



**Mobile Fire-Rescue Department Bureau of Fire Prevention**  
 2851 Old Shell Road Mobile, Al 36607 (251)208-7484 Fax: (251)208-7162



**Fire Pump Plan Review**

**March 2010**

Date of Review: \_\_\_\_/\_\_\_\_/\_\_\_\_ Permit Number: \_\_\_\_\_  
 Business/Building Name: \_\_\_\_\_ Address of Project: \_\_\_\_\_  
 Designer Name: \_\_\_\_\_ Designer's Phone: \_\_\_\_\_  
 Contractor: \_\_\_\_\_ Contractor's Phone: \_\_\_\_\_  
 Occupancy Classification: \_\_\_\_\_

**IFC 913 and NFPA 20**

**Worksheet Legend:** OK = acceptable N = need to provide NA = not applicable  
 Reference numbers following worksheet statements represent an NFPA code section unless otherwise specified.

1. \_\_\_\_ 2 sets of drawings are provided.
2. \_\_\_\_ Equipment is listed for intended use, product listing data sheets are provided, 5.1.2.1, 5.7.
3. \_\_\_\_ 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, 5.2.
6. \_\_\_\_ Room dimensions are provided.
7. \_\_\_\_ Equipment symbol legend is provided.
8. \_\_\_\_ Suction pipe flushing requirements from Table 14.1.1.1 are on the plans.
9. \_\_\_\_ Plot plan illustrating connection to the water supply including the pipe diameter and the pipe routing (including any elevation changes) 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, 5.5.
12. \_\_\_\_ Pump GPM rating: Head rating: RPM: are provided.
13. \_\_\_\_ Pressure gauge complying with 5.10.1 is detailed as installed near the discharge casting.
14. \_\_\_\_ 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. \_\_\_\_ Automatic relief valve complying with 5.11.1 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. \_\_\_\_ Non-sprinklered fire pump room is separated by a 2 hour fire barrier. A sprinklered fire pump room in a non-sprinklered building is separated by a 2 hour fire barrier. A sprinklered fire pump room in a sprinklered building is separated by a 1 hour fire barrier. An exterior fire pump building is separated from adjacent buildings by at least 50 ft., Table 5.12.1.1.2.
17. \_\_\_\_ Fire pumps in high-rise buildings are separated by 1-hour fire-rated construction, 5.12.1.1.1.



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18. \_\_\_\_ Fire pump room containing a diesel pump driver and fuel storage tanks is protected by an automatic sprinkler system in compliance with NFPA 13. 5.12.1.3.
19. \_\_\_\_ Fire pump installed outdoor is located at least 50 ft. from any building that would be an exposure, 5.12.1.2.
20. \_\_\_\_ When required by the environment or engine manufacturer, the fire pump room has a heat source in accordance with Section 5.12.2.
21. \_\_\_\_ Emergency lighting for the fire pump room is provided in accordance with Section 5.12.4.
22. \_\_\_\_ Ventilation is provided in the pump room, 5.12.5.
23. \_\_\_\_ Pump room floor is adequately pitched to provide drainage and it drains to a frost free location, 5.12.6.
24. \_\_\_\_ 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, 5.12.7.
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 aboveground pipe, 5.13.1.
28. \_\_\_\_ Method of joining the steel pipe is specified, 5.13.2.

**Suction Pipe and Fittings:**

29. \_\_\_\_ Size and arrangement of the suction pipe complies with Table 5.25 (a or b), 5.14.3.4.
30. \_\_\_\_ Suction piping arrangement and OS & Y gate valve complies with Section 5.14.5.
31. \_\_\_\_ Installation of elbows and tees shall be in accordance with Section 5.14.6.3.
32. \_\_\_\_ If provided, eccentric taper reducer or increaser (for suction pipe and pump flange size differentials) is detailed and complies with Section 5.14.6.4.
33. \_\_\_\_ Open source water supplies shall be equipped with a suction screen in accordance with Section 5.14.8 and 5.14.9.
34. \_\_\_\_ Screens for open water source are removable and the screen material is specified, 5.14.8.6.
35. \_\_\_\_ Screens have at least a 62.5 percent open area, 5.14.8.11.
36. \_\_\_\_ When devices are installed in the suction piping they shall comply with Section 5.14.9.
37. \_\_\_\_ Vortex plate is provided and detailed on the suction fitting that obtains water from a stored water supply, 5.14.10.

