



Neudorfer Engineers – Sample Commissioning Plan

1. INTRODUCTION

a) Definition of Commissioning

Commissioning is a process for achieving, verifying and documenting that the performance of a building and its various systems meet the design intent and the owner's operational needs. Commissioning tests the operation of the equipment and the buildings systems to ensure that they operate as designed and can be satisfactorily meet the needs of the building throughout the entire range of operating conditions.

b) Commissioning Goal

The goal of the commissioning process is to verify for the owner that the mechanical and control system function interactively in compliance with the project intent and to facilitate the orderly and efficient transfer of the systems to the specific facility operations.

Commissioning also documents system performance parameters for fine-tuning control sequences and operational procedures and to facilitate future troubleshooting.

Commissioning is intended to be a testing or inspection function that is redundant with respect to the contractors for testing and proof of performance.

c) Purpose of Commissioning Plan

The purpose of the commissioning plan as follows:

- Provide and establish a process to verify proper installation of system components per the design document.
- Provide and establish a procedure to verify the operation of the installed systems per the design document.
- Provide a validation of component operation for comparison to design intent and specifications.

d) Commissioning Scope

The process of commissioning a system or systems is a method of achieving, verifying and documenting the performance of the system to meeting the design intent as well as the functional and operational need of the owner. Therefore there are numerous checks for each stage of the building. A set procedure is as follows so each stage of the construction process can be documented to ensure system operational performance.



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Commissioning during the construction phase of this project is intended to achieve the following objectives:

- Inspect and verify that equipment and systems have been properly installed in accordance with the contract documents and manufacturers written installation instructions.
- Inspect and confirm that equipment has been placed into operation with the manufacturer's oversight and approval.
- Inspect and confirm the performance of each piece of equipment and its system, as described in the project document.
- Develop and test the interrelationship of systems and equipment to verify performance.
- Identify, document and report for tracking and correction, all deficiencies of work versus contract specifications and performance requirements.

2. COMMISSIONING TEAM (Members and Responsibilities)

The commissioning team consists of the owner's representative, the designer, the construction manager, mechanical contractor, electrical contractor, control contractor, testing, adjusting and balancing contractor, test engineer and the commissioning agent. These team members have the following responsibilities as part of the commissioning process.

I. DESIGNERS

- a) Provides design input for changes initiated by the commissioning process that are required to achieve the desired performance.
- b) Review the commissioning documentation and provide comments as necessary.
- c) Review and approved the O&M manuals, submittal, etc.

II. GENERAL CONTRACTOR / TEST ENGINEER

- a) Incorporate commissioning activities into the general construction schedule. The schedule is to identify, among other milestones, the completion of all functional performance testing, as well as the initiation and completion of the performance period.
- b) Represent the contractor team's commissioning responsibilities in all related commissioning and construction meeting and field activities.
- c) Coordinate participation of all contractors and commissioning agents in the commissioning process through the construction manager.
- d) Develop test procedures following equipment manufacturer's recommendation and submit it to the commissioning agent through the construction manager for approval.
- e) Develop start up procedures with each of the subcontractors and material suppliers and submit final documentation to the commissioning agent for approval.



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- f) Expediently address issues identified during construction that may affect the commissioning process or the final system performance.
- g) To schedule and implement and document the training of the owners personnel as per requirements within the contract documents.



III. MECHANICAL CONTRACTOR

- a) Coordinate participation of the mechanical subcontractor, plumbing contractor, sheet metal contractor, control contractor and test & balance contractor.
- b) Prepare a schedule for pipe and duct system testing, flushing & cleaning, equipment start up and TAB start & completion. Update the schedule as appropriate and notify the commissioning agent ahead of time when commissioning activities are not yet performed or if scheduling will delay construction.
- c) Perform start-up and testing of mechanical equipment and systems. Document as required with start-up reports and completion of start-up checklist submitted to the test engineer.
- d) Operate the equipment and system as required for functional performance testing.
- e) Participate in the fine-tuning or troubleshooting of the system performance if either of these measures becomes necessary.
- f) Provide complete operation and maintenance information and 'As Built' drawings to the general contractor for verification, organization and distribution.
- g) Provide training for the systems specified.

IV. CONTROL CONTRACTOR

- a) Provide commissioning agent, test engineer and mechanical contractor with control system and wiring diagrams, narrative sequence of operation and software documentation print out of actual programmed sequences in time for use in preparing the functional test procedures.
- b) Prepare a written plan in a step-by-step manner for testing, checkout and adjustment prior to functional testing.
- c) Provide a point-to-point device and calibration check out with a certification that the software and hardware check out is completed prior to the start of the functional testing.
- d) Calibrate all sensors and devices. Provide documentation of calibration using standard contractor or manufacture's form sensor and devices requiring calibration including:
 - Water Temp Sensor
 - Air Temp Sensor
 - CO2 Sensor if installed
 - Flow Stations if installed
 - Filter Diff. Pressure Switches, if applicable
 - ΔP (Supply / Return Water Lines), if applicable

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- e) Execute functional testing for controls and be available on site for mechanical testing.
- f) Execute control system trend logs as required to supplement functional testing.
- g) Participate in start up and testing.
- h) Assist the mechanical contractor as required during the functional testing.
- i) Participate in fine-tuning or troubleshooting of system performance if either measure became necessary.

V. TESTING, ADJUSTING AND BALANCING CONTRACTOR

- a) Submit the outline of TAB plan and approach to the test engineer, commissioning agent and construction manager.
- b) Coordinate balancing activities with those of the mechanical and control contractors. Verify that coordination installation, quality control and final subcontractor testing have been completed to allow proper work to be performed.
- c) Notify the test engineer, designer and construction manager as soon as possible of any system installation or performance issues that may compromise the ability of the system to be balanced.
- d) Participate in start-up and testing as required.
- e) Provide preliminary TAB report, indicating all actual field values recorded to the test engineer and construction manager prior to initiation of functional testing.
- f) Assist the commissioning team during the functional testing as required.
- g) Participate in fine-tuning or troubleshooting of system performance if either of these measures becomes necessary.



VI. COMMISSIONING AGENT

- a) Perform site observation to follow installation progress and to verify system installation quality and readiness for testing.
- b) Observe the start-up activities and initial testing of equipment and system as required and or review contractor start-up documentation.
- c) Review submittal of all required start-up documentation. This includes control contractors point-to-point checklist and TAB contractors completed preliminary TAB report prior to initiation of functional testing.
- d) Monitor TAB work and review final report for completeness.
- e) Coordinate participation of owner's personnel involved with equipment and system performance verification.
- f) Assemble all test results and other required documentation into the final commissioning report.

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