
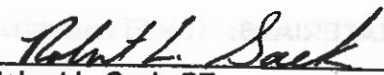


<b>To:</b> <b>SUPERSEDED BY EB 20-038</b> <b>EFFECTIVE 9/3/20</b>		New York State Department of Transportation <b>ENGINEERING</b> <b>INSTRUCTION</b>	<b>EI</b> <b>06-008</b>
<b>Title: SPECIAL SPECIFICATION 688.10XX--18 PREFORMED, WET-REFLECTIVE TAPE (GROOVED PAVEMENT METHOD)</b>			
<b>Distribution:</b> <input checked="" type="checkbox"/> Manufacturers (18) <input type="checkbox"/> Surveyors (33) <input checked="" type="checkbox"/> Local Govt. (31) <input checked="" type="checkbox"/> Consultants (34) <input checked="" type="checkbox"/> Agencies (32) <input checked="" type="checkbox"/> Contractors (39) <input type="checkbox"/> _____ ( )		<b>Approved:</b>  Robert L. Sack, PE <u>12 MAY 06</u> Deputy Chief Engineer, Technical Services      Date	

**ADMINISTRATIVE INFORMATION:**

- This Engineering Instruction (EI) is effective beginning with projects submitted for the letting of 09/07/2006.
- No issuances are superseded by this issuance. This issuance supplements EI 93-037 Raised Snowplowable Pavement Markers.
- The special specification issued by this EI will reside in the Special Specifications directory of the Toolbox server.

**PURPOSE:** The purpose of EI is to issue Special Specifications 688.1001--18 White Preformed, Wet-Reflective Tape (Grooved-Pavement Method) and 688.1002--18 Yellow Preformed, Wet-Reflective Tape (Grooved-Pavement Method).

**TECHNICAL INFORMATION:**

- Preformed, wet-reflective tape provides better reflectivity during wet road conditions than traditional pavement marking tapes and may be used as an alternative to raised snowplowable pavement markers to supplement long-line pavement markings as mitigation for nighttime wet-weather accidents. Wet-reflective tape is more cost effective than raised snowplowable pavement markers (RSPM), generally costing about half the price of RSPMs per marker placement.
- Preformed, wet-reflective tape is useful as a barrier marking but the added cost should be considered.
- The standard installation should consist of 1.0-meter (3ft) long stripes in a 1.2-meter (4 ft) long groove at 24 meter (80 ft) spacing (every other marking cycle).
- Designers should consider using wet-reflective tape at locations where wet-weather accident patterns at safety deficient locations that are correctable by improved lane delineation as per EI 93-037. Location examples include areas with severe curvilinear alignments, areas prone to flooding, and light-deficient, high-accident locations.
- Designers should specify the spacing, length, and width of the tape in the contract documents.
- While this item is proprietary, the Department has obtained a finding from FHWA that the use of this product is in the public interest. This item requires PIN approval. To obtain Main Office approval of its use, the designer needs to submit the locations and justification for its use to the Transportation Systems Operations Bureau. Include in the justification "FHWA has granted blanket approval, finding that the use of the product is in the public interest."
- Construction staff should closely monitor the installation of the tape, as the durability of the tape is highly dependent on strict compliance with proper installation procedures. If the Contractor is inexperienced or has a history of quality control problems with the tape, the presence of a

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manufacturer's representative is required as authorized in the specification.

- Regional staff should monitor products for durability and visual appearance and report findings to the Materials Bureau, approximately every six months for three years.
- The following Special Specifications are disapproved:
  - 688.1001--91 White Durable, Preformed, Wet-Reflective Tape Delineation.
  - 688.1002--91 Yellow Durable, Preformed, Wet-Reflective Tape Delineation (Grooved-Pavement Method).

**TRANSMITTED MATERIALS:** This EI transmits the Special Specification for item 688.10XX--18.

**BACKGROUND:** Reflectivity of traditional pavement markings is scattered when the markings are wet or submerged. The standard treatment for wet-weather, accident-prone locations has been the installation of raised snowplowable pavement markers. The effects of repeated impacts with the raised markers by snowplowing equipment and the effect on snowplow operators have been identified as a concern. The wet-reflective tape displays nighttime wet-weather retroreflectivity values after two years of service which exceed the requirements for new epoxy marking, and eliminates the snowplowing-related concerns cited in EI 93-037.

**CONTACT:** Direct questions on use of the tape to Chuck Riedel, [criedel@dot.state.ny.us](mailto:criedel@dot.state.ny.us) at 457-2185 or Dawn Arnold, [darnold@dot.state.ny.us](mailto:darnold@dot.state.ny.us) at 457-1673, of the Transportation Systems Operations Bureau. Direct questions about the specification to Pat Garlarza of the Materials Bureau, [pgalarza@dot.state.ny.us](mailto:pgalarza@dot.state.ny.us) at 457-4599.

