

**Fire Pump
Plan Review Worksheet**
2006 IFC 913 and 2003 NFPA 20

Date of Review: _____ Permit Number: _____

Business/Building Name: _____ Address of Project: _____

Designer Name: _____ Designer's Phone: _____

Contractor: _____ Contractor's Phone: _____

Pump Manufacturer: _____ Pump Model: _____

Controller Manufacturer: _____ Controller Model: _____

Driver Type: _____ Driver Manufacturer: _____

Driver Model: _____ Occupancy Classification: _____

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

Worksheet Legend: ✓ or OK = acceptable N = need to provide NA = not applicable

1. _____ Three 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. _____ A copy of a fire hydrant flow test summary sheet is provided, which includes static and residual pressures, flow rate, and the location of the flow and test hydrant(s).

Drawings Shall Show the Following:

4. _____ Scale: _____, a common architectural scale is used and 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 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, 5.5.
12. _____ Pump GPM rating: _____ Head rating: _____ RPM: _____ are provided.
13. _____ A pressure gauge complying with 5.10.1 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. _____ A 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. _____ A nonsprinklered fire pump room is separated by a 2 hour fire barrier. A sprinklered fire pump room in a nonsprinklered 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.
17. _____ 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, 5.12.1.3.
18. _____ Outdoor fire pump unit is placed at least 50 ft. from any building that would be an exposure, 5.12.1.2.
19. _____ When required by the environment or engine manufacturer, the fire pump room has a heat source in accordance with Section 5.12.2.
20. _____ Emergency lighting for the fire pump room is provided in accordance with Section 5.12.4.
21. _____ Ventilation is provided in the pump room, 5.12.5.
22. _____ The pump room floor is adequately pitched to provide drainage and it drains to a frost free location, 5.12.6.
23. _____ The coupling guards for the flexible couplings or shaft connections between the pump driver and pump are noted or illustrated, 5.12.7.

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24. _____ If used, the operating angle of a flexible connecting shaft is detailed and does not exceed the manufacturer listing requirements, 7.5.1.7.2.
25. _____ Size and type of pump suction and discharge pipe used are specified and detailed.
26. _____ Steel pipe size is specified for aboveground pipe, 5.13.1.
27. _____ The method of joining the steel pipe is specified, 5.13.2.

Suction Pipe and Fittings:

28. _____ Size and the arrangement of the suction pipe complies with Table 5.25 (a or b), 5.14.3.4.
29. _____ The suction piping arrangement and OS & Y gate valve comply with Section 5.14.5.
30. _____ The installation of elbows and tees shall be in accordance with Section 5.14.6.3.
31. _____ 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.
32. _____ Open source water supplies shall be equipped with a suction screen in accordance with Section 5.14.8 and 5.14.9.
33. _____ Screens for open water source are removable and the screen material is specified, 5.14.8.6.
34. _____ Screens have at least a 62.5 percent open area, 5.14.8.11.
35. _____ When devices are installed in the suction piping they shall comply with Section 5.14.9.
36. _____ A vortex plate is provided on the suction fitting that obtains water from a stored water supply, 5.14.10.

Discharge Pipe and Fittings:

37. _____ The size of the pump discharge pipe and fittings are in accordance with Table 5.25 (a or b), 5.15.5.
38. _____ A listed check valve or backflow prevention device is installed within the pump discharge assembly, 5.15.6.
39. _____ Indicating gate or butterfly valve is on system side of the check valve, 5.15.7.

General:

40. _____ When required, a pressure relief valve for centrifugal pump is provided in accordance with Section 5.18.1.
41. _____ The pressure relief valve's listing data sheet is provided and the valve is either spring loaded or pilot-diaphragm type, 5.18.4.
42. _____ Pressure relief valve discharge is designed in accordance with Section 5.18.5.
43. _____ The 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.
44. _____ The 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.
45. _____ When provided, the location of the backflow prevention device is detailed, and the equipment data sheet and friction loss information are provided, 5.26.
46. _____ The pressure maintenance pump location and piping are detailed and equipment data sheets are provided, 5.24.
47. _____ A 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.
48. _____ 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.
49. _____ For seismic design areas, the fire pump, driver and associated equipment and piping is provided seismic bracing in accordance with Section 5.27 and seismic calculations for each method of protecting equipment are provided.

Centrifugal Pumps:

50. _____ The selected centrifugal pump is specified and meets the design requirements of 6.1.1.
51. _____ The application of a centrifugal pump complies with the requirements of Section 6.1.2.
52. _____ When required, the automatically controlled centrifugal pump has a float operated air release valve at least ½ in. diameter, 6.3.3.
53. _____ When a pipe strainer is required, the distance from the suction flange, construction materials, and free area are in compliance with Section 6.3.4.
54. _____ The foundation and setting for the pump are detailed and in compliance with Section 6.4.
55. _____ The method of securing the pump base plate to the foundation is detailed, 6.4.3.

