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

## SECTION 715

## PRESTRESSED CONCRETE MEMBERS

**Page 700-76, subsection 715.2. Add an additional paragraph to this subsection:**

Inserts intended for use with A307 or F3125 Grade 325 or Grade 490 fasteners shall have internal threads conforming to ASME B1.1 UNC 2B. When specified in the Contract Documents, hot-dip galvanize inserts in accordance with ASTM A 153, Class C or ASTM F 2329. Tap oversize internal treads after galvanizing to the minimum-maximum thread dimensions listed in ASTM A 563. Coil inserts and the mating coil rods shall come from the same manufacturer.

**Page 700-78, TABLE 715-1. Replace the camber requirement for Bridge I-Beams as follows:**

| TABLE 715-1 (continued) | |
|---|---|
| **BRIDGE I-BEAM** | |
| **Unit Feature** | **Tolerance** |
| Camber deviation from design camber | ± ⅛ in. per 10 ft. of span, but not greater than ± 1 inch |

**Page 700-80, subsection 715.3c.(3) and (4). Delete these subsections and replace with the following:**

(3) Concrete. Manufacture the units using concrete that satisfies the requirements of **SECTION 404**. Provide a flowing concrete that is a cohesive mass with no evidence of separation or segregation regardless of the slump or slump flow. The batch will be rejected if there is evidence of separation or segregation. In addition, the presence of any deleterious substance such as "bag paper" is cause for rejection.

Handle and place the concrete by methods that shall produce a dense, uniform product, free from sand streaks and honeycomb areas. Deliver concrete to the producer's site of the work and complete placement within the time limits specified in **SECTION 401**. Deliver and place successive batches at a continuous rate in each unit and before the preceding batch has been perceptibly stiffened, or is no longer pliable so as to avoid horizontal or diagonal planes of weakness. In no case may the interval between successive batches in a unit exceed 20 minutes, or if the concrete mix or environmental conditions require otherwise, a shorter period established by the Engineer. Do not add water to temper deposited concrete.

Place concrete during cold weather according to **SECTION 401**. In addition, the form temperature shall be a minimum of 40ºF before the concrete may be placed. When necessary, continue heating the forms during the placement and finishing of the concrete.

If using Self-Consolidating Concrete (SCC), do not vibrate. SCC is defined as a concrete mixture which can be placed by means of its own weight with little to no vibration.

Provide concrete units meeting the tolerances specified in **TABLE 715-1**, unless shown otherwise in the Contract Documents.

(4) Surface Finish. Make all surfaces of the units reasonably straight and true to lines and grades, and free from fins or other projections. Form joint marks will be permitted. Give top surfaces of beams a wire brush or stiff broom finish applied transverse to the length of the beam. Rake the top surfaces of the panels, perpendicular to the prestressing strand, making depressions of approximately ¼ inch. Do not pull out the coarse aggregate when raking. When using SCC, provide a "natural", unfinished top surface of beams.

**Pages 700-81 and 700-82, subsection 715.3d. Delete this subsection and replace with the following:**

**d. Inspection and Testing.**

(1) General. Provide the Engineer free access to the manufacturing plant at all times for inspecting materials, plant facilities, manufacturing and curing procedures. Inform the Engineer of the planned concrete placement and curing schedule in advance of the start of any work. The Engineer will require time for testing of materials, inspection of equipment and reviewing of procedures that will be used in casting units, prior to beginning casting.

Provide an enclosed office area for the exclusive use of the Engineer at the location of production. The area must satisfy the requirements of a Field Office in **SECTION 803** with the following additions/modifications:

- Floor area = 120 square feet (minimum);
- Single workbench or table, 30 inches x 8 feet (minimum dimensions);
- Desk, 30 inches x 5 feet, with drawers;
- Swivel desk chair with arm rests;
- Waste paper basket;
- Storage/Filing Cabinet with lock and key; and
- Broadband internet connection for one computer.

(2) Quality Control Personnel. All personnel making and curing cylinders, or performing slump flow and J-Ring tests are to be certified by the American Concrete Institute (ACI) as Concrete Field Testing Technicians. All personnel capping cylinders and/or performing compressive strength testing are to be certified by the ACI as Concrete Strength Testing Technicians. Other certifications may be considered for approval by the Engineer.

(3) Testing Equipment.

(a) Cylinder Molds. Provide an ample supply of cylinder molds for the casting of test cylinders. All molds are subject to approval of the Engineer. Use 6"∅ x 12" cylinders. The Engineer may approve the use of 4"∅ x 8" cylinders, provided reliable correction factors have been developed and submitted, along with supporting data, for review and acceptance.

(b) Compression Machine. Provide a machine capable of measuring the compressive strengths of concrete cylinders cast during the manufacturing of the units. All testing machines must be calibrated and approved by the Engineer. Cap and test cylinders sets using KT-76.

(c) Slump Flow. When SCC is used, provide all apparatus necessary to perform ASTM C 1611, "Standard Test Method for Slump Flow of Self-Consolidating Concrete," including appendix X1.

(d) J-Ring Flow. When SCC is used, provide all apparatus necessary to perform ASTM C 1621, "Standard Test Method for Passing Ability of Self-Consolidating Concrete by J-Ring."

(4) Test Cylinders.

(a) Casting and Curing. All test cylinders are the responsibility of the Contractor. With the exception of 28 day cylinders, cure all cylinders under the same conditions (environment) as the concrete they represent. Initially store then cure 28 day cylinders as per KT-22. When using SCC, do not rod or vibrate when making test cylinders and use care when moving newly molded cylinders.

