10.4</strong></th>
<th>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.</th>
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<tbody>
<tr>
<td><strong>10.10.10.4.1</strong></td>
<td>The discharge pressure shall be permitted to restabilize whenever the flow condition changes.</td>
</tr>
</tbody>
</table>

**Submitter Information Verification**

- **Submitter Full Name:** [ Not Specified ]
- **Organization:** [ Not Specified ]
- **Street Address:**
- **City:**
- **State:**
- **Zip:**
- **Submittal Date:** Tue Oct 01 23:16:52 EDT 2013

**Committee Statement**

- **Committee Statement:** Reworded 4.19.1.2.1 to allow for changes in pressure associated with changes in pump flow.
- **Response Message:** The requirements need to remain with series pumping but should be repeated in chapters 10 and 11.
11.2.3 Engine Power Connection to Pump.

11.2.3.1 Horizontal Shaft Pumps.
Horizontal shaft engines shall be provided with a means for direct attachment of a flexible coupling adaptor, a flexible connecting shaft adaptor, a stub shaft, or a torsional vibration damping type coupling to the engine flywheel. (See Section 6.5 and 7.5.1.4)

11.2.3.1.1 Engines shall be connected to horizontal shaft pumps by means of a flexible coupling or flexible connecting shaft listed for this service.

11.2.3.1.2 The flexible coupling or flexible connecting shaft shall be directly attached to the engine flywheel adapter or stub shaft. (See Section 6.5.)

11.2.3.2 Vertical Shaft Turbine-Type Pumps.

11.2.3.2.1 Unless the requirements of 11.2.3.2.2 are met, engines shall be connected to vertical shaft pumps by means of a right-angle gear drive with a listed flexible connecting shaft that will prevent undue strain on either the engine or gear drive. (See Section 7.5.)

11.2.3.2.2 The requirements of 11.2.3.2.1 shall not apply to diesel engines and steam turbines designed and listed for vertical installation with vertical shaft turbine-type pumps, which shall be permitted to employ solid shafts and shall not require a right-angle drive but shall require a nonreverse ratchet.

Supplemental Information

<table>
<thead>
<tr>
<th>File Name</th>
<th>Description</th>
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<td>FR_100_A.11.2.4.3.4.1.1_3_.docx</td>
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Submitter Information Verification

Submitter Full Name: [Not Specified]
Organization: [Not Specified]
Street Address: 
City: 
State: 
Zip: 
Submittal Date: Wed Oct 02 23:27:47 EDT 2013

Committee Statement

There are no new requirements proposed in any of the proposed changes, only relocation of requirements to provide improved clarity and user friendliness. New par. Numbers as shown above.

6.5.1.1 Relocation requirements from 11.2.3.1.1 to provide a single place in the standard defining the coupling requirement for separately coupled pumps. 6.5.1.2 Modified to provide more clarity of listing requirements of flexible couplings and flexible connecting shafts for electric motor or diesel pump drivers. 7.5.1.8.1 Relocation of requirements from Chapter 11 to Chapter 7 where other vertical turbine pump drive where other vertical turbine pump drive requirements are located. 7.5.1.8.2 Renumber. Plus change text for clarity. 7.5.1.8.3 Renumber. 11.2.3.1 This section now applies to the engine power take-off connection for all types of pumps. 11.2.3.1.1 Provide clarity that this requirement does not apply to vertical shaft engines that area are allowed for VT pumps, and add torsional damping coupling which is a requirement of 7.5.1.6.4.
Response Message:
Public Input No. 167-NFPA 20-2013 [Sections 11.2.3.1, 11.2.3.2]
11.2.4.2.3.1 Operation.

(A) The transition from the primary ECM to the alternate or alternate to primary shall be controlled by a hand/automatic switch without an off position.

(B) When the switch required in 11.2.4.2.3.1(A) is in the automatic position, the transition from the primary ECM to the alternate or alternate to primary shall be accomplished automatically upon failure of the either ECM.

(C) When the switch required in 11.2.4.2.3.1(A) is in the hand position, the transition from the primary ECM to the alternate or from alternate to primary shall be accomplished manually.

Submitter Information Verification

Submitter Full Name: [Not Specified]
Organization: [Not Specified]
Street Address:
City:
State:
Zip:
Submittal Date: Wed Oct 02 15:34:11 EDT 2013

Committee Statement

Committee Statement: Editorial.

Response Message:
Public Input No. 176-NFPA 20-2013 [Section No. 11.2.4.2.3.1]
First Revision No. 69-NFPA 20-2013 [ New Section after 11.2.4.2.6 ]

11.2.5.5
The engine shall be provided with a means to indicate the type of trouble being signaled in 11.2.4.2.6.

Submitter Information Verification

Submitter Full Name: [ Not Specified ]
Organization: [ Not Specified ]
Street Address: [ Not Specified ]
City: [ Not Specified ]
State: [ Not Specified ]
Zip: [ Not Specified ]
Submittal Date: Wed Oct 02 15:36:30 EDT 2013

Committee Statement

Committee Statement: Create new section 11.2.5.5. This allows the operator to interpret the level or severity of the trouble and initiate the proper corrective action.

Response Message:

Public Input No. 137-NFPA 20-2013 [New Section after 11.2.4.2.6]
11.2.4.2.6 ECM Engine Supervision.

A common supervisory signal shall be provided to the controller in the event of any of the following as a minimum for the following events:

1. Fuel injection failure
2. Low fuel pressure
3. Any primary sensor failure

Submitter Information Verification

Submitter Full Name: [Not Specified]
Organization: [Not Specified]
Street Address: [Not Specified]
City: [Not Specified]
State: [Not Specified]
Zip: [Not Specified]
Submittal Date: Wed Oct 02 15:43:30 EDT 2013

Committee Statement

Committee Statement: The common supervisory signal to the controller typically contains more than just the three events described and is truly a common alarm. Electronic engines typically have a general fault or common fault alarm for all trouble that is experienced on the engine.

Response Message:

Public Input No. 138-NFPA 20-2013 [Section No. 11.2.4.2.6]
In the event of a failure of the variable speeds control system, the engine shall be fully functional operate at pump-rated speed with the governor defined in 11.2.4.1.
**First Revision No. 28-NFPA 20-2013 [ New Section after 11.2.4.3.4 ]**

<table>
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<th>Section</th>
<th>Text</th>
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<tr>
<td>11.2.4.3.5</td>
<td>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.</td>
</tr>
<tr>
<td>11.2.4.3.5.1</td>
<td>The discharge pressure shall be permitted to restabilize whenever the flow condition changes.</td>
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**Submitter Information Verification**

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<tr>
<td>Organization</td>
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</tbody>
</table>

**Committee Statement**

- **Committee Statement**: Reworded 4.19.1.2.1 to allow for changes in pressure associated with changes in pump flow. The requirements need to remain with series pumping but should be repeated in chapters 10 and 11.

- **Response Message**: [Submission URL]
**First Revision No. 72-NFPA 20-2013 [ New Section after 11.2.4.3.4.1 ]**

<table>
<thead>
<tr>
<th>11.2.4.3.4.1.1*</th>
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<tr>
<td>Pressure sensing line(s) shall be installed with a connection to the pipe that is in horizontal orientation to the pressure source.</td>
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**Supplemental Information**

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<th>File Name</th>
<th>Description</th>
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**Submitter Information Verification**

- **Submitter Full Name:** [ Not Specified ]
- **Organization:** [ Not Specified ]
- **Street Address:**
- **City:**
- **State:**
- **Zip:**
- **Submittal Date:** Wed Oct 02 15:47:49 EDT 2013

**Committee Statement**

The pressure sensing line can be installed in a vertical orientation in either the top or bottom of the pipe. With it installed in the bottom it has the opportunity to gather debris. With it installed in the top it has the opportunity for an air pocket.

**Response Message:**

Public Input No. 136-NFPA 20-2013 [New Section after 11.2.4.3.4.1]
A.11.2.4.3.4.1.1 The pressure sensing line could be installed in a vertical orientation in either the top or bottom of the pipe, however with it installed in the bottom it has the opportunity to gather debris, and with it installed in the top it has the opportunity to receive air.
11.2.4.4.8
Means shall be provided for signaling high cooling water temperature to the controller at a temperature specified by the engine manufacturer coordinated with the sizing of the heat exchanged water supply.

11.2.4.4.8.1
Means shall be provided on the engine for testing the operation of the high cooling water temperature signal to the controller, resulting in a visible and common audible alarm on the controller as required in 12.4.1.3.

11.2.4.4.8.2
Instructions for performing the test in 11.2.4.4.8.1 shall be included in the engine manual.
Nickel-cadmium or other kinds of batteries shall be permitted to be installed in lieu of lead-acid batteries, provided they meet the engine manufacturer's requirements and the charging voltage levels of the chargers in 12.5.3 are coordinated to meet the requirements of the specific batteries.

Submitter Information Verification

Submitter Full Name: [ Not Specified ]
Organization: [ Not Specified ]
Street Address:
City:
State:
Zip:
Submittal Date: Wed Oct 02 16:28:33 EDT 2013

Committee Statement

Committee Statement: Many times when alternative batteries are being used, chargers with voltage charging levels for lead-acid batteries are being used.
Response Message: Public Input No. 180-NFPA 20-2013 [Section No. 11.2.7.2.1.3]
11.3.3 The entire pump room shall be protected with fire sprinklers in accordance with NFPA 13, Standard for the Installation of Sprinkler Systems, as an Extra Hazard Group 2 space.
11.4.1 General.
11.4.1.1 Plan Review.
Before any fuel system is installed, plans shall be prepared and submitted to the authority having jurisdiction for agreement on suitability of the system for prevailing conditions.

11.4.1.2 Fuel Supply Tank.
11.4.1.2.1  The fuel supply tank and fuel shall be reserved exclusively for the fire pump diesel engine.

11.4.1.2.2  There shall be a separate fuel supply tank for each engine.

11.4.1.2.3  There shall be a separate fuel supply and return line for each engine.

11.4.1.3  Fuel Supply Tank Capacity.

11.4.1.3.1* Fuel supply tank(s) shall have a capacity at least equal to 1 gal per hp (5.07 L per kW), plus 5 percent volume for expansion and 5 percent volume for sump.

11.4.1.3.2  Whether larger-capacity fuel supply tanks are required shall be determined by prevailing conditions, such as refill cycle and fuel heating due to recirculation, and shall be subject to special conditions in each case.

