

## PART 2 PRODUCTS

### 2.1 ACCEPTABLE MANUFACTURERS

Subject to compliance with these specifications, the following manufacturers shall be acceptable:

1. Orchard Pump & Supply Co.

### 2.2 MANUFACTURED UNITS

- A. Furnish and install as shown on the plans an OPSCO Engineered Pump Systems Variable Speed Booster System as manufactured by Orchard Pump and Supply Co's Engineered Pump Systems division. Suction and discharge headers shall be constructed of 304 stainless steel.
- B. Unit model shall be \_\_\_\_\_
- C. The pumping package shall be constructed utilizing NSF/ANSI/NSF-61 components, certified for potable drinking water and NSF-61 Annex G for a wetted area, weighted average lead content =0.25%.
- D. The control system shall include, as a minimum, variable frequency drives, a manifold mounted 4-20mA pressure transducer on suction and discharge manifolds, and any additional equipment as specified or as required to properly execute the sequence of operation.
- E. System shall require only suction, discharge and drain connections and single point power connections from a service entrance disconnect.
- F. All components shall be mounted and shipped as a single unit.
- G. Pumps shall be manufactured by Goulds Water Technology, a Xylem brand.
- H. The discharge of each pump shall be fitted with a control valve appropriate for station operation. Each pump and discharge valve assembly shall also be equipped with isolation valves so that the pump can be serviced while system is still filled.
- I. Pressure gauges shall be installed on the suction and discharge headers.
- J. Piping shall be sized so that water velocity shall not exceed 10.0 ft/sec in either the branches or manifolds.
- K. Pumps shall be protected from thermal accumulation via individual thermal relief mechanisms.

### 2.3 COMPONENTS

#### A. Variable Speed Pump Controller

1. The variable speed pump controllers shall be **iQpump1000** VFD's by Yaskawa Electric America, Inc. The **iQpump1000** Controller is designed for use with AC induction pump motors incorporating true pump control system logic, and pump terminology embedded within the controller and displayed on the programming HOA Keypad interface.
2. The integrated OPSVIEW HMI panel standard 7.0" color touchscreen interface shall have a landscape format, VGA (640 x 480) resolution, and a LED backlight. Analog input resolution shall be 12-bit minimum. The interface shall have multi-level password protection capability to configure and modify pump and motor parameters. A Quick Start-up Menu screen shall facilitate easy start-up.
3. Interfacing through the color touchscreen display shall be supported with RS485 connections, and a Profinet interface.
4. The variable speed program shall provide safeguards against damaging hydraulic conditions including:
  - a. Under-voltage (auto reset configuration option permits 3X fault resets)
  - b. Over-voltage (auto reset configuration option permits 3X fault resets)
  - c. Over-current (auto reset configuration option permits 3X fault resets)
  - d. End-of-curve protection (requires option Flow Meter)
  - e. Low or high system failure
  - f. Low or high suction pressure
5. The variable speed program shall have the ability to detect fault conditions includes:
  - a. Pump failure
  - b. VFD run failure
  - c. VFD communication failure

- d. Low and high system pressure
- e. Low and high suction pressure
- f. Loss of prime
- g. Low suction prime
- h. Low inlet pressure

## B. iQpump 1000 Variable Frequency Drive

1. Reference Section XX.XX.XX (Variable-Frequency Motor Controllers)

## C. MECHANICAL

### 1. Pump Station Frame and Piping

- a. Framing shall be designed and fabricated to provide structural support for all attached equipment, and provide anchor bolt support. The base shall supply sufficient rigidity to withstand the stresses of reasonable and competent transportation to site, off loading, installation, and operation.
- b. Piping shall be constructed from 304 stainless steel, schedule 10 or heavier pipe as required to maintain a 3 to 1 pressure safety factor (including 1/16" corrosion allowance).

### 2. Stainless Steel Vertical Multistage Pumps

- a. Goulds Water Technology's e-SV vertical multi-stage pump, compliant to ANSI/NSF-61 Annex G, premium efficient motor - standard NEMA design 56C, JM, or TC frame.
- b. AISI 304 wetted components
- c. Impeller: AISI 304
- d. Diffuser: AISI 304
- e. Shaft: AISI 316 (sizes 1 – 22SV)
- f. External sleeve: AISI 304
- g. Pump body: Cast Iron (ASTM Class 35/40B)
- h. Seal housing: AISI 304
- i. Mechanical seal: all material options NSF/ANSI-61 compliant

### 3. Isolation Lug Style Butterfly Valve

- a. The isolation Lug Style Butterfly Valves shall be Flomatic Corporation's Sylax<sup>3</sup> butterfly valves, model S3L04.
- b. Valve shall be certified to NSF-61 for use with potable drinking water.
- c. butterfly valves shall be designed to be maintenance-free for installation in the vertical or horizontal position.
- d. butterfly valve shall have an EPDM seat lining that is used to obtain a drip tight closure with the 316 stainless steel disc.
- e. The valve shall be equal in all respects to all Sylax<sup>3</sup> Models and configurations as manufactured by Flomatic Corporation.
- f. Valve shall be rated to 250 psi WOG.

