Wisconsin Department of Transportation

Division of Transportation Systems Development
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February 10, 2020

NOTICE TO ALL CONTRACTORS:

Proposal #14: 1228-22-72, WISC 2020 042
IH 43 North South Freeway
Hampton Rd to Bender Rd
IH 43
Milwaukee County

Letting of February 11, 2020

This is Addendum No. 03, which provides for the following:

Special Provisions:

Revised Special Provisions	
Article No.	Description
3	Prosecution and Progress

Added Special Provisions	
Article No.	Description
82	Bridge Joint Repair, item SPV.0090.4009

The responsibility for notifying potential subcontractors and suppliers of these changes remains with the prime contractor.

Sincerely,

Mike Coleman

Proposal Development Specialist
Proposal Management Section

ADDENDUM NO. 3

1228-22-72

February 7, 2020

Special Provisions

3. Prosecution and Progress

Add the following paragraph to the end subsection titled IH 43 Northbound Mainline *under section titled* **Interim Liquidated Damages***:*

If the contractor cannot complete the work necessary to reopen all lanes of traffic prior to the Article 81 Notice to Contractor – Interstate Work Restriction dates, the work should be started post Article 81 Notice to Contractor – Interstate Work Restriction Dates.

Replace paragraph one under subsection titled IH 43 Southbound Mainline *under section titled* **Interim Liquidated Damages***:*

At the beginning of Stage 1A operations, reduce the IH 43 southbound to 2 lanes of through traffic for a maximum of 60 calendar days. Do not reopen until completing the following work: PMA overlay and joint repair on Structure B-40-582, PMA overlay and joint repair on Structure B-40-584, and approach slabs.

Add the following paragraph to the end subsection titled IH 43 Southbound Mainline *under section titled* **Interim Liquidated Damages***:*

If the contractor cannot complete the work necessary to reopen all lanes of traffic prior to the Article 81 Notice to Contractor – Interstate Work Restriction dates, the work should be started post Article 81 Notice to Contractor – Interstate Work Restriction Dates.

82. Bridge Joint Repair, Item SPV.0090.4009.

A Description

This special provision describes saw cutting existing overlay, removing existing bar stock, milling existing overlay, and furnishing and installing silicone joint sealant and polyester polymer concrete with a high molecular weight methacrylate (HMWM) resin prime coat.

B Materials

B.1 Polyester Polymer Concrete

B.1.1 Primer

The high molecular weight methacrylate (HMWM) resin shall be low viscosity and have low odor, and shall meet the following requirements:

Property	RequirementsA	Test Method
Viscosity	≤ 25 cps	ASTM D 2196 – Brookfield RVT
Specific Gravity	0.90 – 1.10	ASTM D 1475
Flash Point	≥ 180°F	ASTM D 3278
Tack-free Time	≤ 400 minutes	California Test Method 551
Vapor Pressure	≤ 1 mm Hg	ASTM D 323
Gel Time	10 – 150 min	ASTM C 881, para.11.2, mod.
Tensile Strength	≥ 2,000 psi (7 days)	ASTM D 638

Adhesive Strength	≥ 250 psi (24hrs)	ACI 503R, Append. A
Compressive Strength	≥ 3,000 psi (24hrs)	ASTM D 695

[A] Values are based on specimens or samples cured or aged and tested at 77°F

B.1.2 Resin

The material shall be a polyester polymer concrete system composed of a two-component, 100 percent solids, thermosetting compound with the following properties:

Property	RequirementsB	Test Method
Gel Time	10 – 25 min	ASTM C 881
Viscosity	1 – 5 poises	ASTM D 2196 – Brookfield RVT
Absorption	≤ 1 percent (24 hr)	ASTM D 570
Tensile Elongation	30 – 80 percent (7 days)	ASTM D 638
Tensile Strength	≥ 2,000 psi (7 days)	ASTM D 638
Permeability to Chloride ion	≤ 100 coulombs (28 days)	AASHTO T 277

[B] Values are based on specimens or samples cured or aged and tested at 75°F

B.1.3 Aggregates

The finishing sand aggregate shall be commercial quality dry blast sand. Furnish material conforming to the following: 95% passing the No. 8 sieve and at least 95% retained on the No. 20 sieve.

