

## **SECTION 02751**

### **CEMENT CONCRETE PAVEMENT**

#### **1. PART 1 GENERAL**

##### **1.1 SECTION INCLUDES**

- A. Concrete sidewalks, pavement, and basketball courts.
- B. Finishing concrete pavements.
- C. Surface treatment.
- D. Aggregate base course.
- E. Concrete pavement striping.
- F. Steel reinforcement.

##### **1.2 REFERENCES**

- A. ACI 301 - Specifications for Structural Concrete for Buildings.
- B. ACI117 – Standard Specification for Tolerances for Concrete Construction and Materials.
- C. ADAAG - Americans with Disabilities Act (ADA) Accessibility Guidelines for Buildings and Facilities.
- D. ASTM A82 - Specification for Steel Wire, Plain, for Concrete Reinforcement.
- E. ASTM A185 - Welded Steel Wire Fabric for Concrete Reinforcement.
- F. ASTM A184 - Specification for Fabricated Deformed Steel Bar Mats for Concrete.
- G. ASTM D1751 - Preformed Expansion Joint Fillers for Concrete Paving and Structural Construction.
- H. ASTM A615 - Deformed and Plain Billet-Steel for Concrete Reinforcement.
- I. ASTM C33 - Concrete Aggregates.
- J. ASTM C94 - Ready Mixed Concrete.
- K. ASTM C150 - Portland Cement.
- L. ASTM C260 - Air-Entraining Admixtures for Concrete.
- M. ASTM C289 - Potential Reactivity of Aggregates.
- N. ASTM C309 - Liquid Membrane-Forming Compounds for Curing Concrete.
- O. ASTM C494 - Chemical Admixtures for Concrete.

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- P. ASTM C618- Standard Specification for Coal Fly Ash and Raw or Calcined Natural Pozzolan for Use as a Mineral Admixture for Concrete.
- Q. ASTM C979 – Pigments of Integrally Colored Concrete.
- R. ASTM C1116 - Specification for Fiber-Reinforced Concrete and Shotcrete.
- S. CBC – California Building Code (CCR) California Code of Regulations, Title 24, Part 2, California State Accessibility Standards.
- T. DSA/AC – Division of State Architect / Access Compliance
- U. National Ready Mix Concrete Association - Plant Certification Program.
- V. Southern California Chapter, American Public Works Association – Standard Specifications for Public Works Construction.
- W. Stormwater Best Management Practice Handbook (BMP Handbook), Construction Edition, as published by the California Storm Water Quality Association.

### 1.3 QUALITY ASSURANCE

- A. Perform work in accordance with ACI 301.
- B. Obtain materials from same source throughout.

### 1.4 QUALIFICATIONS

- A. Manufacturer: Manufacturer of ready-mix concrete products complying with ASTM C94 requirements for production facilities and equipment. Certified according to National Ready Mix Concrete Association's Plant Certification Program.
- B. Installer: Company who has completed pavement work similar in material, design, and extent to that indicated for this project.

### 1.5 REGULATORY REQUIREMENTS

- A. Conform to applicable code for paving work on public property.
- B. Conform to (CBC) California Building Code, (CCR) Title 24, Part 2, and ADAAG for access requirements for individuals with disabilities.

### 1.6 ENVIRONMENTAL REQUIREMENTS

- A. Provide concrete curing, finishing, and waste management techniques as defined in Section 4 of the Storm Water Best Management Practice Handbook, (BMP Handbook) Construction Edition.

### 1.7 SUBMITTALS

- A. Submit product data under provisions of the General Conditions.

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- B. Include data on joint filler, admixtures and curing compounds.
- C. Submit proposed mix design to testing laboratory and to Architect for review prior to commencement of work.
- D. Submit manufacturer's instructions under provisions of the General Conditions.

## 2.PART 2 PRODUCTS

### 2.1 CONCRETE MATERIALS

- A. Cement: ASTM C150 Normal-Type I Portland type, gray color, from single source throughout project.
- B. Fine and Coarse Aggregates: ASTM C33, non-reactive when tested in accordance with ASTM C289 and Appendix X-1 of ASTM C33.
- C. Water: Clean and not detrimental to concrete.

