Stamark™ High Performance Tape
Series 380I ES

Product Bulletin 380I ES **November 2008**

Replaces 380I ES dated October 2006

Description

3M™ Stamark™ High Performance Tape Series 380I ES can be used as an inlay marking on new asphalt or as an overlay marking on asphalt and concrete pavement surfaces in good condition.

Series 380I ES tape offers "Extended Season" applications due to an improved pressure sensitive adhesive (PSA) package on the bottom surface. Series 380I ES does not require 3M™ Stamark™ Surface Preparation Adhesive P-50 prior to application, if applied during the application season as outlined in the 3M Climate Guide for 3M™ Stamark™ Pavement Marking Tapes.

Series A380I ES: Used for long lines, edge lines, channelizing lines, gore markings, stop bars and crosswalks.

Series L380I ES: Lined. Used to cut symbols and legends.

Series SMS-L380I ES: Lined. Precut symbols and legends.

Properties

A. Product Features

- Durable, conformable to pavement and retroreflective
- Embedded net provides increased tear resistance
- Pressure sensitive adhesive (PSA) on bottom surface
- No surface preparation adhesive required when applied within standard tape application season as defined by the 3M Climate Guide
- Series 380I ES tape can be applied early and late season, down to 40˚F (4ºC) with use of 3M™ Stamark™ Surface Preparation Adhesive P-50
- Long-term reflectivity design
- Abrasion-resistant microcrystalline ceramic beads bonded in a highly durable polyurethane topcoat
- Yellow microcrystalline ceramic beads incorporated in Series 381I ES tape to improve nighttime yellow color
- Manufactured without the use of heavy metals, lead chromate pigments or other similar, lead-containing chemicals
- Patterned design presents a near vertical surface to traffic to maximize retroreflectance
- Nominal thickness of 0.065 in. (1.6 mm) at pattern heights
- White: 380I ES
- Yellow: 381I ES

B. Reflectance

Series 380I ES tape has the following initial minimum retroreflectance values when measured in accordance with ASTM-D4061. The photometric quality to be measured is coefficient of retroreflected luminance (R_L) and shall be expressed as:

English R_L: millicandelas per square foot per footcandle [(mcd • ft^{-2}) • fc^{-1}] or equivalently as:

Metric R_L: millicandelas per square meter per lux [(mcd • m^{-2}) • lx^{-1}]

	White	Yellow
Entrance Angle	88.76˚	88.76˚
Observation Angle	1.05˚	1.05˚
Retroreflected Luminance*	500	300

R_L [(mcd • ft^{-2}) • fc^{-1}]

*The quantity of retroreflected luminance (R_L) "relates to the way the effective retroreflective surface is focused on the retina of the human eye and to the visual effect thereby produced. It is recommended for describing the performance of highway signs and striping, or large vehicular markings which are commonly viewed as discernible surface areas." Federal Test Method Standard 370, 3.1.2, Note 6, March 1, 1977.

C. Color
The preformed markings consist of white or yellow films with pigments selected and blended to conform to standard highway colors.

D. Skid Resistance
The patterned surface of the retroreflective pliant polymer shall provide an initial average skid resistance value of 45 BPN when tested according to ASTM E 303 except values will be taken in one direction and at 45˚ angle from that direction. These two values will then be averaged to find the skid resistance of the patterned surface.

E. Application
All applications should be installed using the instructions in the appropriate section of 3M Information Folder 380I ES. Surface Preparation Adhesive is not needed when applying the tape during the application season outlined in the 3M Climate Guide for 3M™ Stamark™ Pavement Marking Tapes. The tape can be applied down to 40˚F ambient temperature outside the dates outlined in the Climate Guide for Stamark pavement marking tapes with the use of 3M™ Stamark™ Surface Preparation Adhesive P-50. For long line applications, the P-50 Surface Preparation Adhesive should be applied with a 3M™ Adhesive Spray Applicator PS-14. For transverse markings, the Surface Preparation Adhesive should be applied using a 3/8" nap paint roller.

F. Patchability
Heavy traffic and snow plowing may cause wear and damage. New materials can be installed in these areas with minimal surface preparation by following the manufacturer's recommendations. Remove the damaged material and replace the damaged area by following the instructions in "Overlay Applications" of 3M Information Folder 380I ES.

General Performance Considerations

Stamark pavement marking tapes are weather resistant and provide excellent reflectivity and color retention. Experience has shown that these materials are highly effective traffic control devices and will show no appreciable fading, lifting, shrinkage or chipping when applied according to 3M's recommendations contained in product literature.