11.4.1.4  Tank Construction.

11.4.1.4.1  Tanks shall be single wall or double wall and shall be designed and constructed in accordance with recognized engineering standards such as ANSI/UL 142, Standard for Steel Aboveground Tanks for Flammable and Combustible Liquids.

11.4.1.4.2  Tanks shall be securely mounted on noncombustible supports.

11.4.1.4.3  Tanks used in accordance with the rules of this standard shall be limited in size to 1320 gal (4996 L).

11.4.1.4.3.1  For situations where fuel tanks in excess of 1320 gal (4996 L) are being used, the rules requirements of NFPA 37, Standard for the Installation and Use of Stationary Combustion Engines and Gas Turbines, shall apply.

11.4.1.4.4  Single-wall fuel tanks shall be enclosed with a wall, curb, or dike sufficient to hold the entire capacity of the tank.

11.4.1.4.5  Each tank shall have suitable fill, drain, and vent connections.

11.4.1.4.6  Fill pipes that enter the top of the tank shall terminate within 6 in. (152 mm) of the bottom of the tank and shall be installed or arranged so that vibration is minimized.

11.4.1.4.7  The fuel tank shall have one 2 in. (50.8 mm) NPT threaded port in the top, near the center, of the tank to accommodate the low fuel level switch.

11.4.1.4.5 Tank Venting.

If a double-wall tank is installed, the interstitial space between the shells of the diesel fuel storage tank shall be monitored for leakage and annunciated by the engine drive controller. The signal shall be of the supervisory type.

11.4.1.4.5.1 Vent Piping.

(A) Vent piping shall be arranged so that the vapors are discharged upward or horizontally away from adjacent walls and so that vapors will not be trapped by eaves or other obstructions.

(B) Outlets shall terminate at least 5 ft (1.5 m) from building openings.
11.4.1.4.5  Engine Supply Connection.

11.4.1.4.5.1  The fuel supply pipe connection shall be located on a side of the tank.

11.4.1.4.5.2  The engine fuel supply (suction) pipe connection shall be located on the tank so that 5 percent of the tank volume provides a sump volume not usable by the engine.

11.4.1.5  Tank Connections.

11.4.1.5.1  Each tank shall have a fill connection.

11.4.1.5.1.1  Fill pipes that enter the top of the tank shall terminate within 6 in. (152 mm) of the bottom of the tank and shall be installed or arranged so that vibration is minimized.

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.

11.4.1.5.3  Each tank shall have a vent connection.

11.4.1.5.3.1  Normal vents shall be 2 in. (50 mm) NPT or sized in accordance with ANSI/UL 142, *Standard for Steel Aboveground Tanks for Flammable and Combustible Liquids*, or other approved standards.

(A)  As an alternative to the requirement in 11.4.1.5.3.1, the normal vent shall be at least as large as the largest filling or withdrawal connection, but in no case shall it be less than $1\frac{1}{4}$ in. (32 mm) nominal inside diameter.

11.4.1.5.4  Each tank shall have an engine supply connection.

11.4.1.5.4.1  The fuel supply pipe connection shall be located on a side of the tank.

11.4.1.5.4.2  The engine fuel supply (suction) pipe connection shall be located on the tank so that 5 percent of the tank volume provides a sump volume not usable by the engine.

11.4.1.5.4.3  The tank connection shall be no smaller than the fuel supply piping to the engine.

11.4.1.5.5  Each tank shall have an engine return connection.

11.4.1.5.5.1  The tank connection shall be no smaller than the fuel return piping from the engine.

11.4.1.5.6  Each tank shall have a fuel level switch connection.

11.4.1.5.6.1  The fuel tank shall have one 2 in. (50.8 mm) NPT threaded port in the top, near the center, of the tank to accommodate the low fuel level switch required in 11.4.2.6.

11.4.1.5.7  Each tank shall have an active fuel maintenance return connection.

11.4.1.5.7.1  The fuel tank shall have one minimum 1 in. (25.4 mm) NPT threaded port in the top of the tank to accommodate the connection of a line for the return fuel from an active fuel maintenance system.

11.4.1.5.8  Where there is not an active fuel system installed, a plug shall be installed in this connection.

11.4.1.5.8  If a double-wall tank is installed, the interstitial space between the shells of the diesel fuel storage tank shall be monitored for leakage and annunciated by the engine drive controller. The signal shall be of the supervisory type.
11.4.1.6 Vent Piping

11.4.1.6.1 Vent piping shall be arranged so that the vapors are discharged upward or horizontally away from adjacent walls and will not be trapped by eaves or other obstructions.

11.4.1.6.2 Outlets shall terminate at least 5 ft (1.5 m) from building openings.

11.4.1.6.3 Outlets shall terminate at least 12 ft (3.7 m) above the finished ground level.

Submitter Information Verification

Submitter Full Name: [Not Specified]
Organization: [Not Specified]
Street Address:
City:
State:
Zip:
Submittal Date: Thu Oct 03 00:33:09 EDT 2013

Committee Statement

Committee Statement: Currently fuel connection requirements are scattered throughout the section. This proposal is provided to provide clarity for the user. The only additional requirements included in this proposal are:
- The specification of tank vent connection of 2 in. (508.8 mm) NPT or in proposed 11.4.1.2.5.3.1 - The addition of a connection for an active fuel maintenance system in 11.4.1.2.5.7. Last cycle this TC determined to leave the implementation decision of an active fuel maintenance system to NFPA 25. However, if NFPA 20 does not install a fuel tank with a suitable connection for the return pipe, the system cannot be appropriately installed if and when the owner decided to implement a system. This proposed requirement is only for a connection and a plug.

Response Message:
Public Input No. 169-NFPA 20-2013 [Sections 11.4.1.2.5, 11.4.1.2.6]
Public Input No. 170-NFPA 20-2013 [Section No. 11.4.1.2.5]
Public Input No. 171-NFPA 20-2013 [Sections 11.4.1.2.8.1, 11.4.1.2.8.2]
Public Input No. 172-NFPA 20-2013 [Section No. 11.4.1.2.9]
Public Input No. 173-NFPA 20-2013 [Sections 11.4.1.2.5, 11.4.1.2.6, 11.4.1.2.7]
Public Input No. 175-NFPA 20-2013 [Section No. 11.4.1.2.8.3]
Public Input No. 182-NFPA 20-2013 [Section No. 11.4.1.2.8]
Committee Statement

This is a requirement from the International Fire Code (IFC). We actually do not know the origin of the 12 ft rule, but we know that many installers of fire pumps are missing this requirement that is buried in section 5704.2.7.3.3 of the IFC. Our goal is to consolidate the rules for the installation of fire pumps in one location so that everyone can find the applicable rules easily.
11.4.1.2 Fuel Supply Tank

11.4.1.2.1 The fuel supply tank and fuel shall be reserved exclusively for the fire pump diesel engine.

11.4.1.2.2 There shall be a separate fuel supply tank for each engine.

11.4.1.2.3 There shall be a separate fuel supply and return line for each engine.

Committee Statement

Committee Statement: These section numbers have been relocated for clarity. Renumber subsequent sections. Section 11.4.2 has been relocated to 11.4.1.2 with "and Capacity" removed from the title. Existing sections 11.4.2.3 and 11.4.2.4 have been relocated as subsections to 11.4.1.2 respectively (11.4.1.2.1 and 11.4.1.2.2). A new subheading has been inserted for 11.4.1.3 “Fuel Supply Tank Capacity”, the existing 11.4.1.3 will need to be renumbered accordingly. Subsection 11.4.2.1. and 11.4.2.2 have been relocated to subsections under the new section subheading for 11.4.1.3 respectively (11.4.1.3.1 and 11.4.1.3.2). Exiting 11.4.2.5 has been relocated as new section 11.4.4.5.3.

Response Message:

Public Input No. 181-NFPA 20-2013 [Section No. 11.4.2]
Committee Statement

The tank needs to be protected from overfilling. This is a requirement from the International Fire Code (IFC). Many installers of fire pumps are missing this requirement that is buried in section 5704.2.9.7.6 of the IFC. Our goal is to consolidate the rules for the installation of fire pumps in one location so that everyone can find the applicable rules easily.

Response Message:

Public Input No. 124-NFPA 20-2013 [New Section after 11.4.2.6.3]
11.4.3* Fuel Supply Tank Supply Location.

11.4.3.1 Diesel fuel supply tanks shall be located above ground in accordance with municipal or other ordinances and in accordance with requirements of the authority having jurisdiction and shall not be buried.

11.4.3.2 In zones where freezing temperatures [32°F (0°C)] are possible, the fuel supply tanks shall be located in the pump room.

11.4.3.3 The supply tank shall be located so the fuel supply pipe connection to the engine is no lower than the level of the engine fuel transfer pump.

11.4.3.4 The engine manufacturer's fuel pump static head pressure limits shall not be exceeded when the level of fuel in the tank is at a maximum.

Submitter Information Verification

Submitter Full Name: [Not Specified]
Organization: [Not Specified]
Street Address:
City:
State:
Zip:
Submittal Date: Wed Oct 02 17:18:04 EDT 2013

Committee Statement

Committee Statement: Editorial.
Response Message:
Public Input No. 183-NFPA 20-2013 [Section No. 11.4.3]
11.4.4.2.1
Where black steel pipe is used for fuel piping, the fittings shall be steel or malleable iron fittings.

Submitter Information Verification

Submitter Full Name: [Not Specified]
Organization: [Not Specified]
Street Address:
City:
State:
Zip:
Submittal Date: Wed Oct 02 17:23:54 EDT 2013

Committee Statement

Committee Statement: Many AHJ's want to force the use of cast iron fittings for fuel service. But cast iron fittings can be a problem when they are struck. The brittle nature of the cast iron fitting makes it a poor choice for putting steel pipe together for fuel service.

Response Message:
Public Input No. 101-NFPA 20-2013 [New Section after 11.4.4.2]
### 11.4.4.3.1
A check valve, as specified by the engine manufacturer, shall be permitted to be installed in the fuel return line only when required by the engine manufacturer.

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<td><strong>Submittal Date:</strong> Wed Oct 02 17:27:09 EDT 2013</td>
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**Committee Statement**

- **Committee Statement:** To eliminate confusion in the field caused by the reference to a check valve in the fuel return line in Figure A.11.4.4.
- **Response Message:**

Public Input No. 184-NFPA 20-2013 [New Section after 11.4.4.3]
### First Revision No. 84-NFPA 20-2013 [ Section No. 11.4.4.6 ]

11.4.4.6* Fuel Line Protection. A guard, pipe protection, or approved double-walled pipe shall be provided for all **exposed** fuel lines exposed to traffic or possible damage.

