

SECTION 32 13 13

PORTLAND CEMENT CONCRETE PAVING

PART 1 GENERAL

1.1 SUMMARY

- A. Arkansas Department of Transportation specifications and those noted on the drawings shall supersede respective items contained in this section.
- B. Related Sections:
 - Section 31 23 00: Earthwork
 - Section 32 11 16: Crushed Stone Base Course
 - Section 03 11 00: Concrete Form Work
 - Section 03 21 00: Concrete Reinforcement
 - Section 03 30 00: Cast-in-Place Concrete
 - Section 07 92 00: Joint Sealant

1.2 PROJECT CONDITIONS

- A. Traffic Control:
 - Maintain access for vehicular and pedestrian traffic as required for other construction activities.
- B. Utilize flagmen, barricades, warning signs, and warning lights as required.

1.3 REFERENCES

- A. ARDOT Specifications

PART 2 PRODUCTS

2.1 MATERIALS

- A. Forms:
 - 1. 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.
 - 2. Use flexible spring steel forms or laminated boards to form radius bends as required.
 - 3. Form Release Agent: Coat forms with non-staining type coating that will not discolor or deface surface of concrete.
- B. Welded Wire Mesh: Welded plain cold-drawn steel wire fabric, ASTM A 185. Furnish in flat sheets, not rolls.
- C. Reinforcing Bars: Deform 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 pre-molded bituminous impregnated fiberboard units complying with ASTM D 1751 FS HH-F-341, Type II, Class A; or AASHTO M 153, Type I.
- F. Curing Compound: FS TT-C-800, with a minimum of 17% solids content.

2.2 MIXING

- A. Concrete Mix, Design and Testing: Comply with requirements of applicable Section 03 30 00 for concrete mix design, sampling and testing, and quality control.
- B. Design mix to produce normal weight concrete consisting of portland cement, aggregate, water-reducing or high-range water-reducing admixture (super-plasticizer), air-entraining admixture and water to produce following properties:
- C. Compressive Strength: 4,000 psi, minimum at 28 days.
- D. Slump Range: 8" for concrete containing HRWR admixture(super- plasticizer); 3"-5" for other concrete.
- E. Air Content: 5% to 7%.

PART 3 EXECUTION

3.1 PREPARATION

- A. Surface Preparation: Remove loose material from compacted base material surface immediately before placing concrete.
- B. 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.

3.2 CONCRETE INSTALLATION

- A. Form Construction:
 - 1. Set forms to required grades and lines, rigidly braced and secured. Install sufficient quantity of forms to allow continuous progress of work and so that forms can remain in place at least 24 hours after concrete placement.
 - 2. Check completed form work for grade and alignment to following tolerances:
 - 3. Top of forms not more than 1/8" in 10'-0".
 - 4. Vertical face on longitudinal axis, not more than 1/4" in 10'-0".

5. Clean forms after each use, and coat with form release agent as often as required to ensure separation from concrete without damage.
6. Reinforcement: Locate, place, and support reinforcement as specified in Division 3 sections.

B. Concrete Placement:

1. Paving thicknesses are as follows:
 - a. Heavy Duty Paving: 6" concrete.
2. Comply with requirements of Section 03 30 00 for mixing and placing concrete.
3. 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 be placed around manholes or other structures until they are at the required finish elevation and alignment.
4. 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.
5. 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.

3.3 JOINT CONSTRUCTION

- A. Provide joints as shown on drawings and as specified, but in no case exceed requirements of ACI 302.1R and 316R code requirements.
- B. Construction expansion, weakened-plane (contraction), and construction joints true-to-line with face perpendicular to surface of concrete. Construct transverse joints at right angles to centerline, unless otherwise indicated.
- C. Weakened-Plane (Contraction) Joints: Provide weakened-plane(contraction) joints, sectioning concrete into areas at 15'-0" o.c. maximum each way. Construct weakened-plane joints for depth equal to at least 1/4 concrete thickness, as follows:
- D. Tooled Joints: Form weakened-plane joints in fresh concrete by grooving top portion with recommended cutting tool and finishing edges with jointer.
- E. Sawed Joints: Form weakened-plane 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.
- F. Construction Joints:
 1. Place concrete joints at end of placements and at locations where placement operations are stopped for period of more than 1/2 hour, except where such placements terminate at expansion joints.
 2. Construct joints using standard metal keyway-section forms.

