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Technical summary

synseal®

Evolve VS Vertical Sliding Sash Windows

with the benefits of modern day technology

Evolve VS windows are manufactured to maintain the elegant proportions of traditional sash windows, whilst incorporating the very best of modern day technology. Evolve VS windows enable your customers to enjoy the low maintenance and high security of PVCu without the problems associated with timber sash windows.

Evolve VS windows feature tilting upper and lower sashes for ease of cleaning, low line beads and gaskets for improved sight lines, energy efficient glass to reduce heating bills and above all they are quality assured for your customers' peace of mind.

From a terraced house to a stately home, Evolve vertical sliding sash windows ensure that every property retains its character and charm. Synseal offer a wide range of styles, colours and hardware options, whilst providing the benefits of modern day technology.

Many buildings have been disfigured by inappropriate window replacements that have ruined the character of the property. Our windows enable you to install new windows that blend into their surroundings. Sculptured Astragal bars, sash horns, two sliding sashes and a choice of hardware all add to the traditional feel of these beautiful windows. Vertical sliding sash windows from Synseal are guaranteed for 10 years as they are manufactured with the highest quality materials under the strictest quality controls.

Safe and secure with a beautiful finish

Evolve vertical sliding sash windows are fully reinforced with aluminium and sliding sashes are fully reinforced with galvanised steel. This is to not only prevent deflection in windy weather, but also to strengthen the sashes so that they are capable of carrying the weight of the glass and provide a strong secure fixing for handles, latches and other components.

The high quality balances maintain the equilibrium of the sash window at any point of travel and robust locking devices ensure homes are secure. All of this gives you improved strength, greater safety and comfort in the knowledge that the windows that you have purchased are built to last.

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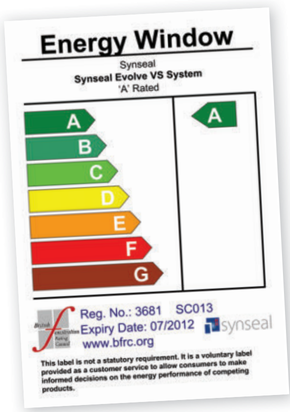
The Evolve vertical sliding sash window from Synseal comes with many advanced features:

- A WER as standard with optional upgrades
- Low maintenance PVCu profiles with traditional styling
- Fully featured sculptured profiles
- Equal sight lines for top and bottom sashes
- Easy clean tilt facility
- 24mm glazing as standard for enhanced weather performance
- Choices of sill sizes available
- Guaranteed for 10 years
- Georgian or Astragal bar finish available
- Decorative sash horns (optional)
- Run through sash horns (optional)
- Anti-jemmy bar (optional)
- Child/travel restrictors (optional)
- Deep bottom rail for a period look (optional)
- Sill jointers for professional detailing

Energy efficient and environmentally friendly

Today window designers have more challenges. Not only do they need to design windows to keep out the wind and rain and let the sun in, but they have to consider the environmental options.



Our windows are not only lead free, but they have a A energy rating as standard, with low E double glazed glass units to keep the heat in and reduce heating bills. The windows also have brush seals around the openings for exceptional draught proofing.

Choosing PVCu over timber is the environmentally friendly choice. The majority of end of life PVCu windows can be recycled over and over again to produce new windows.

Sizes available

Our vertical sliding sash windows are available between the following sizes:

- Minimum sizes 350mm width x 800mm height.
- Maximum sizes 1500mm width x 2500mm height.

Delivered in just 7 working days!

We've invested heavily in setting up efficient and streamlined manufacturing for our Evolve VS windows - meaning we can guarantee delivery within 7 working days.

This quick turnaround is available across the whole range of nine colours enabling you to react quickly to your customers demands.

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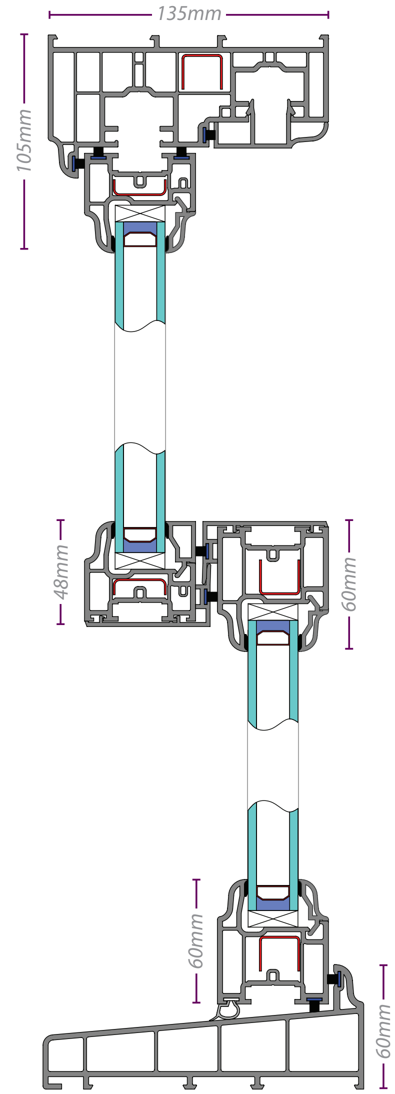
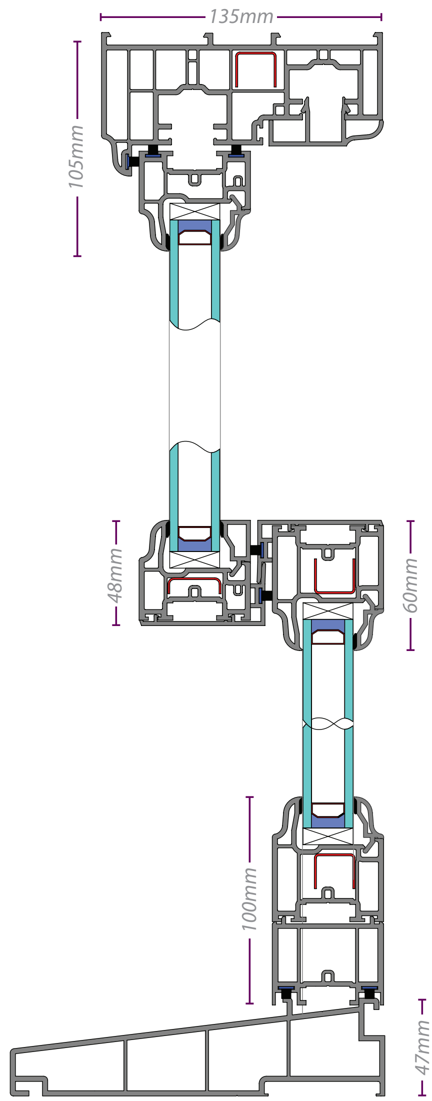
Schematics

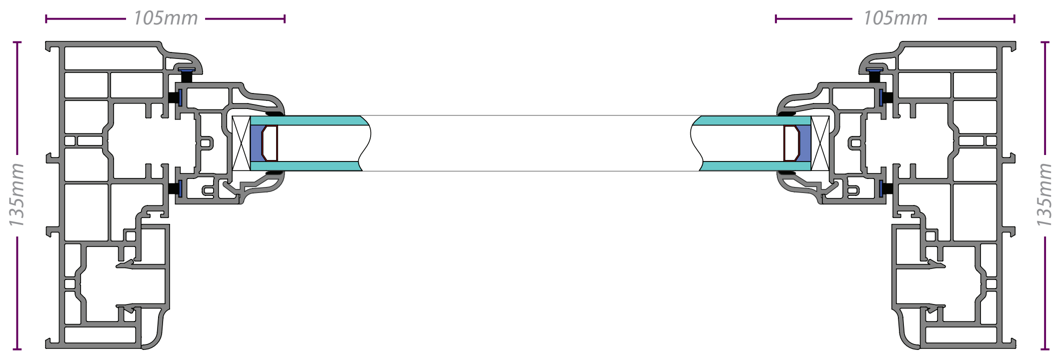
Technical drawings below showing cross sections of the Evolve VS window.



Vertical section through sash
with standard sill



Vertical section through sash with DBR
and non standard sill option



Horizontal section through top sash

Choose a window to suit your project

Every window we manufacture is made to order. Every home and personal taste is different so we can offer you a wide range of styles, colours and hardware so your window will suit the property they are to be installed in perfectly.

Solid colours

Evolve VS windows are available in the following PVC-U profile colour:

White

Woodgrain colours

Foiled finishes are also available to enhance Evolve VS windows with glossy, freshly-painted colour woodgrain or authentic woodgrain effects:

Golden Oak | *Golden Oak on White* | *Cherrywood* | *Cherrywood on White*

Artisan woodgrain collection

Evolve VS windows are available in the following Artisan colours and can be specified with White PVC-U on inside faces and woodgrain foiled finish on outside faces, see below:

Woodgrain White | *Cream* | *Cream on White*

Irish Oak | *Irish Oak on White* | *Chartwell Green* | *Chartwell Green on White*

Grey | *Grey on White* | *Black/Brown* | *Black/Brown on White*

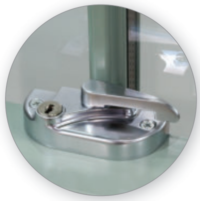
The colours shown are designed as a guide only, before making your final decision, please ensure you have seen a foil swatch.

**Extended lead time applicable on some Artisan colours, contact us for details.*

Hardware

High quality balance weights and hardware are fixed to integral reinforcements for reliable and smooth opening time after time. Hardware is available in white, gold, chrome and satin chrome:

Pole eye - White



Lock - Satin Chrome

Tilt knob - Gold

Sash lift - Chrome

Run through sash horns

Child/travel restrictors

Bars

To achieve a traditional look without the need for individual units of glass, our vertical sliding sash windows offer a choice of internal/external Georgian glazing bars.

Astragal bars

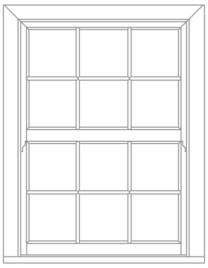
18mm or 25mm Georgian bars

The colours shown are designed as a guide only. Before making your final decision, please ensure you have seen a foil swatch.

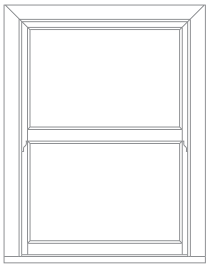
Shape options:

The Evolve VS is available in a wide variety of styles to suit every property. Here are some styles you can order:

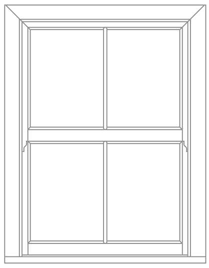
We also offer 90˚ and variable angle bay posts.
Email **vsquotations@synseal.com** for further information.



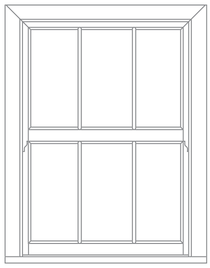
1/2



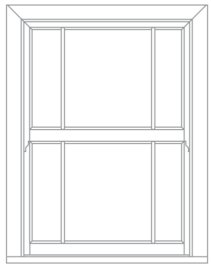
Non-Bar



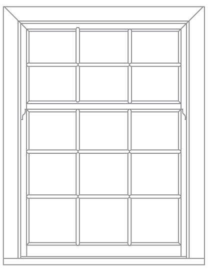
Centre Bar



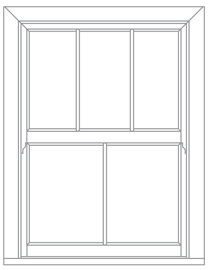
Three Light



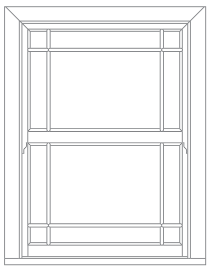
Offset Three Light



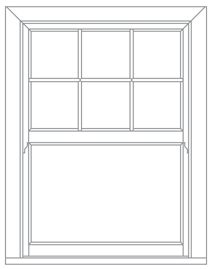
2/5 x 3/5



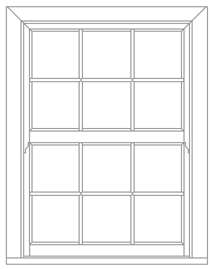
Asymmetric



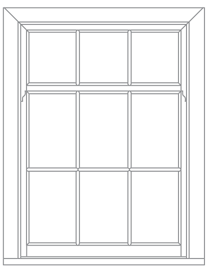
Margin



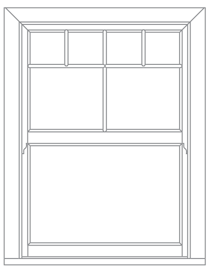
Half Georgian



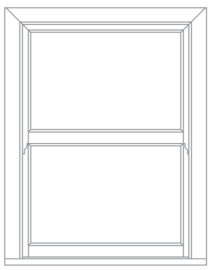
Georgian



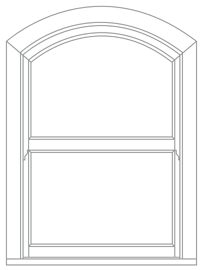
1/3 x 2/3



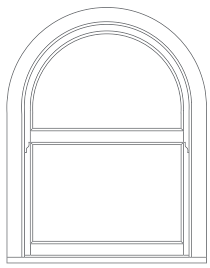
Georgian Variant



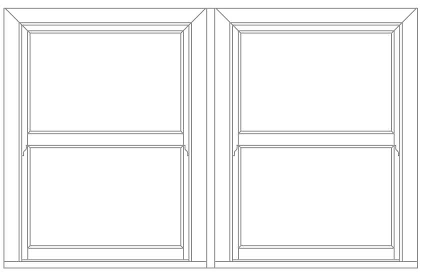
Fire Egress A



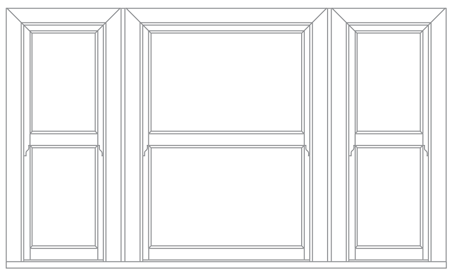
Swept Head



True Arch



Style 2



Tripartite - Style 3

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Both sashes tilt open independently for easy access to clean inside and out

Both sashes slide up and down, great for cleaning access and ventilation

synseal®

Synseal Extrusions Limited.
Common Road,
Huthwiate,
Nottinghamshire,
England.
NG17 6AD

EC DECLARATION OF PERFORMANCE

This document declares that the product:

Vertical Sliding PVC-U window.

