



## Preferred Specifications

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### ESU1 Fire Pumps

#### A. Pump

The pump shall be of single stage construction and shall comply with all applicable requirements of the latest standards for automotive fire apparatus of the National Fire Protection Association, NFPA No. 1901, and shall have a rated capacity of 1500 - 2250 GPM. The Pump shall be free from objectionable pulsation and vibration under all normal operating conditions.

##### 1. Pump Body

The pump body shall be cast in grey iron. It shall have double striping edge volute to minimize radial forces at all flow rates.

##### 2. Intake Connection

The intake connection shall be a single Victaulic or dual 6" intake

##### 3. Impeller

The impellers shall be bronze, accurately balanced (mechanically and hydraulically), labyrinth type, wear rings that resist water bypass and loss of efficiency due to wear.

###### a. Pump Inducer – For 2250 GPM Rating Only

Inducer shall raise inlet pressure to the impeller to achieve maximum pump rating.

###### b. Flame Plating

The impellers shall have flame plated hubs to assure maximum pump life and efficiency despite the presence of abrasive particles, such as fine sand, in the water being pumped.

##### 4. Wear Rings

The wear rings shall be bronze and shall be easily replaceable to restore original pump efficiency and eliminate the need for replacing the entire pump casing due to wear.

##### 5. Impeller Shaft

The impeller shaft shall be stainless steel, accurately ground to size.

##### 6. Anti-Friction Bearings

The impeller shaft shall be supported at each end by oil or grease lubricated anti-friction ball bearings for rigid and precise support. Bearings shall be protected from water and sediment by suitable seal housing, and oil seal. No sleeve type bearings shall be used.

##### 7. Seal Housings

The seal housings shall be equipped with self-adjusting, maintenance-free, mechanical shaft seal.

##### 8. Pump Transmission

The transmission case shall be made of high-strength aluminum (C22 or direct drive). The pump transmission shall be rigidly attached to the pump body assembly and be of latest design incorporating a high strength, involute tooth form chain drive capable of operating at high speeds to provide smooth, quiet transfer of power. The pump transmission shall be mounted either vertically or horizontally.

###### 1. Pump Shift (C22 Only)

The pump shift shall be pneumatically operated and shall use a standard automotive air valve to control a double-action, air-shift cylinder. The in-cab control valve shall include a detent lock to prevent accidental shifting.

## 9. Priming Systems

- a. The Venturis air primer system shall be mounted on the pump transmission or apparatus frame and uses the on-board air supply to create a vacuum to prime the fire pump. The basic system shall consist of a Venturis Air Primer, priming valve and auto or manual prime control panel.

- or -

- b. VPO oil-free rotary vane priming pump shall be rigidly attached to the pump transmission or apparatus frame and activated by a vacuum-activated priming (VAP) valve with a single push-button switch. Valve actuation may be accomplished while the main pump is in operation, if necessary to assure a complete prime.

### 1. Lubrication Option

A lubrication option shall allow the use of Prime Safe lubricant. A priming tank is required when the lubrication option is selected.

## 10. Pressure Control System

The Waterous Intake Relief Valve system shall act as a safety valve by “dumping” excess pressure from the inlet side of the pump. The Discharge Relief Valve shall provide sensitive pump control to protect firefighters from sudden pressure surges resulting from changes in discharge flows from the pump.

### a. Discharge Relief Valve

The discharge relief valve system shall incorporate two separate units; a panel mounted pilot valve which controls the operation of the relief valve proper and the relief valve which is normally mounted on the pump. The pilot valve shall have two controls, one to adjust the relief valve operating pressure, and the other, an ON-OFF control, to place the relief valve in or out of operation. The ON-OFF control shall let the operator put the relief valve out of operation (hydraulically holding the relief valve closed) when a pressure higher than set pressure or higher than 300 psig is desired. Turning this control ON shall permit the relief valve to operate again at whatever pressure was previously set without further adjustment. The relief valve shall be mounted on the pump or in the piping between the intake and discharge sides of the pump. It shall modulate flow between discharge and intake by ranging between the fully open and fully closed position in response to hydraulic signals from the pilot valve. The relief valve shall be available in three sizes. For pumps with rated capacities of 750 gpm or less, a two-inch outlet diameter relief valve is used. For pumps with rated capacities of 1250 gpm through 2250 gpm, a three-inch or 4-inch outlet diameter relief valve is used. Two indicator lights shall show the position of the relief valve; green for fully closed and amber for at least partially open.

