

SECTION 01 4000

QUALITY REQUIREMENTS

PART 1 GENERAL

1.1 SUMMARY

- A. This Section includes administrative and procedural requirements for quality assurance and quality control. Work Included: Provide quality requirements including but not limited to following:
 - 1. Administrative and procedural requirements for Quality Assurance and Quality Control.
 - 2. Testing and inspecting services are required to verify compliance with requirements specified or indicated. These services do not relieve Contractor of responsibility for compliance with the Contract Document requirements.
 - 3. Specific Quality Control requirements for individual construction activities are specified in the Sections that specify those activities. Requirements in those Sections may also cover production of standard products.
 - 4. Specified tests, inspections, and related actions do not limit Contractor's Quality Control procedures that facilitate compliance with the Contract Document requirements.
 - 5. Requirements for Contractor to provide Quality Control services required by Architect, Owner, or authorities having jurisdiction are not limited by provisions of this Section.

1.2 DEFINITIONS

- A. Quality-Assurance Services: Activities, actions, and procedures performed before and during execution of the Work to guard against defects and deficiencies and ensure that proposed construction complies with requirements.
- B. Quality-Control Services: Tests, inspections, procedures, and related actions during and after execution of the Work to evaluate that completed construction complies with requirements. Services do not include contract enforcement activities performed by Architect.
- C. Testing Agency: An entity engaged to perform specific tests, inspections, or both. Testing laboratory shall mean the same as testing agency.

1.3 DELEGATED DESIGN

- A. Performance and Design Criteria: Where professional design services or certifications by a design professional are specifically required of Contractor by the Contract Documents, provide products and systems complying with specific performance and design criteria indicated.
 - 1. If criteria indicated are not sufficient to perform services or certification required, submit a written request for additional information to Architect.
- B. Refer to Section 01 3399 - CONTRACTOR'S DESIGN RESPONSIBILITY.

1.4 SUBMITTALS

- A. Qualification Data: For testing agencies specified in "Quality Assurance" Article to demonstrate their capabilities and experience. Include proof of qualifications in the form of a recent report on the inspection of the testing agency by a recognized authority.
- B. Contractor's Appointed Engineer For Delegated Design:

1. Certificate of Compliance: Stating that the Contractor's professional engineering services performed for the work complies with the specified requirements.
 - C. Schedule of Tests and Inspections: Prepare in tabular form and include the following:
 1. Specification Section number and title.
 2. Description of test and inspection.
 3. Identification of applicable standards.
 4. Identification of test and inspection methods.
 5. Number of tests and inspections required.
 6. Time schedule or time span for tests and inspections.
 7. Entity responsible for performing tests and inspections.
 8. Requirements for obtaining samples.
 9. Unique characteristics of each quality-control service.
 - D. Reports: Prepare and submit certified written reports that include the following:
 1. Date of issue.
 2. Project title and number.
 3. Name, address, and telephone number of testing agency.
 4. Dates and locations of samples and tests or inspections.
 5. Names of individuals making tests and inspections.
 6. Description of the Work and test and inspection method.
 7. Identification of product and Specification Section.
 8. Complete test or inspection data.
 9. Test and inspection results and an interpretation of test results.
 10. Ambient conditions at time of sample taking and testing and inspecting.
 11. Comments or professional opinion on whether tested or inspected Work complies with the Contract Document requirements.
 12. Name and signature of laboratory inspector.
 13. Recommendations on retesting and re-inspecting.
 - E. Permits, Licenses, and Certificates: For Owner's records, submit copies of permits, licenses, certifications, inspection reports, releases, jurisdictional settlements, notices, receipts for fee payments, judgments, correspondence, records, and similar documents, established for compliance with standards and regulations bearing on performance of the Work.
- 1.5 CONSTRUCTION MANAGER'S QUALITY ASSURANCE /QUALITY CONTROL (QA/QC) PROGRAM
- A. Procedures: Contractor, contractors and each subcontractor shall include all labor, materials, equipment, services and incidental items necessary to implement quality control procedures to the extent necessary to demonstrate and maintain compliance with the Contract Documents.
 1. Contractor shall provide a Quality Control Manager at the work site to implement and manage the Contractor's Quality Assurance /Quality Control (QA/QC) program. The only duties and responsibilities of the quality control Manager are to manage and implement the QA/QC program.
 2. The Quality Control Manager is required to attend all Job Progress Meetings, BIM and other coordination Meetings, Environmental review meetings, and conduct separate quality control meetings.
 3. The Quality Control manager is responsible for managing and coordinating project quality control documentation, including submittal review and approvals, ensure testing is performed, and provide QC certifications and documents required as part of the Work.
 - a. Coordinate correction and documentation of non-conforming work and provide clearly

