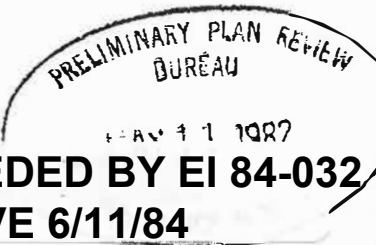



TO: <div style="text-align: center;">  </div> SUPERSEDED BY EI 84-032 EFFECTIVE 6/11/84	<h2 style="text-align: center;">ENGINEERING INSTRUCTION</h2> <p style="text-align: center;">NEW YORK STATE DEPARTMENT OF TRANSPORTATION</p> <p>SUBJECT: PREFORMED REFLECTORIZED PAVEMENT MARKINGS</p> <p>Subject Code: 7.27-1-688</p>
Distribution: <input checked="" type="checkbox"/> Main Office <input checked="" type="checkbox"/> Regions <input type="checkbox"/> Special	Code: <u>EI 82-30</u> Date: <u>5-5-82</u> Supersedes:
APPROVED: <div style="text-align: center;">  </div> Director, Final Plan Review Bureau	

By this EI we are replacing immediately 18688.01 through 18688.04 with the attached new Items 18688.0101 through 18688.0401.

The materials requirements of the previously approved specification on Preformed Pavement Markings "D. Basis of Acceptance" has been changed.

Also, the Materials Bureau has established an approved products list (copy attached) for preformed marking materials.

ITEM NO. 18688.0101 WHITE PREFORMED REFLECTORIZED PAVEMENT STRIPES
ITEM NO. 18688.0201 YELLOW PREFORMED REFLECTORIZED PAVEMENT STRIPES
ITEM NO. 18688.0301 WHITE PREFORMED REFLECTORIZED PAVEMENT LETTERS
ITEM NO. 18688.0401 WHITE PREFORMED REFLECTORIZED PAVEMENT SYMBOLS

DESCRIPTION. Under this work the contractor shall furnish and apply preformed reflectorized pavement markings at the locations and in accordance with the patterns indicated on the plans, or as directed by the Engineer, and in accordance with these specifications.

The preformed reflectorized pavement marking shall be overlaid onto 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.

MATERIALS.

1. White and Yellow Preformed Reflectorized Markings

A. General Requirements. White and yellow preformed reflectorized pavement markings shall be composed of a mixture of plastics or polymeric materials; resins; pigments; and reflective glass spheres that are uniformly distributed throughout the thickness of the material. In addition, a reflective layer of glass spheres shall be bonded to the top surface of the preformed marking.

The preformed material shall be supplied as a tape (or ribbon) for making longitudinal stripes; and it shall be supplied in the form of prefabricated letters or symbols.

Preformed marking tape for longitudinal stripes shall be of the specified width; and shall be precoated on the reverse side with a pressure sensitive adhesive for adherence to bituminous or portland cement concrete surfaces.

Preformed letters and symbols shall be of the specified dimensions; and shall be adhered to bituminous or portland cement concrete surfaces by means of pre-coated pressure sensitive adhesive; or by means of a liquid adhesive that is recommended by the manufacturer and applied to the preformed marking and/or pavement surface at the time of installation; or adhered by both a pre-coated and liquid system.

The preformed reflectorized marking material shall be of good appearance and free of cracks or other defects. The edges shall be clean cut and well defined. The material shall be weather resistant and through normal traffic wear shall show no appreciable fading, lifting or shrinkage.

Preformed - Cont'd

When properly applied the preformed marking shall be capable of molding itself to the contours, breaks and faults of bituminous and portland cement concrete surfaces; and shall show no significant signs of tearing, roll-back, lifting or other signs of poor adhesion.

B. Physical Requirements

1. Color. White preformed pavement markings, as placed, shall be white, free from dirt or tint. The color of the white marking shall be defined by the color chip in the possession of the Materials Bureau.

Yellow preformed pavement markings, as placed, shall be yellow; free from dirt or tint and shall be a reasonable visual match to Munsell Book Notation 10Yr 8/14 (ASTM D1535).

2. Thickness. Preformed pavement marking material shall have an average thickness of not less than 0.060 inch (60 mils). Average thickness shall be determined as the average of five micrometer readings, taken on a 4"x6" sample of material applied to an aluminum panel and by deducting the thickness of the aluminum panel.

