



Certification of Patented or Proprietary Product

By signature of this document, the State official is certifying that in accordance with the requirements of 23 CFR 635.411 (a) (2), this patentend or proprietary item is:

- ☐ Essential for synchronization
☒ No equally suitable alternative exists
☐

Duration	Project Specific Information	
<input checked="" type="checkbox"/> Project Specific Certification	Project Title: IH 41 Conv-State Line-Green Bay	
<input type="checkbox"/> Statewide Blanket Certification (5 yrs maximum for blanket)	SCL Dodge Co-IH 43 Signing	
Specify dates of term:	FA Project #:	State Project #: 1133-03-76
From:	Stewardship: <input checked="" type="checkbox"/> Full Oversight	<input type="checkbox"/> State Administered <input type="checkbox"/>
To:	Manufacturer Name and address: 3M, 3M Center, St. Paul, MN 55144-1000	

Description of Item(s)/Work:

Linear Delineation System - 3M Diamond Grade Linear Delineation System Series 340 (4-inch, Series 344) to be installed on the existing inside, northbound concrete barrier wall on USH 41 along the horizontal curve located near North Green Bay Road in Winnebago County.

Justification:

The purpose for the 3M Linear Delineation System is to delineate the existing concrete barrier in accordance with the need identified in the USH 41 conversion study. As part of the USH 41 interstate conversion process the corridor was reviewed for deficiencies and documented in a deficiency report. This review identified a substandard horizontal curve on USH 41 that had an elevated crash rate. A low cost improvement, documented in the deficiency report, to help mitigate the elevated crash rate is to provide barrier delineation. The Linear Delineation System manufactured by 3M is a unique system for providing enhanced delineation/visibility along concrete barriers when compared to traditional delineator reflectors. FHWA's Safety website discusses Oregon DOT's application of the 3M Linear Delineation System stating that results revealed the system provides a good alternative to traditional concrete barrier delineation methods (such as reflective barrier markers). A literature search for similar systems on the internet did not produce other comparable products.

Cost:

Estimated cost for materials and installation is \$9,300.

Supporting/Reference Documentation (drawing sheet numbers, specifications, correspondence, etc.):

The following are attached to this certification:

- Project Title Sheet/Location Map
- Special Provision for the Linear Delineation System
- Construction Details showing Installation on Concrete Barrier and Location
- Manufacturer's Product/Brochure

State DOT Official (signature):

Name and Title:

Alan J. Rommel, PD Chief

Date:

9/9/2013

Note: A copy of the signed Certification must be send to the FHWA Division Office for the project (s) records.

Special Provisions

Table of Contents

Article	Description	Page #
1.	Linear Delineation System, SPV.0060.06.	2

SPECIAL PROVISIONS

1. Linear Delineation System, SPV.0060.06.

A Description

This special provision describes installing linear delineator panels on concrete barrier.

B Materials

Provide Linear Delineation System that are equivalent to the 3M Diamond Grade Linear Delineation System Series 340 (4-inch, Series 344). Provide delineators in either white or fluorescent yellow, as required by the plans.

C Construction

Install Linear Delineation System in the locations detailed in the plans and as specified by the manufacturer.

