

SECTION 014000

QUALITY REQUIREMENTS

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 REQUIREMENTS INCLUDED

- A. General Contractor's Quality Assurance.
- B. General Contractor's Testing Responsibilities.
- C. Owner's independent agencies.
- D. Duties of the General Contractor's testing agencies.
- E. Welding.
- F. Field engineering.
- G. Examination of substrate.
- H. General Contractor's Quality Assurance and Quality Control Plan.

1.3 RELATED SECTIONS

- A. Section 013100 – PROJECT MANAGEMENT AND COORDINATION:
  - 1. General project management and coordination.
- B. Section 014325 – TESTING AGENCY SERVICES:
  - 1. Testing to be performed by the Owner's Independent Testing Laboratory, exclusive of testing to be performed by the General Contractor.

1.4 GENERAL CONTRACTOR'S QUALITY ASSURANCE

- A. Qualifications for Service Agencies: Engage inspection and testing services agencies, including independent testing laboratories, which are pre-qualified as complying with "Recommended

Requirements for Independent Laboratory Qualification” by the American Council of Independent Laboratories, and which specialize in the types of inspections and tests to be performed.

- B. Each independent inspection and testing agency engaged on the project shall be authorized by authorities having jurisdiction to operate in the Commonwealth of Massachusetts.

#### 1.5 GENERAL CONTRACTOR’S TESTING RESPONSIBILITIES

- A. The General Contractor shall provide inspections, tests and quality control services specified in individual specification Sections and required by governing authorities, except where they are specifically indicated to be solely the responsibility of a Subcontractor in the respective specification section or solely the responsibility of the Owner.
- B. Engage and pay for the services of an independent agency acceptable to the Project Manager to perform the specified inspections, testing, and quality control. Submit qualifications to the Project Manager. General Contractor’s testing agency/laboratory shall be licensed by the Commonwealth of Massachusetts Department of Public Safety.
- C. Re-testing: The General Contractor is responsible for re-testing where results of required inspections, tests or similar services prove unsatisfactory and do not indicate compliance with Contract Documents requirements, regardless of whether the original test or service was the General Contractor’s responsibility.
- D. Substitutions, Suspicious Issues and Designer Initiated Testing: The General Contractor is responsible for inspections, tests and similar services for substitutions, suspicious issues identified by the General Contractor or Project Manager, and testing initiated by the Designer.
- E. Associated Services: The General Contractor shall cooperate with agencies performing required inspections, tests and similar services and provide reasonable auxiliary services as required. Notify the agency sufficiently in advance of operations to permit assignment of personnel. Auxiliary services required include but are not limited to:
  - 1. Provide access to the work and furnish incidental labor and facilities necessary to facilitate inspections and tests.
  - 2. Take adequate quantities or representative samples of materials that require testing or assist the agency in taking samples.
  - 3. Provide facilities for storage and curing of test samples and delivery of samples to testing laboratories.
  - 4. Provide the agency with a preliminary design mix proposed for use for material mixes that require control by the testing agency.
  - 5. Provide security and protection of samples and test equipment at the project site.
- F. The General Contractor shall prepare and submit to the Project Manager for approval a Quality Assurance and Quality Control Plan within 30 days from Notice to Proceed. A Quality Assurance and Quality Control (QA/QC) Plan shall promote completion of all work in accordance with the Contract Documents including Contract, Construction Drawings, Specifications, Project Procedures, Approved Submittals and Shop Drawings, Approved Changes, Applicable Codes and Regulations, Referenced Industry Standards, and similar items.

The primary purpose of this quality plan is to ensure that all in place work by the General Contractor and all Subcontractors is performed correctly the first time and is turned over and represented as complete and defect free in accordance with the Contract Documents.

