

Transportation Safety Division

3M™ Stamark™ High Performance All Weather Contrast Marking Tape Series 380AW-5

Product Bulletin Series 380AW-5
June 2020

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1 Description

3M™ Stamark™ High Performance All Weather Contrast Marking Tape Series 380AW-5 (“Tape”) is a durable pavement contrast marking tape that is highly retroreflective under both wet and dry conditions. The Tape utilizes specially designed optics to provide wet and dry performance and incorporates a matte black film border, bonded to the edges of the central retroreflective film to provide contrast. The Tape can be used as an inlay marking on new asphalt or as an overlay marking on most asphalt and concrete pavement surfaces in good condition.

1.1 Product Features

- o High retroreflective performance, when wet or dry
- o Durable, conformable, and retroreflective
- o 1.5" wide matte black preformed patterned film border on both sides of white or yellow film
- o New product design that provides long-term reflectivity
- o Abrasion-resistant microcrystalline ceramic beads bonded in a highly durable polyurethane topcoat
- o Manufactured with no (intentional) use of heavy metals, lead chromate pigments or other similar, lead-containing chemicals
- o Improved patterned surface that presents a near vertical surface to traffic to maximize retroreflectance
- o Precoated with an extended season pressure sensitive adhesive (PSA) on bottom surface
- o Nominal total thickness of 0.120 in. (3.0 mm)
- o White: 380AW-5
- o Yellow microcrystalline ceramic beads incorporated in 381AW-5 tape to improve nighttime yellow color
- o Yellow: 381AW-5

2 Specifications

2.1 Retroreflectivity

Table 1 presents minimum initial coefficient of retroreflected luminance (R_L) values for tape under both wet and dry conditions. Under dry conditions, R_L is measured in accordance with the testing procedures of ASTM E1710. Under wet conditions, R_L is measured in accordance with ASTM E2832 or ASTM E2177 using a portable reflectometer. R_L values are expressed in millicandelas per square foot per footcandle [$(\text{mcd} \bullet \text{ft}^{-2}) \bullet \text{fc}^{-1}$].

Table 1. Minimum wet and dry R_L values for white and yellow Tape.

Condition/Test	White (380AW-5)		Yellow (381AW-5)	
	Dry ASTM E1710	Wet & Rainy ASTM E2832	Dry ASTM E1710	Wet & Rainy ASTM E2832
Entrance Angle ^a	88.76°	88.76°	88.76°	88.76°
Observation Angle ^a	1.05°	1.05°	1.05°	1.05°
Coefficient of Retroreflected Luminance [$\text{mcd}/\text{m}^2/\text{lux}$]	500	250	300	200

a. An Entrance Angle of 88.76° and an Observation Angle of 1.05° are used to simulate the viewing geometry of a driver at a distance of 30 meters.

Note: R_L values for Tape will be higher when measured under ASTM E2177 than when measured under ASTM E2832. Regardless, stated minimum values shall be met using either test method.

Initial wet retroreflectance values must be measured in accordance with ASTM E2832 or ASTM E2177 prior to installation. Wet retroreflectance values measured under a “condition of continuous wetting” (simulated rain) shall be obtained in accordance with ASTM E2832. Wet retroreflectance values measured under a “condition of wetness” (wet recovery) shall be obtained in accordance with ASTM E2177. To reduce measurement variability, tests shall be performed in a controlled laboratory environment, on markings positioned in accordance with ASTM E2832. Since new marking surfaces are hydrophobic, a wetting agent shall be used to improve the wetting of test markings. A good wetting agent is a 0.1% by volume solution of liquid soap. Measurements shall be reported as an average value for each roll tested, and averages shall be calculated from a minimum of three measurements per roll.

2.2 Color

The daytime and nighttime colors of Tape conform to ASTM D6628, the Standard Specification for Color of Pavement Marking Materials.

2.3 Skid Resistance

The patterned, retroreflective, pliant polymer surfaces of Tape shall provide average initial skid resistance values of 45 BPN or more when tested according to ASTM E303, subject to the following modification:

- o Skid resistance is calculated as the average of two measurements taken at an angle of 45° from one another.

2.4 Patchability

Snow removal equipment and heavy traffic may cause wear and damage to Tape. Such damaged areas can be repaired using patches made of Tape. Remove damaged Tape and replace it according to the instructions presented in the “Overlay Applications” section of [3M Information Folder 5.7](#).

3 Application

Install Tape according to the instructions presented in [3M Information Folder 5.7](#).

4 Durability

The Tape is weather resistant and provides excellent retroreflectivity and color retention. The Tape is a highly effective lane marking material and will show no appreciable fading, lifting, shrinkage, or chipping for the duration of the warranty period, when applied according to the 3M requirements described in the 3M product literature.

The Tape’s durability depends on several environmental and traffic conditions, including, but not limited to, snow removal practices, method of application, and pavement and atmospheric conditions at the time of application. It is recommended that the customer thoroughly evaluate Tape under the conditions present at the installation location prior to large-scale implementation.