For mixing with the polyester polymer, furnish natural or synthetic aggregates that have a proven record of performance in applications of this type. Furnish aggregates that are non- polishing, clean, free of surface moisture, fractured or angular in shape; free from silt, clay, asphalt, or other organic materials; and meet the following properties and gradation requirements:

Aggregate Properties:

Property	Requirements	Test Method
Moisture Content	≀ 0.2%	ASTM C566
Hardness	≀ 6.5	Mohs Scale
Fractured Faces	100% with at least 1 fractured face and 80% with at least 2 fractured faces of material retained on No.16	ASTM 5821

Gradation:

Sieve Size	% Passing by Weight
3/8”	100
No. 4	70
No. 8	50
No. 16	44
No. 30	30
No. 50	5-20
No. 100	1
No. 200	0

B.1.4 Required Properties of Polyester Polymer Concrete

The required properties of the system are listed in the table below:

Property	Requirements[C]	Test Method

Minimum Compressive Strength	1,000 psi (8 hrs) 5,000 psi (24 hrs)	ASTM C 579 Method B, Modified [D]
Thermal Compatibility	No delaminations	ASTM C 884
Minimum Pull-off Strength	250 psi (24 hrs)	ACI 503R, Appendix A

B.1.5 Approval of Polyester Polymer Concrete

A minimum of 20 working days prior to application, submit product data sheets and specifications from the manufacturer, and a certified test report to the engineer for approval. The engineer may request samples of the polymer and/or aggregate, prior to application, for the purpose of acceptance testing by the department.

For materials not pre-qualified, in addition to the above submittals, submit product history/reference projects and a certified test report from an independent testing laboratory showing compliance with the requirements of the specification.

The product history/reference projects consist of a minimum of 5 bridge/roadway locations where the polyester polymer concrete has been applied in Wisconsin or in locations with similar climate – include contact names for the facility owner, current phone number or e- mail address, and a brief project description.

Product data sheets and specifications from the manufacture consists of literature from the manufacturer showing general instructions, application recommendations/methods, product properties, general instructions, or any other applicable information.

B.2 Silicone joint Sealant

Provide rapid cure, self-leveling, cold applied, two-component silicone sealant. Provide a sealant which demonstrates resilience, flexibility, and resistance to moisture and puncture, upon curing. Provide sealant that demonstrates excellent adhesion to Portland cement concrete, polyester polymer concrete, and steel over a range of temperatures from –30 degrees F to 130 degrees F while maintaining a watertight seal. Provide sealant that does not contain any solvents or diluents that cause shrinkage or expansion during curing. Acid cure sealants are not acceptable. Provide the date of manufacture or “use-by date” with each lot. Materials twelve months old or older from the date of manufacture or past its “use-by date” will not be accepted. Provide manufacturer certification that the sealant meets or exceeds the following test requirements before installation begins. The department reserves the right to test representative samples from material proposed for use.

Physical Properties:

Each component supplied:

Specific gravity (ASTM D1475)	1.3 – 1.4
Extrusion rate (MIL-5-8802)	200 – 550 grams per minute
Flow	Self-leveling
Durometer hardness, shore (ASTM D2240) “00” (0 degrees and 77 ±3 degrees F)	40 – 80
Ozone and U.V. resistance (ASTM C793-75)	no chalking, cracking or bond loss after 5,000 hours

After mixing:

Tack-free time (ASTM C679)	60 minutes maximum
Joint cure rate (% of total cure)	50% within 4 - 6 hours 75% within 24 hours 100% within 48 - 160 hours

Upon complete cure (ASTM D3583[1]):

Joint elongation (adhesion to concrete/ steel/polymer concrete)	600% minimum
Joint modulus	3 –12 psi at 100% elongation

[1]Modified; sample cured 2 days @ 77 ± 2 degrees F, 50 ± 5% humidity.

