BUILDING REGULATIONS GUIDE

MARLIN®
ALUMINIUM GLAZING SYSTEMS

Version 1

CONTENTS

INTRODUCTION TO BUILDING REGULATIONS

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Windows and doors are critical components of any building, influencing not only the aesthetics but also the functionality, energy efficiency, and security of a structure. Building Regulations set out stringent requirements to guarantee that these elements meet specific standards for insulation, ventilation, fire safety, accessibility, and structural integrity.

This section is designed to provide you with a simplified overview of the key Approved Documents that relate to windows and doors. Helping you understand the route to compliance with Building Regulations in England and Wales*. Whether you are designing new buildings, conversions, renovations or extensions (domestic or commercial), understanding these regulations is essential to delivering projects that are not only compliant but also exceed the occupants expectations and deliver practical, high-quality glazing solutions.

THE GOOD NEWS IS THAT SHEERLINE'S SYSTEMS HAVE ALL BEEN DESIGNED TO OFFER PRACTICAL AND STRAIGHTFORWARD ROUTES OF COMPLIANCE WHERE POSSIBLE.

FULL UP-TO-DATE COPIES OF THE BUILDING REGULATIONS

can be found here or via the QR code:
www.gov.uk/government/collections/approved-documents

**A different regulatory framework exists in Scotland and other countries and local advice and guidance should be sought.*

Please note this guide does not constitute professional or legal advice. Which should be sought if required.

BUILDING REGULATIONS AND APPROVED DOCUMENTS (ENGLAND)

The Building Regulations may apply in and around buildings. These legal requirements are intended to protect people's safety, health and welfare. They also set standards for accessibility, water use, energy use and security.

The Approved Documents give further guidance for many common building situations. They contain statutory guidance on how to meet the requirements of the Building Regulations, although may not provide appropriate guidance if the building is unusual in terms of its design, setting, use, scale or technology.

When proceeding with one or more of the following, Building Regulations are likely to apply:

a. Put up a new building

b. Change or make bigger a building that is already built

c. Change the use of a building that is already built

d. Alter the building services if a 'controlled service' or a 'controlled fitting'.

Building Regulations approval may also be required if replacing certain windows and doors.

Key elements of the Approved Documents and how they relate to windows and doors are featured in the following sections. All key element information is provided for guidance only and should not be seen as comprehensive, if in any doubt please consult the full text of the document referred to, which is available to view and download at:

www.gov.uk/government/collections/approved-documents

LIST OF THE APPROVED DOCUMENTS AND WHAT THEY COVER, THAT RELATE TO WINDOWS & DOORS			
DWELLINGS		OTHER BUILDINGS	
New	Existing	New	Existing[1]
A: Structure			
B: Fire Safety, Volume 1: Dwellings		**B:** Fire Safety, Volume 2: Buildings other than dwellings	
F: Ventilation			
K: Protection from falling, collision and impact			
L: Conservation of fuel and power **L1A** New dwellings	**L:** Conservation of fuel and power **L1A** Existing dwellings	**L:** Conservation of fuel and power **L2A** New buildings other than dwellings	**L:** Conservation of fuel and power **L2B** Existing buildings other than dwellings
M: Access to and use of buildings. Volume 1: Dwellings		**M:** Access to and use of buildings. Volume 2: Buildings other than dwellings	
Q: Security - Dwellings	**Q:** No requirement	**Q:** No requirement	

APPROVED DOCUMENT A: STRUCTURE

Ensuring buildings are constructed so that the combined dead, imposed and wind loads are sustained and transmitted by it to the ground, safely and without impacting surrounding buildings.

Key elements of Document A relating to windows and doors:

RESISTANCE TO DEFLECTION: All window and door members must be capable of withstanding wind loads established using BS EN 1991-1-1:2007 (Eurocode 9: Design of aluminium structures), without exceeding a deflection ratio of L/175 (GGF recommendation).

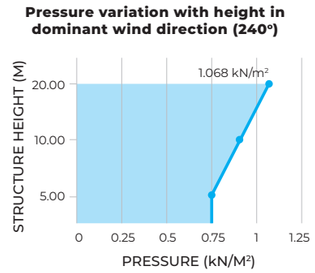
For example, the allowable deflection of a 2100mm high mullion: 2100/175 = 12mm.

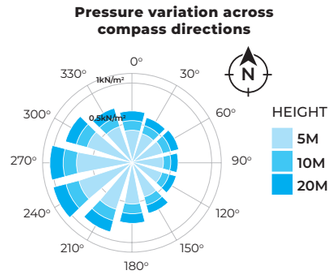
To calculate a 'Peak Velocity Pressure' (wind load) an installation address (most accurate) or postcode is needed, along with a height above ground level for each window or door.

Installations above 5m from ground level can be subject to significantly greater pressures, as can be seen in the pressure variation with height abstract below.

Orientation of the installation also has a significant impact on the pressure a window or door will be exposed to. In general, England's highest wind pressures come from the Southwest to West direction, as shown in the pressure variation compass below.

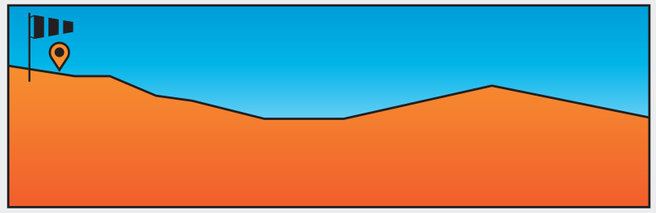
SHEERLINE HQ DE56 2JJ EXAMPLE:





Orography details in dominant wind direction (240°)

Ground at site level and sheltered by higher ground upwind. Orography not significant.



RESISTANCE TO BUCKLING: Applies to bay poles where axial loads are imposed by supporting the structure above, roof/brickwork etc.

APPROVED DOCUMENT B: FIRE SAFETY

VOLUME 1: DWELLINGS / VOLUME 2: BUILDINGS OTHER THAN DWELLINGS.

Ensuring buildings are designed and constructed to protect occupants in case of a fire. Addressing both the prevention of fire outbreak and the management of risk to life should a fire occur.

Key elements of Document B (Volume 1: Dwellings) relating to windows and doors:

MEANS OF ESCAPE

DWELLING HOUSES AND FLATS:

Where escape windows are specified (generally up to 4.5m above ground level), they should comply with all the following:

Windows should have an unobstructed openable area that complies with all the following:

i. *A minimum area of 0.33m².*

ii. *A minimum height of 450mm and a minimum width of 450mm (the route through the window may be at an angle rather than straight through).*

For example: 734 x 450mm OR 575 x 575mm OR 450 x 734mm.

iii. *The bottom of the openable area is a maximum of 1100mm above the floor.*

Unfortunately, there is no straight forward way of translating the above criteria into a simple window width of X and height of Y, as there are many types and manufacturers of hinge, each with varying sizes and geometry.

