

SECTION 01XXX

BUILDING ENVELOPE ENVIRONMENTAL SEPARATION

PROJECT MANAGEMENT, COORDINATION AND COMMISSIONING

PART 1 - GENERAL

1.1 GENERAL PROVISIONS

- A. Attention is directed to the CONTRACT AND GENERAL CONDITIONS and all Sections within DIVISION 01 – GENERAL REQUIREMENTS which are hereby made a part of this Section of the Specifications.

1.2 SUMMARY

A. Commissioning:

1. A systematic process of ensuring that all building envelope systems perform interactively according to the Designer's Basis of Design (BOD) and Owner's Performance Objectives (OPO). This is to be achieved through actual verification of systems performance during the construction period.
2. The commissioning process does not take away from, or reduce the responsibility of, the General Contractor and installing subcontractors to provide a finished and fully-functioning product.

- B. This Section includes building envelope environmental separation commissioning procedures, including substructure, superstructure, exterior enclosure, and roofing construction and associated components, assemblies, and sub-assemblies that protect climate-controlled interior spaces from unconditioned spaces and the exterior environment, as follows:

1. Below-grade construction including foundations, basements, and slab-on-grade that functions as part of the building envelope system, but excluding structural systems and components.
2. Superstructure floor and roof construction that functions as part of the building envelope system.
3. Exterior building envelope construction, above grade, including exterior opaque walls, windows, and doors, including sheathing, framing, and insulation, and interior finish materials attached to the exterior wall.
4. Roofing, including roofing system, roofing insulation, and skylights, hatches, and other roof openings.
5. If part of the OPO includes partitions or walls within the building, surrounding areas with different ambient conditions than the rest of the interior space.

C. Related Sections:

1. Division 01 Section "General Commissioning Requirements" for general requirements for commissioning, including definitions, commissioning team membership, Owner's responsibilities, Contractor's responsibilities, and Commissioning Authority's responsibilities.
2. Division 03 through 14 Sections for building envelope commissioning requirements specific to the Work of each Section.

1.3 COMMISSIONING TEAM

- A. Owner and his/her Consultants.
- B. General Contractor.
- C. Designer and design engineers.
- D. Building Envelope Commissioning Authority (BECA).
- E. Building envelope subcontractors and their subcontractors.
- F. Specialty subcontractors (insert other relevant trades where applicable).
- G. Any other installing subcontractors or suppliers of materials or systems.

1.4 BUILDING ENVELOPE COMMISSIONING AUTHORITY

- A. The Provide a Building Envelope Commissioning Authority (BECA) to oversee the commissioning of all building envelope components.
- B. The BECA shall be approved and engaged by the Owner at the time of Basis-Of-Design, and shall be provided for the Project until all building systems have been accepted by both the Designer and the Owner.
- C. The BECA shall have, at a minimum, 10 years experience in the practices that encompass building envelope commissioning, including understanding systems design intent, performing architectural and shop drawing peer reviews, evaluating submittal compliance, administering preconstruction meetings, performing/supervising field performance testing, fulfilling field construction administration responsibilities, evaluating component/assembly compliance and performing forensic evaluations, as relating to Divisions 03 through 14 Sections for building envelope commissioning requirements specific to the Work of each Section.
- D. The BECA shall be accredited by the International Accreditation Services, Inc. (IAS) and American Architectural Manufacturers Association (AAMA) in accordance with ISO/IEC 17025 (International Standards Organization) for the test methods used in the building envelope commissioning process. If the BECA does not meet these requirements, a subcontractor or vendor responsible for testing under the direction of the BECA must satisfy these same requirements.

- E. The BECA cannot be financially associated with any of the Division 01 through 14 contractors or vendors prior to engaging in this contract.

1.5 COMMISSIONING AUTHORITY'S RESPONSIBILITIES

- A. Meet with Owner to establish OPO, and Architect to determine BOD.
- B. Review project drawings and specifications at 25%, 50%, and 100% completion for constructability, curability, performance, and building envelope conformance.
- C. Review shop drawings, product data, and samples for compliance with Contract Documents.
- D. Write project specific commissioning plan.
- E. Review coordination drawings.
- F. Provide project-specific construction checklists and commissioning process test procedures.
- G. Participate in all project meetings, including design, preconstruction, and construction phase meetings.
- H. Witness systems, assemblies, equipment, and component start-up.
- I. Perform or facilitate mock-up performance testing.
 - 1. Document construction of commissioning components at the completion of mock-up testing.
- J. Review proposals and requests for substitutions and changes for compliance with Contract Documents, and for compatibility with Work of other subcontractors.
- K. Review building envelope work for compliance with Contract Documents.
 - 1. Maintain list of observed deficiencies and discrepancies.
 - 2. Develop protocols for functional performance testing.
 - i. Develop schedules for all testing, and integrate testing into master construction schedule.
 - 3. Perform or facilitate functional performance testing,
- L. Compile test data, inspection reports, and certificates and include them in the systems manual and commissioning process report.
- M. Ensure that building envelope systems, subsystems, and construction have been completed according to the Contract Documents.
- N. Issue letter of compliance, assuming all non-compliant items are addressed.

