



Designation: D 3730 – 98

Standard Guide for Testing High-Performance Interior Architectural Wall Coatings¹

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1. Scope

1.1 This guide covers the selection and use of test methods for high-performance interior architectural wall coatings (HIPAC) that differ from more conventional coatings by being tougher, more stain-resistant, more abrasion-resistant and, ordinarily, designed to be applied to wall surfaces of steel, masonry (poured concrete, concrete block, or cinder block), and plaster or gypsum wallboard. The tests that are listed in Tables 1 and Table 2 are designed to measure performance properties. These tests may not all be required for each HIPAC system. Selection of the test methods to be followed must be governed by experience and the requirements in each individual case, together with agreement between the purchaser and the seller.

1.2 High-performance architectural coatings are tough, extra-durable organic coating systems that are applied as a continuous (seamless) film and cure to a hard finish. The finish can be high gloss, semigloss, or low gloss as desired. These coatings are resistant to persistent heat, humidity, abrasion, staining, chemicals, and fungus growth. They are used in areas where humidity, wear, or unusual chemical resistance requirements, particularly to soiling, are required and where strong detergents are used to maintain sanitary conditions. Halls and stairways in public buildings, lavatories, stall showers, locker areas, animal pens, and biological laboratories are typical applications. In addition, food processing plants, dairies, restaurants, schools, and transport terminals frequently use HIPAC systems. These are effective in many areas of building interiors compared with tile and are of low materials and maintenance costs. They are used as a complete system only as recommended by the manufacturer since the individual coats in a system are formulated to be compatible with each other. HIPAC systems should be applied only to properly prepared surfaces such as steel or masonry, including cinder blocks and cement blocks. They can be applied over plaster and gypsum wallboard. Ordinarily, a prime or fill coat, if required, is part of the system.

1.3 While they are excellent for walls, HIPAC are not usually intended for ceilings and floors. They would not ordinarily be used in homes, although parents with small children might want to use HIPAC coatings on some walls.

1.4 The types of resin ordinarily used are the following: epoxy-polyamide, two-package; polyester-epoxy, two-package; polyurethane, one-package or two-package. However, other resin types are not excluded provided they can meet the requirements (performance specifications) laid down by the purchaser.

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

1.6 *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.* For a specific hazard statement, see the note in 7.6.

2. Referenced Documents

2.1 ASTM Standards:

- D 16 Terminology for Paint and Related Coatings, Materials and Applications²
- D 93 Test Methods for Flash Point by Pensky-Martens Closed Tester³
- D 154 Guide for Testing Varnishes⁴
- D 185 Test Methods for Coarse Particles in Pigments, Pastes, and Paints⁴
- D 344 Test Method for Relative Hiding Power of Paints by the Visual Evaluation of Brushouts²
- D 523 Test Method for Specular Gloss²
- D 562 Test Method for Consistency of Paints Using the Stormer Viscometer²
- D 869 Test Method for Evaluating Degree of Settling of Paint⁵
- D 1005 Test Methods for Measurement of Dry-Film Thickness of Organic Coatings Using Micrometers²

¹ This guide is under the jurisdiction of ASTM Committee D-1 on Paint and Related Coatings, Materials, and Applications and is the direct responsibility of Subcommittee D01.42 on Architectural Finishes.

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² *Annual Book of ASTM Standards*, Vol 06.01.

³ *Annual Book of ASTM Standards*, Vol 05.01.

⁴ *Annual Book of ASTM Standards*, Vol 06.03.

⁵ *Annual Book of ASTM Standards*, Vol 06.02.





