

**SECTION 02520**

**PORTLAND CEMENT CONCRETE PAVING**

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## SECTION 02520

### PORTLAND CEMENT CONCRETE PAVING

#### **PART 1 - GENERAL**

##### **1.01 SUMMARY**

- A. Concrete paving median barriers, sidewalks, and loading dock areas. **(SPECIFICATION WRITER TO VERIFY SUMMARY)**

##### **1.02 RELATED SECTIONS:**

- A. Section 02100 - Site Preparation **check cross references**
- B. Section 02227 - Aggregate Materials **check cross references**
- C. Section 02505 - Paving Base Course **check cross references**
- D. Section 02525 - Curbs and Sidewalks **check cross references**
- E. Section 02584 - Pavement Markings **check cross references**
- F. Section 03300 - Cast-in-place Concrete (See Architectural/Building Specifications). **check cross references**
- G. Maine Department of Transportation Standard Specifications
- H. Construction Documents.

##### **1.03 REFERENCES**

- A. ACI 301 - Specifications for Structural Concrete for Buildings.
- B. ACI 304 - Recommended Practice for Measuring, Mixing, Transporting
- C. ANSI/ASTM A185- Welded Steel Wire Fabric for Concrete Reinforcement.
- D. ANSI/ASTM A497 - Welded Deformed Steel Wire Fabric for Concrete Reinforcement.
- E. ANSI/ASTM D1751 - Preformed Expansion Joint Fillers for Concrete Paving and Structural construction.
- F. ANSI/ASTM D1752 - Preformed Sponge Rubber and Cork Expansion Joint Fillers for Concrete Paving and Structural Construction.
- G. ASTM A615 - Deformed and Plain Billet - Steel for Concrete Reinforcement.
- H. ASTM C33 - Concrete Aggregates.
- I. ASTM C94 - Ready Mix Concrete.
- J. ASTM C150 - Portland Cement
- K. ASTM C260 - Air-Entraining Admixtures for Concrete.

- L. ASTM C309 - Liquid Membrane-Forming Compounds for Curing Concrete.
- M. ASTM C494 - Chemical Admixtures for Concrete.
- N. FA TT-C-800 - Curing Compound, Concrete, for New and Existing Surfaces.

#### **1.05 PERFORMANCE REQUIREMENTS**

- A. Contractor shall maintain access for vehicular and pedestrian traffic as required for other construction activities. Utilize temporary striping, flagmen, barricades, warning signs, and warning lights as required.

### **PART 2 - PRODUCTS**

#### **2.01 MATERIALS**

- A. Forms: Steel, wood, or other suitable material of size and strength to resist movement during concrete placement and to retain horizontal and vertical alignment until removal. Use straight forms, free of distortion and defects. Use flexible spring steel forms or laminated boards to form radius bends as required. Coat forms with nonstaining type coating that will not discolor or deface surface of concrete.
- B. Welded Wire Mesh: Welded plain cold-drawn steel wire fabric, ASTM 185. Furnish in flat sheets, not rolls, unless otherwise acceptable to Owner.
- C. Reinforcing Bars: Deformed steel bars, ASTM A 615, Grade 40.
- D. Concrete Materials: Comply with requirements of applicable Division 3 sections for concrete materials, admixtures, bonding materials, curing materials, and others as required.
- E. Joint Fillers: Resilient premolded bituminous impregnated fiberboard units complying with ASTM D 1751 FS HH-F-341, Type II, Class A; or AASHTO M 153, Type I.
- F. Joint Sealers: Non-priming, pourable, self-leveling polyurethane. Acceptable sealants are Sonneborn "Sonolastic Paving Joint Sealant", Sonneborn "Sonomeric CT 1 Sealant", Sonneborn "Sonomeric CT 2 Sealant", Mameco "Vulken 45", or Woodmont Products "Chem-Caulk".

#### **2.02 MIX DESIGN AND TESTING**

- A. Concrete mix design and testing shall comply with requirements of applicable Section 03300.
- B. Design mix to produce normal weight concrete consisting of Portland cement, aggregate, water-reducing admixture, air-entraining admixture, and water to produce the following properties:
  - 1. Compressive Strength: 4,000 psi, minimum at 28 days, unless otherwise indicated on the Drawings.
  - 2. Slump Range: 3"-5" for normal concrete at time of placement
  - 3. Air Entrainment: 4% to 6%

## **PART 3 - EXECUTION**

### **3.01 PREPARATION**

- A. Proof-roll prepared base material surface to check for unstable areas. The paving work shall begin after the unsuitable areas have been corrected and are ready to receive paving. Compaction testing for the base material shall be completed prior to the placement of the paving.
- B. Surface Preparation: Remove loose material from compacted base material surface immediately before placing concrete.

### **3.02 INSTALLATION**

#### A. Form Construction

- 1. Set forms to required grades and lines, rigidly braced and secured.
- 2. Install sufficient quantity of forms to allow continuance of work and so that forms remain in place a minimum of 24 hours after concrete placement.
- 3. Check completed formwork for grade and alignment to following tolerances:  

Top of forms not more than 1/8" in 10'-0". Vertical face on longitudinal axis, not more than 1/4" in 10'-0".
- 4. Clean forms after each use, and coat with form release agent as often as required to ensure separation from concrete without damage.

