WITAL
EXTRUSION

Technical Catalogue Window and Door System Profiles

Issued: 01.02.2019

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Issued: 01.02.2019

1. General

1.1 Physical properties of PVC profiles

Test		Unit	Standard	WITAL window profiles
1	Vicat softening temperature	°C	PN-93 C-89024 Method B	80.3
2	Impact strength at –10°C		PN-EN- 477:1997	No cracks
3	Temperature resistance to +150°C		PN-EN- 478:1997	No visible changes on the external surfaces, slightly deformed walls inside the profile
4	Tensile strength	Mpa	PN-81 C-89034	46.2
5	Tensile impact strength	Mpa	PN-72 C-04243	64.4
6	Charpy notched impact strength	KJ/m²	PN-81 C-89029	55.3
7	Tensile elastic modulus	MPa	DIN 5345	2443
8	Thermal expansion	%	PN-EN-479:1997	1.7
9	Discolouration due to aging		PN-86 P-04906	5 at the grey scale, corresponding to no discolouration (0).
10	Density ρ	g/cm³	PN-92 C-89035 Method B	1.44 ±0.02

1. General
1.2 Quality Guarantee

WITAL system profiles made of modified polyvinyl chloride are the basic components of PVC windows and doors. The manufacturing process conforms to relevant Polish standards (PN-88 / B-10085), the Building Research Institute requirements and is certified by the Rosenheim Institute.

PW WITAL offers a 5-year warranty on:

- material quality;
- overall profile dimensions and tolerances;
- chemical resistance, see Table below;
- UV resistance of white window profiles;

Difference in colour compared to a 5-step grey scale. This guarantee is valid only if the products are used in accordance with PW WITAL instructions on processing the window profiles.

This guarantee is not valid when damage is caused as a consequence of:

- using solvents or aggressive detergents;
- improper storage;
- incorrect assembly;
- improper operation and maintenance;
- unexpected external factors;
- force majeure (e.g. natural disasters, fire);
- end-user or third-party actions.

If the guarantee claim is approved, the faulty element will be replaced free of charge.
The guarantee covers the replacement only, irrespective of other statutory rights.
PW WITAL sets out the rules of handling claims and claim procedures.

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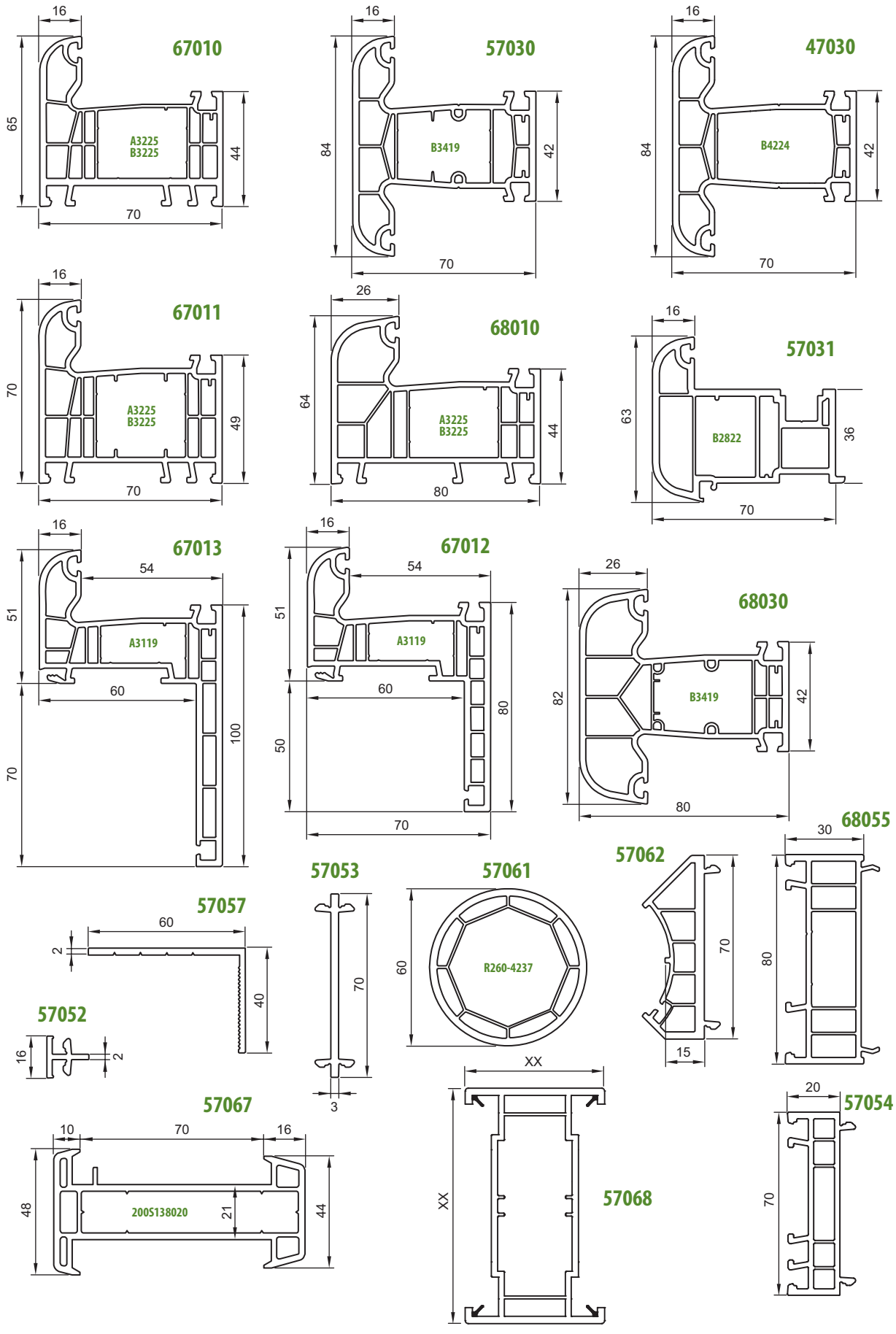
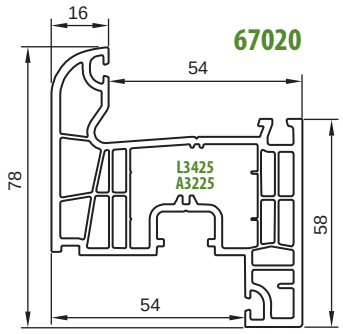
The guarantee start from the date of shipment.



STANDARD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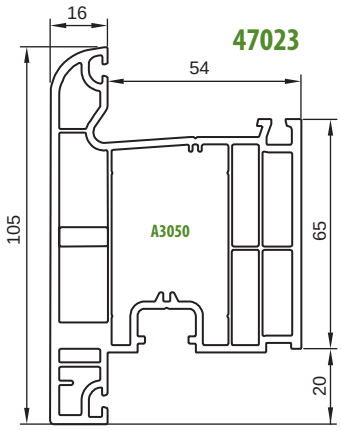
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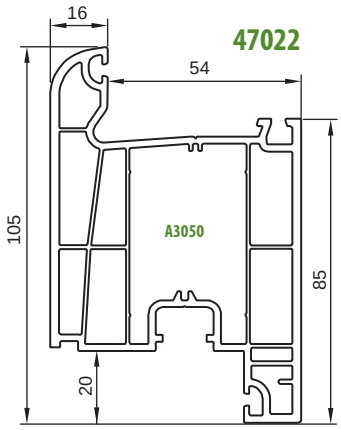
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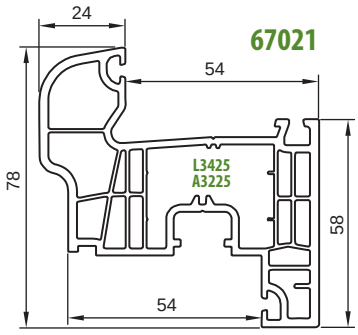
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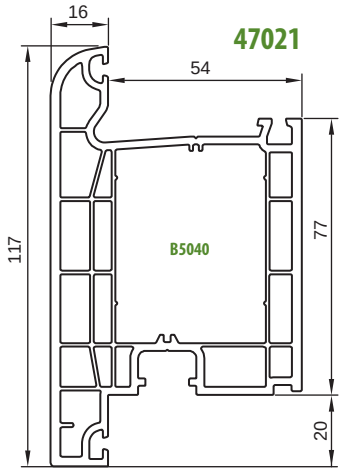
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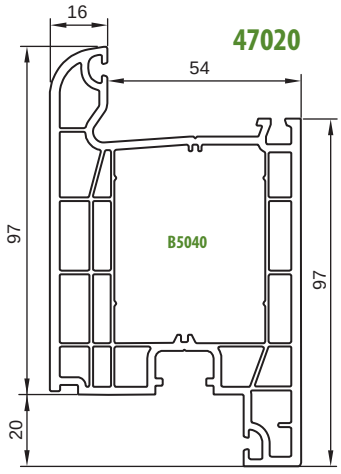
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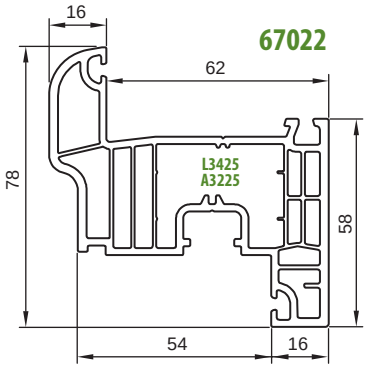
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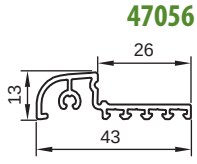
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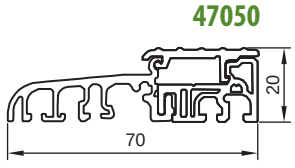
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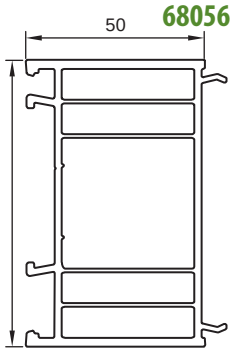
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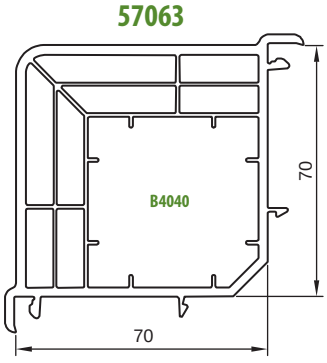
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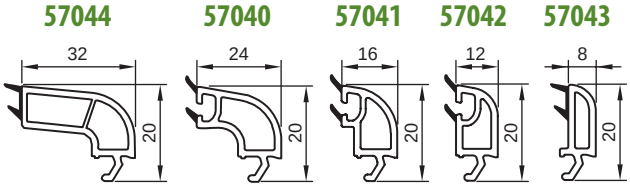
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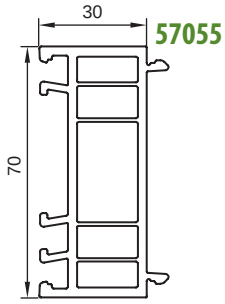
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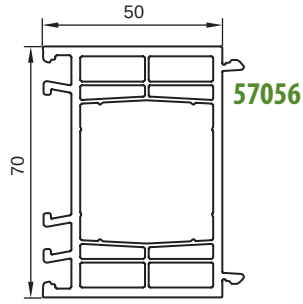
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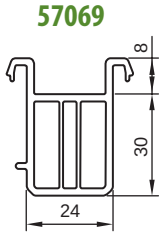
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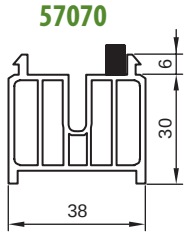
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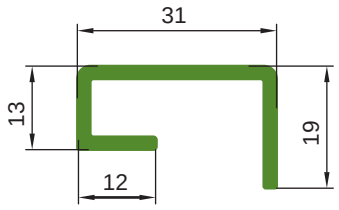
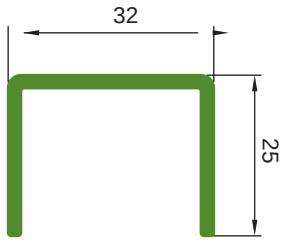
2.2-1 Reinforcement

A3119



A	X	Y
1,50	1,26	0,25
2,00	1,41	0,32

A3225



A	X	Y
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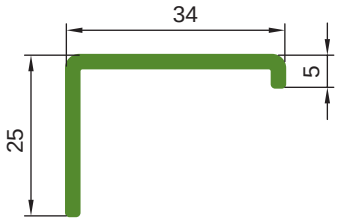
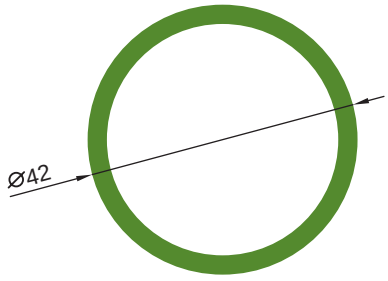
2,00	2,57	0,98

L3425

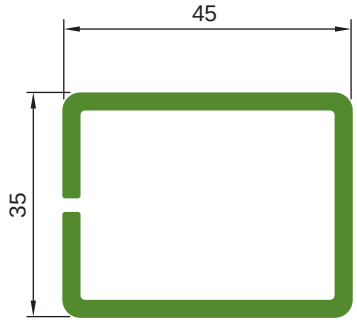


A	X	Y
1,50	1,28	0,49

R260-4237

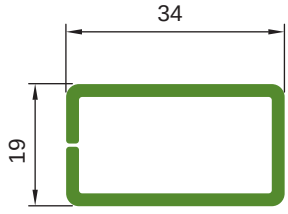


A	X	Y
2,60	7,27	7,27



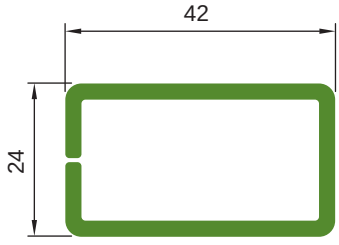
A	X	Y
1,50	xxx	xxx
2,00	8,66	5,67

B3419



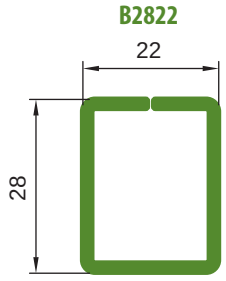
A	X	Y
1,50	2,20	0,87
2,00	2,73	1,07

B4224



A	X	Y
2,00	5,5	2,3

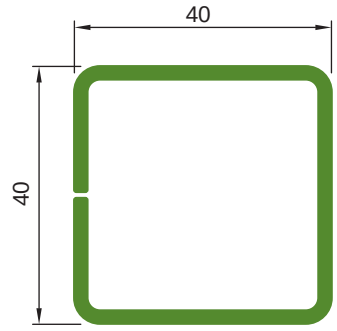
B2822



A	X	Y
1,50	1,02	1,46
2,00	1,28	1,85

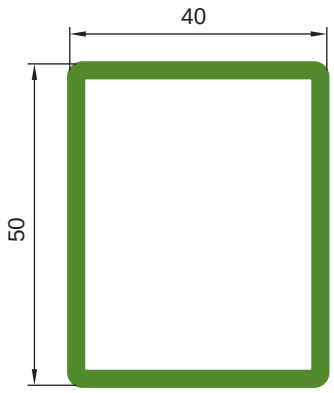
2.2-2 Overview of Steel Reinforcement

B4040



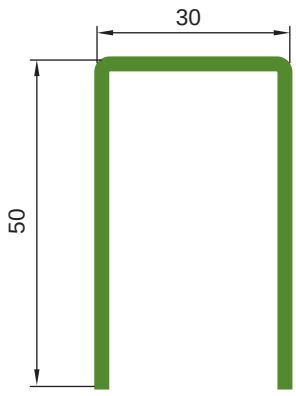
A	X	Y
2,00	7,13	7,21

B4050



A	X	Y
2,00	8,50	14,50
3,00	11,40	16,10

A3050



A	X	Y
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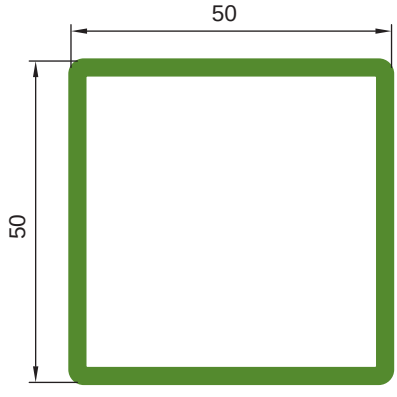
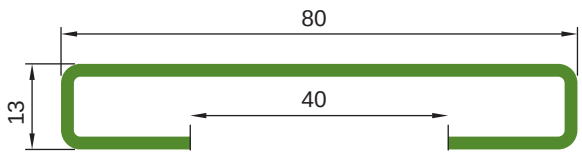
2,00	4,18	6,48

B5050



A	X	Y
2,00	14,70	14,70
3,00	20,00	20,00

S13820



A	X	Y
2,00	20,40	0,70

L	M	I	A	P
1	A3119	150A3119	1,50	67012 67013
		200A3119	2,00	
2	A3225	150A3225	1,50	67020 67021 68010 67020 67021 67022
		200A3225	2,00	
3	A3050	150A3119	1,50	47022 47023
		150A3119	2,00	
4	A3527	150A3527	1,50	68610 68620 68611 68621
		150A3527	2,00	
5	L3827	150L3827	1,50	68620 68621
6	L3425	150L3425	1,50	68620 68621
7	B3419	150B3419	1,50	57030 68630 68652
		200B3419	2,00	
8	B2822	150B2822	1,50	57051
		200B2822	2,00	
9	B3225	150B3225	1,50	57010 67010 68010 68031 68033
		200B3225	2,00	
10	B3527	150B3527	1,50	68610 68611
		200B3527	2,00	
11	B3528	250B3528	2,50	68620 68621
		300B3528	3,00	
12	B4535	150B4535	1,50	58611
		200B4535	2,00	
13	B4040	200B4040	2,00	57063 68663
14	B4050	200B4050	2,00	47020 47021
15	B5050	200B5050	2,00	58620 58621
16	R4237	260R4237	2,60	57061 58661
17	S14022	150S14022	1,50	57065
18	S12422	150S12422	1,50	57065
19	S13820	200S12422	2,00	57067
20	V3628	200V3628	2,00	57064

L – consecutive number
M – reinforcement model/shape
I – reinforcement index
A – steel thickness in mm
X – steel moment of inertia in X plane in cm^4
Y – steel moment of inertia in Y plane in cm^4

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3. Maximum Sash Sizes (size limits)

3.1 General Information

3.2 Maximum Single-Frame Sizes

3.3 – 3.7 Maximum Window and Balcony Door Sizes - single-sash and multi-sash with transom/mullion and multi-sash with meeting rail with 24 mm glazing unit at 400 Pa to 2,000 Pa wind load

3.8 – 3.12 Maximum window and balcony door sizes - single-sash and multi-sash with transom/mullion and multi-sash with meeting rail with 36 mm glazing unit at 400 Pa to 2,000 Pa wind load

3. Maximum Sash Sizes (size limits)

3.1 General Information

Wind load is one of the key factors to consider when designing a window. Based on the resistance to wind load, suitable window and door elements are selected, including PVC profiles and reinforcements, allowing for the size limits, glazing unit or panel weight and method of assembly.

General:

- size limits apply to the outer dimensions of the sashes;
- distances between hinges or locks (hooks) ≤800 mm;
- observe the guidelines of hardware suppliers regarding permissible loads and permissible sash size, regardless of the permissible size defined by the PVC profile system supplier;
- all coloured windows (foiled, painted or aluminium covered) require min. 2 mm thick reinforcements (steel sections).

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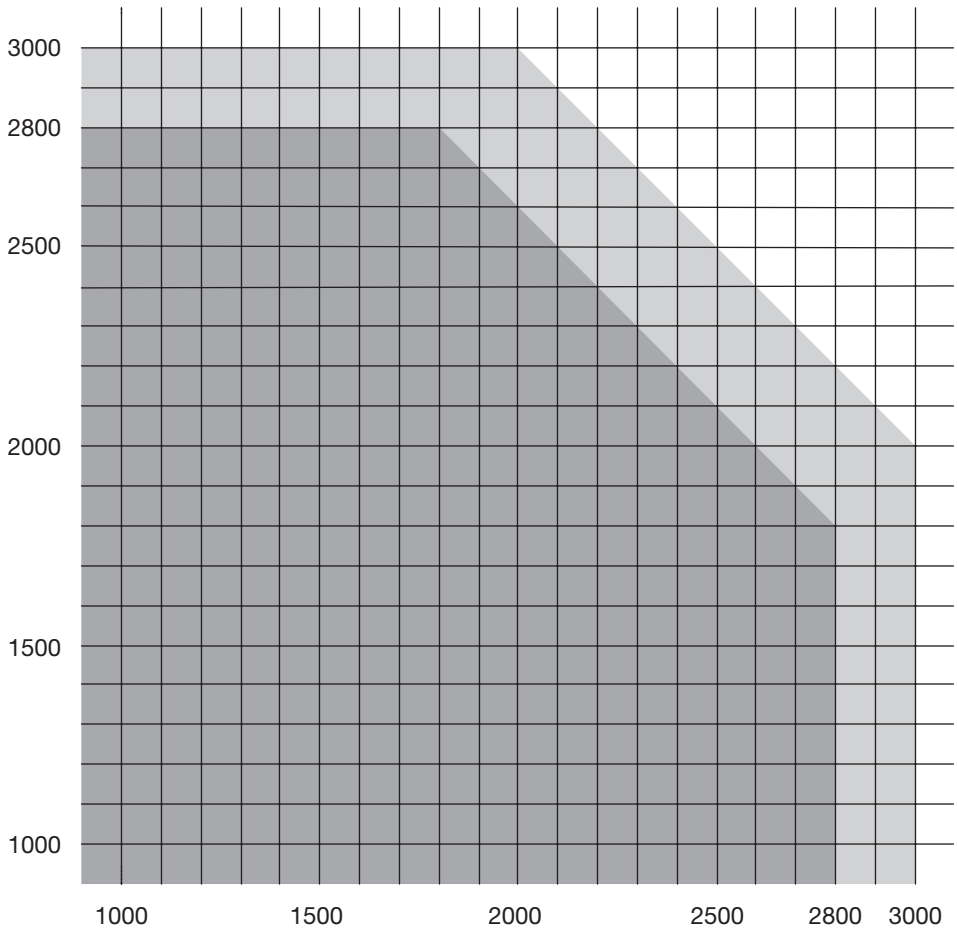
3. Maximum Sash Sizes (size limits)

3.2 Maximum Single-Frame Sizes

Maximum frame sizes for multi-sash windows and doors	White profiles	Coloured profiles
Maximum side length	300 cm	280 cm
Maximum surface area	6,0 m2	5,0 m2

Maximum frame dimensions, outside dimension in mm



	Maximum permissible dimensions		
	Maximum width (mm)	Maximum height (mm)	Maximum surface area (m^2)
White	3,000	3,000	6.00
Colour	2,800	2,800	5.00

3. Maximum Sash Sizes (size limits)

3.3 Maximum Window and Balcony Door Sizes

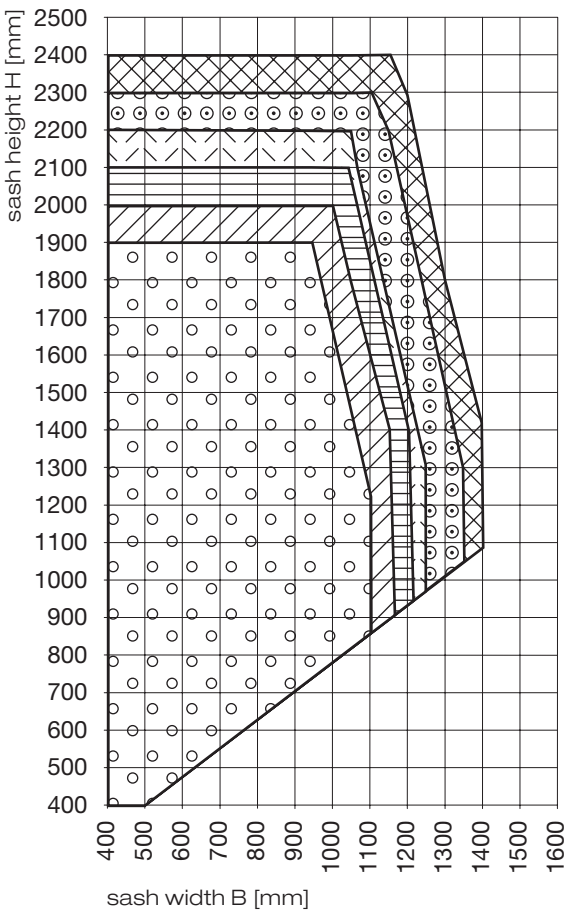
single-sash and multi-sash with transom/mullion and multi-sash with meeting rail.

wind load	400Pa
glazing unit	24mm
frame deflection	L/300

Maximum sash sizes for 70 mm sash profiles.
Single-sash turn / tilt-and-turn windows (or combination windows with transom/mullions and multi-sash turn / tilt-and-turn windows with meeting rail).

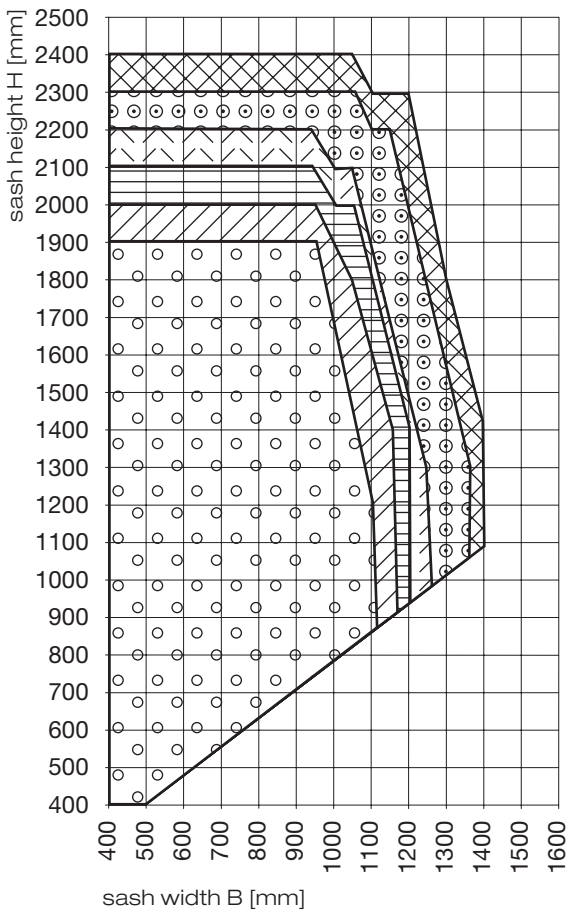
Single-sash windows (or combination windows with transom/mullions)

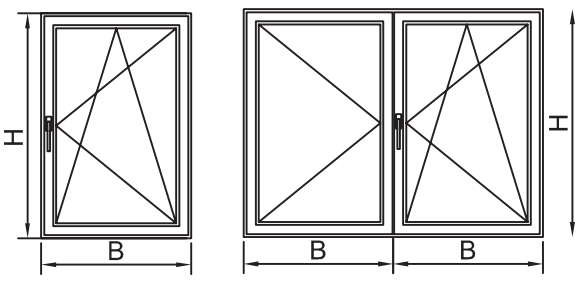
White



Multi-sash turn / tilt-and-turn windows with meeting rail

White





colour	reinforcement no.	reinforcement size [mm]
	250A3225	32 × 25 × 2.5
	200A3225	32 × 25 × 2.0
	150A3225	32 × 25 × 1.5
	250L3425	34 × 25 × 5 × 2.5
	200L3425	34 × 25 x 5 x 2.0
	150L3425	34 × 25 × 5 × 1.5

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3. Maximum Sash Sizes (size limits)

3.4 Maximum Window and Balcony Door Sizes

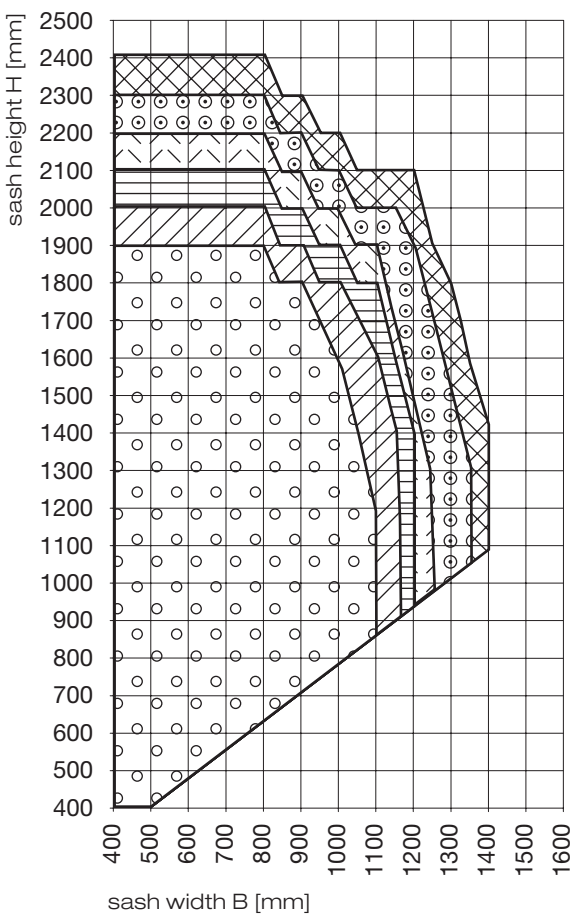
single-sash and multi-sash with transom/mullion and multi-sash with meeting rail.

wind load	800Pa
glazing unit	24mm
frame deflection	L/300

Maximum sash sizes for 70 mm sash profiles.
Single-sash turn / tilt-and-turn windows (or combination windows with transom/mullions and multi-sash turn / tilt-and-turn windows with meeting rail).