1.6 CONTRACTOR'S RESPONSIBILITIES

- A. Attend pre-construction and construction-phase building enclosure coordination meetings.
- B. Provide schedule and perform field quality control tests and inspections required by the Contract Documents to the BECA.
- C. Submit field quality control testing and inspection reports on building envelope construction to the BECA.
- D. Submit operation and maintenance data for systems, subsystems, and components to the BECA.
- E. Provide cut sheets and shop drawing submittals of commissioned systems to the BECA.
- F. Provide input for final commissioning documentation to the BECA.
- G. Participate in testing/inspection procedures meetings.
- H. Provide complete set of Coordination Drawings showing the complete coordination and integration of all Work of commissioned systems to the BECA.
- I. Permit BECA to access locations of installed systems, subsystems, assemblies, and components for testing and inspection.
- J. Reimburse Owner for non-compliant tests and inspections as outlined in Division 01 through 14.
- K. Provide test data, letters of compatibility, and certificates to BECA as required.
- L. Participate in maintenance orientation and inspection.
- M. Participate in operation and maintenance training sessions.
- N. Address current Owner and Designer punchlist items.
- O. Participate in final review at acceptance meeting.

1.7 DESIGNER/DESIGN ENGINEER RESPONSIBILITIES

- A. Submit all Record Documents to BECA including:
 - 1. Electronic [-**and paper**] copies of all project Drawings, including title sheet, code analysis, architectural, and shop drawings.
 - 2. All Specifications in PDF [-**and paper**] format with addenda.
 - 3. Shop drawings and product cuts, scanned in, approved sheets only.
 - 4. Project schedules baseline and all updates.
- B. Provide written responses to design review comments from the BECA or other parties as requested.

- C. Attend design, pre-construction, and construction phase coordination meetings.
- D. Participate in testing procedures meetings.
- E. Provide resolution for items for which the BECA and Contractor may be in disagreement.

1.8 COMMISSIONING DOCUMENTATION

- A. Provide the following information to BECA for inclusion in the Commissioning Plan:
 - 1. Submittals, information for systems manuals, and other required documents and reports.
 - 2. Identification of installed building envelope components, assemblies, systems, and equipment, including design changes that occurred during the construction phase.
 - 3. Certificate of completion, certifying that building envelope assemblies, systems, equipment, and associated controls are complete and ready for testing.
 - 4. Test and inspection reports and certificates.
 - 5. Corrective action documents.
- B. The BECA will provide regular reports to the Owner, and distribute to other parties as requested by the Owner, as construction and commissioning progresses.
- C. A final summary report (including back-up documentation) and letter of compliance will be provided by the BECA to the Owner upon completion of building envelope construction and resolution of unaddressed non-compliant items. All acquired documentation, logs, minutes, reports, deficiency lists, communications, findings, unresolved issues, etc., will be compiled in appendices and provided with the summary report.

1.9 MEETINGS

- A. Scoping Meeting: The BECA shall schedule, plan, and conduct a commissioning scoping meeting with the entire commissioning team in attendance. Meeting minutes will be distributed to all parties by the BECA.
- B. Pre-Construction Commissioning Conference: The General Contractor will schedule a pre-construction commissioning conference prior to the commencement of construction of the building envelope, at a time convenient to the Owner, BECA, Contractor and subcontractors, and Architect. Allow for the conference to be held at Project site or another convenient location. The Commissioning Authority will conduct the meeting to review commissioning responsibilities and personnel assignments.
 - 1. Attendees: Owner, BECA, Architect and consultants, General Contractor, building envelope subcontractors, and other relevant parties shall attend the conference.
 - 2. General Contractor will record and distribute meeting minutes.

3. Agenda: Topics to be discussed during the meeting shall include, but not be limited to, the following:

- i. Commissioning Plan and related specifications.
- ii. Construction schedule for General Contractor and building envelope subcontractors.
- iii. Phasing.
- iv. Review of project plans and specifications.
- v. Review of contractor shop drawings.
- vi. Construction sequencing.
- vii. Designation of key personnel and their duties.
- viii. Construction and testing of mock-ups.
- ix. Inspection and testing protocols, procedures, and test methods.
- x. Submittal procedures.
- xi. LEED requirements (if applicable).
- xii. Preparation of Record Documents.
- xiii. Owner's occupancy requirements.
- xiv. Security.

