

**Specifications for Vertical Fire Pumps**  
**VT Vertical Turbine Type**



**GENERAL:**

The pumps furnished for fire protection service shall be supplied with the specified drivers, controls and pump accessory items by the pump manufacturer to ensure single source responsibility. The pump, driver and controls shall be:

- ☐ Underwriters Laboratories (UL) Listed
- ☐ Factory Mutual Laboratories (FM) Approved

The pumping equipment shall be installed as recommended in the NFPA 20, Standard for the Installation of Centrifugal Fire Pumps. AMERIFLO Pump model shall be furnished with driver, controllers and accessories as detailed in this specification. Pump manufacturer shall have unit responsibility for the proper operation of the complete unit assembly as indicated by field acceptance tests.

Pump performance requirements:

- ☐ the maximum net pressure for a fire pump shall not exceed 140 percent of rated head
- ☐ inlet pressure less than -6.9 PSI [-47.7 KPA]. A pump shall develop not less than 65 percent of rated total head when discharging at 1-1/2 times rated flow
- ☐ a test is to be conducted with a positive suction pressure sufficient to achieve the maximum brake horsepower
- ☐ the shutoff head shall not be less than 99% of Max head

**[Application Standard: UL 448, FM 1311]**

**MANUFACTURER'S FACTORY TEST:**

Each individual pump shall be hydrostatically tested for not less than 5 minutes and run tested prior to shipment. The pump shall be hydrostatically tested at a pressure of not less than 2 times the no flow (shut off) head of the pump's maximum diameter impeller plus the maximum allowable suction head but in no case less than 40 psi.

**[Application Standard: UL 448, FM 1311]**

**FIELD ACCEPTANCE TEST:**

A field acceptance performance test shall be conducted upon completion of pump installation. The test shall be made by flowing water through calibrated nozzles, approved flow meters or other such accurate devices as may be selected by the authority having jurisdiction. The test shall be conducted as recommended in NFPA 20 by

- ☐ the installing contractor
- ☐ the owner
- ☐ the owner's representative
- ☐ (other) \_\_\_\_\_

in the presence of the authority having jurisdiction and with that authority's final approval and acceptance. Failure to submit documentation of factory and field tests will be just cause for equipment rejection.

**[Application Standard: NFPA 20]**

**VERTICAL CENTRIFUGAL PUMPS:**

The fire pump shall be of vertical centrifugal ☐ (single stage) ☐ (multistage) splitcase with construction specifically labeled for fire service and shall be an AMERIFLO pump model \_\_\_\_\_. The pump shall be connected to the ☐ (fire standpipe) ☐ (fire sprinkler) ☐ (underground fire main) system. The suction supply for the fire pump shall be from a ☐ (public service water main) ☐ (ground storage tank) ☐ (underground reservoir) at a maximum at a maximum underground length of \_\_\_\_\_ feet and a minimum submergence of \_\_\_\_\_ feet. The pump discharge head shall be carbon steel with \_\_\_\_\_ inch ASME B16.1 CLASS 250 rated discharge flange machined to American Society of Mechanical Engineers (ASME).

Pump features include:

- ☐ precision investment cast 304 stainless steel impeller
- ☐ flanged column pipe
- ☐ ductile cast iron suction bell
- ☐ Teflon guide bearings
- ☐ 304 stainless steel flush lines and ball valves for packing lubrication
- ☐ factory installed packing leakage drainage piped to a single connection
- ☐ factory installed packing shaft guards
- ☐ sea water materials are available upon request

**[Application Standard: UL 448, FM 1311]**

#### **ELECTRIC MOTORS:**

The pump driver shall be ☐ (UL listed) specifically for fire pump service, vertical mounted, P-base, ball bearing induction motor rated for \_\_\_\_\_ horsepower, 3 phase, ☐ (50) ☐ (60) Hertz with open drip-proof NEMA \_\_\_\_\_ enclosure for operation on \_\_\_\_\_ volt ☐ (single) ☐ (three) phase service. The motor locked rotor current shall not exceed the values stated in NFPA 20. The motor shall be mounted on a steel base common to the pump and shall be connected to the pump with a flexible coupling protected by a suitable guard. The fire pump manufacturer shall accurately align the pump and motor shafts prior to shipment. After field installation, but prior to grouting the base, a millwright or similarly qualified person shall check and verify for correct shaft alignment.

The motor capacity in horsepower shall be such that the maximum motor horsepower located anywhere on the pump curve shall not exceed the motor-rated full-load horsepower multiplied by the motor service factor.

**[Application Standard: UL 1004]**

#### **ELECTRIC MOTOR CONTROLLERS:**

The automatic electric motor controller shall be ☐ (UL Listed) ☐ (FM Approved) specifically for fire pump service. The controller shall be designed for:

- ☐ across the line
- ☐ reduced voltage, part winding
- ☐ reduced voltage, primary resistor
- ☐ auto-transformer
- ☐ wye-delta open transition
- ☐ wye-delta closed transition
- ☐ auto-transformer
- ☐ reduced voltage, soft

type starting. The controller shall be rated for the horsepower specified in this specification's electric motors section.

