

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 The version in effect three (3) Business Days before the Submission Deadline shall apply.
- E1.1.3 Further to GC:2.4(d), Specifications included in the Bid Opportunity shall govern over *The City of Winnipeg Standard Construction Specifications*.
- E1.2 The following Drawings are applicable to the Work:

<u>Drawing No.</u>	<u>Drawing</u>
1	Boiler No.3 Refurbishment

- E1.3 The following specifications apply to the Work of this contract.

E2. MECHANICAL SCOPE OF WORK

- E2.1 Include in mechanical section, provision of labour, new materials, tools, transportation, services and facilities for a complete mechanical refurbishment of the existing boiler. The installation shall be left complete in all respects and ready for operation to the complete satisfaction of the Contract Administrator.
- E2.2 The Mechanical Scope of Work includes, but is not limited to the following:
- E2.2.1 Removal of burner, gas trains, trim and accessories as may be required to provide full clearance to the boiler outer casing and to avoid damage to same during the course of repairs.
- E2.2.2 Removal of boiler casing, refractories and insulation to provide complete access to the pressure vessel.
- E2.2.3 Replacement of all tubes in accordance with current A.S.M.E. code, section 1, titled Power Boilers, for operation over 250 DEG F. and as authorized for material and procedure by The Manitoba Department of Labour. Boiler circulation orifices must be replaced as per the original design, as required.
- E2.2.4 Upon completion of repairs to the pressure vessel, the pressure vessel shall be hydrostatically tested at a pressure of one and one half times the boiler design pressure. The hydrostatic test shall be performed in the presence of a Manitoba Department of Labour Representative and the Contract Administrator. The pressure vessel shall be cleaned and flushed in accordance with instruction and chemicals as furnished by a qualified water treatment specialist.
- E2.2.5 Boiler refractories and insulating materials shall be replaced with the original components where possible. Any materials showing deterioration or damage due to corrosion or removal shall be replaced with new components, subject to inspection and procedure by the Contract Administrator.

- E2.2.6 Boiler casing shall be re-installed in accordance with the boiler manufacturer's design procedure. Any portions of the casing showing signs of deterioration shall be replaced with new, matching material having the same gauge and quality. Where accessible to furnace gasses, all casing, structural bracing, fasteners bolt heads shall be seal welded to ensure gas tight construction.
- E2.2.7 The burner, gas trains, boiler trim and auxiliary components shall be re-installed on the boiler to match the original installation. Any components showing wear or damage shall be brought to the attention of the Contract Administrator, prior to re-installation.
- E2.2.8 Upon completion of the re-assembly of all items, the boiler shall be commissioned in the presence of the Contract Administrator, by a competent burner/boiler technician. Burner operation and limit controls shall be tested for correct operation and a combustion analysis report for both fuels shall be submitted to the Contract Administrator.

E3. MECHANICAL GENERAL REQUIREMENTS

E3.1 General

- E3.1.1 This section covers items common to all sections of National Master Specification Division 15 – Mechanical.

E3.2 Protection of Openings

- E3.2.1 Protect equipment and systems openings from dirt, dust, and other foreign materials with materials appropriate to system.

E3.3 Motors

- E3.3.1 Electrical motor shall be removed and inspected for wear, including broken/scored windings, excessive bearings wear, shaft alignment.
- E3.3.2 Conduct a motor load test at no-load and at full-load to verify performance capacity to stated nameplates data.
- E3.3.3 All unsatisfactory motors shall be replaced with same size and type.

E3.4 Belt Drives

- E3.4.1 All existing belt drives shall be inspected for alignment and excessive belt wear. All worn, or damaged, belts and sleeves shall be replaced with same size and type.
- E3.4.2 Minimum drive rating: 1.5 times nameplates rating on motor. Keep overhung loads within manufacturer's design and requirements on prime mover shafts.

