

PART E
SPECIFICATIONS

PART E - SPECIFICATIONS

GENERAL

E1. APPLICABLE SPECIFICATIONS, STANDARD DETAILS AND DRAWINGS

- E1.1 *The City of Winnipeg Standard Construction Specifications* in its entirety, whether or not specifically listed on Form B: Prices, shall apply to the Work.
- E1.1.1 *The City of Winnipeg Standard Construction Specifications* is available in Adobe Acrobat (.pdf) format on the Information Connection page at The City of Winnipeg, Corporate Finance, Materials Management Division internet site at <http://www.winnipeg.ca/matmgt>.
- E1.1.2 Further to GC:2.4(d), Specifications included in the Bid Opportunity shall govern over *The City of Winnipeg Standard Construction Specifications*.

E2. SCOPE OF WORK

- E2.1 The Work consists of complete installation of four (4) new counter flow electric furnaces; 2 each in Greenhouse #7 and #8.
- E2.2 Installation of the furnaces situated one on each side of the entrance door, mounted on painted steel stands sitting on concrete blocks, complete with ductwork, all required transitions, electrical wiring, control wiring, for a complete installation.
- E2.3 Spiral ductwork attached to pony walls at a low level (within 15cm of the floor) along the length of the greenhouse, with 8-1 meter long branch lines per furnace with balancing dampers, for a total of 16 per greenhouse.
- E2.4 Ductwork shall be sealed and primed.
- E2.5 Provide weep holes of 8mm diameter at 50 cm on centre on the bottom of the branch ductwork (for drainage from watering of plant material above).
- E2.6 Supply and return air grilles shall be painted steel.

E3. PRODUCTS

- E3.1 Furnaces No. 1 – 4 shall be York Model # NIAHD2006 c/w 2HK 16502506 – 25kw electric heating section and 1FR0624 Filter rack complete with heating only Honeywell T-821 thermostats with fan switching sub-base.

E4. GENERAL REQUIREMENTS

- E4.1 Ensure that a permit and registration has been applied for and that the refrigeration trade having employees holding valid T.Q. in refrigeration has been engaged to install and commission any equipment according to the refrigeration equipment being energized or made ready to operate including all low voltage controls.
- E4.2 All Work shall be done in accordance with the requirements of CAN/CSA B52-1999 and the Ozone Depleting Substances Act (Manitoba).
- E4.3 The Contractor and Subcontractors must be fully aware of all work involving hazardous materials. All work shall be performed in compliance to the Department of Labour Workplace Health and Safety Guidelines (Manitoba) and all other applicable codes. The Contractor is

- responsible for the immediate notification of the Contract Administrator of his/her encountering of suspected hazardous material during their course of Work.
- E4.4 The Contractor shall, at least one (1) Calendar Day before the commencement of Work, provide the Contract Administrator with one (1) copy of Material Safety Data Sheets (MSDS) for each product to be supplied under the Contract.
- E4.5 All equipment shall be C.S.A. and/or U.L.C. labelled.
- E4.6 Work shall be performed by trained and skilled tradesmen and to the satisfaction of the Contract Administrator.
- E4.7 Provide a suitable support stand for all equipment installed and/or modified.
- E4.8 For all new equipment installed, provide Contract Administrator with complete Model Numbers and Serial Numbers.
- E4.9 Material may, at the option of the City, be supplied by Public Works Department.
- E4.10 All materials shall be new and first rate quality. Existing materials removed from this Site may be relocated and reused where they are in good condition and in working order.
- E4.11 Leave Site in clean and orderly condition daily.
- E4.12 Store materials and equipment in an area designated by the Contract Administrator.
- E4.13 Where damage occurs, restore finishes without added cost.
- E4.14 Provide three (3) copies of operation and maintenance manuals on all equipment installed under this contract.
- E4.15 Installations shall follow building lines, maximize head room, close to walls, and concealed in finished spaces. Obtain the Contract Administrator approval before implementing any deviations.
- E4.16 Locations and exact mounting height of equipment not listed must be verified with Contract Administrator before proceeding with installation.
- E4.17 Ensure that all equipment, fixtures and devices requiring normal maintenance and/or cleaning are mounted such that they are fully serviceable. Provide necessary isolation, access doors, union type fittings and the like.
- E4.18 Obtain the Contract Administrator permission relative to an access route to the building and/or on the work site.
- E4.19 Do not interfere with normal access to or egress from the Site or building.
- E4.20 Obtain Contract Administrator permission relative to use of on Site power, telephones and the like.
- E4.21 Balance all new and modified air systems affected by these renovations to $\pm 10\%$ of design to accessibility standard and practice.
- E4.22 Put all systems into operation and demonstrate to Contract Administrator. Demonstrate operation and maintenance procedures to Contract Administrator.
- E4.23 Installed equipment to conform to code requirements and manufacturer's recommended installation practice.

