Commonwealth of Pennsylvania
Department of Transportation

SPECIFICATION FOR WATERBORNE HIGH BUILD TRAFFIC LINE PAINT

July 2, 2026

1. SCOPE

1.1 Scope. This specification covers fast-drying waterborne high build traffic line paints for use on bituminous and Portland cement concrete pavements. When used, paints will be made retroreflectorized for night visibility by adding reflective spheres under pressure before the paint dries or sets.

2. REQUIREMENTS

2.1 General. Traffic paint shall consist of a ready-mixed pigmented binder in a one-package system. When applied at a wet-film thickness of 18 mils, the paint shall be suitable for application on all types of roadway surfaces.

2.2 Pigments. Except for the yellow pigment, the manufacturer may use any combination of pigments provided the finished paint meets all the requirements specified herein. Suppliers may use any organic yellow pigment provided it does not contain any of the metals listed in the Environmental Protection Agency Code of Federal Regulation 40, Section 261.24. Sufficient suspending and dispersing agents shall be used to prevent excessive settling.

2.3 Composition. The manufacturer may use any combination of ingredients provided the finished paint satisfies all of these specifications. Sufficient quantity of anti-skinning agents shall be used to prevent skinning, as specified herein. Adequate resin solids, compatible thinners and driers, if necessary, shall be used to meet requirements of Table 1.

2.4 Paint Requirements. The mixed paint shall meet the requirements specified in Table 1.

2.5 Retroreflectivity. The minimum initial retroreflectivity is 250 mcd/m2/lux for white and 165 mcd/m2/lux for yellow. The minimum retroreflectivity after 24 months is 150 mcd/m2/lux for white and 100 mcd/m2/lux for yellow.

2.6 Durability. A minimum durability rating of "7" in the skip line area and "6" in the wheel paths after 24 months. The rating system used will be as indicated by NTPEP procedures.

Table 1
Requirements of Mixed Paints

Characteristics	Requirement	ASTM	Reference Paragraph
Consistency, KU *	80-95	D 562	
Weight per gallon, lbs **		D 1475	
Vehicle Solids ***		D 2369	
Contrast Ratio (0.015 blade)	0.98 min.	D 2805	
Directional Reflection (0.015 blade) White Yellow	84 min. 54 min.	E 1349	
Color			3.2
Condition of Container, Minimum Rating	8	D 869	3.3
Skinning	Passes		3.4
Heat Stability, KU	± 5 KU of initial		3.5
Freeze-Thaw Stability, KU	± 5 KU of initial		3.6
No-Track Time (Field)	90 sec. or less		3.7
No-Track Time (Lab)		D 711	3.8
Miscellaneous Tests			3.9

* Initial mean value shall fall within 80-95 KU tolerance. QC/QA tolerances of an approved material shall fall within the range set in D 562 during the lab analysis portion of the NTPEP evaluation.

** QC/QA tolerances of an approved material shall fall within a range set by D 1475, established during the lab analysis portion of the NTPEP evaluation.

*** QC/QA tolerances of an approved material shall fall within a range set by D 2369, established during the lab analysis portion of the NTPEP evaluation.

3. TESTING

3.1 ASTM Standards. The tests shall be conducted in accordance with ASTM Standards, except as otherwise specified (see Table 1).

3.2 Color. The color of the dry paint shall satisfy the appropriate chromaticity coordinates indicated in Table 2.

Table 2
Chromaticity Coordinates

Color	1		2		3		4	
	x	y	x	y	x	y	x	y
White	0.330	0.370	0.355	0.345	0.310	0.300	0.285	0.325
Yellow	0.515	0.465	0.505	0.430	0.440	0.415	0.420	0.443

3.3 Condition in Containers. The paint shall show no curdling, livering, caking, lumps, skins or color separation. Any settling that has occurred in containers opened within 45 days after receipt must be able to be mixed to a smooth homogeneous state within 5 minutes. This requirement applies to both test samples that are mixed with spatulas, and to paint in 275-gallon intermediate bulk containers that are mixed with air- driven industrial mixers.

3.4 Skinning. The paint shall not skin within 48 hours in a three-quarter-filled, tightly closed container.

3.5 Heat Stability. Put 450 ml of paint in a 473 ml (1 pint) lined container, close the container, seal it with tape and put it in an oven maintained at 60° ±-1° C for 1 week. Equilibrate the paint at 25° ± 1° C and mix thoroughly with gently stirring. Perform the consistency test as specified in ASTM D 562. Consistency shall not vary more than ± 5 KU from the initial viscosity.

3.6 Freeze-Thaw Stability. Put 450 ml of paint in a 473 ml (1 pint) lined container, close the container, invert, and place in a chamber maintained at -10° ± 1° C. Remove the container after 16 hours and maintain at 25° ± 1° C for 8 hours. Repeat this procedure four more times. At the completion of the freeze-thaw cycles, equilibrate the paint at 25° ± 1°C, mix thoroughly with gentle stirring, and examine for smoothness and uniformity. Repeat the consistency tests as specified in ASTM D 562. Consistency shall not vary more than ± 5 KU. The paint shall show no evidence of coagulation or breaking of the emulsion.

3.7 No-Track Time (Field). The reflectorized line, when applied at 18 ± 1 mil wet film thickness with glass spheres applied at rate of 6 pounds per gallon of paint, shall have a no-track time of 90 seconds or less with a maximum paint temperature at the guns of 54° C. The maximum no-track time shall not be exceeded when the pavement temperature is between 10° C and 50° C with the relative humidity less than 70 percent and the pavement is dry. The no-track time shall be determined by passing over an applied test line at approximately 30 degrees with a standard size passenger car or pick-up truck. A line showing no visual deposition of the paint to the pavement surface when viewed from a distance of 15.2 m (50 feet) shall be considered as conforming to the dry-time requirements. Verification of this property can be performed at any time, i.e., prior to or after award of a contract.

3.8 Alternate No-Track Time (Lab). Draw down paint on clean glass plate at various depths using an adjustable doctor blade. Determine which wet film thickness yields a completed dry film thickness of 7 to 8 mils. Fill the bottom of a Paul N. Gardner Co. test chamber, Model WE-HTAB-176, with 6 to 12 mm of water. Close all ports and the door to allow equilibrating overnight. By carefully opening and closing the ports, establish a relative humidity of 90 ± 3 percent inside the chamber. Record temperatures and relative humidity inside and outside the chamber. On clean glass, draw down two test panels of the predetermined wet film thickness that yields a dry film thickness of 7 to 8 mils. Promptly place the wet films in the test chamber and maintain the relative humidity of 90 ± 3 percent. Touch the films at 15-minute intervals until the finger does not pick up wet paint. Then begin dry-through testing outside the chamber at 15-minute intervals. The film is dry through if it does not distort from a 90°-thumb twist without pressure on the film. Record temperatures, relative humidity, and times. Measure the dry thickness of the paint. A control or standard paint should be tested every day that dry-through time tests are conducted.

3.9 Miscellaneous Tests. Samples of shipment may be subjected to other tests such as x-ray analysis, infrared and/or ultraviolet spectral analysis.

4. APPROVAL

4.1 Approval. At the end of year 2, the Department will evaluate the results of laboratory and test deck data. This information will be reviewed for each material by color and roadway surface to determine compliance with this specification. Material must meet or exceed the specification requirements on both bituminous and portland cement concrete surfaces on the same NTPEP test deck to be approved. Approved paint formulas will remain active for a period of approximately 4 years; afterwards the paint will need to be retested.

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