- G. If required by the Contract, the General Contractor shall assign a dedicated Quality Assurance and Quality Control Manager for the duration of the project. If the Contract does not require a dedicated Quality Assurance and Quality Control Manager, the General Contractor shall prepare and submit to the Project Manager their QA/QC Plan as discussed in Par. E above. In addition, if this Contract does not require a dedicated QA/AC Manager, the duties of the QA/AC Manager as delineated in Par. 1.5F6 shall be carried out by another qualified member of the General Contractor's onsite staff.
1. The purpose of a QA/QC Manager shall be to prepare and submit the Quality Assurance and Quality Control Plan for approval and to be responsible for and to manage adherence to the plan throughout the construction process. The QA/QC Manager shall be designated for the project from the initial notice to proceed through system acceptances by both the designer and Project Manager. The QA/QC Manager shall at all times instill an expectation that all work will be completed correctly and in an expeditious manner and shall be responsible for enforcement of the General Contractor's Staff and all Subcontractors to this plan.
  2. Have extensive experience in building construction, project controls, and previous QA/QC training and practical knowledge.
  3. Have excellent communication and writing skills, be highly organized and be able to work with both management and Subcontractors.
  4. Have a working knowledge of project scheduling.
  5. The General Contractor shall submit substantiating documentation attesting to the proposed QA/QC Manager's capabilities to the Project Manager and the Designer for approval.
  6. Duties of the QA/QC Manager:
    - a. Prepare and submit QA/QC Plan for approval.
    - b. Conduct and submit minutes for all requisite Quality Meetings.
    - c. Coordinate and report on all daily quality activities.
    - d. Verify accurate documentation by Subcontractors and Vendors.
    - e. Oversee final project records pertaining to quality.
    - f. Report, photograph and distribute evidence of deficient and/or defective construction conditions or materials that cannot be corrected within three work days of observation. When such conditions or materials are remedied report, photograph and distribute evidence of remedial work prior to concealing. Photographs shall be dated and defects and/or deficiencies shall be clearly labeled on the photographs.

#### 1.6 OWNER'S INDEPENDENT TESTING AGENCIES

- A. Owner will engage an independent testing agency at its own expense to perform certain tests and similar services as set forth in Section 014325. Information provided by Owner's Independent Testing Agency shall be for the sole use of Project Manager, and shall not relieve the General Contractor of its responsibilities to provide its own quality control, to meet all requirements of the Contract and to provide a completed project free from construction defects.

- B. It is the General Contractor's responsibility to provide and pay for its own inspection and testing to assure quality control. General Contractor shall be responsible for coordinating its work with requirements of Owner's testing agencies, and shall provide reasonable services in support of facilitating work of Owner's testing agencies as required.

#### 1.7 DUTIES OF THE GENERAL CONTRACTOR'S TESTING AGENCIES

- A. The General Contractor's independent testing agency engaged to perform inspections, sampling and testing of materials and construction shall cooperate with the Designer and General Contractor in performing its duties, and shall provide qualified personnel to perform required inspections and tests.
- B. The testing agency shall notify the Designer and General Contractor promptly of irregularities or deficiencies observed in the work during performance of its services.
- C. The testing agency shall not perform any duties of the General Contractor.
- D. The General Contractor is responsible for scheduling times for inspections, tests, taking samples and similar activities.

#### 1.8 GENERAL CONTRACTOR'S QUALITY CONTROL REQUIREMENTS, GENERAL

- A. Maintain quality control over suppliers, manufacturers, products, services, site conditions, and workmanship to produce work of the quality as specified.
- B. Comply fully with manufacturer's instructions, including each step in sequence.
- C. Comply with specified standards as a minimum quality for the Work except when more stringent tolerances, codes, or specified requirements indicate higher standards or more precise workmanship.
- D. Perform work by persons qualified to produce workmanship of specified quality.
- E. Secure products in place with positive anchorage devices designed and sized to withstand stresses, vibration, physical distortions, or disfigurement. Anchorage devices shall be labeled to allow for visual inspection and verification of type of anchorage device.

#### 1.9 WELDING

- A. Certified Welders:
  - 1. Structural welds shall be made only by operators who have been qualified by tests, as prescribed in the "Standard Qualification Procedure" of the American Welders Society, to perform the type of work required. Operators shall be certified welders; certification must be current. Provide a copy of certification(s) to the Architect.
  - 2. Pipe welds shall be made by operators who have been qualified by the National Certified Pipe Welding Bureau and each operator's qualification record shall be submitted to the

Designer before any work is performed. Welders' certification card must be shown to the Resident Engineer. . Provide a copy of certification(s) to the Architect.

3. Shop welding shall be in accordance with the "Code for Welding in Building Construction."
4. Welders shall provide their own portable generating equipment for electric welding. Use of the Commonwealth's electrical system for welding will not be permitted.

