

Systems Commissioning and Testing Overview

Section 019113-8

Throughout Phase D: Construction, the Commissioning Team shall conduct a series of checks and tests to verify equipment installation and function; systems operation; and inter-systems operation. The requirements for systems commissioning and testing are described in the project's Commissioning Plan. This plan includes requirements for responsible parties, submissions, test witnesses, and documentation.

Pre-functional Testing: Pre-functional checks are usually static inspections and procedures to prepare the equipment or system for initial operation (e.g., oil levels checked, fan belt tension, labels affixed, gages in place, sensor calibration). However, some pre-functional check items entail simple testing of the function of a component or a piece of equipment or system (e.g. measuring the voltage imbalance on a three phase motor). The word *pre-functional* refers to actions taken before functional testing occurs. Pre-functional check items augment and are combined with the manufacturer's start-up checklist items.

Start-up and Checkout Plans: The process for developing and approving the start-up and checkout plans will be determined by the Commissioning Team for each project. This process will be defined in the Commissioning Plan.

The Commissioning Team will determine who is responsible for the development of detailed start-up and checkout plans for all equipment. Start-up and checkout plans consist of applicable pre-functional checklists, manufacturer installation instructions, start-up instructions, checkout data, and important instructional data and procedures not covered in manufacturer field checkout sheets. Each procedural step has a signature line. The Commissioning Authority may assist in developing the start-up and checkout plans by providing preliminary pre-functional checklists.

The startup and initial checkout are directed and executed by the responsible party as identified in the Commissioning Plan. The responsible party shall execute the start-up and checkout plans and record the test results. To document the process of startup and checkout, the site technician performing the line item task shall initial and date each paragraph of procedures in the "Startup and Checkout Plan" and check off items on the pre-functional and manufacturer field checkout sheets, as they are completed. Only individuals having direct knowledge of a line item being completed shall check or initial the forms.

Within one week (5 working days) of completion of start-up tests, the applicable test results will be forwarded to the Project Manager and the Commissioning Authority for review. The Commissioning Authority will approve the test results based on methods, results, and completeness of the specific data collected.

Functional Testing: The process for developing and approving the functional test procedures will be determined by the Commissioning Team for each project. This process will be defined in the Commissioning Plan. In general, the Commissioning Authority develops the functional test procedures and monitors the actual testing, which are performed by the installing contractor or vendor.

The functional tests are directed and executed by the responsible party as identified in the Commissioning Plan. The Commissioning Authority monitors and, where appropriate, witnesses, the functional testing of commissioned equipment and systems.

Four (4) weeks prior to functional testing, the responsible party schedules the functional tests with the Project Manager and Commissioning Authority.

Final functional test procedures shall be provided to the Project Manager for review by the Commissioning Team at least three (3) weeks prior to the performance of the associated test. Subject to conformance with the Specifications and Commissioning Plan, the Commissioning Team will approve the functional test procedures.

Within one week (5 working days) of completion of functional testing, the applicable test results shall be forwarded to the Project Manager, the Commissioning Authority and Architect-Engineer for review. The Commissioning Authority and Architect-Engineer will review and approve the test results based on methods, results, and completeness of the specific data collected.