Designation: D 3022 – 84 (Reapproved 1996)ε1

Standard Test Method for Color and Strength of Color Pigments by Use of a Miniature Sandmill[1]

This standard is issued under the fixed designation D 3022; 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.

ε[1] NOTE—Editorial changes and Keywords were added in December 1996.

1. Scope

1.1 This test method covers the determination, through the use of a miniature sandmill, of the color and strength of dry color pigments.

1.2 The values stated in inch-pound 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 and health practices and determine the applicability of regulatory limitations prior to use.* For specific hazard statements, see Section 6.

2. Referenced Documents

2.1 *ASTM Standards:*

C 778 Specification for Standard Sand[2]

D 235 Specification for Mineral Spirits (Petroleum Spirits) (Hydrocarbon Dry Cleaning Solvent)[3]

D 523 Test Method for Specular Gloss[4]

D 2244 Test Method for Calculation of Color Differences from Instrumentally Measured Color Coordinates[4]

E 97 Test Method for Directional Reflectance Factor, 45-deg 0-deg, of Opaque Specimens by Broad-Band Filter Reflectometry[5]

E 308 Practice for Computing the Colors of Objects by Using the CIE System[4]

2.2 *Federal Specification:*[6]

TT-R-266 Resin, Alkyd; Solutions

2.3 ASTM Adjuncts:

Miniature sandmill[7]

3. Significance and Use

3.1 This test method is a way of testing the color and strength of pigments by use of a miniature sandmill. It correlates well with industrial practice and is used for routine quality control.

4. Apparatus

4.1 *Balance*, sensitive to 10 mg with a capacity in excess of 300 g.

4.2 *Miniature Sandmill*—A laboratory disperser equipped with a 1⅝-in. (41-mm) diameter fiber rotary disk impeller rotating at a constant 8000 r/min under varying load conditions. The shaft upon which the impeller is mounted shall be sufficiently balanced so no whip of the shaft is observed between 0 and 10 000 r/min.

4.3 *Cylinder*, 100-mL graduated.

4.4 *Beakers*, 200-mL tall-form, stainless steel, or polyethylene (approximately 60-mm inside diameter).

4.5 *Strainers*, paper cone, disposable, about 40 mesh.

4.6 *Fiber Disks*, 1⅝-in. (41-mm) diameter phenolic laminated, ¼ in. (6 mm) thick.[8]

4.7 *Paper Charts*, smooth, surface-coated, the surface of which should be impervious to paint liquids.[9]

4.8 *Film Applicator*, with an 8-mil (200-μm) clearance at least 3 in. (75 mm) wide.

4.9 *Color-Measuring Instruments*, as defined in Test Method E 97 or Practice E 308.

[1] This test method is under the jurisdiction of ASTM Committee D-1 on Paint and Related Coatings, Materials, and Applications and is the direct responsibility of Subcommittee D01.26 on Optical Properties.

Current edition approved April 27, 1984. Published July 1984. Originally published as D 3022 – 72. Last previous edition D 3022 – 72 (1978).

[2] *Annual Book of ASTM Standards*, Vol 04.01.

[3] *Annual Book of ASTM Standards*, Vol 06.04.

[4] *Annual Book of ASTM Standards*, Vol 06.01.

[5] Discontinued; see *1992 Annual Book of ASTM Standards*, Vol 14.02.

[6] Available from Standardization Documents Order Desk, Bldg. 4 Section D, 700 Robbins Ave., Philadelphia, PA 19111-5094.

[7] Drawings are available from ASTM Headquarters. Order Adjunct ADJD3022.

[8] The sole source of supply of the disks known to the committee at this time is Gardner/BYK-Gardner, Inc., Gardner Laboratory, 2435 Linden Lane, Silver Spring, MD 20910. If you are aware of alternative suppliers, please provide this information to ASTM Headquarters. Your comments will receive careful consideration at a meeting of the responsible technical committee,[1] which you may attend.

[9] The sole source of supply of the white and black charts known to the committee at this time is the Leneta Co., 15 Whitney Rd., Mahwah, NJ 07430. If you are aware of alternative suppliers, please provide this information to ASTM Headquarters. Your comments will receive careful consideration at a meeting of the responsible technical committee,[1] which you may attend.