For domestic and commercial buildings, conforming to the product requirements of BS EN 14351-1:2006+A1:2010 Annex ZA

Essential Characteristics	Performance	Test Standards	Notified Body No. of Test Laboratory	Test Report Reference and Issue Date
Watertightness	NPD	BS EN 1027	N/A	N/A
Dangerous substances	NONE	BS EN 14351-1: 2006+A1:2010	N/A	Safety Data Sheet
Resistance to wind load	NPD	BS EN 12211	N/A	N/A
Load-bearing capacity of safety devices	PASSED	BS EN 14609,BS EN 948 & BS EN14351 + A1:2010	Build Check (No.1806)	W13003-1 8th January 2013
Acoustic performance	NPD	BS EN ISO 140-3	N/A	N/A
Thermal transmittance	1.8W/(m²•K)	EN ISO 10077-1 & EN ISO 10077-2 (or EN ISO 12567-1 and EN 12567-2)	Build Check (No.1806)	Report No. CU 13059-2 7th March 2013
Radiation properties	NPD	EN 410	N/A	N/A
Air permeability	NPD	BS EN 1026	N/A	N/A

Initial type testing has been carried out by the following notified body:

Build Check Limited. Montrose House, Lancaster Road, Cressex Business Park, High Wycombe, Buckinghamshire. HP12 3PY.
(No. 1806). *www.buildcheck.co.uk*

Signed on behalf of Synseal Extrusions Limited:

Name: S. Musgrave
Position: Manufacturing Director
Signature:

CE
Synseal Extrusions Limited Common Road Huthwaite Nottinghamshire England NG17 6AD Date of Manufacture 2013
BS EN14351-1:2006 + A1:2010 Annex ZA Vertical Sliding PVC-U Window Intended to be used in Domestic and Commercial Buildings. Dangerous substances – None Load bearing capacity of safety devices – Passed Thermal Performance – 1.8 W/(m² • K)

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Nottinghamshire,
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NG17 6AD

CE

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Acoustic performance	NPD	BS EN ISO 140-3	N/A	N/A
Thermal transmittance	1.6W/(m²•K)	EN ISO 10077-1 & EN ISO 10077-2 (or EN ISO 12567-1 and EN 12567-2)	Build Check (No.1806)	Report No. CU 13059-2 7th March 2013
Radiation properties	NPD	EN 410	N/A	N/A
Air permeability	NPD	BS EN 1026	N/A	N/A

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Name: S. Musgrave
Position: Manufacturing Director
Signature:

CE Marking

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Synseal Extrusions Limited
Common Road
Huthwaite
Nottinghamshire
England
NG17 6AD
Date of Manufacture 2013

BS EN14351-1:2006 + A1:2010 Annex ZA
Vertical Sliding PVC-U Window Intended to be used in Domestic and Commercial Buildings.

Dangerous substances – None
Load bearing capacity of safety devices – Passed
Thermal Performance – 1.6 W/(m² • K)

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Window Energy Ratings

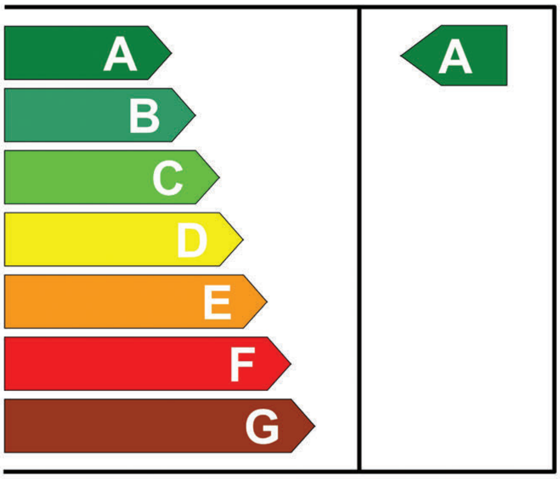
evolvevs

HERITAGE PRODUCT

Energy Window

evolvevs

Synseal
Synseal Evolve VS System
'A' Rated



British Fenestration Rating Council

Reg. No.: 3681 M705
Expiry Date: 07/2012
www.bfrc.org

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This label is not a statutory requirement. It is a voluntary label provided as a customer service to allow consumers to make informed decisions on the energy performance of competing products.

Conservation Grade

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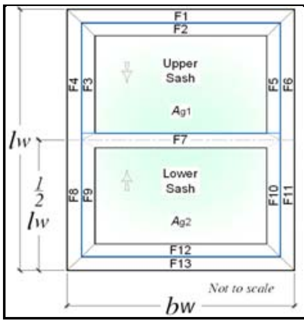


Sample Style:
Vertical Sliding Sash

Blue line illustrates opening light length (air leakage)

Report Number:	SYN-00062-1-Rev1 VS	Report Issue No.11	*(03/03/09)*
Report Date:	18 August 2010		
Project Details:	Evolve VS 4/16/4 Diamant / Argon 90% / Planitherm Total+, Swisspacer V with PU (0.4) to 10mm SL, full RS+RA		

Input Values:
Yellow input, green intermediary, blue finals X' DP is no.of decimal place to enter

Parameter	*Symbol*		*Units*
Total window height ***0DP***	l_w	1480	mm
Total window width ***0DP***	b_w	1230	mm

Nominal 4mm etc to ***0DP***, others ***1DP***

Upper Panel Glazing dim's and properties:			
Thickness of pane 1		**4**	mm
Pane 1/2 distance		**16**	mm
Gas fill (1/2)		**Argon 90%**	
Thickness of pane 2		**4**	mm
Complete next 3 cells for TG IGU			
Pane 2/3 distance			mm
Gas fill (2/3)			
Thickness of pane 3			mm
Glazing Trans. - ***3DP***	U_g	**1.194**	W/(m²·K)
g-value - ***2DP***	$g_\perp$	**0.74**	

Thermal transmittance of window from hot box test		
$U_{w\text{-}2DP}$		W/(m²·K)

Frame dimensions:	(b_f)	Without gasket (mm)	Gasket protrusion (mm)	With gasket (mm)	Total
All frame values to nearest 0.5mm, gaskets to ***1DP***	F1 fixed top rail	**69**	n/a	69	105
	F2 moving top rail	**36**	**0.0**	36	
	F3 top (LH) jamb (moving sash)	**69**	**0.0**	69	105
	F4 top (LH) jamb (fixed frame)	**36**	n/a	36	
	F5 top (RH) jamb (moving sash)	69	0.0	69	105
	F6 top (RH) jamb (fixed frame)	36	n/a	36	
F7 mid rail	(upper gasket)	**62.5**	**0.0**	62.5	62.5
	(lower gasket)		**0.0**		
	F8 bottom (LH) jamb (fixed frame)	**42**	n/a	42	105
	F9 bottom (LH) jamb (moving sash)	**63**	**0.0**	63	
	F10 bottom (RH) jamb (moving sash)	63	0.0	63	105
	F11 bottom (RH) jamb (fixed frame)	42	n/a	42	
	F12 bottom moving rail	**41**	**0.0**	41	101
	F13 bottom fixed rail	**60**	n/a	60	
		Total gasket area	0	m²	

Window Dimensions:			Area	
Section	Length (m)	Width (m)	No gasket (m²)	With gasket (m²)
Upper glazing	0.6038	1.0200	0.6158	0.6158
Lower glazing	0.6078	1.0200	0.6199	0.6199
		Total of glazing	1.2357	1.2357
Frame	(m)	(m)	(m²)	(m²)
F1	1.2300	0.0690	0.0824	0.0824
F2	1.1580	0.0360	0.0392	0.0392
F3	0.6710	0.0690	0.0440	0.0440
F4	0.7400	0.0360	0.0254	0.0254
F5	0.6710	0.0690	0.0440	0.0440
F6	0.7400	0.0360	0.0254	0.0254
F7	1.1580	0.0625	0.0679	0.0679
F8	0.7400	0.0420	0.0298	0.0298
F9	0.6800	0.0630	0.0406	0.0406
F10	0.6800	0.0630	0.0406	0.0406
F11	0.7400	0.0420	0.0298	0.0298
F12	1.1460	0.0410	0.0444	0.0444
F13	1.2300	0.0600	0.0713	0.0713
		Total Frame	0.5847	0.5847
		Total Window, Aw	1.8204	1.8204
		Percentage upper glass area	33.83%	33.83%
		Percentage lower glass area	34.05%	34.05%
		Percentage glass area (total)	67.88%	67.88%

Where a U_d value from hot box testing is available, no L_f^{2D} or L_ψ^{2D} values need to be entered

Frame conductance:	All *L* values to ***4DP***. All b values to ***0DP***					
		W/(m·K)	b_p (mm)		W/(m·K)	b_g (mm)
F1+F2 top rail	L_f^{2D}	**0.3703**	**190**	L_ψ^{2D}	**0.4092**	190
F3+F4 top (LH) jamb		**0.3864**	190		**0.4229**	190
F5+F6 top (RH) jamb		0.3864	190		0.4229	190
F7 mid rail		**0.5727**	380		**0.6530**	380
F8+F9 bottom (LH) jamb		**0.3836**	190		**0.4229**	190
F10+F11 bottom (RH) jamb		0.3836	190		0.4229	190
F12+F13 bottom rail		**0.3689**	190		**0.4080**	190

Frame: Section	b_f *(no gaskets)* (m)	U_f (W/(m²·K))	Frame areas (no gaskets) (m²)	Heat flow (W/K)	Ψ (W/(m·K))	l_g (m)	Heat flow (W/K)
F1+F2 top rail	0.1050	1.4120	0.1216	0.1717	0.0341	1.0200	0.0348
F3+F4 top left jamb	0.1050	1.5654	0.0694	0.1086	0.0317	0.6038	0.0191
F5+F6 top right jamb	0.1050	1.5654	0.0694	0.1086	0.0317	0.6038	0.0191
F7 mid rail	0.0625	2.0580	0.0679	0.1397	0.0707	1.0200	0.0721
F8+F9 btm left jamb	0.1050	1.5387	0.0704	0.1083	0.0345	0.6078	0.0210
F10+F11 btm right jamb	0.1050	1.5387	0.0704	0.1083	0.0345	0.6078	0.0210
F12+F13 bottom rail	0.1010	1.4541	0.1157	0.1682	0.0343	1.0200	0.0350
		Totals	0.5847	0.9134		Total	0.2219

Solar Factor, *g*-value:		
	F_w	0.9
	g_w	0.45

U_{window}	U_w	**1.43**	W/(m²·K)

Air Leakage loss:				
Air leakage at 50 Pa per hour & per unit length of opening light (BS 6375-1) - ***2DP***			**0.26**	m³/(m·h)
Opening light length	6.1640	m	Total air leakage 1.603	m³/h
L_{50}	0.88	m³/(m²·h)	Heat loss = 0.0165 L_{50} 0.01	W/(m²·K)

Other parameters needed for calculation, taken from simulations:		λ_p =	0.035	W/(m·K)	R_{se} =	0.04	m²·K /W	R_{se} = 0.13 m²·K /W
Upper glazing:	Panel thickness, $d_p = d_g$ = 0.024 m	R_p =	0.6857	m²·K /W	R_{tot} =	0.8557	m²·K/ W	U_p = 1.1686 W/(m²·K)

BFRC Rating kWh/(m²·yr)	Label index	EWER Rating Scale	Window Rating
≥ 0 ⇦	0	⇨ A ⇦	A
-10 to <0		B	
-20 to <-10		C	
-30 to <-20		D	
-50 to <-30		E	
-70 to <-50		F	
<-70		G	

BFRC Rating =	
218.6g_{window} - 68.5 x (U_{window} + Effective L_{50}) =	**-0.27**
Climate zone is:	**UK**

Thermal transmittance, W/(m²·K)	U_{window}	**1.4**
Solar factor	g_{window}	**0.45**
Window air leakage heat loss, W/(m²·K)	L_{factor}	**0.01**

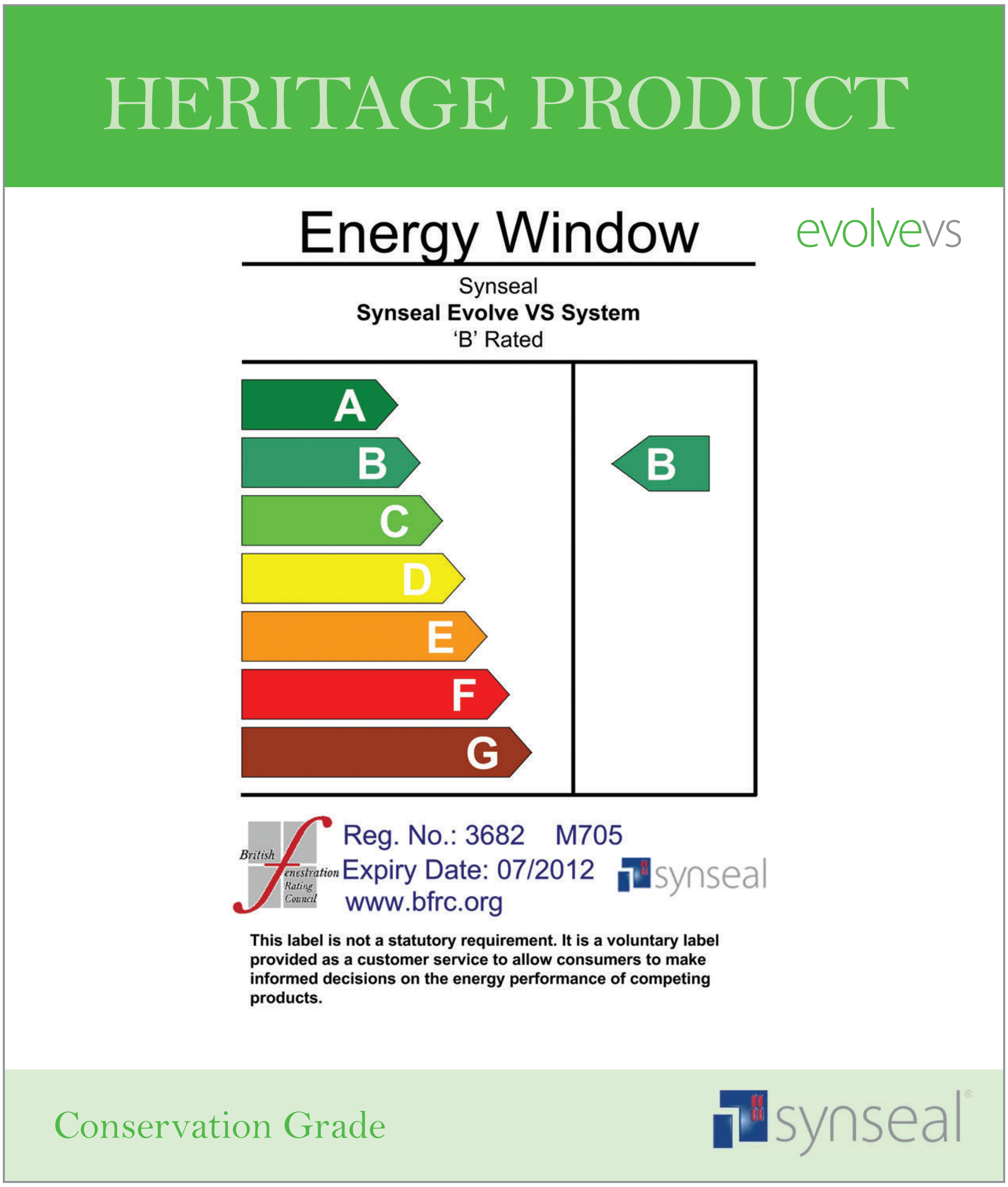
British Fenestration Rating Council

Simulator Name: **Greg Tabberer**

BFRC Certified Simulator 080

Window Energy Ratings

evolvevs



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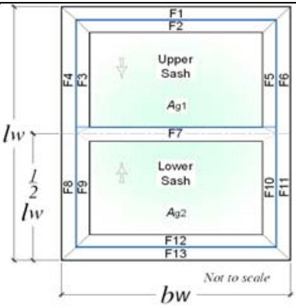