The controller shall be capable of interrupting a short circuit current of at least equal to the available short circuit current in the controller supply circuit. This fire pump controller installation requires a withstand rating of not less than \_\_\_\_\_ amps RMS symmetrical at an operating voltage of \_\_\_\_\_ volts. The controller shall be:

- ☐ floor or wall mounted for electrical connection to the motor by the equipment installer
- ☐ mounted on a common base with the fire pump and wired to the motor by the pump manufacturer
- ☐ according to NFPA 20 pressure sensing line

**[Application Standard: UL 218, FM 1321, FM 1323, NFPA 20]**

#### **DIESEL ENGINES:**

The driver shall be ☐ (UL Listed) ☐ (FM Approved) specifically for fire pump service and a horizontal shaft type internal combustion diesel engine Model \_\_\_\_\_ manufactured by:

\_\_\_\_\_ rated \_\_\_\_\_ RPM, clockwise rotation as viewed from the end opposite of the pump. The horsepower rating of the diesel engine shall have a 4-hour minimum horsepower rating not less than 10 percent greater than the listed horsepower on the diesel engine nameplate. The diesel engine shall provide the required power to operate the pump at the rated speed and maximum pump load under any flow condition on the pump curve. Diesel engine derating for elevation and temperature are as follows:

- ☐ a deduction of 3 percent from the diesel engine horsepower rating at standard SAE conditions shall be made for each 1000 FT [300 M] of elevation above 300 FT [91 M];
- ☐ a deduction of 1 percent from the diesel engine horsepower rating as corrected to standard SAE conditions shall be made

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for every 10°F [5.6°C] above 77°F [25°C] ambient temperature.

The engine shall be provided by the pump manufacturer with, at a minimum, the following accessories for automatic operation.

- ☐ cooling water lines, pressure regulator, strainer, bypass lines and necessary fittings for engine cooling system, pre-piped and factory mounted
- ☐ digital display, electronic instrument panel factory installed
- ☐ UL Listed & FM Approved emergency DC contactor factory installed
- ☐ vibration isolation diesel engine cradle
- ☐ flexible exhaust connector
- ☐ residential exhaust silencer
- ☐ engine jacket water heater, factory installed
- ☐ fire resistant, flexible piping with threaded connection for fuel supply and fuel return lines
- ☐ fuel storage tank sized to provide a minimum supply of one gallon of fuel per engine maximum rated horsepower plus 5% for sump area plus 5% for expansion area. The fuel tank shall be furnished ☐ (with) ☐ (without) horsepower plus 5% for sump area plus 5% for expansion area. The tank shall be furnished ☐ (with) ☐ (without) legs for floor mounting and with a direct reading fuel level gauge. Fuel tank shall be ☐ (single wall) ☐ (double wall) UL Listed
- ☐ the engine shall be run tested for at least one hour by the pump manufacturer prior to shipment
- ☐ engine shall be same brand name as the pump
- ☐ sea water fire pump engines are available upon request

[Application Standard: UL 1247, FM 1333]

**RIGHT ANGLE GEAR DRIVE:**

All right angle gear drives shall be FM approved and equipped with a non-reverse ratchet mechanism rated by the manufacturer at a load equal to the maximum horsepower and thrust of the pump. Water cooled gear drives shall be equipped with a visual means to determine whether water circulation is occurring.

[Application Standard: FM 1338, NFPA 20]

**ENGINE CONTROLLERS:**

The automatic engine controller shall be ☐ (UL listed) ☐ (FM approved) specifically for fire pump service. The diesel engine controller must contain the following features:

- ☐ UL Listed/FM Approved built in battery charger
- ☐ run-time clock for weekly automatic test
- ☐ system pressure recorder
- ☐ power failure start
- ☐ low fuel level switch
- ☐ pump room audible and visual alarm output signals
- ☐ the controller shall be wired to the diesel engine terminals and shall be mounted on a common base with the diesel engine and pump. A complete run test of the base mounted diesel engine controller shall be performed by the pump manufacturer prior to shipment
- ☐ the diesel engine controller shall be floor mounted for electrical connection to the diesel engine by the equipment installer
- ☐ according to NFPA 20 pressure sensing line

[Application Standard: UL 218, FM 1321, FM1323, NFPA 20]

**FITTINGS:**

The pump manufacturer shall furnish piping accessory items for the pump installation which will adapt the pump connections to the fire protection system and test connections as follows. Fittings subjected to pump discharge pressure shall be ASME B16.1 CLASS (□150 □250) rating. Fittings subjected to suction pressure shall be ASME B16.1 CLASS 150 rating.

- ☐ concentric tapered discharge increaser
- ☐ UL Listed/FM Approved hose valve test header
- ☐ hose valves with caps and chains
- ☐ UL Listed/FM Approved pump casing relief valve
- ☐ UL Listed/FM Approved automatic air release valve
- ☐ UL Listed/FM Approved discharge pressure gauge
- ☐ with buffer tube and 1/2-inch stainless steel components
- ☐ aluminum, non sparking coupling guard
- ☐ common base level jackscrew adjusting bolts & milled pads at pump & driver locations
- ☐ alignment jackscrews on pump and electric motor (when supplied) locations

Additional accessories required when pump is engine driven:

- ☐ UL Listed/FM Approved main relief valve:
  - ☐ direct acting (spring actuated)
  - ☐ pilot operated (hydraulically actuated)
  - ☐ relief valve waste cone, enclosed type with dual sight glasses
  - ☐ discharge tee with elbow (for mounting relief valve)

**[Application Standard: NFPA 20]**