5 Storage

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

6 Health and Safety Information

Read all health hazard, precautionary, and first aid statements found in the Safety Data Sheets (SDS) and Article Information Sheets for important health, safety, and environmental information. To obtain SDSs and Article Information Sheets for 3M products, go to [3M.com/SDS](#), contact 3M by mail, or for urgent requests call 1-800-364-3577.

7 Warranty Information

7.1 3M Warranty

3M warrants that, under normal traffic conditions, Tape used in pavement marking applications will remain visible and retain a minimum coefficient of retroreflected luminance (R_L) of 100 mcd/m²/lux under dry conditions when measured in accordance with ASTM E1710, and Tape used in long line pavement marking applications will retain a minimum R_L of 50 mcd/m²/lux under wet conditions when measured in accordance with ASTM E2832, for the periods presented in Table 2 (“Warranty Period”), as measured from the date of installation (“Installation Date”), subject to the provisions presented in Table 2 (“3M Warranty”).

Table 2. Warranty periods for Tape applied as longitudinal lines and as symbols and legends.

Application	Warranty Period
Longitudinal Markings	4 years
Symbols and Legends ^a	2 years

- a. Retained R_L performance of Tape is not warranted under wet conditions for symbols and legends.

7.2 3M Warranty Terms and Conditions

- If Tape is installed in grooves, the depths of the grooves shall be between 150 and 200 mils. Grooves shall be made with a large diameter cutting head with gang-stacked diamond cutting blades to produce a flat (smooth) groove surface, following the Stamark pavement marking tape application requirements described in [3M Information Folder 5.18](#).
- Loss of adhesion is not covered by the 3M Warranty when Tape is applied to surfaces that have been finished using anything other than a gang-stacked diamond cutting head.
- Coefficient of retroreflected luminance (R_L) shall be determined at 1.05° observation and 88.76° entrance angles according to ASTM E1710, as per the sampling and testing procedures outlined herein. Equipment used in measurements shall be in good calibrated order, according to the calibration schedule recommended by the equipment manufacturer, at the time of measurement. 3M may use an additional calibrated instrument or request a calibrated referee instrument to validate measurements.
- Tape and other 3M components involved in the 3M Warranty must be stored, applied, installed, processed, and used in accordance with all 3M application procedures found in 3M's product bulletins, information folders, manufacturing manuals, and technical memos (which will be furnished upon request).
- Tape shall be applied with the 3M-required surface preparation adhesive if the installation conditions warrant its use, as per the Stamark pavement marking tape installation instructions in [3M Information Folder 5.7](#).
- A failure to meet the 3M Warranty must be solely the result of design or manufacturing defects and not of (a) outside causes including improper fabrication, improper application, handling, maintenance, or installation; (b) substrate failure, exposure to chemicals, burial, abrasion or other mechanical damage, improper use, vandalism, or malicious mischief; or (c) an act of God.
- 3M reserves the right to determine the type of replacement marking and method of installation.
- Claims made under this warranty will be honored only if (a) the customer has maintained an accurate record of Installation Date, which constitutes the start of the Warranty Period; (b) 3M is notified in writing of a failure within one month of its discovery; (c) reasonable information requested by 3M is provided; and (d) 3M is permitted to verify the cause of the alleged failure.
- Applications in mountainous, heavy snowfall areas above 5,000 ft. (1,500 m) are not covered under the 3M Warranty.
- Damage to pavement markings caused by snow removal equipment is not covered under the 3M warranty.
- Tape must be shown not to meet the 3M Warranty when measured according to the appropriate ASTM test method, using the sampling procedure described below, to qualify for remedy under the 3M Warranty.

7.3 Exclusive Limited Remedy

If Tape is shown not to meet the 3M Warranty, 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 for the unexpired term of the original Warranty Period.

7.4 Sampling and Testing Procedure for Determining Initial and Retained Coefficients of Retroreflected Luminance for 3M Warranty Purposes

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.

Areas which appear to be below the minimum retained reflectance value shall be identified as potential zones of replacement ("Zone of Replacement"). To qualify for 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 measurement sections. The measurement procedure varies based on the total length of the Zone of Replacement, as described below.

a Zone of Replacement Measuring 360 Feet (108 m) to 1,080 Feet (324 m) in Length

For continuous lines, reflectance measurements must be made at approximately 20 ft. (6 m) intervals throughout the Zone of Replacement. For skip lines, two measurements must be taken at two random locations on each skip throughout the Zone of Replacement.

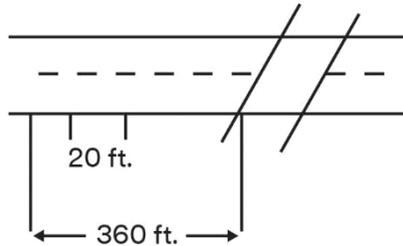


Figure 1. Measure every 20 ft. on continuous lines or 2 measurements per skip for each measurement section.

b Zone of Replacement Measuring 1,080 Feet (324 m) to 6 Miles (9.6 km) in Road Length

A minimum of three measurement sections must be specified within the Zone of Replacement. Each measurement section must be at least 360 ft. in road length. The start point, the midpoint, and the end point of the Zone of Replacement must be included in respective measurement sections as shown in Figure 2. A minimum of 18 measurements must be made at each of three measurement sections within the Zone of Replacement. For continuous lines, reflectance measurements must be made at 20 ft. (6 m) intervals throughout each measurement section. For skip lines, two measurements must be taken at two random locations on each skip in the measurement sections.

