SECTION 23 21 23 - HYDRONIC PUMPS

PART 1 GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 specifications, apply to this section, and the other sections of Division 23.

1.2 SUMMARY

A. Section includes:
   1. Variable speed inline pumps (EC Motor powered).

B. Related Sections: The following sections contain requirements that relate to this section:
   1. Division 23 Section: “Common Motor Requirements”: Product requirements for motors for placement by this section.
   2. Division 23 - Hydronic Piping: Execution requirements for connection to pumps specified by this section.
   3. Division 23 Section: “Vibration and Seismic Controls for HVAC Piping and Equipment”: Product requirements for vibrations isolators installed with pumps.
   4. Division 23 Section: “Pipes and Tubes for HVAC Piping and Equipment”: Execution requirements for connection to pumps specified by this section.
   5. Division 23 Section: “General-Duty Valves for HVAC Piping”: Product requirements for valves used in hydronic piping systems.
   6. Division 26 Section: “Low Voltage Electrical Power Conductors & Cables”: Execution requirements for electrical connections to pumps specified by this section.
   7. Division 26 Section: “Raceways and Boxes for Electrical Systems”

1.3 REFERENCES

(Unless otherwise noted, references apply to “latest editions.”)

A. National Electrical Manufacturers Association:
   1. NEMA 250 - Enclosures for Electrical Equipment (1000 Volts Maximum).

B. Underwriters Laboratories Inc.:

   1. UL 778 - Motor Operated Water Pumps.

1.4 PERFORMANCE REQUIREMENTS

A. Provide pumps to operate at system fluid temperatures without vapor binding and cavitation, are non-overloading in parallel or individual operation, and operate within 25 percent of midpoint of published maximum efficiency curve.

1.5 SUBMITTALS

A. Division 01 Section – “Submittal Procedures”: Submittal Procedures.

B. Product Data: Submit certified pump curves showing performance characteristics with pump and system operating point plotted. Include NPSH curve when applicable. Include electrical characteristics and connection requirements. Submit also, manufacturer model number, dimensions, service sizes, and finishes.

C. Manufacturer's Installation Instructions: Submit application, selection, and hookup configuration with pipe and accessory elevations. Submit hanging and support requirements and recommendations.

D. Manufacturer's Certificate: Certify products meet or exceed specified requirements.

E. Submission of all submittals shall be made electronically via email with PDF attachments to submit@kibart.com

1.6 CLOSEOUT SUBMITTALS

A. Division 01 Section – “Execution and Closeout Requirements”: Closeout procedures.

B. Operation and Maintenance Data: Submit installation instructions, servicing requirements, assembly views, lubrication instructions, and replacement parts list.

1.7 QUALIFICATIONS

A. Manufacturer: Company specializing in manufacturing products specified in this section with minimum three years documented experience.

B. Installer: Company specializing in performing Work of this section with minimum three years documented experience and approved by manufacturer.

1.8 PRE-INSTALLATION MEETINGS

A. Division 01 - Administrative Requirements: Pre-installation meeting.

B. Convene minimum two weeks prior to commencing work of this section.

1.9 DELIVERY, STORAGE, AND HANDLING

A. Division 01 Section – “Product Requirements”: Product storage and handling requirements.

B. Protect systems from entry of foreign materials by temporary covers, completing sections of the work, and isolating parts of completed system.

1.10 FIELD MEASUREMENTS

A. Verify field measurements prior to fabrication.

1.11 WARRANTY

A. Division 01 Section – "Execution and Closeout Requirements": Product warranties and product bonds.

B. Furnish five year manufacturer warranty for pumps.

1.12 EXTRA MATERIALS

A. Division 01 Section – "Execution and Closeout Requirements": Spare parts and maintenance products.

B. Furnish one set of mechanical seals for each pump.

C. Furnish two sets of cartridges for each side-stream filter.

PART 2 PRODUCTS

2.1 VARIABLE SPEED INLINE PUMPS (EC Motor Powered)

A. Manufacturer:
1. Pumps shall meet model numbers, types, sizes, capacities, and characteristics as scheduled on the Contract Drawings. Acceptable manufacturers: Bell & Gossett, Grundfos, Taco or Wilo.

