



## Standard Specification for Flat Glass<sup>1</sup>

This standard is issued under the fixed designation C1036; 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 ( $\epsilon$ ) 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.*

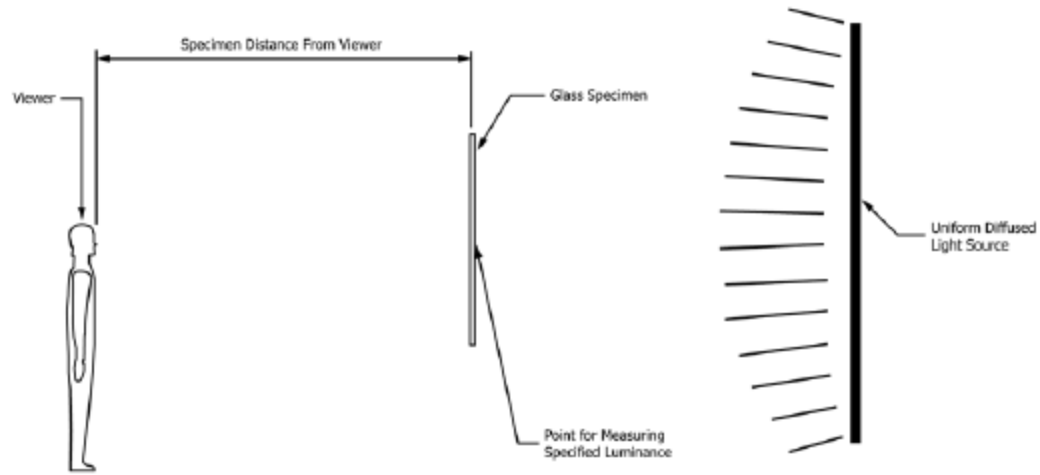
3.2.3 *blemish, n*—imperfection in the body or on the surface of the glass; for the purpose of this specification, blemishes are divided into two categories:

3.2.3.1 *linear blemish, n*—scratches, rubs, digs, and other similar imperfections, which may be straight or curved in nature. If curved, the length of such a blemish is to be measured from end to end along the curve.

3.2.3.2 *point blemish, n*—crush, knots, dirt, stones, gaseous inclusions, and other similar imperfections.

TABLE 1 Type I, Class 1 and 2 Quality and Use

Quality	Typical Use
Quality-Q1 (cut-size or stock sheets) <sup>a</sup>	Production of high-quality mirrors.
Quality-Q2 (cut-size or stock sheets)	Production of general use mirrors and other applications.
Quality-Q3 (cut-size or stock sheets)	Production of architectural glass products including coated, heat treated, laminated, and other select glass products.
Quality-Q4 (cut-size or stock sheets)	General glazing applications. <sup>l</sup>



**FIG. 1 Viewing Conditions for Blemish Detection**

## 6. Test Methods

### 6.1 Test Methods for Type I Glass (Transparent Flat Glass):

6.1.1 *Viewing Conditions for Blemish Detection*—All visual inspections shall be made with 20/20 vision (naked eye or corrected). View samples in the vertical position at the distance as specified in the sections following. The viewer shall be positioned perpendicular to the glass surface (Fig. 1) using the following lighting unless otherwise specified: daylight (without direct sunlight) or other uniform diffused background lighting that simulates daylight, with a minimum luminance of 1700 lux (160 foot-candles) measured at the center of the glass surface.

6.1.1.1 *Blemish Detection for Point Blemish (Knots, Dirt, Stones, Crush, Gaseous Inclusions, and Other Similar Blemishes)*—Samples shall be viewed from a distance of approximately 1 m (39 in.). If blemishes are detected, refer to Tables 5 and 6 for evaluation criteria.

6.1.1.2 *Point Blemish Measurement*—Point blemish size shall be determined by measuring the maximum length and maximum perpendicular width of the blemish and calculating the average of the two dimensions. The allowable blemish sizes listed in Table 5 include associated distortion for Q1 and Q2, but do not include associated distortion for Q3 and Q4.

6.1.1.3 *Detection for Linear Blemishes (Scratches, Rubs, Digs, and Other Similar Blemishes)*—Samples shall be viewed at the detection distance of 3.3 m (130 in.). The inspection shall then progress sequentially to each of the shorter distances for other applicable blemish intensities listed in Table 12. Any blemishes detected from these distances shall be compared with the length and separation criteria for allowable blemishes given in Table 7.

6.1.1.4 *Blemish Distribution*—Separation between blemishes shall be determined by measuring the distance between the two closest points of the blemishes. For blemish size ranges with different separation distance criteria, the minimum separation distance is determined by the minimum separation distance required for the larger of the two blemishes. Blemishes in size ranges that are allowed without separation distance criteria shall not be compared with those that have separation criteria.



