

**ITEM 687.0197--25 - PREFORMED THERMOPLASTIC PAVEMENT SYMBOLS, SF**

**1. DESCRIPTION:**

- 1.01 Under this work, the Contractor shall furnish and apply preformed reflectorized pavement markings at the location and in accordance with the patterns indicated on the plans, or as directed by the Engineer, and in accordance with this specification.
- 1.02 The preformed reflectorized pavement marking shall be applied on new and existing bituminous and Portland cement concrete pavement surfaces by hand and mechanical methods. The resultant marking shall be an adherent reflectorized stripe that is capable of molding itself to the contours of the pavement surface and of resisting deformation by traffic.

**2. MATERIALS:**

- 2.01 **General Requirement:** The markings must be a resilient thermoplastic product with uniformly distributed glass beads throughout the entire cross sectional area. The markings must be resistant to the detrimental effects of motor fuels, lubricants, hydraulic fluids, etc. Lines, legends, and symbols are capable of being affixed to bituminous and/or Portland cement concrete pavements by the use of the normal heat of a propane torch. Other colors shall be available as required.

The markings must be capable of conforming to pavement contours, breaks and faults through the action of traffic at normal pavement temperatures. The markings shall have resealing characteristics, such that it is capable of fusing with itself and previously applied thermoplastic when heated with the torch.

The markings must be able to be applied in temperatures down to 32°F without any special storage, preheating or treatment of the material before application.

- 2.02 **Manufacturing Control and ISO Certification:** The manufacturer must be ISO certified and provide proof of current certification. The scope of the certification shall include manufacture of reflective highway markings.
- 2.03 **Physical Properties:** Must be composed of an ester modified rosin resistant to degradation by motor fuels, lubricants, etc., in conjunction with aggregates, pigments, binders and glass beads which have been factory produced as a finished product, and meets the requirements of the current edition of the Manual on Uniform Traffic Control Devices for Streets and Highways. The thermoplastic material conforms to AASHTO designation M249-79 (98), with the exception of the relevant differences due to the material being supplied in a preformed state.

**2.04 Graded Glass Beads:**

- A. The material must contain a minimum of thirty percent (30%) intermixed graded glass beads by weight. The intermixed beads shall be clear and transparent. Not more than twenty percent (20%) consists of irregular fused spheroids, or silica. The index of refraction shall not be less than 1.50.
- B. The material must have factory applied coated surface beads and abrasives in addition to the intermixed beads at a rate of 1/2 lb. (±20%) per 11 square feet. The surface beads and abrasives must be applied so that every other shaped portion contains glass beads or abrasives with a minimum hardness of 7 (Mohs scale). These factory applied coated surface beads shall have the following specifications:

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**2. MATERIALS:** (cont'd)

**2.04 Graded Glass Beads:** (cont'd)

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|------------------------------------|--|
| 1) Minimum 80% rounds              | 3) Minimum SiO <sub>2</sub> Content of 70% |
| 2) Minimum refractive index of 1.5 | 4) Maximum Iron Content of 0.1%            |

Size Gradation	% Retained
1400Φm (14 U.S. mesh)	0 – 3%
1180 Φm (16 U.S. mesh)	2 – 10%
1000 Φm (18 U.S. mesh)	10 – 30%
850 Φm (20 U.S. mesh)	30 – 60%
600 Φm (30 U.S. mesh)	50 – 80%
500 Φm (35 U.S. mesh)	60 – 85%
355 Φm (45 U.S. mesh)	95 – 100%
250 Φm (60 U.S. mesh)	98 – 100%