B. Welding and Cutting:

1. Where electric or gas welding or cutting work is done above or within ten (10) feet of combustible material or above a space that may be occupied by persons, use interposed shields of incombustible material to protect against fire damage or injury due to sparks and hot metal.
2. Place tanks supplying gases for gas welding or cutting at no greater distance from the work than is necessary for safety, securely fastened and maintained in an upright position in accordance with applicable codes. Store such tanks in a locked enclosure remote from any combustible material and free from exposure to the rays of the sun or high temperatures.
3. Maintain suitable fire extinguishing equipment near all welding and cutting operations. When operations cease for the noon hour or at the end of the day, thoroughly wet down the surroundings adjacent to welding and cutting operations.
4. Station a workman equipped with suitable fire extinguishing equipment near welding and cutting operations to see that sparks do not lodge in floor cracks or pass through floor or wall openings or lodge in any combustible material. Keep the workman at the source of work which offers special hazards for thirty (30) minutes after the job is completed to make sure that smoldering fires have not been started.
5. Place a qualified electrician in charge of installing and maintaining electric and arc welding equipment. Remove damaged electric, arc or gas welding equipment from the site.

1.10 MANUFACTURER'S REPRESENTATIVES

- A. If required by specific Specification Sections, manufacturer's representative shall be present at the job site for supervision of work during installation of materials. Such representative shall be present during all aspects of construction to ensure proper installation of all applicable items. Refer to other sections of these specifications for additional requirements.

1.11 FIELD ENGINEERING

- A. Survey work through the course of all phases of construction shall conform to the following guidelines:
1. General Contractor shall employ a competent Civil Engineer or Land Surveyor, registered in the Commonwealth of Massachusetts, who will establish permanent benchmarks. Maintain all established bounds and benchmarks and replace as directed any which are destroyed or disturbed.
  2. Prior to the installation of permanent construction (foundations, slab-on-grade, utilities, etc.) General Contractor shall provide a certification signed by Engineer/Surveyor

warranting the principal lines, levels, and overall dimensions are accurately established in accordance with the Contract Documents.

3. Establish all lines and grades for the work, and verify all locations, property lines, work lines and other dimensioned points indicated on the Drawings for the project site.
4. Submit to the Designer a written confirmation of locations of all lines, and any discrepancies between conditions and locations as they actually exist and those indicated on the Drawings. General Contractor shall not commence any excavation or construction work until verification has been received and approved by the Designer. Upon receipt of approval from the Designer, provide one (1) copy of that approval to the Architect.
5. General Contractor shall be held responsible for any damage incurred thereby to Owner, due to incorrect laying out of the work. In the event that errors or discrepancies are discovered on the Drawings, the General Contractor shall immediately notify the Designer and no further work shall be performed until the discrepancy has been corrected by the Designer.

#### 1.12 EXAMINATION OF SUBSTRATE

- A. Installers of materials, products or equipment shall:
  1. Examine base surfaces upon which materials, products or equipment are to be installed.
  2. Examine conditions upon which materials, products or equipment are to be installed.
  3. Where there is any question as to the dryness of a surface, test with a modern moisture-indicating machine.
  4. Notify the General Contractor, in writing, with a copy to the Designer, if conditions are detrimental to proper and timely construction and completion of the work.
- B. Do not proceed with work until unsatisfactory substrate, or not acceptable conditions have been corrected. Commencement of installation constitutes acceptance of substrate or base surfaces, and the cost of any corrective work due shall be borne by the installer applying his/her materials, products or equipment thereon.

#### 1.13 GENERAL CONTRACTOR'S QUALITY ASSURANCE AND QUALITY CONTROL PLAN

- A. The General Contractor's Quality Assurance and Quality Control Plan shall instill an expectation that all work will be completed correctly and in an expeditious manner. In all instances the General Contractor shall be responsible for the adherence to and enforcement of the General Contractor's Staff and all Subcontractors to this plan.
  1. Submit the General Contractor's Quality Assurance and Quality Control Plan to the Project Manager within 30 days from the Notice to Proceed. Submit in format acceptable to Project Manager. Identify personnel, procedures, controls, instructions, tests, records, and forms to be used to carry out General Contractor's quality-assurance and quality-control responsibilities. Coordinate with General Contractor's construction schedule.
- B. The Plan shall include specific procedures for conducting formalized inspections of predetermined selected work items at the time the General Contractor first starts new work. These inspections are performed by a designated QA/QC Inspection Team composed of

authorized representatives from Owner, the General Contractor, A/E, Subcontractor(s) (whose work is being inspected) and others as may be required.

C. The Quality Assurance and Quality Control Plan shall be created as a General Contractor Project Specific Quality Plan addressing at a minimum the following components:

1. Quality meetings.
  - a. Pre-construction conference.
  - b. Pre-installation review meetings.
  - c. Coordination meetings.
2. Regular Daily Inspections.
3. Building Exterior Envelope Review.
4. First Delivery of Material / Equipment Inspections.
5. First Equipment in Place Inspections.
6. Mock-up Inspections.
7. Bench Mark Inspections.
8. Follow-Up Bench Mark Inspections.
9. Below Grade / In-Wall and Above Ceiling Inspections.
10. Utility Activation and Start-Up Inspection Procedures for Equipment/Systems Prior to Validation.