Vertical Shaft Turbine-Type Pumps:

56. _____ 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.

- 57. ____ 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 7.2.2.2.3.
- 58. ____ The well casing, screen, and suction strainer are detailed, 7.2.3, 7.3.4.
- 59. ____ A report verifying the well can produce the appropriate quantity of water supply for the specified pump is provided, 7.2.3.1.
- 60. ____ 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.
- 61. ____ Specified is whether the well is in consolidated or unconsolidated formations, 7.2.4.
- 62. ____ A certified performance test report of the well is provided, 7.2.7.
- 63. ____ The tubular well for fire pumps 450 GPM or less is designed in compliance with 7.2.4 except 7.2.4.11 through 7.2.4.15, 7.2.4.16.2.
- 64. ____ 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.
- 65. ____ 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.
- 66. ____ The well is equipped with a water level detector, 7.3.5.3.
- 67. ____ The pump foundation, support, anchoring, etc. design is detailed on the plans and in compliance with Section 7.4.3.

Positive Displacement Pumps:

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

Driver Information:

- 76. ____ Type: ____ Manufacturer: ____ Model: ____ Rated H.P.: ____ RPM: ____ are provided.
- 77. ____ If the pump uses a diesel driver, calculations indicating the number of hours of fuel supply are provided.

Controller Information:

- 78. ____ Manufacturer: ____ Model: ____ are provided.

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

- 79. ____ An electrical circuit schematic is provided.
- 80. ____ When provided, the electrical schematic shall detail the design for the secondary power circuit and transfer equipment is provided, 9.2.4.
- 81. ____ A second power source is provided in accordance with 9.2.4 when electric motors are used and the building height exceeds fire apparatus pumping capability, 9.2.1.2.
- 82. ____ Supply conductors shall directly connect to a listed combination fire pump controller and transfer switch or to a disconnecting means and one or more overcurrent protective devices, 9.2.5.4.
- 83. ____ Circuit conductors feeding fire pump(s) shall be dedicated and protected from fire, structural failure, or operational accident, 9.3.1.
- 84. ____ Circuits that supply the electric motor and that directly connect the power source to a listed pump controller are designed with a means of power continuity in accordance with 9.3.2.2.
- 85. ____ 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.
- 86. ____ 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.

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87. _____ Required generator(s) shall comply with the foundation requirements in Section 6.4 and be of the level, type, and 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.
 88. _____ Transfer of power shall occur in the pump room, 9.6.4.
 89. _____ 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.
 90. _____ The fire pump controller is listed for use with a electric motor-driven fire pump and labeled in accordance with Section 10.1.2.1.
 91. _____ The controller and accessories are mounted on a single noncombustible support foundation, 10.3.2.
 92. _____ Enclosures for the controller and accessories are in compliance with Section 10.3.3.
 93. _____ 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.
 94. _____ 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(A) through 10.4.7.2(D), 10.4.7.
 95. _____ 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.
 96. _____ When required, one dedicated transfer switch is assigned to a fire pump, 10.8.2.3.
- Diesel Driver:**
97. _____ The engine is a compression ignition type and is listed for fire pump service, 11.1.2.1 and 11.2.1.
 98. _____ The engine meets the rating requirements of Section 11.2.2.
 99. _____ The engine connection to the fire pump is noted and designed in compliance with Section 11.2.3.
 100. _____ The engine is equipped with a governor complying with the requirements of Section 11.2.4.1.
 101. _____ 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.
 102. _____ The engine is equipped with overspeed shutdown device that complies with Section 11.2.4.3.
 103. _____ The engine is equipped with an instrument panel containing: tachometer, oil pressure gauge, and temperature gauge, 11.2.4.4- 11.2.4.7.
 104. _____ Batteries have two means of recharging detailed and the chargers are listed for fire pump service and comply with the requirements listed in Sections 11.2.5.2.3 and 11.2.5.2.4.
 105. _____ 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, 11.2.5.2.1.1. and 11.2.5.2.5 -.6
 106. _____ The engine cooling system is closed-circuit liquid type and is specified as radiator or heat exchange type, 11.2.6.
 107. _____ Adequate ventilation is provided for the pump room and the engine, 11.3.2.
 108. _____ 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.
 109. _____ Fuel piping is designed in compliance with Section 11.4.6.
 110. _____ The controller is listed for use with diesel engine-driven fire pumps and labeled in accordance with Section 12.1.3.
 111. _____ 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 -.4.
 112. _____ The controller and accessories are mounted on a single noncombustible support foundation, 12.3.2.
 113. _____ Enclosures for the controller and accessories are in compliance with Section 12.3.3.
 114. _____ 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(1) through 12.4.1.3(11), 12.4.
 115. _____ 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.
 116. _____ Engine exhaust is vented to the exterior and where the exhaust will not harm persons or endanger buildings, 11.5.
 117. _____ 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:

Review Date: _____

Approved or Disapproved

FD Reviewer: _____