Designation: ~~D1155 – 10~~ D1155 – 10 (Reapproved 2015)

Standard Test Method for Roundness of Glass Spheres[1]

This standard is issued under the fixed designation D1155; 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[2] covers the determination of the percent of true spheres in glass spheres used for retroreflective marking purposes and industrial uses.

1.2 This test method includes two procedures as follows:

1.2.1 *Procedure A,* in which the selected specimen is split into two size ranges or groups prior to separation into true spheres and irregular particles, and

1.2.2 *Procedure B,* in which the selected specimen is split into five size ranges or groups prior to separation.

1.2.3 In determining compliance with specification requirements, either Procedure A or Procedure B may be used. Where tests indicate failure to meet the specified percent of true spheres and irregular particles, the referee test shall be made in accordance with Procedure B.

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

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:*[3]

E11 Specification for Woven Wire Test Sieve Cloth and Test Sieves

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 *Other Document:*

ASTM MNL32 Manual on Test Sieving Methods

3. Summary of Test Method

3.1 The glass particles are mechanically separated into true spheres and irregular particles by controlled vibration on a glass plate fixed at a predetermined slope.

4. Significance and Use

4.1 The roundness of glass spheres is one measurable aspect relating to their performance as a retroreflective media. The function of this test method is to measure the percent of true spheres as related to compliance with applicable specifications.

NOTE 1—This method has been used in other industrial areas outside the intended scope of this test method.

5. Apparatus (Fig. 1)

5.1 *Electrical Feeder-Vibrator,* upon which is mounted a smooth glass panel, 152.4 mm (6 in.) wide and 381 mm (15 in.) long.

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[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 D01.44 on Traffic Coatings.

Current edition approved ~~July 1, 2010~~June 1, 2015. Published ~~September 2010~~June 2015. Originally approved in 1951. Last previous edition approved in ~~2003~~2010 as ~~D1155 – 03.~~D1155 – 10. DOI: ~~10.1520/D1155-10.~~10.1520/D1155-10R15.

[2] For information on the development of this test method, reference may be made to the paper by Keeley, A. E., "Roundness Testing of Glass Spheres," *ASTM Bulletin*, No. 174, May 1951, p. 72.

[3] 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.

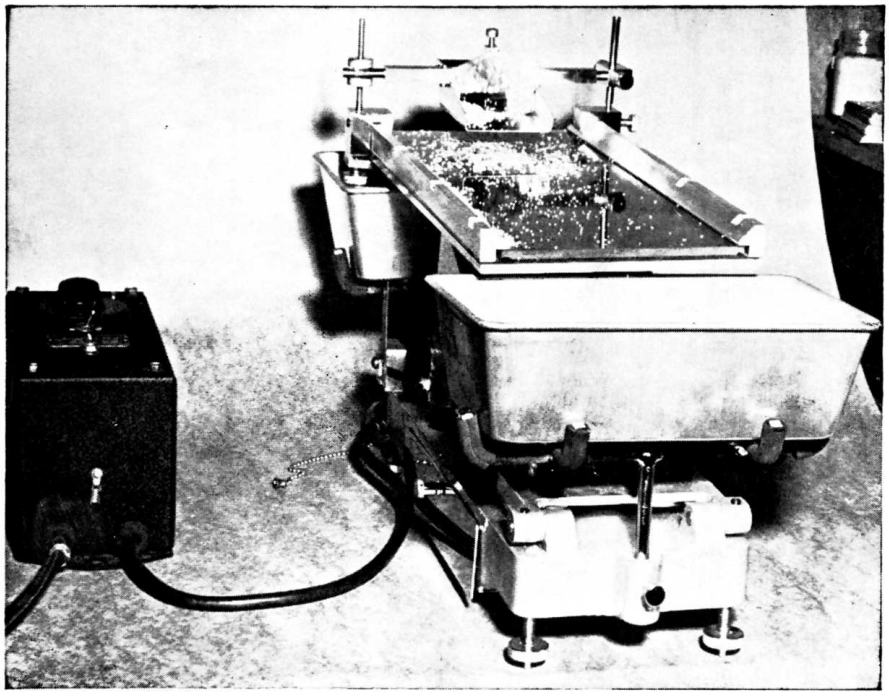

FIG. 1 Apparatus for Roundness Test of Glass Spheres

5.2 *Hinged Base,* supporting the vibrator and panel in such a manner that the angle of slope of the glass panel with the horizontal may be varied and fixed in any predetermined position.

5.3 *Vibrator*—Means of varying the amplitude or strength of the vibrations transmitted to the glass panel, at a fixed frequency of 60 impulses per second.

5.4 *Feeding Device or Pan (Optional),* affixed to the glass panel in such a manner that the selected sample of glass may be evenly dropped at a uniform rate upon the glass panel, from various heights above the panel and at various points on the slope.

5.5 *Collecting Pans or Containers,* at either end of the sloping panel, in which to collect the spheres and irregular particles.

5.6 *Digital Level,* approximately 30 to 60 cm (12 to 24 in.) in length (not shown).

6. Selection of Specimen

6.1 Select a specimen of approximately 10 to 50 g of the glass spheres to be tested for roundness in one of the following ways:

6.1.1 By mechanically splitting a bag or other container of glass spheres, selected at random from the shipment to be tested, or

6.1.2 By grain or seed-rod selection from the container.

6.1.3 The final sample for testing must be obtained using the appropriate sample splitters or reducers. Arrive as near as possible to the desired sample quantity for testing by only using this equipment.

6.1.4 When there is a need to obtain the highest degree of accuracy possible the operator should use a sample size that is closest to the 50 g size limit. In cases where there are disputes between the results obtained by two or more testing parties the maximum sample size should be used in order to settle the dispute.

7. Procedure A

7.1 Sieve the selected specimen through a 300-µm (No. 50) sieve (Note 2). Run the spheres retained on the sieve as one group, and run the spheres passing the sieve as a second group.

NOTE 2—Detailed requirements for ASTM sieves are given in Specification E11. The purchaser or specifying agency may require alternative sieve sizes to be used in lieu of the above reference sizes.

7.2 Level the glass panel; then set the angle of the roundometer plate to the 300-µm (50 U.S. Sieve) setting of 2.3 degrees (from the table in Fig. 2) using a digital level. Affix the feed hopper to the side of the panel at the upper one-third point of the slope, so that the spheres may be dropped in a uniform monolayer onto the glass panel from a height of approximately 13 mm (½ in.). Alternatively, the material may be manually fed by slowly pouring from a height of 13 mm (½ in.) to a point in the center of the plate one-third down from the uphill end.