**Discharge Pipe and Fittings:**

38. \_\_\_\_ Size of the pump discharge pipe and fittings are in accordance with Table 5.25 (a or b), 5.15.5.
39. \_\_\_\_ Listed check valve or backflow prevention device is in the pump discharge assembly, 5.15.6.
40. \_\_\_\_ Indicating gate or butterfly valve is on system side of the check valve, 5.15.7.



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**General:**

- 41.\_\_\_\_\_ When required, a pressure relief valve for centrifugal pump is provided in accordance with Section 5.18.1.
- 42.\_\_\_\_\_ The pressure relief valve's listing data sheet is provided and the valve is either spring loaded or pilot diaphragm type, 5.18.4.
- 43.\_\_\_\_\_ Pressure relief valve discharge is designed in accordance with Section 5.18.5.
- 44.\_\_\_\_\_ Size of the discharge pipe is in accordance with Table 5.25 (a or b), 5.18.5. If the pipe has more than 1 elbow, enlarge the pipe one size.
- 45.\_\_\_\_\_ Test header pipe diameter, number of hose valves, or the flow meter size and piping are detailed in compliance with Table 5.25, 5.19.
- 46.\_\_\_\_\_ When provided, the location of the backflow prevention device is detailed, and the listing data sheet and friction loss information are provided, 5.26.1.
- 47.\_\_\_\_\_ Pressure maintenance (jockey or make-up) pump location and piping are detailed and specification data sheets are provided, 5.24.
- 48.\_\_\_\_\_ Check valve in the pressure maintenance pump discharge pipe is detailed and the location of gate or butterfly valves for allowing component repair are detailed, 5.24.
- 49.\_\_\_\_\_ Where located, check valves and backflow prevention devices or assemblies are located a minimum 10 pipe diameters from the pump suction flange, 5.26.3.
- 50.\_\_\_\_\_ For seismic design areas, the fire pump, driver and associated equipment and piping is provided earthquake protection in accordance with Section 5.27 and seismic calculations for each method of protecting equipment are provided.
- 51.\_\_\_\_\_ Packaged fire pump, house, and skid/unit are in compliance with 5.28 and design details are provided.
- 52.\_\_\_\_\_ Pressure sensing line details are provided and the lines are located between the pump discharge check valve and discharge control valve, 5.29.
- 53.\_\_\_\_\_ Break tank use is as a backflow prevention device or to eliminate city water pressure fluxuations or to augment the city water supply, 5.30.1.
- 54.\_\_\_\_\_ Break tank capacity provides at least 15 minutes of water at 150 percent of the pump's rated capacity, 5.30.2.
- 55.\_\_\_\_\_ Design of the break tank refill equipment is in accordance with 5.30.3.
- 56.\_\_\_\_\_ Break tank installation complies with NFPA 22, 5.30.4.

**Centrifugal Pumps:**

- 57.\_\_\_\_\_ Selected centrifugal pump is specified and meets the design requirements of 6.1.1.
- 58.\_\_\_\_\_ Application of the centrifugal pump complies with the requirements of Section 6.1.2.
- 59.\_\_\_\_\_ When required, the automatically controlled centrifugal pump has a float operated air release valve at least ½ in. diameter, 6.3.3.
- 60.\_\_\_\_\_ Foundation and setting for the pump are detailed and in compliance with Section 6.4.
- 61.\_\_\_\_\_ Method of securing the pump base plate to the foundation is detailed, 6.4.3.



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**Vertical Shaft Turbine-Type Pumps:**

62. \_\_\_\_ 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.
63. \_\_\_\_ 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.
64. \_\_\_\_ Well casing, screen, and suction strainer are detailed, 7.2.3, 7.3.4.
65. \_\_\_\_ Report verifying the well can produce the appropriate quantity of water supply for the specified pump is provided, 7.2.3.1.
66. \_\_\_\_ 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.
67. \_\_\_\_ Specified is whether the well is in consolidated or unconsolidated formations, 7.2.4.
68. \_\_\_\_ Certified performance test report of the well is provided, 7.2.7.
69. \_\_\_\_ 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.
70. \_\_\_\_ 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.
71. \_\_\_\_ 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.
72. \_\_\_\_ Well is equipped with a water level detector, 7.3.5.3.
73. \_\_\_\_ Pump foundation, support, anchoring, etc. design is detailed on the plans and in compliance with Section 7.4.3.

**Positive Displacement Pumps:**

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

**Driver Information:**

82. \_\_\_\_ Type: Manufacturer: Model: Rated H.P.: RPM: are provided.



