

**ITEM 16563.0299 M - PRESTRESSED CONCRETE BOX BEAM UNITS
MADE FROM**

HIGH PERFORMANCE CONCRETE FOR BEAMS

DESCRIPTION:

This work shall consist of furnishing and placing prestressed box beam units made from high performance concrete, as specified in the contract documents. The concrete in the beams shall contain calcium nitrite and the beams shall be coated with a sealer.

MATERIALS:

The requirements of the P.C.C.M. and the following shall apply:

1. The concrete shall:
 - a. Have a maximum water to cementitious material ratio of 0.35.
 - b. Contain a minimum of 5% microsilica measured as a percent of the total cementitious material.

2. Additional materials not included in the P.C.C.M. shall meet the following:

Fly Ash	§ 711-10
Ground Granulated Blast Furnace Slag	§ 711-11
Microsilica	§ 711-12

The Contractor may propose additional material subject to the approval of the D.C.E.S.

3. The corrosion inhibitor shall consist of a calcium nitrite solution as approved by the Director, Materials Bureau, containing $30 \pm 1\%$ calcium nitrite solids by mass and having a mass of 1.27 ± 0.01 kg/L. Calcium nitrite acts as an accelerator. Compatible retarding admixtures may be used, to control set time, as per the manufacturers recommendations and subject to DCES approval. An automated corrosion inhibitor dispensing system shall be required. The dispensing system shall meet the following requirements:

Meter accuracy of $\pm 1\%$ (by volume)
Programmable quantity (liters, nearest tenth)
System interlocks
Batching tolerance of $\pm 3\%$ (by volume)
Print requirements:
 Project number and/or batch number
 Date and time
 Delivered quantity (liters, nearest tenth)

Calibration shall be in accordance with procedures approved by the D.C.E.S.

2/7/2000

**ITEM 16563.0299 M - PRESTRESSED CONCRETE BOX BEAM UNITS
MADE FROM**

HIGH PERFORMANCE CONCRETE FOR BEAMS

4. Penetrating Sealers: The protective sealer used on concrete surfaces shall appear on the Department's Approved List and shall meet the requirements of Standard Specifications Construction and Materials Section 717-03 Penetrating Type Protective Sealers. In addition the penetrating sealer shall either use alcohol as a carrier or use no carrier.

CONSTRUCTION DETAILS:

The requirements of the P.C.C.M. and the following shall apply:

1. The corrosion inhibitor at the rate of 25 l/m³ shall be added to the mix immediately after air entraining and retarding admixtures have been introduced into the mixer. The corrosion inhibitor shall be added to the concrete as an aqueous solution at a dosage rate as indicated in the contract documents. The water in the solution shall be counted as part of the total mix water.

Verification of corrosion inhibitor inclusion shall be made in two (2) ways. First, the concrete batch tickets shall be checked by the Inspector for the appropriate dosage of corrosion inhibitor in the mix. Second, the Contractor shall provide a calcium nitrite inclusion test kit, approved by the Materials Bureau. Testing for inclusion of the corrosion inhibitor shall be performed in the presence of the Inspector during each placement to ensure the presence of the corrosion inhibitor in the plastic concrete. Concrete which does not have the appropriate dosage as per the batch tickets or does not indicate presence from the inclusion testing shall be rejected.

2. Water/Cementitious ratio shall be measured by the Fabricator in accordance with AASHTO TP 23-93 for the first batch of concrete in a days placement and monitored by slump tests throughout production. If the slump increases by more than the following:

slump range	increase
<100 mm	25mm
>100mm	37mm

from the slump of the initial batch or if the Inspector has other reason to believe the water/cementitious ratio is changing, he may order additional water/cementitious ratio tests.

3. Curing: The beams shall be cured for a minimum of 18 hours using the Low Pressure Steam Accelerated Cure method in the PCCM. No other curing method shall be permitted.
4. Control of Camber Growth: Each beam shall have attained an age of at least 60 days before it may be approved for coating and shipment. The Contractor may propose an alternate method for controlling differential camber growth, subject to approval by the DCES.
5. Coating of Concrete Units: All concrete units shall be coated on all surfaces with a penetrating sealer. The surfaces must be prepared by water, shot, or sand blasting, removing all laitance, loose particles, etc. Prior to application of the sealer, the surfaces will be allowed to dry for a minimum of 24 hours after water blasting or other wetting. All surface preparation work shall be completed and approved by the Inspector, before sealer application can commence.

2/7/2000

**ITEM 16563.0299 M - PRESTRESSED CONCRETE BOX BEAM UNITS
MADE FROM**

HIGH PERFORMANCE CONCRETE FOR BEAMS

- A. Weather Limitations: Sealer materials shall not be applied during wet weather conditions, or if, in the opinion of the Inspector, adverse weather conditions are anticipated within twelve (12) hours of completion of sealer application. Ambient and surface temperatures shall be a minimum of 4 degrees C during application and until the sealed concrete is dry to the touch. Application by spray methods will not be permitted during windy conditions.
- B. Sealer Application: The sealer shall be used as supplied by the Manufacturer without thinning or alteration, unless specifically required in the Manufacturer's instructions. Thorough mixing of the sealer before and during its use shall be accomplished as recommended by the Manufacturer. Equipment for sealer application shall be clean of foreign materials and approved by the Inspector before use. A minimum of two (2) coats of the sealer shall be applied to achieve uniform coverage. The total quantity of sealer applied by each coat shall be equal to the quantity required at the application rate specified in the Approved List. Each coat shall be allowed to dry before the next coat is applied. On sloping and vertical surfaces, sealer application shall progress from bottom to top. Care shall be taken to ensure that the entire surface of the concrete is covered and all pores filled.

METHOD OF MEASUREMENT:

The quantity to be paid for under this work will be the number of square meters of plan area of each prestressed unit installed. Plan area is defined as the area bounded by the centerline of bearings and the outer edge of each prestressed unit. No deductions will be made for chamfers, or shear keys, or notch outs. Space between the units greater than 50 mm shall not be included in any measurement.

BASIS OF PAYMENT:

The unit price bid for these units shall include all labor, materials and equipment necessary to complete the work except that bearings will be paid for under their respective items.

Damaged units which cannot be satisfactorily repaired or which do not meet dimensional and camber tolerances shall be replaced by the Contractor at no cost to the State.

Progress payment will be made when each unit is furnished and placed in accordance with the plans and specifications exclusive of preparing and filling joints. Payment will be made at the unit price bid for 90% of the quantity properly placed, less any payment made under subsection 109-04. The balance of the quantity will be paid for upon completion of the work. The completion of work will include the correct preparation and filling of the joints as well as the tightening of transverse ties.