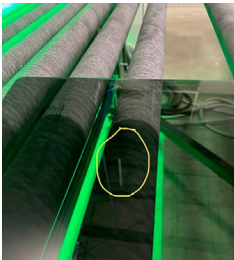


GLASS

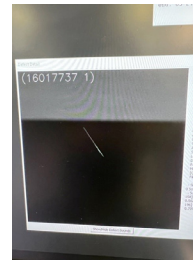
Introduction

Float Glass for automotive and architectural use is produced to ASTM C1036 standards. In addition to float glass, all sections of this standard apply to processed, fabricated products. A primary point of contention regarding the ASTM standard revolves around scratching and linear blemishes on the glass face/surface. Acceptable Lippert glass products are produced to a scratch & blemish quality standard 50% better than the widely accepted industry standards set forth in ASTM C1036 Table 3 below.

ASTM defines scratches as *damage on a glass surface in the form of a line caused by the movement of an object across and in contact with the glass surface.*



Picture of a typical scratch on glass surface.



Scratch detected by Lippert Osprey Defect Scanner

Glass Quality Standards

Lippert produces glass to TWO quality standards: Q-2 Quality and Q-3 Quality. The float glass purchased by all Lippert facilities is produced to ASTM Q-3 standards for general building products and general automotive applications. Due to the risk of material fall-out from producing glass at a quality level higher than what we are purchasing, there may be a 15-20% upcharge to customers requiring Q-2 levels.

Scratch Intensity Identification

In order to determine if a glass scratch is nonconforming, you must first determine the intensity of the scratch. Table 10 (page 2 of this document) of ASTM C1036, classifies scratch intensity into four categories Faint, Light, Medium, Heavy. Lippert Quality standards are to produce glass with Scratching and Linear Blemishes 50% better than ASTM, therefore Lippert classifies scratches and Linear blemishes as follows:

Faint: Only visible when viewed at distances less than 8", viewed at a perpendicular angle, with diffused background lighting

Light: Only visible when viewed at distances between 8" - 20" viewed at a perpendicular angle, with diffused background lighting

Medium: Only visible when viewed at distances between 20" - 65" viewed at a perpendicular angle, with diffused background lighting

Heavy: Visible at distances over 65" viewed at a perpendicular angle with diffused background lighting

The allowable quantity and size of the blemishes are determined by the quality level specified for the glass application. Each scratch intensity is further subcategorized as more than 3" in length or less than 3" in length.

Scratch Intensity	Q-2 Quality	Q-3 Quality
Faint <3"	Allowed - With 48" of separation	Allowed
Faint >3"	Not Allowed	Allowed
Light >3"	Allowed - With 48" of separation	Allowed
Light <3"	Not Allowed	Allowed
Medium <3"	Not Allowed	Allowed

GLASS

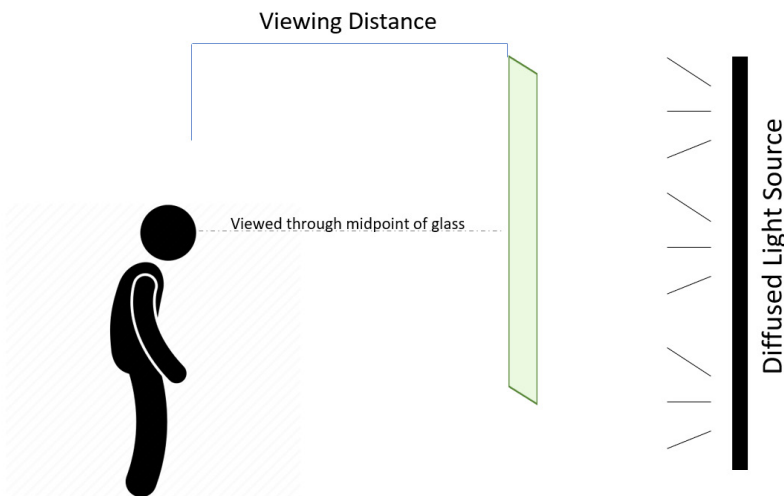
The ASTM C1036 quality standard relating to the definition of scratch intensity

TABLE 10 Blemish Intensity Chart

Detection Distance	Blemish Intensity
Over 3.3 m (132 in.)	Heavy
3.3 to 1.01 m (132 to 40 in.)	Medium
1 to 0.2 m (39 to 8 in.)	Light
Less than 0.2 m (8 in.)	Faint

Process for Determining Scratch/Blemish Intensity

Place midpoint of glass at the viewers eye level and beginning at 65" walk toward the glass until the scratch or blemish is first seen. The distance at which the first scratch or blemish is detected shall be documented for identifying the intensity.



The ASTM C1036 quality standard relating to the quantity and distribution of scratches and blemishes

TABLE 5 Allowable Linear Blemish Size and Distribution for Cut Size and Stock Sheet Qualities

Linear Blemish Size ^A Intensity Length	Q1 Quality 1 Distribution	Q2 Quality 2 Distribution	Q3 Quality 3 Distribution	Q4 Quality 4 Distribution
Faint ≤ 75 mm (3 in.)	Allowed with a minimum separation of 1500 mm (60 in.)	Allowed with a minimum separation of 1200 mm (48 in.)	Allowed	Allowed
Faint > 75 mm (3 in.)	None allowed	None allowed	Allowed	Allowed
Light ≤ 75 mm (3 in.)	None allowed	Allowed with a minimum separation of 1200 mm (48 in.)	Allowed	Allowed
Light > 75 mm (3 in.)	None allowed	None allowed	Allowed	Allowed
Medium ≤ 75 mm (3 in.)	None allowed	None allowed	Allowed with a minimum separation of 600 mm (24 in.)	Allowed
Medium > 75 mm (3 in.)	None allowed	None allowed	None allowed	Allowed
Heavy ≤ 150 mm (6 in.)	None allowed	None allowed	None allowed	Allowed with a minimum separation of 600 mm (24 in.)
Heavy > 150 mm (6 in.)	None allowed	None allowed	None allowed	None allowed

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