

**MEETING  
AGENDA  
ND DEPARTMENT OF  
TRANSPORTATION**

**Title of Meeting:** NDDOT Specification Committee Meeting

**Date:** 02/10/2015

**Time:** 1:00 PM to 5:00 PM

**Location:**  
Comfort Inn -  
Bismarck

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**Meeting Agenda item(s):**

- Specification re-write update
  - o It's Done!!!
  - o Books are available for ordering
  - o Supplemental Specifications will be issued for October 2015 bid openings
- Material Source Approvals – Cassandra Torstenson
  - o New NDDOT guidance on Material Source Approvals and the Northern Long-Eared Bat
- Noxious Weeds – Mike Kisse
  - o Certification/inspection for seeding, sodding, mulch, and fiber rolls
  - o Gravel pits
- Short Term Pavement Marking – Type R – Ken Russel/Dan Currier
  - o See attachment
- Geogrid Installation – Scott Whaley
  - o See attachment
- Future Meeting Schedule
- New Items & Discussion



# AGC SPECIFICATIONS COMMITTEE- ISSUES SUBMITTAL FORM

Date Submitted <b>January 23, 2015</b>
Submitted By <b>Ken Russell/Dan Currier</b>
Spec Committee Meeting Date <b>February 10, 2015</b>
AGC Spec Committee Issue Number

Agenda Item Number
Discussion Time

Decision Required	<input type="checkbox"/>
Information Only	<input type="checkbox"/>

DOT Specification Section Number:	762.04 D.3 Short Term Pavememtn Marking-Type R
Background Information: (include past project experiences as illustration, if possible)	<p>Specification 762.04 D.2.d of the 2008 spec book was the result of AGC and NDDOT meetings to solve an ongoing design and field problem. The specification change worked well for all parties. This section was removed in the new 2014 spec book.</p> <ul style="list-style-type: none"> <li>-Short Term Type R pavement marking products are designed for 50 degree pavement and air temperature installation.</li> <li>-Lower temperature tape installations have resulted in failures and safety concerns to the motoring public and construction workers.</li> <li>-Large/Complex highway projects are designed with incentive and disincentive clauses for phase and project completions. Projects are designed with Type R pavement markings to be installed for phase construction that "impacts traffic". The average mean temperatures for starting "impact" dates are significantly lower than the performance specifications for Type R pavement marking tape.</li> <li>-Type R pavement markings are used in place of paint with the intent that there will be not a significant mark left when the Type R tape is removed.</li> <li>-Design Engineers (NDDOT, Cities, and Consulting Engineers), may not know the performance guidelines of Type R pavement markings.</li> <li>-Prime contractors do not know the performance guidelines for Type R pavement markings.</li> <li>-Projects designed with Type R tape and "cold start dates" could foster unbalanced bids.</li> <li>-Projects designed with Type R tape and "cold start dates" have forced responsible contractors who understand the risk to refuse to submit bids.</li> <li>-Type R pavement markings are not designed to be snow plow resistant.</li> <li>-Designing and allowing Type R tape to be installed at temperatures</li> </ul>

	lower than the product minimums opens all parties up to significant legal liability.
Suggested Solution:	The first paragraph of the 2008 specification 762.04 D.2.d should be put into 762.04.D.3

**Actions to Date:**

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2008

f. **Tolerances.**

- (1) The length of the painted stripe shall not vary more than plus or minus 3 inches from the prescribed length.
- (2) The width of the painted stripe shall not vary more than plus or minus 1/2 inch from the prescribed width.
- (3) The length of the painted segment and gap shall not vary more than 6 inches in a 40-foot cycle.
- (4) The tolerance from the proper alignment shall not vary more than plus or minus 2 inches.
- (5) Dashed lines that are painted over existing dashed lines shall begin within 6 inches of the beginning of the existing line, unless otherwise directed by the Engineer.