The QR code below provides the required sash sizes to achieve the unobstructed openable area using Yale Defender Egress side hung and Yale Defender top hung hinges in a Sheerline window. Sizes should be regarded as theoretical absolute minimums and take no account of hinge or frame assembly tolerances.

Key elements of Document B (Volume 2: Buildings other than dwellings) relating to windows and doors:

MEANS OF ESCAPE

NO PROVISION FOR ESCAPE WINDOWS

AOV (AUTOMATIC OPENING VENTILATOR)

An AOV is a type of window or opening that is designed to automatically open in the event of a fire, to allow smoke and heat to escape from a building.

Windows automated for smoke ventilation fall into the smoke and heat exhaust ventilator (SHEV) standard EN 12101-2

EN 12101-2 dictates that actuators and vent profiles must be tested together as a single system, at an accredited facility, to all test annexes of the prescriptive standard. There are also strict audited procedures to fabricate and install the components, to ensure they are manufactured as tested. Failure to follow this procedure means that the required Declaration of Performance (DoP) certificate cannot be issued, and the installation will not be compliant.

Details of Sheerlines' AOV compliant solution for Prestige Windows is available by scanning the QR code.

APPROVED DOCUMENT F: VENTILATION

VOLUME 1: DWELLINGS / VOLUME 2: BUILDINGS OTHER THAN DWELLINGS.

Ensuring buildings are designed and constructed with a level of ventilation sufficient to provide a healthy living environment for the occupants, whilst preventing the buildup of moisture and pollutants which can affect the durability of the building.

Types of ventilation:

1. Natural ventilation (through windows, doors, and other openings). Using background/trickle ventilation in the head of a frame or sash which should be fitted at least 1700mm above the finished floor level (FFL) but within reach.
2. Mechanical ventilation with heat recovery. Requiring no background/trickle ventilation.
3. Continuous mechanical extract ventilation, combined with background ventilation.

Note: Any night vent facility of an opening sash does not qualify as ventilation.

Key elements of Document F (Volume 1: Dwellings) relating to windows and doors

NEW DWELLINGS:

- Natural ventilation (type 1. above) using background/trickle ventilation. Specific 'equivalent area' (EA) requirements are provided for different types of buildings and rooms, these are listed in the extract below.

EXTRACT FROM F1(1) VOLUME 1: DWELLINGS

TABLE 1.7 MINIMUM EQUIVALENT AREA OF BACKGROUND VENTILATORS FOR NATURAL VENTILATION[1]

ROOM	MINIMUM EQUIVALENT AREA OF BACKGROUND VENTILATORS FOR DWELLINGS WITH MULTIPLE FLOORS	MINIMUM EQUIVALENT AREA OF BACKGROUND VENTILATORS FOR SINGLE-STOREY DWELLINGS
Habitable rooms[2/3]	8000mm²	10,000mm²
Kitchen[2/3]	8000mm²	10,000mm²
Utility room	No minimum	No minimum
Bathroom[4]	4000mm²	4000mm²
Sanitary accommodation	No minimum	No minimum

Notes:

1. The use of this table is not appropriate in any of the following situations and expert advice should be sought.
   - If the dwelling has only one exposed façade.
   - If the dwelling has at least 70% of its openings on the same façade.
   - If a kitchen has no windows or external façade through which a ventilator can be installed.
2. Where a kitchen and living room accommodation are not separate rooms (i.e. open plan), no fewer than three ventilators of the same equivalent area as for other habitable rooms should be provided within the open-plan space.
3. The total number of ventilators installed in a dwelling's habitable rooms and kitchens should be no fewer than five, except in one-bedroom properties, where there should be no fewer than four.
4. If a bathroom has no window or external façade through which a ventilator can be installed, the minimum equivalent area specified should be added to the ventilator sizes specified in other rooms.

- Continuous mechanical extract ventilation combined with background/trickle ventilation (type 3. above).

  Background/trickle ventilators should satisfy all the following conditions:

  a. Not be in wet rooms.

  b. Provide a minimum equivalent area of 4000mm² for each habitable room in the dwelling.

  c. Provide a minimum total number of ventilators that is the same as the number of bedrooms plus two ventilators,

  for example: a one-bedroom dwelling should have three background ventilators

APPROVED DOCUMENT F: VENTILATION *continued*

Key elements of Document F (Volume 1: Dwellings) relating to windows and doors

REPLACEMENT OF WINDOWS WITH BACKGROUND (TRICKLE) VENTILATION:

a. Not be smaller than the background ventilators in the original window.

b. Be controllable either automatically or by the occupant.

REPLACEMENT OF WINDOWS WITHOUT BACKGROUND (TRICKLE) VENTILATION:

a. If the dwelling ventilation is via natural means only, incorporate background ventilators in the replacement windows equivalent to the following.

i. Habitable rooms – minimum 8000mm² EA.

ii. Kitchen – minimum 8000mm² EA.

iii. Bathroom (with or without a toilet) – minimum 4000mm²EA.

b. If the dwelling ventilation system includes a continuous mechanical extract method, install 4,000mm² EA background ventilators in each habitable room.

EXTENSIONS, WINDOWS AND DOORS BACKGROUND (TRICKLE) VENTILATION:

Within Approved Document F, there are too many variables to provide a brief guide to the required background ventilation for extensions.

Please refer to sections:

1. Addition of a habitable room (not including a conservatory) to an existing dwelling.
2. Addition of a conservatory to an existing building.
3. Addition of a wet room to an existing dwelling.
4. Refurbishing a kitchen or bathroom in an existing dwelling.

Key elements of Document F (Volume 2: Buildings other than dwellings) relating to windows and doors:

A ventilation specification for commercial buildings is generally supplied by a CIBSE Member or suitably qualified engineer.

This QR links to show methods of ventilation through various Sheerline Systems.

APPROVED DOCUMENT K: PROTECTION FROM FALLING, COLLISION AND IMPACT

Ensuring buildings are designed and constructed with specific safety provisions to help minimize the risk of serious cutting and piercing injuries from shards of glass. The protection from falling element (BS 6180) ensures the containment and provision of a suitable glazed barrier between different floor levels.