E3.5 Tests

- E3.5.1 Give 48 hours written notice of date for tests.
- E3.5.2 Conceal work only after testing and approval by Contract Administrator.
- E3.5.3 Conduct tests in presence of Contract Administrator.
- E3.5.4 Bear costs including retesting and making good.
- E3.5.5 Piping:
- (a) General: maintain test pressure without loss for 4 hours unless otherwise specified.
 - (b) Hydraulically test steam piping systems at 1-1/2 times system operating pressure or minimum 1550 kpa, whichever is greater.

- (c) Test natural gas systems to CAN1-B149.1-M86 and requirements of authorities having jurisdiction.

E3.5.6 Equipment: test as specified in relevant sections.

E3.5.7 Prior to tests, isolate all equipment or other parts which are not designed to withstand test pressures or test medium.

E4. PACKAGED BOILERS

E4.1 General

E4.1.1 References

- (a) Canadian Standards Association (CSA).
 - (i) CSA B51-M1991, Boiler, Pressure Vessel, and Pressure Piping Code
- (b) Canadian Gas Association (GSA).
 - (i) CA1-3.1-77 (R1985), Industrial and Commercial Gas-Fired Package Boilers.
 - (ii) CAN/CGA-B149.1-M00, Natural Gas and Propane Installation Code.
- (c) American National Standards Institute (ANSI)/ American Society of Mechanical Engineers (ASME).
 - (i) ANSI/ASME Boiler and Pressure Vessel Code, Section IV, 1992.

E4.1.2 Shop Drawings

- (a) Submit shop drawings in accordance with City of Winnipeg requirements.
- (b) Indicate the following:
 - (i) General procedure and methods for tube bending, welding and positioning.
 - (ii) Clearance for operation, maintenance, servicing, tube cleaning, tube replacement.
 - (iii) Refractory material and placement.

E4.2 Products

E4.2.1 Packaged Boiler

- (a) Tubing & Elbows
 - (i) Convection tubes shall consist of 1-1/4" (in) O.D., 0.134" (in) thick wall tubes twenty-eight (28) feet in length. Tubes are to be SA-178 Grade A electric resistance welded in conjunction with ASME Standards.
 - (ii) Elbows shall consist of 180 degrees x 1" (in) short radius elbows. Elbows shall be Schedule 80.
 - (iii) Tubing arrangements shall be provided with alternate spacing to facilitate tube removed and soot blowing equipment as per Drawing 1 Boiler No. 3 Refurbishment.
 - (iv) All tubes are to be expanded into the upper and lower drums.
- (b) Refractory
 - (i) Rebuilding of the insulating materials shall consist of:
 - ◆ 3", 4-way interlock tile
 - ◆ 4" high-temperature block insulation
 - ◆ 2 1/2" low density block insulation.
 - (ii) Furnace Floor
 - ◆ Tubes shall be covered with 1-1/2: square edge tile.

(c) Casing

- (i) Inspection of all boiler casing and replacement of all components indicating signs of corrosion shall be made, including:
 - ◆ Burner head wall.
 - ◆ Remaining boiler casing.
 - ◆ Boiler frame work.

E4.3 Execution

E4.3.1 Installation

- (a) Install in accordance with ANSI/ASME Boiler and Pressure Vessels Code Section IV, regulations of Province Territory having jurisdiction, except where specified otherwise, and manufacturers recommendations.
- (b) Make all required piping connections to all inlets and outlets recommended by boiler manufacturer.
- (c) Maintain clearances as indicated or if not indicated, as recommended by manufacturer for operation, servicing and maintenance without disruption of operation of any other equipment/system.
- (d) Natural and LP gas fired installations – in accordance with CAN/CGA-B149.1-00 Natural Gas and Propane Installation Code.

E4.3.2 Commissioning

- (a) Contractor to:
 - (i) Certify installation.
 - (ii) Start up and commission installation.
 - (iii) Carry out on-site performance verification tests.
 - (iv) Demonstrate operation and maintenance.
- (b) Provide Contract Administrator at least 48 hours notice prior to inspections, tests and demonstrations. Submit written report on inspections and test results.