The durability of Stamark pavement markings will depend on traffic conditions, snow removal practices, application techniques used, and pavement and atmospheric conditions at the time of application. It is recommended that the customer thoroughly evaluate Stamark tapes under the conditions in the specified location before making large-scale applications.

Warranty

3M warrants that 3M™ Stamark™ High Performance Tape Series 380I ES sold by 3M for longitudinal and symbol and legend pavement marking applications in the United States and Canada will remain effective for its intended use under normal traffic conditions and meet the minimum retained coefficient of retroreflection value of 100 millicandelas per foot squared per foot-candle (measured at 1.05° observation and 88.76° entrance angles) subject to the following provisions:

Table 1

Application*	Warranty Period
Longitudinal markings	4 years
Symbols and legends	2 years

*Applications in mountainous, heavy snowfall areas above 5,000 ft. (1,500m) are not covered by this warranty.

3M also warrants that 3M™ Stamark™ High Performance Tape Series 380I ES sold by 3M for transverse (stopbars and crosswalks) and channelizing marking applications in the United States and Canada will maintain road presence subject to the following provisions:

Table 2

	WARRANTY PERIOD	
	Snow Removal Areas Road presence and non wear-through	Non-Snow Removal Areas Road presence and non wear-through
APPLICATION		
CHANNELIZING MARKINGS		
New Asphalt Inlay	2 years	2 years
Asphalt Grooved/Recessed	2 years	2 years
Asphalt Overlay	1 year	2 years
New Concrete Overlay	1 year	2 years
Concrete Grooved/Recessed	2 years	2 years
STOP BARS, CROSSWALKS WITH ADT/LANE OF 6,000 OR LESS		
New Asphalt Inlay	1 year	2 years
Asphalt Grooved/Recessed	1 year	2 years
Asphalt Overlay	—	1 year
New Concrete Overlay	—	1 year
Concrete Grooved/Recessed	1 year	2 years

If Series 380I ES tape is applied in accordance with all 3M application procedures provided in 3M's product bulletins, information folders and technical memos; and fails to retain the minimum reflectance value (for longitudinal and symbol and legend markings) or fails to adhere to the roadway or fails due to complete wear-through (for transverse and channelizing markings) during the warranty period shown in Table 2 (from the date of installation), 3M's sole responsibility and purchaser's and user's exclusive remedy shall be:

3M will provide the replacement materials that will restore the pavement marking retroreflectivity values to warranty levels or greater.

Conditions

Such failure must be solely the result of design or manufacturing defects in the Stamark high performance tape and not of outside causes such as improper installation or substrate failure. Failure to follow recommended application procedures will void this warranty.

Damage to pavement markings caused by snow removal equipment is not covered under this warranty.

A visual night inspection must be made with a 3M representative and a customer representative present to identify areas of the installation which appear to be below the minimum retained reflectance values specified in Table 1. Areas which appear to be below the minimum retained reflectance value shall be identified as "zones of measurement." To qualify for material replacement, a "zone" must be at least 360 feet in road length and consist of either edge lines, center lines or lane lines, but not in combination, or a single word or symbol marking.

3M reserves the right to determine the type of replacement marking and method of installation.

Replacement markings will carry the unexpired warranty of the marking it replaces.

Claims made under this warranty will be honored only if the customer has maintained an accurate record of the dates of material installation, which constitutes the start of the warranty period.

Claims under this warranty will be honored only if 3M is notified of a failure within a reasonable time, reasonable information requested by 3M is provided, and 3M is permitted to verify the cause of the failure.

Limitation of Liability

3M's liability under this warranty is limited to replacement as stated herein, and 3M assumes no liability for any incidental or consequential damages, such as lost profits, business or revenues in any way related to the product regardless of the legal theory on which the claim is based. THIS WARRANTY IS MADE IN LIEU OF ALL OTHER WARRANTIES, EXPRESS OR IMPLIED, INCLUDING BUT NOT LIMITED TO THE IMPLIED WARRANTIES OF MECHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE, AND ANY IMPLIED WARRANTY ARISING OUT OF A COURSE OF DEALING OR OF PERFORMANCE, CUSTOM OR USAGE OF TRADE.

Reflectance Measurement Procedures for Warranty

Step 1: A visual night inspection must be made with a 3M representative and a customer representative present to identify areas of installation which appear to be below the specified minimum retained reflectance values in the Table 1.

Areas which appear to be below the minimum retained reflectance value shall be identified as zones of measurement. To qualify for materials replacement, a zone must be at least 360 feet (108 meters) in road length and shall consist of either edge lines, center lines or lane lines, but not in combination.