Key elements of Document K relating to windows and doors:

GLAZING IN CRITICAL LOCATIONS:

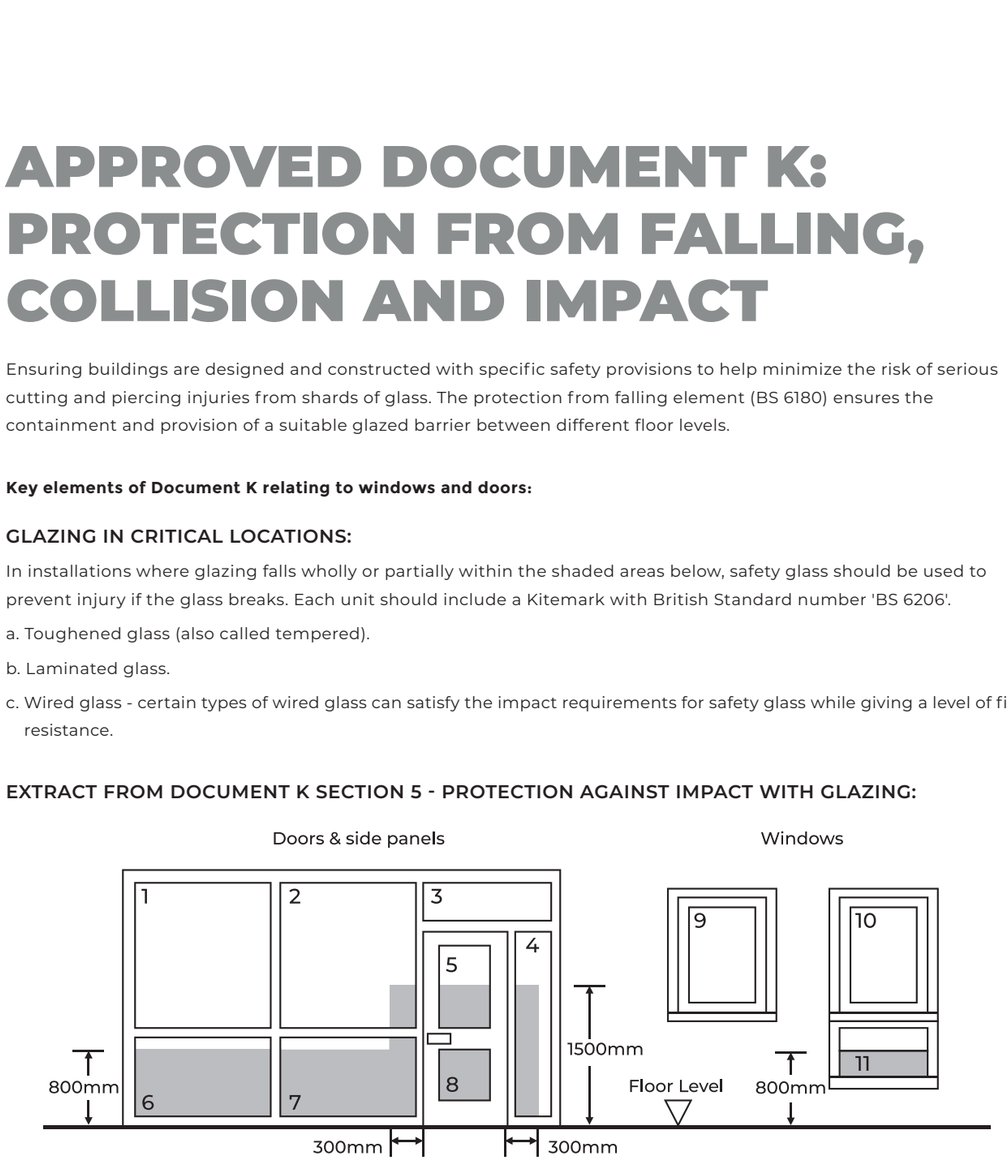
In installations where glazing falls wholly or partially within the shaded areas below, safety glass should be used to prevent injury if the glass breaks. Each unit should include a Kitemark with British Standard number 'BS 6206'.

a. Toughened glass (also called tempered).

b. Laminated glass.

c. Wired glass - certain types of wired glass can satisfy the impact requirements for safety glass while giving a level of fire resistance.

EXTRACT FROM DOCUMENT K SECTION 5 - PROTECTION AGAINST IMPACT WITH GLAZING:



Safety glass is not required if there is a permanent protective screen installed: refer to ‘Permanent Screen Protection’ within Approved Document K. For large single glazed installations, shop fronts for example, a more robust thickness of annealed glass can be used, very often 10 or 12mm or even 15mm dependant on the area of glazing.

Referred to: **BS 6180 Barriers in and about buildings – code of practice.**
Glazed elements - where frame and glazing/infill perform the function of a barrier:

Where low level windows or doors (less than 800mm from FFL to cill) are installed in buildings with a potential for a person falling more than 600mm in a dwelling or 380mm in a non-dwelling there will be a need for a barrier to prevent the risks of falling.

Julliette balconies with French doors for example, generally have an external wall fixed barrier.

In situations where no additional protection from falling is to be installed, the window itself becomes the barrier. With installations such as these both glazing/infill and internal frame members (transoms or mullions) must be able to withstand the appropriate loads dependant on the type of occupancy of the building.

More information plus a guide to calculating transom or mullion deflection, along with product rigidity values can be found via the QR link.

THE LATEST PART L REGULATIONS

These changes came into effect on **15th June 2022** and affects all housing that didn't have planning approval before that date, and on anything that didn't commence construction before 15th June 2023.

APPROVED DOCUMENT L: CONSERVATION OF FUEL AND POWER

VOLUME 1: DWELLINGS / VOLUME 2: BUILDINGS OTHER THAN DWELLINGS.

As the UK moves towards 2025's Future Homes and Buildings Standard, the Government has introduced a range of changes to Building Regulations.

This includes a mandatory 30% cut in carbon for all new homes and a 27% cut for other buildings, including offices and shops. Part L sets the minimum thermal performance for various building elements, including windows and doors.

WHAT'S CHANGED?

The latest revision to Part L shows **thermal standards for windows and doors for both renovation and new-build projects tighten,** as the country looks to reduce its carbon footprint and improve the energy efficiency and thermal performance of everyone's homes.

This table lists the thermal requirements of Part L of the latest Building Regulation for Installation of windows and doors in new and existing Dwellings.

PRODUCT TYPE	EXISTING DWELLING Inc Extensions			NEW BUILD LIMITING VALUE*
	MAXIMUM **U-VALUE** W/(M²K)			
WINDOWS	1.4	OR	Window Energy Rating Band minimum **B**	1.6
DOORS WITH >60% OF INTERNAL FACE GLAZED	1.4	OR	Doorset Energy Rating Band minimum **C**	1.6
OTHER DOORS	1.4	OR	Doorset Energy Rating Band minimum **B**	1.6

***This is the absolute maximum permitted**, with requirements changing based on the overall building specification – we advise checking what is required on a case-by-case basis.

PLEASE NOTE

Building Regulations also state that no window or door should perform more poorly than the element it is replacing.

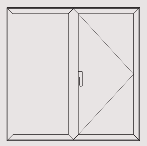
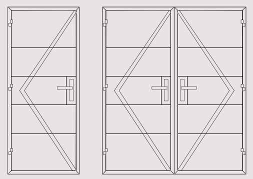
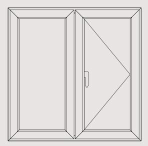
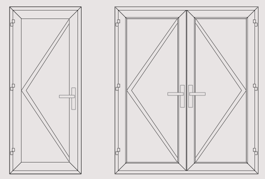
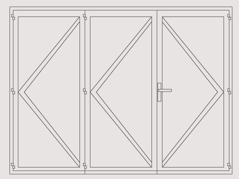
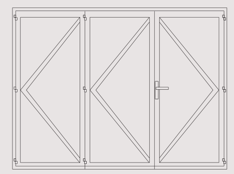
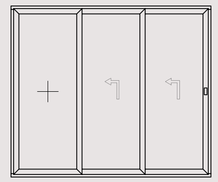
For ease, throughout the document we've listed U-value's without the W/(m²K) suffix.

