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	MISSOURI HIGHWAYS AND TRANSPORTATION COMMISSION 105 W. CAPITOL AVE. JEFFERSON CITY, MO 65101 Phone (888) 275-6636
	If a seal is present on this sheet, JSP's has been electronically sealed and dated.
	JOB NO. J6P3308 St. Louis County, MO Date Prepared: 8/9/2021
Only the following items of the Job Special Provisions (Bridge) are authenticated by this seal: All	

A. CONSTRUCTION REQUIREMENTS

1.0 Description. This provision contains general construction requirements for this project.

2.0 Construction Requirements. The plans and the asbestos and lead inspection report for the existing structure(s) are included in the contract in the bridge electronic deliverables zip file for informational purposes only.

2.1 In order to assure the least traffic interference, the work shall be scheduled so that a lane closure is for the absolute minimum amount of time required to complete the work. A lane shall not be closed until material is available for continuous construction and the contractor is prepared to diligently pursue the work until the closed lane is opened to traffic.

2.2 Bridge work by contractor forces, including erection, rehabilitation or demolition, shall not be allowed over traffic unless a bridge platform protection system is installed below the work area except for work performed above a deck that is intact. The protection system shall be capable of catching all falling objects such as tools, overhang brackets or materials. Lifting of objects that are heavier than the capacity of the bridge protection system shall not be permitted.

2.3 Qualified special mortar shall be a qualified rapid set concrete patching material in accordance with [Sec 704](#). A qualified rapid set concrete patching material will not be permitted for half-sole repair, deck repair with void tube replacement, full depth repair, modified deck repair and substructure repair (formed) unless a note on the bridge plans specifies that a qualified special mortar may be used.

2.4 Provisions shall be made to prevent any debris and material from falling onto the roadway. If determined necessary by the engineer, any debris and material that falls below the bridge outside the previously specified limits shall be removed as approved by the engineer at the contractor's expense. Traffic under the bridge shall be maintained in accordance with the contract documents.

2.5 Any damage sustained to the remaining structure as a result of the contractor's operations shall be repaired or the material replaced as approved by the engineer at the contractor's expense.

2.6 Provisions shall be made to prevent damage to any existing utilities. Any damage sustained to the utilities as a result of the contractor's operations shall be the responsibility of the contractor. All costs of repair and disruption of service shall be as determined by the utility owners and as approved by the engineer.

3.0 Method of Measurement. No measurement will be made.

4.0 Basis of Payment. Payment for the above described work will be considered completely covered by the contract unit price for other items included in the contract.

B. EPOXY URETHANE POLYMER WEARING SURFACE

1.0 Description. This work shall consist of constructing an epoxy urethane polymer wearing surface on a prepared surface in accordance with this specification, as shown on the plans or as directed by the engineer. Epoxy urethane polymer wearing surface shall be composed of the

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following components: a healer/sealer prime coat and two courses of epoxy urethane polymer and aggregate.

1.1 Required Experience. The contractor shall have experience placing similar epoxy urethane polymer wearing surface systems on at least three structures prior to performing work on this project. Written proof of this experience along with project contacts shall be provided to the engineer in writing for approval prior to the preconstruction meeting. Prior to installation of the wearing surface, the contractor shall also provide certification by the material supplier that the contractor is a trained and qualified installer of the selected wearing surface system.

2.0 Material. All material shall be in accordance with [Division 1000](#), Material Details, and specifically as follows:

2.1 Epoxy Urethane Resin. The infrared spectrum for each component of the epoxy urethane polymer shall essentially match that of the standard infrared spectrum for the particular component as specified in AASHTO T 237, Sections 4 and 5. The epoxide equivalent for Component A shall not exceed 270. The mixed epoxy urethane polymer shall be a two-component (base and hardener), 100% solids, thermosetting, moisture insensitive, flexible, high elongation epoxy urethane resin in accordance with the following physical requirements:

Property	Requirement
Pot life (at 75 F), minutes	15 to 45
Tensile Strength (at 75 F, 7 days), psi, min.	2500
Tensile elongation (at 75 F), percent, min.	30
Water Absorption, percent, max.	1
Compressive Strength (at 3 hr), psi, min.	1000
Compressive Strength (at 24 hr, wet), psi, min.	5000
Rotational Viscosity, (at 75 F, spindle 3, 20 rpm), poise	35 to 70
Thermal Shear (shearing, shrinkage, expansion or scaling)	None
Shore D Hardness (ASTM D 2240) (at 77 F)	60 to 75
Adhesion Strength (at 24 hr), psi, min.	250

2.1.1 Classes. Epoxy resin shall be formulated for use at specific temperatures as specified in ASTM C 881. The controlling temperature shall be that of the hardened concrete surface to which the polymer is applied. Where unusual curing rates are desired and upon the approval from the engineer, a class of epoxy resin may be used at a temperature other than that for which the epoxy resin is normally intended.