D. Quality Meetings:

1. Pre-construction Conference:
  - a. A conference held to discuss all aspects of the construction project such as the schedule, payment procedures, change order procedures and much more. This meeting is held immediately after contract award.
  - b. The Project Manager, Designer, Design Consultants, General Contractor and Subcontractors will attend these meetings.
2. Pre-Installation Review Meetings:
  - a. A review meeting shall be held for certain kinds of work requiring special coordination efforts between Subcontractors, a better understanding of how the work is to be performed by one or more Subcontractors, sequencing of work between the Subcontractors, or a review of special requirements pertaining to the work to be performed. This type of meeting is conducted just prior to starting the actual work. The meeting is scheduled and run by the General Contractor on an as needed basis.
  - b. The Project Manager, Designer, General Contractor and all applicable Subcontractors will attend these meetings.
  - c. The General Contractor's Staff and Subcontractor's actual supervisory people who will be performing the work in the field are to attend these meetings.
  - d. Safety precautions relating to the work to be performed are also to be discussed as part of this meeting.
3. Coordination Meetings:
  - a. The General Contractor shall conduct project Coordination Meetings at regular intervals. Project Coordination Meetings are in addition to specific meetings held for other purposes, such as regular progress meetings and special pre-installation meetings. An example would be regularly scheduled MEP coordination meetings to monitor the progress of the MEP coordination process.

- b. General Contractor shall request representation by every party currently involved in coordination or planning for the construction activities involved.
- c. General Contractor shall record meeting results and distribute copies to everyone in attendance and others affected by decisions or actions resulting from each meeting. The Project Manager and the Designer are to be on the Distribution List.

E. Regular Daily Inspections:

- 1. The General Contractor will monitor the quality of the in-place construction work daily, to ensure that it complies with the requirements of the Contract Documents, Pre-Construction Meetings, Pre-Installation Meetings and Coordination Meetings.
- 2. The General Contractor shall log, record and distribute daily record of quality monitoring as a component of daily reporting and provide notification on a regular basis during construction of currently observed items requiring corrective action
- 3. The QA/QC Inspection Team will inspect work periodically based on observations noted in General Contractor's reporting to verify completion and compliance.

F. First Delivery of Material/Equipment Inspection:

- 1. The General Contractor shall manage and keep current an anticipated delivery schedule for all materials and equipment to be delivered to the site and provide regular updates or upon request to the Project Manager and QA/QC Inspection Team.
- 2. The General Contractor shall log, record and distribute any account on the first delivery of each type of material or equipment as a component of daily reporting and provide notification on a regular basis during construction of currently observed items requiring corrective action
- 3. First deliveries will be verified against the requirements of the design documents and the approved submittals. Nonconforming materials and/or equipment will not be allowed to be set into place and will be removed from the site.
- 4. This inspection establishes the basis for judging all future deliveries of like material/equipment.

G. First Equipment In Place Inspection:

- 1. The General Contractor shall manage and keep current an anticipated schedule for all materials and equipment to be inspected in place and provide regular updates or upon request to the Project Manager and QA/QC Inspection Team.
- 2. General Contractor and QA/QC Inspection Team will inspect and document the first setting of equipment to verify it is in conformance with the requirements of the Contract Documents.
- 3. The installation and assembly will be verified against the requirements of the design documents and the approved shop drawings.
- 4. The General Contractor shall log, record and distribute any account for each type of first in place equipment inspection as a component of daily reporting and provide notification on a regular basis during construction of currently observed items requiring corrective action or pending inspection.
- 5. Upon acceptance of the equipment in place, the General Contractor can proceed with permanently anchoring it into place by the means prescribed in the Contract Documents.
- 6. This inspection establishes the basis for judging all future setting of like equipment.



H. Mock-Up Inspections:

1. The General Contractor will note all Mock-Ups required by the Contract Documents and include the activity in their construction schedule and submit for review and approval of the Project Manager, the Designer and the QA/QC Inspection Team.
2. The General Contractor shall log, record and distribute any account of Mock-Up(s) as a component of daily reporting and provide notification on a regular basis during construction of currently observed items in process, requiring corrective action, or follow up, and inspection.
3. General Contractor will benchmark each work type within the Mock-Up for conformance with the requirements and review with the QA/QC Inspection Team.
4. The QA/QC Inspection Team shall review, comment that the work appears in conformance to the requirements. Comments are documented and distributed by the General Contractor. Non-conforming work will be corrected at no additional cost to.
5. The approved Mock-Up establishes a basis for judgment for all later like construction.
6. The Mock-Up process and inspection(s) does not take away from the responsibility of the General Contractor and installing contractors to provide a finished and fully functioning product and to maintain the construction schedule.