PART L COMPLIANCE TABLE

PART L Compliant ✓

PLEASE NOTE

†We have shown the internal low-e pane laminated in our WER specification as this maximises the g-value (solar gain), giving the best possible WER result.
**The low-e (Low-Emissivity) glass we've shown in our WER examples is Planitherm Total+, but similar results can be achieved with other 5% low-e glass options such as Guardian ClimaGuard A, or Pilkington K Glass S. The thermal control glass shown is Planitherm ONE, but is interchangeable with other 1% low-e glass options such as Guardian ClimaGuard 1.0, or Pilkington Optitherm 1.0.*

DOUBLE GLAZED							
	Classic WINDOWS	Classic HERITAGE DOOR	Prestige WINDOWS	Prestige DOORS	Prestige BI-FOLD SYSTEM	INDEX BI-FOLD	Prestige LIFT & SLIDE PATIO
STYLES	CASEMENT, FIXED & FRENCH STYLES	INCLUDING SIDE, TOPLIGHT & FRENCH COMBINATIONS	CASEMENT, FIXED, FRENCH & TILT & TURNS STYLES	INCLUDING SIDE, TOPLIGHT & FRENCH COMBINATIONS	SINGLE, FRENCH & BI-FOLDING DOORS UP TO 7 PANES	SINGLE, FRENCH & BI-FOLDING DOORS UP TO 7 PANES	DOUBLE & TRIPLE UP TO 4 PANES
GLASS SPECIFICATION	28mm (4/20/4) Clear / Argon / **Planitherm* Total+** *or* 28mm (4/18/6.8)† Clear / Argon / **Laminated Planitherm Total+**	28mm (4/20/4) Clear / Argon / **Planitherm* ONE** *or* 28mm (4/18/6.8)† Clear / Argon / **Laminated Planitherm* ONE**	28mm (4/20/4) Clear / Argon / **Planitherm* ONE** *or* 28mm (4/18/6.8)† Clear / Argon / **Laminated Planitherm* ONE**	28mm (4/20/4) Clear / Argon / **Planitherm* ONE** *or* 28mm (4/18/6.8)† Clear / Argon / **Laminated Planitherm* ONE**	28mm (4/20/4) Clear / Argon / **Planitherm* ONE** *or* 28mm (4/18/6.8)† Clear / Argon / **Laminated Planitherm* ONE**	28mm (4/20/4) Clear / Argon / **Planitherm* ONE** *or* 28mm (4/18/6.8)† Clear / Argon / **Laminated Planitherm* ONE**	28mm (4/20/4) Clear / Argon / **Planitherm* ONE** *or* 28mm (4/18/6.8)† Clear / Argon / **Laminated Planitherm* ONE**
Method of Compliance **REPLACEMENT & EXTENSIONS**	**A WER ✓**	**1.4 U-value ✓** **A+ DSER ✓** Changed to **Planitherm* Total+**	**1.4 U-value ✓**	**1.4 U-value ✓**	**1.4 U-value ✓**	**1.4 U-value ✓**	**1.4 U-value ✓**
Method of Compliance **NEW BUILD**	**1.5 U-value ✓** Upgraded to **Planitherm* ONE** *or* **1.6 U-value ✓**	**1.4 U-value ✓**	**1.4 U-value ✓** *or* **1.5 U-value ✓** Changed to **Planitherm* Total+**	**1.4 U-value ✓** *or* **1.5 U-value ✓** Changed to **Planitherm* Total+**	**1.4 U-value ✓** *or* **1.5 U-value ✓** Changed to **Planitherm* Total+**	**1.4 U-value ✓** *or* **1.5 U-value ✓** Changed to **Planitherm* Total+**	**1.4 U-value ✓** *or* **1.5 U-value ✓** Changed to **Planitherm* Total+**
TRIPLE GLAZED **36MM** 	**1.1 U-value ✓✓✓** 36mm (4/12/4/12/4) Clear / Argon x 2 / **Planitherm* ONE** x 2 **A+ WER ✓** 36mm (4/12/4/12/4) Clear / Argon x 2 / **Planitherm Total+** x 2	–	**1.1 U-value ✓✓✓** 36mm (4/12/4/12/4) Clear / Argon x 2 / **Planitherm* ONE** x 2 **1.2 U-value ✓✓** 36mm (4/12/4/12/4) Clear / Argon x 2 / **Planitherm* Total+** x 2 *or* as above with **Laminated Clear** (4/12/4/10/6.8)	**1.1 U-value ✓✓✓** 36mm (4/12/4/12/4) Clear / Argon x 2 / **Planitherm* ONE** x 2 **1.2 U-value ✓✓** 36mm (4/12/4/12/4) Clear / Argon x 2 / **Planitherm* Total+** x 2 *or* as above with **Laminated Clear** (4/12/4/10/6.8)	**1.1 U-value ✓✓✓** 36mm (4/12/4/12/4) Clear / Argon x 2 / **Planitherm* ONE** x 2 **1.2 U-value ✓✓** 36mm (4/12/4/12/4) Clear / Argon x 2 / **Planitherm* Total+** x 2 *or* as above with **Laminated Clear** (4/12/4/10/6.8)	**1.1 U-value ✓✓✓** 36mm (4/12/4/12/4) Clear / Argon x 2 / **Planitherm* ONE** x 2 **1.2 U-value ✓✓** 36mm (4/12/4/12/4) Clear / Argon x 2 / **Planitherm* Total+** x 2 *or* as above with **Laminated Clear** (4/12/4/10/6.8)	**1.1 U-value ✓✓✓** 36mm (4/12/4/12/4) Clear / Argon x 2 / **Planitherm* ONE** x 2 **1.2 U-value ✓✓** 36mm (4/12/4/12/4) Clear / Argon x 2 / **Planitherm* Total+** x 2 *or* as above with **Laminated Clear** (4/12/4/10/6.8)
44MM	–	–	**1.0 U-value ✓✓✓✓** 44mm (4/16/4/16/4) Clear / Argon x 2 / **Planitherm* ONE** x 2 *or* as above with **Laminated Clear** (4/16/4/14/6.8) **1.1 U-value ✓✓✓** 44mm (4/16/4/16/4) Clear / Argon x 2 / **Planitherm* Total+** x 2 *or* as above with **Laminated Clear** (4/16/4/14/6.8)	**1.0 U-value ✓✓✓✓** 44mm (4/16/4/16/4) Clear / Argon x 2 / **Planitherm* ONE** x 2 *or* as above with **Laminated Clear** (4/16/4/14/6.8) **1.1 U-value ✓✓✓** 44mm (4/16/4/16/4) Clear / Argon x 2 / **Planitherm* Total+** x 2 *or* as above with **Laminated Clear** (4/16/4/14/6.8)	**1.0 U-value ✓✓✓✓** 44mm (4/16/4/16/4) Clear / Argon x 2 / **Planitherm* ONE** x 2 *or* as above with **Laminated Clear** (4/16/4/14/6.8) **1.1 U-value ✓✓✓** 44mm (4/16/4/16/4) Clear / Argon x 2 / **Planitherm* Total+** x 2 *or* as above with **Laminated Clear** (4/16/4/14/6.8)	**1.0 U-value ✓✓✓✓** 44mm (4/16/4/16/4) Clear / Argon x 2 / **Planitherm* ONE** x 2 *or* as above with **Laminated Clear** (4/16/4/14/6.8) **1.1 U-value ✓✓✓** 44mm (4/16/4/16/4) Clear / Argon x 2 / **Planitherm* Total+** x 2 *or* as above with **Laminated Clear** (4/16/4/14/6.8)	**1.0 U-value ✓✓✓✓** 44mm (4/16/4/16/4) Clear / Argon x 2 / **Planitherm* ONE** x 2 *or* as above with **Laminated Clear** (4/16/4/14/6.8) **1.1 U-value ✓✓✓** 44mm (4/16/4/16/4) Clear / Argon x 2 / **Planitherm* Total+** x 2 *or* as above with **Laminated Clear** (4/16/4/14/6.8)