2.1.2 Packaging. Containers shall be identified as "Component A--Contains Epoxy Resin" and "Component B--Contains Hardener" and shall show the type, class and mixing directions. Each container shall be marked with the name of the manufacturer, class, batch, or lot number, date of packaging, date of shelf life expiration, pigmentation (if any), manufacturer, and the quantity contained in pounds and gallons.

2.2 Prime Coat. The prepared surface shall receive a healer/sealer prime coat, as specified on the plans or as recommended by the manufacturer, that is compatible with the wearing surface system selected.

2.3 Aggregate. Aggregate shall be bauxite, crushed porphyry, aluminum oxide, flint chat or other similarly hard, durable, dry aggregate with less than 0.2 percent moisture. Aggregate shall be in accordance with the following gradation:

Sieve Size	% Passing By Weight
No. 4	100
No. 20	0 – 5
No. 200	0 – 1.0

2.3.1 Lead Content. Aggregate produced as a by-product from lead or zinc mining operations shall not have a total lead content greater than 4,500 ppm, as determined by EPA Method 3050A, "Acid Digestion of Sediments, Sludges and Soils". Suppliers of this aggregate shall provide certification to the engineer for each shipment that the total lead content of the aggregate does not exceed this value and attach a typical test report from the same source no older than 12 months prior to the shipment.

2.3.2 Aggregate Recommendation. For each contract, the epoxy urethane polymer supplier shall supply a letter to the engineer specifically recommending the use of a designated aggregate and source, which has been previously approved by Construction and Materials.

2.3.3 Epoxy Urethane Polymer Performance. The epoxy urethane polymer system shall not exhibit shearing, shrinkage, expansion or scaling.

2.3.4 Test Methods. Tests will be performed in accordance with the following methods:

Test Methods	
Rotational Viscosity	ASTM D 2393 Model LVT Brookfield viscometer
Epoxy Equivalent	MoDOT Test Method TM 73
Filler Content	MoDOT Test Method TM 73
Pot Life	AASHTO T 237
Elongation	ASTM D 638
Tensile Strength	ASTM D 638
Compressive Strength	ASTM C 881
Water Absorption	ASTM D 570
Thermal Shear	MoDOT Test Method TM 72

2.3.5 Manufacturer and Brand Name Approval. Prior to approval and use of this material, the manufacturer shall submit to Construction and Materials a certified test report showing specific test results in accordance with all requirements of this specification. The certified test report shall include the manufacturer's name, brand name of material, lot tested, date of manufacture, ratio of components by volume and system tested. In addition, the manufacturer shall submit to Construction and Materials a sample representing the system for laboratory testing accompanied by a technical data sheet, an MSDS and any special installation instructions relative to the system being submitted. Upon approval of the certified test report and satisfactory results of tests performed on the sample submitted, the brand name and manufacturer will be placed on a qualified list of epoxy resin material for epoxy urethane polymer concrete wearing surface. New certified test results and samples shall be submitted any time the manufacturing process or the material formulation is changed and may be required when random sampling and testing of material offered for use indicates non-conformity with any of the requirements herein specified.

2.3.6 Product History. The epoxy urethane polymer shall have a proven record of a minimum of two years on similar bridge decks within the United States. A list including the location, the name of the agency involved with the project, and a name and phone number of a contact

person with that agency shall be provided for each location used as evidence of satisfactory use.

2.3.7 Acceptance. The manufacturer shall furnish certification to the engineer at the destination that the material supplied is in accordance with all requirements specified and stating that the material supplied is the same system and is identically formulated to the material tested for manufacturer and brand name approval. Acceptance will be based on certification and testing.

