**REVISION OF SECTION 627**

**EPOXY PAVEMENT MARKING (SPECIAL)**

**CONSTRUCTION REQUIREMENTS**

**Section 627 of the Standard Specifications is hereby revised for this project to include the following:**

**Delete subsection 627.05 and replace with the following:**

**Epoxy Pavement Marking (Special)**. Epoxy Pavement Marking (Special) shall be applied to the road surface according to the epoxy manufacturer’s recommendations at 20 mils minimum thickness. Bead system shall be applied into the epoxy pavement marking by means of a pressurized bead applicator at the manufacturer’s recommended application rate.

The surface area receiving marking shall be ground prior to placement of the Epoxy Pavement Marking (Special). This applies to new or existing concrete or asphalt pavements. The ground surface shall then be cleaned with a high pressure air blast to remove loose material prior to placement of the Epoxy Pavement Marking (Special). The grooved width for the recessed epoxy pavement markings shall be between 4 and 4-1/4 inches in width The grooved depth for the recessed epoxy pavement markings shall be 80 mils ± 5 mils below the surface of the existing pavement.

Grooves shall be clean, dry and free of laitance, oil, dirt, grease, paint or other foreign contaminants. The Contractor shall prevent traffic from traversing the grooves, and shall re-clean grooves, as necessary, prior to application of the Epoxy Pavement Markings (Special).

The Contractor shall grind only those locations on which pavement marking shall be applied on a daily basis.

If a rain event occurs during grinding and marking application, a temporary lane line marking tab shall be placed while the pavement is drying prior to the marking application. Marking application can proceed when pavement is dry and has had no moisture for a minimum of 24 hours. The placement of tabs shall be every other lane line/ skip or approximately 80 feet.

The primary and secondary beads shall be applied in a two drop operation in accordance with the manufacturer’s recommendations. If manufacturer recommendations do not address this operation, then the rate of primary beads shall be 10 to 11 pounds per gallon of epoxy. The primary composite cluster shall be applied first from the bead dispenser directly behind the Epoxy binder application gun followed immediately by the application of the secondary beads from a second bead dispenser. The application rates of the primary and secondary beads shall be adjusted from these starting values until the minimum retroreflectivity values have been consistently achieved. The beads shall be applied in such a manner that the beads shall adhere and be embedded within the epoxy binder to produce a high reflective all weather pavement marking.

There shall be two types of glass and/or ceramic beads used for the Epoxy Pavement Marking (Special) reflective elements, a Primary bead which is a high performance, high reflective all weather bead and a Secondary standard glass bead. Beads will be accepted on the project by certificates of compliance (COC). The COC shall be in conformance with subsection 106.02 in addition to the following requirements:

1) The primary bead shall be a composite cluster comprised of a core element and shall contain an outer shell containing elements surrounding it. The shell elements shall be permanently attached to the core element. The core and shell elements shall be manufactured from glass,

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ceramic, or silica. The primary element shall be coated by manufacturer’s recommendations for application within Epoxy binder.

2) The secondary bead shall conform to the following specifications:

Gradation:

|  |  |  |  |
| --- | --- | --- | --- |
| U.S. Mesh | Microns | % Retained | %Passing |
| 18 | 1000 | 20 – 35 | 65 – 80 |
| 30 | 600 | 50 – 70 | 30 – 50 |
| 50 | 300 | 95 – 100 | 0 – 5  |

Roundness: Shall be a minimum of 85 % true spheres above the sieve 20 by visual inspection using test method FLH-520. All beads below the 20 sieve, must meet a minimum of 80% true spheres by ASTM Method D 1155.

Color / Clarity: Beads shall be colorless / clear and free of carbon residues.

Refractive Index: Minimum 1.50 by oil immersion method.

Air Inclusions: < 5% by visual count.

Hardness: All beads above the 20 sieve shall exhibit an average hardness of C70.5 when measured using the Rockwell C scale method and with a minimum sampling of 100 glass beads.

Crushing Strength: Beads above the 20 sieve shall exhibit an average crushing strength of not less than 60,000 psi when measured with the L/D2 method and with a minimum sampling of 100 glass beads.

Coatings: Shall use manufacturer’s recommended adhesion coating for optimum adhesion and embedment.

Chemical Resistance: Both the primary and secondary beads shall be resistant to hydrochloric acid, water, calcium chloride, sodium sulfide, acid, and magnesium chloride, and shall not develop any haze, dulling or darkening of the bead as tested per methods outlined in sections 4.3.6 to 4.3.9 of the TT-B Federal Spec. 1325C.

3) Primary and secondary glass beads shall be furnished in fully identified, separate containers and shall be free of extraneous materials or clumps. If the use of recycled post consumer glass is used in manufacturing of beads those recycled glass beads shall be manufactured from North American glass waste streams. The bead manufacturer shall submit a notarized certification to the department stating that North American glass waste streams were used in the manufacture of this specification.

Products will be accepted on the project by certificates of compliance (COC). The COC shall be in conformance with subsection 106.02, and shall include that the materials conform to the following:

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1. Retroreflectivity. The applied finish system shall have an initial minimum dry retroreflectivity reading of 700 mcd·m-2·1x-1 for white and 500 mcd·m-2·1x-1for yellow. The Contractor shall use an industry accepted and available Retro-meter for retroreflectivity readings and it shall be calibrated each day testing occurs. For information: (CDOT will be using a Delta LTL-X Retro-meter for retroreflectivity readings). CDOT will obtain retroreflectivity readings from the Contractor for each 1 mile of line placed or fraction thereof. CDOT will determine a random testing location for each 1 mile section of line placed or fraction thereof. Each test location shall represent that 1 mile of line placed or fraction thereof. At each random testing location two reflectivity readings will be taken on 11 different skip lines or 22 readings will be taken with a 440 foot section of the continuous line. Of those 22 readings the highest and lowest will be disregarded and the remaining 20 readings will be averaged and that average value will represent the reflectivity of that 1 mile section or fraction thereof. The contractor shall remove and replace at their expense each 1 mile of line placed or fraction thereof where the test result from that random location fails the minimum retro reflectivity reading.

The retroreflectivity readings shall be taken between two and three days after the marking is tack free. Prior to taking reflectivity readings, the Contractor shall remove at the retroreflectivity reading locations any excess beads placed during marking application.

Applied markings shall have uniform mil thickness and bead distribution across the entire width of the line. Unless otherwise shown on the plans, typical pavement markings shall conform to the shapes and sizes as shown on Standard Plan S-627-1.

The Contractor will be required to submit to CDOT certification from the manufacturer that the installed epoxy binder and both the primary and secondary beads have been installed in accordance with this specification and with their recommendations and has achieved the minimal retroreflectance values stated herein. If the pavement marking system is comprised of multiple manufacturers, then all manufacturers will be required to affirm to the certification. A manufacturer’s representative shall be onsite at the installation of the epoxy binder, primary bead, and secondary bead materials to identify areas of the installation falling below the minimum manufacturer’s recommendations and these specifications to assist in the calibration of equipment, set up of equipment and the proper adjustment of equipment during installation to achieve the minimums outlined herein. The cost of the manufacturer(s) representation will not be measured and paid for separately but shall be included in the cost of the work.

**Subsection 627.13 shall include the following:**

Pay ItemPay Unit

Epoxy Pavement Marking (Special) Gallon

The work to groove the asphalt or concrete and clean the grooving residual or debris will not measured and paid for separately but shall be included in the work.

The primary and secondary beads will not be measured and paid for separately but shall be included in the cost of the Epoxy Pavement Marking (Special).

Temporary markings will not be measured and paid separately, but shall be included in the cost of work.