3. Reflective Glass Spheres. Glass spheres for use in the preformed marking composition and for surface application shall have a refractive index of not less than 1.50, as determined by the liquid immersion method at 25°C.

4. Tensile Strength. Preformed pavement marking material shall have a minimum tensile strength of 40 pounds per inch width when tested in accordance with ASTM D-638. The sample size shall be 6"x1". Tests shall be conducted at an ambient temperature of 70±5°F. The testing machine shall operate at a speed of 0.25" per minute.

5. Elongation. Preformed pavement marking material shall have a minimum elongation of 15% when tested in accordance with ASTM D-638, and under the conditions as specified for "4. Tensile Strength."

6. Plastic Pull Test. A 6"x1" test specimen shall support a dead weight of 4 lbs. for not less than 5 minutes.

C. Packaging and Shipment. Preformed reflectorized pavement marking tape, letters, and symbols shall be shipped and packaged in accordance with commercially accepted standards. The following information shall be plainly marked on each container or on the shipping invoice: the name of the product; the name and address of the manufacturer; the quantity of material; the date of manufacture; and the date of expiration or shelf life.

D. Basis of Acceptance. Preformed reflectorized pavement markings shall be approved by the Materials Bureau. Detailed requirements and procedures for the approval of preformed markings are available from the Materials Bureau.

18688.0101 through 18688.0401

Preformed - Cont'd

Approval of preformed markings will be based on laboratory analysis and field testing prior to their use on a Department project. If the proposed marking passes the requirements for laboratory analysis and initial field tests and it is considered acceptable by the Director, Materials Bureau, the product will first be placed on the Department's "Approved List" of materials for use on a restricted basis. Restricted use will require prior approval by the Materials Bureau for installation of the pavement marking on any project. The preformed marking must be installed and perform successfully on a project before unrestricted approval will be given.

Project acceptance will be based on the appearance of the marking on the Department's approved list of preformed reflectorized pavement markings, and in the case of a marking approved for restricted use, the approval of the Director, Materials Bureau.

MECHANICAL APPLICATING EQUIPMENT FOR PREFORMED MARKING TAPE

Mechanical applying equipment for the placement of preformed marking tape shall be approved by the Deputy Chief Engineer (Technical Services), prior to the start of work.

Mechanical applying equipment shall be defined as a mobile pavement marking machine specifically designed for use in applying pre-coated, pressure sensitive pavement marking tape of varying widths, up to seven (7) inches. Mobile shall mean either mounted on, or towed by, a self-propelled vehicle; and maneuverable to the extent that straight lines can be followed and normal curves can be made in a true arc.

The mechanical applicator shall be capable of installing up to 20,000 linear feet of preformed marking tape in an 8-hour day and shall include the following features:

1. The applicator shall be so constructed as to apply multi-line patterns, to the extent that two (2) preformed marking stripes can be placed simultaneously with a four (4) inch space between them.
2. The applicator shall be equipped with an electronic and programmable line pattern control system or mechanical control system. The control system shall be capable of applying skip or solid lines, in any sequence and in any cycle length.
3. The applicator shall be equipped with rollers, or another suitable compactive device, to provide initial adhesion of the preformed, pressure sensitive marking tape with the pavement surface.

CONSTRUCTION DETAILS

1. General. All pavement markings and patterns shall be placed as shown on the plans and in accordance with the New York State Manual of Uniform Traffic Control Devices.

April 1, 1979
April 27, 1982 (Rev.)

Preformed - Cont'd

Before any pavement marking work is begun, a schedule of operations shall be submitted for the approval of the Regional Director.

When pavement markings are applied under traffic the Contractor shall supply all necessary flags, markers, signs, etc. to maintain and protect traffic; and to protect marking operations and the markings until set.

The application of pavement markings shall be done in the general direction of traffic. Striping against the direction of traffic flow shall not be allowed.

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

When necessary the Contractor shall establish marking line points at twenty-five (25) foot intervals throughout the length of the pavement or as directed by the Engineer.

