



THINK
PVC-U WINDOWS
DOORS AND
CONSERVATORIES
THINK
CRYSTAL

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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.



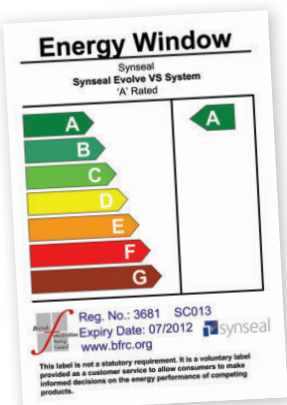


The Evolve vertical sliding sash window from Synseal comes with many advanced features:

- 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.

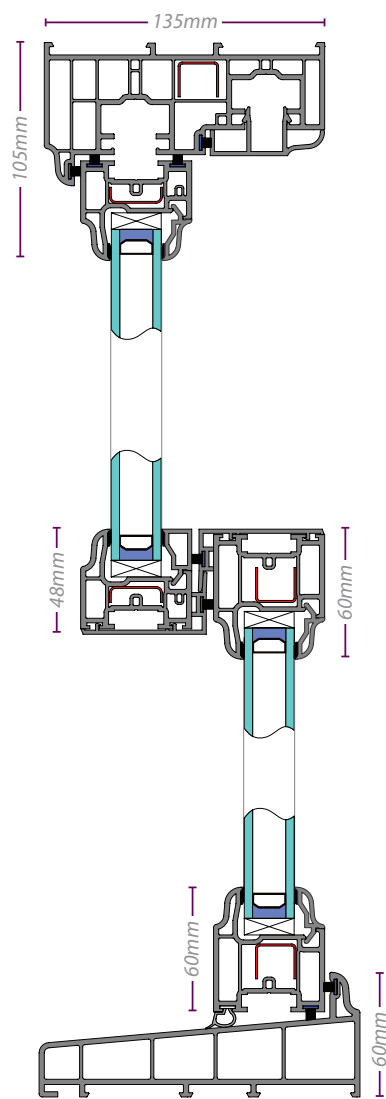
Delivered in just 7 working days!

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.

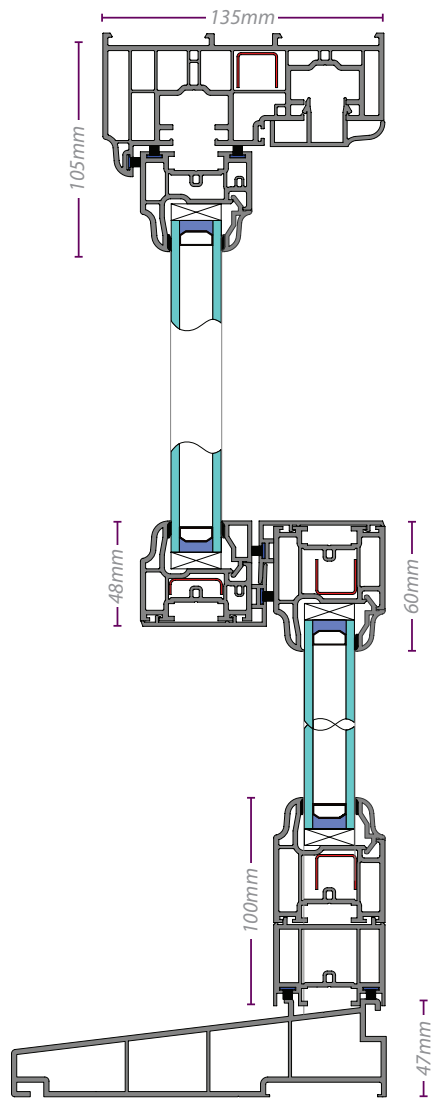
This quick turnaround is available across the whole range of nine colours enabling you to react quickly to your customers demands.

Schematics

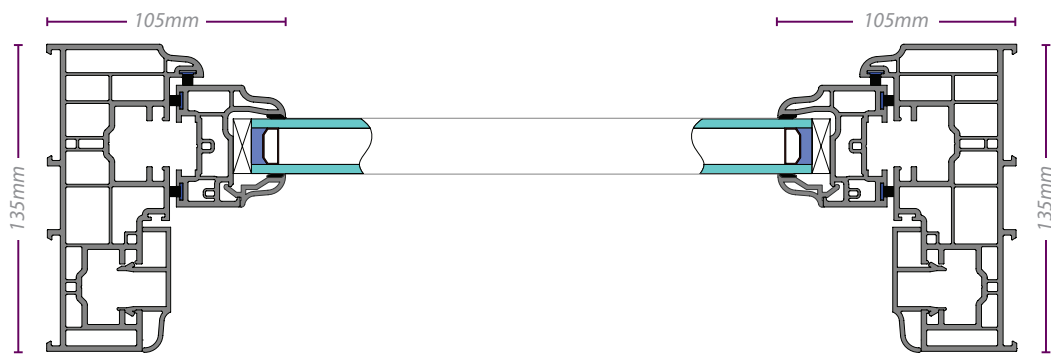
Technical drawings below showing cross sections of the Evolve VS window.



Vertical section through sash with standard sill



Vertical section through sash with DBR and non standard sill option



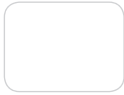
Horizontal section through top sash

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:



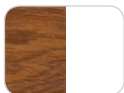
White

Woodgrain colours

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



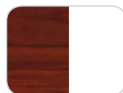
Golden Oak



Golden Oak on White



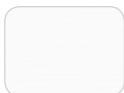
Cherrywood



Cherrywood on White

Artisan woodgrain collection

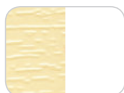
Evolve VS windows are available in the following Artisan colours and can be specified with White PVC-U on inside faces and woodgrain foiled finish on outside faces, see below:



Woodgrain White



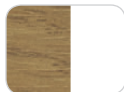
Cream



Cream on White



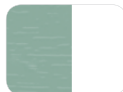
Irish Oak



Irish Oak on White



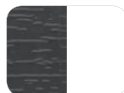
Chartwell Green



Chartwell Green on White



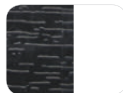
Grey



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.

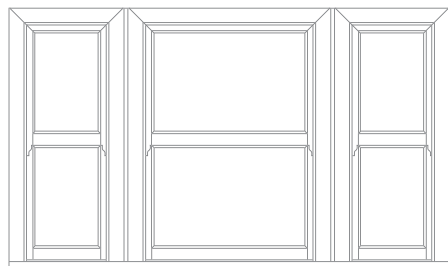
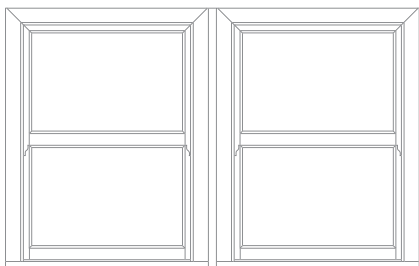
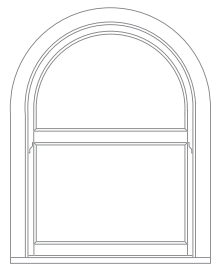
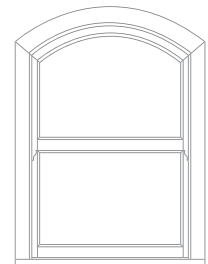
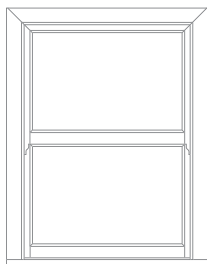
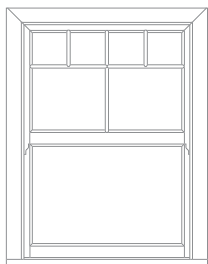
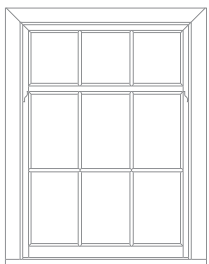
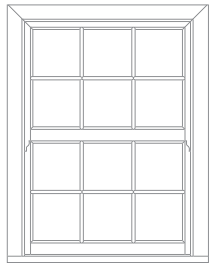
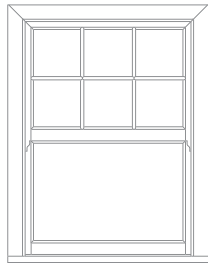
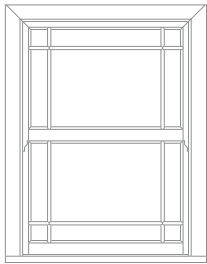
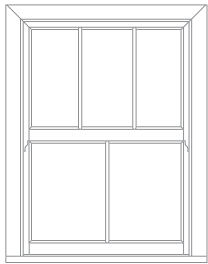
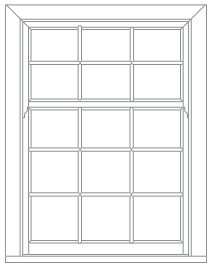
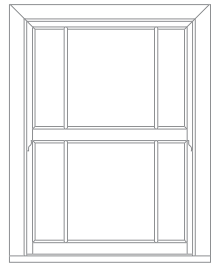
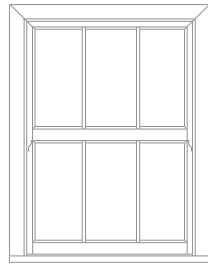
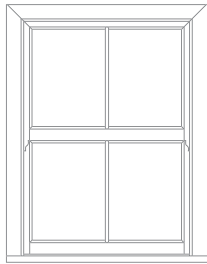
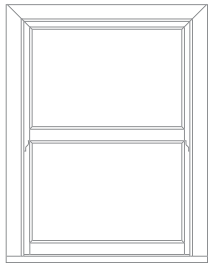
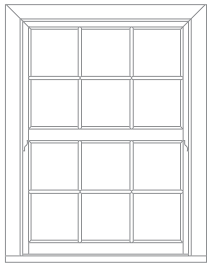


Astragal bars



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.