Step 2: Within each zone, reflectance measurements must be taken at specified checkpoint areas.

a. Zones Measuring 360 Feet (108 m) to 1,080 Feet (324 m) in Length

No separate checkpoints are required. For continuous lines, reflectance measurements must be made at approximately 20 ft. (6 m) intervals throughout the zone. For skip lines, two measurements must be taken at two random locations on each skip.

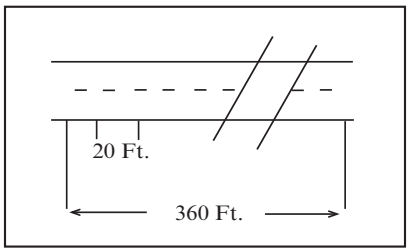

Figure 1

b. Zones Measuring 1,080 Feet (324 m) to 6 Miles (9.6 km) in Road Length

A total of 18 measurements must be made at each of three checkpoints within the zone, including the start point, the mid point and the end point. For continuous lines, reflectance measurements must be made at 20-foot (6 m) intervals throughout each checkpoint. For skip lines, two measurements must be taken at two random locations on each skip.

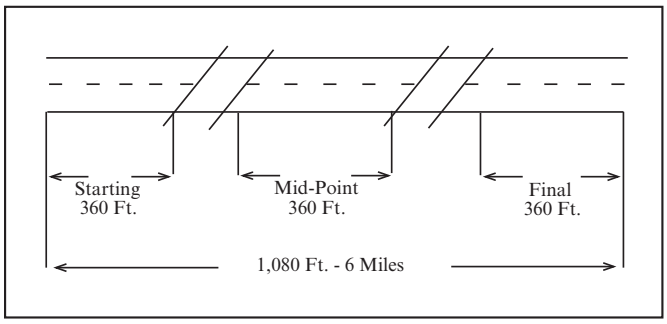

Figure 2: Measure every 20 ft. on continuous lines or 2 measurements per skip for each checkpoint.

c. Zone Greater than 6 Miles in Road Length

A total of 18 measurements must be made in each checkpoint within the zone, including the start point, the end point and at approximately 3-mile (4.8 kilometers) intervals throughout the zone. For measurement intervals on continuous lines, center lines or lane line skips, refer to Section b above.

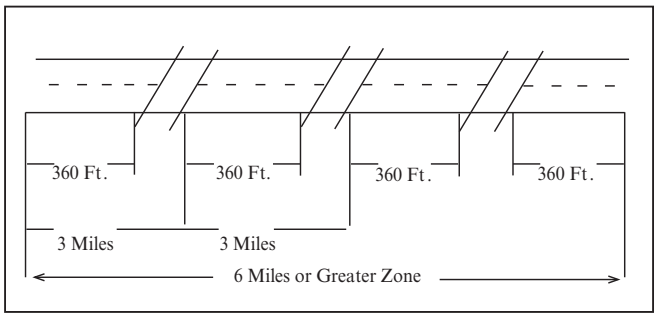

Figure 3: Measure every 20 ft. on continuous lines or 2 measurements per skip for each checkpoint.

Step 3: All reflectance measurements made at the checkpoints shall be made on a clean, dry surface at a minimum temperature of 40˚ F (4˚ C). The test instrument shall use an Entrance Angle of 88.76˚ and an Observation Angle 1.05˚ which represent a simulated driver viewing geometry at a 30 meter distance.

Step 4: All reflectance measurements within the zone must be averaged to determine if the minimum retained reflectance values have been met.

Materials Replacement Condition

Markings must be applied according to the instructions in 3M Information Folder 380I ES to qualify for any applicable materials replacement provisions.

Storage

Store in a cool, dry area indoors. Use within one year of receipt.

Health and Safety Information

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. Also refer to the MSDS for information about the volatile organic compound (VOC) content of chemical products. Consult local regulations and authorities for possible restrictions on product VOC content and/or VOC emissions. Electronically, visit us at www.3M.com/us and select MSDS search.

Literature Reference

For additional information on Stamark tapes, application instructions or application equipment, refer to the following publications:

IF 380I ES	Application Guidelines for 3M™ Stamark™ High Performance Tape Series 380I ES
IF 5.2	Information Folder for 3M Highway Tape Applicator - HTA
IF 5.7	Pavement Surface Preparation and Application Procedures for Stamark Pavement Marking Tapes
IF 5.8	Application of 3M Stamark Precut Symbols and Legends

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