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 25 00.

1.2 SUMMARY

.1 Section Includes:

.1 Materials, components, equipment and chemicals for installation of complete HVAC water treatment system.

.2 Related Sections:

.1 Division 01 – General Requirements.

.2 Section 23 08 02 – Cleaning and Start-up of Mechanical Piping Systems.

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 Division 01 – General Requirements. Include product characteristics, performance criteria, and limitations.

.1 Submit required copies of Workplace Hazardous Materials Information System (WHMIS) Material Safety Data Sheets (MSDS) in accordance with Division 01 – General Requirements. Indicate VOC's for adhesives and solvents during application and curing.

.2 Shop Drawings:

.1 Submit Manufacturer printed shop drawings in accordance with Division 01 – General Requirements.

.3 Quality assurance submittals: submit following in accordance with Division 01 – General Requirements.

.4 Closeout Submittals:

.1 Submit operation and maintenance data for incorporation into manual in accordance with Division 01 – General Requirements.

1.5 QUALITY ASSURANCE

.1 Health and Safety:

.1 Do construction occupational health and safety in accordance with Division 01 – General 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: separate waste materials for reuse and recycling in accordance with Division 01 – General Requirements.

Part 2 Products

2.1 SUSTAINABLE REQUIREMENTS

.1 Materials and products in accordance with Division 01 – General Requirements.

2.2 MANUFACTURER

.1 Equipment, chemicals, service provided by one supplier.

2.3 CHEMICAL FEED PIPING

.1 Resistant to chemicals employed. Pressure rating: 860 kPa.

2.4 WATER TREATMENT FOR HYDRONIC SYSTEMS

.1 Hot water heating system.

.2 Micron filter for each pot feeder:

.1 Capacity 2% of pump recirculating rate at operating pressure.

.2 Six (6) sets of filter cartridges for each type, size of micron filter.

2.5 CHEMICALS

.1 Provide 1 years supply.

2.6 TEST EQUIPMENT

.1 Provide one set of test equipment for each system to verify performance.

.2 Complete with carrying case, reagents for chemicals, specialized or supplementary equipment.

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 HVAC water treatment systems in accordance with ASME Boiler Code Section VII, 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 CHEMICAL FEED PIPING

.1 Install crosses at changes in direction. Install plugs in unused connections.

3.4 CLEANING OF MECHANICAL SYSTEM

.1 Scope of Cleaning: All new piping systems (other than domestic water piping).

.2 Provide copy of recommended cleaning procedures and chemicals for approval by Engineer.

.3 Flush mechanical systems and equipment with approved cleaning chemicals designed to remove deposition from construction such as pipe dope, oils, loose mill scale and other extraneous materials. Use chemicals to inhibit corrosion of various system materials that are safe to handle and use.

.4 Examine and clean filters and screens, periodically during circulation of cleaning solution, and monitor changes in pressure drop across equipment.

.5 Drain and flush system(s) until alkalinity of rinse water is equal to make-up water. Refill with clean water treated to prevent scale and corrosion during system operation.

.6 Disposal of cleaning solutions approved by authority having jurisdiction.

3.5 WATER TREATMENT SERVICES

.1 Provide water treatment monitoring and consulting services for period of one year after system start-up. Service to include:

- .1 Initial water analysis and treatment recommendations.
- .2 System start-up assistance.
- .3 Operating staff training.
- .4 Visit plant every 5 days during period of operation and as required until system stabilizes, and advise on treatment system performance.
- .5 Provide necessary recording charts and log sheets for one year operation.

.6 Provide necessary laboratory and technical assistance.

.7 Provide clear, concise, written instructions and advice to operating staff.

3.6 FIELD QUALITY CONTROL

.1 Start-up:

.1 Start up water treatment systems in accordance with manufacturer's instructions.

.2 Commissioning:

.1 Timing:

.1 After start-up deficiencies rectified.

.2 After start-up and before TAB of connected systems.

.2 Pre-commissioning Inspections: verify:

.1 Presence of test equipment, reagents, chemicals, details of specific tests performed, and operating instructions.

.2 Suitability of log book.

.3 Currency and accuracy of initial water analysis.

.4 Required quality of treated water.

.3 Commissioning procedures - applicable to Water Treatment Systems:

.1 Establish, adjust as necessary and record automatic controls and chemical feed rates.

.2 Monitor performance continuously during commissioning of connected systems and until acceptance of project.

.3 Establish test intervals, regeneration intervals.

.4 Record on approved report forms commissioning procedures, test procedures, dates, times, quantities of chemicals added, raw water analysis, treated water analysis, test results, instrument readings, adjustments made, results obtained.

.5 Establish, monitor and adjust automatic controls and chemical feed rates as necessary.

.6 Visit project at specified intervals after commissioning is satisfactorily completed to verify that performance remains as set during commissioning (more often as required until system stabilizes at required level of performance).

.7 Advise Departmental Representative and Engineer in writing on matters regarding installed water treatment systems.

.4 Commissioning procedures - Closed Circuit Hydronic Systems:

.1 Analyze water in system.

.2 Based upon an assumed rate of loss approved by Engineer, establish rate of chemical feed.

.3 Record types, quantities of chemicals applied.

.5 Training:

.1 Commission systems, perform tests in presence of, and using assistance of, assigned O&M personnel.

.2 Train O&M personnel in softener regeneration procedures.

.6 Certificates:

.1 Upon completion, furnish certificates confirming satisfactory installation and performance.

.7 Commissioning Reports:

.1 To include system schematics, test results, test certificates, raw and treated water analyses, design criteria, other data required by Departmental Representative and Engineer.

.8 Commissioning activities during Warranty Period:

.1 Check out water treatment systems on regular basis and submit written report to Departmental Representative and Engineer.

.3 Verification requirements in accordance with Division 01 – General Requirements.

3.7 CLEANING

.1 Proceed in accordance with Division 01 – General Requirements.

.2 Upon completion and verification of performance of installation, remove surplus materials, excess materials, rubbish, tools and equipment.

END OF SECTION