

## **Capital Projects Group**

# **Humidity Control Equipment Specification**

Specification 23 84 00

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Date: August 2018

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## Amendment Record Sheet

Amendment in Clause No.	Date of Amendment	Description of Changes

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**1. GENERAL**

**1.1. SCOPE OF WORK**

1.1.1. Provide humidity control equipment as required, scheduled and specified herein.

**1.2. DESIGN REQUIREMENTS**

1.2.1. Design requirements are based on Part 2 specified requirements of products.

**1.3. RELATED WORKS**

1.3.1. Section 20 05 05 - Mechanical Work General Instructions.

1.3.2. Section 20 05 10 - Basic Mechanical Materials and Methods.

1.3.3. Section 20 05 40 - Mechanical Work Commissioning.

1.3.4. Section 23 51 23 - Flue Gas Vents.

**1.4. REFERENCE STANDARDS**

1.4.1. Standards and codes to be latest editions adopted by and enforced by local governing authorities.

1.4.2. CAN/CSA B149.1 Natural Gas and Propane Installation Code.

1.4.3. CAN/ULC S102 Standard Method of Test for Surface Burning Characteristics of building Materials and Assemblies.

**1.5. TRAINING**

1.5.1. Training is to be a full review of all components including but not limited to a full operation and maintenance demonstration, with abnormal events.

1.5.2. Include for 3 training sessions of maximum 7 hours duration per session for 10 Metrolinx people per session.

1.5.3. Refer to Section 20 05 05 for additional general requirements.

**1.6. WARRANTY**

1.6.1. Products to be guaranteed by manufacturer, for a minimum of 2 years after acceptance by Metrolinx.

**1.7. DELIVERY, STORAGE AND HANDLING**

1.7.1. Handle and store products in accordance with manufacturer's instructions, in locations approved by Metrolinx. Include one copy of these instructions with product at time of shipment.

**1.8. SUBMITTALS**

- 1.8.1. Refer to submittal requirements in Section 20 05 05.
- 1.8.2. Submit with delivery of each unit a copy of the factory inspection report, and include a copy of each report with O & M Manual project close-out data.
- 1.8.3. Submit a site inspection and start-up report from manufacturer's representative as specified in Part 3 of this Section.
- 1.8.4. Submit 3 identified keys for cabinet doors for each humidifier prior to Substantial Performance of the Work.
- 1.8.5. Submit a spare steam/water cylinder for each humidifier prior to Substantial Performance of the Work.
- 1.8.6. Submit a signed copy of manufacturer's extended warranty.
- 1.8.7. Submit shop drawings/product data sheets as follows:
  - a) to regulatory authority for review and approval prior to submitting to Consultant;
  - b) for all products specified in this Section.
- 1.8.8. Product Data
  - a) Submit product data sheets indicating:
    - 1) technical data, supplemented by bulletins, component illustrations, detailed views, technical descriptions of items, and parts lists;
    - 2) performance criteria, compliance with appropriate reference standards, characteristics, limitations, and troubleshooting protocol;
    - 3) product transportation, storage, handling, and installation requirements;
    - 4) product identification in accordance with Metrolinx requirements.
- 1.8.9. Shop Drawings
  - a) Submit shop drawings indicating:
    - 1) types and ratings;
    - 2) mounting details to suit locations shown, indicating methods and hardware to be used;
    - 3) control components and control wiring schematic.

1.8.10. Commissioning Package

- a) Submit the following in accordance with Sections 20 05 05 and 20 05 40:
  - 1) Commissioning Plan;
  - 2) Commissioning Procedures;
  - 3) Certificate of Readiness;
  - 4) complete test sheets specified in Section 20 05 40 and attach them to the Certificate of Readiness;
  - 5) Source Quality Control inspection and test results and attach to the Certificate of Readiness.

