

Introduction: A Clear Look at Glass Distortion

A GUIDE FOR HOMEOWNERS

We take great pride in delivering high-quality products that are strong, energy efficient, and customizable for any home or business. To ensure exceptional performance, our glass undergoes extreme processes that can cause distortion like bubbles, discolorations, and scratches – occurrences that are experienced industry-wide. We adhere to the guidelines established by the American Society for Testing and Materials International (ASTM) on annealed glass, heat-strengthened glass, coated glass, laminated glass, and insulated glass units. Each pane is inspected thoroughly to meet our benchmarks for excellence and to meet/exceed industry standards.

This document includes general guidelines to help you determine if a glass-related concern is eligible for replacement. Please reference the ASTM standards at www.astm.org for a complete overview of industry policies.

WHAT CAUSES GLASS DISTORTION?



PROTECTION

Necessary processes that are used to create glass products, pressures, glazing, and heat treatments increase strength, safety, and/or efficiency. However, they can cause visible distortions.



LOCATION

Environmental factors like barometric pressure and elevation can affect your glass.



CLIMATE

Constantly changing temperature fluctuations based on the time of day, season, and other environmental factors will also distort glass.

GLOSSARY OF TERMS

- **American Society for Testing and Materials International (ASTM)**
An organization that develops and publishes technical standards for a wide range of materials and products.
- **Annealed Glass**
Raw glass that has not been heat-treated.
- **Heat-Strengthened Glass**
Glass that is re-heated to below melting point and cooled quickly; nearly two times stronger than annealed glass.
- **Insulated Glass Units**
Window panes separated by an air- or other gas-filled space to reduce heat transfer.
- **Laminated Glass**
Two or more pieces of glass bonded together with a strong, clear interlayer.
- **Low-E (Emissivity) Glass**
Glass with a transparent, metallic oxide coating applied onto or into a glass surface. The coating typically allows short-wave energy to pass through but reflects long-wave infrared energy, which improves the U-value.
- **Tempered Glass**
Glass that is re-heated to below melting point and cooled twice as fast as heat-strengthened glass; nearly four times stronger than annealed glass. When shattered, it breaks into small pieces.

A Clear Look at Blemishes

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Since glass is derived primarily from sand, blemishes may appear in the finished product. There are two main types of blemishes: linear and point. This document will guide you through how to determine eligibility for replacement in 2 steps.

STEP 1: IDENTIFY THE BLEMISH TYPE



LINEAR BLEMISH

- **Scratch** – Damage in the form of a line
- **Rub** – Abrasion that produces a frosty appearance
- **Dig** – Deep, short scratch



POINT BLEMISH

- **Crush** – Lightly pitted condition with a dull gray appearance
- **Knot** – Lumps
- **Dirt/Mark/Contaminant** – Small particle of foreign material on the surface
- **Gaseous Inclusion** – Round or elongated bubble
- **Pinhole** – Small area in which the coating is entirely or partially absent
- **Corrosion** – Change in color or level of reflected or transmitted light over all or part of the surface



STEP 2: INSPECT GLASS PROPERLY

If you suspect that you have a linear or point blemish, please examine your glass with the industry-wide standards featured below. This ensures that every glass pane is measured consistently.

- Inspect glass with the naked eye in the vertical position
- View it at a 90-degree angle to the glass
- Make all inspections during the daytime (without direct sunlight)
- Stand at the **distance specified** by each blemish type below for the noted amount of time
- Understand what merits replacement based upon the location of the blemish (review the **central area and outer area** section below)



VIEWING DISTANCES AND TIMES FOR BLEMISHES

Where you stand and how long you review a potential blemish will help you determine if your glass pane is eligible for replacement. Use the charts below to identify the appropriate criteria.

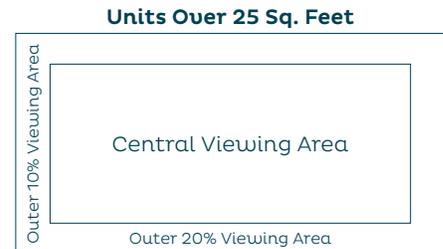
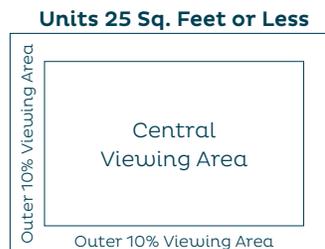
Blemish Type	Viewing Distance (Based on Size of Glass Pane)		Viewing Time (Based on Size of Glass Pane)	
	25 Square Feet or Less	Over 25 Square Feet	25 Square Feet or Less	Over 25 Square Feet
Linear	6 Feet Away	10 Feet Away	10 Seconds	20 Seconds
Point	39 Inches Away	39 Inches Away	10 Seconds	20 Seconds

How to Read: If you are examining a potential linear blemish on a glass pane that is 25 sq. feet or less, you must stand 6 ft. away from the pane and view it for 10 seconds.

LOCATIONS OF BLEMISHES (CENTRAL AREA AND OUTER AREA)

Blemishes are eligible for replacement based upon their location on the glass pane. Before you examine your glass, it is important to understand the two viewing areas for each pane/unit: central area and outer area. The central area is considered the section in the middle of the glass, and the outer area represents the remaining portion along the perimeter of the glass.

Based upon the standards to the right, please refer to the charts below to determine eligibility for replacement.



Linear Blemish

Viewing Area	Blemish Intensity	Replacement Eligibility
Outer	Light and Heavy	Any occurrence is not eligible for replacement.
Central	Light	Any occurrence is not eligible for replacement.
	Heavy	Any occurrence is eligible for replacement.

How to Read: If a light or heavy linear blemish occurs in the outer area of the pane, your glass will not be eligible for replacement.

Point Blemish

Size of Glass Pane	Blemish Intensity		Replacement Eligibility	
	Outer Area	Central Area	Outer Area	Central Area
25 Square Feet or Less	3/32 inch or less	1/16 inch or less	Any pane with a point blemish larger than 3/32 inch is eligible for replacement.	Any pane with a point blemish larger than 1/16 inch is eligible for replacement.
Over 25 Square Feet	1/8 inch or less	3/32 inch or less	Any pane with a point blemish larger than 1/8 inch is eligible for replacement.	Any pane with a point blemish larger than 3/32 inch is eligible for replacement.

How to Read: If you are examining a point blemish in the outer area on a pane that is 25 square feet or less, it will be eligible for replacement if the blemish is larger than 3/32 inch.