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



CE Marking



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 EN 14351 + A1:2010	Build Check (No.1806)	W13003-1 8 th January 2013
Acoustic performance	NPD	BS EN ISO 140-3	N/A	N/A
Thermal transmittance	1.8W/(m ² •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 7 th March 2013
Radiation properties	NPD	EN 410	N/A	N/A
Air permeability	NPD	BS EN 1026	N/A	N/A

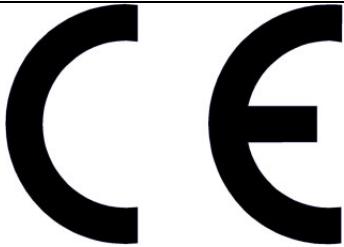
Initial type testing has been carried out by the following notified body:

*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 Marking


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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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 7 th March 2013
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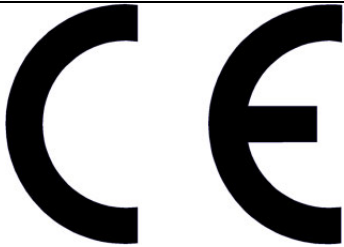
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Name: S. Musgrave
Position: Manufacturing Director
Signature:

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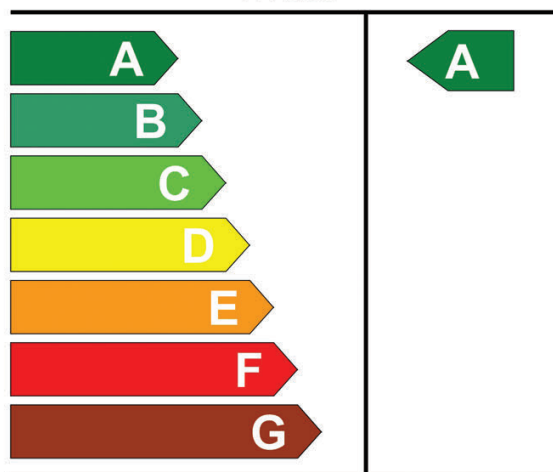
Window Energy Ratings

HERITAGE PRODUCT

Energy Window

evolvevs

Synseal
Synseal Evolve VS System
'A' Rated



Reg. No.: 3681 M705

Expiry Date: 07/2012

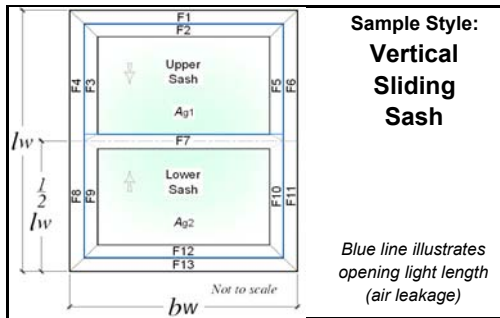
www.bfrc.org



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





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 ODP	l_w	1480 mm
Total window width ODP	b_w	1230 mm

Nominal 4mm etc to ODP , 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/(m ² ·K)
g-value - 2DP	$g_{\perp}$	0.74	

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

Window Dimensions:			Area	
Section	Length (m)	Width (m)	No gasket (m ²)	With gasket (m ²)
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)	(m ²)	(m ²)
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, A_w			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%

Solar Factor, g-value:		F_w	0.9
		g_w	0.45

U_{window}	U_w	1.43	W/(m ² ·K)
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Other parameters needed for calculation, taken from simulations:

Upper glazing: Panel thickness, $d_p = d_g = 0.024$ m

$\lambda_p = 0.035$ W/(m·K) $R_{se} = 0.04$ m²·K/W $R_{se} = 0.13$ m²·K/W

$R_p = 0.6857$ m²·K/W $R_{tot} = 0.8557$ m²·K/W $U_p = 1.1686$ W/(m²·K)

Frame dimensions:		Without gasket (mm)	Gasket protrusion (mm)	With gasket (mm)	Total
(b _f)		(mm)	(mm)	(mm)	
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	m ²	

Where a U_g 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 ODP			
		$W/(m \cdot K)$	b_p (mm)	$W/(m \cdot K)$	b_g (mm)
F1+F2 top rail		0.3703	190	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:	b_f (no gaskets) (m)	U_f (W/(m ² ·K))	Frame areas (no gaskets) (m ²)	Heat flow (W/K)	ψ (W/(m·K))	l_g (m)	Heat flow (W/K)
Section	(m)	(W/(m ² ·K))	(m ²)	(W/K)	(W/(m·K))	(m)	(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

Air Leakage loss:			
Air leakage at 50 Pa per hour & per unit length of opening light (BS 6375-1) - 2DP			
Opening light length	6.1640 m	Total air leakage	1.603 m ³ /h
L_{50}	0.88 m ³ /(m ² ·h)	Heat loss = 0.0165 L_{50}	0.01 W/(m ² ·K)

BFRC Rating kWh/(m ² ·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/(m ² ·K)	U_{window}	1.4
Solar factor	g_{window}	0.45
Window air leakage heat loss, W/(m ² ·K)	L_{factor}	0.01

Simulator Name: **Greg Tabberer**



BFRC Certified Simulator **080**

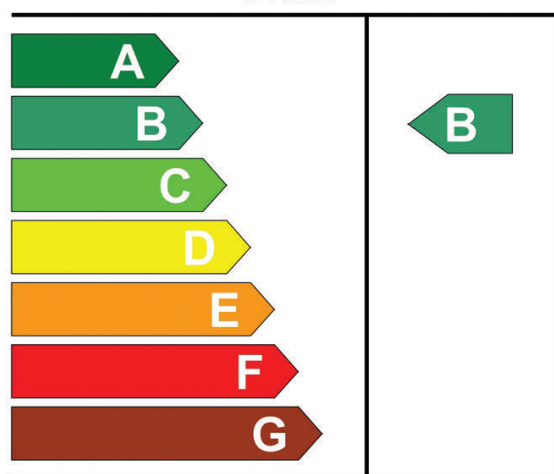
Window Energy Ratings

HERITAGE PRODUCT

Energy Window

evolvevs

Synseal
Synseal Evolve VS System
'B' Rated



Reg. No.: 3682 M705

Expiry Date: 07/2012

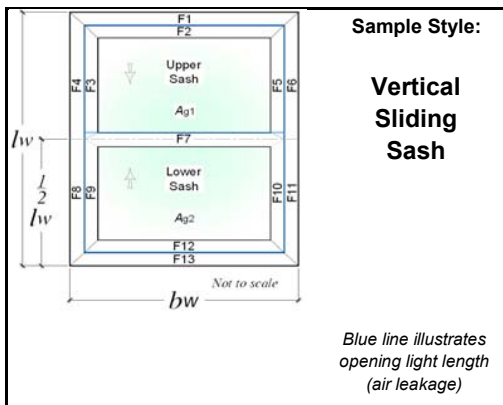
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Conservation Grade





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 ODP	l_w	1480 mm
Total window width ODP	b_w	1230 mm

Nominal 4mm etc to ODP , 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/(m ² ·K)
g-value - 2DP	$g_{\perp}$	0.71	

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

Window Dimensions:			Area, A	
	Length, l	Width, b	No gasket	With gasket
Section	m	m	m ²	m ²
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	m ²	m ²
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, A_w			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%

Solar Factor, g-value:	glazing area A_g (m ²)	1.2392
	F_w	0.9
	g_w	0.43

U_{window}	U_w	1.46	W/(m ² ·K)
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Other parameters needed for calculation, taken from simulations:

Glazing: Panel thickness, $d_p = d_g = 0.024$ m

$\lambda_p = 0.035$ W/(m·K) $R_{se} = 0.04$ m²·K / W $R_{se} = 0.13$ m²·K / W

$R_p = 0.6857$ m²·K / W $R_{tot} = 0.8557$ m²·K / W $U_p = 1.1686$ W/(m²·K)

Frame dimensions (All frame values to nearest 0.5mm, gaskets to 1DP)	Frame height, b _f (mm)			Gasket protrusion (mm)	With gasket (mm)	Total
	Combo	Internal	External			
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
	(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	m ²	

Where a U_w 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 ODP			
		$W/(m^2 \cdot K)$	b_p (mm)	$W/(m^2 \cdot K)$	b_g (mm)
F1+F2 top rail	L_f^{2D}	0.3578	190	L_{ψ}^{2D}	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:	b_f	U_f	A_f (no gasket)	Frame heat, HU	ψ	l_g	Junction heat, H_{ψ}
Section	m	W/(m ² ·K)	m ²	W/K	W/(m·K)	m	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

Air Leakage loss:			
Air leakage at 50 Pa per hour & per unit length of opening light (BS 6375-1) - 2DP			
Opening light length, $l_{opening}$	6.0340	m	Total air leakage 1.569 m ³ /h
L_{50}	0.86	m ³ /(m ² ·h)	Heat loss = 0.0165 L_{50} 0.01 W/(m ² ·K)

BFRC Rating kWh/(m ² ·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/(m ² ·K)	U_{window} 1.5
Solar factor	g_{window} 0.43
Window air leakage heat loss, W/(m ² ·K)	L_{factor} 0.01
Simulator Name:	Greg Tabberer

