

ITEM 10551.90 M – PRECAST CONCRETE DOLPHIN

DESCRIPTION

This work shall consist of furnishing and installing Precast Concrete Dolphins as shown on the Contract Plans including materials, casting, coating, transporting, positioning and temporarily supporting dolphins, sealing the bottom of the precast concrete dolphin boxes and removal and disposal of the temporary supports. All precast concrete, epoxy coated reinforcing steel, grout, marine epoxy coating, epoxy bonding compound, seals at the pile openings and temporary supports necessary to complete this work shall be included in this specification.

The Contractor shall prepare erection plans for the Precast Concrete Dolphins. The plans shall show the method of transport to the site, the details and arrangement for lifting, the equipment positioning for lifting, the adequacy of adjacent bulkheads and other structures to support the lifting equipment, the method of installing the dolphins in the vicinity of the existing steel panel bridge over Sloop Channel, the method of sealing the bottom of the precast concrete dolphin box at the pile openings and details of the precast concrete dolphin box support devices. The precast concrete dolphin box support devices shall be capable of carrying the full weight of the dolphin box plus tremie plus the footing concrete up to Elevation + 1.77m. Calculations and erection plans shall be sealed by a Professional Engineer Registered in the State of New York.

MATERIALS

Material shall meet the requirements of the following sections:

Precast Concrete	704-03
28 days minimum compressive strength	34.5 MPa.
Epoxy Coated Reinforcement	709-04
Epoxy Polysulphide Grout	721-03

The Marine Epoxy Coating for the exterior of the Precast Concrete Dolphins shall be a two component, high-solids, solvent-free, epoxy resin, high-build protective coating specifically intended for splash zone applications. The coating shall be Sikagard 61 or approved equal.

The properties shall be as follows:

Color:	gray	
Pot Life:	approx. 40 minutes	
Tensile Properties (ASTM D-638):		
14 days	Tensile Strength	32 MPa
	Elongation at Break	1.7%
	Modulus of Elasticity	1241 MPa
Flexural Properties (ASTM D-790):		
14 days	Flexural Strength (Modulus of Rupture)	44 MPa
	Tangent Modulus of Elasticity in Bending	2206 MPa
Shear Strength (ASTM D-732):		
14 days	Shear Strength	39 MPa

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Water Absorption (ASTM D-570):		
7 days	Total Water Absorption (2-hour boil)	0.9%
Abrasion Resistance (ASTM D-968):		
14 days	Abrasion coefficient	2.65 liters/_m
Adhesion (ASTM D-3359):		
7 days	Adhesion classification	4A (air and underwater cure)
Elongation (ASTM D-522):		
14 days	Elongation	6.4%

CONSTRUCTION DETAILS

The exterior of the Precast Concrete Dolphin shall be coated with the marine epoxy coating prior to exposing it to salt water. The Precast Concrete Dolphin shall be positioned and lowered onto the temporary supports. The piles at each dolphin shall be installed, the holes around the piles shall then be sealed, and the tremie placed. Once the tremie has cured seven days, epoxy bonding compound on the interior of the dolphin and the footing concrete may be placed.

The concrete shall be placed in accordance with Section 555-3 of the Standard Specifications.

The reinforcement shall be placed in accordance with Section 556-3 of the Standard Specifications

The Contractor may provide extra reinforcing steel, other than that shown on the Contract Plans, for handling and transporting of the Precast Concrete Dolphin.

The Marine Epoxy Coating on the exterior of the Precast Concrete Dolphin shall be applied according to the manufacturer's recommendations and as follows:

Preparation of Surface:

Sandblast surface and allow a 24-hour neutralization period before applying the coating.

Mixing:

Pre-mix each component. Proportion equal parts by volume of Component "A" and Component "B" in a clean container. Mix with a low-speed (400-600-rpm) drill and paddle for 3 minutes until uniform in color or as recommended by the manufacturer. Mix only that quantity that can be used within its pot life.

Application:

Two coats of 205-280 micrometers each shall be applied before installing the boxes. The substrate temperature shall be a minimum of 10_C at application. The coating shall not be thinned. Apply the coating using high-quality rollers or brushes. Saturate all the rollers or brushes with the coating before immersion. The coating may be totally submerged after mixing and kept there during the application.

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Apply the coating with least amount of agitation possible. Always apply the second coat as soon as possible to reduce potential surface contamination. Any damaged coating shall be touched up.

The Epoxy Polysulphide Grout shall be applied as follows:

Preparation of Surface:

All surfaces designated to receive epoxy polysulphide grout shall be thoroughly sandblasted with No. 40 boiler slag grit or No. 2 sandblast sand or abraded by other mechanical means approved by the Engineer.

After sandblasting and just prior to the application of epoxy, the surface shall be air-blown or vacuum-cleaned.

Mixing:

The two components of the epoxy polysulphide grout are furnished in separate containers. It is essential that the entire contents of both containers be thoroughly blended together. A paddle attached to a slow-speed electric drill or other methods approved by the Engineer shall be used for mixing. For small batches of one gallon or less, thorough hand stirring may be satisfactory.

Application:

The prepared surface shall be dry and then coated with the properly mixed epoxy polysulphide grout. The epoxy covering should be as uniform as possible and shall be worked into the prepared receiving surface by means of stiff brushes, or other means acceptable to the Engineer. The Contractor shall use every means available to prevent epoxy polysulphide grout from collecting in pools. However, under no circumstances shall the epoxy polysulphide grout be thinned with solvents or sprayed onto the designated receiving surface.

Epoxy polysulphide grout should be applied in such a manner that surfaces are coated with no more than 0.4mm of film thickness. However, since it is impracticable to measure a thickness of this magnitude under most conditions, the application coating thickness will be considered acceptable if it appears wet to visual observation. The prepared surface shall be considered adequately coated if 75 percent of the actual surface area designated to be coated, has been coated and passes the visual test previously described.

Should 75 percent of the actual surface area not be coated as previously described, additional epoxy polysulphide grout shall be applied to the surface until the required coating coverage is achieved. The additional epoxy polysulphide grout shall be applied at no additional cost to the State.

It should be noted that the workable life of epoxy polysulphide grout is a function of time, temperature and quantity of material being mixed. Therefore, the manufacturer's detailed instructions for mixing and application shall be carefully adhered to, with the exception that instructions regarding application by thinning of the epoxy polysulphide grout or spraying of the epoxy polysulphide grout shall be disregarded.

Scheduling:

The Contractor shall schedule his operations so that concrete shall be placed while the epoxy polysulphide grout is still uncured and tacky. If the Engineer determines that the epoxy

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polysulphide grout has begun to cure, then the Contractor shall apply a new coating of epoxy polysulphide grout to the required areas at no cost to the State. No concrete shall be placed upon any surface, which the Engineer determines is covered with epoxy polysulphide grout.

All support devices at the dolphins shall be removed and disposed of once the dolphin concrete has reached ninety percent of its required compressive strength.

METHOD OF MEASUREMENT

Payment will be made at the unit price bid for each Precast Concrete Dolphin furnished and placed as shown on the plans and in accordance with the specifications.

BASIS OF PAYMENT

The unit price for each Precast Concrete Dolphin shall include the cost of furnishing all labor, equipment and materials necessary to install the Precast Concrete Dolphin to its proper line and grade. No additional payment will be made for the temporary supports required to set the Precast Concrete Dolphin.