1 General

1.1 INSTRUCTIONS

.1 Comply with Instructions to Proponents, Enbridge Master Construction Agreement and General Requirements of Division 01.

1.2 RELATED SECTIONS

.1 Division 22 – Plumbing

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

.3 Section 23 07 00 – HVAC Insulation

.4 Section 23 20 00 – HVAC Piping and Pumps

.5 Section 23 25 00 – HVAC Water Treatment

.6 Section 23 30 00 – HVAC Air Distribution

.7 Section 23 70 00 – Central HVAC Equipment

.8 Section 23 80 00 – Decentralized HVAC Equipment

.9 Division 25 – Integrated Automation

.10 Division 26 – Electrical

1.3 REFERENCE STANDARDS

.1 Conform to:
– CSA-B52 Mechanical Refrigeration Code
– CSA-C743 Performance Standard for Rating Packaged Water Chillers
– ANSI/ASHRAE Standard 15-1992, Safety Code for Mechanical Refrigeration
– Canadian Pressure Vessels Regulations (CRN)
– Requirements of Local and Provincial Authorities
– CSA, ULC and governing electrical codes
– ARI, ASME and ASHRAE Standards specified for ratings, performance tests, and efficiency requirements.

1.4 DESCRIPTION OF SYSTEMS

.1 The work of this Section shall include the furnishing of all labour, materials, equipment, and services required for the complete installation, testing and operation of the Central Cooling Systems, as indicated on the drawings, or hereinafter specified.

1.5 QUALIFICATIONS

.1 The refrigeration manufacturer shall be regularly engaged in production of the specified equipment. The manufacturer shall also be one who issues catalogue information with correction factors where published ratings are based on parameters different from those specified.

.2 All work in conjunction with the refrigeration system shall be carried out by Trades specializing in this type of work. The Sub-trade shall have full-time registered refrigeration mechanics on staff. The Sub-trade must be approved by the Consultant.

1.6 SOURCE QUALITY CONTROL

.1 Factory leak test air-cooled condenser and evaporator coils in accordance with above referenced agencies.

.2 Test water-cooled condensers in accordance with ASME Code for unfired pressure vessels and ARI Standards for water-cooled refrigerant condensers.

1.7 ENGINEERING DATA

.1 Provide manufacturer's diagrams of field installation, internal wiring and piping for complete assembly.

.2 Provide sound power levels referenced to dB weighted according to A scale.

1.8 MAINTENANCE DATA

.1 Provide maintenance data for incorporation in operation and maintenance manuals. Include exploded views of components.

1.9 DELIVERY AND STORAGE

.1 Ship equipment factory dehydrated and sealed with a full charge of refrigerant and lubricating oil.

.2 Store equipment in protected area.

1.10 GUARANTEE

.1 Replace all refrigerant lost from system(s) due to leaks for an additional one (1) year after normal one year warranty period.

.2 Provide refrigeration compressors and compressor motors with five (5) years non-pro-rated material and labour guarantee. Material shall be by equipment manufacturer and labour shall be by Mechanical Trade.

1.11 SHOP DRAWINGS

.1 Submit shop drawings for:
Dry cooler

.2 This Trade shall submit detailed system wiring diagrams and refrigerant piping drawings for approval before any work is carried out. Failure to submit these drawings will not release the Trade from the obligation of installing a proper operating system.

2 Products

2.1 DRY COOLER

.1 Certification

.1 Acceptable coils are to have ARI Standard 410 certification and bear the ARI symbol. Coils exceeding the scope of the manufacturer’s certification and/or the range of ARI’s standard rating conditions will be considered provided the manufacturer is a current member of the ARI Air-Cooling and Air-Heating Coils certification program and the coils have been rated in accordance to ARI Standard 410. Manufacturer must be ISO 9001 certified.

.2 Fluid Coil Design Pressures and Temperatures

.1 Coils shall be designed to withstand 360 psi maximum operating pressures and a maximum fluid temperature of 300ºF for standard duly copper tube coils. For cleanable coils with removable heads, coils shall be designed to withstand 100 psi maximum operating pressures and a maximum fluid temperature of 150ºF.

.3 Factory Testing Requirements

.1 Coils shall be submerged in water and tested with a minimum of 450 psi air pressure for standard copper tube coils. A 500 psig hydrostatic and shock test is required for high pressure cupronickel construction. Coils must display a tag with the inspector's identification as proof of testing.

.4 Fins

.1 Coils shall be of plate fin type construction providing uniform support for all coil tubes. Coils are to be manufactured with die-formed aluminum, copper, self-spacing collars which completely cover the entire tube surface. The fin thickness shall be 0.0075 +/- 5% unless otherwise specified. Manufacturer must be capable of providing self-spacing die-formedfins 4 through 14 fins/inch with tolerance of +/-3%.