1.8.11. Commissioning Closeout Package

- a) Submit the following in accordance with Section 20 05 05:
  - 1) Deficiency Report;
  - 2) Commissioning Closeout Report;
  - 3) submit the following for each Product for incorporation into the Operation and Maintenance Manuals in accordance with Section 20 05 05:
    - i) identification: manufacturer's name, type, year, serial number, number of units, capacity, and identification to related systems;
    - ii) functional description detailing operation and control of components;
    - iii) performance criteria and maintenance data;
    - iv) safety precautions;
    - v) operating instructions and precautions;
    - vi) component parts availability, including names and addresses of spare part suppliers;
    - vii) maintenance and troubleshooting guidelines/protocol;
    - viii) product storage, preparation, handling, and installation requirements;
    - ix) Commissioning Report.

## 1.9. QUALITY ASSURANCE

### 1.9.1. Manufacturers Qualifications

- a) Manufacturer shall be ISO 9000, 9001 or 9002 certified. Manufacturer of product shall have produced similar product for a minimum period of five years. When requested by Consultant, an acceptable list of installations with similar product shall be provided demonstrating compliance with this requirement.
- b) Where manufacturers provide after installation onsite inspection of product installations, include for manufacturer's authorized representative to perform onsite inspection and certificate of approvals.

### 1.9.2. Installers Qualifications

- a) Installers for work to be performed by or work under licensed Mechanical Contractor.
- b) Installers of systems are to be fully qualified and experienced installers of respective products and work in which they are installing.
- c) Where manufacturers provide training sessions to installers and certificates upon successful completion, installers to have obtained such certificates and submit copies with shop drawings.

### 1.9.3. Regulatory Requirements

- a) Products and work to comply with applicable local governing authority regulations, bylaws and directives.
- b) Include for required inspections and certificate of approvals of installation work from local governing authorities.

## 2. PRODUCTS

### 2.1. ELECTRIC/ELECTRONIC STEAM HUMIDIFIER

2.1.1. Nortec Air Conditioning Ltd. or approved equivalent, CSA certified, package type, 3-phase, 60 Hz, fully automatic electric/electronic steam humidifier in accordance with drawing schedule, capable of discharging pure steam with no mineral dust carryover, and complete with:

- a) 1.3 mm (0.05") thick enamelled steel barriered wall mounting cabinet with hinged and lockable door with interlock switch for the 3-phase power electrical section, an additional door to isolate line voltage components, and a separate plumbing compartment;
- b) disposable plastic water/steam cylinders with mesh electrodes;

- c) solenoid drain and fill valves;
- d) control panel with self-diagnostic microprocessor-based control system with LCD display and keypad, steam capacity adjustment, manual drain activation pushbutton, rest pushbutton, digital operation and fault indication and display, and LED indication for current draw, humidistat demand, steam output, capacity adjustment, draining, normal operation and cylinder full, self-check on start-up, and automatic drain of cylinder at end of season;
- e) duct or plenum mounting steam distributor assembly with a length to suit mounting location, complete with condensate separator and return leg;
- f) wall mounting steam distributing blower pack;
- g) wall mounting 24 volt adjustable tamper-proof humidistat with 10% to 90% RH range;
- h) duct mounting 24 volt adjustable humidistat with 10% to 90% RH range;
- i) duct mounting differential pressure switch for air flow proving interlock;
- j) duct mounting adjustable high limit humidistat.

2.1.2. Standard of quality assurance manufacturers are:

- a) Nortec Humidity Ltd.;
- b) Vapac Humidification;
- c) Armstrong International Ltd.;
- d) Hygromatic (Spirax Sarco);
- e) Carnes Co.;
- f) Northern Industrial Humidifiers "Neptronic";
- g) or approved equivalent.

## 2.2. GAS FIRED STEAM HUMIDIFIER

2.2.1. Nortec GS Series or approved equivalent, natural gas fired, CSA certified, package type, fully automatic steam humidifier in accordance with drawing schedule, capable of discharging pure steam with no mineral dust carryover, in accordance with requirements of CAN/CSA B149.1, and complete with:

- a) totally enclosed steel cabinet finished with a baked powder epoxy coating and equipped with 25 mm (1") thick insulation, top and front keyed access doors, and a cross-braced telescopic steel stand;

