

**DEPARTMENT OF TRANSPORTATION
STATE OF GEORGIA**

SUPPLEMENTAL SPECIFICATION

Section 659—Hot Applied Preformed Plastic Pavement Markings

Delete Section 659 and substitute the following:

659.1 General Description

This work includes furnishing and placing hot applied preformed plastic pavement markings according to these Specifications and at locations shown in the Plans or as otherwise directed. Use applied markings that are very durable, impervious to oil and grease, and provide immediate and continuing retroreflectivity. Use hot applied preformed plastic pavement markings compatible with existing alkyd and hydrocarbon thermoplastic material.

659.1.01 Definitions

General Provisions 101 through 150.

659.1.02 Related References

A. Standard Specifications

General Provisions 101 through 150.

B. Referenced Documents

Federal Standard 595

Manual on Uniform Traffic Control Devices for Streets and Highways

AASHTO M 247

AASHTO M 249

ASTM E 274

ASTM E 303

ASTM D 476

QPL 74

659.1.03 Submittals

Transfer to the Department all manufacturer warranties or guarantees for heat-applied preformed plastic marking materials. Ensure warranties or guarantees can be transferred.

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659.2 Materials

Select one of the following types of preformed marking material according to the Plans and Proposal.

Type HA – Hot Applied Preformed Thermoplastic Marking

Type HA-BLM – Hot Applied Preformed Thermoplastic Marking - Bike Lane Marking

Type HA-CBL - Hot Applied Preformed Thermoplastic Marking – Colorized Bike Lane

For a list of sources, see QPL-74.

A. Marking Characteristics

Ensure markings have the following characteristics:

1. Composition

Use pavement marking material consisting of a homogeneous mixture of high quality hydrocarbon resin, alkyd resin, or modified ester rosin solution in conjunction with aggregates, pigments, binders, and glass beads. Use thermoplastic material conforming to AASHTO M 249, except for relevant differences due to the material being supplied in a preformed state.

- a. Ensure Type HA-CBL pavement marking material contains no glass beads.
- b. Ensure Type HA and Type HA-BLM pavement marking materials contain at least 30% glass beads conforming to AASHTO M 247, Type 1. Use clear and transparent glass beads with a minimum index of refraction of 1.50 and at least 80% being true spheres.

2. Color

a. White

Use white markings containing at least 8% by weight of titanium dioxide pigment meeting ASTM D 476, Type II, Rutile. Ensure color meets Federal Highway White, Color 17886, as per Federal Standard 595. Use white markings with a minimum daylight reflectance (Y value) at 45°/0° of 80%.

b. Yellow

Use yellow markings containing sufficient yellow pigment to ensure the color meets Federal Highway Yellow, Color 13538, as per Federal Standard 595. Use yellow markings with a minimum daylight reflectance (Y value) at 45°/0° of 45%.

c. Colorized Bike Lane (Type HA-CBL)

Ensure colorized bike lane material meet the color requirements of the Manual on Uniform Traffic Control Devices.

3. Shapes and Sizes

Ensure prefabricated legends and symbols conform to the applicable shapes and sizes outlined in the “Manual on Uniform Traffic Control Devices for Streets and Highways.” As an option, turn arrows and combination arrows may come without pre-applied surface glass beads to allow reversibility.

4. Thickness

Ensure Type HA pavement marking material is at least 0.125 in (3.175 mm) thick.

Ensure Type HA-CBL and Type HA-BLM pavement marking materials are at least 0.090 in (2.286 mm) thick.

5. Retroreflectivity

Obtain pavement marking retroreflectivity values with a 30 meter geometry retroreflectometer.

Use preformed markings meeting the following initial minimum reflectivity values:

a. Non-Bike Lane Markings (Type HA)

| | White | Yellow |
|-------------------|----------------------------|--------------------------|
| Dry (ASTM E 1710) | 350 mcd/lux/m ² | 200 d/lux/m ² |

b. Colorized Bike Lanes (Type HA-CBL)

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Colorized bike lanes do not contain glass beads or reflective elements. Thus, colorized bike lanes are non-reflective.

c. Markings inside the Bike Lane (Type HA-BLM)

| | White | Yellow |
|-------------------|----------------------------|--------|
| Dry (ASTM E 1710) | 275 mcd/lux/m ² | -- |

6. Skid Resistance

Ensure the surface of Type HA preformed markings provides a minimum skid resistance of 45 BPN when tested according to ASTM E 303.

Ensure the surface of Type HA-BLM preformed markings provides a minimum skid resistance of 55 BPN when tested according to ASTM E 303.

Ensure the surface of Type HA-CBL preformed markings maintains a minimum level of friction of 32 when tested according to ASTM E 274 after one year in place.

