

PART 1 - GENERAL

1.1 RELATED
SECTIONS

- .1 Divisions 22 and 23.

1.2 SUBMITTALS

- .1 Submittals: in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Shop drawings to show:
 - .1 Mounting arrangements.
 - .2 Operating and maintenance clearances.
- .3 Shop drawings and product data accompanied by:
 - .1 Detailed drawings of bases, supports, and anchor bolts.
 - .2 Acoustical sound power data, where applicable.
 - .3 Points of operation on performance curves.
 - .4 Manufacturer to certify current model production.
 - .5 Certification of compliance to applicable codes.
- .4 Closeout Submittals:
 - .1 Provide operation and maintenance data for incorporation into manual specified in Section 01 78 00 - Closeout Submittals.
 - .2 Operation and maintenance manual approved by, and final copies deposited with Departmental Representative before final inspection.
 - .3 Operation data to include:
 - .1 Control schematics for systems including environmental controls.
 - .2 Description of systems and their controls.
 - .3 Description of operation of systems at various loads together with reset schedules and seasonal variances.
 - .4 Operation instruction for systems and component.
 - .5 Description of actions to be taken in event of equipment failure.
 - .6 Valves schedule and flow diagram.
 - .7 Colour coding chart.

- .4 Maintenance data to include:
 - .1 Servicing, maintenance, operation and trouble-shooting instructions for each item of equipment.
 - .2 Data to include schedules of tasks, frequency, tools required and task time.
- .5 Performance data to include:
 - .1 Equipment manufacturer's performance datasheets with point of operation as left after commissioning is complete.
 - .2 Equipment performance verification test results.
 - .3 Special performance data as specified.
- .6 Approvals:
 - .1 Submit 1 copy of draft Operation and Maintenance Manual to Departmental Representative for approval. Submission of individual data will not be accepted unless directed by Departmental Representative.
 - .2 Make changes as required and re-submit 3 copies as directed by Departmental Representative.
- .5 Additional data:
 - .1 Prepare and insert into operation and maintenance manual additional data when need for it becomes apparent during specified demonstrations and instructions.
- .6 Site records:
 - .1 Departmental Representative will provide 1 set of reproducible mechanical drawings. Provide sets of white prints as required for each phase of work. Mark changes as work progresses and as changes occur. Include changes to existing mechanical systems, control systems and low voltage control wiring.
 - .2 Transfer information weekly to reproducibles, revising reproducibles to show work as actually installed.
 - .3 Use different colour waterproof ink for each service.
 - .4 Make available for reference purposes and inspection.

- .7 As-built drawings:
 - .1 Prior to project completion finalize production of as-built drawings.
 - .2 Identify each drawing in lower right-hand corner in letters at least 12 mm high as follows: - "AS BUILT DRAWINGS: THIS DRAWING HAS BEEN REVISED TO SHOW MECHANICAL SYSTEMS AS INSTALLED" (Signature of Contractor) (Date).
 - .3 Submit to Departmental Representative for approval and make corrections as directed.
 - .4 Submit one (1) electronic copy and three (3) hard copies of as-built drawings with Operating and Maintenance Manuals.
 - .5 Electronic version of as-built drawings to be in AutoCad 2014 format or later.

1.3 INTERPRETATION OF PLANS AND SPECIFICATION

- .1 These specifications are to be considered an integral part of the plans which accompany them. Neither the plans nor the specifications shall be used alone. Any item which is reasonably implied in either shall be considered properly and sufficiently specified and must therefore be included by the Contractor.
- .2 Misinterpretation of the plans or specifications shall not relieve the contractor of responsibility. Final interpretation of details and clauses remain with the Departmental Representative.
- .3 The plans which accompany these specifications show the complete system and must be followed. If, however, on account of structural or other conditions, a deviation seems necessary or advisable, the Contractor must take the matter up with the Departmental Representative and secure his written consent before any changes are made.
- .4 The plans do not necessarily show all valves, traps, drains, access panels, dampers, unions, balancing fittings, etc. and the Contractor shall not avail himself of these obvious omissions but shall install the work complete

in essential details so that it will function properly, can be easily balanced, and so that repairs and removal of equipment can easily be made.

