

**Part 1 General**

**1.1 RELATED SECTIONS**

- .1 Section 01 33 00 - Submittal Procedures.
- .2 Section 01 74 19 - Construction/Demolition Waste Management And Disposal.
- .3 Section 01 78 30 - Closeout Submittals.
- .4 Section 44 41 13.01 – Water Treatment Equipment.

**1.2 SUMMARY**

- .1 Section Includes:
  - .1 Materials and installation for plumbing pumps.

**1.3 REFERENCES**

- .1 Health Canada/Workplace Hazardous Materials Information System (WHMIS)
  - .1 Material Safety Data Sheets (MSDS).

**1.4 ACTION AND INFORMATIONAL SUBMITTALS**

- .1 Submittals in accordance with Section 01 33 00 – Shop Drawings, Product Data and Samples.
- .2 Product Data:
  - .1 Submit manufacturer's printed product literature, specifications and data sheet for fixtures and equipment.
- .3 Shop Drawings.
  - .1 Submit shop drawings to indicate:
    - .1 Equipment, including connections, fittings, control assemblies and ancillaries. Identify whether factory or field assembled.
    - .2 Wiring and schematic diagrams.
    - .3 Dimensions and recommended installation.
    - .4 Pump performance and efficiency curves.
- .4 Certificates: submit certificates signed by manufacturer certifying that materials comply with specified performance characteristics and physical properties.
- .5 Instructions: submit manufacturer's installation instructions.
- .6 Closeout submittals: submit maintenance and engineering data for incorporation into manual specified in Section 01 78 30 - Closeout Submittals, include:
  - .1 Manufacturers name, type, model year, capacity and serial number.
  - .2 Details of operation, servicing and maintenance.
  - .3 Recommended spare parts list with names and addresses.

## **1.5 DELIVERY, STORAGE AND HANDLING**

- .1 Waste Management and Disposal:
  - .1 Separate waste materials for recycling in accordance with Section 01 74 19 - Construction/Demolition Waste Management and Disposal.
  - .2 Remove from site and dispose of packaging materials at appropriate recycling facilities.
  - .3 Collect and separate for disposal corrugated cardboard packaging material in appropriate on-site bins for recycling in accordance with Waste Management Plan.
  - .4 Divert unused metal materials from landfill to metal recycling facility as approved by Departmental Representative.
  - .5 Fold up metal banding, flatten and place in designated area for recycling.

## **Part 2 Products**

### **2.1 POTABLE WATER SYSTEMS**

- .1 All products to be approved for use in potable water systems in Canada.

### **2.2 DOMESTIC WATER BOOSTER SYSTEM**

- .1 Packaged system, tested and adjusted, ready for site piping and electrical connections.
- .2 Total Capacity:
  - .1 Flow rate: 1.0 L/s.
  - .2 System pressure: 450 kPa.
  - .3 Available pressure at system outlet: 450 kPa.
- .3 Construction: horizontal, end suction, closed coupled centrifugal, cast-iron casing, bronze impeller, stainless steel shaft sleeve, mechanical shaft seal, designed for 850 kPa suction pressure.
- .4 Valves: all valves and plumbing to follow design-build specifications and RFP documents.
- .5 Supports: install complete package on factory fabricated structural steelwork designed to withstand seismic zone four acceleration and velocity forces.
- .6 Anchor Bolts and Templates:
  - .1 Supply for installation by other Divisions.
  - .2 Size anchor bolts to withstand seismic zone four acceleration and velocity forces.
- .7 Control Panel: CSA 1 enclosure complete with:
  - .1 Externally operated disconnect switch.
  - .2 Magnetic across-the-line fused starters.
  - .3 Overload protection for each phase.
  - .4 Adjustable pressure switch.
  - .5 Low pressure safety cut-out.

- .6 Control circuit transformer with fused secondary.
- .7 Adjustable time delay relay.
- .8 Hand-off-automatic selector switch for pumps.
- .9 Pilot lights; power on, low suction pressure.
- .10 Alarm: visual and audible with silencing switch for abnormal conditions.
- .8 Operation:
  - .1 In Auto pump to operate during pressure demand.
  - .2 Adjustable 90 sec time delay to maintain starting pump operation and avoid "on-off" cycling.
  - .3 Pressure switch to cycle pump.
  - .4 Low suction pressure switch to stop pumps.