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<th><strong>Submitter Information Verification</strong></th>
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**Committee Statement**

**Committee Statement:** Exposed fuel lines is to broad of a term.

**Response Message:**
11.5.2.5
The exhaust pipe and muffler, if used, shall be suitable for the use intended acceptable to the engine manufacturer, and the exhaust back pressure shall not exceed the engine manufacturer's recommendations.

11.5.2.5.1
The exhaust pipe and muffler shall be supported independently of the engine's flexible exhaust connection.

Submitter Information Verification

Submitter Full Name: [Not Specified]
Organization: [Not Specified]
Street Address:
City:
State:
Zip:
Submittal Date: Wed Oct 02 17:34:40 EDT 2013

Committee Statement

Committee Statement: Premature failures of the engine’s exhaust flexible connection due to excessive weight being applied to it resulting from inadequate support of the exhaust pipe system.
Response Message: Public Input No. 185-NFPA 20-2013 [New Section after 11.5.2.5]
11.6.4.3*
The tanks shall be designed and installed so that they can be maintained by means that will ensure removal of water and foreign material.

11.6.4.4*
An active fuel maintenance system listed for fire pump service shall be permitted to be installed for the maintenance of the fuel in the supply tank.

11.6.4.4.1
Where provided, the active fuel maintenance system shall be equipped with a visible indicator to indicate when the system is in need of maintenance.

11.6.4.4.2
Where provided, the active fuel maintenance system shall be equipped with a contact closure for signaling to the controller when the system is in need of maintenance.

11.6.4.4.3
Where provided, the active fuel maintenance systems shall be permanently connected to the fuel tank as follows:

1. All connections shall be made directly to the tank.
2. The supply from the tank to the active fuel maintenance system shall include a manual shutoff valve and a connection to the drain located between the bottom of the tank and the drain valve of the fuel storage tank.
3. The return from the active fuel maintenance system to the fuel storage tank shall be connected to the dedicated connection on the top of the tank with a drop tube down to the 50 percent level, and shall include a manual shutoff valve for servicing the system.

Supplemental Information

File Name: A_11_6_4_3_and_A_11_6_4_4_new_.docx

Submitter Information Verification

Submitter Full Name: [ Not Specified ]
Organization: [ Not Specified ]
Street Address:
City:
State:
Zip:
Submittal Date: Fri Oct 11 13:15:35 EDT 2013

Committee Statement

Committee Statement: New requirements for active fuel maintenance systems has been added providing guidance for the installation of these systems when used. These requirements provide provisions which will allow the active fuel maintenance system to be installed either at the time of construction or at a later date. This coordinates with the changes made to NFPA 25, which currently provides guidance on the inspection, testing and maintenance of such systems. See new annex language to sections 11.6.4.3 and 11.6.4.4.
Response
Message:
Public Input No. 9-NFPA 20-2013 [Section No. 11.6.4]
Public Input No. 186-NFPA 20-2013 [Section No. 11.6.4.2]
A.11.6.4.3 NFPA 25 requires periodic testing of the fuel and maintenance of the fuel supply tank to ensure quality fuel is always available to the engine for fire protection operation.

A11.6.4.4 Where environmental or fuel quality conditions result in degradation of the fuel while stored in the supply tank, from items such as water, micro-organisms and particulates, or destabilization, active fuel maintenance systems permanently installed on the fuel storage tanks have proven to be successful at maintaining fuel quality. An active fuel maintenance system will maintain the fuel quality in the tank, therefore preventing the fuel from going through possible cycles of degradation, risking engine reliability, and then requiring reconditioning.
12.3.5.3.3.1

Except as provided in 4.20.2.5, remote shutdown or interlock to prevent normal operation shall not be permitted unless approved by the authority having jurisdiction.

Submitter Information Verification

Submitter Full Name: [Not Specified]
Organization: [Not Specified]
Street Address: 
City: 
State: 
Zip: 
Submittal Date: Wed Oct 02 14:03:16 EDT 2013

Committee Statement

Committee Statement: This has always been the intent of the committee based on past action, but is not stated anywhere in the standard. The exceptance reference, references the newly proposed 4.19.2.2.
Response Message: 
Public Input No. 151-NFPA 20-2013 [New Section after 12.3.5.3.3]
Separate visible indicators and a common audible fire pump alarm capable of being heard while the engine is running and operable in all positions of the main switch except the off position shall be provided to immediately indicate the following conditions:

1. Critically low oil pressure in the lubrication system
2. High engine temperature
3. Failure of engine to start automatically
4. Shutdown from overspeed
5. High cooling water temperature

Submitter Information Verification

Submitter Full Name: [Not Specified]
Organization: [Not Specified]
Street Address:
City:
State:
Zip:
Submittal Date: Wed Oct 02 16:24:19 EDT 2013

Committee Statement

Committee Statement: Relocated (5) from 12.4.1.4 to 12.4.1.3 because 12.4.1.3 address automatic shutdown.
Response Message:
First Revision No. 87-NFPA 20-2013 [ Section No. 12.4.1.4 ]

12.4.1.4
Separate visible indicators and a common audible signal capable of being heard while the engine is running and operable in all positions of the main switch except the off position shall be provided to immediately indicate the following conditions:

1. Battery failure or missing battery. Each controller shall be provided with a separate visible indicator for each battery. The battery failure signal shall initiate at no lower than two-thirds of battery nominal voltage rating (8.0 V dc on a 12 V dc system). Sensing shall be delayed to prevent nuisance signals.

2. Battery charger failure. Each controller shall be provided with a separate visible indicator for battery charger failure and shall not require the audible signal for battery charger failure.

3. Low air or hydraulic pressure. Where air or hydraulic starting is provided (see 11.2.7 and 11.2.7.4), each pressure tank shall provide to the controller separate visible indicators to indicate low pressure.

4. System overpressure, for engines equipped with variable speed pressure limiting controls, to actuate at 115 percent of set pressure.

5. ECM selector switch in alternate ECM position (only for engines with ECM control only).

6. Fuel injection malfunction Common alarm for fuel injection malfunction (only for engines with ECM control).

7. Low fuel level. Signal at two-thirds tank capacity.

8. Low air pressure (air-starting engine controllers only). The air supply container shall be provided with a separate visible indicator to indicate low air pressure.

9. Low engine temperature.

10. Supervisory signal for interstitial space liquid intrusion.

11. High cooling water temperature.

12. Fuel maintenance needed if automatic fuel maintenance system is provided.

Supplemental Information

File Name: FR-87_A.12.4.1.4.docx

Submitter Information Verification

Submitter Full Name: [ Not Specified ]
Organization: [ Not Specified ]
Street Address:
City:
State:
Zip:
Submittal Date: Wed Oct 02 18:09:59 EDT 2013

Committee Statement

Committee Statement: A separate fuel maintenance signal is need if an active fuel maintenance system is installed. See attached annex A language for further guidance. Alarms annunciated on the controller draw immediate concern and phone calls without understanding the true type of trouble. The operator needs to go to the engine to understand the type of trouble or fault.
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<td>Public Input No. 139-NFPA 20-2013 [Section No. 12.4.1.4]</td>
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<tr>
<td>Public Input No. 140-NFPA 20-2013 [New Section after A.12.4.1.6]</td>
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</table>
12.4.1.6.1
This switch shall be clearly marked as to its function.

Submitter Information Verification
Submitter Full Name: Chad Duffy
Organization: National Fire Protection Assoc
Street Address: 
City: 
State: 
Zip: 
Submittal Date: Thu Oct 17 08:14:22 EDT 2013

Committee Statement
Committee Statement: The use of the word "clearly" makes this text unenforceable, and the sentence is unnecessary as the requirement for the marking of components is addressed in 12.4.7.
Response Message:
First Revision No. 127-NFPA 20-2013 [Sections 12.7.2.1.1.1, 12.7.2.1.1.2]

12.7.2.1.1.1
A pressure-actuated switch or electronic pressure sensor having adjustable high- and low-calibrated set-points as part of the controller shall be provided.

12.7.2.1.1.2
For multistage multiport pumps a separate pressure-actuated switch or electronic pressure sensor as described in 12.7.2.1.1.1 shall be provided for each discharge port of the pump as part of the controller.

12.7.2.1.1.3
The requirements of 12.7.2.1.1.1 and 12.7.2.1.1.2 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

Submitter Full Name: Chad Duffy
Organization: National Fire Protection Assoc
Street Address: 
City: 
State: 
Zip: 
Submittal Date: Thu Oct 17 15:03:40 EDT 2013

Committee Statement

Committee Statement: This requirement is part of the addition of multistage multiport pumps to the standard, providing requirements for the pressure sensing arrangement.
12.7.2.1.3*
Where an electronic pressure sensor is used to automatically control fire pump operation, the fire pump controller shall monitor the transducer during automatic testing.

12.7.2.1.3.1*
When the transducer pressure reading exceeds 10 psi (0.68 bar) during any automatic pump start where initiated by the solenoid drain valve as required by 12.7.2.1.2.2, the controller shall activate a visual and audible alarm that can be silenced.

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 signal for the following electronic pressure sensor conditions.

1. Any time the transducer output is less than 10 percent of rated span or below its rated zero pressure output
2. Any time the pressure transducer reading is more than 10 percent above its rated full-scale output

Supplemental Information

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Submitter Information Verification

Submitter Full Name: [Not Specified]
Organization: [Not Specified]
Street Address:
City:
State:
Zip:
Submittal Date: Wed Oct 02 14:09:08 EDT 2013

Committee Statement

Committee Statement: Monitor diesel pressure transducers for drifting, which over time has been a proven problem.
Response Message: See attached annex A language for further guidance.

Public Input No. 23-NFPA 20-2013 [New Section after 12.7.2.1.7]
Public Input No. 25-NFPA 20-2013 [New Section after A.12.7]
Public Input No. 152-NFPA 20-2013 [New Section after 12.7.2.1.2]
Public Input No. 153-NFPA 20-2013 [New Section after A.12.7]
12.7.2.4
Automatic starting upon loss of ac power shall not be permitted unless required by the authority having jurisdiction.

