Part 1 General

1.1 RELATED WORK

.1 Division 1

1.2 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.

1.3 TRIAL USAGE

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

1.4 PROTECTION OF OPENINGS

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

1.5 PAINTING

.1 To Section 09 90 00 - Painting.

.2 Prime and touch up marred finished paintwork to match original.

.3 Restore to new condition, finishes which have been damaged too extensively to be merely primed and touched up.

1.6 SPARE PARTS

.1 Furnish spare parts in accordance with Division 1as follows:
  .1 One filter cartridge or set of filter media for each filter or filter bank in addition to final operating set.

1.7 SPECIAL TOOLS

.1 Provide one set of special tools required to service equipment as recommended by manufacturers and in accordance with Division 1.

.2 Furnish one commercial quality grease gun, grease and adapters to suit different types of grease and grease fittings.

1.8 DEMONSTRATION AND OPERATING AND MAINTENANCE INSTRUCTIONS

.1 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.

.2 Where specified elsewhere, manufacturers to provide demonstrations and instructions.

.3 Use operation and maintenance manual, as-built drawings, audio visual aids, etc. as part of instruction materials.

.4 Instruction duration time requirements as specified in appropriate sections.

.5 Where deemed necessary, Departmental Representative may record these demonstrations on video tape for future reference.

1.9 CLOSEOUT SUBMITTALS

.1 Provide operation and maintenance data for incorporation into manual specified in Division 1.

.2 Operation and maintenance manual to be approved by, and final copies deposited with, Departmental Representative before final inspection.

.3 Operation data to include:
- .1 Control schematics for each system including environmental controls.
- .2 Description of each system and its controls.
- .3 Description of operation of each system at various loads together with reset schedules and seasonal variances.
- .4 Operation instruction for each system and each 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 shall 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 data sheets with point of operation as left after commissioning is complete.
- .2 Equipment performance verification test results
- .3 Special performance data as specified elsewhere.

.6 Approvals:
- .1 Submit 2 copies of draft Operation and Maintenance Manual to Departmental Representative. Submission of individual data will not be accepted unless so directed by Consultants.
- .2 Make changes as required and re-submit as directed by Departmental Representative.

.7 Additional data:
- .1 Prepare and insert into operation and maintenance manual when need for same becomes apparent during demonstrations and instructions specified above.

1.10 SHOP DRAWINGS AND PRODUCT DATA

.1 Submit shop drawings and product data in accordance with Division 1.

.2 Shop drawings and product data shall show:
- .1 Mounting arrangements.
- .2 Operating and maintenance clearances. eg. access door swing spaces.

.3 Shop drawings and product data shall be 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 as to current model production.
- .5 Certification of compliance to applicable codes.

.4 Use MCAC "Shop Drawing Submittal Title Sheet". Identify section and paragraph number.

1.11 CLEANING

.1 Clean interior and exterior of all existing systems including strainers. Vacuum interior of ductwork and air handling units serving area of work.

.2 All existing ductwork shall be cleaned to NADCA Standards for commercial buildings.

1.12 AS-BUILT DRAWINGS

.1 Site records:
- .1 Departmental Representative will provide 1 set of reproducible mechanical drawings. Provide sets of white prints as required for each phase of the work. Mark on prints all changes as work progresses and as changes occur. This shall include changes to existing mechanical systems, control systems and low voltage control wiring.
- .2 On a weekly basis, transfer information to reproducibles, revising reproducibles to show all work as actually installed.
- .3 Use different colour waterproof ink for each service.
- .4 Make available for reference purposes and inspection at all times.

.2 As-built drawings:
- .1 Prior to start of Testing, Adjusting and Balancing (TAB), 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 Engineer-Architect for approval and make corrections as directed.
- .4 TAB to be performed using as-built drawings.
- .5 Submit completed reproducible as-built drawings with Operating and Maintenance Manuals.

.3 Submit copies of as-built drawings for inclusion in final TAB report.

1.13 WASTE MANAGEMENT

.1 Refer to Division 1 for waste management and disposal procedures.

1.14 FIRE STOPPING

.1 All penetrations of fire separations shall be sealed according to Section 07 84 00 - Fire Stopping.

.2 Refer to Section 23 33 16 - Dampers-Fire and Smoke for installation of ductwork fire and smoke dampers at fire separations. Dampers shall be sealed as specified directly above.

1.15 TESTS

.1 Notify Departmental Representative three days in advance of system testing and verification.

.2 Insulate or conceal work only after testing and approved by Departmental Representative.

.3 Conduct tests in presence of Departmental Representative.

.4 Bear costs including retesting and making good.

.5 Piping:
- .1 General: maintain test pressure without loss for 4 h unless otherwise specified.
- .2 Hydraulically test hydronic piping systems at 1-1/2 times system operating pressure or minimum 860 kPa (125 psig).
- .3 Test drainage, waste and vent piping to National Building Code and authorities having jurisdiction.
- .4 Test domestic hot, cold and recirculation water piping at 1-1/2 times system operating pressure or minimum 860 kPa (125 psig), whichever is greater.

.6 Equipment: test as specified in relevant sections.

.7 Prior to tests, isolated all equipment or other parts which are not designed to withstand test pressures or test medium.

END OF SECTION