



## Preferred Specifications

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# CZ / CZU Series Single Stage Centrifugal Fire Pumps

## A. Pump

The pump shall be of two-piece 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 1906, and shall have a rated capacity of 950 (CZ) – 1500 (CZU) GPM. The Pump shall be free from objectionable pulsation and vibration under all normal operating conditions.

### 1. Pump Body

The pump body shall be high-tensile, gray iron and can be vertically split in two sections for easy removal of the impeller assembly. All passageways are carefully matched to assure the very best hydraulic flow characteristics.

### 2. Discharge

The discharge shall be cast as an integral part of the pump body assembly and shall provide a 4-inch ANSI Flange for an O-ring seal (CZ) or 4-inch Victaulic manifold (CZU), opening for ultimate flexibility in providing various discharge outlets for maximum efficiency.

### 3. Impeller

The impeller shall be bronze and be balanced both mechanically and hydraulically for vibration-free operation.

### 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 heat-treated stainless steel that is ground at all critical areas.

### 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 housings, flinger rings, and oil seals. 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 pump shall be directly driven from a power take-off.

#### a. Pump Shift

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.
- 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 relief valve system shall be positive and quick acting and shall have a control valve to provide instantaneous hydraulic lock-out which does not require the operator to cancel out or disturb the pressure rating. Relief valve control (pilot valve) shall be protected from malfunction due to sand or other sediment in the water by a strainer which can be removed, cleaned, and replaced from the operator's panel while the pump is operating. Relief valve indicator lights shall be provided and mounted on the panel adjacent to the pilot valve assembly. The indicator lights are to be "amber" marked OPEN to indicate the relief valve is bypassing and "green" marked CLOSED to indicate the relief valve is closed.

### **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 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. A two-inch diameter relief valve shall be used on pumps with rated capacities of 750 GPM (2850 L/min.) or less. For pumps with rated capacities through 1250 GPM (4750 L/min.), a three-inch diameter relief valve shall be used. For pumps with rated capacities of 1250 GPM through 2250 GPM (4750 through 8550 L/min.), a four-inch relief valve shall be used.

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

## 13. Monarch Intake Valve

The Waterous Monarch Intake Valve shall include an extra short intake fitting, an intake butterfly valve and an intake nipple with integral relief valve mounting pad, all designed to fit behind the pump panel. The Waterous Monarch shall feature a Jamesbury Wafer Sphere high performance butterfly valve. The Monarch valve shall also feature a provision for a pre-valve relief valve and your choice of a manual worm gear, pneumatic or electric actuator.

## 14. 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
- Cables

## 15. 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).

## 16. 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.