

**Part 1 General**

**1.1 GENERAL REQUIREMENTS**

- .1 The Contractor shall be responsible to carry out all the Work set out or referred to in this Section 23 21 14.

**1.2 SUMMARY**

- .1 Section includes:
  - .1 The supply and installation of hydronic specialties equipment.
  - .2 Materials, equipment selection, installation and start-up for hydronic system.
- .2 Sustainable requirements for construction and verification.
- .3 Related Sections:
  - .1 Division 01 – General Requirements.

**1.3 REFERENCES**

- .1 American Society of Mechanical Engineers (ASME):
  - .1 ASME-04, Boiler and Pressure Vessel Code.
- .2 American Society for Testing and Materials (ASTM):
  - .1 ASTM A47/A47M-99, Specification for Ferritic Malleable Iron Castings.
  - .2 ASTM A278M-01, Specification for Gray Iron Castings for Pressure-Containing Parts for Temperatures up to 650°F (345°C).
  - .3 ASTM A516/A516M-96 (e1), Specification for Pressure Vessel Plates, Carbon Steel, for Moderate - and Lower - Temperature Service.
  - .4 ASTM A536-84 (1999) e1, Specification for Ductile Iron Castings.
  - .5 ASTM B62-93, Specification for Composition Bronze or Ounce Metal Castings.
- .3 Canadian Standards Association (CSA International):
  - .1 CSA B51-03, Boiler, Pressure Vessel, and Pressure Piping Code.
  - .2 CAN/CSA-B214-01, Installation Code for Hydronic Heating Systems.
- .4 American Society of Heating Refrigeration and Air-Conditioning Engineers (ASHRAE):
  - .1 Standard 90.1-2001 Energy Standard for Buildings Except Low-Rise Residential Buildings.
- .5 Electrical Equipment Manufacturers Advisory Council (EEMAC).
- .6 National Electrical Manufacturers Association (NEMA):
  - .1 NEMA MG 1-2003, Motors and Generators.

**1.4 SUBMITTALS**

- .1 Submittals in accordance with Division 01 – General Requirements.

- .2 Product Data: submit WHMIS MSDS - Material Safety Data Sheets:
  - .1 Submit shop drawings and product data in accordance Division 01 – General Requirements.
  - .2 Indicate on product data expansion tanks, air vents, separators, valves, strainers.
- .3 Closeout Submittals:
  - .1 Submit maintenance data in accordance with Division 01 – General Requirements.

## **1.5 QUALITY ASSURANCE**

- .1 Health and Safety:
  - .1 Construction occupational health and safety in accordance with Division 01 – General Requirements.

## **1.6 DELIVERY STORAGE AND DISPOSAL**

- .1 Waste Management and Disposal:
  - .1 Separate waste materials for reuse and recycling in accordance with Division 01 – General Requirements.
  - .2 Collect and separate for disposal paper, plastic, polystyrene, corrugated cardboard, packaging material in appropriate on-site bins for recycling in accordance with Waste Management Plan.

## **1.7 EXTRA MATERIAL**

- .1 Provide maintenance materials in accordance with Division 01 – General Requirements.
- .2 Furnish following spare parts: Seals, gaskets (one for every ten items installed).

## **Part 2 Products**

### **2.1 MATERIAL**

- .1 Sustainable Requirements:
  - .1 Materials and resources in accordance with Division 01 – General Requirements.
  - .2 Do component selection and siting to: CAN/CSA-B214.

### **2.2 BLADDER TYPE EXPANSION TANK**

- .1 Vertical steel bladder type expansion tank shall be ASME rated, CRN number, CSA B51 and be in accordance with all Applicable Laws.
- .2 Full acceptance, heavy duty, replaceable butyl bladder suitable for 116°C operating temperature.
- .3 Free-standing on integral welded ring base.
- .4 Maximum working pressure: 860 kPa.
- .5 Maximum working temperature: 116°C

- .6 Factory pre-charged at 87.7 kPa.
- .7 Access port at top, 25 mm (1") pipe and spare connections, lifting lugs.
- .8 Tank Volume: 300 litres.
- .9 Tank diameter: 610 mm.
- .10 Tank height: 1308 mm.

