

Commercial Branding and Transportation Division

3M™ Stamark™ Wet Retroreflective Removable Tape Series 710IR

Product Bulletin Series 710IR
September 2023

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1 Description

3M™ Stamark™ Wet Retroreflective Removable Tape Series 710IR (“Tape”) is highly retroreflective under both wet and dry conditions. The Tape is a conformable marking tape designed for longitudinal line applications in highway work zones where removability is required. The Tape has been designed to perform for the duration of the normal construction season. A normal construction season is defined as the time after the last snow plowing in the spring and before the first snow plowing in the fall/winter, but no longer than one year. The Tape is a temporary removable product and not for multi-year applications.

Under most conditions, once Tape pavement markings are no longer required, Tape can be removed manually or by temporary tape removal machines largely intact or in large pieces, saving additional time, labor, and materials normally required to re-mark roadways.

Note: Any Tape installations that have been subjected to high traffic flows (ADT > 10 000), installed on marginal pavement surfaces, left on pavement for long periods (more than 6 months), or are being removed at low temperatures are more difficult to remove. The Tape is most easily removed after short periods of use, at temperatures above 50 °F (10 °C), and from smooth pavement surfaces that have been subject to moderate traffic flows.

Tape is available in the following colors.

Table 1. Product codes by color.

Color	Product Code
White	710IR
Yellow	711IR

2 Tape Features and Advantages

- Highly retroreflective, under both wet and dry conditions.
- Durable for the duration of a normal work zone season, as defined above.
- Skid resistant.
- Coated with pressure sensitive adhesive.
- Available in white and yellow.
- Provides continuous delineation, day or night.
- Easy to apply and remove by hand or by machine.
- Easy to remove largely intact or in large pieces under most conditions.
- Leaves no permanent marks.
- Roadway may be opened to traffic immediately following application.
- Increased tear resistance compared to traditional 3M removable pavement marking tapes.
- Faster removal speeds compared to traditional 3M removable pavement marking tapes.

3 Specifications

3.1 Retroreflectivity

The photometric quality to be measured is coefficient of retroreflected luminance (R_L). Dry values shall be obtained in accordance with the testing procedures of ASTM E1710. Wet and rainy values shall be obtained in accordance with testing procedures of ASTM E2832 and ASTM E2177.

To reduce variability between measurements, ASTM E2832 tests shall be performed in a controlled laboratory environment with Tape positioned on a 3–5° lateral slope. Use a wetting agent to improve wetting of Tape by water. A 0.1% by volume aqueous liquid soap solution is the recommended wetting agent. Take measurements at a minimum of three locations per roll and report average value for each roll tested.

Wet retroreflectance values obtained under simulated conditions shall be measured in accordance with the ASTM E2177 testing procedure. The test may be performed on Tape installed on the road or in a laboratory. New markings shall be tested using a wetting agent, as previously described. Perform laboratory measurements on Tape positioned on a 3–5° lateral slope. Take measurements at a minimum of three locations per roll and report average value for each roll tested.

Tables 2 and 3 present initial minimum R_L values under wet and dry conditions for white and yellow Tape, respectively.

Table 2. Minimum retroreflectivity values for white Tape.

White, 710IR	Dry	Wet & Rainy
Entrance Angle	88.76°	88.76°
Observation Angle	1.05°	1.05°
Retroreflected Luminance, R_L [(mcd • m ⁻²) • lx ⁻¹]	500	250

Table 3. Minimum retroreflectivity values for yellow Tape.

Yellow, 711IR	Dry	Wet & Rainy
Entrance Angle	88.76°	88.76°
Observation Angle	1.05°	1.05°
Retroreflected Luminance, R_L [(mcd • m ⁻²) • lx ⁻¹]	300	200

Note: Wet R_L values are higher when measured using the ASTM E2177 procedure than when measured using the ASTM E2832 procedure. Regardless, Tape shall meet stated minimum values using either test method.

English R_L : Millicandelas per square foot per foot-candle [(mcd • ft⁻²) • fc⁻¹]

Metric R_L : Millicandelas per square meter per lux [(mcd • m⁻²) • lx⁻¹]

Note: The entrance angle of 88.76° and observation angle of 1.05° represent a simulated driver viewing geometry at a 30 meter distance.

3.2 Strength

The Tape offers improved removability compared to traditional 3M removable pavement marking tapes, due to its combination of adhesive and tensile strength properties, presented in Table 4. This combination of adhesive and tensile strengths provide greater tear resistance and enable significantly faster removal speeds compared to traditional 3M removable pavement marking tapes.

Table 4. Minimum peel adhesion and tensile strength

Property	Minimum Value	Test Method	Substrate	Sample Geometry	Strain Rate
Peel adhesion	10 lb/in	ASTM D3330, Method F	Stainless steel	N/A	12 in/min
Tensile strength	1300 PSI	ASTM D638	N/A	Type 1	12 in/min

3.3 Skid Resistance

The Tape's surface provides a minimum initial average skid resistance value of 45 BPN when tested in accordance with ASTM E303.