E5. MECHANICAL

- E5.1 Support all piping and ductwork to industry standards. Use copper hangers on copper pipe. Do not use perforated straphangers. All supply water piping hot and cold shall be tight to u/s in parallel and perpendicular lines to the building.
- E5.2 Do all cutting required for the installations. Patching shall be by trades normally engaged in working with materials necessary to restore building finishes. Keep openings to an absolute minimum. All openings larger than 5/8" shall be cored not hammer drilled.
- E5.3 Acoustic Liner – 1" thick neoprene covered fibreglass, seal joints.
- E5.4 The piping and pipe insulation shall be installed with strict adherence to the manufacturer's instructions.
- E5.5 Duct Insulation – 1" thick rigid V.P. covered fibreglass.
- E5.6 All structural steel shall be in conformance with C.S.A. G40 – latest revision, type 350W. All welding shall be done in accordance with C.S.A. W59 latest edition. Using Canadian Welding Bureau (CWB) certified welders and a CWB approved firm. Welds shall be continuous and grind smooth all welds. All steel shall be primed with one (1) coat red-oxide primer and two (2) coats rust proof black enamel.
- E5.7 If, in the opinion of the Contract Administrator, the piping is not adequately braced and/or supported to provide a good installation, additional bracing and/or supports must be provided at no extra cost to the City of Winnipeg.
- E5.8 All new piping shall be degreased, flushed, cleaned and pressure tested before filling with refrigerant.
- E5.9 Apply two (2) coast of shop primer paint to all steel pipes, supports and retouch any material scratched during installation.
- E5.10 Align and support all piping properly; under no circumstance may any piping load be transferred to the individual liquid.
- E5.11 All steel piping to be welded, above 2" in diameter screwed fittings allowed for 2" diameter pip sized and smaller.
- E5.12 Remove all burrs and chips and ream or file all pipe ends out to size of bore prior to welding.
- E5.13 Make pipe to pipe welded joints with open, secure butt welds, reinforced by metal in excess of the net throat dimensions by at least 1/5 (1/16") built up to give a gradual increase in thickness from edge to centre. Clean all rust, paint oil, greased or foreign matter from all welding faces and adjoining pipe surfaces for a depth of at least 12 (1/2") from the edge of welding groove. Maintain a surface clearance of 1.5 (1/16"). Carefully align piping using proper clearances and tacking before welding. Leave welded surfaces clean.
- E5.14 Welding must be performed by welders with proper certificates. All welding shall be done in accordance with the regulations of the Boiler Inspection Branch. All field welding shall be in accordance with the procedures for C.S.A.-W55.2-1957 and C.S.A. W117.2-1974 and the current edition of ASME Code for Power Piping. Do not caulk or pean welds. Perform welding above 4.4 degrees Celsius (40 degrees Fahrenheit) if necessary preheat to at least 21 degrees Celsius (70 degrees Fahrenheit).
- E5.15 Fabrication and installation of all ductwork shall be in accordance with ASHRAE and SMACNA recommendations, including gauge, cross breaking, seams, support and sealing. Adjust sheet metal size for lined ductwork.

