

- ITEM 557.51XX 18 - INTERNAL CURING CONCRETE FOR SUPERSTRUCTURE SLABS WITH INTEGRAL WEARING SURFACE- BOTTOM FORMWORK REQUIRED -TYPE XX FRICTION**
- ITEM 557.52XX 18 - INTERNAL CURING CONCRETE FOR SUPERSTRUCTURE SLABS WITH INTEGRAL WEARING SURFACE- BOTTOM FORMWORK NOT REQUIRED - TYPE XX FRICTION**
- ITEM 557.54XX 18 - INTERNAL CURING CONCRETE FOR STRUCTURAL APPROACH SLAB WITH INTEGRAL WEARING SURFACE - TYPE XX FRICTION**

DESCRIPTION.

Furnish and place reinforcing steel and Internal Curing (IC) concrete to construct superstructure slabs as shown in the contract plans. Internal Curing concrete is a modified Class HP concrete with lightweight fine aggregate substituted for a portion of the standard fine aggregate to aid the curing process internally.

MATERIALS.

Use materials meeting §557-2. Perform additional work as follows:

Manufacture IC concrete, with lightweight fine aggregate according to §501, and the following modifications:

1. Design an IC concrete mixture with lightweight fine aggregate, proportioned according to the American Concrete Institute Manual of Concrete Practice, ACI 211.2, Standard Practice for Selecting Proportions for Structural Lightweight Concrete. Produce a homogeneous mixture of cement, pozzolan (fly ash or GGBFS), microsilica, fine aggregate, lightweight fine aggregate, coarse aggregate, air entraining agent, water-reducing and set-retarding admixture, and water as designed.
2. Use Type I, I/II, II or Type SF cement. Use a minimum total cementitious content of 400 kg/m³. Use 15-20% pozzolan (fly ash or GGBFS) and 6-10% microsilica.*

*If Type SF Blended cement is used, the separate addition of Microsilica is not required.
3. Substitute lightweight fine aggregate, meeting the requirements of AASHTO M 195, for 30% (by volume) of standard fine aggregate.
4. Construct lightweight fine aggregate stockpile(s) at the production facility so as to maintain uniform moisture throughout the pile. Continuously and uniformly sprinkle the stockpile(s) with water for a minimum of 24 hours using a sprinkler system approved by the Materials Engineer. If a steady rain of comparable intensity occurs, turn off the sprinkler system at the direction of the Materials Engineer, until the rain ceases. At the end of the wetting period, or after the rain ceases, allow stockpiles to drain for 12 to 15 hours immediately prior to use, unless otherwise directed by the Materials Engineer.
5. After the materials have been accepted for this work, determine the proportions for concrete and equivalent batch masses based on trials made with materials to be used in the work. Make appropriate adjustments to the specific gravity (Bulk SSD) and fineness modulus of the combined fine aggregate when developing the mix design.

At least 1 week prior to concrete placement, provide the Materials Engineer with a copy of the trial mix design with the following data:

- a. Fine and coarse aggregate (saturated, surface dry condition) content in kg/m³.*
- b. Cementitious content in kg/m³.
- c. Water content in kg/m³.
- d. 28-day compressive strengths.

- e. Batch masses.

* The moisture content of the lightweight fine aggregate must be determined immediately prior to batching, using Materials Procedure 703-19E. If the supplied mix design is based on “oven dry” weight of lightweight fine aggregate, a corresponding adjusted weight must be supplied to account for the actual absorbed moisture content, so that the mix design entered in to the automated batching system is based on SSD weight. After the adjusted mix design is entered into batching system, additional adjustments must be made to the fine aggregate and water quantities to account for the “surface” moisture of the fine aggregates.

The Materials Engineer, or his representative, will approve the batch weights prior to use. Use these values to manufacture all high performance concrete with lightweight fine aggregate for this project, and periodically correct the batch masses to account for changes in the fine aggregate fineness modulus and aggregate moisture contents.

- 6. Achieve an average 28-day compression strength of 25 MPa, or greater, with no individual cylinder compressive strength less than 21 MPa.

CONSTRUCTION DETAILS.

Apply the provisions of §557-3 and the following modifications:

- 1. Add the following to §557-3.01, Concrete Manufacturing and Transporting:
 - a. The lightweight fine aggregate moisture content at the time of batching must be a minimum of saturated surface dry (SSD). Batch the lightweight fine aggregate first, then routinely batch the fine aggregate, coarse aggregate, admixtures, cement, pozzolan, microsilica, and remaining mixing water and mix completely.
 - b. Have the lightweight aggregate manufacturer supply a service representative at the site for the first two days of concrete placement operations to assist in the control of IC concrete mixing and placement operations.
- 2. Make any repairs as per the provisions of §557-3.16, Damaged or Defective Concrete. The Engineer will reject any concrete represented by a 28-day cylinder set with an average compressive strength less than 25 MPa, or an individual cylinder with a compressive strength less than 21 MPa. Proposed repairs require Deputy Chief Engineer, Structures approval.
- 3. The loading limitations of §557-3.14 apply, except that concrete cylinder sets designated for early loading must attain an average compression strength of 25 MPa, or greater, with no individual cylinder less than 21 MPa.

METHOD OF MEASUREMENT.

Apply all the provisions of §557-4.

BASIS OF PAYMENT.

Apply all the provisions of §557-5.

- XX = Friction Type
- 01 - Type 1 Friction
 - 02 - Type 2 Friction
 - 03 - Type 3 Friction
 - 09 - Type 9 Friction