

GGF Visual Quality for Adhesive Backed Polymeric Filmed Glass

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Contents

Introduction

1. Scope
2. Definitions and description
3. Cure time
4. Inspection for visual quality
5. Inspection conditions
6. Acceptance criteria
7. Inspection of perimeter zone
8. Edge gaps
9. Splicing of film
10. Visible light reflections
11. Marking of safety film
12. References

Introduction

This standard has been developed by the GGF **Window** Film Group, in association with all major film manufacturers, to define the visual quality standard for adhesive backed polymeric filmed glass.

1. Scope

This standard details the acceptable visual quality for adhesive backed polymeric film ("film") applied to architectural glass. Adhesive backed polymeric filmed glass is not expected to have identical visual quality as the glass on which it is installed. The following criteria apply to the installed film only and not to any defect inherent in the glass.

2. Definitions and Description

See GGF Datasheet 5.18.3 "GGF Recommendations for Adhesive Backed Polymeric Film Applied to Glass: Definitions, Descriptions and Components".

3. Cure time

Installed film has a discrete time for full adhesion to be effected since installation utilises a detergent solution in water to float the film onto the glass; the excess water is squeegeed out but inevitably residual water will remain between the film and glass. The time to achieve full adhesion is often referred to as "the adhesive cure time". Adhesion will be increasing from a lower value during this time. Visual and adhesive cure time is related to thickness and type of film used. Typical visual cure times may be extended or shortened according to local environmental conditions.

4. Inspection for visual quality

Inspection for optical quality can be made before full visual cure is attained. Table 1 provides a guide for typical visual cure times for adhesive backed polymeric film not containing layers of metal, alloys, oxides and similar coatings. It should be noted that effects during cure, such as water bubbles, water distortion, and water haze are not to be regarded as defects.

5. Inspection conditions

5.1 Internally applied film

The glass with applied film shall be viewed by looking through the film at right angles

to the glass from the room side, at a distance of not less than 2 metres. Viewing shall be carried out in natural daylight, not in direct sunlight, and shall assess the normal vision area with the exception of a 50 mm wide band around the perimeter of the unit.

5.2 Externally applied film

The glass with applied film shall be viewed by looking through the film at right angles to the glass from either side as appropriate at a distance of not less than 2 metres. Viewing shall be carried out in natural daylight, not in direct sunlight, and shall assess the normal vision area with the exception of a 50 mm wide band around the perimeter of the unit.

6. Acceptance criteria

6.1 Internally applied film

The installation shall be deemed acceptable if any of the following are not visually disturbing (effects during visual cure should be disregarded):

Dirt Particles	Water Haze
Hair and Fibres	Scores and Scratches
Adhesive Gels	Film Distortion
Fingerprints	Creases
Insects	Air Bubbles
Edge Lift	Nicks and Tears

Initial inspection may be undertaken within 1 day of installation. Visual quality shall be judged by looking through the film installation under the conditions described in section 5.



6.2 Externally applied film

The installation shall be deemed acceptable if any of the following are not visually disturbing (effects during visual cure should be disregarded):

Water Haze	Hair and Fibres
Scores & Scratches	Adhesive Gels
Film Distortion	Fingerprints
Creases	Air Bubbles
Edge Lift	Nicks and Tears
Dirt Particles	Insects

Initial inspection may be undertaken within 1 day of installation. Visual quality shall be judged by looking through the film installation under the conditions described in section 5.

Due to the conditions existing in external installations the visual quality of applied film may not be as good as for internally applied film. However, the installation quality should not reduce the performance and / or the expected life of the applied film.

7. Inspection of perimeter zone

7.1 Internally applied film

The 50 mm wide band around the perimeter shall be assessed by a similar procedure to that in 4 and 5, but a small number of particles are considered acceptable where poor frame condition mitigates against the high quality standards normally achieved.

7.2 Externally applied film

The 50 mm wide band around the perimeter shall be assessed by a similar procedure to that in 4 and 5, but allowing for a small increase in defects since external environmental conditions usually mitigate against the high quality standards normally achieved.