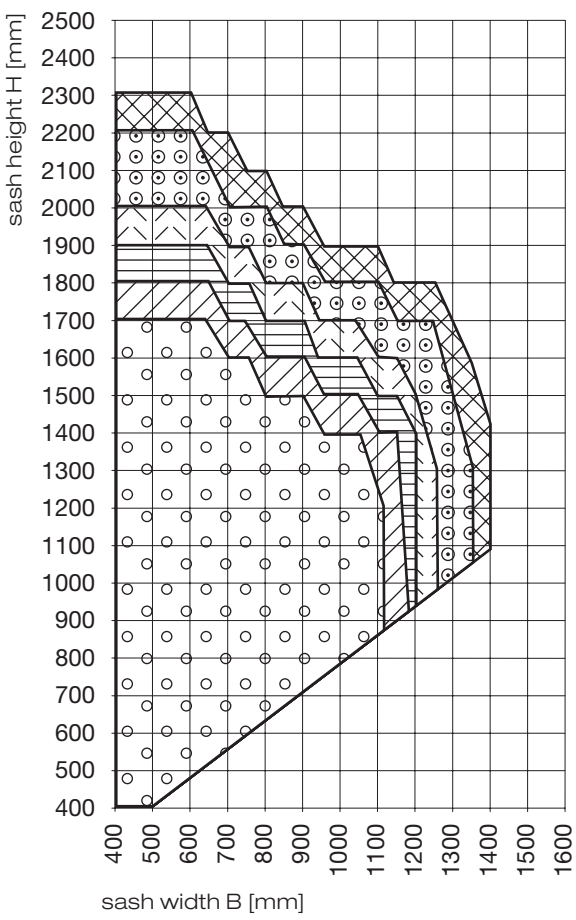
Single-sash windows (or combination windows with transom/mullions)

White

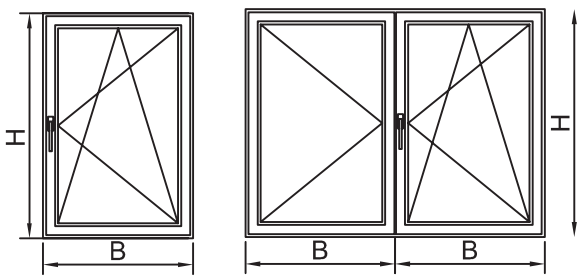


Multi-sash turn / tilt-and-turn windows with meeting rail

White



Maximum sash sizes for foiled profiles are reduced by 10%.



colour	reinforcement no.	reinforcement size [mm]
	250A3225	32 × 25 × 2.5
	200A3225	32 × 25 × 2.0
	150A3225	32 × 25 × 1.5
	250L3425	34 × 25 × 5 × 2.5
	200L3425	34 × 25 × 5 × 2.0
	150L3425	34 × 25 × 5 × 1.5

3. Maximum Sash Sizes (size limits)

3.5 Maximum Window and Balcony Door Sizes

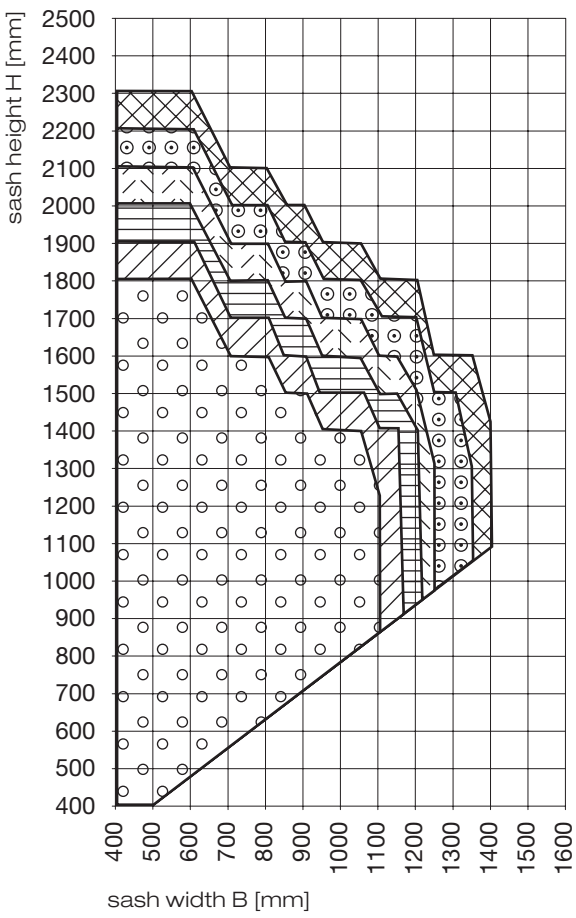
single-sash and multi-sash with transom/mullion and multi-sash with meeting rail.

wind load	1200Pa
glazing unit	24mm
frame deflection	L/300

Maximum sash sizes for 70 mm sash profiles.
Single-sash turn / tilt-and-turn windows (or combination windows with transom/mullions and multi-sash turn / tilt-and-turn windows with meeting rail).

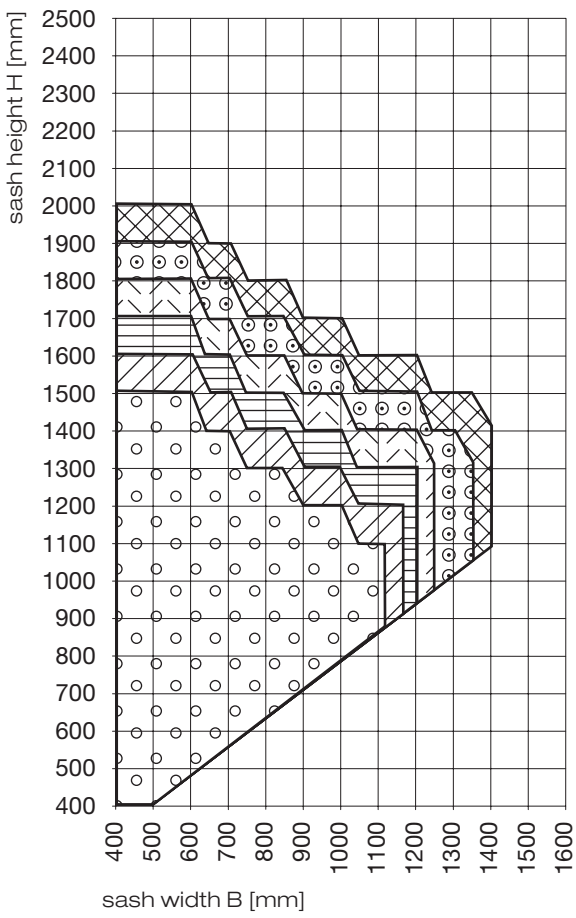
Single-sash windows (or combination windows with transom/mullions)

White

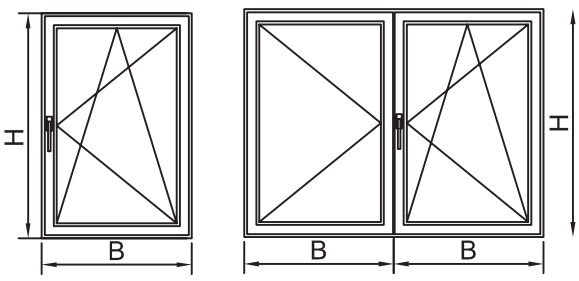


Multi-sash turn / tilt-and-turn windows with meeting rail

White



Maximum sash sizes for foiled profiles are reduced by 10%.



colour	reinforcement no.	reinforcement size [mm]
	250A3225	32 × 25 × 2.5
	200A3225	32 × 25 × 2.0
	150A3225	32 × 25 × 1.5
	250L3425	34 × 25 × 5 × 2.5
	200L3425	34 × 25 × 5 × 2.0
	150L3425	34 × 25 × 5 × 1.5

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3. Maximum Sash Sizes (size limits)

3.6 Maximum Window and Balcony Door Sizes

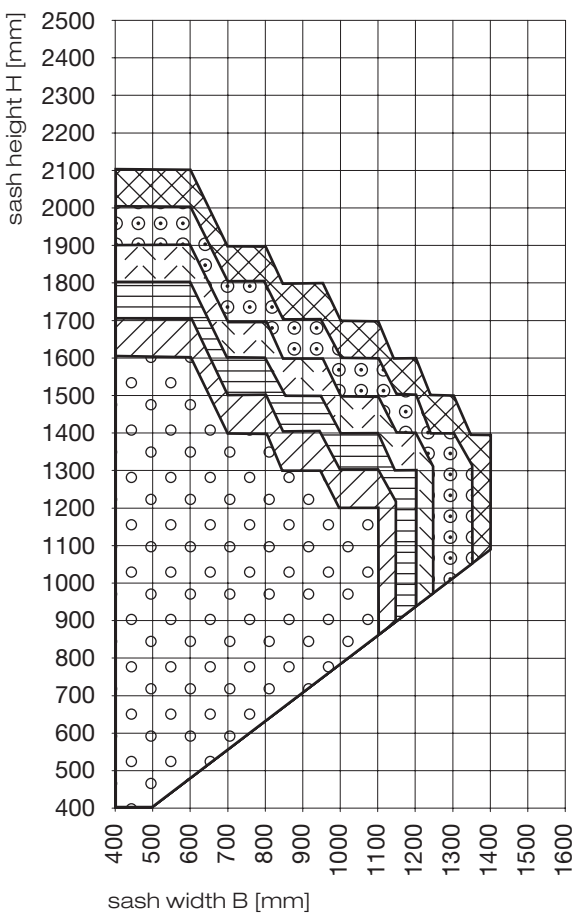
single-sash and multi-sash with transom/mullion and multi-sash with meeting rail.

wind load	1600Pa
glazing unit	24mm
frame deflection	L/300

Maximum sash sizes for 70 mm sash profiles.
Single-sash turn / tilt-and-turn windows (or combination windows with transom/mullions and multi-sash turn / tilt-and-turn windows with meeting rail).

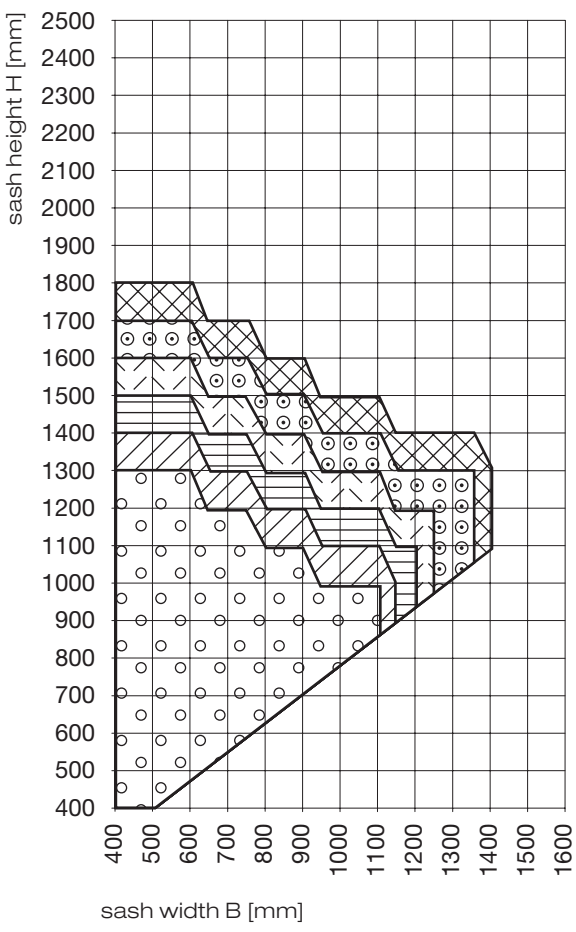
Single-sash windows (or combination windows with transom/mullions)

White

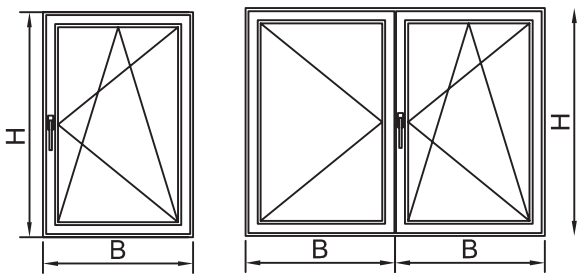


Multi-sash turn / tilt-and-turn windows with meeting rail

White



Maximum sash sizes for foiled profiles are reduced by 10%.



colour	reinforcement no.	reinforcement size [mm]
	250A3225	32 × 25 × 2.5
	200A3225	32 × 25 × 2.0
	150A3225	32 × 25 × 1.5
	250L3425	34 × 25 × 5 × 2.5
	200L3425	34 × 25 × 5 × 2.0
	150L3425	34 × 25 × 5 × 1.5

3. Maximum Sash Sizes (size limits)

3.7 Maximum Window and Balcony Door Sizes

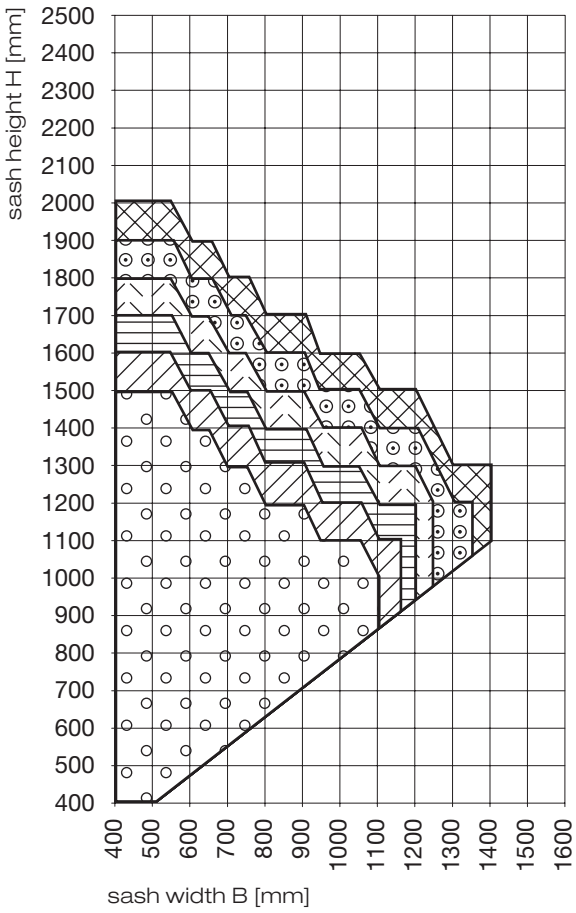
single-sash and multi-sash with transom/mullion and multi-sash with meeting rail.

wind load	2000Pa
glazing unit	24mm
frame deflection	L/300

Maximum sash sizes for 70 mm sash profiles.
Single-sash turn / tilt-and-turn windows (or combination windows with transom/mullions and multi-sash turn / tilt-and-turn windows with meeting rail).

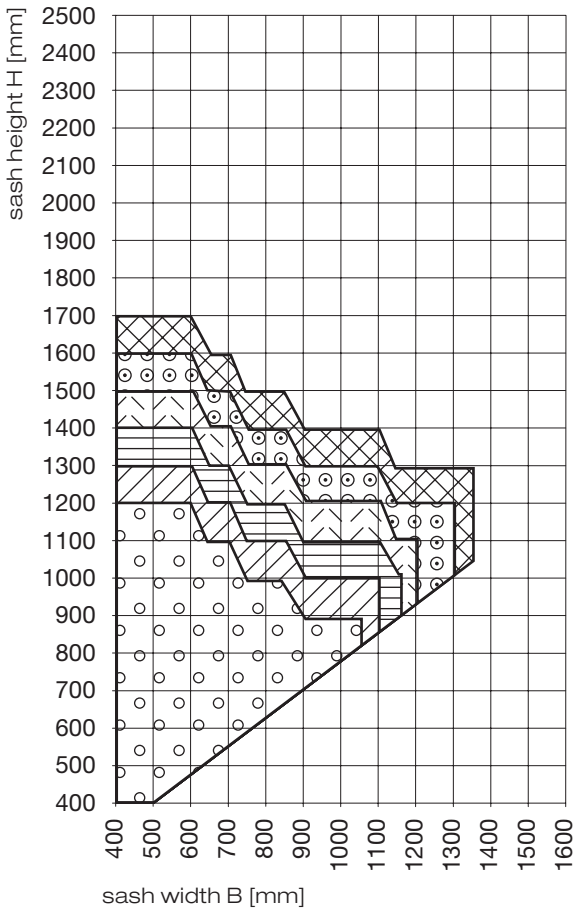
Single-sash windows (or combination windows with transom/mullions)

White

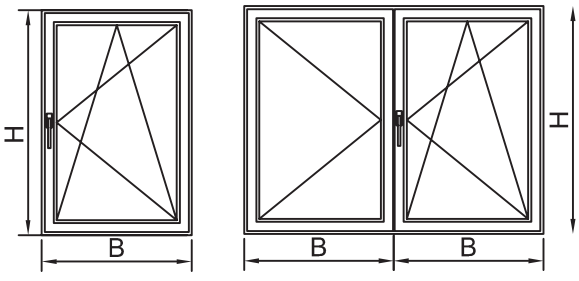


Multi-sash turn / tilt-and-turn windows with meeting rail

White



Maximum sash sizes for foiled profiles are reduced by 10%.



colour	reinforcement no.	reinforcement size [mm]
	250A3225	32 × 25 × 2.5
	200A3225	32 × 25 × 2.0
	150A3225	32 × 25 × 1.5
	250L3425	34 × 25 × 5 × 2.5
	200L3425	34 × 25 × 5 × 2.0
	150L3425	34 × 25 × 5 × 1.5

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3. Maximum Sash Sizes (size limits)

3.8 Maximum Window and Balcony Door Sizes

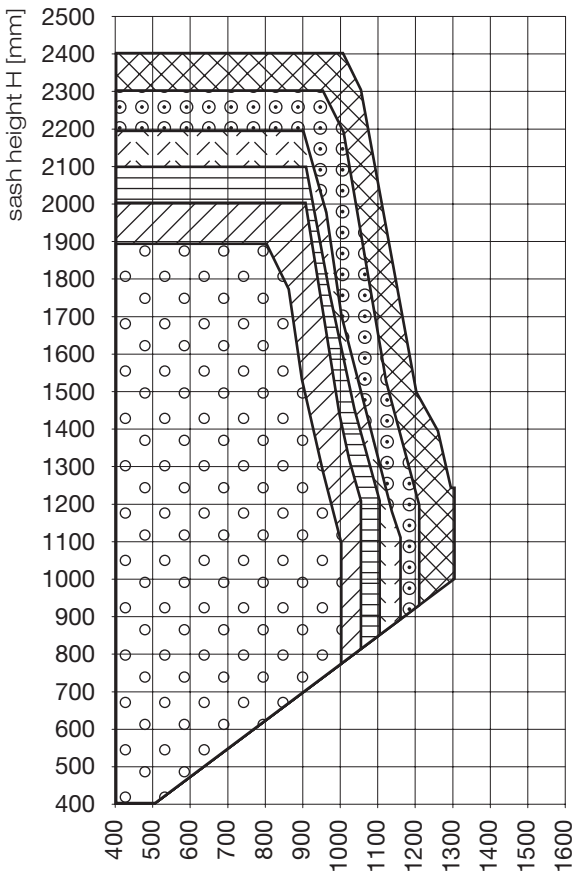
single-sash and multi-sash with transom/mullion and multi-sash with meeting rail.

wind load	400Pa
glazing unit	36mm
frame deflection	L/300

Maximum sash sizes for 70 mm sash profiles.
Single-sash turn / tilt-and-turn windows (or combination windows with transom/mullions and multi-sash turn / tilt-and-turn windows with meeting rail).

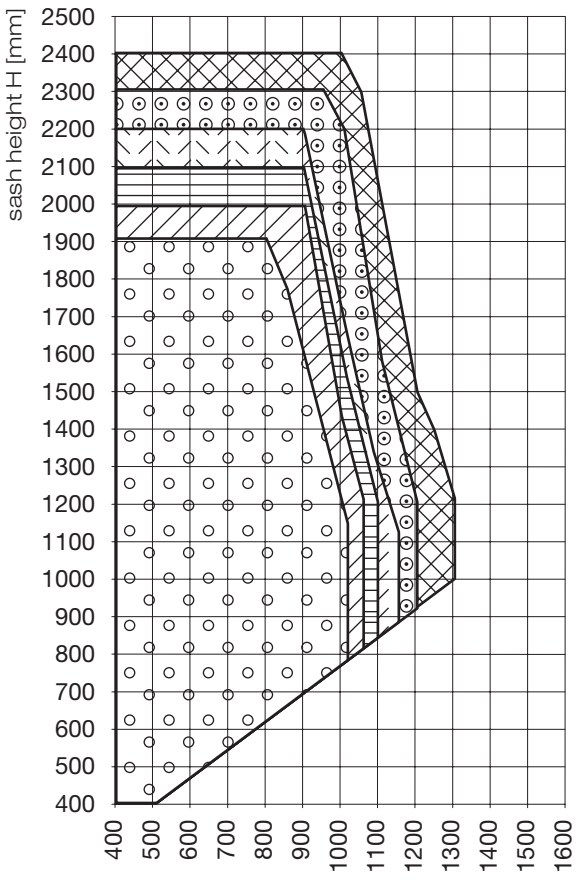
Single-sash windows (or combination windows with transom/mullions)

White

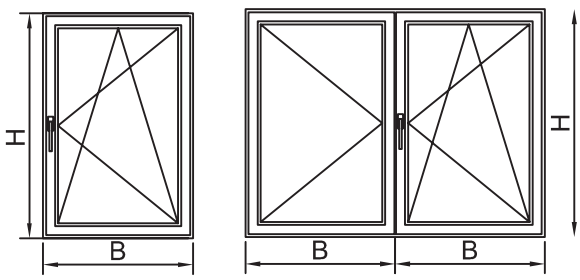


Multi-sash turn / tilt-and-turn windows with meeting rail

White



Maximum sash sizes for foiled profiles are reduced by 10%.



colour	reinforcement no.	reinforcement size [mm]
	250A3225	32 × 25 × 2.5
	200A3225	32 × 25 × 2.0
	150A3225	32 × 25 × 1.5
	250L3425	34 × 25 × 5 × 2.5
	200L3425	34 × 25 x 5 x 2.0
	150L3425	34 × 25 × 5 × 1.5

3. Maximum Sash Sizes (size limits)

3.9 Maximum Window and Balcony Door Sizes

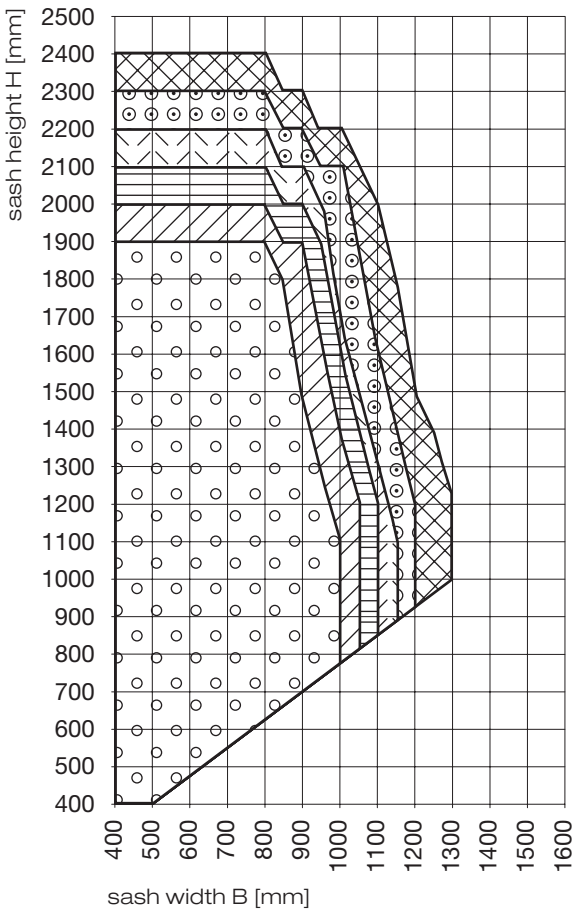
single-sash and multi-sash with transom/mullion and multi-sash with meeting rail.

wind load	800Pa
glazing unit	36mm
frame deflection	L/300

Maximum sash sizes for 70 mm sash profiles.
Single-sash turn / tilt-and-turn windows (or combination windows with transom/mullions and multi-sash turn / tilt-and-turn windows with meeting rail).

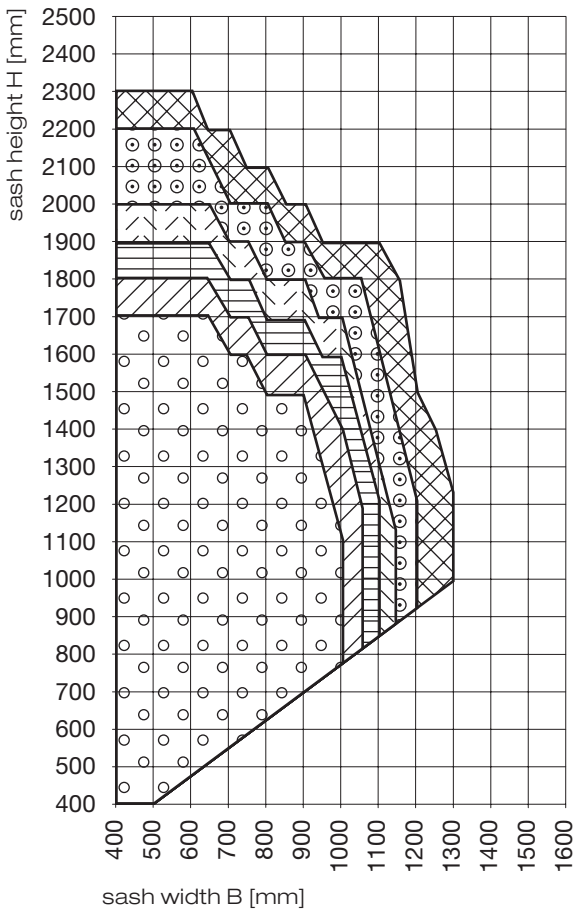
Single-sash windows (or combination windows with transom/mullions)

White

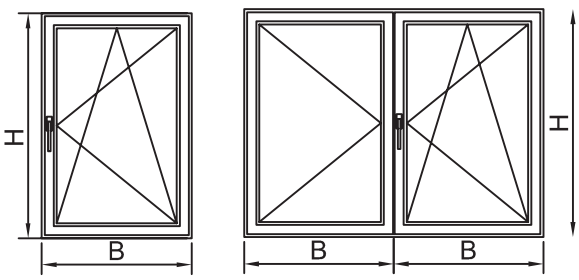


Multi-sash turn / tilt-and-turn windows with meeting rail

White



Maximum sash sizes for foiled profiles are reduced by 10%.



colour	reinforcement no.	reinforcement size [mm]
	250A3225	32 × 25 × 2.5
	200A3225	32 × 25 × 2.0
	150A3225	32 × 25 × 1.5
	250L3425	34 × 25 × 5 × 2.5
	200L3425	34 × 25 × 5 × 2.0
	150L3425	34 × 25 × 5 × 1.5

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3. Maximum Sash Sizes (size limits)

3.10 Maximum Window and Balcony Door Sizes

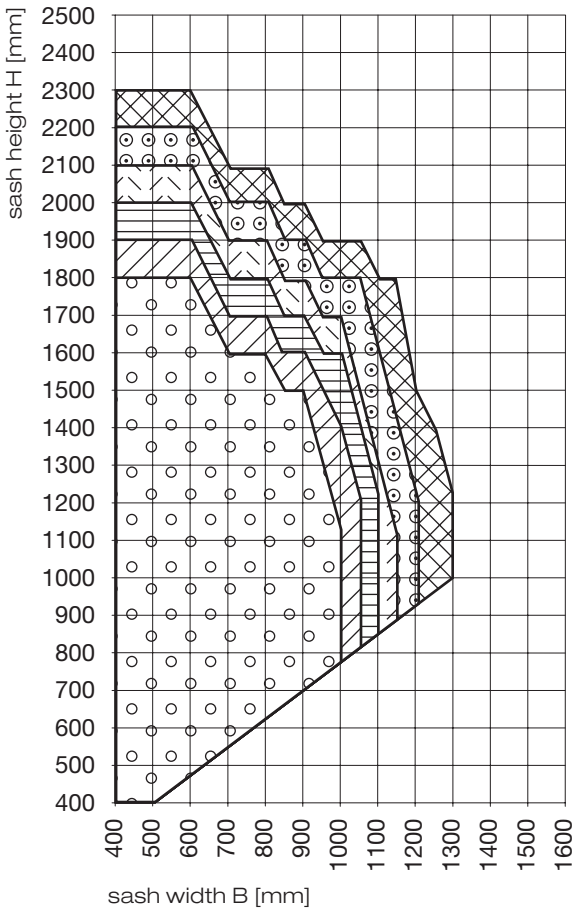
single-sash and multi-sash with transom/mullion and multi-sash with meeting rail.

wind load	1200Pa
glazing unit	36mm
frame deflection	L/300

Maximum sash sizes for 70 mm sash profiles.
Single-sash turn / tilt-and-turn windows (or combination windows with transom/mullions and multi-sash turn / tilt-and-turn windows with meeting rail).