### b. Intake Relief Valve

1. Piloted intake relief valve shall be a pilot-operated intake relief valve and shall be provided by the pump manufacturer. The pilot valve shall be mounted in a position specified by the purchaser, and allow adjustment from 50 P.S.I.G. to 250 P.S.I.G. A pilot-operated intake relief valve will allow full opening of the relief valve with a very small rise in intake pressure above set pressure.

- or -

2. Non-piloted intake relief valve shall be mounted on the pump intake. The valve shall have a 2-1/2 in. Victaulic on the outside diameter and a 2 in. NPT (F) tap on the inside diameter. The control to adjust relief valve dumping pressure shall be integral to the valve.

## 11. Manifold Drain Valve Assembly

The manifold drain valve assembly shall consist of a stainless-steel plunger in a bronze body with multiple ports. The valve shall be designed so that the pump discharge pressure prevents it from opening accidentally. The drain valve control shall be panel mounted, cable or rod operated and identified PUMP DRAIN.

## 12. Tank to Pump Valve

The tank to pump valve shall be a full-flow, 3-1/2-inch diameter ball valve that is attached directly to the pump. The valve shall be operated by a 90° spring detent remote control handle or by an optional 12- or 24-volt electric rotary actuator.

### 13. Discharge Valves

The discharge valve shall be bronze-fitted, ball-type, with a self-adjusting seal for wear. All discharge valves shall be capable of being locked or unlocked at the valve from the control panel at any position between OPEN or CLOSED and shall operate freely up to maximum pump discharge pressure. Valve seal shall be between the pump and the valve stem mechanism to minimize air leaks and facilitate draining. One valve shall be furnished for each 250 GPM of rated capacity. Means shall be provided for attaching (1) a pressure gauge which will indicate the pressure in the line immediately outboard of the valve, and (2) a drain of at least 3/4-inch NPT for simultaneously draining the valve and line outboard the valve. They shall be available in the following sizes:

- 2-1/2" ¼ turn open-close
- 3-1/2" ¼ turn open-close
- 1/4 –turn remote locking handle
- Rack and sector push-pull with locking handle
- Rotary Electric Actuator
- Manual Rotary Actuator

### 14. Overheat Protection Manager (OPM)

The Waterous Overheat Protection Manager (OPM) shall act as a safety device by releasing hot water from the discharge area of the pump to the ground. The OPM shall consist of a valve that opens when the water in the pump reaches 140° F (60° C) and a warning light on the pump panel that is triggered by a thermal switch when the water in the pump reaches 180° F (82° C).

### 15. Zinc Pump Intake Strainers and Magnesium Anodes

The pump intake strainers shall be removable, die cast zinc screens that are designed to provide cathodic protection for the pump, thus reducing corrosion in the pump. Magnesium anodes are normally mounted on the pump intake piping, but they may also be installed in the discharge piping if no intake mounting locations were available. Physical mounting of the anode may be via an NPT tap or bolt-on flange.

### 16. Auto Tank Fill

The Auto Tank Fill System shall maintain tank water level between 50 and 80% of capacity: The system shall be calibrated for any shape or size tank, shall allow operator interaction while Auto Tank Fill System is in operation, operator shall have the ability to open or close the electric-actuated ball valve using the Electric Valve Position Control. The Auto Tank Fill System shall be equipped with the following items unless specified otherwise:

- Pressure Transducer
- Tank Level Display
- Electric Valve Position Control
- Auto Tank Fill Selector Switch (Green LED indicates Auto Tank Fill Mode)
- Electric-Actuated Ball Valve (Furnished (1) valve)
- Cables