### 2.2 BASE MATERIALS

- A. Aggregate Base: Crushed miscellaneous base conforming to Section 200-2.2 of the Standard Specifications for Public Works Construction.

### 2.3 FORM MATERIALS

- A. Conform to ACI 301.

### 2.4 REINFORCEMENT

- A. Reinforcing Steel: ASTM A615; 60 ksi yield grade; deformed billet steel bars, uncoated finish.
- B. Welded Steel Wire Fabric: Plain type, ASTM A185; in coiled rolls or flat sheets; uncoated finish.
- C. Fabricated Bar Mats: ASTM A184; welded or clip-assembled steel bar mats of ASTM A615, Grade 60 steel bars.
- D. Tie Wire: ASTM A82, annealed steel, minimum 16 gage size.
- E. Dowels: ASTM A615; 40 ksi yield grade, plain steel, uncoated finish.
- F. Supports: Chairs, spacers, dowel bar supports and other devices for spacing, supporting and fastening reinforcing bars, welded wire fabric, and dowels in place.

### 2.5 ACCESSORIES

- A. Curing Compound: ASTM C309, Type 1-D, Class B.
- B. Preformed Joint: ASTM D1751, 3/8 inch thick.

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C. Joint Sealers: ASTM C1193, install in accordance with manufacturer's instructions.

## 2.6 ADMIXTURES

A. Air Entrainment: ASTM C260.

B. Fly Ash: ASTM C618, Class F.

C. Water Reducing Admixture: ASTM C494, Type A.

D. Colored Concrete Pigment: ASTM C979 of color selected.

## 2.7 CONCRETE MIX

A. Mix concrete in accordance with ASTM C94, Alternative No. 3.

B. Provide concrete of the following characteristics:

1. Sidewalks, pavement, and basketball courts: Compressive Strength of 3,500 psi at 28 days.
2. Slump: 4 inches maximum.
3. Maximum aggregate size: 1 inch.
4. Cement Content: Minimum 540 lbs/cu. yd.
5. Fly Ash: Maximum 25 percent by weight.
6. Air Entrainment: 2 to 4 percent.
7. Water Cement Ratio: 0.45.
8. Integral Coloring: Where integral color is designated, provide 5 pounds of colored pigment per sack of cement.

## 2.8 PAVEMENT STRIPING PAINT

A. Vinyl emulsion type, black color.

B. Acceptable products:

1. W801 Vin-L-Stripe Traffic Paint, manufactured by Dunn-Edwards, [www.dunnedwards.com](http://www.dunnedwards.com).
2. 506 Traffic Line Paint-Vinyl, manufactured by Frazee, [www.frazeepaint.com](http://www.frazeepaint.com).

C. Substitutions: Under provisions of the General Conditions.

## 3. PART 3 EXECUTION

### 3.1 INSPECTION

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- A. Verify compacted subgrade is ready to support paving and imposed loads.
- B. Verify gradients and elevations of base are correct.
- C. Beginning of installation means acceptance of existing conditions.

### 3.2 BASE

- A. Prepare and compact base materials in accordance with Section 200-2.2 of the Standard Specifications for Public Works Construction.

### 3.3 PREPARATION

- A. Moisten base to minimize absorption of water from fresh concrete.
- B. Coat surfaces of adjacent manholes, catch basins, inlets, and other fixed objects with oil to form isolation joint and prevent bond with paving.

### 3.4 FORMING

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

### 3.5 REINFORCEMENT

- A. Place reinforcement at mid-height of slabs-on-grade.
- B. Lap adjoining pieces of welded wire fabric one full mesh and lace splice with wire. Offset laps of adjoining sheets.
- C. Place fabricated bar mats in lengths as long as practical. Overlap adjacent mat 2 inches.
- D. Interrupt reinforcement at expansion joints.
- E. Place reinforcement to achieve slab and curb alignment as detailed.
- F. Provide doweled joints at interruption of concrete with one end of dowel set in capped sleeve to allow longitudinal movement.

