



Source Approval Process for Qualified Products List 21

Preformed Flexible Pavement Markings

Only materials from sources appearing on the Department's Qualified Product Listing 21, titled "Preformed Pavement Markings, Flexible Retroreflective (White and Yellow)" may be used to supply SCDOT work. A manufacturer may request qualification by furnishing the following information to the Office of Materials and Research contact listed below in order to verify that the marking meets the requirements of the specification titled "Preformed Retroreflective Pavement Marking Tape Requirements" attached to the end of this document.

1. Appropriate information and test results to verify that the product to be considered has been successfully tested for two years by the AASHTO National Transportation Product Evaluation Program (NTPEP) and that the product is the same as that tested.
2. A certified affidavit with test results from a recognized laboratory verifying the material meets the requirements of the specification including applicable testing required as noted in ASTM D4592 and/or ASTM D4505.
3. Complete instruction for installing the material.
4. Complete identification of each type of material along with the brand name and stock numbers to be used when purchasing.
5. A technical data sheet.
6. A Materials Safety Data Sheet conforming to applicable OSHA regulations.
7. A notarized letter for each product to be qualified stating that the product (by name) meets all SCDOT specifications and that the manufacturer agrees to comply by the warranty terms of Section 6 of the below specification for all materials furnished.
8. A letter or statement regarding pavement bonding that includes specific recommendations on how soon the markings may be applied after pavement placement, time necessary for adhesives to cure before rain, and other factors that would affect the bonding when markings are otherwise properly installed.

A manufacturer shall remain on the Qualified Products List given that they provide an annual notification of any updates to the company and products by December 31 of the calendar year. This shall be produced in a form of a letter to the State Pavement Design Engineer stating that the company name and contact person has not changed, or updating that information. The letter shall also state that the product name and manufacturing process has not changed. Any changes to product manufacturing would require new approval.

Withdrawal of Approval: The Department reserves the right to remove any material from the qualified product listing if, in the opinion of the State Pavement Design Engineer, the product is not performing satisfactorily under field conditions.

SCDOT Contact

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South Carolina Department of Transportation
Specification for
Preformed Retroreflective Pavement Marking Tape Requirements*

*(*The intent of this specification is to allow for the review of products for listing on QPL 21. It is not intended to specify requirements for specific applications. These requirements may be replaced by contract documents with higher order of precedence and Traffic Engineering should be consulted for minimum retroreflective values required for specific applications.)* October 18, 2021

- Type 1 – Permanent
- Type 2 – Temporary (removable)
- Type 3 – Temporary (non-removable)

1. Scope: The work consists of furnishing white or yellow preformed retroreflective pavement markings consisting of pigmented flexible materials with a reflective glass sphere layer uniformly distributed and bonded to the top surface. These components are factory produced as a finished product to meet the requirements for the current edition of the Manual of Uniform Traffic Control Devices for Streets and Highways. The markings shall be capable of being affixed to bituminous or Portland cement concrete pavement by a pressure sensitive, pre-coated adhesive. The markings shall be provided complete in packages that will facilitate rapid application and protect the markings in shipment and storage. Markings shall have a one-year minimum storage life.
2. Recommended Use of Each Type Marking: The marking materials shall consist of three types. Each type shall consist of the composition and physical characteristics as necessary and as specified in this specification for the various applications as follows:
 - 2.1. Type 1 – Permanent retroreflective preformed markings for longitudinal lines, transverse lines, and word/symbol markings that will be subjected to high traffic volumes and severe wear conditions. The minimum useful life shall be two years.
 - 2.2. Type 2 - Temporary removable retroreflective preformed markings for use in applications where the pavement they are applied on will be the final wearing surface which is to handle a temporary pattern of traffic before the final markings are placed and removal is required. The minimum useful life shall be 9 months.
 - 2.3. Type 3 – Temporary non-removable retroreflective preformed markings for use in applications where the pavement will be resurfaced or obliterated before final markings are placed and removal is not required. The minimum useful life shall be 3 months.
3. Materials: Preformed retroreflective Pavement Marking Tape meet the material requirements of the lasted edition of ASTM D 4505 (permanent) and ASTM D 4592 (temporary) with the following exceptions:
 - 3.1. Glass Beads: Markings shall contain glass beads meeting AASHTO M247. The size, quality and refractive index of the glass beads shall be such that the performance requirements for the markings shall be met. The bead adhesion and embedment shall be sufficient to hold the beads in place for the specified minimum useful life of the type marking specified.
 - 3.2. Color:
 - 3.2.1. White: White Markings contain sufficient pigment to produce Federal Standard 595, Color 17886 and conform to ASTM D6628. Pigments containing lead, chromium, cadmium, mercury, or other toxic heavy metals are not allowed.
 - 3.2.2. Yellow: White Markings contain sufficient pigment to produce Federal Standard 595, Color 13538 and conform to ASTM D6628. Pigments containing lead, chromium, cadmium, mercury, or other toxic heavy metals are not allowed.