For the testing purposes described below, the "total volume of concrete placed" is defined as each 40 cubic yards of concrete or fraction thereof placed in each line, within each curing enclosure, between tensioning bulkheads, during a continuous working period.

Make 1 group of 3 or more cylinders for each third of the total volume of concrete to be placed. Note the limits of the concrete in the beds represented by each of the groups of cylinders. Mark and identify all cylinders groups as 1, 2 and 3 with marked group 1 representing the first third of the total volume of concrete placed, marked group 2 representing the second third of the total concrete placed, and marked group 3 representing the final third of the total concrete placed. To facilitate the testing of multiple sets of cylinders for release or shipping, each group may contain more than 3 cylinders. Mark cylinders within a group as xA, xB, xC, xD, xE where "x" is the group number (always 1, 2, or 3) and A through E are the unique cylinder identifying marks within the group. Letters D and E, etc., are optional additional cylinders which allow more than one set of test cylinders for release or shipping. Identify which cylinders will be used for 28 day testing (i.e. 1E, 2E, 3E). Store and cure these three cylinders as per KT-22.

Follow the procedure of making sets of cylinders from early, middle and late placement, during normal production operations. When operations are interrupted or changed (i.e. equipment break-down, very small placements, etc.), adjust the cylinder fabrication schedule to match the production, and provide adequate cylinders for later release and shipping strength testing. Coordinate this revised schedule with the Engineer on the production site.

(b) Testing. With the Engineer observing, test cylinders to measure the release and shipping strength at the producer's plant.

(i) Release Strength. Test 3 cylinders, 1 cylinder from each of the 3 groups of cylinders (i.e. 1A, 2A, 3A) prior to strand release to determine if the specified (design) release strength shown in the Contract Documents has been reached. Release strength is attained when the average compressive strength of the 3 tested cylinders equals or exceeds the design release strength and no more than 1 cylinder in the tested set has a compressive strength which is below the design release strength by no more than 100 psi. If the above conditions are not met, a minimum of 1 hour must pass before a second cylinder from each of the same 3 groups is tested (i.e. 1B, 2B, 3B).

(ii) Shipping Strength. Before reaching 28 days of age, the Contractor, may test 3 cylinders, 1 cylinder from each of 3 groups of cylinders (i.e. 1C, 2C, 3C) to determine if the specified 28 day strength shown in the Contract Documents has been reached. Shipping strength is attained when all 3 tested cylinders meet or exceed the specified minimum 28 day strength. If this requirement is met, the products represented by these cylinders are accepted for strength requirements and may be shipped 1 day (approximately 24 hours) after meeting the compressive strength requirement and 5 days (approximately 120 hours) after concrete placement, whichever is greater. If the above condition is not met, a minimum of 2 hours must pass before a second cylinder from each of the same 3 groups is tested (i.e. 1D, 2D, 3D). If a cylinder from each of the 3 groups is not available for testing, then early shipping will not be allowed. Cylinders earmarked for 28 day testing cannot be tested for shipping.

(iii) 28 Day Strength. A previously identified set of 3 cylinders, 1 cylinder from each group of cylinders (i.e. 1E, 2E, 3E) shall be stored and moist cured as per KT-22 and then tested when the concrete has reached an actual age of 28 days. Testing will take place at a location chosen by the Engineer while being observed by the Engineer. When the early shipping requirements described above have not been met, the average strength of these 3 cylinders must meet or exceed the specified minimum 28 day strength. In addition, only 1 of the cylinders in the tested set may be below the minimum specified 28 day strength by no more than 5%.

The average strength of 1 set of 3 cylinders may be less than the specified minimum 28 day strength by no more than 5% or 300 psi, whichever is less, provided that the previous 9 consecutive sets of 28 day cylinders manufactured for the same KDOT project and using the same mix design complied with the 28 day strength criteria described above.

(iv) Coring. When either (but not both) of the following occur:

- the 28 day strength of an individual cylinder is less than the 5% criteria described above or
- a second of any 10 consecutive manufactured cylinder sets attains an average compressive strength below the specified minimum 28 day strength by no more than 5% or 300 psi, whichever is less.

The Contractor may, with the approval of the Engineer, core the unit (or units) represented by such cylinder (or cylinders) and have them tested. The location of the cores must be approved by the Engineer. Follow KT-49 when obtaining, preparing, testing and calculating the strength of drilled cores.

If the adjusted compressive strengths of any of the cores are below the specified minimum 28 day compressive strength, the represented units will be rejected. Coring is not allowed on product represented by more than 1 out of any 10 consecutively manufactured cylinder sets, regardless of reason, and can only take place after the concrete has reached an age of 28 days.

(5) When SCC is used: At the point of placement, perform a slump flow test and a J-ring flow test for each third of the total volume of concrete to be placed, as defined above. Both the slump flow and the J-ring flow test results must satisfy the requirements of **TABLE 404-2** or the load will be rejected.

(a) Slump Flow.

(i) Determine the slump flow spread.

(ii) Assign a Visual Stability Index (VSI) value to the concrete spread.

(iii) A single retest is permitted only after the hand addition of a measured amount of admixture by lab personnel and then mixing for 5 minutes at moderate drum speed.
(b) J-Ring Flow Test. Calculate a “blocking assessment” value.

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