Committee Statement
Committee Statement: Upon loss of AC power the charger, which maintains the batteries, will no longer be functioning. If automatic starting is allowed during this time it could deplete the batteries and compromise the fire pumps ability to start during a running cause (fire).
Section 12.7.2.7, Sole Supply Pumps:

12.7.2.7.1 Shutdown shall be accomplished by manual or automatic means.

12.7.2.7.2 Automatic shutdown shall not be permitted where the pump constitutes the sole source of supply of a fire sprinkler or standpipe system or where the authority having jurisdiction has required manual shutdown.

Submitter Information Verification:

Submitter Full Name: Chad Duffy
Organization: National Fire Protection Assoc
Street Address:
City:
State:
Zip:
Submittal Date: Fri Oct 18 07:58:04 EDT 2013

Committee Statement:

Committee Statement: Section 12.7.2.6 has been integrated into new 12.7.5.2

Response Message:

Public Input No. 18-NFPA 20-2013 [Section No. 12.7.2.6.2]
Public Input No. 156-NFPA 20-2013 [Section No. 12.7.2.6.2]
### 12.7.2.7 Weekly Program Timer: Automatic Testing

12.7.2.7.1 To ensure dependable operation of the engine and its controller, the controller equipment shall be arranged to automatically start and run, run, and shut down the engine for at least 30 minutes once a week at the minimum no-flow test frequency and duration required by NFPA 25.

12.7.2.7.2 The controller shall use the opposite battery bank (every other bank) for cranking on subsequent weeks.

12.7.2.7.2 Performance of this weekly program timer shall be recorded as a pressure drop indication on the pressure recorder. (See 12.4.4.)

12.7.2.7.3 Means A solenoid valve drain on the pressure control line shall be permitted within the controller to manually terminate the weekly test, provided a minimum of 30 minutes has expired the initiating means.

12.7.2.7.4 A solenoid valve drain on the pressure control line shall be the initiating means. The engine shall shut down automatically on high engine temperature, low oil pressure, or high cooling water temperature if no other starting or running cause exists.

12.7.2.7.5 If after shutdown a starting cause occurs, the controller shall restart the engine and override the high engine temperature, low oil pressure, or high cooling water temperature shutdowns and run in accordance with 12.7.5.2.

12.7.2.7.6 Performance of this weekly program timer shall be recorded as a pressure drop indication on the pressure recorder. (See 12.4.4.)

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

12.7.2.7.7 The controller shall use the opposite battery bank (every other bank) for cranking on subsequent weeks.

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**Submitter Information Verification**

- **Submitter Full Name:** Chad Duffy
- **Organization:** National Fire Protection Assoc
- **Street Address:**
- **City:**
- **State:**
- **Zip:**
- **Submittal Date:** Fri Oct 18 08:02:21 EDT 2013

**Committee Statement**

- **Committee Statement:** Section 12.7.2.7 has been revised to clarify that automatic starting and shutdown are permitted for testing purposes.

**Response Message:**
- **Public Input No. 19-NFPA 20-2013 [Section No. 12.7.2.7.3]**
- **Public Input No. 154-NFPA 20-2013 [New Section after 12.7.2.7]**
12.7.5.2 Automatic Shutdown After Automatic Start.
The requirements for automatic shutdown after automatic start shall be as follows:

If the controller is set up for automatic engine shutdown, the controller shall shut down the engine only after all starting causes have returned to normal and a 30-minute minimum run time has elapsed.

When the engine overspeed shutdown device operates, the controller shall remove power from the engine running devices, prevent further cranking, energize the overspeed fire pump alarm, and lock out until manually reset.

Resetting of the overspeed circuit shall be required at the engine and by resetting the controller main switch to the off position.

The engine shall not shut down automatically on high engine temperature, low oil pressure, or high cooling water temperature when any automatic starting or running cause exists, and the following also shall apply:

If no other starting or running cause exists during engine test, the engine shall shut down automatically on high engine temperature, low oil pressure, or high cooling water temperature.

If after shutdown a starting cause occurs, the controller shall restart the engine and override the high engine temperature, low oil pressure, or high cooling water temperature shutdowns for the remainder of the test period.

The controller shall not be capable of being reset until the engine overspeed shutdown device is manually reset.

Automatic shutdown shall not be permitted if starting and running causes are present.

12.7.5.2.1 Automatic shutdown shall be permitted only in the following circumstances:

(1) During automatic testing in accordance with 12.7.2.7.

(2) When the engine overspeed shutdown device operates:

(a) The controller shall remove power from the engine running devices, prevent further cranking, energize the overspeed fire pump alarm, and lock out until manually reset.

(b) Resetting of the overspeed circuit shall be required at the engine and by resetting the controller main switch to the off position.

(c) The controller shall not be capable of being reset until the engine overspeed shutdown device is manually reset.

(3) Where approved by the authority having jurisdiction.

Submitter Information Verification

Submitter Full Name: [ Not Specified ]
Organization: [ Not Specified ]
Street Address: 
City: 
State: 
Zip: 
Submittal Date: Wed Oct 02 14:22:46 EDT 2013
### Committee Statement

**Committee Statement:**

Section 12.7.5.2 has been revised to clarify that automatic starting and shutdown are permitted for testing purposes.

**Response Message:**

[Link to National Fire Protection Association Report](http://submittals.nfpa.org/TerraViewWeb/ContentFetcher?commentPara...123 of 168 1/13/2014 1:38 PM)
14.1.1.3
Where the maximum flow available from the water supply cannot provide the flow rate provided in Table 14.1.1.1, the flushing flow rate shall be equal to or greater than 150 percent of rated flow of the greater of 100 percent of rated flow of the connected fire pump or the maximum flow demand of the fire protection system(s).

14.1.1.3.1
Where the maximum flow available from the water supply cannot provide a flow of 150 percent of the rated flow of the pump, the flushing flow rate shall be the greater of 100 percent of rated flow of the connected fire pump or the maximum flow demand of the fire protection system.

14.1.1.3.2
This reduced flushing flow capacity in accordance with 14.1.1.3.1 shall constitute an acceptable test, provided that the flow rate is as much as can be safely achieved and it exceeds the fire protection system design and flow rate.

Submitter Information Verification
Submitter Full Name: Chad Duffy
Organization: National Fire Protection Assoc
Street Address:
City:
State:
Zip:
Submittal Date: Thu Oct 17 08:26:32 EDT 2013

Committee Statement
Committee Statement: This proposal is offered to coordinate the flushing rates more closely with the concept that a water supply for a fire pump should ideally be at least 150% of a pump’s rating. For 5 in. and larger pump suction sizes, Table 14.1.1.1 asks for flow rates in excess of 150% of the rated pump capacities. For example, a 6 in. suction size indicates a 750 gpm fire pump, so 150% of rated capacity would be 1125 gpm. If this rate is achievable but the rate of 1360 gpm from Table 14.1.1.1 is not, then that should be the flushing rate, as that is the rate that the pump acceptance testing and subsequent annual testing would be conducted at. As currently written, if the 1360 gpm were not available, the pump could be flushed at a value as low as 750 gpm and then tested at a greater flow. Thus despite the flushing, obstructing materials could be carried into the pump during later activities.

Response Message:
First Revision No. 89-NFPA 20-2013 [ New Section after 14.2.4.1 ]

Submitter Information Verification

Submitter Full Name: [ Not Specified ]
Organization: [ Not Specified ]
Street Address:
City:
State:
Zip:
Submittal Date: Wed Oct 02 18:32:09 EDT 2013

Committee Statement

Committee Statement: Part of multiple stage multiple port fire pump requirements
Response Message:
Public Input No. 85-NFPA 20-2013 [New Section after 14.2.4.1]
A copy of the manufacturer's certified pump test characteristic curve shall be available for comparison of with the results of the field acceptance test.

Submitter Information Verification

Submitter Full Name: [Not Specified]
Organization: [Not Specified]
Street Address:
City:
State:
Zip:
Submittal Date: Wed Oct 02 18:38:00 EDT 2013

Committee Statement

Committee Statement: The term characteristic curve is normally related to a family or range of pump values available for the various flows and pressures within a given pump and various driver horsepower combinations.

Response Message:
Public Input No. 116-NFPA 20-2013 [Section No. 14.2.4.1 [Excluding any Sub-Sections]]
At all flow conditions, including those required to be tested in 14.2.6.2, the fire pump as installed shall equal the performance as indicated on the manufacturer's certified shop test characteristic curve within the accuracy limits of the test equipment.

Submitter Information Verification

Submitter Full Name: [ Not Specified ]
Organization: [ Not Specified ]
Street Address:
City:
State:
Zip:
Submittal Date: Wed Oct 02 18:39:41 EDT 2013

Committee Statement

Committee Statement: The term characteristic curve is normally related to a family or range of pump values available for the various flows and pressures within a given pump and various driver horsepower combinations. The term "Certified Test Curve" means test data for a specific pump assembly.

Response Message:
14.2.6.5.3.7  
For water mist positive displacement pumping units, each pump shall be operated manually a minimum of six times during the acceptance test.

14.2.6.5.3.8  
For water mist positive displacement pumping units, each of the required automatic operations shall operate all pumps, except as provided in 14.2.6.5.3.9 and 14.2.6.5.3.10.

14.2.6.5.3.9  
Where redundant pumps are provided, each of the automatic operations shall operate the number of pumps required to meet system demand.

14.2.6.5.3.10  
Where redundant pumps are provided, each pump shall operate for a minimum of three automatic operations.

Submitter Information Verification

Submitter Full Name: Chad Duffy  
Organization: National Fire Protection Assoc  
Street Address:  
City:  
State:  
Zip:  
Submittal Date: Thu Oct 17 08:47:33 EDT 2013

Committee Statement

Committee Statement: The water mist positive displacement pumping unit test requirements belong under the positive displacement pump section. Move existing section numbers 14.2.6.2.1, 14.2.6.2.2, 14.2.6.2.2.1 and 14.2.6.2.2.2 to section 14.2.6.4.3 Positive Displacement Pumps and renumber as shown in the First Revision text.
14.2.6.2.2*
Vibrations of the fire pump assembly shall not be of a magnitude to pose potential damage to any fire pump component.

