

SECTION 01 45 29 TESTING LABORATORY SERVICES

PART 1 - GENERAL

1.1. DESCRIPTION:

- A. This section specifies materials testing activities and inspection services required during project construction to be provided by a Testing Laboratory retained by Department of Veterans.

1.2. APPLICABLE PUBLICATIONS:

- A. The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by the basic designation only.
- B. American Association of State Highway and Transportation Officials (AASHTO):
 - T27-11Standard Method of Test for Sieve Analysis of Fine and Coarse Aggregates
 - T96-02 (R2006)Standard Method of Test for Resistance to Degradation of Small-Size Coarse Aggregate by Abrasion and Impact in the Los Angeles Machine
 - T99-10Standard Method of Test for Moisture-Density Relations of Soils Using a 2.5 Kg (5.5 lb.) Rammer and a 305 mm (12 in.) Drop
 - T104-99 (R2007)Standard Method of Test for Soundness of Aggregate by Use of Sodium Sulfate or Magnesium Sulfate
 - T180-10Standard Method of Test for Moisture-Density Relations of Soils using a 4.54 kg (10 lb.) Rammer and a 457 mm (18 in.) Drop
 - T191-02(R2006)Standard Method of Test for Density of Soil In-Place by the Sand-Cone Method
- C. American Concrete Institute (ACI):
 - 506.4R-94 (R2004) .Guide for the Evaluation of Shotcrete

D. American Society for Testing and Materials (ASTM):

A325-10Standard Specification for Structural Bolts, Steel,
Heat Treated, 120/105 ksi Minimum Tensile Strength

A370-12Standard Test Methods and Definitions for
Mechanical Testing of Steel Products

A416/A416M-10Standard Specification for Steel Strand, Uncoated
Seven-Wire for Prestressed Concrete

A490-12Standard Specification for Heat Treated Steel
Structural Bolts, 150 ksi Minimum Tensile Strength

C31/C31M-10Standard Practice for Making and Curing Concrete
Test Specimens in the Field

C33/C33M-11aStandard Specification for Concrete Aggregates

C39/C39M-12Standard Test Method for Compressive Strength of
Cylindrical Concrete Specimens

C109/C109M-11b ...Standard Test Method for Compressive Strength of
Hydraulic Cement Mortars

C136-06Standard Test Method for Sieve Analysis of Fine and
Coarse Aggregates

C138/C138M-10b ...Standard Test Method for Density (Unit Weight),
Yield, and Air Content (Gravimetric) of Concrete

C140-12Standard Test Methods for Sampling and Testing
Concrete Masonry Units and Related Units

C143/C143M-10a ...Standard Test Method for Slump of Hydraulic Cement
Concrete

C172/C172M-10Standard Practice for Sampling Freshly Mixed
Concrete

C173/C173M-10b ...Standard Test Method for Air Content of freshly Mixed
Concrete by the Volumetric Method

C330/C330M-09Standard Specification for Lightweight Aggregates for
Structural Concrete

C567/C567M-11Standard Test Method for Density Structural
Lightweight Concrete

C780-11Standard Test Method for Pre-construction and
Construction Evaluation of Mortars for Plain and Reinforced Unit Masonry

C1019-11Standard Test Method for Sampling and Testing
Grout

C1064/C1064M-11..Standard Test Method for Temperature of Freshly
Mixed Portland Cement Concrete

C1077-11cStandard Practice for Agencies Testing Concrete and
Concrete Aggregates for Use in Construction and Criteria for Testing
Agency Evaluation

C1314-11aStandard Test Method for Compressive Strength of
Masonry Prisms

D422-63(2007).....Standard Test Method for Particle-Size Analysis of
Soils

D698-07e1Standard Test Methods for Laboratory Compaction
Characteristics of Soil Using Standard Effort

D1140-00(2006).....Standard Test Methods for Amount of Material in
Soils Finer than No. 200 Sieve

D1143/D1143M-07e1 Standard Test Methods for Deep Foundations
Under Static Axial Compressive Load

D1188-07e1Standard Test Method for Bulk Specific Gravity and
Density of Compacted Bituminous Mixtures Using Coated Samples

D1556-07Standard Test Method for Density and Unit Weight of
Soil in Place by the Sand-Cone Method

D1557-09Standard Test Methods for Laboratory Compaction
Characteristics of Soil Using Modified Effort (56,000ft lbf/ft³ (2,700
KNm/m³))

D2166-06Standard Test Method for Unconfined Compressive
Strength of Cohesive Soil

D2167-08).....Standard Test Method for Density and Unit Weight of
Soil in Place by the Rubber Balloon Method

D2216-10Standard Test Methods for Laboratory Determination
of Water (Moisture) Content of Soil and Rock by Mass