2. **Plastic Pavement Marking Film.**

- a. **General.** Plastic pavement marking film applied as a permanent pavement marking shall not be applied before June 1 nor after September 1 of any year. The permanent marking film shall not be applied when the pavement surface temperature is 50°F or colder, nor shall the film be placed over painted markings. The pavement surface and the marking film shall be prepared for installation as required for the type of film used. The film shall be lap or butt spliced when required to join two lengths of film, and the film shall be cut at open joints or cracks in the pavement. The cut ends shall be firmly tamped in place.
- b. **Plastic Pavement Marking Film Application.** Application of plastic pavement marking film, whether by contact cement or mechanical application, shall be made using the manufacturer's recommendation.
- c. **Plastic Pavement Marking Film Rolled in Hot Asphalt.** The plastic pavement marking shall be rolled into the hot asphalt surface. The contractor shall arrange to have the plastic pavement markings placed on the hot asphalt in the position shown on the plans at the time of final asphalt rolling operations. The plastic pavement markings shall receive at least one rolling. The requirements not allowing installation prior to June 1 or after September 1 will not apply. The temperature of the hot asphalt pavement during application shall be as specified by the manufacturer. The cost of placing and rolling the pavement markings into the hot asphalt pavement shall be included in the price bid for the item "Plastic Pavement Marking Film Line or Message."
- d. **Short-Term Pavement Marking.** Pavement marking tape applied as short-term pavement marking shall conform with the requirement for application of pavement marking tape. The tape shall be applied on the center line in a 4-inch width and a 10-foot length with a gap of 30 feet. Short Term Type R and Short Term Type R-WR shall be installed where air and pavement temperatures are 50°F and are expected to remain at or continue to increase above 50°F. If either temperature falls below 50°F,

2008

short-term paint shall be substituted and paid for as "Short Term IN Line - Type NR." Removal of the paint will be paid for as "Obliteration of Pymt Mk." The short-term paint substitution shall cease and installation of "Short Term IN Line - Type NR" shall proceed as soon as air and pavement temperatures reach 50°F. The no-passing zone markings shall be made in a 4-inch width and a length, as required, to cover the no-passing zone. The short-term pavement marking shall be applied to the full length of the bituminous pavement and milled surface placed each day, and shall be completed before sunset each day. Paving and milling operations shall not resume if the striping is not in place as required.

Type R-Removal Retroreflective Film, Type R-WR-Removable Wet Reflective Film, and Type NR Retroreflective Pavement Striping (not easily removed) construction zone marking film shall be applied where specified. The film required shall be applied as specified for pavement marking film.

The Contractor shall remove the Type R or Type R-WR construction zone marking film when required in the Contract or directed by the Engineer.

Pavement marking paint with beads may be used in lieu of Type NR construction zone marking film for short-term pavement marking.

3. **Preformed Patterned Pavement Marking Film.**

- a. **General.** Preformed patterned pavement marking film applied as a permanent pavement marking shall not be applied before June 1 nor after September 1 of any year. The permanent marking film shall not be applied when the pavement surface temperature is 50°F or colder, nor shall the film be placed over painted markings. The pavement surface shall be prepared for installation as required by the manufacturer. The film shall be lap or butt spliced when required to join two lengths of film, and the film shall be cut at open joints or cracks in the pavement. The cut ends shall be firmly tamped in place.
- b. **Preformed Patterned Pavement Marking Film Application.** Application of preformed patterned pavement marking film shall be according to the manufacturer's recommendation.
- c. **Preformed Patterned Pavement Marking Film Rolled in Hot Asphalt.** The Contractor shall provide Preformed Patterned Pavement Marking Film for longitudinal lines and messages. The preformed patterned pavement marking shall be rolled into the hot asphalt surface. The Contractor shall arrange to have the preformed patterned pavement markings placed on the hot asphalt in the position shown on the plans at the time of the final rolling operations. The preformed patterned pavement markings shall be rolled at least twice. The requirements not allowing installation prior to June 1 or after September 1 will not apply. The temperature of the hot asphalt pavement during application shall be as specified by the manufacturer. The cost of placing and rolling the pavement markings into the hot asphalt pavement shall be included in the

2014

4. **Preformed Patterned Pavement Marking Film.**

Install the permanent marking film in accordance to the manufacturer's temperature recommendations. Do not place the permanent marking film over painted markings. Prepare the pavement surface for installation as required by the manufacturer. Cut the film at open joints or cracks in the pavement. Tamp the cut ends firmly into place.

