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**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 systems (SRS) - Type P2 Buildings.

**1.2                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 humidifiers 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, member of OIQ.
  - .2        Submit shop drawings to indicate project layout, dimensions and extent of humidification system.
- .4        Certificates: submit certificates signed by manufacturer certifying that materials comply with specified performance characteristics and physical properties.
- .5        Test Reports: submit certified test reports 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.

**1.3                CLOSEOUT SUBMITTALS**

- .1        Submit in accordance with Section 01 78 00 - Closeout Submittals.
- .2        Operation and Maintenance Data: submit operation and maintenance data for humidifiers for incorporation into manual.

**1.4                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 Materials:
  - .1        Provide maintenance materials in accordance with Section 01 78 00 - Closeout Submittals.

- .2 Furnish list of individual manufacturer's recommended spare parts for equipment, addresses of suppliers, list of specialized tools necessary for adjusting, repairing or replacing, for inclusion into operating manual.
- .3 Provide following: one complete set of renewable evaporator media.

## **1.5 DELIVERY, STORAGE AND HANDLING**

- .1 Deliver, store and handle materials in accordance with Section 01 61 00 - Common Product Requirements and 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 humidifiers from nicks, scratches, and blemishes.
  - .3 Replace defective or damaged materials with new.

## **Part 2 Products**

### **2.1 PACKAGED STEAM GENERATING ELECTRODE HUMIDIFIER (HU1-100-B00 et HU1-200-C01)**

- .1 General:
  - .1 CSA certified and ULC listed.
  - .2 Humidifier with heating elements and single use ionic bed. Steam generated from untreated domestic water. Ionic bed technology attracts solids as temperature rises.
  - .3 Steam dissipation calculations and location and quantity of distributors to be verified by manufacturer.
- .2 Components housed in factory fabricated cabinet with factory enameled finish and electrically interlocked door.
- .3 Factory sealed disposable steam cylinder complete with factory installed electrodes to suit water condition.
- .4 Controls:
  - .1 Micro-processor which can indicate or control:
    - .1 Time left before ionic bed replacement is required;
    - .2 Drain cycle while conserving water and energy;
    - .3 Fault of the system on unexpected stop of the drainage or fill systems or on electrical surcharge;
    - .4 12 hour programmable purge;
    - .5 Humidistat, flow interruptor, high/low limit.
  - .2 Panel to indicate the following:

- .1 System operation;
- .2 Pilot lamp advising that ionic beds need to be replaced within 100 operating hours otherwise automatic system shutdown;
- .3 Automatic shutdown set according to manufacturer's recommendations (adjustable);
- .3 Control system:
  - .1 Thermal sensor to prevent overheating;
  - .2 Programmable and secure password to access control panel;
  - .3 Automatic tank drainage after 72 hours of inactivity;
  - .4 Water heated by an SCR electric element which modulates the humidifier's maximum capacity from 0 to 100 % and capable of receiving 0-5 V, 0-10 V or 4-20 mA signals.
- .4 Solenoid valve on water and drain lines.
- .5 Hygrometer, installed in supply duct.
- .6 Airflow proving switch.
- .7 Amp meter.
- .5 Duct distribution header
  - .1 Fast absorption steam injection humidifier for an air speed of 250 fpm with simple factory assembled distribution tubes ready for duct installation.
  - .2 Stainless steel separator/header with multiple distribution tubes. Discharge ports sized and located for uniform distribution of dry steam.
  - .3 Parabolic needle regulating valve for quick and precise modulation of flow with a three quarter stroke. Valve protected by filter and inverted bucket trap. Drainage of separator/header and distribution tubes by float and thermostatic traps.
- .6 Plumbing :
  - .1 Terminals to connect humidistat, high limit switch, flow interrupting switch and an alarm (class 2).
  - .2 Stainless steel humidifier with drain connection, for duct installation.
  - .3 303, 149 stainless steel humidifier tank. Incoloy sheathed heating elements,
  - .4 Replacement single use ionic beds.
- .7 Capacities : see tables in drawings.
- .8 Acceptable products : Dri-steam VLC series, Armstrong HC series or replacement product approved by addendum in accordance with the Instructions to Bidders.

### **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 humidifiers 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 Install in accordance with manufacturer's instructions.
- .2 Humidifier and evaporator media to be new and clean when project is accepted.
- .3 Install humidistat as indicated.
- .4 Water service overflow drain: to manufacturers' recommendation.
- .5 Install access doors or panels in adjacent ducting.
- .6 When installing in ducting, provide waterproof duct up and downstream in accordance with Section 23 31 13 - Metal Ductwork.
- .7 Install capped drain connection at low point in duct.

### **3.3 FIELD QUALITY CONTROL**

- .1 Manufacturer's Field Services:
  - .1 Have manufacturer of products, supplied under this Section, review Work involved in the handling, installation/application, protection and cleaning, of its products and submit written reports, in acceptable format, to verify compliance of Work with Contract.
  - .2 Manufacturer's Field Services: 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, at stages listed:
    - .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 Upon completion of the Work, after cleaning is carried out.
  - .4 Obtain reports, within three (3) days of review, and submit immediately to Departmental Representative.
- .2 Performance Verification (PV):
  - .1 General: in accordance with Section 01 91 13 - General Commissioning (Cx) Requirements: General Requirements, supplemented as specified.
  - .2 Timing:
    - .1 After TAB of ducted air systems.
    - .2 At same time as PV of related air handling units.

- .3 Start-up:
  - .1 General: in accordance with Section 01 91 13 - General Commissioning (Cx)  
Requirements: General Requirements, supplemented as specified.
  - .2 Verify:
    - .1 Steam lines are sloped to ensure steam condensate is drained away from the humidifier.
    - .2 Vapour lines and manifolds are sloped to ensure condensate is drained away from the duct system.
    - .3 Visually check distribution manifold to ensure:
      - .1 Even distribution of vapour.
      - .2 Freedom from water deposits.
  - .4 Commissioning Reports:
    - .1 General: in accordance with Section 01 91 13 - General Commissioning (Cx)  
Requirements: reports, supplemented as specified. Include:
      - .1 PV results on approved PV Report Forms.

### **3.4 DEMONSTRATION**

- .1 Training: in accordance with Section 01 91 13 - General Commissioning (Cx)  
Requirements: Training of O M Personnel.

### **3.5 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.
- .3 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.

### **3.6 PROTECTION**

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

**END OF SECTION**