

## 2211 - THERMOPLASTIC PAVEMENT MARKING MATERIAL

### SECTION 2211

#### THERMOPLASTIC PAVEMENT MARKING MATERIAL

##### 2211.1 DESCRIPTION

This specification covers thermoplastic materials suitable for use as retroreflective pavement markings on asphalt and portland cement concrete pavements. Material will be prequalified for use on both asphalt and portland cement concrete surfaces or for use only on asphalt surfaces. The material is applied to the pavement in molten form. Glass beads are pre-mixed into the material furnished, and also dropped on the surface of the molten material immediately after it is applied to the pavement surface, at a rate specified. Upon cooling to normal pavement temperature, it produces an adherent retroreflectorized stripe of specified thickness and width, capable of resisting deformation by traffic.

##### 2211.2 REQUIREMENTS

###### a. General.

- (1) Provide the material in white and/or yellow as specified.
- (2) A binder-sealer is required for applications involving asphalt over 2 years old, or for asphalt surfaces that are worn or oxidized to a condition where 50% or more of the wearing surface is exposed aggregate.
- (3) Do not commingle materials from different manufacturers.

**b. Thermoplastic Material and Premix Beads.** Provide thermoplastic material that complies with AASHTO M 249 with the following restrictions:

- (1) Only maleic modified glycerol ester alkyd based resins will be allowed for the binder system.
- (2) Yellow pigments must comply with the latest OSHA standards for toxic heavy metals.

**c. Glass Beads for Drop-on Application.** Provide glass beads according to the thermoplastic manufacturer's recommendations.

**d. Binder-Sealer.** When a binder-sealer is specified, provide one that is recommended by the manufacturer of the thermoplastic material, and apply it according to the manufacturer's instructions. The binder-sealer must be compatible with the pavement material, and form a tight bond between the pavement and the thermoplastic material.

**e. Color.** Provide thermoplastic that complies with the requirements of ASTM D 6628. The yellow lines must also display a nighttime presence of yellow when viewed under automobile headlights.

**f. Retroreflectivity.** Provide thermoplastic that complies with the minimum retroreflectivity requirements in TABLE 2211-2 using an acceptable 30-meter retroreflectometer:

TABLE 2211-2: THERMOPLASTIC RETROREFLECTIVITY REQUIREMENTS	
Color	millicandelas/sq m/lux (min.)
White	300
Yellow	225

##### 2211.3 TEST METHODS

###### a. Thermoplastic Material.

- (1) AASHTO T 250, plus,
- (2) Verify the material is alkyd using KTMR-6, Determination of Alkyd Base in Thermoplastic Material.
- (3) Glass Bead Content. ASTM D 4797.
- (4) Titanium Dioxide. ASTM D 1394, Aluminum Reduction Method.
- (5) Specific Gravity. AASHTO T 228.

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### 2211.4 PREQUALIFICATION

a. Manufacturers interested in prequalifying material under this specification must provide a 10-lb sample of each color to the Engineer of Tests. Also include a copy of the quality control test report for each lot of material, material safety data sheets, and a complete set of installation recommendations and instructions.

b. If the material complies with all laboratory requirements, the manufacturer will be contacted to arrange for the field evaluation. The field evaluation will consist of 2 or 3 test projects at times and locations as determined by the Bureau of Transportation Safety and Technology. Manufacturers must specify if the material may be used on both asphalt and concrete surfaces or only on asphalt or concrete surfaces.

Duration of the test project will be dependent on the submittal of test data from the AASHTO National Transportation Product Evaluation Program (NTPEP). Forward an official copy of the test data along with evidence that the material referenced is identical to that submitted for prequalification to the Engineer of Tests for evaluation. Materials with no test data will have a test project duration of 18 months; materials with test data will have a test project duration of 12 months. Materials will be evaluated initially and every 3 to 6 months throughout the duration of the test project for retroreflectivity, color and durability.

c. The material will be evaluated for compliance with all requirements of this specification, and the manufacturer will be notified of the results. The Bureau of Construction and Materials will maintain a list of qualified materials and installation instructions. The list will differentiate between products prequalified for use on asphalt and concrete surfaces, or for use on asphalt surfaces only. 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.

### 2211.5 BASIS OF ACCEPTANCE

#### a. Thermoplastic Material.

- (1) Prequalification as required by **subsection 2211.4**.
- (2) Receipt and approval of a Type C certification as specified in **DIVISION 2600** for each lot of material used.

#### b. Glass Beads for Drop-on Application.

- (1) Receipt and approval of a Type D certification as specified in **DIVISION 2600**.
- (2) Copies of testing results for each lot of beads used on the project.

c. **Binder-Sealer.** If binder-sealer is required, it will be accepted on the basis of brand name as recommended by the thermoplastic material manufacturer, and visual observation of performance in the field.