Sample Style:

Vertical Sliding Sash

Blue line illustrates opening light length (air leakage)

Report Number:	SYN-00062-19	Report Issue No.14	*(15/07/11)*
Report Date:	18/11/2011		
Project Details:	Evolve VS 4/16/4 Float / Argon 90% / Total+/ TX-N (PS), full RS+RA		

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Input Values:
Yellow input, green intermediary, blue finals — X' DP is no.of decimal place to enter

Parameter	Symbol		Units
Total window height ***0DP***	l_w	1480	mm
Total window width ***0DP***	b_w	1230	mm

Nominal 4mm etc to ***0DP***, others ***1DP***			
Glazing dimensions and properties:			
Thickness of pane 1, d_{p1}		**4.0**	mm
Glazing fill thickness 1/2, d_{gf1}		**16.0**	mm
Gas fill (1/2)		**Argon 90%**	
Thickness of pane 2, d_{p2}		**4.0**	mm
Complete next 3 cells for TG IGU			
Glazing fill thickness 2/2, d_{gf2}			mm
Gas fill (2/3)			
Thickness of pane 3, d_{p3}			mm
Glazing Trans. - ***3DP***	U_g	**1.197**	W/(m²·K)
g-value - ***2DP***	$g_\perp$	**0.71**	

Thermal transmittance of window from hot box test		
U_w **- 2DP**		W/(m²·K)

Frame dimensions (All frame values to nearest 0.5mm, gaskets to 1DP)	Frame height, b_f (mm) Combo	Internal	External	Gasket protrusion (mm)	With gasket (mm)	Total
F1 fixed top rail	105.0	63.0	36.0	n/a	63.0	105.0
F2 moving top rail		42.0	69.0	**0.0**	42.0	
F3 top (LH) jamb (moving sash)	105.0	42.0	69.0	**0.0**	42.0	105.0
F4 top (LH) jamb (fixed frame)		63.0	36.0	n/a	63.0	
F5 top (RH) jamb (moving sash)	105.0	42.0	69.0	0.0	42.0	105.0
F6 top (RH) jamb (fixed frame)		63.0	36.0	n/a	63.0	
F7 mid rail (upper)		62.5		**0.0**	62.5	62.5
F7 mid rail (lower)				**0.0**		
F8 bottom (LH) jamb (fixed frame)	105.0	63.0	36.0	n/a	63.0	105.0
F9 bottom (LH) jamb (moving sash)		42.0	69.0	**0.0**	42.0	
F10 bottom (RH) jamb (moving sash)	105.0	42.0	69.0	0.0	42.0	105.0
F11 bottom (RH) jamb (fixed frame)		63.0	36.0	n/a	63.0	
F12 bottom moving rail		41.0		**0.0**	41.0	101.0
F13 bottom fixed rail		60.0		n/a	60.0	
				Total gasket area	0	m²

Window Dimensions:			Area, A	
Section	Length, l (m)	Width, b (m)	No gasket (m²)	With gasket (m²)
Upper glazing	0.6038	1.0200	0.6158	0.6158
Lower glazing	0.6078	1.0200	0.6199	0.6199
Total of glazing			1.2357	1.2357
Frame	m	m	m²	m²
F1	1.2300	0.0630	0.0735	0.0735
F2	1.1040	0.0420	0.0446	0.0446
F3	0.6770	0.0420	0.0269	0.0269
F4	0.7400	0.0630	0.0446	0.0446
F5	0.6770	0.0420	0.0269	0.0269
F6	0.7400	0.0630	0.0446	0.0446
F7	1.1040	0.0625	0.0664	0.0664
F8	0.7400	0.0630	0.0447	0.0447
F9	0.6800	0.0420	0.0270	0.0270
F10	0.6800	0.0420	0.0270	0.0270
F11	0.7400	0.0630	0.0447	0.0447
F12	1.1040	0.0410	0.0435	0.0435
F13	1.2300	0.0600	0.0700	0.0700
Total Frame			0.5847	0.5847
Total Window, Aw			1.8204	1.8204
Percentage upper glass area			33.83%	33.83%
Percentage lower glass area			34.05%	34.05%
Percentage glass area (total)			67.88%	67.88%

Where a *Uw* value from hot box testing is available, no L_f^{2D} or L_ψ^{2D} values need to be entered

Frame conductance:		All *L* values to ***4DP***.	All b values to ***0DP***		
		L_f^{2D} W/(m·K)	b_p (mm)	L_ψ^{2D} W/(m·K)	b_g (mm)
F1+F2 top rail		**0.3578**	**190**	**0.4101**	190
F3+F4 top (LH) jamb		**0.3672**	190	**0.4198**	190
F5+F6 top (RH) jamb		0.3672	190	0.4198	190
F7 mid rail		**0.5727**	380	**0.6763**	380
F8+F9 bottom (LH) jamb		**0.3787**	190	**0.4317**	190
F10+F11 bottom (RH) jamb		0.3787	190	0.4317	190
F12+F13 bottom rail		**0.3689**	190	**0.4215**	190

Frame: Section	b_f (m)	U_f (W/(m²·K))	A_f (no gasket) (m²)	Frame heat, HU (W/K)	Ψ (W/(m·K))	l_g (m)	Junction heat,HΨ (W/K)
F1+F2 top rail	0.1050	1.2930	0.1181	0.1527	0.0469	1.0200	0.0478
F3+F4 top left jamb	0.1050	1.3825	0.0715	0.0989	0.0472	0.6038	0.0285
F5+F6 top right jamb	0.1050	1.3825	0.0715	0.0989	0.0472	0.6038	0.0285
F7 mid rail	0.0625	2.0580	0.0664	0.1366	0.0928	1.0200	0.0947
F8+F9 btm left jamb	0.1050	1.4920	0.0718	0.1071	0.0476	0.6078	0.0289
F10+F11 btm right jamb	0.1050	1.4920	0.0718	0.1071	0.0476	0.6078	0.0289
F12+F13 bottom rail	0.1010	1.4541	0.1136	0.1651	0.0472	1.0200	0.0482
		Totals	0.5847	0.8664		Total	0.3055

Solar Factor, *g*-value:		
	glazing area A_g (m²)	1.2392
	F_w	0.9
	g_w	0.43
U_{window}	U_w **1.46**	W/(m²·K)

Air Leakage loss:

Air leakage at 50 Pa per hour & per unit length of opening light (BS 6375-1) - ***2DP***				**0.26**	m³/(m·h)
Opening light length, $l_{opening}$	6.0340	m	Total air leakage	1.569	m³/h
L_{50}	0.86	m³/(m²·h)	Heat loss = 0.0165 L_{50}	0.01	W/(m²·K)

Other parameters needed for calculation, taken from simulations:								
	λ_p =	0.035	W/(m·K)	R_{se} =	0.04	m²·K /W	R_{se} = 0.13	m²·K /W
Glazing: Panel thickness, $d_p = d_g$ = 0.024 m	R_p =	0.6857	m²·K /W	R_{tot} =	0.8557	m²·K/ W	U_p = 1.1686	W/(m²·K)

BFRC Rating kWh/(m²·yr)	Label index	EWER Rating Scale	Window Rating
≥ 0	-7	A	B
-10 to <0 ⇦		⇨ B ⇦	
-20 to <-10		C	
-30 to <-20		D	
-50 to <-30		E	
-70 to <-50		F	
<-70		G	

BFRC Rating =		
218.6g_{window} - 68.5 x (U_{window} + Effective L_{50}) =		**-6.70**
Climate zone is:		**UK**
Thermal transmittance, W/(m²·K)	U_{window}	**1.5**
Solar factor	g_{window}	**0.43**
Window air leakage heat loss, W/(m²·K)	L_{factor}	**0.01**

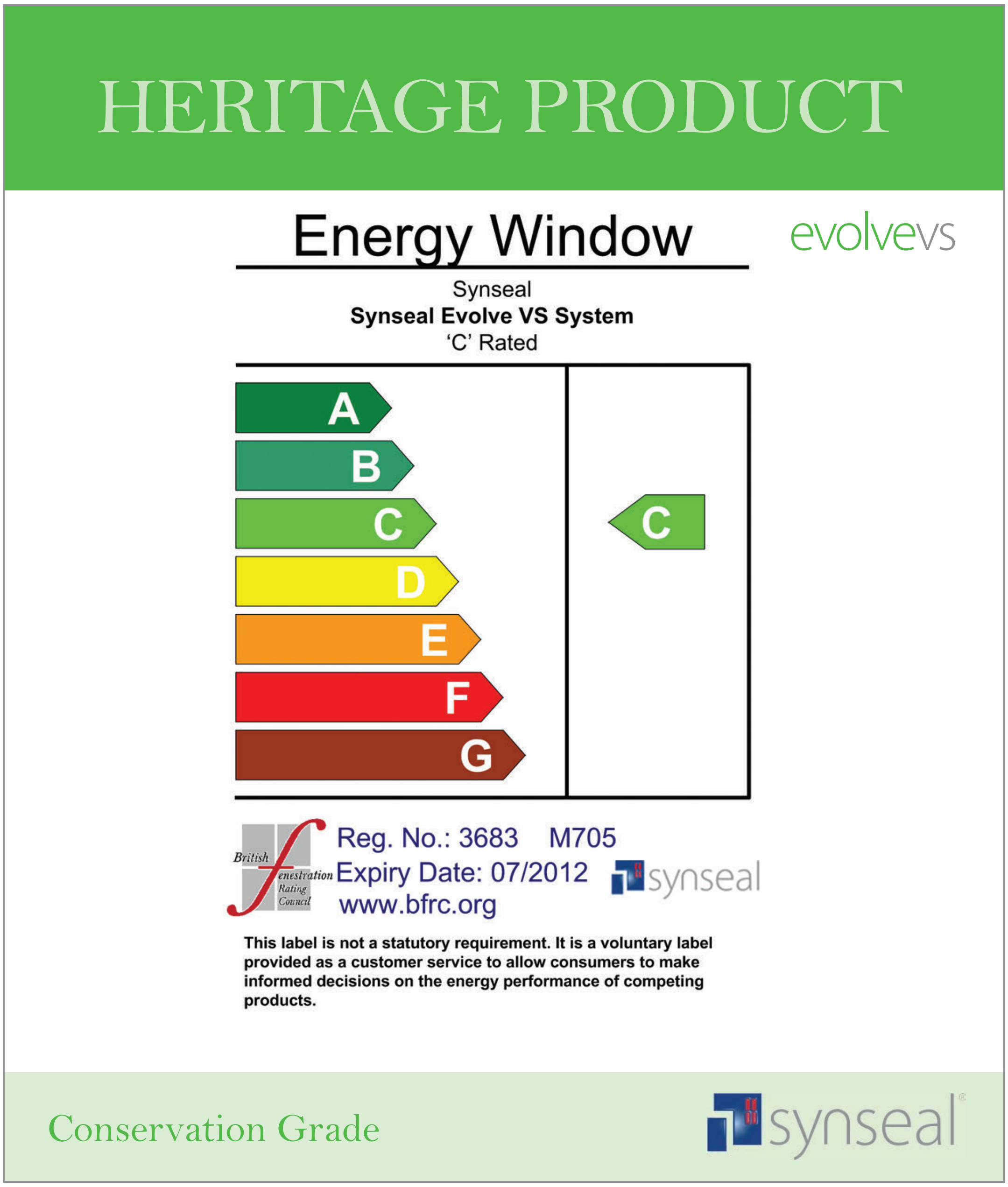
Simulator Name: **Greg Tabberer**

British fenestration Rating Council

BFRC Certified Simulator **080**

Window Energy Ratings

evolvevs



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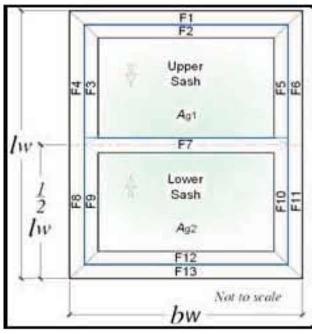


Sample Style:
Vertical Sliding Sash

Blue line illustrates opening light length (air leakage)

Report Number:	SYN-00062-3-Rev1 VS	Report Issue No.11 *(03/03/09)*
Report Date:	18 August 2010	
Project Details:	Evolve VS 4/16/4 Float / Argon 90% / Planitherm Total+, Aluminium spacer, PU (0.4) to 10mm SL, full RS + RA	

Input Values:
Yellow input, green intermediary, blue finals — X' DP is no.of decimal place to enter

Parameter	*Symbol*		*Units*
Total window height ***0DP***	l_w	1480	mm
Total window width ***0DP***	b_w	1230	mm

Nominal 4mm etc to ***0DP***, others ***1DP***			
Upper Panel Glazing dim's and properties:			
Thickness of pane 1		**4**	mm
Pane 1/2 distance		**16**	mm
Gas fill (1/2)		**Argon 90%**	
Thickness of pane 2		**4**	mm
Complete next 3 cells for TG IGU			
Pane 2/3 distance			mm
Gas fill (2/3)			
Thickness of pane 3			mm
Glazing Trans. - ***3DP***	U_g	**1.197**	W/(m²·K)
g-value - ***2DP***	$g_\perp$	**0.71**	

Thermal transmittance of window from hot box test		
$U_{w\text{-}2DP}$		W/(m²·K)

Frame dimensions:	(b_f)	Without gasket (mm)	Gasket protrusion (mm)	With gasket (mm)	Total
All frame values to nearest 0.5mm, gaskets to ***1DP***	F1 fixed top rail	**69**	n/a	69	105
	F2 moving top rail	**36**	**0.0**	36	
F3 top (LH) jamb (moving sash)		**69**	**0.0**	69	105
F4 top (LH) jamb (fixed frame)		**36**	n/a	36	
F5 top (RH) jamb (moving sash)		69	0.0	69	105
F6 top (RH) jamb (fixed frame)		36	n/a	36	
F7 mid rail	(upper gasket)	**62.5**	**0.0**	62.5	62.5
	(lower gasket)		**0.0**		
F8 bottom (LH) jamb (fixed frame)		**42**	n/a	42	105
F9 bottom (LH) jamb (moving sash)		**63**	**0.0**	63	
F10 bottom (RH) jamb (moving sash)		63	0.0	63	105
F11 bottom (RH) jamb (fixed frame)		42	n/a	42	
F12 bottom moving rail		**41**	**0.0**	41	101
F13 bottom fixed rail		**60**	n/a	60	
Total gasket area			0	m²	

