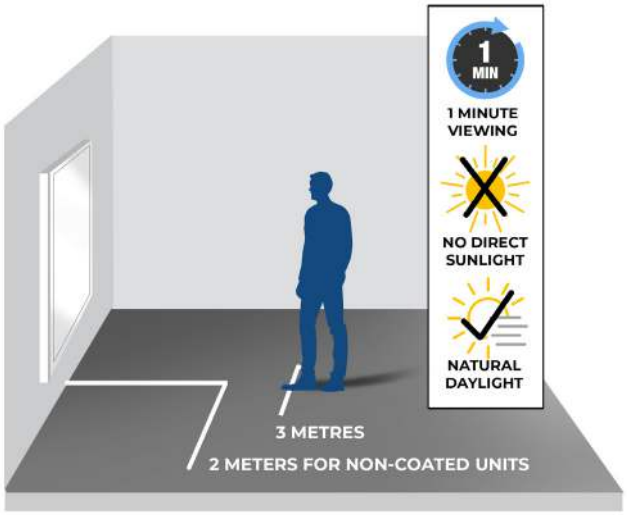
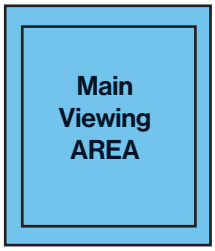
Sealed Unit Observation Guide

Technical Guide

This Guide has been produced to help answer many of the common questions which arise when inspecting sealed units both before and after glazing. We have produced this document to help our customers to be able to discuss any quality questions raised and to understand why and when a unit becomes rejectable.
Below we have produced an instruction guide on how to inspect sealed units, in parallel with The Glass & Glazing Federation (GGF) recommendations, and some common issues related to glazing inspection.





Edge Zone 50mm or 5% of W x H

How to do a professional inspection to GGF Standards

The visual quality of a window is assessed by looking through it from the room side, at right angles to the glass, standing at a distance of not less than 3 metres (2m for non-coated annealed glass) from the glass, under natural daylight and not direct sunlight, with no visible moisture on the surfaces of the glass.

Provided your vision through the glass is not impeded under these conditions, for example, by scratches, bubbles, or distortion of external objects, your windows are of good visual quality.

Permissible Defects

Scratches (both Main and Edge Zone)
- hairline but not in clusters.
- Single scratch of 25mm but the sum of all scratches must not be greater than 90mm

Spot and Mark Defects
- No dirt should be visible from a 2m distance inside the unit
- < 0.5mm permissible on Main and Edge Area
- < 1.0mm permissible but not in clusters
- < 2.0mm Maximum 5 spots in Main Area and 1 spot per metre length on Edge Area
- > 2.0mm Not permissible

Toughened Glass
- Toughened glass will show distortions due to the process of heating the glass.
- Some wave is acceptable and is accentuated by reflections is Double or Triple glazing

Edge Work
- Single shell or chip upto 6mm is permissible
- Edge chips and multiple shells are acceptable upto 2mm in series
- Cracks are not permissible

Georgian & Leaded Units
- Georgian and Back to Back/Integra Bar should not deviate from parallel by more than 2mm per 1m
- All internal bar should be free from marks
- Lead strip applied to the face of the glass will oxidise for several weeks after installation eventually stabilising leaving a dark patination. This is permissible.

Spacer Bar Defects
- The surface of the spacer bar should be clean and free from debris
- The distance between spacer bar sightline and glass edge should not exceed 13mm
- No primary seal (PIB) should protrude beyond the the spacer bar into the vision area

Moisture Penetration
- Permanent or periodic condensation between the panes is a sign of a fault
- Note – for the first 2 weeks after manufacture some condensation can appear between the panes. This should disappear after this period.

Dimension & Thickness Tolerances
- Dimensions +2.0/-1.0mm
- Thickness +1.0mm (annealed glass). +1.5mm (Toughened/Laminated/Textured)
- Diagonal Difference <2.0mm/m
- Glass Pane offset <2.0mm

Unit Cleaning Guide

Whilst it may seem an obvious and simple process, some products and tools can damage the glass surface. We recommend a non-abrasive glass cleaner using a grit free cloth or sponge. Always immediately rinse away with clean water. Avoid any metal or sharp implements for cleaning.
For Easy Clean, Activ or Bioclean products we recommend only using warm soapy water and a soft lint free cloth to clean the surface.