8. Edge gaps

Edge gaps will normally be 1 - 4 mm without allowing the film to contact the frame / glazing margin, gaskets, or similar; but may need to be greater where frame / glazing conditions do not allow close fitting of the applied film. This edge gap allows for the water used in the installation to be squeezed out and ensures that film edges are not raised up by contact with the frame margin. Contact with the frame margin could lead to peeling of the film, and is an

installation fault. For thicker films of > 200 μ the edge gaps will normally be \leq 4 mm, depending upon frame / glazing conditions.

An edge gap of \leq 2 mm is recommended for darker (tinted, metallised, tinted/metallised, and sputtered) films to minimise the light line around the edge of the installed film.

9. Splicing of film

Splicing of film is necessary when larger panels of glass are treated, where both length and width of the glazing panel exceed the maximum width of film. The splice line itself should not be viewed as a defect. This line should be straight and should be parallel to one edge of the frame margin. The two pieces of film may be butt jointed, and should be close but not touching; the maximum gap at any point in the splice line should be 1 mm. Film of less than 50 μ may be overlapped, spliced or butt jointed.

Note: In some cases a butt joint (e.g. safety / security film) is necessary on glazing panels that are subject to bow. In these cases the gap along the splice may have to be greater than 1 mm.

10. Visible light reflections

It should be noted that visible light reflections can be changed by installation of window film. This is especially the case for films with deposited layers containing metal, metal alloys, or similar. This is not a defect, but is a natural consequence of the high performance coatings used within the film.

11. Marking of safety film

Safety films used to comply with BS 6262-4, "Safety related to human impact", shall be correctly marked to show compliance with the relevant British Standard (BS EN 12600). The marking shall be as follows:

- (a) an identifiable name, or trademark, or other mark capable of identification through a suitable source*
- (b) the type of material, i.e. "F" for film applied glass
- (c) the number of the British Standard, BS EN 12600
- (d) the classification according to BS EN 12600

*e.g. through the Glass and Glazing Federation.

This mark shall be permanent, and applied during installation in a position so that it will remain completely visible and readable after installation. Examples of permanent marking include non-reusable labels (e.g. perforated or brittle labels that peel from the substrate in small pieces) and UV stabilised ink printing.

Table 1

Typical cure times for film (section 3)

Film thickness/ μ	Typical cure times/days
Up to 100	30
100 to 200	60
200 to 300	100
300 to 425	140

Note: Typical cure times are for the installed product to reach acceptable visual quality and are not to be confused with time to performance. Cure times will be extended for certain environmental conditions, e.g. low temperature and / or high humidity and / or external blinds drawn down to shade the film from direct sunlight.

12. References

Current GGF Datasheets for adhesive backed polymeric film are:

- 5.18.1 "GGF Visual Quality for Adhesive Backed Polymeric Filmed Glass"
- 5.18.2 "GGF Installation Quality Standard for Applying Adhesive Backed Polymeric Film to Glass"
- 5.18.3 "GGF Recommendations for Adhesive Backed Polymeric Film Applied to Glass: Definitions, Descriptions and Components"
- 5.18.4 "GGF Recommendations for Adhesive Backed Polymeric Film Applied to Glass in the Overhead Position for Containment of Glass in the Event of Failure: Types of Systems and Precautions in Use"
- 5.18.5 "GGF Recommendations for Adhesive Backed Polymeric Film Applied to Glass in the Overhead Position for Containment of Glass in the Event of Failure: Test Method"
- 5.18.6 "GGF Recommendations for Blast Mitigation: Adhesive Backed Polymeric Film Applied to Glass"
- 5.18.7 "GGF Standard for On-Site Peel Adhesion Testing of Aged Adhesive Backed Polymeric Film Applied to Vertical Flat Glass"
- 5.18.8 "GGF Adhesive backed polymeric film-Guidelines for installation onto existing glazing"