- .5 Runs of piping and ductwork on plans are in cases diagrammatic and exact locations must be determined by the Contractor as work proceeds with due regard to existing conditions, structural members and the work of other Contractors. The Departmental Representative reserves the right to alter locations of pipes, or equipment without extra cost, where such changes do not involve additional materials. The Contractor shall make any changes dictated by structural requirements without charge to the Owner.
- .6 Building dimensions shall not be scaled from the Mechanical plans but shall be obtained from the building as required.
- .7 Contractor is reminded to review all architectural, structural and electrical contract documents in conjunction with all mechanical contract documents in determining his full scope of work.

1.4 EQUIPMENT MANUFACTURERS

- .1 The manufacturers of all equipment shall be responsible to provide the services of a factory trained technical representative to visit the site, prior to starting and commissioning of the equipment and verify that the equipment has been installed in accordance with the manufacturer's recommendations. The Contractor shall be responsible to make all changes necessary to ensure the manufacturer's recommendations are met. The technical representative shall provide a report certifying that the equipment has been installed per their recommendations.
- .2 The manufacturer's representative shall be further responsible to test the equipment, at full and part load, during the start-up and commissioning stages and submit the report of his findings to the Departmental

Representative for approval with recommendations regarding changes required, if applicable. The manufacturer and contractor shall be responsible to ensure that equipment, as installed, meets the Contract Document requirements.

1.5 COMMISSIONING

- .1 Where specified in this division that a manufacturer's representative is to perform start-up, approve installation, commission and field test specific equipment or systems. Departmental Representative shall be notified three (3) days in advance.
- .2 The commissioning process may involve real or simulated conditions to determine systems full operational capabilities. Copies of all specified reports and maintenance manuals shall be available on site during the commissioning period.
- .3 Deficiencies or discrepancies discovered during the commissioning process, which prevent the satisfactory completion of the commissioning process, are to be rectified as soon as possible.
- .4 Commissioning shall include a complete detailed calibration and functional check of every separate point, as applicable, installed under this contract, together with a complete run through of all functions on all building systems, including all sequences, all front-end programs specified, to ensure all equipment, systems and circuits are functioning perfectly before completion of the contract.

1.6 WARRANTY

- .1 All Contractors shall warranty their work for a period of one(1) year, unless specified for a longer period elsewhere in this specification for specific equipment or element of work.

1.7 DELIVERY,

- .1 Store materials in area designated by Owner. All materials to be kept dry and free of dirt and moisture.

1.8 EQUIPMENT LIST

- .1 Complete list of equipment and materials to be used on this project and forming part of tender documents by adding manufacturer's name, model number and details of materials, and submit for approval.
- .2 Submit for approval within 10 days after award of contract.

1.9 TRIAL USAGE

- .1 Departmental Representative may use equipment and systems for test purposes prior to acceptance. Supply labour, material, and instruments required for testing.

1.10 PAINTING

- .1 To Section 09 91 99 - Painting.
- .2 Prime and touch up marred finished paintwork as required.
- .3 Restore to new condition, finishes which have been damaged too extensively to be merely primed and touched up.
- .4 Apply at least one coat of corrosion resistant primer paint to ferrous supports and site fabricated work.
- .5 Paint interior of ductwork at sidewall and ceiling grilles matte black.

1.11 EQUIPMENT
INSTALLATION

- .1 Unions or flanges: provide for ease of maintenance and disassembly.
- .2 Space for servicing, disassembly and removal of equipment and components: provide as recommended by manufacturer or as indicated.
- .3 Equipment drains: pipe to floor drains.
- .4 Install equipment, rectangular cleanouts and similar items parallel to or perpendicular to building lines.