- cataloged documentation verify work has been brought into compliance with the contract to be included with response to non-conformance letters. QCM shall review all field reports and promptly submit responses indicated the action taken to correct noted discrepancies, upon completion of correction the QCM shall notify architect and coordinate review of remediation.
4. The Quality Control manager is responsible for managing and coordinating inspection and testing personnel.
- B. Pre-construction Quality Assurance /Quality Control meeting: Conduct meeting to develop a mutual understanding of the quality control details, including documentation, administration for on-site and off-site work, design intent, commissioning, environmental requirements and procedures, coordination of activities to be performed and the coordination of the Contractor's management, production and quality control personnel.
1. Required attendees: Owner's Project Representative, Architect, an officer of Contractor's firm, Project Manager, Project Superintendent, Quality Control Manager, Mechanical/Electrical/Plumbing/Fire Protection Systems (MEP/FP) & Envelope Coordinator, BIM Manager, Field Safety Representative, Project Sustainability Representative and Installer's/Applicator's Project Superintendents of all major trades as directed by Contractor.
 - a. Submit detailed agenda to Owner's Project Representative and Architect not less than 2 weeks prior to date of meeting.
 - b. Meeting minutes will be distributed to all attendees within 3 work days of meeting. Meeting minutes are the responsibility of the QCM.
 2. Meeting will include implementation of Quality Assurance /Quality Control methods for the following:
 - a. Waste management plan.
 - b. Indoor air quality management plan.
 - c. Sustainability program.
 - d. Acoustical components and systems.
 - e. Site noise control.
 - f. Environmental regulatory requirements.
 - g. Exterior envelope commissioning.
 - h. Building fire protection, plumbing, mechanical and electrical systems commissioning.
 - i. Owner's work under separate contracts.
 - j. Water management plan, including storm, fire hydrant cleanouts, and other causes.
- C. It is recognized that the Contractor maintains standing written procedures as a corporation for the assurance of quality in finished projects. The Architect and Owner shall review and approve such corporate Quality Assurance /Quality Control (QA/QC) program; review will be against the guidance provided by the following paragraphs and approval may be conditioned with requirements to expand specific sections to meet specific requirements of the Owner and/or the Owner's funders.
- D. Quality Control Plan: Within 20 days after Notice to Proceed, the Contractor shall submit a Quality Control (QC) Plan to the Owner's Representative and Architect for approval. The plan shall address the following, as a minimum:
1. The Contractor's commitment to quality and implementing and managing the QC program.
 2. Identification of the Contractor's onsite QC Manager, with name, qualifications, duties and responsibilities. The QC Manager shall have the authority to direct the removal and replacement of non-conforming work. The QC Manager shall be present for all QC meetings, inspections and tests during the project.
 3. Procedures for addressing and commenting QC with Contractor's staff, all subcontractors and suppliers, and Owner, Architect and Owner's representative.

4. Procedures for review of submittals and submittal status, and documentation of same.
 5. Procedures for pre-installation meetings and documentation of same.
 6. Procedures for inspections of deliveries and documentation of same.
 7. Procedures for benchmark inspections, defined as initial installations, and documentation of same.
 8. Procedures for mockup inspections and documentation of same.
 9. Procedures for equipment in place, inspections and documentation of same.
 10. Procedures for inspections prior to closures of concealment and documentation of same.
 11. Procedures for addressing and incorporating authorities having jurisdiction inspections and comments.
 12. Procedures for concrete floor slab acceptance for finish flooring system, including flatness tolerances, surface condition, and tested moisture.
 13. Procedures for start-up and commissioning and documentation of same.
 14. Procedures for turnover and documentation of same.
 15. Procedures for identifying, recording, tracking correcting and reporting items requiring rework, using a Rolling Completion list chronological item number, phase area, date listed, description, party responsible for correction, date notified, and date corrected.
 - a. Provide sample reporting forms.
 16. Procedures for photographic documentation of same.
 17. Procedures for testing and documentation of same.
 18. Procedures for corrective action on Architect's Field Reports and Testing Agency reports and documentation of same.
- E. Photograph all non-conforming work. Take photographs before and after corrective actions.
1. Submit with photographs the following information:
 - a. Description of condition, location, date of discovery, date of corrective action.
 2. Take before and after photographs from same vantage point.
- F. Procedures for reporting on all of the above on a monthly basis as a condition precedent to review of the Contractor's application for payment. Include copy of report and support documentation with each Application for Payment.

