Part 1 General

1.1 RELATED REQUIREMENTS

.1 Section 23 05 00 – Common Work Results for HVAC.

.2 Section 23 05 49.01 – Seismic Restraint System (SRS).

1.2 REFERENCES

.1 American Society of Mechanical Engineers (ASME)

.1 ASME Boiler and Pressure Vessel Code.

.2 CSA International

.1 CSA B51, Boiler, Pressure Vessel and Pressure Piping Code.

1.3 ADMINISTRATIVE REQUIREMENTS

.1 Pre-Installation Meetings:

.1 Convene pre-installation meeting 1 week prior to beginning work of this Section, with Departmental Representative in accordance with Section 01 31 19 - Project Meetings to:

.1 Verify project requirements.

.2 Review installation and substrate conditions.

.3 Co-ordination with other building subtrades.

.4 Review manufacturer's written installation instructions and warranty requirements.

1.4 ACTION AND INFORMATIONAL SUBMITTALS

.1 Submit submittals in accordance with Section 01 33 00 - Submittal Procedures.

.2 Product Data:

.1 Submit manufacturer's instructions, printed product literature and data sheets for heat exchangers and include product characteristics, performance criteria, physical size, finish and limitations.

.3 Shop Drawings:

.1 Submit drawings stamped and signed by professional engineer registered or licensed in Canada and OIQ member.

.2 Shop drawings to indicate project layout, including layout and dimensions of heat exchangers and system.

.1 Indicate manufacturer's recommended clearances for tube withdrawal and manipulation of tube cleaning tools.

.4 Test Reports: submit certified test reports from approved independent testing laboratories indicating compliance with specifications for specified performance characteristics and physical properties.

.5 Certificates: submit certificates signed by manufacturer certifying that materials comply with specified performance characteristics and physical properties.

.6 Manufacturer's Instructions: submit manufacturer's installation instructions.

.7 Manufacturers Reports:

.1 Manufacturer's Field Reports: submit manufacturer's written reports within 3 days of review, verifying compliance of Work, as described in PART 3 - FIELD QUALITY CONTROL.

1.5 CLOSEOUT SUBMITTALS

.1 Submit in accordance with Section 01 78 00 - Closeout Submittals.

.2 Operation and Maintenance Data: submit operation and maintenance data for heat exchangers for incorporation into manual.

1.6 MAINTENANCE MATERIAL SUBMITTALS

.1 Where materials or products are specified by their trademark, consult the Instructions to Bidders document for the procedures to follow regarding the request for approval for materials or product replacement

.2 Extra Stock Materials:

.1 Submit in accordance with Section 01 78 00 - Closeout Submittals.

1.7 DELIVERY, STORAGE AND HANDLING

.1 Deliver, store and handle materials in accordance with Section 01 61 00 - Common Product Requirements with manufacturer's written instructions.

.2 Delivery and Acceptance Requirements: deliver materials to site in original factory packaging, labelled with manufacturer's name and address.

.3 Storage and Handling Requirements:

.1 Store materials off ground, indoors, in dry location and in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.

.2 Store and protect heat exchangers from nicks, scratches, and blemishes.

.3 Replace defective or damaged materials with new.

Part 2 Products

2.1 PLATE AND FRAME TYPE EXCHANGERS

.1 General: exchanger consists of a frame, plates, gaskets, heads, guiding bars, bolts, fixed frame plate.

.2 Bylaws: Designed, constructed and tested in accordance with ASME Boiler and Pressure Vessel Code, CSA B51 and provincial pressure vessel regulations.

.3 Frame: support for plates, heads, bolts and guide bars, made of carbon steel coated with epoxy baked enamel. Frame capacity must be able to accommodate additional plates, if required.

.4 Plates: 304 stainless steel, supported and aligned by guiding bars. Openings which serve as supports are an integral part of the plates. Give plate thickness on shop drawings.

.5 Gaskets: NBR material suited to application, installed in pre-made channels and fixed to plate with adhesive.

.6 Heads: carbon steel coated with epoxy baked enamel. Connections of 75 mm NPS (3") and less are made with threaded couplings. Larger connections are flanged. Orifices in heads are lined with stainless steel sleeve.

.7 Guiding bars: carbon steel with stainless steel or zinc-coated carbon steel sleeve, for an easy assembly, keeping plates and gaskets aligned. Also prevent lateral movement, leaks while tightening, operation shocks and vibration.

.8 Bolts: cadmium plated carbon steel.