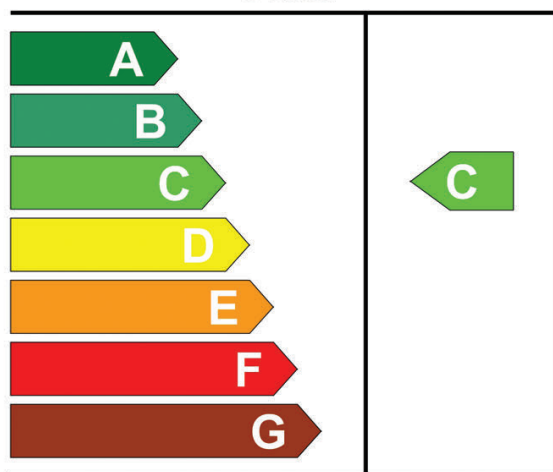
Window Energy Ratings

HERITAGE PRODUCT

Energy Window

evolvevs

Synseal
Synseal Evolve VS System
'C' Rated



Reg. No.: 3683 M705

Expiry Date: 07/2012

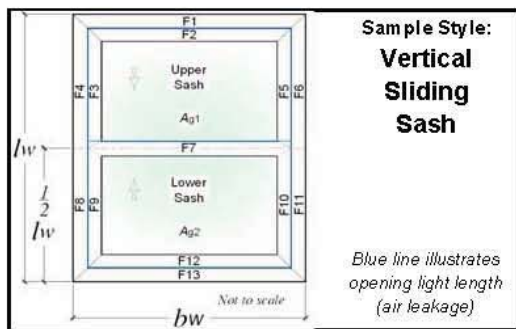
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Conservation Grade





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	0.71	

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

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, A_w			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%

Solar Factor, g-value:	F_w	0.9
	g_w	0.43

U_{window}	U_w	1.60	W/(m²·K)
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Other parameters needed for calculation, taken from simulations:
 Upper glazing: Panel thickness, $d_p = d_g = 0.024$ m
 $\lambda_p = 0.035$ W/(m·K) $R_{se} = 0.04$ m²·K/W $R_{se} = 0.13$ m²·K/W
 $R_p = 0.6857$ m²·K/W $R_{tot} = 0.8557$ m²·K/W $U_p = 1.1686$ 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	62.5	0.0	62.5	62.5
	(upper gasket)		0.0		
	(lower gasket)				
	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	

Where a U_g 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	0.3703	190		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	L_{ψ}^{2D}	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:	b_f (no gaskets)	U_f	Frame areas (no gaskets)	Heat flow	ψ	l_g	Heat flow
Section	(m)	(W/(m²·K))	(m²)	(W/K)	(W/(m·K))	(m)	(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

Air Leakage loss:			
Air leakage at 50 Pa per hour & per unit length of opening light (BS 6375-1) - 2DP			
Opening light length	6.1640 m	Total air leakage	1.603 m³/h
L_{50}	0.88 m³/(m²·h)	Heat loss = 0.0185 L_{50}	0.01 W/(m²·K)

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

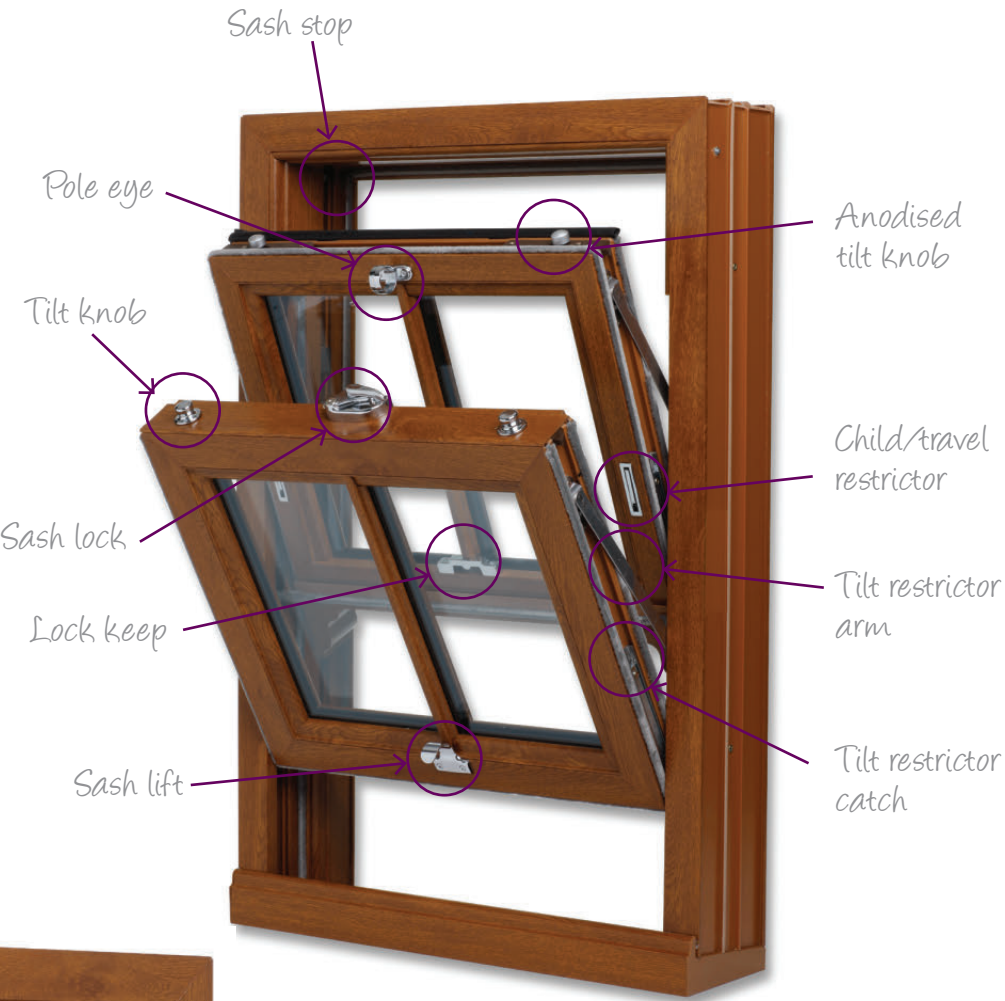
BFRG Rating =	
218.6 g_{window} - 68.5 × (U_{window} + Effective L_{50}) =	-16.29
Climate zone is: UK	
Thermal transmittance, W/(m²·K)	U_{window} 1.6
Solar factor	g_{window} 0.43
Window air leakage heat loss, W/(m²·K)	L_{factor} 0.01
Simulator Name: Greg Tabberer	