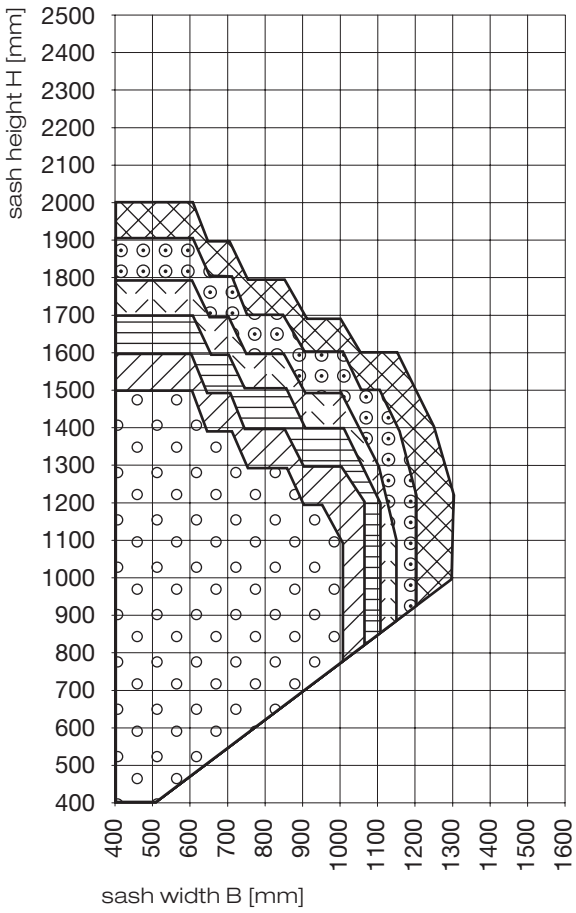
Single-sash windows (or combination windows with transom/mullions)

White

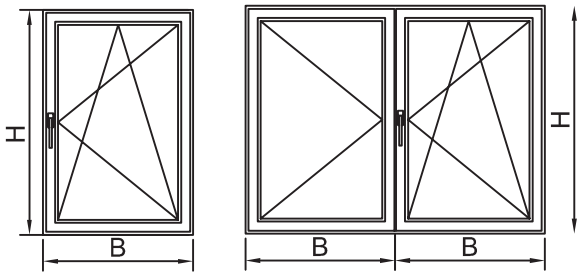


Multi-sash turn / tilt-and-turn windows with meeting rail

White



Maximum sash sizes for foiled profiles are reduced by 10%.



colour	reinforcement no.	reinforcement size [mm]
	250A3225	32 × 25 × 2.5
	200A3225	32 × 25 × 2.0
	150A3225	32 × 25 × 1.5
	250L3425	34 × 25 × 5 × 2.5
	200L3425	34 × 25 × 5 × 2.0
	150L3425	34 × 25 × 5 × 1.5

3. Maximum Sash Sizes (size limits)

3.11 Maximum Window and Balcony Door Sizes

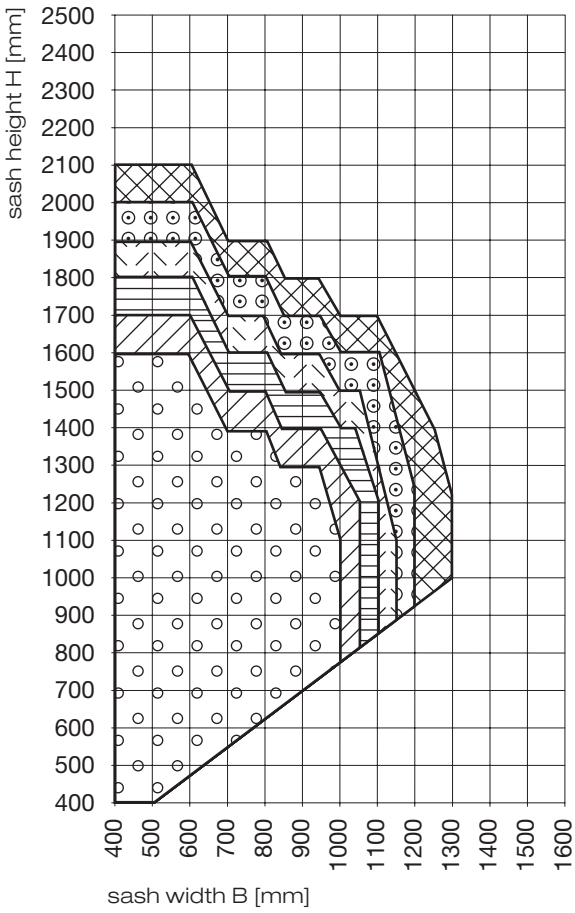
single-sash and multi-sash with transom/mullion and multi-sash with meeting rail.

wind load	1600Pa
glazing unit	36mm
frame deflection	L/300

Maximum sash sizes for 70 mm sash profiles.
Single-sash turn / tilt-and-turn windows (or combination windows with transom/mullions and multi-sash turn / tilt-and-turn windows with meeting rail).

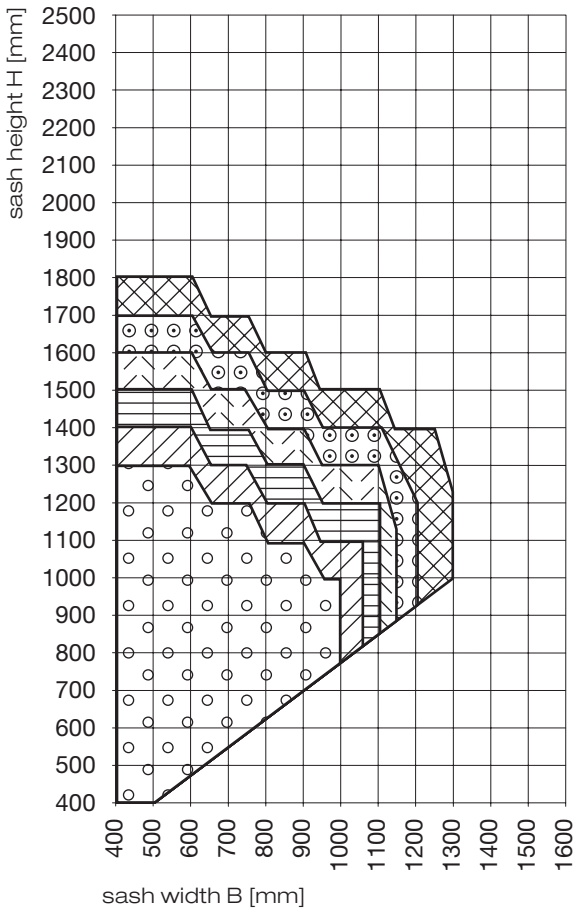
Single-sash windows (or combination windows with transom/mullions)

White

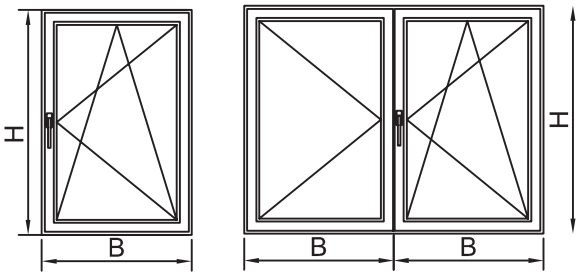


Multi-sash turn / tilt-and-turn windows with meeting rail

White



Maximum sash sizes for foiled profiles are reduced by 10%.



colour	reinforcement no.	reinforcement size [mm]
	250A3225	32 × 25 × 2.5
	200A3225	32 × 25 × 2.0
	150A3225	32 × 25 × 1.5
	250L3425	34 × 25 × 5 × 2.5
	200L3425	34 × 25 × 5 × 2.0
	150L3425	34 × 25 × 5 × 1.5

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3. Maximum Sash Sizes (size limits)

3.12 Maximum Window and Balcony Door Sizes

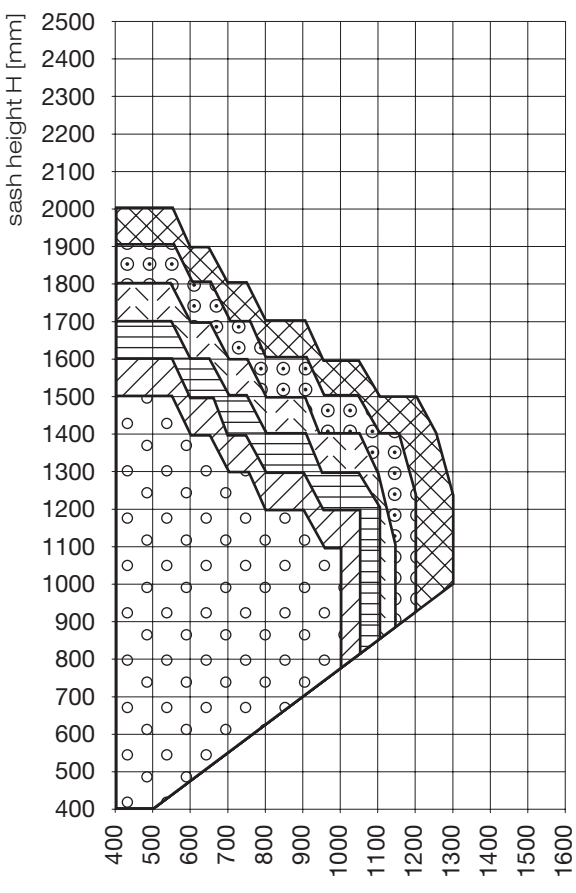
single-sash and multi-sash with transom/mullion and multi-sash with meeting rail.

wind load	2000Pa
glazing unit	36mm
frame deflection	L/300

Maximum sash sizes for 70 mm sash profiles.
Single-sash turn / tilt-and-turn windows (or combination windows with transom/mullions and multi-sash turn / tilt-and-turn windows with meeting rail).

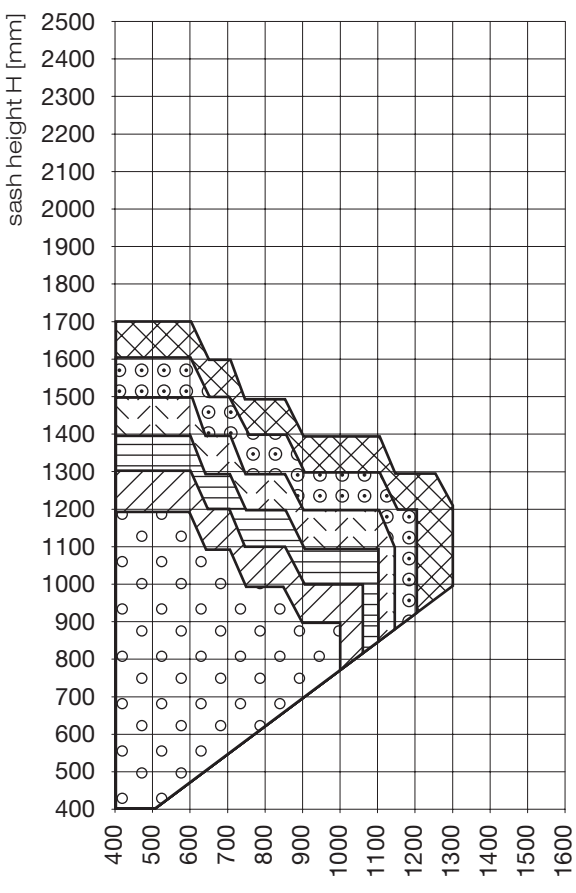
Single-sash windows (or combination windows with transom/mullions)

White

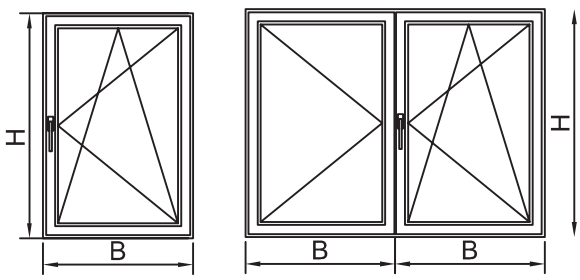


Multi-sash turn / tilt-and-turn windows with meeting rail

White



Maximum sash sizes for foiled profiles are reduced by 10%.



colour	reinforcement no.	reinforcement size [mm]
	250A3225	32 × 25 × 2.5
	200A3225	32 × 25 × 2.0
	150A3225	32 × 25 × 1.5
	250L3425	34 × 25 × 5 × 2.5
	200L3425	34 × 25 × 5 × 2.0
	150L3425	34 × 25 × 5 × 1.5

4. Overview of profiles

4.1 Frame 67010, Frame 67011
4.2 Frame 68010, Sash 67020
4.3 Flush Sash 67021, Flush Sash 67022
4.4 Renovation Frame 67012
4.5 Renovation Frame 67013
4.6 In-Opening Balcony Door Sash Z 47022
4.7 Out-Opening Balcony Door Sash T 47023
4.8 In-Opening Door Sash Z 47020
4.9 Out-Opening Door Sash T 47021
4.10 Transom/Mullion 47030
4.11 Transom/Mullion 57030
4.12 Transom/Mullion 68030
4.13 Meeting Rail 57031
4.14 Glazing Beads, Coupling Mullions
4.15 Frame Packers
4.16 Bay Pole 57061 & Bay Pole Adapter 57062
4.17 90° Bay Post – 57063, Structural Transom/Mullion 57067
4.18 Structural Transom/Mullion 57068
4.19 Cill Packers, Gaskets & Sealings
4.20 Accessories

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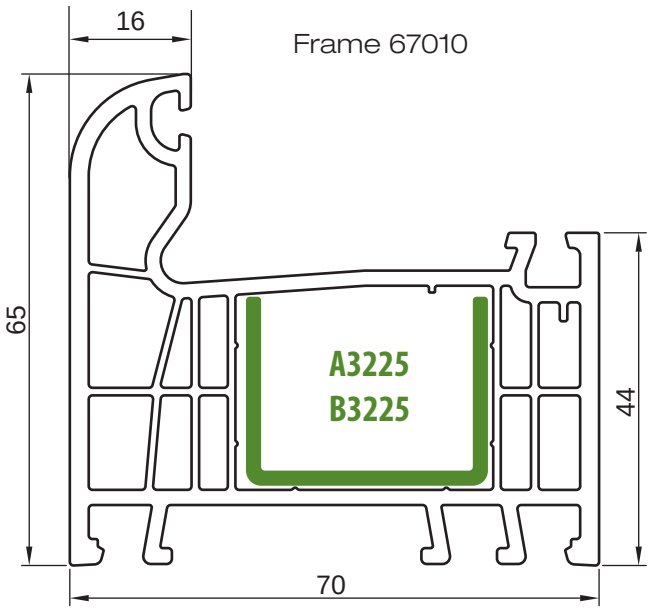
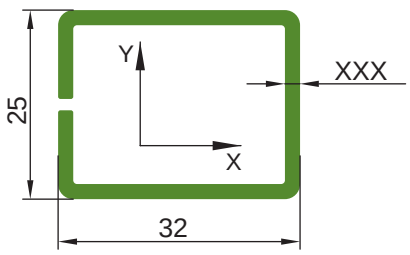
4.1 Frame 67010, Frame 67011

Frame 67010

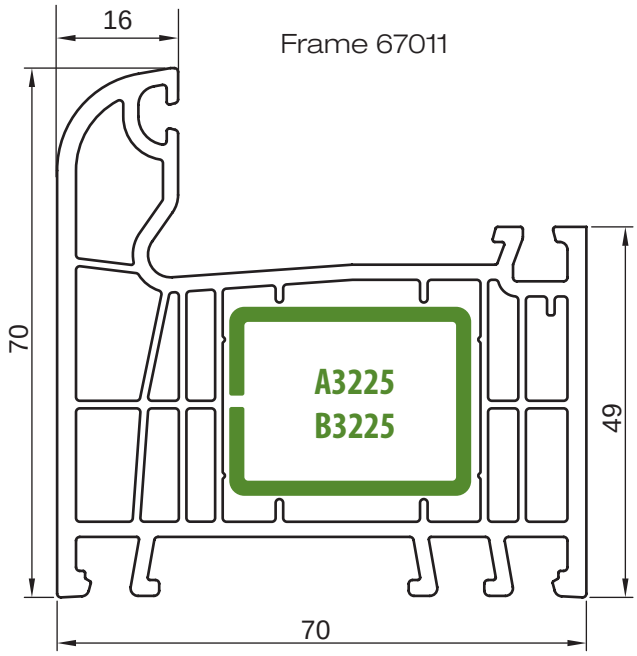


Reinforcement
XXXB3225

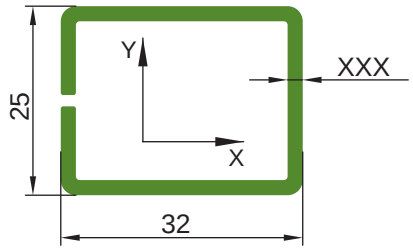


reinforcement symbol	x [mm]	Ix [cm4]	Iy [cm4]
200B3225	2,00	2,8357	1,9581
175B3225	1,75	2,5360	1,7587
150B3225	1,50	2,2202	1,5459
120B3225	1,20	1,8661	1,3192

Frame 67011



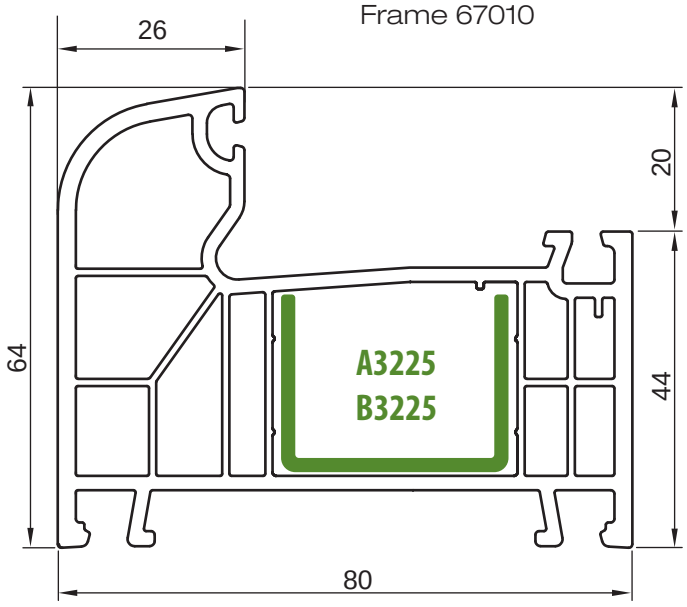
Reinforcement
XXXB3225



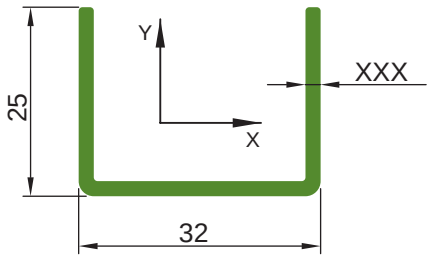
reinforcement symbol	x [mm]	Ix [cm4]	Iy [cm4]
200B3225	2,00	2,8357	1,9581
175B3225	1,75	2,5360	1,7587
150B3225	1,50	2,2202	1,5459
120B3225	1,20	1,8661	1,3192

4.2 Frame 68010, Sash 67020

Frame 67010

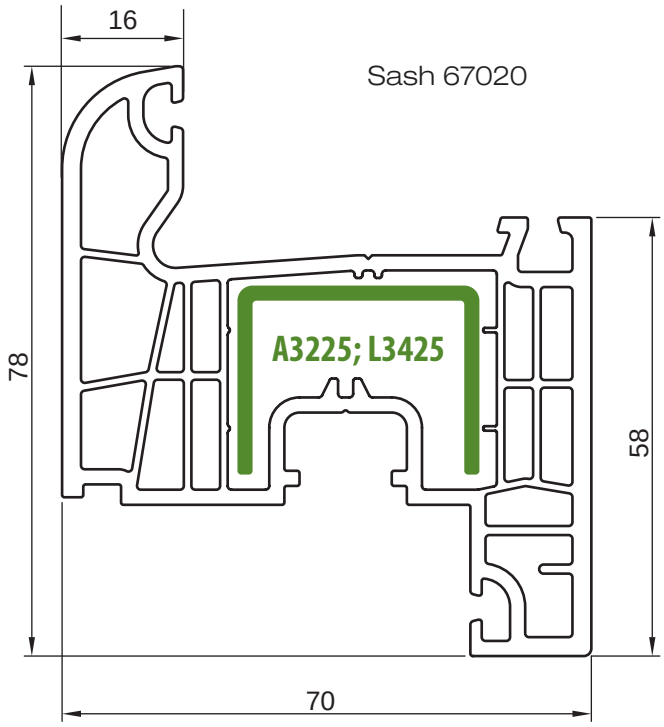


Reinforcement
XXXA3225

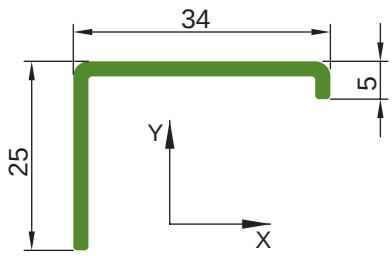


reinforcement symbol	x [mm]	Ix [cm4]	Iy [cm4]
200A3225	2,00	2,5748	0,9811
175A3225	1,75	2,2972	0,8702
150A3225	1,50	2,0061	0,7556
120A3225	1,20	1,7013	0,6373

Sash 67020



Reinforcement
XXXL3425



reinforcement symbol	x [mm]	Ix [cm4]	Iy [cm4]
250L3425	2,50	1,8704	0,7648
200L3425	2,00	1,5934	0,6314
175L3425	1,75	1,4381	0,5612
150L3425	1,50	1,2815	0,4896

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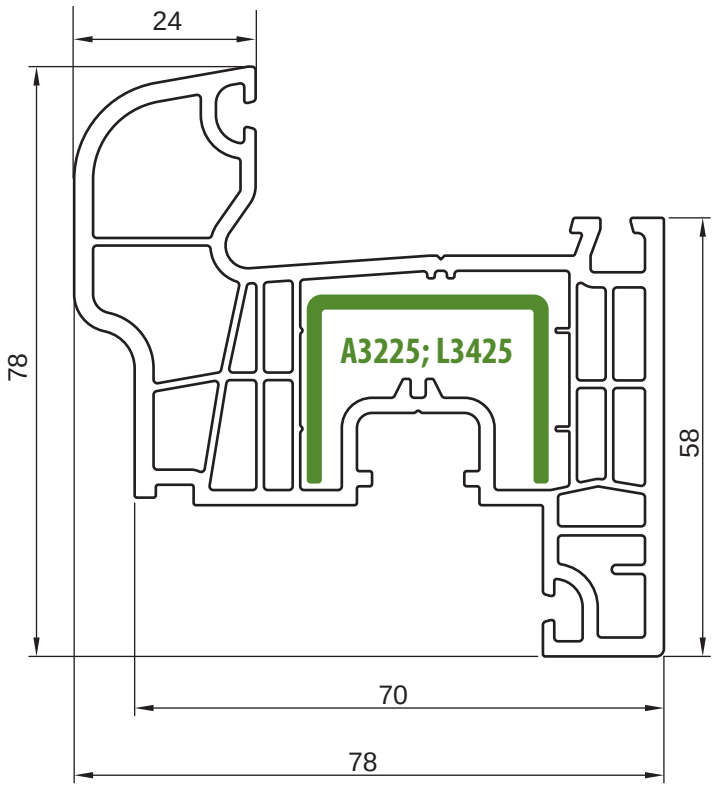
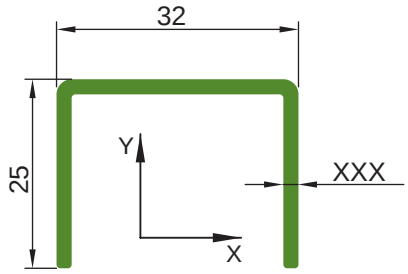
4.3 Flush Sash 67021, Flush Sash 67022

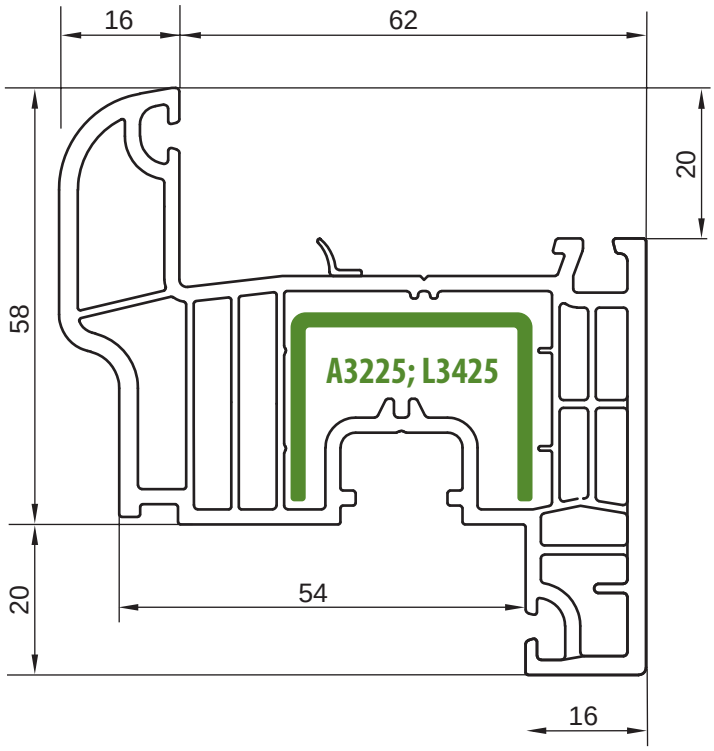
Flush Sash 67021

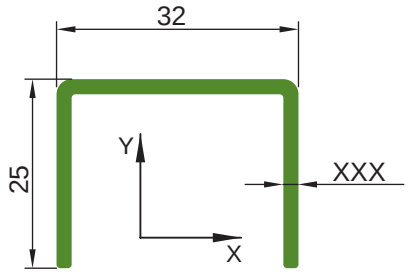




reinforcement symbol	x [mm]	Ix [cm4]	Iy [cm4]
200A3225	2,00	2,5748	0,9811
175A3225	1,75	2,2972	0,8702
150A3225	1,50	2,0061	0,7556
120A3225	1,20	1,7013	0,6373

