

ITEM 557.0501 16 - PRECAST CONCRETE DECK SYSTEM

DESCRIPTION

Under this work, the Contractor shall furnish all labor, materials, tools and equipment and other necessary means to perform all operations necessary for furnishing and installing precast concrete deck panels and placing a Class DP Concrete Overlay in accordance with the provisions of the Contract Documents.

MATERIALS

Materials used in this work shall conform to the NYSDOT Prestressed Concrete Construction Manual (PCCM)-Current Edition and the following:

CONCRETE

28 Day Compressive Strength	35.0 MPa	(Minimum)
Lifting Strength	20.0 MPa	(Minimum)

HAUNCH/SHEAR STUD POCKET

Class DP Concrete (see Note 1)	501-2
Or Shear Key Grout	701-06

REINFORCING STEEL

Galvanized Reinforcing Bars	709-11
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OVERLAY

Class DP Concrete Friction Type 1	501-2
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Additional material, listed below, shall meet the requirements of the following subsections or specifications:

1)	Mechanical Connectors for reinforcing bars splices	709-10
2)	Leveling Bolts	ASTM F568M, Class 4.6
3)	Fasteners (Galvanized)	719-01

GALVANIZED THREADED FASTENERS. All tapped holes in plates and nuts, for galvanized bolts, shall have a standard oversized tap to allow for the galvanizing on the bolts, nuts and tapped plates.

Note 1: Optional use of Self Consolidating Concrete (SCC) for Filling Haunch/Shear Stud Pocket

The contractor may, with the approval of the Engineer, submit a proposed mix design for Self Consolidating Concrete (SCC). This mix may be used under the Materials Requirements for Item 555 - Structural Concrete. All necessary materials, labor, and equipment shall be provided at no additional cost to the state and shall be included in the bid price for the appropriate Section 555 item(s). Use of a Corrosion Inhibiting Admixture, meeting the requirements of §711-13, in SCC will be as required by the plans and proposal and paid under a separate item.

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Under this option, the contractor will create a mix design using materials from the Departments Approved List of Materials and Equipment. When a viscosity modifying admixture is used, it will be from the same manufacturer as the high-range water reducing SCC admixture. The contractor will prepare a trial batch using those specific materials to be used on the project and must demonstrate the mix's ability to achieve the specified properties to the Regional Materials Engineer's satisfaction. At least three weeks prior to placement, the contractor shall supply:

- detailed mix design including materials sources, admixtures, and batch amounts
- compressive strength results, including rate of strength gain for 1, 3, 7, 14, and 28 days, or maturity curves with corresponding temperatures as appropriate.
- proposed target limits for spread, indicating acceptable low and high spread limits and proposed actions when mixture testing is outside of the target limits.
- proposed visual stability index (VSI) target limits for acceptance.
- proposed air content target within specified limits.
- J-ring test results, according to ASTM C 1621, proving minimal blocking assessment of less than 50 mm
- Column segregation results, according to ASTM C 1610, proving a maximum segregation index of 15%

The contractor will provide a proposed quality control plan, including how the above performance criteria will be maintained and actions taken when test results are not acceptable. Once a mixture design is accepted by the Department, changes other than minor fluctuations in admixture dosage rates will require a new mix design.

Sampling and testing of SCC during placement will be according to the requirements of Materials Method 9.2 – Field Inspection of Portland Cement Concrete except as modified here:

- Slump flow measured according to ASTM C 1611.
- Air content measured according to ASTM C 231 except the sample container shall be filled in one lift without vibration, rodding or tapping.
- Cylinder cast according to ASTM C 31 except the sample container shall be filled in one lift without vibration, rodding or tapping.

All other provision of Item 555 apply, unless otherwise directed by the Engineer.

DRAWINGS

Shop drawings shall be prepared and submitted as per the requirements of the Prestressed Concrete Construction Manual, (PCCM), and the following:

1) Before the preparation of shop drawings, all dimensions shall be field verified, as deemed necessary, to ensure the accurate fit of the proposed precast panels. Shop drawings shall be prepared based upon the Contract Documents as well as the information gathered by field survey.

