

# SPECIFICATION

## 6800 Intelligent Variable Speed (IVS) Domestic Water Pump Systems

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### PART I: GENERAL

#### QUALITY ASSURANCE

Single-Source Responsibility: Pumps shall be manufactured by the booster manufacturer. The entire package shall be third party certified by Underwriters Laboratories Inc.

Design Criteria: The drawings indicate sizes, profiles, connections and dimensional requirements of plumbing pumps and are based on the specific manufacturer types and models indicated. Pumps having equal performance characteristics by other manufacturers may be considered, provided that deviations in dimensions and profiles do not change the design intent and performance as judged by the engineer. The burden of proof for equality is on the proposer.

#### DELIVERY AND STORAGE

Store pumps in a dry location. Retain shipping flange protective covers and protective coatings during storage. Protect bearings and couplings against damage from sand, grit and other foreign matter. Comply with manufacturers' rigging instructions for handling.

### PART II: PRODUCTS

#### A. Intelligent Variable Speed Domestic Water Pressure Booster System

Provide an Armstrong 6800 Series Design Envelope Packaged Booster System envelope number \_\_\_\_\_. The design envelope shall encompass an initial design point of \_\_\_\_\_ USgpm (L/s) at \_\_\_\_\_ psig (kPa) head. The design envelope shall also be capable of supplying \_\_\_\_\_ USgpm (L/s) at \_\_\_\_\_ psig (kPa) head at \_\_\_\_\_% minimum efficiency level.

#### B. Pump Types

Pumps shall be manufactured by Armstrong Pumps and shall have the following characteristics:

##### Vertical Multistage:

Each Vertical MultiStage (VMS) pump, with pump characteristics which provide rising heads to shut off, shall be supplied with a \_\_\_\_\_hp, ODP (TEFC), \_\_\_\_\_v/3/60, NEMA Premium® efficiency motor and an Armstrong UL Type-12 enclosure variable speed drive, which shall be integrated with the motor. Drives shall not be enclosed within the control panel.

The pump casings shall be 304 stainless steel with ANSI-250 flanges for working pressure to 370 psig (25 bar) at 250°F (120°C), cast iron with ANSI-150 flanges for working pressures to 232 psig (16 bar) at 250°F (120°C) or cast iron with ANSI-300 flanges for working pressures to 400 psig (27 bar) at 250°F (120°C) with rigid couplings, mechanical seals, stainless steel pump shafts and stainless steel, fully enclosed type impellers.



## **C. Pump Control Valves**

Each pump shall be equipped with one Bronze full port ball valve on the suction and discharge. The discharge ball valve shall be located after a soft seating check valve. No pressure reducing valves shall be required.

## **D. Pump Sequencing**

The pump designated as the lead pump shall start after a 5 second On-Delay time after sensing a drop in the desired set point value. The pump controller shall compare a signal from the discharge pressure transducer to the set point value and the lead pump speed shall ramp up in order to satisfy the set point pressure. The first lag pump shall start following a 5 second On-Delay time, when the lead pump exceeds its best operating point (BOP), and a minimum run timer shall ensure that the lag pump runs for a minimum of 5 minutes. The lag pump shall ramp down in speed and turn off when the 2 pumps are running, are operating at a point below the BOP and the lag pump minimum run timer has timed out. The lead pump shall continue to operate and meet system requirements based on the set point pressure. These steps shall be repeated in order to satisfy the building requirements for 2, 3, 4 and 5 pump packages. The lead pump shall alternate every 24 hrs of operation where the second pump shall be brought on for a period of 5 seconds, both pumps shall operate and the first pump on shall ramp down.

## **E. Power and Control Panel**

The control panel shall be of the programmable logic controller (PLC) type. The complete control panel assembly and all internal devices shall be UL508 and/or CSA labeled. The panel shall be complete with NEMA 12 enclosure and include door interlocked main disconnect, water tight LCD interface, breaker VFD connections, adjustable time delays, Hand-Off-Auto selector for each pump and min run timers. The control circuit shall include fault relay circuit to turn on the next pump should the lead pump fail.

Controller will have the capability to control no less than 5 individual pumps. Analogue pressure signaling will be provided by 4-20mA pressure transmitter factory installed on the discharge header of the unit. Customer install remote location option available. (Transmitter supplied and shipped loose)

Controller will have the following features: Energy saving No Demand water shut-off , Soft Fill providing a gradual pressure build at system start-up to prevent excessive pressure stress, Pressure Setback capability to regulate pressure under variable friction loss conditions, Energy and Efficiency (BOP) Best Operating Point Sequencing , End of Point Curve protection, 24 pump alternation, built-in pump on-delay and minimum run timers, re-settable pump elapsed run time meters, smooth pump starting and sequencing, on-screen field modifiable control and alarm parameters, high suction pressure shutdown and no-flow shutdown with drawdown tank/system optimization. Optional 7" HMI touch screen available.

## **F. Instrumentation and Controls**

Pump system shall be supplied with manifold mounted liquid filled pressure gauges for indicating suction and discharge pressure.

## **G. Factory Prefabrication**

The system shall be factory prefabricated, including ball or butterfly isolation valves on the suction and discharge of each pump, spring loaded or silent check valves on the discharge as well as 2", 2.5", 3",



4", 6", 8" or 10" Stainless Steel headers with threaded, grooved or optional flanged adapter system connections and Stainless Steel base and panel support. All interconnecting piping shall be stainless steel. The only field connections required shall be piping to the system headers and one incoming power connection at the control panel.

## H. Factory Test and Certification

The booster system and its component parts shall undergo a complete operational flow test from zero to 100% design flow rate under the specified suction pressure conditions. The system certification shall include copies of the test data as certified by a factory engineer. Performance test certifications should be placed inside the control panel and extra copies with installation manual. In addition, the entire system shall be third party certified by Underwriters Laboratories Inc. In accordance with OSHA 29 CFR with references to nationally recognized testing laboratories.

## I. Options

- ☐ Remote mount the pressure transmitter (for increased energy savings where mounting in a location other than outlet header is desired). Transmitter provided loose for customer installation.
- ☐ 7" Touch screen HMI Control Panel

## MANUFACTURERS

The above specification describes equipment manufactured by Armstrong Pumps. Alternate manufacturers of equipment will be considered provided that they are completely equal as to type, capacity and efficiency of pumps and controls. Alternate manufacturers' submittals must be certified by an officer of the company who is proposing that their system complies with the specifications in every detail.

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