

COMMISSIONING

SECTION 01 91 00

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 1 Specification Sections, apply to this Section.

1.2 SECTION INCLUDES

- A. Equipment and system commissioning, including the following:
 - 1. Completion of commissioning procedures on specific equipment and systems as indicated under "Related Sections" below.
 - 2. Verification of operational and functional performance of specific equipment and systems for compliance with the "Design Intent" as described in the "Related Sections" indicated below.

1.3 RELATED SECTIONS

- A. Section 01 33 00 – Submittal Procedures: Procedures for submittal of product data and quality assurance submittals.
- B. Section 01 77 00 – Closeout Procedures: General closeout requirements.
- C. Section 01 78 53 – Sustainable Design Closeout Documentation: Closeout requirements relating to sustainable design certification.
- D. Appropriate Sections of Divisions 15 and 16 specify closeout and/or commissioning related requirements for specific pieces of equipment or building operating systems.

1.4 REFERENCES

- A. [ASTM International (ASTM)]:
 - 1. [ASTM X000-00, Title of Standard].
 - 2. [ASTM X000-00, Title of Standard].
- B. [Name of Organization (Organization Acronym)]:
 - 1. [Acronym, Standard or Document Number and Date of Issue, Title of Standard or Document].

1.5 DEFINITIONS

- A. Commissioning: The process of verifying that the installation and performance of selected building systems meet or exceed the specified design criteria and therefore satisfy the design intent.
- B. Deficiencies and Resolutions List: List of noted deficiencies discovered as result of commissioning process.
- C. Final Commissioning Report: Overall final commissioning document, prepared by the Systems Commissioning Authority, which details the actual commissioning procedures performed, inspection and testing results, and the final version of the deficiencies and resolutions list indicating that all issues discovered through the commissioning process have been verified as resolved.
- D. Functional Performance Testing Process: Documented testing of system parameters, under actual or simulated operating conditions.
- E. Pre-Commissioning Checklists: Installation and start-up items to be completed by the appropriate party prior to operational verification through functional testing.
- F. Physical Inspection Process: On-site inspection and review of related system components for conformance to the specifications.
- G. Systems Commissioning Authority (SCA): Independent entity under contract directly with the Owner or Owner's Representative responsible for performing the specified commissioning procedures.

1.6 DESCRIPTION OF CONSTRUCTION PHASE COMMISSIONING PROCESS

- A. As soon as practicable after the [bid award] [start of construction] the Systems Commissioning Authority (SCA) will conduct a pre-installation commissioning "kick-off" meeting with the contractors. Parties directly affected by the commissioning work will be required to attend. The SCA will explain the commissioning process in detail, and identify specific commissioning related responsibilities of the various parties.
- B. Commissioning status meetings will be scheduled to occur during construction to monitor progress and to help facilitate the commissioning process. Contractor representatives will be required to attend these meetings.
- C. Once contractors have provided the SCA with written verification indicating completion of installation and startup procedures, the SCA will conduct an on-site physical inspection of the specific systems and equipment.
- D. Upon confirmation of system readiness, the SCA will schedule with the contractors to perform functional compliance with the project specifications and drawings. The SCA will oversee the process and will provide the format and documentation for these tests.
- E. Deficiencies noted during these tests will be documented on the Deficiencies and Resolutions list. When corrected, issues will be resolved at the time of discovery. The

responsible Contractor will resolve all other issues at a later date. All deficiencies will be noted by the SCA as either resolved or pending resolution.

- F. The construction commissioning process will be complete when all noted deficiencies have been corrected, proved to be compliance with the project specifications or otherwise resolved to the satisfaction of the Owner.