British
 Registration
 Rating
 Council

BFRG Certified
 Simulator **080**

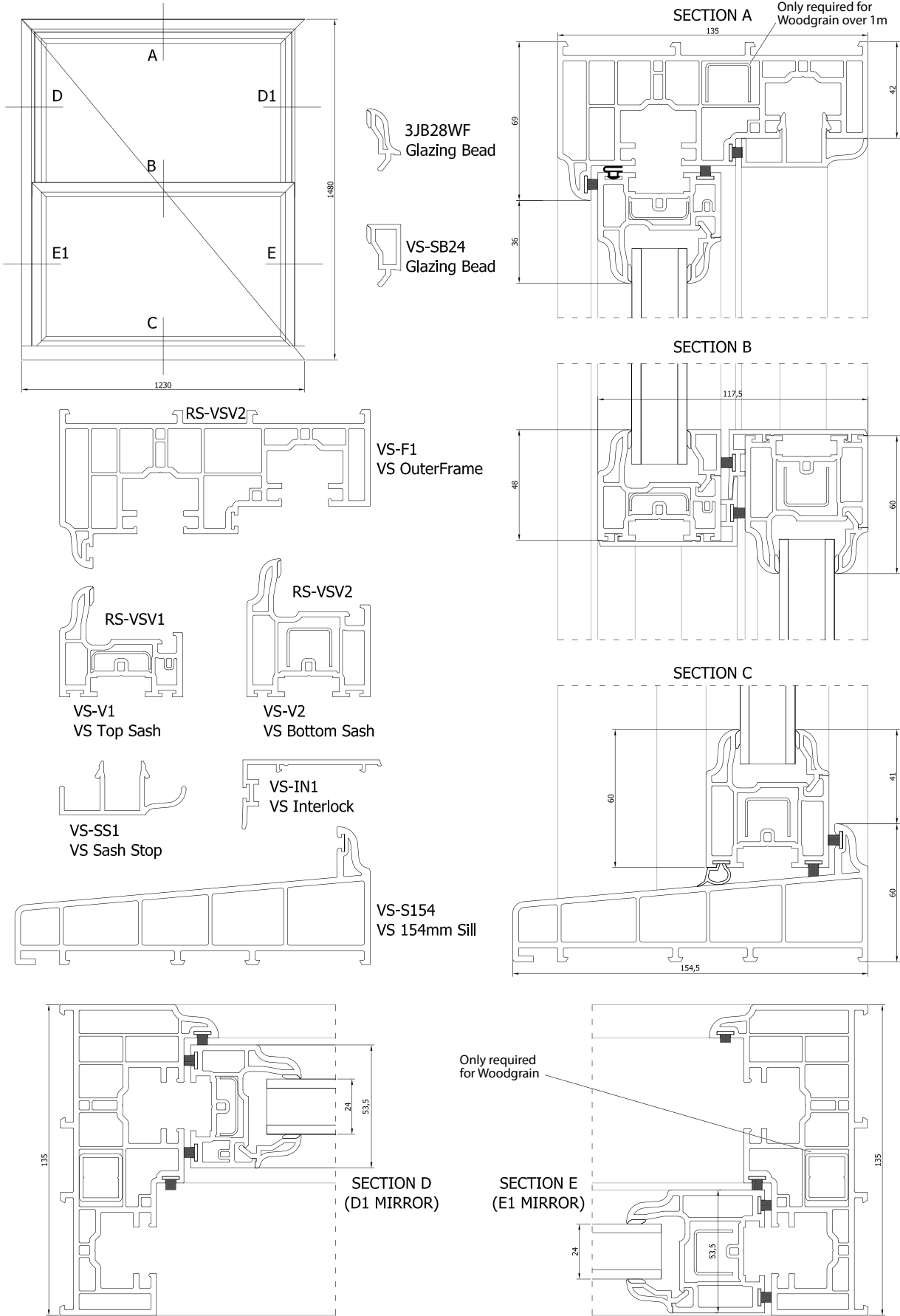
Vertical Slider Anatomy

Internal view

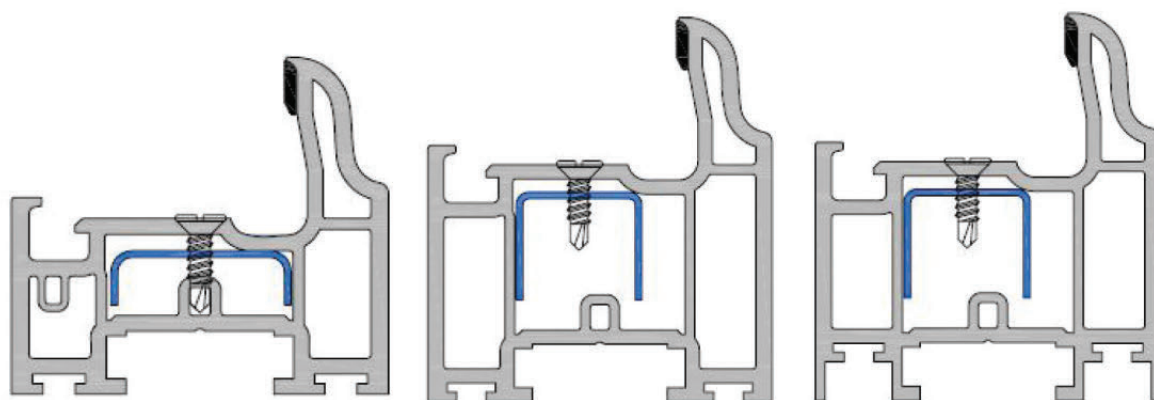


External view

Components



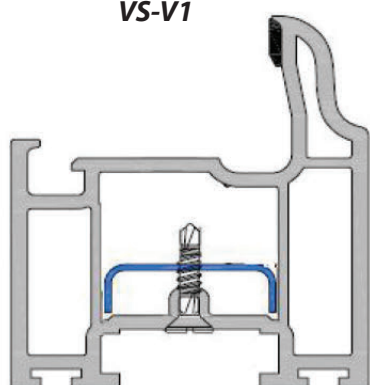
Reinforcing guidelines



VS-V1

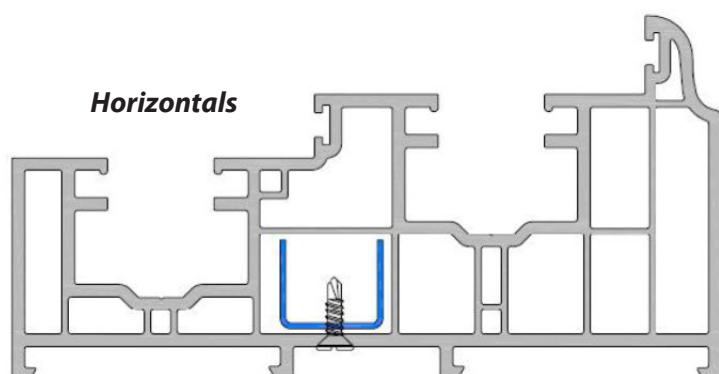
VS-V2

VS-V3

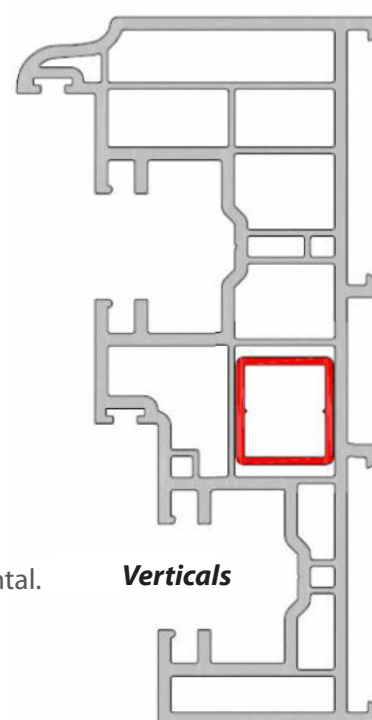


VS-V2 (trickle vent)

- 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

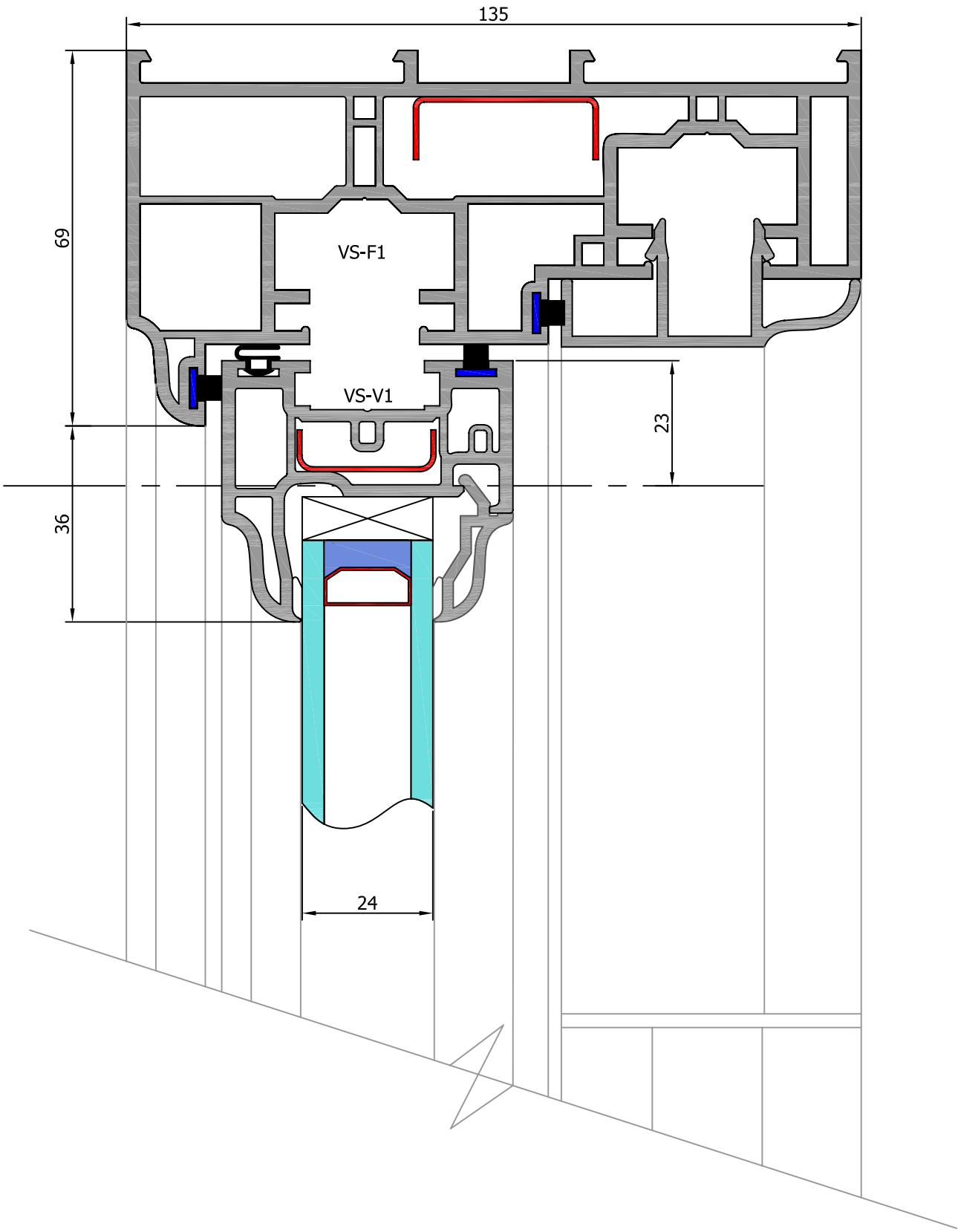


Verticals

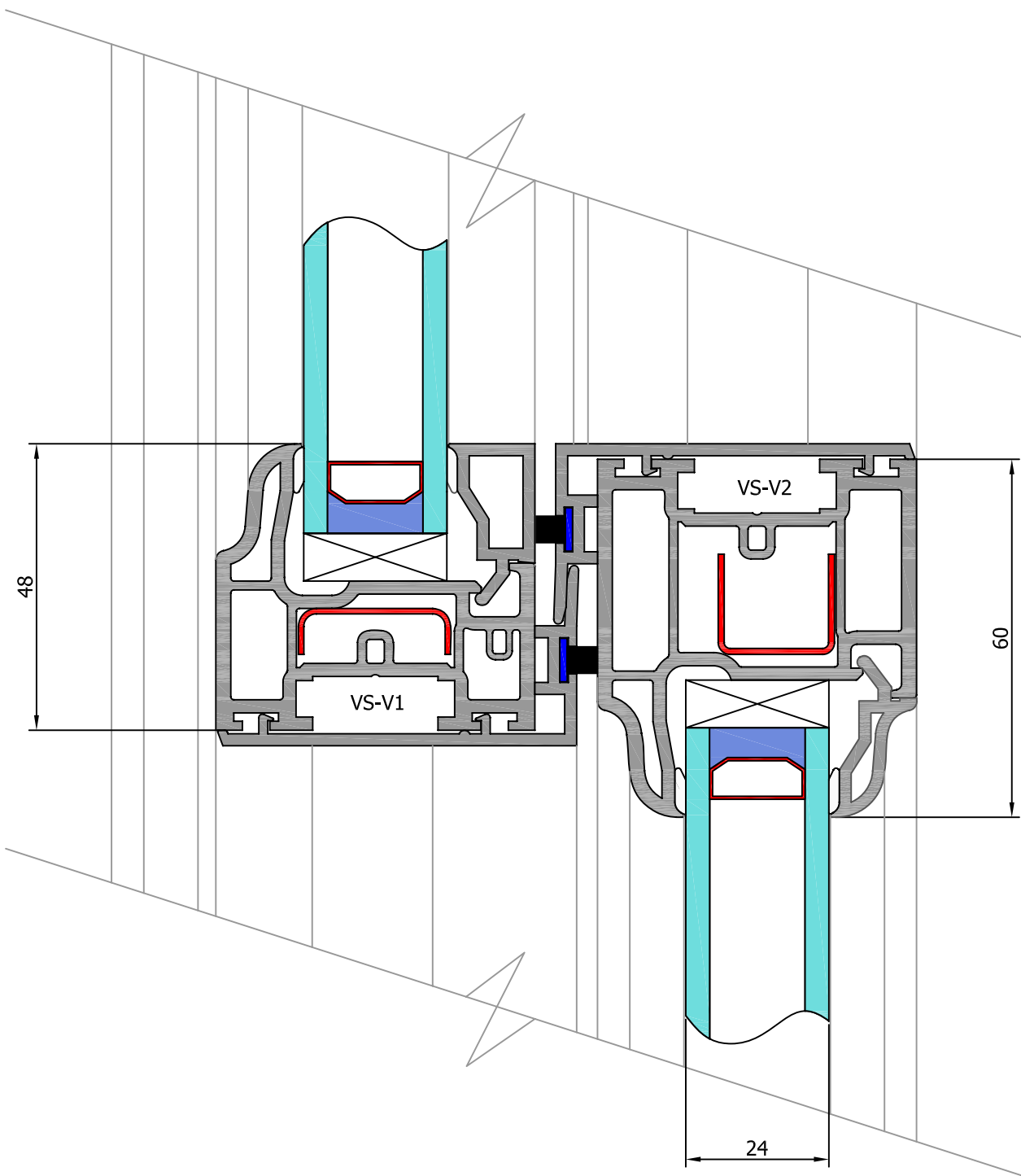
Frames are reinforced when:

- 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.

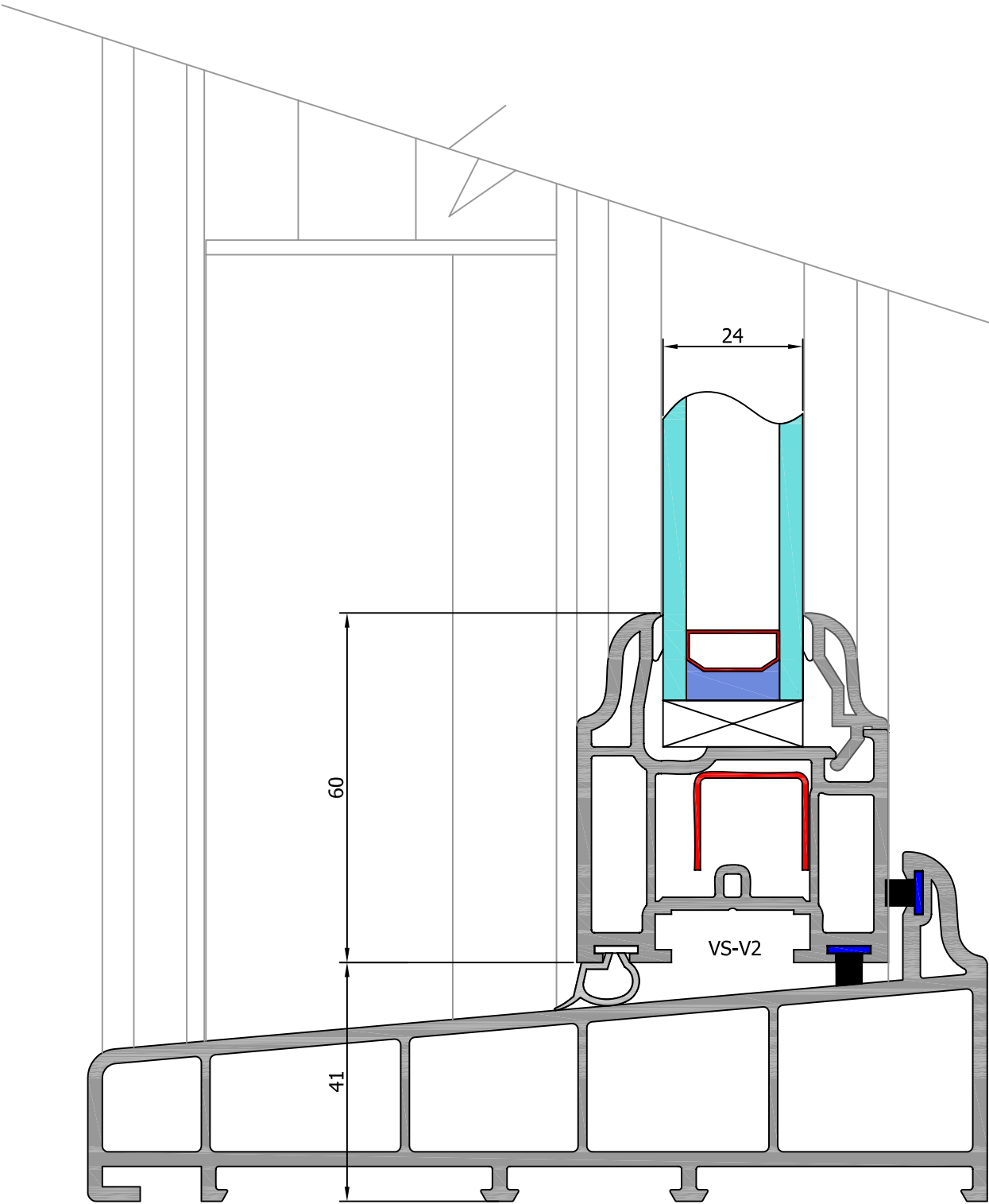
Frame and Top Sash Cross Section



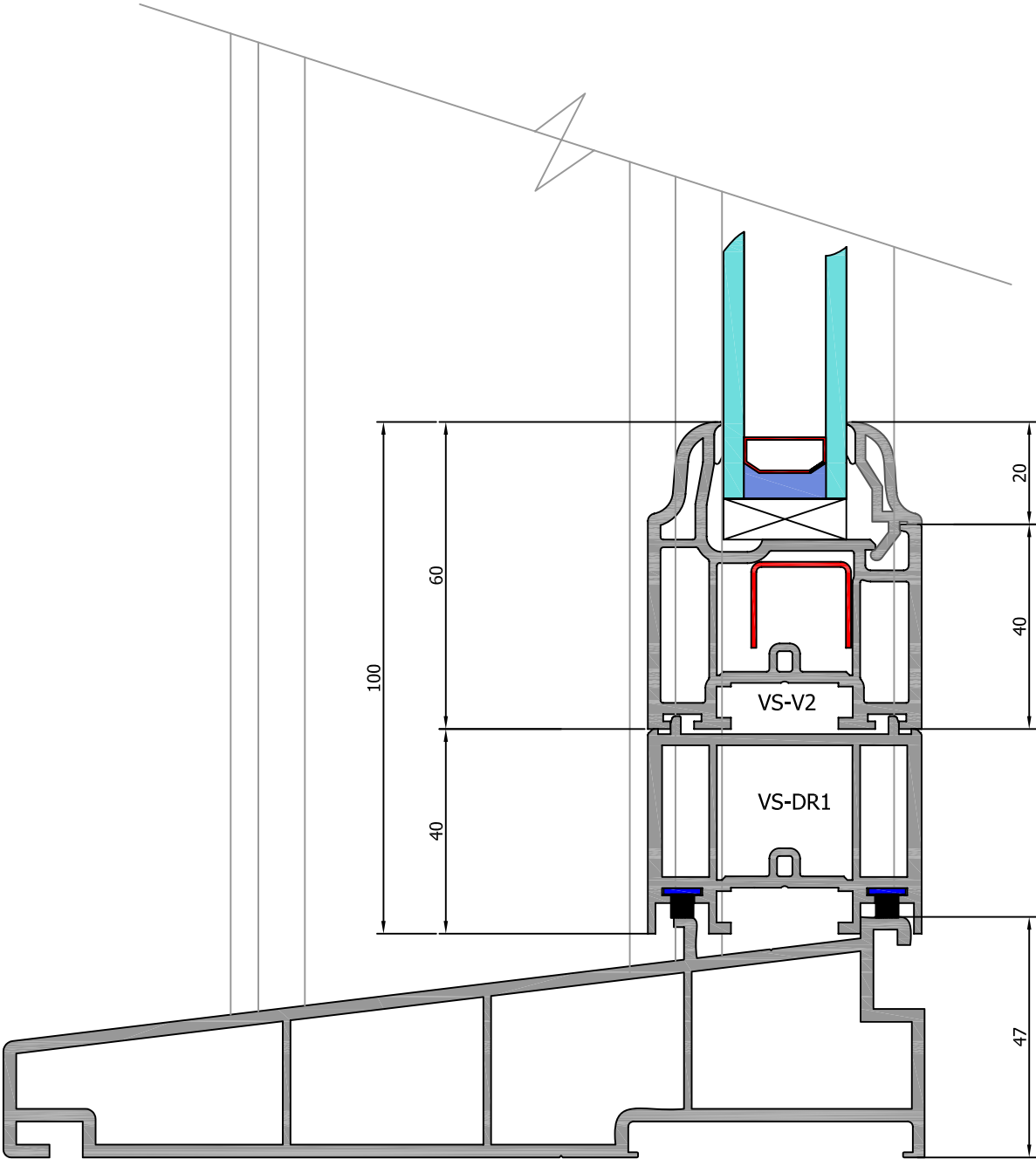
Meeting Rail Cross Section



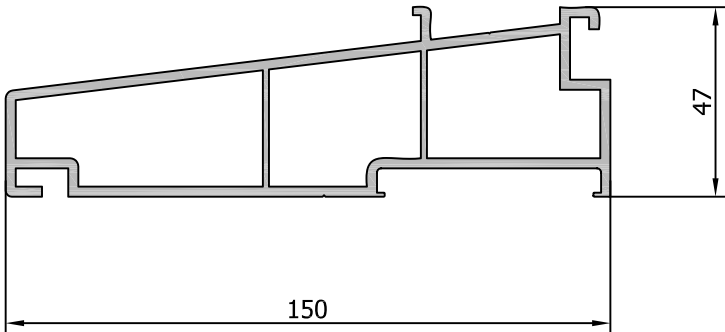
Standard 154mm Cross Section



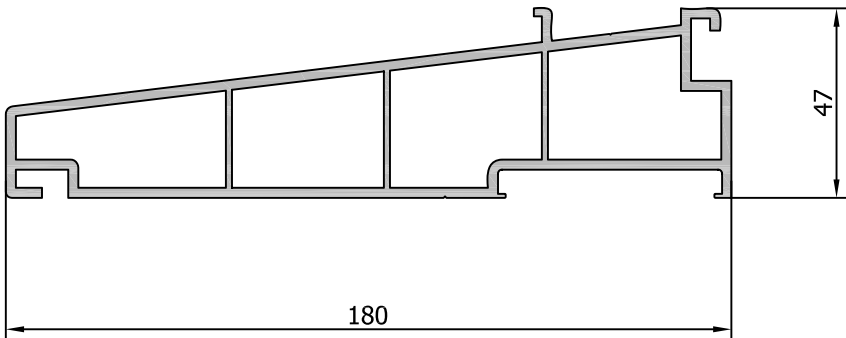
Non Standard Sill with DBR Cross Section



