

COMMISSIONING OF ELEVATORS

OWNER FURNISHED

The owner directly contracts an independent third party commissioning agent for this project. This Commissioning Plan has been included for reference to define roles and responsibilities. Each contractor should review this procedure and include adequate time in their proposal.

RELATED DOCUMENTS

Contract drawings and specifications, general provisions of the contract, including general and supplementary conditions, architectural, electrical, and mechanical provisions, and Division-1 Specification sections apply to work of this section.

DESCRIPTION OF WORK

The purpose of the commissioning process is to provide the owner/operator of the facility with a high level of assurance that the building systems have been installed in the prescribed manner, and operate within the performance guidelines set in the Design Intent Documents (DID). The Commissioning Agent (CA) shall provide the owner with an unbiased, objective view of the systems' installation, operation, and performance. This process is not intended to take away or reduce the responsibility of the design team or installing contractors to provide a finished product. Commissioning is intended to enhance the quality of system start-up and aid in the orderly transfer of systems for beneficial use by the owner. The CA will be a member of the construction team, administrating and coordinating commissioning activities with the design team, General Contractor, subcontractors, manufacturers and equipment suppliers.

REFERENCES

ASHRAE Guideline 0 – 2005: *The Commissioning Process*
ACG Commissioning Guideline - 2005
ASME A17.1 – 2004: *Safety Code For Elevators and Escalators*

ROLES AND RESPONSIBILITIES OF THE COMMISSIONING AGENCY

1. **Mission:** The primary point of responsibility is to inform the General Contractor, the owner and design team on the status, integration, and performance of the elevators within the facility.

2. **Information:** The CA shall function as a catalyst and initiator to disseminate information and assist the design and construction teams in implementing completion of the construction process. This shall include system verification, functional performance testing, and conformance with the intended design of each system. Services include documenting construction observations, verification and functional performance testing, and documenting proper distribution of performance and operating information to the owners O&M staff.
3. **Quality Assurance:** Assist the responsible parties to maintain a high quality level of installation by meeting or exceeding prevailing standards and specifications.
4. **Observation of Tests:** The CA shall observe and coordinate testing as required to assure system performance meets the design intent.
5. **Documentation of Tests:** The CA shall document the results of the performance testing directly and/or assure that the appropriate technicians document testing. The CA shall compile standard forms to be used by the commissioning team for consistency of approach and type of information to be recorded.
6. **Deficiencies:** The CA shall provide technical expertise to facilitate and verify the correction of deficiencies found during the commissioning process.
7. **Resolution of Deficiencies:** The CA is to remain an independent party with specific technical knowledge of the project. The CA shall investigate the scope and extent of problems and facilitate communication to determine responsibilities by delineating specifications. The CA shall monitor resolution for conformance with design intent and prevailing industry standards.
8. **Acceptance:** The CA shall document the date of acceptance as determined by the General Contractor, owner and design team. System Verification Checklists and Functional Performance Test results may be used in determining the start of the warranty period for the elevators.
9. **O&M Material:** The CA will review operating and maintenance materials for the elevators.
10. **Phasing:** The CA will review phasing plans as provided by the GC relating to elevator testing, O&M considerations, warranty issues, impact of construction sequencing on occupied areas, and interruption of services from the existing equipment.
11. **Independence:** The CA shall be an independent third party agency and shall work under a separate contract, and report directly to the owner. The CA shall not be financially associated with any of the Division 2 through 16 installing contractors on this project to avoid potential conflicts of interest.

ROLES AND RESPONSIBILITIES OF THE OWNER

Assign maintenance personnel and schedule them to participate in the various meetings, training sessions and inspections as follows:

1. Contractors' commissioning kick-off meeting.
2. Observe acceptance and operating testing.
3. Review the continuing maintenance service proposal.
4. Owner's demonstration session.
5. Verification demonstrations and Functional Performance Tests.
6. Final review and acceptance meeting.

ROLES AND RESPONSIBILITIES OF THE DESIGN TEAM

1. Verify adequate maintenance accessibility for each piece of equipment in shop drawings and actual installation.
2. Observe acceptance and operating testing.
3. Review O&M Manuals submitted by the Elevator Contractor. Insert Design Narrative.

ELEVATOR COMPONENTS INCLUDED IN THE COMMISSIONING PROCESS

1. Hoist Motors.
2. Hydraulic Machines.
3. Elevator Pit.
4. Elevator Hoist Way.
5. Controllers.
6. Signaling Devices.
7. Door Safety Devices.
8. Cab Interiors.

