

**SECTION 26 08 00
COMMISSIONING OF ELECTRICAL**

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 electrical systems, assemblies, and equipment.
- B. Related Sections:
 - 1. Refer to Division 01 Section 019113 "General Commissioning Requirements for additional commissioning scope and requirements. All testing and commissioning requirements of that section shall be met.

1.3 ALLOWANCES

- A. Labor, instrumentation, tools, and equipment costs for technicians for the performance of commissioning testing are covered by the "Schedule of Allowances" Article in Division 01 Section "Allowances."

1.4 UNIT PRICES

- A. Commissioning testing allowance may be adjusted up or down by the "List of Unit Prices" Article in Division 01 Section "Unit Prices" when actual man-hours are computed at the end of commissioning testing.

1.5 CONTRACTOR'S RESPONSIBILITIES

- A. Perform commissioning tests at the direction of the CxA.
- B. Attend construction phase controls coordination meeting.
- C. Attend testing, adjusting, and balancing review and coordination meeting.
- D. Participate in Electrical systems, assemblies, equipment, and component maintenance orientation and inspection as directed by the CxA.
- E. Provide information requested by the CxA for final commissioning documentation.

- F. Provide measuring instruments and logging devices to record test data, and provide data acquisition equipment to record data for the complete range of testing for the required test period.

1.6 CxA'S RESPONSIBILITIES

- A. Provide Project-specific construction checklists and commissioning process test procedures for actual Electrical systems, assemblies, equipment, and components to be furnished and installed as part of the construction contract.
- B. Direct commissioning testing.
- C. Verify contractor testing work is complete.
- D. Provide test data, inspection reports, and certificates in Systems Manual.

1.7 COMMISSIONING DOCUMENTATION

- A. Provide the following information to the CxA for inclusion in the commissioning plan:
 - 1. Plan for delivery and review of submittals, systems manuals, and other documents and reports.
 - 2. Identification of installed systems, assemblies, equipment, and components including design changes that occurred during the construction phase.
 - 3. Process and schedule for completing construction checklists and manufacturer's prestart and startup checklists for Electrical systems, assemblies, equipment, and components to be verified and tested.
 - 4. Certificate of completion certifying that installation, prestart checks, and startup procedures have been completed.
 - 5. Certificate of readiness certifying that electrical systems, subsystems, equipment, and associated controls are ready for testing.
 - 6. Test and inspection reports and certificates.
 - 7. Corrective action documents.

1.8 SUBMITTALS

- A. Certificates of readiness.
- B. Certificates of completion of installation, prestart, and startup activities.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 TESTING PREPARATION

- A. Certify that electrical systems, subsystems, and equipment as part of the systems being commissioned, including electrical systems that interface with HVAC systems being

commissioned, have been installed, calibrated, and started and are operating according to the Contract Documents.

- B. Set systems, subsystems, and equipment into operating mode to be tested (e.g., normal auto position, normal manual position, unoccupied cycle, emergency power, and alarm conditions).
- C. Inspect and verify the position of each device and interlock identified on checklists.
- D. Check safety cutouts, alarms, and interlocks with smoke control and life-safety systems during each mode of operation.
- E. Testing Instrumentation: Install measuring instruments and logging devices to record test data as directed by the CxA.

3.2 GENERAL TESTING REQUIREMENTS

- A. Provide technicians, instrumentation, and tools to perform commissioning test at the direction of the CxA.
- B. Scope of electrical testing shall include electrical systems as indicated below, including interface with HVAC systems being commissioned.
 - 1. Refer to section 019113 for scope of electrical systems testing and for equipment strategies and sampling requirement functional performance test requirements.
- C. Test all operating modes, interlocks, control responses, and responses to abnormal or emergency conditions.
- D. The CxA along with the Electrical Contractor/Subcontractor shall prepare detailed testing plans, procedures, and checklists for electrical systems, subsystems, and equipment to be commissioned.
- E. Tests will be performed using design conditions whenever possible. Simulated conditions may need to be imposed using an artificial load when it is not practical to test under design conditions.
- F. The CxA may direct that set points be altered when simulating conditions is not practical.
- G. The CxA may direct that sensor values be altered with a signal generator when design or simulating conditions and altering set points are not practical.
- H. If tests cannot be completed because of a deficiency outside the scope of the electrical system, document the deficiency and report it to the Owner. After deficiencies are resolved, reschedule tests.
- I. If the testing plan indicates specific seasonal testing, complete appropriate initial performance tests and documentation and schedule seasonal tests.

3.3 ELECTRICAL, SUBSYSTEMS, AND EQUIPMENT TESTING PROCEDURES

- A. Generator and Emergency Power and Acceptance Procedures: Testing requirements are specified in Division 26 Standby Generator, Automatic Transfer Switch, and Emergency Power

Systems Sections. Provide submittals, test data, factory load test, field load-bank test, and engine-generator certification to the CxA.

- B. Electrical Distribution System Testing: Provide technicians, instrumentation, tools, and equipment to test performance of breakers, panels, switchboards, feeders, etc, and other distribution systems as required by the Cx Plan and CxA.
- C. Lighting and Daylighting Controls: Provide technicians, instrumentation, tools, and equipment to test performance of lighting control systems and daylighting control devices/systems.

3.4 NON-CONFORMANCE

- A. The CxA will record the results of the Functional Performance Tests. All deficiencies, non-conformance issues, or test failures will be noted and reported to the Contractors in a deficiency list or in a punch-list format.
- B. Corrections of minor deficiencies identified may be made during the tests at the discretion of the CxA. In such cases the deficiency and resolution will be documented on the procedure form.
- C. Every effort will be made to expedite the testing process and minimize unnecessary delays, while not compromising the integrity of the procedures. However, the CxA will not be pressured into overlooking deficient work or loosening acceptance criteria to satisfy scheduling or cost issues, unless there is an overriding reason to do so at the request of the Owners Representative.
- D. Re-testing.
 - 1. If a Functional Performance Test fails, corrections shall be made to the deficient equipment or systems by the Contractors. The systems will be re-tested until they pass the Tests.
 - 2. The time/cost for the CxA to perform any re-testing required because of improper set up of the systems by the contractors or failed functional or performance tests will be back-charged to the Contractor (who may choose to recover costs from the party responsible for executing faulty equipment start-up/checkout and associated checklists). This includes instances where a specific item was overlooked in the equipment start-up and checkout procedures, reported to have been successfully completed, but determined during Functional Performance testing to be faulty.
 - 3. Any required re-testing by any contractor, sub-contractor, or vendor shall not be considered a justified reason for a claim of delay or for a time extension by the Contractor.

3.5 DEFICIENCIES AND RETESTING

- A. The CxA documents the results of each test. (Corrections of minor installation or sequence of operation deficiencies are made during tests at the discretion of CxA.)
- B. Deficiencies/non-conformance issues not corrected during testing are reported to the Contractors for corrective action. Upon completion, a request is made by the Contractors to CxA for retest.

- END OF SECTION -