B. Wet Rotor In-Line Circulating Pumps:

1. Wet rotor, glandless inline circulating pumps shall include electronic variable speed control to operate at constant/variable differential pressure control without external sensors. Automatic night setback control available as standard using "self taught FUZZI" technology.
2. Pumps to include integrated synchronous motors using ECM technology with permanent magnetic rotors, special sensor less control electronics and single phase electronic converters.
3. Pumps to include wireless communication
4. Integrated overload motor protection shall protect the pump against over/under voltage, over temperature of motor and/or electronics, over current, locked rotor and dry run (no load condition).
5. Fault contact "FC" terminals shall be included in the terminal box and are to be potentially free, normally closed contacts that open on the event of a failure.
6. Interface (IF) modules will be included where specified, installed in the terminal box. The modules will allow BMS communication via LON works, 0 – 10 volt DC control of speed or head setpoint. External minimum speed, external off, dual pump communication and pump operation status.
7. Pump shall meet the latest minimum efficiency as set forth by the DOE.

C. Materials and Construction:

1. Circulating pumps shall be constructed with Cast-Iron bodies with factory applied Catephoresic coating.

2. Shafts shall be constructed of high quality stainless steel. Motor bearings shall be metal impregnated carbon sleeve bearing type. Impellers will be constructed on a high strength glass filled polypropylene engineered composite.

D. Manufacturer's Warranty:

1. Minimum warrant will be 2 years from date of manufacturer, and/or 1.5 years after date of installation.

PART 3 EXECUTION

3.1 INSTALLATION

A. Provide pumps to operate at specified system fluid temperatures without vapor binding and cavitation, are non-overloading in parallel or individual operation, and operate within 25 percent of midpoint of published maximum efficiency curve.

B. Install long radius reducing elbows or reducers between pump and piping. Support piping adjacent to pump so no weight is carried on pump casings. For close coupled or base mounted pumps, install supports under elbows on pump suction and discharge line sizes 4 inches and over.

C. Install pumps on vibration isolators. Refer to Division 23 Section: "Vibration and Seismic controls for HVAC Piping and Equipment".

D. Vertical in line split coupled type pumps shall be mounted directly in the pipe system without flexible connectors or connection to the floor. The pipe system may be supported by spring hangars or as determined by the ASHRAE standard.

E. Install flexible connectors at or near pumps where piping configuration does not absorb vibration. Refer to Division 23 Section: "Vibration and Seismic controls for HVAC Piping and Equipment".

F. Provide valves and piping specialties as indicated on details on the Contract Drawings.

G. Decrease from line size with long radius reducing elbows or reducers. Support piping adjacent to pump so no weight is carried on pump casings. Provide supports under elbows on pump suction and discharge line sizes 4 inches and larger.

H. Provide air cock and drain connection on horizontal pump casings.

I. Provide drains for bases and seals.

J. Check, align, and certify alignment of base mounted pumps prior to start-up.

1. Align (laser) pump and motor shafts and piping connections after setting on foundation, grout has been set and foundation bolts have been tightened, and piping connections have been made.
2. Adjust pump and motor shafts for angular offset alignment by methods specified in the Hydraulics Institute Standard 1.1 – 1.5. "Centrifugal Pumps for Nomenclature, Definitions, Application and Operation".

3. After alignment is correct, tighten foundation bolts evenly but not too firmly. Completely fill base plate with non-shrink nonmetallic grout while metal blocks and shims or wedges are in place. After grout has cured, fully tighten foundation bolts.
4. Comply with pump and coupling manufacturer's written instructions.

K. Lubricate pumps before start-up.

L. Install Work in accordance with all applicable codes, standards, and local authorities having jurisdiction requirements.

M. Control wiring for remote mounted transmitting sensors, switches, etc. shall be provided by controls contractor. All wiring shall be performed per manufacturer's instructions and applicable State, Federal and local codes.

3.2 MOCK-UPS

A. Provide a mock up unit complete with piping trim, insulation, condensate drain trap, controller, lights, disconnect switches, ATC panels, etc. prior to installation of units. The engineer and owner will review the mock-up. The contractor shall make all modifications as requested by the owner or engineer.

3.3 FIELD QUALITY CONTROL

A. Division 01 Section – "Quality Requirements": Field inspection, testing, adjusting, and balancing.

B. Inspect for alignment of base mounted pumps.

C. Inspect, test, adjust and balance all pumps to meet scheduled capacities.

3.4 COMMISSIONING

A. Provide support for Commissioning Activities and Functional Performance Testing as outlined in specification Division 01 Section "Commissioning".

B. Contractor shall provide copies of final reports to the Commissioning Agent (CxA) for review and inclusion with final Cx project documentation as applicable

END OF SECTION 23 21 23