

PART 1 - GENERAL

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| <u>1.1 REFERENCES</u> | .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. |
| <u>1.2 ACTION AND INFORMATIONAL SUBMITTALS</u> | .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: |

1.2 ACTION AND
INFORMATIONAL
SUBMITTALS
(Cont'd)

- .3 Sustainable Design Submittals:(Cont'd)
 - .2 Construction Waste Management:(Cont'd)
 - .1 Submit project Waste Management Plan highlighting recycling and salvage requirements.
 - .2 Submit calculations on end-of-project recycling rates, salvage rates, and landfill rates demonstrating that 75% of construction wastes were recycled or salvaged.
 - .3 Recycled Content:
 - .1 Submit listing of recycled content products used, including details of required percentages or recycled content materials and products, showing their costs and percentages of post-consumer and post-industrial content, and total cost of materials for project.
 - .4 Regional Materials: submit evidence that project incorporates required percentage 30% of regional materials and products, showing their cost, distance from project to furthest site of extraction or manufacture, and total cost of materials for project.

1.3 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 indoors in dry location and in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.
 - .2 Store and protect duct heaters from nicks, scratches, and blemishes.
 - .3 Replace defective or damaged materials with new.
- .4 Develop Construction Waste Management Plan related to Work of this Section and in

- 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 (Cont'd)
- .5 Ratings: (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 Solidy 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.

- 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.