



**SPECIAL PROVISIONS  
FOR  
LIGHT WEIGHT CONCRETE**

**Scott County  
IMN-074-1(180)5--0E-82**

**Effective Date  
January 19, 2011**

**THE STANDARD SPECIFICATIONS, SERIES 2009, ARE AMENDED BY THE FOLLOWING MODIFICATIONS AND ADDITIONS. THESE ARE SPECIAL PROVISIONS AND THEY SHALL PREVAIL OVER THOSE PUBLISHED IN THE STANDARD SPECIFICATIONS.**

**090100.01 DESCRIPTION.**

- A.** This work shall consist of developing and providing light weight concrete for the bridge deck when called for in the contract documents. Light weight concrete is defined as a concrete mix that provides a minimum average 28 day compressive strength of 3,500 pounds per square inch (psi) at a unit weight of not more than 115 pounds per cubic foot.
- B.** Sections 2403, 2412 and Division 41 of the Standard Specifications shall apply with the modifications contained in this specification.

**090100.02 MATERIALS.**

- A.** Coarse aggregate shall meet the requirements of ASTM C330. Coarse aggregate shall not exceed 55% of the total concrete volume.
- B.** Air content shall be in accordance with Article 2403.02, B, 3, of the Standard Specifications.

**090100.03 CONSTRUCTION.**

- A.** The proposed mix design, utilizing project materials, shall meet the following requirements:
  - A minimum compressive strength of 3500 psi.
  - A unit weight of not more than 115 pounds per cubic foot, tested in accordance with ASTM C567.
  - A durability factor greater than 85 at 300 cycles, tested in accordance with ASTM C666 Procedure A.
- B.** Coarse aggregate shall be proportioned at a moisture content of less than 60 percent of that at surface saturated dry (SSD) condition.

**C. Trial Batch.**

1. Provide a trial batch of the proposed lightweight concrete. Provide the District Materials Engineer notice and mix proportions 7 calendar days prior to this event.
2. Mix the trial batch (a minimum of 3 cubic yards in size) at least 30 calendar days prior to planned placement. Establish the batching sequence of the materials during the trial batch.
3. Transport the concrete a distance comparable to the distance from the ready mix plant to the placement site.
4. Use concrete for testing purposes that is representative of the entire batch while having a slump within 1 inch of the maximum slump allowed, an intended in place air content of 6% ± 1% and a water/cement (w/c) ratio that will be typical in deck placement. Perform the following tests for each trial batch:
  - a. Specific Gravity of Each Individual Aggregate                      Materials I.M. 307
  - b. Gradation of Each Individual Aggregate                                Materials I.M. 302
  - c. Unit Weight of Plastic Concrete    Materials I.M. 340
  - d. Slump of Plastic Concrete    Materials I.M. 317
  - e. Air Content of Plastic Concrete    Materials I.M. 318
  - f. Cast one or more test slabs 8 feet by 4 feet in area and 4 inches thick. Place and consolidate using methods typical for bridge deck pours. Finish the concrete by hand and evaluate the mix workability and finishability for the intended application and methods of placement.
5. Submit a trial batch report to the District Materials Engineer no later than 7 calendar days after trial batching. Include the following in the report:

Cover Page	Contractor and Producer Name Project Number Date and Location of Trial Batch Date Submitted Signature of Contractor/Producer Representative
Material Source Information	Brand, Type and Source
Material Proportion Information	Specific Gravity Relative % of Each Individual Aggregate Target Combined Gradation % Passing (Materials I.M. 531) Target Combined Gradation Charts (Materials I.M. 532) Design and As Mixed Batch Weights (Mass) (SSD) Design and As Mixed w/c Ratios
Mix Properties	Unit Weight (Mass) of Plastic Concrete Air Content of Plastic Concrete Slump

6. The District Materials Engineer will cast samples and transport them to the Central Materials Laboratory for testing. Trial batch concrete will be tested for permeability and strength. All samples will be cast, cured, and handled according to Materials I.M. 315. Two permeability and nine strength samples will be cast in 4 inch by 8 inch cylinder molds.
7. Permeability samples will be stripped of their molds and wet cured to an age of 7 calendar days in a moist room. After 7 calendar days, the samples will be submerged in water heated to 100°F until an age of 28 days. One sample will be obtained from each cylinder and tested according to AASHTO T 277 at 28 days. The target value of permeability is 1500 coulombs or less based on the average of two tests.

8. Strength samples will be stripped of their molds and wet cured until their break age. Strength samples will be tested according to AASHTO T22. Three cylinders will be tested for strength at each age of 7, 28, and 56 days. The average 28 day compressive strength shall be equal to or greater than 3500 pounds per square inch.
9. Approval will be based on trial batch mix properties and submittal of a trial batch report. The District Materials Engineer may waive the trial batch testing provided satisfactory mix properties have been achieved through testing of previous trial batches or production placements.

**D. Production Concrete.**

1. Notify the District Materials Engineer 48 hours prior to placement of production concrete. Use only approved mix for production concrete.
2. Test production concrete for strength. These test results will be used for acceptance. An Iowa DOT PCC Level 1 Concrete Field Testing Technician is to cast, cure, and handle strength samples according to Materials I.M. 315. At the site, properly cure the cylinders with wet burlap and plastic. Do not move the cylinders for 16 hours and leave them at the site for a maximum of one calendar day before transporting to a certified laboratory for final curing and testing. Cast nine strength samples in 4 inch by 8 inch cylinder molds for each placement. Document the slump, air content, unit weight, and w/c ratio (adjusted for all water) of the concrete for the cylinders cast.
3. Strength samples are to be tested by a certified lab according to AASHTO T 22. Test three cylinders for strength at each age of 28 and 56 days. For acceptance, the average 28 day strength must be equal to or greater than 3500 psi.
4. Submit test results to the Engineer and the District Materials Engineer no later than one working day after testing is completed. In the submittal, clearly indicate (as a minimum) the project number, location, Contractor, producer, structural element constructed, slump, air content, w/c ratio (adjusted for all water), unit weight, date sampled, date tested, break age, individual compressive strengths, and average compressive strengths. In addition, attach the plant report for the pour to the submittal.
5. The District Materials Engineer may obtain random verification strength samples. Strength samples will be tested at the Central Materials Laboratory according to AASHTO T 22. A set of four cylinders will be cast, cured and handled according to Materials I.M. 315. Three cylinders will be tested for strength at 28 days. The remaining cylinder will be tested for permeability on a random basis by the Central Materials Laboratory. Testing will be conducted as described in AASHTO T 277.

**090100.04 METHOD OF MEASUREMENT.**

The quantity of Light Weight Concrete, in cubic yards, will be the quantity shown in the contract documents.

**090100.05 BASIS OF PAYMENT.**

Payment will be made at the contract unit price for Light Weight Concrete per cubic yard. The cost of the trial batch, testing of the trial batch and testing of the production concrete shall be included in the contract unit price for Light Weight Concrete.