



Standard Test Method for Fineness of Grind of Printing Inks By the NPIRI Grindometer¹

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1. Scope*

1.1 This test method describes the procedure for determining the fineness of grind of printing inks using a NPIRI Grindometer. It evaluates the size of the largest particles in a finished dispersion but not average particle size or concentration of sizes.

1.2 This test method covers both manual and automatic drawdowns using an A1 scraper.

1.3 This test method is applicable to any dispersion that is fine enough to fall within the 0–25 μm range of the specified grind gauge. With a minor variation in procedure, it is applicable to both paste (nonvolatile) and liquid (volatile) inks.

NOTE 1—The 0–25 μm gauge specified in this test method is similar in principle to the 0–100 μm Hegman gauge described in Test Method D1210 and the various gauges described in ISO 1524:2000. Sieve analysis for concentration of particles above 45 μm is covered in Test Method D2067.

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:²

D1210 Test Method for Fineness of Dispersion of Pigment-Vehicle Systems by Hegman-Type Gage

D2067 Test Method for Coarse Particles in Printing Ink Dispersions

D6846 Practice for Preparing Prints of Paste Printing Inks with a Printing Gage

E177 Practice for Use of the Terms Precision and Bias in ASTM Test Methods

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

2.2 ISO Standards:³

ISO 1524:2000 Paints, varnishes and printing inks — Determination of fineness of grind

3. Terminology

3.1 *Definitions of Terms Specific to This Standard:*

3.1.1 *fineness of grind, n*—a measure of the size and prevalence of oversize particles in a printing ink dispersion.

3.1.2 *NPIRI grind unit (gu), n*—the distance equal to 2.5 μm or 0.1 mils on a grind gauge.

3.1.3 *scratch, n*—a depression at least 10 mm in length in the surface of a grind gauge drawdown.

3.1.3.1 *Discussion*—A scratch develops when a particle (or agglomerate) is trapped between the blade and the bottom of the path and is drawn along by the blade.

3.1.4 *speckle, n*—protuberance of particles above the surface of a grind gauge drawdown.

3.1.4.1 *Discussion*—Speckles occur at gauge depths greater than those at which scratches occur and are caused by oversize particles that are not hard enough or of the proper size to produce scratches.

4. Summary of Test Method

4.1 This test method utilizes a NPIRI Grindometer having two precision machined grooves each 25.4 mm (1 in.) wide and with a 0–25 μm (0–1 mil) taper. The test specimen is drawn down the paths slowly if a nonvolatile (paste) ink, briskly if a volatile (liquid) ink. The drawdowns are examined for the scale readings at which four and ten scratches appear and at which a preponderance of speckles disappear. A single determination of fineness of grind requires readings from four paths and the computation of an arithmetical mean.

5. Significance and Use

5.1 Oversize particles in a printing ink may damage a printing plate, plug a cell, clog a nozzle and adversely affect the

³ Available from International Organization for Standardization (ISO), 1, ch. de la Voie-Creuse, Case postale 56, CH-1211, Geneva 20, Switzerland, <http://www.iso.ch>.

*A Summary of Changes section appears at the end of this standard