SECTION 22 11 24 – domestic water pressure boosting systems (constant speed) [3.5 Horsepower and less]

1. GENERAL
	* + 1. RELATED DOCUMENTS
				1. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.
				2. Specifications throughout all Divisions of the Project Manual are directly applicable to this Section, and this Section is directly applicable to them.
			2. SUMMARY
				1. Furnish and install a complete, factory packaged and tested, constant-speed domestic water pressure boosting system. The system shall be capable of automatically maintaining a constant system pressure, as scheduled on Drawings, under all conditions of flow between zero and the scheduled maximum GPM demand, with minimum suction pressure. System shall include pumps, motor sets, and Control Center. Systems using variable speed drivers are not acceptable. Entire packaged system to be UL listed or third party approved by a company acceptable to the Owner.
			3. REFERENCE STANDARDS
				1. The latest published edition of a reference shall be applicable to this Project unless identified by a specific edition date.
				2. All reference amendments adopted prior to the effective date of this Contract shall be applicable to this Project.
				3. All materials, installation and workmanship shall comply with the applicable requirements and standards addressed within the following references:

Underwriters Laboratories Listings

2009 Edition of the International Plumbing Code

2008 Edition of the National Electric Code

National Electrical Manufacturers Association

ANSI/NSF Standard 61 - Drinking Water System Components - Health Effects

* + - 1. QUALITY ASSURANCE
				1. All equipment under this section shall be furnished by a single supplier and shall be products that the manufacturer regularly engages in. The supplier shall have sole responsibility for proper functioning of the system and equipment supplied.
				2. The manufacturer of the domestic water pressure boosting system shall be responsible for compliance with all applicable codes and regulations be held accountable for the complete pump package and installation.
				3. Manufacturer’s Qualifications: Company specializing in manufacturing the products specified in this Section with minimum three years documented experience. The packaged system manufacturer shall have 24 hour local service available provided by a trained factory authorized representative.
				4. All disconnects, transformers, and control devices shall be installed to provide minimum wire bending clearances per N.E.C. All wiring shall be stranded copper conductors with 90° C. insulation. Conductors shall be numbered and identified at all termination points. All wiring shall be installed in nylon wire ways and laced with nylon tie straps. All disconnects, transformers, controllers, control devices, selector switches, and indicator lights shall be provided with nameplates indicating their respective function and/or identification. A factory wiring schematic shall be permanently affixed to the inside of cabinet door. The entire assembly shall be wired and tested in accordance with the National Electrical Code (N.E.C.). All components shall be built to National Electrical Manufacturers Association (NEMA) standards and be Underwriters Laboratory (U.L.) approved. The entire control panel shall bear the U.L. Label for enclosed industrial control panels. The entire package pumping system shall comply with Federal Regulations 29 CFR 1910.399 and certified through ETL under Category 225 and ULQCZJ.
				5. Installer's Qualifications: The system shall be installed by a firm having minimum three years experience regularly engaged in the installation of variable speed domestic booster pump systems.
				6. Certification shall obtained by the manufacturer indicating that the function and performance characteristics of all products and materials have been determined by testing and ongoing surveillance by an approved third-party certification agency. Assertion of certification shall be in the form of identification in accordance with the requirements of the third-party certification agency.
			2. SUBMITTALS
				1. Product Data:

Provide manufacturers literature including general assembly, pump curves showing performance characteristics with pump and system with operating point indicated, NPSH curve, controls, wiring diagrams, and service connections.

Code and Standards compliance.

Third-Party Certification.

* + - * 1. Record Documents:

Provide full written description of manufacturer’s warranty.

Shop Drawings: Indicate layout, general assembly, components, dimensions, weights, clearances, and methods of assembly.

Manufacturer's Installation Instruction: Indicate support details, connection requirements, and include start-up instructions for pump system.

Manufacturer's Certificate: Certify that pumps meet or exceed specified requirements at specified operating conditions. Submit summary and results of factory tests performed.

Field Reports: Submit verification statement, signed by system manufacturer representative, of start-up, adjustment service and acceptance of installation. Indicate summary of hydrostatic test and field acceptance tests performed.

* + - * 1. Operation and Maintenance Data:

Operation Data: Include manufacturer’s instructions, start-up data, trouble-shooting check lists, for pumps, drivers, and controllers.

Maintenance Data: Include manufacturer’s literature, cleaning procedures, replacement parts lists, and repair data for pumps, drivers and controllers, preventive maintenance schedule, preventive maintenance recommendations and procedures. Identify place of purchase, location and contact numbers of service depot and technical support for each product installed.

