SECTION 22 0800 - COMMISSIONING OF PLUMBING SYSTEMS

PART 1 - GENERAL

1.1 SUMMARY

A. The purpose of this section is to specify the Division 22 responsibilities and participation in the Commissioning Process.

B. Work under this contract shall conform to requirements of Division 01, General Requirements,

3. *Commissioning Plan*. The document prepared for each project, which identifies the processes and procedures necessary for a successful Cx process.
4. *Commissioning Record*. The complete set of commissioning documentation for the project, which is turned over to the owner at the end of the construction phase.
5. *Functional Testing*. Tests performed to verify compliance with manufacturers' specifications, applicable codes and standards, and the project BOD and OPR.

1.2 RELATED SECTIONS

A. Division 01 Section 01 9113 - General Commissioning Requirements

B. Division 21 Section 21 0800 - Commissioning of Fire Suppression

C. Division 23 Section 23 0800 - Commissioning of HVAC Systems

D. Division 25 Section 25 0800 - Commissioning of Integrated Automation System

E. Division 26 Section 26 0800 - Commissioning of Electrical Systems

F. Individual Division 01, 21, 22, 23, 25, and 26 sections contain requirements related to the commissioning process.

1.3 ROLES AND RESPONSIBILITIES

A. Refer to Section 01 9113 for Commissioning Authority, Owner, Architect, and General Contractor roles and responsibilities.

B. Refer to Section 21 0800 for fire suppression contractor roles and responsibilities.

C. Refer to Section 22 0800 for plumbing contractor roles and responsibilities.

D. Refer to Section 23 0800 for Mechanical contractor roles and responsibilities.

E. Refer to Section 25 0800 for Integrated Automation System contractor roles and responsibilities.

F. Refer to Section 26 0800 for Electrical contractor roles and responsibilities.

G. Design Team

1. Provide the Owners Project Requirements (OPR).
2. Provide documentation of initial design concepts and Design Intent based on Owner's program.
3. Provide plumbing system design parameters and obtain approval of Owner.
4. Prepare contract documents incorporating Commissioning Specification requirements and description of the electrical systems.
5. The Design Team shall specify and verify adequate maintenance accessibility for each piece of equipment in shop drawings and the actual installation.
6. Periodic inspections as part of the Design Team's contract with the Architect and/or Owner.
7. Review and approve submittals.
8. Participate in commissioning meetings.
9. Review Pre-functional Checklists and Functional Performance Test procedures submitted by the Commissioning Authority.
10. Prepare punch lists.

11. Review as-built records as required by contract documents. Issue a report noting deficiencies requiring correction to the Commissioning Authority.
12. Review and comment on final commissioning report.

H. Plumbing Contractor

1. Include cost to complete commissioning requirements for plumbing systems in the contract price.
2. Include requirements for submittal data, O&M data, and training in each purchase order or sub contract written.
3. Ensure cooperation and participation of all subcontractors.
4. Ensure participation of major equipment manufacturers in appropriate training and testing

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EXECUTION

3.1 GENERAL

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3.6 ACCEPTANCE PROCEDURES

A. Pre-Functional Checklists

1. Pre-Functional Checklist Scope

a. Tests and verifications included in the Pre-Functional Checklists shall determine if all components, equipment, systems, and interfaces between systems are installed and are ready to operate in accordance with contract documents.

2. Pre-Functional Checklist Roles and Responsibilities

a. The Commissioning Authority shall be responsible for creating the Checklists, which will be completed by the installing contractors and then verified (via spot checking and Functional Performance Testing). Participating contractors, manufacturers, etc. shall include all costs to do the work involved in these tests in their proposals. The following is a list of tasks and supporting information that shall be required:

b. The Plumbing Contractor shall provide the services of a technician(s) who is (are) familiar with the construction and operation of the applicable system. Provide access to the contract plans, shop drawings, and equipment cut sheets of all installed equipment.

3. Documentation and Reporting Requirements

a. Pre-[illegible]

3. Failure of an item is defined as:

   a. For all readings other than sound, a deviation of more than 10 percent.
   b. For sound pressure readings, a deviation of 3 decibels. (Note: variations in background noise must be considered).

4.

5) If during a test an operating deficiency is observed, appropriate comments will be added to the Test Procedure form and the Issues Log.
6) Confirmation of the TAB results shall be verified utilizing the Building Automation System. This shall include, but not be limited to, the following:

    a) Verify domestic hot water recirculation balancing.

7) Verification of the proper responses of BAS system controllers and sensors shall be as follows:

    a) For each controller or sensor, record the indicated BAS system reading, and the test instrument reading.
    b) If the initial test indicates that the test reading is outside of the control range of the installed device, the calibration of the installed device shall be checked and adjusted as required. The deficient device shall be re-tested and the results recorded on the Functional Performance Test form.

b. If deficiencies are identified during Functional Performance Testing, the General Contractor will be notified, and action taken to remedy the deficiency. The final Functional Test Procedure forms will be reviewed by the Commissioning Authority

3.7 SYSTEMS MANUAL:

A. The Systems Manual shall be submitted in paper AND/OR electronic format and shall contain the following major sections:

1. System Descriptions:

a. Each major system shall be described, typewritten, in general terms, including major components, interconnections, theory of operation, theory of controls, unusual features and major safety precautions. This information should correlate with information provided in the manufacturers' instructions book. This section shall include, but not be limited to, the following data:

1) Detailed description of each system and each of its components showing piping, valves, controls, and other components, with diagrams and illustrations where applicable.
2) Wiring and control diagrams with data to explain detailed operation and control of each component.
3) Control sequences describing start-up, all modes of operation, and shut down.
4) Corrected shop drawings.
5) Approved product data including all performance curves and rating data.
6) Copies of approved certifications and laboratory or factory test reports (where applicable).
7) Copies of warranties.

b. System diagrams, described in the following section, shall be incorporated in the appropriate systems descriptions. These should be reduced in size or folded to usefully fit into the manual.

2. Operating Instructions:

a. Condensed, typewritten, suitable for posting, instructions shall be provided for each

3. Ongoing and Preventive Maintenance:

   a. Condensed, typewritten procedures for recommended ongoing and preventive maintenance actions shall be provided for each category of equipment/system listed above. This information shall include, but not be limited to the following:

      1) Maintenance and overhaul instructions.
      2) Lubricating schedule including type, grade, temperature, and frequency range.
      3) Parts list, including source of supply and recommended spare parts.
      4) Name, address, and 24 hour telephone number of each subcontractor who installed equipment and systems, and local representative for each type of system.
      5) Other pertinent data applicable to the maintenance of particular systems or equipment.

   b. These recommended preventive maintenance actions shall be categorized by the following recommended frequencies:

      1) Weekly
      2) Monthly
      3) Quarterly
      4) Semi Annual
      5) Annual
      6) Other

B. Posted Operating Instructions and Diagrams:

   1. Operating Instructions:

      a. Copies of operating instructions provided in the Systems Manual shall be posted in the near vicinity of each piece of applicable equipment. The instructions shall be mounted neatly in frames under Plexiglas, where they can be easily read by operating personnel. Instructions mounted outdoors shall be suitably protected from weather.

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