D 1186 Test Methods for Nondestructive Measurement of Dry Film Thickness of Nonmagnetic Coatings Applied to a Ferrous Base²
D 1210 Test Method for Fineness of Dispersion of Pigment-Vehicle Systems by Hegman-Type Gage²
D 1211 Test Method for Temperature-Change Resistance of Clear Nitrocellulose Lacquer Films Applied to Wood⁵
D 1212 Test Methods for Measurement of Wet Film Thickness of Organic Coatings²
D 1296 Test Method for Odor of Volatile Solvents and Diluents⁶
D 1308 Test Method for Effect of Household Chemicals on Clear and Pigmented Organic Finishes⁵
D 1400 Test Method for Nondestructive Measurement of Dry Film Thickness of Nonconductive Coatings Applied to a Nonferrous Metal Base²
D 1475 Test Method for Density of Liquid Coatings, Ink, and Related Products²
D 1644 Test Methods for Nonvolatile Content of Varnishes⁷
D 1729 Practice for Visual Evaluation of Color Differences of Opaque Materials²
D 1849 Test Method for Package Stability of Paint⁵
D 2196 Test Methods for Rheological Properties of Non-Newtonian Materials by Rotational (Brookfield) Viscometer²
D 2244 Test Method for Calculation of Color Differences from Instrumentally Measured Color Coordinates²
D 2247 Practice for Testing Water Resistance of Coatings in 100 % Relative Humidity²
D 2486 Test Method for Scrub Resistance of Interior Latex Flat Wall Paints⁵
D 2794 Test Method for Resistance of Organic Coatings to Effects of Rapid Deformation (Impact)²
D 2805 Test Method for Hiding Power of Paints by Reflectometry²
D 3273 Test Method for Resistance to Growth of Mold on the Surface of Interior Coatings in an Environmental Chamber²
D 3278 Test Method for Flash Point of Liquids by Small Scale Closed Cup Apparatus²
D 3432 Test Method for Unreacted Toluene Diisocyanate in Urethane Prepolymers and Coating Solutions by Gas Chromatography⁴
D 3450 Test Method for Washability Properties of Interior Architectural Coatings⁵
D 3925 Practice for Sampling Liquid Paints and Related Pigmented Coatings²
D 3928 Test Method for Evaluation of Gloss or Sheen Uniformity⁵
D 4060 Test Method for Abrasion Resistance of Organic Coatings by the Taber Abraser²
D 4062 Test Method for Leveling of Paints by Draw-Down Method⁵
D 4213 Test Method for Scrub Resistance of Paints by Abrasion Weight Loss⁵

D 4287 Test Method for High Shear Viscosity Using the ICI Cone/Plate Viscometer²
D 4400 Test Method for Sag Resistance of Paints Using a Multinotch Applicator⁵
D 4541 Test Method for Pull-Off Strength of Coatings Using Portable Adhesion Testers⁵
D 4707 Test Method for Measuring Paint Spatter Resistance During Roller Application⁵
D 4828 Test Method for Practical Washability of Organic Coatings⁵
D 4958 Test Method for Comparison of the Brush Drag of Latex Paints⁵
E 84 Test Method for Surface Burning Characteristics of Building Materials⁸
E 105 Practice for Probability Sampling of Materials⁹
E 313 Practice for Calculating Yellowness and Whiteness Indices from Instrumentally Measured Color Coordinates²
E 1347 Test Method for Color and Color-Difference Measurement by Tristimulus (Filter) Colorimetry²
2.2 *U.S. Federal Standard:*
Federal Test Method Standard No. 141¹⁰
2112 Application by Roller
2131 Application of Sprayed Films
2141 Application of Brushed Films
3011 Condition in Container
4203 Reducibility and Dilution Stability
4401 Odor Test
4541 Working Properties and Appearance of Dried Film
6141 Washability of Paints
6142 Scrub Resistance
2.3 *U. S. Federal Specification:*
TT-F-1098 Filler, Block Solvent-Thinned for Porous Surfaces¹⁰

3. Terminology

3.1 Definitions:

3.1.1 For definitions of terms used in these practices, refer to Terminology D 16.

4. Conditions Affecting Performance of HIPAC Coating Systems

4.1 Practical requirements for high performance coatings may vary with:

4.1.1 Substrate type such as concrete, poured or precast block, lime-gypsum plaster, etc.

4.1.2 Climatic conditions, both generally and specifically, at the time of coating application. ASTM standard conditions for laboratory testing are 73.5 ± 3.5°F (23 ± 2°C) and 50 ± 5 % relative humidity.