APPROVED DOCUMENT M: ACCESS TO AND USE OF BUILDINGS

VOLUME 1: DWELLINGS / VOLUME 2: BUILDINGS OTHER THAN DWELLINGS.

Ensuring that buildings are accessible and usable by everyone, including people with disabilities. This regulation covers different categories of access requirements depending on the intended use of a building or area of a building, ensuring an inclusive environment which is accessible for a wide range of people.

Key elements of Document M (Volume 1) relating to windows and doors:

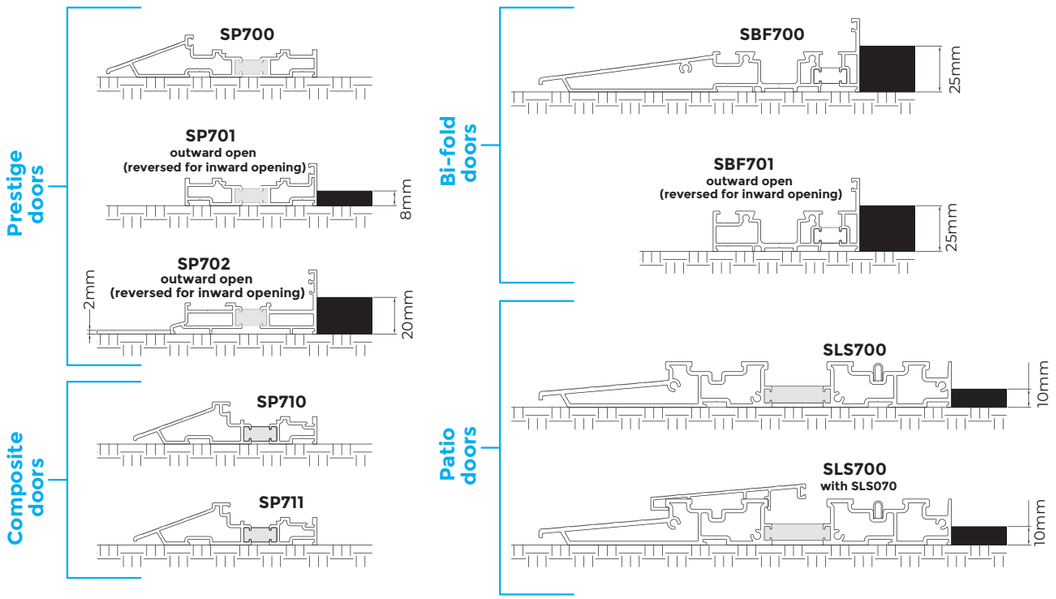
- The accessible threshold, which is either flat or no more than 15mm high with no vertical face more than 5mm. This requirement is problematic and often results in poor weather performance. However, there is provision within the document to comply via ergonomic testing as specified in 'Accessible thresholds in new housing – Guidance for house builders and developers, The Stationary Office Ltd. ISBN 0 11 702333 3. 1999.

- The clear opening width of doors, not including door furniture such as handles.
  a. **CATEGORY 1 –** Visitable Dwellings. 775mm clear opening width.
  b. **CATEGORY 2 –** Accessible and adaptable dwellings. 850mm clear opening width.
  c. **CATEGORY 3 –** Wheelchair User Dwellings. 850mm clear opening width.

Accessible threshold:

'Part M' testing was carried out by Ciilock Engineering ltd on behalf of Sheerline, with the assistance of wheelchair supply experts, Midshires of Rugely. These tests have been performed to show the effectiveness of wheelchair operation over thresholds designed to meet Part M requirements for Building Regulations in dwellings.

Packers were fitted to represent flooring / paving.
No up-stands were greater than 15mm - see below diagrams for details



	THRESHOLDS								
WHEELCHAIR REGS	**SP700**	**SP701**	**SP702**	**SP710**	**SP711**	**SBF700**	**SBF701**	**SLS700**	**SLS W/ SLS070**
ASSISTED SMALL CHAIR	LEVEL 7	LEVEL 9	LEVEL 9	LEVEL 7	LEVEL 7	LEVEL 7	LEVEL 7	LEVEL 7	LEVEL 7
NON ASSISTED LARGE CHAIR	LEVEL 9	LEVEL 9	LEVEL 9	LEVEL 9	LEVEL 9	N/A			
ASSISTED LARGE CHAIR	LEVEL 9	LEVEL 9	LEVEL 9	LEVEL 9	LEVEL 9				
LIGHTWEIGHT ELECTRIC	LEVEL 10	LEVEL 10	LEVEL 10	LEVEL 10	LEVEL 10				
MIDWEIGHT ELECTRIC	N/A					LEVEL 9	LEVEL 9	LEVEL 9	LEVEL 9
HEAVYWEIGHT ELECTRIC	LEVEL 10	LEVEL 10	LEVEL 10	LEVEL 10	LEVEL 10	LEVEL 9	LEVEL 9	LEVEL 9	LEVEL 9

Note: A scale of 1 to 10 (where the standard of 1 = extremely difficult and 10 = very easy) has been devised to determine the ease of operation over each low threshold with each type of wheelchair provided.

For clear opening widths of Sheerline range of door assemblies see 'approved document M' section of pdf by scanning the QR code.

Key elements of Document M (Volume 2) relating to windows and doors:

The accessible threshold, which is level or, if a raised threshold is unavoidable, it has a total height of not more than 15mm, a minimum number of upstands and slopes, with any upstand higher than 5mm chamfered or rounded.