.5 Tubing

.1 Tubing and return bends shall be constructed from UNS 12200 seamless copper conforming to ASTM B75 and ASTM B251 for standard pressure applications. Copper tube temper shall be light annealed with a maximum grain size of 0.040 mm and a maximum hardness of Rockwell 65 on the 15T scale. Design permits in-tube water velocities up to 6 ft/s for the standard seamless copper tubing. Tubes are to be mechanically expanded to form an interference fit with the fin collars. Coil tube size and wall thickness′ are 5/8″x0.020 and ½″x0.017 for copper, with other options available.

.6 Headers

.1 Headers shall be constructed from UNS 12200 seamless copper conforming to ASTM B75 and ASTM B251 for standard pressure applications. High pressure construction is to incorporate seamless 90/10 Cupronickel alloy C70600 per ASTM B111.

.2 Coil return headers are to be equipped with factory-installed 1/2″ fpt air vent connection placed at the highest point available on face of the header.

.3 Tube-to-header holes are to be intruded inward such that the landed surface area is three times the core tube thickness to provide enhanced header to tube joint integrity. All core tubes shall evenly extend within the inside diameter of the header no more than 0.12 inch.

.4 Header ends will be spun closed.

.7 Connections

.1 Standard construction fluid connections are male pipe thread (MPT) and constructed from red brass conforming to ASTM B43 or Schedule 40 steel pipe as a minimum.

.8 Cleaning

.1 All residual manufacturing oils and solid contaminants are removed internally and externally by completely submersing the coil in an environmentally and safety approved type degreasing solution, which is also chemically compatible with the coil material. This may vary for steel tube coils, depending on the application and/or customer specifications.

.9 Brazing

.1 Oxyfuel gas brazing, using fillet rod material of minimum 5% silver, is used for all non-ferroustube joints to headers and connections. Depending on the application, ferrous to non-ferrous brazing material may contain upwards of 35% silver or may be Tobin bronze.

.2 Welding

(1) Gas shielded arc welding is used for welded vessels constructed of stainless steel. Gas welding is used for welded vessels constructed of carbon steel. Design permits in-tube water velocities up to 6 ft/s for the standard seamless copper tubing.
(2) Tubes are to be mechanically expanded to form an interference fit with the fin collars. Coil tube size and wall thickness′ are 5/8″x0.020 and ½″x0.017 for copper, with other options available.

.10 Certification

.1 Performance certified coils that are ARI Standard 410 listed bear the ARI symbol. Coils exceeding the scope of the certification and/or the range of standard rating conditions are also rated to the extent possible by the ARI Std. 410 method. Cancoil continues as a current and active member of the ARI Air-Cooling and Air-Heating Coils certification program, with original coil line certification and computerized selections dating back to 2006.

.11 Agency Approval

.1 Cancoil Commercial Products was facility registered by SGS 2004 to ISO 9001 (ANSI/ASQC Q92). Applicable commercial coil models are UL Standard 207 registered as Refrigerant Containing Components and Accessories; non-electrical.

.2 Note: Cancoil can provide ASME code stamped vessels.

.12 Refer to schedules on drawings for equipment model and capacity.

3 Execution

3.1 INSPECTION

.1 Upon delivery, inspect components for damage or gas loss and report to Consultant in writing. Wait for written instruction.

3.2 START-UP OF EQUIPMENT

.1 The manufacturer of this equipment will forward to the Mechanical Trade a checklist of recommended procedures for piping and starting up the equipment. This procedure will be followed exactly by the Mechanical Trade. The manufacturer will issue his guarantee to the Mechanical Trade on receipt of a signed letter stating that all steps have been carried out. The manufacturer shall notify the Consultant of the issuing of the guarantee. The manufacturer shall provide all necessary wiring diagrams to the Refrigeration Trade showing the necessary interlocks between equipment.

.2 This system will be completely tested with all temperature controls in place and operational, to ensure absolute integrity of the heating and cooling system with all other building environmental controls.

.3 Provide one year of operations service at no cost to the Owner.

3.3 ISOLATION

.1 Requirements for vibration isolation as specified under Section 23 05 00 on drawings and as specified with equipment.

3.4 DRY COOLER

.1 Provide the dry cooler on sleeper support beams supplied by the Structural Contractor.

.2 Provide all piping connections, systems, and equipment as outlined on plans and specifications to make a complete operating system.

.3 The installation must comply with manufacturer's recommendations.

END OF SECTION