

## **SECTION 32 13 13 - CONCRETE PAVING**

### **PART 1 GENERAL**

#### **1.01 SECTION INCLUDES**

- A. Concrete sidewalks, integral curbs, gutters, and parking areas.

#### **1.02 RELATED REQUIREMENTS**

- A. Section 03 20 00 - Concrete Reinforcing.
- B. Section 03 30 00 - Cast-in-Place Concrete.
- C. Section 31 22 00 - Grading: Preparation of site for paving.
- D. Section 32 12 16 - Asphalt Paving: Asphalt wearing course.
- E. Section 32 17 13 - Parking Bumpers: Precast concrete parking bumpers.
- F. Section 32 17 26 - Tactile Warning Surfacing: Plastic tactile and detectable warning tiles for pedestrian walking surfaces.
- G. Section 33 05 13 - Manholes and Structures: Manholes, including frames; gutter drainage grilles, covers, and frames for placement by this section.

#### **1.03 REFERENCE STANDARDS**

- A. ACI 211.1 - Standard Practice for Selecting Proportions for Normal, Heavyweight, and Mass Concrete; 1991 (Reapproved 2009).
- B. ACI 301 - Specifications for Structural Concrete; 2010 (Errata 2012).
- C. ACI 305R - Hot Weather Concreting; 2010.
- D. ACI 306R - Cold Weather Concreting; 2010.
- E. ASTM C39/C39M - Standard Test Method for Compressive Strength of Cylindrical Concrete Specimens; 2015a.
- F. ASTM C94/C94M - Standard Specification for Ready-Mixed Concrete; 2015.
- G. ASTM C260/C260M - Standard Specification for Air-Entraining Admixtures for Concrete; 2010a.
- H. ASTM C685/C685M - Standard Specification for Concrete Made by Volumetric Batching and Continuous Mixing; 2014.
- I. ASTM D1751 - Standard Specification for Preformed Expansion Joint Filler for Concrete Paving and Structural Construction (Nonextruding and Resilient Bituminous Types); 2004 (Reapproved 2013).
- J. ASTM D1752 - Standard Specification for Preformed Sponge Rubber Cork and Recycled PVC Expansion Joint Fillers for Concrete Paving and Structural Construction; 2004a (Reapproved 2013).

#### **1.04 SUBMITTALS**

- A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide data on joint filler, admixtures, curing compound, and concrete mix design.
- C. Samples: Submit two sample panels, 12 by 12 inch in size illustrating exposed aggregate finish.
- D. Design Data: Indicate pavement thickness, designed concrete strength, reinforcement, and typical details.

### **PART 2 PRODUCTS**

#### **2.01 PAVING ASSEMBLIES**

- A. Comply with applicable requirements of State of Virginia Highways standard.

- B. Concrete Sidewalks, Curbs and Gutters: 3,000 psi 28 day concrete, buff color Portland cement, exposed aggregate finish.
- C. Parking Area Pavement: 3,000 psi 28 day concrete, wood float finish.

## **2.02 FORM MATERIALS**

- A. Wood form material, profiled to suit conditions.
- B. Joint Filler: Preformed; non-extruding bituminous type (ASTM D1751) or sponge rubber or cork (ASTM D1752).
  - 1. Thickness: 1/2 inch.

## **2.03 REINFORCEMENT**

- A. Reinforcing Steel and Welded Wire Reinforcement: Types specified in Section 03 20 00.
- B. Reinforcing Steel and Welded Wire Reinforcement: Types specified on plans.

## **2.04 CONCRETE MATERIALS**

- A. Obtain cementitious materials from same source throughout.
- B. Concrete Materials: Provide in accordance with State of Virginia Highways standards.
- C. Air-Entraining Admixtures: ASTM C260/C260M.

## **2.05 CONCRETE MIX DESIGN**

- A. Proportioning Normal Weight Concrete: Comply with ACI 211.1 recommendations.
- B. Concrete Strength: Establish required average strength for each type of concrete on the basis of tested mixtures, as specified in ACI 301.
  - 1. For trial mixtures method, employ independent testing agency acceptable to Architect for preparing and reporting proposed mix designs.
- C. Admixtures: Add acceptable admixtures as recommended in ACI 211.1 and at rates recommended by manufacturer.
- D. Fiber Reinforcement: Add to mix as recommended by manufacturer for specific project conditions.
- E. Concrete Properties:
  - 1. Compressive strength, when tested in accordance with ASTM C39/C39M at 28 days; As indicated on drawings.

