

SECTION 4100 - CONCRETE PAVEMENT AND FLATWORK

PART 1 - GENERAL

1.01 SCOPE: This Section covers installation of portland cement concrete street pavement, curbs and gutters, sidewalks, steps, ADA ramps, median paving, driveways, drainage ditch lining, and spillway lining. Topics covered are permit and inspection requirements formwork, reinforcement placing, concrete placing, joints, connection of patches to existing pavement, finishing, curing, opening to traffic, and tolerances.

1.02 RELATED WORK: Refer to the following sections for related work:

Permits	Section 1000- General Requirements
Subgrade Preparation	Section 2000- Earthwork
Pavement Removal	Section 2200- Subgrade Preparation and Pavement Milling
Profilograph Requirements	Section 3200- Pavement Trueness
Concrete Mixes and Weather Limits	Section 4000- Concrete Materials and Methods
Reinforcing Supports	Section 4000- Concrete Materials and Methods

1.03 INSPECTIONS: A minimum of two inspections by a Unified Government representative are required: formwork and reinforcing inspection including string line inspection for curb and gutter, prior to ordering concrete; and final inspection after curing period is complete.

1.04 PERMITS: Permits that may be required for pavement and flatwork construction are: driveway permit for construction, alteration, or repair of a driveway; and right-of-way use permit for any other construction, repair, or patching of curbs, sidewalks, pavements, or medians in the right-of-way. A minimum of two inspections by a Unified Government representative are required for driveways: formwork and reinforcing inspection, including string line inspection for curb and gutter, prior to ordering concrete; and final inspection after curing period is complete.

PART 2 - PRODUCTS

2.01 GENERAL: Concrete mix designs are specified elsewhere; see Related Work in Part 1 of this Section.

2.02 EXPANSION JOINTS: Joint materials shall comply to the following specifications:

A. Driveways, Sidewalks, and Joints Between Sidewalk and Curb: Joint filler shall be one of the following:

- a. Zip strip: All wood fiber with weather and termite resisting additives and shall meet ASTM D1751 nonextruding type (Homex 300 by Homasote Co., or equal). Joint filler

shall be manufactured with 1/2-inch deep pull strip to guarantee uniform depth of joint recess.

- b. Resilient bituminous type filler ASTM D1751, nonextruding bituminous type.
 - B. Street Pavements and Curbs: Joint filler shall conform to ASTM D1751, nonextruding bituminous type.
 - C. Joint sealant shall be hot type joint sealing compound meeting the requirements of ASTM D1190, hot-poured mastic type.
- 2.03 DETECTABLE WARNING:** Material for detectable warnings for curb ramps shall be wet set, solid panels. Panel size shall be nominal 24"x24" with a minimum thickness of 7/8". Panels shall be manufactured from either air entrained concrete or Portland cement. Panels shall have minimum 6,000 psi compressive strength. Alternate material, cast grey iron ASTM A48 Class 35B. Manufacturer's installation template shall be used to place panels. Pre-approved models include:
- A. CASTinTACT panels, by MASCO
 - B. Detectable warning panels, by M R Casting, Inc.
 - C. DetectaShield panels, by Maher Products, Inc.
 - D. Detectable Warning Plates, by Neenah Foundry Company
 - E. Or other approved equal panel

PART 3 - EXECUTION

- 3.01 GENERAL:** General placing and curing requirements and weather limitations are specified elsewhere; see Related Work in Part 1 of this Section. The following requirements are in addition to the referenced section.
- 3.02 FORMS:** Metal forms shall be used for street pavement and curb and gutter, except wood or masonite forms may be used to form radiuses or where approved by Engineer. Alternatively, slip forming may be used in lieu of metal forms. The machine shall be equipped with vibrators and be capable of placing concrete to the specified cross section, thickness, line, and grade within the allowable tolerances.
- 3.03 REINFORCEMENT:** Reinforcement shall be placed as indicated or specified. Reinforcing shall be supported on chairs, see reference Part 1. Lap splices shall be Class B as defined by ACI 318 unless otherwise indicated or specified. Reinforcing of pavement on grade shall be at least 3 inches clear of subgrade and 2 inches clear of other surfaces.
- 3.04 EXPANSION JOINTS:** Joints shall be placed where directed by Engineer, where indicated on the drawings or Special Conditions, and as required below:

- A. Expansion joint filler shall extend the entire width of the pavement from the subgrade to 1/2-inch below the surface of the pavement. Joint filler shall be secured so that it will not move during placement, consolidation, and finishing of the concrete.
- B. If dowels are required, they shall be supported in dowel baskets. The dowels shall be epoxy coated on the working end and within 2 inches of the joint. The dowels shall be fitted with a cap to allow working clearance. The dowels shall lie parallel to the slab surface and perpendicular to the joint face. One-half of each dowel shall be greased as a bond break.
- C. Expansion joints shall be sealed. Joint preparation shall follow the sealant manufacturer's recommendations.
- D. Place expansion joints in the following locations:
 - 1. Where new work abuts existing building foundations, zip-strip filler and sealant shall be used.
 - 2. Where new work abuts inlets or other drainage structures, or utility and signal pole foundations. Filler shall be 1/2-inch thick. Joint need not be sealed.
 - 3. Where shown on the drawings.
- E. Expansion joints are not required between curb and gutter, sidewalk, and concrete street pavement. New elements shall be cast against to the existing elements.

3.05 CONTRACTION AND CONTROL JOINTS: Place contraction joints where directed by Engineer, where indicated on the drawings or Special Conditions, and where required as follows:

- A. Control joints shall be cut to one-third of the slab depth. Control joints in street pavements shall be sawn. Control joints in sidewalks and curbs may be tooled with a radiused jointer or sawn. Control joints in driveways may be sawn or tooled. Sawn joints shall be soft sawn to a depth of 1.5-inches as soon as the concrete can bear the weight of the saw and shall be resawn to one-third of the slab depth within 24 hours. Tooled joints shall have a 1/4 to 1/2-inch radius.
- B. Maximum control joint spacing shall be 24 times the slab thickness. Locations of control joints on street paving shall fall on lane lines to the maximum extent possible. The resulting panels shall be approximately square with no sharp points or inside corners. Maximum length to width ratio shall be 1.5:1. Curb and gutter shall be jointed at not more than 10-foot spacing.
- C. Requirements for sealing control joints depend upon width of saw kerf, see Standard Detail *UG 4100-A Concrete Pavement Joint Details*.

3.06 CONSTRUCTION JOINTS: Locate construction joints on street pavement where indicated on the drawings. Obtain Engineer's approval of joints located by Contractor. Longitudinal construction

joints shall fall on lane lines to the maximum extent possible. Longitudinal construction joints shall be keyed and connected with tiebars. Transverse headers shall be connected with tie bars. Transverse headers may be formed or sawn. Construction joints shall be used wherever placement is suspended for 30 minutes or more. Unless a monolithic pavement and curb is used, construction joints shall be used between concrete street paving and curb and gutter.

3.07 CONCRETE JOINT REPAIR: Limits of patching shall be marked in the field by Engineer. Minimum patch size will be 4 feet long and one lane panel wide. Traverse joints shall have three dowels at 12-inch spacing centered in each wheel path. Unless otherwise required by the drawings or Special Conditions, the longitudinal joints shall not be tied. Dowels and tiebars shall be epoxy grouted into the existing pavement. Longitudinal joints shall have bond breaker sheeting applied to the existing face.

3.08 PLACEMENT: Concrete shall be deposited on properly prepared and unfrozen subgrade conforming to the requirements of Section 2200. The concrete shall be placed as uniformly as possible to minimize the amount of additional spreading necessary. Concrete shall not be placed around manholes or other structures until they have been brought to the required grade.

3.09 STRIKE OFF AND FLOATING: The concrete shall be struck off at such a height that after consolidation and final finishing it shall be at the elevations shown on the drawings. A depth of at least 2 inches of concrete shall be carried in front of the strike-off screed for the full width of the slab. The concrete shall be brought to a true and even surface, free from rock pockets, with the fewest possible number of passes of the screed.

After the concrete has been struck off, it shall be further smoothed by means of a float. Wood floats shall not be used on air-entrained concrete. Surface tolerances shall be checked and material added or taken away and the surface refloated to produce a uniform surface within tolerances, and free of tool marks.

3.10 FINISHING: After floating, concrete shall be given the finish listed for the appropriate application.

- A. Street pavement for collector and arterial streets shall receive a transverse tined texture. Transverse grooves shall be approximately 3/16-inch wide at 3/4-inch centers with a depth of approximately 1/8-inch. The groove pattern shall be uniform over the entire pavement.
- B. Street pavement for local streets, driveways, curb and gutter, sidewalks, and stair treads, median pavements, and concrete base under asphalt shall receive a transverse, coarse broom finish. Sidewalks shall be "picture-framed" with a 3 to 4 inch tooled edge or, where directed by Engineer, shall match the adjacent existing sidewalks.
- C. Drainage ditch lining and spillway lining shall receive no additional finishing after final floating.

