Glass Defect Detection & Inspection Guide

This Inspection Guide establishes the procedures, acceptance criteria and documentation requirements to ensure that glass products manufactured or supplied by Eurocraft Industries, Inc (the "Company") conform to the applicable ASTM standards listed below and meet the Company's quality requirements. It further integrates industry-recognized defect detection workflows to ensure early identification of unacceptable product conditions.

What is Glass Defect Detection

Defect detection in impact-resistant, laminated, and insulated glass is a critical quality assurance process designed to identify both surface and internal imperfections that could compromise safety, performance, or compliance with industry standards. Using optical inspection to detect anomalies such as delamination, interlayer defects, seal failures, and inclusions.

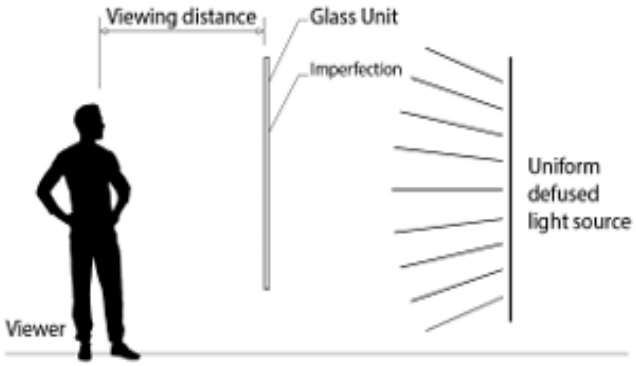
Each glass type—impact, laminated, and insulated—is inspected under ASTM standards (C1036, C1048, C1172, C1376, and E2190), with defined viewing conditions and measurable tolerances. For example, impact glass is inspected for interlayer migration and edge stability, laminated glass for clarity and bonding, and IGUs for moisture intrusion and spacer alignment.\

Common Types of Glass Defects

Defect Type	Typical Origin	Difficulty to Detect	Impact on Product
Interlayer Inclusions (Laminated Glass)	Contamination during lamination or furnace processing	Moderate to Hard	Potential delamination and failure under impact loads
Surface Scratches	Handling, fabrication, or post-lamination transport	Moderate	May weaken glass or compromise safety rating
Edge Chips / Shell Chips	Cutting operations, edge finishing, or impact during IGU assembly	Easy	May initiate cracks affecting laminated bond or IGU seal integrity
Coating Pinholes (Low-E / Performance Coatings)	Deposition or coating-stage contamination	Easy to Moderate	May compromise coating continuity and long-term durability
Interlayer Voids / Bubbles (Laminated Glass)	Entrapped air or improper autoclave cycle	Moderate	Risk of spreading, aesthetic issues, and potential compromise of impact resistance
Sealant Cracks or Voids (IGUs)	Manufacturing defects, spacer misalignment, or curing issues	Hard	Leads to moisture intrusion, fogging, and premature IGU seal failure
Desiccant Contamination (IGUs)	Spacer failure or desiccant dust release	Hard	Fogging, internal debris, and long-term IGU performance degradation

Inspection Conditions

- ✓ The glass shall be inspected in a vertical orientation, in ambient daylight (not direct sunlight), and at a viewing distance of at least 10 feet (3.05 m) from the product.
- ✓ Viewing angle shall be approximately perpendicular (90°) to the glass surface for visual inspection.
- ✓ Prior to inspection, surfaces must be cleaned of dust, grease, and other contaminants to avoid false positives. This aligns with the 7-step workflow described in glass defect detection literature.



Inspection and Quality Workflow

1. Pre-Inspection Surface Preparation

Prior to initiating any formal inspection activity, all glass surfaces shall be cleaned thoroughly using lint-free, non-abrasive microfiber cloths and a manufacturer-approved, ammonia-free glass cleaning solution. This process shall remove any surface contaminants such as dust, adhesive residue, oils, or environmental particulates that may obscure or interfere with visual inspection. A contrasting background (preferably black or white) shall be positioned behind the glass unit to enhance defect visibility.