1.12 ANCHOR BOLTS
AND TEMPLATES

- .1 Supply anchor bolts and templates for installation by other divisions.

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- 1.13 ELECTRICAL
- .1 Electrical work to conform to Division 26, including the following:
 - .1 Supplier and installer responsibility is indicated on electrical drawings and related mechanical responsibility is indicated on mechanical drawings.
 - .2 Wiring, conduit and connections, which are related to control systems, shall be provided by Division 26. Refer to Division 26 for quality of materials and workmanship.
- 1.14 EQUIPMENT SUPPORTS
- .1 Equipment supports supplied by equipment manufacturer: specified in other sections.
 - .2 Equipment supports not supplied by equipment manufacturer: fabricate from structural grade steel. Submit structural calculations with shop drawings, stamped by a professional Departmental Representative licensed to practice in New Brunswick.
- 1.15 PREPARATION FOR FIRESTOPPING
- .1 Firestopping material and installation within annular space between pipes, ducts, insulation and adjacent fire separation.
 - .2 Uninsulated unheated pipes not subject to movement: no special preparation.
 - .3 Uninsulated heated pipes subject to movement: wrap with non-combustible smooth material to permit pipe to move without damaging firestopping material.
 - .4 Insulated pipes and ducts: ensure integrity of insulation and vapour barrier at fire separation.
 - .5 Submit shop drawings for approval.
- 1.16 ESCUTCHEONS
- .1 On pipes passing through walls, partitions, floors and ceilings in finished areas.

- .2 Chrome or nickel-plated brass or Type 302 stainless steel, one-piece type with set screws.
- .3 Outside diameter to cover opening or sleeve.
- .4 Inside diameter to fit around finished pipe.

1.17 DIELECTRIC
COUPLINGS

- .1 General:
 - .1 To be compatible with and to suit pressure rating of piping system.
 - .2 Where pipes of dissimilar metals are joined.
- .2 Pipes 50 mm and under: isolating unions.
- .3 Pipes 65 mm and over: isolating flanges.

1.18 DRAIN VALVES

- .1 Locate at low points and at section isolating valves unless otherwise specified.
- .2 Minimum 20 mm unless otherwise specified: bronze, with hose end male thread and complete with cap and chain.

1.19 TESTS

- .1 Give 24 Hr. written notice of date for test.
- .2 Insulate or conceal work only after testing and approval by Departmental Representative.
- .3 Conduct tests in presence of Departmental Representative.
- .4 Bear costs, including retesting and making good.
- .5 Equipment: test as specified in relevant sections.
- .6 Prior to tests, isolate all equipment or other parts which are not designed to withstand test pressures or test medium.

PART 2 - PRODUCTS

2.1 MATERIALS

- .1 Use products and materials with recycled

content or resource efficient characteristics whenever possible. Use least toxic sealants, adhesives, sealers and finishes necessary to comply with the requirements of the project.

PART 3 - EXECUTION

3.1 CLEANING

- .1 Clean all work areas to remove all remnants and material related to this contract.

3.2 FIELD QUALITY CONTROL

- .1 Manufacturer's Field Services:
 - .1 Obtain written report from manufacturer verifying compliance of Work, in handling, installing, applying, protecting and cleaning of product and submit Manufacturer's Field Reports as described in PART 1 - SUBMITTALS.
 - .2 Provide manufacturer's field services consisting of product use recommendations and periodic site visits for inspection of product installation in accordance with manufacturer's instructions.

3.3 DEMONSTRATION

- .1 Departmental Representative will use equipment and systems for test purposes prior to acceptance. Supply labour, material, and instruments required for testing.
- .2 Supply tools, equipment and personnel to demonstrate and instruct operating and maintenance personnel in operating, controlling, adjusting, trouble-shooting and servicing of all systems and equipment during regular work hours, prior to acceptance.
- .3 Use operation and maintenance manual, as-built drawings, and audio-visual aids as part of instruction materials.

3.4 PROTECTION

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