APPROVED DOCUMENT O: OVERHEATING

Introduced to address the growing concern of overheating in residential buildings. This part of the regulations is specifically focused on ensuring that new residential buildings, including dwellings, care homes, student accommodation, and children's homes, are designed to mitigate the risks of excessive indoor temperatures.

Key elements of Document O relating to windows and doors:

LIMITING SOLAR GAINS: The regulations require measures to limit the amount of heat entering a building from sunlight, which can significantly contribute to overheating. This involves considerations around window design, shading, and orientation.

ADEQUATE VENTILATION: Part O emphasizes the importance of providing adequate and effective ventilation to help cool buildings. This includes both natural ventilation strategies and, where appropriate, mechanical ventilation solutions.

THERMAL COMFORT: The regulations aim to ensure thermal comfort for occupants without excessive reliance on active cooling systems like air conditioning, promoting more sustainable design practices.

ASSESSMENT OF OVERHEATING RISK: During the design stage, an assessment must be carried out to evaluate the risk of overheating based on factors such as location, building orientation, and local climate conditions. This assessment guides the design process to ensure appropriate measures are in place to prevent overheating.

ADAPTABILITY AND CONTROL: Features that allow occupants to control heat gains and losses, such as operable windows, shades, and the potential for retrofitting cooling systems, are encouraged under Part O.

The introduction of Part O reflects an evolving understanding of climate change impacts and the importance of designing buildings that remain comfortable and safe as temperatures rise. This part is crucial in promoting healthier living environments and reducing the energy demand associated with cooling buildings.

COMPLIANCE RELATING TO WINDOWS AND DOORS

Compliance to Part O is heavily focused on the Architect and the building design.

Is the location in Moderate or High Risk of Overheating?

Part O refers to CIBSE TM59 and TM49 Guidance on understanding the methodologies of categorising a building.

Typical factors –

1. Southern regions of the UK are more prone to overheating due to the warmer climate.

2. Urban areas are more prone to overheating due to the built-up topography, resulting in less wind, making ventilation less effective.

3. Building orientation having a mainly glazed façade towards the South or West will lead to more solar gain.

4. Buildings with highly insulated elements are more prone to overheating due to the high efficiency of said elements.

This risk level determines the number of mitigating strategies which must be implemented to satisfy Building Control.

Does the Dwelling have Cross Ventilation?

Part O defines cross-ventilation as openings on opposite façades which are within the control of the occupant.
For example, a detached house with windows on the front and back which is occupied by a singular party has cross-ventilation but a block of flats with multiple occupancy across different floors and façades does not.
Each dwelling must be assessed independently.

Limiting Solar Gain

To limit the amount of solar gain, Part O sets out guidance for the area of glazing vs. the floor area of the dwelling.
This is applicable for both the dwelling as a whole and the individual rooms.

Buildings or parts of buildings with cross-ventilation should not exceed the maximum glazing areas in the below table.

LIMITING SOLAR GAINS FOR BUILDINGS OR PARTS OF BUILDINGS WITH CROSS-VENTILATION				
	HIGH RISK LOCATION		MODERATE RISK LOCATION	
Largest glazed façade orientation	Maximum area of glazing (% floor area)	Maximum area of glazing in the most glazed room (% floor area of room)	Maximum area of glazing (% floor area)	Maximum area of glazing in the most glazed room (% floor area of room)
NORTH	15	37	18	37
EAST	18	37	18	37
SOUTH	15	22	15	30
WEST	18	37	11	22

NOTE: 1. Floor area and floor area of room areas defined as:
Floor area: Internal wall to wall of building at each floor.
Floor area of the room: Internal wall to wall of room. For multi-use rooms e.g. open-plan kitchen and living room, use the area with the largest glazing area and calculate based on a room depth no greater than 4.5m from the glazed façade.

Buildings or parts of buildings with no cross-ventilation should not exceed the maximum glazing areas in the below table.

LIMITING SOLAR GAINS FOR BUILDINGS OR PARTS OF BUILDINGS WITHOUT CROSS-VENTILATION[1]				
	HIGH RISK LOCATION		MODERATE RISK LOCATION	
Largest glazed façade orientation	Maximum area of glazing (% floor area)	Maximum area of glazing in the most glazed room (% floor area of room)	Maximum area of glazing (% floor area)	Maximum area of glazing in the most glazed room (% floor area of room)
NORTH	15	26	18	26
EAST	11	18	18	26
SOUTH	11	11	15	15
WEST	11	18	11	11

From the tables above, the glazed area must be proportional to the floor area, dependant on the elevation and orientation at maximum. It is to be noted that the glazing area is only related to the area taken up by glass that can be seen through. *For example, glass area minus the overlap of the rebate depth.*

Dwellings that fall under the high-risk category must also have one of the following shading methods on the façades between North-East and North-West via the South;

- External Shutters with a means of ventilation.
- Glazing with a maximum g-value of 0.4 and minimum light transmittance of 0.7. This can be achieved using special coatings, such as the Saint-Gobain's SKN range, or equivalent solar control glazing.
- Overhangs on the south facing façade which cover the glazing relative to a 50° sun angle.

APPROVED DOCUMENT O: OVERHEATING *continued*

REMOVING EXCESS HEAT

Buildings with cross-ventilation should have a free area of ventilation as governed by the below tables, relating to floor area.

MINIMUM FREE AREAS FOR BUILDINGS OR PARTS OF BUILDINGS WITH CROSS-VENTILATION		
	HIGH RISK LOCATION	MODERATE RISK LOCATION
Total minimum free area[1]	The greater of the following: a. 6% of the floor area[2] b. 70% of the glazing area[3]	The greater of the following: a. 9% of the floor area[2] b. 55% of the glazing area[3]
Bedroom minimum free area	13% of the floor area of the room[4]	4% of the floor area of the room[4]

Buildings or parts of buildings with no cross-ventilation should equal or exceed the minimum free areas in the below table.

MINIMUM FREE AREAS FOR BUILDINGS OR PARTS OF BUILDINGS WITHOUT CROSS-VENTILATION		
	HIGH RISK LOCATION	MODERATE RISK LOCATION
Total minimum free area[1]	The greater of the following: a. 10% of the floor area[2] b. 95% of the glazing area[3]	The greater of the following: a. 12% of the floor area[2] b. 80% of the glazing area[3]
Bedroom minimum free area	13% of the floor area of the room[4]	4% of the floor area of the room[4]

NOTES:

1. The total minimum free area is the free area for the whole dwelling house, residential unit, shared communal room or common space, including any bedrooms.
2. Floor area: Internal wall to wall of building at each floor.
3. Glazing area: The area of transparent material, not including the window frame.
4. Floor area of the room: Internal wall to wall of room. For multi-use rooms e.g. open-plan kitchen and living room, use the area with the largest glazing area and calculate based on a room depth no greater than 4.5m from the glazed façade.

