Security - Glazing

Poorly secured and maintained windows can be vulnerable to forced entry and may increase the risk of theft or vandalism.

This Loss Prevention Standard provides guidance on the types of glazing materials available.

Version: 1.2
Date: 16th May 2025

Security - Glazing

Introduction

One of the most common means of gaining unauthorised entry into otherwise secure premises is the breakage of glazing, followed by the opening or forcing of any securing locks or catches. This is often made easier by the fact that most glass used to glaze windows and doors is quickly and easily broken, but this does not have to be so. This document outlines various types of glazing material available and comments on their respective strengths or weaknesses.

This Loss Prevention Standard provides general advice on selecting and identifying glazing types.

General Considerations

Various glazing material types are available, e.g. glass or plastics. Types of glass are generally categorised by the method of manufacture, i.e. float glass, toughened glass or laminated glass etc., however, for each type of glass different constituent materials may be used. As an example, soda lime is the most common type of glass, but for specialist applications borosilicate or alkaline earth silicate may be used.

Whatever its type, for effective security all glazing needs to have appropriately designed and built frames/surrounds which are then maintained in good condition. To help achieve this, the services of a competent glazier should always be sought when installing new or upgraded glazing, e.g. by using a member of an accredited organisation, such as the Glass and Glazing Federation (GGF) in the United Kingdom.
As a guide, when choosing glazing, the following aspects also need consideration:

Rather than installing security of glazing in isolation, review security arrangements holistically, and consider whether there are other potential weak points in the building perimeter. Other points of consideration include:

- When choosing a glass for security purposes, do not overlook the need to comply with any requirements that may relate to fire precautions or life safety.
- Double glazing may not be suited for security purposes. Double glazed units typically use standard float glass which does not provide enhanced security ratings.
- Glazing rebates should be considered and need to be deep enough to adequately hold any ‘improved' glazing material in place, e.g. laminated glass usually requires a minimum rebate of 15mm to ensure it remains in place during a security breach event.
- Glazing should ideally be internally fixed into its frame. Externally fixed glazing is more vulnerable to removal, and if glazing is externally fixed, you should be aware that:
  - ✓ Putty or glazing compound is soft when new and requires considerable time to harden.

Note: Once the glazing compound is hardened and provided it and the frame remain in good condition, puttied glazing is usually difficult to remove.

- ✓ Beading strips may be inherently weak. In any event they derive their strength from the means and number of fixings.
  - The use of glass sealant or security glazing tape can improve the security of external beading.

- Glazed openings should be fitted with suitable locks and catches fitted, strong enough and arranged to withstand being forced from the outside, or should the glazing be broken, from the inside.

Refer to Aviva Loss Prevention Standards **Security - Doors and Windows and Other Barriers** and **Security - Locks** for further guidance.

Glazing Types - Security Qualities

The glass types used to glaze windows and doors, include:

Laminated Glass

This is the only glass generally recognised as providing security glazing. It can be made by assembling two or more pieces of float glass, one each side of an interlayer of thin Polyvinyl butyral (PVB) resin. It comes in various thicknesses (grades), with the thicker grades containing more layers of glass and interstitial layers of PVB. The current manufacturing standard for laminated glass is BS EN 14449 - Glass in building. Laminated glass and laminated safety glass. Evaluation of conformity/product standard.

When attacked, laminated glass resists breakage, but more significantly, the PVB interlayer helps prevent an opening being made.

The more common grades are as follows:

- Safety Glass: 6.4 - 6.8mm. Intended mainly as basic safety glass. It can nonetheless provide reasonable resistance to forced entry, being stronger than float or toughened glass.
- Burglary Resistant Glass: 7.5 - 13.5mm. Intended as burglary resistant glass. This can provide considerable resistance to forced entry, according to the risk level of BS EN 356 used, e.g. P1A - P5A (impact) and/or P6B - P8B (hammer and axe attack).

  Note: Such glass needs to be installed within an appropriate security glazing frame.