Supplemental Information

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Submitter Information Verification

Submitter Full Name: [ Not Specified ]
Organization: [ Not Specified ]
Street Address: 
City: 
State: 
Zip: 
Submittal Date: Fri Oct 11 13:52:35 EDT 2013

Committee Statement

Committee Statement: New guidance is provided in an annex regarding vibrations and the levels of vibrations which may cause damage.
A.14.2.6.2.4 Vibration in excess of limits in the Hydraulic Institute Standards for Centrifugal Rotary and Reciprocating Pumps (Reference ANSI/HI Section 9.6.4-Rotodynamic (Centrifugal and Vertical) Pumps for Vibration Measurement and Allowable Values), may pose potential damage to the fire pump. Some of the areas of vibration concern can be attributed usually to a number of items. Examples of vibration concerns are as follows: (a) Bearing, due to lack of lubrication, (b) Impeller vibrations due to debris in impeller, due to poor flushing, (c) Foundation concern due to poorly designed and installed foundations, (d) lack of proper grouting of the pump base and foundation. (e) Main drive couplings require the proper alignment of the driver and the pump shaft.
14.2.6.2.6 Water Level Detection.
Water level detection shall be required for all vertical turbine pumps installed in wells to determine the suction pressure, water level available at the shutoff, 100 percent flow, and the 100 percent and 150 percent flow points, to determine if the pump is operating within its design conditions.

14.2.6.2.6.1
The distance between the water level and the discharge flange shall be used to determine the net discharge pressure of the pump to prove the pump's performance.

Submitter Information Verification

Submitter Full Name: [Not Specified]
Organization: [Not Specified]
Street Address:
City:
State:
Zip:
Submittal Date: Thu Oct 03 08:30:35 EDT 2013

Committee Statement

Committee Statement:
Vertical pumps do not have suction pressure, it is lift as determined by the difference between the water level and the pump discharge flange.

Response Message:
Public Input No. 110-NFPA 20-2013 [Section No. 14.2.6.2.8]
14.2.6.3.2
The fire protection system shall be isolated and the pressure relief valve closed for the rated speed tests required in 14.2.6.3.1 14.2.6.3.1.1.

Submitter Information Verification

Submitter Full Name: [Not Specified]
Organization: [Not Specified]
Street Address:
City:
State:
Zip:
Submittal Date: Thu Oct 03 08:47:25 EDT 2013

Committee Statement

Committee Statement: Editorial correction of an incorrect reference. Currently the reference to 14.2.6.3.1 is sending us back to the requirement for the variable speed tests rather than to the rated speed tests of 14.2.6.3.1.1.
14.2.6.4 Multistage Multiport Pumps.
14.2.6.4.1 Each discharge outlet on a multistage multiport fire pump shall be tested in accordance with this standard.

Submitter Information Verification

Submitter Full Name: [Not Specified]
Organization: [Not Specified]
Street Address: [Not Specified]
City:
State:
Zip:
Submittal Date: Thu Oct 03 08:51:29 EDT 2013

Committee Statement

Committee Statement: Part of multiple stage multiple port fire pump requirements
Response Message:
Public Input No. 87-NFPA 20-2013 [New Section after 14.2.6.3.3]
14.2.6.5* 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.

Supplemental Information

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Submitter Information Verification

Submitter Full Name: Chad Duffy
Organization: National Fire Protection Assoc
Street Address: 
City: 
State: 
Zip: 
Submittal Date: Thu Oct 17 09:52:48 EDT 2013

Committee Statement

Committee Statement: Added new annex language providing guidance on the phrase varying voltage. This question comes up from the field from time to time.
A.14.2.6.4.5 The phrase "varying voltage" applies when the measurement of motor current is at a voltage above or below the motor rated voltage. This is because the motor running current varies inversely with the voltage applied to the motor, but the product is fairly constant (excepting the secondary effect of the out of phase magnetizing currents and minor core loss current). For example, a 460 Vac motor running at rated horsepower and rated at 100 FLA will draw 79.7 Kw electrical power (ignoring losses) E.g.: 460 x 100 x 1.732. The product off (average of the three phases) voltage and current will be a constant with moderate changes in the line voltage. In the above example the rated volts x amps (VA) product 46,000. At 480 Volts, the current drawn will be 95.6 amps (46,000/480). The current draw at 437 Volts (460-5%) would be 105.3 amps. Another method is to adjust the rated current by the inverse ratio of rated voltage to actual running voltage. For example, 100 x 460/480=95.8 and 100 X 460/437= 105.3 . also, The motor service factor (1.15) applies to fixed speed installations, But not variable speed applications(1.0). Hence for a fixed speed installation, the above example is allowed to have a maximum current on any phase of 115 amps at 460 Vac or 110.2 amps at 480 volts or 121 and at 437 Vac.
The voltage at the motor contactor output lugs shall not vary more than 5 percent below or 10 percent above rated (nameplate) voltage during the test. *(See Section 9.4.)*
14.2.7.3
An electric-driven fire pump shall be operated for a period of at least 5 minutes at full speed during each of the operations required in 14.2.6.2 14.2.7.2.

Submitter Information Verification

Submitter Full Name: [Not Specified]
Organization: [Not Specified]
Street Address:
City:
State:
Zip:
Submittal Date: Thu Oct 03 09:23:01 EDT 2013

Committee Statement

Committee Statement: Editorial correction. During the last revision cycle, when a new Section 14.2.5 was added, as per Proposal 20-205, the reference should have been renumbered during editing, as is being requested herewith. The subject matter is controller acceptance testing, but presently, this requirement is inappropriately making reference back to the requirements for fire pump flow testing.

Response Message:
A.4.13
Special consideration needs to be given to fire pump installations installed belowgrade. Light, heat, drainage, and ventilation are several of the variables that need to be addressed. Some locations or installations might not require a pump house. Where a pump room or pump house is required, it should be of ample size and located to permit short and properly arranged piping. The suction piping should receive first consideration. The pump house should preferably be a detached building of noncombustible construction. A one-story pump room with a combustible roof, either detached or well protected from an adjoining one-story building, is acceptable if sprinklered. Where a detached building is not feasible, the pump room should be located and constructed so as to protect the pump unit and controls from falling floors or machinery, and from fire that could drive away the pump operator or damage the pump unit or controls. Access to the pump room should be provided from outside the building. Where the use of brick or reinforced concrete is not feasible, metal lath and plaster is recommended for the construction of the pump room. The pump room or pump house should not be used for storage purposes. Vertical shaft turbine-type pumps might necessitate a removable panel in the pump house roof to permit the pump to be removed for inspection or repair. Proper clearances to equipment should be provided as recommended by the manufacturer’s drawings.

Submitter Information Verification
Submitter Full Name: [Not Specified]
Organization: [Not Specified]
Street Address:
City:
State:
Zip:
Submittal Date: Tue Oct 01 15:38:52 EDT 2013

Committee Statement
Committee Statement: If a fire pump is on an elevated platform to keep it above a flood level, the bottom of the pump controller should not be below this level. Language revised to eliminate ambiguity
Response Message: Public Input No. 52-NFPA 20-2013 [Section No. A.4.12]
A.4.18
Pipe breakage caused by movement can be greatly lessened and, in many cases, prevented by increasing flexibility between major parts of the piping. One part of the piping should never be held rigidly and another free to move without provisions for relieving the strain. Flexibility can be provided by the use of flexible couplings at critical points and by allowing clearances at walls and floors. Fire pump suction and discharge pipes should be treated the same as sprinkler risers for whatever portion is within a building. (See NFPA 13, Standard for the Installation of Sprinkler Systems.)

Holes through pump room fire walls should be packed with mineral wool or other suitable material held in place by pipe collars on each side of the wall. Pipes passing through foundation walls or pit walls into the ground should have clearance from these walls, but holes should be watertight. Space around pipes passing through pump room walls or pump house floors can be filled with asphalt mastic. The movement being addressed in Section 4.18 is settling of the system and possible vibration during the operation of the fire pump. The section does not address anticipated earthquake forces.

Submitter Information Verification
Submitter Full Name: Chad Duffy
Organization: National Fire Protection Assoc
Street Address:
City:
State:
Zip:
Submittal Date: Thu Oct 17 14:06:38 EDT 2013

Committee Statement
Committee Statement: It is important for the user to understand what loads they are protecting against, especially when a situation does not fit exactly in the standard. The reasons behind a requirement can dramatically assist the field scenarios where users and authorities have to sort out the best solution for the specifics of the site. It may also be beneficial to have this section, the general pointer for hanging requirements and the earthquake section successive in the standard.
See Figure A.4.19.2.1.

Figure A.4.19.2.1 Sample Pressure Relief Valve Calculation.
Submitter Information Verification

Submitter Full Name: [Not Specified]
Organization: [Not Specified]
Street Address: 
City: 
State: 
Zip: 
Submittal Date: Tue Oct 01 17:18:35 EDT 2013

Committee Statement

Committee Statement: Correcting error in original Table
Response Message:
Public Input No. 96-NFPA 20-2013 [Section No. A.4.18.2.1]
Outlets can be provided through the use of standard test headers, yard hydrants, wall hydrants, or standpipe hose valves.

The following notes apply to Figure A.4.21.1.2(a) and Figure A.4.21.1.2(b):

1. The distance from the flowmeter to either isolation valve should be as recommended by the meter manufacturer.

2. There should be a distance of not less than 5 diameters of suction pipe for top or bottom suction connection to the fire pump suction flange. For horizontal split-case fire pumps, there should be a distance of not less than 10 diameters of suction pipe for side connection (not recommended) to the fire pump suction flange. (See 4.14.6.3.1.)

3. Automatic air release should be provided if piping forms an inverted “U,” trapping air.

4. The fire protection system should have outlets available to test the fire pump and suction supply piping. (See A.4.21.3.1.)

5. The closed loop meter arrangement will test only net pump performance. It does not test the condition of the suction supply, valves, piping, and so forth.

6. Return piping should be arranged so that no air can be trapped that would eventually end up in the eye of the pump impeller.

7. Turbulence in the water entering the pump should be avoided to eliminate cavitation, which would reduce pump discharge and damage the pump impeller. For this reason, side connection is not recommended.

8. Prolonged recirculation can cause damaging heat buildup, unless some water is wasted.

9. The flowmeter should be installed according to manufacturer’s instructions.

10. Pressure sensing lines also need to be installed in accordance with 10.5.2.1. [See Figure A.4.31(a) and Figure A.4.31(b).]

**Figure A.4.21.1.2(a) Preferred Arrangement for Measuring Fire Pump Water Flow with Meter for Multiple Pumps and Water Supplies.** Water is permitted to discharge to a drain or to the fire pump water source. (See the text for information on the notes.)

