

Recommend Approval: <u>David D. [Signature]</u> 9/21/11 Team Leader Date <u>[Signature]</u> 9-21-11 Division Chief Date	Maryland Department of Transportation State Highway Administration Office of Materials Technology MARYLAND STANDARD METHOD OF TESTS	
Approved: <u>[Signature]</u> 10/31/11 Director Date	REMOVABLE PREFORMED PAVEMENT MARKING TEST DECK FIELD TEST	MSMT 723

SCOPE:

This procedure is used to evaluate the performance of removable preformed pavement marking materials. The accepted materials will be those which stay in place under traffic exposure and have acceptable retroreflectance. The removable pavement marking material shall be easily removed from the pavement without the need for equipment and leave no objectionable marks or residue on the pavement.

The Maryland State Highway Administration (SHA) currently reviews data results obtained from the National Transportation Product Evaluation Program (NTPEP) for compliance with Maryland specifications. SHA reserves the right to perform further testing on Maryland highways before final approval of any material.

Marking materials conforming to these requirements will be placed on the Qualified Products List (QPL) maintained by SHA's Office of Materials Technology.

If the Administration chooses to test the material, the manufacturer shall follow the procedure listed below.

MATERIALS AND EQUIPMENT:

1. 250 linear feet of yellow preformed line marking material.
2. 250 linear feet of white preformed line marking material.
3. Roller for tamping in accordance with manufacturers' recommendations.
4. Mechanical tape application machine (optional).
5. 30 meter Retroreflectometer

APPLICATION:

1. All application materials shall be accompanied by a manufacturer's certification in conformance with TC-1.03 and shall include the following:
 - a) Manufacturer's name
 - b) Place of manufacture
 - c) Material color
 - d) Date of manufacture (month-year)
 - e) Lot/ Batch identification
 - f) Width of material

- g) Material Safety Data Sheet(s)
2. Application schedules shall be established to assure that both the ambient and surface temperatures of the pavement at the time of application are in conformance with the manufacturers' recommendations. These temperatures, as well as the relative humidity, shall be recorded at the beginning and end of each application period.
 3. The surface of the pavement shall be dry as determined by MSMT 729 - Surface Moisture Test, and swept clean of loose debris prior to application of any materials.
 4. Marking materials shall be placed both longitudinally and transversely on either or both type of pavement surface, i.e., Portland Concrete Cement (PCC), and Hot Mix Asphalt (HMA), conforming to the layout (Exhibit A) below. Selection of sites and placement of the marking materials shall be performed by the manufacturer's personnel and approved by SHA.
 5. The following parameters shall be used in the evaluation of the marking materials during each inspection:
 - a) Ease of application
 - b) Removability:
 - i. Internal Tape Strength
 - ii. Adhesive Bond
 - c) Discernability (Tackiness)
 - d) Loss or Movement of Marking Material
 - e) Performance Rating (R):
 - i. Durability (D)
 - ii. Appearance (A)
 - iii. Night Visibility (N)
 6. Retroreflectance - Nighttime Retroreflectivity and Daytime Luminance
 7. Color

EVALUATION INTERVALS:

1. Evaluate the in-place longitudinal marking materials within three to seven days after completion of the test deck and at approximately 30 day intervals from installation for a total of 180 days, or to failure, whichever comes first.
2. Evaluate the in-place transverse marking materials within three to seven days after completion of the test deck and at approximately 30 day intervals from installation for a total of 180 days, or to failure, whichever comes first.

EVALUATION PROCEDURES

1. Ease of Application.

Evaluate the ease at which the marking materials were applied at the time of placement. Any of the following observations shall result in an unsatisfactory rating:

- a) The marking material had a backing material to remove;
- b) Difficulty encountered in unrolling the marking material; or
- c) Any other observation which made the operation difficult.

2. Removability

Remove one of each of the longitudinal skip marking materials from the pavement surface. Rate the ease with which the marking materials are removed from the pavement surfaces using the following scale:

a) Internal Tape Strength

- 1 - Tape removed intact, in one piece
- 3- Tape removed in three to four pieces
- 5- Tape removed in five pieces
- 7- Tape removed in seven pieces
- 10- Tape only removed in very small fragments

b) Adhesive Bond

- 1- Tape removed easily (potentially by one hand)
- 3- Tape removed with moderate two-hand effort
- 5- Tape removed significant, two-handed effort, requiring multiple pulls
- 9- Tape removed only by exhausting, two-handed effort
- 10- Tape could not be removed from surface

3. Discernability (Tackiness)

- 1- No discernable marking on road surface
- 5- 50% of marking (adhesive outline) left on road surface
- 10- 100% of marking left on road surface

Evaluate the residue left on the pavement surface after removal of the marking materials during the day and again at night.

Perform an additional evaluation of the residue on the pavement surface left by the marking materials removed during the previous evaluation.

4. Loss or Movement of Marking Material

- 0- No movement
- 5- Slight movement
- 10- Significant movement

Evaluate the loss or movement of the marking material during the daylight inspections.

5. Performance Rating

Durability (D) is an evaluation of the material in the wheel tracks and is an expression of the loss of the marking material when estimated by close observation without the aid of a magnifying glass during the daylight hours. The percent is converted to a rating on a numerical scale of 0 to 10, with 10 indicating 100 percent intact.

Formula:

$$R = 0.45D + 0.10A + 0.45N$$

where:

R = Performance Rating,

A = Appearance Rating, and

N = Night Visibility Rating

6. Retroreflectance

The 30 meter retroreflectance readings are obtained by the following:

Longitudinal Lines

- a) Take five readings on the right skip then pull up the skip and record durability.
- b) Take ten readings on first 40 feet of both edge lines, then cut and pull up the entire 40 feet in 10 foot segments and record average of durability.
- c) Repeat each month for six months

Transverse Lines

- a) Take five readings of both colors in the middle of the transverse lines.
- b) Pull up the white and yellow transverse lines and record durability.
- c) Repeat each month for six months.

Note: Follow the numbers sequence on the Temporary Tape diagram for testing and pulling.

7. Color

The color of the marking shall match Federal Standard 595

- a) 38907 – Yellow
- b) 37925 – White
- c) 37038 – Black

REPORT:

1. Provide comments regarding the ease of application.
2. Record the ambient and pavement surfaces temperatures, and relative humidity and surface moisture (MSMT 729) at the beginning and end of the installation period.
3. Rating of the ease with which materials were removed.
4. Rating of the discernable residue remaining on the pavement after removal of the tape to the nearest whole number.
5. Rating of the loss or movement of the materials.
6. Durability rating to the nearest whole number.
7. Appearance rating to the nearest whole number.
8. Night Visibility Rating to the nearest whole number.
9. Performance rating to the nearest hundredth.
10. Retroreflectance readings for 180 day period.
11. Provide comments on color retention.