

1 General

1.1 **REFERENCES**

- .1 CSA, Canadian Standards Association.
- .2 ULC, Underwriters' Laboratories of Canada.

1.2 **SUBMITTALS**

- .1 Submit the following Product data and Shop Drawings in one package.
 - .1 Product Data:
 - .1 Submit copies of manufacturer's product data in accordance with Section 01 33 00 Submittal Procedures, indicating:
 - .1 Product characteristics.
 - .2 Performance criteria, minimum operating air flow.
 - .3 Mounting methods, unit support.
 - .4 Physical size.
 - .5 KW rating, voltage, phase.
 - .6 Cabinet material thicknesses.
 - .7 Limitations, clearance to combustibles.
 - .8 Colour and finish.
 - .2 Shop Drawings:
 - .1 Submit Shop Drawings in accordance with Section 01 33 00 Submittal Procedures, indicating:
 - .1 Equipment, capacity and piping connections.
 - .2 Dimensions, internal and external construction details, recommended method of installation with proposed structural steel support, sizes and location of mounting bolt holes.
 - .2 Submit design data and test reports.
 - .3 Submit inspection and test reports.
 - .2 Warranty on heavy duty units shall be minimum of 5 years, on lighter units shall be 2 years.
 - .3 Commissioning
 - .1 Submit Commissioning Plan, Commissioning Procedures, Certificate of Readiness, Deficiency Report and Commissioning Closeout Report, in accordance with Division 23.
 - .2 Submit design data and test reports.
 - .3 Submit inspection and test reports.

.5 Closeout Submittals

- .1 Submit the following for incorporation into Operation and Maintenance Manuals in accordance with Section 01 33 00 Submittal Procedures.
 - .1 Identification: Manufacturer name, type, year, serial number, number of units, and capacity.
 - .2 Functional description detailing operation and control.
 - .3 Performance criteria and maintenance data.
 - .4 Operating instructions and precautions.
 - .5 Component parts availability including names and addresses of spare part Suppliers.
 - .6 Lubrication schedule, maintenance and troubleshooting guidelines.
- .2 Manufacturer's installation instructions for the following items:
 - .1 Force flow heater.
- .3 Submit As-Built Drawings in accordance with Section 01 33 00 Submittal Procedures.

2 Products

2.1 **ELECTRIC FORCED AIR HEATER (FAH)**

- .1 Manufacturers:
 - .1 Ouellet
 - .2 Chromalox (Dimplex)
 - .3 Stelpro
- .2 Construction: 0.8 mm thick steel (20 ga) removable and tamperproof panel, glass fibre insulation and integral air outlet and inlet.
- .3 Finish: Polyester epoxy powder coat, white.
- .4 Electric coils: durable tubular heating element with fins.
- .5 Fans: statically and dynamically balanced, direct driven, sleeve bearings, resilient mounted,
- .6 Motor: Totally enclosed type with permanently lubricated bearings, built-in thermal overload protection and resilient rubber isolation mounting.
- .7 Capacity: As per Drawing.
- .8 Built-in disconnect switch.

- .9 Controls
 - .1 On-off switch with integral overloads in cabinet.
 - .2 Remote wall-mounted thermostat.
 - .3 120 V control circuit with magnetic contactor and transformer.
 - .4 High temperature limit switch.
- .10 Units must be UL and CSA approved.

