SECTION 2214

EPOXY PAVEMENT MARKING MATERIAL

2214.1 DESCRIPTION

This specification covers epoxy resin and glass beads suitable for use as reflective pavement markings on portland cement concrete or asphalt pavement.

2214.2 REQUIREMENTS

a. Epoxy Pavement Marking Material.

(1) General. Provide an epoxy resin material that is toxic heavy metal free, 2-component, 100% solids, and is formulated and tested to perform as a pavement marking material with glass beads applied to the surface. The 2 components are an epoxy resin and an amine curing agent. Provide complete manufacturer's specifications and material safety data sheets to the Engineer for all material provided.

Provide a material that does not exude toxic fumes when heated to application temperature.

Provide a material that, when mixed in the proper ratio and applied at 0.02 inch wet film thickness at 75ºF with the proper saturation of glass beads, has a no tracking time of less than 40 minutes for slow curing material and less than 10 minutes for rapid curing material. Provide a material that is capable of fully curing under a constant surface temperature of 32ºF or above.

(2) Properties of Cured Material.

(a) Color. Provide white and yellow material that complies with the following Daylight Reflectance values:

TABLE 2214-1 DAYLIGHT REFLECTANCE	
Color	**45 Degrees-0 Degrees, % Min.**
White	75
Yellow	45

Provide yellow that complies with the following minimum chromaticity coordinates:

TABLE 2214-2: CHROMATICITY COORDINATES								
COLOR	**1**		**2**		**3**		**4**	
	X	**Y**	**X**	**Y**	**X**	**Y**	**X**	**Y**
Yellow	0.461	0.445	0.476	0.424	0.520	0.450	0.495	0.475

(b) Retroreflectivity. Provide epoxy pavement marking material that meets the following minimum retroreflectivity requirements using an acceptable 30-meter retroreflectometer:

TABLE 2214-3: EPOXY RETROREFLECTIVITY REQUIREMENTS	
Color	**millicandelas/sq m/lux (min.)**
White	325
Yellow	250

(c) Hardness. Provide material with Shore D hardness of 75 minimum.

(d) Bond Strength to Concrete. Provide material that when catalyzed, has such a high degree of adhesion to the specified concrete surface that there is a 100% concrete failure. Apply the material at a film thickness of 0.01 ± 0.001 inch to concrete with a minimum compressive strength of 4000 psi. Allow the material to cure for 72 hours at 77ºF before the test is performed.

(e) Yellowness Index. White only. Value after 72 hours in QUV – 30 maximum when tested at 0.01 ± 0.001 inch and a 72-hour cure.

(f) Field Evaluation. Field test materials at AASHTO NTPEP regional test facilities, which include both hot and cold weather conditions and are a minimum of 6 months in duration.

b. Glass Beads For Drop-On Application (double drop system).

(1) For the first drop, provide large beads that are compatible with the epoxy system, and comply with AASHTO M 247 except with the following gradation:

TABLE 2214-4: GLASS BEADS

Sieve Size	Percent Passing
No. 10	100
No. 12	95 - 100
No. 14	80 - 95
No. 16	10 - 40
No. 18	0 - 5
No. 20	0 - 2

(2) For the second drop, provide regular beads that are specifically manufactured to be compatible with the epoxy system, and comply with AASHTO M 247, Type I.

(3) Both types of beads are to be coated with a moisture resistant coating and an adhesion promoting coating that is compatible with the epoxy system.

c. Verification testing. The Engineer will take a ½-pint sample of each color and a ½-pint sample of the hardener from 1 lot per project. Send the samples to MRC for testing and evaluation. Lots previously tested will be exempted from testing and may be exempted from sampling if coordinated with MRC. Samples will be tested using infrared spectroscopy. Deviations as determined by comparison with the prequalification sample will be cause for removal from the prequalified list. The Engineer will also take (2) one-quart samples of each type of glass bead used on the project. Forward all samples to MRC for verification testing

2214.3 TEST METHODS

a. Bond Strength to Concrete. AASHTO T 237

b. Hardness. ASTM D 2240

c. Yellowness Index. ASTM E 313

d. Glass Beads. AASHTO M 247, KTMR-8, "Moisture Resistance of Glass Beads for Traffic Markings," and KTMR-17, "Adhesion Coating of Glass Beads for Traffic Markings."

2214.4 PREQUALIFICATION

a. Manufacturers interested in prequalifying material under this specification must provide a 1-quart sample of each color plus 1 quart of hardener to the Engineer of Tests, Materials and Research Center, 2300 Van Buren, Topeka, KS 66611. Also include a copy of the quality control test report for each lot of material, an infrared spectroscopy analysis for each component if available, material safety data sheets and a complete set of installation recommendations and instructions. Forward an official copy of the AASHTO NTPEP test report along with evidence that the product in reference is identical to that submitted for prequalification.

b. The material will be evaluated for compliance with all requirements of this specification, and the manufacturer will be notified of the results. Each color and the hardener will be analyzed and "fingerprinted" using infrared spectroscopy for use in screening future verification samples to verify that materials submitted for use are of an identical formulation as originally approved.

c. The Bureau of Materials and Research will maintain a list of qualified materials and installation instructions. Products will remain on the prequalified list as long as the results of verification testing and field performance are satisfactory. Any changes in formulation should be reported to the Engineer of Tests for review and evaluation to determine if requalification is necessary.

2214.5 BASIS OF ACCEPTANCE

a. Epoxy Material.

(1) Prequalification as required by **subsection 2214.4**.

(2) Receipt and approval of a Type C certification as specified in **DIVISION 2600**.

(3) Visual observation of performance on the project.

b. Glass Beads for Drop-on Application. Receipt and approval of a Type D certification as specified in **DIVISION 2600**.