**Figure A.4.21.1.2(b) Typical Arrangement for Measuring Fire Pump Water Flow with Meter.** Discharge from the flowmeter is recirculated to the fire pump suction line. (See the text for information on the notes.)
Submitter Information Verification

Submitter Full Name: [ Not Specified ]
Organization: [ Not Specified ]
Street Address:
City:
State:
Zip:
Submittal Date: Tue Oct 01 23:58:31 EDT 2013

Committee Statement

Committee Statement: NFPA 20 does not have restrictions on non horizontal shaft split case pumps (see 4.14.6.3.1).
Response Message:
First Revision No. 125-NFPA 20-2013 [ Section No. A.4.28.1.2 ]

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<td>NFPA 13, <em>Standard for the Installation of Sprinkler Systems</em>, contains specific requirements for seismic design of fire protection systems. It is a simplified approach that was developed to coincide with SEI/ASCE 7, <em>Minimum Design Loads for Buildings and Other Structures</em>, and current building codes.</td>
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<td>Thu Oct 17 14:33:24 EDT 2013</td>
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Committee Statement

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See Figure A.4.31(a) and Figure A.4.31(b).

**Figure A.4.31(a) Piping Connection for Each Automatic Pressure Switch (for Electric-Driven and Diesel Fire Pump and Jockey Pumps).**

**Figure A.4.31(b) Piping Connection for Pressure Sensing Line (Diesel Fire Pump).**

Notes:
1. Solenoid drain valve used for engine-driven fire pumps can be at A, B, or inside controller enclosure.
2. If water is clean, ground-face unions with noncorrosive diaphragms drilled for ¼ in. orifices can be used in place of the check valves.
Committee Statement

Committee Statement: Stainless steel is also an appropriate material.

Response Message:
A.4.31.3
The use of soft copper tubing is not permitted for a pressure sensing line because it is easily damaged.

Differentiation must be made between nominal pipe sizes and nominal tube sizes. The nominal pipe sizes are based on the approximate inside diameters of the pipe, whereas tube sizes are based on outside diameters. For example, nominal 1/2 in. (15 mm) copper Type K, L, or M, or Series 300 stainless steel pipe would be equivalent to nominal 5/8 in. (16 mm) or 0.625 in. (15 mm) O.D. tube.

Submitter Information Verification
Submitter Full Name: [ Not Specified ]
Organization: [ Not Specified ]
Street Address:
City:
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Submittal Date: Wed Oct 02 08:11:25 EDT 2013

Committee Statement
Committee Statement: In the fire protection business, as in NFPA 20, we habitually use the terms "pipe" and "tube" interchangeably, but in fact, in industry there are two ways of sizing copper and stainless steel piping materials - by inside diameter (pipe) or by outside diameter (tube). This difference should be pointed out, as there have been instances where a purchaser has unknowingly ordered 1/2 in. tube - thinking it was the same thing as 1/2 in. pipe, and thus receiving material that in fire protection would be classified as 1/2 in. pipe.

Response Message:
A.8.5.2
Positive displacement pumps are capable of quickly exceeding their maximum design discharge pressure if operated against a closed discharge system. Other forms of protective devices (e.g., automatic shutdowns, rupture discs) are considered a part of the pumping system and are generally beyond the scope of the pump manufacturer's supply. These components should be safely designed into and supplied by the system designer or by the user, or both. (See Figure A.8.5.2(a) and A.8.5.2(b) for proposed schematic layout of pump requirements.)

Figure A.8.5.2(a) Typical Foam Pump Piping and Fittings with Relief Back to Suction.

Figure A.8.5.2(b) Typical Foam Pump Piping and Fittings with Relief to Tank Return.
Submitter Information Verification

Submitter Full Name: Chad Duffy
Organization: National Fire Protection Assoc
Street Address:
City:
State:
Zip:
Submittal Date: Tue Oct 22 15:07:27 EDT 2013

Committee Statement

Committee Statement: New figures added to represent revisions in the standard requirements.
Response Message:
NOTES:
1. ATMOSPHERIC STORAGE TANK SHOULD HAVE APPROXIMATE 1/4" LAYER OF MINERAL OIL ADDED TO SEAL THE CONCENTRATE AND MINIMIZE THE EFFECTS OF EVAPORATION.
2. FOAM SYSTEM MAY BE WET PIPE, DRY PIPE, PREACTION, DELUGE OR MANUAL TYPE.
3. ARROWS INDICATE DIRECTION OF FLOW.
4. THE HYDRAULIC CONCENTRATE VALVE MAY BE ELIMINATED ONLY ON MANUAL SYSTEMS WHERE THE OPERATOR WILL MANUALLY OPEN THE CONCENTRATE VALVE.
5. STRAIGHT PIPE LENGTH MINIMUM 5 TIMES PROPORTIONER DIAMETER
6. STRAIGHT PIPE LENGTH MINIMUM 2.5 TIMES PROPORTIONER DIAMETER
NOTES:
1. ATMOSPHERIC STORAGE TANK SHOULD HAVE APPROXIMATE 1/4" LAYER OF MINERAL OIL ADDED TO SEAL THE CONCENTRATE AND MINIMIZE THE EFFECTS OF EVAPORATION.
2. FOAM SYSTEM MAY BE WET PIPE, DRY PIPE, PREACTION, DELUGE OR MANUAL TYPE.
3. ARROWS INDICATE DIRECTION OF FLOW.
4. THE HYDRAULIC CONCENTRATE VALVE MAY BE ELIMINATED ONLY ON MANUAL SYSTEMS WHERE THE OPERATOR WILL MANUALLY OPEN THE CONCENTRATE VALVE.
5. STRAIGHT PIPE LENGTH MINIMUM 5 TIMES PROPORTIONER DIAMETER
6. STRAIGHT PIPE LENGTH MINIMUM 2.5 TIMES PREPENTIONER DIAMETER
7. PER NFPA 20 - "SAFETY RELIEF VALVE SHALL BE PIPED TO RETURN THE VALVE DISCHARGE TO THE CONCENTRATE SUPPLY TANK".
NO OTHER VALVE SHALL BE INSTALLED IN THIS PIPE SECTION.
A.8.5.3
Only the return to source and external styles tank return line and external valves should be used when the outlet line can be closed for more than a few minutes. Operation of a pump with an integral relief valve and a closed outlet line will cause overheating of the pump and a foamy discharge of fluid after the outlet line is reopened. Means of thermal relief should be considered when discharge is piped back to pump suction. Overheating of the pump and subsequent damage to the pump can occur quickly if the pump is operated against a closed outlet line and the relief valve discharge is piped back to suction.

Submitter Information Verification

Submitter Full Name: [Not Specified]
Organization: [Not Specified]
Street Address: [Not Specified]
City: 
State: 
Zip: 
Submittal Date: Wed Oct 02 09:36:33 EDT 2013

Committee Statement

Committee Statement: Adding allowance for safety relief valve to be piped to tank return line since tank connections are often limited. Revision to annex material required to correlate code material and annex material.

Response Message:
A.9.3.2
A reliable power source possesses the following characteristics:

1. The source power plant has not experienced any shutdowns longer than 4\text{ 10} continuous hours in the year prior to plan submittal. NFPA 25, \textit{Standard for the Inspection, Testing, and Maintenance of Water-Based Fire Protection Systems}, requires special undertakings (i.e., fire watches) when a water-based fire protection system is taken out of service for longer than 4\text{ 10} hours. If the normal source power plant has been intentionally shut down for longer than 4\text{ 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. The standard is not intended to require that the normal source of power be infallible to deem the power reliable. NFPA 20 does not intend to require a backup source of power for every installation using an electric motor–driven fire pump. The standard is not intended to require that the normal source of power be infallible to deem the power reliable. NFPA 20 does not intend to require a backup source of power for every installation using an electric motor–driven fire pump. Note that should the normal source of power fail in a rare event, the impairment procedures of NFPA 25 could be followed to mitigate the fire risk. If a fire does occur during the power loss, the fire protection system could be supplied through the fire department connection.

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 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. \textit{IEEE 493, Recommended Practice for the Design of Reliable Industrial and Commercial Power Systems}


3. "Reliability analysis for power to fire pump using Fault Tree and RBD,” in \textit{IEEE Transactions on Industry Applications}


5. "NEC Article 708,” in IEEE Industry Application Magazine, Jan-Feb 2011
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<td>Public Input No. 60-NFPA 20-2013 [Section No. A.9.3.2]</td>
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A.11.4.4

NFPA 31, *Standard for the Installation of Oil-Burning Equipment*, can be used as a guide for diesel fuel piping. Figure A.11.4.4 shows a suggested diesel engine fuel system.

**Figure A.11.4.4 Fuel System for Diesel Engine–Driven Fire Pump.**

Supplemental Information

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Submitter Information Verification

Submitter Full Name: [ Not Specified ]
Organization: [ Not Specified ]
Street Address:  
City:  
State:  
Zip:  
Submittal Date: Thu Oct 03 09:49:18 EDT 2013

Committee Statement

Committee Statement: Currently fuel connection requirements are scattered throughout the section. This proposal is provided to provide clarity for the user. The only additional requirements included in this proposal are:
- The specification of tank vent connection of 2 in. (508.8 mm) NPT or in proposed 11.4.1.2.5.3.1 -
- The addition of a connection for an active fuel maintenance system in 11.4.1.2.5.7. Last cycle this TC
determined to leave the implementation decision of an active fuel maintenance system to NFPA 25. However, if NFPA 20 does not install a fuel tank with a suitable connection for the return pipe, the system cannot be appropriately installed if and when the owner decided to implement a system. This proposed requirement is only for a connection and a plug. Correct flow direction of check valve.

Response
Message:
Public Input No. 174-NFPA 20-2013 [New Section after A.11.3.2.4.3.4]
Public Input No. 187-NFPA 20-2013 [Section No. A.11.4.4]
Public Input No. 188-NFPA 20-2013 [Section No. A.11.4.4]
FIGURE A.11.4.4 Fuel System for Diesel Engine-Driven Fire Pumps
A.11.6.4

Active systems that are permanently added to fuel tanks for removing water and particulates from the fuel can be acceptable, provided the following apply:

All connections are made directly to the tank and are not interconnected with the engine or its fuel supply and return piping in any way.

There are no valves or other devices added to the engine or its fuel supply and return piping in any way.

Commercial distillate fuel oils used in modern diesel engines are subject to numerous detrimental effects during storage. The origin of the crude oil, refinement processing techniques, time of year, and geographical consumption location all influence the determination of fuel blend formulas. Naturally occurring gums, waxes, soluble metallic soaps, water, dirt, blends, and temperature all contribute to the degradation of the fuel as it is handled and stored. These effects begin at the time of fuel refinement and continue until consumption. Proper maintenance of stored distillate fuel is critical for engine operation, efficiency, and longevity.