### 4. Wafer Style Silent Check Valve

- a. The Wafer Style Silent Check Valve shall be model Flomatic Corporation's Sylax<sup>3</sup> butterfly valves, model 2434VFD.
- b. Wafer style silent check valves shall be of silent operating type that begin to close as flow is reduced and fully close at zero velocity stopping reverse flow which reduces or eliminates water hammer shock.
- c. The valve design shall incorporate a center guided, spring loaded poppet, guided by an oversized, one-piece bushing. The poppet shall have a short linear stroke that generates a flow area equal to that of the pipe size in the full open position.
- d. The valve body shall be constructed of ductile iron (grade 65-45-12) or stainless steel. The poppet and seat ring shall be constructed of 316 stainless steel, with the spring constructed of 302 stainless steel. The oversized bushing shall be constructed of un-leaded bronze and will be located concentrically within the valve body and held in place by a 302 stainless steel snap ring. The valve will be fitted with an EPDM o-ring seal to insure drip tight closure when the poppet closes against the seat ring.
- e. Valves shall be certified to NSF/ANSI 61 Drinking Water System Components - Health Effects, and also certified to be lead free in accordance with NSF/ANSI 372.
- f. All component parts shall be field replaceable and without the need of specialty tools.
- g. The valve shall be equal in all respects to the Model 888VFD as manufactured by the Flomatic Corporation.
- h. Valve shall be rated to Max Pressure 300 PSI at 150°F.

## 5. Sensor / Transmitters

- a. Pressure transducer shall be utilized for providing all pressure signals for the VFD. Pressure transducer shall be a solid-state bonded strain gage type with an accuracy of  $< \pm 0.5\%$  BFSL and constructed of stainless steel. Transducer shall be rated for a pressure of 100 or 300 psi and shall provide gauge pressure output, rather than an absolute. Pressure transducer shall be 4-20mA analog type with 10-28 VDC supply range.

## 6. Pressure Gauges

- a. Gauges shall be provided for the suction and discharge manifold.
- b. Accuracy shall be  $\pm 1.5\%$
- c. Bourdon tube and connection shall be constructed of 316SS.
- d. Case, bezel and internals shall be constructed of 316SS.
- e. Gauge shall be filled with glycerin in order to dampen pulsation and vibration and to provide lubrication to the internal parts.
- f. Gauge range shall be selected to cover the largest operating range for the specific conditions and pump selected.

## 7. Flange Bolts

- a. Bolts shall be zinc plated and shall meet ASTM Grade A193 B7.

## 8. Paint

- a. Standard finish coat shall be acrylic enamel to a thickness of no less than 3 mil.

# PART 3 EXECUTION

## 3.1 INSTALLATION

- A. Install equipment in accordance with manufacturer's instructions. The contractor shall determine the appropriate method for mounting, securing and plumbing the package in accordance with applicable state, federal and local building and plumbing codes. Isolation valves are required by the manufacturer on suction and discharge lines, valves by others.
- B. The contractor shall align the pump and motor shafts to within the manufacturer's recommended tolerances prior to system start-up.
- C. Power supply wiring, as required, as well as installation methods, shall be the responsibility of the electrical contractor. All wiring shall be performed per applicable state, federal and local codes.
- D. Control wiring for remote mounted switches and sensor / transmitters shall be the responsibility of the controls contractor. All wiring shall be performed per manufacturer's instructions and applicable state, federal and local codes.

## 3.2 DEMONSTRATION/TRAINING & START-UP SERVICE

- A. One-time, on-site start-up and training of the packaged pumping system shall be included.

## 3.3 WARRANTY

- A. The manufacturer shall warrant the water pumping system to be free of defects in material and workmanship for one year (12 months) from date of authorized start-up, not to exceed eighteen (18) months from date of manufacturer's invoice. Complete terms and conditions will be provided upon request.