- 3.3. Thickness: The minimum thickness of the marking is 60 mils.
- 3.4. Skid Resistance: Markings provide a minimum skid resistance value of 45BPN when tested according to ASTM E303.
- 3.5. Environmental Resistance: Markings are resistant to the deterioration due to exposure to sunlight, water, oil, gasoline, salt, or other adverse weather conditions.
- 3.6. Adhesives: The markings shall be precoated with a pressure sensitive adhesive which shall adhere to pavement surfaces when applied in accordance with the manufacturer's instructions. The markings shall be immediately ready for traffic after application. It shall not be necessary to use a binder, activating agent, heat, additional adhesive, or any other special surface preparation methods or materials to effect proper adhesion to roadway surfaces.
 - 3.6.1. Primer: If a primer is required by the manufacturer for proper adhesion, information on the conditions under which the primer is required to be used in the application of the material shall be provided, and the drying time (tack free) required for various applications conditions and temperatures shall be stated. Rate of application shall also be stated. The manufacturer shall supply the appropriate primer as required. Sufficient information shall be provided so that application can be made without voiding the warranty. Cost of the primer shall be included in the unit cost of the materials with no extra cost to the State. The materials shall properly adhere to the pavement surfaces when applied according to the manufacturer's recommendations at surface temperatures down to 60 degrees F and shall sustain traffic hits immediately requiring no drying time.
- 3.7. Marking Designs: Preformed words and symbols shall meet the requirements for the most recent edition of the Manual on Uniform Traffic and Control Devices for Streets and Highways.
- 3.8. Resealing Characteristics: Markings are able to fuse itself and previously applied marking film of the same composition under normal conditions of use. Markings shall conform to pavement contours, breaks, and faults through the action of traffic at normal pavement temperatures.
- 3.9. Packaging: Manufacture and package markings to permit storage at normal shelf temperature (50 degrees F to 100 degrees F) for a minimum shelf life of one year from the date of purchase.
- 3.10. Marking Life: The minimum useful life for each marking shall be as follows:
 - 3.10.1. Type 1 – 2 years
 - 3.10.2. Type 2 – 9 months
 - 3.10.3. Type 3 – 3 months
4. Retroreflection: The pavement markings shall meet the retroreflective requirements of ASTM D4592 and ASTM D4505. Additionally, the markings shall have a minimum retroreflectance value through 180 days when tested according to ASTM E1710:
 - 4.1. White: 325 mcd/lux/m²
 - 4.2. Yellow: 200 mcd/lux/m²

5. Acceptance and Certification: Use only materials preapproved by the Department, A manufacturer may request preapproval by furnishing the following to the Department's State Pavement Design Engineer:
 - 5.1. Appropriate information and test results to verify that the product to be considered has been successfully tested for two years by the AASHTO National Transportation Product Evaluation Program (NTPEP) and that the product is the same as that tested.
 - 5.2. A certified affidavit with test results from a recognized laboratory verifying the material meets the requirements of the specification including applicable testing required as noted in ASTM D4592 and/or ASTM D4505.
 - 5.3. Complete instruction for installing the material.
 - 5.4. Complete identification of each type of material along with the brand name and stock numbers to be used when purchasing.
 - 5.5. A technical data sheet.
 - 5.6. A Materials Safety Data Sheet conforming to applicable OSHA regulations.
 - 5.7. A notarized letter for each product to be qualified stating that the product (by name) meets all SCDOT specifications and that the manufacturer agrees to comply by the warranty terms of Section 6 of the specification for all materials furnished.
 - 5.8. A letter or statement regarding pavement bonding that includes specific recommendations on how soon the markings may be applied after pavement placement, time necessary for adhesives to cure before rain, and other factors that would affect the bonding when markings are otherwise properly installed.
6. Warranty (All Types): In addition to any standard manufacturer's warranty, warrant preformed markings for a minimum of the specified performance period (type 1 – 2 years, type 2 – 9 months, type 3 – 3 months) from the date of installation if installed in accordance with the manufacturer's recommendations. Replace material not meeting the criteria of the warranty at no charge to the Department unless failure is due to snowplowing damage. The SCDOT will base performance on the following criteria:
 - 6.1. Longitudinal and Transverse Markings:
 - 6.1.1. The line shall remain bonded to the pavement surface and remain at least 75% intact throughout the period as measured by ASTM D913.
 - 6.1.2. No displacement, discoloration, or shift in location due to normal activity of traffic throughout the period.
 - 6.1.3. No permanent discoloration or fading for any reason, including the marking from braking/acceleration vehicles throughout the period.
 - 6.1.4. Maintain the 180 day values as specified in section 4 of this specification.
 - 6.2. Longitudinal Markings(Type 1):
 - 6.2.1. Material shall maintain a specific luminance of 130 millicandelas/lux/m² during the 2 year period as measured with a Miralux 12 reflectometer or 100 millicandelas/lux/m² as measured by an Ecolux retroreflectometer.

Measurements for reflectivity are as follows:

- Installations 360 to 1080 feet in length – Take a measurement at approximately twenty (20) foot intervals throughout the installation. Take two (2) readings on skips (one at each end). Average the measurements taken.
- Installations 1080 feet to six (6) miles – Mark three locations for testing. Obtain eighteen measurements at each location. Take measurements every twenty (20) feet on solid lines or two per skip on skip lines. Average the measurements.
- Installations greater than six (6) miles – Mark locations for testing at the beginning of the project every three (3) miles, and at the end of the project.. Obtain eighteen measurements at each location. Take measurements every twenty (20) feet on solid lines or two per skip on skip lines. Average the measurements.

6.3. Transverse Markings(Type 1):

6.3.1. Material shall maintain a specific luminance of 100 millicandelas/lux/m² during the 2 year period as measured with a Miralux 12 reflectometer or 75 millicandelas/lux/m² as measured by an Ecolux retroreflectometer.

Measurements for reflectivity are as follows:

- Crosswalks and stopbars – Take eight (8) measurements 18” from curb, six (6) measurements in the wheelpaths, and ten (10) measurements between the wheelpaths. Average the results.
- Arrows, symbols and legends – Take four (4) measurements in the wheelpaths and eight (8) measurements outside the wheelpaths. Average the results.