- B. Reinforcement: Locate, place and support reinforcement per Division 3 specifications. For areas to be paved with Portland Cement Concrete, six-inch by six-inch welded wire fabric reinforcement shall be installed per typical detail contained on the Contract Drawings.

#### C. Concrete Placement

- 1. Do not place concrete until base material and forms have been checked for line and grade. Moisten base material if required to provide uniform dampened condition at time concrete is placed. Concrete shall not be placed around manholes or other structure until they are at the required finish elevation and alignment.
- 2. Place concrete using methods which prevent segregation of mix. Consolidate concrete along face of forms and adjacent to transverse joints with internal vibrator. Keep vibrator away from joint assemblies, reinforcement, or side forms. Consolidate with care to prevent dislocation of reinforcing, dowels, and joint devices.
- 3. Deposit and spread concrete in continuous operation between transverse joints, as far as possible. If interrupted for more than 1/2 hours, place construction joint.

- D. Joint Construction: Construct expansion, weakened-plane Control (contraction), and construction joints straight with face perpendicular to concrete surface. Construct transverse joints perpendicular to centerline, unless otherwise detailed.
1. Weakened-Plane Control (Contraction) Joints: Provide joints at a spacing of 40' - 0" o.c. maximum each way. Construct control joints for depth equal to at least 1/4 concrete thickness, as follows:
    - a. Form tooled joints in fresh concrete by grooving top portion with recommended tool and finishing edges with jointer.
    - b. Form sawed joints using powered saws equipped with shatterproof abrasive or diamond-rimmed blades. Cut joints into hardened concrete as soon as surface will not be torn, abraded, or otherwise damaged by cutting action.
  2. Construction Joints: Place concrete joints at end of placements and at locations where placement operations are stopped for period of more than 1/2 hours, except where such placements terminate at expansion joints. Construct joints using standard metal keyway-section forms. No. 5 x 2 1/2" Tee dowels at 18- to 40-inch center to center spacing shall be installed at all construction joints.
  3. Expansion Joints: Provide premolded joint filler for expansion joints abutting concrete curbs, catch basins, manholes, inlets, structures, walks, and other fixed objects. Expansion joint spacing of 80 to 120 feet.
- E. Joint Fillers: Extend joint fillers full-width and depth of joint, and not less than 1/2" or more than 1" below finished surface where joint sealer is indicated. If not joint sealer, place top of joint filler flush with finished concrete surface. Furnish joint fillers in one-piece lengths for full width being placed, wherever possible. Where more than one length is required, lace or clip joint filler section together.
- F. Joint Sealants: Exterior pavement joint sealants shall be installed per manufacturer's recommendations.

### **3.03 COLD WEATHER PLACING**

- A. Protect concrete work from physical damage or reduced strength which could be caused by frost, freezing actions or low temperatures, in compliance with ACI 306 and as specified herein. All expenses associated with the protective measures, temporary heating, etc. shall be at the expense of the Contractor.

When air temperature has fallen to or is expected to fall below 40 degrees F (4 deg. C) uniformly heat water and aggregates before mixing to obtain a concrete mixture temperature of not less than 50 degrees F (10 deg. C) and not more than 80 degrees F (27 deg. C) at point of placement.

Do not use frozen materials or materials containing ice or snow. Do not place concrete on frozen subgrade or subgrade containing frozen materials.

Do not use calcium chloride, salt, and other materials containing antifreeze agents or chemical agents, unless otherwise accepted in mix design.

### **3.04 CONCRETE FINISHING**

- A. After striking off and consolidating concrete, smooth surface by screeding and floating. Adjust floating to compact surface and produce uniform texture. After floating, test surface for trueness with 10'-0" straightedge. Distribute concrete as required to remove surface irregularities, and refloat repaired areas to provide continuous smooth finish.
- B. Work edges of slabs, gutters, back top edge of curb, and formed joints with an edging tool, and round to 1/2" radius. Eliminate tool marks on concrete surface. After completion of floating and troweling when excess moisture or surface sheen has disappeared, complete surface finishing, as follows:
  - 1. Inclined Slab Surfaces: Provide coarse, nonslip finish by scoring surface with stiff-bristled broom perpendicular to line of traffic.
  - 2. Paving: Provide coarse, nonslip finish by scoring surface with stiff-bristled broom perpendicular to line of traffic.
- C. Do not remove forms for 24 hours after concrete has been placed. After form removal, clean ends of joints and point up any minor honeycombed areas. Remove and replace areas or sections with major defects, as directed.
- D. Protect and cure finished concrete paving using acceptable moist-curing methods, more particularly described in the "water-curing" section of ACI 308-81.

### **3.05 CLEANING AND ADJUSTING**

- A. Sweep concrete pavement and wash free of stains, discolorations, dirt, and other foreign material just prior to final inspection.
- B. Protect concrete from damage until acceptance of work. Exclude traffic from pavement for at least 14 days after placement. When construction traffic is permitted, maintain pavement as clean as possible by removing surface stains and spillage of materials.

### **3.06 FIELD QUALITY CONTROL**

An independent testing laboratory shall randomly core the pavement at a minimum rate of one core per 20,000 square feet or portion thereof of concrete pavement. In no case shall less than one core be obtained. Core shall be tested for thickness and quality of aggregate distribution.

Core holes shall be patched immediately with Portland cement concrete conforming to paragraph 2.02, and shall be finished to provide a level surface conforming to paragraph 3.04A above.

**---END OF SECTION 02520---**