B.2.1 Backer Rod

Provide closed cell backer rod as recommended by the sealant manufacturer, conforming to ASTM D5249, Type 3. Backer rod should be 25%-33% larger than the joint opening at the time of sealing to ensure a snug fit.

B.2.2 Joint Sealant Primer

For use on Portland cement concrete or polyester polymer concrete, provide primer in accordance to the silicone sealant manufacturer's recommendations.

B.2.3 Zinc-Rich Primer

For use on steel in areas where silicone joint sealant will be placed, provide a zinc-rich primer in accordance to the silicone sealant manufacturer's recommendations.

C Construction

C.1 General

Provide manufacturer technical assistance during surface preparation and installation at no additional cost to the department. Provide the manufacturer's written product information, installation procedures, and instructional video – if available - at least two weeks prior to installation. Coordinate meeting with manufacturer and the engineer to review and clarify installation procedures and requirements prior to starting the work. A technical representative must be available at the start of surface preparations and sealant installation. Contact the manufacturer at least two weeks prior to installation.
Remove loose or damaged areas around joint, repair the joint nose where damaged and place sealant in accordance to manufacturer's installation procedures.

C.2 Joint Preparation

(1) Remove the existing bar stock either welded to the existing expansion joint or pinned to the bridge deck. The bridge deck and overlay shall be saw cut and milled off on either side of the bridge joint to the width and depth as shown on the plans. The joints and milled surface shall be cleaned of all old joint seals, old expansion materials/devices, bituminous material, dirt, grease, and all other deleterious material. Remove all structurally unsound materials. The joints shall be cleaned over the total area of the block-out or openings to receive the polyester polymer concrete and/or primer material by sandblasting all concrete, steel, or asphalt surfaces. Preparation shall be as recommended by the polyester polymer concrete and/or sealant manufacturer.
(2) Place extruded foam insulation board into the joint opening at a width as specified as a form for the polyester polymer concrete material. Foam board width must be as specified for the joint opening. Foam board should be cut to extend at least 1"-2" below the bottom of the block-out or joint nosing opening. Foam board should be cut so that the top is level or up to 2" above the driving surface. Secure foam board in the joint. Tape the intersections of the foam board in the joint after they are placed correctly. Cut and remove any tape that overlaps onto the block-out surface. All potential leaks must be plugged before installing the polyester polymer concrete.

C.3 Polyester Polymer Concrete

C.3.1 Application of the Primer

Do not apply the primer if any of the restrictions listed in C.3.2.1 are present. Apply primer to the deck surface within 5 minutes of mixing at approximately 1 gallon per 100

square feet. Use a squeegee, roller, broom, low pressure sprayer, etc. to distribute the material uniformly. Remove excess buildup. Wait a minimum of 15 minutes before placement of polyester polymer.

C.3.2 Placement of the Polyester Polymer Concrete

(1) Perform the handling and mixing of the polymer resin and hardening agent in a safe manner to achieve the desired results according to the manufacturer's instructions. Do not apply the polyester polymer system if any of the following exists:

- Ambient air temperature is below 50^{O}F.
- Deck temperature is below 50^{O}F or above 100^{O}F.
- Moisture content in the deck exceeds 4.5% when measured by an electronic moisture meter or shows visible moisture after 2 hours when measured in accordance to ASTM D4263.

- Rain is forecasted within 12 hours of completion.
- Materials component temperatures below 50°F or above 99°F.
- If gel time is 10 minutes or less at predicted high air temperature for the day.

(2) Fill the nosing space with the polyester polymer concrete following manufacturer's instructions. The finish sand shall be applied by either mechanical or hand dispersion immediately after strike-off, before gelling occurs. Apply at approximately 15 to 20 lbs per 100 square feet or until saturation as determined by the engineer. The final surface of the polyester polymer concrete nosing material should be exactly level with the driving surface.
(3) Allow polyester polymer concrete nosing material to completely cure prior to placing joint sealant. Cure time will depend on temperature. After polyester polymer concrete has cured, remove the foam board. Grind a ¼" bevel on each right angle edge of the nosing concrete at the joint opening.