D Measurement

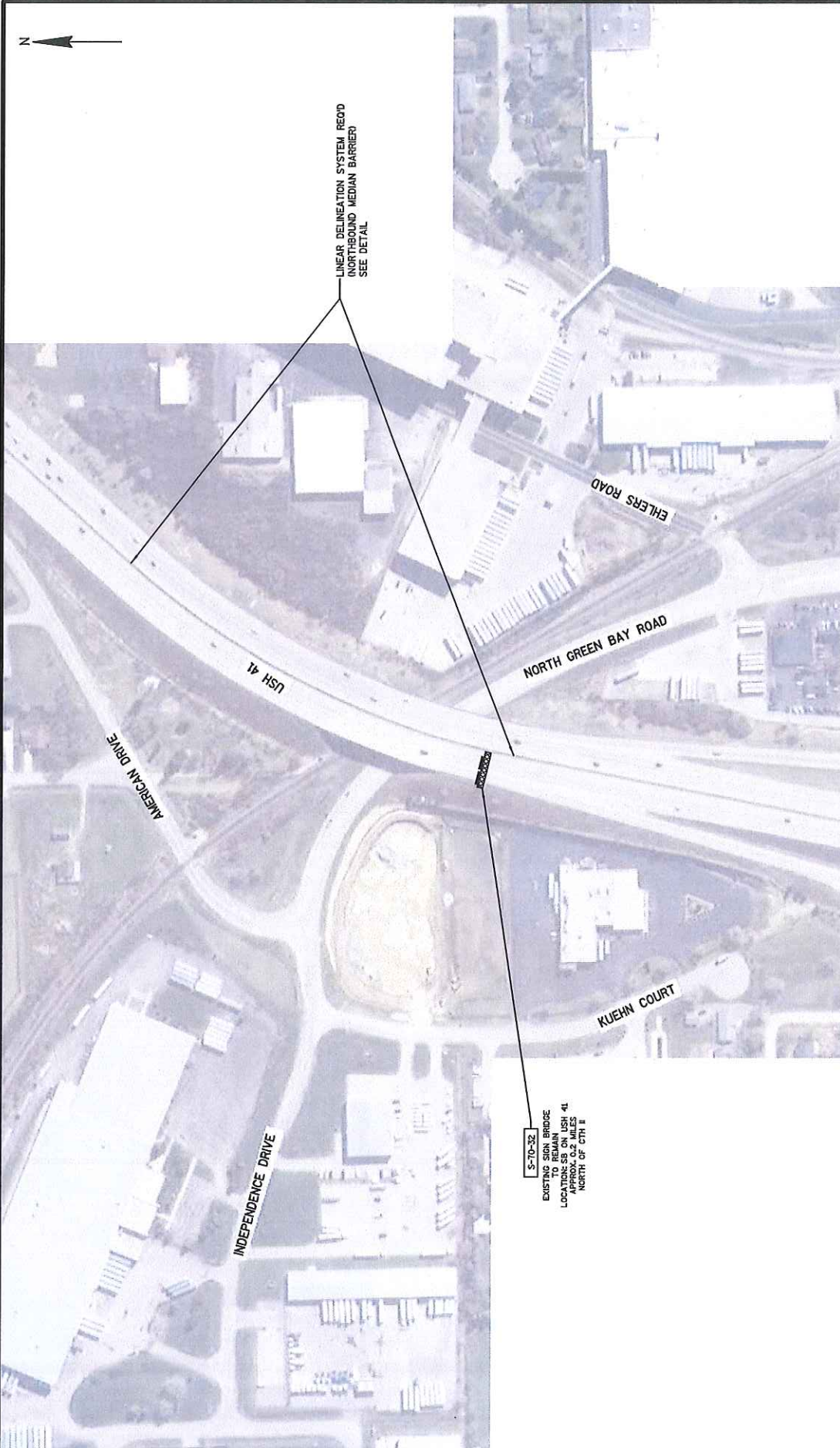
The department will measure Linear Delineation System as each individual linear delineation system acceptably completed.

E Payment

The department will pay for measured quantities at the contract unit price under the following bid item:

ITEM NUMBER	DESCRIPTION	UNIT
SPV.0060.06	Linear Delineation System	Each

Payment is full compensation for providing and placing all materials, including mounting brackets, hardware, adhesives, or other incidental items needed as directed by the manufacturer's installation instructions; and for furnishing all labor, tools, equipment, and incidentals necessary to complete the contract work.