1.6 QUALITY ASSURANCE

- A. Fabricator Qualifications: A firm experienced in producing products similar to those indicated for this Project and with a record of successful in-service performance, as well as sufficient production capacity to produce required units.
- B. Factory-Authorized Service Representative Qualifications: An authorized representative of manufacturer who is trained and approved by manufacturer to inspect installation of manufacturer's products that are similar in material, design, and extent to those indicated for this Project.
- C. Installer Qualifications: A firm or individual experienced in installing, erecting, or assembling work similar in material, design, and extent to that indicated for this Project, whose work has resulted in construction with a record of successful in-service performance.
- D. Manufacturer Qualifications: A firm experienced in manufacturing products or systems similar to those indicated for this Project and with a record of successful in-service performance.
- E. Professional Engineer Qualifications: A professional engineer who is legally qualified to practice in jurisdiction where Project is located and who is experienced in providing engineering services of the kind indicated. Engineering services are defined as those performed for installations of the system, assembly, or product that are similar to those indicated for this Project in material, design,

and extent.

- F. Specialists: Certain sections of the Specifications require that specific construction activities shall be performed by entities who are recognized experts in those operations. Specialists shall satisfy qualification requirements indicated and shall be engaged for the activities indicated.
 - 1. Requirement for specialists shall not supersede building codes and similar regulations governing the Work, nor interfere with local trade-union jurisdictional settlements and similar conventions.
- G. Testing Agency Qualifications: An agency with the experience and capability to conduct testing and inspecting indicated, as documented by ISO/ IEC Standard 17025, and that specializes in types of tests and inspections to be performed.
- H. Preconstruction Testing: Testing agency shall perform preconstruction testing for compliance with specified requirements for performance and test methods.
 - 1. Contractor responsibilities include the following:
 - a. Provide test specimens and assemblies representative of proposed materials and construction. Provide sizes and configurations of assemblies to adequately demonstrate capability of product to comply with performance requirements.
 - b. Submit specimens in a timely manner with sufficient time for testing and analyzing results to prevent delaying the Work.
 - c. Fabricate and install test assemblies using installers who will perform the same tasks for Project.
 - d. When testing is complete, remove assemblies; do not reuse materials on Project.
 - 2. Testing Agency Responsibilities: Submit a certified written report of each test, inspection, and similar quality-assurance service to Architect, with copies to Contractor. Interpret tests and inspections and state in each report whether tested and inspected work complies with or deviates from the Contract Documents.

1.7 QUALITY CONTROL

- A. Contractor Responsibilities: Unless otherwise indicated, provide quality-control services specified and required by authorities having jurisdiction.
 - 1. Where services are indicated as Contractor's responsibility, engage a qualified testing agency to perform these quality-control services.
 - a. Contractor shall not employ the same entity engaged by Owner, unless agreed to in writing by Owner.
 - 2. Notify testing agencies at least twenty-four (24) hours in advance of time when Work that requires testing or inspecting will be performed.
 - 3. Where quality-control services are indicated as Contractor's responsibility, submit a certified written report, in duplicate, of each quality-control service.
 - 4. Testing and inspecting requested by Contractor and not required by the Contract Documents are Contractor's responsibility.
 - 5. Submit additional copies of each written report directly to authorities having jurisdiction, when they so direct.
- B. Special Tests and Inspections: Owner will engage a testing agency to conduct special tests and inspections required by Code and/or the Contract Documents as the responsibility of Owner.
 - 1. Testing agency will notify Architect and Contractor promptly of irregularities and deficiencies observed in the Work during performance of its services.
 - 2. Testing agency will submit a certified written report of each test, inspection, and similar