### **2.3 COMBINATION AIR, DIRT, HYDRAULIC AND MAGNETIC SEPARATOR**

- .1 Designed and constructed per ASME Codes c/w CRN registration.
- .2 Construction: epoxy resin coated steel body.
- .3 Stainless steel internal coalescing mesh.
- .4 Pre-formed insulation.
- .5 Neodymium magnet.
- .6 Automatic air vent with shut-off valve.
- .7 Drain valve.
- .8 4" ANSI 150 flange connections.
- .9 Particle separation capacity: to 5 µm (0.2 mil).
- .10 Max working pressure: 1034 kPa (150 psi).
- .11 Temperature range: 0 –104°C (32 – 220°F).

### **2.4 AUTOMATIC AIR VENT**

- .1 Standard float vent: brass body and NPS 1/8 connection and rated at 1034 kPa working pressure.

### **2.5 HYDRONIC BALANCING VALVES**

- .1 NPS 1/2 to 2: Refer to spec Section 23 21 13 – Hydronic System: Steel.
- .2 NPS 2 1/2 to 12:
  - .1 Valves are to be of the 'Y' pattern, equal percentage globe-style.
  - .2 Valve shall provide multi-turn, 360° adjustment with micrometer type indicators located on the valve handwheel.
  - .3 Valves shall have a minimum of five full 360° handwheel turns.
  - .4 90° 'circuit-setter' style ball valves are not acceptable.
  - .5 Valve handle shall have hidden memory feature, which will provide a means for locking the valve position after the system is balanced.

- .6 Valve body shall be either cast iron with integrated cast iron flanges (2½" to 12") or ductile iron with industrial standard grooved ends (2½" to 12").
- .7 Valve stem and plug disc shall be bronze with ergonomically designed handwheel that permits multi-turn adjustments.
- .8 Armstrong flange adapters shall be supplied, to prevent rotation.
- .9 The valve shall be installed with flow in the direction of the arrow on the valve body and installed at least five pipe diameters downstream from any fitting, and at least ten pipe diameters downstream from any pump.
- .10 Two pipe diameters downstream from the CBV should be free of any fittings.
- .11 When installed, easy and unobstructed access to the valve handwheel and metering ports for adjustment and measurement are to be provided.
- .12 Mounting of valve in piping must prevent sediment build-up in metering ports
- .13 Refer to schedule on drawings for model and sizes.

## **2.6 PIPE LINE STRAINER**

- .1 NPS 1/2 to 2: bronze body to ASTM B62, screwed connections, Y pattern.
- .2 NPS 2 1/2 to 12: cast iron body to ASTM, Class 30 flanged connections (or grooved type).
- .3 NPS 2 to 12: T type with ductile iron body to ASTM A536 malleable iron body to ASTM A47M, grooved ends.
- .4 Blowdown connection: NPS 1.
- .5 Screen: brass with 1.19 mm perforations.
- .6 Working pressure: 860 kPa.

## **Part 3 Execution**

### **3.1 GENERAL**

- .1 Install as indicated on drawings and to manufacturer's recommendations.
- .2 Run drain lines and blow off connections to terminate above nearest drain.
- .3 Maintain proper clearance to permit service and maintenance.
- .4 Should deviations beyond allowable clearances arise, request and Engineer's directive.
- .5 Check shop drawings for conformance of allappings for ancillaries and for equipment operating weights.

### **3.2 STRAINERS**

- .1 Install in horizontal or down flow lines.
- .2 Ensure clearance for removal of basket.

- .3 Install ahead of each pump.
- .4 Install ahead of each automatic control valve.

### **3.3 AIR VENTS**

- .1 Install at high points of systems.
- .2 Install gate valve on automatic air vent inlet.

### **3.4 EXPANSION TANKS**

- .1 Adjust expansion tank pressure to suit design criteria.
- .2 Install Lockshield type valve at inlet to tank.

### **3.5 VERIFICATION**

- .1 Verification requirements in accordance with Division 01 – General Requirements.

END OF SECTION