COMMISSIONING PLAN

1. Commissioning Team

A. The Commissioning Team (CT) shall consist of key parties involved in design, construction and testing of this facility. It is necessary for each agency to appoint team members that will have long-term commitments to this project. Switching team members during the project will reduce the ability of the CT to provide continuity and acceptable results to the building owner. Team members must maintain an ongoing supervisory position on this project. One team member shall be provided by each of the parties listed below:

- 1) Owner – Commonwealth of Kentucky Division of Engineering
- 2) Facilities Management Division – Owner's Maintenance Engineer (FMD)

- 3) Commissioning Agent (CA) – Facility Commissioning Group (FCG)
- 4) Design Team – Engineer of Record (DT)
- 5) General Contractor – General Construction Trade Representative (GC)
- 6) Elevator System Contractor – Elevator Trade Representative (ESC)

2. Design Intent Document

- A. The Design Intent Document (DID) represents a composite of design drawings, project specifications, submittals, change orders and industry standards, prepared by the designer of record, that describe the systems of this facility. References to design intent will be taken from the DID. The DID is an evolving manuscript maintained by the design professional to track and incorporate design alterations that occur throughout the construction process. Any industry standards used for this project will be specifically noted when referenced.
- B. The CA will review the DID documents for commissioning provisions, functional performance, optimization of performance, accessibility, and O&M considerations.

3. Commissioning Meetings

- A. Commissioning meetings will be held in conjunction with progress meetings as necessary. The CA will be on site for the Cx meetings. Commissioning meetings will be used to address any problems that alter the design intent or affect the commissioning process. These meetings provide an open forum for exchange of ideas between contractors, vendors, designers, users and owners.

4. Resolution Tracking Forms (RTF)

- A. The use of Resolution Tracking Forms is a method employed by the CA to monitor and record problems, their causes, and solutions. The use of these lists promotes communication between the installing contractors, design team, commissioning agent, and owner, in order to expedite their resolution in a timely manner.
- B. The CA will regularly submit RTF's to the CT in order to document and resolve deficiencies as quickly as possible. The frequency of RTF submission will be adjusted as project conditions dictate.

5. System Verification Checklists (SVC) / Manufacturer's Checklists

- A. The CA will write SVC's based on the DID. These tests will be created for the elevators. Draft copies will be submitted to the CT for review and comment prior to placement on the job site. A master copy of the SVC's will be bound in a three-ring binder and placed on the job site for use by the installing contractors. No system will be started until the appropriate SVC's have been completed.

- B. The CA will review the SVC for each elevator prior to acceptance and operating tests. Elevators will be released for acceptance and operating tests only after these checklists have been completed by the installing contractor and reviewed by the CA.
- C. Prior to acceptance and operating tests, the CA must also review the equipment manufacturer's checklists. These lists must be completed by the installing contractor, and reviewed by the CA before acceptance and operating tests can commence.

6. Acceptance and Operating Test

- A. The CA will witness acceptance and operating test on the elevators. The appropriate contractors and/or manufacturer's representative will be required on site to perform the testing. Acceptance and operating tests will be performed according to the manufacturer's recommended procedures. The CA will visit the site to review completeness of installation in conjunction with progress meetings prior to starting tests.
- B. CT members involved in installation, fabrication, manufacturer, control, or designs of equipment are required to be present at the time of acceptance and operating tests. A factory-authorized technician will be on site to start the testing. This will minimize delays in bringing equipment on line and expedite acceptable functional performance in accordance with the DID.

7. Functional Performance Tests (FPT)

- A. The CA will write FPT's based on the DID. These tests will be created for the elevators.
- B. Each elevator will be tested. This will be coordinated and witnessed by the CA and the owner's maintenance staff. Witnessing the FPT's will serve as a compliment to the O&M Training. No FPT's will be performed until the SVC's, acceptance and operating testing are complete. The FPT's do not take the place of the tests performed by the authority having jurisdiction.
- C. The Functional Performance Tests shall include elevators.
 - 1) Elevator Hoist Motor: The elevator trade representative, with the CA and AHJ present, will demonstrate operational conformance to the project contract documents and prevailing code requirements. The operating testing includes loading the elevator to its rated capacity and operating the elevator continuous for 30 minutes. The elevator will travel the full distance stopping at each level and proceeding immediately to the next level. During this test the temperature rise of the motor is recorded.
 - 2) Hydraulic Machine: The elevator trade representative, with the CA and AHJ present, will demonstrate operational conformance to the project contract documents and prevailing code requirements. The elevator trade representative, with the CA and AHJ present, will field test and verify

components connected to the elevator system, documenting the date, type of device, device location, response time, and sensitivity.