Free area of the opener can be calculated in multiple ways, the simplest and easiest to calculate is the tables for casement windows provided via the QR code.

APPROVED DOCUMENT Q: SECURITY IN DWELLINGS

(NEW BUILD ONLY, INCL. EXTENSIONS)

Ensures all easily accessed doors and windows installed in a new residential property must be secure and resistant to physical attack by an opportunistic burglar. This includes main entrance doors, ground floor windows, and any accessible upper-floor windows or doors.

Suppliers and installers of secure windows and doors need to be able to demonstrate the installed product has been manufactured to a design that has been shown by test to meet the security requirements of British Standards publication PAS24.

TS 007 was developed by the DHF (Door and Hardware Federation) and the Glass & Glazing Federation to provide a recognisable security standard for single, French, patio and bi-folding doors. It has the support of BSI and Secured by Design. The TS007 standard helps provide evidence-based guidance on the relative security offered by external handle and cylinder combinations.

The 3-star security standard can be achieved via specifying a 1-star handle and a 2-star cylinder for example. The level of security provided is shown by the appearance of one to three stars, with three stars signifying the highest level of security.

LINK TO THE SHEERLINE PART Q MANUAL:

SUPPLEMENTAL INFORMATION

CONDENSATION

IS WHEN WATER VAPOUR IN THE AIR TURNS INTO LIQUID WATER.

This often happens on windows. It occurs because air can hold varying amounts of water vapor, and warmer air can hold more than cooler air. When warm, moist air touches a cooler surface, like a window during colder months, it cools down quickly and can't hold as much moisture. The excess moisture turns into droplets of water on the cool surface, which we see as condensation.

The following can help reduce condensation on windows:

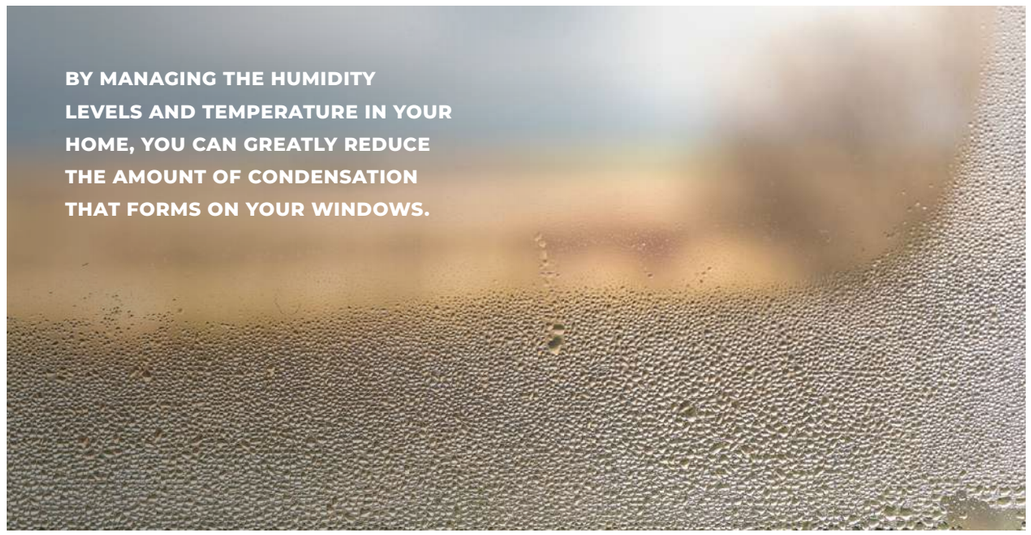
INCREASE VENTILATION: Open windows or use exhaust fans, especially in areas where a lot of moisture is produced like kitchens and bathrooms. This helps to get rid of moist air inside your home before it can condense.

USE A DEHUMIDIFIER: This device lowers the humidity level inside your home, which helps reduce the amount of moisture available to turn into condensation on your windows.

HEAT YOUR HOME EVENLY: Keeping your home at a consistent temperature helps to minimize the cold surfaces where condensation can form.

INSULATE YOUR WINDOWS: If windows are poorly insulated, they're more likely to be a lot colder than the air inside your home, which makes condensation more likely. Using double-glazing or thermal curtains can help keep the window surface warmer.

MOVE PLANTS: House plants release moisture into the air. If you have many plants near windows, moving them to another area can help reduce condensation.



SUPPLEMENTAL INFORMATION

G VALUES

In the context of windows in the UK, the "g-value" or solar factor refers to the ability of a window to transmit solar energy, which includes both the visible light and other forms of solar radiation such as ultraviolet and infrared rays. This factor is critical in determining how much heat from the sun can enter a building through the glass. The g-value is expressed as a number between 0 and 1.

Understanding G-Value

DEFINITION: The g-value (or solar gain coefficient) measures the percentage of the total solar radiation that is transmitted through the window. *For instance, a g-value of 0.6 means 60% of the solar radiation hitting the window is allowed to pass through it into the interior.*

IMPACT ON ENERGY EFFICIENCY: A higher g-value indicates that more solar heat is transmitted, which can be beneficial in colder climates as it helps to naturally heat up the space, reducing the need for artificial heating. Conversely, in warmer climates, a lower g-value can help keep a building cooler by blocking more solar heat, thus reducing the need for air conditioning.

Factors Influencing G-Value

TYPE OF GLASS: The type of glass used in the window affects its g-value. Options include clear glass, tinted glass, coated glass (like low-emissivity or low-e glass), and multiple glazing layers (double-glazed, triple-glazed), each offering different levels of solar gain.

COATINGS AND TREATMENTS: Special coatings and treatments can be applied to glass to modify its thermal and optical properties, thereby altering its g-value. Low-e coatings are particularly effective; they reflect infrared heat back outside while allowing visible light to pass through, thus optimizing both light and temperature control.

Importance in Building Design

In the UK, considering the g-values of windows is crucial for building design to comply with Part L of the Building Regulations, which focuses on the conservation of fuel and power. Proper selection of windows with appropriate g-values helps in creating energy-efficient buildings that maintain comfort without excessive reliance on heating and cooling systems.

When selecting windows for a building or renovation project, it's important to balance the g-value with other performance factors like thermal insulation (U-value) and visual light transmission to achieve the desired comfort levels, energy efficiency, and aesthetic outcomes.

SUPPLEMENTAL INFORMATION

G VALUES *continued*

CALCULATING SOLAR FACTOR FOR SHEERLINE PRODUCTS

1. Identify the Glazing Specification

g_{glass} is dependant on the make up of the glazed unit and the value is available from the glass suppliers main websites.

Saint Gobain - **Calumen** | Pilkington - **Spectrum** | Guardian - **Guardian Glass Analytics**.

Typical glazing combinations shown in the table below. The unit are in the configuration are 4-20-4, standard float glass.

