



MOBILE FIRE - RESCUE DEPARTMENT FIRE CODE ADMINISTRATION

Fire Pump Plan Review 2009 International Fire Code and NFPA 20

Date of Review ___/___/_____ BLD201__ - _____

Project Address: _____ Project Name: _____

Contractor's Business Name: _____ Phone: _____

Contractors Name: _____

Pump Manufacturer: _____ Pump Model: _____

Controller Manufacturer: _____ Controller Model: _____

Driver Type: _____ Driver Manufacturer: _____

Reference numbers following checklist statements represent an NFPA code section unless otherwise specified.

Checklist Legend: √ or OK = acceptable N = need to provide NA = not applicable

1. _____ Two sets of drawings are provided.
2. _____ Equipment is listed for intended use, product listing data sheets are provided, 4.1.2.1, 4.7.1.
3. _____ A copy of a fire hydrant flow test summary sheet is provided, which includes static and residual pressures, flow rate, and location of test hydrant(s).

Drawings shall show the following:

4. _____ Scale: _____, a common architectural scale is used and the plan information is legible.
5. _____ Plan view and cross-sectional views of installed equipment are provided, 4.2.
6. _____ Room dimensions are provided.

7. ____ Equipment symbol legend is provided.
8. ____ Suction pipe flushing requirements from Tables 14.1.1.1(a, b) are on the plans.
9. ____ Plot plan illustrating connection to the water supply pipe and pipe diameter, and the pipe routing from the source to the fire pump.
10. ____ Driver, pump, and controller manufacturer, respective models, and driver type are specified.
11. ____ Copy of the factory pump test curve is provided, 4.5.
12. ____ Pump GPM rating: _____ Head rating: _____ RPM: _____ are provided.
13. ____ A pressure gauge complying with 4.10.1 is detailed as installed near the discharge casting.
14. ____ A compound and vacuum pressure gauge complying with 5.10.2.1 are detailed as installed to the suction pipe (does not apply to vertical shaft turbine-type pumps taking suction from a well or open pit)
15. ____ An automatic relief valve complying with 4.11.1 is detailed as installed on the discharge side of the pump before the discharge check valve and it discharges to the drain. This requirement does not apply to engine-driven pumps provide cooling water from its discharge to the engine.
16. ____ Fire pump rooms are separated from other areas of the building by 2-hour fire barriers in accordance with IBC 707 and 712. 1-hour fire barriers are permitted in other than high-rise buildings or a separation is not required for pumps physically separated in accordance with NFPA 20, IBC 913.2.1.
17. ____ Fire pumps in high-rise buildings are separated by 2-hour fire-rated construction, IBC 913.2.1.
18. ____ The fire pump room containing a diesel pump driver and fuel storage tanks is protected by an automatic sprinkler system in compliance with NFPA 13, 4.12.1.3.
19. ____ Outdoor fire pump unit is placed at least 50 ft. from any building that would be an exposure, 4.12.1.2.
20. ____ When required by the environment or engine manufacturer, the fire pump room has a heat source in accordance with Section 4.12.2.
21. ____ Emergency lighting for the fire pump room is provided in accordance with Section 4.12.5.
22. ____ Ventilation is provided in the pump room, 4.12.6.
23. ____ The pump room floor is adequately pitched to provide drainage and it drains to a frost-free location, 4.12.7.
24. ____ The coupling guards for the flexible couplings or shaft connections between the pump driver and pump are noted or illustrated and in compliance with Section 8 of ANSI B15.1, 4.12.8.

25. ____ If used, the operating angle of a flexible connecting shaft is detailed and does not exceed the manufacturer listing requirements, 7.5.1.8.2.
26. ____ Size and type of pump suction and discharge pipe used are specified and detailed.
27. ____ Steel pipe size is specified for above-ground pipe, 4.13.1.
28. ____ The method of joining the steel pipe is specified, 4.13.2.

