

Smart Architectural Aluminium

Building Regulation Updates



Anthony Murray MEng
Technical Manager

1



Building Regulations 2022 Update



<https://www.gov.uk/housing-local-and-community/building-regulation>

<https://www.smartsystems.co.uk/understanding-document-l>

2



Building Regulations Implementation

15th June 2022 Implementation

Transition Period

Where building work was started before **15th June 2022**, the work may continue as if the amendments in the Amendment Regulations had not been made.

Where a **building notice**, an **initial notice**, a **plans certificate** an **amendment notice** or a public body's notice has been given, or **full plans submitted**, before 15th June 2022, the work may be carried out as if the amendments in the Amendment Regulations had not been made provided that the work begins before **15th June 2023**.



3



Building Regulations Implementation

Circular 01/2021

Commencement of work

In the Department's opinion the commencement of work would usually be marked by work such as:

- excavation for strip or trench foundations or for pad footings;
- digging out and preparation of ground for raft foundations;
- vibrofloatation (stone columns) piling, boring for piles or pile driving;
- drainage work specific to the building(s) concerned.

We consider that the following sorts of work would not be likely to constitute the commencement of work:

- removal of vegetation
- demolition of any previous buildings on the site;
- removal of top soil;
- removal or treatment of contaminated soil;
- excavation of trial holes;
- dynamic compaction;
- general site servicing works (e.g. roadways)

<https://www.gov.uk/government/publications/building-amendment-regulations-2021-circular-012021>



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Approved Document F Ventilation



Approved Document F

■ Volume 1
Dwellings

Volume 2
Commercial

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Approved Document F Ventilation

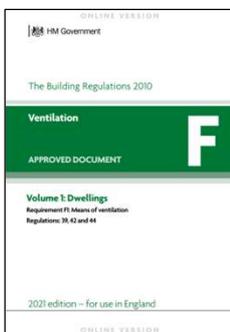
Ventilation Trickle Vents

2010

Replacement Windows should be fitted with trickle vents only if the windows being replaced had them.

2022

If no background ventilation alternative is being installed then **all replacement windows should be fitted with trickle vents regardless of whether the windows being replaced had vents in them or not.***



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Approved Document F Trickle Vents

Equivalent Areas EA (mm²)

	2010	2022
Habitable Room	5,000	8,000
Kitchens	2,500	8,000
Bathrooms	2,500	4,000

Product Name	TA	EA (mm ²)	Length	Width	Price
SFX 13 4000EA Vent 434mm	TA7833	434	23	10 – 24	4438
SF418 Canopy	TA5005	418	23	27	5423
SFX 13 4000EA Vent 434mm	TA7833	434	23	10 – 24	4438
XC13 412 Canopy (plastic)	TS2134040	411	18	32.5	5027



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Approved Document F Trickle Vents

Existing windows without background ventilators

3.15 Replacing the windows is likely to increase the airtightness of the dwelling. If ventilation is not provided via a mechanical ventilation with heat recovery system, then increasing the airtightness of the building may reduce beneficial ventilation in the building. In these circumstances, it is necessary to ensure that the ventilation provision in the dwelling is no worse than it was before the work was carried out. This may be demonstrated in any of the following ways.

- Incorporating background ventilators in the replacement windows equivalent to the following.
 - Habitable rooms – minimum 8000mm² equivalent area.
 - Kitchen – minimum 8000mm² equivalent area.
 - Bathroom (with or without a toilet) – minimum 4000mm² equivalent area.
- If the dwelling will have continuous mechanical extract ventilation, installing background ventilators in any replacement windows which are not in wet rooms, with a minimum equivalent area of 4000mm² in each habitable room.
- Other ventilation provisions, if it can be demonstrated to a building control body that they comply with the requirements of paragraph 3.2.

NOTE: If it is not technically feasible to adopt the minimum equivalent areas set out in paragraph 3.15, the background ventilators should have equivalent areas as close to the minimum value as is feasible.



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Approved Document F Trickle Vents

Existing windows without background ventilators

3.15 Replacing the windows is likely to increase the airtightness of the dwelling. If ventilation is not

3.2 When other building work is carried out that will affect the ventilation of the existing dwelling, for example:

- a. replacing a window or door
- b. doing energy efficiency work

a. the ventilation of the dwelling should either:

- a. meet the standards in the relevant approved document
- b. not be less satisfactory than before the work was carried out.

iii. Bathroom (with or without a toilet) = minimum 4000mm² equivalent area.

b. If the dwelling will have continuous mechanical extract ventilation, installing background ventilators in any replacement windows which are not in wet rooms, with a minimum equivalent area of 4000mm² in each habitable room.

c. Other ventilation provisions, if it can be demonstrated to a building control body that they comply with the requirements of paragraph 3.2.

NOTE: If it is not technically feasible to adopt the minimum equivalent areas set out in paragraph 3.15, the background ventilators should have equivalent areas as close to the minimum value as is feasible.



Approved Document F Trickle Vents



Approved Document F

Volume 1
Dwellings

Volume 2
Commercial



Approved Document F Trickle Vents

Existing windows without background ventilators

3.6 Replacing the windows is likely to increase the airtightness of the building. If ventilation is not provided via a mechanical ventilation system, then increasing the airtightness of the building may reduce beneficial ventilation in the building. In these circumstances, it is necessary to ensure that the ventilation provision in the building is no worse than it was before the work was carried out. This may be demonstrated in any of the following ways.

- a. Incorporating background ventilators in the replacement windows equivalent to the following.
 - i. Occupiable rooms.
 - For floor areas up to 10m² – minimum 2500mm² equivalent area.
 - For floor areas greater than 10m² – minimum 250mm² equivalent area per m² of floor area.
 - ii. Domestic-type kitchen – minimum 8000mm² equivalent area.
 - iii. Bathroom (with or without a toilet) and shower rooms – minimum 4000mm² equivalent area per bath or shower.
 - iv. Sanitary accommodation (and/or washing facilities) – minimum 2000mm² equivalent area per WC.
- b. Other ventilation provisions, if it can be demonstrated to a building control body that they comply with the requirements of paragraph 3.2.

NOTE: If it is not technically feasible to adopt the minimum equivalent areas set out in paragraph 3.6, the background ventilators should have equivalent areas as close to the minimum value as is feasible.



Approved Document F Trickle Vents

Equivalent Areas EA (mm²)

	2010	2022
Floor Area <10m ²	2,500	2,500
Floor Area >10m ²	250	250 per m ²
Kitchen	2,500	8,000
Bathroom	2,500	2,500 per bath/shower
W/C	2,500	2,500 Per W/C



Approved Document F Trickle Vents



Approved Document F Trickle Vents required for all replacement windows

New build need to consult
building designer



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Approved Document F Trickle Vents

2006

3.4 To comply with Requirement F1, unless the room is ventilated adequately by other installed ventilation provisions, **all replacement windows** should include trickle ventilators, preferably with accessible controls as described in Table 1.5.

2006 – Amendment

Delete paragraph 3.4 and replace with the following:

'3.4 Where the original windows were fitted with trickle ventilators the replacement windows should include them and they should be sized as **set-out** in paragraph 3.6. It would be **good practice** to fit trickle ventilators (or equivalent), with accessible controls, in all replacement windows to help with control of condensation and improve indoor air quality.'



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Approved Document F Trickle Vents



Approved Document F

Trickle Vents required for **all** replacement windows
**Or not less satisfactorily then before*

New build need to consult building designer



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Approved Document O Overheating



Approved Document O

Overheating Applies to New Build Domestic



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Approved Document O Overheating

Simplified Method

Limiting Solar Gains

Removing Excess Heat

Dynamic Thermal Modelling

CIBSE TM59 Modelling



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1.7 Buildings or parts of buildings with cross-ventilation should not exceed the maximum glazing areas in Table 1.1.

Table 1.1 Limiting solar gains for buildings or parts of buildings with cross-ventilation⁽¹⁾

Largest glazed façade orientation	High risk location		Moderate risk location	
	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 are as defined in Appendix A.

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Dynamic Thermal Modelling

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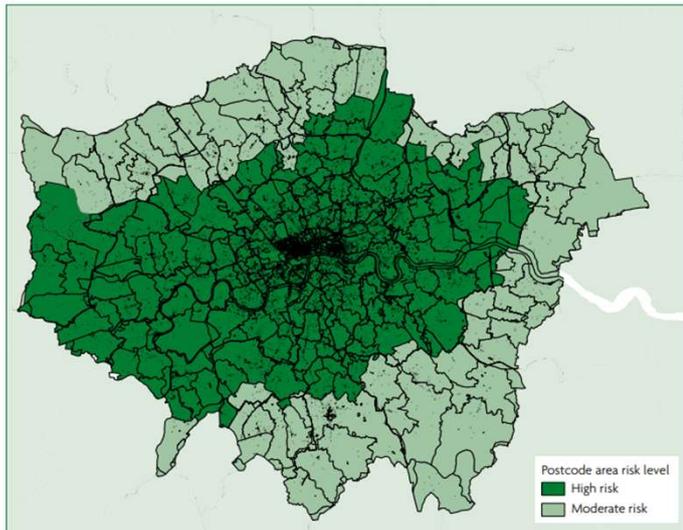


1.7 Buildings or parts of buildings with cross-ventilation in Table 1.1.

Table 1.1 Limiting solar gains for buildings or parts of buildings with cross-ventilation⁽¹⁾

Largest glazed façade orientation	High risk location	
	Maximum area of glazing (% floor area)	Maximum glazing in 1 glazed room (% floor area)
North	15	37
East	18	37
South	15	22
West	18	37

NOTE:
1. Floor area and floor area of room are as defined in Appendix A.



1.9 Residential buildings in the high risk location should, in addition to following the maximum glazing areas in Table 1.1 and Table 1.2, provide shading for glazed areas between compass points north-east and north-west via the south. Shading should be provided by one of the following means.

- External shutters with means of ventilation.
- Glazing with a maximum g-value of 0.4 and a minimum light transmittance of 0.7.
- Overhangs with 50 degrees altitude cut-off on due south-facing façades only.

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Dynamic Thermal Modelling CIBSE TM59 Modelling



1.7 Buildings or parts of buildings with cross-ventilation should not exceed the maximum glazing areas in Table 1.1.

Table 1.1 Limiting solar gains for buildings or parts of buildings with cross-ventilation⁽¹⁾

Largest glazed façade orientation	High risk location		Moderate risk location	
	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 are as defined in Appendix A.

1.8 Buildings or parts of buildings with no cross-ventilation should not exceed the maximum glazing areas in Table 1.2.

Table 1.2 Limiting solar gains for buildings or parts of buildings without cross-ventilation⁽¹⁾

Largest glazed façade orientation	High risk location		Moderate risk location	
	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

NOTE:
1. Floor area and floor area of room are as defined in Appendix A.

Cross-ventilation The ability to ventilate using openings on opposite façades of a dwelling. Having openings on façades that are not opposite is not allowing cross-ventilation, e.g. in a corner flat.

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Simplified
Limiting
Modelling

■ Removing Excess Heat

Dynamic
CIBSE

Table 1.3 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⁾

NOTES:

1. The total minimum free area is the free area for the whole dwellinghouse, residential unit, shared communal room or common space, including any bedrooms.
2. 'Floor area' is a key term. See Appendix A.
3. 'Glazing area' is a key term. See Appendix A.
4. 'Floor area of the room' is a key term. See Appendix A.

1.11 Buildings or parts of buildings with no cross-ventilation should equal or exceed the minimum free areas in Table 1.4.

Table 1.4 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 dwellinghouse, residential unit, shared communal room or common space, including any bedrooms.
2. 'Floor area' is a key term. See Appendix A.
3. 'Glazing area' is a key term. See Appendix A.
4. 'Floor area of the room' is a key term. See Appendix A.



Approved Document O Overheating

Simplified Method

Limiting Solar Gains

Max glazing area 11% to 15% floor area

Removing Excess Heat

Min openable free area glazing 55% to 95% glass area

Min openable free area glazing 6% to 12% floor area

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Simplified Method

Limiting Solar Gains

Max glazing area 18% floor area

Removing Excess Heat

Min openable free area glazing 55% glass area

Min openable free area glazing 9% floor area

Dynamic Thermal Modelling

CIBSE TM59 Modelling

Example 1

Low Risk Location

Largest Façade Glazed North

With Cross Ventilation

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Simplified Method

Limiting Solar Gains

Max glazing area 11% floor area

Removing Excess Heat

Min openable free area glazing 95% glass area

Min openable free area glazing 10% floor area

Dynamic Thermal Modelling

CIBSE TM59 Modelling

Example 2

High Risk Location

Largest Façade Glazed South

Without Cross Ventilation

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- 1.12 Openings should be designed to ensure that the area of the opening should meet the requirements. The opening should be assessed by either:
- Measurement of the product
 - Calculation using Appendix D.

Appendix D: Calculating equivalent area

- D1** The free areas in Section 1 of this approved document are geometric open areas that assume a clear sharp-edged orifice with a 0.62 coefficient of discharge (C_d). Different opening types will reduce the amount of air flow by both affecting the way air flows and reducing the physical area. Accounting for these factors gives the equivalent area.
- D2** The equivalent area of a window can be calculated using one of the following:
- The discharge coefficient calculator, available online at: <https://www.gov.uk/government/publications/classvent-and-classcool-school-ventilation-design-tool>.
 - Tables D1 to D9.



[Discharge coefficient calculator](https://www.gov.uk/government/publications/classvent-and-classcool-school-ventilation-design-tool)
MS Excel Spreadsheet, 27.7 KB

<https://www.gov.uk/government/publications/classvent-and-classcool-school-ventilation-design-tool>

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WINDOW DISCHARGE COEFFICIENT CALCULATOR

Window width, w	1.000 m
Window height, h	1.000 m
Opening angle, α	50°
Stroke length, d	0.845 m
Orifice Discharge Coefficient, C_{d0}	0.62 -
Equivalent area, A_{eq}	0.787 m ²
Effective area, A_{eff}	0.488 m ²
Free area, A_{free}	1.000 m ²
Discharge coefficient, C_d	0.49 -

50° Opening
Equivalent area 78.7%

7 When $\alpha < 10^\circ$ the A_{eff} (and C_d , therefore) may not be constant when pressure differences across the window are small.