N

LINEAR DELINEATION SYSTEM ROAD
(NORTHBOUND MEDIAN BARRIER)
SEE DETAIL

USH 41

AMERICAN DRIVE

EBLERS ROAD

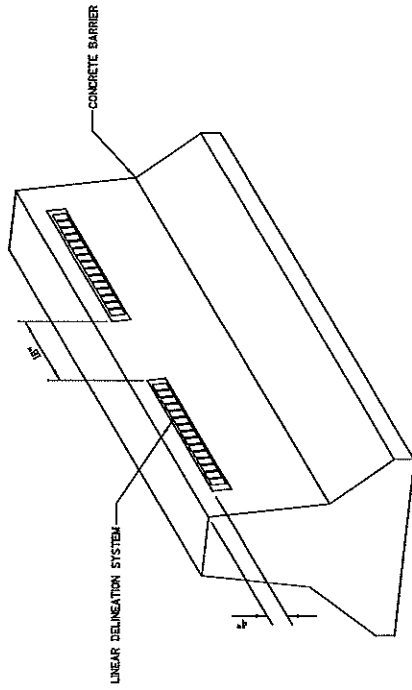
NORTH GREEN BAY ROAD

KUEHN COURT

INDEPENDENCE DRIVE

S-70-32
EXISTING SIGN BRIDGE
LOCATION: 58 ON USH 41
APPROX. 0.2 MILES
NORTH OF CTH B

PROJECT NO: 1133-03-76	HWY: USH 41	COUNTY: WINNEBAGO	CONSTRUCTION DETAILS - LINEAR DELINEATION SYSTEM	SHEET	E
FILE NAME : S:\MAD\1000--1058\1058\132\1058\0376\021002.dgn					
PLOT DATE : 8/20/2013					
PLOT BY : JMB/CPM					
PLOT NAME : 1058					
PLOT SCALE : 1"=100'					
WSDOT/CADD SHEET 42					



LINEAR DELINEATION SYSTEM
FOR CONCRETE BARRIER



Linear Delineation System

Series 340

Product Bulletin 340

April 2011

Description

The 3M™ Linear Delineation System is intended for the linear reflectorization of concrete barriers and metal guardrails. Linear delineation system panels are fabricated from 3M™ Diamond Grade™ Reflective Sheeting, and are laminated onto a thin gauge of aluminum and formed to a unique shape, which provides retroreflection across a very wide range of entrance and observation angles.

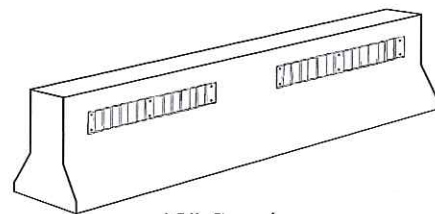
The 1.5-inch linear delineation system panels are designed for use on guardrail and concrete barrier application. These panels include pre-applied 3M™ VHB™ tape on the back side. The panels can easily be installed onto the guardrail in the trough (or "W") groove.

Linear delineation system panels can be used in a variety of applications including bridge abutments, concrete or metal pillars and posts and utility boxes. 3M recommends testing surface for proper adhesion. See Technical Bulletin, Surface Preparation for 3M™ VHB™ Tape Applications.

All panels have a standard length of 34 inches (36 inches is the actual length of the panel prior to formation).

Color	Available Sizes
White	1.5, 4, 6 inch
Fluorescent Yellow	1.5, 4, 6 inch
Fluorescent Orange	4, 6 inch
Red	4, 6 inch

Linear delineation system panels will provide continuous linear delineation by installing the panels edge to edge. If linear delineation system panels are spaced for day or night contrast, 3M recommends a spacing of 18 inches between each panel, especially into and around a curve, such as a cloverleaf entrance. If linear delineation system panels are spaced on a barrier or guardrail, running parallel with traffic, space should be at a maximum of 36 inches between panels. For example, on a typical 10-foot concrete barrier, two linear delineation system panels are recommended at a spacing of 18 inches (see Figure 2).



18" Spacing

FIGURE 2

Average Installation Time Using VHB™ Tape Method

Concrete Installation

4 Person Crew = 120 Panels/hour

2 Person Crew = 60 Panels/hour

Guardrail Installation

2 Person Crew = .50/hour

Installation Procedures

Product Installation Requirements

Note: It is the responsibility of the installer to contact a 3M sales representative or 3M technical service representative whenever there is a question regarding application procedures or substrate conditions (1-800-553-1380).

Concrete Barriers

To assure a straight level application, snapping a chalk-line is recommended. (see Figure 3).

