

# **ITEM 11557.0491 M - PRECAST, PRESTRESSED, POST TENSIONED 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, prestressed concrete deck panels and post-tensioning the precast concrete deck panels 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	50.0 Mpa	(Minimum)
Strength at Transfer	40.0 MPa	(Minimum)

### **GROUT**

Grout shall have a compressive strength of 24.1 MPa after seven (7) hours	PCCM, Para 4.5.2
Polypropylene Fiber (Only for Grout in Shear Keyway)	NYSDOT Approved List
Material Specification	PCCM, Para 4.5.3.1 and 4.6.3.2

### **REINFORCING STEEL**

Uncoated Welded Wire Fabric	709-02 ASTM A497
Epoxy Coated Reinforcing Bars	709-04

Additional material, listed below, shall meet the requirements of the following subsections or specifications:

1)	Post-tensioning System	718-53
2)	Galvanized Sheet metal forms and closures	736-01
3)	Mechanical Connectors for reinforcing bars splices	709-10
4)	Adhesive backed foam	ASTM D1056, Type 2
5)	Hot dipped galvanized (inside & outside) grout pipe ports and fittings, minimum coating of 0.55 kg/SM	ASTM A53, Type F, E, or S, Grade A or B Sch 40
6)	Steel Plates, shims and shapes (ASTM A36 M with a minimum of 0.20% copper content, unless the plans show otherwise)	715-01
9)	Leveling Bolts	ASTM F568M, Class 4.6
10)	Fasteners (Galvanized)	719-01
11)	Spring Rollpins	Carbon Steel, Zinc Plated MIL-P-10971, AMS 7205, MS 16562

**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.

## **DRAWINGS**

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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 there is no induced tensile stresses in any part of the concrete. 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. Position of Prestress strands
  - Vertical +/- 2 mm
  - Horizontal +/- 6 mm
5. Tendon duct location at shear key +/- 3 mm
6. Bulkhead alignment (deviation from square or designated skew)
  - Vertical 4 mm
  - Horizontal 4 mm
7. 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 the steel shall comply with the requirements of the New York State Steel Construction Manual.

#### **Placing Concrete, Curing and Finishing**

All requirements stipulated in PCCM, Para 5.9, 5.10 and 5.11 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

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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 and assuring the required alignments of the tendon ducts are achieved.

**Steel Embedments.** Steel embedments for the panel leveling devices, hold down devices, grout port pipes and tendon anchorages 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.

**Mixing and Placing Underdeck Grout.** Specifications for Para 8.6.1 to 8.6.7 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. After the underdeck grouting is completed, the upper pipe port sections and couplings shall be removed and the recess shall be filled with grout.

### **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 with costs paid for under the concrete removal items.
2. Install transverse shear keyway grout and allow to reach a minimum compressive strength of 24.1 MPa within 7 hours, prior to beginning the post-tensioning operations.

### **METHOD OF MEASUREMENT**

Payment will be made at the unit bid price per square meter for the number of square meters of precast, prestressed, post-tensioned 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, prestressed, post-tensioned panels. The cost of existing concrete removal, sawcutting existing deck, placement of field placed concrete closure pours, installation of field placed reinforcing steel and removal of existing and placement of new stud shear connectors, new steel support members, field drilled holes, underdeck protective shielding, removal of existing protective netting/shielding, shall be paid for under their appropriate items.