



Designation: D1210 – 05 (Reapproved 2022)

Standard Test Method for Fineness of Dispersion of Pigment-Vehicle Systems by Hegman-Type Gage¹

This standard is issued under the fixed designation D1210; 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.

This standard has been approved for use by agencies of the U.S. Department of Defense.

1. Scope

1.1 This test method covers measurement of the degree of dispersion (commonly referred to as “fineness of grind”) of the pigment in a pigment-vehicle system such as liquid coatings and their intermediates. It may also be used to assess the inclusion of particulates by a cleanliness (or texture) rating.

1.2 The values stated in SI units are to be regarded as the standard. The values given in parentheses are for information only.

1.3 *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.*

1.4 *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

D1316 Test Method for Fineness of Grind of Printing Inks
By the NPIRI Grindometer

3. Summary of Test Method

3.1 *Tapered Gage*—The product is spread by means of a scraper in a machined tapered path. At some point in this path, particles or agglomerates, or both, will become visible. A direct reading from the graduated scale is then made at the point

where the particles form a definite pattern. When the single path gage is used it is also possible to rate “cleanliness” (see 6.2).

3.2 *Stepped Gage*—The product is spread by means of a scraper on a stepped gage. There are 2 delimited sections on this gage, each of 6.5 cm² (1 in.²) area, and of two different depths. A count is made of the particles deposited in the two delimited areas, and cleanliness (texture) reading is determined.

4. Significance and Use

4.1 In making pigmented products, the pigment is usually dispersed in a portion of the vehicle in some sort of mill. At this stage, it is necessary to be able to judge if the pigment agglomerates have been sufficiently broken up so as not to interfere with the smoothness of the finished coating film. This test method describes a way of making this judgment.

5. Apparatus

5.1 *Tapered Gage*—A hardened steel, stainless steel, or chrome-plated steel block (Fig. 1) approximately 170 mm (6.7 in.) in length, and 15 mm (0.6 in.) in thickness. The top surface of the block shall be ground smooth and planar and shall contain one or two paths 127 mm (5 in.) in calibrated length. The path shall be tapered uniformly in depth lengthwise from about 4 mils (100 μ m) at 10 mm from one end to zero depth at the other with intermediate calibrations in accordance with the depth at those points. Preferred calibrations are Hegman units and micrometers (Note 1). Three path widths are covered by this test method:

5.1.1 *Two Parallel Paths*, each 12.5-mm (0.5-in.) wide and spaced 0.5-in. apart centered in a block 65-mm (2.5-in.) wide (see Fig. 1).

5.1.2 *One Path*, 50 mm (2 in.) in width centered in a block 90-mm (3.5-in.) wide (see Fig. 1).

5.1.3 *One Path*, 25 mm (1 in.) in width centered in a block 65-mm (2.5-in.) wide (see Fig. 1a).

NOTE 1—Several arbitrary scales and modifications of the gage are used by industry. In order that readings obtained with these arbitrary scales and modifications can be reported in the preferred units, the approximate

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 D01.24 on Physical Properties of Liquid Paints & Paint Materials.

Current edition approved July 1, 2022. Published July 2022. Originally approved in 1952. Last previous edition approved in 2014 as D1210 – 05 (2014). DOI: 10.1520/D1210-05R22.

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.