**ITEM 688.10XX 18 - PREFORMED, WET-REFLECTIVE TAPE (GROOVED- PAVEMENT METHOD)**

**DESCRIPTION**

This work shall consist of installing preformed, wet-reflective tape, into machine-cut grooves in the pavement in accordance with the contract documents, and as directed by the Engineer, to provide wet-weather, nighttime delineation.

**MATERIALS**

**General Requirements:**

Wet-Reflective Tape shall:

- Consist of a highly retroreflective enclosed lens, white or yellow film with a thin, flexible and conformable backing pretreated with a pressure-sensitive adhesive.
- Adhere to HMA or PCC pavement surfaces at a minimum air temperature of 16°C, and a minimum pavement temperature of 21°C.
- Provide wet-weather, nighttime visibility and dry-nighttime visibility when installed below the pavement surface in machine-cut, grooved pavement.
- Be of the specified color, dimension, and shape, have a good appearance, be free of cracks and other defects.
- Have clean-cut and well defined edges.
- Be weather resistant.
- Show no appreciable fading, significant tearing, lifting or shrinkage through normal traffic wear.
- Be capable of molding itself to the contours, breaks and faults of grooved pavement surfaces.

**Daytime Chromaticity Coordinates (Dry):**

Chromaticity Coordinates								
Color	Point 1		Point 2		Point 3		Point 4	
	x	y	x	y	x	y	x	y
White	.355	.355	.305	.305	.285	.325	.335	.375
Yellow	.560	.440	.460	.400	.420	.440	.490	.510

**Retro-reflectivity (Wet and Dry):**

MINIMUM INITIAL RETROREFLECTANCE [mcd/m <sup>2</sup> /lx] Dry: ASTM E 1710 Wet: ASTM E 2176 and ASTM E 2177	
White	Yellow
750	450

**Liquid Adhesive.** Use a liquid adhesive or primer which conforms to Federal, State, and Local regulations for the emission of volatile organic compounds (VOC) and as recommended by the

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preformed tape manufacturer.

**Packaging and Shipment.** Shipped and packaged in accordance with commercially accepted standards. Clearly display 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 the shelf life, on each container or on the shipping invoice.

**Basis of Approval.** Approvals will be based upon independent lab analysis and field testing in accordance to this specification and Department directives. If the product passes the requirements of this specification, it will be added to the Department's Approved List.

**Basis of Acceptance.** Preformed Wet-reflective Tape will be accepted on the basis of the appearance of the product on the Department's Approved List.

**CONSTRUCTION DETAILS**

**General.** Install white or yellow, preformed, wet-reflective tape as shown on the contract documents and in accordance with the MUTCD. Install wet-reflective tape within the seasonal and temperature limitations of the table below:

<b>TEMPERATURE AND SEASONAL REQUIREMENTS</b>			
<b>Geographic Location</b>	<b>Pavement Surface Temperature</b>	<b>Air Temperature</b>	<b>Allowable Installation Dates</b>
Regions 1, 2, 3, 4, 5, 6, 7 & 9 (All Counties) Region 8 (Ulster County only)	21°C, Min.	16°C, Min.	May 15 to September 1
Regions 8 & 10 (except Ulster County)	21°C, Min.	16°C, Min.	May 15 to September 15
Region 11	21°C, Min.	16°C, Min.	May 1 to September 30
<b>Notes:</b> 1. Measure surface temperature at three locations, 30 m apart on the pavement surface where the wet-reflective tape is to be installed and average the three readings to determine specification compliance. 2. Measure air temperature in a shaded area.			

Do not install wet-reflective tape during periods of rain or when the pavement surface is wet or damp.

At least 5 work days prior to the start of work, provide the Engineer with the manufacturer's written instructions for:

- Grinding pavement for wet-reflective tape.
- Applying liquid surface adhesive.
- Installing preformed, wet-reflective tape.

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If the Contractor has no or limited experience with wet-reflective tape or if required by the Engineer, the Contractor shall provide a manufacturer's representative to provide guidance for the proper grinding equipment and grinding method, and to oversee the proper installation of wet-reflective tape. The services of the manufacturer's representative shall be retained by the Contractor until the Engineer approves all equipment and work.

Establish marking-line points at appropriate intervals throughout the length of the pavement. Apply pavement markings in the direction of normal traffic flow unless otherwise approved by the Engineer. Protect the pavement markings until the adhesive has proper time to dry per manufacture's instructions.

Install wet-reflective tape into the grooved/ground pavement at the specified depth, and the required width and length shown in the contract documents. Do not grind grooves or install wet-reflective tape across longitudinal or transverse pavement joints.

