



Designation: D1316 – 20

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

This standard is issued under the fixed designation D1316; 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 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 to 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 to 25 μm gauge specified in this test method is similar in principle to the 0 to 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, health, and environmental practices and determine the applicability of regulatory limitations prior to use.*

1.5 *This international standard was developed in accordance with internationally recognized principles on standardization established in the Decision on Principles for the Development of International Standards, Guides and Recommendations issued by the World Trade Organization Technical Barriers to Trade (TBT) Committee.*

2. Referenced Documents

2.1 ASTM Standards:²

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.

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

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 to 25 μm (0 to 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

³ Available from International Organization for Standardization (ISO), ISO Central Secretariat, BIBC II, Chemin de Blandonnet 8, CP 401, 1214 Vernier, Geneva, Switzerland, <http://www.iso.org>.