

## **PART 1 - GENERAL**

### **1.1 RELATED REQUIREMENTS**

- .1 Section 23 31 13.01 - Metal Duct - Low Pressure to 500 PA.

### **1.2 REFERENCES**

- .1 Unless otherwise indicated, all the works shall be done in accordance with the in force edition of the "Code de construction du Québec".
- .2 Furthermore, the works will be done in accordance with any other code or standard having jurisdiction, as per the latest edition, notably including, but not limited to:
  - .1 American National Standards Institute/American Society of Mechanical Engineers (ANSI/ASME).
    - .1 Section VII of ASME Boiler and Pressure Vessel Code.
  - .2 Canadian Standards Association (CSA) / CSA International.
    - .1 CSA B51, Boiler, Pressure Vessel and Pressure Piping Code.
    - .2 CAN/CSA B149.1, Natural Gas and Propane Installation Code.
  - .3 Underwriters Laboratories of Canada (ULC).

### **1.3 ACTION AND INFORMATIONAL SUBMITTALS**

- .1 All documents and samples required in accordance with the requirements.
  - .2 Shop Drawings:
    - .1 Shop drawings shall include the following:
      - .1 A description of the equipment, including the manufacturer's name, type, model, year of manufacture and the power, flow or capacity;
  - .3 Test Reports:
    - .1 Submit test reports issued by recognized independent laboratories, certifying that the products, materials, and equipment comply with specified physical characteristics and performance criteria.
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- .4 Certificates:
  - .1 Submit certificates signed by manufacturer certifying that the products, materials and equipment comply with specified physical characteristics and performance criteria.
- .5 Instructions:
  - .1 Submit installation instructions provided by the manufacturer.
- .6 Onsite manufacturer test reports:
  - .1 Provide the required reports.
- .7 Certification of Ratings:
  - .1 Catalogue or published ratings are those obtained from tests carried out by manufacturer or independent testing agency signifying adherence to Codes and Standards.

#### **1.4 CLOSEOUT SUBMITTAL**

- .1 Submit all required documents and items to the completion of the work and attach them to the "Operating and Maintenance Manual" according prescriptions.
  - .2 Maintenance Data:
    - .1 Maintenance data sheet shall include the following:
      - .1 Pertinent details relating to the operation, maintenance and maintenance.
      - .2 A list of recommended spare parts.
  - .3 Materials / Equipment Maintenance / Replacement:
    - .1 Provide a complet list of recommended spare parts by each manufacturer, a list of suppliers where you can get them, and a list of special tools necessary to adjust, repair and replacement each part, and incorporate the operating and maintenance manual.
    - .2 Provide a complete set of heating elements.
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## **PART 2 - PRODUCTS**

### **2.1 ELECTRICAL HUMIDIFIER LESS POWER CAPACITY THAN 35 KW (119,500 BTU/H)**

- .1 Humidifiers electric elements including the following:
    - .1 Steel or aluminum cabinet, coated with a baked enamel, equipped with a drain pan in stainless steel with drain fitting.
    - .2 304 stainless steel evaporation chamber that can resist to a maximum of 5 inches (1.25 kPa) static pressure for SK300 model by Neptronic, resist to a maximum of 19 inch (4.73 kPa) for EC Pure model or resist to a maximum of 8 inch (2 kPa) for LR Series by Vapac.
    - .3 Screwed cover type or snap-lock cover system.
    - .4 Stainless steel tube for steam injection with slope for condensate drain.
    - .5 "Incoloy Clad" heating element type or Inconel 800/825.
    - .6 Equipement design to increase the water trap height to drain to operation static pressure of maximum 5 inches (1.25 kPa) for SK300 model by Neptronic or maximum 19 inches (4.73 kPa) for EC model by Pure or maximum 8 inch (2 kPa) for the LR series by Vapac.
    - .7 Solenoid valve type on water supply.
    - .8 Forced Drain to reduce blocking possibility.
    - .9 Integrated automated drain water cooler.
    - .10 Filter with removable strainer installed on water inlet valve.
    - .11 A water level control, system AFEC or system VAPANET to control water level and high temperature.
    - .12 Three steps stainless steel sensor which allows a continuous operation during the filling cycle to maintain a constant relative humidity.
    - .13 Thermal protection with manual reset prewired and installed on the device.
    - .14 Separate electrical panel of the evaporation chamber and provided with an access door on hinges and a key lock. The panel should include a sub-panel including magnetic contactor, the high level and low water automatic controller filling, transformer, control fuses and load and terminal block. The high-voltage wiring shall be provided with protection to prevent electric shock.
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- .15 Control Module with pilot light indicating the operation of the humidifier.
- .16 Approvals: CSA and UL.
- .17 Wall bracket.
- .18 Electronic control system for adjusting the intervals and automatic drainage times with a manually adjustable timer.
- .19 Automatic drainage system for end of the season.
- .2 Accessories:
  - .1 Thermal Insulation 25 mm (1 inch) thick on the evaporation chamber.
  - .2 Modulating controller SCR or proportional SSR with cross detection and switching to zero, and 0-10 VDC or 4-20 mA.
- .3 Features: As indicated in the humidifiers schedule shown on drawing.
- .4 Acceptable Products: Neptronic model SK 300M; Vapac, RS Series; Dri-Steem.