  - ✓ BS EN 356 - Glass in building. Security glazing. Testing and classification of resistance against manual attack
- Bullet Resistant Glass: 30mm upwards. Intended as bullet resistant glass. This is a specialist area for which suitable professional advice should be sought. A risk level should be selected according to those described in BS EN 1063 which specifies the test requirements for bullet resistant glass.
  - ✓ BS EN 1063 - Glass in building. Security glazing. Testing and classification of resistance against bullet attack

Other benefits of laminated glass include:

- Aesthetics and Design - It can be coloured or patterned.
- Ease of Use - It can be cut to size.
- Ultraviolet Radiation Protection - The PVB interlayer filters out ultraviolet radiation from sunshine, which helps reduce colour fading/bleaching of any items in line of sight of the sunlight and other related ultraviolet issues.
- Contamination Protection – When broken the glass is held in place, and glass fragments may not fall onto and damage or contaminate any items in close proximity to the glass.

For safety critical applications, laminated glass can be made from toughened glass. When this form is required, a poured resin material is used as the interlayer instead of PVB. The glass is sometimes referred to as Resin Compound Glass.

Float or Annealed Glass

This is the most frequently used glass and is supplied in a range of thicknesses from 2 to 15mm, with 4mm being the most common. Float glass above 8mm thick is often referred to as plate glass and is usually used for fixed shopfront windows. Thicker sizes can provide some increase in resistance to breakage, however that is normally based on the size of the glazed pane and its arrangement.

For safety reasons (not security), float glass is sometimes retro fitted with plastic 'Applied Safety Film'. Ideally this film is a type designed to meet the requirements of BS 6206 or BS EN 12600.

- BS 6206: Specification for impact performance requirements for flat safety glass and safety plastics for use in buildings.
- BS EN 12600: Glass in building. Pendulum test. Impact test method and classification for flat glass.

Safety film is designed to hold the glass pieces together in the event of breakage, thus reducing the risk of personal injury. It can also enhance security to a limited degree as it hinders breakage, helps retain broken panes within a frame and can slow down removal of the glass fragments and therefore access via the glazed area.

Glass Bricks

These are made of float glass and cast into blocks resembling hollow bricks. These are generally constructed like a wall and cemented or grouted in place. Properly installed they can create a very strong glazed area.

Wired (Georgian Wired) Glass

This glass has a fine steel mesh sandwiched between two molten layers of glass during its manufacture. It is intended as a fire-resistant material, the mesh holding the glass together in the event of a fire.

Although often fitted as secure glazing, such glass is only marginally more resistant to breakage than float glass. It is however harder to break a wired glass pane completely out of its frame, e.g. to gain full entry, and the mesh may act as a visual deterrent to breakage.

Toughened/Tempered (Safety) Glass

This glass has been subjected to a special heat treatment after being cut to size, and the process is designed to improve the safety of the glass when it breaks.

Whilst more resistant to breakage than float glass when hit by a large soft object, e.g. accidental impact by a person, when hit by a small sharp object it is very easily broken. Once a pane of toughened glass is broken it shatters into hundreds of tiny cubes, which then can be easily and quickly knocked out of the frame to create a smooth opening.

Plastic Glazing

Various types of plastic sheet are potentially suitable for glazing, e.g. cast or extruded acrylic, polystyrene or polycarbonate sheet. Some of these can be supplied with Glass Reinforced Plastic (GRP)/fibreglass or metal mesh reinforcement to help prevent breakage.

Whilst some plastics have better resistance to breakage than float glass, there are some disadvantages to using plastic materials for glazing, such as:

- Combustibility – they are combustible.
- Poor optical clarity (polycarbonate).
- Poor light transmission (GRP or metal mesh reinforced plastic).
- Vulnerability to scratching.
- Can be easily compromised by a saw or a flame.
- Potential loss of strength and/or cloudiness caused due to the effects of ultraviolet radiation from exposure to sunshine.

Polycarbonate is probably the most useful of these plastics, as it has good impact resistance, e.g., it is used in police riot shields, it has reasonable optical clarity and is available in sheets of varying thicknesses. However, it flexes under sustained impact or attack and, if it is to remain securely in place, careful fixing is required.

For reasons of appearance, plastic glazing is usually only used at industrial premises. Its use should be carefully considered, and any proposals should be discussed with your Property Insurer or Broker.