2. Atmospheric Conditions. Preformed reflectorized pavement markings shall be placed upon dry pavement surfaces; surface dry shall not be considered an acceptable condition. Preformed pavement markings shall only be installed between the dates given below:

<u>Location</u>	<u>Installation Not to Begin Before</u>	<u>Installation Not to be Made After</u>
Adirondack Park and St. Lawrence, Franklin, Clinton, Cattaraugus and Allegany Counties	June 1	August 31
Regions 1 thru 7 with the exception of the Adirondack Park and St. Lawrence, Franklin, Clinton, Cattaraugus, and Allegany Counties Plus		
Region 9, and Ulster County	May 15	September 15
Regions 8 and 10 with the exception of Ulster County	May 15	September 30
Region 11	May 1	October 15

At a time of actual installation, the pavement surface temperature shall be a minimum of 50°F and the ambient temperature shall be a minimum of 60°F and rising. The Engineer shall be the sole determinor as to when the temperature and pavement surface conditions are such as to produce satisfactory results.

Preformed - Cont'd

3. 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 cleaned and paid for in accordance with the specifications for cleaning and preparation of pavement surfaces.

4. Application of Preformed Reflectorized Pavement Markings:

All preformed reflectorized pavement markings shall be placed by the overlay method, whereby the marking material is applied and adhered to the surface of bituminous and portland cement concrete pavements.

Preformed marking operations shall not begin until after the pavement surface has been cleaned and prepared.

Unless otherwise directed by the Engineer all centerline, skip line, edgeline and other longitudinal stripes shall be marked with preformed, pressure sensitive marking tape, using the mechanical applying equipment. Small quantities of longitudinal stripes may be applied by hand on projects which do not include extensive longitudinal striping.

Preformed letters and symbols shall be applied by hand methods, and adhered to the pavement surface by means of a pre-coated pressure sensitive adhesive or a liquid adhesive or both. The liquid adhesive shall be as recommended by and applied in accordance with the instructions of the manufacturer of the preformed material. After placement the entire surface of all letters and symbols shall be rolled with a 100-200 lb. hand roller or rubber tired vehicle (e.g. car or pick-up truck).

METHOD OF MEASUREMENT. Pavement striping will be measured in linear feet along the centerline of the pavement stripe, and will be based on a 4-inch wide stripe. Measurement for striping with a plan width greater or less than the basic 4 inches will be made by the following method:

$$\frac{\text{Plan Width of Striping (inches)} \times \text{Linear Feet}}{4 \text{ (inches)}}$$

No payment will be made for the number of linear feet of skips in the dashed line.

April 1, 1979
April 27, 1982

18688.0101 through 18688.0401

Preformed - Cont'd

Letters and symbols will be measured by each unit applied. A unit consists of one letter or one symbol. Example "SCHOOL" would be measured as six letters.

BASIS OF PAYMENT. 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 maintaining and protecting traffic during the marking operations shall be included in the price bid. The cost of removal of concrete curing compounds and existing pavement markings will be paid under separate items and is not included in this item.

<u>Pay Item No.</u>	<u>Item</u>	<u>Pay Unit</u>
18688.0101	White Preformed Reflectorized Pavement Stripes	Linear Foot
18688.0201	Yellow Preformed Reflectorized Pavement Stripes	Linear Foot
18688.0301	White Preformed Reflectorized Pavement Letters	Each
18688.0401	White Preformed Reflectorized Pavement Symbols	Each

April 1, 1979
April 27, 1982

Approved List MAP CODE 7.42-2

II. Index 7.42-1 Materials by Brand Name

PREFORMED REFLECTORIZED PAVEMENT MARKINGS (Item No. 18688)
(STRIPES-LETTERS-SYMBOLS-LIQUID ADHESIVES)

WHITE AND YELLOW PREFORMED STRIPES

<u>BRAND NAME</u>	<u>SUPPLIER/LOCATION</u>
"Stamark" Brand Pavement Tape, Pliant Polymer Grade, Series 5730 (60 mils thick)	3 M, Traffic Control Materials Division 223-3N 3 M Center St. Paul, MN 55144

LETTERS AND SYMBOLS

"Stamark" Brand, Pliant Polymer Grade, Sheeting, Series 6330 (60 mils thick)	3 M, Traffic Control Materials Division 223-3N 3 M Center St. Paul, MN 55144
"Stamark" Brand, Pliant Polymer Grade Precut Legends and Symbols, Series SMS-900 (60 mils thick)	3 M, Traffic Control Materials Division 223-3N 3 M Center St. Paul, MN 55144

LIQUID ADHESIVE

"Stamark" Brand Primer P-46	3 M, Traffic Control Materials Division 223-3N 3 M Center St. Paul, MN 55144
-----------------------------	---------------------------------------------------------------------------------------