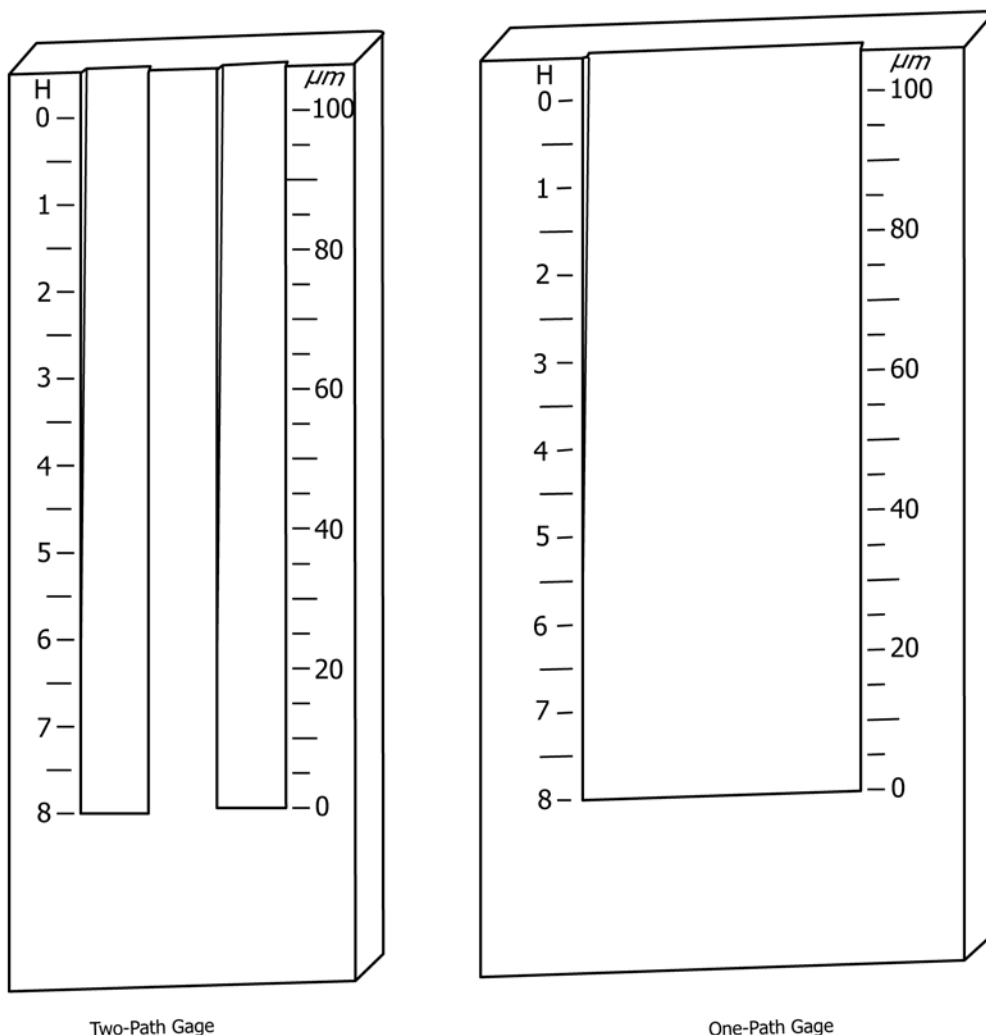


FIG. 1 Fineness Gages

relationship of these scales to gage depth is shown in the following example:

Hegman Scale ^A	Depth, μm ^B	Depth, mils ^B	PC or FSPT Scale ^C	NPIRI Scale ^D
0	100	4	0	40
1	90	3.5	1¼	35
2	75	3	2½	30
3	65	2.5	3¾	25
4	50	2	5	20
5	40	1.5	6¾	15
6	25	1	7½	10
7	15	0.5	8¾	5
8	0	0	10	0

^A Sometimes referred to in error as the North Standard scale.

^B Rounded to nearest 5 μm or 0.5 mil.

^C Federation of Societies for Paint Technology scale.

^D National Printing Ink Research Institute scale, 0 to 10 on the NPIRI Production Grindometer, but extended on many gages to 20 or 30 (see Test Method D1316).

5.2 Stepped Gage—A hardened steel, stainless steel, or chrome-plated steel block (Fig. 1a), approximately 170 mm (6.7 in.) in length, and 15 mm (0.6 in.) in thickness. A path

25-mm (1-in.) wide shall be cut the length of, and centered in a block 65-mm (2.5-in.) wide. The path will be cut to two different depths, each for half of its length. The two depths will be 3 mils, and 1 mil, or as agreed upon between the buyer and the seller. There shall be two tick marks, above and below the “step,” and spaced 25 mm (1 in.) from it.

5.3 Scraper—A double-edged hardened steel, stainless steel, or chrome-plated steel blade (Fig. 2) 95-mm (3.75-in.) long, 40-mm (1.5-in.) wide, and 6.4-mm (0.25-in.) thick. The two edges on the 3.75-in. sides shall be rounded to a radius of 0.38 mm (0.015 in.).

5.4 Illumination—The gage shall be illuminated for viewing with a fluorescent tube, mounted approximately 250 mm (10 in.) above the gage with the length of the tube parallel to the length of the gage. The tube will be mounted so that the angle between the plane of the gage, and the tube is 75 to 80°. A