

SECTION 01400
QUALITY REQUIREMENTS

PART 1 - GENERAL

1.01 SUMMARY

- A. This Section includes administrative and procedural requirements for quality assurance and quality control.
- B. 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.
 - 1. 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.
 - 2. Specified tests, inspections, and related actions do not limit Contractor's quality-control procedures that facilitate compliance with the Contract Document requirements.
 - 3. Requirements for Contractor to provide quality-control services required by Architect, Owner, or authorities having jurisdiction are not limited by provisions of this Section.
- C. Related Work Specified in Other Sections:
 - 1. Section 01731, "Cutting and Patching," for repair and restoration of construction disturbed by testing and inspecting activities.
 - 2. Divisions 2 through 16 Sections for specific test and inspection requirements.

1.02 REGULATORY REQUIREMENTS

- A. Building Codes: The following codes are the principal codes applicable to this Project:
 - 1. State Building Code: BOCA-1999
 - 2. Fire Protection: NFPA-13 and 14.
 - 3. Plumbing: State of Maine, Chapter 238, Internal Plumbing Rules.
 - 4. Gas: NFPA-54
 - 5. Mechanical Systems Code: BOCA National mechanical Code, 1993 Edition as amended by the Buildings and Building Regulations of the City of Portland Code of Ordinances.
 - 6. Electrical Code: National Electrical Code, NFPA-70 (2002)
- B. Copies of Codes and Regulations: Obtain copies of the regulations listed above and retain at Project site to be available for reference by parties who have a reasonable need.

1.03 DEFINITIONS OF TERMS USED IN THIS SECTION

- 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. Mockups: Full-size, physical example assemblies to illustrate finishes and materials. Mockups are used to verify selections made under Sample submittals, to demonstrate aesthetic effects and, where indicated, qualities of materials and execution, and to review construction, coordination, testing, or operation; they are not Samples. Mockups establish the standard by which the Work will be judged.
- D. Testing Agency: An entity engaged to perform specific tests, inspections, or both. Testing laboratory shall mean the same as testing agency.

1.04 INDUSTRY STANDARDS

- A. Applicability of Standards: Unless the Contract Documents include more stringent requirements, applicable construction industry standards have the same force and effect as if bound or copied directly into the Contract Documents to the extent referenced. Such standards are made a part of the Contract Documents by reference.
- B. Publication Dates: Comply with standards in effect as of the date of the Contract Documents, unless otherwise indicated.
- C. Conflicting Requirements: Where compliance with two or more standards is specified and the standards establish different or conflicting requirements for minimum quantities or quality levels, comply with the most stringent requirement. Refer uncertainties and requirements that are different, but apparently equal, to Architect for a decision before proceeding.
 - 1. Minimum Quantity or Quality Levels: The quantity or quality level shown or specified shall be the minimum provided or performed. The actual installation may comply exactly with the minimum quantity or quality specified, or it may exceed the minimum within reasonable limits. To comply with these requirements, indicated numeric values are minimum or maximum, as appropriate, for the context of the requirements. Refer uncertainties to Architect for a decision before proceeding.
- D. Copies of Standards: Each entity engaged in construction on Project must be familiar with industry standards applicable to its construction activity. Copies of applicable standards are not bound with the Contract Documents.
 - 1. Where copies of standards are needed to perform a required construction activity, obtain copies directly from the publication source and make them available on request.

- E. Abbreviations and Names: Abbreviations and acronyms are frequently used in the Specifications and other Contract Documents to represent the name of a trade association, standards-developing organization, authorities having jurisdiction, or other entity in the context of referencing a standard or publication. Where abbreviations and acronyms are used in the Specifications or other Contract Documents, they mean the recognized name of these entities. Refer to Gale Research's "Encyclopedia of Associations" or Columbia Books' "National Trade & Professional Associations of the U.S.," which are available in most libraries.

1.05 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.

1.06 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. Delegated-Design Submittal: For each product and system specifically assigned to the Contractor to Contractor to be designed or certified by a design professional, in addition to Shop Drawings, Product Data, and other required submittals, submit a statement, signed and sealed by the responsible design professional, indicating that the products and systems are in compliance with performance and design criteria indicated. Include list of codes, loads, and other factors used in performing these services.
- C. 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 reinspecting.
- D. 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.

- E. Coordination Drawings: As described elsewhere in this Section.

1.07 QUALIFICATIONS

- 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: Where Contract Documents require Contractor to provide the services of a professional engineer, this shall mean a Professional Engineer who is legally qualified to practice in the Commonwealth of Massachusetts 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 ASTM E 548, and that specializes in types of tests and inspections to be performed.

1.08 PRECONSTRUCTION TESTING

- A. When preconstruction testing to demonstrate compliance with specified requirements is required by these Contract Documents, comply with the following procedures:

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. 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 copy to Contractor. Interpret tests and inspections and state in each report whether tested and inspected work complies with or deviates from the Contract Documents.

