

January, 2011

STATE OF MAINE DEPARTMENT OF TRANSPORTATION
SPECIFICATION FOR WHITE AND YELLOW FAST DRY WATERBORNE
TRAFFIC PAINT

1. SCOPE:

This specification describes 100% acrylic type, low VOC, fast drying, white and yellow waterborne traffic paints that can be used on bituminous and Portland cement concrete pavements.

2. APPLICABLE SPECIFICATIONS:

Federal specification TT-P-1952D (Paint, Traffic and Air Field Marking, Waterborne), Federal Test Method Standard 141c. American Society for Testing and Materials (latest revision) as referenced. American Association of State Highway and Transportation Officials (AASHTO) Materials, Specifications and Tests.

3. GENERAL REQUIREMENT:

3.1 The paint shall be formulated and processed specifically for service as a binder for beads, in such a manner as to produce maximum adhesion, refraction, and reflection. Any capillary action of the paint shall not be such as to cause complete coverage of the beads.

3.2 The paint shall be well mixed in the manufacturing process and shall be properly ground when incorporating the pigments in order to conform to the requirements as specified.

3.3 The paint shall not liver, thicken, curdle gel, settle excessively, or otherwise show any objection properties while in storage and in use. It shall be readily remixed manually to smooth, uniform consistency throughout and during application.

3.4 The paint shall dry on a road surface to a strongly adherent film that will not turn dark in sunlight or show appreciable discoloration with age. It shall be easily and uniformly applicable with mechanical line-marking equipment and shall have excellent covering properties. The paint shall be suitable for binding glass beads so as to produce a highly weather and wear resistance traffic line.

4. APPLICATION

4.1 This paint must be reflectorized for night visibility by adding reflective spheres before the paint dries or sets, by using drop-on or pressurized methods. The reflective spheres shall be evenly dispersed on wet paint film of 15+ 1 mils (110- 115 square feet per gallon) at a rate of 8 pounds per gallon.

4.2 The lines shall be applied with airless or air assisted spray equipment so as to have the paint at a temperature of 150°F maximum in the heat exchanger and 120-140°F at the spray nozzle. The maximum no-tracking time shall not be exceeded when the pavement temperature is greater than 50°F, under humidity conditions of 80% or less on dry pavement.

5. COMPOSITION

5.1 The composition of the **white paint** shall comply with the following:

5.1.1 The binder shall be 100% acrylic, as determined by infrared analysis according to ASTM D2621. It shall consist of either Rohm Haas Fastrack 3427, or Dow DT-250 or an equivalent, pre-approved by the State. (The State will, as its option, to assure that the specified binder is used).

5.1.2 Titanium Dioxide (ASTM D1394), Rutile Type II 1 lb./gal. Min.

5.1.3 Pigment (ASTM D3723), by weight 58% Min. 62% Max.

5.1.4 Total non-volatile (ASTM D2697) 76% Min. by weight 62% Min. by vol.

5.1.5 Total non-volatile in vehicle 42% Min. by weight

5.1.6 Lead (ASTM D3335) 0.06% Max.

5.1.7 VOC (ASTM D3960) 1.25 lb./gal. (150 g/l) Max.

5.1.8 Weight per gallon (ASTM D1475) 14.0 + 0.3 pounds

5.1.9 pH of the paint 9.6 Min.

5.1.10 The paint shall be rated as non-combustible. The closed cup flash point shall not be less than 140°F.

5.2 The composition of the **yellow paint** shall comply with the following:

5.2.1 The binder shall be 100% acrylic, as determined by infrared analysis according to ASTM D2621. It shall consist of either Dow DT-250 or Rohm Haas Fastrack 3427, or an equivalent, pre-approved by the State. (The State will, as its option, to assure that the specified binder is used.) The yellow pigment shall be Yellow #65 or Yellow #75.

5.2.2 Titanium Dioxide (ASTM D1394), Rutile Type II 0.2 lb./gal. Max.

5.2.3 Pigment (ASTM D3723), by weight 58% Min. 62% Max.

5.2.4 Total non-volatile (ASTM D2697) 76% Min. by weight 62% Min. by Vol.

5.2.5 Total non-volatile in vehicle 42% Min. by weight

5.2.6 Lead (ASTM D3335) 0.06% Max.

5.2.7 VOC (ASTM D3960) 1.25 lb./gal. (150g/l) Max.

5.2.8 Weight per gallon (ASTM D1475) 13.6 + 0.3 pounds

5.2.9 pH of the paint 9.6 Min.

5.2.10 The paint shall be rated as non-combustible. The close cup flash point shall not be less than 140°F.

6. DETAILED REQUIREMENT

6.1 Viscosity: The paint viscosity shall not be less than 78 nor more than 95 Krebs units at 77°F when tested according to ASTM D562.

6.2 Condition in Container: The paint as received shall show no livering, skinning, mold growth, purification, corrosion of the container, or hard settling of the pigment. Any settling shall be readily dispersed when stirred by hand with no persistent foaming.

6.3 Grind: The fineness of grind shall not be less than 2 N.S.U. when tested according to ASTM D1210.

6.4 Drying Time: The paint shall dry in not more than 10 minutes at 77°F when tested according to ASTM D711 and drawn down to a wet film thickness of 15 mils.