1.7 SYSTEMS COMMISSIONING AUTHORITY'S DUTIES AND RESPONSIBILITIES

- A. Meet and communicate with the Owner's representatives, [Construction Manager] [Construction Administrator] Contractors, equipment manufacturers' representatives, Architect, Engineer [and others] as needed, to facilitate the commissioning process.
- B. Review commissioning related specifications, submittals and construction documents. Communicate noted deficiencies and concerns to the Owner, Architect and Engineer.
- C. Develop detailed and specific functional testing procedures for equipment and systems to be commissioned.
- D. Develop testing, adjusting and balancing (TAB) specifications. Oversee the TAB process.
- E. Perform site inspections and verify contractor readiness for the functional testing process. Document deficiencies for future resolution.
- F. Witness contractor performed functional testing process as appropriate to verify contractor compliance with the functional testing procedures. Document deficiencies for future resolution.
- G. Provide the Owner, [Construction Manager] [Construction Administrator] [Contractor], Architect, and Engineer with a Final Commissioning Report to document the commissioning process and to verify that the commissioning process is complete.

1.8 DUTIES AND RESPONSIBILITIES OF OTHERS FOR COMMISSIONING

- A. The commissioning process will require the active participation of persons qualified to represent the Owner, Mechanical Engineer, Electrical Engineer, General Contractor, Equipment Manufacturers' Representatives, Mechanical Contractor, HVAC Contractor, Controls Contractor, TAB Contractor, Electrical Contractor, and other specific subcontractors, as deemed appropriate. The SCA will witness the final functional performance commissioning process. Participants shall include in their contracts all costs necessary to participate in and complete the commissioning process.
- B. The [General Contractor] [Construction Manager] [Construction Administrator] will assure the participation and co-operation of [Contractors] [and] [subcontractors], as required to complete the commissioning process.
- C. The Owner will assure the participation of their chosen representatives as required to complete the commissioning process.

- D. The Architect will assure the participation of necessary representatives from the Design Team as required to complete the commissioning process. Design team members will provide prompt replies to requests for information issued during the commissioning process.
- E. It is the Contractor's specific responsibility to complete their respective start-up and checkout procedures, and to insure the complete readiness of equipment and systems, prior to the start of the functional performance testing phase. The SCA shall request written confirmation of system readiness for performance testing, from the appropriate subcontractor or Contractor. Once the SCA is provided with confirmation of all related systems completion, the actual date and times for the functional performance testing process will be confirmed. Contractors shall provide sufficient time, and qualified representatives, to complete this process.
- F. After a second failure of a system to successfully meet the criteria as set forth in the functional performance testing process, the Contractor shall reimburse the Owner for all costs associated with any additional re-testing efforts made necessary due to remaining Contractor related system deficiencies previously reported by the Contractor as corrected. These costs shall include salary, travel costs and per diem lodging costs (where applicable) for the SCA. [Rates to be used:
- | | |
|-------------------|----------------------|
| Mileage: | <u>\$0.35/Mile</u> |
| Per Diem Lodging: | <u>\$115.00/Day</u> |
| Salary: | <u>\$100.00/Hour</u> |
- G. Training on related systems and equipment operation and maintenance shall only be scheduled to commence after final performance commissioning is satisfactorily completed, and systems are verified to be 100 percent complete and functional.

1.9 SUBMITTALS

- A. Submit under provisions of Section [01300] [_____].
- B. Pre-Commissioning Checklist Forms: Submit [two (2)] [_____] signed copies of the checklist forms to the SCA upon completion of all listed items.
- C. Equipment Manufacturer's Startup Forms: Submit [two (2)] [_____] completed copies of the installation and startup checklists provided by the equipment manufacturers to the SCA.
- D. Test Reports: Submit [two (2)] [_____] copies of test reports for equipment and systems to the SCA.
- E. Control Schematics: Submit [two (2)] [_____] copies of the control schematics for equipment, systems, and subsystems to the SCA.
- F. Inspection Records: Submit [two (2)] [_____] copies of the records of inspections for code compliance, and approved permits and licenses to operate the equipment and systems to the SCA.

- G. Operating Data: Submit [two (2)] [_____] copies of equipment and system operating data including all necessary instructions to facilitate operation to specified performance standards to the Owner.
- H. Maintenance Data: Submit [two (2)] [_____] copies of equipment and system maintenance data including all necessary information required to maintain the equipment and systems in continuous operation, such as the testing, balancing and adjusting report and the as-built drawings.

PART 2 - PRODUCTS

Not Used

PART 3 - EXECUTION

Not Used

END OF SECTION