## **2.06 MIXING**

- A. On Project Site: Mix in drum type batch mixer, complying with ASTM C685/C685M. Mix each batch not less than 1-1/2 minutes and not more than 5 minutes.
- B. Transit Mixers: Comply with ASTM C94/C94M.

## **PART 3 EXECUTION**

### **3.01 EXAMINATION**

- A. Verify compacted subgrade is acceptable and ready to support paving and imposed loads.
- B. Verify gradients and elevations of base are correct.

### **3.02 SUBBASE**

- A. See Section 32 11 23 for construction of base course for work of this Section.

### **3.03 PREPARATION**

- A. Moisten base to minimize absorption of water from fresh concrete.
- B. Coat surfaces of manhole and catch basin frames with oil to prevent bond with concrete pavement.
- C. Notify Architect minimum 24 hours prior to commencement of concreting operations.

### **3.04 FORMING**

- A. Place and secure forms to correct location, dimension, profile, and gradient.
- B. Assemble formwork to permit easy stripping and dismantling without damaging concrete.
- C. Place joint filler vertical in position, in straight lines. Secure to formwork during concrete placement.

### **3.05 REINFORCEMENT**

- A. Place reinforcement at midheight of slabs-on-grade.
- B. Interrupt reinforcement at contraction joints.
- C. Place dowels to achieve pavement and curb alignment as detailed.

### **3.06 COLD AND HOT WEATHER CONCRETING**

- A. Follow recommendations of ACI 305R when concreting during hot weather.
- B. Follow recommendations of ACI 306R when concreting during cold weather.
- C. Do not place concrete when base surface temperature is less than 40 degrees F, or surface is wet or frozen.

### **3.07 PLACING CONCRETE**

- A. Coordinate installation of snow melting components.
- B. Place concrete in accordance with State of Virginia Highways standards.
- C. Do not place concrete when base surface is wet.
- D. Ensure reinforcement, inserts, embedded parts, formed joints are not disturbed during concrete placement.
- E. Place concrete continuously over the full width of the panel and between predetermined construction joints. Do not break or interrupt successive pours such that cold joints occur.
- F. Apply surface retarder to all exposed surfaces in accordance with manufacturer's instructions.

### **3.08 JOINTS**

- A. Align curb, gutter, and sidewalk joints.
- B. Place 3/8 inch wide expansion joints at 20 foot intervals and to separate paving from vertical surfaces and other components.
  - 1. Form joints with joint filler extending from bottom of pavement to within 1/2 inch of finished surface.
  - 2. Secure to resist movement by wet concrete.
- C. Provide scored joints.
  - 1. At 4 feet intervals.
  - 2. Between sidewalks and curbs.
  - 3. Between curbs and pavement.
- D. Provide keyed joints as indicated.
- E. Saw cut contraction joints 3/16 inch wide at an optimum time after finishing. Cut 1/3 into depth of slab.

### **3.09 EXPOSED AGGREGATE**

- A. Wash scheduled concrete surfaces exposing aggregate to match sample panel.

### **3.10 FINISHING**

- A. Parking Paving: Light broom, texture perpendicular to pavement direction.
- B. Sidewalk Paving: Light broom, texture perpendicular to direction of travel with troweled and radiused edge.
- C. Curbs and Gutters: Light broom, texture parallel to pavement direction.

- D. Inclined Vehicular Ramps: Broomed perpendicular to slope.
- E. Place curing compound on exposed concrete surfaces immediately after finishing. Apply in accordance with manufacturer's instructions.

**3.11 TOLERANCES**

- A. Maximum Variation of Surface Flatness: 1/4 inch in 10 ft.
- B. Maximum Variation From True Position: 1/4 inch.

**3.12 FIELD QUALITY CONTROL**

- A. Compressive Strength Tests: ASTM C39/C39M; for each test, mold and cure three concrete test cylinders. Obtain test samples for every 100 cu yd or less of each class of concrete placed.
  - 1. Take one additional test cylinder during cold weather concreting, cured on job site under same conditions as concrete it represents.
  - 2. Perform one slump test for each set of test cylinders taken.
- B. Maintain records of placed concrete items. Record date, location of pour, quantity, air temperature, and test samples taken.

**3.13 PROTECTION**

- A. Immediately after placement, protect pavement from premature drying, excessive hot or cold temperatures, and mechanical injury.
- B. Do not permit pedestrian, vehicular, or construction traffic over pavement for 7 days minimum after finishing.

**END OF SECTION**