

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.

- (1) Provide regular beads that are specifically manufactured to be compatible with the thermoplastic system, and comply with AASHTO M 247, Type I.
- (2) When a double drop system using both regular beads and large beads is specified, provide large beads that are also compatible with the thermoplastic system, and comply with AASHTO M 247, except with the following gradation (FP-96, Type 4):

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

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. For yellow, meet the following minimum chromaticity coordinates:

COLOR	1		2		3		4	
	X	Y	X	Y	X	Y	X	Y
Yellow	0.475	0.450	0.490	0.433	0.520	0.450	0.495	0.475

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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 2211-3** using an acceptable 30-meter retroreflectometer:

TABLE 2211-3: THERMOPLASTIC RETROREFLECTIVITY REQUIREMENTS	
Color	millicandelas/sq m/lux (min.)
White	300
Yellow	225

g. Verification Testing. The Engineer will take verification samples of thermoplastic material from 1 lot of each color per project, using KT-30. Send the samples to MRC for testing and evaluation. Lots previously tested by MRC will be exempted from testing, and may be exempted from sampling if coordinated with MRC. The Engineer will take 2 one-quart samples of each type of glass bead used on each project. Forward the sample to MRC for verification testing.

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.

b. Glass Beads for Drop-On Application. AASHTO M 247.

c. Field Evaluation.

KTMR-9, Field Evaluation of Pavement Marking Materials.

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, 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, material safety data sheets, and a complete set of installation recommendations and instructions. Manufacturers must specify if the material may be used on both asphalt and concrete surfaces or only on asphalt surfaces. If the material complies with all laboratory requirements, the manufacturer will be contacted to arrange for the field evaluation.

b. Provide material that complies with **subsection 2211.2**. In addition, the following Field Evaluation will be conducted:

- **Field Evaluation.** The material will be subjected to traffic conditions on both portland cement and asphalt surfaces for 6 months during the period of July through February. During this time, the material cannot pick up and retain road grime that causes more than a slight graying of the surface. A strong contrast must remain between the striping material and the pavement surface. At the end of the evaluation period, the material must be intact with no evidence of lifting, curling, breaking or displacement. After 6 months, the material must maintain minimum retroreflectivity values of 150 millicandelas/sq m/lux for white and 100 millicandelas/sq m/lux for yellow.

Field evaluation may be waived if a complete field test has been performed on the identical product by another state department of transportation or AASHTO test facility that includes both hot and cold weather conditions, and was a minimum of 6 months in duration. Forward an official copy of the test report along with evidence that the product referenced is identical to that submitted for prequalification to the Engineer of Tests for evaluation.

c. Provide personnel and equipment to apply manufacturer supplied material from the lots tested above to the test deck selected by the KDOT.

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d. 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 Materials and Research 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. Receipt and approval of a Type D certification as specified in **DIVISION 2600**.

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.