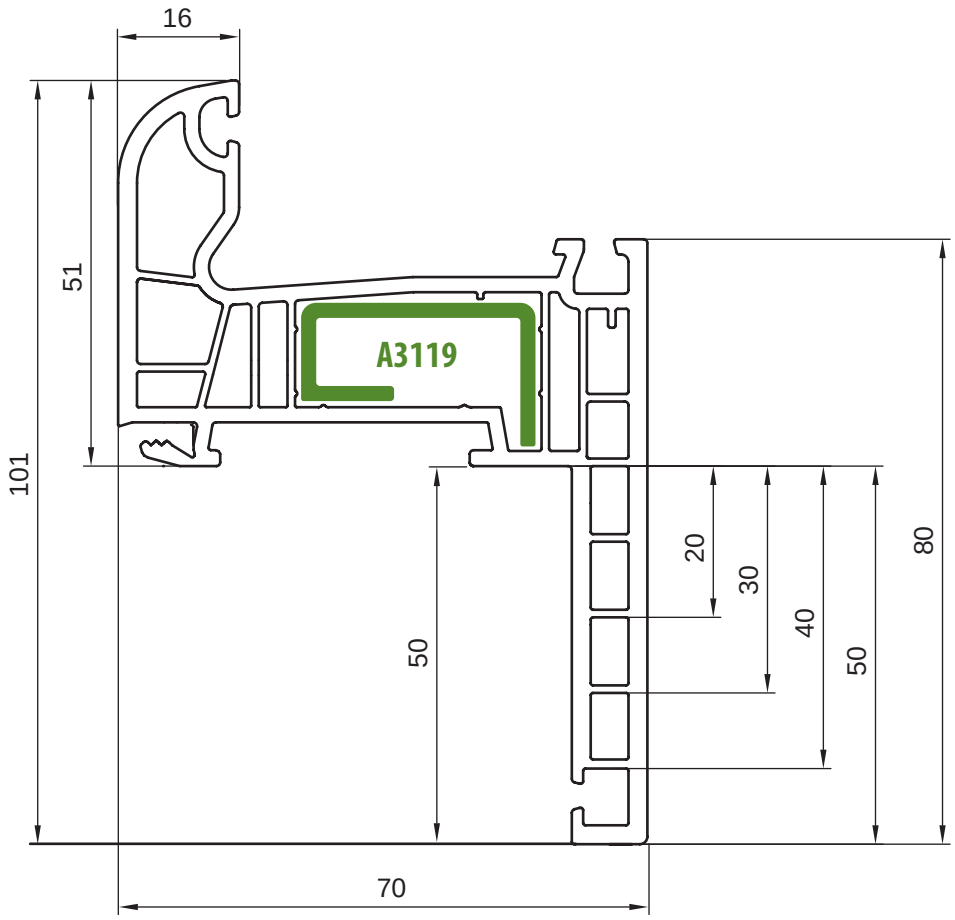
Flush Sash 67022



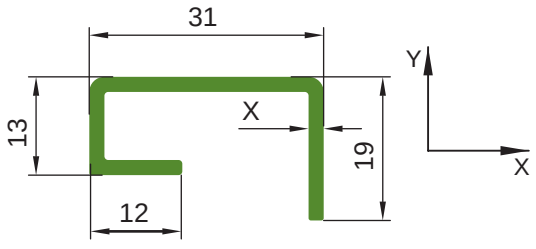


reinforcement symbol	x [mm]	Ix [cm4]	Iy [cm4]
200A3225	2,00	2,5748	0,9811
175A3225	1,75	2,2972	0,8702
150A3225	1,50	2,0061	0,7556
120A3225	1,20	1,7013	0,6373

4.4 Renovation Frame 67012



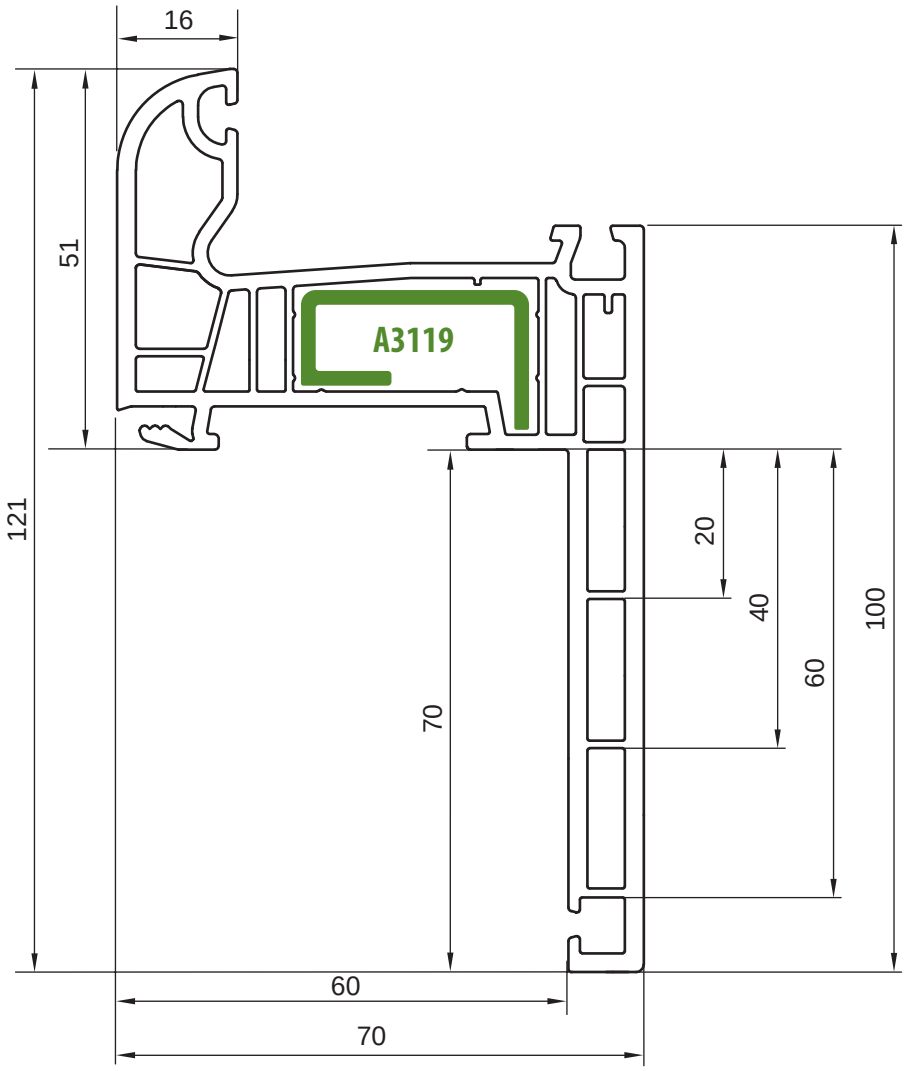
Reinforcement
XXXA3119

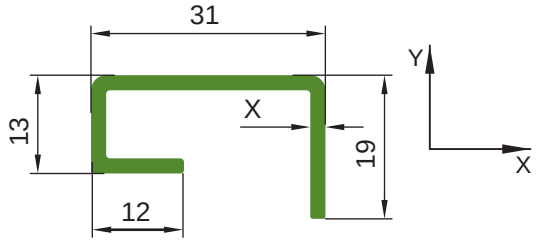


reinforcement symbol	x [mm]	Ix [cm4]	Iy [cm4]
150A3119	1,50	1,41	0,32

Issued: 01.02.2019

4.5 Renovation Frame 67013

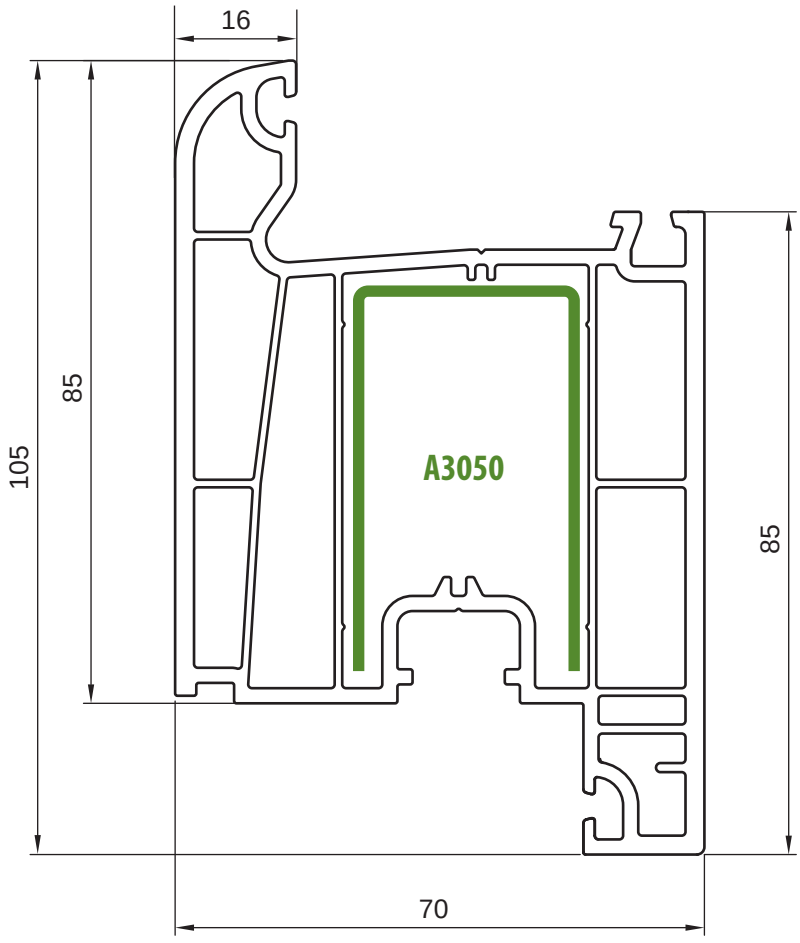


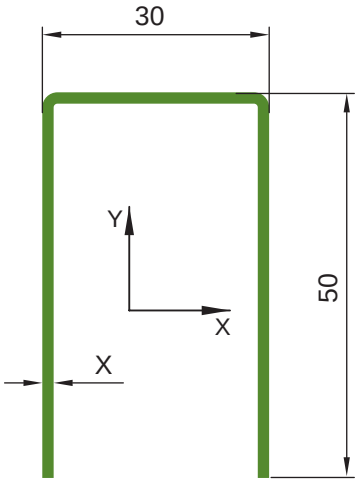


Reinforcement
XXXA3119

reinforcement symbol	x [mm]	Ix [cm4]	Iy [cm4]
150A3119	1,50	1,41	0,32

4.6 In-Opening Balcony Door Sash Z 47022



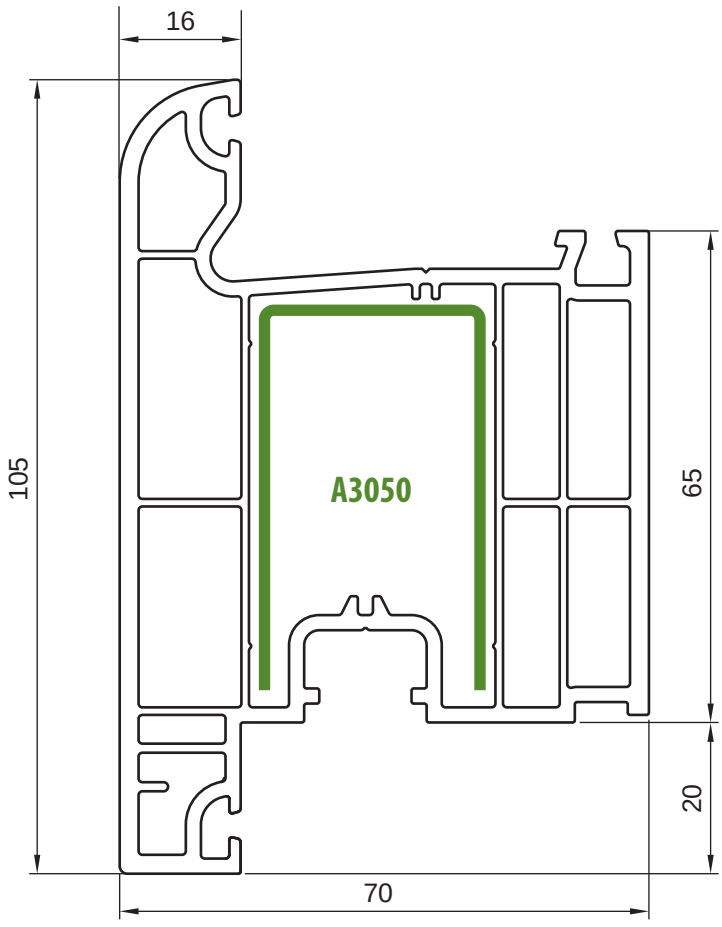


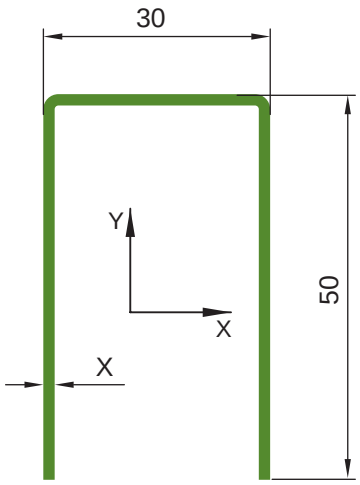
Reinforcement
XXXA3050

reinforcement symbol	x [mm]	Ix [cm4]	Iy [cm4]
150A3050	1,50	3,26	4,94
200A3050	2,00	4,18	6,48

Issued: 01.02.2019

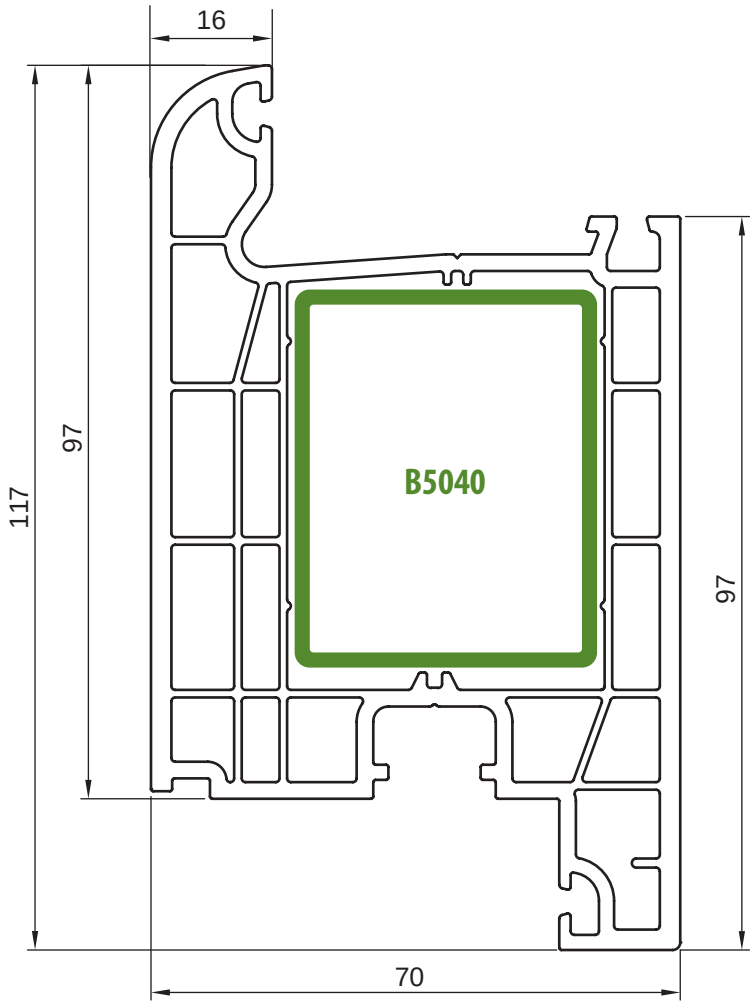
4.7 Out-Opening Balcony Door Sash T 47023

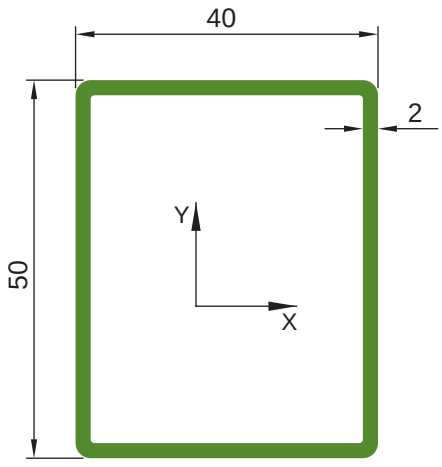




reinforcement symbol	x [mm]	Ix [cm4]	Iy [cm4]
150A3050	1,50	3,26	4,94
200A3050	2,00	4,18	6,48

4.8 In-Opening Door Sash Z 47020



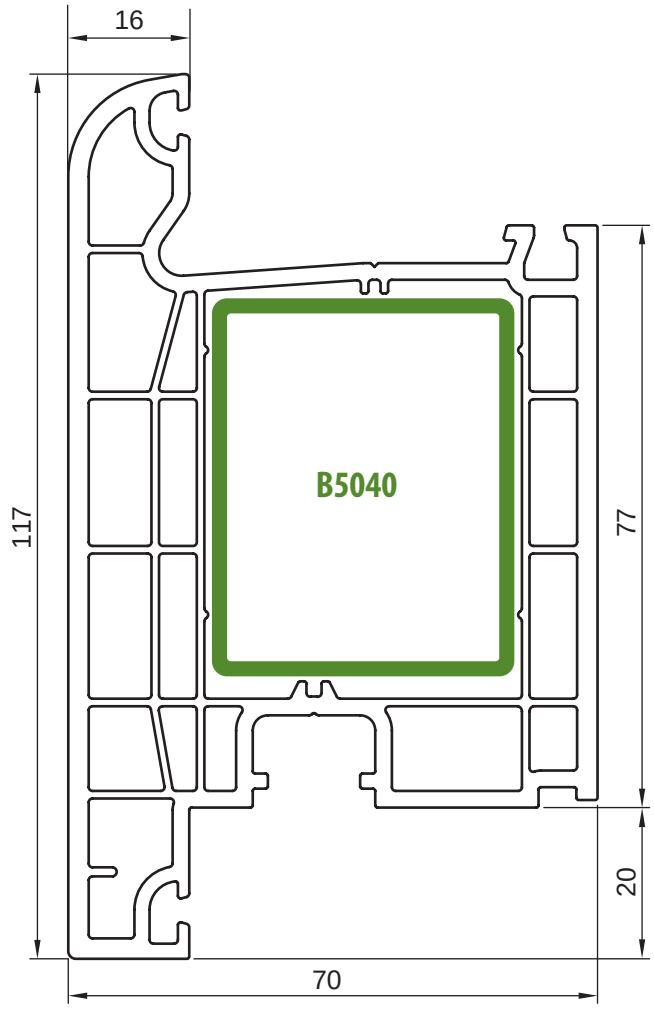


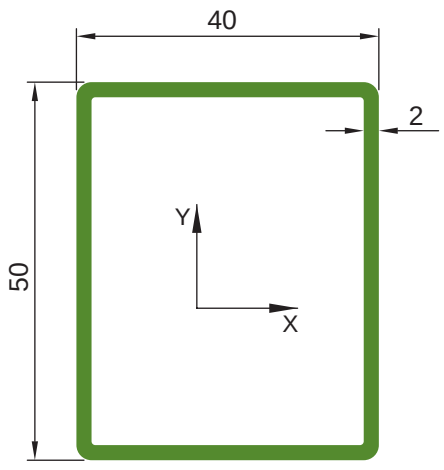
Reinforcement
200B5040

reinforcement symbol	x [mm]	Ix [cm4]	Iy [cm4]
200B5040	2.00	8.657	12.154

Issued: 01.02.2019

4.9 Out-Opening Door Sash T 47021

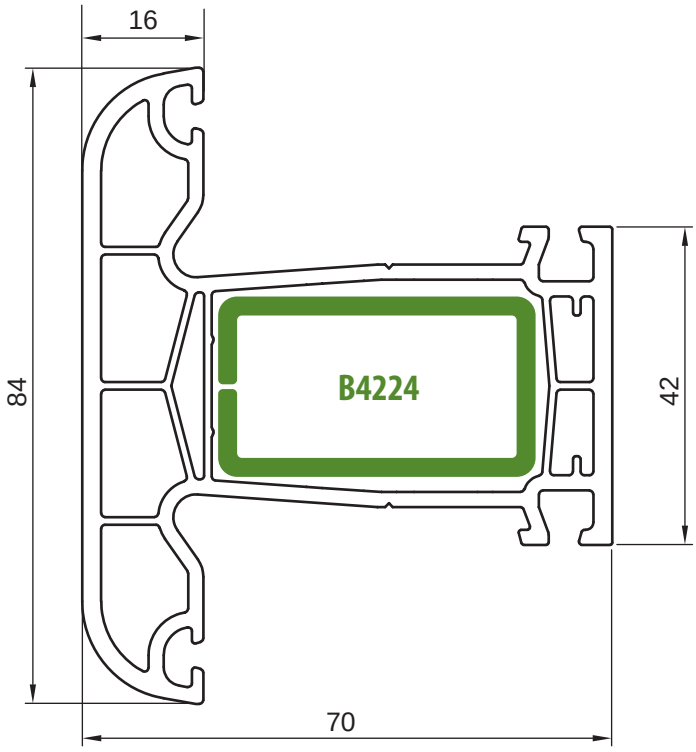


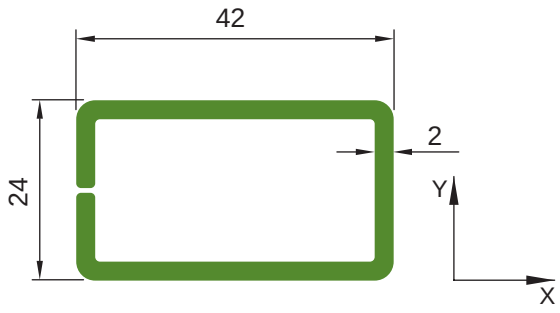


Reinforcement
200B5040

reinforcement symbol	x [mm]	Ix [cm4]	Iy [cm4]
200B5040	2.00	8.657	12.154

4.10 Transom/Mullion 47030





Reinforcement
XXXB4224

reinforcement symbol	x [mm]	Ix [cm4]	Iy [cm4]
200B4224	2,00	5,5	2,3

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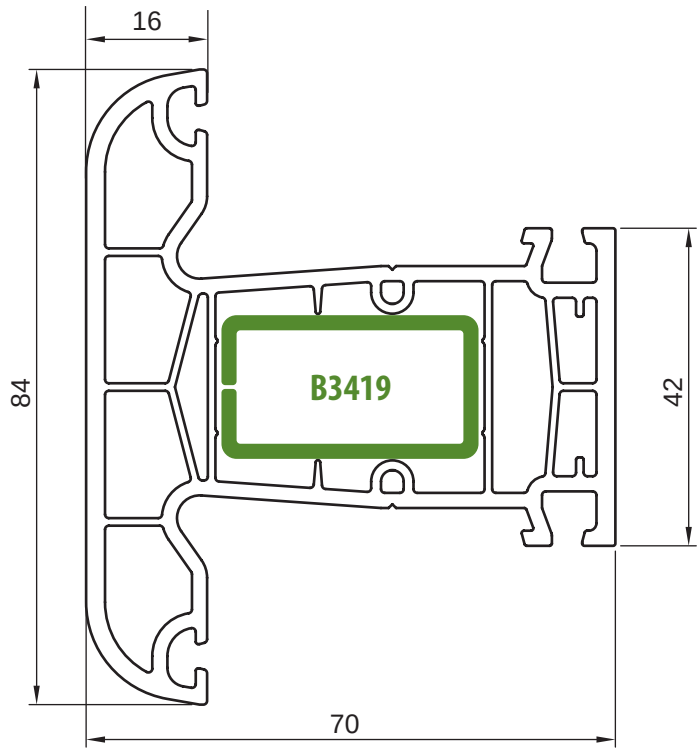
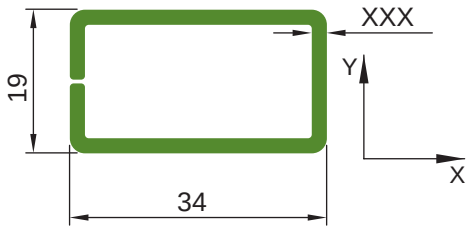
4.11 Transom/Mullion 57030

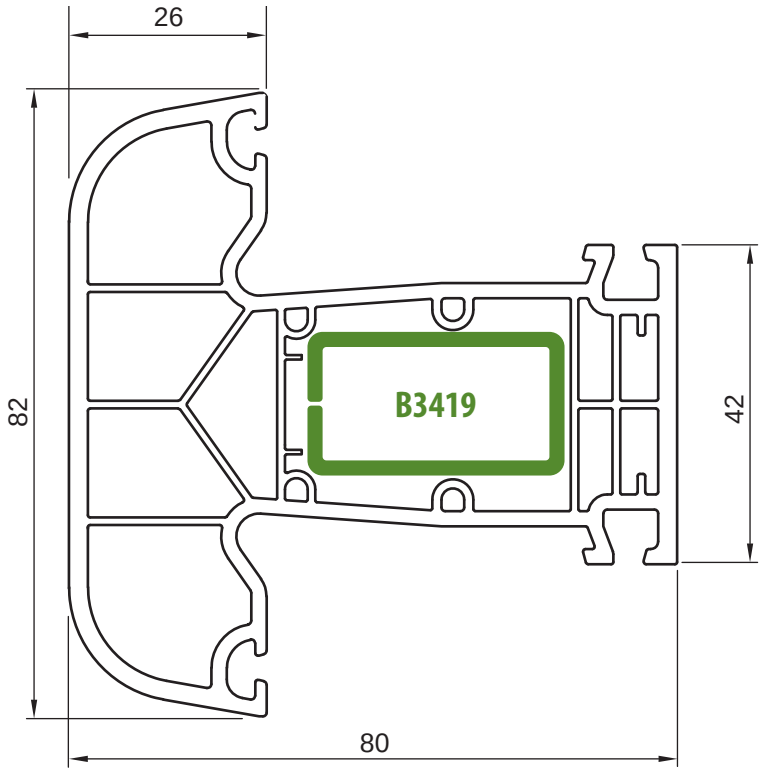


Reinforcement
XXXB3419

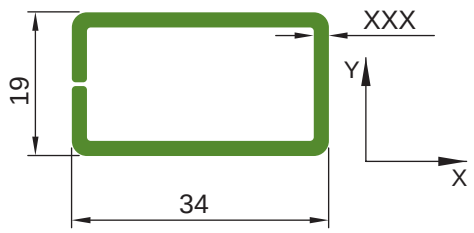


reinforcement symbol	x [mm]	Ix [cm4]	Iy [cm4]
250B3419	2,50	3,2010	1,2376
200B3419	2,00	2,7280	1,0719
175B3419	1,75	2,4626	0,9755
150B3419	1,50	2,1962	0,8752
120B3419	1,20	1,9071	0,7288

4.12 Transom/Mullion 68030



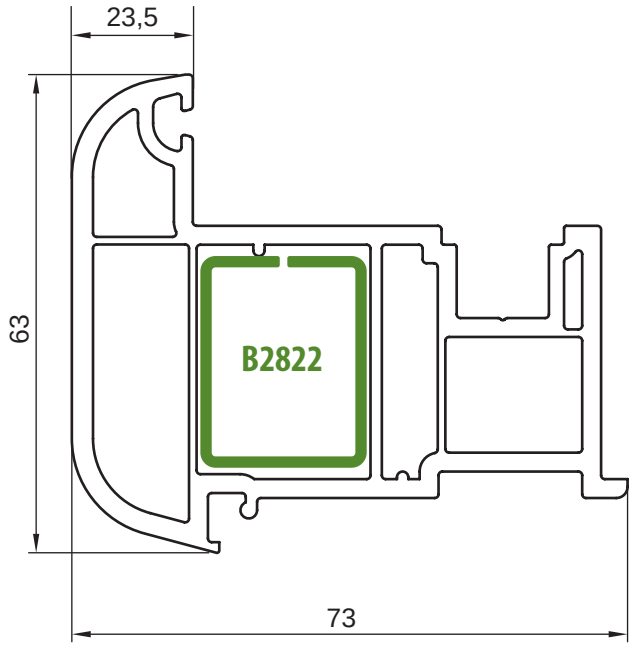
Reinforcement
XXXB3419



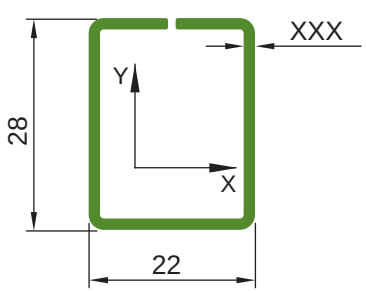
reinforcement symbol	x [mm]	Ix [cm4]	Iy [cm4]
250B3419	2,50	3,2010	1,2376
200B3419	2,00	2,7280	1,0719
175B3419	1,75	2,4626	0,9755
150B3419	1,50	2,1962	0,8752
120B3419	1,20	1,9071	0,7288

Issued: 01.02.2019

4.13 Meeting Rail 57031



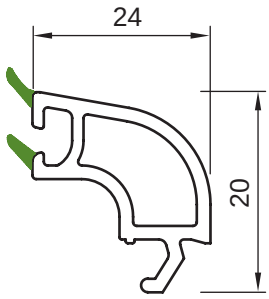
Reinforcement XXXB2822



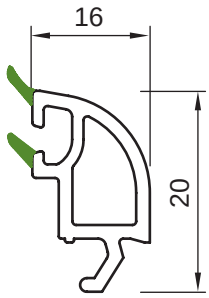
reinforcement symbol	x [mm]	Ix [cm4]	Iy [cm4]
250B2822	2,50	1,506	2,197
200B2822	2,00	1,282	1,854
175B2822	1,75	1,155	1,664
150B2822	1,50	1,019	1,463

4.14 Glazing Beads, Coupling Mullions

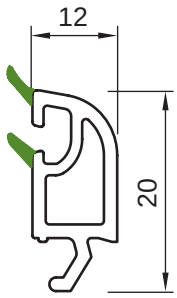
glazing bead 57040
glazing unit 24 mm
*glazing unit 32 mm



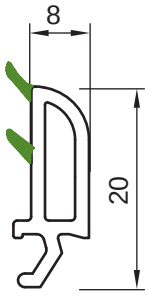
glazing bead 57041
glazing unit 32 mm
*glazing unit 40 mm