- 2.05 **Heating Indicators:** The top surface of the material (same side as the factory applied surface beads) shall have regularly spaced indents. These indents shall act as an indicator system for the operator to properly gauge the correct amount of heat to apply during installation. The indents shall work by closing together to show that the material has reached a molten state.
- 2.06 **Skid Resistance:** The surface, with properly applied and embedded surface beads, must provide a minimum resistance value of 60 BPN when tested according to ASTM E303.
- 2.07 **Thickness:** The material must be supplied at a minimum thickness of 125 mils.
- 2.08 **Environmental Resistance:** The material must be resistant to deterioration due to exposure to sunlight, water, salt or adverse weather conditions and impervious to oil and gasoline.
- 2.09 **Retroreflectivity:** The material, when applied in accordance with manufacturer's guidelines, must demonstrate a uniform level of sufficient nighttime retroreflection when tested in accordance to ASTM E1710-97. The applied material must have an initial minimum intensity reading of 275 mcd m<sup>-2</sup>-lx<sup>-1</sup> for white as measured with an Approved Retroreflectometer.
- 2.10 **Packaging:** The preformed thermoplastic markings shall be placed in protective plastic film with cardboard stiffeners where necessary to prevent damage in transit. Legends and symbols must also be supplied in flat pieces. The weight of the individual carton must not exceed 70 lbs. A protective film around the box must be applied in order to protect the material from rain or premature aging.
- 2.11 **Sealer:** The sealer must be a two (2) component polyurea sealer used to enhance the bond strength between the substrate and preformed thermoplastic materials made from resins and/or polymers, and inorganic fillers as recommended by the thermoplastic manufacturer.

**3. CONSTRUCTION DETAILS:**

**3.01 Application:**

- A. **Asphalt:** The materials shall be applied using the propane torch method recommended by the manufacturer. The material must be able to be applied at ambient and road temperatures down to 32°F without any preheating of the pavement to a specific temperature. The material must be able to be applied without the need to heat the material to a specific temperature. The pavement shall be clean, dry and free of debris. Supplier must enclose application instructions with each box/package.
- B. **Portland Concrete:** The same application procedure shall be used as described under Section 3.01. However, a compatible primer sealer must be applied before application to assure proper adhesion.

3.02 **General:** All pavement markings and patterns shall be placed as shown on the plans and in accordance with the National Manual on Uniform Traffic Control Devices and NYS Supplement.

3.03 The Contractor shall be responsible for removing, to the satisfaction of the Engineer, preformed markings applied in unauthorized areas.

3.04 **Application Methods:** Preformed pavement markings shall be applied by the following methods. The installation of markings on the project may be performed simultaneously by more than one method.

3.05 **Mechanical Applying Equipment:** Mechanical applying equipment for the placement of preformed pavement marking stripes shall be of the type recommended by the manufacturer of the preformed material. All applying equipment shall be approved by the Engineer prior to the start of work.

3.06 **Sealer Requirements:** Two (2) component sealer shall be used for marking applications in accordance with the written recommendations of the manufacturer of the preformed marking material.

Sealer materials shall be placed at the application rate and by the application methods recommended by the manufacturer.

When sealer is applied, the area of application shall be at least the width or dimension, of the new preformed marking, plus 1 inch on all sides.

3.07 **Surface Cleaning and Preparation of Pavement Surfaces:** The Contractor shall be responsible for cleaning the pavement surface to the satisfaction of the Engineer.

Surface cleaning and preparation work shall be performed only in the area of the preformed markings application.

At the time of application, all pavement surfaces shall be free of oil, dirt, dust, grease and similar foreign materials. The cost of cleaning these contaminants shall be included in the bid price of this item.

In addition, concrete curing compounds on new Portland cement concrete surfaces and existing pavement markings on both concrete and bituminous pavement surfaces shall be removed and paid for under separate items.

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**4. METHOD OF MEASUREMENT:**

- 4.01 Pavement symbols will be measured by square foot and shall be paid for to the 1/10 square foot.
- 4.02 The preformed pavement markings will be inspected during and following installation to determine conformance with this specification. In addition, they will be inspected following a performance period that will extend for 90 calendar days following both their installation and opening of the roadway to traffic.
- 4.03 Within 15 consecutive calendar days after the end of the 90 day performance period, a final performance inspection will be made by the Engineer. If this inspection discloses any work, in whole or in part, as not being visibly intact and serviceable, the Contractor shall completely repair or replace such work.
- 4.04 When required all repair or replacement work shall be performed in accordance with this specification and completed within 60 calendar days of the earliest allowable installation date as specified for that location.
- 4.05 Upon completion of the final performance inspection, or after satisfactory completion of any necessary corrections, the Engineer will, within 10 calendar days, notify the Contractor in writing, of the date of such final performance inspection and release him from further performance responsibility.

**5. BASIS OF PAYMENT:**

- 5.01 The accepted quantities of markings will be paid for at the contract unit price, which shall include the cost of furnishing all labor, materials and equipment to satisfactorily complete the work. The cost of cleaning pavement surfaces of oil, dirt, dust, grease, and similar foreign materials shall be included in the price bid.