<https://www.gov.uk/government/publications/classvent-and-classcool-school-ventilation-design-tool>

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WINDOW DISCHARGE COEFFICIENT CALCULATOR	
Window width, w	1.000 m
Window height, h	1.000 m
Opening angle, α	90°
Stroke length, d	1.414 m
Orifice Discharge Coefficient, C_{d0}	0.62 -
Equivalent area, A_{eq}	0.883 m ²
Effective area, A_{eff}	0.548 m ²
Free area, A_{free}	1.000 m ²
Discharge coefficient, C_d	0.55 -

50° Opening

Equivalent area 78.7%

90° Opening

Equivalent area 88.3%

<https://www.gov.uk/government/publications/classvent-and-classcool-school-ventilation-design-tool>

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Simplified Method

Limiting Solar Gains

Max glazing area 11% floor area

Removing Excess Heat

Min openable Free area glazing 10% floor area

Min openable Free area glazing 95% Glass area

Dynamic Thermal Modelling

CIBSE TM59 Modelling

Example 2

High Risk Location

Largest Façade Glazed South

Without Cross Ventilation

90° Opening

Equivalent area 88.3%

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Simplified Method

Limiting Solar Gains

Max glazing area 11% to 15% floor area

Removing Excess Heat

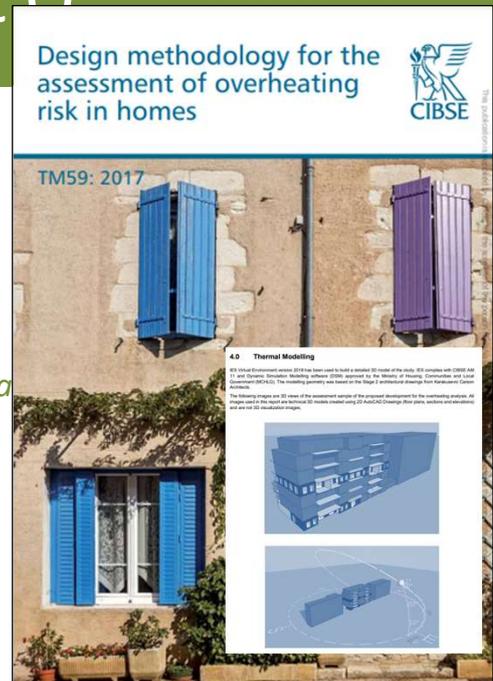
Openable Free area glazing 6% to 12% floor area

Openable Free area glazing 55% to 95% Glass area

Dynamic Thermal Modelling

CIBSE TM59 Modelling

Dynamic thermal analysis software which complies with the requirements of CIBSE AM11: Building performance modelling



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Overheating

Applies to New Build Domestic

Reduced overall glass areas

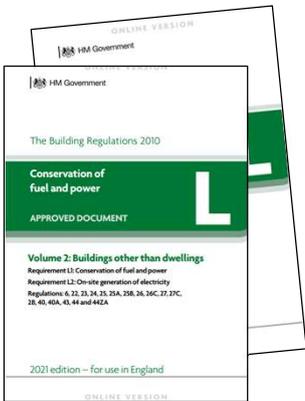
Mainly openers for removing heat

Increased use of solar control glass





Document L Thermal Performance



Approved Document L

Volume 1

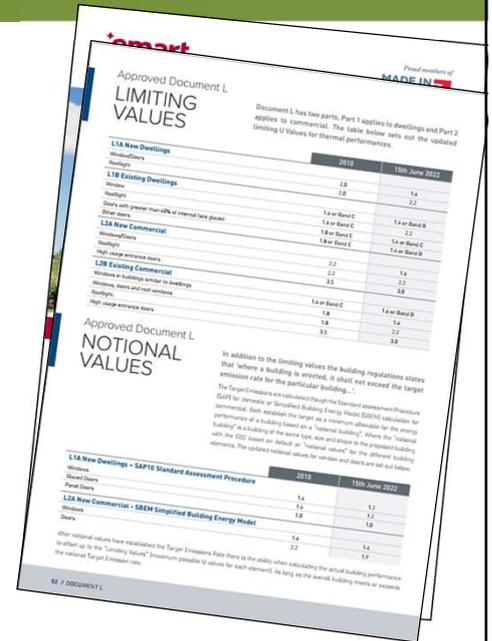
L1A New Dwellings

■ L1B Existing Dwellings

Volume 2

L2A New Commercial

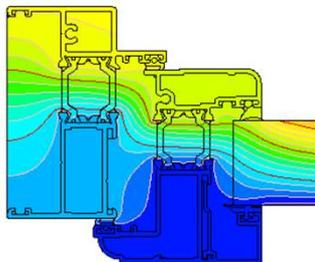
L2B Existing Commercial



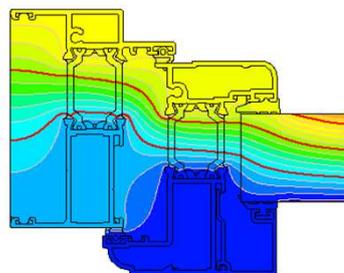
Document L L1 B Existing Dwellings

L1B Existing Dwellings
Window

1995	2002	2006	2010	2022
3.3	2.2	1.8 or Band E	1.6 or Band C	



Alitherm 55



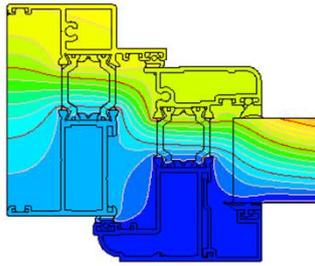
Alitherm 600



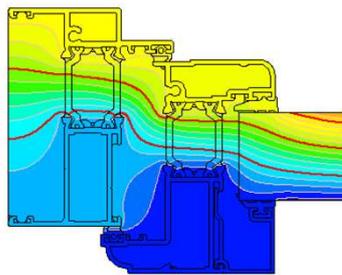
Document L

L1 B Existing Dwellings

L1B Existing Dwellings Window	1995	2002	2006	2010	2022
	3.3	2.2	1.8 or Band E	1.6 or Band C	1.4 or Band B



Alitherm 55



Alitherm 600



New Systems?



Document L

L1 B Existing Dwellings

L1B Existing Dwellings Window	1995	2002	2006	2010	2022
	3.3	2.2	1.8 or Band E	1.6 or Band C	1.4 or Band B

Alitherm 600

- OF ETC614
- VF ETC620
- TM ETC634

Type	Specification	Outer Frame:	Vent Frame:	Transom Mullion:		
Casement	Alitherm 600	ETC614F	ETC620	ETC634		
Beta Vent	Settings	<input checked="" type="checkbox"/> Low Profile Gaskets	<input checked="" type="checkbox"/> Outerframe with foam cavity closed			
Glass:	User Glass	AGC	Crystal Units	Guardian Pilkingtons SaintGobain All Glass		
Supplier	Spacer Bar					
Pilkingtons	SuperSpacer Premium 0.035		Add User Glass			
Specification	Supplier	Center Pane	g Value	WER	U Value	SEL
4/12/4/12/4 Opfloat K Glass S Argon	Pilkingtons	0.6	0.61	B	1.4	3312
4/12/4/12/4 Opfloat K Glass Argon	Pilkingtons	0.9	0.64	C	1.5	3313
4/12/4/12/4 Opfloat K Glass A Argon	Pilkingtons	0.9	0.63	B	1.4	3312
4/16/4 Opfloat S1+ K Glass Div Argon	Pilkingtons	0.9	0.44	E	1.5	
4/16/4 Opfloat K Glass S1+ Argon	Pilkingtons	1.0	0.51	E	1.6	
4/16/4 Opfloat K Glass S1+ Argon	Pilkingtons	1.0	0.49	E	1.6	
4/16/4 Opfloat K Glass S Argon	Pilkingtons	1.2	0.74	D	1.7	3312
4/16/4 Opfloat K Glass S Argon	Pilkingtons	1.2	0.71	D	1.7	3313
4/16/4 Opfloat K Glass A Argon	Pilkingtons	1.4	0.78	D	1.8	3313
4/16/4 Opfloat K Glass A Argon	Pilkingtons	1.4	0.75	D	1.8	3313
4/16/4 Opfloat K Glass Argon	Pilkingtons	1.5	0.79	D	1.9	3313
4/16/4 Opfloat K Glass Div Argon	Pilkingtons	1.5	0.79	D	1.9	3313
4/16/4 Opfloat K Glass Argon	Pilkingtons	1.5	0.75	D	1.9	
4/16/4 Opfloat K Glass Div Argon	Pilkingtons	1.5	0.75	D	1.9	

SEL = BRC Simplified Energy Label
* Low Iron Glass

Energy

ETC614F
ETC620
ETC634
1.193/0.74/0.035

B

-9

Window Energy Rating
kWh/m²·Year
Typical annual energy transfer per square meter. Rating to UK Building Regulation calculated in accordance with BR443 Domestic Window. Actual Energy consumption will depend on design, local climate and interior temperature.

Thermal Transmittance U_{Window}
1.7 W/m²·K

Solar Factor g_{Window}
0.50

Air Leakage
0.00 W/m³·K

Manufacturer
UNREGISTERED



Document L

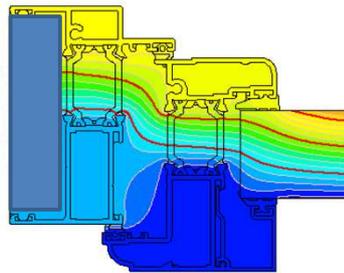
L1 B Existing Dwellings

L1B Existing Dwellings
Window

1995	2002	2006	2010	2022
3.3	2.2	1.8 or Band E	1.6 or Band C	1.4 or Band B

Alitherm 600

OF ETC614F
VF ETC620
TM ETC634



Energy

ETC614F
ETC620
ETC634
1.193/0.74/0.035

B

Window Energy Rating
kWh/m²Year
Typical annual energy transfer per square meter. Rating to UK Building Regulation calculated in accordance with BR443 Domestic Window. Actual Energy consumption will depend on design, local climate and interior temperature.

Thermal Transmittance U_{Window} 1.7 W/m²K
Solar Factor g_{Window} 0.50
Air Leakage 0.00 W/m²K
Manufacturer UNREGISTERED

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Document L

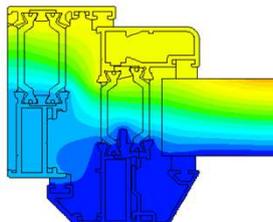
L1 B Existing Dwellings

L1B Existing Dwellings
Window

1995	2002	2006	2010	2022
3.3	2.2	1.8 or Band E	1.6 or Band C	1.4 or Band B

Alitherm 300

OF ETC313
VF ETC321
TM ETC333



Energy

ETC313
ETC321
ETC333
1.193/0.745/0.035

A

Window Energy Rating
kWh/m²Year
Typical annual energy transfer per square meter. Rating to UK Building Regulation calculated in accordance with BR443 Domestic Window. Actual Energy consumption will depend on design, local climate and interior temperature.

Thermal Transmittance U_{Window} 1.7 W/m²K
Solar Factor g_{Window} 0.55
Air Leakage 0.00 W/m²K
Manufacturer UNREGISTERED

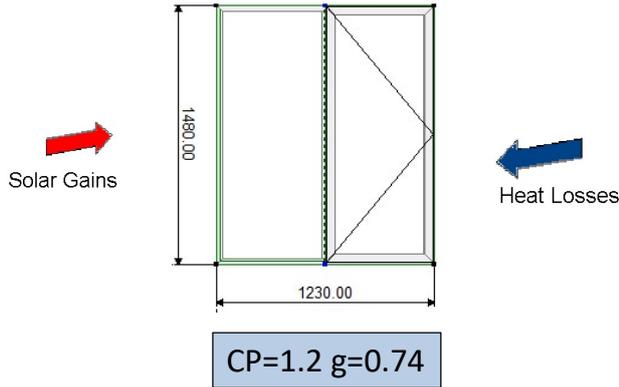
+4



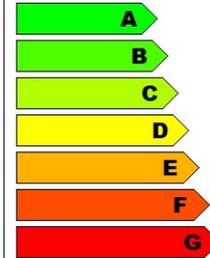
Document L Window Energy Rating

4.22 The Window Energy Rating (WER) is given by the following equation;

$$WER = 196.7 \times ((1 - f) \times g_{\text{glass}}) - 68.5 \times (U + (0.0165 \times AL))$$



Energy



ETC313F
ETC321
ETC333
1.193/0.74/0.035
A

+2

Window Energy Rating
kWh/m²/Year
Typical annual energy transfer per square meter. Rating to UK Building Regulation calculated in accordance with BR443 Domestic Window. Actual Energy consumption will depend on design, local climate and interior temperature.
Thermal Transmittance U_{Window}
Solar Factor g_{Window}
Air Leakage

1.7 W/m²K
0.54
0.00 W/m³K

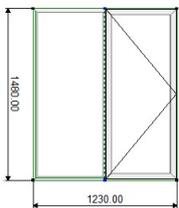
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Document L Door Energy Rating

L1B Existing Dwellings
Window

1995	2002	2006	2010	2022
3.3	2.2	1.8 or Band E	1.6 or Band C	1.4 or Band B



Alitherm 300

OF ETC313
VF ETC321
TM ETC333

Thk	Specification	Supplier	Centre Pane %	g Value	Psi	WER	U Value*	SEL
24mm	4/16/4 Optiwhite K Glass S1+ Argon	Pilkingtons	1.0	0.51	0.035	D	1.6	
24mm	4/16/4 Optifloat K Glass S1+ Argon	Pilkingtons	1.0	0.49	0.035	D	1.6	
24mm	4/16/4 Optiwhite K Glass S Argon	Pilkingtons	1.2	0.74	0.035	A	1.7	3308
24mm	4/16/4 Optifloat K Glass S Argon	Pilkingtons	1.2	0.71	0.035	B	1.7	3309
24mm	4/16/4 Optiwhite K Glass A Argon	Pilkingtons	1.4	0.78	0.035	B	1.9	3309
24mm	4/16/4 Optifloat K Glass A Argon	Pilkingtons	1.4	0.75	0.035	B	1.9	3309
24mm	4/16/4 Optiwhite K Glass Argon	Pilkingtons	1.5	0.79	0.035	B	1.9	3309
24mm	4/16/4 Optiwhite K Glass OW Argon	Pilkingtons	1.5	0.79	0.035	B	1.9	3309
24mm	4/16/4 Optifloat K Glass Argon	Pilkingtons	1.5	0.75	0.035	C	1.9	3310
24mm	4/16/4 Optifloat K Glass OW Argon	Pilkingtons	1.5	0.75	0.035	C	1.9	3310

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Document L Window Energy Rating

The screenshot shows the WER (Window Energy Rating) software interface. It includes a table of window specifications with columns for Title, Specification, Supplier, Centre Panel, g Value, and U Value. A summary panel on the right displays the Energy Rating (A+), Thermal Transmittance U_{window} (1.1 W/m²K), Solar Factor g_{total} (0.40), and Air Leakage (0.00 W/m³K).