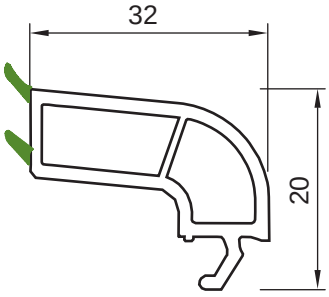
glazing bead 57042
glazing unit 36 mm
*glazing unit 44 mm



glazing bead 57043
glazing unit 40 mm
*glazing unit 48 mm

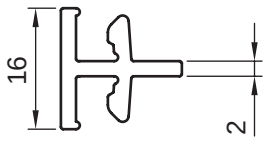


glazing bead 57044
glazing unit 16 mm
*glazing unit 24 mm

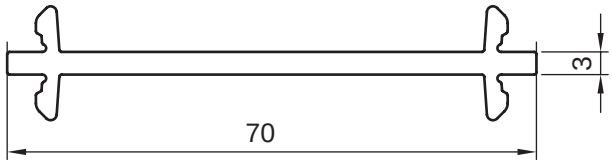


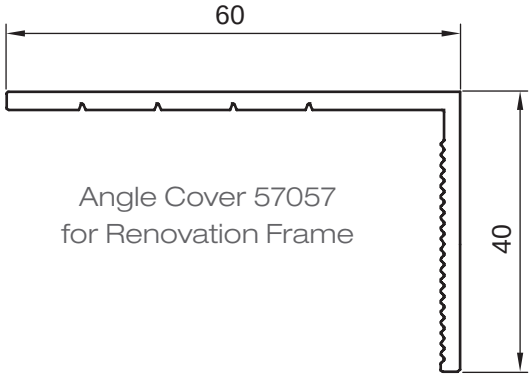
*Glazing unit with sash 67022

H Coupling 57052



Coupling Profile 57053





Angle Cover 57057
for Renovation Frame

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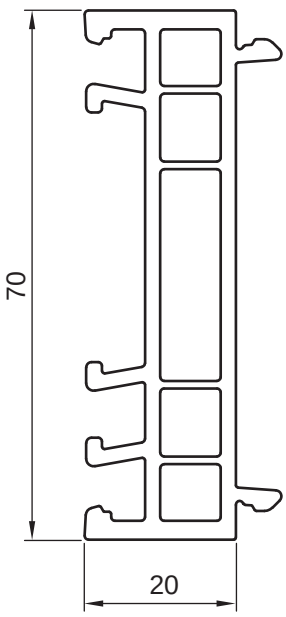
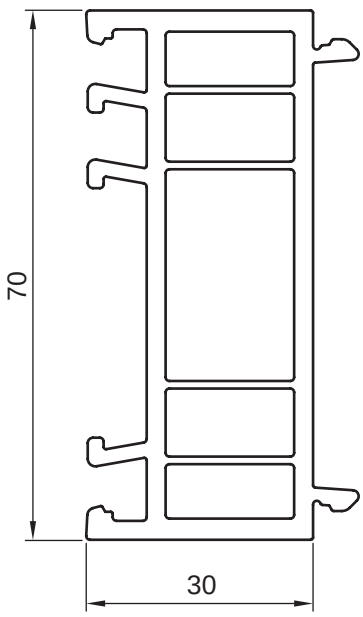
4.15 Frame Packers

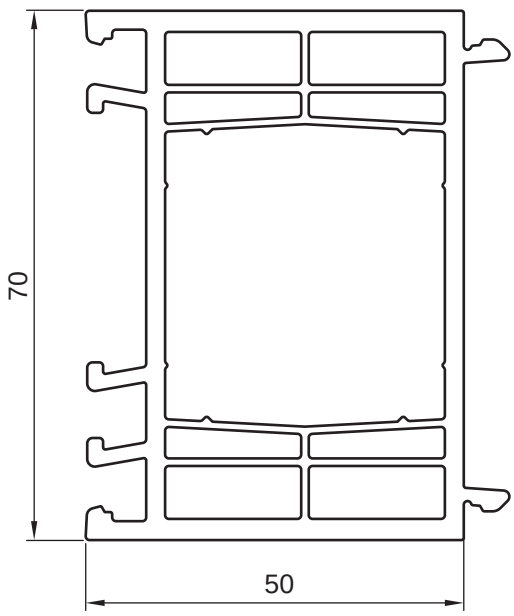
Packer 20mm 57054



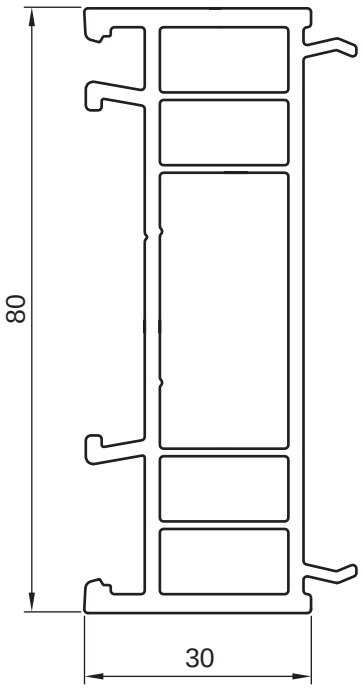
Packer 30mm 57055



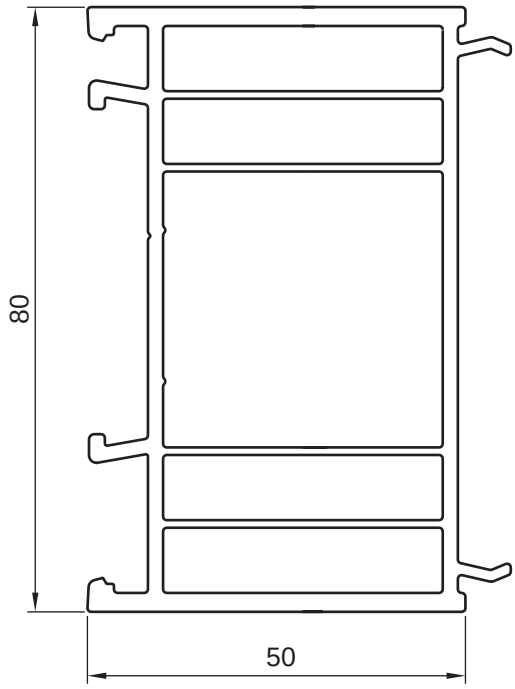
Packer 50mm 57056



Packer 30mm 68055

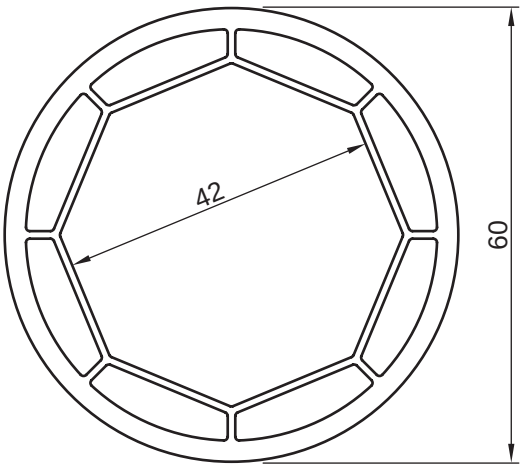


Packer 50mm 68056

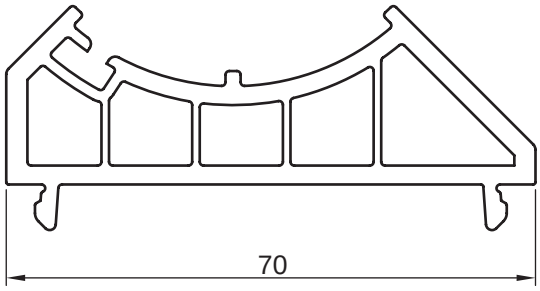


4.16 Bay Pole 57061 & Bay Pole Adapter 57062

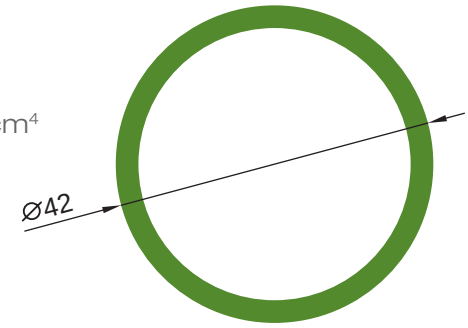
Bay pole 57061



Bay pole adapter 57062



Reinforcement Ø 42/3.0
Weight: 2,950±3% g/m
Moment of inertia I=7.0297 cm^4



reinforcement symbol	x [mm]	Ix [cm4]	Iy [cm4]
Fi42/3,0	3,00	7,0297	7,0297

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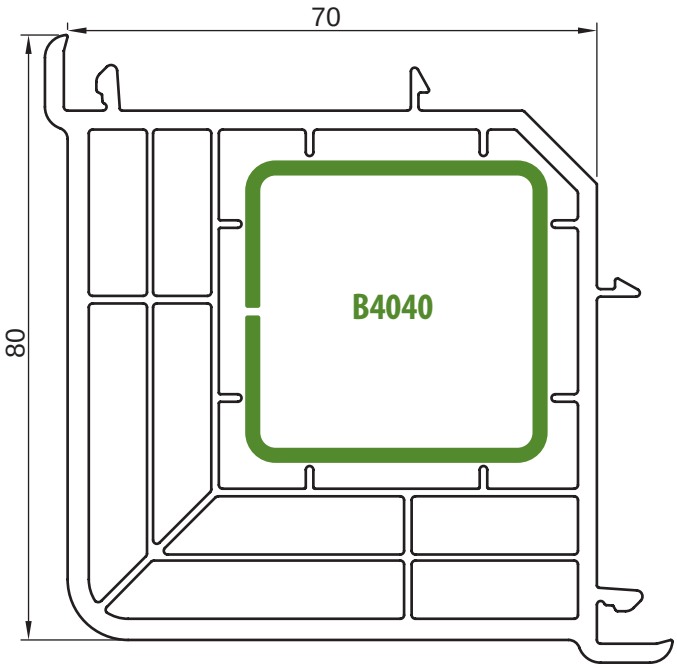
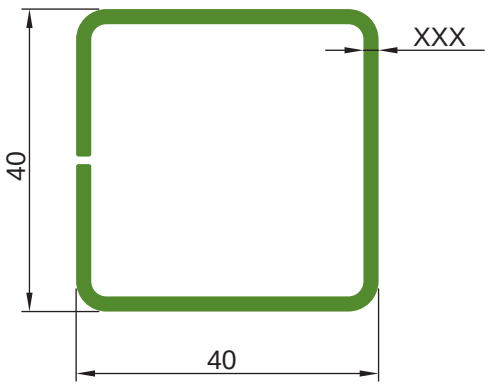
4.17 90° Bay Post – 57063, Structural Transom/Mullion 57067

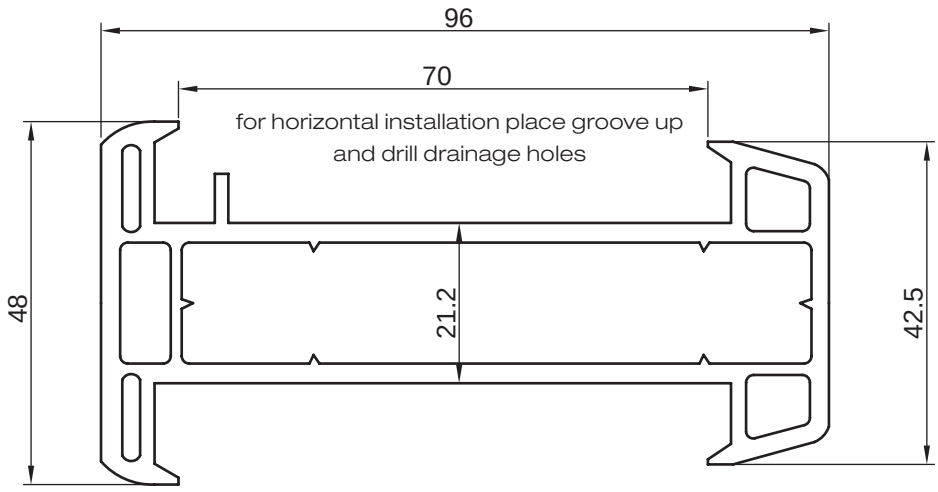
90° bay post 57063

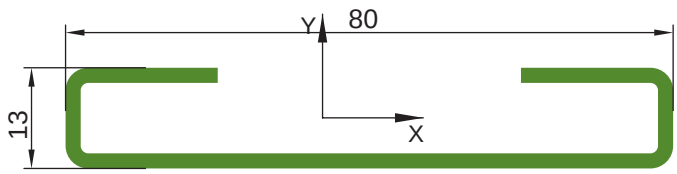




reinforcement symbol	x [mm]	Ix [cm4]	Iy [cm4]
250B4040	2,50	8,5361	8,6275
200B4040	2,00	7,1321	7,2076
175B4040	1,75	6,3766	6,4440
150B4040	1,50	5,5843	5,6432

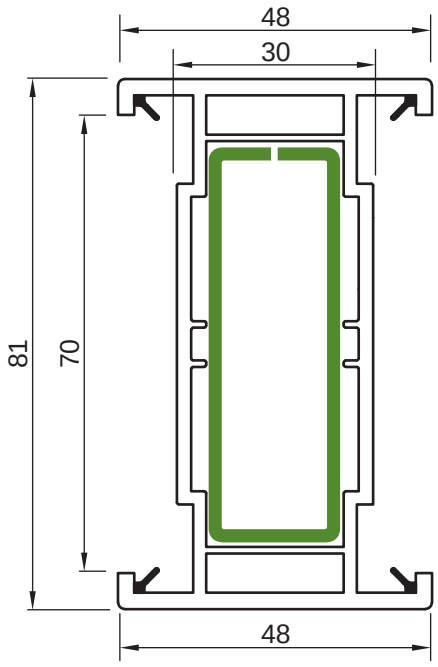
Structural transom/mullion57067 with steel reinforcement 200S1380120

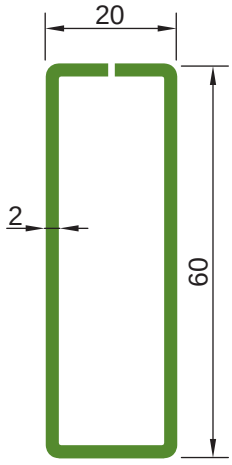




Steel section s=2.0 mm Ix-20.4 cm⁴

4.18 Structural Transom/Mullion 57068





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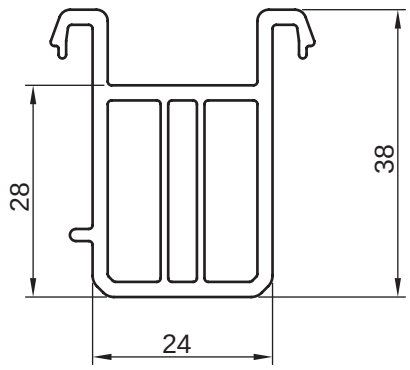
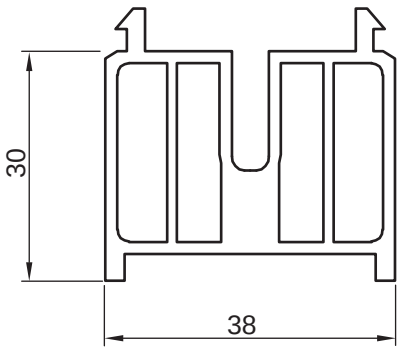
4.19 Cill Packers, Gaskets & Sealings

Cill packer 57069



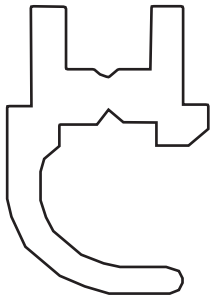
Cill packer 57070



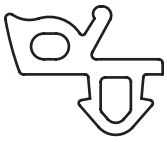
Gaskets & Sealings

Gasket 57071

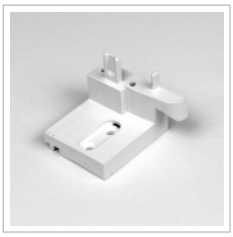
Threshold sealing 47054



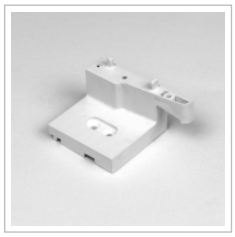
Gasket touching glass 57074



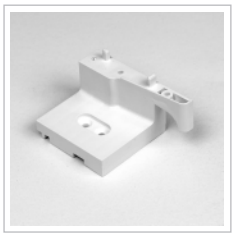
4.20 Accessories



47051
Threshold Connector Prestige

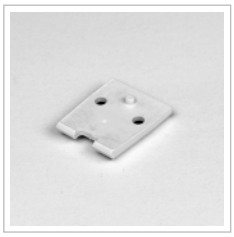


58651K
Threshold Connector Prestige Therm



58651
Threshold Connector Prestige Therm

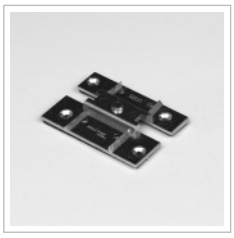
57085
Transom/Mullion PVC joint Prestige



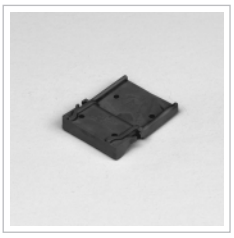
57085
Transom/Mullion PVC joint Prestige

57083
Transom/Mullion Metal Joint Prestige

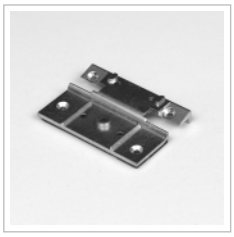
68685
Transom/Mullion PVC Joint Prestige Therm



68683
Transom/Mullion Metal Joint Prestige Therm



68085
Transom/Mullion PVC Joint Prestige Therm Light

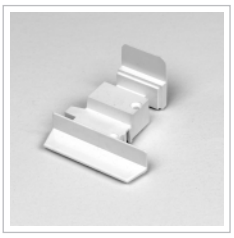


68083
Transom/Mullion Metal Joint Prestige Therm Light

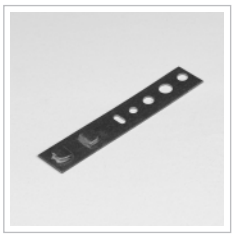
57084
Meeting Rail End Cap Prestige

68684
Meeting Rail End Cap Prestige Therm

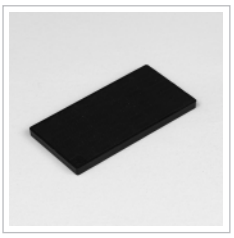
68084
Meeting Rail End Cap Prestige Therm Plus



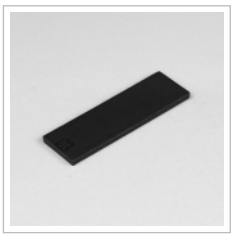
68684K
Meeting Rail End Cap Prestige Therm Light



57082
Fixing lug

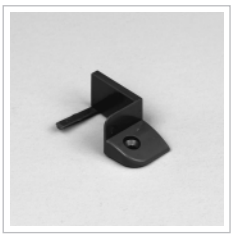


68681
Spacer for Glazing



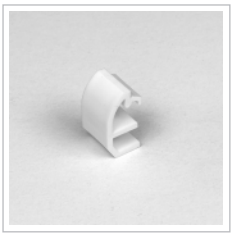
57081
Spacer for Glazing

57080
Glazing packer

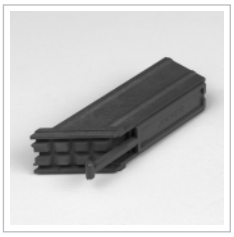


47057
Drip Bar End Cap

58658
Drip Bar End Cap



57086
Sash Packer



47053
Corner welding block

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5. Detail Sheets

5.1 Frame 67010 – Fixed Glazing, 32 mm glazing unit

5.2 Frame 67010 + Sash 67020 – 24 mm glazing unit

5.3 Frame 67010 + Sash 67021 – 32 mm glazing unit

5.4 Frame 67011 + Sash 67020 – 32 mm glazing unit

5.5 Frame 67011 + Sash 47021 – 32 mm glazing unit

5.6 Frame 67011 + Sash 47020 – 32 mm glazing unit

5.7 Frame 67011 + Sash 47023 – 32 mm glazing unit

5.8 Frame 67011 + Sash 47022 – 32 mm glazing unit

5.9 Renovation Frame 67012 + Sash 67021 – 32 mm glazing unit

5.10 Transom/Mullion 57030 – 24 mm and 32 mm glazing unit

5.11 Sash 67020 + Transom/Mullion 57030 + Sash 57020 – 24 mm and 32 mm glazing unit

5.12 Sash 67021 + Transom/Mullion 57030 + Sash 57021 – 24 mm and 32 mm glazing unit

5.13 Frame 68010 – Fixed glazing, 24 mm and 32 mm glazing unit

5.14 Frame 68010 + Sash 67020 – 24 mm glazing unit

5.15 Frame 68010 + Sash 67021 – 24 mm glazing unit

5.16 Frame 68010 + Sash 67022 – 24 mm glazing unit

5.17 Frame 68010 + Sash 67022 – 44 mm glazing unit

5.18 Frame 68010 + Sash 67022 – 48 mm glazing unit

5.19 Transom/Mullion 68030 – 24 mm glazing unit

5.20 Transom/Mullion 68030 – fixed glazing + sash 67021 – 24 mm glazing unit

5.21 Sash 67022 + Transom/Mullion 68030 + sash 67022 – 48 mm glazing unit

5.22 Door Sash 47020 + Door Threshold 47050 with Brush Sealing

5.23 Door Sash 47020 + Door Threshold 47050 with EPDM Sealing

5.24 Frame 67010 with 90° Bay Post 57063

5.25 Frame 67010 with Coupling Profiles 57052, 57053

5.26 Frame 67010 with Structural Coupling 57068

5.27 Frame 67010 with Structural Coupling 57067

5.28 Frames 57010 with Bay Pole 57061 + 57062

5.29 Frame 57010 + Cill packers 57069 and 57070

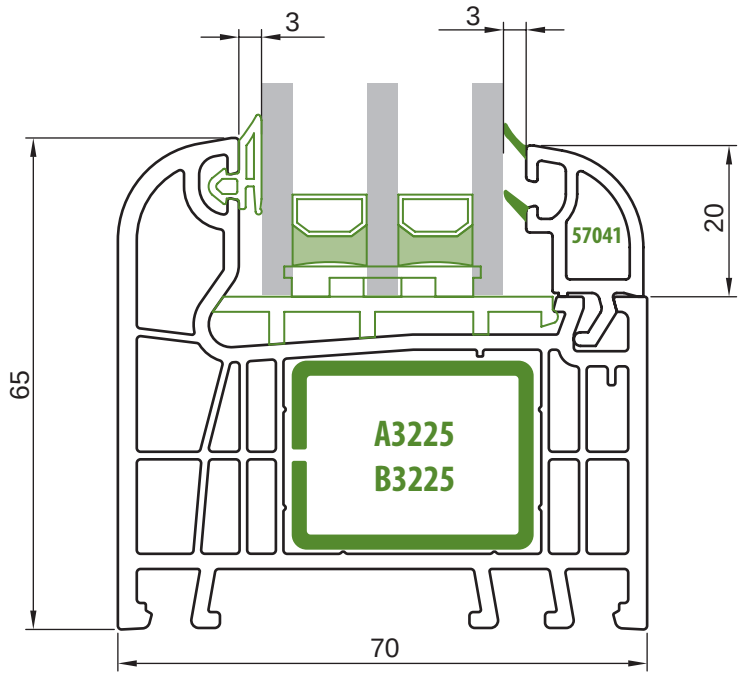
5.30 Frame 67011 + Windstop 47059 + Sash 47021 + Aerostop 47060

SS – Fixed Glazing

US – Brush Sealing

UP – Threshold Sealing

5.1 Frame 67010 – Fixed Glazing, 32 mm glazing unit



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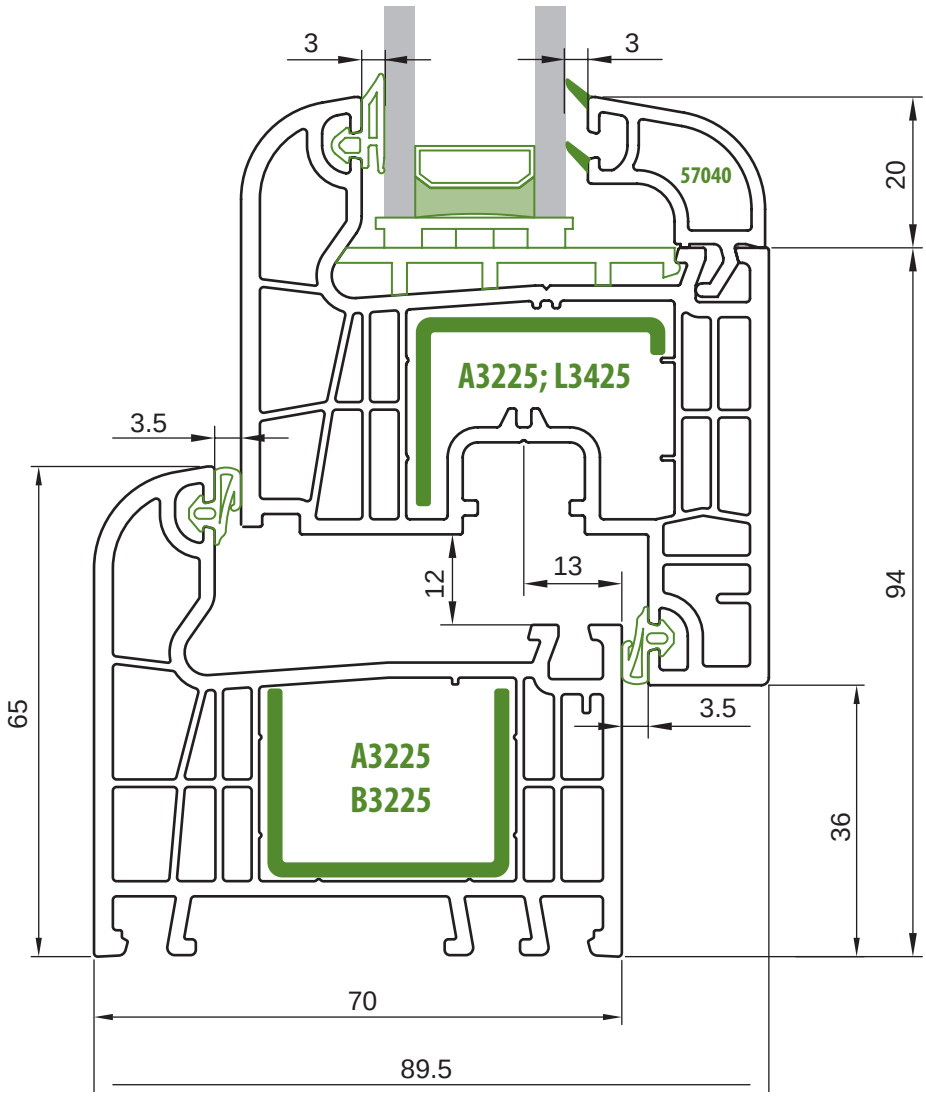
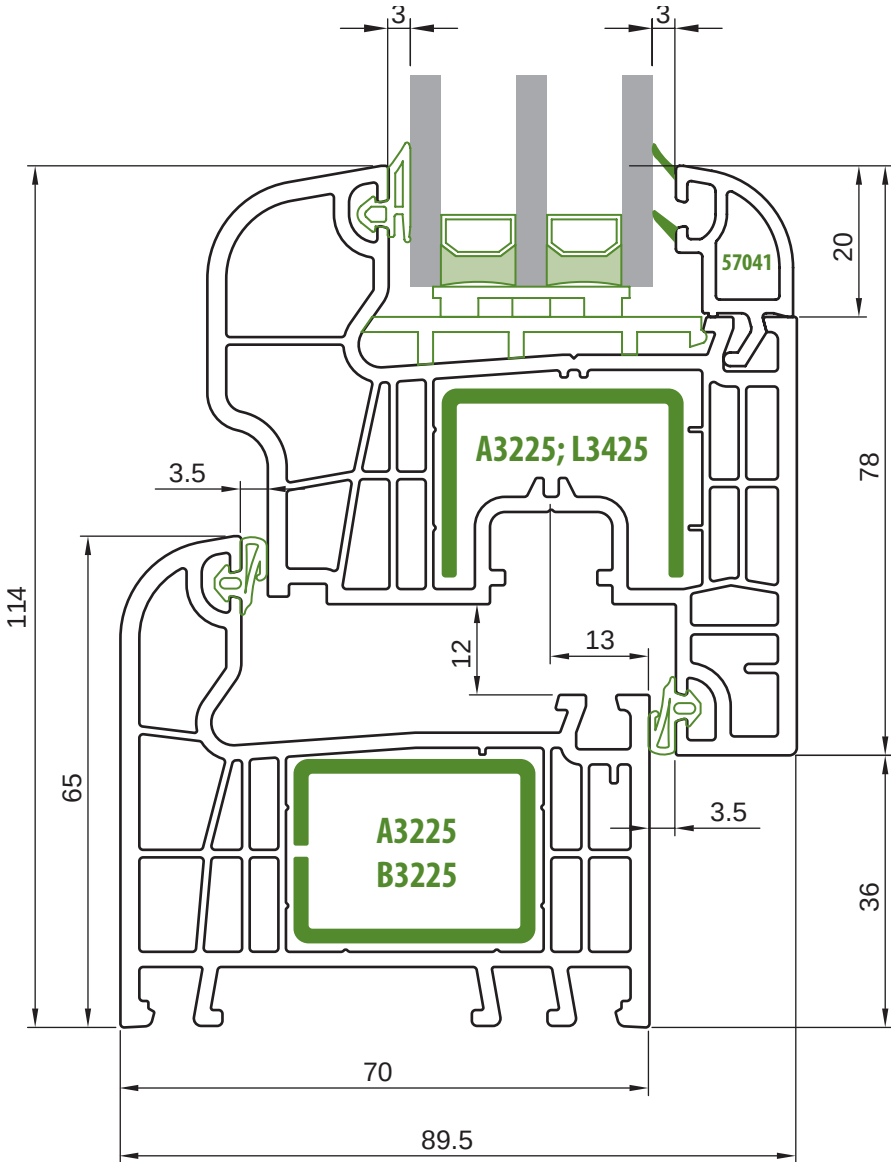
5. Detail Sheets

