

**SECTION 32 05 23
CEMENT AND CONCRETE FOR EXTERIOR IMPROVEMENTS**

PART 1 - GENERAL**1.1 DESCRIPTION**

- A. This section shall cover site work concrete constructed upon the prepared subgrade and in conformance with the lines, grades, thickness, and cross sections shown. Construction shall include the following:
- B. Curb, combination curb and gutter.
- C. Pedestrian Pavement: Walks, grade slabs.
- D. Equipment Pads: Condenser Units, Lighting Protection Bases.

1.2 RELATED WORK

- A. Laboratory and Field Testing Requirements: Section 01 45 29, TESTING LABORATORY SERVICES.
- B. Subgrade Preparation: Section 31 20 00, EARTH MOVING.
- C. Concrete Materials, Quality, Mixing, Design and Other Requirements: Section 03 30 00, CAST-IN-PLACE-CONCRETE.

1.3 DESIGN REQUIREMENTS

Design all elements with the latest published version of applicable codes.

1.4 WEATHER LIMITATIONS

Placement of concrete shall be as specified under Article 3.8, COLD WEATHER and Article 3.7, HOT WEATHER of Section 03 30 00, CAST-IN-PLACE CONCRETE.

1.5 SUBMITTALS

- A. In accordance with Section 01 33 23, SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES, furnish the following:
- B. Manufacturers' Certificates and Data certifying that the following materials conform to the requirements specified.
 - 1. Expansion joint filler
 - 2. Hot poured sealing compound
 - 3. Reinforcement
 - 4. Curing materials
 - 5. Detectable Warning Panel
- C. Data and Test Reports
 - 1. Aggregate Base Course: Sources, gradation, liquid limit, plasticity index, percentage of wear, and other tests required by State Highway Department.
 - 2. Concrete and Reinforcing Steel: In accordance with Section 03 30 00, Cast-In-Place Concrete.

1.6 APPLICABLE PUBLICATIONS

- A. The publications listed below form a part of this specification to the extent referenced. The publications are referenced in the text by the basic designation only. Refer to the latest edition of all referenced Standards and codes.
- B. Virginia Department of Transportation (VDOT)
2007 Road and Bridge Specifications
- C. American Association of State Highway and Transportation Officials (AASHTO):
- M031MM031-07-UL.....Deformed and Plain Carbon-Steel Bars for
Concrete Reinforcement (ASTM A615/A615M-09)
- M055MM055-09-UL.....Steel Welded Wire Reinforcement, Plain, for
Concrete (ASTM A185)
- M147-65-UL.....Materials for Aggregate and Soil-Aggregate
Subbase, Base and Surface Courses (R 2004)
- M148-05-UL.....Liquid Membrane-Forming Compounds for Curing
Concrete (ASTM C309)
- M171-05-UL.....Sheet Materials for Curing Concrete (ASTM C171)
- M182-05-UL.....Burlap Cloth Made from Jute or Kenaf and Cotton
Mats
- M213-01-UL.....Preformed Expansion Joint Fillers for Concrete
Paving and Structural Construction
(Non-extruding and Resilient Bituminous Type)
(ASTM D1751)
- M233-86-UL.....Boiled Linseed Oil Mixer for Treatment of
Portland Cement Concrete
- T099-09-UL.....Moisture-Density Relations of Soils Using a 2.5
kg. (5.5 lb) Rammer and a 305 mm (12 in.) Drop
- T180-09-UL.....Moisture-Density Relations of Soils Using a 4.54
kg (10 lb.) Rammer and a 457 mm (18 in.) Drop
- D. American Society for Testing and Materials (ASTM):
- C94/C94M-09.....Ready-Mixed Concrete
- C143/C143M-09.....Slump of Hydraulic Cement Concrete

PART 2 - PRODUCTS**2.1 GENERAL**

Concrete shall be Type A3 concrete, as described in Section 217 of the VDOT Road and Bridge Specifications: Hydraulic Cement Concrete.

2.2 REINFORCEMENT

Steel reinforcement shall comply with Section 223 of the VDOT Road and Bridge Specifications: Steel Reinforcement.

2.3 AGGREGATE BASE

Aggregate base shall be 21B aggregate base coarse, as described in Section 203 of the VDOT Road and Bridge Specifications: Coarse Aggregate.

2.4 FORMS

Forms shall comply with section 316 of the VDOT Road and Bridge Specifications: Hydraulic Cement Concrete Pavement.

2.5 CONCRETE CURING MATERIALS

Curing materials shall comply with Section 220 of the VDOT Road and Bridge Specifications: Concrete Curing Materials

2.6 EXPANSION JOINT FILLERS

Material shall conform Section 212 of the VDOT Road and Bridge Specifications: Joint Materials.

2.7 DETECTABLE WARNING PLATES

Detectable warning plates shall comply with the details in the Plans, and shall consist of red-brick colored pre-fabricated wet-set polymer panels. Product shall be ADA Tile by ADA Solutions or approved equivalent.

PART 3 - EXECUTION**3.1 SUBGRADE PENETRATION**

- A. Prepare subgrade in accordance with Section 305 of the VDOT Road and Bridge Specifications: Subgrade and Shoulders.

3.3 SETTING FORMS

- A. Set forms in accordance with Section 316 of the VDOT Road and Bridge Specifications: Hydraulic Cement Concrete Pavement.

3.4 EQUIPMENT

- A. The VA shall approve equipment and tools necessary for handling materials and performing all parts of the work prior to commencement of work.
- B. Maintain equipment and tools in satisfactory working condition at all times.

3.5 PLACING REINFORCEMENT

- A. Set forms in accordance with Section 316 of the VDOT Road and Bridge Specifications: Hydraulic Cement Concrete Pavement.

3.6 PLACING AND FINISHING CONCRETE PAVEMENT

- A. Obtain approval of the VA before placing concrete.

- B. Place and finish concrete pavement in accordance with Section 316 of the VDOT Road and Bridge Specifications: Hydraulic Cement Concrete Pavement.

3.7 PLACING JOINTS

- A. Place joints, where shown, conforming to the details as shown, and perpendicular to the finished grade of the concrete surface.
- B. Joints shall be straight and continuous from edge to edge of the pavement.
- C. Place joints in accordance with Section 316 of the VDOT Road and Bridge Specifications: Hydraulic Cement Concrete Pavement.

3.8 DETECTABLE WARNING PLATES

- A. Set detectable warning plates in wet concrete in the curb ramp locations shown on the Plans. Install according to the manufacturer's instructions.

3.9 FORM REMOVAL

- A. Remove forms in accordance with Section 316 of the VDOT Road and Bridge Specifications: Hydraulic Cement Concrete Pavement.

3.10 CURING, CLEANING, AND JOINT SEALING OF CONCRETE

- A. Concrete curing, cleaning, and joint sealing shall be in accordance with Section 316 of the VDOT Road and Bridge Specifications: Hydraulic Cement Concrete Pavement.

3.11 PROTECTION

The contractor shall protect the concrete against all damage prior to final acceptance by the Government. Remove concrete containing excessive cracking, fractures, spalling, or other defects and reconstruct the entire section between regularly scheduled joints, when directed by the VA, and at no additional cost to the Government. Exclude traffic from vehicular pavement until the concrete is at least seven days old, or for a longer period of time if so directed by the VA.

3.12 FINAL CLEAN-UP

Remove all debris, rubbish and excess material from the site.

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