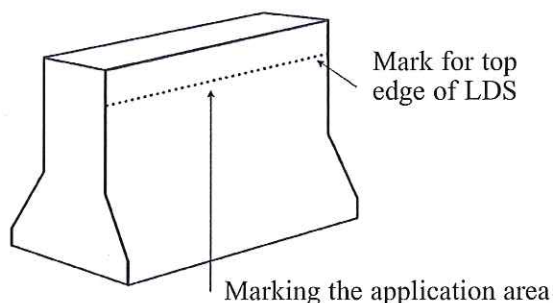


FIGURE 3

To avoid dirt, snow, salt and road grime, installing the linear delineation system panel near the top of the barrier is recommended. (see Figure 4).

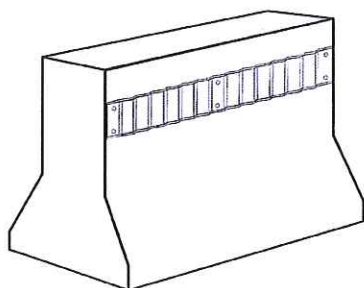


FIGURE 4

Using a black marking pen, mark where the panels will be mounted on the barrier (see Figure 5).

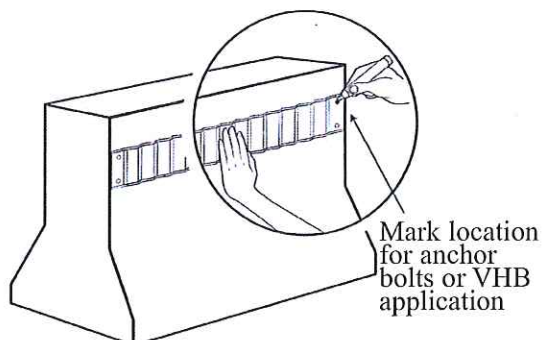


FIGURE 5

Application Instructions on Concrete

3M™ VHB™ Tape Method

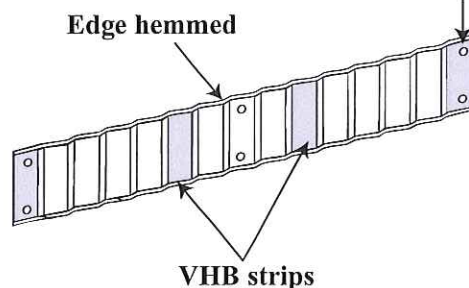
VHB Acrylic Foam Tape 5962 is a double-coated (1.55mm) pressure sensitive adhesive tape for bonding a wide range of substrates, including concrete. 3M™ Spray 90 Adhesive must be used to unify the surface and improve the tape bond.

Note: Spray 90 must dry or cure for 15 minutes (tacky to finger touch) before VHB application

Application to concrete surface that has excessive grime, oil, grease or loose paint is not recommended. Ensure surface is clean, dry and free from dust, oil or grease before application of linear delineation system panels.

- Application temp: 50°F (10°C) and rising
- Remove surface dirt with wire brush from concrete surface
- *High velocity air must be used to remove any loose particles or dust*
- Pre-cut strips of VHB tape can be used to apply panels to concrete substrate. Both 6 and 4 inch strips are available and can be purchased from 3M.
- Apply 3M™ Spray 90 or other recommended adhesive primer to surface where VHB tape will be applied
- Remove backing from VHB tape and press linear delineation system panels firmly into place (avoid pressing in raised surface of panel). ***Roller or adequate hand pressure must be applied to the linear delineation system panel at the VHB surface point.***

Pre-punched holes



Anchor Bolt Method

Once the barriers are marked for location, drill holes with a rotary hammer drill with a concrete drill bit. The linear delineation system panels are predrilled and can be used as individual drilling jig fixtures for concrete application (see Figure 6).