- E5.16 All exhaust and relief ductwork shall be insulated with 1" thick foil-faced fibreglass duct.
- E5.17 Insulation from exterior wall to a distance of 10'-0" minimum into building space.
- E5.18 Contractor shall install 4" minimum flexible connectors on inlet and discharge ductwork of equipment.
- E5.19 Provide 3M brand fire barrier CP25WB caulk for all conduit wirings at floor slabs and both sides of fire rated walls.
- E5.20 All seams and joints shall be sealed with DURO-DYNE S-2 duct sealer on all low pressure ductwork.
- E5.21 Contractor to confirm all fire-rated partitions and separations and install fire dampers as required with local authorities.
- E5.22 Insulate fresh air ducts all the way back to main return air duct.
- E5.23 Supply and install all equipment such as furnaces, make-up air unit, exhaust fans, diffusers, grilles, condensing units, etc. which make up the HVAC system as shown to the satisfaction of manufacturer's requirements.
- E5.24 Duct and equipment supports shall be designed for total support in all matter, which will not stress unduly the building construction. All horizontal ductwork shall be supported by non-perforated, galvanized steel, riveted strap or rods on galvanized angle iron passing under ducts.
- E5.25 All equipment either supported or mounted on slab or roof mounted shall have vibration isolators for sound control.
- E5.26 Where necessary provide extended lubricators.

E6. ELECTRICAL

- E6.1 The electrical installation shall be in accordance with the current edition of the Canadian Electrical Code, Provincial and Municipal codes and regulations.
- E6.2 Provide all electrical hook-ups, including all controls, pressure switches, motor starters, magnetic motor starters, push button stations, overload protection devices, switches auxiliary contacts, interlocks, conduits, wiring disconnects, etc. for complete equipment satisfaction. Refer to shop manuals, drawings, equipment wiring diagrams, specifications, etc., for detail description, locations of equipment that required electrical hook-ups.
- E6.3 Install equipment, conduit and cables in the workmanlike manner to present a neat appearance to the satisfaction of the Contract Administrator. Install conduit and cable runs parallel and perpendicular in chases, behind furring or above ceilings. In areas where systems are to be exposed (electrical room only), install neatly and group to present a tidy appearance.
- E6.4 Supply power to new equipment from nearest power panel with sufficient ampacity and voltage complete with new circuit breakers, contactors, disconnect switches, etc., for system operation.
- E6.5 All exposed wiring to run in EMT conduit for power wiring concealed wiring may be BX armoured cable minimum size #12 awg copper.
- E6.6 Panel board directly shall be completed and updated with a full description neatly typed.
- E6.7 Provide Mylar labels to all new equipment and corresponding controls and devices.
- E6.8 A certificate of electrical final inspection and approval is required by completion of Work.

- E6.9 Outlets or equipment shall be moved to any point within a 10' radius when relocation is requested by the contract Administrator before the Work has been substantially completed, without additional cost.
- E6.10 Commercial/spec. grade devices c/w s.s. or approved covers for all outlets.
- E6.11 The entire installation shall be grounded in accordance with the Canadian Electrical Code.
- E6.12 Install equipment and apparatus requiring maintenance, adjustment or eventual replacement with adequate clearances and accessibility for same.
- E6.13 All conduits shall be clipped to structural concrete by means of anchors or supported by Unistrut hangers as close to U/S as possible. Tie wraps and tie wires for wire and conduit support and fastening is not acceptable.
- E6.14 Where existing services such as electrical power, fire alarm system, television system, are required to be disrupted and/or shutdown, co-ordinate the shutdowns with the Contract Administrator and carry out the work at a time and in a manner acceptable to them. Carefully schedule all disruption and/or shutdowns and ensure that the duration of same is kept to a minimum. Submit for approval a written schedule of each disruption at least 72 hours in advance of performing work to obtain Contract Administrator's written consent prior to implementing.
- E6.15 Wiring in concrete or masonry construction shall be installed in steel electrical metallic tubing (EMT). Provide a separate grounding conductor in EMT conduit runs embedded in concrete slabs. Conduits installed in areas exposed to moisture shall have watertight fittings.
- E6.16 All wiring in finished areas shall be concealed. Conduits shall be run at right angles to the building lines.
- E6.17 Verify all existing voltage prior to equipment ordering.