Designation: E677 – 94 (Reapproved 2004)

Standard Specification for Interchangeable Spherical Ground Joints[1]

This standard is issued under the fixed designation E677; 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 specification covers standard dimensional requirements for obtaining, within practical limits, interchangeability in spherical ground joints for ordinary laboratory and industrial applications. It covers dimensional interchangeability of the ground surfaces only and does not involve design characteristics of the item except where specified, nor does it involve physical or chemical characteristics of the material used.

NOTE 1—The dimensions pertaining to spherical ground joints were taken from the Commercial Standard CS 21–58 of the U.S. Department of Commerce.

NOTE 2—Although glass is the most commonly used material for ground joints, other materials may be used as specified. Spherical joints constructed from glass shall conform to Specifications E438 and E671.

1.2 The following precautionary caveat pertains only to the Test Method portion, Section 4, of this specification. *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]

E438 Specification for Glasses in Laboratory Apparatus

E671 Specification for Maximum Permissible Thermal Residual Stress in Annealed Glass Laboratory Apparatus

E920 Specification for Commercially Packaged Laboratory Apparatus

E921 Specification for Export Packaged Laboratory Apparatus

E1133 Practice for Performance Testing of Packaged Laboratory Apparatus for United States Government Procurements

E1157 Specification for Sampling and Testing of Reusable Laboratory Glassware

2.2 *U.S. Department of Commerce Standard:*

CS-21 Interchangeable Taper-Ground Joints, Stopcocks, Stoppers, and Spherical-Ground Joints[3]

3. Requirements

3.1 *Socket Member*—The design of the socket member is shown in Fig. 1. The contour of the ground area shall be spherical, with a radius of curvature equal to one half of the gaging ball diameter specified in Table 1 as a minimum. The contour of the shoulder shall be essentially spherical and concentric with the ground area. When tested in accordance with 4.2, socket members shall show a continuous circumferential line of contact with the gaging ball.

3.2 *Ball Member*—The design of the ball member is shown in Fig. 1. The contour of the ground area shall be spherical, with a radius of curvature equal to one half of the gaging ball diameter as specified in Table 1 as a maximum. The contour of the shoulder shall be essentially spherical, approximately concentric with the ground area and with a slightly smaller radius to provide a short offset at or slightly beyond the line of the gaging diameter. Ball members shall meet the reduced pressure test (4.3) when assembled with a socket member complying with 3.1.

3.3 *Size Designation*—The size designation of joints shall be the accepted nominal gaging diameter, plus the inside diameter of the joint within the ball member, both expressed in millimetres and separated by a line. Therefore, the designation 18/7 means that the nominal gaging diameter of the joint is 18 mm and the inside diameter of the joint is 7 mm.

3.4 *Dimensions*—The size designations and essential dimensions of joints are shown in Table 1. Only the sizes listed shall be considered standard.

3.5 *Interchangeability*—When assembled ball-and-socket members are paired at random and tested under reduced pressure, the leak rates shall not exceed those specified in 4.3.

4. Test Methods

4.1 *Gaging the Ball*—Gaging balls shall have dimensions and tolerances shown in Table 1.

4.2 *Gaging the Socket*—Sockets shall be tested against a gaging ball. The ball shall enter the socket and the line of

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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.

[3] *Discontinued 1979*—U.S. Department of Commerce, Washington, DC 20234.