

**Part 1 GENERAL**

**1.1 SUMMARY**

- .1 Section Includes:
  - .1 Decommission, temporary removal, installation and recommission of process cooling equipment shown on drawings.

**1.2 ACTION AND INFORMATIONAL SUBMITTALS**

- .1 Submit submittals in accordance with Section 21 05 01.
- .2 Product Data:
  - .1 Submit manufacturer's instructions, printed product literature and data sheets for cooling equipment and include product characteristics, performance criteria, physical size, finish and limitations.
- .3 Shop Drawings:
  - .1 Submit diagrams of field installation, internal wiring and piping for field assembly, with refrigerant flows, pipe sizes, pressure drops in equipment and suction lines.

**1.3 QUALITY ASSURANCE**

- .1 Only one split cooling system to be decommissioned at any time to maintain cooling within IT room.
- .2 Installation: performed by certified refrigeration mechanics/technician.
- .3 Installation must comply with requirements listed in manufacturer installation instructions.
- .4 Contractor shall carry costs required to ensure a factory trained representative from the equipment manufacturer does all installation checks required by manufacturer prior to equipment start-up and is involved for equipment start-up. A start-up report shall be filled out by the factory trained representative and submitted directly to the Engineer and Contractor.
- .5 System decommissioning, temporary removal, installation and recommissioning shall be performed by Global Mechanical.

**Part 2 PRODUCTS**

2.1 N/A

**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 EXAMINATION**

- .1 Verification of Conditions: verify conditions of substrates previously installed under other Sections or Contracts are acceptable for process cooling equipment installation in accordance with manufacturer's written instructions.
- .2 Visually inspect substrate in presence of Consultant.
- .3 Inform Consultant of unacceptable conditions immediately upon discovery.
- .4 Proceed with installation only after unacceptable conditions have been remedied and after receipt of written approval to proceed from Consultant.

**3.3 INSPECTION**

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

**3.4 ACCESSIBILITY**

- .1 Provide clearance around equipment and components for observation of operation, inspection, service and maintenance without removal of any equipment, components or piping.

**3.5 INSTALLATION**

- .1 Provide appropriate protection apparatus.
- .2 Install systems and related controls in accordance with manufacturer installation requirements.
- .3 Locate vibration and noise isolation as indicated.
  - .1 Where units are supplied with sound attenuator, conform to manufacturer's instructions.
  - .2 Ensure adequate base or foundation.
- .4 Install disconnect switch adjacent to each unit.
- .5 Thermal expansion valves:

- .1 Install in conformance with manufacturer installation requirements.

### 3.6 FIELD QUALITY CONTROL

- .1 Pressure and leak testing:
  - .1 Perform leak test before evacuating system.
  - .2 Meet requirements of CSA B52, but not less than gauge pressure of 2 MPa high side and 1 MPa low side.
  - .3 Use non ozone depleting gas as tracer with dry nitrogen to develop pressure.
  - .4 Compressors with refrigerant holding charge to remain isolated from system.
  - .5 Protect accessories when performing test.
  - .6 Build 35 kPa initial pressure in high and low side and add dry nitrogen to field test pressure.
  - .7 Test for leaks with detector.
  - .8 Repair leaks and retest.

### 3.7 CLEANING

- .1 Reclaim refrigerant by pumping down through filtration system.

### 3.8 DEHYDRATION

- .1 Carry out work in presence of Consultant or Owner's representative.
- .2 Evacuate using two stage vacuum pump with gas ballast on second stage capable of pulling vacuum of 0.05 mm minimum.
  - .1 Fill pump with fresh dehydrated oil.
- .3 Do not use refrigerant compressors to pull vacuum.
- .4 Maintain ambient temperature of 13 degrees C minimum throughout refrigeration system for 12 hours minimum before and during dehydration.
- .5 Connect high vacuum hose or seamless copper tubing jumper lines to both high and low pressure sides.
  - .1 Line size: 6 mm minimum nominal outside diameter for units up to 70 L internal volume and 12 mm minimum nominal outside diameter for larger units.
- .6 Install thermo couple vacuum gauge to measure system pressure.
  - .1 Locate manual isolating valve between pump and gauge and take readings only with system isolated from pump.
- .7 When compressor/condensing unit has refrigerant holding charge intact, service valves to remain closed during evacuation.
  - .1 Evacuate any equipment received with dry air, wrong refrigerant, or lost holding charge.
- .8 Evacuate field installed system 3 times as follows: twice to 1.5 mm and hold for 4 hours minimum.
  - .1 Break vacuum to gauge pressure of 14 kPa each time with refrigerant.
  - .2 Continue pumping, for final evacuation, through 12 hours minimum after reaching 0.5 mm.

- .3 After completion of final evacuation, isolate pump from system and make graphic record of rate of any increase in vacuum reading which may take place inside following hours.
- .4 Continue readings until vacuum has stabilized.
- .5 Provide Consultant with 3 copies of graphic record.
- .6 Charge through filter drier.
- .7 Use receivers or other technology to contain CFC-13 or other ozone depleting refrigerant used for triple evacuation.
- .8 If this is not possible, an alternative to triple evacuation such as vacuum evacuation should be employed.

### **3.9 CHARGING**

- .1 Give initial charge through high side charging valve with pressure gauge and new filter-drier installed in connection to charging valve.
- .2 Charge only amount of refrigerant necessary for proper operation of refrigeration system.
  - .1 Close liquid charging valve when amount has been charged.
  - .2 Observe sight glass near receiver outlet, with system in operation, to recheck.
- .3 Re-purge charging line, when refrigerant container must be changed during charging process.
- .4 Permit low side charging only for charging small amounts in gaseous state.
- .5 Provide 3 days notice of leak testing, dehydration and charging.
- .6 Prime oil separator with operating charge of compressor oil.

### **3.10 START-UP AND ADJUSTMENT**

- .1 Provide necessary instruments, gauges and testing equipment required.
  - .1 Adjust controls, to obtain design requirements and manufacturer's ratings.
- .2 Ensure that insulation of refrigerant piping and accessories completed.
- .3 Test and record cooling apparatus entering and leaving air temperatures, dry bulb and wet bulb.
- .4 Test and record voltage and running amperes and compare to motor nameplate data, and starter heater rating against design requirements.
  - .1 Check each phase which must be accurate to nearest 100 VA.
- .5 Ensure that refrigerant temperatures are accurate to within 0.5 degrees C of design requirements.
- .6 Set and adjust automatic control system to achieve required sequence of operations in co-operation with Consultant.
- .7 Bring equipment into operation, trial run and make up any loss of oil and refrigerant.

**3.11 PROTECTION**

- .1 Protect installed products and components from damage during construction.
- .2 Repair damage to adjacent materials caused by process cooling equipment installation.

**END OF SECTION**