Title	Specification	Supplier	Centre Panel	g Value	U Value
44 0mm	4/16/4/16/6 0 Dpfloat S1+ S3 Argon	Pilkingtons	0.6	0.44	0.036
36mm	4/12/4/12/4 Dpfloat S1+ S1+ Argon	Pilkingtons	0.7	0.39	0.030
36mm	4/12/4/12/4 Dpfloat K Glass S Argon	Pilkingtons	0.8	0.31	0.030
36mm	4/12/4/12/4 Dpfloat K Glass A Argon	Pilkingtons	0.9	0.64	0.030
24mm	4/16/4/16/4 Dpfloat S1+ K Glass Div Argon	Pilkingtons	0.9	0.44	0.035
24mm	4/16/4/16/4 Dpfloat K Glass S1+ Argon	Pilkingtons	1.0	0.51	0.035
24mm	4/16/4/16/4 Dpfloat K Glass A Argon	Pilkingtons	1.0	0.49	0.035
24mm	4/16/4/16/4 Dpfloat K Glass S Argon	Pilkingtons	1.2	0.74	0.035
24mm	4/16/4/16/4 Dpfloat K Glass A Argon	Pilkingtons	1.2	0.71	0.035
24mm	4/16/4/16/4 Dpfloat K Glass S Argon	Pilkingtons	1.4	0.78	0.035
24mm	4/16/4/16/4 Dpfloat K Glass A Argon	Pilkingtons	1.4	0.75	0.035
24mm	4/16/4/16/4 Dpfloat K Glass S Argon	Pilkingtons	1.5	0.79	0.035
24mm	4/16/4/16/4 Dpfloat K Glass Div Argon	Pilkingtons	1.5	0.79	0.035
24mm	4/16/4/16/4 Dpfloat K Glass S Argon	Pilkingtons	1.6	0.75	0.035

Energy Rating Calculator

39



Document L Window Energy Rating

The screenshots show the Spectrum software interface for Pilkingtons and the Guardian Glass Analytics Performance Calculator and Acoustic Assistant. The Spectrum interface displays window configuration options and performance metrics. The Guardian interface shows a detailed window configuration with a diagram of the window assembly and associated performance data.

Pilkingtons - Spectrum

Saint Gobain - Calumen

Guardian – Glass Analytics

40

Document L

04.May.2022
By Cole, Kevin

PERFORMANCE CALCULATOR

New Project 09

Make-up Name	Glass 1 & Coating	Glass 2 & Coating	Visible Light			Solar Energy			Thermal Properties	
			Transmittance	Reflectance		Transmittance	Reflectance	Solar Factor (g%)	Secondary Heat Transfer (q)	U-Value
			Visible (τ _v %)	p _v % out	p _v % in	Solar (τ _e %)	p _e % out			
Default Make-up 01	Guardian ExtraClear (CE)	ClimaGuard® Neutral 1.0 (CE) on Guardian ExtraClear (CE)	73.2	13.8	12.9	40.8	37.3	52.9	12.1	1.042

Calculation Standard: EN 410:2011 / EN 673:2011

Default Make-up 01

Outdoors

GLASS 1	Guardian ExtraClear (CE) Thickness = 4mm	#1 --- #2 ---	
GAP 1	10% Air, 90% Argon, 16mm		
GLASS 2	Guardian ExtraClear (CE) Thickness = 4mm	#3 ClimaGuard® Neutral 1.0 (CE) #4 ---	

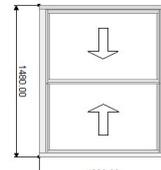
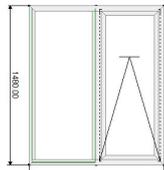
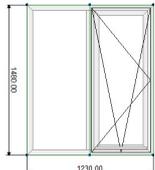
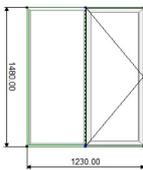
Total Unit (Nominal) = 24 mm Slope = 90°
Estimated Nominal Glazing Weight: 19.19 kg/m²

41

Document L Door Energy Rating

L1B Existing Dwellings
Window

1995	2002	2006	2010	2022
3.3	2.2	1.8 or Band E	1.6 or Band C	1.4 or Band B



- Alitherm 300
- Alitherm 600
- Alitherm 700
- Alitherm 800
- Heritage
- EcoFutural

- EcoFutural
- Heritage T/T
- Visoline

Alitherm 700

VS600

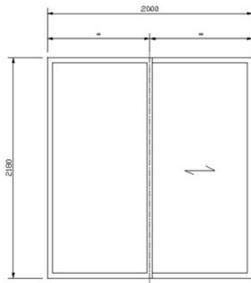
42



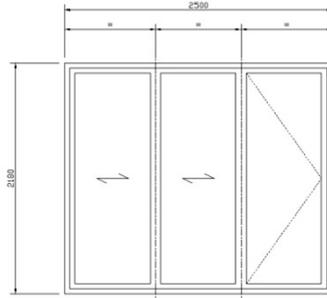
Document L Door Energy Rating

L1B Existing Dwellings
Window
Doors

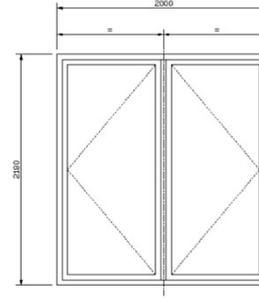
	1995	2002	2006	2010	2022
Window	3.3	2.2	1.8 or Band E	1.6 or Band C	1.4 or Band B
Doors	3.3	2.2	2.2	1.8 or Band E	1.4 or Band C



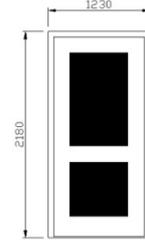
Sliding Patio Door



Sliding / Folding Door



French Door



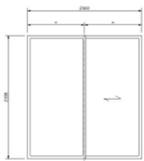
TYPE 3
FULLY
GLAZED



Document L Door Energy Rating

L1B Existing Dwellings
Window
Doors

	1995	2002	2006	2010	2022
Window	3.3	2.2	1.8 or Band E	1.6 or Band C	1.4 or Band B
Doors	3.3	2.2	2.2	1.8 or Band E	1.4 or Band C



Sliding Patio Door

- Visoglide Plus
- Slide 2000

Type: **Patio** Specification: **Visoglide Plus** Outer Frame: **VG510** Interlock: **VG551** Sash: **VG520F**

Low Profile Gaskets
 With Foam

Supplier: **Pilkington** Spacer Bar: **Super Spacer Premium** Pa/DGU/TGU: **0.035/0.030**

Thk	Specification	Supplier	Centre Pane	g Value	Pa	WER	U Value*	SEL
44.8mm	4/16/4/1/4/6.8 Optifloat S1+ S3 Argon	Pilkingtons	0.6	0.44	0.036	C	1.2	
36mm	4/12/4/1/2/4 Optifloat K. Glass S Argon	Pilkingtons	0.7	0.38	0.030	D	1.3	
36mm	4/12/4/1/2/4 Optifloat K. Glass S Argon	Pilkingtons	0.8	0.61	0.030	B	1.3	
36mm	4/12/4/1/2/4 Optifloat K. Glass Argon	Pilkingtons	0.9	0.64	0.030	B	1.5	
36mm	4/12/4/1/2/4 Optifloat K. Glass A Argon	Pilkingtons	0.9	0.63	0.030	B	1.4	
24mm	4/16/4 Optiwhem S1+ K. Glass D/W Argon	Pilkingtons	0.9	0.44	0.035	D	1.5	
24mm	4/16/4 Optiwhite K. Glass S1+ Argon	Pilkingtons	1.0	0.51	0.035	D	1.6	
24mm	4/16/4 Optifloat K. Glass S1+ Argon	Pilkingtons	1.0	0.49	0.035	D	1.6	
24mm	4/16/4 Optiwhite K. Glass S Argon	Pilkingtons	1.2	0.74	0.035	B	1.7	
24mm	4/16/4 Optifloat K. Glass S Argon	Pilkingtons	1.2	0.71	0.035	D	1.7	
24mm	4/16/4 Optiwhite K. Glass A Argon	Pilkingtons	1.4	0.78	0.035	D	1.8	
24mm	4/16/4 Optifloat K. Glass A Argon	Pilkingtons	1.4	0.75	0.035	D	1.8	
24mm	4/16/4 Optiwhite K. Glass Argon	Pilkingtons	1.5	0.79	0.035	D	1.9	
24mm	4/16/4 Optiwhite K. Glass D/W Argon	Pilkingtons	1.5	0.79	0.035	D	1.9	
24mm	4/16/4 Optifloat K. Glass Argon	Pilkingtons	1.5	0.75	0.035	D	1.9	
24mm	4/16/4 Optifloat K. Glass D/W Argon	Pilkingtons	1.5	0.75	0.035	C	1.9	

SEL = BFRIC Simplified Energy Label
U Value: EN 14551-1 BR443

Energy

B

VG510
VG551
VG520F
1.193/0.74/0.035

-6

Window Energy Rating
Whitener/Factor
Typical annual energy transfer per square meter.
Rating to UK Building Regulation calculated in accordance with BRE44 Domestic Door.
Actual Energy consumption will depend on design, local climate and interior temperature.

Thermal Transmittance U_{window} **1.7 W/m²K**
Solar Factor g_{window} **0.50**
Air Leakage **0.01 W/m²K**
Manufacturer **UNREGISTERD**



Document L

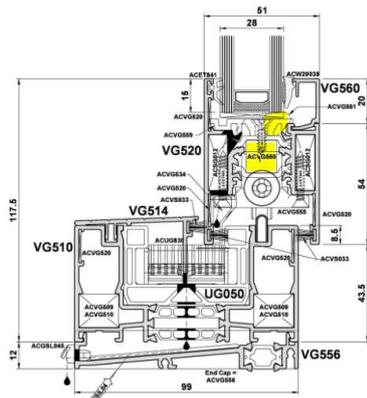
Door Energy Rating

L1B Existing Dwellings
Window
Doors

	1995	2002	2006	2010	2022
Window	3.3	2.2	1.8 or Band E	1.6 or Band C	1.4 or Band B
Doors	3.3	2.2	2.2	1.8 or Band E	1.4 or Band C



- Visoglide Plus
- Slide 2000



Energy

B

1.193/0.74/0.035

-6

1.7 W/m²K
0.50
0.01 W/m³K
UNREGISTERED

45

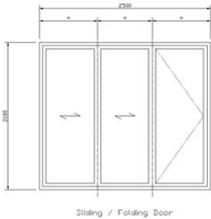


Document L

Door Energy Rating

L1B Existing Dwellings
Window
Doors

	1995	2002	2006	2010	2022
Window	3.3	2.2	1.8 or Band E	1.6 or Band C	1.4 or Band B
Doors	3.3	2.2	2.2	1.8 or Band E	1.4 or Band C



- Visofold 1000
- Visofold 2000
- Visofold 6000

Type: BIFold Specification: Visofold 1000 Outer Frame: DV14 Threshold: DV14 Sash: DV123

Low Profile Gaskets
With Foam

Glass: User Glass AGC Crystal Units Guardian Pilkingtons SaintGobain All Glass

Thk	Specification	Supplier	Centre Pane	g Value	Psi	w/ER	U Value*	SEL
44.8mm	4/16/4/14/6.8 Optifloat S1+ S3 Argon	Pilkingtons	0.6	0.44	0.036	D	1.2	
36mm	4/12/4/12/4 Optifloat S1+ S1+ Argon	Pilkingtons	0.7	0.38	0.030	E	1.3	
36mm	4/12/4/12/4 Optifloat K Glass S Argon	Pilkingtons	0.8	0.61	0.030	B	1.4	
36mm	4/12/4/12/4 Optifloat K Glass Argon	Pilkingtons	0.9	0.64	0.030	B	1.5	
36mm	4/12/4/12/4 Optifloat K Glass A Argon	Pilkingtons	0.9	0.63	0.030	B	1.5	
24mm	4/16/4 Optitherm S1+ K Glass DW Argon	Pilkingtons	0.9	0.44	0.025	B	1.5	
24mm	4/16/4 Optifloat K Glass S1+ Argon	Pilkingtons	1.0	0.51	0.035	B	1.6	
24mm	4/16/4 Optifloat K Glass S1+ Argon	Pilkingtons	1.0	0.49	0.035	B	1.6	
24mm	4/16/4 Optifloat K Glass S Argon	Pilkingtons	1.2	0.74	0.035	B	1.7	
24mm	4/16/4 Optifloat K Glass S Argon	Pilkingtons	1.2	0.71	0.035	B	1.7	
24mm	4/16/4 Optifloat K Glass A Argon	Pilkingtons	1.4	0.78	0.035	D	1.8	
24mm	4/16/4 Optifloat K Glass A Argon	Pilkingtons	1.4	0.75	0.035	D	1.8	
24mm	4/16/4 Optifloat K Glass Argon	Pilkingtons	1.5	0.79	0.035	D	1.9	
24mm	4/16/4 Optifloat K Glass DW Argon	Pilkingtons	1.5	0.79	0.035	D	1.9	
24mm	4/16/4 Optifloat K Glass Argon	Pilkingtons	1.5	0.75	0.035	D	1.9	
24mm	4/16/4 Optifloat K Glass DW Argon	Pilkingtons	1.5	0.75	0.035	D	1.9	

SEL = BFRIC Simplified Energy Label
U Value*: EN 14351-1 BR443

Energy

B

DV14
DV14
1.193/0.74/0.035

-9

1.7 W/m²K
0.50
0.02 W/m³K
UNREGISTERED

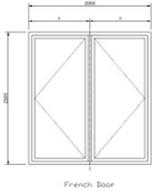
46



Document L Door Energy Rating

L1B Existing Dwellings
Window
Doors

	1995	2002	2006	2010	2022
Window	3.3	2.2	1.8 or Band E	1.6 or Band C	1.4 or Band B
Doors	3.3	2.2	2.2	1.8 or Band E	1.4 or Band C



- Visofold 1000
- Visofold 2000
- Visofold 6000
- Alitherm Plus
- EcoFutural
- Heritage Door

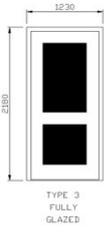
47



Document L Door Energy Rating

L1B Existing Dwellings
Window
Doors

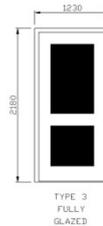
	1995	2002	2006	2010	2022
Window	3.3	2.2	1.8 or Band E	1.6 or Band C	1.4 or Band B
Doors	3.3	2.2	2.2	1.8 or Band E	1.4 or Band C



- Visofold 1000
- Visofold 2000
- Visofold 6000
- Alitherm Plus
- EcoFutural
- Heritage Door