2.2 **ELECTRIC UNIT HEATER**

- .1 Manufacturers:
 - .1 Ouellet Model OAS
 - .2 Chromalox (Dimplex)
 - .3 Stelpro
- .2 Construction: 18 gauge steel cabinet with threaded connections for hanger rods.
- .3 Finish: Epoxy powder coat, white.
- .4 Heating coil: Low surface temperature, seamless copper sheathed tubular elements, low-watt density.
- .5 Fan: Propeller type, dynamically and statically balanced, epoxy coated aluminum construction and fan guard.
- .6 Motor: Totally enclosed type with permanently lubricated bearings, built-in thermal overload protection and resilient rubber isolation mounting.
- .7 Air outlet: Two-way adjustable louvres.
- .8 Capacity: As per Drawing schedule.
- .9 Built-in disconnect switch.
- .10 Controls
 - .1 Remote wall-mounted thermostat.
 - .2 120 V control circuit with magnetic contactor and transformer.
 - .3 High temperature limit switch.
- .11 Units must be UL and CSA approved

2.3 **CONTROL AND MONITORING SYSTEMS (*FUTURE* BAS INTEGRATION)**

- .1 Any vendors that are authorized dealers or distributors of the following control systems are acceptable:
 - .1 Delta Controls
 - .2 Reliable Controls

- .3 Schneider Electric SmartX Series
- .4 Distech Controls
- .5 Johnson Controls Facility Explorer
- .6 Honeywell CIPer series, Spyder Models 5 or 7
- .2 BAS System Integration:
 - .1 All control systems must be integrated to the City's J2 Innovations Fluid Integration (FIN) serve, including but not limited to the following:
 - .1 Graphical user interface (monitoring and control)
 - .2 Alarming
 - .3 Data Trending
 - .4 Data Archiving
 - .5 Project Haystack naming convention
 - .2 The installer must be licensed by J2 Innovations to sell, install, program and configure Fluid INtegration (FIN).
 - .3 Building Controllers (BC) must be Tridium Niagara JACE with the Haystack module and driver. The installer must be a licensed Tridium system integrator for any Tridium BCs or embedded or edge Niagara Framework products used. Soft JACE is not accepted.
- .3 Licensing Requirements
 - .1 Licenses shall be provided to and in the name of the City of Toronto.
 - .2 Licenses shall be perpetual, transferrable, assignable and royalty free.
 - .3 Tridium Licenses shall allow all workbench/supervisor brands complete system access and functionality.
- .4 Installer and Manufacturer Qualifications
 - .1 Installer shall have an established working relationship with Control System Manufacturer.
 - .2 Installer shall have successfully completed control system's control system training. Upon request, installer shall present record of completed training including course outlines.
 - .3 It is the intent of these specifications to define an open protocol state-of-the-art distributed computerized Building Management and Control System, which is user friendly, has known reliability, is extremely responsive, and which is to be designed, installed, implemented, and supported by a local office of approved bidders.

.4 BAS Contractor provides three locations for successful installations of similar open protocol computer-based systems. Sites provided must consist of more than 150 hardware inputs/outputs. Project sites must be local to the location of this project.

3 Execution

3.1 **EXAMINATION**

- .1 Review proposed locations on-site and co-ordinate installation requirements with general trades, architectural finishes and power requirements.

3.2 **INSTALLATION**

- .1 Install in accordance with manufacturer's instructions.
- .2 Check final location with Consultant if different from that indicated prior to installation. Should deviations beyond allowable clearances arise, request and follow Consultant's direction.
- .3 Clean finned tubes and comb straight.
- .4 Provide supplementary suspension steel as required.
- .5 Install thermostats in locations indicated.
- .6 Before acceptance, set discharge patterns and fan speeds to suit requirements.

3.3 **COMMISSIONING**

- .1 Perform Commissioning in accordance with Section 23 08 23 Mechanical Commissioning.
- .2 Verify operational performance in general conformance with the following outline:
 - .1 Operational performance outline:
 - .1 Thermostat operation.
 - .2 Element response.
 - .3 Fan operation.
 - .4 Disconnect.
 - .5 Other unit control features/devices.
 - .2 Functional performance outline:
 - .3 Interlocks with associated equipment.
 - .4 Interface with adjacent building components.

3.4 **PROTECTION**

- .1 Protect from damage during construction. Do not operate during construction or until unit and area thoroughly cleaned and inspected.

End of Section