- b) fully piped, valved, 82% thermal efficiency combustion system with modulating variable speed forced draft blower, 100% premix burner, negative pressure regulator gas valve, and microprocessor controlled hot surface ignition system with flame system and 100% safety shutdown;
- c) type 304 stainless steel smooth flat surface heat exchanger and water tank, both removable and insulated with 25 mm (1") thick insulation meeting 25/50 flame spread/smoke developed ratings when tested to CAN/ULC S102 and complete with water level control consisting of a dual magnetic electronic float system with dual fill valves, an internal water supply air gap, internal water tempering for drain water cooling, a drain pump for scale removal, and timed periodic tank blow-down;
- d) control panel with self-diagnostic microprocessor-based control system capable of integration with building automation system and equipped with LCD display and keypad, steam capacity adjustment, modulating control demand status, tank water level indication, on/off control and safety (high limit, air proving) status, troubleshooting guide with scroll down menu, fault indication with date and time history, maintenance intervals, fill and drain status, drain/flush intervals and duration, capacity limitation, and 72 hours drain enable/disable;
- e) duct or plenum mounting stainless steel steam distributor assembly with a length to suit mounting location, complete with condensate separator and return leg;
- f) wall mounting steam distributing blower pack;
- g) wall mounting 24 volt adjustable tamper-proof humidistat with 10% to 90% RH range;
- h) duct mounting 24 volt adjustable humidistat with 10% to 90% RH range;
- i) duct mounting differential pressure switch for air flow proving interlock;
- j) duct mounting adjustable high limit humidistat.

2.2.2. Standard of quality assurance manufacturers are:

- a) Nortec Humidity Ltd.;
- b) Vapac Humidification;
- c) Armstrong International Ltd.;
- d) Hygromatic (Spirax Sarco);
- e) Carnes Co.;

- f) Northern Industrial Humidifiers "Neptronic";
- g) or approved equivalent.

### **3. EXECUTION**

#### **3.1. INSTALLATION OF ELECTRIC/ELECTRONIC STEAM HUMIDIFIERS**

- 3.1.1. Provide electric/electronic steam humidifiers.
- 3.1.2. Secure each steam generator assembly in place, level, and plumb, in accordance with manufacturer's instructions.
- 3.1.3. Install steam distributor manifold assemblies and secure in place. Coordinate installation with sheet metal trade.
- 3.1.4. Connect steam generators and distribution manifolds with steam and condensate hose kits supplied with humidifiers. Install in accordance with manufacturer's instructions.
- 3.1.5. Install humidistats and pressure differential air flow proving switches and connect with 24 volt control wiring in conduit to steam generator control panel.
- 3.1.6. Supply a spare water/steam cylinder for each unit and 3 identified keys for each steam generator cabinet and hand to Consultant at site prior to Substantial Performance of the Work.
- 3.1.7. Refer to Section 20 05 10 for equipment/system manufacturer certification requirements.
- 3.1.8. Refer to Section 20 05 10 for equipment/system start-up requirements.
- 3.1.9. When installation is complete, arrange for the humidifier manufacturer to visit site to supervise start-up, testing and adjusting of each humidifier, including all controls and safeties, and when this work is complete, obtain from manufacturer and submit a letter stating humidifiers have been properly installed, started, adjusted, and are in proper operating condition.

#### **3.2. INSTALLATION OF GAS FIRED STEAM HUMIDIFIERS**

- 3.2.1. Provide gas fired steam humidifiers.
- 3.2.2. Secure each steam generator assembly in place, level, and plumb, on stand provided on a concrete housekeeping pad in accordance with manufacturer's instructions.
- 3.2.3. Install duct and/or plenum mounted steam distributor/manifold assemblies and secure in place. Coordinate installation with sheet metal trade.

- 3.2.4. Provide blower packs and surface wall mount. Confirm exact locations prior to roughing-in.
- 3.2.5. Connect humidifiers and distributor/manifold assemblies with valved steam and condensate piping. Install in accordance with humidifier manufacturer's instructions.
- 3.2.6. Provide flue vent in accordance with Section 23 51 23.
- 3.2.7. Install humidistats (duct or wall mounted as indicated) and duct mounted pressure differential air flow proving switches and high limit switches and connect with 24 volt control wiring in conduit to humidifier control panel.
- 3.2.8. Refer to Section 20 05 05 for equipment/system manufacturer certification requirements.
- 3.2.9. Refer to Section 20 05 05 for equipment/system start-up requirements.

**END OF SECTION**