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Standard Guide for Selection of Tests for Traffic Paints[1]

This standard is issued under the fixed designation D 2205; the number immediately following the designation indicates the year of original adoption or, in the case of revision, the year of last revision. A number in parentheses indicates the year of last reapproval. A superscript epsilon (ε) indicates an editorial change since the last revision or reapproval.

1. Scope

1.1 This guide covers the selection and use of procedures for testing traffic paints in the laboratory and in the field.

1.2 This guide covers the testing of a ready-mixed paint product of sprayable consistency that shall be suitable for use as a reflecting traffic guide on paved roadways.

1.3 The values stated in inch-pound units are to be regarded as the standard. The values given in parentheses are for information only.

1.4 *This standard does not purport to address all of the safety concerns, if any, associated with its use. It is the responsibility of the user of this standard to establish appropriate safety and health practices and determine the applicability of regulatory limitations prior to use.*

2. Referenced Documents

2.1 *ASTM Standards:*

C 219 Terminology Relating to Hydraulic Cement[2]
D 8 Terminology Relating to Materials for Roads and Pavements[3]
D 16 Terminology for Paint, Related Coatings, Materials, and Applications[4]
D 154 Guide for Testing Varnishes[5]
D 185 Test Methods for Coarse Particles in Pigments, Pastes, and Paints[5]
D 215 Practice for Chemical Analysis of White Linseed Oil Paints[4]
D 562 Test Method for Consistency of Paints Using the Stormer Viscometer[4]
D 711 Test Method for No-Pick-Up Time of Traffic Paint[6]
D 713 Practice for Conducting Road Service Tests on Fluid Traffic Marking Materials[6]
D 868 Test Method for Evaluating Degree of Bleeding of Traffic Paint[6]
D 869 Test Method for Evaluating Degree of Settling of Paint[6]
D 870 Practice for Testing Water Resistance of Coatings Using Water Immersion[4]
D 913 Test Method for Evaluating Degree of Resistance to Wear of Traffic Paint[6]
D 968 Test Methods for Abrasion Resistance of Organic Coatings by Falling Abrasive[4]
D 969 Test Method for Laboratory Determination of Degree of Bleeding of Traffic Paint[6]
D 1210 Test Method for Fineness of Dispersion of Pigment-Vehicle Systems by Hegman-Type Gage[4]
D 1309 Test Method for Settling Properties of Traffic Paints During Storage[6]
D 1475 Test Method for Density of Liquid Coatings, Inks, and Related Products[4]
D 1644 Test Methods for Nonvolatile Content of Varnishes[7]
D 1647 Test Methods for Resistance of Dried Films of Varnishes to Water and Alkali[5]
D 1729 Practice for Visual Appraisal of Colors and Color Differences of Diffusely-Illuminated Opaque Materials[4]
D 1737 Test Method for Elongation of Attached Organic Coatings with Cylindrical Mandrel Apparatus[8]
D 2244 Test Method for Calculation of Color Differences from Instrumentally Measured Color Coordinates[4]
D 2371 Test Method for Pigment Content of Solvent-Reducible Paints[4]
D 2372 Practice for Separation of Vehicle from Solvent-Reducible Paints[4]
D 4061 Test Method for Retroreflectance of Horizontal Coatings[4]
E 97 Test Method for Directional Reflectance Factor, 45-deg 0-deg, of Opaque Specimens by Broad-Band Filter Reflectometry[9]
E 308 Practice for Computing the Colors of Objects by Using the CIE System[4]

2.2 *U.S. Federal Test Methods Standard 141B:*[10]

4121 Dry Opacity

[1] This guide is under the jurisdiction of ASTM Committee D01 on Paint and Related Coatings, Materials, and Applications and is the direct responsibility of Subcommittee D01.44 on Traffic Coatings.

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[2] *Annual Book of ASTM Standards*, Vol 04.01.
[3] *Annual Book of ASTM Standards*, Vol 04.03.
[4] *Annual Book of ASTM Standards*, Vol 06.01.
[5] *Annual Book of ASTM Standards*, Vol 06.03.
[6] *Annual Book of ASTM Standards*, Vol 06.02.
[7] Discontinued; see *1998 Annual Book of ASTM Standards*, Vol 06.01.
[8] Discontinued; see *1988 Annual Book of ASTM Standards*, Vol 06.01.
[9] Discontinued; see *1991 Annual Book of ASTM Standards*, Vol 06.01.
[10] Available from Standardization Documents Order Desk, Bldg. 4 Section D, 700 Robbins Ave., Philadelphia, PA 19111-5094.

