971 COATINGS AND TRAFFIC MARKING MATERIALS.

(REV 5-4-00) (FA 5-26-00) (7-01)

SECTION 971 (Pages 913-945) is expanded by the following:

971-22 Class 5 Applied Finish Coatings for Concrete.

971-22.1 General: Use a commercial product designed specifically for this purpose, which upon curing is capable of accommodating the thermal and elastic expansion ranges of the substrate without cracking.

971-22.2 Material Tests and Certification: Meet the requirements of the tests listed below:

(a) Freeze-Thaw Tests: Subject the applied finish coating to Freeze-Thaw Cycle Tests as follows:

(1) Cast and cure three concrete specimens, not less than 4 by 6 by 6 inches [102 by 152 by 152 mm], of the mix design for the structure. Moist cure the specimens for 14 days followed by a drying period in room air at 60 to 80ºF [16 to 27ºC] for 24 hours

Ensure that there is no excessive oil on specimen forms. Apply the finish coating to the sides of specimens (brush permitted) at a spreading rate of 50 ± 10 ft^2/gal [1.25 ± 0.25 m^2/L]. Cure the specimens at room temperature and 50% relative humidity for 24 hours, at room temperature and 90% relative humidity for 48 hours, and at room temperature and 50% relative humidity for four days for a total cure time of seven days. After the completion of curing:

(2) Immerse the specimens in water at room temperature (60 to 80ºF [16 to 27ºC]) for three hours; remove and:

(3) Place in cold storage at -15ºF [-26ºC] for one hour; remove and;

(4) Thaw at room temperature for one hour.

(5) Repeat Steps three and four for a total of 50 cycles. At the end of 50 cycles Freeze-Thaw Test, verify that the specimens show no visible defects.

(b) Accelerated Weathering: Subject the applied finish coating specimens to a 5,000-hour exposure test in Twin-Carbon-Arc-Weather-ometer, ASTM G 23, Type D, at an operating temperature of 145ºF [63ºC]. Perform this test at 20-minute cycles consisting of 17 minutes of light and three minutes of water spray plus light. At the end of the exposure test, verify that the exposed samples show no chipping, flaking, or peeling. Prepare the panels for this test by applying the coating at a spreading rate of 50 ± 10 ft^2/gal [1.25 ± 0.25 m^2/L] to both sides and edges of panels cut from non asbestos cement shingles conforming to Federal Specification SS-S-346, Type I. Use curing time as in (a) above.

(c) Fungus Growth Resistance: Ensure that the applied finish coating to be used passes a fungus resistance test as described by Federal Specification TT-P-29G with a minimum incubation period of 21 days where no growth is indicated after the test.

(d) Abrasion Resistance: Ensure that the applied finish coating to be used passes the 3,000 L sand abrasion test, Federal Test Method Standard 141A Method 6191 Abrasion Resistance - Falling Sand.

Prepare the specimens for this test by applying the coating to a cleaned steel panel at a spreading rate of 50 ± 10 ft^2/gal [1.25 ± 0.25 m^2/L]. Cure at room temperature for 21 days.

(e) Impact Resistance: Apply the coating to a concrete panel prepared in accordance with Federal Test Method Standard 141A, Method 2051 at a spreading rate of 50 ∀ 10 ft^2/gal [1.25 ± 0.25 m^2/L], and allow it to cure for 21 days at room temperature. Then, run the test using the Gardner Mandrel Impact Tester and its method, applying an impact load of 24 inch-pounds [2.7 N·m]. Verify that the coating shows no chipping under this impact load.

(f) Salt-Spray Resistance Test: Coat a concrete specimen with the applied finish coating at a rate of 50 ft^2/gal ± 10% [1.25 m^2/L ± 10%], and cure it for 21 days at room temperature.

Using the ASTM B 117 test method, expose the coated specimen to a 5% salt solution for 300 hours where the atmospheric temperature is maintained at 90 ± 2ºF [32 ± 1ºC]. At the end of 300 hours of exposure, verify that the coating shows no loss of adhesion or deterioration.

(g) Flexibility Test: Coat a sheet metal specimen with the applied finish coating at a rate of 50 ± 10 ft^2/gal [1.25 ± 0.25 m^2/L]. Bend the coated specimen 180 degrees over a 1 inch [25 mm] round mandrel. After bending, verify that the coating shows no breaking.

Supply a service record showing that the finish coating material has a satisfactory service record for a period of not less than five years prior to the date of submission of the service record and that the finish coating has shown satisfactory service characteristics without peeling, chipping, flaking, or nonuniform change in texture or color. Name a specific structure for the specific product for the service record.

Submit the following product analysis data:

(a) Weight per gallon [liter].

(b) Viscosity [Consistency] (Krebs Units).

(c) Weight percent pigment.

(d) Weight percent vehicle solids.

(e) Infra-red spectra of vehicle solution.

971-22.3 Color: Use a color that is similar to Federal Color Standard No. 595B, Table VIII, Shade No. 36622 or as specified in the plans for the applied finish coating.

971-23 Materials for Inverted Profile, Wet Weather Traffic Stripes.

971-23.1 General: Upon cooling to normal pavement temperature, these materials shall produce an adherent, reflective pavement marking capable of resisting deformation by traffic and draining water from the highway surface. The manufacturer shall have the option of formulating the material according to his own specifications. However, the requirements delineated in this Specification, Section 702, and Florida Test Method FM 5-541 shall apply regardless of the type of formulation used. The pigment, glass spheres, and filler shall be well dispersed in the resin. The material shall be free from all skins, dirt and foreign objects.

971-23.2 Composition:

Component	Test Method	White	Yellow
Binder		19.0% minimum	19.0% minimum
TiO_2, Type II Ructile	ASTM D 476	10.0% minimum	N/A
Glass Spheres (intermix)	ASTM D 1155	40.0% minimum	40.0% minimum
Yellow Pigment		N/A	% minimum per manufacturer
Calcium Carbonate and Inert Filler (-200 mesh [-75 µm] sieve)		31.0% maximum	41.0% maximum
Lead	EPA Methods 3050 and 6010	3.0 ppm maximum	3.0 ppm maximum
Heavy Metals, Total (RCRA)	EPA Methods 3050 and 6010	100 ppm maximum	100 ppm maximum

Percentages are by weight.

971-23.3 Glass Spheres: Meet the requirements of 971-14.

971-23.4 Physical Requirements: Laboratory samples shall be prepared in accordance with ASTM D 4960 and shall meet the following criteria:

Property	Test Method	Minimum	Maximum
Water Absorption	ASTM D 570	-	0.5%
Softening Point	ASTM D 36	200ºF [93ºC]	-
Low Temperature Stress Resistance	AASHTO T 250	Pass	-
Specific Gravity	Water displacement	1.9	2.3
Indentation Resistance	ASTM D 2240* Shore Durometer, A2	45	-
Impact Resistance	ASTM D 256, Method A	10 in-lb [1.0 N·m]	-
Flash Point	ASTM D 92	475ºF [245ºC]	-

*The durometer and panel shall be at 90ºF [32ºC] with a 4.4 lb [2.0 kg] load applied. Instrument measurement shall be taken after 15 seconds.

971-23.4.1 Set To Bear Traffic Time: When applied at the temperatures and thickness specified by Section 702, the striping material shall set to bear traffic in not more than two minutes.

971-23.4.2 Color: Meet the requirements of 971-17.5.2.

971-23.5 Application Properties: Application properties shall meet the requirements of Section 702.

971-23.6 Packing and Labeling: Meet the requirements of 971-17.7.