EXPECTED IMPLEMENTATION JULY 2006

9710800
All Jobs

DRAFT

971 TRAFFIC MARKING MATERIALS.
(REV 1-4-06) (FA 2-15-06) (7-06)

ARTICLES 971-8 and 971-11 (of the Supplemental Specifications) are deleted and the following substituted:

971-8 Permanent Tape Materials for Pavement Stripes and Markings.

971-8.1 General: The materials for pavement stripes and markings shall consist of white or yellow weather-resistant reflective film as specified herein. The markings are divided into two classes: Standard and High Performance. The classes are differentiated by their durability and retroreflectivity. The pigment, glass spheres, and filler shall be well dispersed in the resin. However, the requirements delineated in this Specification and Section 713 shall apply. The material shall be free from all skins, dirt and foreign objects.

971-8.2 Composition: The pavement stripes and markings shall consist of high-quality plastic materials, pigments, and glass spheres uniformly distributed throughout their cross-sectional area, with a reflective layer of spheres embedded in the top surface.

971-8.3 Skid Resistance: The surface of the stripes and markings shall provide a minimum skid resistance value of 35 BPN (British Pendulum Number) when tested according to ASTM E 303. Bike lane symbols and pedestrian crosswalks shall provide a minimum skid resistance value of 55 BPN.

971-8.4 Thickness: The Qualified Products List will list the specified thickness of each approved product.

971-8.5 Durability and Wear Resistance: When properly applied, the material shall provide neat, durable stripes and markings. The materials shall provide a cushioned resilient substrate that reduces sphere crushing and loss. The film shall be weather resistant and, through normal wear, shall show no significant tearing, rollback or other signs of poor adhesion. Durability is the measured percent of pavement marking material completely removed from the pavement. The pavement marking material line loss must not exceed 5.0% of surface area at the end of its service life.

971-8.6 Conformability and Resealing: The stripes and markings shall be capable of conforming to pavement contours, breaks and faults under traffic at pavement temperatures recommended by the manufacturer. The film shall be capable of use for patching worn areas of the same types of film in accordance with the manufacturer's recommendations.

971-8.7 Tensile Strength: The stripes and markings shall have a minimum tensile strength of 40 psi [275 kPa] when tested according to ASTM D 638. A rectangular test specimen 6 by 1 by 0.05 [150 by 25 by 1.5 mm] minimum thickness shall be tested at a temperature range of 40 to 80ºF [21 to 27ºC] using a jaw speed of 0.25 inch/min [6 mm/min].

971-8.8 Elongation: The stripes and markings shall have a minimum elongation of 25% when tested in accordance with ASTM D 638.

971-8.9 Plastic Pull test: The stripes and markings shall support a dead weight of 4 lb [1.8 kg] for not less than five minutes at a temperature range of 70 to 80ºF [21 to 27ºC]. Rectangular test specimen size shall be 6 by 1 by 0.05 inch [150 by 25 by 1.5 mm] minimum thickness.

971-8.10 Pigmentation: The pigment shall be selected and blended to provide a material which is white or yellow conforming to standard highway colors through the expected life of the stripes and markings.

971-8.11 Glass Spheres: The glass spheres shall meet the requirements of 971-2.

The stripes and markings shall have glass retention qualities such that, when at room temperature a 2 by 6 inches [50 by 150 mm] specimen is bent over a 0.5 inch [13 mm] diameter mandrel axis, a microscopic examination of the area on the mandrel shall show no more than 10% of the spheres with entrapment by the material of less than 40%. The bead adhesion shall be such that spheres are not easily removed when the film surface is scratched firmly with a thumbnail.

971-8.12 Standard Markings: The preformed materials for pavement stripes and markings shall have a service life of three year. The materials shall attain an initial retroreflectance of not less than 300 mcd/lx·m^2 for white and contrast markings and not less than 250 mcd/lx·m^2 for yellow markings. The retroreflectance of the white, yellow and contrast pavement markings at the end of the three year service life shall not be less than 150 mcd/lx·m^2.