3.0 Construction Requirements.

3.1 Manufacturer Representation. The wearing surface manufacturer's representative shall witness the entire testing phase of each field test. The manufacturer's representative shall verify that all operations are performed by acceptable practices.

3.2 Handling and Storage of Material. Handling and storage of material shall be in accordance with the manufacturer's written recommendations.

3.3 Field Test. Prior to the start of the wearing surface operation, a test area of the complete wearing surface system shall be placed on the bridge deck in a contractor proposed location that is approved by the engineer. When multiple bridges are included in a project, a test area will be required on each bridge. The contractor may utilize one-half of the bridge deck or an area equal to one day's placement operation, whichever is smaller, as a field test. The degree of cleaning used on the test area shall be the minimum used on the remainder of the structure. The surface for the test wearing surface shall be prepared in accordance with the test method prescribed in ACI 503R - Appendix A of the ACI Manual of Concrete Practice to establish an approved cleaning practice. The approved cleaning practice shall remove all potentially detrimental material which may interfere with the bonding or curing of the wearing surface. Concrete shall be sound, with mortar soundly bonded to the coarse aggregate, with clean and open pores to be considered adequate for bond. All areas of asphalt and pavement markings shall be removed. Preparation of the surface shall produce a surface relief equal to International Concrete Repair Institute (ICRI) surface preparation level 6 or 7 or ASTM E 965 pavement macrotexture depth of 0.04 to 0.08 inch.

3.3.1 Visible moisture on the prepared deck at the time of placing the wearing surface will not be permitted. Moisture in the deck shall be checked by taping a plastic sheet to the deck for a minimum of 2 hours in accordance with ASTM D 4263.

3.3.2 In addition to the above requirements, the cleaning practice shall provide an adhesion strength test result greater than 250 psi or a failure area into the base concrete that is greater than 50 percent of the test area. After the test area has cured for a minimum of 72 hours, adhesion shall be checked in accordance with ACI 503R. A test result will be the average of three tests on a sample area of the test patch. A minimum of three sample areas per test patch shall be tested. Successful test results will be required from each sample area.

3.3.3 If the test of a sample area fails to meet the above requirements due to a cohesive failure of the substrate concrete, the adhesive strength of the sample area will be considered acceptable.

3.3.4 Successful completion of the adhesion strength tests will be required before the full-scale wearing surface operation is to begin. All cleaning operations shall equal those used for the adhesion strength test areas in both profile and cleanliness. If changes are made to the

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established cleaning practice, new adhesion strength testing shall be performed at the contractor's expense.

3.3.5 Test patches shall be installed with the same material, equipment, personnel, timing, sequence of operations and curing period that will be used for the installation of the wearing surface.

3.3.6 If the test fails, the contractor shall remove the material represented by the failed test patches and provide another test patch, at the contractor's expense, until satisfactory test results are obtained.

3.4 Surface Preparation. Before placement of the wearing surface, the entire deck surface shall be prepared by the cleaning practice established in the field adhesion strength tests in accordance with section 3.3 of this job special provision by shot blast method. Sand blasting will not be permitted. Clean-up and disposal of blast material shall be in accordance with [Sec 202.3.1.3](#).

3.4.1 If the engineer determines that the weather has changed significantly since the application of the field test patch, the contractor shall verify through adhesion strength tests that the practice is acceptable, at the contractor's expense.

3.4.2 No traffic of any kind shall be permitted on any portion of the deck which has been shot blasted or on the wearing surface without approval from the engineer. The time between surface preparation and application of the first course shall not exceed 24 hours.

3.4.3 All patching and cleaning operations shall be inspected and approved prior to placing the wearing surface.

3.4.4 If the deck or intermediate course is contaminated by foreign material or water after initial cleaning, the contamination and any detrimentally affected wearing surface material shall be removed. Both courses shall be applied prior to opening the area to traffic.

3.5 Equipment. The contractor's equipment shall be as recommended by the epoxy urethane manufacturer.

3.6 Epoxy Mixing. Mixing of epoxy urethane polymer components shall be in accordance with the manufacturer's recommendations, except that the use of a volumetric mixer will be required. When mineral fillers are specified, the mineral fillers shall be inert and non-settling or readily dispersible. Material showing a permanent increase in viscosity or the settling of pigments that cannot be readily dispersed with a paddle shall be replaced at the contractor's expense. At least 95 percent of the filler shall pass the No. 200 sieve.

