



Designation: C 1443 – 99

Standard Specification for Glasses, Portlight, Circular, Fully Tempered¹

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1. Scope

1.1 This specification covers the requirements for circular, fully tempered, high clarity, flat glasses used for portlight applications.

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

1.3 The following safety hazard caveat pertains only to the test method portion, Section 11, 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:

- C 162 Terminology of Glass and Glass Products²
- C 1036 Specification for Flat Glass²
- C 1048 Specification for Heat-Treated Flat Glass—Kind HS, Kind FT Coated and Uncoated Glass²
- C 1279 Test Method for Non-Destructive Photoelastic Measurement of Edge and Surface Stresses in Annealed, Heat Strengthened, and Full Tempered Glass²

2.2 ANSI Standard:

- ANSI Z1.4 Sampling Procedures and Tables for Inspection by Attributes (DOD Adopted)³

3. Terminology

3.1 *Definitions*—For definitions of terms used in this specification, refer to Terminology C 162 and also Specifications C 1036 and C 1048 and Test Method C 1279.

¹ This specification is under the jurisdiction of ASTM Committee C-14 on Glass and Glass Products and is the direct responsibility of Subcommittee C14.08 on Flat Glass.

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² *Annual Book of ASTM Standards*, Vol 15.02.

³ American National Standards Institute (ANSI), Inc., 11 W. 42nd St., New York, NY 10036.

4. Classification

4.1 Glasses covered by this specification shall be of the following types, as specified (see 5.1):

4.1.1 *Type I*—Plain edges, both faces polished,

4.1.2 *Type II*—Plain edge, one face polished, opposite face frosted,

4.1.3 *Type III*—Rabbeted edge, both faces polished, or

4.1.4 *Type IV*—Rabbeted edge, one face polished, opposite face frosted.

5. Ordering Information

5.1 Purchasers should select the preferred options permitted in this specification, and include the following information in procurement documents:

5.1.1 Title, number, and date of this specification,

5.1.2 Type of portlight glasses, as requested (see 4.1),

5.1.3 Dimensions of portlight glasses (see 8.1 and 9.3), and

5.1.4 Type, class, and quality of glass (see Specification C 1036) and heat treatment (see Specification C 1048).

5.2 *Samples*—If samples are to be supplied with bids, they should be specifically requested in the invitation for bids and the particular purpose to be served by the bid sample should be clearly stated.

6. Materials and Manufacture

6.1 *Material*—The glass used shall be glazing quality, float glass in accordance with the requirements for Specification C 1036, Type I, Class 1, quality q³ or higher, if required, and heat-treated Specification C 1048, kind FT.

6.2 *Marking*—Specimens shall exhibit the words “fully tempered” approximately ½ in. (12.7 mm) from the edge by means of etching or sand blasting. Marking shall be done before heat treating.

7. Other Requirements

7.1 *Breaking Strength*—Glasses shall exhibit satisfactory resistance to breakage (see 11.1.2.1).

7.2 *Surface and Edge Compression*—Type I and III glasses shall have a surface compression of not less than 10 000 psi or an edge compression of not less than 9700 psi (see 11.1.1.2).

7.3 *Clarity*—When glasses are tested (see 11.1.2.3), black and white lines of the clarity target shall be definitely distinguishable for all parts of the critical area.

7.4 *Warpage*—Glasses shall not exhibit more than $\frac{1}{32}$ in. (0.8 mm) warpage along any line on either face (see 11.1.2.3).

8. Dimensions

8.1 The dimensions of the specimens shall be as specified in 5.1. The thickness of a circular glass specimen shall not vary more than $\frac{1}{32}$ in. (0.8 mm) between any two points on its periphery. Dimensional tolerances for circular cut glasses shall not exceed values specified in Table 1 and Specification C 1036.

9. Finish and Appearance

9.1 *Finish*—Glasses shall be finished by grinding to the tolerances specified in 8.1. Edges shall be ground, with corners chamfered $\frac{1}{16}$ in. (1.6 mm).

9.2 *Types II and IV*—The designated faces of the glasses shall be uniformly frosted by sand blasting or etching.

9.3 *Types III and IV*—The edges of the glasses shall be rabbeted. The depth of the rabbet in the horizontal direction and in the vertical direction shall be specified by the purchaser (see 5.1.3). Depth dimensions for the rabbet shall be accurate to within $\frac{1}{32}$ in. (0.8 mm) when measured from the edge and from the face of the glass. One edge of the rabbet shall be perpendicular to the face of the glass and the other edge of the rabbet shall be perpendicular to the edge of the glass such that the angle formed by the faces of the rabbet is $90 \pm 2^\circ$.