1.09 COORDINATION DRAWINGS

- A. General: Wherever close and careful coordination is required among the work of several subcontractors, fabricators or suppliers, with regard to configurations and dimensions of products or equipment, prepare, or require the appropriate subcontractor to prepare, Coordination Drawings which clearly indicated in detail the relationship between systems, materials and components of the Work.
 1. As a minimum, prepare Coordination Drawings for the following types of work:
 - a. Glazed aluminum curtain wall.
 - b. HVAC, plumbing, fire protection and electrical work
 2. Submit Coordination Drawings to the Architect before beginning fabrication or installation of the work represented in the Coordination Drawings.
 3. Format: Reproducible drawings at not less than 1/4" = 1'-0" scale; with details at not less than 3/8" = 1'-0" scale.
 4. Show in detail the relationship of components shown on separate Shop Drawings.
 5. Indicate required installation sequences.
- B. Concrete Pours: Show extent and thicknesses of concrete; show locations of rebar. Show locations and dimensions of openings in and penetrations of concrete slabs and concrete shear wall by work of other trades, including heating, ventilation and air conditioning, plumbing, fire-protection, and general construction.
 1. Require each trade to record the locations and dimensions of their own work on the Drawings, and to review and comment on potential interference by work of other trades.
 2. Make the modifications necessary to accommodate all the necessary penetrations while maintaining the structural integrity of the concrete construction penetrated.
 3. Require each trade, including the rebar fabricator, to indicate acceptance of the completed Coordination Drawings by signing them, as specified in paragraph E.

- C. Curtain Wall: Show framing and glazing in relation to building structure, adjacent exterior wall construction, flashing and sealants, and in relation to interior floor and ceiling levels and interior finishes.
- D. HVAC, Plumbing, Fire Protection and Electrical Work: Using CADD, prepare complete coordination drawings showing principal components and interrelationship of systems listed below, and showing the relationship of these components to other components of the Work, and to existing building systems.
1. Systems: As a minimum, show the following systems:
 - a. Structural members above the ceiling.
 - b. Ceiling suspension members.
 - c. Heating, ventilating and air conditioning.
 - d. Fire protection sprinkler systems.
 - e. Building plumbing.
 - f. Electrical systems and components.
 2. Use architectural and structural plans as a base for these Coordination Drawings. Show location of mechanical rooms, electrical rooms, and electrical closets. Indicate location of structure and partitions. Indicate ceiling heights. Indicate locations of fire-rated construction, fire-separation walls, and fire walls.
 - a. Access: Show the location of dampers, valves, and other operating devices to which access will be required after building is completed. Show the location and size of access doors and removable ceiling panels required to provide access to such devices.
 3. Sequence of Preparation:
 - a. Require the Heating, Ventilating and Air-Conditioning Subcontractor to first prepare CADD files showing ductwork, water piping for HVAC equipment, and other heating lines. Show locations of air outlets and returns.
 - b. Include a signature block on each plot with space for signatures of the HVAC, Plumbing, Fire Protection and Electrical subcontractors, and space for the Contractor to certify coordination.
 - c. Transfer the electronic file, with a hard copy plot for reference, to the Plumbing subcontractor, and require the Plumbing subcontractor to add plumbing equipment and plumbing piping to the electronic document.
 - d. Transfer the electronic file, with a hard copy plot for reference, to the Fire Protection subcontractor, and require the Fire Protection subcontractor to add fire-protection equipment, water lines, and sprinkler heads to the electronic document.
 - e. Transfer the electronic file, with a hard copy plot for reference, to the Electrical subcontractor and require the Electrical subcontractor to add electrical equipment, conduit, cable trays, panels, pull boxes, lighting fixtures, and communication equipment components to the electronic document.
 - f. The Contractor shall then plot the combined documents for the purpose of coordination, and shall coordinate the work of the subtrades with building structure and architectural finish, and add indication of these materials to the CADD file and to the plots where they have not been otherwise addressed.