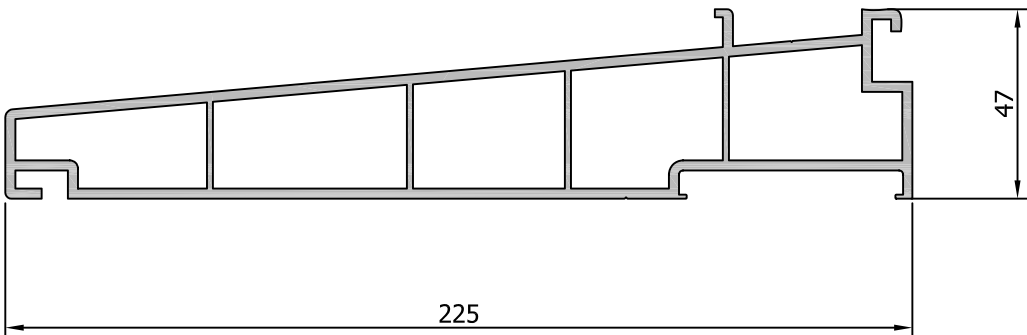
Non Standard Sills



3S150 - 150mm Vertical Slider Sill

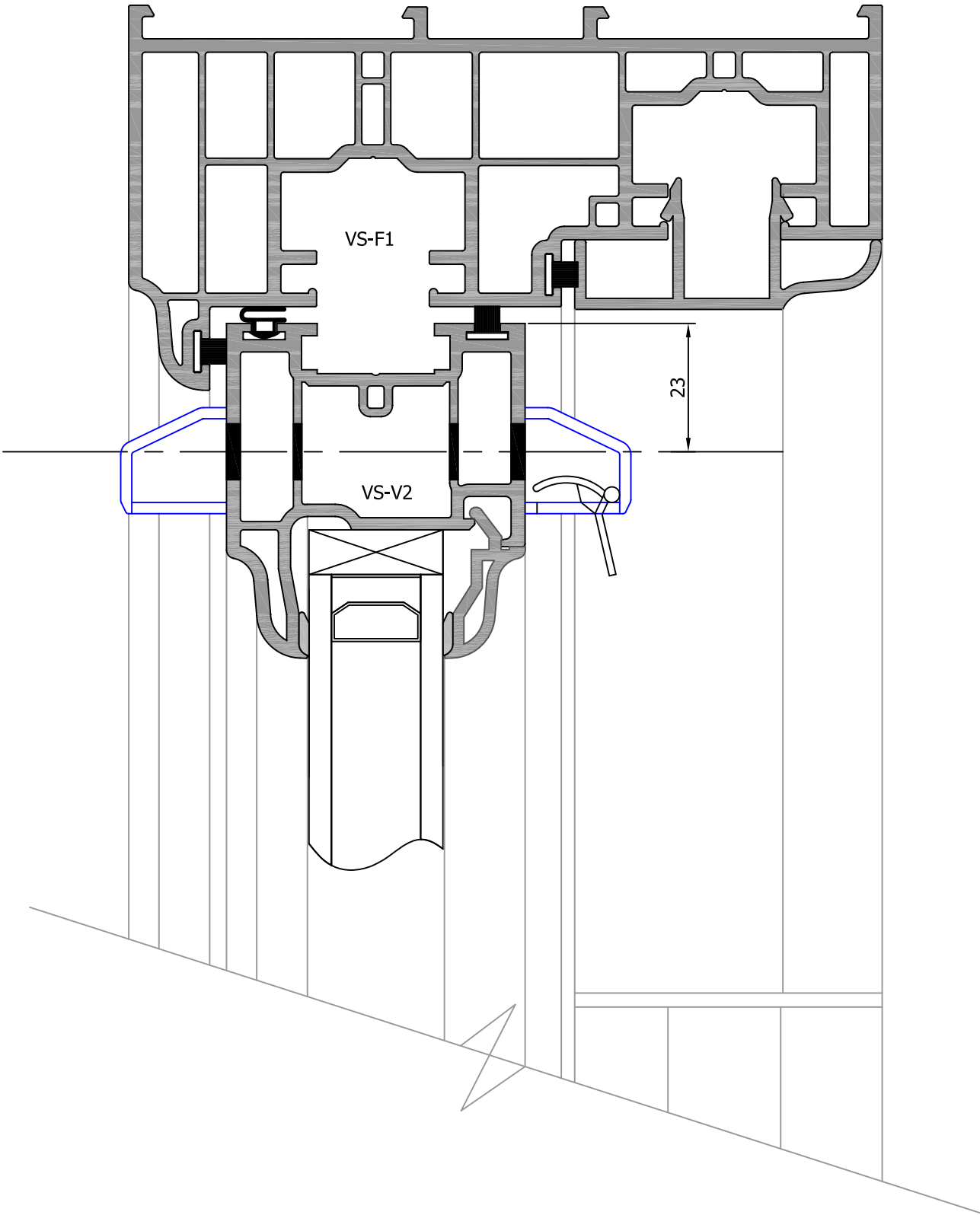


3S180 - 180mm Vertical Slider Sill

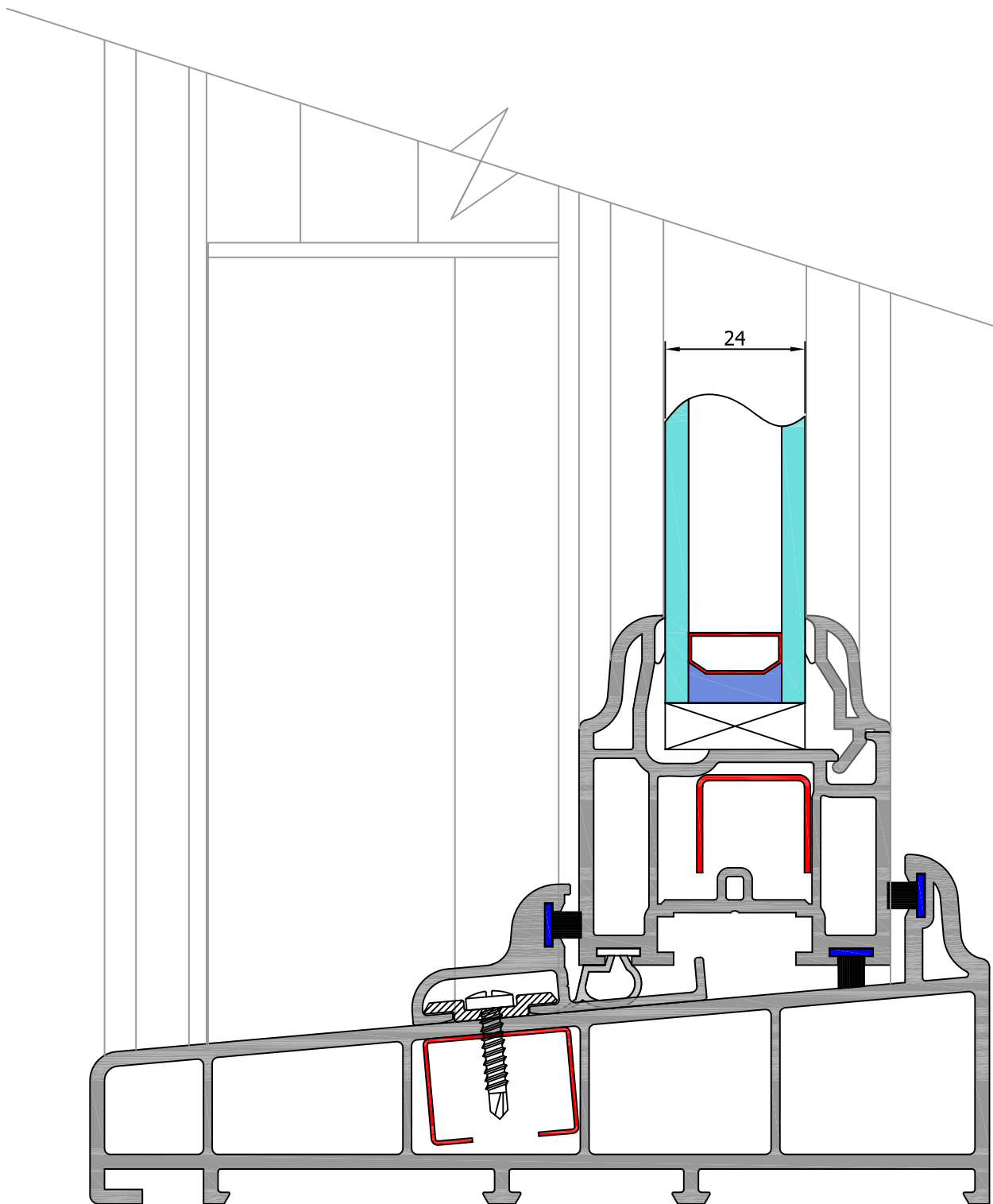


3S225 - 225mm Vertical Slider Sill

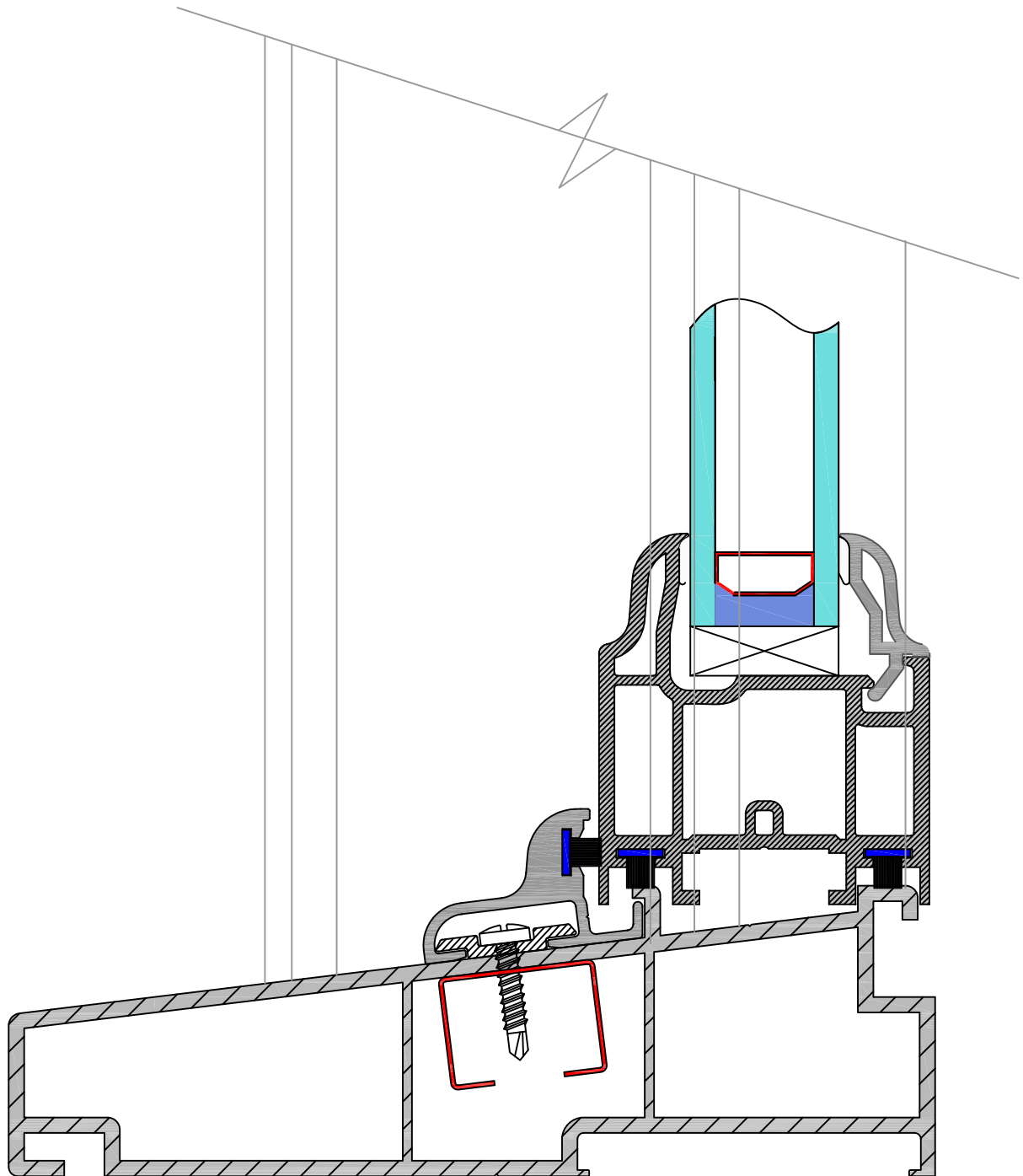
Trickle Vent Cross Section



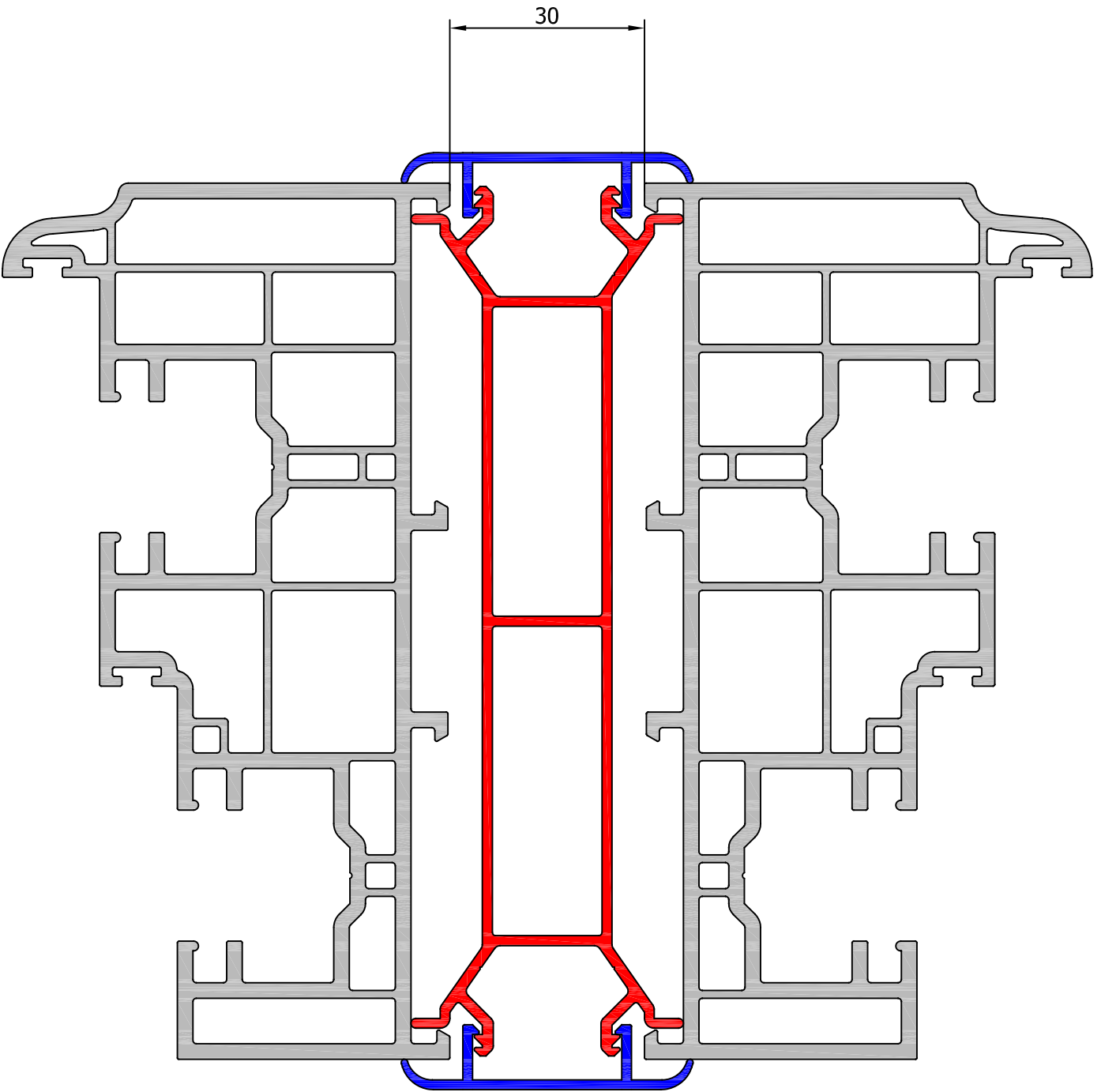
Aluminium security bar on standard cill



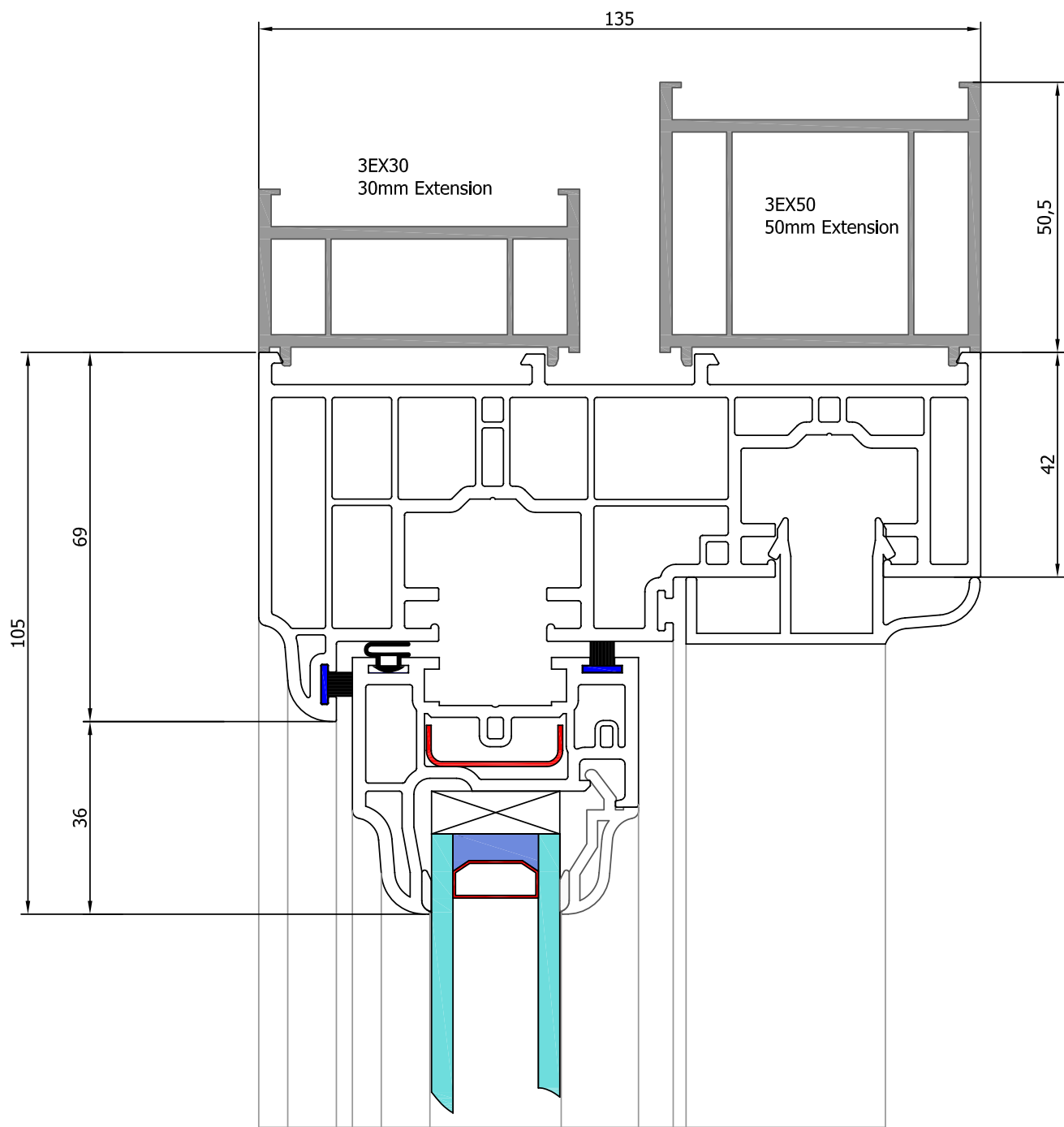
Aluminium security bar on non standard cill



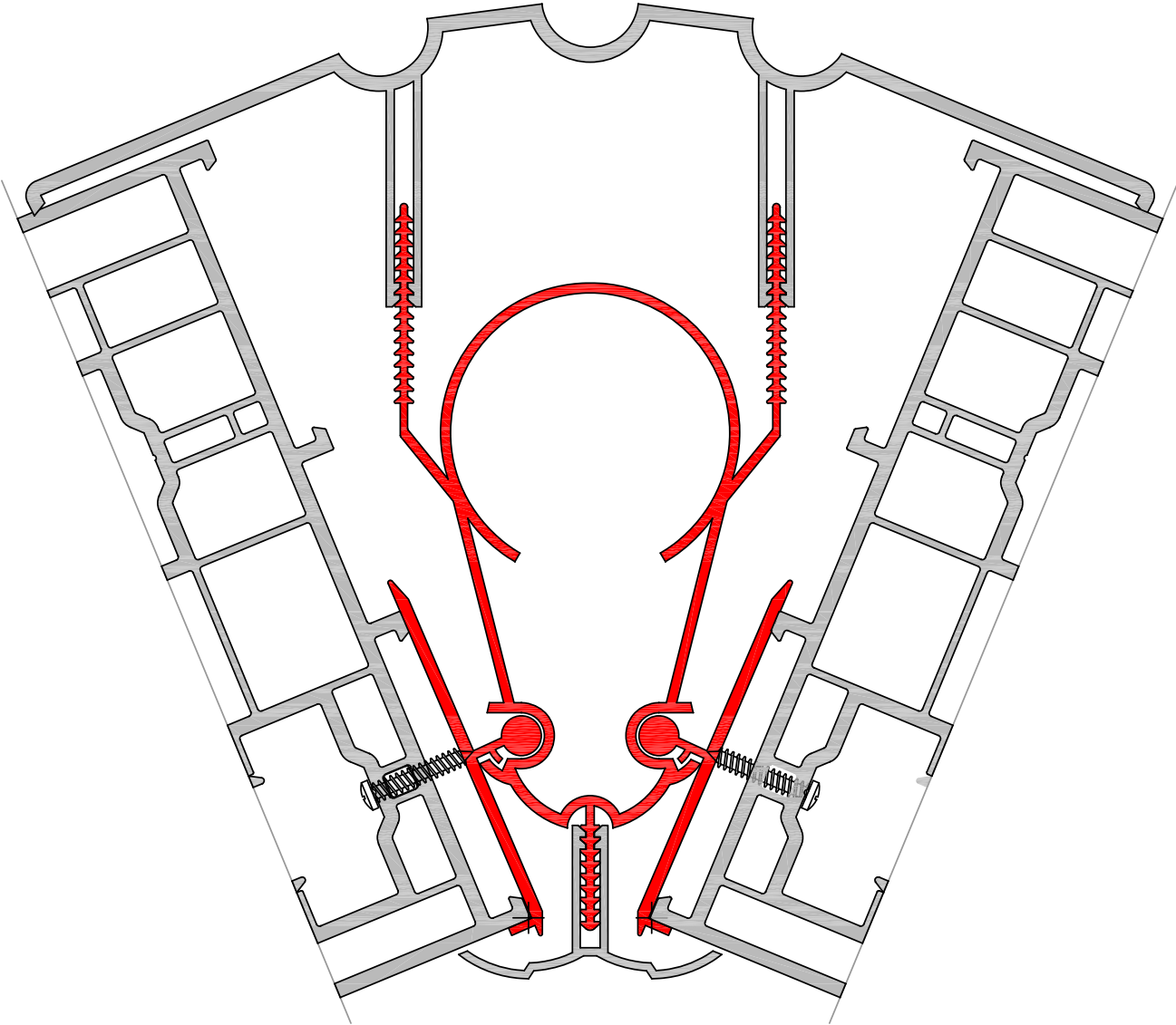
30mm Coupler Cross Section