10. Sampling

10.1 *Inspection Lot*—For purposes of inspection, a lot shall consist of not more than 1000 specimens which shall be of a single thickness, produced in a single plant and offered for delivery at one time.

10.1.1 *Sampling for Visual and Dimensional Examinations*—Samples shall be selected in accordance with the procedures of ANSI Z1.4 at inspection Level II for examination in accordance with 11.1.1.1.

10.1.2 *Sampling for Surface and Edge Stress*—Samples shall be selected at random in accordance with Table 2 for examination in accordance with 11.1.1.2. When a lot contains fewer than seven glasses, or when a special use (see 5.1) requires protection against defects, the sample shall consist of all specimens in the lot. Where the lot consists of between 7 and 50 glasses, the sample shall consist of 6 specimens. Where the lot consists of between 51 and 100 glasses, the sample shall consist of 14 specimens. Lots containing more than 100 glasses shall be evaluated by means of a sample of 10 specimens. Samples from lots consisting of more than 6 glasses shall contain a representative variety of types and diameters.

10.1.3 *Sampling for Test*—Sampling for all tests to be performed on specimens shall be in accordance with 10.1.2.

TABLE 1 Permitted Tolerances

Dimension	Tolerance, \pm in. (\pm mm)
Diameter	$\frac{1}{16}$ (1.6)
Depth of rabbet	$\frac{1}{32}$ (0.8)

TABLE 2 Sampling for Surface and Edge Stress Examination and Tests

Lot Size	Sample Size	Allowable Number of Failures for Surface and Edge Stress Examination	Allowable Number of Failures for Tests (Load, Clarity, Warpage)
1-6	all	none	none
7-50	6	none	load ^A
51-100	14		clarity: none ^B warpage: none ^C
101-1000	10	none	load ^A clarity: none ^B warpage: none ^C

^ASee 11.1.2.1.

^BSupplier may, at his option, test all remaining glasses in the lot for clarity in accordance with 11.1.2.2 and all glasses that pass shall be considered acceptable.

^CSupplier may, at his option, test all remaining glasses in the lot for warpage in accordance with 11.1.2.3 and all glasses that pass shall be considered acceptable.

11. Inspection, Acceptance and Rejection

11.1 *Responsibility*—The supplier is responsible for inspection of cut specimens unless otherwise specified in the contract or purchase order. Two forms of inspection are required: examination and test.

11.1.1 *Examination*—Inspection by examination shall consist of determining compliance with visual and dimensional requirements.

11.1.1.1 *Visual and Dimensional Examinations*—All specimens of a sample size selected in accordance with 10.1.1 shall be examined to verify conformance to all of the requirements which do not involve tests or polariscopic examination. The lot shall be accepted if all of the specimens in the sample (see 10.1.1) conform to visual requirements of Section 6.2 and Section 9 and dimensional requirements of Section 8. The lot shall be rejected if any of the specimens in the sample fail to conform to these requirements. If the lot is rejected on the basis of visual and dimensional examination, the supplier may at his option examine all remaining specimens of the lot to determine conformance with visual and dimensional requirements. Any of the specimens of the lot that comply with the visual and dimensional requirements shall be considered acceptable, subject to conformance with polariscopic examination requirements and test requirements.

11.1.1.2 *Surface and Edge Stresses, (Type I and Type III Glasses)*—All specimens of a sample size selected in accordance with 10.1.2 shall be subjected to surface or edge stress examination (see 7.2) to determine if they are fully tempered. It is suggested that Type III glasses be tested for surface stress. Test Method C 1279 is recommended for testing edge and surface stresses. If any glass specimen from a sample undergoing surface and edge stress examination does not meet the required values (see 7.2), the lot shall be rejected in accordance with criteria given in Table 2.

11.1.2 *Test Acceptance or Rejection*—Inspection by test shall consist of load, clarity, and warpage tests.

11.1.2.1 *Load Test*—All specimens of a sample size selected in accordance with 10.1.3 shall be tested under a load applied without shock using the jig illustrated in Fig. 1. Each of the specimens shall be placed centrally between the upper and lower steel beams which should be perpendicular as shown in