5.2 Frame 67010 + Sash 67020 – 24 mm glazing unit



5.3 Frame 67010 + Sash 67021 – 32 mm glazing unit



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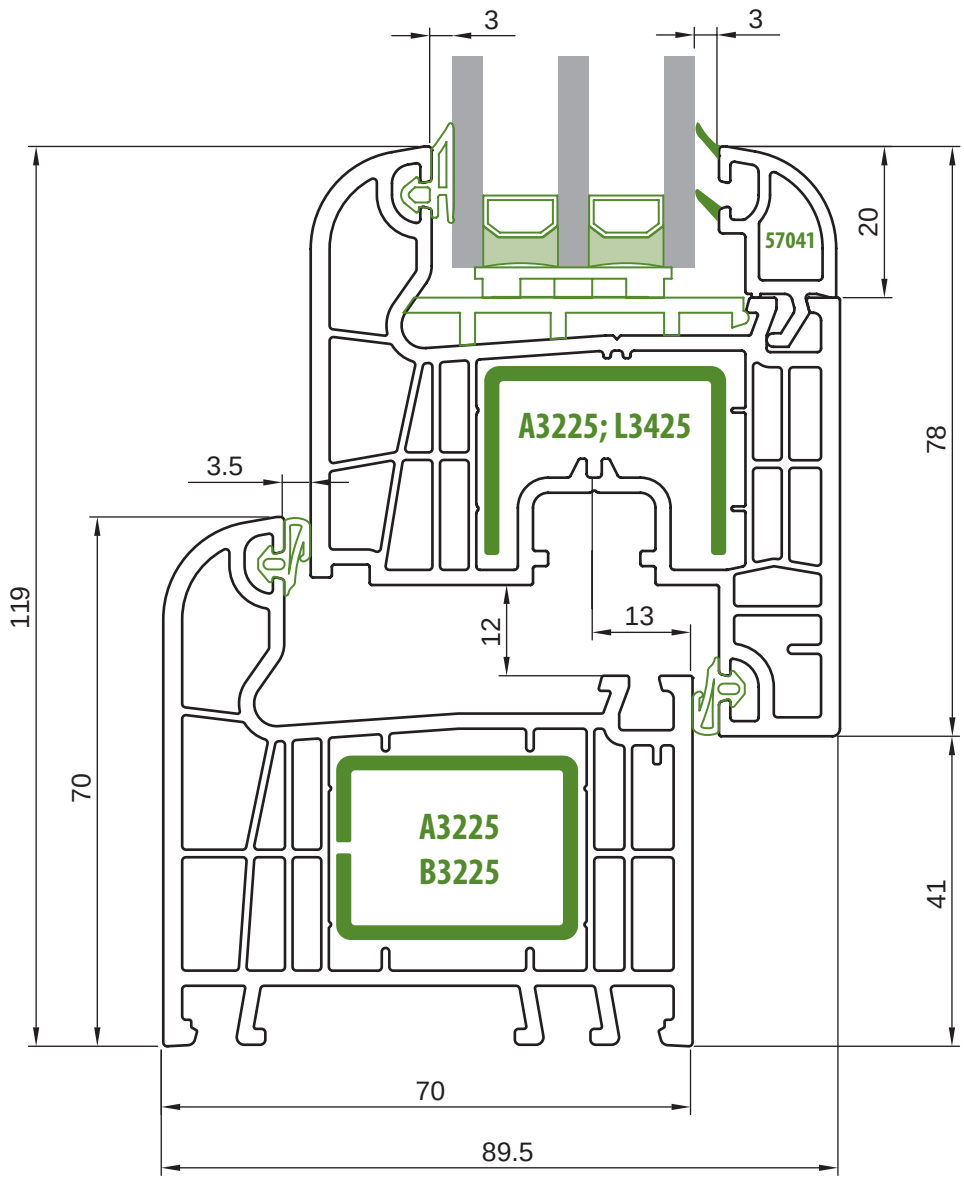
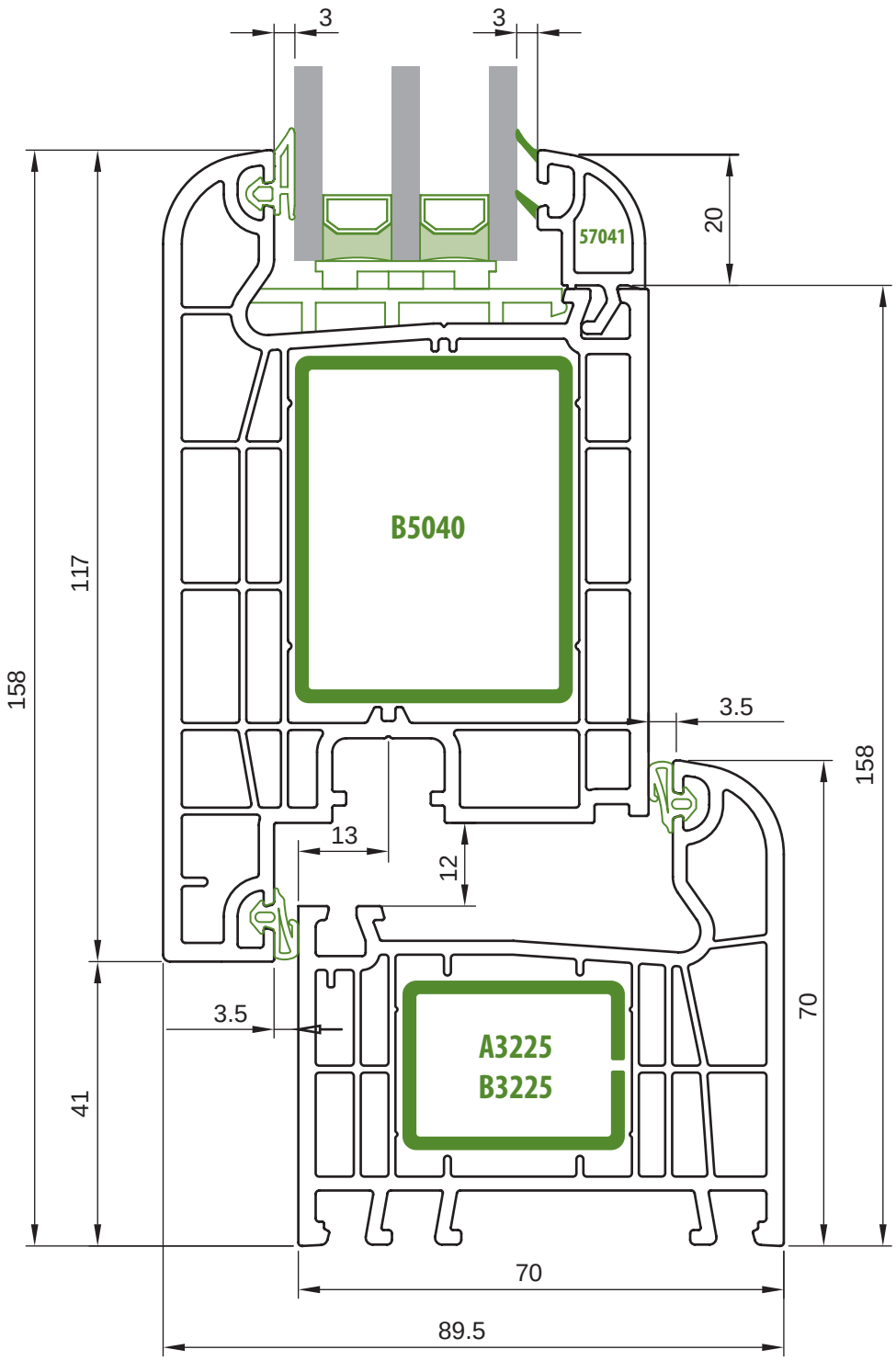
5.4 Frame 67011 + Sash 67020 – 32 mm glazing unit



5.5 Frame 67011 + Sash 47021 – 32 mm glazing unit



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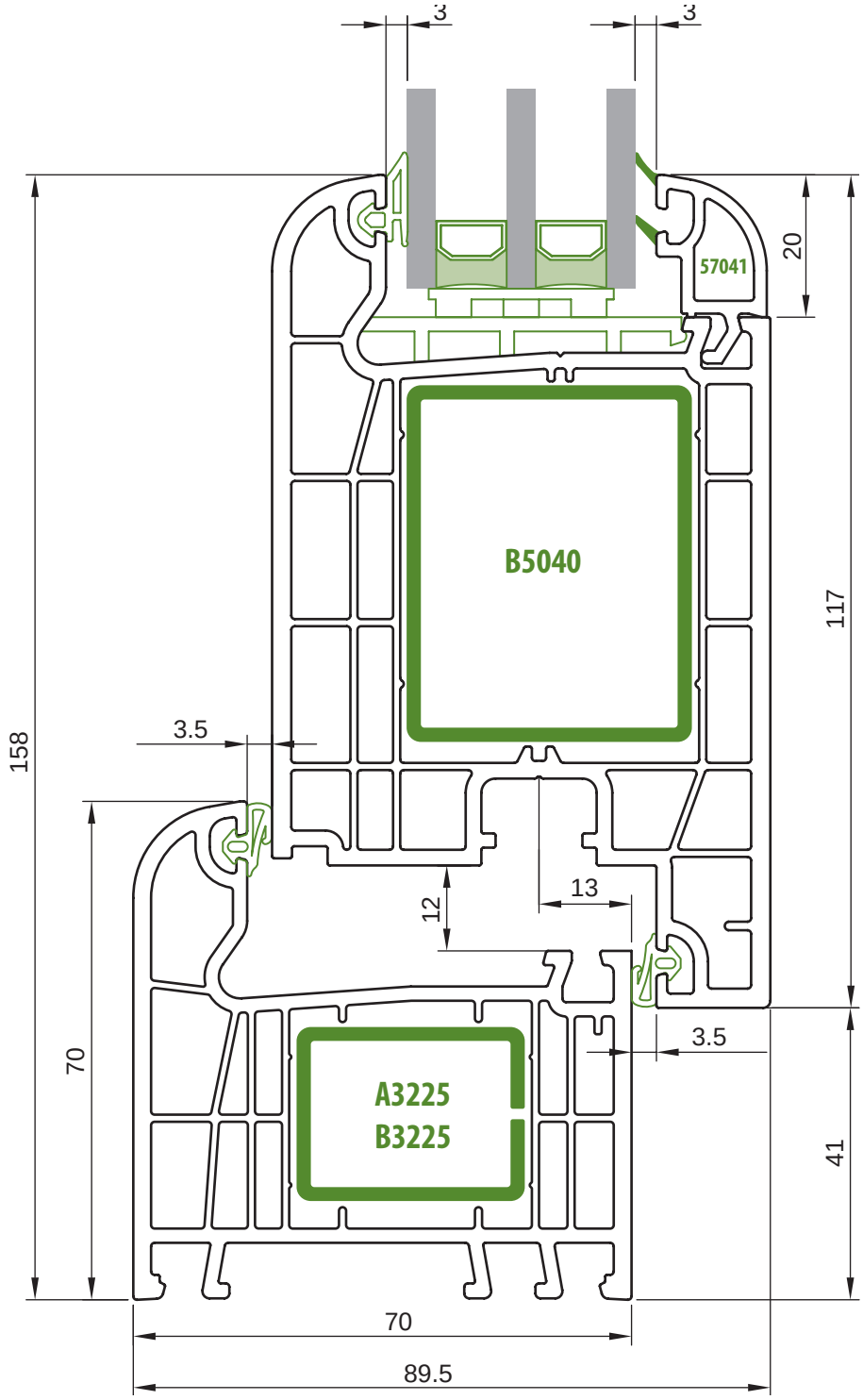
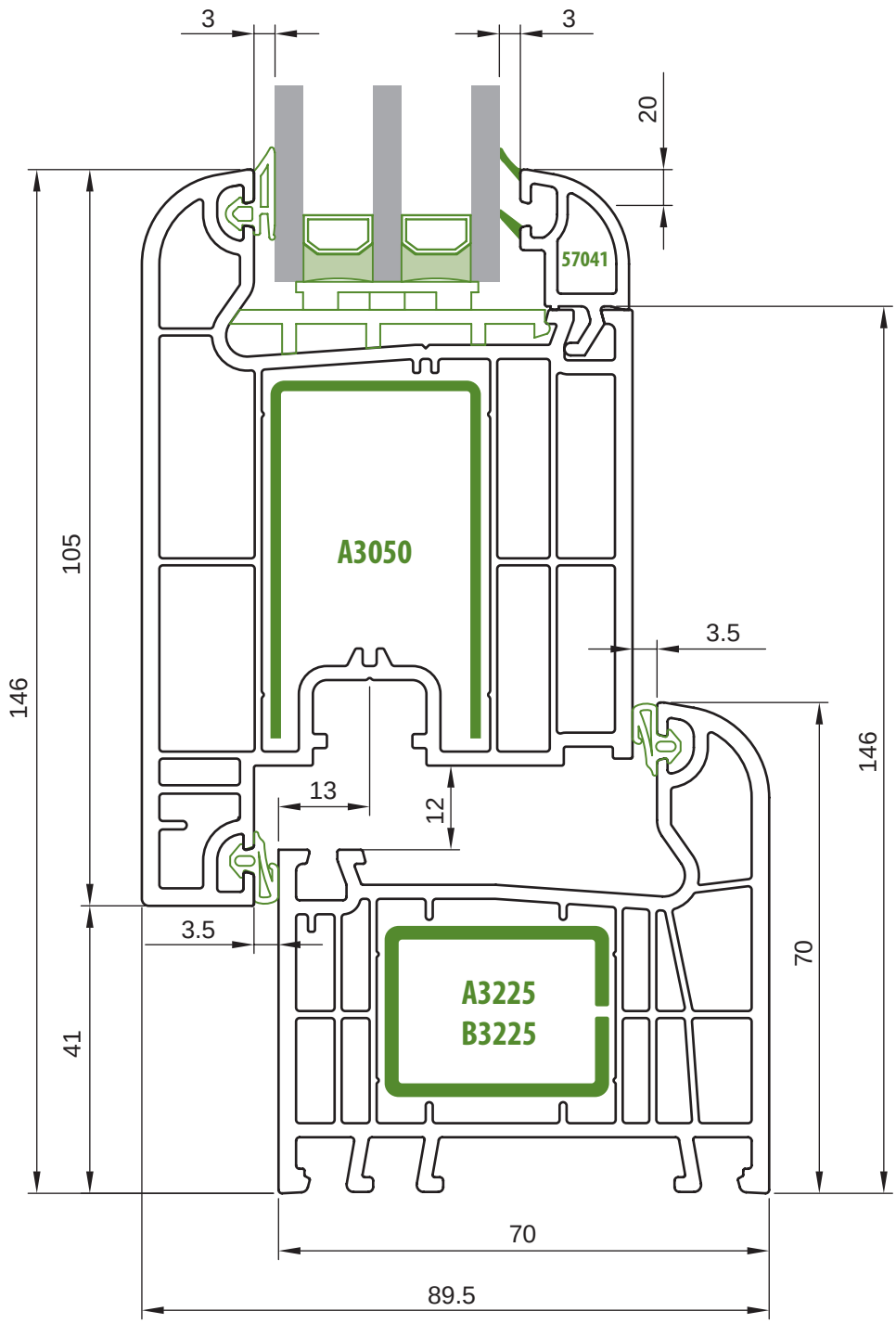
5.6 Frame 67011 + Sash 47020 – 32 mm glazing unit



5.7 Frame 67011 + Sash 47023 – 32 mm glazing unit



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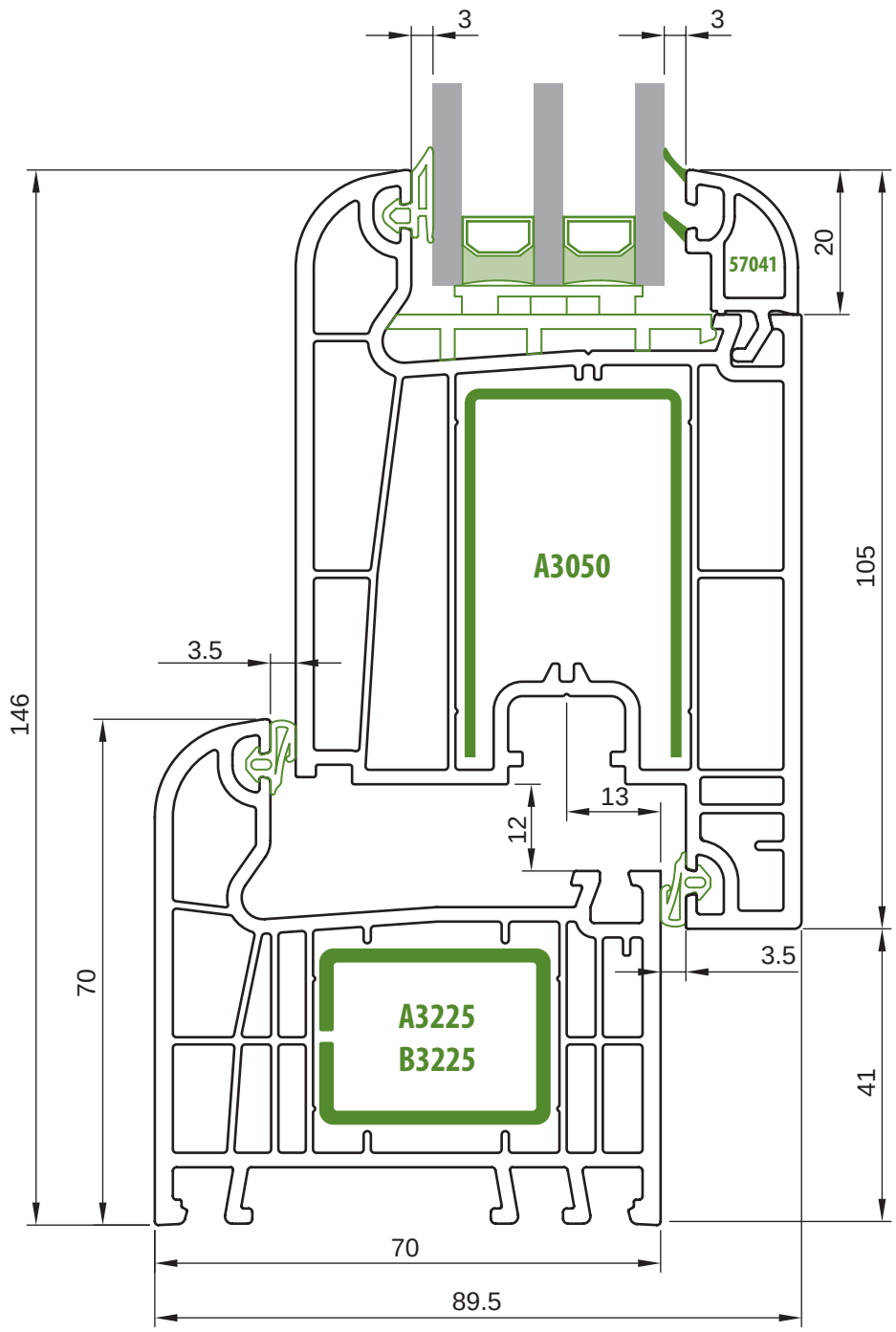
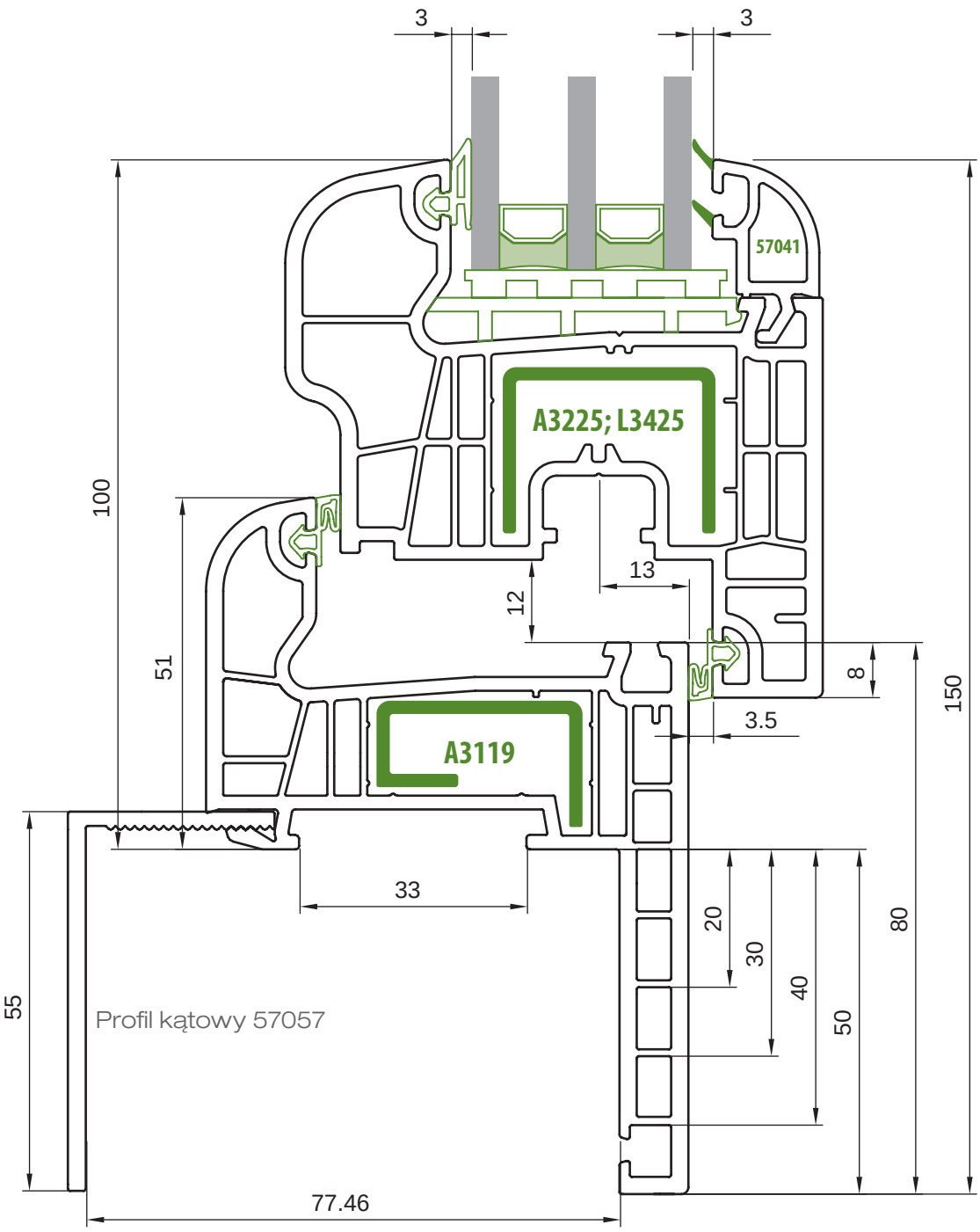
5.8 Frame 67011 + Sash 47022 – 32 mm glazing unit



5.9 Renovation Frame 67012 + Sash 67021 – 32 mm glazing unit



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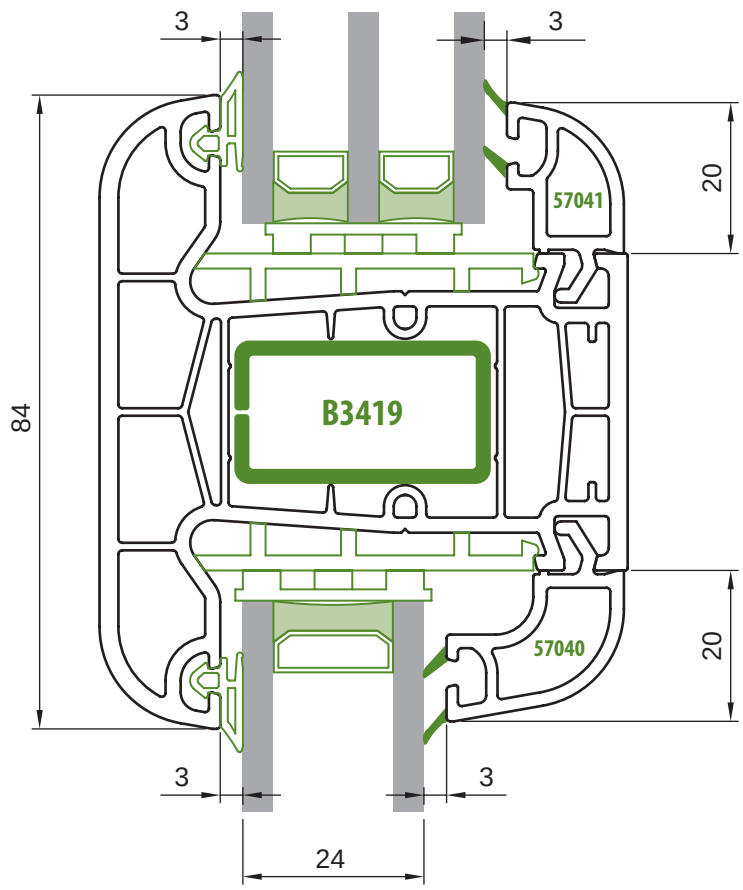
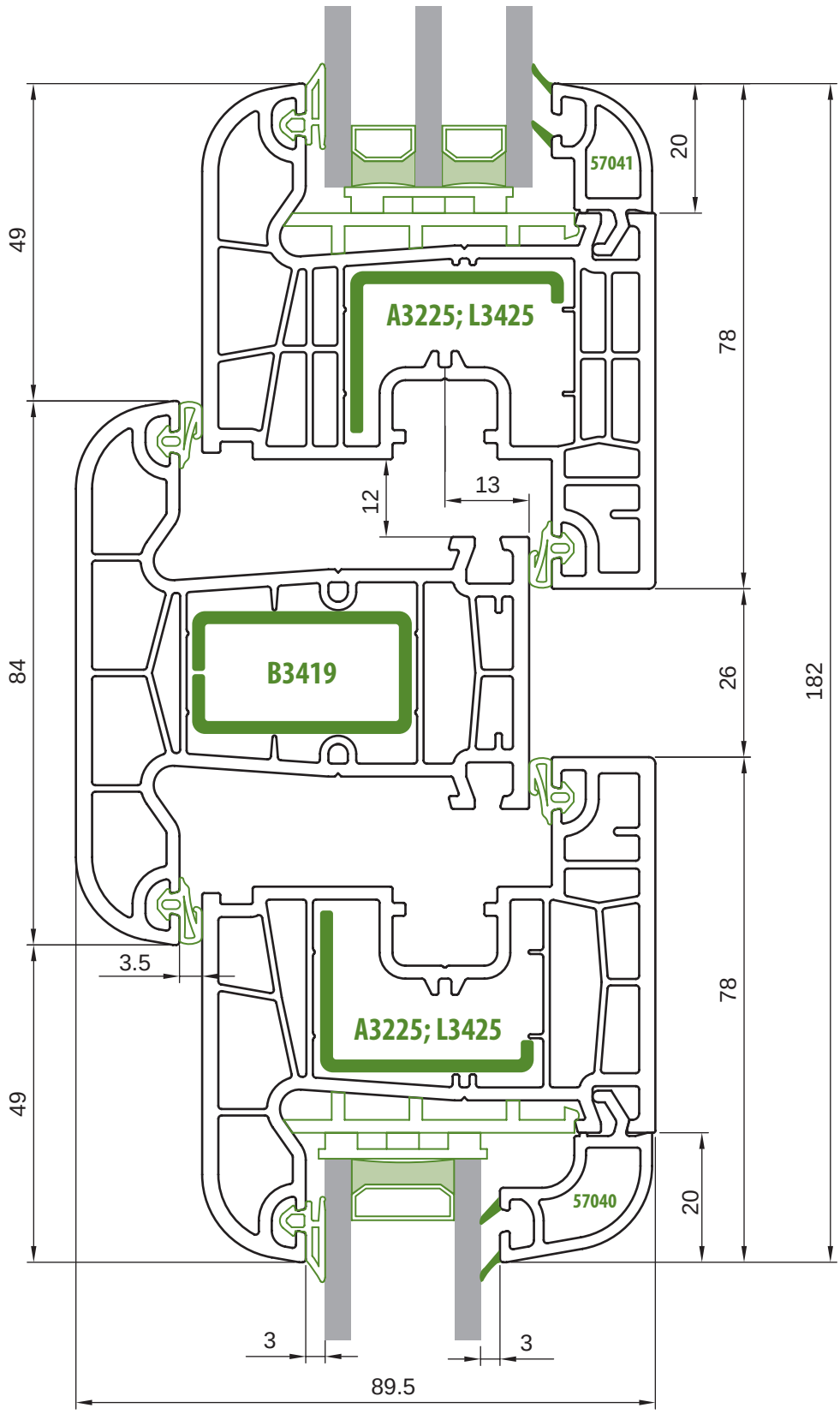
5.10 Transom/Mullion 57030 – 24 mm and 32 mm glazing unit