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How to conduct a visual inspection to accepted industry & GGF standards

Stand 3m away (2m for non-coated annealed glass) from the unit to be inspected on the room side at 90° to the glass surface. Look straight through the glass and not directly at it. Only view in natural daylight and not with direct sunlight or artificial lighting behind it. The time limit for the observation is 1 minute per m2 of glass. Magnifying devices and strong light sources such as torches are not permitted. Provided your vision through the glass is not impeded under these conditions your windows are of good visual quality.
Inspections MUST start with the 3m/2m distance and not close up fault finding followed by stepping back to the 3m/2m distance.

Autumn Inspection Criteria

Autumn brings different challenges for the inspection of glass units as the sun is lower and more directly behind the units. The morning and evening sun can have a temporary effect on the visuals of installed glass. It is imperative that visual inspections are made at the right time of day with the correct viewing criteria adhered to. Ignoring these instructions and viewing in direct sunlight at oblique angles can result in otherwise invisible visual effect such as bloom or haze marks, milky or dusty appearance and or the accentuation of small scratches and particles becoming noticeable. In these circumstances the customer should be reminded that no glass is perfect and all times it must be viewed looking through and not directly at the unit.

Special or Processed Glasses

Toughened Glass may show visual distortions which are caused by the heating process and may be accentuated by reflections in sealed units. There may be some bow distortion and unevenness (known as roller wave) caused by the heating process. This is a natural phenomenon and not a fault.
Laminated Glass occasionally has blemishes between the panes caused during the vacuum process.
Low E glass types can produce transient visual effects such as haze or transparent film effect in certain lights.Patterned Glass panes are not covered by this product guide due to the manufacturing process for the glass and sealed units.

Decorative Insulating Glass Units

Unlike standard Insulating glass units which are generally manufactured on an automatic or semi-automatic production line, decorative panels are individually produced and, in most instances, assembled by hand. Due to this manufacturing process, each panel is unique and as such, slight variances can and will occur during production. The inspection procedure remains the same as a standard Insulating glass unit.

Whilst the utmost care is taken to align the grille perfectly both horizontally and vertically, there may in some instances be a slight misalignment. This can be elevated when there are multiple panels with each joint increasing the probably of misalignment. An acceptable level of discrepancy would be 1.5mm per metre length or each joint and is applicable both vertically and horizontally.

Bar Movement, after installation there are several factors that can cause movement. The Georgian grille must be allowed to expand and contract during changes in temperature, the bar to expand up to 2mm per metre.

Swarf, although the upmost care is taken to clean the Bar/ grille prior to manufacture, the precision cutting of the bar may lead to small fragments or “swarf” adhering to the frame. These small particles may come loose during transportation or installation. This cannot be prevented in normal production, and a small amount of swarf is deemed acceptable but limited to 5 pieces of less than 4mm in length in any section of 100mm in length.""

Condensation

Condensation can occur on both the inside and outside of a sealed unit. For condensation seen internally we would expect this to cease after 14 days post manufacture.

External condensation (Faces 1 & 4 outer) can be wiped off using a soft cloth. If the condensation is appearing on the inside of the building then this indicates warm air is trapped inside the building and possibly needs increased ventilation. Condensation on the face of the glass is NOT a fault of the IGU integrity.

Internal condensation (Faces 2 & 3 inner) cannot be wiped off using a soft cloth. Whilst internal condensation is very rare, it can happen due to the manufacturing process. However, if after 2 weeks after install the condensation remains then contact your installer. Permanent or periodic condensation would be deemed as a failed unit, and if under warranty contact the installer.

Safety Glass Marking

Every pane of glass certified as safety or security must be individually marked. We use 3 individual safety marks (Toughened, Laminated Type 1 and Laminated Type 2) and one additional for panes that have been Heat Soaked. Due to the way the glass is marked in process we cannot guarantee that the safety marks will be in the same corner in the same unit. Below are some examples of our CMS markings -