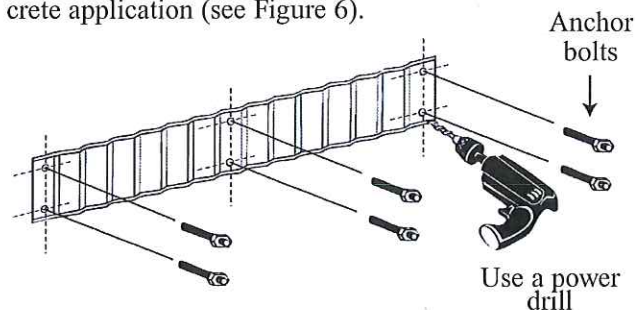


FIGURE 6

After drilling, hammer in 1/4" x 1" stainless steel anchors (such as Hilti Stainless Steel Metal Hit Anchor 304 (Model #230520/9). Be sure to use a 5/16" nylon washer with each anchor, other than the Hilti anchor mentioned above. The Hilti anchors are removable, if necessary.

Note: It is helpful to use an adhesive caulking system (similar to the 3M™ Windo-Weld™ Super Fast Urethane mentioned in the guardrail section) to aid in the alignment of the panels to the chalk line, prior to drilling through the pre-drilled linear delineation system holes. The Windo-Weld Urethane will adhere fast at temperatures ranging from 60°F to 100°F. The Windo-Weld Urethane can only be used with linear delineation system panels on concrete in conjunction with the Hilti anchoring system.

Note: Other anchor systems, including drilling (mechanical fasteners) or concrete epoxy systems, can be used to attach linear delineation system panels to concrete. The end user is responsible to test durability and strength of the anchor or epoxy.

Application Instructions on Standard Galvanized Metal Guardrails

Application of 1.5-inch panels

Panel Width - The 1.5-inch wide linear delineation system panels will fit your guardrail properly.

Panel Positioning - Check on spacing recommendations. Mark the area on the guardrail where the linear delineation system panels will be installed. Spacing distances may vary depending upon configuration and construction of the guardrail (see Figure 7). Where possible avoid application over bolt heads and seams to ensure best possible adhesion to guardrail surface.

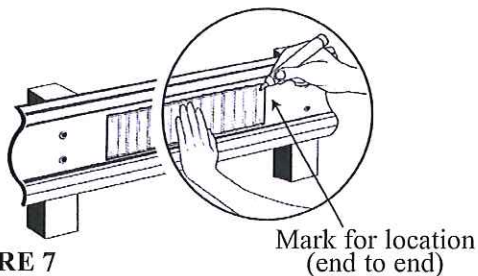


FIGURE 7

Surface Preparation and Cleaning - With the guardrail properly marked for installation, use a wire brush to clean surface dirt from application area (see Figure 8). Lightly clean guardrail with rubbing alcohol or isopropyl alcohol. Allow alcohol to dry before application.

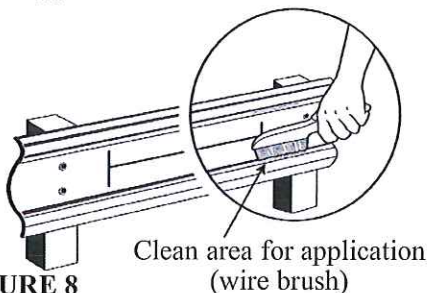


FIGURE 8

Once guardrail is clean and dry, apply panels with VHB™ tape by removing the liner from tape and pressing panel firmly to guardrail. Avoid pressing in raised area of panel.

Application with Brackets

Bracket Size - Two styles of brackets are available and can be purchased from 3M.

The brackets must be matched to fit the exact 4-inch or 6-inch wide linear delineation system panels. The brackets are packaged 150 each to a carton and labeled LDS-4B for 4-inch brackets and LDS-6B for 6-inch brackets. End user must use three brackets per panel on either 4-inch or 6-inch LDS styles (see Figure 9).