4.22 The Window Energy Rating (WER) is given by the following equation;

$$WER = 196.7 \times ((1 - t) \times g_{\text{glass}}) - 68.5 \times (U + (0.0165 \times AL))$$



Heat Losses

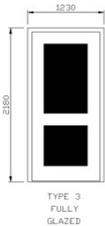
48



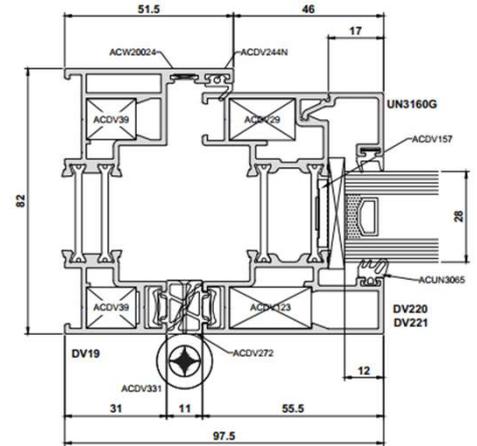
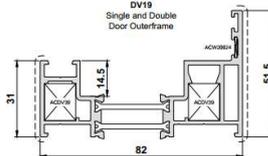
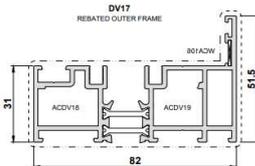
Document L Door Energy Rating

L1B Existing Dwellings
Window
Doors

	1995	2002	2006	2010	2022
Window	3.3	2.2	1.8 or Band E	1.6 or Band C	1.4 or Band B
Doors	3.3	2.2	2.2	1.8 or Band E	1.4 or Band C



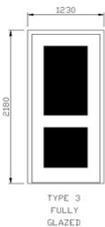
- Visofold 1000 (DV19)
- Visofold 2000
- Visofold 6000 (DV19)
- Alitherm Plus
- EcoFutural
- Heritage Door



Document L Door Energy Rating

L1B Existing Dwellings
Window
Doors

	1995	2002	2006	2010	2022
Window	3.3	2.2	1.8 or Band E	1.6 or Band C	1.4 or Band B
Doors	3.3	2.2	2.2	1.8 or Band E	1.4 or Band C



- Visofold 1000 (DV19)
- Visofold 2000
- Visofold 6000 (DV19)
- Alitherm Plus
- EcoFutural
- Heritage Door

Type: **Hinge Door Single** Specification: **Visofold 1000** Outer Frame: **DV19** Threshold: **DV19** Sash: **DV123**

Low Profile Gaskets With Foam

Glass: User Glass AGC Crystal Units Guardian Pilkingtons SaniGobain All Glass

Supplier: **Pilkingtons** Spacer Bar: **Super Spacer Premium** Psi: **DGU/TGU** 0.035/0.030

Thk	Specification	Supplier	Centre Panel	g Value	Psi	WER	U Value*	SEL
24mm	4/16/4 Optiwhite K Glass S1+ Argon	Pilkingtons	1.0	0.51	0.035	B	1.5	
24mm	4/16/4 Optifloat K Glass S1+ Argon	Pilkingtons	1.0	0.49	0.035	B	1.5	
24mm	4/16/4 Optiwhite K Glass S Argon	Pilkingtons	1.2	0.74	0.035	D	1.6	
24mm	4/16/4 Optiwhite K Glass A Argon	Pilkingtons	1.4	0.78	0.035	E	1.8	
24mm	4/16/4 Optifloat K Glass A Argon	Pilkingtons	1.4	0.75	0.035	E	1.8	
24mm	4/16/4 Optiwhite K Glass Argon	Pilkingtons	1.5	0.79	0.035	E	1.8	
24mm	4/16/4 Optiwhite K Glass DW Argon	Pilkingtons	1.5	0.79	0.035	E	1.8	
24mm	4/16/4 Optifloat K Glass Argon	Pilkingtons	1.5	0.75	0.035	E	1.8	
24mm	4/16/4 Optifloat K Glass DW Argon	Pilkingtons	1.5	0.75	0.035	E	1.8	

SEL = BFRIC Simplified Energy Label
U Value*: EN 14351-1 BR443

Energy

Window Energy Rating
kWh/m²/Year
Typical annual energy transfer per square meter. Rating to UK Building Regulation calculated in accordance with BR443 Domestic Door. Actual Energy consumption will depend on design, local climate and interior temperature.

DV19
DV19
DV123
1.042/0.51/0.035

-105



Document L

L2B Existing Commercial

	1995	2002	2006	2010	2022
L1B Existing Dwellings					
Window	3.3	2.2	1.8 or Band E	1.6 or Band C	1.4 or Band B
Doors	3.3	2.2	2.2	1.8 or Band E	1.4 or Band C
L2B Existing Commercial					
Windows	3.3	2.2	2.2	1.8	1.6
Doors	3.3	2.2	2.2	1.8	1.6
High usage entrance doors	-	-	6.0	3.5	3.0

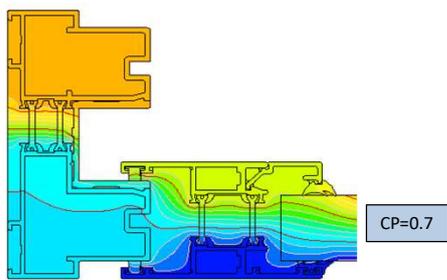
51



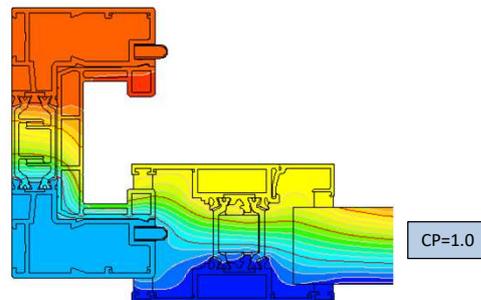
Document L

L2B Existing Commercial

	1995	2002	2006	2010	2022
L1B Existing Dwellings					
Window	3.3	2.2	1.8 or Band E	1.6 or Band C	1.4 or Band B
Doors	3.3	2.2	2.2	1.8 or Band E	1.4 or Band C
L2B Existing Commercial					
Windows	3.3	2.2	2.2	1.8	1.6
Doors	3.3	2.2	2.2	1.8	1.6
High usage entrance doors	-	-	6.0	3.5	3.0



Visoglide 1.6W/m²K



Visoglide Plus 1.6W/m²K

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Document L

L2B Existing Commercial

	1995	2002	2006	2010	2022
L1B Existing Dwellings					
Window	3.3	2.2	1.8 or Band E	1.6 or Band C	1.4 or Band B
Doors	3.3	2.2	2.2	1.8 or Band E	1.4 or Band C
L2B Existing Commercial					
Windows	3.3	2.2	2.2	1.8	1.6
Doors	3.3	2.2	2.2	1.8	1.6
High usage entrance doors	-	-	6.0	3.5	3.0

High-usage entrance door A door to an entrance primarily for people, through which many people are expected to move. Robustness and/or powered operation are the main performance requirements. A high-usage entrance door will have automatic closers and, except where operational requirements preclude it, be protected by a lobby.



Document L

L2B Existing Commercial

L1B Existing Dwellings
Window
Doors
L2B Existing Commercial
Windows
Doors
High usage entrance doors

2010

The U-value of glazing
 a. the smaller of the
 b. the standard window
 c. the specific size and

2022

U-values

- 4.1** U-values should be assessed using the methods and conventions set out in the Building Research Establishment's BR 443. U-values should be assessed for the whole thermal element (e.g. in the case of a window, the combined performance of the glazing and the frame).
- 4.2** The U-value of a window should be assessed using one of the following methods.
- Calculated using the actual size and configuration of the window.
 - For windows in buildings similar to dwellings, calculated for a standard window 1.23m wide × 1.48m high and one of the following standard configurations. **Standard configurations should not be used for commercial windows.**
 - For a casement window, a central vertical divider with one opening light and one fixed light.
 - For a vertical sliding sash window, a central horizontal divider with one opening light and one fixed light.
 - For a roof window, no divider.
 - Measured using the hot-box method as set out in **BS EN ISO 12567-1** for windows and **BS EN ISO 12567-2** for roof windows.

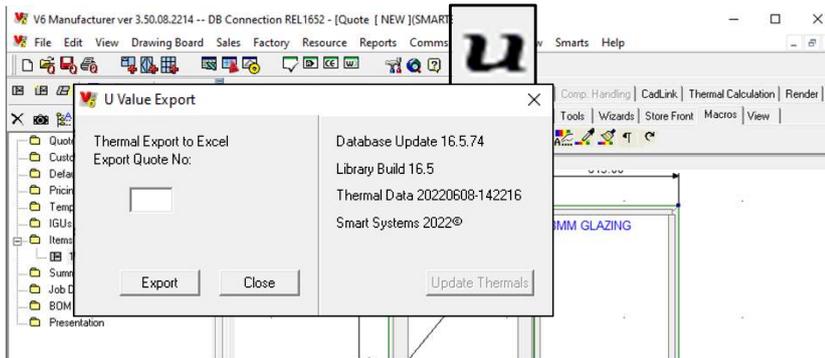
NOTE: For domestic-type window construction, to be used in buildings similar to dwellings (see Table 4.1), the default value from the **Standard Assessment Procedure** (Table 6e) may be used if there are no test data or calculated performance values.



Document L

L2B Existing Commercial

	1995	2002	2006	2010	2022
L1B Existing Dwellings					
Window	3.3	2.2	1.8 or Band E	1.6 or Band C	1.4 or Band B
Doors	3.3	2.2	2.2	1.8 or Band E	1.4 or Band C
L2B Existing Commercial					
Windows	3.3	2.2	2.2	1.8	1.6
Doors	3.3	2.2	2.2	1.8	1.6
High usage entrance doors	-	-	6.0	3.5	3.0



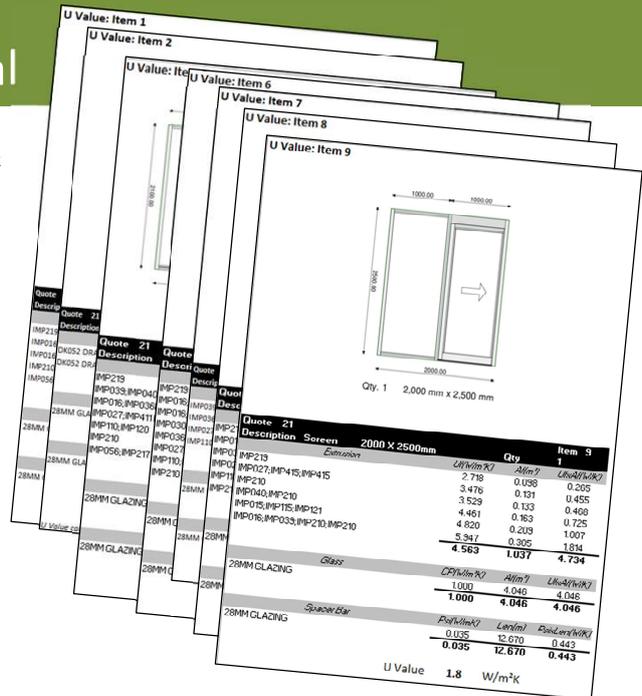
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Document L

L2B Existing Commercial

	1995	2002																																																																																																					
L1B Existing Dwellings																																																																																																							
Window	3.3	2.2																																																																																																					
U Value: screens																																																																																																							
Quote: 21																																																																																																							
<table border="1"> <thead> <tr> <th>Infills</th> <th>Centre Pane W/m²K</th> <th>Psi W/m²K</th> </tr> </thead> <tbody> <tr> <td>28MM GLAZING</td> <td>1.000</td> <td>0.035</td> </tr> </tbody> </table>			Infills	Centre Pane W/m ² K	Psi W/m ² K	28MM GLAZING	1.000	0.035																																																																																															
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<table border="1"> <thead> <tr> <th>Item</th> <th>Qty</th> <th>Description</th> <th>Width</th> <th>Height</th> <th>U Value W/m²K</th> <th>Area m²</th> <th>Heat Loss W/K</th> </tr> </thead> <tbody> <tr><td>1</td><td>1</td><td>Smart Wall</td><td>2000 X 2500 mm</td><td>1.4</td><td>5.0</td><td>7.2</td></tr> <tr><td>2</td><td>1</td><td>SC Frame</td><td>2000 X 2500 mm</td><td>1.2</td><td>5.0</td><td>5.9</td></tr> <tr><td>3</td><td>1</td><td>MC600</td><td>2000 X 2500 mm</td><td>1.2</td><td>5.0</td><td>5.9</td></tr> <tr><td>4</td><td>1</td><td>MC Wall</td><td>2000 X 2500 mm</td><td>1.3</td><td>5.0</td><td>6.4</td></tr> <tr><td>5</td><td>1</td><td>Smart Wall + Door</td><td>4000 X 2100 mm</td><td>1.6</td><td>8.4</td><td>13.3</td></tr> <tr><td>6</td><td>1</td><td>Smart Wall + Door</td><td>3000 X 2500 mm</td><td>1.5</td><td>7.5</td><td>11.0</td></tr> <tr><td>7</td><td>1</td><td>Screen</td><td>1000 X 2100 mm</td><td>1.9</td><td>2.1</td><td>3.9</td></tr> <tr><td>8</td><td>1</td><td>Screen</td><td>2000 X 2500 mm</td><td>1.6</td><td>5.0</td><td>7.9</td></tr> <tr><td>9</td><td>1</td><td>Screen</td><td>2000 X 2500 mm</td><td>1.8</td><td>5.0</td><td>9.1</td></tr> <tr><td>10</td><td>1</td><td>Screen</td><td>2000 X 2500 mm</td><td>1.8</td><td>5.0</td><td>9.2</td></tr> <tr><td>11</td><td>1</td><td>Screen</td><td>2000 X 2500 mm</td><td>1.6</td><td>5.0</td><td>8.0</td></tr> <tr><td colspan="5">Totals</td><td></td><td>58.0</td><td>87.7</td></tr> <tr><td colspan="5">U Value</td><td>1.5</td><td></td><td>W/m²K</td></tr> </tbody> </table> <p><small>U Value calculation in accordance with BR 443, BS EN 10077-1 and BS EN 10077-2</small></p>			Item	Qty	Description	Width	Height	U Value W/m ² K	Area m ²	Heat Loss W/K	1	1	Smart Wall	2000 X 2500 mm	1.4	5.0	7.2	2	1	SC Frame	2000 X 2500 mm	1.2	5.0	5.9	3	1	MC600	2000 X 2500 mm	1.2	5.0	5.9	4	1	MC Wall	2000 X 2500 mm	1.3	5.0	6.4	5	1	Smart Wall + Door	4000 X 2100 mm	1.6	8.4	13.3	6	1	Smart Wall + Door	3000 X 2500 mm	1.5	7.5	11.0	7	1	Screen	1000 X 2100 mm	1.9	2.1	3.9	8	1	Screen	2000 X 2500 mm	1.6	5.0	7.9	9	1	Screen	2000 X 2500 mm	1.8	5.0	9.1	10	1	Screen	2000 X 2500 mm	1.8	5.0	9.2	11	1	Screen	2000 X 2500 mm	1.6	5.0	8.0	Totals						58.0	87.7	U Value					1.5		W/m ² K
Item	Qty	Description	Width	Height	U Value W/m ² K	Area m ²	Heat Loss W/K																																																																																																
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9	1	Screen	2000 X 2500 mm	1.8	5.0	9.1																																																																																																	
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11	1	Screen	2000 X 2500 mm	1.6	5.0	8.0																																																																																																	
Totals						58.0	87.7																																																																																																
U Value					1.5		W/m ² K																																																																																																



