

**Part 1 General**

**1.1 SUBMITTALS**

- .1 Submittals: in accordance with Section 01 33 00 – Submittal Procedures.
- .2 Shop drawings to show:
  - .1 Mounting arrangements.
  - .2 Operating and maintenance clearances.
- .3 Shop drawings and product data accompanied by:
  - .1 Detailed drawings of bases, supports, and anchor bolts.
  - .2 Acoustical sound power data, where applicable.
  - .3 Points of operation on performance curves.
  - .4 Manufacturer to certify current model production.
  - .5 Certification of compliance to applicable codes.
- .4 Closeout Submittals:
  - .1 Provide operation and maintenance data for incorporation into manual specified in Section 01 78 00 - Closeout Submittals.
  - .2 Operation and maintenance manual approved by, and final copies deposited with, Departmental Representative before final inspection.
  - .3 Operation data to include:
    - .1 Control schematics for systems including environmental controls.
    - .2 Description of systems and their controls.
    - .3 Description of operation of systems at various loads together with reset schedules and seasonal variances.
    - .4 Operation instruction for systems and component.
    - .5 Description of actions to be taken in event of equipment failure.
    - .6 Valves schedule and flow diagram.
    - .7 Colour coding chart.
  - .4 Maintenance data to include:
    - .1 Servicing, maintenance, operation and trouble-shooting instructions for each item of equipment.
    - .2 Data to include schedules of tasks, frequency, tools required and task time.
  - .5 Performance data to include:
    - .1 Equipment manufacturer's performance datasheets with point of operation as left after commissioning is complete.
    - .2 Equipment performance verification test results.
    - .3 Special performance data as specified.
    - .4 Testing, adjusting and balancing reports as specified in Section 23 05 93 - Testing, Adjusting and Balancing for HVAC.

- .6 Approvals:
  - .1 Submit 1 copy of draft Operation and Maintenance Manual to Departmental Representative for approval. Submission of individual data will not be accepted unless directed by Departmental Representative.
  - .2 Make changes as required and re-submit as directed by Departmental Representative.
- .7 Additional data:
  - .1 Prepare and insert into operation and maintenance manual additional data when need for it becomes apparent during specified demonstrations and instructions.
- .8 Site records:
  - .1 Departmental Representative will provide 1 set of reproducible mechanical drawings. Provide sets of white prints as required for each phase of work. Mark changes as work progresses and as changes occur. Include changes to existing mechanical systems, control systems and low voltage control wiring.
  - .2 Transfer information daily to reproducibles, revising reproducibles to show work as actually installed.
  - .3 Use different colour waterproof ink for each service.
  - .4 Make available for reference purposes and inspection.
- .9 As-built drawings:
  - .1 Prior to start of Testing, Adjusting and Balancing for HVAC, finalize production of as-built drawings.
  - .2 Identify each drawing in lower right hand corner in letters at least 12 mm high as follows: - "AS BUILT DRAWINGS: THIS DRAWING HAS BEEN REVISED TO SHOW MECHANICAL SYSTEMS AS INSTALLED" (Signature of Contractor) (Date).
  - .3 Submit to Departmental Representative for approval and make corrections as directed.
  - .4 Perform testing, adjusting and balancing for HVAC using as-built drawings.
  - .5 Submit completed reproducible as-built drawings with Operating and Maintenance Manuals.
- .10 Submit copies of as-built drawings for inclusion in final TAB report.

## **1.2 QUALITY ASSURANCE**

- .1 Quality Assurance: in accordance with Section 01 45 00 – Quality Control

## **1.3 MAINTENANCE**

- .1 Furnish spare parts in accordance with Section 01 78 00 - Closeout Submittals as follows:
  - .1 One set of packing for each pump.

- .2 One casing joint gasket for each size pump.
  - .3 One head gasket set for each heat exchanger.
  - .4 One glass for each gauge glass.
  - .5 One filter cartridge or set of filter media for each filter or filter bank in addition to final operating set.
- .2 Provide one set of special tools required to service equipment as recommended by manufacturers and in accordance with Section 01 78 00 - Closeout Submittals.
  - .3 Furnish one commercial quality grease gun, grease and adapters to suit different types of grease and grease fittings.

