



**SUPPLEMENTAL SPECIFICATIONS
FOR
WET RETROREFLECTIVE REMOVABLE TAPE MARKINGS**

**Effective Date
December 21, 2010**

THE STANDARD SPECIFICATIONS, SERIES 2009, ARE AMENDED BY THE FOLLOWING MODIFICATIONS AND ADDITIONS. THESE ARE SUPPLEMENTAL SPECIFICATIONS AND THEY SHALL PREVAIL OVER THOSE PUBLISHED IN THE STANDARD SPECIFICATIONS.

Apply Section 2527 of the Standard Specifications with the following modifications:

09012.01 Description.

Furnish, install, maintain, and remove or obliterate pavement markings in work zones according to the contract documents.

09012.02 Materials.

A. General.

Preformed markings consist of white or yellow films providing immediate and continuing retroreflection during dry, wet, and rainy conditions. Ensure film is free of lead, chrome, and other heavy metals as defined by the EPA.

Precoat markings with pressure sensitive adhesive capable of adhering to the pavement at temperatures as low as 50°F (10°C) in accordance with the manufacturer's recommendations.

B. Classification.

Ensure tape design and manufacture allows it to be readily removed when markings are no longer needed. Ensure tape is capable of performing for the duration of a normal construction season* and being removed intact or in large pieces. Ensure tape is reflective throughout its useful life.

*Normal construction season is defined as the time between the last snowplowing in the spring and the first snowplowing in the fall/winter.

C. Requirements.

1. Retroreflectance.

White and yellow markings shall have initial expected retroreflectance values as shown in Table 1 under dry, wet, and rainy conditions.

Measure retroreflectance values under wet conditions according to ASTM E 2176 or ASTM E 2177. Measure wet retroreflectance values under a "condition of continuous wetting" (simulated rain) according to ASTM E 2176, and to reduce variability between

measurements, ensure test is performed in a controlled laboratory environment while the marking is positioned with a 3 to 5 degree lateral slope. Use wetting agent to improve wetting of pavement marking with water. Use of a 0.1% (by volume) liquid soap solution is recommended. Report measurements as an average for each roll tested, in at least three locations.

Measure wet retroreflectance values under a “condition of wetness” according to ASTM E 2177. Test may be performed with the marking installed on the road. Test new markings using a wetting agent previously described. Perform laboratory measurements using a 3 to 5 degree lateral slope. Report measurements as an average for each roll tested, in a minimum of three locations.

Table 09012.02-1: Expected Initial R_L under dry, wet, and rainy conditions

WHITE	Dry, Wet, & Rainy
Entrance Angle	88.76 degrees
Observation Angle	1.05 degrees
Retroreflected Luminance $R_L [(mcd \cdot ft^{-2}) \cdot fc^{-1}]$ ($R_L [(mcd \cdot m^{-2}) \cdot lx^{-1}]$)	150
YELLOW	Dry, Wet, & Rainy
Entrance Angle	88.76 degrees
Observation Angle	1.05 degrees
Retroreflected Luminance $R_L [(mcd \cdot ft^{-2}) \cdot fc^{-1}]$ ($R_L [(mcd \cdot m^{-2}) \cdot lx^{-1}]$)	100

2. Removability.

Pavement markings shall be removable from the pavement intact or in large pieces, at temperatures above freezing without the use of heat, solvents, grinding, or blasting; and with no permanent scarring of the roadway surface.

3. Patchability.

Pavement marking material shall be capable of being patched in accordance with manufacturer’s instructions.

4. Wet Retroreflective Removable Tape Markings shall be in accordance with Materials I.M. 483.06.

09012.03 Construction.

Place markings according to the following:

- A. Place markings as specified in the contract documents.
- B. Place markings on clean dry surfaces according to the manufacturer's instructions.
- C. Cut markings at joint lines to facilitate replacement.

09012.04 Method of Measurement.

Wet Retroreflective Removable Tape Markings will be measured according to Article 2527.04.

Removal in construction work zones will not be measured for payment, but shall be considered incidental to the work.

09012.05 Basis of Payment.

Wet Retroreflective Removable Tape Markings will be paid for according to Article 2527.05. Additional markings placed due to loss of retroreflectivity or obliterated material will not be measured for payment and shall be considered incidental to the contract unit price.