- 3) **Controllers:** The elevator trade representative, with the CA and AHJ present, will field test and verify operation of the controller to demonstrate conformance to the project contract documents and prevailing code requirements. The elevator trade representative, with the CA and AHJ present, will field test and verify the controller is receiving and displaying distance and velocity feedback from each elevator.
- 4) **Signaling Devices:** The elevator trade representative, with the CA and AHJ present, will demonstrate operational conformance to the project contract documents and prevailing code requirements. The elevator trade representative, with the CA and AHJ present, will field test and verify operation of each signaling device on all floors for each elevator.
- 5) **Door Safety Devices:** The elevator trade representative, with the CA and AHJ present, will demonstrate operational conformance to the project contract documents and prevailing code requirements. The elevator trade representative, with the CA and AHJ present, will field test and verify operation of each door safety device on all floors for each elevator.

8. Building Turn-Over / Owner Orientation / User Training

- A. The CA will assist contractors prepare, coordinate and review O&M manuals, working closely with each contractor to achieve specificity and completeness.
- B. The CA will review as-built drawings, working closely with each contractor to achieve specificity and completeness.
- C. Owner training will be coordinated with the assistance of the CA. The installing contractor or manufacturer's representative will provide the training, witnessed by the CA. This training should include hands-on operational training. The owner may choose to videotape this training for future use. The CA will visit the site during the Turnover and Training period to assure that any on-going elevator related problems are being addressed and corrected in a timely and efficient manner.
- D. The CA will assist the owner/user with warranty issues.
- E. The CA will assist in the coordination of elevator demonstrations.
- F. The CA will assist the owner in obtaining copies of all inspections and acceptance certificates required to operate the elevators.

9. Warranty Review

- A. The CA will participate in an 11th month walk-through to observe the operation of the elevators. This will include a review meeting with the owner's personnel to review the continuing maintenance service agreement, a discussion of warranty

issues, maintenance practices, usage changes, and chronic problems, as well as other issues affecting the owner and the operation of the elevators.

RESPONSIBILITIES OF INSTALLING CONTRACTORS

1. General Contractor – General Construction Trade Representative (GC)
2. Elevator System Contractor – Elevator Trade Representative (ESC)

1. General Contractor - General Construction Trade Representative (GC)

- A. Assure acceptable representation, with the means and authority to prepare and coordinate execution of the elevator commissioning program as described in the contract documents.
- B. Attend commissioning meetings scheduled by the CA.
- C. Coordinate inclusion of commissioning activities in the construction schedule.
- D. Complete System Verification Checklists and manufacturer's pre-start checklists prior to scheduling acceptance and operating tests.
- E. Monitor and respond to Resolution Tracking Forms distributed by the CA in order to expedite corrective actions necessary to achieve design intent.
- F. Facilitate resolution of deficiencies identified by observation or performance testing.
- G. Participate in the Functional Performance Tests as required to achieve design intent.
- H. Participate in O&M Training as required by project specifications.

2. Elevator System Contractor – Elevator Trade Representative (ESC)

- A. Review design for provision of power and fire alarm connections to the elevator system equipment.
- B. Attend commissioning meetings scheduled by the CA.
- C. Verify proper installation and performance of all elevator system services provided.
- D. Complete System Verification Checklists and manufacturer's pre-start checklists prior to scheduling acceptance and operating tests.
- E. Monitor and respond to Resolution Tracking Forms distributed by the CA in order to expedite corrective actions necessary to achieve design intent.

- F. Provide an elevator system technician to assist during functional performance testing.
- G. Participate in the functional performance tests as required to achieve design intent.
- H. Provide dates when governing authorities testing will be conducted.
- I. Participate in O&M Training as required by project specifications.
- J. Ensure cooperation and participation of specialty sub-Trade Representatives.
- K. Coordinate with the General, Mechanical, and Electrical Trade Representatives.
- L. Obtain O & M data on all equipment and assemble in binders using tabs as required. Submit to Engineer of Record for approval prior to the distribution completion stage.
- M. Participate in and schedule vendors and other Trade Representatives to participate in the training sessions set up by the Commissioning Agent.
- N. Conduct a maintenance demonstration with hands on training. Update drawings to the record condition to date and review with the Commissioning Agent prior to the orientation. Demonstrate proper use, operations and routine maintenance of the elevators and components.
- O. Provide completed system verification checklists documenting that the work has been completed in accordance with the plans and specifications and that they are functioning as designed.
- P. Provide set of record as-built drawings to the Engineer of Record for inclusion into record documents.