3.7 Application. Application of epoxy urethane polymer shall be performed by the manufacturer or by a factory trained or licensed applicator with written approval from the manufacturer of the epoxy system.

3.7.1 The handling and mixing of epoxy urethane polymer shall be in accordance with the manufacturer's written recommendations. The epoxy urethane polymer shall not be placed when weather or surface conditions are such that the material cannot be properly handled, placed and cured within the specified requirements of traffic control, or when rain is forecast within 24 hours of application.

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3.7.2 The wearing surface shall consist of a two-course application of epoxy urethane polymer and aggregate. A healer/sealer prime coat shall be used as specified on the plans or if recommended by the manufacturer. Each of the two courses shall consist of a layer of epoxy urethane polymer covered with a layer of aggregate in sufficient quantity to completely cover the epoxy urethane polymer. The thickness of each course shall be approximately equal. The total thickness of the wearing surface shall be no less than 1/4 inch.

3.7.3 The temperature of the bridge deck surface at the time of application shall be less than 90 F and in accordance with the manufacturer's recommendation.

3.7.4 Dry aggregate shall be applied in such a manner as to cover the epoxy urethane polymer completely within five minutes of application. The dry aggregate shall be placed in a manner such that the level of the epoxy urethane polymer is not disturbed.

3.7.5 The first course shall be swept to remove loose aggregate prior to the second course application. Sweeping shall be performed without removing embedded aggregate. First course applications which do not receive enough aggregate prior to gelling shall be removed and replaced. A second course applied with insufficient aggregate may be left in place, but additional applications shall be placed at the contractor's expense before opening to traffic.

3.7.6 The thickness of the wearing surface shall be verified to be at least 1/4 inch, measured from the deck surface to the top of the epoxy urethane polymer. The contractor shall provide a minimum 1/2-inch diameter hole at a rate of at least one hole per 100 feet of traffic lane. Hole placement shall be at locations designated by the engineer. Thin areas shall be recoated and reverified at the contractor's expense.

3.7.7 When additional applications or recoating are required, the engineer may require additional adhesion strength tests by the contractor, at the contractor's expense, in accordance with ACI 503R to verify the contractor's procedure.

3.7.8 All adhesion strength test areas, thickness test holes or any debonded areas shall be repaired by filling them with wearing surface material before final acceptance.

3.7.9 The first epoxy urethane polymer course shall be cured at least one hour or until brooming or vacuuming can be performed without tearing or otherwise damaging the surface. No traffic or equipment shall be permitted on the first course surface during the curing period.

3.7.10 After the curing period, all loose aggregate shall be removed by brooming or vacuuming and the next epoxy urethane polymer course applied as specified in the contract documents.

3.7.11 The epoxy urethane polymer mixture shall not be permitted to run into drains.

3.7.12 Unless otherwise specified, the epoxy urethane polymer courses shall be applied over the expansion joints and joint seals of the bridge deck. The expansion joints and joint seals shall be provided with a bond breaker. Prior to opening to traffic, the wearing surface shall be removed over each joint by removal of the bond breaker in accordance with the epoxy urethane polymer manufacturer's recommendations.

3.7.13 Prior to opening a section to public or construction traffic, the wearing surface shall be allowed to cure in accordance with the manufacturer's recommendations. First course applications shall not be opened to traffic.

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3.7.14 Damaged or debonded areas of an epoxy urethane polymer course shall be removed and repaired prior to acceptance. Repair shall consist of saw-cutting in rectangular sections to the top of the concrete deck surface and replacing the various courses in accordance with this job special provision at the contractor's expense.

4.0 Method of Measurement. Final measurement will not be made except for authorized changes during construction or where appreciable errors are found in the contract quantity. Where required, the area of epoxy urethane polymer wearing surface will be measured to the nearest square yard based on measurement longitudinally from end to end of bridge deck and transversely between roadway face of curbs, excluding the area of any expansion devices. The revision or correction will be computed and added to or deducted from the contract quantity.

5.0 Basis of Payment. The accepted quantity of epoxy urethane polymer wearing surface will be paid for at the contract unit price. Payment will be considered full compensation for all labor, equipment and material necessary to complete the described work.