.9 Design pressure : 1 MPa (150 lb/sq in).

.10 Maximum operating temperature: 60 ^{o}C (140 ^{o}F).

.11 Acceptable products: Alfa-Laval, Armstrong, Tranter or replacement product approved by addendum in accordance with the Instructions to Bidders

Part 3 Execution

3.1 EXAMINATION

.1 Verification of Conditions: verify conditions of substrates previously installed under other Sections or Contracts are acceptable for heat exchanger installation in accordance with manufacturer's written instructions.

.1 Visually inspect substrate in presence of Departmental Representative.

.2 Inform Departmental Representative of unacceptable conditions immediately upon discovery.

.3 Proceed with installation only after unacceptable conditions have been remedied and after receipt of written approval to proceed from Departmental Representative.

3.2 INSTALLATION

.1 Manufacturer's Instructions: comply with manufacturer's written recommendations, including product technical bulletins, product catalogue installation instructions, product carton installation instructions, and data sheets.

.2 General: install levels firmly anchored to supports in accordance with manufacturer's recommendations.

.3 Plate exchangers: install in accordance with manufacturer's recommendations.

3.3 ACCESSORIES

.1 Install a safety relief valve piped to drain.

.2 Install thermometer wells with thermometers on inlet and outlet of primary and secondary side.

.3 Install pressure gauge on steam inlet.

3.4 FIELD QUALITY CONTROL

.1 Site Tests and Inspections:

.1 Perform tests as directed by Departmental Representative to ensure heat exchangers are functional.

.2 Obtain reports within 3 days of review and submit immediately to Departmental Representative.

.2 Obtain written report from manufacturer verifying compliance of Work, in handling, installing, applying, protecting and cleaning of product.

.3 Manufacturer's Field Services:

.1 Submit manufacturer's field services consisting of product use recommendations and periodic site visits for inspection of product installation in accordance with manufacturer's instructions.

.2 Ensure manufacturer's representative is present before and during critical periods of installation.

.3 Schedule site visits:

.1 After delivery and storage of products, and when preparatory Work, or other Work, on which the Work of this Section depends, is complete but before installation begins.

.2 Twice during progress of Work at 25% and 60% complete.

3.5 SYSTEM START-UP

.1 General: perform start-up operations in accordance with Section 01 91 13 - General Commissioning (Cx) Requirements: General Requirements, supplemented as specified herein.

.2 Check heater for cleanliness on primary and secondary sides.

.3 Check water treatment system is complete, operational and correct treatment is being applied.

.4 Check installation, settings, operation of relief valves and safety valves.

.5 Check installation, location, settings and operation of operating, limit and safety controls.

.6 Check supports, seismic restraint systems.

.7 General: perform performance verification in accordance with Section [01 91 13 - General Commissioning (Cx) Requirements]: General Requirements, supplemented as specified.

.8 Timing: only after TAB of hydronic systems have been successfully completed.

.9 Primary side:

.1 Measure flow rate, pressure drop and temperature at heater inlet or water temperature at heater inlet and outlet.

.1 Verify operation of steam traps. Measure temperature of condensate return at trap outlet.

.2 Control/regulation valve: verify proper operation without binding, slack in components.

.3 Secondary side:

.1 Measure flow rate, pressure drop and water temperature at heater inlet and outlet.

.2 Verify installation and operation of air elimination devices.

.4 Calculate heat transfer from primary and secondary sides.

.5 Simulate heating water temperature schedule and repeat above procedures.

.6 Verify settings, operation, safe discharge from safety valves and relief valves.

.7 Verify settings, operation of operating, limit and safety controls and alarms.

.8 Reports:

.1 In accordance with Section 01 91 13 - General Commissioning (Cx) Requirements: Reports, supplemented as specified herein.

3.6 CLEANING

.1 Progress Cleaning: clean in accordance with Section 01 74 11 - Cleaning.

.1 Leave Work area clean at end of each day.

.2 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment in accordance with Section 01 74 11 - Cleaning.

.2 Waste Management: separate waste materials for reuse recycling in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal.

.1 Remove recycling containers and bins from site and dispose of materials at appropriate facility.

3.7 DEMONSTRATION

.1 Training: provide training in accordance with Section 01 91 13 - General Commissioning (Cx) Requirements: Training of O M Personnel, supplemented as follows:

3.8 PROTECTION

.1 Protect installed products and components from damage during construction.

.2 Repair damage to adjacent materials caused by heat exchanger installation.

END OF SECTION