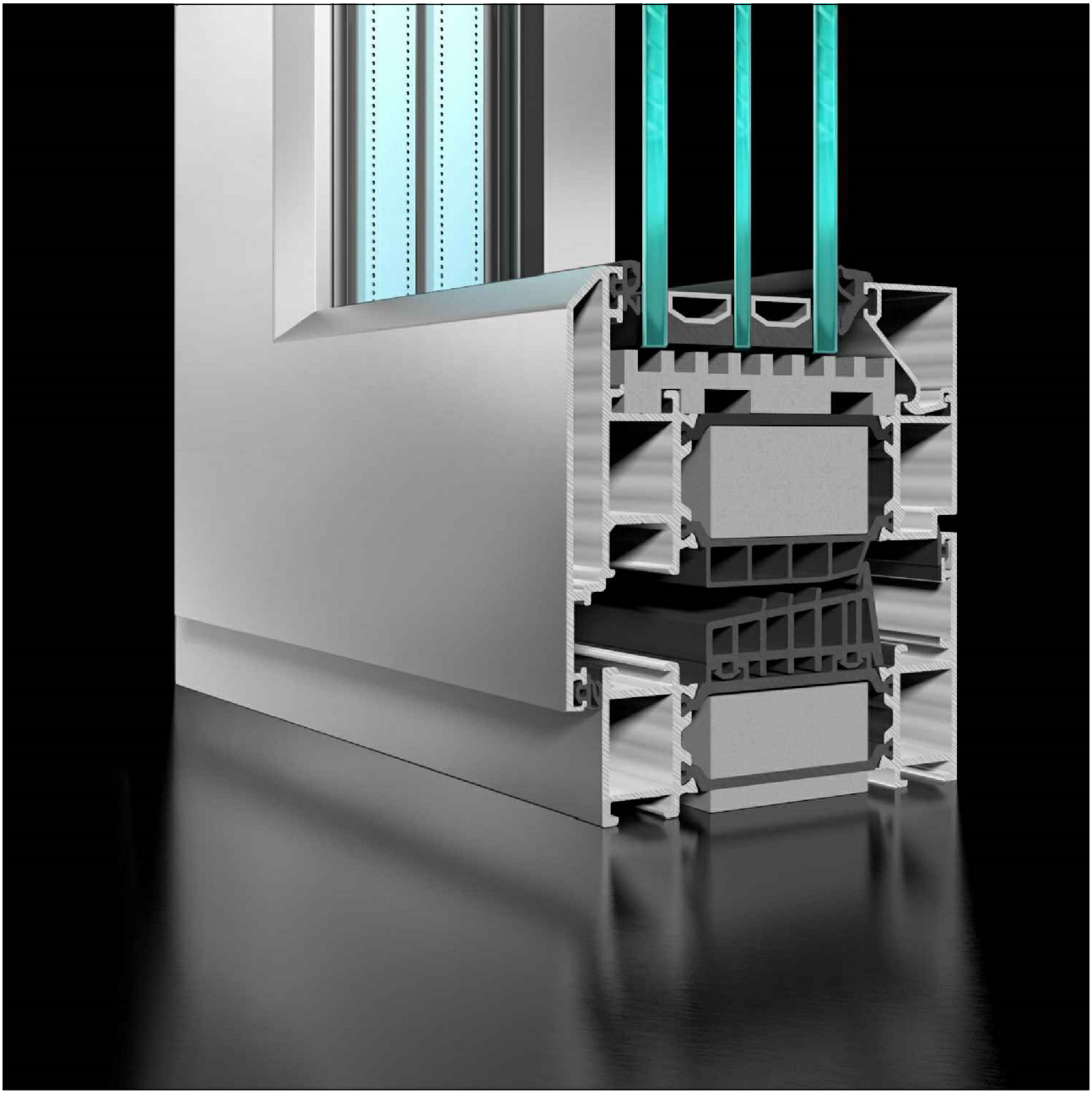
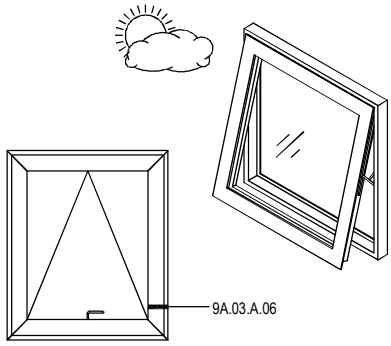
APA ST90 - Window Suite
Architectural Manual

APA FACADE SYSTEMS



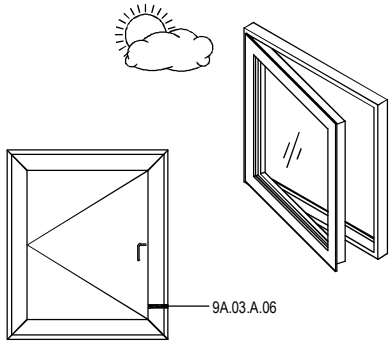
Top Hung- outward opening casement window

• Uw Whole window value:	ST90 0.74 W/m² K	EN ISO 10077-1
• Uf Frame value:	ST90 1.0 W/m² K	EN ISO 10077-2
• Air:	Class 4	BS 6375-1:2009
• Water:	Class E1050	BS 6375-1:2009
• Wind:	Class A5	BS 6375-1:2009
• Operating Forces:	Class 1	BS 6375-2:2009
• Mechanical strength:	Class 3	BS 6375-2:2009
• Repeated opening & closing (30,000):	Class 3 (Heavy Duty)	BS 6375-2:2009
• Security Classification:	Certisecure	PAS 24:2012
• Maximum Size	1450x1500mm (contact APA Facade Systems technical department for sizes over and above)	



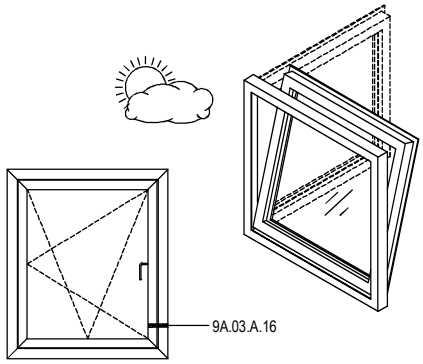
Side Hung- outward opening casement window

• Uw Whole window value:	ST90 0.74 W/m² K	EN ISO 10077-1
• Uf Frame value:	ST90 1.0 W/m² K	EN ISO 10077-2
• Air:	Class 4	BS 6375-1:2009
• Water:	Class E1050	BS 6375-1:2009
• Wind:	Class A5	BS 6375-1:2009
• Operating Forces:	Class 1	BS 6375-2:2009
• Mechanical strength:	Class 3	BS 6375-2:2009
• Repeated opening & closing (30,000):	Class 3 (Heavy Duty)	BS 6375-2:2009
• Security Classification:	Certisecure	PAS 24:2012
• Maximum size	900x1450mm (contact APA FACADE SYSTEMS technical department for sizes over and above)	



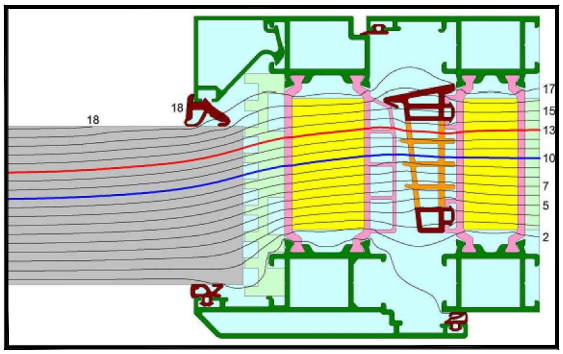
Tilt & Turn- inward opening window

• Uw Whole window value:	ST90 0.74W/m² K	EN ISO 10077-1
• Uf Frame value:	ST90 1.0W/m² K	EN ISO 10077-2
• Air:	Class 4	BS 6375-1:2009
• Water:	Class E1050	BS 6375-1:2009
• Wind:	Class A5	BS 6375-1:2009
• Operating Forces:	Class 1	BS 6375-2:2009
• Mechanical strength:	Class 3	BS 6375-2:2009
• Repeated opening & closing (10,000):	Class 3	BS 6375-2:2009
• Security Classification:	Certisecure	PAS 24:2012
• Maximum size	1500x2100mm (contact APA FACADE SYSTEMS technical department for sizes over and above)	



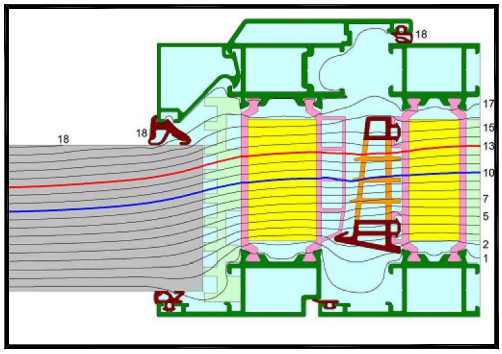
Thermal Performance

ST90 ESPAG



Uf = 1.0 W/m²K

ST90 TILT & TURN



Uf = 1.0 W/m²K

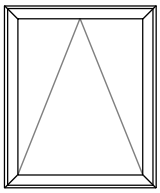
U_w Simulation of profiles in accordance to EN ISO 10077-2

U_f Calculation of windows in accordance to EN ISO 10077-1

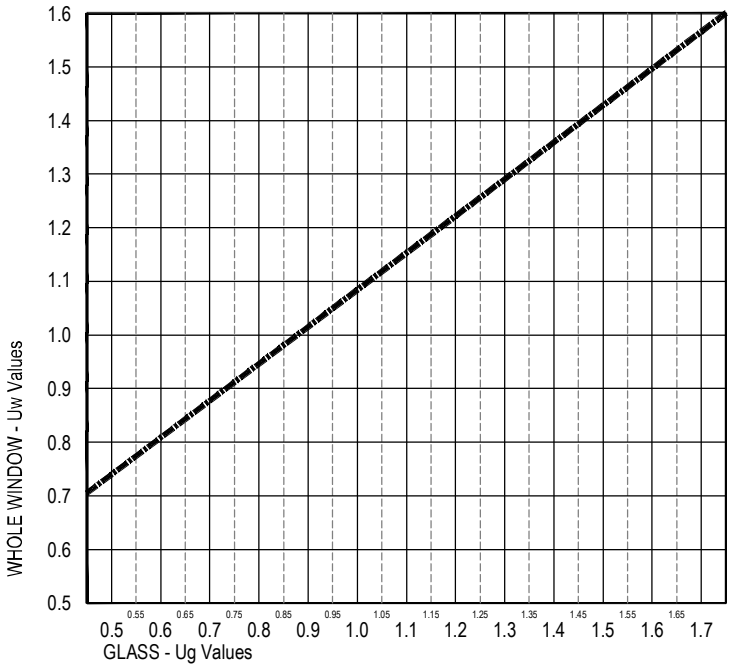
Note

When comparing different systems for their thermal properties,a U value is given for standard window size of 1.23 X 1.48m (Type L2). This doesn't represent a project and an actual project report should be issued providing the actual U value for each position and finally the sum of all positions (the weighted U-value)

Whole window Uw Values
(L2 Type window 1230mm x 1480mm)



Glass Values 0.5 to 1.7W/m²K
Ψ-value = 0.039 W/mK

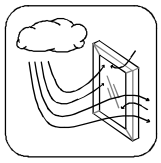
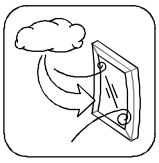


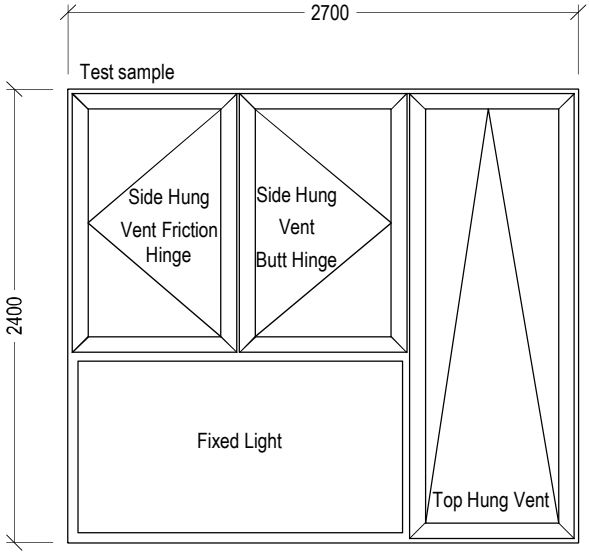
DATE:	REVISION:	TITLE:	SYSTEM:			
24-10-2019	0	Thermal Performance	ST90 Window Suite	1:1	A4	9A.01.A.01

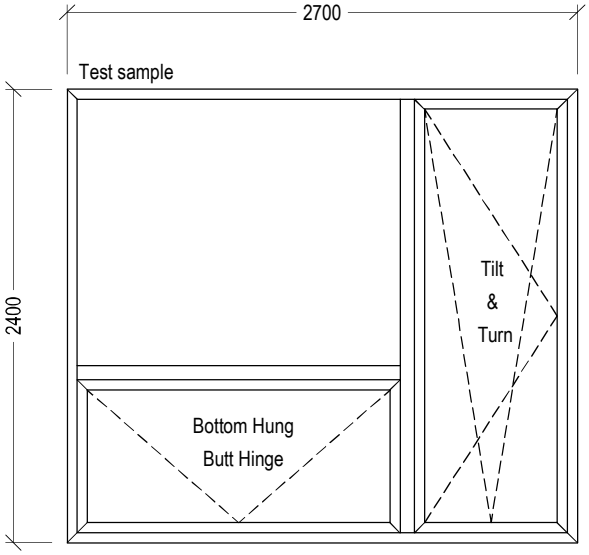
Weather Performance

BS 6375-1:2009. Part 1: Classification for weathertightness

The purpose of BS 6375-1 is to measure the air permeability, watertightness and wind load resistance respectively.

		
Air Permeability	Watertightness	Wind Load Resistance
Class 4 for the average of positive & negative test result	**Class E1050**	P1 = 2000Pa P2 = 1000Pa P3 = 3000Pa Met requirements for **class A5**



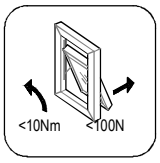


DATE:	REVISION:	TITLE:	SYSTEM:			
24-10-2019	0	Weather Performance	ST90 Window Suite	1:1	**A4**	9A.01.A.02

Operational Performance

BS 6375-2:2009. Part 2: Classification for operation and strength characteristics

Defines the performance Class for operating forces, mechanical strength, load-bearing capacity of safety devices, impact resistance and repeated opening and closing

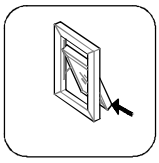


Operating Forces

Class 1

Lever handle operation <10Nm

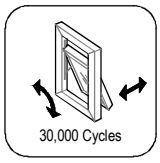
Movement of vent <100N



Mechanical strength

Class 3

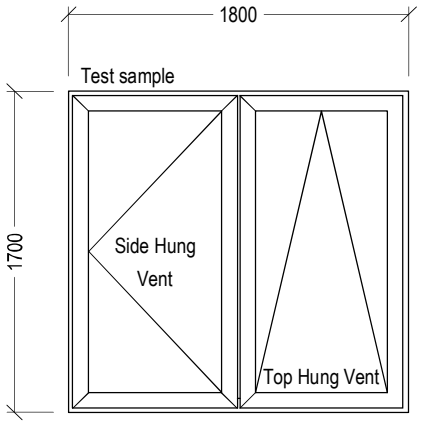
No damage or permanent deformation & remain functional

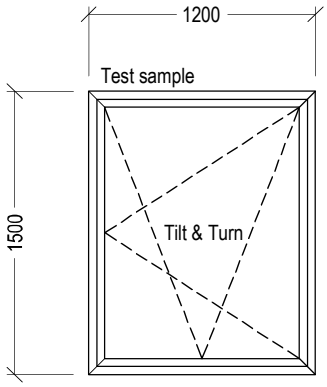


Resistance to repeated opening & closing

Class 3 (Heavy Duty)

Maintain fit for purpose after 30,000 cycles

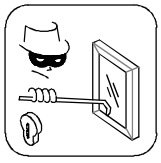




DATE:	REVISION:	TITLE:	SYSTEM:			
24-10-2019	0	Operational Performance	ST90 Window Suite	1:1	**A4**	9A.01.A.03

Security Classification

PAS 24: 2012: Enhanced security performance requirements for doorsets and windows



Security Classification

Certisecure

Certificate
No CS 5023 - Casement

Certificate
No CS 5023 - Tilt & Turn

Manipulation Test

Multiple attempts to open the windows are made with progressive hand tools for approx. 5 to 6 minutes.

Glazing removal test.

Manual: For approximately 3 minutes hand tools (small and large chisels) are used to try and remove the glazing to gain entry.

Mechanical: 200Kgs load is applied to each corner of the glazing.

Mechanical load test

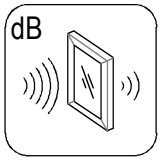
A 100Kgs parallel load is applied in each of the opposing directions plus a 300Kgs perpendicular load is applied to all of the locking point including the hinges. No entry should be gained after the sequence of applied loads. This particular test sample was subject to 10 load tests per opening sash.

Manual check test

Subsequent to the mechanical load test the window is attacked with 2 levers around the perimeter to try and open the window.

Acoustic Performance

BS EN ISO 140-3:1995: Acoustics. Measurement of sound insulation in buildings and building elements



Acoustic Performance

Example Only.

Glass	Reduction	Total
37 dB	0 dB	**37 dB**
40 dB	- 2 dB	**38 dB**
44 dB	- 4 dB	**40 dB**

Project testing required.

In heavy weight walls the window will usually be the weakest component. It is an industry standard and has being shown in laboratory & field measurement that when using glazing with a Rw up 37 dB the window frame has an insignificant effect on the sound insulation and therefore the glazing can be adopted as representative the whole window.

It is prudent to evaluate a window that requires a higher Rw.

Care should also be taken when using data from a standard size test sample (example type L2 - 1.23x1.48) changes in the window design (size & shape) will have an effect on the acoustic performance, therefore it is important to project test for a valid evaluation.

Ventilation: Physical Free Area

Top / Side Hung- outward opening casement window

The calculation for the physical free area is the WRO (window restricted opening) multiplied by the width of the handle side of the opening vent.

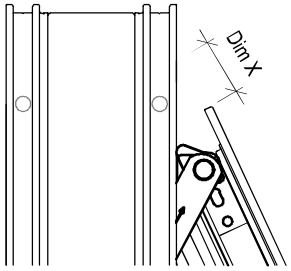
Example

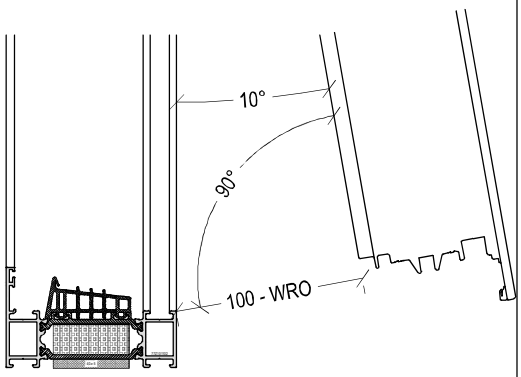
Size 1m*1m

WRO = 100mm

Width x WRO = Physical free area

1m x 0.1m = 0.1m²





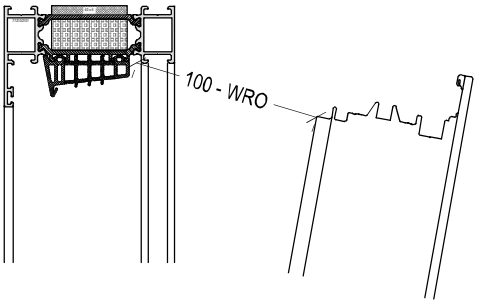
Note : The max WRO is restricted by the angle of opening. See hinge tables for max opening angles.

When the vent is open more that 25° there is a physical free area available at the hinge side of the vent (see Dim X). NA to Egress Hinges

25° = 20mm 30° = 30mm

Tilt & Turn - Inward opening window

The calculation for the physical free area is the WRO multiplied by the width of the topside of the opening vent.



Example

Size 1m*1m

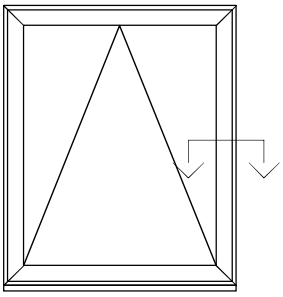
WRO = 100mm

Width x WRO = Physical free area

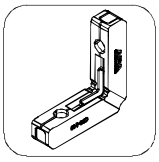
1m x 0.1m = 0.1m²

Note: The standard arm for tilt and turn gives a physical free area of 100mm

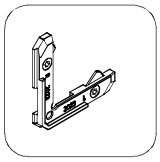
Internal structure must also be taken into consideration.



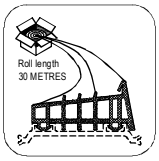
70AC08140
CORNER CLEAT



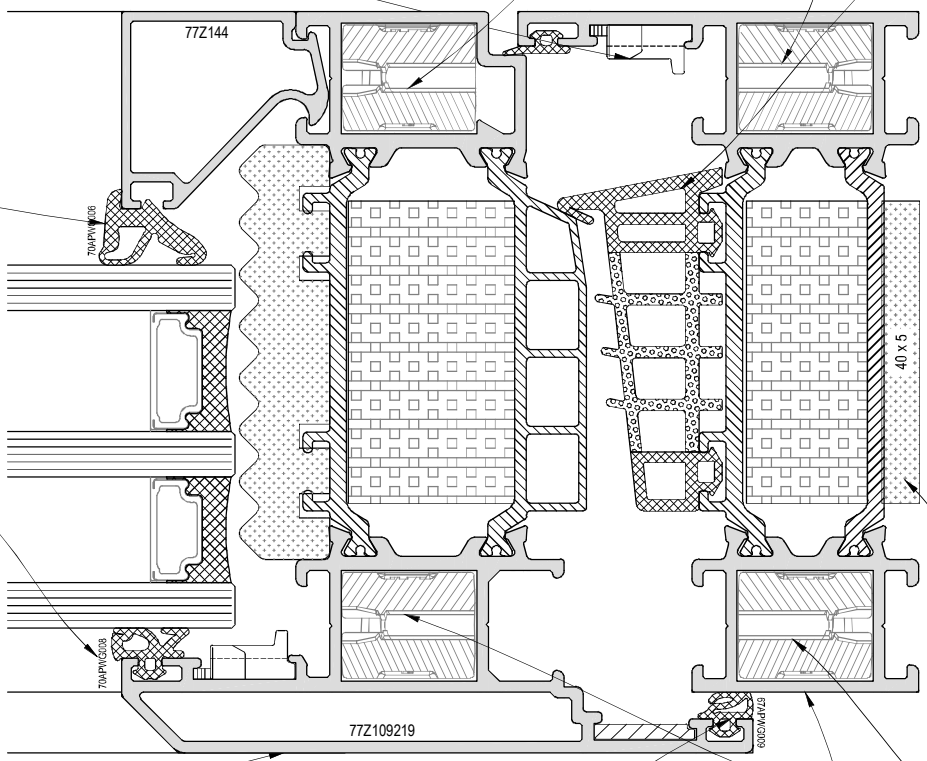
70AC052023
CORNER CHEVRON



70APWG025
CENTRE SEAL GASKET

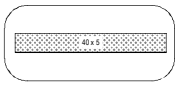


70APWG006
INT. GLAZING WEDGE

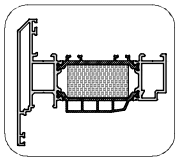


70APWG008

77A601170
ADHESIVE BACKED PE FOAM

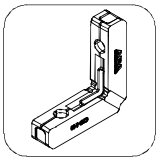


77ZS109219
TEE ESPAG SASH

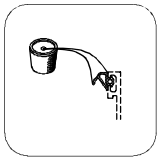


Certisecure

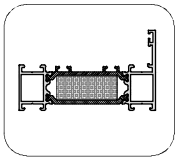
70AC08140
CORNER CLEAT



67APWG009
4mm WEATHER STRIP

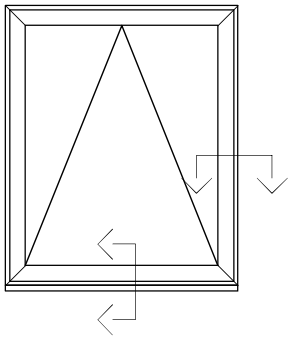


77ZS101102
OUTER FRAME



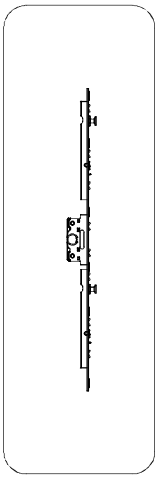
ESPAG SASH IN OUTER FRAME

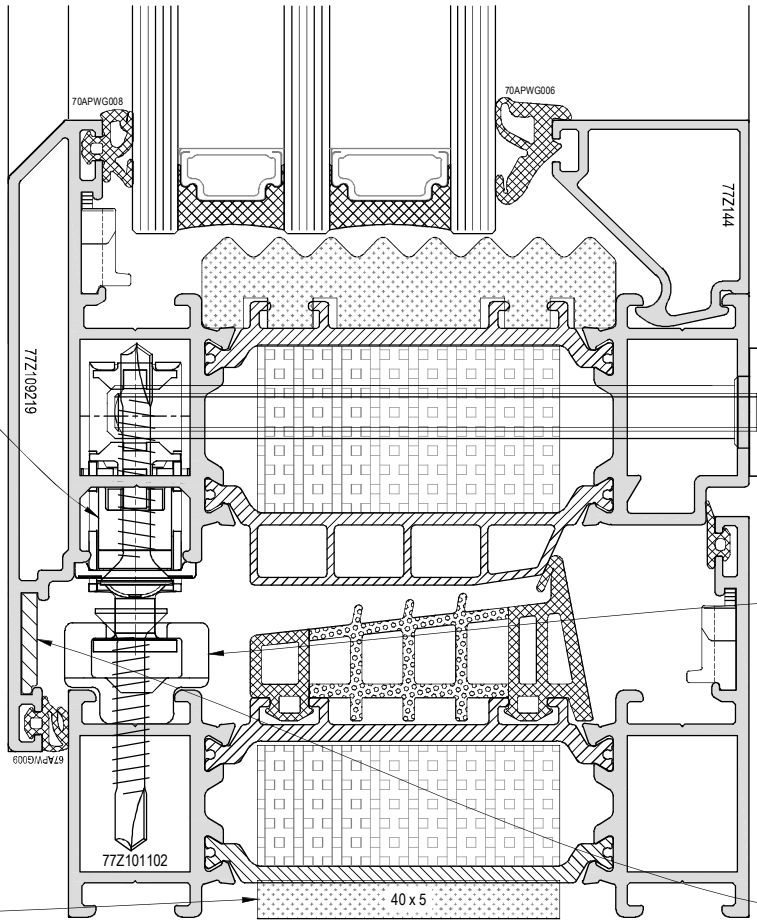
DATE:	REVISION:	TITLE:	SYSTEM:			
24-10-2019	0	General Cross Section	ST90 Window Suite	1:1	A4	9A.03.A.05



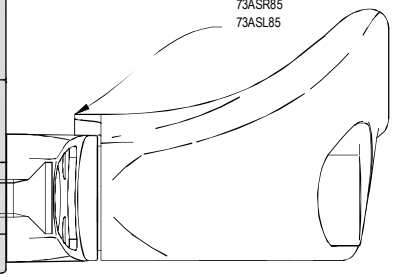
Certisecure

TRIDENT ESPAG
70A 22 GR30
70A 22 GR45
70A 22 GR65
70A 22 GR105
70A 22 GR125

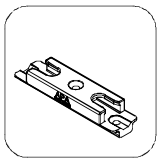




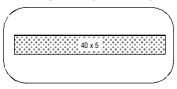
HANDLE
73ABR85
73ABL85
73ASR85
73ASL85



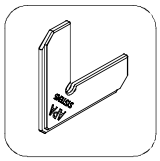
70A001
ESPAG RECEIVER

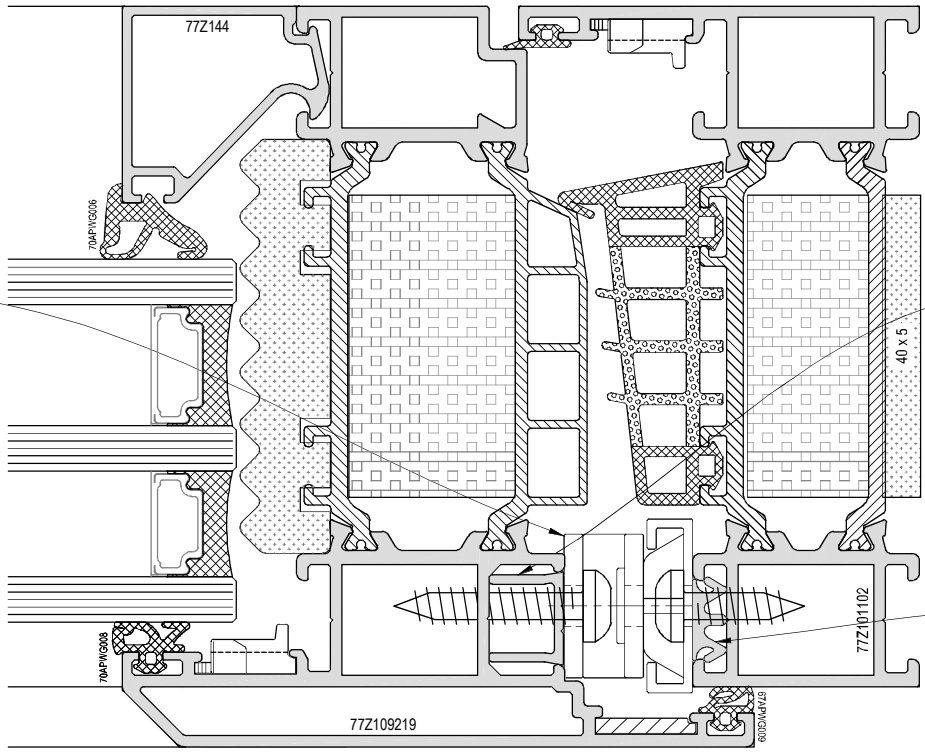


77A601170
ADHESIVE BACKED PE FOAM

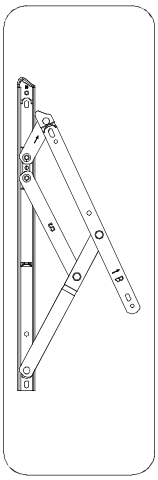


70A005
NYLON CHEVRON





STORM HINGE
17STRMB10
17STRMB12
17STRMB16
17STRMB22
17STRMB26

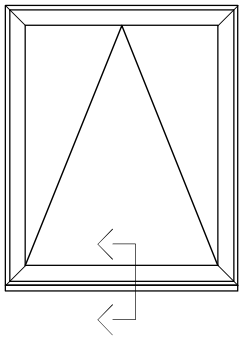


70M116
HINGE PACKER SASH

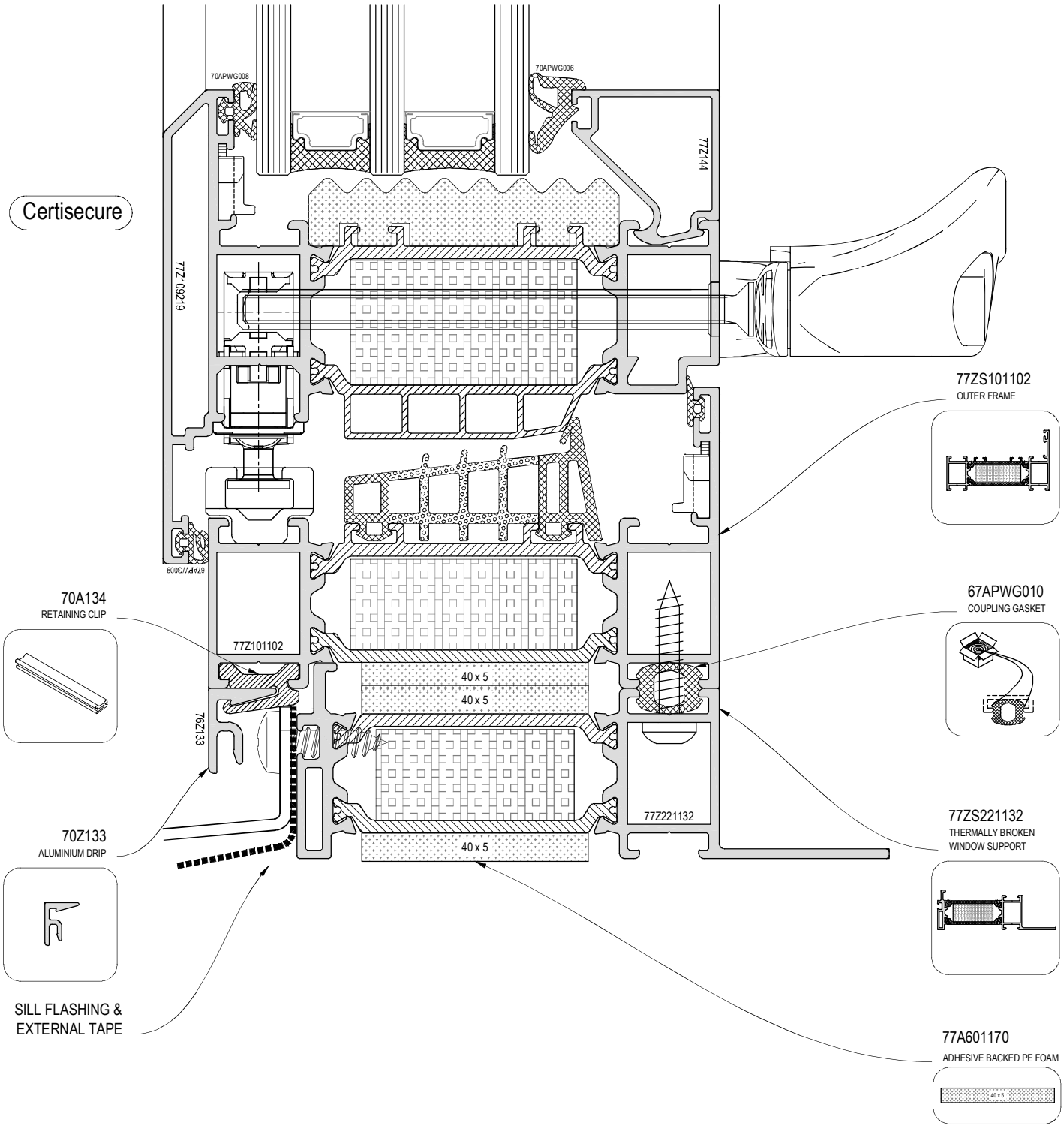
70APWG019
HINGE PACKER FRAME

HARDWARE IN ESPAG SASH

DATE:	REVISION:	TITLE:	SYSTEM:			
24-10-2019	0	General Cross Section	ST90 Window Suite	1:1	**A4**	9A.03.A.06



Certisecure



WINDOW SUPPORT / SILL

DATE:	REVISION:	TITLE:	SYSTEM:			
24-10-2019	0	General Cross Section	ST90 Window Suite	1:1	**A4**	9A.03.A.14