5. Sampling

5.1 Prior to sampling, establish the condition of the container since damage to it may cause evaporation, skinning, or

⁶ Annual Book of ASTM Standards, Vol 06.04.

⁷ Discontinued; see 1997 Annual Book of ASTM Standards, Vol 06.01.

⁸ Annual Book of ASTM Standards, Vol 04.07.

⁹ Annual Book of ASTM Standards, Vol 14.02.

¹⁰ Available from Standardization Documents Order Desk, Bldg. 4 Section D, 700 Robbins Ave., Philadelphia, PA 19111-5094.



TABLE 1 List of Standards in Sectional Order

Property (or Related Test)	Section	ASTM Test Method	Federal Test Method Standard No. 141
Sampling:	6.2	D 3925	1022
Liquid Paint Properties:			
Skinning	7.1	D 154	
Condition in container	7.2	...	3011
Coarse particles and foreign matter	7.3	D 185	
Density or weight per gallon	7.4	D 1475	
Fineness of dispersion	7.5	D 1210	
Odor	7.6	D 1296	4401
Flash point	7.7	D 93, D 3278	
Dilution stability	7.8	...	4203
Volatile content	7.9	D 1644	...
Free diisocyanate content	7.10	D 3432	...
Package stability	7.11		
Heat stability	7.11.1	D 1849	
Settling	7.11.2	D 869	
Coating Application and Film Formation:			
Application properties	8.1	...	4541
Brush application	8.1.1	...	2141
Brush drag	8.1.1.1	D 4958	...
Roller application	8.1.2	...	2112
Roller spatter	8.1.2.1	D 4707	...
Spray application	8.1.3	...	2131
Rheological properties	8.2	...	...
Consistency (low-shear viscosity)	8.2.1	D 562	...
Rheological properties of non-Newtonian liquids	8.2.2	D 2196, D 4287	...
Sag resistance	8.2.3	D 4400	...
Leveling properties	8.2.4	D 4062	...
Curing properties	8.3	...	...
Wet-film thickness	8.4	D 1212	...
Touch-up uniformity	8.5	D 3928	
Appearance of Dry Coating:			
Color appearance	9.1.1	...	...
Color differences by visual comparison	9.1.2	D 1729	...
Color differences using instrumental measurements	9.1.3	D 2244	...
Directional reflectance	9.2	E 1347	...
Gloss, 60°	9.3	D 523	...
Hiding power	9.4	D 344, D 2805	...
Yellowness index	9.5	E 313	
Properties of Dry Film:			
Abrasion resistance	10.1	D 4060	...
Adhesion	10.2	D 4541	...
Impact resistance	10.3	D 2794	...
Chemical resistance	10.4	D 1308	...
Washability and cleansability	10.5	...	...
Washability	10.5.1	D 2486, D 4213	...
Cleansability	10.5.2	D 3450, D 4828	...
Mildew resistance	10.6	D 3273	...
Perspiration resistance	10.7	...	...
Heat and cold resistance	10.8	D 1211	...
Heat and humidity resistance	10.9	D 2247	...
Fire hazards	10.10	E 84	
Dry-film thickness	10.11	D 1005, D 1186, D 1400	

other undesirable effects. Excessive storage time and temperature fluctuations may cause settling or changes in viscosity.

5.2 Sample in accordance with Practice D 3925. Determine the density in pounds per gallon (kilograms/litre) in accordance with Test Method D 1475. Continue sampling and determining density until successive results agree within 0.1 lb (45 g) or as agreed upon between the purchaser and seller. Then take samples for testing.

5.3 Specify the amount required for a representative sample, the package sizes, and an identification code. A 1-U.S. gal (or

4-L) sample is usually sufficient for the recommended tests, but for guidance in selecting a sampling plan consult Practice E 105.

6. Laboratory Tests

6.1 Preparation of Test Panels:

6.1.1 Unless otherwise specified, test panels shall be 1½ by 7½ by 15½-in. (40 by 190 by 395-mm) masonry units made from standard lightweight concrete block, having an apparent specific gravity of 1.60 to 1.62.