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83. \_\_\_\_ If the pump uses a diesel driver, calculations indicating the number of hours of fuel supply are provided.

**Controller Information:**

84. \_\_\_\_ Manufacturer: Model: are provided.

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

85. \_\_\_\_ Normal power is arranged in compliance with one of the 5 choices offered in Section 9.2.2.

86. \_\_\_\_ 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.

87. \_\_\_\_ Detailed or noted on the plans is 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.

88. \_\_\_\_ Disconnect means permitted in 9.2.3 has the supervision method, of the closed position, described on the plans, 9.2.3.3.

89. \_\_\_\_ If a secondary power supply is provided, an electrical schematic for the circuit and transfer equipment is provided, 9.3.

90. \_\_\_\_ A second power source is provided in accordance with 9.3 when the building height exceeds fire apparatus pumping capability and an electric driver is used, 9.3.1, 9.3.3

91. \_\_\_\_ 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.

92. \_\_\_\_ 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.

93. \_\_\_\_ Required generator(s) shall comply with the foundation requirements of Section 6.4, be of a level, type, class specified in Section 9.6.2. The system shall be designed in accordance with NFPA 110, and have a minimum fuel supply to operate the fire pump at its 100 percent rated capacity, 9.6.2.

94. \_\_\_\_ Transfer of power shall occur in the pump room, 9.6.4.

95. \_\_\_\_ 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.

96. \_\_\_\_ Fire pump controller is listed for use with an electric motor-driven fire pump and labeled in accordance with Section 10.1.2.1.

97. \_\_\_\_ Controller and accessories are mounted on a single noncombustible support foundation, 10.3.2.

98. \_\_\_\_ Enclosures for the controller and accessories are in compliance with Section 10.3.3.

99. \_\_\_\_ 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.



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100. \_\_\_ 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– 10.4.7.2.4, 10.4.7.
101. \_\_\_ 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.
102. \_\_\_ When required, one dedicated transfer switch is assigned to a fire pump, 10.8.2.3.
103. \_\_\_ If used, the design details of a controller with variable speed pressure limiting control are in compliance with Sections 10.10.1– 10.10.11.

**Diesel Drive:**

104. \_\_\_ Engine is a compression ignition type and is listed for fire pump service, 11.1.3.1 and 11.2.1.
105. \_\_\_ Engine meets the rating requirements of Section 11.2.2.
106. \_\_\_ Engine connection to the fire pump is noted and designed in compliance with Section 11.2.3.
107. \_\_\_ Engine is equipped with a governor complying with the requirements of Section 11.2.4.1.
108. \_\_\_ 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.
109. \_\_\_ Engine is equipped with over-speed shutdown device that complies with Section 11.2.4.3.
110. \_\_\_ Engine is equipped with an instrument panel containing: tachometer, oil pressure gauge, and temperature gauge, 11.2.4.4 –11.2.4.7.
111. \_\_\_ Batteries have two means of recharging detailed and the chargers are listed for fire pump service and comply with the requirements listed in Sections 11.2.5.2.4 and 11.2.5.2.5.
112. \_\_\_ 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, 11.2.5.2.2.1. and 11.2.5.2.6
113. \_\_\_ The engine cooling system is closed-circuit liquid type and is specified as radiator or heat exchange type, 11.2.6.
114. \_\_\_ Adequate ventilation is provided for the pump room and the engine, 11.3.2.
115. \_\_\_ 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, 11.4.3 and the fuel supply tank design complies with IFC 34.
116. \_\_\_ Fuel piping is designed in compliance with Section 11.4.6.
117. \_\_\_ Controller is listed for use with diesel engine-driven fire pumps and labeled in accordance with Section 12.1.3.
118. \_\_\_ 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 –12.2.2.4.
119. \_\_\_ Controller and accessories are mounted on a single noncombustible support foundation, 12.3.2.
120. \_\_\_ Enclosures for the controller and accessories are in compliance with Section 12.3.3.



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121. \_\_\_\_ Provided and detailed is an alarm circuit and a signal device(s) in the engine room. The visible indicators and a common alarm signal occurs in accordance with events listed in Sections 12.4.1.3 and 12.4.1.4, 12.4.

122. \_\_\_\_ 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.

123. \_\_\_\_ Engine exhaust is vented to the exterior and where the exhaust will not harm persons or endanger buildings, 11.5.

124. \_\_\_\_ Engine exhaust piping connections, diameter, clearances to combustible materials, and termination points are detailed and design in accordance with Section 11.5.3.

**Additional Comments:**

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