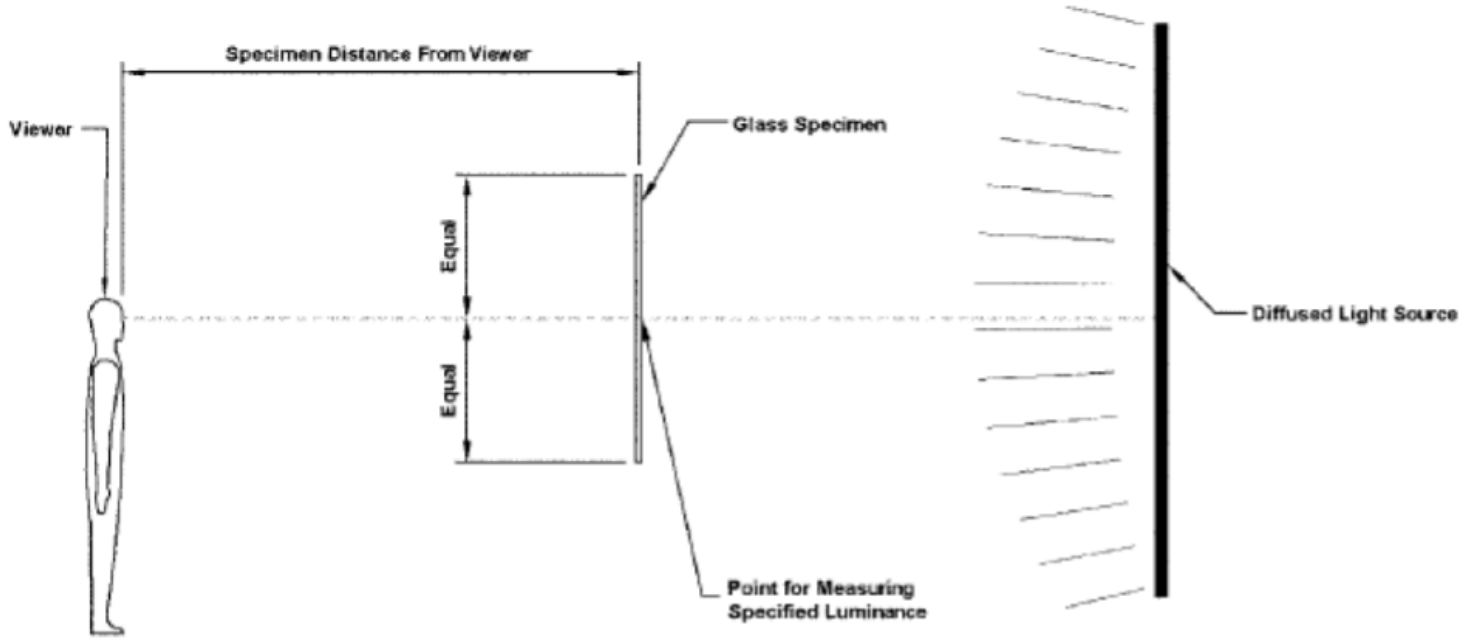
Glass Inspection Guide

Common Defects Inspection Criteria For All Glass Types:

- Glass must be in a vertical position perpendicular to the surface it is resting on.
- Observer must be positioned perpendicular to the glass being inspected (see example below)
- Observation must occur with the naked eye representing 20/20 vision.
- Lighting source must be daylight level with no direct sunlight or backlighting that simulates direct sunlight.



Specific Criteria for Various Glass Types:

Flat Glass

Point Blemish - Point blemishes include crush[1], knots[1], dirt[1], stones[1], gaseous inclusions[1], and other similar imperfections.

Point blemish inspection should be observed from 39” and the following are the allowable tolerances:

TABLE 6 Point Blemishes Allowed for Stock Sheets

Glass Area	Rejectable Point Blemishes Allowed per Sheet
If glass area < 7 m^2 (75 ft^2)	One rejectable point blemish
If glass area ≥ 7 m^2 (75 ft^2), but < 14 m^2 (150 ft^2)	Two rejectable point blemishes
If glass area ≥ 14 m^2 (150 ft^2)	Three rejectable point blemishes

[1]Please refer to Terms & Definitions section on page 4.

Blemish Size mm (in.)[B,C,D]	Q3 Quality 3
< 0.50 (0.02)	Allowed
≥ 0.50 < 0.80 ≥ (0.02) < (0.03)	Allowed
≥ 0.80 < 1.20 ≥ (0.03) < (0.05)	Allowed
≥ 1.20 < 1.50 ≥ (0.05) < (0.06)	Allowed with a minimum separation of 600 mm (24 in.)[F]
≥ 1.50 < 2.00 ≥ (0.06) < (0.08)	Allowed with a minimum separation of 600 mm (24 in.)[F]
≥ 2.00 < 2.50 ≥ (0.08) < (0.10)	None allowed
≥ 2.5 ≥ (0.10)	None allowed

Linear Blemish – Linear blemishes include scratches[1], rubs[1], digs[1], and other similar imperfections Linear Blemishes should be observed from 130" and the following are the allowable tolerances:

Q3 Quality 3 Distribution	Linear Blemish Size[A] Intensity Length
Allowed	Faint ≤ 75 mm (3 in.)
Allowed	Faint > 75 mm (3 in.)
Allowed	Light ≤ 75 mm (3 in.)
Allowed	Light > 75 mm (3 in.)
Allowed with a minimum separation of 600 mm (24 in.)	Medium ≤ 75 mm (3 in.)
None allowed	Medium > 75 mm (3 in.)
None allowed	Heavy ≤ 150 mm (6 in.)
None allowed	Heavy > 150 mm (6 in.)

