SECTION 03 01 33

BRIDGE DECK METHACRYLATE RESIN TREATMENT

PART 1 - GENERAL

1.1 SCOPE

A. This specification section governs application of a high molecular weight methacrylate (HMWM) resin system with sand and absorbent material to bridge decks.

1.2 RELATED SECTIONS

A. Section 03 01 30 – Cast-in-Place Concrete Maintenance

1.3 REFERENCED CODES AND STANDARDS

A. Caltrans Standard Specifications dated 2018 and Revised Standard Specifications dated 4/16/2021

1.4 SUBMITTALS

The Contractor shall submit the following to the City Representative for review prior to HMWM placement in accordance with Division 1:

A. A HMWM resin system placement plan including the following:

1. Schedule of work and testing for each bridge.
2. Description of equipment for applying HMWM resin.
3. Range of gel time and final cure time for HMWM resin.
4. Absorbent material to be used.
5. Description of equipment for applying and removing excess sand and absorbent material.
6. Procedure for removing HMWM resin from the deck, including equipment.
7. Storage and handling of HMWM resin components and absorbent material.
8. Disposal of excess HMWM resin and containers.

B. Safety Data Sheets (SDS): For each HMWM resin system component and diatomaceous earth shipment before use.

1.5 QUALITY ASSURANCE

A. Quality-Control Program: Complete a test area before starting work. Results from airborne emissions monitoring of the test area must be submitted to the City Representative before starting production work. The test area must:

1. Be approximately 500 sq ft
2. Be placed within the project limits outside the traveled way at an approved location

3. Be constructed using the same equipment as the production work
4. Replicate field conditions for the production work
5. Demonstrate proposed means and methods meet the acceptance criteria
6. Demonstrate the production work will be completed within the time allowed
7. Demonstrate suitability of the airborne emissions monitoring plan

B. The test area will be acceptable if:

1. The treated deck surface is tack free and non-oily
2. The sand cover adheres and resists brushing by hand
3. Excess sand and absorbent material has been removed
4. The coefficient of friction is at least 0.35 when tested under California Test 342

PART 2 - PRODUCTS

2.1 MATERIALS

A. HMWM resin system consists of a resin, promoter, and initiator. HMWM resin must be low odor and comply with the following:

Property	**Requirement**	**Test Method**
Volatile Content*	30 percent, maximum	ASTM D 2369
Viscosity*	25 cP, maximum, (Brookfield RVT with UL adaptor, 50 RPM at 77°F)	ASTM D 2196
Specific Gravity*	0.90 minimum, at 77°F	ASTM D 1475
Flash Point*	180°F, minimum	ASTM D 3278
Vapor Pressure*	1.0 mm Hg, maximum, at 77°F	ASTM D 323
Tack-free Time	400 minutes, maximum, at 25°C	Specimens prepared per California Test 551
PCC Saturated Surface-Dry Bond Strength	3.5 MPa, minimum at 24 hours and 21 ± 1°C	California Test 551

* Test must be performed before adding initiator

B. Sand for abrasive sand finish must:

1. Be commercial quality dry blast sand
2. Have at least 95 percent pass the No. 8 sieve and at least 95 percent retained on the No. 20 sieve when tested under California Test 205

C. Absorbent material must be diatomaceous earth, abrasive blast dust, or substitute

recommended by the HMWM resin supplier and approved by the Engineer.

PART 3 - EXECUTION

3.1 CLEAN BRIDGE DECK

A. Abrasive blast clean the deck surface. Sweep the deck surface clean. Blow loose material form cracks using high-pressure air.

B. The deck surface must be dry when abrasive blast cleaning is performed. Laitance, surface contaminants, and foreign material must be removed from the bridge deck surface.

C. Remove dust and residue from abrasive blast cleaning using a vacuum attachment operating concurrently with blasting equipment when abrasive blast cleaning within 10 ft of public traffic.

D. If the deck surface becomes contaminated before placing methacrylate resin, abrasive blast clean the contaminated area and sweep the deck clean.

E. Materials removed during blast cleaning operations shall be disposed of away from the site in conformance with applicable rules and regulations.

3.2 APPLICATION OF HMWM RESIN

A. HMWM resin applied by machine must be:

1. Combined in volumetric streams of promoted resin to initiated resin by static in-line mixers

2. Applied without atomization

B. HMWM resin system may be applied manually. Limit the quantity of resin mixed for manual application to 5 gallons at a time.

C. The deck must be dry before applying HMWM resin. The concrete surface must be at least 50 degrees F and at most 100 degrees F. Relative humidity must be expected to be at most 85 percent during the work shift.

D. Thoroughly mix all components of HMWM resin. Apply HMWM resin to the deck surface within 5 minutes of mixing at approximately 80 sq ft per gallon. The City Representative determines the exact application rate. The resin gel time must be between 40 and 90 minutes. HMWM resin that thickens during application is rejected.

E. Spread the HMWM resin uniformly. Completely cover surfaces to be treated and fill all cracks. Redistribute excess resin using squeegees or brooms within 10 minutes of application. For textured or grooved deck surfaces, excess resin must be removed from the texture indentations.

F. Apply the abrasive sand finish of at least 2 lbs per sq yd or until saturation as determined by the City Representative no sooner than 20 minutes after applying resin. Apply absorbent material before opening lane to traffic. Remove excess sand and absorbent material by vacuuming or power sweeping.

G. Traffic or equipment will be allowed on the overlay after the City Representative has determined:

1. The treated deck surface is tack free and non-oily
2. The sand cover adheres and resists brushing by hand
3. Excess sand and absorbent material have been removed
4. No material will be tracked beyond limits of treatment by traffic

3.3 ACCEPTANCE AND REJECTION OF WORK

A. If the conditions of Section 3.2 G have not been met and the allowable lane closure time will be exceeded, the work will be rejected. The Contractor will immediately remove the deck treatment by the abrasive blast method detailed in Section 3.1.

B. The Contractor shall submit a revised plan and schedule for reapplication of the HMWM resin.

C. After treatment of the entire deck surface for the group of bridges had been completed, the City Representative will perform California Test 342 on the treated deck surfaces.

D. The City Representative will provide at least a 15-day notice for the Contractor to provide traffic control for each bridge location.

E. The coefficient of friction of the treated bridge deck must be at least 0.35 when tested in conformance with California Test 342.

F. If the coefficient of friction is less than 0.35, then the deck treatment will be rejected. The Contractor shall submit a revised plan and schedule for modification and reapplication of the HMWM resin.

END OF SECTION