C. Miscellaneous Meetings: Other meetings will be planned and conducted by the BECA as construction progresses. These meetings will cover coordination, deficiency resolution, and planning issues with particular contractors and their subcontractors. The BECA will plan these meetings and will minimize unnecessary time being spent by contractors and subcontractors. These meetings will be held as required.

1.10 PRE-CONSTRUCTION TESTING

- A. Refer to Section 1.12 below for commissioning procedures governing mock-ups and phased mock-up testing.
- B. Refer to Division 03 through 14 Sections for mock-up requirements specific to the Work of each Section.

1.11 QUALITY ASSURANCE

- A. Quality Assurance and Control: Specific commissioning quality assurance and quality control requirements for individual construction activities are specified in the Sections that specify those activities. Specified commissioning tests, inspections, and related actions do not limit Contractor's other quality assurance and quality control procedures that facilitate compliance with the Contract Document requirements.

1.12 FUNCTIONAL PERFORMANCE TESTING

- A. Objectives and Scope: The objective of functional performance testing is to demonstrate that each building envelope assembly/system is functioning according to the documented design intent of the Contract Documents and in accordance with the OPR. Functional testing facilitates bringing the material assembly from a state of substantial completion (or completed to facilitate pre-testing) to full operation. Additionally, during the testing process, areas of non-compliant performance are identified and corrected, improving the operation and functioning of the building envelope/assemblies.

- B. Development of Test Procedures: Before specific test protocols and procedures are developed, the BECA will request all documentation and a current list of change orders affecting building envelope/assemblies, including an updated points list and parameters. The BECA shall develop specific test protocols and procedures to verify and document proper operation of each piece of building envelope/assemblies.
- C. Functional Performance Testing: All functional performance testing of building envelope/assemblies shall be performed by the BECA, unless otherwise specified by the BECA. Any subcontractor or vendor responsible to execute a test shall provide assistance to the BECA in developing the procedures review (answering questions about assemblies and sequences, etc.). Prior to execution, the BECA will provide a copy of the test procedures to the General Contractor and subcontractor(s) who will review the tests for feasibility, building envelope/assemblies, and warranty protection.
- D. Test Methods:
1. A mock-up test[s] must be included to verify component and assembly performance prior to commencing with construction or during the first phase of construction. Refer to Section 019115, 1.8 PRE-CONSTRUCTION TESTING.
 2. Functional performance testing and verification may be achieved by manual testing (persons manipulate the equipment and observe performance). The BECA may substitute specified methods or require an additional method to be executed, other than what was specified. The BECA will determine which method is most appropriate for tests that do not have a method specified.
 3. Simulated Conditions: Simulating conditions (not by an overwritten value) shall be allowed, though timing the testing to experience actual conditions is encouraged wherever practical.
- E. Sampling: Multiple identical pieces of assemblies may be functionally tested using a sampling strategy. Significant application differences and significant sequence of functional differences in otherwise identical materials or assemblies invalidates their common identity. A small size or capacity difference, alone, does not constitute a difference. It is noted that no sampling by contractors and their subcontractors is allowed in pre-functional checklist execution.
- F. The Contractors and their subcontractors shall provide sufficient notice to the BECA regarding their completion schedule for the construction of the assemblies or exterior enclosure systems. The BECA will schedule functional tests through the General Contractor.
- G. The BECA shall perform/administer and document the results of all functional performance tests.
- H. If tests cannot be completed because of a deficiency outside the scope of the building envelope, the deficiency shall be documented and reported to Owner. Deficiencies shall be resolved and corrected by Contractor and tests rescheduled.
- I. The BECA may recommend solutions to problems found; however, the burden of responsibility to solve, correct, and retest problems is with the General Contractor, subcontractors and their sub-subcontractors and the Designer.

1.13 NON-CONFORMANCE

- A. All deficiencies or non-conformance issues shall be noted and reported by the BECA to the General Contractor and Designer.
- B. Corrections of minor deficiencies identified during functional performance testing or inspections may be made at the time of testing/inspection at the discretion of the BECA. In such cases, the deficiency and resolution will be documented.
- C. Failure Due to Manufacturer Defect: If **<insert number>** of identical pieces (size alone does not constitute a difference) of materials or assemblies fail to perform to the Contract Documents (physically or substantively) due to manufacturing defect, not allowing it to meet its submitted performance spec, all identical units may be considered unacceptable by the General Contractor, subcontractor, sub-subcontractor, BECA, Designer or Owner.

PART 2 - PRODUCTS

Not Used

PART 3 – EXECUTION

Not Used

END OF SECTION