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Document L

Limiting Values

	1995	2002	2006	2010	2022
L1A New Dwellings					
Window / Doors	3.3	2.2	2.2	2.0	1.6
L2A New Commercial					
Windows/Doors	3.3	2.2	2.2	2.2	1.6
High usage entrance doors	-	-	6.0	3.5	3.0



Document L

Notional Values

	1995	2002	2006
L1A New Dwellings			
Window / Doors	3.3	2.2	2.2
+			
SAP Standard Assessment Procedure			
Windows			
Doors			
L2A New Commercial			
Windows/Doors	3.3	2.2	2.2
High usage entrance doors	-	-	6.0
+			
SBEM Simplified Building Energy Model			
Window			
Doors			

The image shows a detailed energy calculation spreadsheet with the following sections:

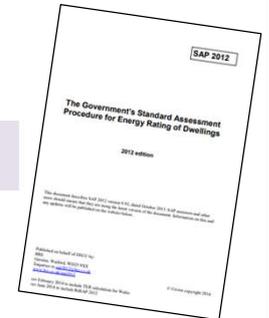
- 3. Heat losses and heat gains:** Includes calculations for space heating, cooling, and hot water. It lists various building elements like solid doors, semi-glazed doors, windows, roof windows, ground floor, exposed floor, basement floor, external walls, and roofs. It includes formulas for calculating heat losses and gains, such as $Q_{loss} = U \cdot A \cdot \Delta T$ and $Q_{gain} = \dots$.
- 3a. Energy requirements - Individual heating systems including micro-CHP:** This section details the energy requirements for different heating systems. It includes a table for monthly space heating requirements (Jan to Dec) and a total annual requirement. It also includes a table for monthly water heating requirements and a total annual requirement.
- Formulas and References:** The spreadsheet contains numerous formulas and references to other tables and documents, such as Table 11, Table 4a, Table 4b, Table 4c, Table 4d, Table 4e, Table 4f, Table 4g, Table 4h, Table 4i, Table 4j, Table 4k, Table 4l, Table 4m, Table 4n, Table 4o, Table 4p, Table 4q, Table 4r, Table 4s, Table 4t, Table 4u, Table 4v, Table 4w, Table 4x, Table 4y, Table 4z, Table 4aa, Table 4ab, Table 4ac, Table 4ad, Table 4ae, Table 4af, Table 4ag, Table 4ah, Table 4ai, Table 4aj, Table 4ak, Table 4al, Table 4am, Table 4an, Table 4ao, Table 4ap, Table 4aq, Table 4ar, Table 4as, Table 4at, Table 4au, Table 4av, Table 4aw, Table 4ax, Table 4ay, Table 4az, Table 4ba, Table 4bb, Table 4bc, Table 4bd, Table 4be, Table 4bf, Table 4bg, Table 4bh, Table 4bi, Table 4bj, Table 4bk, Table 4bl, Table 4bm, Table 4bn, Table 4bo, Table 4bp, Table 4bq, Table 4br, Table 4bs, Table 4bt, Table 4bu, Table 4bv, Table 4bw, Table 4bx, Table 4by, Table 4bz, Table 4ca, Table 4cb, Table 4cc, 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Document L

Notional Values

	1995	2002	2006	2010	2022
L1A New Dwellings					
Window / Doors	3.3	2.2	2.2	2.0	1.6
+					
SAP Standard Assessment Procedure					
Windows				1.4	1.2
Doors				1.2	1.2
L2A New Commercial					
Windows/Doors	3.3	2.2	2.2	2.2	1.6
High usage entrance doors	-	-	6.0	3.5	3.0
+					
SBEM Simplified Building Energy Model					
Window				1.6	1.4
Doors				2.2	1.9



Document L

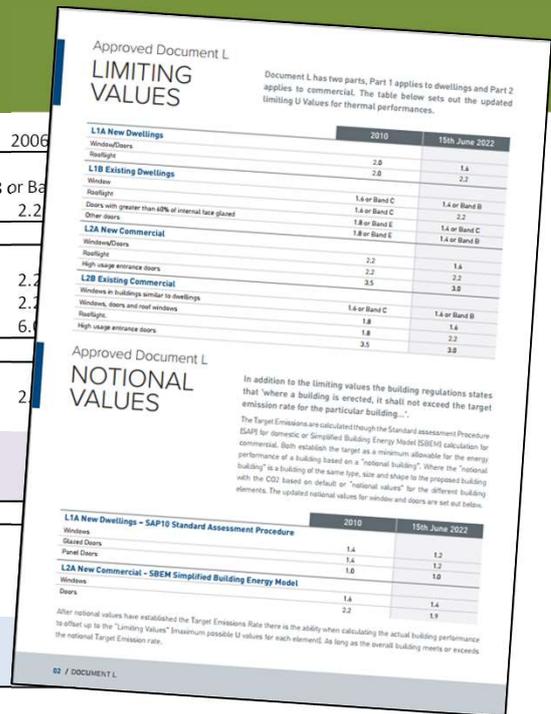
Notional Values

	1995	2002	2006	2010	2022
L1B Existing Dwellings					
Window	3.3	2.2	1.8 or Band E	1.6 or Band C	1.4 or Band B
Doors	3.3	2.2	2.2	1.8 or Band E	1.4 or Band C
L2B Existing Commercial					
Windows	3.3	2.2	2.2	1.8	1.6
Doors	3.3	2.2	2.2	1.8	1.4
High usage entrance doors	-	-	6.0	3.5	3.0
L1A New Dwellings					
Window / Doors	3.3	2.2	2.2	2.0	1.6
+					
SAP Standard Assessment Procedure					
Windows				1.4	1.2
Doors				1.2	1.0
L2A New Commercial					
Windows/Doors	3.3	2.2	2.2	2.2	1.6
High usage entrance doors	-	-	6.0	3.5	3.0
+					
SBEM Simplified Building Energy Model					
Window				1.6	1.4
Doors				2.2	1.9



Document L Notional Values

	1995	2002	2006
L1B Existing Dwellings			
Window	3.3	2.2	1.8 or B
Doors	3.3	2.2	2.2
L2B Existing Commercial			
Windows	3.3	2.2	2.2
Doors	3.3	2.2	2.2
High usage entrance doors	-	-	6.1
L1A New Dwellings			
Window / Doors	3.3	2.2	2.2
+ SAP Standard Assessment Procedure			
Windows			
Doors			
L2A New Commercial			
Windows/Doors	3.3	2.2	
High usage entrance doors	-	-	
+ SBEM Simplified Building Energy Model			
Window			
Doors			

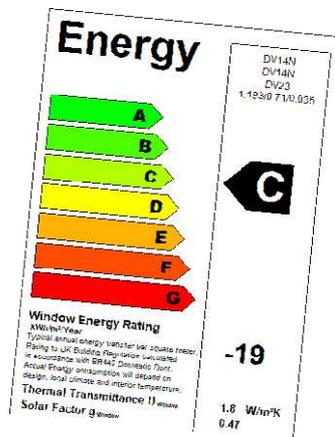


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Document L Summary

- Implementation 15th June 2022
12 Month "Transition Period" 15th June 2023
- Existing Domestic Double Glaze
 - Windows 1.4 or **B rating**
 - Doors 1.4 or **C rating**

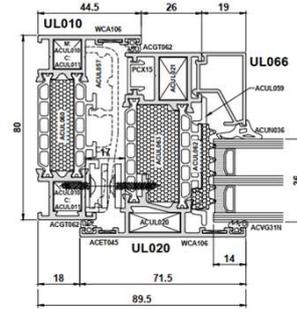


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Document L Summary

- Implementation 15th June 2022
12 Month "Transition Period" 15th June 2023
- Existing Domestic Double Glaze
 - Windows 1.4 or **B** rating
 - Doors 1.4 or **C** rating
- New Build **Limiting Values** Double Glaze
 - Window/Door 1.6
- New Build **Notional Values** Triple Glaze
 - Window Domestic 1.2 Commercial 1.4
 - Door Domestic 1.2 Commercial 1.9



Building Regulations 2022 Update

U Value Certificate
Door U Value - In accordance with Approved Document L

U Value: 1.0 W/m²K

U Value: Item 5

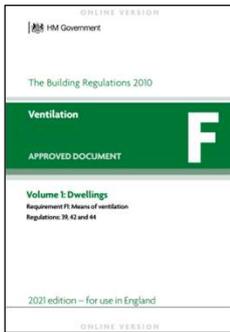
4000 X 2100mm Qty: 1

Description	U Value	Area	U Value
PPC20	2.780	0.050	0.285
PPC10	2.721	0.305	0.732
PPC06	2.271	0.601	1.364
PPC12	3.476	0.281	0.975
PPC10	3.430	0.306	1.063
PPC20	3.523	0.223	0.788
PPC06	3.924	0.123	0.483
PPC05	3.288	1.360	4.495
SPM GLAZING	1.000	6.888	6.888
SPM GLAZING	1.000	6.888	6.888
SPM GLAZING	0.035	22.290	0.780
Total	0.035	22.290	0.780

U Value: 1.6 W/m²K



Building Regulations 2022 Update



<https://www.gov.uk/housing-local-and-community/building-regulation>

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Product Development New Systems

Façade Systems:

Visofold Door

DV19 Outerframe
New Sashes DV220 and DV221
New Bead DV162

Alitherm 400 Door

Flush Door ETD4203 and ETD4204
Stepped Door ETD4204 and ETD4205

Alitherm 400 Window

Sash ETC4120 and ETC4129

Visoglide Plus

New Sash VG920

Visotherm Door

Sash UL224 UL225

Visotherm Window

Sash UL020 UL023

Heritage 60 Door

Sash W20XXX and W20XXXX

Internal Systems:

AluSpace

Internal screen system

External Systems:

Decking System

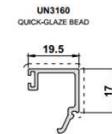
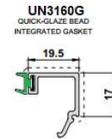
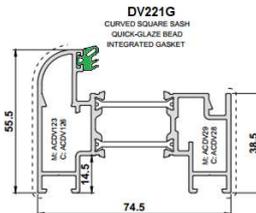
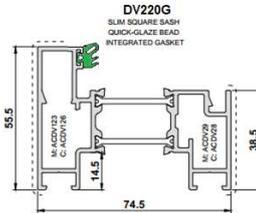
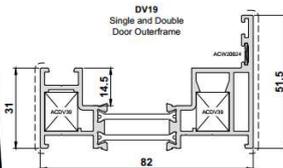
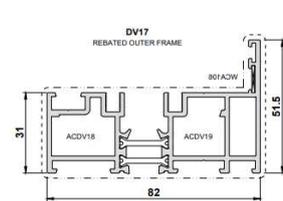
Aluminium decking

SolUmbra

Pergola

66

Product Development Visofold Door



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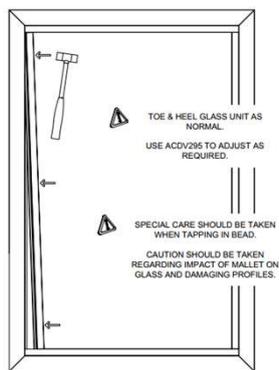
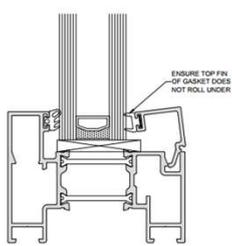
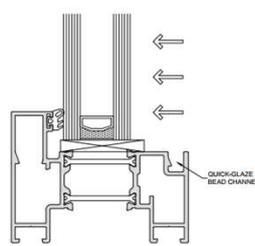
Product Development Visofold Door – Quick Glaze Bead



QUICK-GLAZE BEAD INSTALLATION

1. INSTALL GLASS UNIT, ENSURING IT HAS BEEN PUSHED FORWARD TO ENGAGE COMPRESSION OF E GASKET.
2. BEGINNING WITH HORIZONTAL BEADS, LOCATE BEAD IN CLIP CHANNEL OF SASH AS SHOWN. INTEGRATED GASKET MAY REST AGAINST GLASS UNIT.
3. APPLY FIRM PRESSURE TO THE BEAD TO HOLD IN POSITION. THIS MAY CAUSE THE BEAD TO FULLY LOCK INTO POSITION.
4. USING A NYLON MALLET, TAP BEAD INTO CHANNEL WORKING FROM ONE END TO THE OTHER. PLEASE TAKE CARE AT THIS STAGE TO AVOID DAMAGE TO BOTH THE GLAZING UNIT AND THE BEAD.
5. REPEAT STEPS 2 - 4 TO INSTALL VERTICAL BEADS.

WE STRONGLY RECOMMEND INSTALLING ACCDV295 GLASS ADJUSTERS WHEN USING QUICK-GLAZE BEADS. THIS WILL REMOVE THE NEED TO REMOVE BEADS IN ORDER TO ADJUST GLASS POSITION.



68

Product Development Visofold Door – Quick Glaze Bead



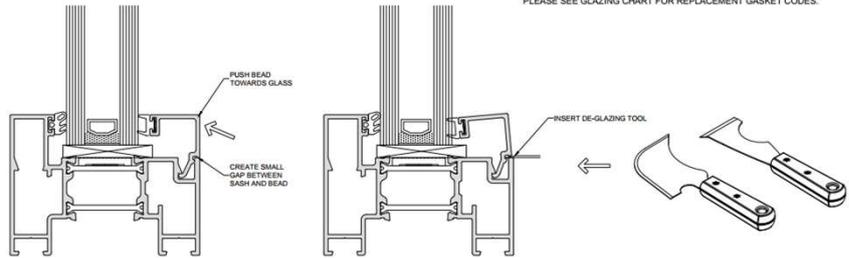
KEEP INTEGRATED GASKET QUICK-GLAZE BEAD REMOVAL

- STARTING ON VERTICAL BEADS, APPLY PRESSURE TO BEAD IN DIRECTION SHOWN IN ORDER TO CREATE SMALL GAP BETWEEN SASH AND BEAD.
 - GENTLY INSERT DE-GLAZING TOOL TAKING PARTICULAR CARE **AS NOT TO DAMAGE PAINT FINISH.**
 - SLOWLY PRISE THE BEAD UP AND AWAY FROM THE SASH.
 - THE BEAD SHOULD NOW BE EASILY REMOVABLE FROM QUICK-GLAZE BEAD CHANNEL IN SASH
- BEAD AND INTEGRATED GASKET CAN BE REUSED.



REPLACE INTEGRATED GASKET QUICK-GLAZE BEAD REMOVAL

- USING SMALL FLAT HEADED SCREWDRIVER OR SIMILAR, WEDGE TIP BETWEEN CO EXTRUDED GASKET AND ALUMINIUM.
 - IN A LEVERING MOTION, PRISE THE GASKET AWAY FROM THE ALUMINIUM. PARTICULAR CARE SHOULD BE TAKEN NOT TO DAMAGE THE GLASS UNIT AND ALUMINIUM.
 - COMPLETE THIS AT SEVERAL LOCATIONS ALONG THE LENGTH OF THE BEAD.
 - REMOVE GASKET AND DISCARD. THIS GASKET CAN NO LONGER BE USED.
 - THE BEAD SHOULD NOW BE EASILY REMOVABLE FROM TAP IN BEAD CHANNEL IN SASH
- PLEASE SEE GLAZING CHART FOR REPLACEMENT GASKET CODES.

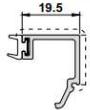


69

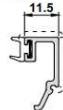
Product Development Visofold Door



UN3160G
19.5mm Bead
with Gasket



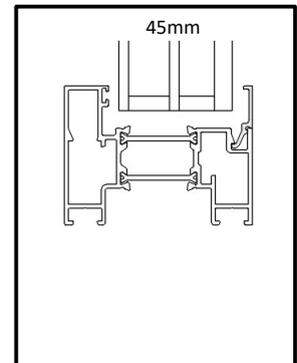
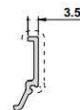
ETC4179G
11.5mm Bead
with Gasket



UN3166
8.5mm Bead



UN3168
3.5mm Bead



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Product Development Visofold Door

Position	Product	Process	Thickness (nominal) mm	Weight kg/m ²	
Pilkington Insulight™ Protect Triple					
Class 1	Pilkington Optifloat™ Clear	Annealed	4.0		
Cavity 1	Argon (90%)		16.0		
Class 2	Pilkington Optitherm™ S1 Plus	Annealed	4.0		
Cavity 2	Argon (90%)		14.0		
Class 3	Pilkington Optilam™ Therm S3	Laminated	6.8		
Product Code	4-16Ar--14Ar-S(3)6.8L			44.8	35.76

DESCRIPTION

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Cavity 1	Argon (90%)		16.0		
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PERFORMANCE

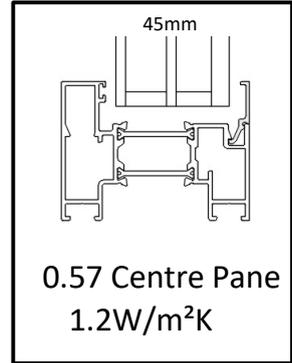
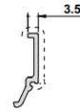
Light	Energy	Sound	Thermal
Transmittance	Direct Transmittance	Sound Reduction	R _g (GG) dB
Reflection	Reflection	Thermal Transmittance	W/m ² K
Absorbance	Absorbance		
Total Transmittance	Total Transmittance		
Shading Coefficient	Shading Coefficient		
Shading Coefficient Shortwave	Shading Coefficient Shortwave		
U-value	U-value		

The values of some characteristics are displayed as NPD. This stands for No Performance Determined.

Pilkington Spectrum allows you to combine a wide range of products available from Pilkington and determine their key properties such as light transmittance, g-value and U-value. The program includes restrictions that prevent some combinations being selected that may not be considered suitable for your project. Even with these restrictions, it is still possible to create product combinations that may not be available from your supplier. Please check with your supplier that your chosen product combination is available in the store required and is suitable for your project. Furthermore, it is essential that you check that your product combination is appropriate for satisfying local, regional, national and other project-specific requirements.

Calculations are made according to EN standards 410 and 673:2012
Pilkington Spectrum Version UK7.3.1 26/10/22

UN3168
3.5mm Bead



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Product Development Visofold Door – Quick Glaze Bead

smart
A Division of Pilkington

MADE IN BRITAIN

FEATURING SMART'S NEW QUICK GLAZE BEAD

Introducing VISOFOLD SERIES

The Visofold Series of side-sliding doors is suitable for both residential and commercial applications. Each door offers responsive opening apertures that bring together internal and external spaces to create unique living and social areas.

Use in a wide range of projects from residential to commercial. The Visofold Series can create a great impression, enhance and maximise the space and functionality of your building. It is available in a wide range of finishes and is suitable for use in a wide range of environments.

DESIGNING PRODUCT SOLUTIONS FOR

- The UK's Best Building Aluminium Sliding Door Range
- Smart Quick-Glaze Bead featuring integrated gasket and integrated gasket for easier installation and removal
- Ultra-Slim Sightlines from 50mm Height Point
- Available for Residential and Commercial Properties
- BS 2016 Approved
- Building Regulations Compliant (Approved Document L)

Available in Natural colours
White (WP), Black (BL) & Anthracite Grey (KL005)

Visofold 1000 Slim sash profiles are now available with optional integrated gaskets designed to speed the fabrication process. Note, DV220G & DV221G sashes when used with UN3160G Quick Glazed Bead are suitable for 28.8mm glazing only.

- Featuring Smart's Quick-Glaze Bead UN3160G with integrated gasket
- New sash profiles DV220G & DV221G with integrated gasket
- Quicker fabrication and installation, saving costs
- Quick-Glaze Beads designed to be easy to remove
- Slim sightlines
- Security tested to PAS 24: 2016
- Weather tested to BS 6375 Part 1: 2009

Tests: Impact, Security, Weather, UV (96 hours), Hot & Cold, shock testing (for shrinkage)

72

Product Development Alitherm 400 Door

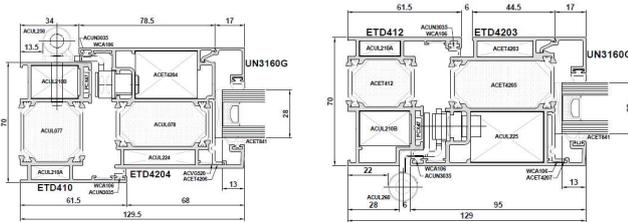


73

Product Development Alitherm 400 Door



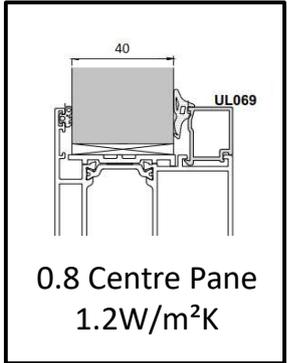
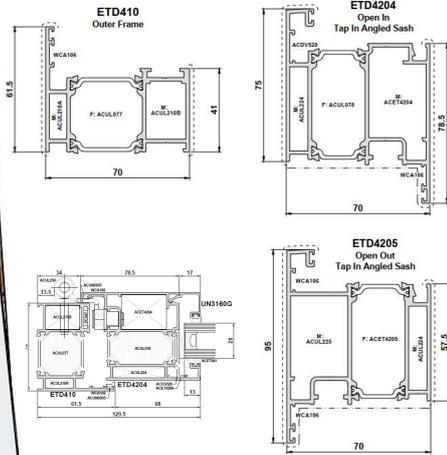
- Open in, Open out, Single & Double door options
- Quick Glaze Bead (with integrated gasket)
- Kitemarked
- Lock Key operated, Auto engage or Lift lever
- Will accommodate 40mm infill panel
- Stepped or Flush finish



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Product Development

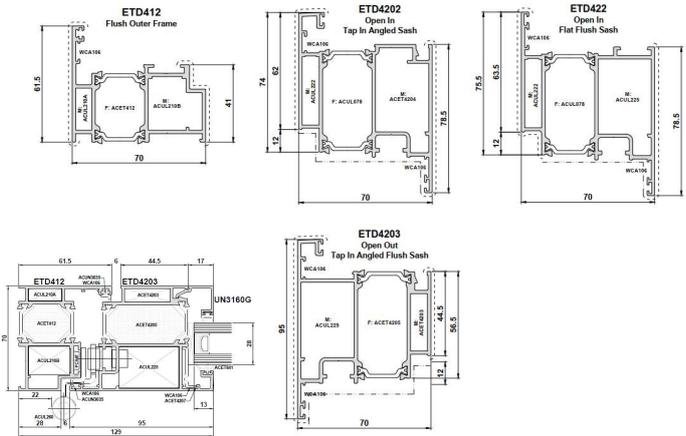
Alitherm 400 Door Stepped



75

Product Development

Alitherm 400 Door - Flush



76

Product Development Alitherm 400 Window



FEATURES SMART'S NEW QUICK-GLAZE BEAD

For installers, Alitherm 400's new, Quick-Glaze Bead is simply tapped in on site with the gasket already in place (rather than beading followed by inserting wedge gaskets), making the installation and glazing process faster, more straightforward and more cost effective.

Smart Quick-Glaze Bead is available in Naturals colours White (WP), Black (BL) and Anthracite Grey (KL005).

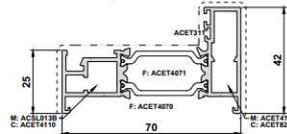
Window Type	Maximum Width (mm)	Maximum Height (mm)	Frame Depth (mm)	Maximum Perimeter (mm)	Glazing Units	Security Standard	Typical U Value ¹	WER ²	Air Permeability Classification	Water Tightness Classification	Resistance to Wind Classification
Sash dimensions for windows with approved sash profiles:											
Side Hung	864	1400	70	-	24, 28, 32, 36, 40 & 45	PAS 24:2016	1.4 W/m ² K	Band A	Class 4	AE2400	2000+
Top Hung	1400	1500	70	-	24, 28, 32, 36, 40 & 45	PAS 24:2016	1.4 W/m ² K	Band A	Class 4	AE2400	2000+
Fixed	2100	2100	70	42	24, 28, 32, 36, 40 & 45	PAS 24:2016	1.4 W/m ² K	Band A	Class 4	AE2400	2000+

[For sizes outside these parameters, contact the Smart Technical Support team]
Typical Values different glass, profiles and door configurations will vary U Value and Window Energy Rating
1. U Value based on operer next to fixed 1230 x 1480 using glass Centre Pane 1.0
2. WER based on operer next to fixed 1230 x 1480 using glass Centre Pane 1.2 and g value 0.74

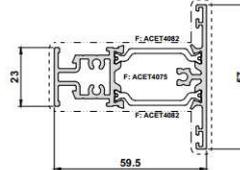
Product Development Alitherm 400 Window



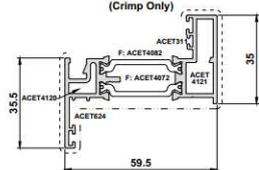
ETC4110
Square Outer Frame



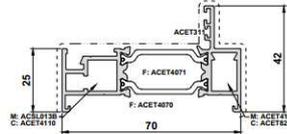
ETC4130
Tansom/Mullion



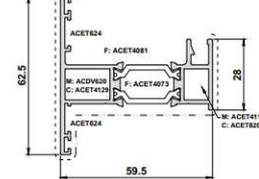
ETC4120
Externally Beaded Sash (Crimp Only)



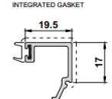
ETC4112
Stepped Outer Frame



ETC4129
Internally Bead Sash



UN3160G
QUICK-GLAZE BEAD INTEGRATED GASKET



Product Development Alitherm 400 - Flush Window

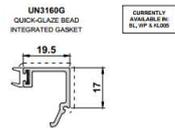
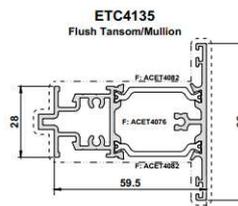
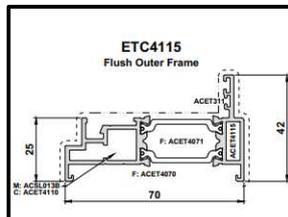
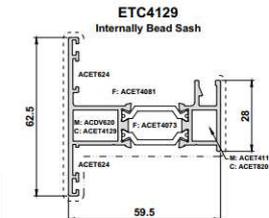
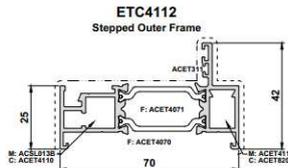
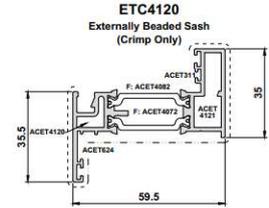
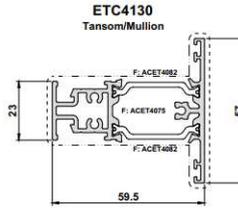
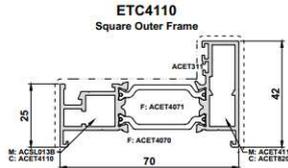
Alitherm 400 WINDOWS

The Alitherm 400 window is the first thermally broken aluminium system to feature Smart's pioneering extruded glazing gasket. This means the beads are supplied with the glazing gasket pre-extruded into the profile. This enables the Quick-Glaze beads to be simply tapped in on site, significantly reducing fabrication and installation time.

Available with a flush or chamfered profile, the slim lines of Alitherm 400 provide excellent weather and thermal performance, as well as the security resistor provided by PAS26 accreditation. With the built-in security resistor and the fact that the extruded gasket beads, the chamfered design features a European, or made to order representative facing mechanism to be used.

FEATURES AND SPECIFICATIONS

- Building Regulations Compliant (Full compliance with Approved Document L of the Building Regulations)
- Quick-Glaze Bead
- Excellent Thermal Performance An extruded aluminium thermal break to ensure thermal performance
- Suitable for All Lock Types Suitable for all lock mechanisms, including lock mechanisms
- PAS 26:2019 Approved Enhanced security for residential windows and doors



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Product Development Alitherm 400 - Flush Window

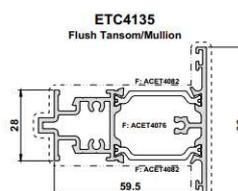
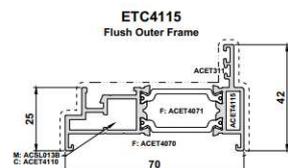
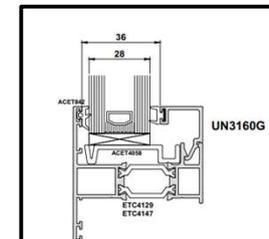
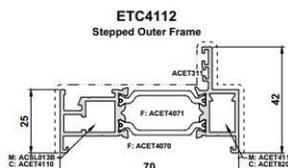
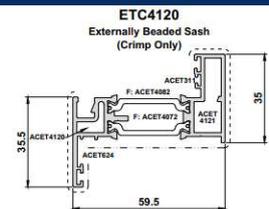
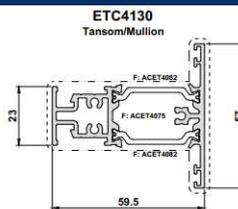
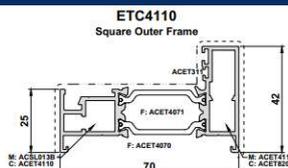
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FEATURES AND SPECIFICATIONS

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- PAS 26:2019 Approved Enhanced security for residential windows and doors



1.0 Centre Pane
1.4W/m²K

80

Product Development Visotherm Door

Visotherm DOORS

Visotherm doors are a perfect complement to the window range. Available as single or double doors, with opening and approval options, the system provides excellent thermal and weather performance. The doors are also available with an extensive selection of color, glazing and hardware options to provide the perfect finishing touches.

With 60+ years' experience in windows, Visotherm door's security options include a choice of key set, 50 lever or alarm lock multipoint locks to provide a degree of secured security.

FEATURES AND SPECIFICATIONS

- Building Regulations Compliant
- Available as Open-in or Open-out, Single or Double Doors
- PAS 24:2016 Approved
- Performance up to 3000mm wide
- Security
- Depth up to 100mm for best-in-class insulation
- Thermally Efficient
- Single or Dual Colour
- Wide Range of Hardware

UL210 Outer Frame

UL224 Open in Flat Sash

UL226 Open in Chamfered Sash

UL225 Open Out Flat Sash

UL227 Open Out Chamfered Sash

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Product Development Visotherm Door

smart Architectural Windows

MADE IN BRITAIN

Introducing VISOTHERM

The new high-quality, high-performance Visotherm window and door ranges have been introduced to enhance Smart's established systems portfolio, with the range being developed to provide optimal levels of thermal performance using double or triple glazed sealed units.

DESIGNING PRODUCT SOLUTIONS FOR

- Pass Performance Thermal Break
- Window options
- Suitable for residential and commercial applications
- Typical U-value from 1.3 W/m²K
- PAS 24:2016 specification as standard
- British Standard Windows and Doors
- Low Maintenance

UL224 UL066

Type: Hinge Door Single

Specification: Visotherm

Outer Frame: UL210

Threshold: UL210

Sash: UL224

Energy Performance Calculator showing a rating of A+ and a U-value of -70.

Thk	Specification	Supplier	Centre Panel	g Value	Pa	WER	U Value*	SEL
44	4/16/4/16/6 Optifloat S1+ S3 Argon	Pilkingtons	0.6	0.44	0.036	1.5	1.0	
36mm	4/12/4/12/4 Optifloat S1+ Argon	Pilkingtons	0.7	0.38	0.030	1.5	1.1	
36mm	4/12/4/12/4 Optifloat K Glass Argon	Pilkingtons	0.8	0.51	0.030	1.5	1.1	
36mm	4/12/4/12/4 Optifloat K Glass Argon	Pilkingtons	0.9	0.54	0.030	1.5	1.2	
36mm	4/12/4/12/4 Optifloat K Glass Argon	Pilkingtons	0.9	0.63	0.030	1.5	1.2	
24mm	4/16/4 Optitherm S1+ K Glass DW Arg	Pilkingtons	0.9	0.44	0.035	1.5	1.3	
24mm	4/16/4 Optitherm K Glass S Argon	Pilkingtons	1.0	0.51	0.035	1.5	1.3	
24mm	4/16/4 Optifloat K Glass S Argon	Pilkingtons	1.0	0.49	0.035	1.5	1.3	
24mm	4/16/4 Optitherm K Glass S Argon	Pilkingtons	1.2	0.74	0.035	1.5	1.4	
24mm	4/16/4 Optifloat K Glass S Argon	Pilkingtons	1.2	0.71	0.035	1.5	1.4	
24mm	4/16/4 Optitherm K Glass A Argon	Pilkingtons	1.4	0.78	0.035	1.5	1.5	
24mm	4/16/4 Optifloat K Glass S Argon	Pilkingtons	1.4	0.75	0.035	1.5	1.5	
24mm	4/16/4 Optitherm K Glass Argon	Pilkingtons	1.5	0.79	0.035	1.5	1.5	
24mm	4/16/4 Optitherm K Glass DW Argon	Pilkingtons	1.5	0.79	0.035	1.5	1.6	
24mm	4/16/4 Optifloat K Glass Argon	Pilkingtons	1.5	0.75	0.035	1.5	1.6	

SEL = BFRIC Simplified Energy Label

U Value*: EN 14351-1 (R BR443)

Energy

UL210
UL210
UL224
0.57/0.44/0.036

A+

Window Energy Rating

W/m²Year

Typical annual energy transfer per square meter Rating to UK Building Regulation calculated as accordance with BR443 Connors Door

Actual Energy consumption will depend on design, local climate and interior temperature.

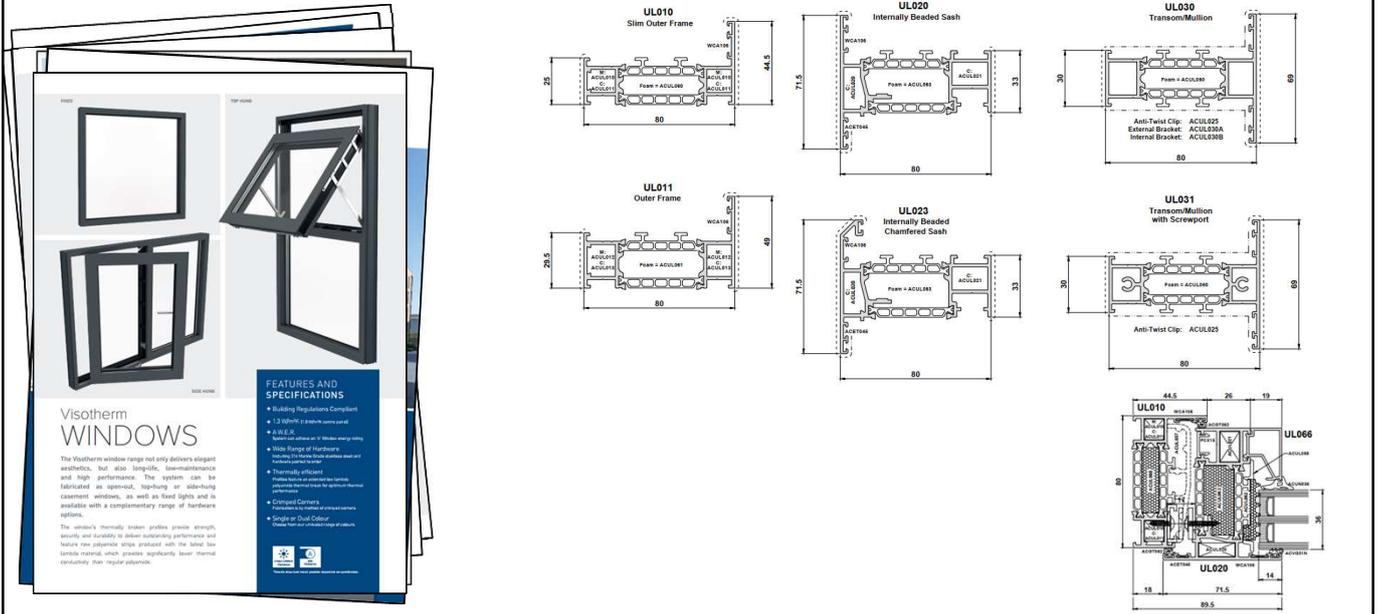
Thermal Transmittance U_{frame} 1.0 W/m²K

Solar Factor g_{frame} 0.26

Air Leakage 0.01 W/m³K

86

Product Development Visotherm Window



87

Product Development Visotherm Window

Type: Casement

Specification: Visotherm

Outer Frame: UL010

Vent Frame: UL020

Transom Mullion: UL030

Low Profile Gaskets

With Foam

Glass: User Glass, AGC, Crystal Units, Guardian, Pilkingtons, SaintGobain, All Glass

Supplier: User Glass, Spacer Bar, Psi DGU/TGU, Super Spacer Premium, 0.035/0.030, Add User Glass

Thk	Specification	Supplier	Centre Pane %	g Value	Psi	WER	U Value*	SEL
44mm	4/16/4/16/4 Optifloat S1+ S1+ Argon	Pilkingtons	0.5	0.35	0.030	0.9	0.9	
44.8mm	4/16/4/14/6.8 Optifloat S1+ S3 Argon	Pilkingtons	0.6	0.44	0.036	1.0	1.0	
38mm	4/12/4/12/6.8 Optifloat S1+ S3 Argon	Pilkingtons	0.7	0.43	0.036	1.1	1.1	
36mm	6.8/12/4/10/4 8.8mm ExtraClear + 2x 4mm C	Guardian	0.7	0.41	0.033	1.1	1.1	
36mm	4/12/4/12/4 Optifloat K Glass S Argon	Pilkingtons	0.8	0.51	0.030	1.1	1.1	
24mm	4/16/4 4mm ExtraClear + 16mm Argon - 4mm C	Guardian	1.0	0.53	0.035	1.3	1.3	
24mm	4/16/4 Planiclear Argon Planitherm One	Saint Gobain	1.0	0.52	0.035	1.3	1.3	
28mm	6/16/6 6mm ExtraClear + 16mm Argon - 6mm C	Guardian	1.0	0.52	0.041	1.4	1.4	
28mm	6/16/6 6mm ExtraClear + 16 - 6.8 Lam Clin	Guardian	1.0	0.52	0.043	1.4	1.4	
24mm	4/16/4 Optiwhite K Glass S1+ Argon	Pilkingtons	1.0	0.51	0.035	1.4	1.4	
24mm	4/16/4 4mm UltraClear + 16mm argon - 4mm C	Guardian	1.2	0.73	0.035	1.3	1.3	
28mm	4/20/4 UltraClear CG A+ UltraClear Argon	Guardian	1.2	0.73	0.035	1.5	1.5	
28mm	6/16/6 6mm UltraClear 16mm Argon - 6mm C	Guardian	1.2	0.72	0.041	1.5	1.5	
28mm	6/16/6 6mm UltraClear 16mm Argon - 6.8 L	Guardian	1.2	0.72	0.043	1.5	1.5	

SEL = BFRIC Simplified Energy Label
U Value*: EN 14351-1 BR443

Energy

UL010
UL020
UL030
0.76/1.0.61/0.03

A+

Window Energy Rating
kWh/m²Year
+12

Typical annual energy transfer per square meter. Rating to UK Building Regulation calculated in accordance with BR443 Domestic Window. Actual energy consumption will depend on design, local climate and interior temperature.

Thermal Transmittance U_{Window}
1.1 W/m²K

Solar Factor g_{Window}
0.40

Air Leakage
0.00 W/m²K

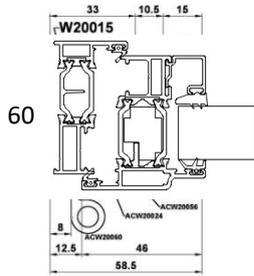
54.5
15-48mm Glazing
UL066
UL020 / UL040
Centre Pane
0.9 W/m²K

Pilkington Spectrum allows you to combine a wide range of products available from Pilkington and determine their key properties such as light transmittance, g value and U value. The program includes restrictions that prevent some combinations being selected that may be considered unwise or impractical. Even with these restrictions, it is still possible to create product combinations that may not be available from your supplier. Please check with your supplier that your chosen product combination is possible, available in the sizes required and in a timescale appropriate to your project. Furthermore, it is essential that you check that your product combination is appropriate for satisfying local, regional, national and other project-specific requirements.

Calculations are made according to EN standards 410 and 673/12898
Pilkington Spectrum Version UK7.3.1 08/06/2022

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Product Development Heritage 60 Door



Type: **Hinge Door Single** Specification: **Heritage 60** Outer Frame: **W200F*** Threshold: **W200F*** Sash: **W20VFOUT***

Low Profile Gaskets
 With Foam

Show Settings

Glass: User Glass AGC Crystal Units Guardian Pilkingtons SaintGobain All Glass

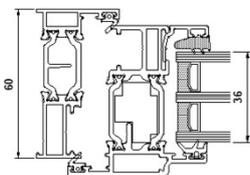
Supplier: **Pilkingtons** Spacer Bar: **Super Spacer Premium** Psi DGU/TGU: **0.035/0.030** Add User Glass

Thk	Specification	Supplier	Centre Pane%	g Value	Psi	WER	U Value*	SEL
24mm	4/16/4 Optiwhite K Glass S1+ Argon	Pilkingtons	1.0	0.51	0.035	B	1.5	
24mm	4/16/4 Optifloat K Glass S1+ Argon	Pilkingtons	1.0	0.49	0.035	D	1.5	
24mm	4/16/4 Optiwhite K Glass S Argon	Pilkingtons	1.2	0.74	0.035	D	1.7	
24mm	4/16/4 Optifloat K Glass S Argon	Pilkingtons	1.2	0.71	0.035	D	1.7	
24mm	4/16/4 Optiwhite K Glass A Argon	Pilkingtons	1.4	0.78	0.035	E	1.8	
24mm	4/16/4 Optifloat K Glass A Argon	Pilkingtons	1.4	0.75	0.035	E	1.8	
24mm	4/16/4 Optiwhite K Glass Argon	Pilkingtons	1.5	0.79	0.035	F	1.9	
24mm	4/16/4 Optiwhite K Glass DW Argon	Pilkingtons	1.5	0.79	0.035	F	1.9	
24mm	4/16/4 Optifloat K Glass Argon	Pilkingtons	1.5	0.75	0.035	F	1.9	
24mm	4/16/4 Optifloat K Glass DW Argon	Pilkingtons	1.5	0.75	0.035	F	1.9	

SEL = BFRIC Simplified Energy Label
U Value: EN 14351-1 RR443

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Product Development Heritage 60 Door