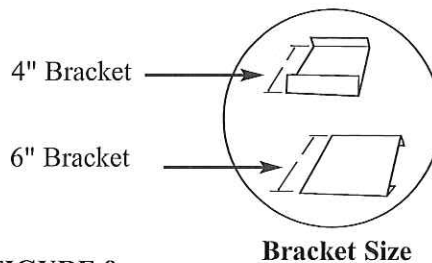
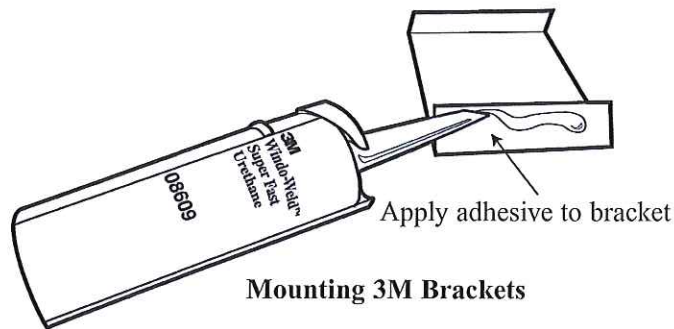


FIGURE 9

Linear delineation system Panel and Bracket Mounting

- For mounting the 3M brackets to the guardrail and the linear delineation system panels to the brackets, 3M recommends the use of 3M™ Windo-Weld™ Super Fast Urethane (#08609).* This product is stocked at most local general Automotive Supply Stores. The product is available in a standard caulking tube and should be applied to the brackets and panels with a construction style caulking gun. The Windo-Weld urethane must be applied at 60F + in dry weather conditions. One tube of Windo-Weld caulk will adhere 10 linear delineation system panels and 30 linear delineation system brackets of either 4-inch or 6-inch styles (see Figure 10).



Mounting 3M Brackets

FIGURE 10

Note: Guardrails should be dry, without rain in the forecast for at least 8 hours after the Windo-Weld caulk is applied for the linear delineation system installation.

*Other epoxy and adhesive systems can be used to mount brackets and linear delineation system panels to the guardrails, but the end user is responsible to test the durability and strength of the epoxy type system they use.

Finished panels can provide continuous linear delineation by installing panels edge to edge (as shown in Figure 11) or if desired, may be spaced at an 18-inch distance apart along the guardrail.

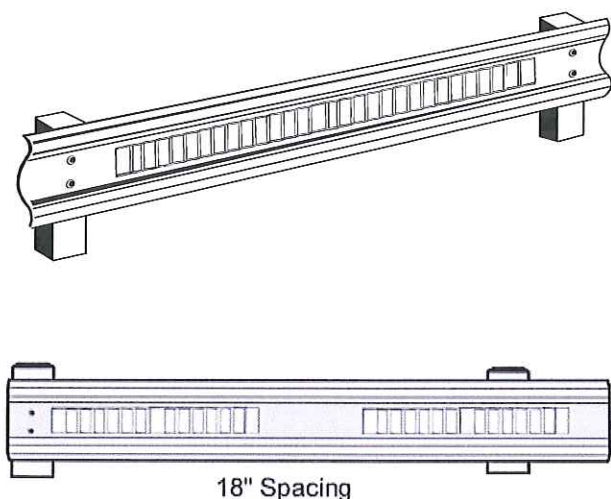


FIGURE 11

Note: For linear delineation system mechanical guardrail mounting brackets please call WSIH/Irwin-Hodson Company at 1-877-641-3021.

Health and Safety Information

Read all health hazard, precautionary and first aid statements found in the Material Safety Data Sheets (MSDS) and/or product label of chemicals prior to handling and use. Also refer to the MSDS for information about the volatile organic compound (VOC) content of chemical products. Consult local regulations on product VOC content and/or emissions. This product is manufactured without the use of heavy metals, lead chromate pigments or other similar lead containing chemicals. Electronically, visit us at www.3M.com/us and select MSDS search.

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3M's liability under this warranty is limited to replacement or allowance as stated herein, and 3M assumes no liability for incidental or consequential damages such as lost profits, business or revenue in any way related to the product regardless of the legal theory on which the claim is based.

Literature Reference

3M™ VHB™ Acrylic Foam Tape 5962 Product Data Sheet
Surface Preparation for 3M™ VHB™ Tape Applications.

FOR INFORMATION OR ASSISTANCE

CALL:

1-800-553-1380

IN CANADA CALL:

1-800-265-1840

Internet:

www.3M.com/tss

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