



Standard Test Method for Reflection Density of Printed Matter¹

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1. Scope*

1.1 This test method describes a procedure for measuring reflection density of printed matter using a reflection densitometer or spectrodensitometer.

1.2 This test method is intended primarily for process colors (yellow, magenta and cyan) and black. With appropriate instrumentation, it may also be used for other colors.

1.3 This test method applies to prints made by any printing process on a flat surface, with reflection density values ranging from just above zero, on the unprinted substrate, through to around 2.5 for very dense prints.

1.4 This test method can be used for prints on paper, film or board but not for those on metal or foil. It can be conducted in the pressroom or laboratory.

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 prior to use.*

2. Referenced Documents

2.1 *ASTM Standards:*²

E284 Terminology of Appearance

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

2.2 *ANSI Standards:*³

CGATS.4-1993 Graphic Technology – Graphic Arts Reflection Densitometry Measurements — Terminology,

Equations, Image Elements and Procedures

CGATS.6 Graphic Technology — Specifications for Graphic Arts Printing

CGATS.11-1999 Graphic Technology — Certified Reference Materials for Reflection and Transmission Metrology – Documentation Requirements and Recommended Procedures

PH 2.17 Geometric Conditions for Reflection Density

PH 2.18 Spectral Conditions for the Measurement of Optical Density

2.3 *ISO Standard:*³

ISO 15790 Graphic technology and photography — Certified reference materials for reflection and transmission metrology — Documentation and procedures for use, including determination of combined standard uncertainty

2.4 *Other Standard:*³

DIN 16536-2:1986 Testing of prints and printing inks in graphic technology — Colour density measurements on on-press or off-press prints

3. Terminology

3.1 Definitions related to appearance are in Terminology E284.

3.2 *Definitions of Terms Specific to This Standard:*

3.2.1 *reflection density, n*—the light-absorbing property of a material, expressed as the logarithm of the reciprocal of the reflectance factor (i.e. higher density indicates more light is absorbed). [$D = \log_{10} (1/R) = -\log_{10} (R)$]

3.2.2 *reflection densitometry, n*—the practice of characterizing the amount of light absorption of materials by measuring reflectance and calculating and reporting reflection density.

3.2.3 *spectrodensitometer, n*—a spectrophotometer with appropriate software to convert the measured reflectance values to reflection density.

3.2.4 *process color, n*—a color having the main attribute of absorbing approximately one-third (1/3) the visible spectrum and transmitting the other two-thirds (2/3).

3.2.5 *dry back, n*—the reduction in density that occurs over time after printing on paper and other absorbent substrates due to ink penetration into the substrate.

3.2.6 *status T, n*—an ISO Reflection Status Density.

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.

³ Available from American National Standards Institute (ANSI), 25 W. 43rd St., 4th Floor, New York, NY 10036, <http://www.ansi.org>.