#### **1.4 DELIVERY, STORAGE, AND HANDLING**

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

### **Part 2 Products**

#### **2.1 MATERIALS**

- .1 Section not used.

### **Part 3 Execution**

#### **3.1 PAINTING REPAIRS AND RESTORATION**

- .1 Prime and touch up marred finished paintwork to match original.
- .2 Restore to new condition, finishes which have been damaged.

#### **3.2 CLEANING**

- .1 Clean interior and exterior of all systems including strainers. Vacuum interior of ductwork and air handling units.

#### **3.3 FIELD QUALITY CONTROL**

- .1 Site Tests: conduct following tests in accordance with Section 01 45 00 - Quality Control and submit report as described in PART 1 - SUBMITTALS.
- .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 - 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 DEMONSTRATION**

- .1 Departmental Representative will use equipment and systems for test purposes prior to acceptance. Supply labour, material, and instruments required for testing.
- .2 Trial usage to apply to following equipment and systems:
  - .1 Ventilation Systems:
    - .1 Smudging Room System
    - .2 Rooftop Units
- .3 Supply tools, equipment and personnel to demonstrate and instruct operating and maintenance personnel in operating, controlling, adjusting, trouble-shooting and servicing of all systems and equipment during regular work hours, prior to acceptance.
- .4 Use operation and maintenance manual, as-built drawings, and audio visual aids as part of instruction materials.
- .5 Instruction duration time requirements as specified in appropriate sections.

### **3.5 PROTECTION**

- .1 Protect equipment and systems openings from dirt, dust, and other foreign materials with materials appropriate to system.

### **3.6 HALOCARBONS**

- .1 Comply with all of:
  - .1 Federal Halocarbon Regulations, 2003;
  - .2 *Environmental Code of Practice for Elimination of Fluorocarbon Emissions from Refrigeration and Air Conditioning Systems* (the Environment Canada "Refrigeration Code of Practice") Cat. No.: En14207/2015E-PDF. April, 2015.
- .2 Work on Halocarbon Systems includes installation, servicing, leak testing, charging and/or decommissioning of a refrigeration system or an air-conditioning system or doing any other work on the system that may result in the release of a halocarbon.

- .3 All work on Halocarbon Systems shall be carried out only by a “Certified Person” as defined by the Federal Halocarbon Regulations 2003.
  - .1 Provide copies of all technicians’ certificates to the Departmental Representative.
- .4 Halocarbons listed under Item 1 through 10 of schedule 1 of Federal Halocarbon Regulations, 2003 (SOR/2003-289) are not acceptable refrigerants for any new installations.
- .5 Document **all** work on Halocarbon Systems using CSCs halocarbon form “**Information Required for Refrigeration Systems at Federal Correctional Facilities**”. Obtain the latest form from Departmental Representative. Affix the completed form to equipment, and submit a copy of the form to Departmental Representative.
- .6 Comply with the following timelines:
  - .1 Upon delivery of halocarbon-containing equipment to site, submit the following information to Departmental Representative within 24 hours of service;
    - .1 Equipment Location
    - .2 Make
    - .3 Model #
    - .4 Serial #
    - .5 Type of halocarbon
    - .6 Halocarbon charging capacity of system (kg or lbs)
    - .7 Factory Halocarbon Charge (kg or lbs)
    - .8 Cooling capacity (kW, Btuh, or Tons)
  - .2 Leak-test factory-charged halocarbon-containing equipment containing over 10kg of refrigerant in accordance with the Refrigeration Code of Practice within one week of equipment delivery to site.
  - .3 Leak-test field-charged halocarbon-containing equipment in accordance with Section 4.4 of the Refrigeration Code of Practice at the time of field charging of system.
  - .4 For all work on Halocarbon Systems, submit forms to Departmental Representative within 48 hours of work.
  - .5 For release of halocarbons >10 kg and <100 kg, submit forms to Departmental Representative within 24 hours of discovery of release.
  - .6 For release or potential release of halocarbons >100 kg, submit forms to Departmental Representative **immediately**.

- .7 Conduct annual leak tests of halocarbon-containing equipment with 19kW (5.4 tons) or greater cooling capacity in accordance with the *Federal Halocarbon Regulations, 200* until such time as Interim Certificate of Completion is issued.

**END OF SECTION 23 05 00**