Suction Pipe and Fittings:

29. ____ Size of the suction pipe upstream of the suction flange and within 10 pipe diameters is in accordance with Table 4.26 (a or b), 4.14.3.4.
30. ____ An OS & Y gate valve is located in the suction piping and no other valve except an OS&Y valve is within 50 ft. of pump suction flange, 4.14.5.
31. ____ The installation of elbows and tees shall be in accordance with Section 4.14.6.3.
32. ____ If provided, eccentric taper reducer or increaser (for suction pipe and pump flange size differentials) is detailed and complies with Section 4.14.6.4.
33. ____ For open source water supplies a double intake suction screen is detailed at the suction intake. The screen size is noted and is designed to be at least 1 sq. in. per 1 gpm at 150 percent of the rated capacity, 4.14.8.
34. ____ Screens for open water source are removable and the screen material is specified, 4.14.8.6.
35. ____ Screens have at least a 62.5 percent open area, 4.14.8.11.
36. ____ When devices are installed in the suction piping they shall comply with Section 4.14.9.
37. ____ Vortex plate is provided and detailed on the suction fitting that obtains water from a stored water supply, 4.14.10.

Discharge Pipe and Fittings:

38. ____ The size of the pump discharge pipe and fittings are in accordance with Table 4.26 (a or b), 4.15.5.
39. ____ A listed check valve or backflow prevention device is in the pump discharge assembly, 4.15.6.
40. ____ Indicating gate or butterfly valve is on system side of the check valve, 4.15.7.

General:

41. ____ When required, a pressure relief valve for centrifugal pump is provided in accordance with Section 4.18.1.
42. ____ The pressure relief valve's listing data sheet is provided and the valve is either spring loaded or pilot-diaphragm type, 4.18.4.

43. _____ Pressure relief valve discharge is designed in accordance with Section 5.18.5.
44. _____ The size of the discharge pipe is in accordance with Table 4.26 (a or b), 4.18.5. If the pipe has more than 1 elbow, enlarge the pipe one size.
45. _____ A maximum of three pumps can be arranged in series, 4.19.2.1.
46. _____ Pumps arranged in series shall not have pressure reducing or regulating valves installed between pumps, 4.19.2.3.
47. _____ The test header pipe diameter, number of hose valves, or the flow meter size and piping are detailed in compliance with Table 4.26, 4.20. The test header is located on the exterior wall, 4.20.1.4.
48. _____ The location of the backflow prevention device is detailed, and the listing data sheet and friction loss information are provided, 4.26.1.
49. _____ The pressure maintenance (jockey or make-up) pump location and piping are detailed and specification data sheets are provided, 4.25.
50. _____ A check valve in the pressure maintenance pump discharge pipe is detailed and the location of gate or butterfly valves for allowing component repair is detailed, 4.25.5.4.
51. _____ Where located, check valves and backflow prevention devices or assemblies are located a minimum 10 pipe diameters from the pump suction flange, 4.27.3.
52. _____ For seismic design areas, the fire pump, driver and associated equipment and piping are provided earthquake protection in accordance with Section 4.28 and seismic calculations for each method of protecting equipment are provided.
53. _____ Packaged fire pump, house, and skid/unit are in compliance with 4.29 and design details are provided.
54. _____ Pressure sensing line details are provided and the lines are located between the pump discharge check valve and discharge control valve, 4.30.
55. _____ Break tank use is as a backflow prevention device or to eliminate city water pressure fluctuations or to augment the city water supply, 4.31.1.
56. _____ Break tank capacity provides at least 15 minutes of water at 150 percent of the pump's rated capacity, 4.31.2.
57. _____ The design of the break tank refill equipment is in accordance with 4.30.3.
58. _____ The break tank installation complies with NFPA 22, 4.31.4.
59. _____ Pumps for high-rise structures detail the requirements for location, test headers, backup pumps, water supply tanks, and valves on the plans in accordance with Chapter 5.

Centrifugal Pumps:

60. ____ The selected centrifugal pump is specified and meets the design requirements of 6.1.1.
61. ____ Centrifugal pump is not used with a water supply that requires a static suction lift, 6.1.2.
62. ____ When required, the automatically controlled centrifugal pump has a float operated air release valve at least ½ in. diameter, 6.3.3.
63. ____ The foundation and setting for the pump are detailed and in compliance with Section, 6.4.
64. ____ The method of securing the pump base plate to the foundation is detailed, 6.4.3.

