

**KANSAS DEPARTMENT OF TRANSPORTATION
SPECIAL PROVISION TO THE
STANDARD SPECIFICATIONS, 2015 EDITION**

Delete SECTION 402 and replace with the following:

SECTION 402

STRUCTURAL CONCRETE

402.1 DESCRIPTION

Provide the grades of concrete specified in the Contract Documents.

This specification is specific to Structural Concrete. See **SECTION 401** for general concrete requirements.

402.2 MATERIALS

Provide materials that comply with the applicable requirements.

General Concrete.....	SECTION 401
Aggregate	DIVISION 1100
Admixtures, and Plasticizers	DIVISION 1400
Cement, Fly Ash, Silica Fume, Slag Cement and Blended Supplemental Cementitious.....	DIVISION 2000
Water	DIVISION 2400

402.3 CONCRETE MIX DESIGN

a. General. Design structural concrete mixes as specified in the Contract Documents.

b. Concrete Mix Design. Two options are available for mix design procedures. Use the procedures outlined in **SECTION 401** to design structural concrete mixes.

c. Concrete Strength Requirements. Design concrete to meet the strength requirements of **SECTION 401**.

d. Portland Cement, Blended Hydraulic Cement, and Individual and Blended Supplemental Cementitious Materials. Unless specified otherwise in the Contract Documents, select the type of portland cement, blended hydraulic cement and individual and blended supplemental cementitious materials according to **SECTION 401**.

e. Structural Concrete Specific Requirements. Design concrete to meet the following requirements:

(1) Maximum water to cementitious ratio of 0.45 and a minimum cementitious content of 480 lbs per cubic yard.

(2) Air entrained concrete with a target air content of 6.5 ± 1.5 percent as specified in **subsection 401.3i**.

(3) Determine the air loss due to pumping operations once in the AM and once in the PM. Determine the difference between the air content from concrete sampled before the pump, and concrete sampled after pumping. Make adjustment to the mix to compensate for the pumping of the concrete.

(4) Concrete permeability requirements according to **TABLE 402-1**.

TABLE 402-1: REQUIREMENTS FOR STRUCTURAL CONCRETE			
	Volume of Permeable Voids, maximum	Surface Resistivity, minimum	Rapid Chloride Permeability, maximum
Use Low Permeability Concrete (LPC) for Bridge Overlays	9.5%	27.0 kΩ-cm	1000 Coulombs
Use Moderate Permeability Concrete (MPC) for specified Full Depth Bridge Decks.	11.0%	13.0 kΩ-cm	2000 Coulombs
Use Standard Permeability Concrete (SPC) for all other structural concrete not specified as Low or Moderate Permeability.	12.5%	9.0 kΩ-cm	3000 Coulombs

(5) Test data from KT-73 tested at 28 days, KT-79 tested at 28 days, or AASHTO T-277 tested at 56 days. Provide test results on a minimum of 1 set of 3 cylinders for each mix, tested at the highest water to cementitious ratio that meets **subsections 401.3e.** and **401.3i.** Submit accelerated cure procedures for the Engineer's approval. The use of supplemental cementitious materials may be necessary to meet permeability requirements. See **SECTION 401.**

(6) Use Quality Requirements for Structural Aggregates as listed in **SECTION 1102,** Aggregates For Concrete Not Placed on Grade.

(7) Use gradation requirements for aggregates as listed in **SECTION 1102,** Aggregates For Concrete Not Placed on Grade.

(8) Use MA-6 optimized gradation for Low Permeability Concrete for Bridge Overlays.

(9) ASTM C-1567 may be required if supplementary cementitious materials (SCMs) other than silica fume are utilized. See **subsection 401.3j.** for requirements.

f. Slump.

(1) Designate a slump for each concrete mix design that is required for satisfactory placement of the concrete application. Reject concrete with a slump that limits the workability or placement of the concrete.

(2) If the designated slump is 3 inches or less, the tolerance is $\pm 3/4$ inch, or limited by the maximum allowable slump for the individual type of construction.

(3) If the designated slump is greater than 3 inches the tolerance is $\pm 25\%$ of the designated slump.

(4) For drilled shafts the target slump just prior to being pumped into the drilled shaft is 9 inches. If the slump is less than 8 inches, redose the concrete with admixtures as permitted in **subsection 401.3k.**

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Dec-17 Letting