

## 01 91 13 – COMMISSIONING

### PART 1 - GENERAL

#### 1.01 REQUIREMENTS

Complete the processes of commissioning selected equipment and systems as specified. These should be listed in a companion section following this section. The absence of such a section does not negate the commissioning responsibilities. In the absence of such a section, review the specifications for commissioning requirements and provide a summary list as a submittal to the Designer for approval prior to performing the required commissioning.

#### 1.02 SUBMITTALS

- A. Functional Performance Testing: Prepare and submit to the Designer Functional Performance Testing Procedures for approval of equipment and systems. Contractor will use forms provided in this section of the specifications. Testing procedures will be detailed step-by-step and specific to each system. The approved procedures will be used to conduct the Functional Performance Testing. Functional Performance Testing will be completed prior to Substantial Completion.
- B. Commissioning Data: Upon completion of the Functional Performance Testing, the Contractor will submit to the Designer the commissioning section of the Operation and Maintenance Binder. The binder will be divided into sections. The binder will contain copies of the manufacturer's installation and start-up procedures utilized by the installer and/or contractor, completed Functional Performance Testing Procedures and associated forms from Sections 23 08 xx and 26 08 xx, signed Functional Performance Test Certificates, and equipment and maintenance records for equipment and systems operated prior to Owner acceptance.

#### 1.03 ROLES:

- A. Designer, using its Consultants will:
  - 1. Review and approve the contractors Functional Performance Testing Procedures.
  - 2. Report on field observations and report deficiencies to the contractor.
  - 3. Observe the Contractor's Functional Performance Testing.
  - 4. Report on Functional Performance Testing deficiencies, ensure sign off on completion of testing, and perform recheck of deficiencies.
  - 5. Review final Commissioning Data.
- B. Contractor:
  - 1. Prepare and provide Functional Performance Testing Procedures for Designer approval.
  - 2. Provide installation and start-up of all equipment and systems as prescribed by the manufacturer's procedures.
  - 3. Perform and maintain a maintenance and service log for equipment and systems that are being operated prior to Owner acceptance.
  - 4. Provide manpower, supplies, testing instruments, etc. required to perform Functional Performance Testing.

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5. Perform, in the presence of the Designer/Consultants and Owner, Functional Performance Testing.
6. Prepare three sets of Commissioning Data for Designer review and approval.

### 1.04 SYSTEMS TO BE COMMISSIONED:

- A. The following mechanical systems and associated equipment are to be commissioned as specified. These include but are not limited to:
  1. Mechanical (HVAC) air and water
  2. Associated controls and building automation
  3. Domestic hot water
- B. The following Electrical systems and associated equipment are to be commissioned as specified. These include but are not limited to:
  1. Electrical panel boards.
  2. Power circuits.
  3. Lighting levels.
  4. Generator and/or back-up power sources.

## PART 2 – PRODUCTS (Not used)

## PART 3 – EXECUTION

### 3.01 COMMISSIONING CONSTRUCTION PHASE:

Complete the following commissioning activities during the construction phase of the project. Submit for review and provide notification of activities.

- A. Manufacturer's system/equipment start-up procedures.
- B. Specified manufacturer's and/or independent testing agency reports.
- C. Project schedule that included dates for start-up of equipment and systems, and Functional Performance Testing.
- D. Minimum seven day notification of code required testing and specified cleaning of systems.
- E. Minimum seven day notification of system and equipment start-up.
- F. Control submittal on systems and equipment including drawings, sequences and programming.
- G. Prepare detailed Functional Performance Testing Procedures for systems and equipment. Utilize the forms provided in this section of the specifications. Procedures will be detailed, step-by-step, and include description of expected results for verification. Modify test procedures as required by the Designers' comments. Coordinate and schedule tests so that all parties involved will be present for final testing and acceptance.
- H. Correct all deficiencies prior to final acceptance.

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- I. Prepare a list of all system and equipment warranties specified in the contract documents. Provide the warranty item and the contract document section number. Provide the Designer with an update list throughout the project.
- J. Prepare a list of all deliverables specified in the contract documents. Provide the deliverable item and the contract document section number. Provide the Designer with an updated list throughout the project.
- K. Prepare a list of all Training and Demonstrations specified in the contract documents. Provide the type of Training and/or Demonstration and the contract document section number. Provide the Designer with an updated list throughout the project.
- L. Prepare a list of all tests, reports, services, etc. whether required by codes, independent authorities, or manufacturers as specified in the contract documents. Provide the type of test, report, services, etc. and the contract document section number. In the case that the test is required by state or local codes, update the list as soon as the information is available. Provide the Designer with an updated list throughout the project.
- M. Systems and/or equipment will not be used for temporary purposes of any kind until authorized by the Designer in writing to ensure that required maintenance and warranties remain in force. The Contractor will be responsible for maintenance of all systems and equipment until final acceptance and will maintain on site a binder containing schedules of maintenance activities, items checked, repairs or replacements made and documents to verify that the work was performed. The documentation contained in this binder will become part of the commissioning binder.

### 3.02 COMMISSIONING ACCEPTANCE PHASE:

Complete the following commissioning activities during the acceptance phase of the project. The activities described in this section must be completed prior to Substantial Completion.

- A. Perform Functional Performance Tests of mechanical and electrical systems and equipment as specified utilizing the testing procedure prepared by the Contractor and approved by the Designer to verify proper calibration, operation and performance. The Contractor is responsible for providing all manpower, equipment and/or testing instruments required to perform tests. Functional Performance Testing will be performed in the presence of the Designer/Consultant and the Owner. Tests that fail to perform as required will be retested upon correction. If retesting has to be rescheduled, the Contractor will be responsible for any additional charges.
- B. All deliverables prescribed in the contract documents will be delivered to the Owner at the location designated by the Owner.
- C. Perform all training and demonstrations prescribed in the contract documents.
- D. Provide three final commissioning binders to the Designer for review and approval. Ensure that all forms are completely filled out and all testing results documented. If missing or incomplete information and/or data is identified by the Designer, reassemble replacement manuals with complete information prior to project final payment.

END OF SECTION