Vertical Shaft Turbine-Type Pumps:

65. ____ Detailed for well installations is the submergence level of the second pump impeller level being at least 10 ft. below the water level and 1 ft. submergence is added for each 1,000 ft. of elevation, 7.2.2.1.1, 7.2.2.1.2.
66. ____ Detailed for wet pit installations is the submergence level of the second pump impeller level being below the lowest pumping level of the open body of supply water. A greater submergence is required for pumps rated 2,000 gpm or greater. Obtain submergence depth requirement data sheet from manufacturer 7.2.2.2.1 to 7.2.2.2.4.
67. ____ The well casing, screen, and suction strainer are detailed, 7.2.3, 7.3.4.
68. ____ A report verifying the well can produce the appropriate quantity of water supply for the specified pump is provided, 7.2.3.1.
69. ____ The dimensions of the well, its casing and casing materials, well screen, fill gravel around the well screen, method of sealing the well bottom are detailed, 7.2.4.
70. ____ Specified is whether the well is in consolidated or unconsolidated formations, 7.2.4.
71. ____ A certified performance test report of the well is provided, 7.2.7.
72. ____ The tubular well for fire pumps 450 gpm or less is designed in compliance with 7.2.3 and .4 except 7.2.4.11 through 7.2.4.15, 7.2.4.16.2.
73. ____ The suction strainer has a free area at least 4 times the area of the suction connection and the screen can restrict passage of a .5 in. sphere, 7.3.4.2.
74. ____ The air relief valve and size, water level detector, pressure gauges, relief valves, hose valve header, valves or metering device locations are detailed and in conformance with Section, 7.3.5.
75. ____ The well is equipped with a water level detector, 7.3.5.3.
76. ____ The pump foundation, support, anchoring, etc., design is detailed on the plans and in compliance with Section 7.4.3.

Positive Displacement Pumps:

77. _____ The pump is listed for its intended use and the listing verifies the pump's performance curves, 8.1.2.
78. _____ When installed on a closed head fire system a listed dump valve type is specified, and detailed in accordance with Section 8.1.6.
79. _____ When provided, foam concentrate and additive pump installations are detailed in conformance with 8.2. Pump data sheets are provided.
80. _____ When provided, water mist pump installations are detailed in conformance with 8.3. Pump data sheets are provided.
81. _____ Detailed are compound suction and discharge pressure gauges, and listed safety relief valve locations, 8.4.
82. _____ A pump suction strainer is provided and is in compliance with the requirements of 8.4.5.
83. _____ The pump foundation, support, anchoring, etc., design is detailed on the plans and in compliance with Section 8.7.
84. _____ A means for flow testing is provided and the piping schematic is provided, 8.9.

Driver Information:

85. _____ Type: _____ Manufacturer: _____ Model: _____ Rated H.P.: _____ RPM: _____
_____ are provided.
86. _____ If the pump uses a diesel driver, calculations indicating the number of hours of fuel supply are provided

Controller Information:

87. _____ Manufacturer: _____ Model: _____ are provided.

Electric Drive and Electrical, complies with National Electrical Code Article 695:

88. _____ Normal power is arranged in compliance with one of the 5 choices offered in Section 9.2.2.
89. _____ Detailed is only one disconnection means when using a power arrangement of 9.2.2(1) or (2) or (3) or (5), 9.2.3. The disconnecting means meets the 5 criteria in Section 9.2.3.1.
90. _____ Detailed or noted on the plans are the size, verbiage, and location of the disconnect placard, i.e., adjacent the fire pump controller, stating the location of the disconnect means and unlocking key if required, 9.2.3.2.
91. _____ The disconnect means permitted in 9.2.3 has the supervision method, of the closed position, described on the plans, 9.2.3.3.