5.11 Sash 67020 + Transom/Mullion 57030 + Sash 57020 – 24 mm and 32 mm glazing unit



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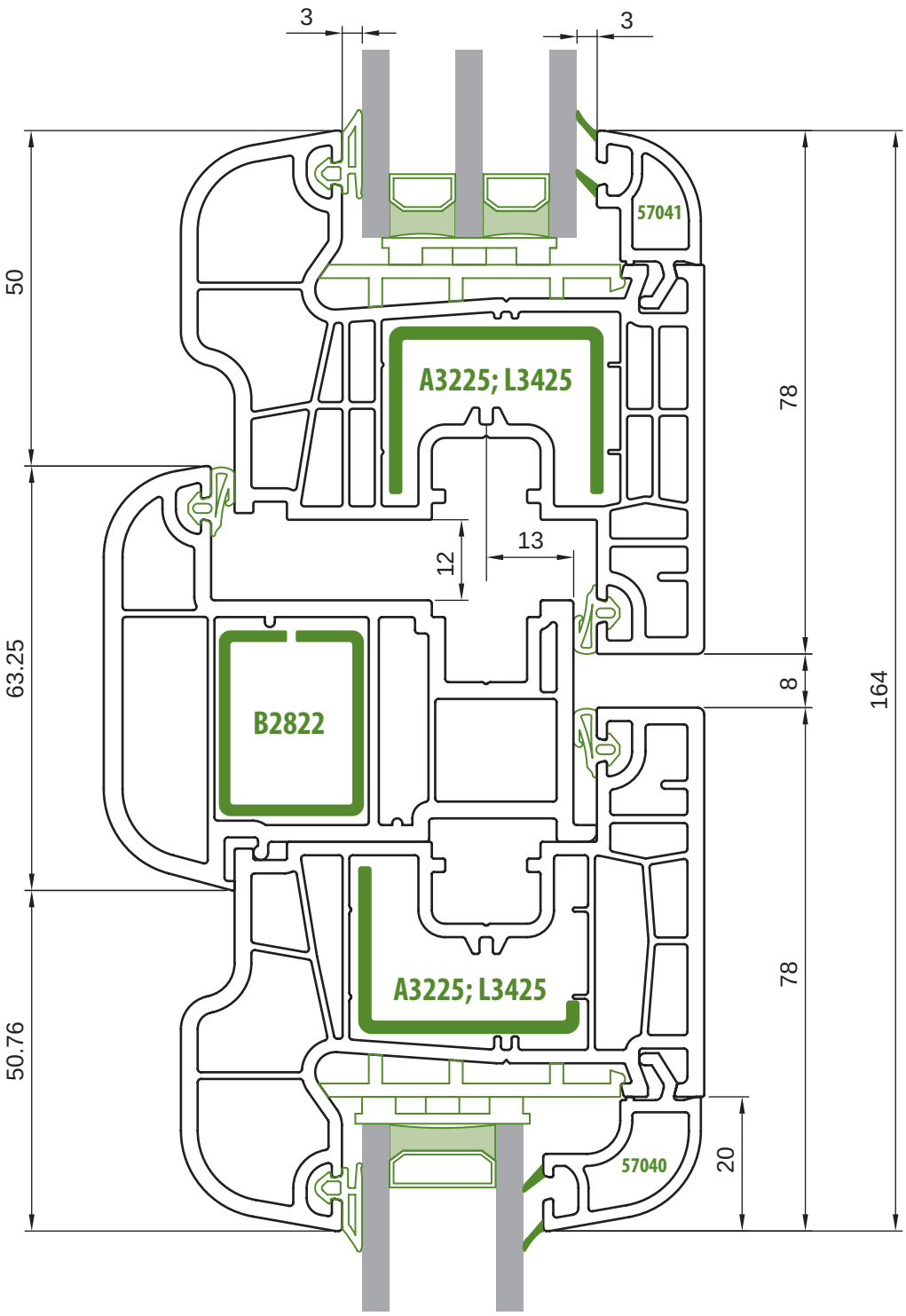
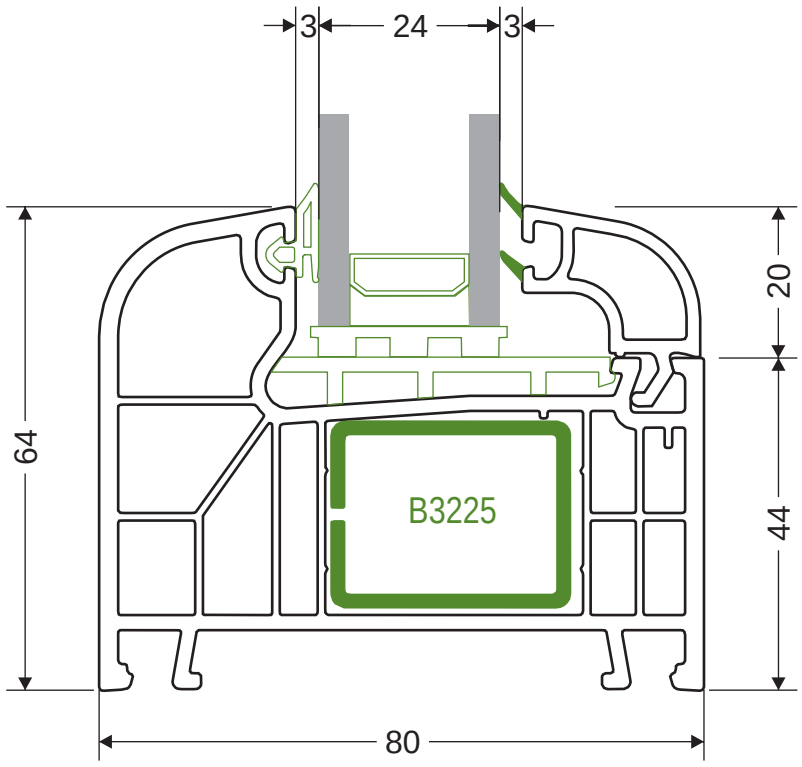
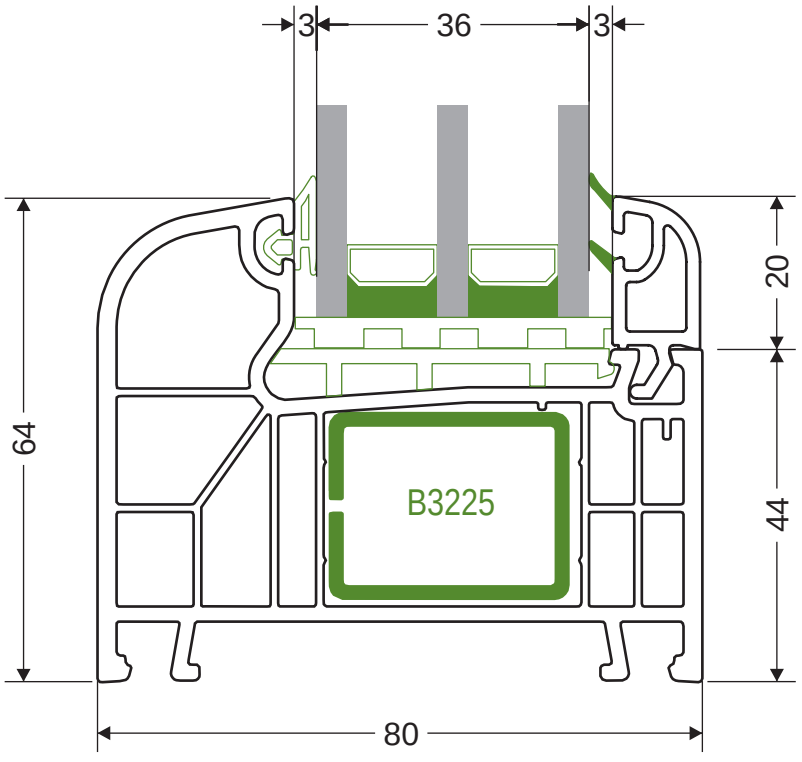
5.12 Sash 67021 + Transom/Mullion 57030 + Sash 57021 – 24 mm and 32 mm glazing unit



5.13 Frame 68010 – Fixed glazing, 24 mm and 32 mm glazing unit





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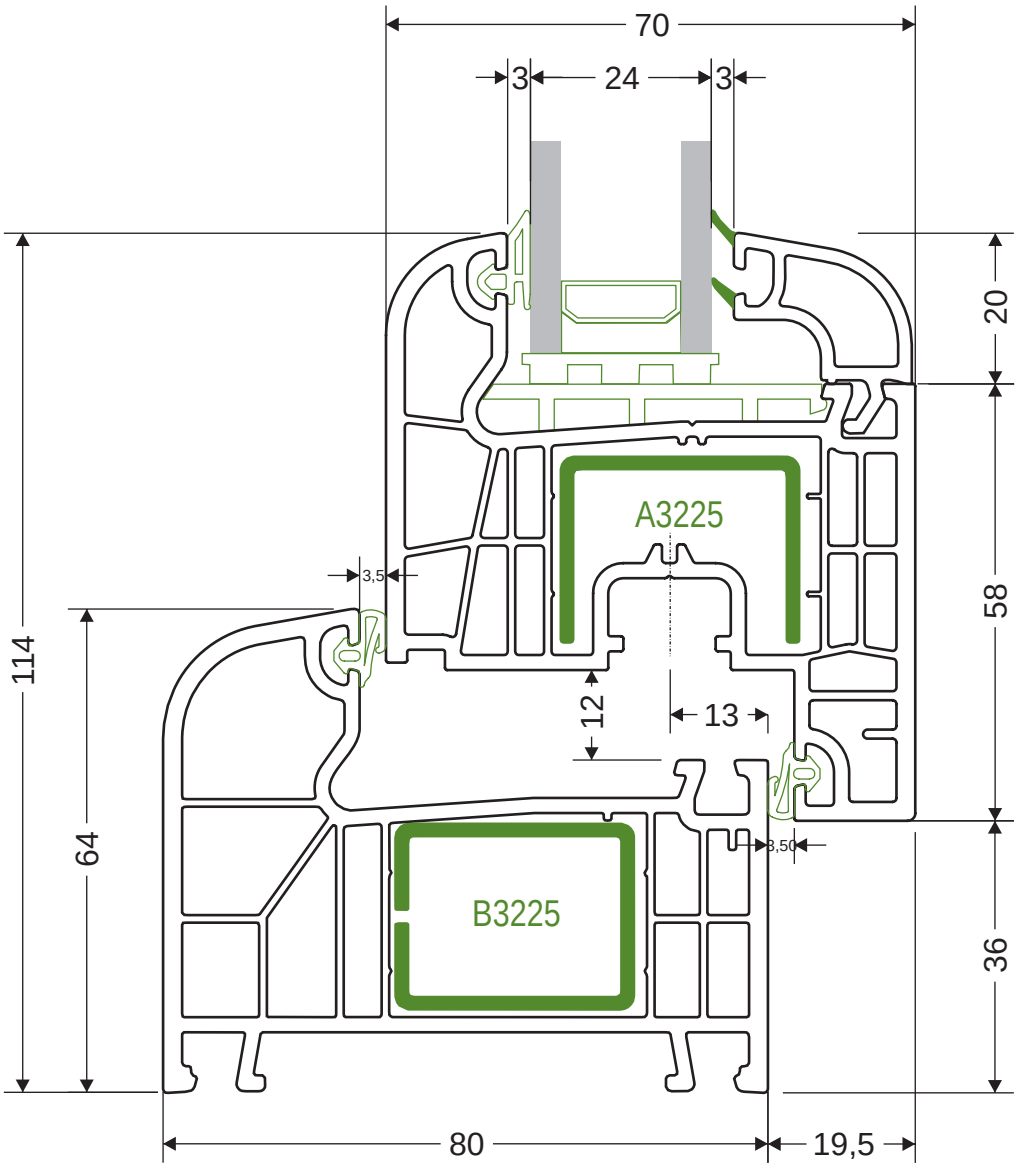
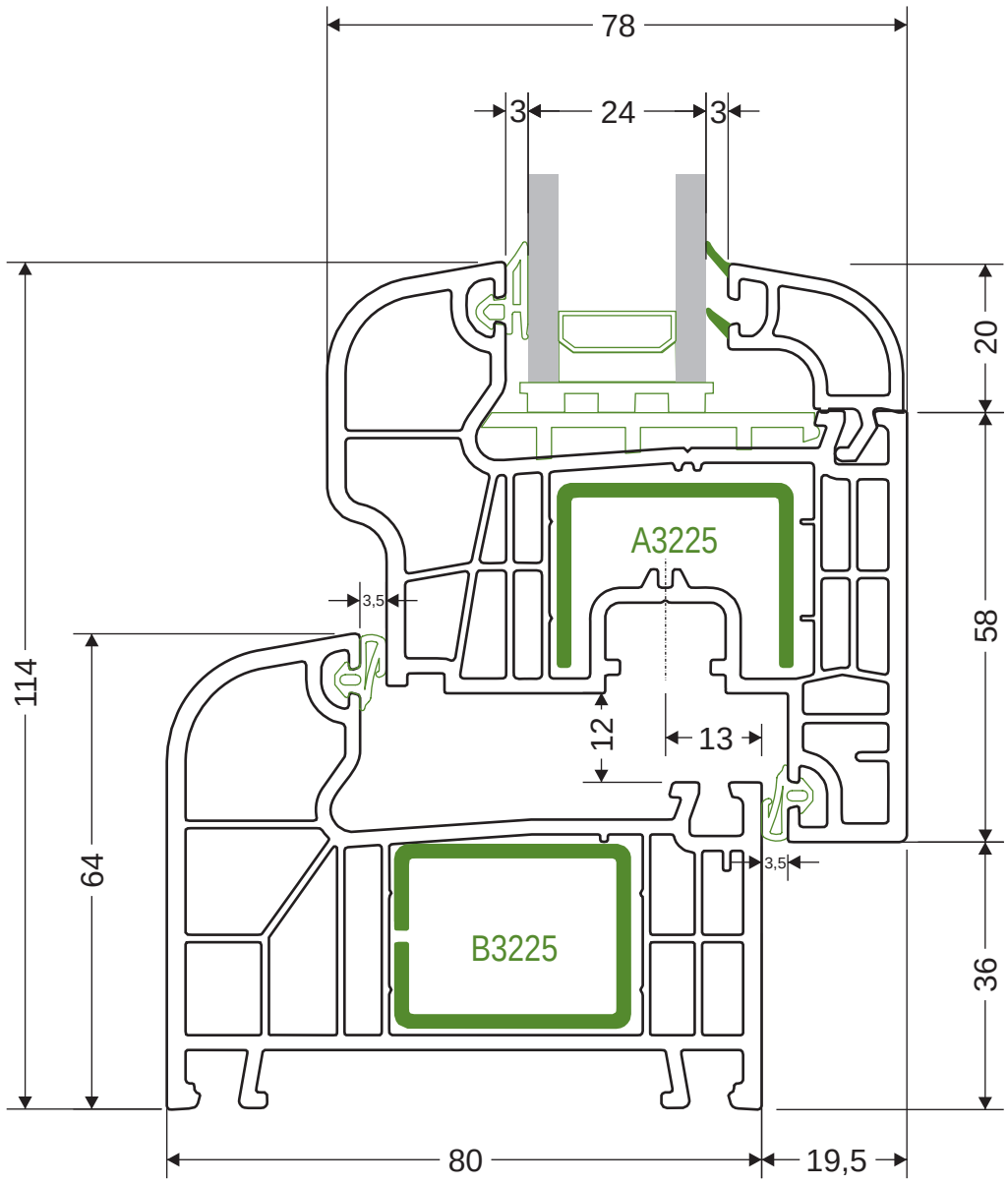
5.14 Frame 68010 + Sash 67020 – 24 mm glazing unit



5.15 Frame 68010 + Sash 67021 – 24 mm glazing unit



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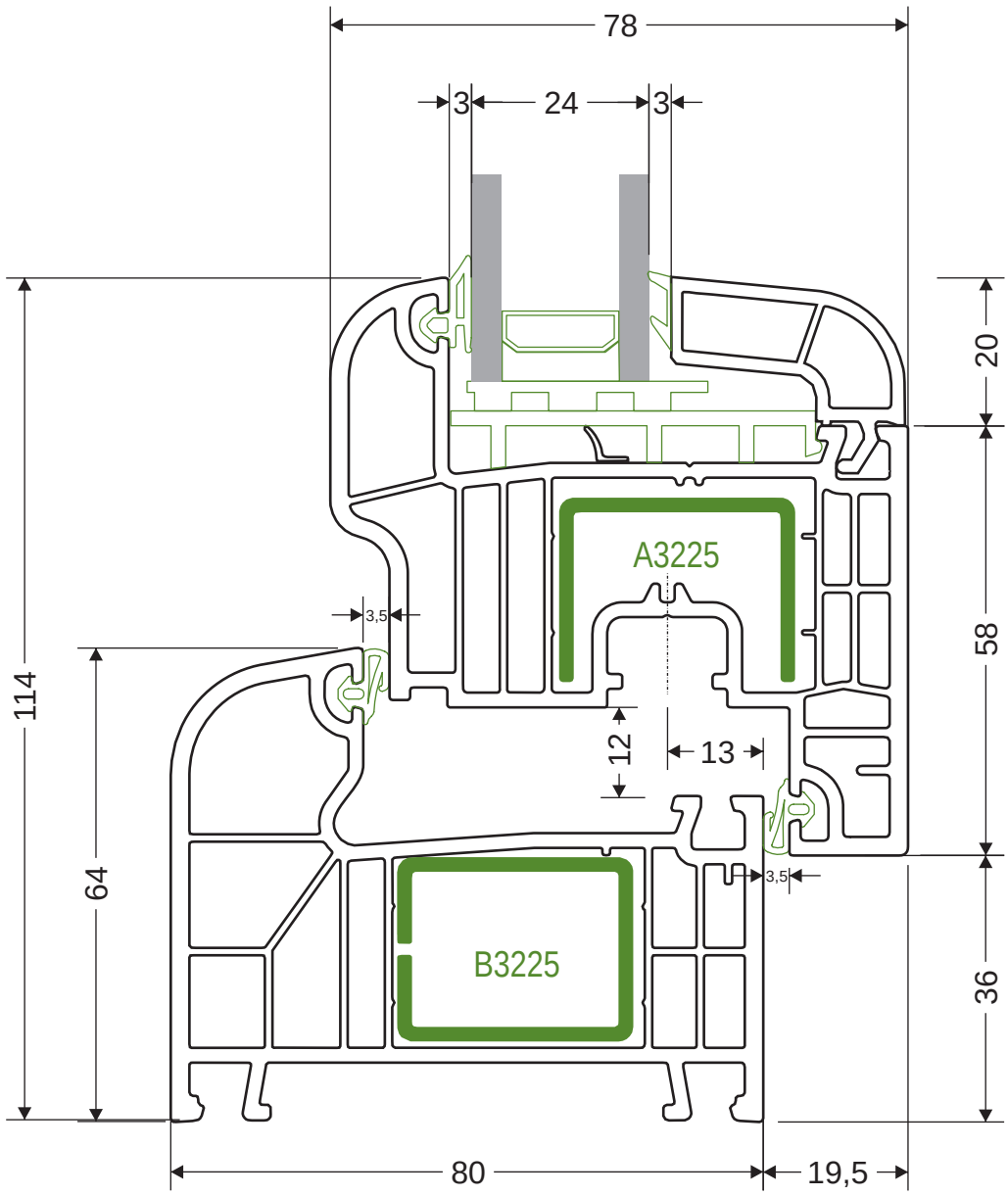
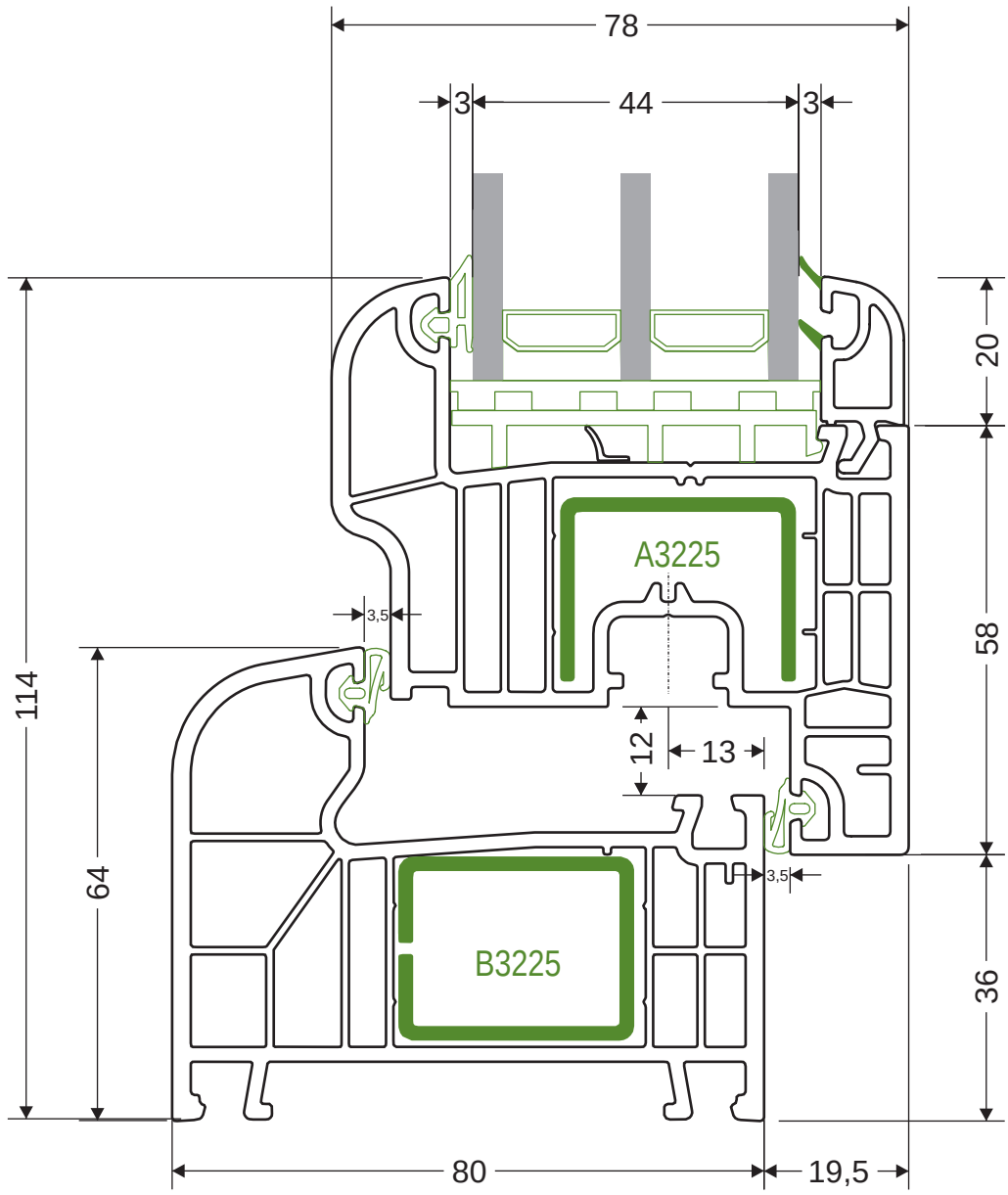
5.16 Frame 68010 + Sash 67022 – 24 mm glazing unit



5.17 Frame 68010 + Sash 67022 – 44 mm glazing unit



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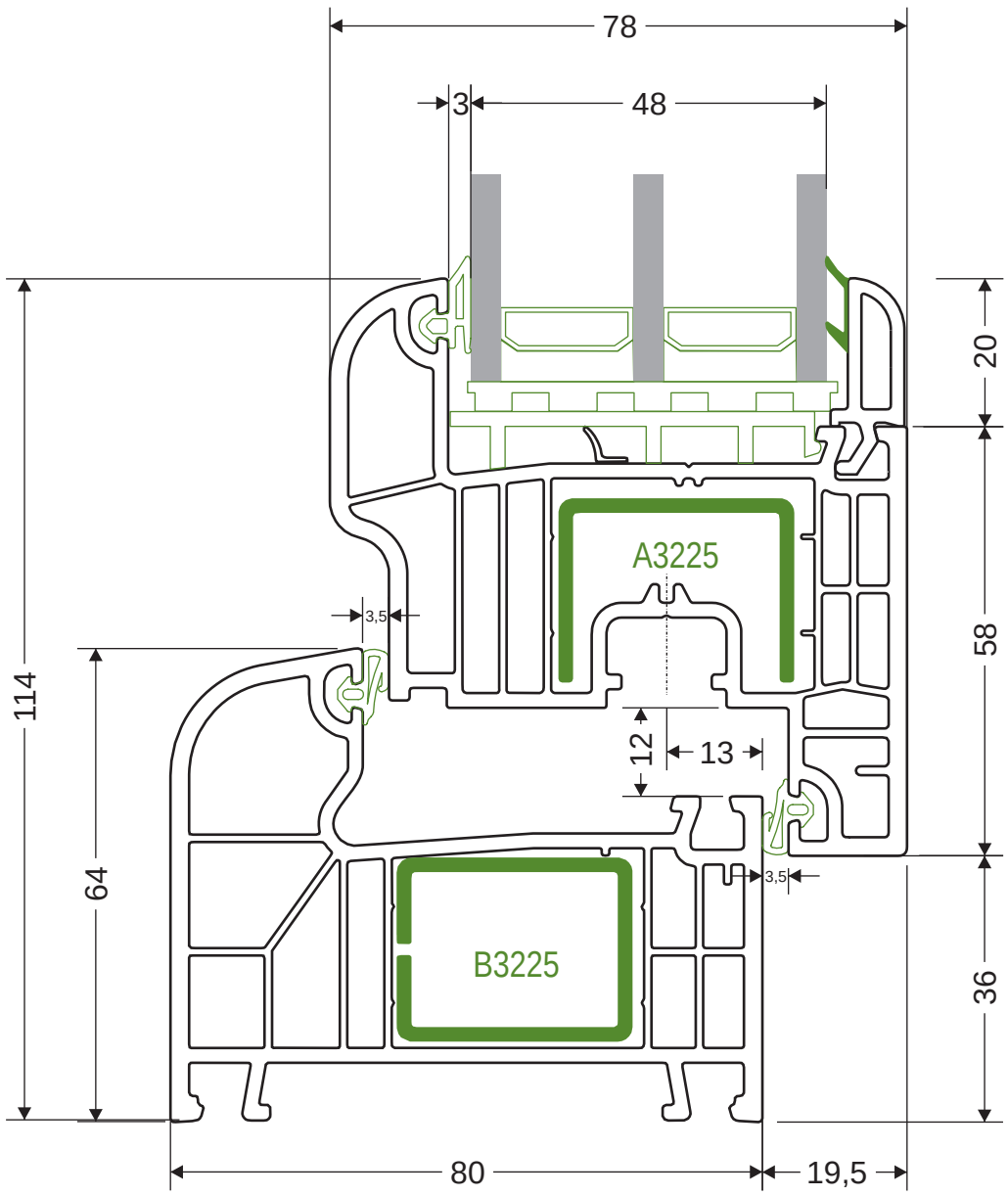
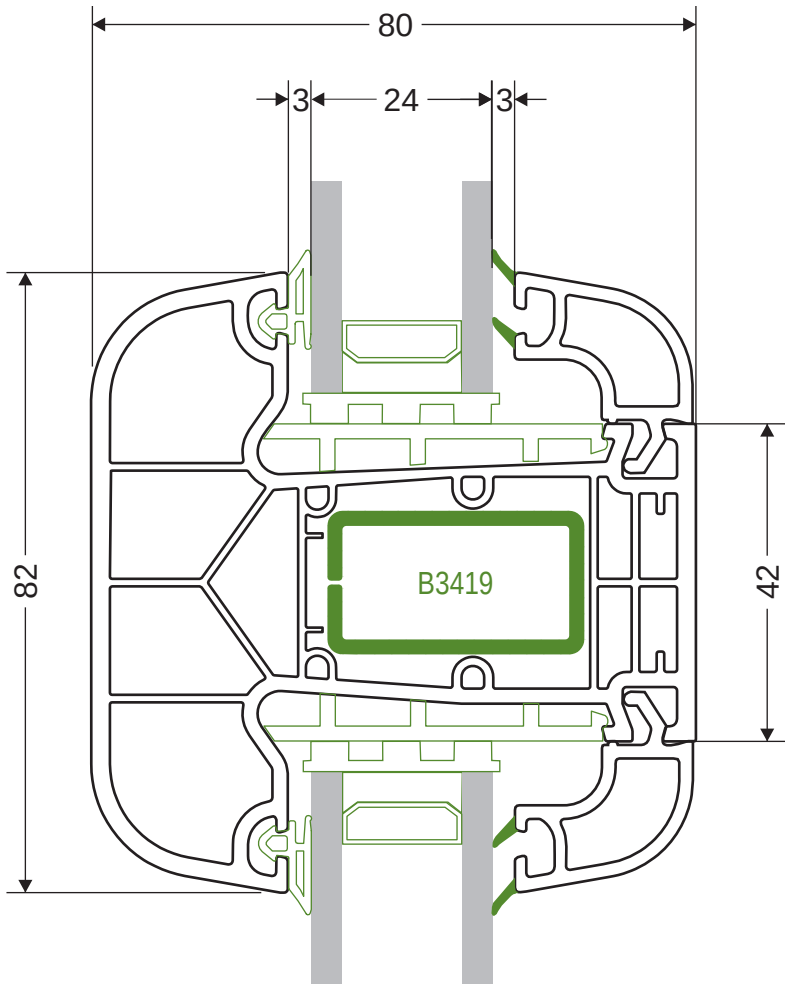
5.18 Frame 68010 + Sash 67022 – 48 mm glazing unit



