

## SECTION 202 - CONCRETE

### 1. GENERAL

On Grade Concrete (pavement, curb and gutter, sidewalk, etc.) shall comply with all composition, quality, product control and handling (stockpile) requirements of the latest version of Sections 401 and 403 of the Kansas Department of Transportation (KDOT) Standard Specifications and as amended herein.

The mix design shall be per KDOT Standard Specifications Table 403-1: Air-Entrained Concrete for Pavement. Mix shall contain a minimum of 517 pounds of cementitious material for on grade concrete per Table 401-1 with supplementary cementitious material proportions per Table 401-4 to waive ASTM C1567 testing and 6% design air content (+/-1.5%). Also per Table 403-1, water to cement ratio shall be less than or equal to 0.45 with associated permeability and resistivity requirements listed in the table. Design mix shall meet a minimum 4000 psi compressive strength at 28 days and be approved by the Engineer prior to construction.

### 2. AGGREGATES

Coarse aggregate shall be CPA-1, 3 or 4 from a KDOT pre-qualified freeze/thaw resistant source per the latest version of Section 1116 of the Standard Specifications. Fine aggregate shall be type FA-A from a KDOT pre-qualified non-reactive siliceous source per the latest version of Section 1116 of the Standard Specifications.

Mixed aggregate shall comply with Table 1116-2 of the latest version of Section 1116 of the KDOT Standard Specifications types MA-3, 4, 5 or 7 optimized for all concrete usage.

### 3. ALLOWABLE SLUMP

Slump shall range between 1 and 4 inches with a maximum of 4.75 inches.

### 4. PLACEMENT LIMITATIONS

Refer to the latest version of Section 401 of the KDOT Standard Specifications for concrete batching, mixing and delivery. Per KDOT section 401.8b.(2), "...Submit a cold weather concrete plan to the Engineer prior to placing concrete in cold weather."

### 5. CURING CONCRETE

Liquid membrane forming compounds furnished under this specification shall conform to the latest revision of the KDOT Standard Specifications Section 1404 Liquid Membrane Forming Compounds.

Curing membrane shall be applied while the surface of the concrete is still moist, but no free water remains; and shall be applied to the exposed surfaces including the sides of the pavement at the rate of not less than 1 gallon per 150 square feet. The spray equipment shall be capable of supplying a constant pressure to provide uniform and adequate coverage of the curing membrane compound at the rates required. If curing membrane is damaged, such as by rainfall soon after its application, the Contractor shall immediately apply another application of curing membrane to the surface of the pavement. The rate of application for the replacement membrane shall be the same as for the original membrane.

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### 6. CONCRETE PANEL REPAIR

It is the responsibility of the contractor to repair any spalled, cracked or broken panels at no cost to the City. Removal and replacement of entire or partial sidewalk or pavement panels may be required; but will be avoided whenever possible. In general; the structural integrity of the pavement, as originally cast and placed, is superior to that of a replacement panel. Final determination of what corrective action is deemed necessary will be on a case by case basis, but will for the most part follow these basic guidelines:

#### (1) Repair of Spalls

- For spalls greater than 1/4 inch and less than or equal to 1/2 inch from the edge of the original sawed joint; repair with hot pour sealant.
- For spalls greater than 1/2 inch and less than or equal to 1 inch from the edge of the original sawed joint; blast clean and repair with epoxy patch material.
- For spalls greater than 1 inch from the edge of the original sawed joint; repair by making a saw cut a minimum of 1 inch outside the spalled area to a minimum depth of 2 inches. Chip out the concrete between saw cuts to solid concrete (2 inch minimum). Thoroughly clean all loose material from the cavity. Apply a coat of an approved concrete bonding epoxy to the dry, cleaned surface of all sides of the cavity, except the joint. Apply the epoxy by scrubbing the material into the surface with a stiff brush. Place Portland cement concrete, epoxy resin concrete or non-shrink grout immediately following epoxy application according to the manufacturer's recommendations. If the spalled area to be patched abuts a working joint; use an insert or other bond breaking medium during the repair work to maintain working joints.

#### (2) Repair of Cracked/Broken Panels

- When a single transverse hairline crack extends across the entire roadway within 1/3 panel length of a sawed joint:
  - a. If nearest sawed joint is working as a contraction joint; crack will be epoxied.
  - b. If nearest sawed joint is not working as a contraction joint; crack will be sawed and sealed as it has now become the contraction joint. Planned contraction joint should then be epoxied.
- When a single transverse hairline crack falls within the middle 1/3 of a pavement panel; no corrective work will be required.
- When a single longitudinal hairline crack falls within a panel; no corrective work will be required.
- When a single diagonal hairline crack falls within a panel; crack will be repaired with epoxy.
- Any panel with more than 1 crack dividing the panel into 3 or more distinct sections will be removed and replaced.
- Any transverse, longitudinal, or diagonal crack that appears to have opened wider than 1/8 inch shall be considered individually. This could indicate panel movement vertically.

All replacement panels will be reinforced the same as original panels. All joints of repaired or replaced panels will be properly sealed. Epoxy repairs will use Unitex Pro-Poxy 200 or an approved equivalent. Final approved corrective actions will be determined by the Engineer.