971-8.13 High Performance Markings: The preformed materials for pavement stripes and markings shall have a service life of five years. The materials shall attain an initial retroreflectance of not less than 450 mcd/lx·m^2 for white and contrast markings and not less than 350 mcd/lx·m^2 for yellow markings. The pavement stripes and markings shall retain a minimum retroreflectance for two years of not less than 300 mcd/lx·m^2 for white and contrast markings and not less than 250 mcd/lx·m^2 for yellow markings. The retroreflectance of the white, yellow and contrast pavement markings at the end of the five year service life shall not be less than 150 mcd/lx·m^2.

971-9 Two Reactive Component Materials For Traffic Stripes And Markings.

971-9.1 General: Two reactive component materials intended for use under this Specification shall include, but not be limited to, epoxies, polyesters and urethanes. Upon curing, these materials shall produce an adherent, reflective pavement marking capable of resisting deformation by traffic. The manufacturer shall have the option of formulating the material according to his own specifications. However, the criteria outlined in this Specification and Section 709 shall apply regardless of the type of formulation used. In a cured condition, all of the products designated in this Specification shall be classified as non-hazardous waste as defined by 40 CFR 261.24 when tested in accordance with EPA Method 1311, Toxicity Characteristics Leaching Procedures (TCLP). The material shall not exude fumes which are toxic or detrimental to persons or property. The material shall be free from all skins, dirt and foreign objects.

971-9.2 Composition:

Component	Test Method	Criteria
TiO_2, Type II Rutile (white paint only)	ASTM D 476	minimum 10% by weight
Lead	EPA 1311 (TCLP)	maximum 0.15 ppm
Volatile Organic Content, (VOC)	ASTM D 3960	maximum 150 g/L

971-9.3 Pigment: The yellow pigment used shall not contain lead or any other Resource Recovery and Conservation Act (RCRA) materials.

971-9.4 Glass Spheres: Glass spheres shall be Type 1 and meet the requirements of 971-2.

971-9.5 Sharp Silica Sand: Sharp silica sand used for bike lane symbols and longitudinal lines shall meet the following gradation requirements:

Sieve Size	% Passing
20 mils [850 µm]	100
50 mils [300 µm]	0 to 10

971-9.6 Physical Requirements: The material shall meet the following criteria:

Property	Test Method	Minimum	Maximum
Dry Opacity*	Fed Std 141a Method 4121	0.96	-
Bleed Ratio	Fed Spec TT-P-85D	0.95	-
Flexibility	Fed Spec TT-P-115D	Pass	-
Abrasion Resistance	971-12.6.3	Pass	-
*When applied at manufacturer's recommended dry film thickness.			

971-9.6.1 Set To Bear Traffic Time: When applied at the temperatures and thickness specified by Section 710, the material shall set to bear traffic in not more than two minutes.

971-9.6.2 Abrasion Resistance: Test four samples per LOT using a Taber Abrader. The paint shall be applied to specimen plates using a drawdown blade having a clearance of 26 mils [660 µm]. Air dry each sample for 30 minutes and bake at 220ºF [105ºC] for 18 hours. Clean with a soft brush and weigh each sample. Abrade samples for 1,000 cycles with 1.1 lb [500 g] weights and CS-10 wheels. Clean the samples with a soft brush and weigh again. The average weight loss for the four plates shall not exceed 0.178 oz [50 mg] per plate.

971-9.6.3 Retroreflectivity: The white and yellow pavement markings shall attain an initial retroreflectance of not less than 450 mcd/lx·m^2 and not less than 350 mcd/lx·m^2, respectively. The retroreflectance of the white and yellow pavement markings at the end of the one year service life shall not be less than 150 mcd/lx·m^2.

971-9.7 Application Properties: Application properties shall meet the requirements of Section 709.

971-9.8 Packaging and Labeling: The two reactive component material shall be placed in 55 gal [210 liter] open-end steel drums with a re-usable multi-seal sponge gasket. No more than 50 gal [190 liters] of material shall be placed in any drum to allow for expansion during transport and storage. Other containers will be used for applicable products. Each container shall designate the color, generic type (e.g. epoxy), user information, manufacturer’s name and address, batch number and date of manufacture. Each batch manufactured shall have a unique number. The label shall warn the user of hazards associated with handling or using the material.

971-9.9 Storage Life: Any material stored for less than one year not meeting these requirements shall be replaced at no cost to the Department.