92. ____ If a secondary power supply is provided, an electrical schematic for the circuit and transfer equipment is provided, 9.3.
93. ____ A second power source is provided in accordance with 9.3 when the building height exceeds fire apparatus pumping capability and an electric pump is used, 9.3.1, 9.3.3.
94. ____ The electric motor is listed for fire pump service and meets the construction, horsepower and locked rotor current requirement of Section 9.5.1.1.
95. ____ When an on-site generator is required to meet the power reliability requirements of NFPA 20, it has the capacity to run under the loads identified in Section 9.6.1. The loads are specified and provided.
96. ____ Required generator(s) shall comply with 6.4, be a Level 1, Type 10, Class X system designed in accordance with NFPA 110, and have a minimum fuel supply to operate the fire pump at its 100 percent rated capacity and any other additional loads for a duration of 8 hours, 9.6.2.
97. ____ Transfer of power shall occur in the pump room, 9.6.4.
98. ____ The controller installation is detailed. It is located near and in sight of the motors it controls and energized controller components are provided working clearances in accordance with the National Electrical Code Article 110, NFPA 20 10.2.
99. ____ The fire pump controller is listed for use with an electric motor-driven fire pump and labeled in accordance with Section 10.1.2.1.
100. ____ The controller and accessories are mounted on a single noncombustible support foundation, 10.3.2.
101. ____ Enclosures for the controller and accessories are in compliance with Section 10.3.3.
102. ____ Controllers shall be provided with voltage surge arrestor, isolating switch, circuit breaker, locked rotor protection, and motor contacts in accordance with Sections 10.4.1 through 10.4.5.
103. ____ Provided and detailed is an alarm circuit and a signal device at a constantly attended location when the pump room is not constantly attended. The alarm signal transmission occurs in accordance with sections 10.4.7.2.1 through 10.4.7.2.4, 10.4.7.
104. ____ When required, the dedicated fire pump transfer switch location is detailed, the listing data sheets are provided, and the design complies with Section 10.8.3.
105. ____ When required, one dedicated transfer switch is assigned to a fire pump, 10.8.2.3.
106. ____ If used, the design details of a controller with variable speed pressure limiting control are in compliance with Sections 10.10.1 through 10.10.11.

Diesel Drive:

107. ____ The engine is a compression ignition type and is listed for fire pump service, 11.1.3.1 and 11.2.1.
108. ____ The engine meets the rating requirements of Section 11.2.2.

109. ____ The engine connection to the fire pump is noted and designed in compliance with Section 11.2.3.
110. ____ The engine is equipped with a governor complying with the requirements of Section 11.2.4.1.
111. ____ Engines with electronic control module (ECM) have a secondary ECM unit, 11.2.4.2.1.
112. ____ ECM details and plans for supervision, enclosure, mounting, and primary and secondary sensors are in accordance with 11.2.4.2.
113. ____ When the engine uses a variable speed pressure limiting control system, it is noted on the plans and complies with Section 11.2.4.2.
114. ____ The engine is equipped with over-speed shutdown device that complies with Section 11.2.4.4.
115. ____ The engine is equipped with an instrument panel containing: tachometer, oil pressure gauge, and temperature gauge, 11.2.5.1 – 11.2.5.4.
116. ____ Detailed or noted on the plans is that each engine has two batteries that are rack supported, and current carrying-parts (cables) are not less than 12 in. above the floor, 11.2.7.2.4.1, .2.
117. ____ The engine cooling system is closed-circuit liquid type and is specified as radiator or heat exchange type, 11.2.8.
118. ____ Adequate ventilation is provided for the pump room and the engine, 11.3.2.
119. ____ Fuel supply tank capacity calculations are provided and are at least 1 gallon per horsepower plus 5 percent volume for expansion and 5 percent volume for sump, 11.4.2.
120. ____ The fuel supply tank design including mounting, containment, fill and drain connections, and venting complies with 11.4.1.2 and IFC 34.
121. ____ Fuel piping is designed in compliance with Section 11.4.4.
122. ____ The controller is listed for use with diesel engine-driven fire pumps and labeled in accordance with Section, 12.1.3.
123. ____ The controller installation is detailed. It is located near and in sight of the engine it controls and energized controller components are provided working clearances in accordance with the *National Electrical Code* Article 110, 12.2.2 – 12.2.4.
124. ____ The controller and accessories are mounted on a single noncombustible support foundation, 12.3.2.
125. ____ Enclosures for the controller and accessories are in compliance with Section 12.3.3.
126. ____ Provided and detailed is an alarm circuit and a signal device(s) in the engine room. The visible indicators and a common alarm signal occur in accordance with events listed in Sections 12.4.1.3 and 12.4.1.4, 12.4.

127. _____ When the pump room is not constantly attended, the alarm and signal devices are remote from the controller, in a constantly attended location, and are detailed and designed in accordance with Section 12.4.2.
128. _____ Engine exhaust is vented to the exterior and where the exhaust will not harm persons or endanger buildings, 11.5.
129. _____ Engine exhaust piping connections, diameter, clearances to combustible materials, and termination points are detailed and designed in accordance with Section 11.5.3.

Additional Comments: _____

Review Date: _____

Fire Code Administration Staff Captain