G. Expansion Joints:

1. Provide pre-molded joint filler for expansion joints abutting concrete curbs, catch basins, manholes, inlets, structures, walks, and other fixed objects.
2. Locate expansion joints at 60'-0" o.c. maximum for each pavement lane.

H. Joint Fillers:

1. 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 no joint sealer, place top of joint filler flush with finished concrete surface.
2. Furnish joint fillers in one-piece lengths for full width being placed, wherever possible. Where more than one length is required, lace of clip joint filler sections together.

I. Joint Sealants:

1. Exterior pavement joint sealants shall composed of a non-priming, pourable, self-leveling type of a coal tar modified polyurethane, or a polyurethane, sealant suitable for use in pavements and sidewalks.

3.4 CONCRETE FINISHING

- A. After striking-off and consolidating concrete, smooth surface by screeding and floating. Adjust floating to compact surface and produce uniform texture.
- B. After floating, test surface for trueness with 10'-0" straightedge. Distribute concrete as required to remove surface irregularities and re-float repaired areas to provide continuous smooth finish.
- C. Work edges of slabs, back top edge of gutter, and formed joints with an edging tool, and round to 1/2" radius. Eliminate tool marks on concrete surface.
- D. After completion of floating and troweling when excess moisture or surface sheen has disappeared, complete surface finishing, as follows:
 1. Broom finish by drawing fine-hair broom across concrete surface perpendicular to line of traffic. Repeat operation if required to provide fine line texture. Inclined Slab Surfaces: Provide coarse, non-slip finish by scoring surface with stiff-bristled broom perpendicular to line traffic.
- F. 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.
- G. Protect and cure finished concrete paving using acceptable moist-curing methods.

3.5 CLEANING AND ADJUSTING

- A. Repair or replace broken or defective concrete, as directed.

- 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.
- C. Sweep concrete pavement and wash free of stains, discolorations, dirt, and other foreign material just prior to final inspection.

3.6 TESTING AND SAMPLING:

- A. Slump Tests: A minimum of two slump tests shall be made each day concrete is placed with one test being made at the time test cylinders are made. Slump tests are to be made in accordance with "Method of Test for Slump of Portland Cement Concrete" (ASTM C-143-78). Where slump exceeds five inches (5") or the average 28 day strength of the three test specimens falls below the strength specified (3000 p.s.i.) for the class of concrete tested, or below proportional minimum 7 day strengths, (2,400 psi) the proportions, water content or temperature conditions shall be changed to secure the required properties, and, at the discretion of the Architect, portions of the structure containing such concrete shall be removed and replaced, or reinforced as necessary.
- B. Strength Tests: Compression strength test shall be performed in accordance with "Method of Test for Compressive Strength of Molded Concrete Cylinders" (ASTM C39-81). Samples for concrete cylinders shall be made in accordance with "Method of Sampling Fresh Concrete" (ASTM C172-82), and test cylinders shall be prepared and laboratory cured in accordance with "Method of Making and Curing Concrete Compression and Flexure Test in the Field" (ASTM C31-69).
- C. Cylinders: Three cylinders from the same batch shall be made for each 50 cubic yards or fraction thereof placed, but not less than three cylinders for each day of concrete operations shall be made. Location of batch as to placement on the subject shall be noted, and cylinders so designated. No tests shall be required for sidewalks. One cylinder shall be tested at 7 days and two at 28 days.
- D. A minimum of 9 cylinders shall be tested for each class of concrete used on the project and the average of any three consecutive strength tests at 28 days shall be equal to or greater than the specified strength. Result of any individual strength test shall not be less than 500 p.s.i. of required fc.
- E. Contractor shall bear expense of all testing by a recognized licensed engineer.

END OF SECTION