

**SECTION 01410**

**TESTING AND INSPECTION  
(FOR NEW GROUND UP CONSTRUCTION)**

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**PART 1 - GENERAL**

1.01 GENERAL PROVISIONS

- A. These specifications for Testing and Inspection are applicable to the Project and the Contract Documents therefore are hereby incorporated into these Specifications.
- B. The Testing Agency shall conform to applicable requirements of ASTM E329, and any additional requirements specified herein or in the Contract Documents.
- C. Examine the Contract Documents and the Report on Subsurface Investigation and become thoroughly acquainted with the detailed testing and inspection requirements, especially those of the following Sections:

- Division 2 - Site Work
- Division 3 - Concrete
- Division 4 - Masonry
- Division 5 - Metal

- D. The Testing Agency shall make all necessary arrangements with the Contractor in insuring the presence of the required Inspectors at all Contract Operations specified to be included under the Testing and Inspection Agreement.
- E. The Contractor shall notify the Testing Agency a reasonable time in advance (not less than 24 hours) of the time when operations requiring inspection or testing are scheduled to start.
- F. Provide necessary personnel, equipment and facilities for tests and inspection. Personnel shall be experienced and competent in their particular specialties.
- G. Nothing herein specified permits the Testing Agency to allow the Contractor to deviate from the requirements of the Contract Documents.
- H. The Testing Agency shall conduct its work so as not to cause delay in the progress of construction. Any non-compliance with the Contract Documents shall be immediately reported to the Contractor and Architect.
- I. The costs of the following tests and inspections shall be accounted for separately.
  - 1. Tests and inspection of materials and workmanship not conforming to Specification requirements.
  - 2. Acceptance tests for materials because of changes in properties or changed sources.
  - 3. Tests and services of inspectors required by a Public Authority.

#### 1.02 TESTING AND INSPECTION

- A. The Testing Agency shall maintain and distribute a continuous record of the quality of materials and workmanship under its control, and certify that such materials and workmanship meet the Specification requirements.
- B. The Inspection and control shall be performed under the direction of the Architect.
- C. The duties of the Testing Agency shall include:
  - 1. Test and certification of materials or components designated to be tested at source, at place of fabrication, or at the job site.
  - 2. Supervision and certification of installation of materials designated to be inspected.
  - 3. Submission of reports:

- a) Copies of each report of source and field inspection shall be made and distributed within 3 days. Copies of each report of tests shall be distributed within 2 days of the performance of tests. Results of tests showing non-conformance to specification requirements shall be advised to the Contractor and the Architect by phone on the same day.
- b) Distribution of one copy of each report shall be as follows:
  - (1) Architect (name and address)
  - (2) Engineer (name and address)
  - (3) Contractor
  - (4) Local Building Inspectors, when required by them.
- c) All reports shall include accurate and unambiguous descriptions of the source of the materials and their location in the project and a statement whether the work inspected or tested conforms or does not conform to Contract Documents.

#### 1.03 MATERIALS ACCEPTANCE TESTS

- A. To determine that materials to be used on the job meet Specification requirements, the following tests shall be made prior to actual use of materials.
  - 1. Composition, gradation and moisture-density relationships for compacted and ordinary fill materials. One set of tests for each type of material from each source.
  - 2. Review of Contractor's qualification test results for cements and for fine and coarse aggregates for:
    - a) Normal weight concrete
  - 3. Review of Contractor's qualification test results for masonry unit and masonry prism strengths.
- B. Whenever the source or characteristics of materials change or the quality of materials provided indicates lack of compliance with specification requirements, full or partial acceptance tests shall be repeated as directed by the Architect until such materials conform. Cost of such tests and inspection repetitions shall be kept separately.

#### 1.04 CONCRETE MIX DESIGNS

- A. The Testing Agency shall review and/or make acceptance tests as specified for concrete design mixes provided by the Contractor.

1. A mix for each specified strength and type of concrete and each admixture or combination of admixtures specified.
2. All materials and design mixtures to be supplied by the Contractor at least five (5) weeks prior to proposed use.

#### 1.05 EARTHWORK

- A. Inspection and control shall include:
1. In-place density tests, generally at the rate of 3 tests per lift for compacted fill and 1 test per lift for ordinary fill. Tests for moisture content control of subgrade as required by existing conditions.
  2. Inspection of foundation pier excavation, footing bottoms and finished subgrades for bearing capacity and workmanship.
  3. Review and make necessary recommendations to insure compliance to specification requirements of all lime or cement stabilization and compaction operations, materials, methods and equipment proposed by the Contractor.
  4. Inspection of and necessary adjustment recommendations for fills and subgrade stabilization materials and installation.

#### 1.06 CONCRETE

- A. Inspection and control shall, in general, conform to ACI Recommended Practice for Concrete Inspection, ACI 311, and shall include:
1. Inspection of forms and form facing materials for line, grade, tightness, quality of surface, and cleanliness.
  2. Inspection of reinforcement for quantity, details, clearances and placement, including proper use of accessories.
  3. Inspection of concrete at the mixing plant, consisting of inspection of materials for conformance to the approved materials, check of batch quantities for compliance with design mixes and project requirements, recommendations for adjustment of batches for consistency.
  4. Inspection of concrete at the job site, including transportation, mixing, placement, protection and curing.
  5. Sampling of concrete at site, fabrication of compression test specimens, transportation to laboratory and performing standard compression tests. One set of three (3) specimens shall be made for each 50 cubic yards of concrete placed, but not less than one (1) set for each day's placement for each design mix used.

6. Periodic slump, air content and density tests at the site. These tests shall be made whenever cylinders are taken or whenever field conditions indicate non-compliance with Specification requirements.
7. In addition to the above, the Contractor may direct additional control cylinders to be made, cured and tested to check strengths for shoring or adequacy of curing or cold weather protection. In such instances, the cylinders shall be cured with the concrete in the field under the least advantageous conditions. All work requested by the Contractor or all work required by non-compliance with the Specifications shall be at the Contractor's expense, utilizing the selected Testing Agency.
8. When tests of control specimens fall below the required strength, the Architect may require core specimens to be taken from the concrete which it represents, and tested in accordance with ASTM Methods, at Contractor's expense.

#### 1.07 MASONRY

- A. Inspection shall be of a nature as to determine, in general, that the construction and workmanship are in accordance with the Contract Documents, and shall include:
  1. Inspection of materials in field for conformance to Specification requirements and adequacy of Contractor's protection measures.
  2. Full time inspection of installation of all reinforced masonry.
  3. Inspection of reinforcement for quantity, details, clearances and placement.
  4. Inspection of grouting to insure that required spaces are properly filled.
  5. Compression tests of field samples of mortar and grout at the rate of one set of 5 samples for each 1,000 square feet of wall (but not less than one set for each day's production).

#### 1.08 STRUCTURAL STEEL, STEEL JOISTS & METAL DECKS

- A. Inspection and control shall include:
  1. When directed by the Architect, inspection of materials and workmanship at shop to verify effectiveness of Contractor's quality control and conformance to specification requirements.
  2. Verification of welder qualifications.
  3. Certification that quality and size of all field welds meet specification requirements.

4. Checking bolt installation and certifying that all bolts required are provided and properly tightened.
5. Checking of high-strength bolt tightening tools for accurate performance. Procedure shall be approved by the Architect or Engineer.
6. Inspection of primer paint film thickness and touch-up painting.
7. Inspection (upon delivery to site) of steel joist weld quality and sizes for conformance to Specification requirement.
8. Inspection of steel deck welding in the field.

**END OF SECTION**