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3. Terminology

3.1 Definitions—For definitions used in this guide, refer to Terminology C 219, D 8, and D 16.

4. Summary of Guide

4.1 This guide consists of the following tests that, although not exhaustive, cover the areas normally of concern in traffic paint testing:

	Sections
Liquid Paint Properties	6 through 11
Application and Appearance Properties	12 through 17
Properties of the Dried Film	18 through 20
Analysis of Paint	21 through 24
Field Evaluations	25 through 29

5. Conditions Affecting Traffic Paint

5.1 Practical requirements for traffic paint may vary with:

5.1.1 Substrate type, such as portland cement and asphaltic concretes, and the various coarse aggregates used therein.

5.1.2 Climatic conditions, both generally and specifically, at the time of paint application.

5.1.3 Service density, such as heavy traffic areas in cities versus lightly traveled rural highways and parking lots.

5.1.4 Traffic type, whether light passenger cars or heavy trucks and airplanes.

5.1.5 Presence of foreign matter on the road surface, such as oil, old paint, skid marks, sand, salt, concrete curing compound, etc.

5.2 New portland cement concrete surfaces have a greater degree of moisture and alkalinity than older surfaces and thereby adversely affect paint adhesion. Paint adhesion is also affected by the ratio of cement to fine aggregate, coarse aggregate, and mixing water, as well as by the surface character of the aggregate that can range from impervious smooth quartz to irregular, porous slag.

LIQUID PAINT PROPERTIES

6. Skinning

6.1 Paints containing a binder that dries by oxidation are subject to skin formation in a partially filled can or by diffusion of air into a filled can. Since skins are insoluble in the paint they must be removed before use. The referenced test employs a partially filled container to indicate the tendency of a paint to skin. A typical minimum time for skinning is 18 to 24 h.

6.2 Examine the original sample for skins both on the surface and in the mass. Using a well-mixed, skin-free portion of the sample, perform a skinning test in accordance with Guide D 154, except use a 1-pt (0.5-L) friction-top can instead of an 8-oz (0.25-L) jar.

7. Coarse Particles

7.1 Paints must be free of oversize particles and foreign matter to avoid clogging application equipment, a typical maximum being 1 % by weight of total paint. The referenced test with a 325-mesh (45-µm) screen gives the percent of this material in the paint.

7.2 Determine coarse particles in accordance with Test Methods D 185.

NOTE 1—This test is not used for traffic paint containing pre-mixed glass beads.

8. Fineness of Dispersion

8.1 The more finely a pigment is dispersed, the more efficiently it is being used. One method for measuring the degree of dispersion (commonly referred to as “fineness of grind”) is to draw the material down a calibrated, tapered groove in a hardened steel block with the groove varying in depth from 4 to 0 mils (100 to 0 µm). The point at which continuous groupings of particles or agglomerates, or both, protrude through the surface of the liquid is taken as the fineness reading. Lower readings in mils or micrometres or higher reading in Hegman units indicate better fineness of dispersion.

8.2 Fineness of grind is not generally specified for traffic paint but some application equipment may require a limit of 1 to 2 Hegman units (3 to 3.5 mils, 75 to 90 µm). If additional assurance is needed that the paint will not clog application equipment, determine the fineness in accordance with Test Method D 1210 after reducing the traffic paint with mineral spirits, or compatible aromatic solvent with a similar evaporation rate, to keep the film wet long enough to determine the end point more easily. When a premix traffic paint is being tested, conduct the test on the paint before addition of the beads.

9. Density or Weight per Gallon

9.1 Density as measured by weight per unit volume is not a performance characteristic but is used to check product uniformity from batch to batch. A calibrated weight per gallon cup is used.

9.2 For an unbeaded paint, determine the density in accordance with Test Method D 1475.

9.3 For beaded paints, use a special weight-per-gallon cup[11] having a modified cap so that the beads do not interfere with a snug fit of the cap to the cup. Proceed in accordance with Test Method D 1475.

10. Consistency

10.1 Paints of a given type should fall within a stated consistency range as agreed upon between the purchaser and the seller. Consistency is used mainly to ensure product uniformity. Improper consistency, however, can adversely affect application properties, and in turn, paint performance.

10.2 Determine consistency using the Stormer viscometer in accordance with Test Method D 562. If the requirement is in Krebs units, Table 1 of Test Method D 562 permits changing seconds to KU.

11. Package Stability

11.1 Since paints are not normally used immediately after manufacture, they must remain stable in the can for some time,

[11] The sole source of supply of the satisfactory modified cup known to the committee at this time is BYK-Gardner, Inc., Gardner Laboratory, 2435 Linden Lane, Silver Spring, MD 20910. If you are aware of alternative suppliers, please provide this information to ASTM Headquarters. Your comments will receive careful consideration at a meeting of the responsible techincal committee,[1] which you may attend.

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