Storage tanks should be kept waterfree. Water contributes to steel tank corrosion and the development of microbiological growth where fuel and water interface. These problems together with the metals of the system provide elements that react with fuel to form certain gels or organic acids, resulting in clogging of filters and system corrosion. Scheduled fuel maintenance helps to reduce fuel degradation. Fuel maintenance filtration can remove contaminants and water and maintain fuel conditions to provide reliability and efficiency for standby fire pump engines. Fuel maintenance and testing should begin the day of installation and first fill.

Submitter Information Verification

Submitter Full Name: [Not Specified]
Organization: [Not Specified]
Street Address:
City:
State:
Zip:
Submittal Date: Fri Oct 11 13:20:28 EDT 2013

Committee Statement

Committee Statement: New requirements for active fuel maintenance systems has been added providing guidance for the installation of these systems when used. These requirements provide provisions which will allow the active fuel maintenance system to be installed either at the time of construction or at a later date. This coordinates with the changes made to NFPA 25, which currently provides guidance on the inspection, testing and maintenance of such systems.

Response Message:
Public Input No. 10-NFPA 20-2013 [Section No. A.11.6.4]
A.12.4.2.3(3)
The following signals should be monitored remotely from the controller:

(1) A common signal can be used for the following trouble indications: the items in 12.4.1.4(1) through 12.4.1.4(7) and loss of output of battery charger on the load side of the dc overcurrent protective device.

*If there is no other way to supervise loss of power, the controller can be equipped with a power failure circuit, which should be time delayed to start the engine upon loss of current output of the battery charger.*

(2) The arrangement specified in A.12.4.2.3(2) is only permitted where approved by the authority having jurisdiction in accordance with Section 1.5 and allows, upon loss of the ac power supply, the batteries to maintain their charge, activates ventilation in case conditions require cooling the engine, and/or maintains engine temperature in case conditions require heating the engine. *(See also A.4.6.4 and A.11.4.1.3.1.)*

### Submitter Information Verification

**Submitter Full Name:** Chad Duffy  
**Organization:** National Fire Protection Assoc  
**Street Address:**  
**City:**  
**State:**  
**Zip:**  
**Submittal Date:** Fri Oct 18 08:51:39 EDT 2013

### Committee Statement

**Committee Statement:** Upon loss of AC power the charger, which maintains the batteries, will no longer be functioning. If automatic starting is allowed during this time it could deplete the batteries and compromise the fire pumps ability to start during a running cause (fire).
### D.1.1 NFPA Publications

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


### Submitter Information Verification

- **Submitter Full Name:** Chad Duffy
- **Organization:** National Fire Protection Assoc
- **Street Address:**
- **City:**
- **State:**
- **Zip:**
- **Submittal Date:** Tue Oct 22 15:13:48 EDT 2013

### Committee Statement

- **Committee Statement:** References updated per manual of style.
- **Response Message:**
First Revision No. 141-NFPA 20-2013 [Section No. C.1.2.1]

D.1.2.1 ANSI Publications.
American National Standards Institute, Inc., 25 West 43rd Street, 4th Floor, New York, NY 10036.

Submitter Information Verification

Submitter Full Name: Chad Duffy
Organization: National Fire Protection Assoc
Street Address:
City:
State:
Zip:
Submittal Date: Wed Oct 23 08:00:05 EDT 2013

Committee Statement

Committee Statement: Reference updated per manual of style.
Response Message:
First Revision No. 142-NFPA 20-2013 [ Section No. C.1.2.3 ]

D.1.2.3  AWWA Publications.
American Water Works Association, 6666 West Quincy Avenue, Denver, CO 80235.


Submitter Information Verification

Submitter Full Name: Chad Duffy
Organization: National Fire Protection Assoc
Street Address:
City:
State:
Zip:
Submittal Date: Wed Oct 23 08:03:06 EDT 2013

Committee Statement

Committee Statement: References updated per manual of style.
Response Message:
First Revision No. 143-NFPA 20-2013 [Section No. C.1.2.4]

D.1.2.4 HI Publications.
Hydraulic Institute, 6 Campus Drive, First Floor North, Parsippany, NJ 07054-4406.


Submitter Information Verification

**Submitter Full Name:** Chad Duffy  
**Organization:** National Fire Protection Assoc

**Street Address:**
**City:**
**State:**
**Zip:**  
**Submittal Date:** Wed Oct 23 08:11:34 EDT 2013

Committee Statement

**Committee Statement:** References updated per manual of style.

**Response Message:**
D.1.2.5 IEEE Publications.
Institute of Electrical and Electronics Engineers, Three Park Avenue, 17th Floor, New York, NY 10016-5997.


Submitter Information Verification

Submitter Full Name: [ Not Specified ]
Organization: [ Not Specified ]
Street Address: 
City: 
State: 
Zip: 
Submittal Date: Thu Oct 03 09:40:32 EDT 2013

Committee Statement

Committee Statement: The Fire Protection Research Foundation has published "Guidance Document for Incorporating Risk Concepts into NFPA Codes and Standards", March 2007. The text proposed to be added to NFPA 20 supplies bibliographic references to works that describe how to perform risk analyses.

Response Message: Public Input No. 158-NFPA 20-2013 [Section No. C.1.2.5]
First Revision No. 144-NFPA 20-2013 [ Section No. C.1.2.7 ]

D.1.2.7 SAE Publications.
Society of Automotive Engineers, 400 Commonwealth Drive, Warrendale, PA 15096.

Submitter Information Verification

Submitter Full Name: Chad Duffy
Organization: National Fire Protection Assoc
Street Address:
City:
State:
Zip:
Submittal Date: Wed Oct 23 08:20:07 EDT 2013

Committee Statement

Committee Statement: References updated per manual of style.
Response Message:
First Revision No. 145-NFPA 20-2013 [Section No. C.1.2.8]

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**Submitter Information Verification**

- **Submitter Full Name:** Chad Duffy  
- **Organization:** National Fire Protection Assoc  
- **Street Address:**  
- **City:**  
- **State:**  
- **Zip:**  
- **Submittal Date:** Wed Oct 23 08:21:41 EDT 2013

**Committee Statement**

- **Committee Statement:** References updated per manual of style.  
- **Response Message:**  

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http://submittals.nfpa.org/TerraViewWeb/ContentFetcher?commentPara...
First Revision No. 111-NFPA 20-2013 [ New Section after C.3 ]

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- **Organization:** [ Not Specified ]
- **Street Address:**
- **City:**
- **State:**
- **Zip:**
- **Submittal Date:** Thu Oct 03 11:18:15 EDT 2013

Committee Statement

- **Committee Statement:** The committee desires to explore connectivity and has developed Annex D as a starting point.
- **Response Message:**

Committee:

- The committee desires to explore connectivity and has developed Annex D as a starting point.

Response Message:
Renumber extant Annex “D” as Annex “E”.

*This annex is not a part of the requirements of this NFPA document but is included for informational purposes only.*

**T.O.C.:**
D.1 -- Scope
D.2 -- Definitions
D.3 -- Possible Configurations
D.4 -- Security Risks (Hazards)
D.5 -- Risk Mitigation Methods
D.6 -- Standardization of Parameters
D.7 -- Other Considerations
D.8 Recommended requirements

**D.1 -- Scope**

D.1.1 This annex covers considerations relating to the access of fire pump controllers, including access methods, security considerations, accessible information, potential use of accessible information, long term improvement in reliability, and standardization that allows the full potential of connectivity to be met.

D.1.2 Potential use of accessible information includes remote supervision, remote monitoring that may include specific components for failure forecasting / component replacement, reliability analysis for owner, manufacturer, and NFPA or similar group.

D.1.3 Connectivity for remote testing and control is a complex issue that is not adequately covered or understood and is not recommended at this time.

D.1.4 The access may be local, such as a port (USB, RS-232, RS-485), or by remote access over any communication channel, such as phone line, Ethernet, Internet, Local Network (LAN), or other.

D.1.5 This annex includes: Possible controller access configurations (D.3), security considerations (D.4), Some protection methods (D.5) and standardization issues (D.6). Standardization means standardization per se. E.g.: Defining common data formats and etc. to allow access to a defined common set of data in any compliant controller. Controllers may also have proprietary data beyond the defined common set.

D.1.6 Remote or local access to fire pump controller stored data has been in existence for over 20 years; but, each manufacturer used proprietary means for accessing (reading or downloading...
or transferring) this data. There is a perceived need to extend this means to fire pump controllers in general using some amount of commonality.

D.1.7 While none of the clauses in this Annex are enforceable, future versions will have enforceable requirements or provisions. These will be moved into the main body of this NFPA-20 standard. The more technical aspects will remain in the Annex or be deleted in the future.

D.1.8 This is a new topic. The Fire Pump Technical Committee invites public input into this new topic.

D.2 -- General Definitions: [not yet alphabetical]

D.2.1 LAN. Local Area Network. May consist of either routable or non-routable IP addresses

D.2.2 WAN. Wide area network. Consists of two or more locations under the control of a single entity (corporation or other entity). IP addresses must be routable in order to be visible from other locations.

D.2.3 Internet. Same as WAN except accessible by the public.

D.2.4 Routable. IP address(s) which is part of a routing table in a network (internet) router (or switch). These are visible to the outside world.

D.2.5 Non-routable. IP address(s) reserved for LAN use. These are not visible outside the local network. Typical LAN addresses are: 10.x.y.z, 19D.2.168.x.y, and 17D.2.16/3D.2.x.y

D.2.6 IP-4 (IPV4). Internet Version 4. Most of the extant internet is IP-4. LAN address are specific to IP-4. IP-4 uses 32 bit addresses (4 x 8) and has around 4.3 billion addresses.

D.2.7 IP-6 (IPV6). Latest (next) Internet Version. Most of the current Internet is IP-V. All IP-6 addresses are routable. IP-6 uses 128 bit addresses and provides many times more addresses than IP-4.

D.2.8 IP. Internet Protocol


D.2.10 Encode. Encrypt. May be used to hide data, passwords, access information & etc.

D.2.11 Serial Protocol. Data format used in various commercial data/and/or control schemes involving multiple pieces of equipment. Examples are ModBus, LonWorks, BacNet, CAN bus, and etc.


D.2.14 Connectivity. The issues involved with communicating with (connecting to) fire pump controllers.