### **2.3 WATER SUPPLY PUMP, SUBMERSIBLE**

- .1 Capacity: as indicated 0.5 L/s at 200 kPa total head with NPS 1 discharge.
- .2 Construction: simplex CSA approved, housing epoxy coated cast iron, stainless steel shaft, non-clog bronze impeller, mechanical shaft seal.
- .3 Motor: as required, hermetically sealed, with automatic overload protection.
- .4 Control: floats, switches and simplex control box, HOA switch, and alarm lights. See Section 44 41 13.1.
- .5 Operation
  - .1 In Auto, pump controlled by low level control in Tank A. After start, pump run for adjustable time delay of up to 120 minutes. Pump also runs for an adjustable time every 12 hours when in Auto. See Section 44 41 13.01.
  - .2 Low level alarm (Float 3) to stop pump and provide alarm light.

## **Part 3 Execution**

### **3.1 MANUFACTURER'S INSTRUCTIONS**

- .1 Compliance: comply with manufacturer's written recommendations or specifications, including product technical bulletins, handling, storage and installation instructions, and data sheet.

### **3.2 INSTALLATION**

- .1 Make piping and electrical connections to pump and motor assembly and controls as indicated.
- .2 Ensure pump and motor assembly do not support piping.

### **3.3 FIELD QUALITY CONTROL**

- .1 Site Tests/Inspection:
  - .1 Check power supply.
  - .2 Check starter protective devices.

- .2 Start-up, check for proper and safe operation.
- .3 Check settings and operation of hand-off-auto selector switch, operating, safety and limit controls, audible and visual alarms, over-temperature and other protective devices.

### **3.4 START-UP**

- .1 General:
  - .1 In accordance with Section 01 91 00 - Commissioning:
  - .2 Procedures:
    - .1 Check power supply.
    - .2 Check starter O/L heater sizes.
    - .3 Start pumps, check impeller rotation.
    - .4 Check for safe and proper operation.
    - .5 Check settings, operation of operating, limit, safety controls, over-temperature, audible/visual alarms, other protective devices.
    - .6 Test operation of hands-on-auto switch.
    - .7 Run-in pumps for 12 continuous hours.
    - .8 Check installation, operation of mechanical seals, packing gland type seals. Adjust as necessary.
    - .9 Adjust alignment of piping and conduit to ensure full flexibility.
    - .10 Eliminate causes of cavitation, flashing, air entrainment.

### **3.5 PERFORMANCE VERIFICATION (PV) PRESSURE BOOSTER PUMPS**

- .1 Application tolerances:
  - .1 Flow: +/- 10%.
  - .2 Pressure: Plus 20%, minus 5%.
- .2 PV procedures:
  - .1 Open pump valves fully.
  - .2 Measure differential pressure (DP) across pump.
  - .3 Measure amperage and voltage and compare with manufacturer's data sheets and motor nameplate data.
  - .4 If suction is different size than discharge connection, add velocity head correction factor to DP.
  - .5 Mark this DP on manufacturer's pump curve..
  - .6 Repeat measurements of amps and volts. Compare with manufacturer's data sheets.
  - .7 Calculate BHP and compare with nameplate data.

### **3.6 PERFORMANCE VERIFICATION (PV) - HYDROPNEUMATIC PRESSURE BOOSTER SYSTEM**

- .1 Measure pre-charge air pressure on tank prior to any pumping operations.
- .2 Switch pump to auto and check pressure at which pump stops.

### **3.7 PERFORMANCE VERIFICATION (PV) - SUPPLY PUMPS**

- .1 Application tolerances:
  - .1 Flow: plus 10%; minus 0%.
  - .2 Pressure: plus 10%; Minus 5%.
- .2 PV Procedures:
  - .1 Fill sump and confirm alarm set points.
  - .2 Record levels at which low level lockout will occur. Determine pump flow rate by measuring time to fill tank A in building.
  - .3 Adjust water level alarms as required.
- .3 Check removability of pumps for servicing without interfering with installation or operation of other equipment.

### **3.8 REPORTS**

- .1 Include:
  - .1 PV results on approved PV Report Forms.
  - .2 Product Information report forms.
  - .3 Pump performance curves (family of curves) with final point of actual performance.

**END OF SECTION**