* + - 1. DELIVERY, STORAGE and HANDLING
				1. Accept pumps and components on Site in factory packing. Inspect for damage. Comply with manufacturers rigging and installation instructions.
				2. Protect pumps and components from physical damage including effects of weather, water, and construction debris.
				3. Provide temporary inlet and outlet caps, and maintain in place until installation.
			2. warranty
				1. All components furnished shall be warranted for a period of 12 months from documented date of startup.
			3. maintenance service
				1. Furnish service and maintenance of packaged system for one year from date of Substantial Completion.
1. PRODUCTS
	* + 1. GENERAL
				1. All materials shall meet or exceed all applicable referenced standards, federal, state and local requirements, and conform to codes and ordinances of authorities having jurisdiction.
				2. All materials that may come in contact with the potable water delivered shall comply with ANSI/NSF Standard 61.
				3. All brass and bronze piping materials that may come in contact with the potable water delivered shall have no more than 15% zinc content.
			2. ACCEPTABLE MANUFACTURERS
				1. The following manufacturers are acceptable provided their products meet or exceed these Specifications and the Contract drawing schedules:

Armstrong

Bell and Gossett

Canariis

Grundfos

Namco

Patterson Pump

Syncroflo

Tigerflow

* + - 1. Pumps and motors
				1. Provide pumps and motors as scheduled on Drawings.
				2. Provide bronze-fitted, vertical, multi-state pumps with bronze impellers, sleeves and bearings.
				3. Furnish drip-proof motors sized so that nameplate amperage is not exceeded at any point on the pump operating curve.
				4. Furnish each pump with a high-temperature switch with drain line piped to nearest floor drain.
			2. Controls
				1. Provide a single control enclosure conforming to NEMA 1 and complete with the following:

One main system disconnect switch.

Combination magnetic across-the-line starters with circuit breakers for each motor with each starter wired to receive separate power source for each motor.

H-O-A selector.

Run lights.

Run timers.

Pressure controller for pumps.

Provide auxiliary relay to automatically transfer control voltage form one power source to the other. Connect relay to provide control power from the source for the lead pump. When this power source is de-energized, relay is to transfer control power to the source for the lag pump.

Pressure control with relay for connection to the 4-inch alarm bell for surge tank lower water alarm. Provide an alarm bell, located as shown on Drawings, and silence pushbutton. Provide two sets each of dry form “C” contacts for remote indication of surge tank low water alarm, surge tank high water alarm and low discharge water pressure.

Control voltage transformer.

Alarm silencer switch.

Alarm light.

Pump temperature probes and purge valves with test pushbutton.

* + - * 1. All pilot lights and visual indicators shall be illuminated from the rear by long life LED lamps. Neon and incandescent lamps are not acceptable
			1. Pump control sequence
				1. Lead Pump Operation: The lead pump shall run only as necessary to maintain system pressure and shall be controlled automatically by means of a pressure switch and minimum run timer to prevent short cycling.
				2. Lag Pump Sequencing: The lag pumps shall be sequenced on and off automatically in accordance with the system demand. The lag sequence control shall be a pressure switch operated, with on delay and minimum run timers to prevent short cycling. Provide auto alternation of lag pumps.
				3. In the event of a power failure of sufficient duration to cause loss of system pressure, the system shall shut down.
			2. System valves
				1. Constant system pressure shall be maintained by a pilot-operated diaphragm-type combination pressure regulating and non-slam check valve on each pump. Main valve and cover to be cast iron with a fused epoxy coating and stainless steel stem and cover bolts. Construction shall be suitable for the maximum working pressure of the system.
			3. Hydro pneumatic tank
				1. Provide a hydropneumatic tank with a carbon steel shell and a replaceable FDA approved heavy-duty bladder to separate the air and water. No water shall come in contact with the metal walls of the tank. Features shall include an air fill valve, pressure gauge connection and bottom system connection suitable for 100 percent drawdown.
				2. The tank shall be constructed in accordance with Section VIII of the ASME code and be Nation Board stamped and shall be rated for minimum 200 psig operating pressure and maximum operating temperature of 240 degrees F.
				3. Tank shall be factory finished in high quality epoxy or enamel paint.
				4. The tank shall be mounted on the pump skid, and the tank feed line shall be connected between the lead pump’s discharge and its PRV to provide maximum tank storage.
1. EXECUTION
	* + 1. INSTALLATION
				1. Installation shall meet or exceed all applicable federal, state and local requirements, referenced standards and conform to codes and ordinances of authorities having jurisdiction.
				2. All installation shall be in accordance with manufacturer’s published recommendations.
				3. Install the system level and in accordance with manufacturer’s published recommendations.
				4. Locate equipment with allowance for manufacturer's recommended clearances around unit.
				5. Set entire unit on 4" high reinforced concrete equipment pad. Provide vibration isolators and bolt skid to pad. Structurally connect equipment pad to building slab to prevent movement.
				6. Pipe discharge from all relief valves, drains and individual pump thermal purge protection solenoid valves, indirectly to floor drain having adequate capacity to accept discharge.
				7. Provide valved Type "L" copper branch feed to the bladder tank from system distribution main as shown on the Contract Drawings.
			2. Factory testing
				1. The booster system shall be hydrostatically tested as well as undergo a complete electric and hydraulic test form 0 to 100 percent design flow at the factory.
			3. verification and TESTING
				1. Verify that the pumps and prime movers have been aligned according to manufacturers’ recommendations. Test the system performance by verifying the operation of the pumps and system vs. the pump curves, alarms, controls, etc. Contractor shall inform Owner 48 hours in advance of verification and testing so that Owner’s Construction and Physical Plant personnel may observe pump alignment, performance verifications, and testing of system performance, alarms and controls.
			4. Instructions and start-up
				1. Provide for the service of a competent factory-trained supervising agent from the pump package manufacturer to inspect the completed installation, start the system and acquaint the operators with the proper operation and maintenance of the equipment.

END OF SECTION 22 11 24