



Designation: D6531 – 00 (Reapproved 2005)

Standard Test Method for Relative Tinting Strength of Aqueous Ink Systems by Instrumental Measurement¹

This standard is issued under the fixed designation D6531; 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 test method covers the procedure for determining the relative tinting strength of waterbased ink systems using a computer-aided spectrophotometer.

1.2 This test method is applicable to waterbased printing inks and bases to be used primarily in flexographic and gravure printing applications.

1.3 This test method applies only to single, non-fluorescent pigmented colors and black ink systems for which there is a reference standard containing a pigment of the identical color index name and number.

1.4 The procedure in this test method specifies placing tinted samples in a cuvette for spectrophotometric measurements. The use of thick wet drawdowns as in Test Methods D2066 are inappropriate due to severe floating problems with aqueous systems.

1.5 The values stated in SI units are to be regarded as standard. No other units of measurement are included in this standard.

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.*

2. Referenced Documents

2.1 *ASTM Standards:*²

D2066 Test Methods for Relative Tinting Strength of Paste-Type Printing Ink Dispersions

D2244 Practice for Calculation of Color Tolerances and Color Differences from Instrumentally Measured Color Coordinates

¹ This test method is under the jurisdiction of ASTM Committee D01 on Paint and Related Coatings, Materials, and Applications and is the direct responsibility of Subcommittee D01.56 on Printing Inks.

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² For referenced ASTM standards, visit the ASTM website, www.astm.org, or contact ASTM Customer Service at service@astm.org. For *Annual Book of ASTM Standards* volume information, refer to the standard's Document Summary page on the ASTM website.

E691 Practice for Conducting an Interlaboratory Study to Determine the Precision of a Test Method

E1331 Test Method for Reflectance Factor and Color by Spectrophotometry Using Hemispherical Geometry

E1347 Test Method for Color and Color-Difference Measurement by Tristimulus Colorimetry

E1349 Test Method for Reflectance Factor and Color by Spectrophotometry Using Bidirectional (45°:0° or 0°:45°) Geometry

3. Terminology

3.1 Definitions related to color differences are covered in Practice D2244. The definitions of tinting strength terms are given in Test Methods D2066.

4. Summary of Test Method

4.1 A standard and unknown samples are each reduced to the same concentration in a white tinting base then dispersed on a paint shaker.

4.2 The dispersed samples are transferred to cuvettes for reflectance measurements on a spectrophotometer. Hue and strength relative to the standard tint are computed.

NOTE 1—The hue readings indicate the closeness of the unknown sample to that of the standard.

5. Significance and Use

5.1 Tinting strength is an essential property of printing ink dispersions. Although results on bulk tints do not guarantee equivalency of dry printed films, they provide useful parameters for quality control of production batches of bases and finished inks. Test results may also be used for color matching purposes.

6. Apparatus

6.1 *Glass Jars*, capacity approx. 64 g, 33 mm in diameter by 70 mm in height, with screw cap lids.

6.2 *Paint Shaker*.

6.3 *Spectrophotometer*, with small-area view (10-mm aperture, diffuse/8° geometry) and with a computer and software to measure reflectance factor, calculate color differences by CIELAB 1976 equation. Tinting strength is calculated by a