

## SECTION 230800 - COMMISSIONING OF HVAC

### PART 1 - GENERAL

#### 1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

#### 1.2 SUMMARY

- A. Section includes commissioning process requirements for HVAC&R systems, assemblies, and equipment.

- B. Related Sections:

- 1. Division 23

#### 1.3 SCOPE

- A. Commissioning requires the participation of Division 23, Mechanical Contractor and Subcontractors, to ensure that all systems are operating in a manner consistent with the Contract Documents.
- B. Commissioning on all HVAC systems listed below shall be a Delegated Design. The mechanical contractor shall include in his bid all cost associated hiring a commissioning agent to execute the scope of work as outlined below.
- C. Submit for review and approval by the engineer a commissioning plan, pre-functional test checklist, functional check lists, and all test results. A report shall be issued at the time of functional testing indicating each piece of equipment, the test performed, the result of each test, and the recommended corrective measure.
- D. Functional tests shall be repeated until all equipment is functioning properly and in accordance with the sequence of operation.
- E. Functional tests must include simulating conditions that will make the automatic temperature controls systems perform all sequences of operation automatically. Example. Simulate pump failure by shutting down the running pump to test automatic pump change over.
- F. Final functional testing shall be performed in the presence of the Engineer.
- G. SYSTEMS TO BE COMMISSIONED
- H. The following Mechanical systems will be commissioned on this project:
  - 1. Mechanical Systems
    - a. Rooftop Units

- b. DOAS units
  - c. Condensing Units
  - d. VRF systems
  - e. Control Dampers and Control Valves
  - f. Automatic Controls
- 2. Spot checking of air balancing readings including total building space pressurization.
- 3. All Direct Digital Controls (DDC) shall be verified for proper operation as it relates to the above equipment including interfaces for remote monitoring.
- 4. Fire Alarm System: Verification of the fire alarm system as it interfaces with the HVAC system such as duct smoke detectors and fire/smoke dampers shall be verified.

#### 1.4 RESPONSIBILITIES

- A. Commissioning responsibilities applicable to the Mechanical contractor of Division 23.

#### 1.5 OPERATION AND MAINTENANCE (O&M) MANUALS

- A. Compile and prepare documentation for all equipment and systems covered in Division 23, Mechanical, and deliver to Construction Manager for inclusion in O&M Manuals in accordance with Division 1.
- B. Provide the Commissioning Agent with a copy of O&M Manuals for review.

### PART 2 - PRODUCTS

#### 2.1 TEST EQUIPMENT

- A. Provide test equipment necessary to fulfill testing requirements of Division 23, Mechanical.

### PART 3 - EXECUTION

#### 3.1 PREFUNCTIONAL CHECKLISTS AND STARTUP

- A. Pre-functional tests and checklists (PFT's) are important to ensure that the equipment and systems are connected properly and are operational. PFT's ensure that functional performance testing may proceed without unnecessary delays. The Contractor shall be responsible for performing Pre-functional testing. EVERY piece of equipment to be commissioned receives a full Pre-functional checkout.
- B. Division 23, Mechanical contractor, has start-up responsibility and is required to complete systems and sub-systems so they are fully functional, meeting design objectives of Contract Documents. Commissioning procedures and functional testing do not relieve or lessen this responsibility for deficiency resolution or shift that responsibility partially to Engineer or Owner.

### 3.2 FUNCTIONAL PERFORMANCE TESTS

- A. Functional testing is intended to begin upon completion of a system. Functional testing may proceed prior to completion of systems or sub-systems at discretion of commissioning agent and the engineer. Beginning system testing before full completion does not relieve Contractor from fully completing system as soon as possible, including pre-functional checklists. Refer
- B. Functional performance testing requirements are in addition to and do not replace any testing required by Code or listed elsewhere in Division 23.
- C. Functional performance testing procedures will be performed on but not be limited to the following system types and equipment. Final functional testing requirements and procedures will be developed based on approved equipment shop drawings.
  - 1. Mechanical Systems
    - a. Rooftop Units
    - b. Rooftop ERVs
    - c. DOAS units
    - d. Condensers
    - e. VRF systems
    - f. Control Dampers and Control Valves
    - g. Automatic Controls

### 3.3 ISSUES AND DEFICIENCIES

- A. All deficiencies shall be detailed in functional testing report and or log. The report shall also include the corrective measures required and resolution of issues and deficiencies.

### 3.4 TRAINING OF OWNER PERSONNEL

- A. Contractor shall be responsible for training coordination and scheduling and ultimately to ensure that training is completed.
- B. Duration of Training: Mechanical Contractor shall provide training on each piece of equipment. Allow as least (2) separate 4-hour sessions. .

END OF SECTION 230800