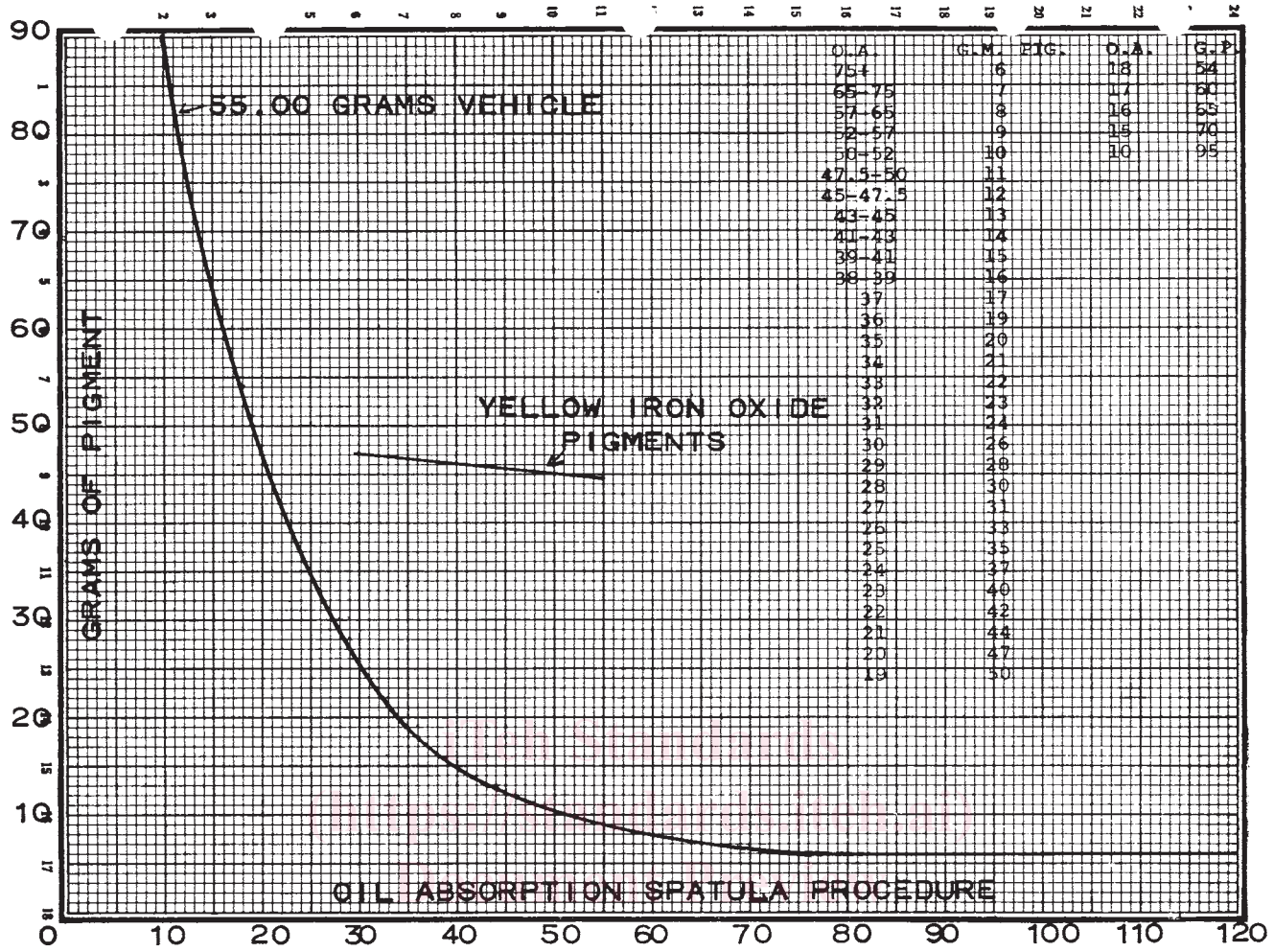

FIG. 1 Oil Absorption Spatula Procedure

5. Materials

5.1 Samples of standard reference pigments as agreed upon between the purchaser and the seller.

5.2 *Standard Sand*[10]—Regular 20 to 30-mesh (850 to 600-μm) cement testing sand conforming to Specification C 778. The sand shall be screened to remove all sub 30-mesh particles. Twenty to thirty-mesh glass beads may be used instead of sand.[11]

5.3 *Grinding Vehicle*—A long oil alkyd[12] meeting U.S. Fed. Spec. TT-R-266 Type 1-A reduced to 47 % solids with mineral spirits conforming to Specification D 235 (2 parts alkyd and 1 part mineral spirits by weight).

5.4 *White Tinting Paint*—A flat white tinting paint compatible with the dispersion vehicle meeting the following requirements.

5.4.1 *Gloss (60°)* less than 4, as determined by Test Method D 523.

5.4.2 *Contrast Ratio* (2-mil (51-μm) dry film): 99.2 min.

5.5 *Drier Blend*—One part 6 % manganese naphthenate, 2 parts 6 % cobalt naphthenate, and 4 parts 24 % lead naphthenate by weight.

6. Hazards

6.1 While operating the mill, keep hands well away from the shaft and disk and be sure that no article of clothing (for example, necktie or long hair) will catch on moving parts. This precaution applies to all cases where the mill is in operation.

7. Procedure for Mass Color

7.1 Weigh to the nearest 10 mg an appropriate amount of pigment to be tested into a 200-mL tall-form beaker. (The amount of pigment needed can be calculated from the graph shown in Fig. 1 or obtained from the table on the graph.) To the pigment in the beaker carefully weigh in 55.00 ± 0.01 g of the

[10] The sole source of supply of the sand known to the committee at this time is Agsco Division, American Graded Sand Co., 189 E. 7th St., Patterson, NJ 07524. If you are aware of alternative suppliers, please provide this information to ASTM Headquarters. Your comments will receive careful consideration at a meeting of the responsible technical committee,[1] which you may attend.

[11] The sole source of supply of the glass beads known to the committee at this time is Quackenbusch Co., P. O. Box 607, Palatine, IL 60067. If you are aware of alternative suppliers, please provide this information to ASTM Headquarters. Your comments will receive careful consideration at a meeting of the responsible technical committee,[1] which you may attend.

[12] A long oil soya or safflower alkyd at 70 % solids with the following characteristics: Nonvolatile 70 ± 1 %, phthalic anhydride 23 % min, fatty acids 60 to 65 %, dihydric alcohol 4 % max, acid number 5 to 10, specific gravity 0.950–0.970, Gardner color 10.