C.4 Silicone Joint Sealant

C.4.1 General

Place silicone against dry concrete or polyester polymer concrete which has been allowed to cure. Apply sealant in strict accordance with the manufacturer's instructions for joint opening 1 inch to 3 inches at the time of sealing.

C.4.2 Surface Preparation

C.4.2.1 Sandblasting

Sandblast both faces of the joint, including areas where polyester polymer concrete was installed. Make a separate pass for each face for the full length of the joint and to the design depth of the center of the backer rod or a minimum of 3". Hold nozzle at an angle of 30 to 90 degrees to the joint face, at a distance of 1 to 2 inches.
For Portland cement concrete and polyester polymer concrete surfaces, sandblasting will be considered acceptable when both joint faces have a roughened surface with clean, exposed aggregate. Provide surface free of foreign matter or plastic residue.

After sandblasting, clean joint of debris using compressed air, with a minimum pressure of 90 psi. Equip air compressor with traps to prevent the inclusion of water and/or oil in the air line. Provide joint opening that is clean, dry, and free from mud, dirt, sand, oil, or grease and any other contaminants prior to application of the primer or sealant.

C.4.3 Joint Installation

C.4.3.1 Backer Rod Placement

Install the backer rod to a uniform depth of at least 1 ¼ inches for joints up to 2 -1/2" wide as specified on the plans and as recommended by the manufacturer. For joints larger than 2-1/2" wide place backer rod at a depth of 1-3/8". Tape all splices in the backer rod to prevent material loss during sealing. Install the backer rod to within 1/8 inch tolerance prior to sealing.

C.4.3.2 Sealant Placement

Place sealant ½ inch thick within 1/8 inch tolerance as measured in the center of the joint at the thinnest point. Measure the sealant thickness during installation every ±2 feet. Adjust to correct sealant thickness to within tolerance immediately before the sealant begins to set up. Place sealant when the air and substrate temperatures are above 41 degrees F and 5 degrees F above the dew point. Maintain the joint in clean and dry condition during sealing. Halt sealing operation until the joint has been restored to a clean and dry state if the joint becomes wet and/or dirty during sealing,
Perform sealing using a pneumatic gun approved by the sealant manufacturer. Inspect the gun prior to sealing to ensure that it is in proper working order and that it is being operated at the recommended air pressure.
The gun must demonstrate proper mixing action before sealant will be allowed into the joint. Do not place unmixed sealant in the joint. Remove and replace all unmixed sealant found in the joint at the contractor's expense.

After the engineer has determined that the pneumatic gun is functioning properly, the joint shall be sealed to the thickness and depth as shown on the plans and in accordance to sealant manufacturer's recommendations. The sealant must be allowed to achieve initial set before opening the joint to traffic.
End of seal treatment at vertical faces of curbs, sidewalks or parapets shall be as recommended by the manufacturer and as shown on the plans.

Sealant placed incorrectly shall be removed and replaced by the contractor at the contractor's expense.

C.4.3.3 Field Testing

A minimum of one joint per bridge per joint configuration will be tested by the engineer by performing a "Pull Test". The sealant shall be allowed to cure for a minimum of 24 hours before testing. The locations for the tests will be determined by the engineer. The tests will be performed per the manufacturer's written instructions. As part of the test, the recess depth and sealant thickness will be verified. All joint system installations failing to meet the specifications shall be removed and replaced by the contractor, to the satisfaction of the engineer, at no cost to the department. In addition, since the "Pull Test" is a destructive test, the contractor shall repair the joint after completion of the test per the sealant manufacturer's written instructions at no additional cost to the department.

D Measurement

The department will measure Bridge Joint Repair in length by the linear foot of repaired transverse joint acceptably completed.

E Payment

The department will pay for measured quantities at the contract unit price under the following bid items:

ITEM NUMBER	DESCRIPTION	UNIT
SPV.0090.4009	Bridge Joint Repair, B-40-587	LF

Payment is full compensation for saw cutting, removing bar stock, milling existing overlay, cleaning, repairing and preparing the surface; and for furnishing and installing all materials.

END OF ADDENDUM