

Part 1 General

1.1 PRODUCTS SUPPLIED BUT NOT INSTALLED UNDER THIS SECTION

- .1 Anchor bolts: size anchor bolts to withstand seismic acceleration and velocity forces as defined in Section 23 05 48 - Vibration and Seismic Controls for HVAC Piping and Equipment.

1.2 REFERENCES

- .1 ASTM International
 - .1 ASTM A48/A48M-03(2012), Standard Specification for Gray Iron Castings.
 - .2 ASTM A123/A123M-2012, Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products.
 - .3 ASTM A153/A153M-09, Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware.
 - .4 ASTM B117-11, Standard Practice for Operating Salt Spray (Fog) Apparatus.
 - .5 ASTM C67-12, Standard Test Methods for Sampling and Testing Brick and Structural Clay Tile.
 - .6 ASTM D520-00(2011), Standard Specification for Zinc Dust Pigment.
- .2 CSA Group
 - .1 CSA B52-05, Mechanical Refrigeration Code.
 - .2 CAN/CSA-Z809-08, Sustainable Forest Management.
- .3 Cooling Technology Institute (CTI)
 - .1 CTI-ATC-105-00, Acceptance Test Code.
 - .2 CTI-STD-201-11, Standard for the Certification of Commercial Water Cooling Tower Thermal Performance.
- .4 National Electrical Manufacturers Association (NEMA)
 - .1 NEMA MG 1-2011, Motors and Generators.
- .5 Sustainable Forestry Initiative (SFI)
 - .1 SFI-2010-2014 Standard.
- .6 Underwriters Laboratories of Canada (ULC)
 - .1 CAN/ULC-S102.2-10, Method of Test for Surface Burning Characteristics of Flooring, Floor Coverings and Miscellaneous Materials and Assemblies.

1.3 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Submit in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Product Data:

- .1 Submit manufacturer's instructions, printed product literature and data sheets for condensers 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 Province of Alberta, Canada.
 - .2 Indicate on drawings:
 - .1 Connections, piping, fittings, valves, strainers, control assemblies and ancillaries, identifying factory and field assembled.
 - .2 Wiring as assembled and schematically.
 - .3 Dimensions, construction details, recommended installation and support, mounting bolt hole sizes and locations and point loads.
 - .4 Vibration and seismic control measures.
 - .5 Manufacturers recommended clearances.
- .4 Certificates: submit certificates signed by manufacturer certifying that materials comply with specified performance characteristics and physical properties.
- .5 Test reports:
 - .1 Submit certified test reports for cooling towers closed circuit coolers evaporative condensers from approved independent testing laboratories, indicating compliance with specifications for specified performance characteristics and physical properties.
- .6 Manufacturer's Field Reports:
 - .1 Submit manufacturer's field reports specified.

1.4 CLOSEOUT SUBMITTALS

- .1 Submit in accordance with Section 01 78 00 - Closeout Submittals.
- .2 Operation and Maintenance Data: submit operation and maintenance data for condensers for incorporation into manual.
- .3 Include:
 - .1 Description of equipment giving manufacturers name, type, model year, capacity.
 - .2 Start-up and commissioning procedures.
 - .3 Details of operation, servicing and maintenance.
 - .4 Recommended spare parts list.

1.5 DELIVERY, STORAGE AND HANDLING

- .1 Delivery and Acceptance Requirements: deliver materials to site in original factory packaging, labelled with manufacturer's name and address.
- .2 Storage and Handling Requirements:
 - .1 Store materials indoors in dry location and in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.

- .2 Store and protect condensers and cooling equipment from nicks, scratches, and blemishes.
- .3 Replace defective or damaged materials with new.

Part 2 Products

2.1 GENERAL

- .1 Factory assembled forced draft counterflow vertical discharge air cooled condenser.
- .2 Ensure major equipment including cooling towers, cooling tower gear drive assemblies, fans, and motors have manufacturer's name, address, style, model serial number, catalogue number on plate secured to item of equipment.
- .3 Plates: durable and legible throughout equipment life and made of anodized aluminum stainless steel.
- .4 Fix plates in prominent locations with nonferrous screws or bolts.