3.11 CURING AND FORM REMOVAL: Curing method shall conform to Section 4000. Curing period shall be seven days. Curing material shall be applied immediately after finishing operations. All edges and laps of waterproof sheeting shall be continuously weighted so that wind cannot enter. Curing membrane, or asphalt emulsion when specified, shall be applied to produce a uniform, opaque

surface. Formed element shall be cured in form a minimum of 16 hours, after which curing material shall be applied for the remainder of the curing period. Maintain curing material free of defects during curing period.

- 3.12 PROTECTION AND OPENING TO TRAFFIC:** Protect concrete from unauthorized imprinting of any sort. Protect concrete from traffic, both through traffic and construction vehicles, until concrete has reached 3,000 psi.
- 3.13 TOLERANCES:** Finished concrete shall meet the following tolerances for planeness and alignment.
- A. On concrete surfaces not subject to profilograph testing, finished surface shall be true to plane within 1/4-inch in 10 feet, as determined by a 10-foot straight edge placed anywhere on the surface in any direction.
 - B. Thickness shall not be less than 0.2-inch less than the specified thickness.
 - C. Lines, joints, and edges whether formed, cut, or tooled shall not vary from true by more than 1/2-inch in 20 feet or more than 1 inch overall.
 - D. Stairs shall meet the tolerances contained in the Unified Government's building code. Those tolerances are summarized as follows: The tolerance between the largest and smallest riser and between the largest or smallest tread shall not exceed 3/8-inch in any flight of stairs, nor by more than 1/4-inch between consecutive steps. Where the bottom or top riser adjoins a sloping public way, walkway, or driveway having an established grade and serving as a landing, the bottom or top riser is permitted to be reduced along the slope to less than 4 inches in height with the variation in height of the bottom or top riser not to exceed one unit Vertical in 12 units Horizontal (8 percent slope) of stairway width.
- 3.14 DEFECTIVE WORK:** Defective work shall be repaired or replaced in the manner required by KDOT Standard Specifications Division 500.
- 3.15 DETECTABLE WARNING:** Follow manufacturer's installation recommendations. Use fresh-set installation method. Use manufacturer's installation template to guide the extent and depth of fresh concrete to be removed. Protect panels from overspray of curing compound.

STANDARD DETAILS RELATED TO THE WORK OF THIS SECTION:

- UG 4100-A CONCRETE PAVEMENT JOINT DETAILS
- UG 4100-B CONCRETE PAVEMENT JOINT LAYOUT AND PATCHING
- UG 4100-C CURB AND GUTTER SECTIONS
- UG 4100-D CURB AND GUTTER INSTALLATION (ASPHALT STREETS)
- UG 4100-E CURB AND GUTTER INSTALLATION (CONCRETE STREETS)
- UG 4100-F ADA RAMP FOR NEW CONSTRUCTION
- UG 4100-G DRIVEWAY LAYOUT – SHEET 1 OF 2 – GENERAL
- UG 4100-H DRIVEWAY LAYOUT – SHEET 2 OF 2 – FOR ADA ACCESSIBILITY

- UG 4100-I DRIVEWAY DIMENSIONS & MATERIALS – SHEET 1 OF 6 – CONSTRUCTION ENTRANCE
- UG 4100-J DRIVEWAY DIMENSIONS & MATERIALS – SHEET 2 OF 6 – FIELD ENTRANCE
- UG 4100-K DRIVEWAY DIMENSIONS & MATERIALS – SHEET 3 OF 6 – RESIDENTIAL
- UG 4100-L DRIVEWAY DIMENSIONS & MATERIALS – SHEET 4 OF 6 – LONG DRIVEWAY ON RESIDENTIAL LOTS
- UG 4100-M DRIVEWAY DIMENSIONS & MATERIALS – SHEET 5 OF 6 – COMMERCIAL / INDUSTRIAL DRIVEWAY
- UG 4100-N DRIVEWAY DIMENSIONS & MATERIALS – SHEET 6 OF 6 – SIDE PROPERTY LINE SETBACK ALL DRIVEWAYS
- UG 4100-O STANDARD SIDEWALK DETAIL

END OF SECTION 4100