4. In addition to reflected ceiling plans, if necessary to describe the relationship of mechanical and electrical systems to structural components, shafts, walls, suspended ceilings, and other components which abut or may conflict with mechanical work, or to resolve conflicts, prepare and submit floor plans, building sections, wall sections, elevations, and details.
 5. Supplementary Information: Include the following notations and details; prepare details on separate sheets keyed to the plans and section drawings.
 - a. Clearances for installing and maintaining insulation.
 - b. Clearances for servicing and maintaining equipment, including tube removal, filter removal, and space for equipment disassembly required for periodic maintenance.
 - c. Equipment connections and support details.
 - d. Exterior wall penetrations.
 - e. Fire-rated wall and floor penetrations.
 - f. Sizes and location of required concrete pads and bases.
 - g. Valve stem movement.
 6. Identify locations where space is limited for installation and access and where sequencing and coordination of installations are of importance to the efficient flow of the Work.
 7. Describe scheduling, sequencing, movement, and positioning of large equipment into the building during construction.
- E. Coordination and Signatures: Resolve conflicts among the trades, have each subcontractor sign a hard copy of the drawings to indicate that their agreement that all conflicts have been resolved. Endorse the drawings with the notation "Drawings Have Been Checked and Coordinated with All Trades"; stamp with Contractor's review stamp and sign the Drawings.
- F. Architect's Review: Submit the Coordination Drawings to the Architect before beginning work shown on the Drawings. The Architect will review the coordination Drawings to confirm that the Work is being coordinated, but not for the details of the coordination, which are the Contractor's responsibility.
1. If the Architect determines that the coordination drawings are not being prepared in sufficient scope or detail, or are otherwise deficient, the Architect will so inform the Contractor, who shall make changes as directed and resubmit.
 2. Contractor shall not purchase, fabricate nor install Work which requires coordination drawings until the Architect has accepted the coordination drawings. Work begun before the coordination drawings are accepted by the Architect will not be processed for payment by the Owner. In addition, work performed prior to acceptance of the coordination drawings which is deemed to be non-conforming, shall be removed and rebuilt by the Contractor with no change to the Contract Price or the Contract Time.
 3. Architect's acceptance of Coordination Drawings shall not relieve the Contractor from its overall responsibility for coordination of the Work.

- G. Coordination drawings are for Contractor's use during construction, and will not be accepted as the Record Drawings required by Section 01770, "Closeout Procedures and Submittals."

1.10 QUALITY CONTROL

- A. Owner Responsibilities: Where quality-control services are specifically indicated as Owner's responsibility, and where authorities having jurisdiction specifically require the Owner to provide testing and inspection services, the Owner will engage a qualified testing agency to perform these services.
 - 1. Owner will furnish Contractor with names, addresses, and telephone numbers of testing agencies engaged and a description of the types of testing and inspecting they are engaged to perform.
 - 2. The Testing agency will notify Architect and the Owner promptly of irregularities and deficiencies observed in the Work during performance of its services.
- B. Contractor Responsibilities: Contractor shall provide all other quality control services required under the Contract, including quality-control services specified and required by authorities having jurisdiction. Engage a qualified testing agency to perform these services.
 - 1. Contractor shall not employ the same entity engaged by Owner, unless agreed to in writing by Owner.
 - 2. Notify testing agencies at least 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.
 - 6. Retesting: After correcting or replacing construction that failed to comply with requirements established by the Contract Documents, arrange for and pay for retesting and reinspection, regardless of whether the original testing was the Owner's responsibility or the Contractor's.
- 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. Responsibilities of the Contractor's Testing Agency: Cooperate with Architect and Contractor in performance of duties. Provide qualified personnel to perform required tests and inspections.

1. Notify Architect and Contractor promptly of irregularities or deficiencies observed in the Work during performance of its services.
 2. Interpret tests and inspections and state in each report whether tested and inspected work complies with or deviates from requirements.
 3. Submit a certified written report, in duplicate, of each test, inspection, and similar quality-control service through Contractor.
 4. Do not release, revoke, alter, or increase requirements of the Contract Documents or approve or accept any portion of the Work.
 5. Do not perform any duties of Contractor.
- E. Associated Services: The Contractor shall 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.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.01 MOCK-UPS

- A. Required mock-ups are described in the technical sections, Divisions 2 through 16.
- B. Mockups: Before installing portions of the Work requiring mockups, build mockups for each form of construction and finish required to comply with the following requirements, using materials indicated for the completed Work.
- C. Notify Architect seven days in advance of dates and times when mockups will be constructed. Obtain Architect's approval of mockups before starting work, fabrication, or construction.
- D. Build mockups in location and of size indicated or, if not indicated, as directed by Architect. Unless otherwise indicated, mock-up a complete unit of work, including back-up materials, anchors, fasteners, flashing, trim and closure pieces, and similar accessories as applicable to the type of work.
 - 1. Demonstrate the proposed range of aesthetic effects and workmanship.
 - 2. Unless mock-ups are constructed inside the fully enclosed and weatherproofed building shell, protect mock-ups from the elements with weather-resistant membrane.
 - 3. Maintain mockups during construction in an undisturbed condition as a standard for judging the completed Work.
 - 4. Demolish and remove mockups when directed, unless otherwise indicated in the Section requiring the mock-up. Mock-ups shall be demolished and removed no later than the time of Substantial Completion, unless the Architect specifically directs the Contractor to leave the mock-up in place for a longer time.

3.02 REPAIR AND PROTECTION

- A. General: On completion of testing, inspecting, sample taking, and similar services, repair damaged construction and restore substrates and finishes.
 - 1. Comply with the Contract Document requirements for cutting and patching specified in Section 01731, "Cutting and Patching."
- B. Protect construction exposed by or for quality-control service activities.
- C. Repair and protection are Contractor's responsibility, regardless of the assignment of responsibility for quality-control services.

END OF SECTION 01400