2) The submitted shop drawings shall include details of lifting and handling of panels in the production facility and their storage, transportation, handling and storage at the construction site. The proposed handling and lifting shall be such that the maximum tensile stress in concrete for handling and erection loads when analyzed according to the proposed handling and

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installation procedures, shall not exceed $0.40 (f'_{ci})^{1/2}$, where f'_{ci} is the concrete compressive strength at the time being considered.. Calculations showing actual concrete stresses based upon the proposed support locations and expected dynamic loading of the panels during handling, storage and transportation of the panels shall be prepared by a NYS Licensed Professional Engineer and shall be submitted along with the shop drawings. These drawings and calculations shall be stamped and signed by a Professional Engineer.

FABRICATION

Fabrication shall meet the requirements of the PCCM and the following:

Fabrication Tolerances

1. Width (transverse direction of the bridge): +3, -3 mm
2. Length (longitudinal direction of the bridge): +3, -3 mm
3. Depth (overall): +3, -0 mm
4. Bulkhead alignment (deviation from square or designated skew)

Vertical	4 mm
Horizontal	4 mm
5. Horizontal alignment (deviation from straight line parallel to centerline of unit):

4 mm for 12 m length
6 mm for 12 m to 18 m length
8 mm for greater than 18 m length

Welding of steel shall comply with the requirements of the New York State Steel Construction Manual.

Placing Concrete, Curing and Finishing

All requirements stipulated in PCCM shall apply except for the following:

The top surface shall be finished by roughening, in the long direction of the panel, with a stiff broom to an amplitude of 5 mm. After curing, all form release material and all other forming material adhering to the shear keyway and block out concrete shall be removed.

Shear key faces shall be roughened and blast cleaned and coated with penetrating sealers as per the PCCM.

Shipping and Handling of Precast Panels. Custom steel installation frames shall be utilized during panel handling in the shop and during transport loading, unloading and the field placement operations. The steel installation frames shall be specially designed by the Contractor to provide panel support at a minimum of four (4) frame bearing points. The Contractor shall verify that the method of lifting does not overstress the precast concrete panels in any way. The use of lifting holes will not be permitted. The panels shall have markings on the edges of the panel locating the center line of the supporting stringers, to assure that the panels are placed correctly and accurately onto their supports.

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Steel Embedments. Steel embedments for the panel leveling devices and hold down devices shall be installed in the shop based upon the locations shown on the shop drawings. Embedments for the panel hold down devices shall be based on field measured and verified locations of the existing steel members to which the device is attached.

Loading of Panels. Construction equipment shall not be permitted on the precast units until after they have been grouted in place and sufficient time has passed for the grout to gain strength.

Mixing and Placing Underdeck Grout. Specifications in the PCCM and the following:

Thoroughly wet the concrete contact area 24 hours prior to grouting, keep wet and remove all surface water just prior to grout placement.

INSTALLATION REQUIREMENTS

Installation shall meet the requirements of the PCCM and the following:

1. Prior to installing panels, the supporting steel surfaces in contact with the panels or field placed concrete shall be cleaned, including removal of free water, to the satisfaction of the engineer.
2. Installation tolerances shall be as shown in the Contract Documents.

WEARING SURFACE OVERLAY

Place the Class DP Concrete Overlay according to the requirements of Section 584.

METHOD OF MEASUREMENT

Payment will be made at the unit bid price per square meter for the number of square meters of precast panel as shown on the Contract Plans.

BASIS OF PAYMENT

The square meter bid price shall include the cost of all labor, materials and equipment necessary to complete the work, including the furnishing, storing and protecting, transporting, unloading and installation of all precast panels, field placed reinforcing bars, forming systems for cast-in-place haunches and shear stud pockets, concrete and grout, underdeck protective shielding, removal of existing protective netting/shielding, and the placement of a Class DP Concrete overlay. The cost of field cast joints between precast concrete members shall be paid for under their appropriate items.