- quality-control service to Architect, with copy to Contractor and to authorities having jurisdiction.
3. Testing agency will submit a final report of special tests and inspections at Substantial Completion, which includes a list of unresolved deficiencies.
 4. Testing agency will interpret tests and inspections and state in each report whether tested and inspected work complies with or deviates from the Contract Documents.
 5. Testing agency will retest and re-inspect corrected work.
- C. Manufacturer's Field Services: Where indicated, engage a factory-authorized service representative to inspect field-assembled components and equipment installation, including service connections. Report results in writing.
- D. Retesting/ Re-inspecting: Regardless of whether original tests or inspections were Contractor's responsibility, provide quality-control services, including retesting and re-inspecting, for construction that revised or replaced Work that failed to comply with requirements established by the Contract Documents.
- E. Associated Services: Cooperate with agencies performing required tests, inspections, and similar quality-control services, and provide reasonable auxiliary services as requested. Notify agency sufficiently in advance of operations to permit assignment of personnel. Provide the following:
1. Access to the Work.
 2. Incidental labor and facilities necessary to facilitate tests and inspections.
 3. Adequate quantities of representative samples of materials that require testing and inspecting. Assist agency in obtaining samples.
 4. Facilities for storage and field-curing of test samples.
 5. Delivery of samples to testing agencies.
 6. Preliminary design mix proposed for use for material mixes that require control by testing agency.
 7. Security and protection for samples and for testing and inspecting equipment at Project site.
- F. Coordination: Coordinate sequence of activities to accommodate required quality-assurance and quality-control services with a minimum of delay and to avoid necessity of removing and replacing construction to accommodate testing and inspecting.
1. Schedule times for tests, inspections, obtaining samples, and similar activities.
- G. Schedule of Tests and Inspections: Prepare a schedule of tests, inspections, and similar quality-control services required by the Contract Documents. Submit schedule within thirty (30) days of date established for commencement of the Work.
1. Distribution: Distribute schedule to Owner, Contractor, Architect, testing agencies, and each party involved in performance of portions of the Work where tests and inspections are required.
- 1.8 REFERENCES
- A. For products or workmanship specified by association, trade, or other consensus standards, comply with requirements of standard, except when more rigid requirements are specified or are required by applicable codes. Such standards are made a part of Contract Documents by reference.
1. Conflicting Requirements: Where compliance with two or more standards is specified, and the standards may establish different or conflicting requirements for minimum quantities or quality levels, refer requirements that are different, and uncertainties to Architect for decision

before proceeding.

- B. Conform to reference standard by date of issue current on original date indicated on Contract Documents.
- C. Copies of Standards: Each entity engaged in construction on the Project is required to be familiar with industry standards applicable to that entity's construction activity. Copies of applicable standards are not bound with Contract Documents.
 - 1. Where copies of standards are needed for performance of a required construction activity, Contractor shall obtain copies directly from publication source.
 - 2. Maintain copy of applicable standards at Project Site during the project, until Final Acceptance.
- D. Should specified reference standards conflict with Contract Documents, request clarification from the Architect before proceeding.
- E. The contractual relationship, duties, and responsibilities of the parties in the Contract, and the Architect, shall not be altered from Contract Documents by mention or inference otherwise in any reference document.

1.9 MOCK-UPS, PROTOTYPES, AND BENCHMARKS

- A. Provide and coordinate assemblies both on and off the Project site, as scheduled in the technical specification sections and in Section 01 4339 - PROTOTYPES, MOCKUPS, AND BENCHMARK INSTALLATIONS for Contractor, Architect's and Owner's review.
- B. The Contractor shall coordinate the requirements for each sample installation with individual Subcontractors and their material suppliers.

PART 2 PRODUCTS

2.1 MATERIALS AND PRODUCTS

- A. All materials shall be treated/ selected to prevent any damage from all possible combinations of atmospheric deterioration, corrosion, wet rot, dry rot, fungi, mould and all other deleterious effects including atmospheric pollution and pH factor of the adjacent elements.
- B. Ensure that no chemical or electrolytic action takes place where dissimilar metals and/ or materials are used together.
- C. No materials shall discolor, crack or otherwise be damaged by the worst possible combination of environmental conditions identified in the Contract Documents.
- D. With materials subject to surface treatment, special attention shall be given to the substrate to ensure that the preparation is compatible with the surface treatment.
- E. Ensure that all superficial dust and friable materials are removed and that adequate protection is provided during the process of the surface treatment and finishes to prevent contamination by dust and other debris.
- F. Materials used in the manufacture of the work shall not be liable to infestation attack by micro-organisms, fungi, insects or other vermin, nor provide harborage for same.

PART 3 EXECUTION

3.1 REPAIR AND PROTECTION

- A. General: On completion of testing, inspecting, sample taking, and similar services, repair damaged construction and restore substrates and finishes.
 - 1. Provide materials and comply with installation requirements specified in other Sections of these Specifications. Restore patched areas and extend restoration into adjoining areas in a manner that eliminates evidence of patching.
 - 2. Protect construction exposed by or for quality-control service activities.
- B. Repair and protection are Contractor's responsibility, regardless of the assignment of responsibility for quality-control services.
- C. Continued Protection: Provide continued protection of completed work through the remainder of the Construction Time, and monitor protective measures in relation to construction activities.

3.2 TOLERANCES

- A. Monitor tolerance control of installed Products to produce acceptable Work. Do not permit tolerances to accumulate.
- B. Comply with manufacturer's tolerances. If manufacturer's tolerances conflict with Contract Documents, request clarification from Architect before proceeding.
- C. Adjust Products to appropriate dimensions, position before securing Products in place.

END OF SECTION