

PART 1 - GENERAL

- 1.1 REFERENCES
- .1 Canada Green Building Council (CaGBC)
    - .1 LEED Canada 2009 for Design and Construction, LEED Canada 2009 for Design and Construction Leadership in Energy and Environmental Design Green Building Rating System Reference Guide.
  - .2 CSA Group
    - .1 CSA C22.2 No.46-M1988(R2011), Electric Air-Heaters.
- 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 duct heaters and include product characteristics, performance criteria, physical size, finish and limitations.
    - .2 Submit product data and include:
      - .1 Element support details.
      - .2 Heater: total kW rating, voltage, phase.
      - .3 Number of stages.
      - .4 Rating of stage: rating, voltage, phase.
      - .5 Heater element watt/density and maximum sheath temperature.
      - .6 Maximum discharge temperature.
      - .7 Unit support.
      - .8 Clearance from combustible materials.
      - .9 Internal components wiring diagrams.
      - .10 Minimum operating airflow.
      - .11 Pressure drop operating airflow.
  - .3 Sustainable Design Submittals:
    - .1 LEED Canada submittals: in accordance with Section 01 35 21 - LEED Requirements.
    - .2 Construction Waste Management:
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- 1.3 DELIVERY, STORAGE AND HANDLING  
(Cont'd)
- .4 (Cont'd)  
accordance with Section 01 35 21 - LEED Requirements.
- .5 Packaging Waste Management: remove for reuse or return of pallets, crates, padding, banding, and packaging materials as specified in Construction Waste Management Plan in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal and Section 01 35 21 - LEED Requirements.

PART 2 - PRODUCTS

- 2.1 DUCT HEATERS
- .1 Duct heaters: flange type CSA approval.
- .2 Elements:  
.1 Open coils of nickel chrome resistance wire.  
.2 Coils machine crimped into stainless steel terminals extending at least 25 mm into the air stream.  
.3 All terminal hardware shall be stainless steel.  
.4 Coils shall be supported by ceramic bushins staked into the supporting brackets.
- .3 Frames: Heater frames and boxes shall be corrosion resistant steel.
- .4 Terminal box:  
.1 NEMA 1 general purpose enclosure.  
.2 Hinged, latching cover.  
.3 Multiple concentric knockouts to accept field wiring.  
.4 Temrinal blocks to accomodate field wiring.  
.5 All internal wiring to be complete with 105°C rated insulation.
- .5 Ratings:  
.1 Heaters to be rated for voltage, phase and KW capacity as indicated in schedule on drawings.  
.2 All three phase heaters to have equal, balanced, three phase stages.

- 2.1 DUCT HEATERS .5 Ratings: (Cont'd)  
(Cont'd)
- .3 Supply heaters with size and quantity of fixed and proportional heating stages as indicated in schedule.
- .6 Controls:
- .1 Factory mounted and wired in control box. Use terminal blocks for power and control wiring.
- .2 Controls to include:
- .1 Magnetic contactors.
  - .2 Fixed differential pressure switch.
  - .3 Manual and automatic reset high limit.
  - .4 Control transformers.
  - .5 Solidly state relays.
  - .6 Door interlocked disconnect switch (non-fused).
  - .7 HRC load fuses.
  - .8 Electronic hybrid step controller.
  - .9 Heater to be controlled by 0-10 VDC or 4-20 mA remote control signal from the building automation system supplied and installed by the controls Contractor.
- .3 Performance: see schedule on drawings.
- .4 Provide heater complete with protective screens on inlet/outlet.

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 duct heaters 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.

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- 3.2 INSTALLATION .1 Make power and control connections to CSA  
C22.2 No.46.
- 3.3 FIELD QUALITY CONTROL .1 Perform tests in accordance with Section  
01 91 13 - General Commissioning (Cx)  
Requirements and Section 26 05 00 - Common  
Work Results for Electrical.
- .2 Perform tests in presence of Departmental  
Representative.  
.1 Provide test report and include copy  
with Operations and Maintenance Manuals.
- 3.4 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 and recycling in accordance with  
Section 01 74 21 - Construction/Demolition  
Waste Management and Disposal and Section  
01 35 21 - LEED Requirements.  
.1 Remove recycling containers and bins  
from site and dispose of materials at  
appropriate facility.