

2213 - SPRAYED THERMOPLASTIC PAVEMENT MARKING MATERIAL

SECTION 2213

SPRAYED THERMOPLASTIC PAVEMENT MARKING MATERIAL

2213.1 DESCRIPTION

This specification covers thermoplastic materials suitable for use as retroreflecting pavement markings on asphalt pavement. The material is applied to the pavement in molten form by spray means. 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, the material produces an adherent retroreflective marking of specified thickness and width, capable of resisting deformation by traffic.

2213.2 REQUIREMENTS

a. General.

- (1) Provide the material in white and/or yellow as specified.
- (2) Provide 100% solids thermoplastic material that is homogeneously composed of pigment, filler, resins and glass beads. The material must have a minimum binder content of 25% by mass composition and be free of foreign objects that would cause bleeding, staining, or discoloration. Upon heating to application temperature, the material will not exude fumes that are toxic, or injurious to persons or property.

b. Pigment.

- (1) Use high-grade titanium dioxide as the pigment for the white material. The material must contain a minimum of 10% titanium dioxide by mass.
- (2) Use heat resistant and colorfast yellows, golds, or oranges to produce a material to comply with color requirements.
- (3) Yellow pigments must comply with the latest OSHA standards for toxic heavy metals.
- (4) Use a filler consisting of white calcium carbonate, silica, or an approved substitute.

c. Glass Beads.

- (1) Pre-Mix Beads--Provide beads that are specifically manufactured to be compatible with the thermoplastic system, and comply with AASHTO M 247, Type I. The beads must be a minimum of 25% by mass of the thermoplastic material.
- (2) Drop-On Beads--Provide beads which are specifically manufactured to be compatible with the thermoplastic system, and comply with AASHTO M 247, Type I. The beads must have a moisture resistant coating and an adhesion coating.

d. Thermoplastic Material. Provide thermoplastic material that complies with the following:

- (1) Specific Gravity--2.0 maximum
- (2) Daylight Reflectance (Y)
 - (a) White—75% minimum
 - (b) Yellow—42% minimum
- (3) Color—For yellow, comply with the following minimum chromaticity coordinates:

TABLE 2213-1: 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

Yellow lines must display a nighttime presence of yellow when viewed under automobile headlights.

- (4) Retroreflectivity—Provide sprayed thermoplastic that meets the following minimum retroreflectivity requirements using an acceptable 30-meter retroreflectometer:

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Color	Millicandelas/sq m/lux (min.)
White	300
Yellow	225

- (5) Softening Point--180°F minimum
(6) Cracking Resistance at Low Temperature--No visible cracks when observed from a distance of one foot.

e. 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.

f. 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 glass beads used on each project. Forward the sample to MRC for verification testing.

2213.3 TEST METHODS

a. Thermoplastic Material. Use AASHTO T 250 except for:

- (1) Softening Point-Heat the material for 4 hours \pm 5 minutes at 375 \pm 2°F.
- (2) Cracking Resistance at Low Temperature-Heat the material for 4 hours \pm 5 minutes at 375 \pm 2°F.
- (3) Glass Beads content. ASTM D 4797 and AASHTO T 247.
- (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.

2213.4 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. 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 2213.2**. 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.

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

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. 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.

2213.5 BASIS OF ACCEPTANCE

a. Thermoplastic Material.

- (1) Prequalification as required by **subsection 2213.4**.
- (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 based on brand name as recommended by the thermoplastic material manufacturer, and visual observation of performance in the field.