D.2.15 Access. The ability to interrogate a controller in order to be able to read or download data. This may also include means of sending data or commands to a controller. This section addresses both local access and remote access.

D.2.16 User. The person or entity which accesses or desires to access a FPC or FPCs.

D.2.17 Serial Port. The electrical connection (electrical connector) to circuitry which provides and complies with a serial protocol

D.2.18 USB port. The connection (connector) to circuitry which provides and complies with the Universal Serial Bus protocol. This is the same as USB connection on personal devices (computers & etc.).

D.2.19 Circuitry. The electrical circuitry; but, including possibly controller program code (firmware).

D.2.20 Firmware. Permanently stored processor program code (software); also called embedded program code.

D.2.21 Mapping. Mapping a device’s IP address (usually a LAN address) into another IP address (usually a WAN or a routable address)

D.2.22 IT Department. The company’s Information Technology (computer) department.

D.2.23 Ethernet. High speed serial connection. Each Ethernet device has (should have) a unique Ethernet MAC (Media Access Control) address. These are 48 bit (12 hexadecimal digit) addresses such as: 00:A0:C9:14:C8:29.

D.2.24 Internet. The world of devices with routable IP addresses.

D.2.25 “Cloud” The world of Internet connected devices and services.

D.2.26 PAN. Private Areas Network. These are short range wireless networks such as: Bluetooth, ZigBee, infrared, RFID, among others.

D.3 -- Possible Configurations

D.3.1 Standalone Controllers (FPCs) – Controllers not connected to any network.

D.3.1.1 These have no permanent physical (wired) or wireless connection.

D.3.1.2 This is almost universal in modern controllers. Manual (user) intervention is required to
D.3.1.3 User Connection. This may be any of several means, such as a Serial Port or a USB Port.

D.3.1.4 There are potential dangers (security hazards) to these access means. The dangers may be accidental (inadvertent) or malicious (willful) occurrences.

D.3.1.5 Potential damage may include corrupting the stored data or the access circuitry or firmware, either the data access means and/or the fire protection related firmware.

D.3.2 Controllers (FPCs) permanently connected to a network

D.3.2.1 Private (premise) permanently wired methods may be include: Phone modem; Serial Port or USP Port with local serial Protocols (BACnet, Modbus, LonWorks, CAN bus & etc.); Ethernet (IEEE 802.3).

D.3.2.2 Public accessible connections (wired or wireless) may: have a factory pre-assigned (default) LAN IP address(s), or addresses; be the same or different among manufacturers, [need input from NEMA SC-10.]; or have a routable (public accessible), which is usually assigned by the premise owner’s IT department.

D.3.2.2 Permanent wireless connection. These can be: WiFi (IEEE 802.11), LAN or Routable; Cellular (any of various services), PAN.

D.4 -- Security Concerns.

D.4.1 General. Fire pump controllers (FPCs) are usually critical to life safety and property protection. Modern FPCs make use of internal embedded processors (microprocessors or microcontrollers). These are subject to damage or derangement if the program (program code) or data is damaged or compromises.

D.4.2 Standalone units. These are at risk whenever anyone plugs into the data access port (USP or other) via a computer (laptop, tablet, etc), smart phone, or a thumb drive (memory stick). Damage can be electrical or to data or software. This damage may pose a risk to the fire pump starting function.

D.4.2.1 Inadvertent damage. The device used to access the data may be damaged or have an
infection (virus) which may infect the fire pump controller. Inadvertent threats include:

D.4.2.1.1 Accidental altering controller while connected to a lap-top, cell phone or etc. (remotely or locally)

D.4.2.1.2 Lightning hits (mainly induced surges from nearby hits)

D.4.2.1.3 Local (building) network problems (LANs)

D.4.2.1.4 Ditto for Wide Area (corporate) networks (WANs)

D.4.2.1.5 Internet or "Cloud" problems

D.4.3 Malicious intent. All devices with a routable IP address are discovered within minutes of being connected to the internet. Further, connected (routable) devices are constantly being scanned.

D.4.4 Infections

D.4.4.1 Computers (laptops, tablets, etc.) are frequently infected with viruses, key-loggers, Trojan Horses & etc. despite installed anti-virus software. Many of these allow the infected machine to be used for malicious intents.

D.4.4.2 Corporate and premise networks are often compromised despite professional IT departments. This includes large corporations.

D.4.4.3 Web pages are often infected. Web pages can be shutdown, masquerade as another web page ("spoofing"), or used to gather data.

D.4.4.5 Web servers can also be come infected and forced to use hosted web pages for malicious purposes.

D.4.5 Potential Damage to controllers.

D.4.5.1 Single Installations: Disable PUMP starting, False starting (cause a Fire Alarm), False or reset weekly test time (cause a fire alarm), of a disabled controller.

D.4.5.2 Multiple Installations: simultaneous instances of any or all of the above in order to hamper municipal services such as the local fire departments or the 911 centers

D.4.6 Motivations for Attackers. Some include: simple mischief or curiosity (hackers); desire to commit arson; business disruption; corporate blackmail; mask criminal activity; disrupt a COPS site or sites; reprisal (disgruntled employees or former ones); foreign enemies, including terrorists; disruption of critical services; damage a competitors reputation.

D.4.7 Remote Control Hazards.

D.4.7.1 Allowing remote starting and/or stopping a fire pump implies outside world access to the basic control software. This limits or negates the effectiveness of any firewalls.
D.4.8 Corrupting a fire pump controller’s data or software (firmware) is made easier if the attacker knows said controller software. This is often done by one or more techniques.

D.4.8.1 Malicious access to controller firmware:

D.4.8.1.1 Corruption of controller manufacturer's network via numerous attack schemes.

D.4.8.1.2 Compromised employees or service personnel

D.4.8.1.3 Faux service personnel, vendors, etc.

D.4.8.1.4 Access by employees' smart phones, lap-tops or tablets,

D.4.8.1.5 Direct or indirect via home connection

D.4.8.1.6 Key-loggers or other infections of manufacturers computers

D.5 -- Risk Mitigation Methods. Any single method can be, and are, compromised. The use of multiple methods of protection reduce the likelihood of successful attacks.

D.5.1 Risk Assessment includes as a minimum both the likelihood and the frequency of an identified risk or hazard. See the risk assessment method of NFPA-70 Article 708 for an example.

D.5.2 Some means of protection include: Password protection (needs minimum requirements), encryption, software firewall, hardware firewall (separate processors for data access versus fire pump controlling).

D.5.3 Passwords are easily compromised; but, more comprehensive ones take longer.

D.5.4 Encryption. Various methods include: HTTPS (SSL), RC5 and public-private key encryption. Anything less than 128 bit encryption methods are easily cracked in minutes by a determined attacker.

D.5.5 Other methods

D.5.5.1 Use of non-standard ports (only limited help since encryption is vital)

D.5.5.2 Call back for dial-up links (See Note 3)

D.5.5.3 Limit IP access to specific IP addresses(s) (white list)

D.5.5.4 Limit access to specific MAC address(s)

D.5.6 Protecting controller software (source code).

D.5.6.1 Limit the number of copies

D.5.6.2 Limit access to software (source or object code)
D.5.6.3 Effective Encryption of code

D.6 -- Standardization of Parameters

D.6.1 Standardization per se. Note: Input from NEMA SC-10 needed on these. Namely what should be common between various controller brands and definition of said common elements (data, methods, protection, etc.).

D.6.2) Message Format

D.6.3) Allowed local network types: RS-232, RS-485, Ethernet (TCP/IP), and protocols: CAN bus, BACnet, Modbus, LonWorks or other(s).

D.6.4) LAN Access default address or addresses.

D.6.5) Which/What controller Parameters and/or Alarms to be available from all controllers

D.6.5.1) Diesel Controllers:

D.6.5.1.1) Standard three "group" alarms (Running, Switch Off, Engine/Controller Failure)
D.6.5.1.2) Individual engine/controller alarms
D.6.5.1.3) Controller's optional engine/controller alarms
D.6.5.1.4) Analog Parameters: Pressure, A.C., D.C. Voltages, cranking times

D.6.5.2) Electric Motor Controllers:

D.6.5.2.1) Standard three alarms (Running, Power Fail/Available Phase Reversal/Normal)
D.6.5.2.2) Controller's optional engine/controller alarms
D.6.5.2.3) Analog Parameters: Pressure, Volts, Amps

D.6.5.3) Common to either type of controller

D.6.5.3.1) Running Hours, Number of starts
D.6.5.3.2) Controller info.: Mfr., Model, Date(s)
D.6.5.3.3) Firmware version

D.6.6) Security Methods

D.6.6.1) Minimums?

D.6.6.2) Methods to be implemented on all accessible controllers

D.6.6.3) Allow controller to obtain Time/Date remotely?
D.6.7) Time/Date stamp formats
D.6.7.1) Uniform among mfr’s?
D.6.7.2) Allowed format(s)?
D.6.8) Other?

D.7 -- Other Considerations
D.7.1 Who shall downloaded data be treated. Who owns the data? What permissions are needed, and by whom.
D.7.2 Can gathered data be used to predict any impending failures? If so, how and by whom.
D.7.3 How many levels of security should be used to control access to different portions of fire pump controllers.
D.7.4 What is experience of other similar networks, including wireless fire alarm equipment?
D.7.5 Pros and cons of interconnection (or being part of) building management systems
D.7.6 What amount of incoming commands should be allowed?
D.7.7 Is input or coordination with NFPA-25 or NFPA-72 needed or desirable?
D.7.8 Can and should pump curve be stored in controller?

D.7.9 Prohibit remote control (starting / stopping) until suitable requirements can be established?

D.8 Recommended Requirements
D.8.1 Separate access protocols should be used for the follow access level
D.8.1.1 Read only access to performance information – Level 1
D.8.1.2 Access for statistical analysis by independent body – Level 2a
D.8.1.3 Access for manufacturer analysis – fire pump – Level 2b
D.8.1.4 Access for manufacturer analysis – controller – Level 2c
D.8.1.5 Access for remote control of settings – Level 3 that requires a local switch to activate, and automatic return to local protection in one hour.
D.8.1.6 Access for remote testing – Level 2d with alarm to be triggered if pump is not restored to automatic mode within one hour.
D.8.1.7 Remote operation of fire pump – Currently not recommended. If done, monitoring that is
completely independent of and not accessible by the remote operation independently should report any condition that might impair the fire pump operation.

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Revisions: