BRIGHT

Landscapus Inc

Temporary Raised Pavement Markers (TRPMs)
Technical Data Sheet & Application

TRPMs may be used to simulate solid lines without the use of any other pavement marking material and may be used to supplement other types of pavement markings.

TRPMs shall not be used as an interim pavement marking between October 1 and May 1 because of snowplowing operations.

TRPMs should not substitute for right hand edge line markings unless an engineering study or engineering judgment indicates that the benefits of enhanced delineation of a curve, or other location, would outweigh possible impacts on bicycles using the shoulder. In this case, the spacing of raised pavement markers on the right-hand edge line shall be close enough to avoid misinterpretation as a broken line during wet night conditions.

Simulating a Solid Line and a Broken Line

When TRPMs are used to **simulate** a line the following guideline applies, unless otherwise indicated in the Plan or directed by the Engineer:

Broken Line - place three (3) TRPMs per **10 foot** skip stripe, **5 foot** on center, and **40 foot** gap.

Solid Line

- place TRPMs, **10 foot** on center for tangent sections; place TRPMs, **5 foot** on center for curve sections over six (6) degrees, steep grades, and concrete pavements.

Double Solid Line - place two (2) TRPMs separated by **4 inches** side-by-side using the same spacing required for Solid Lines.

When substituting for wide lines, raised pavement markers may be placed laterally adjacent to each other to simulate the width of the line.

When Supplementing dotted line markings, place one (1) raised pavement marker **12 foot**.

Refer to the details on Page 3 of 3.

Supplementing a Solid Line and a Broken Line

In the following situations, TRPMs do not provide adequate simulation of solid lines and shall only be used to Supplement Solid Lines:

Areas where the markers, even **5 foot** on center, become visually separated. This occurs frequently on low speed urban highways with sharp curves and short transition areas. This also occurs where there are steep grades and dips.

Areas with high ambient lighting which may diminish the retroreflective capabilities of the markers.

When TRPMs are used to **supplement** a line, the following guideline applies, unless otherwise indicated in the Plan or directed by the Engineer:

Broken Line – place three (3) TRPMs per **10 foot**-skip stripe, **5 foot** on center, and **40 foot** gap.

Solid Line - place TRPMs, at spacing no greater than **50 foot**, except when supplementing left edge line markings, a spacing no greater than **25 foot** should be used.

Double Solid Line - place two (2) TRPMs separated by **4 inches** side-by-side, using the same spacing required for Solid Lines.

When substituting for wide lines, raised pavement markers may be placed laterally adjacent to each other to simulate the width of the line.

Dotted line - markings, spacing appropriate for the application should be used.

Types of TRPMs

The TRPMs are classified into four types as follows:

TRPM Type 1 - These markers are acceptable for use on all roadways for short or long term projects. They may be used to supplement or simulate solid or broken lines.

TRPM Type 2 - These markers are acceptable for use on projects with Average Daily Traffic (ADT) of less than 3,000. They may be used to supplement or simulate solid or broken lines.
TRPM Type 3 - These markers are acceptable for use on all roadways for short or long term projects. They may be used to supplement solid or broken lines. These markers are **NOT** acceptable to simulate solid or broken lines. If these markers do not conform to the color requirements herein they shall not be placed directly on the pavement marking line.
TRPM Type 4 - These markers are acceptable for use on chip or sand sealing operations. These markers are designed to be placed prior to the sealing operation with a protective cover that is removed after the seal coat is applied.

Installation, Maintenance and Removal

Installation, maintenance and removal of the TRPMs shall be done on a continuous basis as directed by the Engineer. The Contractor shall remove all containers, wrappers and used or damaged markers, etc. from the job site at the time of installation, during the project, and at the time of removals. All TRPMs shall be new and unused when placed.

Damaged or missing TRPMs shall be replaced by the Contractor within twenty-four (24) hours after notification by the Engineer, at no cost to the Department.

Prior to installing TRPMs, the pavement surface shall be air blown or brushed to remove surface dust and dirt.
The TRPMs shall then be fixed to the pavement surface as per the manufacturer's recommendation.

SPECIFICATIONS for TEMPORARY RAISED PAVEMENT MARKERS (TRPMS)

This specification provides four types of Temporary Raised Pavement Markers (TRPMs) for use in highway work zones.

GENERAL DESCRIPTION
The TRPMs used shall conform to the following specifications:

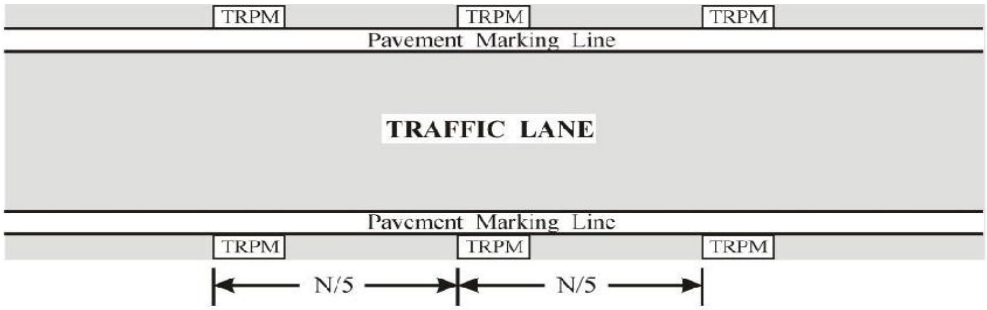
Color Requirements
TRPM TYPE 3 is not required to meet these daytime color requirements. ALL TRPM Types shall appear the same color at night as the pavement markings they simulate or supplement.
All TRPM Types 1, 2, and 4 shall conform to the following requirements:

White TRPMs shall conform to color number 17778 of the Federal Standard Number 5952 for daytime visibility.

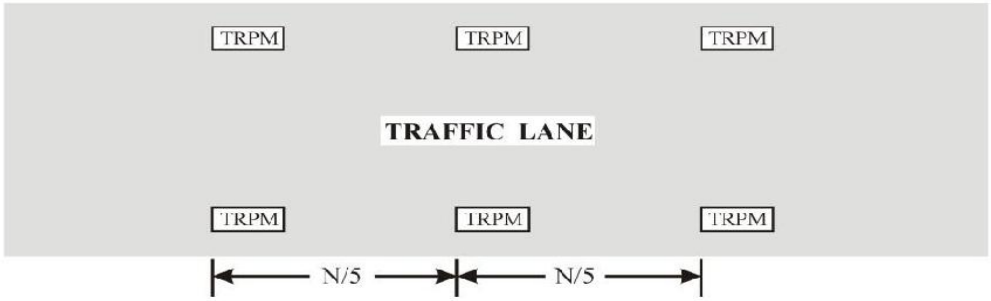
Yellow TRPMs shall conform to the Federal Highway Administration's (FHWA's) Yellow Color Tolerance Chart for daytime visibility.

A document certifying that the markers meet the above color standards shall be included with each shipment.

Number of Retroreflective Surfaces
All white TRPMs shall contain a one way reflector unless otherwise specified. This means that only one face of the marker contains a retroreflective surface. All yellow TRPMs shall contain a two way reflector unless otherwise specified. This means that both faces of the marker shall contain a retroreflective surface. If this is not possible, then two (2) markers installed back-to-back shall be used to provide two way reflectivity when needed as shown in the Plans or directed by the Engineer.



SUPPLEMENTING A SOLID LINE



SIMULATING A SOLID LINE

SUPPLEMENTING A BROKEN LINE

SIMULATING A BROKEN LINE

N = the length of one line segment plus one gap

PLACEMENT AND SPACING OF TEMPORARY RAISED PAVEMENT MARKERS (TRPMs)

LONG TERM

LAYOUT 6J-2

PAVEMENT MARKER TABS (CHIP SEAL MARKERS)

TECHNICAL DATA SHEET (TDS)

1, Types:
Type Y—yellow marker with amber reflective area on one side
Type Y-2—yellow marker with amber reflective area on both sides
Type W—white marker with white or silver reflective area on one side
Type W-2—white marker with white or silver reflective area on both sides

2, Body Size:
2.1 The body of the marker consists of a base and vertical wall made of polyurethane.
2.2 The base is 100mm (4in.) in length and from 25 mm(1 in.) in width.
2.3 A butyl rubber adhesive pad with an easily removed protective covering is affixed to the bottom of the base. The adhesive pad must be approximately 3 mm (1/8 in.) thick, 19 mm (3/4 in.) wide, and 100 mm (4 in.) long.
2.4 The vertical wall is 100mm (4in.) long with a height of 51 mm (2 in.) A reflective material is affixed o the upper portion of the vertical wall ,The reflective material is 8mm (1/3 in.) in width and 100mm in length.
2.5 The reflective material is protected with an easily removable cover of heat resistant PVC capable of withstanding and protecting the reflective material from the application of 204°C (400°F) asphalt.