2.2 MATERIALS

- .1 Steel: components fabricated of zinc-coated steel not lighter than 1.5 mm thick steel, protected against corrosion by zinc coating.
 - .1 Zinc coating: to ASTM A153/A153M and ASTM A123/A123M, with extra heavy coating of not less than 0.76 kg per square meter of surface.
 - .2 Coat galvanized surfaces damaged due to welding with zinc rich coating conforming to ASTM D520, Type 1.
- .2 Fibre glass reinforced plastic, (FRP) components: inert, corrosion resistant, and fire-retardant with thickness of 3.66 kg/square meter.
- .3 Polyvinyl chloride, (PVC) with flame spread rating of 10, smoke developed of 25, to CAN/ULC-S102.2.

2.3 CASING AND FRAMEWORK

- .1 Materials: galvanized steel sheet, angles and channels.

2.4 COIL SECTION

- .1 Tube bundle: copper, type M, isolated from steel support with poly propylene spacers or steel tubing and supporting steel framework hot-dip galvanized after fabrication.
- .2 Factory test to 2.4 MPa under water.

2.5 ACCESSORIES

- .1 Capacity control: scroll damper and modulating electronic damper motor, controlled by temperature controller. Sensor in pan set at 60 degrees C.

2.6 VIBRATION ISOLATORS

- .1 To Section 23 05 48 - Vibration and Seismic Controls for HVAC Piping and Equipment.

Part 3 Execution

3.1 EXAMINATION

- .1 Verification of Conditions: verify that conditions of substrate previously installed under other Sections or Contracts are acceptable for condensers, coolers and cooling tower installation in accordance with manufacturer's written instructions.
 - .1 Visually inspect substrate.
 - .2 Inform Departmental Representative of unacceptable conditions immediately upon discovery.
 - .3 Proceed with installation only after unacceptable conditions have been remedied.

3.2 GENERAL

- .1 Mount on structural supports and vibration isolators and to manufacturer's recommendations.
- .2 Ensure clearance for servicing and maintenance as recommended by manufacturer.
- .3 Manufacturers field service representative to approve installation, to supervise start up and to instruct operators.

3.3 FIELD QUALITY CONTROL

- .1 Site Tests:
 - .1 Test under actual operating conditions in accordance with CTI-ATC-105 to verify specified performance.
- .2 Manufacturer's Field Services:
 - .1 Obtain written report from manufacturer verifying compliance of Work, in handling, installing, applying, protecting and cleaning of product and submit Manufacturer's Field Reports as described in PART 1 - ACTION AND INFORMATIONAL SUBMITTALS.
 - .2 Provide manufacturer's field services consisting of product use recommendations and periodic site visits for inspection of product installation in accordance with manufacturer's instructions.
 - .3 Schedule site visits, to review Work, as directed in PART 1 - QUALITY ASSURANCE.

3.4 ADJUSTING

- .1 Lubricate bearings with oil or grease as recommended by manufacturer.
- .2 Tighten belts to manufacturer's specified tension.

3.5 CLEANING

- .1 Progress Cleaning:
 - .1 Leave Work area clean at end of each day.
- .2 Wipe equipment clean, and remove traces of oil, dust, dirt, or paint spots.
- .3 Maintain system in clean condition until final acceptance.

- .4 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment.

3.6 PERFORMANCE REQUIREMENTS

- .1 Air Cooled Packaged condenser:
- .1 E-CU1: 10 ton nominal, R410-A refrigerant, dual compressor with 2 circuits, suction line: 1 3/8", liquid line: 5/8". Compressor: Scroll. Power:208V/3Ph.
 - .2 E-CU2: 10 ton nominal, R410-A refrigerant, dual compressor with 2 circuits, suction line: 1 3/8", liquid line: 5/8". Compressor: Scroll. Power:208V/3Ph.
 - .3 C-CU1: 7.5 ton nominal, R410-A refrigerant, single compressor with 2 circuits, suction line: 1 1/8", liquid line: 5/8". Compressor: Scroll. Power:208V/3Ph.
 - .4 C-CU2: 7.5 ton nominal, R410-A refrigerant, single compressor with 2 circuits, suction line: 1 1/8", liquid line: 5/8". Compressor: Scroll. Power:208V/3Ph.
 - .5 M-CU1: 5 ton nominal, R410-A refrigerant, single compressor with 1 circuits, suction line: 1 1/8", liquid line: 3/8". Compressor: Scroll. Power:208V/3Ph.
 - .6 P-CU1: 7.5 ton nominal, R410-A refrigerant, single compressor with 2 circuits, suction line: 1 1/8", liquid line: 5/8". Compressor: Scroll. Power:208V/3Ph.

END OF SECTION