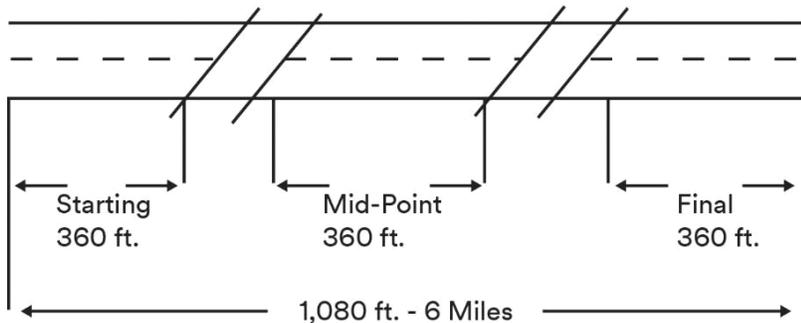


Figure 2. Measure every 20 ft. on continuous lines or 2 measurements per skip for each measurement section.

c Zone of Replacement Greater than 6 Miles in Road Length

A minimum of 18 measurements must be made in each measurement section within the Zone of Replacement. The start point and the end point must be a part of a measurement section. Each 3-mile (4.8 kilometers) interval throughout the Zone of Replacement must include at least one measurement section. For continuous lines, reflectance measurements must be made at 20 ft. (6 m) intervals throughout each measurement section. For skip lines, two measurements must be taken at two random locations on each skip in the measurement sections.

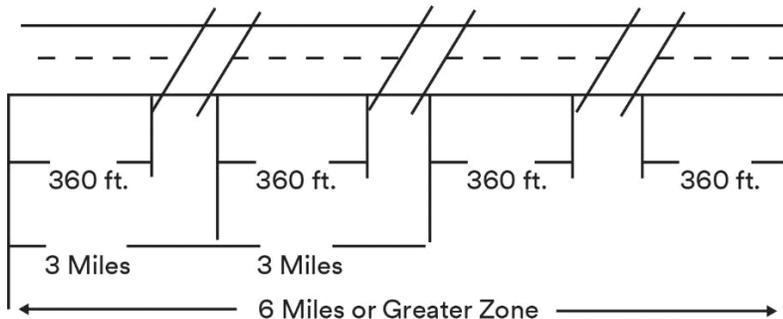


Figure 3. Measure every 20 ft. on continuous lines or 2 measurements per skip for each measurement section.

Step 3: All reflectance measurements made at checkpoints shall be made on clean, dry surfaces with 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 of Replacement must be averaged to determine if the minimum retained retroreflectance values have been met.

7.5 Materials Replacement Condition

Tape must be applied according to the Stamark pavement marking tape installation instructions in [3M Information Folder 5.7](#) to qualify for any applicable materials replacement provisions.

7.6 Disclaimer

THE 3M WARRANTY IS MADE IN LIEU OF ALL OTHER WARRANTIES OR CONDITIONS, EXPRESS OR IMPLIED, INCLUDING BUT NOT LIMITED TO ANY IMPLIED WARRANTY OR CONDITION OF MERCHANTABILITY, OR FITNESS FOR A PARTICULAR PURPOSE, OR ANY IMPLIED WARRANTY ARISING OUT OF A COURSE OF DEALING OR OF PERFORMANCE, CUSTOM, OR USAGE OF TRADE.

7.7 Limitation of Liability

Except for the limited remedy stated above, and except where prohibited by law, 3M will not be liable for any loss or damage arising from the Tape or any 3M product, whether direct, indirect, special, incidental, or consequential damages (including but not limited to lost profits, business, or revenue in any way), regardless of the legal theory asserted including warranty, contract, negligence, or strict liability.

8 Other Product Information

Always confirm that you have the most current version of the applicable product bulletin, information folder, or other product information from 3M's Website at <http://www.3M.com/roadsafety>.

9 Literature References

- [3M IF 5.2](#) Highway Tape Applicator (HTA)
- [3M IF 5.7](#) 3M™ Stamark™ Tapes Pavement Surface Preparation and Application Techniques
- [3M IF 5.18](#) Application Guidelines for Pavement Markings in Grooved Pavement Surfaces
- [3M™ Stamark™ Pavement Markings Tapes Climate Guide](#)

ASTM Test Methods are available from ASTM International, West Conshohocken, PA.

For Information or Assistance

Call: 1-800-553-1380

In Canada Call:

1-800-3M HELPS (1-800-364-3577)

Internet:

<http://www.3M.com/roadsafety>

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