3, Color:
white or yellow as specified

4,Flexibility and Deformation Resistance:
The vertical wall of the tabs is sufficiently flexible to bend under normal traffic and sufficiently resistant to permanent deformation, to be conducted when air temperature is above 10°C (50°F).

5, PET reflective film, Retro-reflective characteristic (ASTM D 4956-04 Type V):

Min Coefficient Of Retroreflection (Min: cd/lux/㎡)				Specific intensity(Candlepower)	
Observation Angle	Entrance Angle	White	Yellow	White	Yellow
0.2	-4	280	200	3.7	3.1
0.5	-4	230	180		
1.0	-4	120	90		
0.2	30	215	160	2.8	2.0
0.5	30	150	112		
1.0	30	45	34		

Chip Seal Markers Installation Procedures

A) Installation of TRPMs Prior To Bituminous Surface Treatments

TRPMs should be installed no more than 24 hours prior to bituminous surface treatments such as chip seals and slurry seals.

1) Surfaces must be cleaned prior to application. If at all possible, the roadway should be swept before actual placement of TRPMs. Individual placement spots may require further cleaning with the use of brushes, rags or compressed air. All road surfaces must be free of dust, dirt, oil and moisture to insure proper adhesion.

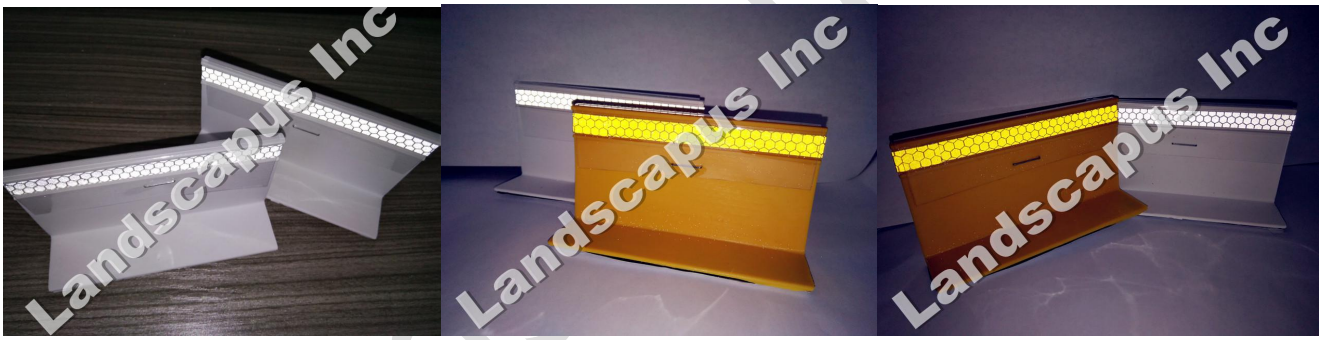
2) TRPMs should be placed under dry conditions and at temperatures above 50°F (10° C). (Atmospheric moisture will inhibit adhesion).

3) Remove release paper from butyl adhesive.

4) Place marker on roadway and apply foot pressure for 5 seconds. (With "1-Way" markers, reflectorized side must face oncoming traffic.)

5) After sealing, remove protective cover to expose upper marker with reflector. The "Happy Hooker" tool may be used for easy cover removal and disposal.

6) Properly dispose of protective cover.



B) Special Conditions

1) On old, oxidized asphalt pavements, use of a pavement primer is recommended prior to installation.

2) Priming is also recommended if air temperatures are expected to dip below 50° F (10°C), or if moist, rainy conditions appear imminent.

3) On high volume roadways or for use on slurry seal projects, "setting" of the markers is highly recommended. Setting is accomplished by driving over the markers with a heavy vehicle at slow speeds. This procedure improves adhesion of the marker to the road and is highly encouraged for optimal adhesion.