B. Heating Characteristics

Use preformed markings capable of being affixed to bituminous or Portland cement concrete pavements by the use of the normal heat of a torch recommended by the manufacturer and according to the manufacturer's installation guidelines. Ensure preformed markings resealing characteristics allow it to fuse with itself and with previously applied marking material of the same composition under normal conditions of use.

659.2.01 Delivery, Storage, and Handling

Manufacture and package preformed markings permitting storage at normal shelf temperatures for up to one year after purchase.

659.3 Construction Requirements

659.3.01 Personnel

General Provisions 101 through 150.

659.3.02 Equipment

General Provisions 101 through 150.

659.3.03 Preparation

General Provisions 101 through 150.

659.3.04 Fabrication

General Provisions 101 through 150.

659.3.05 Construction

A. Pre-Conditions for Applying Markings with Heat

Apply markings under the following conditions:

1. Ambient temperature is 35 °F (2 °C) or above.
2. Pavement is clean, dry, and free of debris.
3. Prior to installation, follow manufacturer's recommendations for preheating road surface.

B. Applying Drop-On Glass Beads

1. Apply drop-on glass beads to the entire surface of preformed markings not having factory pre-applied surface beads.
2. Apply the drop-on glass beads to the preformed marking material while still in a liquid state. Use beads meeting the requirements specified in [Subsection 659.2.A](#).
3. Do not apply drop-on glass beads to colorized bike lanes.

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659.3.06 Quality Acceptance

Use material evaluated by the National Transportation Product Evaluation Program (NTPEP), the Georgia Department of Transportation or other State DOT test facilities.

Hot applied preformed plastic pavement markings meeting the laboratory test and field test requirements will be placed on the Georgia Department of Transportation Qualified Products List. Provide certification from the manufacturer certifying the Hot Applied Preformed Plastic Pavement Markings supplied to construction and maintenance projects is formulated of the same material as when tested by NTPEP and will conform to the requirements of this Specification. Products meeting all the requirements in this Section but fail to perform adequately in actual use will be removed from the Qualified Products List.

659.3.07 Contractor Warranty and Maintenance

General Provisions 101 through 150.

659.4 Measurement

Heat-applied preformed plastic pavement markings, complete in-place and accepted, are measured as follows:

A. Solid Traffic Stripe

Solid traffic stripe of the color, width, and type shown on the Plans or in the Proposal will be measured by the linear foot (meter) or linear mile (kilometer) as specified. Breaks or omissions in solid lines or stripes at street or road intersections will not be measured for payment.

B. Skip Traffic Stripe

Skip traffic stripe of the color, width, and type shown on the Plans or in the Proposal will be measured by the gross linear foot (meter) or gross linear mile (kilometer) as specified. The unpainted spaces between the stripes will be included in the overall measurement if the Plan ratio remains uninterrupted. Measurement will begin and end on a stripe.

C. Payment by Square Yard (Meter)

When hot applied preformed plastic pavement markings are paid for by the square yard (meter), the actual number of square yards (meters) covered will be measured in the overall measurement, including the space between the markings. The color, width, and type shall be indicated on the Plans.

D. Heat Applied Preformed Plastic

Each heat-applied preformed plastic word or symbol, complete according to Plan dimensions, is measured by the unit. The code for each word or symbol is stated in the Plan.

659.4.01 Limits

General Provisions 101 through 150.

659.5 Payment

Payment in each case will be full compensation for all aspects of heat-applied markings, including adhesives, cleaning, application, and traffic control necessary to complete the Item.

Payment will be made under:

| | | |
|--------------|---|-----------------------------------|
| Item No. 659 | Hot applied preformed plastic solid pavement markings _____ in (mm), (<u>color</u>), (<u>type</u>) | Per linear foot (meter) |
| Item No. 659 | Hot applied preformed plastic solid pavement markings _____ in (mm), (<u>color</u>), (<u>type</u>) | Per linear mile (kilometer) |
| Item No. 659 | Hot applied preformed plastic skip pavement markings _____ in (mm), (<u>color</u>), (<u>type</u>) | Per gross linear foot (meter) |
| Item No. 659 | Hot applied preformed plastic skip pavement markings _____ in (mm), (<u>color</u>), (<u>type</u>) | Per gross linear mile (kilometer) |
| Item No. 659 | Hot applied preformed plastic pavement markings (<u>color</u>), (<u>type</u>) | Per square yard (meter) |
| Item No. 659 | Hot applied preformed plastic pavement markings (<u>color</u>), (<u>type</u>) | Per linear foot (meter) |
| Item No. 659 | Hot applied preformed plastic pavement markings (<u>color</u>), (<u>type</u>) | Per gross linear foot (meter) |

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| | | |
|--------------|---|----------|
| Item No. 659 | Hot applied preformed plastic pavement markings words or symbols (<u>color</u>), (<u>type</u>) | Per each |
|--------------|---|----------|

659.5.01 Adjustments

General Provisions 101 through 150.

Office of Materials & Testing