SAINT-GOBAIN

COATING PRODUCT	G-VALUE	UG
COOL-LITE SKN 176	0.37	1.070
PLANITHERM TOTAL+	0.71	1.217
PLANITHERM ONE	0.52	1.070

PILKINGTON

COATING PRODUCT	G-VALUE	UG
SUNCOOL 70/35	0.38	1.070
K GLASS S	0.71	1.217
OPTITHERM S1 PLUS	0.48	1.070

GUARDIAN GLASS

COATING PRODUCT	G-VALUE	UG
SUNGUARD SN 70/35	0.35	1.070
CLIMAGUARD A+	0.71	1.217
CLIMAGUARD 1.0+	0.53	1.070

2. Identify which Frame and Sash combination is required, within the Sheerline product range.

G VALUES: AREA OF GLASS ON SHEERLINE PRODUCTS

	OUTER FRAME – SASH	a_{glass}
CLASSIC WINDOWS	SC100/SC101 – SC300/SC301	0.8071
	SC100/SC101 – SC310/SC311	0.8037
	SC102/SC103 – SC300/SC301	0.7739
	SC102/SC103 – SC310/SC311	0.7719
CLASSIC DOOR (French is only applicable)	SC100/SC101 – SC310/SC312	0.8378
	SC102/SC103 – SC310/SC312	0.8169
PRESTIGE WINDOWS	SP100/SP101 – SP300SP301	0.7325
	SP102/SP103 – SP300/SP301	0.6970
	SP104/SP105 – SP300/SP301	0.6722
	SP100/SP101 – SP305	0.7191
	SP102/SP103 – SP305	0.6839
	SP104/SP105 – SP305	0.6565
PRESTIGE DOORS (French is only applicable)	SP102/SP103 – SP350/SP351/SP352	0.6882
	SP104/SP105 – SP350/SP351/SP352	0.6767
PRESTIGE BIFOLD	SBF100 – SBF300/SBF301	0.7308
INDEX BIFOLD	SBF170 – SBF371	0.7359
LIFT AND SLIDE	SLS100 – SLS300/SLS301 – Standard Interlock	0.7710
	SLS100 – SLS300/SLS301 – Slim Interlock	0.7836

The figures above relating to each product combination are a factor of glass area relating to total product area, based on the CEN Sizing of the product group. This factor remains constant despite changing sizes in real-world applications.

3. Input the figures into the formula below.

SOLAR FACTOR = g_{glass} x 0.9 x a_{glass}

SUPPLEMENTAL INFORMATION

ACOUSTICS - BS EN 14351-1

(Not an approved document)

PART 1: WINDOWS & EXTERNAL PEDESTRIAN DOORSETS

Helping to achieve acoustic comfort for occupants by reducing sound nuisance, with consideration given to particular types of external sources.

Key elements of acoustics relating to windows and door:

The acoustic insulation of windows or doors is their ability to reduce the flow of sound and are measured in decibels (dB). Generally referred to in the format: Rw (C; Ctr).

Rw values of frame and glazing combined can be determined through acoustic testing at a laboratory, or using appropriate tables within BS EN 14351-1 Part 1, based on the acoustic values of most insulating glass units (IGU). However, the table-based method can only be used to qualify windows and doors up to Rw ≥ 39 dB or Rw + Ctr ≥ 35 dB, higher values shall be determined by laboratory testing.

Rw - The Weighted Sound Reduction represents the effectiveness of a window or door's soundproofing over a broad range of frequencies, measured in decibels (dB).

The higher the Rw number, the better sound insulator a window or door is.

C and **Ctr** are correction values applied to Rw (always negative) to give a more accurate performance level of a window or door when accounting for specific frequencies of sound. These corrections are not always applicable, in which case, Rw may be shown in isolation. Rw = 33 dB for example.

Ctr - is subtracted from the Rw value to account for sounds of low and medium frequency e.g. urban road traffic, low speed railway traffic, aircraft at long distance. Rw+Ctr will always be less than the Rw value.

C - is subtracted from the Rw value to account for sounds of medium and high frequency e.g. motorway traffic, high speed railway traffic, children playing, nearby aircraft.

For example, a window or door glazed with a 28mm double glazed 4-20-4 unit will achieve:

Rw (C; Ctr) = 33 (-2;-5) dB OR Rw = 33 dB (no correction applied) OR Rw + Ctr = 28 dB

Whichever Rw value applies can be subtracted from the external sound level (dB) to calculate the internal sound level (dB).

External Sound level of 80dB - Glazed window/door of 31dB = Internal Sound level of 49dB

Glazing thickness and glass type has a significant impact on the acoustic performance of the unit.

There are numerous acoustic glazing products available such as Stadip Silence & Pilkington Optiphon. These feature a special acoustic interlayer in the laminate to further help their sound insulation performance and generally are identified with an 'A' suffix, 6.8A or 8.8A for example.

Acoustic information for most IGUs can be found using the manufacturer's on-line tools:

- Pilkington - **Spectrum**
- Saint Gobain - **Calumen**
- Guardian - **Guardian Glass Analytics**.

It is a popular misconception that triple glazing is the best way to improve a window or door's acoustic performance. The addition of a further pane of the same thickness will see very little improvement in sound insulation and merely add significant cost.

For example, a 4-20-4 double IGU will achieve an Rw of 31dB, a 4-16-4-16-4 triple IGU will achieve an Rw of 32 dB. But a 6.8A-18-4 double IGU achieves 36 dB and an 8.8A-16-4 an Rw of 39 dB.

Whilst a sound insulation increase of 5 decibels may not seem significant, it should be considered along with the it's logarithmic scale of measurement, for every 10 decibel increase there is a perceived doubling of volume to the human ear.

For example, a window with an Rw of 40 dB would be twice as effective as a window with an Rw of 30 dB but four times more effective than one of 20 dB.

The above are IGU only Rw values and the method detailed in BS EN 14351-1 Part 1 - Annex B must be followed to calculate the Rw Value for the frame and glazing combined.
This method is based on a fixed or openable window of 1.23m x 1.48m.

For Rw reference, Rw + Ctr reference and extrapolation rules for different window sizes please see additional information available via the QR code below.

The following acoustic reports are available via the Sheerline website login.

REPORT NUMBER	GLAZING SPEC	RESULT (Rw)	RESULT (Rw + Ctr)
W20176-1	4-20-4	Rw = 33	Rw + Ctr = 28
W20176-2	6.8A – 12 - 4	Rw = 36	Rw + Ctr = 31
W20176-3	8.8A – 16 - 4	Rw = 37	Rw + Ctr = 33
W20176-4	6.8A – 12 - 6	Rw = 37	Rw + Ctr = 32
W20176-5	8.8A – 16 - 6	Rw = 38	Rw + Ctr = 33

Manufacturers IGU test data is not always available for the preferred air gap but small variations have no bearing on stated values.

MADE IN BRITAIN

MARLIN
ALUMINIUM GLAZING SYSTEMS

sales@marlinwindows.co.uk / 01535 603909 / marlinwindows.co.uk

PART L
Compliant