Install wet-reflective tape between existing broken (skip) lines and in the same longitudinal alignment as existing broken lines at the spacing shown on the contract documents. If the wet-reflective tape is being used as a full- or partial-barrier centerline, remove the entire section of existing centerline markings and replace with the wet-reflective tape, as per the requirement of this specification.

On newly constructed PCC pavements, do not begin grinding operations until the requirements of §502-3.18 *Opening to Traffic*, are met. Conduct pavement grinding operations and pavement cleaning work in such a manner as to minimize airborne dust and similar debris and prevent a hazard to workers, motor vehicle traffic, or nuisance to property. Install wet-reflective tape in such a manner as to prevent damage to the surrounding pavement or pavement joints. Repair all damaged pavement surfaces that result from improper installation, or installation of wet-reflective tape in unauthorized areas. Remove and repair damaged pavement surfaces to meet the pavement condition prior to grinding areas at no additional cost to the State.

Locate the ends of the wet-reflective tape, at least 100 mm to 150 mm away from pavement joints and cracks when possible. Do not install wet-reflective tape at locations that show visible evidence of pavement deterioration such as cracking and spalling. Relocate the installation of wet-reflective tape to another area if the typical longitudinal spacing of the wet-reflective tape falls at a location of pavement deterioration. Do not install the wet-reflective tape if it cannot be relocated within  $\pm 10\%$  tolerance of the specified longitudinal spacing.

**Installation.** Install wet-reflective tape according to the following sequence of operations:

Grind a groove of the following dimensions into the pavement:

Groove Length: 1.2 m minimum or specified tape length plus 150 mm minimum at each end  
(Minimum tape length: 1.0 m)

Groove Width: Specified tape width plus 30 mm

Groove Depth: 2.2 mm to 2.4 mm

The Contractor shall supply the Engineer with two accurate, easily readable gauges with

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which to verify groove depth. The gauges shall be delivered no less than one week prior to the anticipated beginning of grooving operations. Gauges shall be accompanied by manufacturer's instructions for their use, if such instructions are necessary for proper understanding of the gauge's function.

For areas of tape replacement in a previously ground groove, remove old tape and any contaminants on the surface by regrinding or sand/shot blasting. Re grind groove to the required depth if necessary.

Use free-floating, independent grinding heads. Grind the groove with portable or mobile equipment to provide a pavement surface texture that is free of ridges. Grind the pavement in accordance with the tape manufacturer's written guidelines for grooving pavement surfaces. If necessary, to achieve the proper surface texture, supplement grooving with shot blasting, abrasive blasting, or power sweeping or brooming.

If water or other lubricants are used for grinding or cleaning the grooves, the surface must be allowed to thoroughly dry before application of any adhesive, primer, or tape. If the groove surface becomes contaminated or dirty during the dry time, it must be cleaned again as per this specification.

Verify the specified groove depth at the start of the grooving operation and periodically throughout the operation. Re grind areas where any groove depth measurement does not meet the minimum specified depth. Reject grooves which exceed the specified maximum and relocate the groove to an adjacent area and repair rejected grooves.

Remove and collect debris resulting from the grooving/grinding operation prior to opening the roadway to traffic and prior to the application of a surface preparation adhesive. Dispose of collected debris in accordance with §107-10 *Managing Surplus Material and Waste*.

Clean all surfaces of the groove by air blasting to remove all loose residue. Include power brooming or manual brooming, if necessary, to remove all loose residue from the groove. Make sure all pavement surfaces are free of oil, dirt, dust, grease, salt, and similar foreign materials at the time of application. If water blasting is used, allow the surface to thoroughly dry before application of any adhesive, primer, or tape.

Uniformly apply a manufacturer's recommended adhesive or primer to the entire bottom area of the groove at the recommended application rate.

Apply wet-reflective tape into the primed groove according to manufacturer's recommendations. Tamp (roll) in a straight line with a shouldered tamping roller, slightly less in width than the groove. Do not roll the tape with a vehicle tire unless allowed by the manufacturer's written instructions.

**METHOD OF MEASUREMENT**

The Engineer will measure the length in meters of wet-reflective tape satisfactorily installed in grooved pavement. The Engineer will measure wet-reflective tape with a plan width greater

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than the standard 100 mm using the following method:

$$\frac{\text{Plan Width of Striping (Millimeters)} \times \text{Meters}}{100 \text{ Millimeters}}$$

The Engineer will not measure the length of gaps between wet-reflective tape for the purpose of payment.

**BASIS OF PAYMENT**

The unit bid price, shall include all labor, materials, and equipment to complete the work including the cost of grooving the pavement for installation.

The work will be paid work under:

<u>Item No.</u>	<u>Item</u>	<u>Pay Unit</u>
688.1001 18	White, Preformed, Wet-reflective Tape (Grooved-Pavement Method)	Meters
688.1002 18	Yellow, Preformed, Wet-reflective Tape (Grooved-Pavement Method)	Meters