- D2974-07aStandard Test Methods for Moisture, Ash, and Organic Matter of Peat and Other Organic Soils
- D3666-11Standard Specification for Minimum Requirements for Agencies Testing and Inspecting Road and Paving Materials
- D3740-11Standard Practice for Minimum Requirements for Agencies Engaged in Testing and/or Inspection of Soil and Rock as used in Engineering Design and Construction
- D6938-10Standard Test Method for In-Place Density and Water Content of Soil and Soil-Aggregate by Nuclear Methods (Shallow Depth)
- E94-04(2010)Standard Guide for Radiographic Examination
- E164-08Standard Practice for Contact Ultrasonic Testing of Weldments
- E329-11cStandard Specification for Agencies Engaged in Construction Inspection, Testing, or Special Inspection
- E543-09Standard Specification for Agencies Performing Non-Destructive Testing
- E605-93(R2011)Standard Test Methods for Thickness and Density of Sprayed Fire Resistive Material (SFRM) Applied to Structural Members
- E709-08Standard Guide for Magnetic Particle Examination
- E1155-96(R2008) ...Determining FF Floor Flatness and FL Floor Levelness Numbers
- E. American Welding Society (AWS):
- D1.D1.1M-10Structural Welding Code-Steel

1.3. REQUIREMENTS:

- A. Accreditation Requirements: Construction materials testing laboratories must be accredited by a laboratory accreditation authority and will be required to submit a copy of the Certificate of Accreditation and Scope of Accreditation. The laboratory's scope of accreditation must include the appropriate ASTM standards (i.e.; E329, C1077, D3666, D3740, A880, E543) listed in the technical sections of the specifications. Laboratories engaged in Hazardous Materials Testing shall meet the requirements of OSHA and EPA. The policy applies to the specific laboratory performing the actual testing, not just the "Corporate Office."

- B. Inspection and Testing: Testing laboratory shall inspect materials and workmanship and perform tests described herein and additional tests requested by COR. When it appears materials furnished, or work performed by Contractor fail to meet construction contract requirements, Testing Laboratory shall direct attention of COR to such failure.
- C. Written Reports: Testing laboratory shall submit test reports to COR, Contractor, unless other arrangements are agreed to in writing by the COR. Submit reports of tests that fail to meet construction contract requirements on colored paper.
- D. Verbal Reports: Give verbal notification to COR immediately of any irregularity.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION

3.1. STRUCTURAL STEEL:

- A. General: Provide shop and field inspection and testing services to certify structural steel work is done in accordance with contract documents. Welding shall conform to AWS D1.1 Structural Welding Code.
- B. Prefabrication Inspection:
 - 1. Review design and shop detail drawings for size, length, type and location of all welds to be made.
 - 2. Approve welding procedure qualifications either by pre-qualification or by witnessing qualifications tests.
 - 3. Approve welder qualifications by certification or retesting.
 - 4. Approve procedure for control of distortion and shrinkage stresses.
 - 5. Approve procedures for welding in accordance with applicable sections of AWS D1.1.
- C. Fabrication and Erection:
 - 1. Weld Inspection:
 - a. Inspect welding equipment for capacity, maintenance and working condition.
 - b. Verify specified electrodes and handling and storage of electrodes in accordance with AWS D1.1.

- c. Inspect preparation and assembly of materials to be welded for conformance with AWS D1.1.
- d. Inspect preheating and interpass temperatures for conformance with AWS D1.1.
- e. Measure 25 percent of fillet welds.
- f. Verify that correction of rejected welds are made in accordance with AWS D1.1.
- g. Testing and inspection do not relieve the Contractor of the responsibility for providing materials and fabrication procedures in compliance with the specified requirements.

2. Bolt Inspection:

- a. Inspect high-strength bolted connections in accordance AISC Specifications for Structural Joints Using ASTM A325 or A490 Bolts.
- b. Slip-Critical Connections: Inspect 10 percent of bolts, but not less than 2 bolts, selected at random in each connection in accordance with AISC Specifications for Structural Joints Using ASTM A325 or A490 Bolts. Inspect all bolts in connection when one or more are rejected.
- c. Bolts installed by turn-of-nut tightening may be inspected with calibrated wrench when visual inspection was not performed during tightening.
- d. Snug Tight Connections: Inspect 10 percent of connections verifying that plies of connected elements have been brought into snug contact.
- e. Inspect field erected assemblies; verify locations of structural steel for plumbness, level, and alignment.

- D. Submit inspection reports, record of welders and their certification, and identification, and instances of noncompliance to COR.

3.2. OTHER INSPECTIONS:

- A. Inspect placement of epoxy embedded rods as indicated on the drawings.
- B. Inspect placement of grout for concrete repairs and for placement of base plates.

3.3. TYPE OF TEST:

A. Structural Steel:

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| 1. | Ultrasonic Testing of Welds (ASTM E164) | 2 |
| 2. | Radiographic Testing of Welds (ASTM E94) | 2 |

B. Inspection:

- | | | |
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| 1. | Technical Personnel (Man-days) | 1 |
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END OF SECTION 01 45 29