

**Part 1 General****1.1 RELATED SECTIONS**

- .1 Section 21 05 00 Common Work Results for Mechanical
- .2 Section 23 08 02 Cleaning and Start-Up of Mechanical Piping Systems

**1.2 SUMMARY**

- .1 General:
  - .1 Materials, components and equipment for the installation of complete triplex depth filter system.
  - .2 This section also includes the flushing of the existing piping.

**1.3 REFERENCES**

- .1 American Society of Mechanical Engineers (ASME)
  - .1 ASME Boiler and Pressure Vessel Code, Section VII 2004.
- .2 Health Canada/Workplace Hazardous Materials Information System (WHMIS)
  - .1 Material Safety Data Sheets (MSDS).

**1.4 SUBMITTALS**

- .1 Product Data:
  - .1 Submit manufacturer's printed product literature, specifications and datasheet in accordance with Section 01 33 00 - Submittal Procedures. Include product characteristics, performance criteria, and limitations.
- .2 Shop Drawings:
  - .1 Submit shop drawings in accordance with Section 01 33 00 - Submittal Procedures.

**1.5 QUALITY ASSURANCE**

- .1 Health and Safety:
  - .1 Do construction occupational health and safety in accordance with Section 01 35 29.06 - Health and Safety Requirements.

**1.6 DELIVERY, STORAGE, AND HANDLING**

- .1 Packing, shipping, handling and unloading:
  - .1 Deliver, store and handle in accordance with manufacturer's written instructions.
- .2 Waste Management and Disposal:

- .1 Construction/Demolition Waste Management and Disposal: in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal.

## **Part 2 Products**

### **2.1 MANUFACTURER**

- .1 Equipment and controller shall be designed and provided by one supplier. The unit shall be a complete package except for pipe connection to existing piping and electrical power and pressure transmitter connections to the unit.

### **2.2 WATER TREATMENT SYSTEM- TRIPLEX DEPTH FILTER SYSTEM**

- .1 The triplex depth filter system is for filtering the river water used in the plant for various functions. The system design shall conform to a 52005000 sand filter unit.
- .2 The unit shall be a controlled triplex depth filter system filtration system. The filtration system shall consist of three (3) only distinct carbon steel non coded depth filter tanks with side mounted GBE controls plumbed in a triplex parallel configuration with progressive flow capability allowing one, two or all three units to be in service simultaneously. The filtration system shall be designed to handle the requested peak flow of 1192 LPM.

- .3 Mineral Tanks

The triplex depth filter system shall have three (3) only 1219 mm diameter x 1524 mm side-shell height tanks. The tanks shall be electrical welded pressure vessels constructed of low carbon steel and rated for 690 kPa working pressure and a minimum design pressure of 1.2 times the working pressure amount. Additionally, the tanks shall be capable of withstanding testing with pressure fluctuations from 0 to 827 kPa for a minimum of 30,000 cycles.

- .4 Control System

Each tank shall be fully integrated programmable microprocessor driven electronic controller capable of automatically cycling the main operating valve through the reconditioning sequence. The electronic controller shall be designed and manufactured by the water treatment supplier. The option known as "progressive flow" shall be included. Each side mounted GBE Smart Controller will monitor the system flow demands and can bring additional filters on-line or off-line as the flow increases or decreases. Each controller to be provided with flow a flow meter.

Timeclock - An operator selected program of a time-initiated reconditioning for the triplex system shall be included. The controller shall be capable of being entirely programmed in the field without additional interface devices. The operator shall be able to select reconditioning to occur after a specified number of hours or days or specific day of the week. The electronic controller shall indicate various data that includes number of reconditionings in the last 14 days, the number of days since last reconditioning, the total number of reconditionings for the life of the unit, the current day of the week, time of day, and the unit in reconditioning mode. The triplex system shall be programmed to complete reconditioning on only one unit at a time leaving two units

available always for continuous flow conditions.

The control system shall be provide with BacNet capability for future connection to the building automation system (ABB)

.5 Flow Rates

Each of the three depth filters shall have a clean filter continuous flow rating of 397 LPM @ 21.4 kPa pressure drop. The peak flow rate through each filter shall not exceed 715 LPM @ 69.0 kPa pressure drop. Each filter requires 711 LPM to properly backwash.

.6 Filter Media

Each filter tank shall have a granular media bed, consisting of three (3) distinct layers and designed to operate as a depth filter rather than a surface filter. The filter layers shall stratify with the coarsest layer at the top and the finest layer at the bottom. Mineral density, particle size, uniformity coefficient and depth of each layer shall be carefully controlled to assure proper stratification after backwashing and optimum performance in service. The top layer shall remove large debris and collect coarse turbidity. The center layer shall accumulate trapped by sand filters. The bottom layer shall polish the water by removing particles 10 microns in size. Each filter vessel shall include 1941 kg of filter media and a total of 5824 kg of filter media for the entire three tank system.

.7 Electrical Requirements

120 volts 60 Hz I phase, full load amps less than 1.

**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 datasheet.

**3.2 INSTALLATION**

- .1 Install the triplex depth filter system in accordance with manufacturer instructions and requirements and standards of authorities having jurisdiction, except where specified otherwise.

- .2 Ensure adequate clearances to permit performance of servicing and maintenance of equipment.

### **3.3 CLEANING OF MECHANICAL SYSTEM**

- .1 Flush the system as per section 23 08 02 Cleaning and Start-Up of Mechanical Piping Systems.

### **3.4 FIELD QUALITY CONTROL**

- .1 Start-up:
  - .1 Start up the triplex depth filter system in accordance with manufacturer's instructions.
  - .2 Training:
    - .1 Train O&M personnel

### **3.5 CLEANING**

- .1 Proceed in accordance with Section 01 74 11 - Cleaning.

**END OF SECTION**