Purpose: Surface cleanliness is essential to ensure accurate visual evaluation and to eliminate the possibility of misidentifying contamination as product defects.

2. Manual Visual Inspection

Visual inspection shall be conducted under uniform, ambient daylight or diffused artificial light. Observers shall inspect the glass at a perpendicular angle (90 degrees) and at a distance of no less than ten (10) feet, consistent with ASTM visual evaluation guidelines, including but not limited to ASTM C1036, C1048, C1172, C1376, and E2190.

The inspection shall include, but not be limited to, the following criteria:

- ✓ Surface imperfections such as scratches, scuffs, abrasions, and drag marks;
- ✓ Edge and corner conditions, including chips, shell cracks, or fractures;
- ✓ Interlayer defects in laminated units, such as bubbles, delamination, or discoloration;
- ✓ Seal integrity in insulated units, including signs of internal condensation or fogging;
- ✓ Coating inconsistencies, including pinholes, haze, or visual streaks;
- ✓ Foreign inclusions, embedded debris, or particulate matter within laminated layers.

Purpose: Manual inspection provides discretionary insight, particularly for complex defects or conditions.

3. Dimensional and Structural Verification

Dimensional conformance shall be verified using basic manual tools such as tape measures or framing squares to ensure that the delivered unit matches the specifications outlined in the applicable order or project documents. This shall include validation of:

- ✓ Unit height, width, and thickness;
- ✓ Spacer width (IGUs);
- ✓ Visible glass dimensions and overall frame compatibility.

Inspectors shall also assess:

- ✓ Proper placement of interlayers or decorative inserts;
- ✓ Uniformity of sealant application;
- ✓ Glass alignment within framing systems (if pre-glazed).

Purpose: Dimensional and structural verification ensures the unit will install correctly and function as intended within its designated opening or assembly.

4. Field-Level Performance Observation

In instances where the product has been partially or fully installed, a field-level assessment of basic functionality may be conducted. This includes:

- ✓ Observing whether operable windows and doors open, close, and seal properly;
- ✓ Verifying there is no visible shifting, racking, or binding of glazed components;
- ✓ Ensuring all sealants, gaskets, and structural elements remain intact and visually stable.

Purpose: Performance observation confirms that no damage occurred during handling or installation that would impact operability or structural integrity.

5. Final Quality Confirmation Prior to Acceptance

A final review shall be conducted prior to accepting delivery or initiating installation. Any identified discrepancies, including surface or structural issues, shall be clearly documented and communicated to [Your Company Name] in accordance with warranty claim procedures.

Acceptance of product without inspection does not constitute a waiver of warranty rights; however, prompt review is strongly encouraged to avoid claims-related disputes or delays.

Purpose: This review acts as the final quality checkpoint before product integration into the structure and ensures any non-conformities are addressed immediately.

Acceptance Criteria & Defects Guidelines

A glass unit is considered acceptable if:

- ✓ It is free of cracks, excessive edge chips, or safety-compromising defects
- ✓ It presents no visible delamination or seal failure under inspection conditions
- ✓ Visual imperfections are not discernible beyond 10 feet under ambient light
- ✓ Color, clarity, and coatings are consistent with approved samples or technical data sheets

A glass unit is considered defective if:

- ✗ Cracks or major chips > 1/8 inch compromising performance or appearance
- ✗ Seal failure with visible condensation or fogging in IGUs
- ✗ Delamination exceeding 1/8 inch or expanding over time
- ✗ Foreign objects or bubbles in laminated glass that exceed ASTM tolerances
- ✗ Distortion or defect affecting more than 5% of the viewable area

Disclaimer

This inspection workflow is intended to support reasonable field inspection procedures using visual means. It does not supersede or expand the Company's warranty obligations, and final determination of product acceptability rests solely with Eurocraft Industries, Inc.