4 Application

The Tape should only be installed to surfaces conforming to the [3M Road Surface Guide](#) and according to the instructions presented in this product bulletin and the appropriate sections of [3M Information Folder 3.2](#). Areas that have been newly marked with Tape can be opened to traffic immediately following Tape application.

4.1 General Application Conditions:

- o Air and pavement temperature minimums are both 50 °F (10 °C) and rising.
- o Pavement surface must be clean and dry.
- o Butt splices must be used; do not overlap Tape ends.
- o Do not apply Tape on longitudinal seams or joints.
- o In areas of high traffic encroachment or rough, exposed aggregate surfaces, service life may be limited; for example, on tined Portland cement or open graded asphalt cement concrete. In such situations, it is recommended that Tape be inspected for replacement on a two-month cycle.

4.2 Surface Preparation Adhesive

Surface preparation adhesive is not needed when applying Tape under normal conditions, outlined in Section 4.1, General Application Conditions. Under marginal weather conditions, however, a 3M surface preparation adhesive can be used to improve initial and long term adhesion. For long line applications, 3M surface preparation adhesive should be applied with a 3M PS-14 Adhesive Spray Applicator. The 3M surface preparation adhesives can be applied using a 3/8" nap paint roller.

Marginal weather conditions can include circumstances where:

- o The air and pavement temperatures have not exceeded the minimum application temperature for the majority of the 24 hours preceding application.
- o Prolonged or heavy rainfall following Tape application is predicted.
- o Application is planned for the early spring or late fall, beyond the typical road construction season.

Note: Use of a surface preparation adhesive increases Tape adhesion, which can make Tape removal more difficult. Increased pull force may be required to remove Tape and Tape may break more frequently during removal when Tape has been applied using a surface preparation adhesive.

5 Removability

Under most conditions, Tape can be removed largely intact or in large pieces from asphalt and smooth Portland cement concrete surfaces at temperatures above 40 °F (4 °C) without the use of heat, solvents, grinding, or sandblasting. At temperatures below 40 °F (4 °C), Tape may be more difficult to remove in large pieces and may leave faint but visible temporary traces on the pavement.

Use the following procedure to remove Tape:

- 1 Always wear gloves and eye protection when removing Tape.
- 2 Pry up the edge of the Tape using a chisel-like tool.
- 3 Pull Tape straight up (at an angle of approximately 90°, relative to the pavement).
- 4 At temperatures below 40 °F (4 °C), Tape may be brittle and difficult to remove in large pieces. In these situations, a small amount of heat may be used to help soften the adhesive.

Note: Neither burning nor grinding is recommended for Tape removal. In areas of high encroachment or where Tape has been installed on rough exposed aggregate surfaces, removal and replacement of Tape may be required during the normal construction season, defined in Section 1, Description. In such instances, mechanical methods, such as high pressure water blasting, may be required to remove Tape. The user is responsible for determining the suitability of Tape for their specific application.

6 Durability

The Tape has been designed to provide excellent retroreflectivity under both wet and dry conditions. The Tape's actual performance will be dependent on pavement and atmospheric conditions present at the time of application, application method used, traffic exposure, and environmental conditions. Users should verify that Tape conforms to their requirements before applying it in any significant quantity.

3M makes no generalized effective performance claims or material replacement provisions. Abrasion or heavy wear may significantly reduce performance.

The Tape has been designed to increase durability over traditional 3M removable pavement marking tapes, however, Tape's actual durability will depend on pavement conditions. For example, when used in active construction sites, Tape cannot be expected to provide the longevity observed for durable marking applications.

7 Storage

Store Tape in a cool, dry indoor area and use within one year of receipt.

8 Health and Safety Information

Read all health hazard, precautionary, and first aid statements found in the Safety Data Sheets (SDS), Article Information Sheets, and products labels of any materials for important health, safety, and environmental information prior to handling or use. When removing Tape, obey all best practices described in the FWHA and State DOT safety guidelines. When using a pavement preparation adhesive with this product, refer to the appropriate MSDS for information about the volatile organic compound (VOC) content of the adhesive. Consult local regulations and authorities for possible restrictions on product VOC content and/or VOC emissions. 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.

9 Warranty Information

9.1 3M Basic Product Warranty

3M warrants that Tape will be free of defects in materials and manufacture at the time of shipment and meet the specifications stated in this product bulletin ("**Basic Warranty**"). If Tape is proven not to have met the Basic Warranty on its shipment date, then a buyer's exclusive remedy, and 3M's sole obligation, at 3M's option, will be refund or replacement of the Tape.

9.2 Disclaimer

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10 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>.

11 Literature References

3M IF 3.2	3M™ Stamark™ Removable Tapes Pavement Surface Preparation and Application Procedures
3M IF 5.2	3M™ Highway Tape Applicator (HTA)
3M IF 5.17	3M™ Stamark™ Surface Preparation Adhesive P-50 Instructions for use with 3M™ Stamark™ Pavement Marking Tapes
3M IF 5.21	3M™ Stamark™ Low VOC Surface Preparation Adhesive SPA60 Spray Application Instructions for Bulk Liquid for Longitudinal Pavement Marking Tapes
3M Road Surface 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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