## Standard Specification for Heat-Strengthened and Fully Tempered Flat Glass<sup>1</sup>

This standard is issued under the fixed designation C1048; 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 ( $\epsilon$ ) 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.*

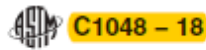


TABLE 2 Overall Bow, Maximum

Nominal Thickness Desig., mm (in.)	Edge Dimension, cm (in.)											
	0–60 (0–20)	>60–90 (>20–35)	>90–120 (>35–47)	>120–150 (>47–59)	>150–180 (>59–71)	>180–210 (>71–83)	>210–240 (>83–94)	>240–270 (>94–106)	>270–300 (>106–118)	>300–330 (>118–130)	>330–370 (>130–146)	>370–400 (>146–158)
	Maximum Bow, mm (in.)											
3 (1/8)	3.0 (0.12)	4.0 (0.16)	5.0 (0.20)	7.0 (0.28)	9.0 (0.35)	12.0 (0.47)	14.0 (0.55)	17.0 (0.67)	19.0 (0.75)	...	...	...
3 (1/8) Alternate Method <sup>a</sup>	2.0 (0.08)	2.0 (0.08)	2.0 (0.08)	3.0 (0.12)	5.0 (0.20)	6.0 (0.24)	7.0 (0.28)	8.0 (0.31)	10.0 (0.39)	...	...	...
4 (5/16)	3.0 (0.12)	4.0 (0.16)	5.0 (0.20)	7.0 (0.28)	9.0 (0.35)	12.0 (0.47)	14.0 (0.55)	17.0 (0.67)	19.0 (0.75)	...	...	...
5 (3/8)	3.0 (0.12)	4.0 (0.16)	5.0 (0.20)	7.0 (0.28)	9.0 (0.35)	12.0 (0.47)	14.0 (0.55)	17.0 (0.67)	19.0 (0.75)	...	...	...
6 (1/4)	2.0 (0.08)	3.0 (0.12)	4.0 (0.16)	5.0 (0.20)	7.0 (0.28)	9.0 (0.35)	12.0 (0.47)	14.0 (0.55)	17.0 (0.67)	19.0 (0.75)	21.0 (0.83)	24.0 (0.94)
8 (5/16)	2.0 (0.08)	2.0 (0.08)	3.0 (0.12)	4.0 (0.16)	5.0 (0.20)	6.0 (0.24)	8.0 (0.31)	10.0 (0.39)	13.0 (0.51)	15.0 (0.59)	18.0 (0.71)	20.0 (0.79)
10 (3/8)	2.0 (0.08)	2.0 (0.08)	2.0 (0.08)	4.0 (0.16)	5.0 (0.20)	6.0 (0.24)	7.0 (0.28)	9.0 (0.35)	12.0 (0.47)	14.0 (0.55)	17.0 (0.67)	19.0 (0.75)
12–22 (1/2–7/8)	1.0 (0.04)	2.0 (0.08)	2.0 (0.08)	2.0 (0.08)	4.0 (0.16)	5.0 (0.20)	5.0 (0.20)	7.0 (0.28)	10.0 (0.39)	12.0 (0.47)	14.0 (0.55)	17.0 (0.67)

<sup>a</sup> Values apply to 3 mm (1/8 in.) thickness only when the alternative checking procedure in 10.7.2 is used.

### 10.7 Localized and Overall Bow:

**10.7.1 Localized Bow**—Place sample glass in a freestanding vertical position, resting on blocks at the quarter points. With the glass in this position, place a 300 mm (12 in.) long straightedge anywhere on the concave surface. Measure the maximum deviation with a taper, or feeler gauge, dial indicator or fine scale ruler.

**10.7.2 Overall Bow**—Place sample glass in a freestanding vertical position, resting on blocks at the quarter points. With the glass in this position, place a straightedge or taut string across the concave surface, parallel to and within 25.4 mm (1 in.) of one edge, and spanning from one edge to the opposite other edge, and measure the maximum deviation with a taper, or feeler gauge, dial indicator or fine scale ruler. When the above procedure is impractical for larger sizes of 3 mm (1/8 in.) thickness, place the glass on a flat surface, concave side down, and use a taper, feeler gauge, dial indicator, or fine scale ruler.

reading in 0.02 mm (0.001 in.) increments, to determine overall bow. Overall bow values shown on the second line of Table 2 apply to 3 mm ( $\frac{1}{8}$  in.) when the alternative (horizontal) procedure is used.