Identifying Installed Glass

Over the years different standards have been in force and applied to glass, some of which have been mentioned above. In some cases, the manufacturer or the installer will have voluntarily applied an indelible mark or label to their glass, but legal requirements to mark glass only exist when the glass is installed in particular ‘safety critical locations’. This is as defined by the relevant Health and Safety Regulations and/or Building Regulations.

Identifying installed glass and any related legal safety requirements is not straightforward, so to reiterate previous advice, reference should always be made to a competent glazier when reviewing glazing matters.

It is always recommended to have up to date drawings and specifications of a building, therefore, if an investment has been made in special glazing or enhanced security features, then these should be clearly documented in site drawings and associated documentation.

Some general information on identifying glazing can be found in the RISCAuthority (the UK Insurer's technical advice body) publication: S24 – Physical Security for Homes: Guidance for Occupiers.

Checklist

A generic **Glazing Security Checklist** is presented in Appendix 1 which can be tailored to your own organisation.

Specialist Partner Solutions

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For more information please visit: Aviva Risk Management Solutions – Specialist Partners

Sources and Useful Links

- The British Standards Institution
- RISCAuthority
- British Security Industry Association (BSIA)
- BS 5375:2007 – Code of practice for installation and application of security glazing
- PAS 24:2016 – Enhanced security performance requirements for doorsets and windows in the UK

Note: Whilst UK standards and legislation are referenced in this document, other international standards and legislation should be referenced where applicable.

Additional Information

Relevant Aviva Loss Prevention Standards include:

- **Intruder Alarms European Standards**
- **Intruder and Hold Up Alarms - General Guidance**
- **Video Surveillance Systems - Introduction**
- **Security - Locks**
- **Security - Doors, Windows and Other Barriers**

To find out more, please visit Aviva Risk Management Solutions or speak to one of our advisors.

Email us at riskadvice@aviva.com or call 0345 366 6666.*
*The cost of calls to 03 prefixed numbers are charged at national call rates (charges may vary dependent on your network provider) and are usually included in inclusive minute plans from landlines and mobiles. For our joint protection telephone calls may be recorded and/or monitored.

Appendix 1 – Glazing Security Checklist

Location	
Date	
Completed by (name and signature)	

	Title	Y/N	Comments
1.	Has a risk assessment been undertaken of the current physical security at your premises, including the following? • Local history of security related events? • Nature of contents/occupancy, especially close to each opening and its attractiveness to theft? • Accessibility of the area for criminals? • Provision of anything that could improve access to upper levels of the building/roof? • Strength and nature of the building construction in comparison to any doors/windows and securing mechanisms? • The nature of any other electronic security measures or human presence on site?		
2.	Has independent crime prevention advice been sought from: • The police? • An accredited security consultant? • Your Property Insurer and Broker?		
3.	• Have you checked whether your Insurer has applied a Minimum Security Standard/Condition? • If one has been applied, do your existing locks and wider security arrangements comply with the Minimum Security Standard? • If not do you have formal insurer agreement for any alternative arrangements? ✓ Are these clearly described? ✓ Are these audited against?		

	Title	Y/N	Comments
4.	• Have you checked the nature and type of your glazing? • Is this formally recorded with up to date drawings and specifications maintained on site? • Does your glazing provide the appropriate level of security based on the security risk? • Does it also meet any fire or life safety criteria?		
5.	Have the glazing, frames/surrounds and fixings been audited recently to ensure they are appropriately: • Designed? • Installed? • Inspected and maintained in good condition?		
6.	Are glazed openings fitted with any additional physical security devices?		
7.	Have you considered improving the glazing as part of a set of joined-up and robust security measures?		
8.	• Do you seek professional advice and use competent installers, e.g. a member of the GGF, when reviewing or installing new or upgrading any glazing? • Is this part of your Management of Change procedure?		
9.	Are security arrangements and the basis for the risk assessment reviewed following any security issues; local incidents; intrusions or losses? **Note:** If not, you may be at more risk of a repeat incident.		
10.	Additional comments:		

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16th May 2025

Version 1.2

ARMSGI1432020