D. **Short-Term Pavement Marking.**

1. **General.**

a. **Short-Term Pavement Marking Condition Classifications.**

The Engineer will rate short-term pavement markings as "acceptable," "marginal," or "unacceptable" in accordance with *Quality Guidelines for Temporary Traffic Control Devices and Features*, published by ATSSA.

Install short-term pavement markings that are classified as acceptable.

The Engineer will allow markings that degrade into the "marginal" category during the course of the work to remain in place. Replace markings that fall into the "unacceptable" range no more than 24 hours after being notified of the marking's condition.

b. **Maintenance and Duration.**

As necessary, remove material from raised pavement markers that reduces the brightness of reflectorized sheeting.

Immediately remove all markings that are no longer required.

c. **Installation Requirements.**

Use the same method of surface preparation as specified for permanent installation.

Apply short-term pavement marking to the center line to the full length of the surface treatment and milled surface before sunset on the same day the work is performed. Do not resume paving or milling operations if the short-term pavement marking has not been replaced as required.

On the final lift, allow new asphalt pavements to cool to 125°F before applying short-term pavement marking paint.

Place short-term pavement marking on the final lift of new pavement with alignment and spacing so that the permanent striping matches when applied. Correct errors in alignment and spacing or remove the short-term markings just before the installation of the permanent striping.

2. **Short-Term Pavement Marking – Type NR (Non-Removable).**

Allow the final lift of asphalt pavements to cool to 125°F before Type NR markings.

Place the short-term pavement markings at the rate specified in Section 762.04 C.2.b., "Rate of Application," with the following exception:

**Exception:** When the permanent pavement marking is specified as epoxy paint, apply the short term pavement marking at a thickness of 10 mils.

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3. **Short-Term Pavement Marking – Type R (Removable).**

Remove Type R markings once they are no longer necessary for traffic control operations.

4. **Short-Term Pavement Marking – Seal Coat Projects.**

Use pavement marking paint and beads for short-term pavement marking for seal coat projects.

Broom the areas to receive the striping before applying the paint and beads, without dislodging the chips.

If the in-place short-term pavement marking has become obscured and has lost its required visibility due to being covered, or partially covered, by cover coat or blotter material, remove the material from the striped areas by light brooming or compressed air before sunset. Correct damage to the cover coat material and striping resulting from the removal operation at no additional cost to the Department.

Apply paint at a rate such that 1 gallon of paint will cover a 4-inch wide stripe for a length of 200 to 240 feet. Evenly distribute glass beads over the wet paint stripe at a rate of at least 6 pounds per gallon of paint.

5. **Raised Pavement Markers.**

Install broken lane lines on two-lane two-way roadways using four markers spaced at 3.33-foot centers with a 30-foot gap. Space markers used for solid lines on 5-foot centers. In no-passing zones, place the double rows of markers 4 inches apart. Place raised pavement markers used in double solid lines side by side.

Remove raised pavement markers once they are no longer necessary for traffic control operations.

**762.05 METHOD OF MEASUREMENT**

The Engineer will measure as specified in Section 109.01 "Measurement of Quantities" and as follows:

The Engineer will only measure the painted or installed portion of broken lines.

If substituting raised pavement markers for paint, the Engineer will measure the lengths of a pavement line that would exist if paint had been installed.

The Engineer will measure pavement marking-painted messages by the square footage shown on the Plans, in place, and accepted by the Engineer.

**762.06 BASIS OF PAYMENT**

**Pay Item**

Pavement Mark Painted – Message

Pavement Mark Installation

Epoxy Pavement Mark Message

Epoxy Pavement Mark Message – Grooved

Epoxy Pavement Mark \_\_IN Line

**Pay Unit**

Square Foot

Mile

Square Foot

Square Foot

Linear Foot



Stamark™

# Wet Reflective Removable Tape

Series 710

Product Bulletin 710

January 2014

Replaces PB 710 dated April 2013

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## Description

3M™ Stamark™ Wet Reflective Removable Tape Series 710 is highly reflective under both wet and dry conditions. Series 710 tape is a conformable marking tape intended for longitudinal line applications in highway work zones where removability is required. The tape is designed to perform for the duration of the normal construction season.<sup>1</sup> After the pavement markings are no longer required, the tape can be manually removed intact or in large pieces.

Series 710 is also supplied as pre-cut symbols and legends for work zone applications. Series 710 tape utilizes specially designed optics to provide dry and wet reflective performance. It is comprised of white or yellow film supported by a flexible, conformable backing. The tape is reinforced by a structured medium and pre-coated with a pressure sensitive adhesive (PSA) for easy, rapid application in temperatures above 50°F (10°C).

<sup>1</sup>A normal construction season is defined as the time after the last snow plowing in the spring and before the first snow plowing in the fall/winter. In locations where snow removal is not performed Series 710 tape is intended for use up to one year. Series 710 tape is a temporary removable product not intended for multi-year applications.

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## Properties

### A. Product Features and Advantages

- Highly reflective, wet or dry.
- Durable during normal work zone season as defined above.
- Skid resistant.
- Coated with pressure sensitive adhesive (PSA).
- Tape available in white and yellow.
- Symbols and legends available in white only.
- Provides continuous delineation, day or night.
- Easy to apply by hand or by machine.
- Easy to remove intact or in large pieces.
- Leaves no lasting marks.
- Roadway may be opened to traffic immediately

### B. Reflectance

Stamark Series 710 has the following initial minimum retroreflectance values under wet and dry conditions. Values are measured under dry conditions in accordance with the testing procedures of ASTM D4061. Retroreflectance values are measured under wet conditions in accordance with ASTM E2176 or ASTM E2177 using a portable reflectometer.

Wet retroreflectance values measured under a “condition of continuous wetting” (simulated rain) will be in accordance with the testing procedure of ASTM E2176. To reduce variability between measurements, test method is to be performed in a controlled laboratory environment while the marking is positioned with a 3 to 5 degree lateral slope. A wetting agent is used to improve wetting of the pavement marking by the water. It is recommended that a 0.1% by volume liquid soap solution be used. Measurements are reported as an average for each roll tested, in a minimum of three locations.

Wet reflective values measured under a “condition of wetness” (simulated rain) will be in accordance with the testing procedure of ASTM E2177. The photometric quality to be measured is coefficient of retroreflected luminance ( $R_L$ ). The test may be performed with the marking installed on the road. New markings are tested using a wetting agent, as previously described. Laboratory measurements are performed using a 3 to 5 degree lateral slope. Measurements are reported as an average for each roll tested, in a minimum of three locations.

**Table 1 - 710 Minimum Retroreflectivity Values**

White	Dry	Wet & Rainy
Entrance Angle	88.76°	88.76°
Observation Angle	1.05°	1.05°
Retroreflected Luminance	500	250
$R_L$ [(mcd • m <sup>-2</sup> ) • lx <sup>-1</sup> ]		

**Table 2 - 711 Minimum Retroreflectivity Values**

Yellow	Dry	Wet & Rainy
Entrance Angle	88.76°	88.76°
Observation Angle	1.05°	1.05°
Retroreflected Luminance	300	200
$R_L$ [(mcd • m <sup>-2</sup> ) • lx <sup>-1</sup> ]		

*Note: 710 wet retroreflectance values when measured under a “condition of wetness” will be higher than when measured under a “condition of continuous wetting.” Stated minimum values shall be met using either test method.*

**English  $R_L$ :** Millicandelas per square foot per foot-candle [(mcd • ft<sup>-2</sup>) • fc<sup>-1</sup>]

**Metric  $R_L$ :** Millicandelas per square meter per lux [(mcd • m<sup>-2</sup>) • lx<sup>-1</sup>] Note: Entrance Angle 88.76° and Observation Angle 1.05° represent a simulated driver viewing geometry at a 30 meter distance.

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### C. Color

The preformed markings consist of white or yellow.

### D. Skid Resistance

The surface of the Series 710 tape provides a minimum initial average skid resistance value of 45BPN when tested according to ASTM E 303.

### E. Application

All applications of Series 710 tapes should be installed using the instructions in this Product Bulletin and the appropriate section of 3M Information Folder 3.2 and the 3M Road Surface Guide for suitability of application. The newly marked area can be opened to traffic immediately following application.

Surface Preparation Adhesive is not needed when applying the tape under normal conditions as outlined under the General Application Conditions section of this bulletin. Under marginal weather conditions, 3M™ Stamark™ Surface Preparation Adhesive P-50 can be used to improve initial and long term adhesion. For long line applications, the P-50 Surface Preparation Adhesive should be applied with a 3M™ Adhesive Spray Applicator PS-14. For symbols and legends, the Surface Preparation Adhesive should be applied using a 3/8" nap paint roller.

Marginal weather conditions can include circumstances where:

- The air and pavement temperatures will not drop below the minimum application temperature for the next 24 to 48 hours after installation.
- Prolonged or heavy rainfall following tape application is predicted.
- Application is to occur in early spring or late fall beyond typical road construction season.

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#### General Application Conditions:

- Air and pavement temperature minimums for Series 710 tape are 50°F (10°C) and rising.
- Pavement surface must be clean and dry.
- Butt splices must be used. Do not overlap tape ends.
- Do not apply tape on longitudinal seams or joints.
- In areas of high traffic encroachment or on rough, exposed aggregate surfaces, service life may be limited, for example: tined Portland cement or open graded ACC. In this situation it is recommended that the tape be inspected for replacement on a two-month cycle.

### F. Removability

The tape is removable from asphalt and smooth Portland cement concrete surfaces intact or in large pieces at temperatures above 32°F (0°C) without the use of heat, solvents, grinding, or sandblasting. Use the following procedure:

1. Wear gloves and use a chisel-like tool to pry up the edge of the tape.
2. Pull straight up at a 90° angle to the pavement.
3. A small amount of heat may be used to help soften the adhesive when removing Stamark tape during cold weather conditions.

*Note: Burning or grinding is not recommended. Removal and replacement during the normal construction season as defined in the Description section may be required in areas of high encroachment or on rough exposed aggregate surfaces using mechanical methods such as high pressure water blasting. User is responsible for determining suitability of product.*

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#### Storage

Stamark tapes should be stored in a cool, dry indoor area and used within one year of receipt.



<b>Health and Safety Information</b>	Read all health hazard, precautionary, and first aid statements found in the Material Safety Data Sheet (MSDS), and/or product label of chemicals prior to handling or use. When using a pavement preparation adhesive with this product, refer to the appropriate MSDS for information about the volatile organic compound (VOC) content of the adhesive. Consult local regulations and authorities for possible restrictions on product VOC content and/or VOC emissions. Electronically, visit us at <a href="http://www.3M.com/us">www.3M.com/us</a> and select MSDS search.	
<b>General Performance Considerations</b>	3M™ Stamark™ Wet Reflective Removable Tape Series 710 is designed to provide excellent reflectivity under both wet and dry conditions. Actual performance will be dependent on pavement and atmospheric conditions at the time of application, application method, traffic and exposure conditions. The user should test for conformance to their requirements before making large scale applications. 3M makes no generalized effective performance claims or material replacement provisions. Abrasion or heavy wear may significantly reduce expected effective performance. Our experience has shown that properly installed Series 710 tape is a highly effective traffic control device.	
<b>Literature Reference</b>	Information Folder 3.2	Pavement Surface Preparation and Application Procedures for 3M™ Stamark™ Temporary Pavement Marking Tapes.
	Information Folder 5.2	3M™ Highway Tape Applicator (HTA).
	Information Folder 5.17	Instructions for Using 3M™ Stamark™ Surface Preparation Adhesive P-50. 3M Road Surface Guide.

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**AGC SPECIFICATIONS COMMITTEE- ISSUES SUBMITTAL FORM**

Date Submitted <b>1/2/2015</b>
Submitted By <b>Scott Whaley - Tensar</b>
Spec Committee Meeting Date <b>2/10/2015</b>
AGC Spec Committee Issue Number <b>AGC-15-001</b>

<p>DOT Specification Section Number:</p>	<p>709.04-C: Construction Requirements - Geosynthetic Geogrid (Type G)</p>
<p>Background Information: (include past project experiences as illustration, if possible)</p>	<p>Installation requirements in Section 709.04-C pertaining to pinning, tying and overlapping make installation unnecessarily difficult and costly to construct in typical roadway applications. The Tensar (geogrid manufacturer) installation guide suggests only limited use of pins and ties, while the specification requires extensive use. Excessive pins and ties complicate material placement, limit contractor ability to make adjustments during geogrid and fill placement, and can cause wrinkling that is otherwise avoidable.</p> <p>Manufacturer guidelines contain different overlap and tie recommendations for distinct geogrid applications: subgrade improvement and aggregate base reinforcement. The minimum overlap requirement of 30 inches required by the specification is excessive for all but the most extreme subgrade improvement applications. Manufacturer guidelines for typical base reinforcement applications recommend 12 - 24 inches overlap. The excessive overlap requirement can complicate placement, reduce contractor flexibility, and unnecessarily increase cost. Manufacturer recommends mechanically tying overlaps only as needed to maintain minimum overlap during fill placement. No tying of longitudinal overlaps and minimal tying of transverse overlaps are typical in base reinforcement applications; however, the specification requires ties at 15 ft intervals on longitudinal overlaps and 3 ft intervals on transverse overlaps.</p>
<p>Suggested Solution:</p>	<p>Perform geogrid installation and cover material placement in accordance with published manufacturer guidelines.</p> <p>Unroll geogrid parallel to the centerline of the road. Do not drag the geogrid across the underlying material. Use geogrid widths that produce overlaps of parallel rolls at the centerline and at the</p>

	<p>shoulders and so that no overlaps are required along wheel paths.</p> <p>At all splices and joints, overlap the geogrid a minimum of 30 inches in subgrade improvement applications (CBR less than 2.0) and 18 inches in base reinforcement applications (CBR greater than 2.0). Construct joints at the end of a roll so the previous roll laps over the subsequent roll in the direction of the cover material placement. Geogrid may be mechanically tied with plastic or metal ties as needed to maintain minimum overlap during fill placement. Pins, staples or small piles of aggregate may be used as needed to maintain geogrid position prior to placement of cover material.</p> <p>Stagger end overlaps at least 10 feet from other end overlaps in parallel rolls. On curves, the geogrid may be cut or the overlap may be increased to conform to the curves.</p> <p>Patch damaged areas of geogrid. Place a patch that overlaps the damaged area by 36 inches on all sides. Mechanically tie the patch to the underlying grid.</p> <p>Place the first lift of material over geogrid installed on subgrade to a depth of 10 inches of loose material. Place the first lift of material over geogrid installed on aggregate base to a depth of 6 inches of loose material. Use low ground pressure equipment to spread the initial lift of material. If rutting occurs, fill the ruts with additional material before placing the subsequent lift. Do not blade out ruts. Do not turn construction equipment on the first layer of material. Do not operate tracked equipment directly on geogrid without at least 6 inches of cover material in place.</p>
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**Actions to Date:**

Tensar representative Scott Whaley has discussed with NDDOT representatives TJ Murphy and Tom Bold.