6.5 Color: The white traffic paint shall match Federal Test Standard 595 No. 37886. It shall not discolor in sunlight and shall maintain its light fastness throughout the life of the paint (approximately two years). For yellow the color shall closely match Federal Test Standard 595 No. 33538. Color determination shall be made without bead at least 24 hours after application.

6.6 Flexibility: The paint shall show no cracking or flaking when tested in accordance with Federal Specification TT-P-1952D, Section 4.5.5., using a ½” mandrel bends.

6.7 Dry Opacity: The paint shall have a minimum contrast ratio of 0.96 when applied at a wet film thickness of 5 mils when tested according to ASTM D2244.

6.8 Daylight Reflectance: The daylight directional reflectance of the white paint shall not be less than 85% and not less than 50% for yellow (relative to magnesium oxide) when measured in accordance with Federal Test Method No. 141c.

6.9 Bleeding: The paint shall have a minimum bleeding ratio of 0.97 when tested in accordance with Federal Spec. TT-P-1952D.

6.10 Scrub Resistance: The paint shall pass 300 cycles when tested in accordance with ASTM D-2486.

6.11 Freeze-Thaw Stability: The paint shall show no change in consistency greater than 10% when tested in accordance with TT-P-1952D.

6.12 No Track Time: The paint shall dry to a no tracking condition in no more than 75 seconds. The no tracking condition shall be determined by actual application on the pavement at a wet film thickness of 15 mils (381 microns) with white or yellow paint covered with glass beads at a rate of 6 pounds per gallon (719 grams per liter). The paint lines for this test shall be applied with the striping equipment operated so as to have the paint at temperatures up to 140°F (60°C) at the spray orifice. This maximum tracking time shall not be exceeded when the pavement temperature varies from 50°F (10°C) to 120°F (49°C), and under humidity conditions of 80% or less providing that the pavement is dry. The no tracking time shall be determined by passing over the paint line 75 seconds after paint application, in a simulated passing maneuver at a constant speed of 30 to 40 miles per hour (48 to 64 kilometer per hour) with a passenger car. A line showing no visual deposition of the paint to the pavement surface when viewed from a distance of approximately 50 feet (15.3 meters) from the point where the test vehicle has crossed the line shall be considered as showing no tracking and conforming to the requirement for

field drying conditions. This field dry time test shall be used for production samples only.

6.13 Heat Stability: The paint shall show no coagulation, discoloration or change in consistency greater than ten (10) Krebs Units when tested in accordance with TT- P-1952D.

6.14 Dry Through (Early Washout): A 15 mil wet film of the paint placed immediately in a humidity chamber maintained at 72.5°F+ 2.5°F and 90%+ 3 relative humidity shall have a “dry-through” time less than or equal to the specifier’s laboratory reference paint film when tested in accordance with ASTM D1640, except that the pressure exerted will be the minimum needed to maintain contact between the thumb and film.

6.15 Storage Stability: When stored in a three-quarters filled can for a period of thirty days, the paint shall be in a homogeneous state with no skinning, curdling, hard settling or caking that cannot be readily remixed.

7. PACKING:

7.1 Two hundred-fifty (250) gallon containers (totes) containers must be rust resistant (e.g. stainless steel or glass lined)* and tight filled with 250 gallons of paint. A minimum amount of water shall be floated on the surface to prevent skinning.

*These refillable containers (totes) shall have a lever operated 2” bottom outlet valve. Totes shall be constructed of sufficient strength to withstand repeated use of filling and transporting to avoid leakage over the life of these totes. These totes shall be mounted on a platform which will serve as a skid for easy forklift handling. All totes will be the property of the bidder and the bidder shall have an adequate quantity of totes to meet the paint delivery schedule.

7.2 All totes shall be completely cleaned and flushed inside, to the satisfaction of the Maine Department of Transportation Traffic Office before refilling.

8. SAMPLING AND INSPECTION:

8.1 Each bidder shall submit a paint formula. The paint manufacturer shall submit to the Construction Division Test Lab a batch formula in weight proportions and total gallonage per batch prior to the award of the bid. The formula shall be in generic terms rather than trade names. After the paint has been manufactured, a certified batch analysis shall also be sent to the Construction Division Test Lab, Maine Department of Transportation, PO Box 1208, Bangor, Maine 04402-1208.

8.2 The authorized Department inspector shall have free access to the manufacturing plant for sampling, inspecting, and testing the raw materials entering into the paint and for observing the weighting of the raw materials going into the batches and the process of the manufacture. The manufacturer shall furnish every reasonable facility for

sampling and testing and for sealing the containers of the paint samples before and during manufacture. Samples adequate for testing shall be furnished free of charge by the manufacturer. Random samples at the manufacturing plant or at the point of delivery may be subjected to both chemical and physical analysis and if found to be of unsatisfactory quality, the materials they represent will be rejected. The methods of analysis shall be those approved by the "American Society for Testing and Materials" or otherwise specified in the applicable material specifications.

8.3 The accepted manufacturer of the paint shall take 3 one pint samples from the batch, nearest to the completion of production of each 4,000 gallons, and shipped to the MDOT Construction Division Test Lab, 219 Hogan Road, Bangor, Maine 04402, all without charge.

8.4 The manufacturer shall have sufficient capacity of his plant to produce a minimum of 5,000 gallons of MDOT paint per 8 hour day.