Window Dimensions:			Area	
Section	Length (m)	Width (m)	No gasket (m²)	With gasket (m²)
Upper glazing	0.6038	1.0200	0.6158	0.6158
Lower glazing	0.6078	1.0200	0.6199	0.6199
Total of glazing			1.2357	1.2357
Frame	(m)	(m)	(m²)	(m²)
F1	1.2300	0.0690	0.0824	0.0824
F2	1.1580	0.0360	0.0392	0.0392
F3	0.6710	0.0690	0.0440	0.0440
F4	0.7400	0.0360	0.0254	0.0254
F5	0.6710	0.0690	0.0440	0.0440
F6	0.7400	0.0360	0.0254	0.0254
F7	1.1580	0.0625	0.0679	0.0679
F8	0.7400	0.0420	0.0298	0.0298
F9	0.6800	0.0630	0.0406	0.0406
F10	0.6800	0.0630	0.0406	0.0406
F11	0.7400	0.0420	0.0298	0.0298
F12	1.1460	0.0410	0.0444	0.0444
F13	1.2300	0.0600	0.0713	0.0713
Total Frame			0.5847	0.5847
Total Window, Aw			1.8204	1.8204
Percentage upper glass area			33.83%	33.83%
Percentage lower glass area			34.05%	34.05%
Percentage glass area (total)			67.88%	67.88%

Where a U_d value from hot box testing is available, no L_f^{2D} or L_Ψ^{2D} values need to be entered

Frame conductance:	All *L* values to ***4DP***. All b values to ***0DP***					
		W/(m·K)	b_p (mm)		W/(m·K)	b_g (mm)
F1+F2 top rail	L_f^{2D}	**0.3703**	**190**	L_Ψ^{2D}	**0.4560**	190
F3+F4 top (LH) jamb		**0.3864**	190		**0.4729**	190
F5+F6 top (RH) jamb		0.3864	190		0.4729	190
F7 mid rail		**0.5727**	380		**0.7363**	380
F8+F9 bottom (LH) jamb		**0.3836**	190		**0.4714**	190
F10+F11 bottom (RH) jamb		0.3836	190		0.4714	190
F12+F13 bottom rail		**0.3689**	190		**0.4559**	190

Frame: Section	b_f *(no gaskets)* (m)	U_f (W/(m²·K))	Frame areas (no gaskets) (m²)	Heat flow (W/K)	Ψ (W/(m·K))	l_g (m)	Heat flow (W/K)
F1+F2 top rail	0.1050	1.4120	0.1216	0.1717	0.0803	1.0200	0.0819
F3+F4 top left jamb	0.1050	1.5654	0.0694	0.1086	0.0811	0.6038	0.0490
F5+F6 top right jamb	0.1050	1.5654	0.0694	0.1086	0.0811	0.6038	0.0490
F7 mid rail	0.0625	2.0580	0.0679	0.1397	0.1528	1.0200	0.1559
F8+F9 btm left jamb	0.1050	1.5387	0.0704	0.1083	0.0824	0.6078	0.0501
F10+F11 btm right jamb	0.1050	1.5387	0.0704	0.1083	0.0824	0.6078	0.0501
F12+F13 bottom rail	0.1010	1.4541	0.1157	0.1682	0.0816	1.0200	0.0832
		Totals	0.5847	0.9134		Total	0.5191

Solar Factor, *g*-value:		
	F_w	0.9
	g_w	0.43

U_{window}	U_w	**1.60**	W/(m²·K)

Air Leakage loss:

Air leakage at 50 Pa per hour & per unit length of opening light (BS6375-1) - ***2DP***				**0.26**	m³/(m·h)
Opening light length	6.1640	m	Total air leakage	1.603	m³/h
L_{50}	0.88	m³/(m²·h)	Heat loss = 0.0165 L_{50}	0.01	W/(m²·K)

Other parameters needed for calculation, taken from simulations:		λ_p =	0.035	W/(m·K)	R_{se} =	0.04	m²·K/W	R_{se} =	0.13 m²·K/W
Upper glazing:	Panel thickness, $d_p = d_g$ = 0.024 m	R_p =	0.6857	m²·K/W	R_{tot} =	0.8557	m²·K/W	U_p =	1.1686 W/(m²·K)

BFRC Rating kWh/(m²·yr)	Label index	EWER Rating Scale	Window Rating
≥ 0	-16	A	C
-10 to <0		B	
-20 to <-10 ⇦		⇨ C ⇦	
-30 to <-20		D	
-50 to <-30		E	
-70 to <-50		F	
<-70		G	

BFRC Rating =	
218.6g_{window} - 68.5 x (U_{window} + Effective L_{50}) =	**-16.29**
Climate zone is:	**UK**

Thermal transmittance, W/(m²·K)	U_{window}	**1.6**
Solar factor	g_{window}	**0.43**
Window air leakage heat loss, W/(m²·K)	L_{factor}	**0.01**

Simulator Name: Greg Tabberer

British Fenestration Rating Council

BFRC Certified Simulator **080**

The Evolve Vertical Slider Window Specification

- Synseal White
- WER A as standard
- Fully featured system
- Fully reinforced sashes
- Fully concealed gaskets
- Internally beaded
- Two pole eye to top sash
- Cam locking locks (An additional non-locking cam lock if over 850mm wide)
- Two sash lifts to bottom sash
- Easy clean tilt facility to top and bottom sash
- Standard 154mm sill (unless overwise requested)
- White furniture as standard (Gold, Chrome and Satin Chrome also available)
- Run through or stuck on sash horn option available
- Optional travel/child restrictors
- Optional trickle vents
- Optional security rail

Our vertical slider comes with a 10 year guarantee on the profile and glass, a lifetime guarantee on the springs and a 1 year guarantee on the furniture (eg, locks, pole eyes, sash lifts and tilt knobs).

If you require any further information, please do not hesitate to contact myself.

Assuring you of our best attention at all times.

Yours Sincerely

Sarah Starkey

Sarah Starkey
Vertical Slider Business Development Manager

Direct Dial: 01623 446 308

Mobile: 07540 121999

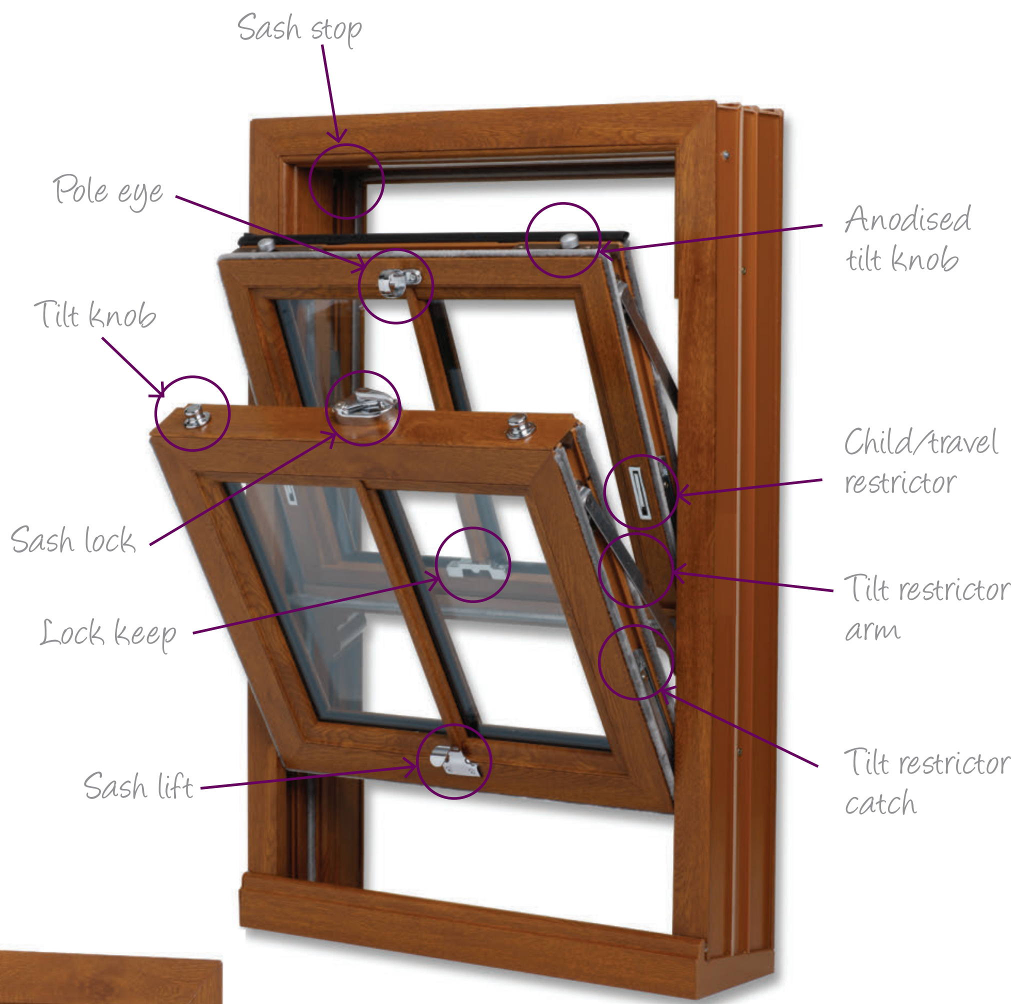
Fax: 01623 554050

Email: sarah.starkey@synseal.com

Vertical Slider Anatomy

evolvevs

Internal view



External view

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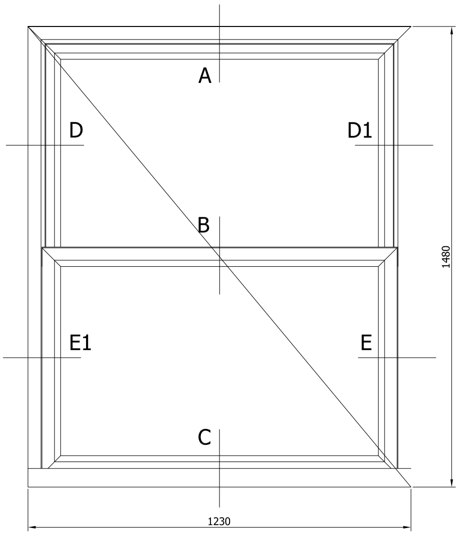
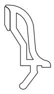
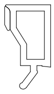
Components



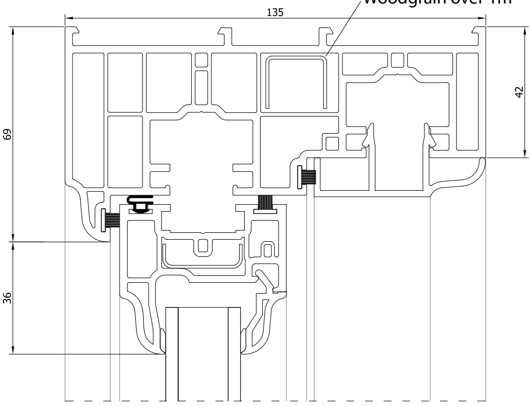


3JB28WF
Glazing Bead

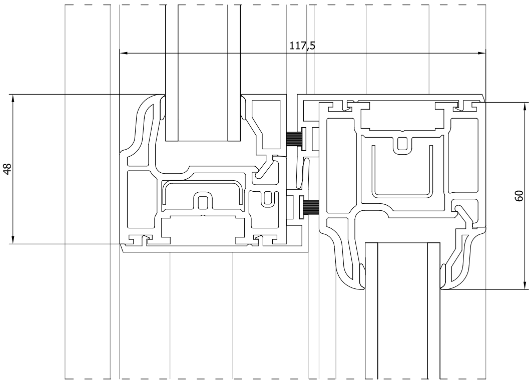


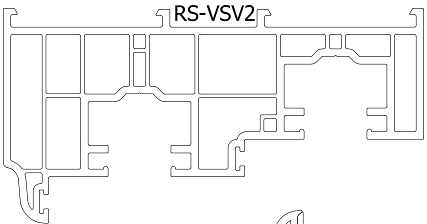
VS-SB24
Glazing Bead

SECTION A

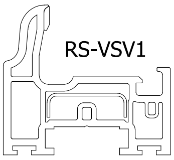


SECTION B

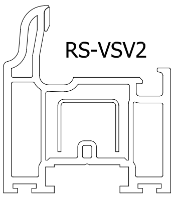




VS-F1
VS OuterFrame

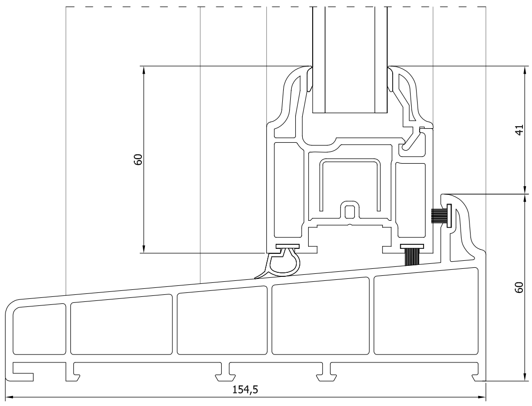


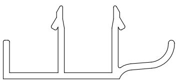
VS-V1
VS Top Sash



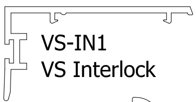
VS-V2
VS Bottom Sash

SECTION C

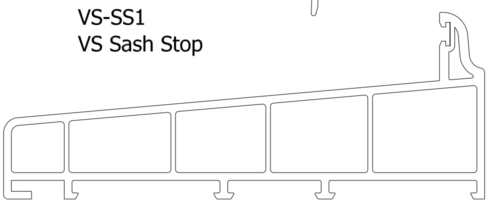




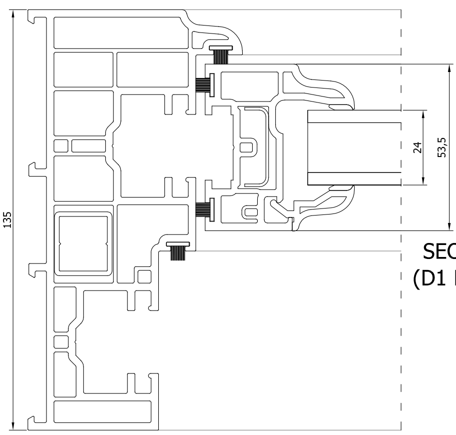
VS-SS1
VS Sash Stop



VS-IN1
VS Interlock

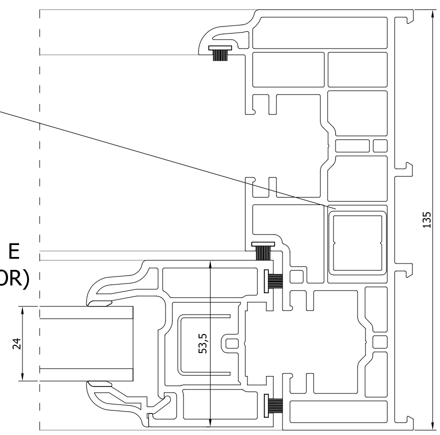


VS-S154
VS 154mm Sill



SECTION D
(D1 MIRROR)