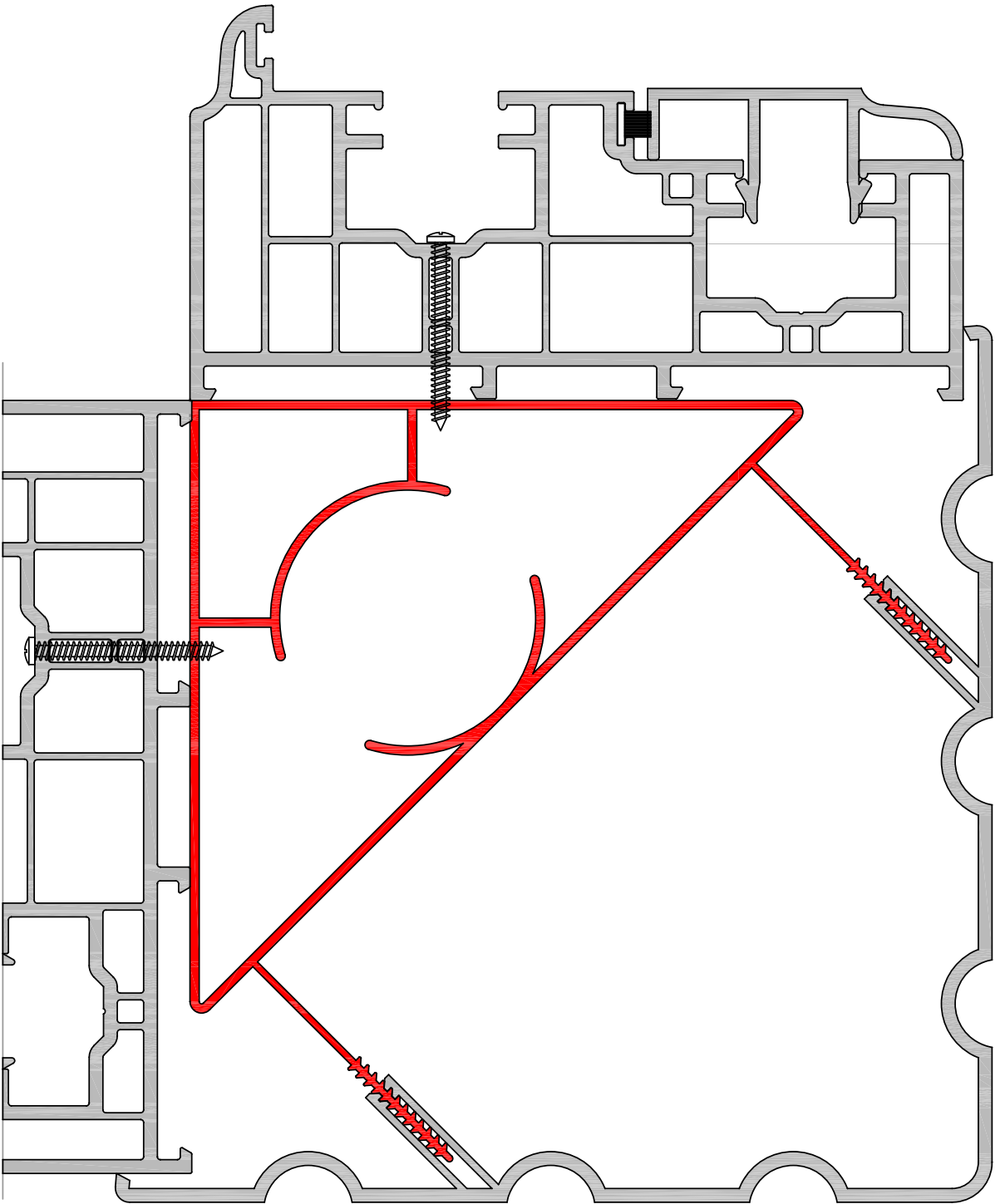
30mm and 50mm Add-on



Variable Angle Bay Pole Detail



90 Degree Bay Pole Detail



Bay Pole Deductions and Loads

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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