WER Reports Label

Type: **Hinge Door Single** Specification: **Heritage 60** Outer Frame: **W200F*** Threshold: **W200F*** Sash: **W20VFOUT***

Low Profile Gaskets
 With Foam

Show Settings

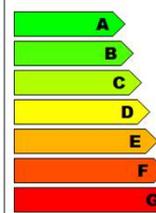
Glass: User Glass AGC Crystal Units Guardian Pilkingtons SaintGobain All Glass

Supplier: **All Glass** Spacer Bar: **Super Spacer Premium** Psi DGU/TGU: **0.035/0.030** Add User Glass

Thk	Specification	Supplier	Centre Pane%	g Value	Psi	WER	U Value*	SEL
36mm	4/12/4/12/4 Optifloat S1+ S1+ Argon	Pilkingtons	0.7	0.38	0.030	A	1.2	
36mm	4/12/4/12/4 Optifloat K Glass S Argon	Pilkingtons	0.8	0.61	0.030	B	1.3	
28mm	4/20/4 CUIN 28 ClemaGuard A+ outer/Clema	Crystal Units	0.8	0.58	0.052	B	1.4	
28mm	4/20/4 CUIN 28 ClemaGuard A 1.1 outer/Clema	Crystal Units	0.8	0.50	0.052	B	1.4	
32mm	4/10/4/10/4 Diamant* PlanithermTotal+ FG	SaintGobain	0.9	0.64	0.030	B	1.4	
36mm	4/12/4/12/4 Optifloat K Glass Argon	Pilkingtons	0.9	0.64	0.030	B	1.4	
36mm	4/12/4/12/4 Optifloat K Glass Argon	Pilkingtons	0.9	0.63	0.030	B	1.4	
24mm	4/16/4 Optitherm S1 + K Glass DW Argon	Pilkingtons	0.9	0.44	0.035	D	1.5	
28mm	4/8/4/8/4 Diamant* PlanithermTotal+ FG A	SaintGobain	1.0	0.64	0.030	B	1.5	
24mm	4/16/4 Optiwhite K Glass S1 + Argon	Pilkingtons	1.0	0.51	0.035	D	1.5	
24mm	4/16/4 Optifloat K Glass S1 + Argon	Pilkingtons	1.0	0.49	0.035	D	1.5	
24mm	4/16/4 Diamant* PlanithermTotal+ FG Argon	SaintGobain	1.2	0.75	0.035	D	1.7	
28mm	4/20/4 Diamant* PlanithermTotal+ FG Argon	SaintGobain	1.2	0.75	0.035	D	1.7	
24mm	4/16/4 Optiwhite K Glass S Argon	Pilkingtons	1.2	0.74	0.035	D	1.7	
24mm	4/16/4 AGC Clear vision CG A+ UltraClear /	Guardian	1.2	0.73	0.035	D	1.7	
24mm	4/16/4 Pilk DW CG A+ UltraClear Argon	Guardian	1.2	0.73	0.035	D	1.7	
24mm	4/16/4 Planiclear PlanithermTotal+ FG Argon	SaintGobain	1.2	0.73	0.035	D	1.7	
24mm	4/16/4 SGG Diamant CG A+ UltraClear Arg	Guardian	1.2	0.73	0.035	D	1.7	
24mm	4/16/4 UltraClear CG A+ UltraClear Argon	Guardian	1.2	0.73	0.035	D	1.7	

SEL = BFRIC Simplified Energy Label
U Value: EN 14351-1 RR443

Energy



W200F*
W200F*
W20VFOUT*
0.57/0.38/0.03

A

-85

Window Energy Rating
kWh/m²/Year
Typical annual energy transfer per square meter.
Rating to UK Building Regulation calculated
in accordance with BR443 Domestic Door.
Actual Energy consumption will depend on
design, local climate and interior temperature.

Thermal Transmittance U_{Window} 1.2 W/m²/K
Solar Factor g_{Window} 0.27
Air Leakage 0.01 W/m³/K
Manufacturer UNREGISTERED

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Product Development New Systems

Façade Systems:

Visofold Door

DV19 Outerframe
New Sashes DV220 and DV221

Alitherm 400 Door

Flush Door ETD4203 and ETD4204
Stepped Door ETD4204 and ETD4205

Alitherm 400 Window

Sash ETC4120 and ETC4129

Visotherm Door

Sash UL224 UL225

Visotherm Window

Sash UL020 UL023

Heritage 60 Door

Sash W20XXX and W20XXXX

Internal Systems:

AluSpace

Internal screen system

External Systems:

Decking System

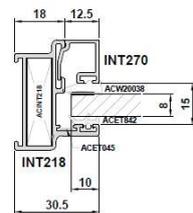
Aluminium decking

SolUmbra

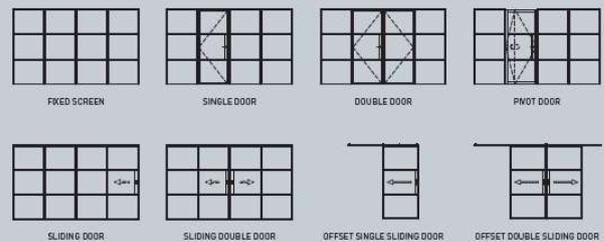
Pergola



Product Development AluSpace - Internal Screen and Door



Smart AluSpace Interior Screen DESIGN SOLUTIONS





Product Development

AluSpace - Internal Screen and Door



Hinged Doors

With a range of width, glazing, hinge and furniture options, our doors can be configured to suit any design theme, from traditional to minimalist and contemporary to industrial.

DOOR SASH SPECIFICATIONS

Maximum Width	900mm
Minimum Width	400mm
Maximum Height	2200mm
Maximum Weight	40kg
Door	Single or double
Glazing	6mm, 8mm or 18mm
Colour	Various powder coating colours available with a 25 year guarantee



HEAD DETAIL



SASH DETAIL



THRESHOLD DETAIL



Product Development

AluSpace - Internal Screen and Door



Pivot Doors

Our pivot door options provides the flexibility to instantly change the way the internal space is configured. Available up to 2 metres wide and with adjustable closer.

DOOR SASH SPECIFICATIONS

Maximum Width	2000mm
Minimum Width	400mm
Maximum Height	2500mm
Maximum Weight	100kg
Door	Single or double
Glazing	6mm, 8mm or 18mm
Colour	Various powder coating colours available with a 25 year guarantee



HEAD DETAIL



THRESHOLD DETAIL

Pivot door – single – with or without outer frame



Product Development

AluSpace - Internal Screen and Door



Sliding Doors

Sliding doors provide the option to close or partially open the internal screen, with a choice of a contemporary or vintage rail options to echo the overall design.

DOOR SASH SPECIFICATIONS	
Maximum Width	1200mm
Minimum Width	400mm
Maximum Height	2500mm
Maximum Weight	100kg (with each 1300mm sash)
Door	Single or double
Glazing	6mm, 8mm or 18mm
Colour	Various powder coating colours available with a 25 year guarantee



HEAD DETAIL



SASH DETAIL



THRESHOLD DETAIL



Product Development

AluSpace - Internal Screen and Door



Aluspace Screen Acoustic Laminates

6.8mm **Rw upto 36 dB**

8.8mm **Rw upto 38 dB**

10.8mm **Rw upto 40 dB**

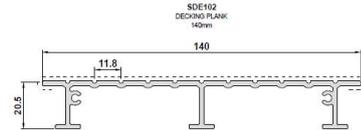
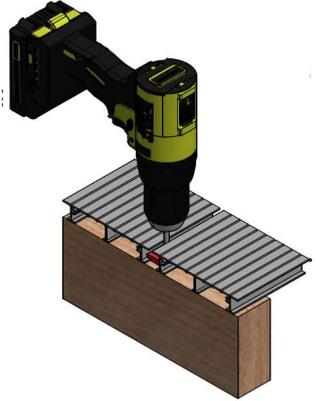


Product Development

SolDeck - Aluminium Decking



- Low maintenance
- Anti-slip powder coat finish
- None Combustible
- Easy to install

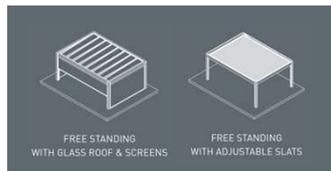
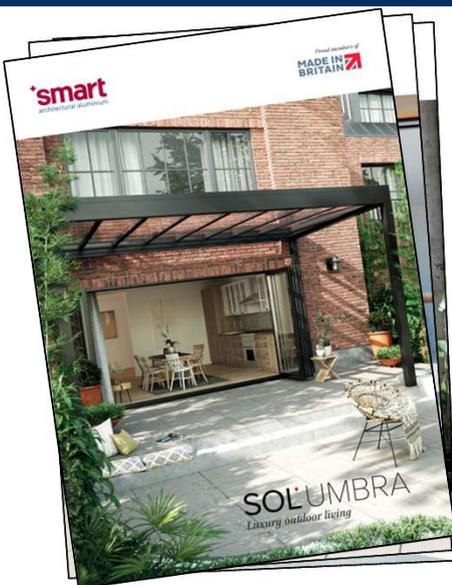


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Product Development

SolUmbra - Pergola



SolUmbra - Pergola

Made to Measure

- Free standing or attached to a building
- Available with slats, glass roof and/or screens
- Maximum dimensions: 6m x 4.5m x 3m
- Minimalist, elegant design
- Single or double wall slats

Optimal Comfort

- Operation via Somfi control
- Slats rotate up to 120 degrees
- Waterproof construction with integrated gutter

Custom

- Integrated windproof screens
- Optional built in LED lighting
- Infinite choice of colours
- Rain, wind or snow sensor

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Product Development

New Systems

Façade Systems:

- Visofold Door**
DV19 Outerframe
New Sashes DV220 and DV221
New Bead DV162
- Alitherm 400 Door**
Flush Door ETD4203 and ETD4204
Stepped Door ETD4204 and ETD4205
- Alitherm 400 Window**
Sash ETC4120 and ETC4129
- Visoglide Plus**
New Sash VG920
- Visotherm Door**
Sash UL224 UL225
- Visotherm Window**
Sash UL020 UL023
- Heritage 60 Door**
Sash W20XXX and W20XXXX

Internal Systems:

- AluSpace**
Internal screen system

External Systems:

- Decking System**
Aluminium decking

- SolUmbra**
Pergola



Smart Developments

Smart Expansion

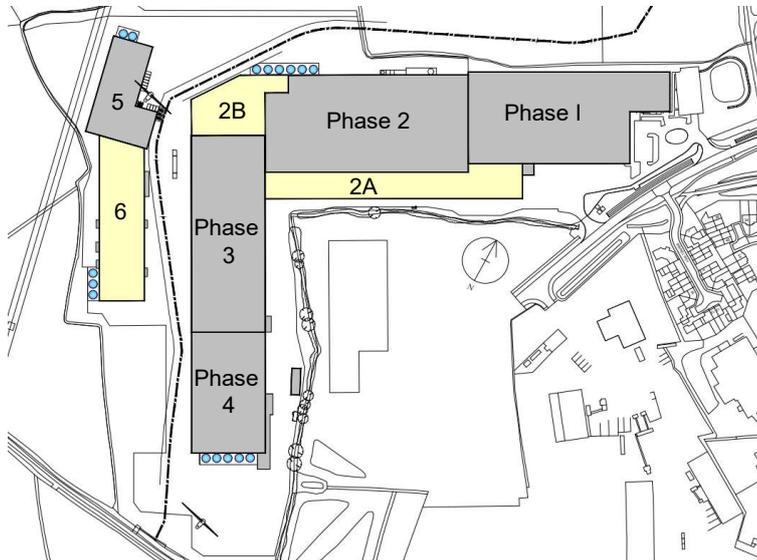


	Phase
2005	1 Offices and Warehouse
2010	2 Two Extrusion Presses + Horizontal Paint
2015	3 Third Press + Vertical Paint Plant
2017	4 Secondary Vertical Paint and storage
2018	5 Tooling and Doors



Smart Developments

Smart Expansion



Phase	
2005	1 Offices and Warehouse
2010	2 Two Extrusion Presses + Horizontal Paint
2015	3 Third Press + Vertical Paint Plant
2017	4 Secondary Vertical Paint and storage
2018	5 Tooling and Doors
2022	6 Panel Paint Line
	2A/2B Forth Extrusion Press

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Product Development

New Systems

Façade Systems:

- Visofold Door**
DV19 Outerframe
New Sashes DV220 and DV221
New Bead DV162
- Alitherm 400 Door**
Flush Door ETD4203 and ETD4204
Stepped Door ETD4204 and ETD4205
- Alitherm 400 Window**
Sash ETC4120 and ETC4129
- Visoglide Plus**
New Sash VG920
- Visotherm Door**
Sash UL224 UL225
- Visotherm Window**
Sash UL020 UL023
- Heritage 60 Door**
Sash W20XXX and W20XXXX

Internal Systems:

- AluSpace**
Internal screen system

External Systems:

- Decking System**
Aluminium decking

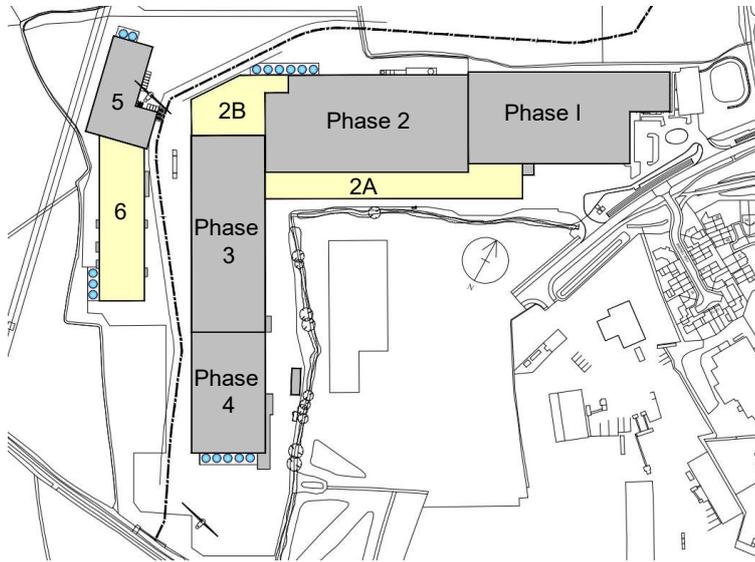
- SolUmbra**
Pergola

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Smart Developments

Smart Expansion



	Phase
2005	1 Offices and Warehouse
2010	2 Two Extrusion Presses + Horizontal Paint
2015	3 Third Press + Vertical Paint Plant
2017	4 Secondary Vertical Paint and storage
2018	5 Tooling and Doors
2022	6 Panel Paint Line
	2A/2B Forth Extrusion Press