Only required
for Woodgrain



SECTION E
(E1 MIRROR)

Reinforcing guidelines

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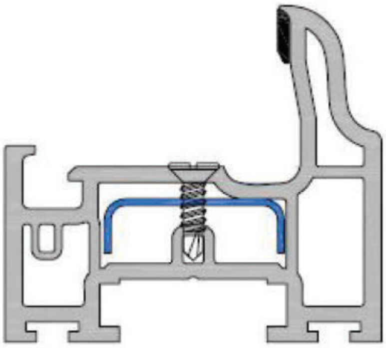
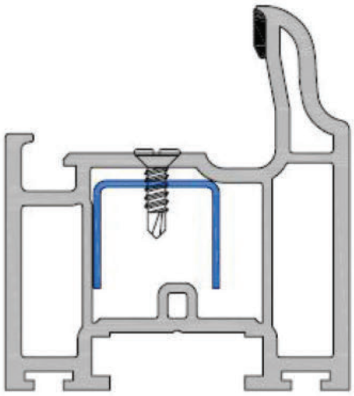
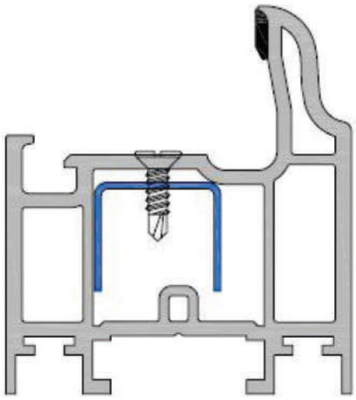


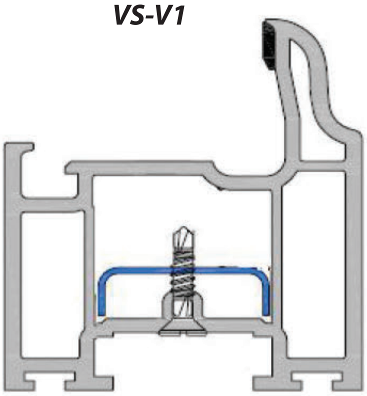
VS-V1



VS-V2



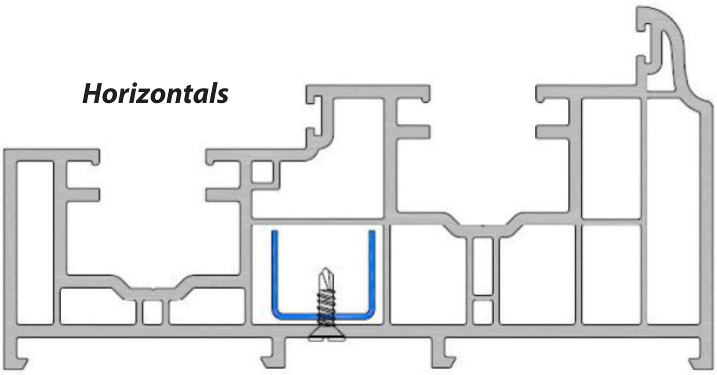
VS-V3

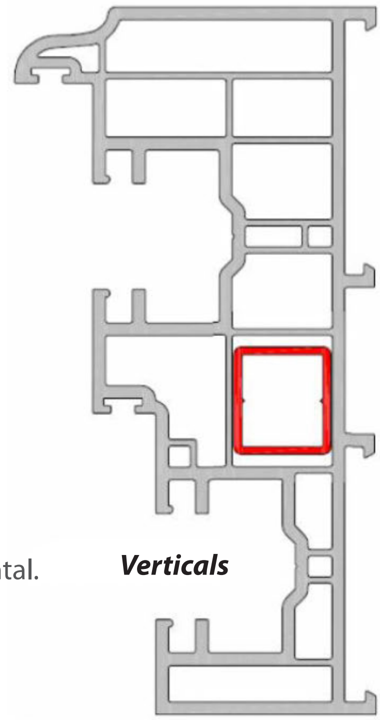


VS-V2 (trickle vent)

- All sashes are fully reinforced
- Place the reinforcing into the chamber of the profiles as shown at equal distances from each end and fix the reinforcing with 3.9 x 16 countersunk screws (SH25) or 3.9 x 25 countersunk screw ((SH08) when fixing to trickle vent sash) at 150mm from each end with no more than 500 mm centres, on the inner of the profile.
- Ensure that the reinforcing does not enter the apertures for the travel restrictors.

Horizontals





Verticals

Frames are reinforced when:

- Width is greater than 1000mm, with steel (VSRSV2) along the horizontal.
- Height is greater than 2500mm with aluminium (5RA-SO7) along the verticals or if the profile is foiled.

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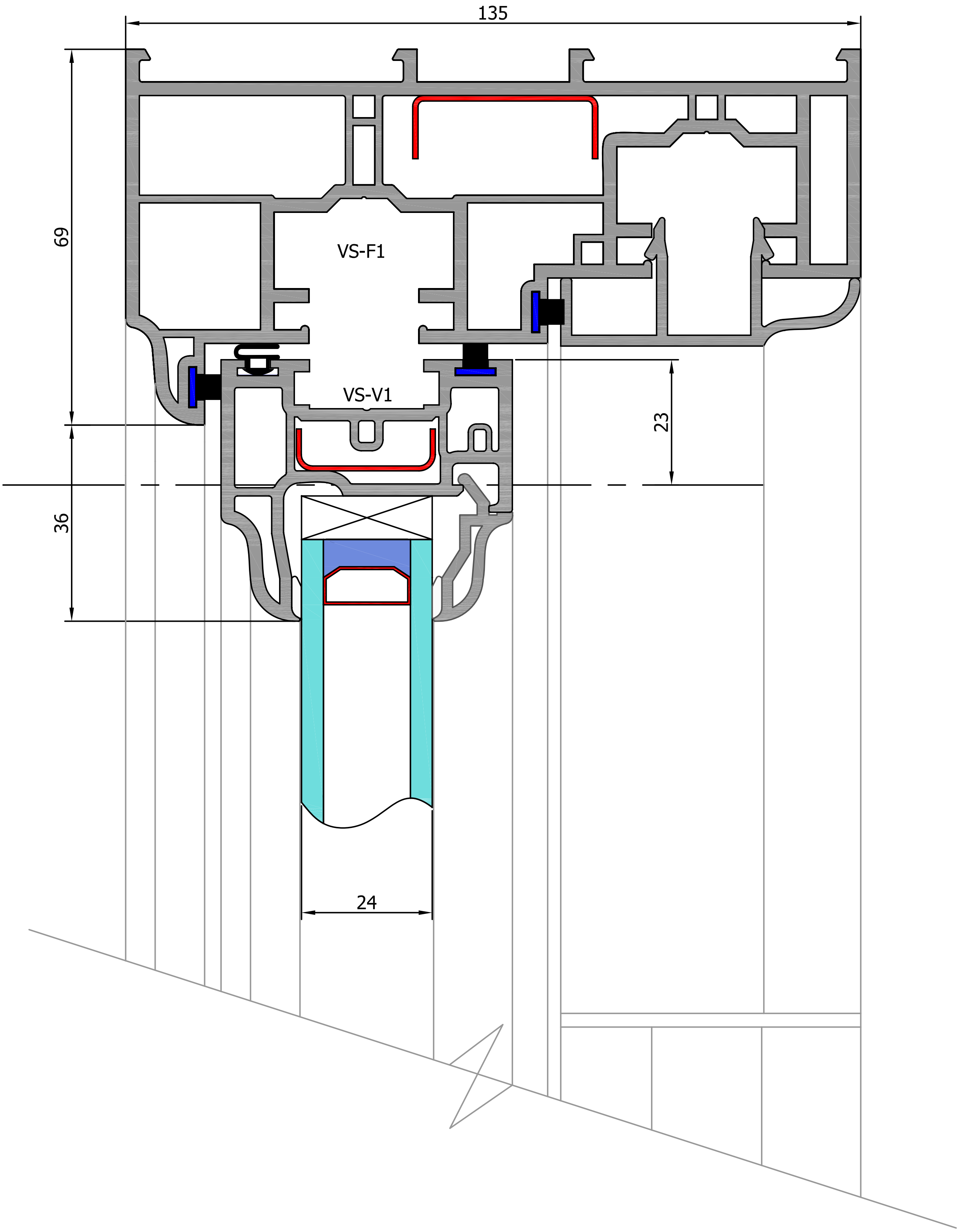
Frame and Top Sash Cross Section

evolvevs



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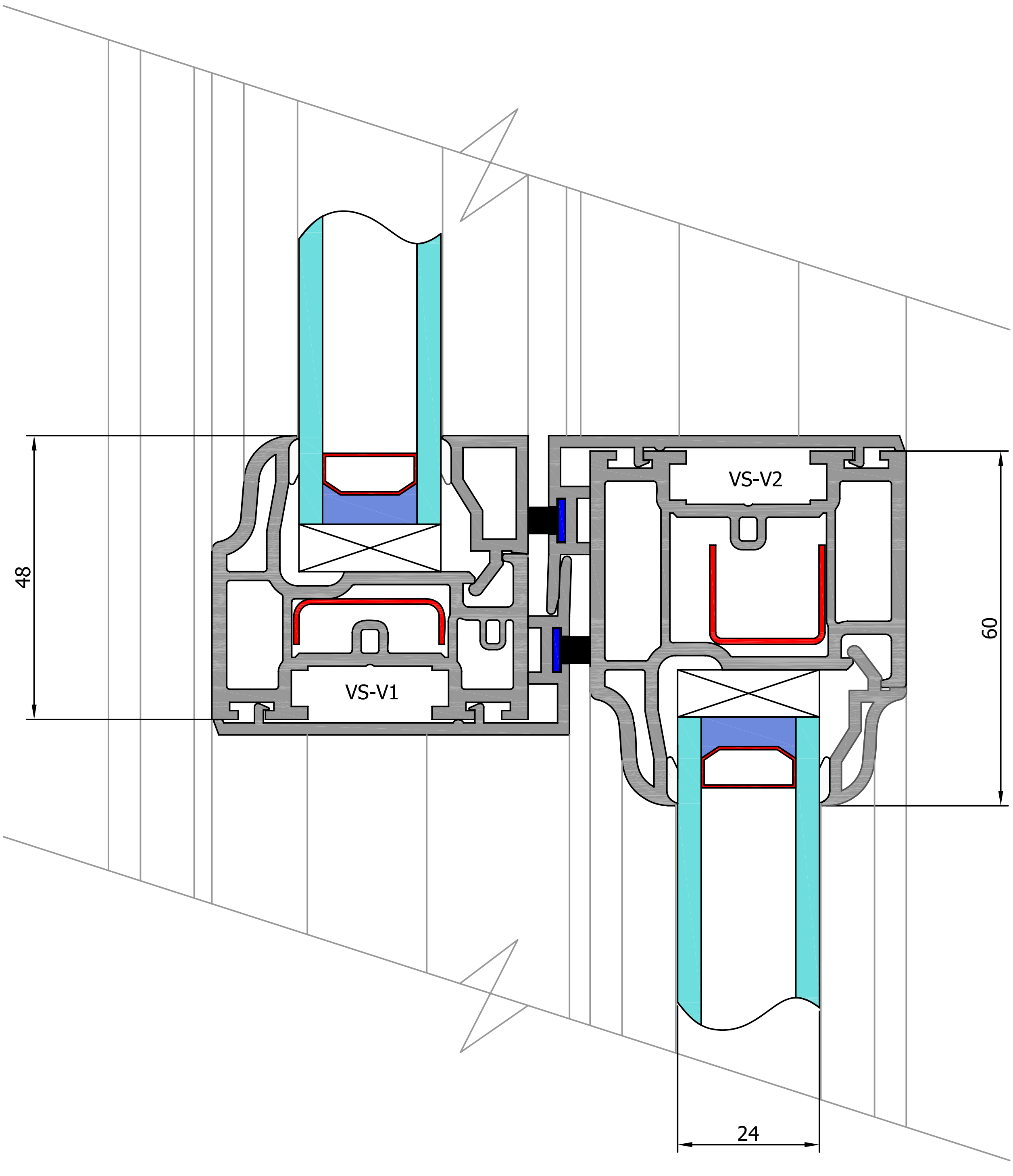
Meeting Rail Cross Section

evolve**VS**



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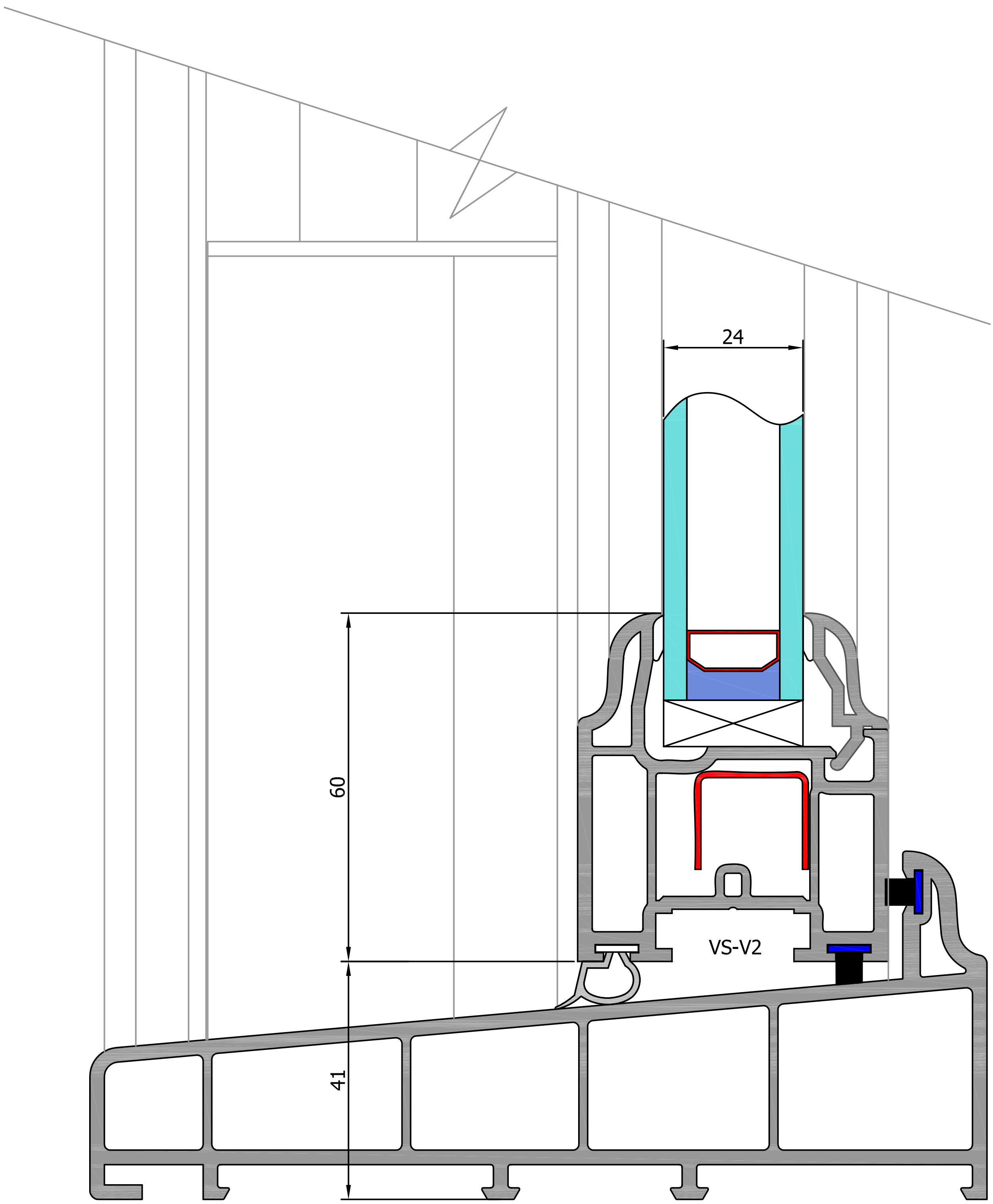
Standard 154mm Cross Section

evolvevs



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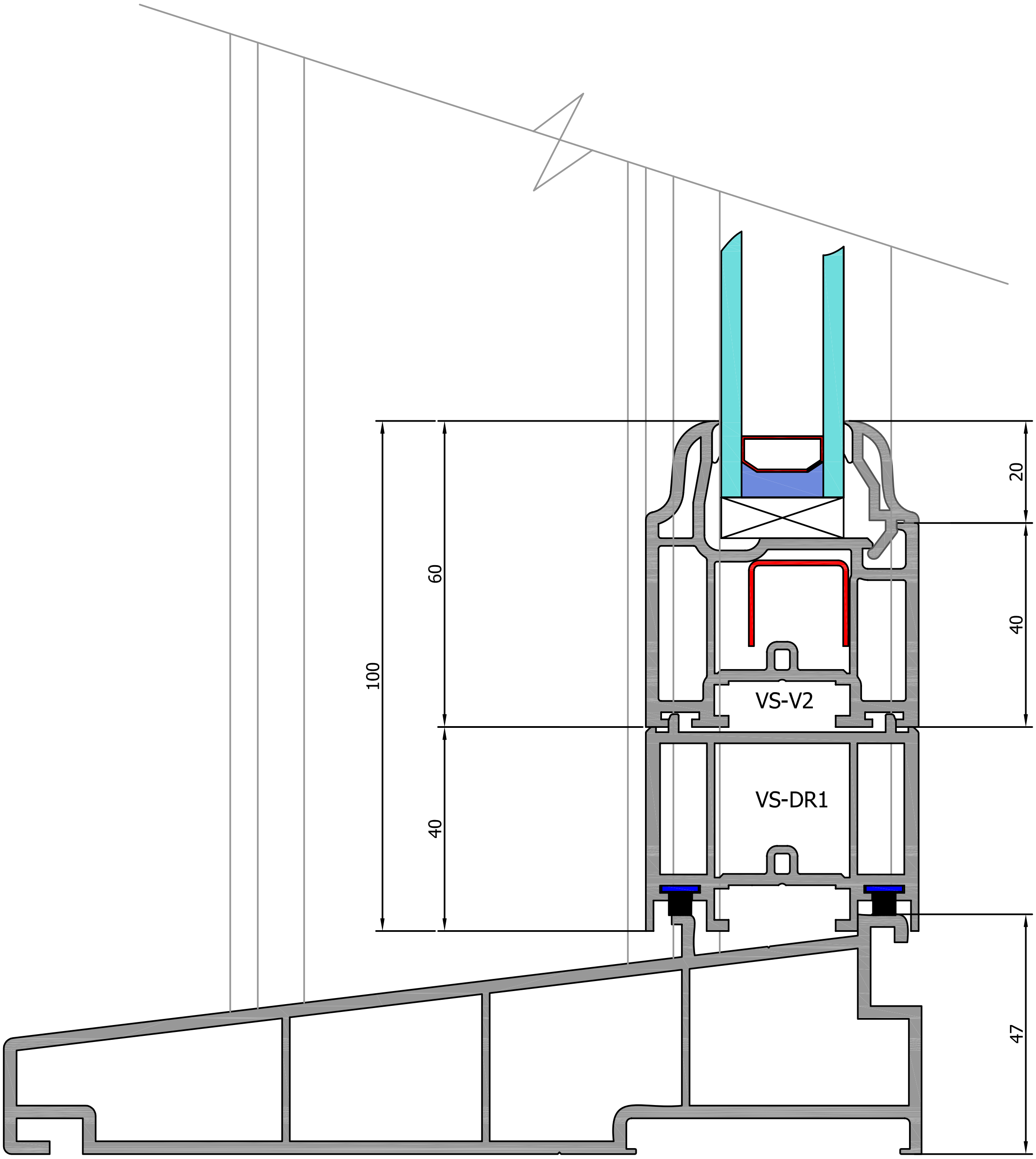
Non Standard Sill with DBR Cross Section

evolvevs



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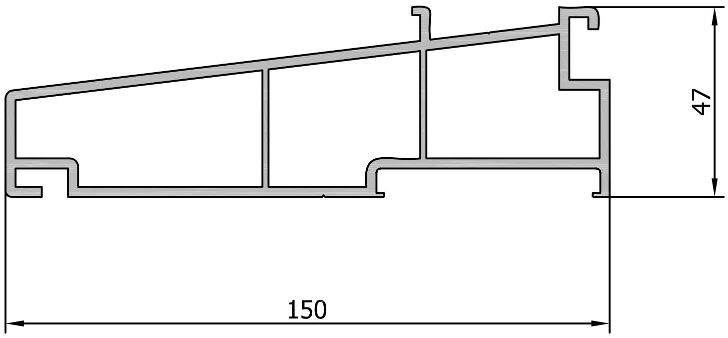
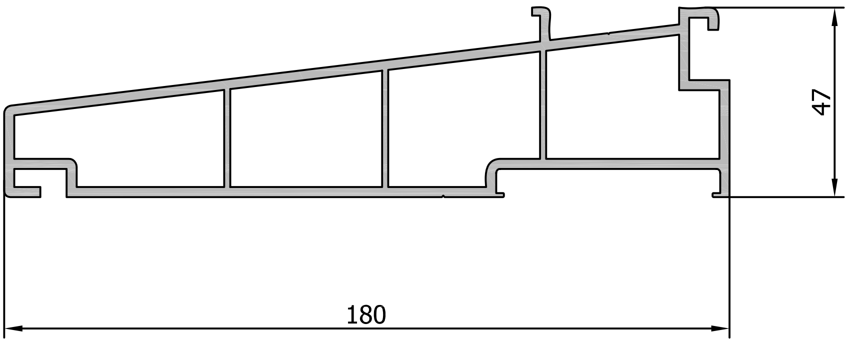
Non Standard Sills

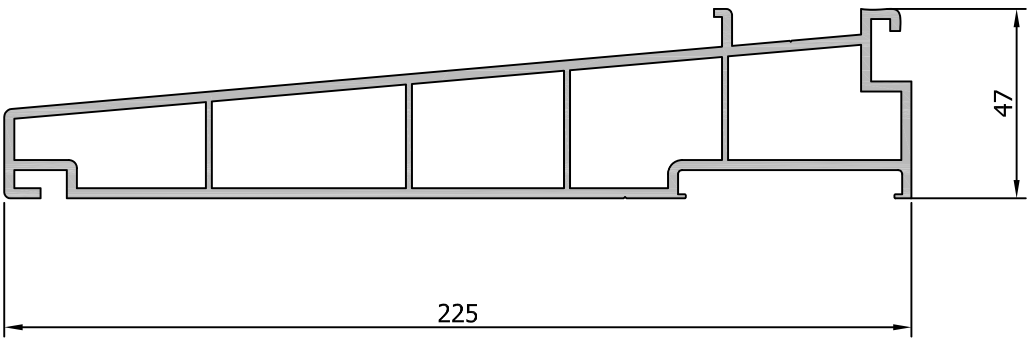
evolve**vs**



3S150 - 150mm Vertical Slider Sill



3S180 - 180mm Vertical Slider Sill



3S225 - 225mm Vertical Slider Sill

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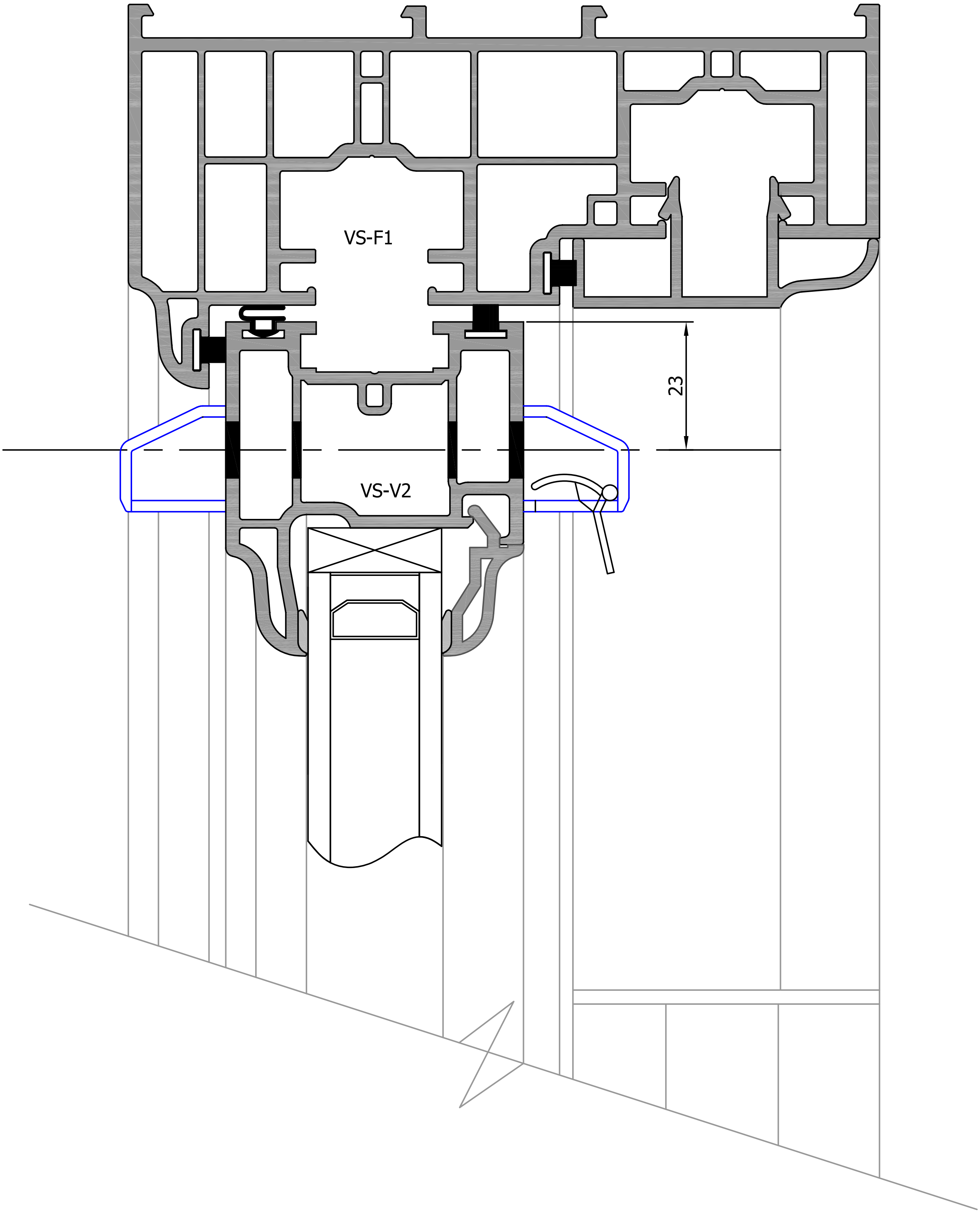
Trickle Vent Cross Section

evolve**vs**



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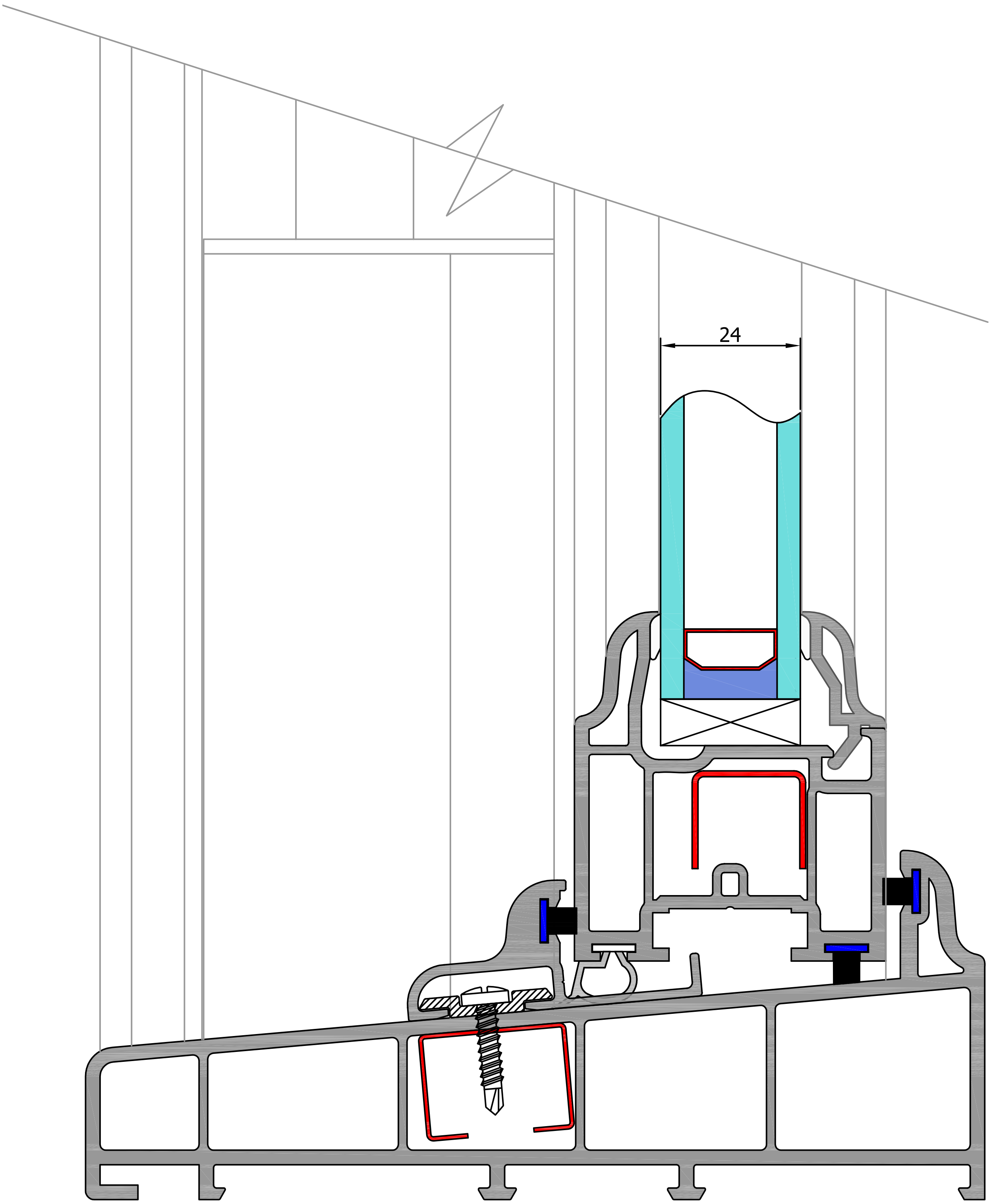
Aluminium security bar on standard cill

evolvevs



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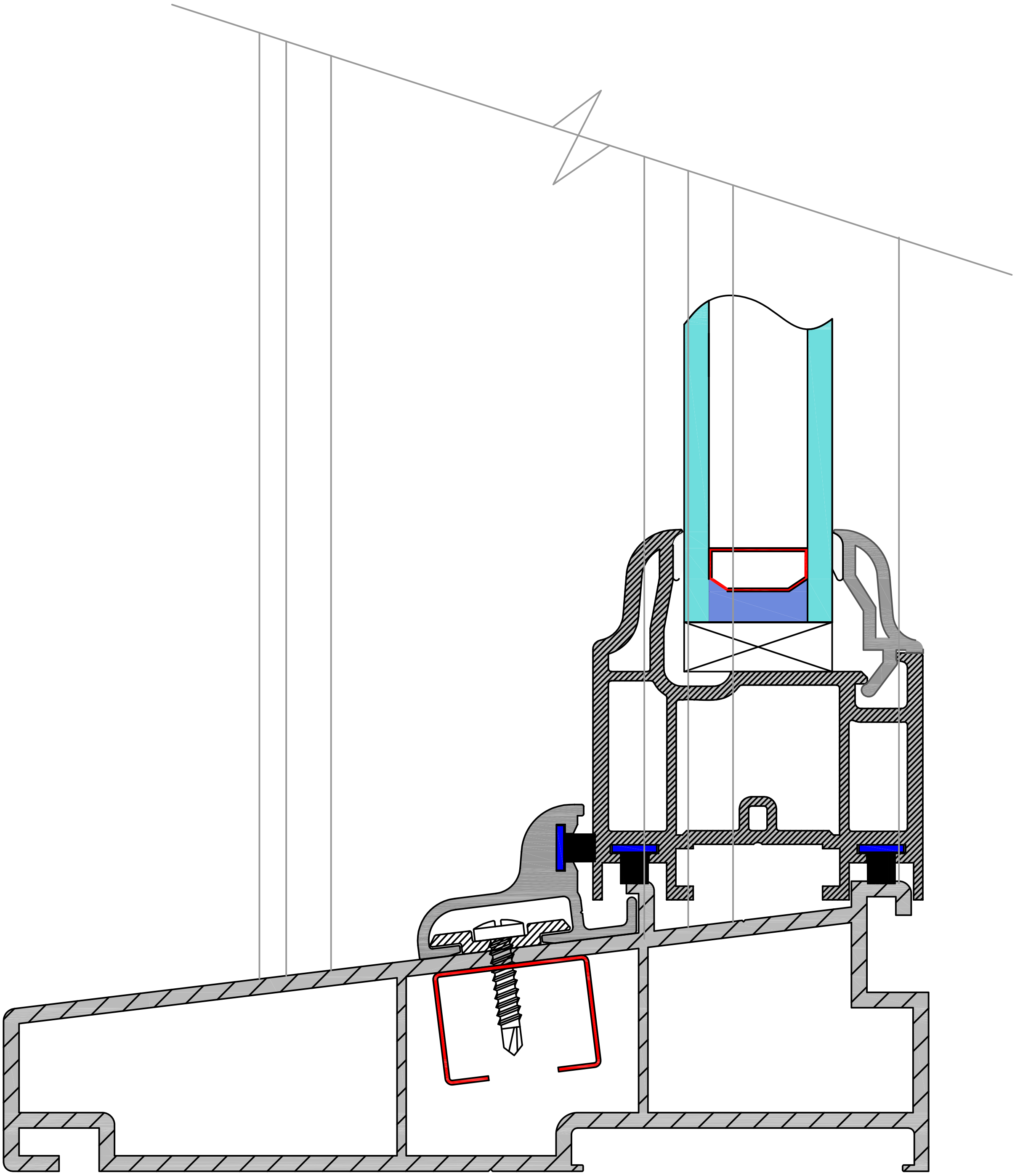
Aluminium security bar on non standard cill

evolvevs



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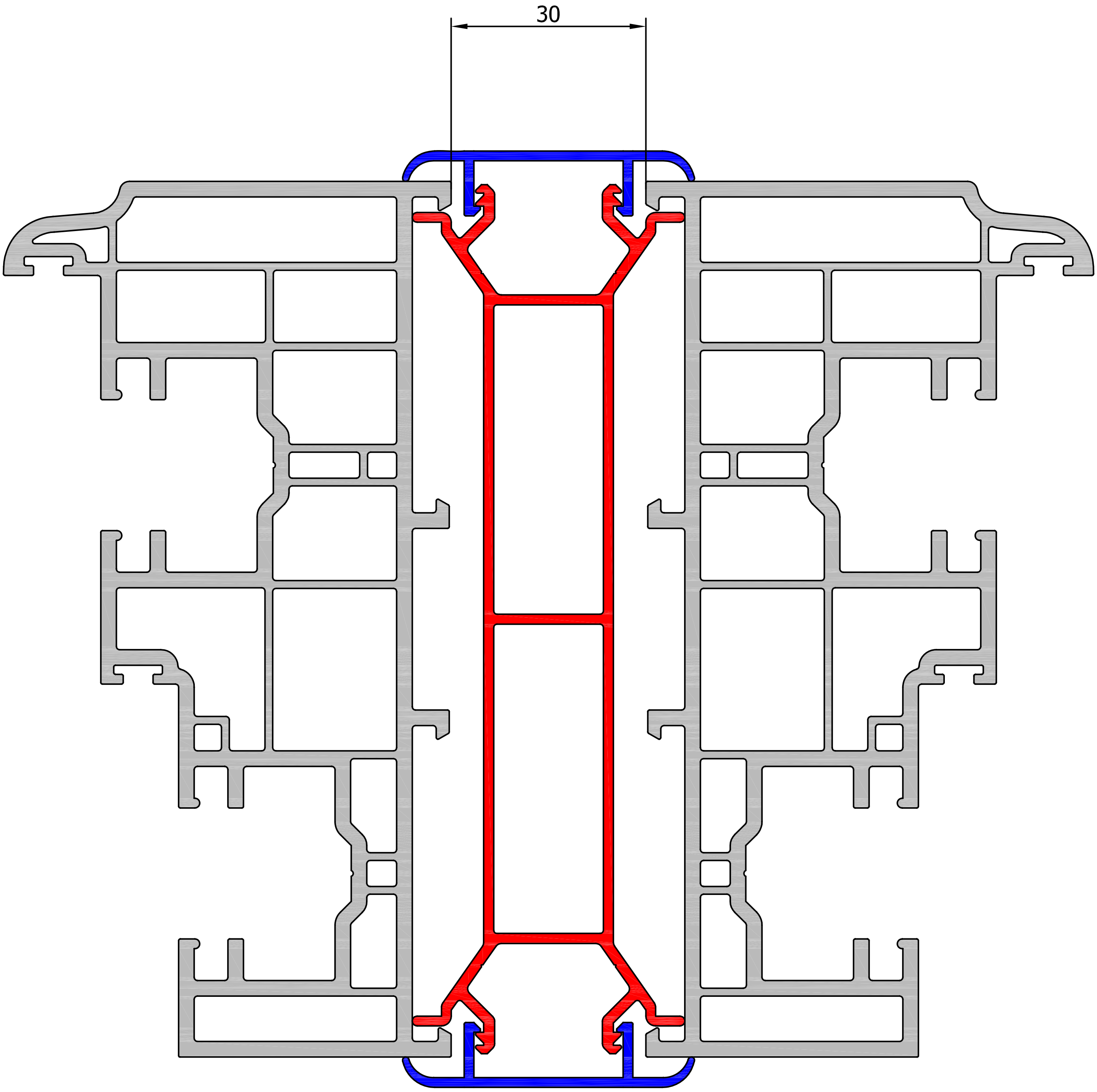
30mm Coupler Cross Section

evolvevs



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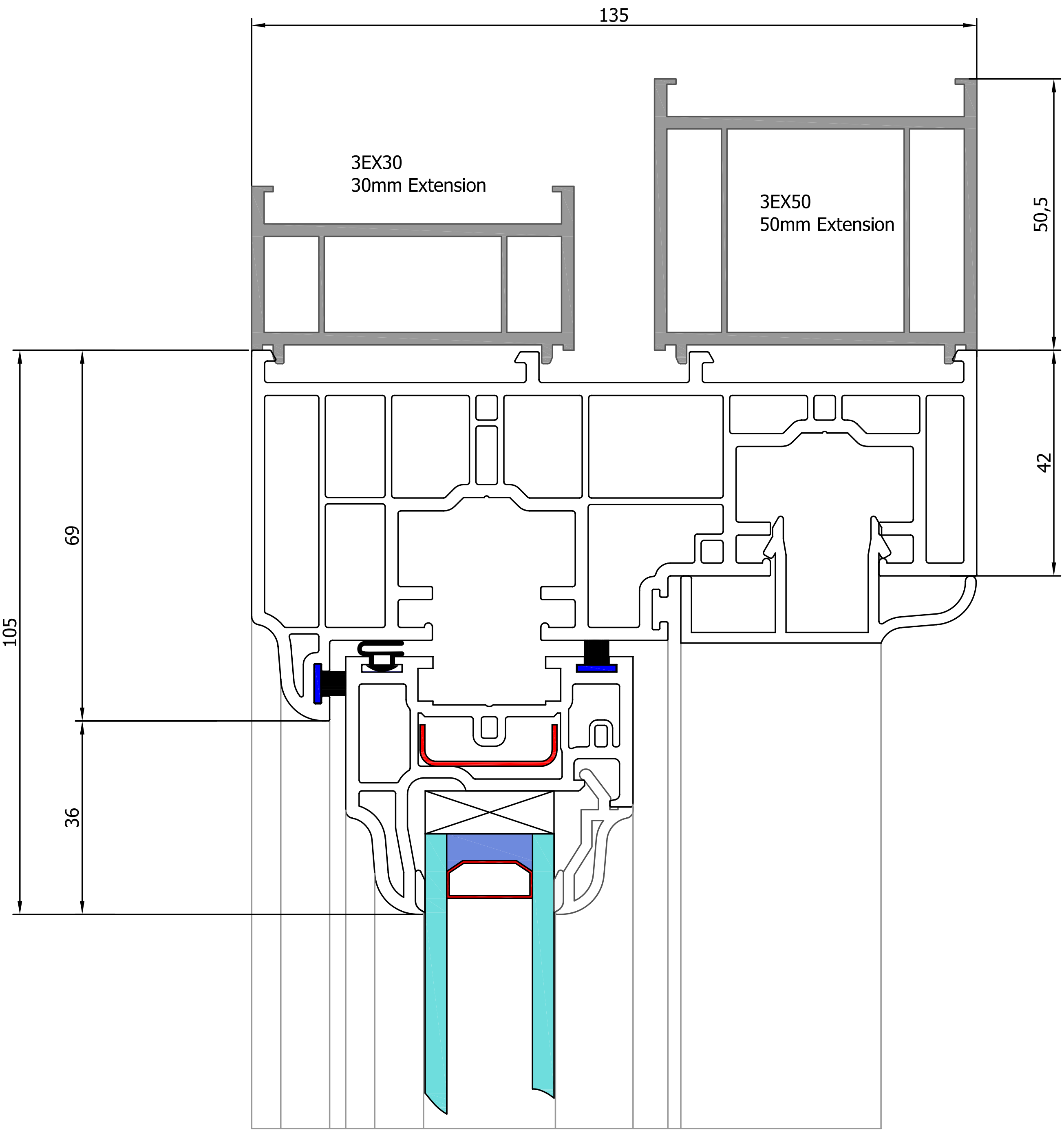
30mm and 50mm Add-on

evolvevs



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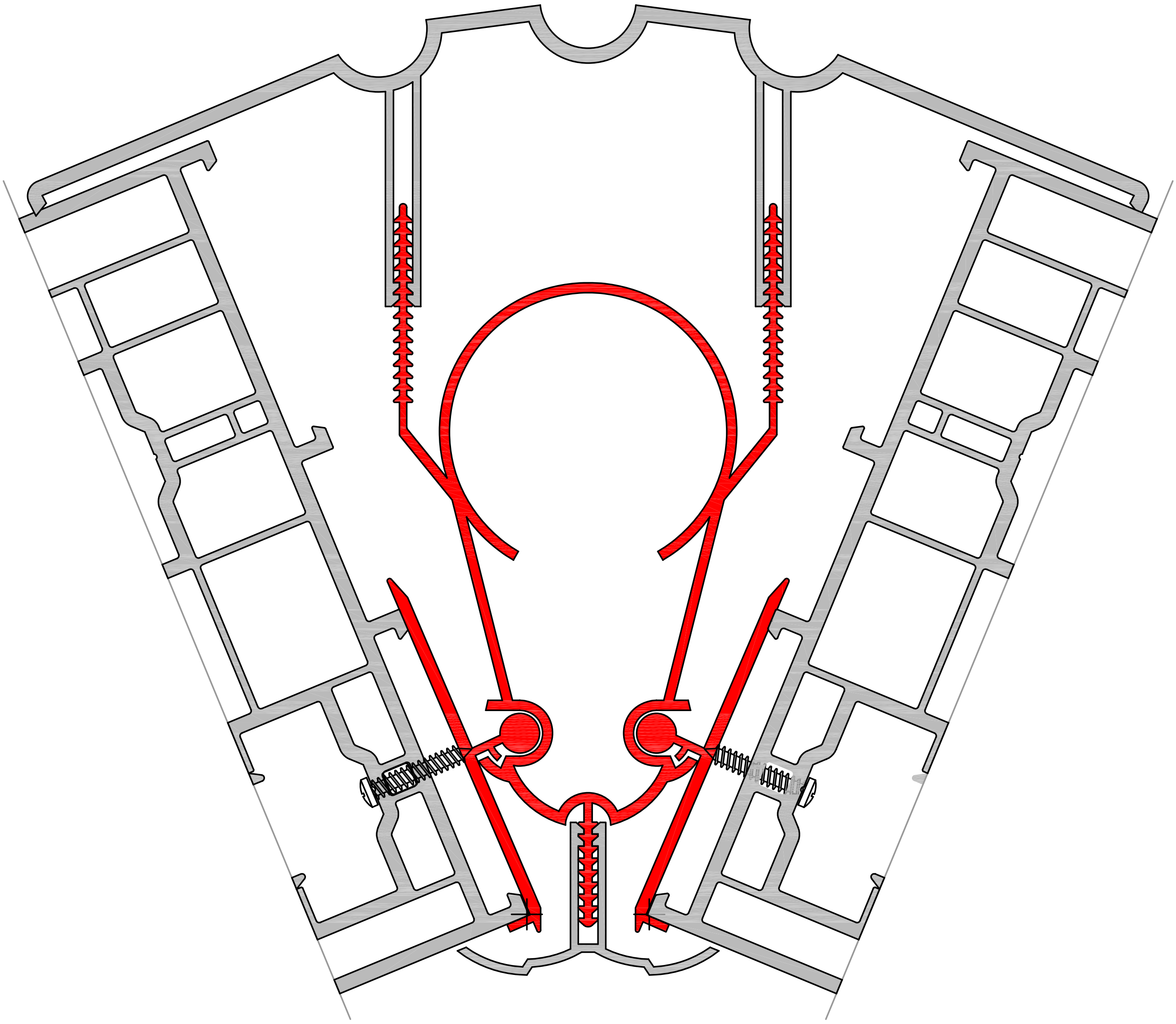
Variable Angle Bay Pole Detail

evolvevs



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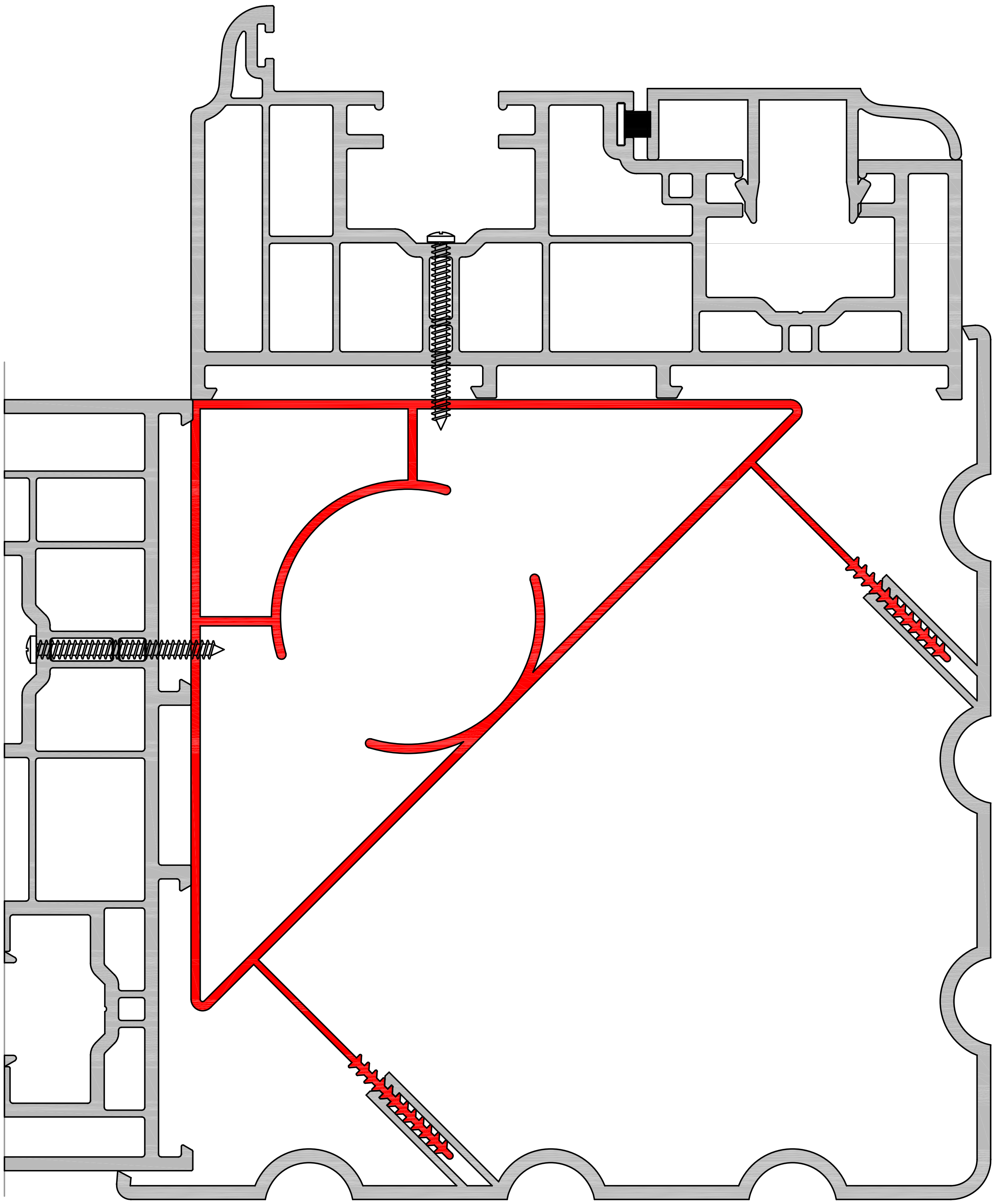
90 Degree Bay Pole Detail

evolvevs



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Bay Pole Deductions and Loads

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Frame Deductions

Angle	Frame Deduction (Per Side or Per Touch)
90°	0mm
120°	5.2mm
125°	6.4mm
130°	7.6mm
135°	9mm
140°	10.1mm
145°	11.4mm
150°	12.6mm

Please note, These deductions are measured to the inside of the sill upstand.

Max Loads

Angle	VSLBB01	VSLBB02	VS90
600	3.26	3.26	3.5*
900	3.26	3.26	3.5*
1200	3.06	3.06	3.5*
1500	2.90	2.90	3.0*
1800	2.90	2.90	3.0*
2100	2.66	2.66	2.7*
2400	2.40	2.40	2.5*

Please note, We rounded down the I-values to include a safety factor within this calculation.

Also be aware that the interface between the Baypole Jack and the pole is the weakest link and the max load is capped at 2 tonnes.

Please note: Bay cills are not welded

Bay cills will be supplied as seperate window cills with cill horns and cill jointers.

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Operation guide

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Travel/child restrictors

A key is provided to operate the travel/child restrictors. Insert the key into the restrictor and turn it which will allow the restrictor to spring out.

Remove the key, carryout the above procedure with the other restrictor and store the key in a suitable location.

The bottom sash (if the cam catch(s) are in the open position) can be opened to allow ventilation, but it will not fully open.

To disengage the travel/child restrictors and allow full opening of the sash, press and hold the restrictor against the top sash and at the same time, insert and turn the key to lock.

Remove the key, carryout the above procedure with the other restrictor and store the key in a suitable location.

The restrictors will now be in the closed and locked position allowing full opening of the sash.

WARNING: *The travel/child restrictors have to be manually re-engaged each time the windows have been fully opened or put into the tilt mode*

Tilt facility (top and bottom sashes)

The tilt facility is to allow the consumer to clean the outside pane of the sealed unit from within the property. On using the tilt facility, the window must be supported at all times until it comes to rest in the open position.

Ensure that the cam catch(s) are in the unlocked and open position. Lift the bottom sash up using the sash lifts say 10cm. On top of the sash there are two tilt knobs. Push both tilt knobs simultaneously inwards towards the middle of the window until they come to a stop and, whilst holding them, pull the sash towards you. Do not let go of the sash until it comes fully to rest and is supported in the open position by the side tilt restrictors.

To close the window, simply push the sash back towards the outer frame and the top sash. You will hear a 'click' as the spring loaded snap latches lock back into the outer frame. Once the tilt restrictors have been re-engaged, the window can be moved up or down as required.

To allow the top sash to tilt for cleaning purposes, the bottom sash must be put into the tilt mode first. Refer to the notes above.

Pull the top sash down using the ring pull(s) fitted to the sash for say 10cm.

WARNING: *Failure to support the window opening could result in the restrictors being permanently damaged*

Operation guide

Sash opening/closing

The cam catch lever(s) needs to be positioned in the open position. If locking cam catch(s) are fitted, insert the key and turn to lock or unlock. Remove the key and store in a suitable position.

The sashes must be opened and closed by using the sash lifts/ring pull(s). On no account must the sashes be opened and closed using the external Georgian bars (if fitted). The Georgian bars are a decorative feature only and it is possible that they could become loose or even fall off if used to open and close the sashes.

WARNING: *If the Georgian bars are used as a means for opening and closing sashes, no warranty will be given and any remedial site visits will be chargeable*

Cleaning

The windows should be cleaned using warm soapy water. On no account should abrasive or solvent based cleaners be used on the window.

EVOLVE VS WINDOWS ENQUIRY/ORDER FORM

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Company: ....

Account no. ....

Address: ....

....

.... Postcode: ....

Tel: ....

Fax: ....

Contact Name: ....

Email: ....

Requested Delivery Date: ....

Order Reference: ....

Order Number: ....

Page [ ] of [ ]

Quote	
Order	
Total no. of frames	

Any glazing or part of that glazing, which is between the finished floor level and a height of 800mm requires toughened glass as per BS 6262 Part 4: 1994. Ref Part N Building Regulations 1991.

Bay Windows

Please send us the sill layout & internal dimensions

Additional notes: ....

....

....

Frame layout

Width

Height

Quantity [ ]

Window location [ ]

Dimensions

Width (mm) [ ]

Height (mm) [ ]

Add on [ ] *1 side* [ ] *2 side* [ ] *Head*

Sills [ ] *154 (std.)* [ ] *150* [ ] *180* [ ] *225*

Transom Split (mm)

[ ] *50/50 (std.)* [ ] *1/3 top* [ ] *2/5 top*

Colour/Extras

Profile: White (Std.) [ ]

Colour *(please state)* ....

Furniture:

White (Std.) [ ] Chrome [ ]

Gold [ ] Satin Chrome [ ]

[ ] *Deep Bottom Rail* [ ] *Fixing Cleats* [ ] *Fire Escape* [ ] *Child Restrictors* [ ] *Security Bar*

[ ] *Sash Horns* [ ] *Run Through Sash Horns*

Trickle vent: [ ] *2000* [ ] *4000*

Glass

[ ] A [ ] B [ ] C (Std.)

Toughened: Low 'E'

[ ] *Top* [ ] *Bottom*

Laminated: Low 'E'

[ ] *Top* [ ] *Bottom*

Obscure: *State design*

Georgian Grid

(show layout on window)

[ ] *Internal (Fret)* [ ] *External (Astragal)*

Lead Design

(show layout on window)

[ ] *Diamond* [ ] *SQ Lead*

Single Vertical Bar

[ ] *Internal (Fret)* [ ] *External (Astragal)*

Frame layout

Width

Height

Quantity [ ]

Window location [ ]

Dimensions

Width (mm) [ ]

Height (mm) [ ]

Add on [ ] *1 side* [ ] *2 side* [ ] *Head*

Sills [ ] *154 (std.)* [ ] *150* [ ] *180* [ ] *225*

Transom Split (mm)

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Lead Design

(show layout on window)

[ ] *Diamond* [ ] *SQ Lead*

Single Vertical Bar

[ ] *Internal (Fret)* [ ] *External (Astragal)*

Frame layout

Width

Height

Quantity [ ]

Window location [ ]

Dimensions

Width (mm) [ ]

Height (mm) [ ]

Add on [ ] *1 side* [ ] *2 side* [ ] *Head*

Sills [ ] *154 (std.)* [ ] *150* [ ] *180* [ ] *225*

Transom Split (mm)

[ ] *50/50 (std.)* [ ] *1/3 top* [ ] *2/5 top*

Colour/Extras

Profile: White (Std.) [ ]

Colour *(please state)* ....

Furniture:

White (Std.) [ ] Chrome [ ]

Gold [ ] Satin Chrome [ ]

[ ] *Deep Bottom Rail* [ ] *Fixing Cleats* [ ] *Fire Escape* [ ] *Child Restrictors* [ ] *Security Bar*

[ ] *Sash Horns* [ ] *Run Through Sash Horns*

Trickle vent: [ ] *2000* [ ] *4000*

Glass

[ ] A [ ] B [ ] C (Std.)

Toughened: Low 'E'

[ ] *Top* [ ] *Bottom*

Laminated: Low 'E'

[ ] *Top* [ ] *Bottom*

Obscure: *State design*

Georgian Grid

(show layout on window)

[ ] *Internal (Fret)* [ ] *External (Astragal)*

Lead Design

(show layout on window)

[ ] *Diamond* [ ] *SQ Lead*

Single Vertical Bar

[ ] *Internal (Fret)* [ ] *External (Astragal)*

Fax: **01623 554050** or Email: **evolveorders@synseal.com**

We are able to supply architrave in bar length - contact us for details.

Promotional Code [ ]

synseal® evolvevs

Evolve VS Service Call Request Form

You have made a request for a Synseal Engineer to visit a site installation. To enable us to effectively action your request, could you please complete and sign the sections below.

Please complete in full the following requested information. ALL SECTIONS MUST BE COMPLETED.
Return to FAX: 01623 554050 or EMAIL: vscustomercare@synseal.com

Your Details

Name	
Company	
Telephone	
Synseal Account Code	
VS Order No (The visit relates to) e.g. VJ00000	
Reason for Site Visit	

Your Customer Details *(If the vertical sliders have been sold on)*

Contact Name	
Company Name	
Contact Number	

Site Details

Occupiers Name	
Site Address (including postcode)	
Name of person (including mobile phone number) who will be attending site on your behalf or your customers Company	

Please be aware that the signing of this order will generate a minimum fixed site visit cost of £120.00 plus travelling cost of 28p per mile from and returning to Synseal Head Office, if the following occurs:

- *If on inspection of the product the fault is found to be as a result of poor fitting, Synseal will request that the product is refitted by yourselves / your customer before any remedial work is carried out.*
- *If the fault is rectifiable without refitting and you / your customer require Synseal to carry out the remedial works.*

Synseal recommends that at the time of the engineers visit, a representative from your / your customers company is present. Please sign and date below that you accept the terms of this agreement.

Signed:.. **on behalf of:** .... **Date:** ....

Office use only

Date Received	Visit Order No.	Agreed Site Visit Date	Name(s) of Operatives	Appropriate Miles	Time Out Of Office