## **2.2 AIR DISTRIBUTORS**

- .1 Components:
    - .1 Distributor composed of a horizontal supply header and a section of vertical dispersion tubes equally spaced between them. All tubing and manifold shall be in stainless steel type 304.
    - .2 Dispersion tubes in 304 stainless steel shall have:
      - .1 Two rows of holes, rated for the load, diametrically opposed inserted into the tube and spaced at 38 mm centers. The holes shall be made of a nonmetallic material to prevent heat transfer.
      - .2 Two rows of orifices should relieve the steam perpendicular to the air and so as to have a balanced flow of steam over the entire injection surface.
      - .3 Coupling joints to allow the tubes to be completely removable without dismantling the collectors, giving quick access to all equipment upstream or downstream of the distribution system.
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- .3 Each dispersion tube shall be thermally insulated to reduce heat transfer to the air and to reduce the amount of condensate. The insulation of the pipes shall be as follows:
  - .1 Types "Polyvinylidene fluoride" (PVDF) thick and a maximum thickness of 3.2 mm;
  - .2 The tube should be wrapped by the insulation. A type of weld fusion joint will close the envelope around the tube;
  - .3 Insulation approved for installation in ventilation ducts;
  - .4 Shall meet UL 723 and ASTM E84 Standards regarding the spread of fire and smoke with a ratio of 0/0 without releasing harmful gas;
  - .5 May be exposed to a temperature of 150 °C in continuous service;
  - .6 By design, the water cannot be absorbed and will not grow bacteria culture;
  - .7 No degradation when exposed to UVC light;
  - .8 On request, the test results for the thermal conductivity to be provided;
  - .9 The insulation shall reduce heat transfer by conduction and convection;
  - .10 The distributor shall respect the maximum temperature gain shown in the table in this section.
- .4 Calculations of steam dissipation, location and distribution shall be verified with the manufacturer.
- .2 Acceptable Products: Dri-Steem Rapid-Sorb; Nortec.

## **2.3 ACCESSORIES**

- .1 Particulate filter particles of 30 microns:
    - .1 For installation on the water supply of humidifiers electric elements or heat exchangers.
    - .2 Acceptable products: Culligan, Filter-Gard 4435-55.
  - .2 High Efficiency Cartridge Filter:
    - .1 Installed upstream magnetic conditioners.
    - .2 Acceptable products: MAG-O-PUR, model 132-9505.
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- .3 Magnetic Conditioner:
  - .1 Water conditioner magnetic field with no moving parts and requires no external power source.
  - .2 For installation on the water supply of electric humidifiers electrodes.
  - .3 Acceptable products: MAG-O-PUR, BMC3 model.

## **2.4 CONDENSATE COOLER**

- .1 Application: Condensate coolers mounted downstream of low pressure steam traps to reduce condensate temperature that will be thrown in the sewer.
- .2 Automated Cooler, delivered as a compact unit, including control valve and temperature sensor.
  - .1 Pressure: 860 kPa (125 lb/in<sup>2</sup>).
  - .2 Fittings:
    - .1 Drain: 2 inch NPT.
    - .2 Condensate: 1 inch NPT.
    - .3 Cooling water: ½ inch NPT.
    - .4 Acceptable products: Drane-Kooler, No. DK-12, including the appropriate media.

## **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 INSTALLATION**

- .1 The ventilation contractor will provide the humidifiers and install them in the provided ductwork. The plumbing contractor will hook up the humidifier to the steam and condensate pipes as indicated on the drawings.
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- .2 Install humidifiers according to manufacturer's recommendations.
- .3 At the time when work is received, humidifiers and evaporator elements shall be new and clean.
- .4 Install humidistats in easily accessible locations.
- .5 Provide, for required elements, an excess water drain conform to the manufacturer's recommendations.
- .6 Install access doors or panels in the ductwork before and after the system.
- .7 Provide sections of waterproof ductwork, as specified in Section 23 31 13.01 - Metal Ducts - Low Pressure to 500 Pa, before and after humidifiers installed in-duct.
- .8 At the lower points of the ductwork, install drain fixtures with female plugs.

### **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 product[s] 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 Upon completion of the Work, after cleaning is carried out.
  - .4 Obtain reports, within 3 days of review, and submit, immediately, to Departmental Representative.

### **3.4 NETTOYAGE**

- .1 Upon completion and verification of performance of installation, remove surplus materials, excess materials, rubbish, tools, and equipment.

### **END OF SECTION**

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