### 3.6 PLACING CONCRETE

- A. Place concrete in accordance with ACI 301.
- B. Hot and Cold Weather Placement: ACI 301.
- C. Place concrete formwork on public property in conformance with applicable code.

- D. Ensure reinforcement, inserts, embedded parts, and formed joints are not disturbed during concrete placement.
- E. Place concrete continuously between predetermined construction joints and control joints. See drawings for layout.
- F. Do not push or drag concrete into place or use vibrators to move concrete into place.
- G. Place concrete to pattern indicated in strip sequence.
- H. Placing During Warm Weather: The temperature of the concrete as placed shall not exceed 85 degrees F except where an approved retarder is used. The mixing water and/or aggregates should be cooled, if necessary, to maintain a satisfactory placing temperature. The placing temperature shall not exceed 95 degrees F at any time.

### 3.7 JOINTS

- A. Review locations of joints when indicated and make recommendations for any additional joints or suggestions for new locations. Lack of joints or misplacement of joints will not constitute justification of pavement cracking.
- B. Place construction joints at indicated intervals per drawings to correct elevation and profile.
- C. Place joint filler between paving components and building or other appurtenances. Recess top of filler for sealant placement in accordance with manufacturer's instructions.
- D. Provide control joints at indicated intervals per drawings.
- E. Saw cut and hand tool control joints 3/16 inch wide at an optimum time after finishing. Cut 1/3 into depth of slab.
- F. Finish each edge of joint with radiused jointer tool.
- G. Form isolation joints where paving abutts curbs, sidewalks, footings, structures, and other fixed objects.

### 3.8 FINISHING

- A. Uniformly spread, screed and consolidate concrete. Do not spread concrete by vibration.
- B. Medium Broom Finish:
  - 1. Float surface and trowel to smooth even finish.
  - 2. While surface is still plastic draw a soft fiber bristle broom uniformly over surface in perpendicular direction to traffic.

### 3.9 CURING

- A. Cure concrete surfaces in accordance with ACI 301.
- B. Apply curing compound on finished slab surfaces in accordance with manufacturer's instructions.

### 3.10 PAVEMENT STRIPING

- A. Lay out line markings and other painting in accordance with Drawings.
- B. Clean surfaces to be painted.
- C. Apply paint in accordance with manufacturer's directions.
- D. Apply only when weather conditions permit proper application.
- E. Machine apply paint in as many coats as are required to provide opaque markings.

### 3.11 FIELD QUALITY CONTROL

- A. Field inspection and testing will be performed under provisions of the General Conditions.
- B. Owner's Inspector will take cylinders and perform slump and air entrainment tests in accordance with ACI 301 and will arrange for pick-up of cylinders by Testing Laboratory.
- C. Three concrete test cylinders will be taken for every 50 or less cu yds of each class of concrete placed each day.
- D. One slump test will be taken for each set of test cylinders taken.
- E. Maintain records of placed concrete items. Record date, location of pour, quantity, air temperature, and test samples taken.

### 3.12 TOLERANCES

- A. Provide tolerances under provisions of the General Conditions in accordance with ACI117.
- B. Maximum Variation of Surface Flatness: 1/4 inch in 10 feet.
- C. Maximum Variation from True Position: 1/4 inch.
- D. Variation of Pavement Thickness: Plus 3/8 inch, minus 1/4 inch.
- E. Maximum Variation of Pavement Joints: 1/8 inch vertical alignment.
- F. Flood Test: All concrete basketball courts and concrete pavement shall be given a flood test. All concrete work where water ponds more than 1/4 inch and does not run off or evaporate within a reasonable amount of time not to

exceed 4 hours, the concrete work shall be removed to the nearest score or joint line and replaced to provide proper drainage.

### 3.13 PROTECTION

- A. Immediately after placement, protect concrete under provisions of the General Conditions from premature drying, excessive hot or cold temperatures, and mechanical injury. Provide temporary and removal protection for installing paving. Control activity in immediate work area to avoid damage.
- B. Do not permit traffic over pavement for 7 days after finishing.

END OF SECTION