I. Benchmark Inspections (In Sequence Work):

1. The General Contractor in consultation with the Project Manager, Designer and QA/QC Inspection Team will establish which work will be scheduled for benchmarking during the normal course of construction.
2. The General Contractor shall log, record and distribute any account of Benchmark(s) as a component of daily reporting and provide notification on a regular basis during construction of currently observed items in process, requiring corrective action, or follow up, and that require inspection.
3. General Contractor shall note that the work to be inspected has been started and if found to be acceptable shall call for a benchmark inspection to be conducted by the QA/QC Inspection Team.
4. The QA/QC Inspection Team shall review, comment that the work appears in conformance to the requirements. Comments are documented and distributed by the General Contractor. Non-conforming work will be corrected at no additional cost to DCAMM.
5. This inspection establishes the basis for judging all future work of a like type, none of which shall commence until the benchmark is approved.
6. The Benchmark process and inspection(s) does not take away from the responsibility of the General Contractor and installing contractors to provide a finished and fully functioning product and to maintain the construction schedule.

J. Follow-Up Benchmark Inspections:

1. The General Contractor shall ensure that all subsequent work being built of the same type of work that was previously benchmarked will be built in conformance to the Benchmarked work without deviation.
2. The General Contractor and QA/QC Inspection Team will randomly inspect subsequent work being built of the same type of work that was previously benchmarked to ensure the work is being built in conformance with the benchmarked work.

3. The General Contractor shall log, record and distribute any account of follow-up benchmark(s) as a component of daily reporting and provide notification on a regular basis during construction of currently observed items in process, requiring corrective action, or follow up, and that require inspection.

K. Below Grade / In Wall and Above Ceiling Inspections:

1. It is the intent of this section to mandate inspection of as much of the work that is to be enclosed before it has been covered over to avoid having to reopen closed spaces to complete or correct work therein.
2. The General Contractor shall verify that all work is complete within the concealed space and is ready to be inspected before it is enclosed.
3. The General Contractor and all Subcontractors who have work installed within the work area shall sign a closure form stating that their work has been completed and has been inspected by all applicable code officials. General Contractor will be responsible for all costs to have the space reopened later to complete or correct any work within the space, and to have the space closed again, including all costs incurred for any schedule impacts due to this work.
4. Photographs of areas to be permanently enclosed will be taken by General Contractor and retained as a part of the project record.
5. The General Contractor shall log, record and distribute account of below grade, in wall or above ceiling inspections as a component of daily reporting and provide notification on a regular basis during construction of currently observed items in process, requiring corrective action, or follow up.
6. No closure or covering of work shall proceed until all requirements are met and approval given by the QA/QC Inspection Team where such inspections are to be conducted.

L. Utility Activation and Start-Up Inspection Procedures for Equipment/Systems Prior to Validation. Refer also to Section 018100 - COMMISSIONING for additional requirements.

1. Activation Inspection:
  - a. The Activation Inspection is required when the General Contractor has verified that system work meets the contract document requirements and has completed the static installation of equipment/systems, and is ready to place it into dynamic operation for the purposes of shakedown, debugging, check-out and similar activities.
  - b. The General Contractor shall log, record and distribute any account of pending activations as a component of daily reporting and provide separate individual notification at a minimum of 48 hour notice prior to the scheduled time for placing specific equipment into dynamic operation.
  - c. The General Contractor will notify the QA/QC Inspection Team who will inspect the work, the surroundings and provide comment that the installation is safe and appears meets the requirements for operation.
  - d. Any deficiencies noted shall be corrected immediately
  - e. The General Contractor will then place the equipment/systems into operation for his use, shakedown, debugging, check-out, and similar activities.
2. Start-Up Inspection:
  - a. The General Contractor shall log, record and distribute any account of pending startups as a component of daily reporting and provide separate individual

notification at a minimum of 48 hour notice prior to the scheduled time for placing specific equipment into final operation.

- b. The General Contractor shall coordinate with the QA/QC Inspection Team and Owner CA to ensure that the installation operates as required.
- c. All non-conforming work will be corrected immediately.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION