REPUBLIC OF THE PHILIPPINES
DEPARTMENT OF PUBLIC WORKS AND HIGHWAYS
OFFICE OF THE SECRETARY
MANILA

099.13 DPWH
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DEPARTMENT ORDER)
NO. 202)
Series of 1992 12-2

SUBJECT: USE OF REFLECTORIZED THERMOPLASTIC PAVEMENT MARKINGS BASED ON DPWH STANDARD SPECIFICATIONS

In view of the absence of DPWH standard specifications for thermoplastic pavement markings, and considering its use on vital national roads and highways, the attached Standard Specifications for Reflectorized Thermoplastic Pavement Markings are hereby prescribed.

In no case should the material be allowed to be used without complying with the requirements as prescribed herein.

For your guidance and strict compliance.

JOSE P. DE JESUS
Secretary

Attachment: As stated

DPWH SPECIFICATION FOR
REFLECTORIZED THERMOPLASTIC PAVEMENT MARKINGS

1. Scope

This standard specifies the requirement for reflectorized thermoplastic pavement striping material that is applied to the road surface in a molten state by mechanical means with surface application of glass beads at a rate of not less than 350 g/L of glass beads having a size range of drop-in type and will produce an adherent reflectorized stripe of specified thickness and width capable of resisting deformation by traffic.

2. Materials

2.1 Reflectorized Thermoplastic Pavement Markings Material shall be homogeneously composed of pigment, filler, resins and glass reflectorizing spheres.

2.1.1 The thermoplastic material shall be available in both white and yellow.

2.2 Glass Beads (Pre-Mix) shall be uncoated and shall comply with the following requirements:

Refractive Index, min. - 1.50
Spheres, Percent, min. - 90
Gradation:

Sieve mm	Mass Percent Passing
0.850	100
0.600	75 - 95
0.425	-
0.300	15 - 35
0.180	-
0.150	0 - 5

3. General Requirements

3.1 Composition - The pigment, beads and filler shall be uniformly dispersed in the resin. The material shall be free from all skins, dirt and foreign objects and shall comply with the requirements as specified in Table I.

Table I - Composition Requirements

Component	White	Yellow
Binder, min.	18.0	18.0
Glass Beads:		
min.	30	30
max.	40	40
Titanium Dioxide, min.	10.0	
Chrome Yellow, Medium, min		10.0
Calcium Carbonate and Inert Fillers, max.	42.0	42.0

3.2 Qualitative - The material shall conform to the qualitative requirements as specified in Table 2.

Table 2 - Qualitative Requirements

Property	Requirements White	Yellow
Specific Gravity, max.	2.15	
Drying time, minutes, max.	10.0	
Bond Strength to Portland Cement Concrete after heating for four (4) hrs. $\pm$ 5 min. @ 218^{0}C, MPa, max.	1.24	
Cracking Resistance @ low tem. after heating for 4 hrs. $\pm$ 5 min. @ 218 $\pm$ 2^{0}C.	No cracks	

Table 2 - Qualitative Requirements

Property	Requirements White	Yellow
Impact Resistance after heating for 4 hrs ± 5 min. @ 218 ± 2C and forming test specimens, mm/kg, min.	115	
Softening Point after heating for 4 hrs. ± 5 min. @ 218 ± 2°C.	102.5 ± 9.5°C	
Daylight reflectant @ 45 degrees - 0 degrees, %, min.	75	45

4. Application Properties

The material shall readily extrude @ temperature of 211 ± 7°C, from approved equipment to produce a line 3.2 to 4.8 mm thick which shall be continuous and uniform in shape having clear and sharp dimensions.

The material shall not exude fumes which are toxic, obnoxious or injurious to persons or property when heated during applications.

The application of additional glass beads by drop-in methods shall be at a rate of not less than 350 g/L of glass beads having a size range for drop-in type. The typical size range of spheres of a drop-in type paints is as follows.

Passing 850 um (#20) sieve and retained on 250 um (#60) sieve, %	80 - 100

5. Sampling

A minimum weight of 10 kg of Reflectorized Thermoplastic paint shall be taken for every 100 bags or fraction thereof.

6. Testing

The material shall be tested in accordance with AASHTO T 250 or with the appropriate method in ASTM designation.

7. Packing and Marking

The material shall be packaged in a suitable containers to which it will not adhere during shipment and storage. The blocks of cast thermoplastic material shall be approximately 300 x 915 by 51 mm and shall weigh approximately 23 kg. Each container label shall designate the color, manufacturer's name, batch number and date of manufacture. Each batch manufactured shall have its own separate number. The label shall warn the user that the material shall be heated to 211 ± 7 C during application.

REFERENCES:

1. AASHTO Standards:
   M-249-79 (1990) - White and Yellow Reflective Thermoplastic Strippping Material Solid Form
   M-247-Type I - Glass Beads Used in Traffic Paints
   American Association of State Highway and Transportation Officials, Washington D.C.

2. Japanese Industrial Standard (JIS)
   JIS K 5665 - 1987
   Japanese Standard Association

3. ASTM D 2205 - Traffic Paints
   American Society for Testing and Materials