[1]Please refer to Terms & Definitions section on page 4.

Laminated Glass

Laminated Glass blemishes should be observed in accordance with C1036 (see above).

Laminated Glass bow should be measured by placing glass in a free-standing vertical position with the longest edge resting on blocks at the quarter points. A straight edge should be placed on the concave surface parallel to and within 1” of the edge. The following are the allowable bow tolerances:

TABLE 4 Maximum Allowable Overall Bow for Laminated Glass[A,B]

Edge Dimension, in. (mm)	Laminate Make-up Two Glass Lites of, in. (mm):				
	1/8 to 3/16 (3 to 5)	1/4 (6)	5/16 (8)	3/8 (10)	1/2 to 7/8 (12 to 22)
0 to 18 (0 to 460)	1/8 (3.2)	1/16 (1.6)	1/16 (1.6)	1/16 (1.6)	1/16 (1.6)
Over 18 to 36 (Over 460 to 910)	3/16 (4.8)	1/8 (3.2)	3/32 (2.4)	3/32 (2.4)	1/16 (1.6)
Over 36 to 48 (Over 910 to 1220)	9/32 (7.1)	3/16 (4.8)	5/32 (4.0)	1/8 (3.2)	3/32 (2.4)
Over 48 to 60 (Over 1220 to 1520)	3/8 (9.5)	9/32 (7.1)	7/32 (5.6)	3/16 (4.8)	1/8 (3.2)
Over 60 to 72 (Over 1520 to 1830)	1/2 (12.5)	3/8 (9.5)	9/32 (7.1)	1/4 (6.4)	3/16 (4.8)
Over 72 to 84 (Over 1830 to 2130)	5/8 (15.9)	1/2 (12.7)	11/32 (8.7)	5/16 (7.9)	1/4 (6.4)
Over 84 to 96 (Over 2130 to 2440)	3/4 (19.0)	5/8 (15.9)	7/16 (11.1)	3/8 (9.5)	9/32 (7.1)
Over 96 to 108 (Over 2440 to 2740)	7/8 (22.2)	3/4 (19.0)	9/16 (14.3)	1/2 (12.7)	3/8 (9.5)
Over 108 to 120 (Over 2740 to 3050)	1.0 (25.4)	7/8 (22.2)	11/16 (17.5)	5/8 (15.9)	1/2 (12.7)
Over 120 to 132 (Over 3050 to 3350)	...	1.0 (25.4)	13/16 (20.6)	3/4 (19.0)	5/8 (15.9)
Over 132 to 144 (Over 3350 to 3660)	...	1 1/8 (28.6)	15/16 (23.8)	7/8 (22.2)	3/4 (19.0)
Over 144 to 156 (Over 3660 to 3960)	...	1 1/4 (31.8)	11/16 (27.0)	1.0 (25.4)	7/8 (22.2)

Heat Strengthened and Fully Tempered Flat Glass

Heat Strengthened glass may exhibit strain patterns when observed through polarized lighting conditions and is a result of the tempering process thus not a defect.

Heat Strengthened Glass blemishes should be inspected in accordance with C1036 (see above)

Heat Strengthened Glass Bow should be measured by placing the glass in a freestanding vertical position resting on Blocks at the quarter points. With the glass in this position place a straight edge or a taught string across the concave surface parallel to and within 1” of the glass edge stretching from one edge to the other and measure the maximum deviation with a measuring device. The following are the allowable bow tolerances for Heat Strengthened and Fully Tempered glass:

TABLE 2 Overall Bow, Maximum

Nominal Thickness Desig., mm (in.)	Edge Dimension, cm (in.)											
	0–50 (0–20)	>50–90 (>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[A]	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 (5/32)	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 (3/16)	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)	...	...	...
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)

[A] Values apply to 3 mm (1/8 in.) thickness only when the alternative checking procedure in 10.7.2 is used.

[1]Please refer to Terms & Definitions section on page 4.

Terms and Definitions

Crush - Pitted condition with a dull appearance

Dig - A deep scratch in the glass surface

Dirt - Small particles of foreign matter embedded in the surface of flat glass

Gaseous Inclusion - Round or elongated bubble in the glass

Knot - Inhomogeneity in the form of a vitreous lump

Rub - Abrasion of a glass surface producing a frosted appearance

Scratch - An abrasion on the glass surface in the form of a curved line, a straight line, or both

Stone - Crystalline inclusion in the glass

[1]Please refer to Terms & Definitions section on page 4.