5.19 Transom/Mullion 68030 – 24 mm glazing unit



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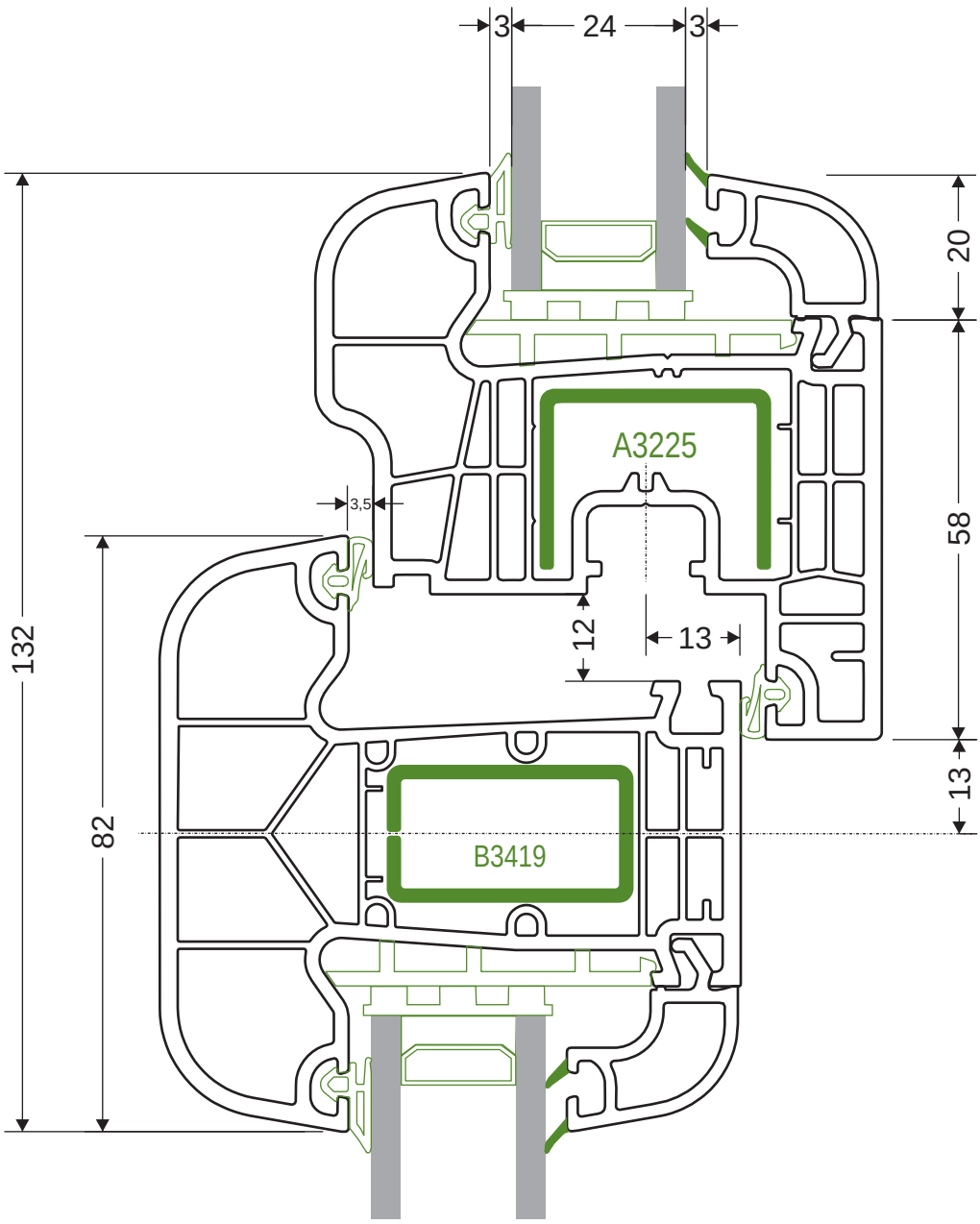
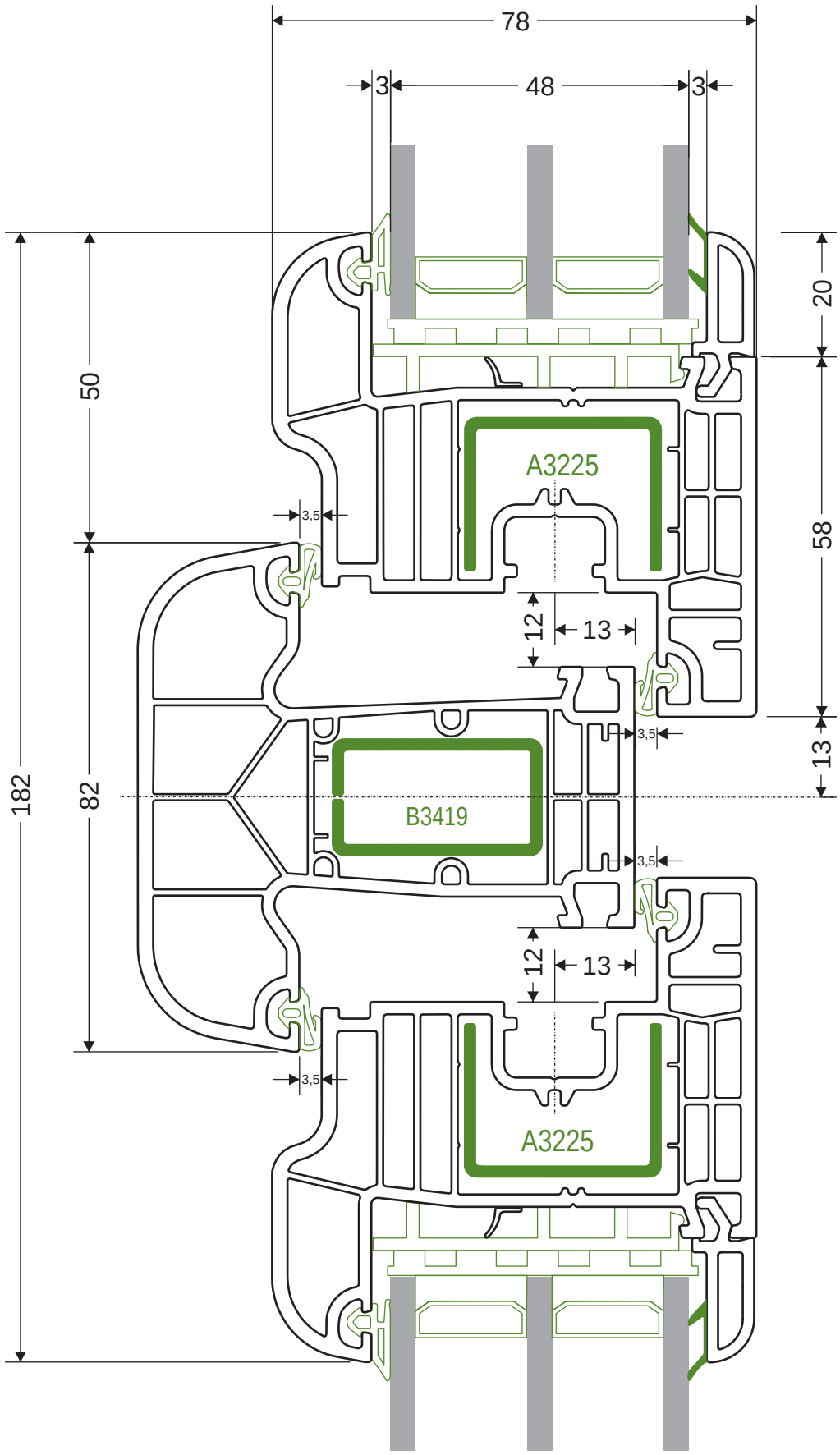
5.20 Transom/Mullion 68030 – fixed glazing + sash 67021 – 24 mm glazing unit



5.21 Sash 67022 + Transom/Mullion 68030 + sash 67022 – 48 mm glazing unit



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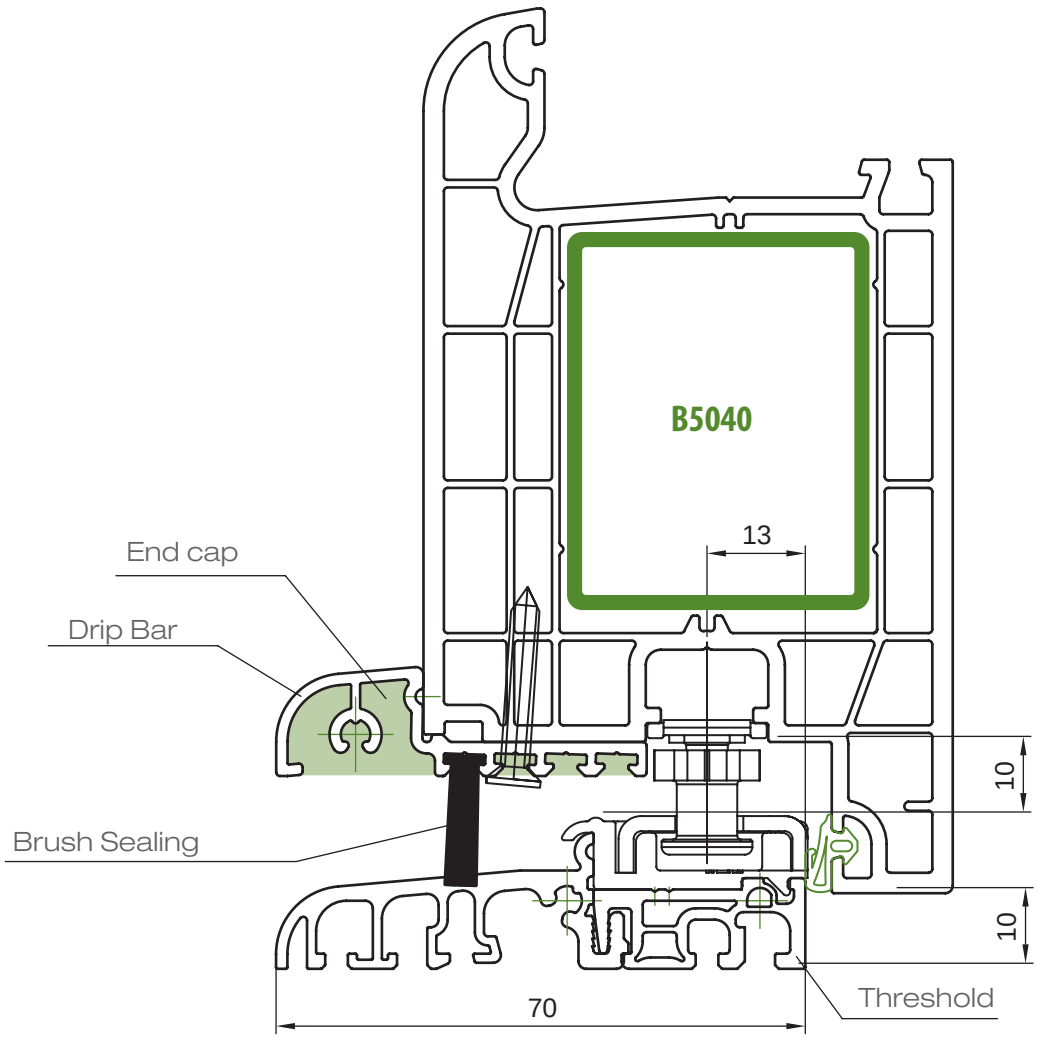
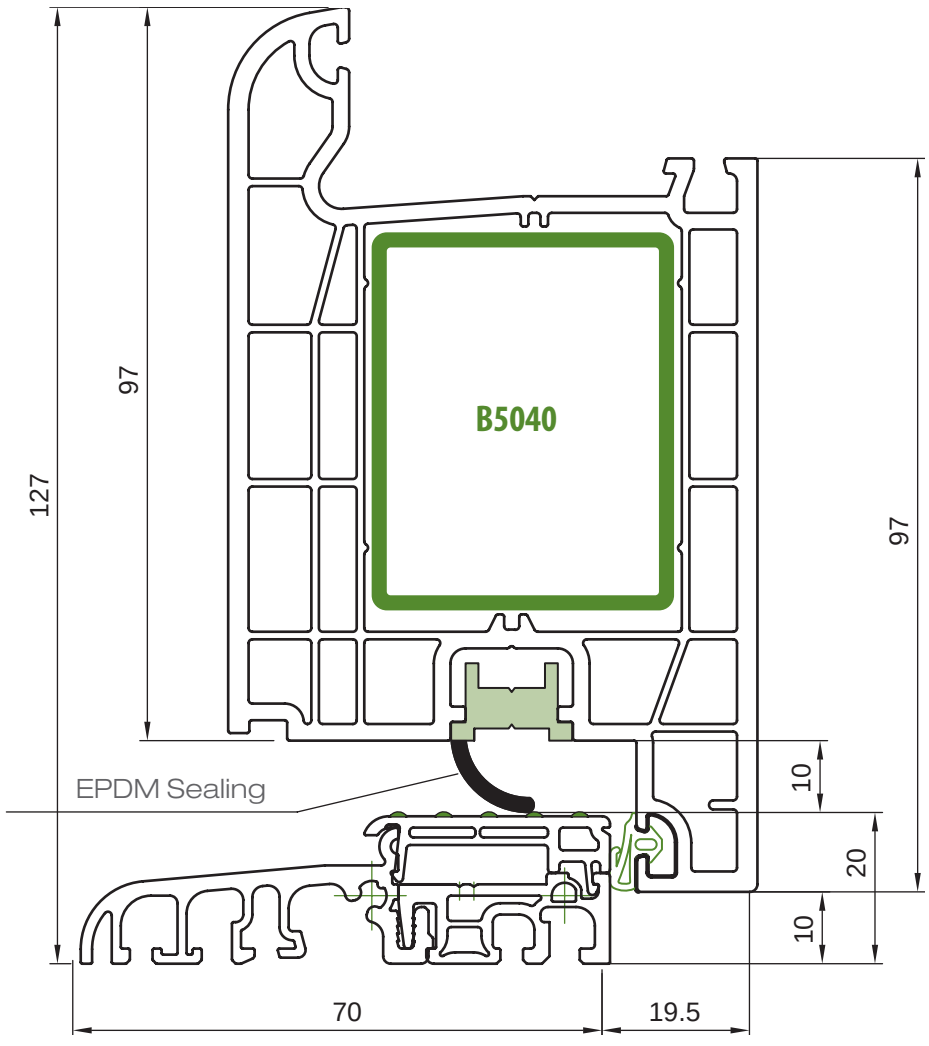
5.22 Door Sash 47020 + Door Threshold 47050 with Brush Sealing



5.23 Door Sash 47020 + Door Threshold 47050 with EPDM Sealing



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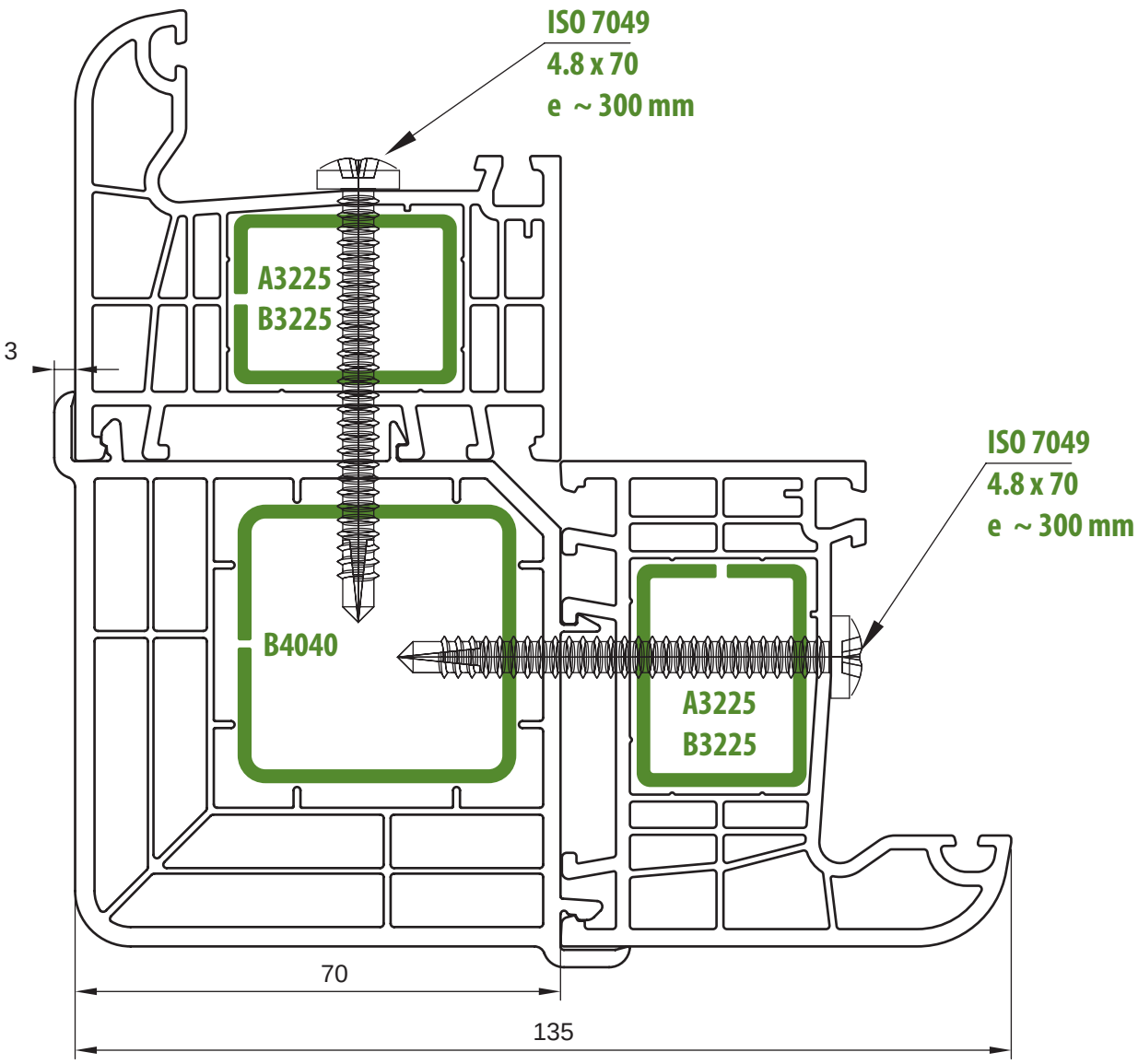
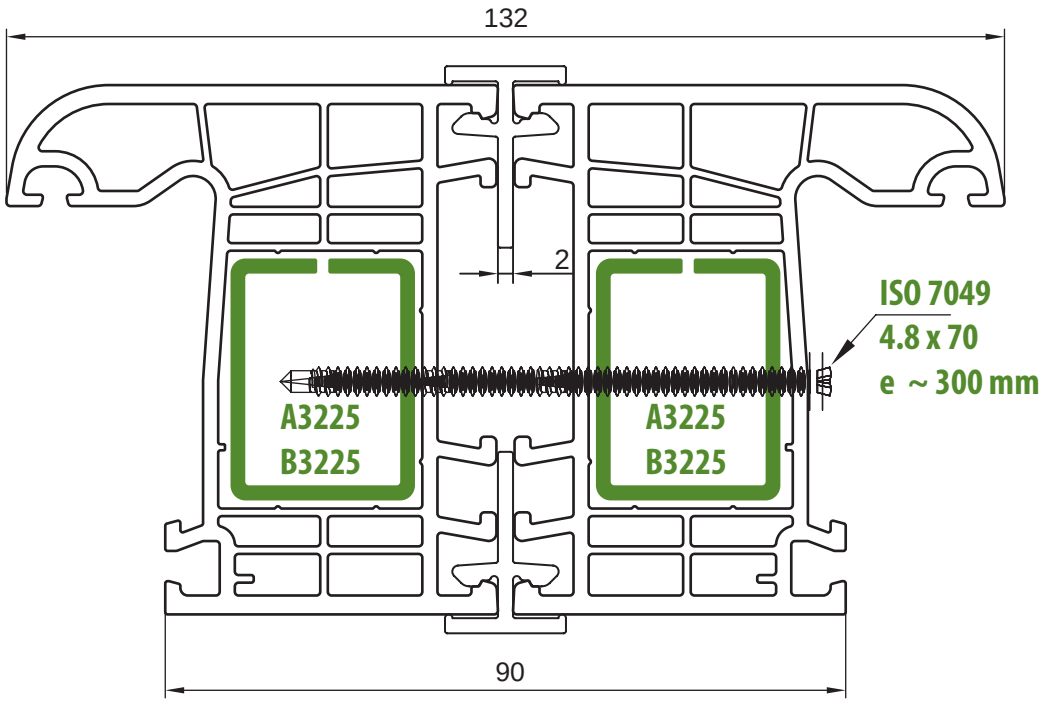
5.24 Frame 67010 with 90° Bay Post 57063

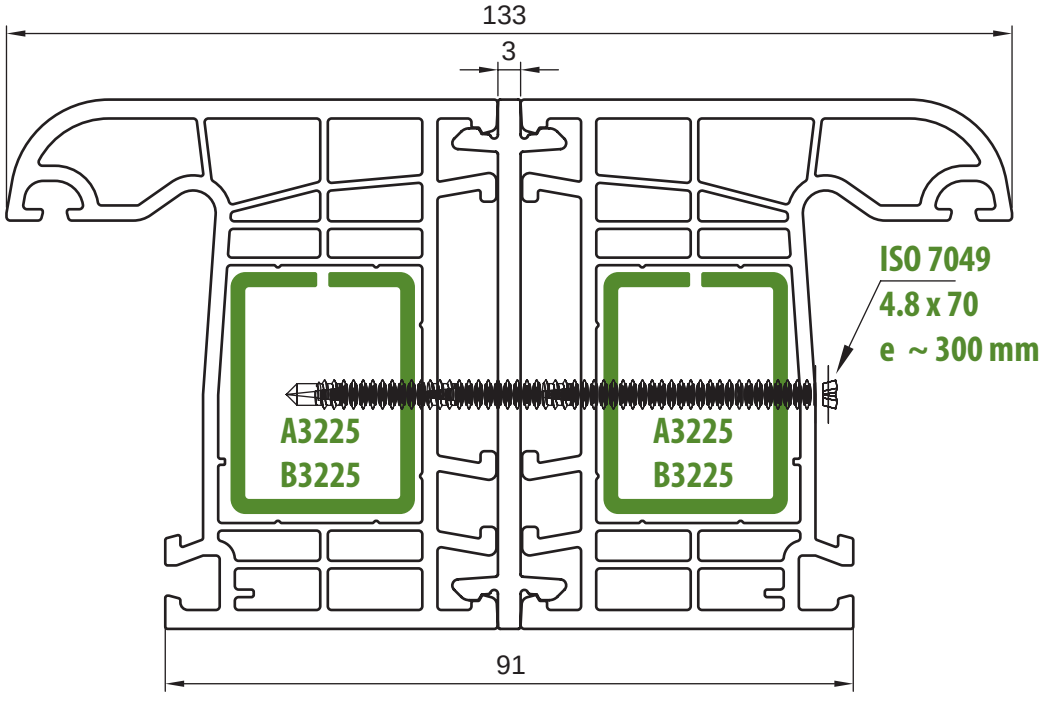


5.25 Frame 67010 with Coupling Profiles 57052, 57053

H Coupling 57052



Coupling 57053



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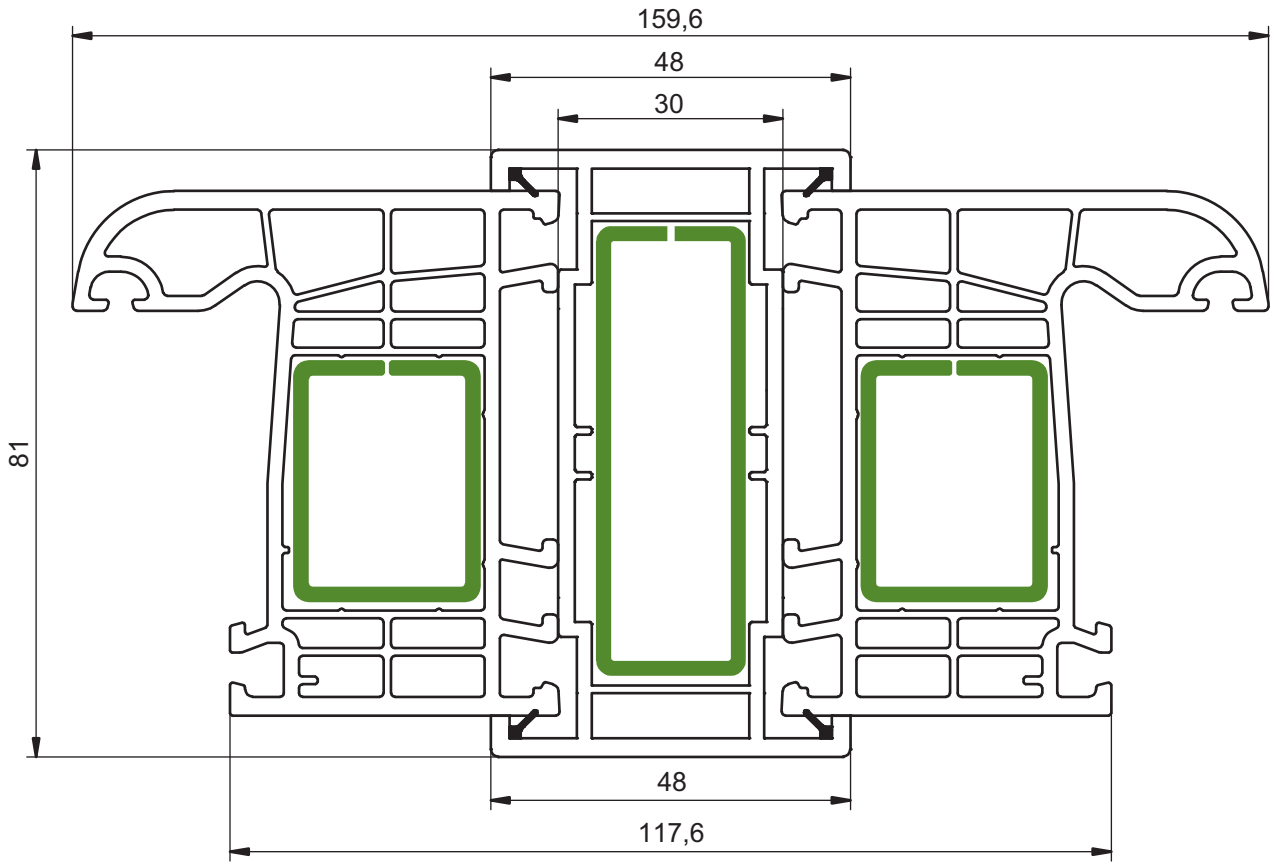
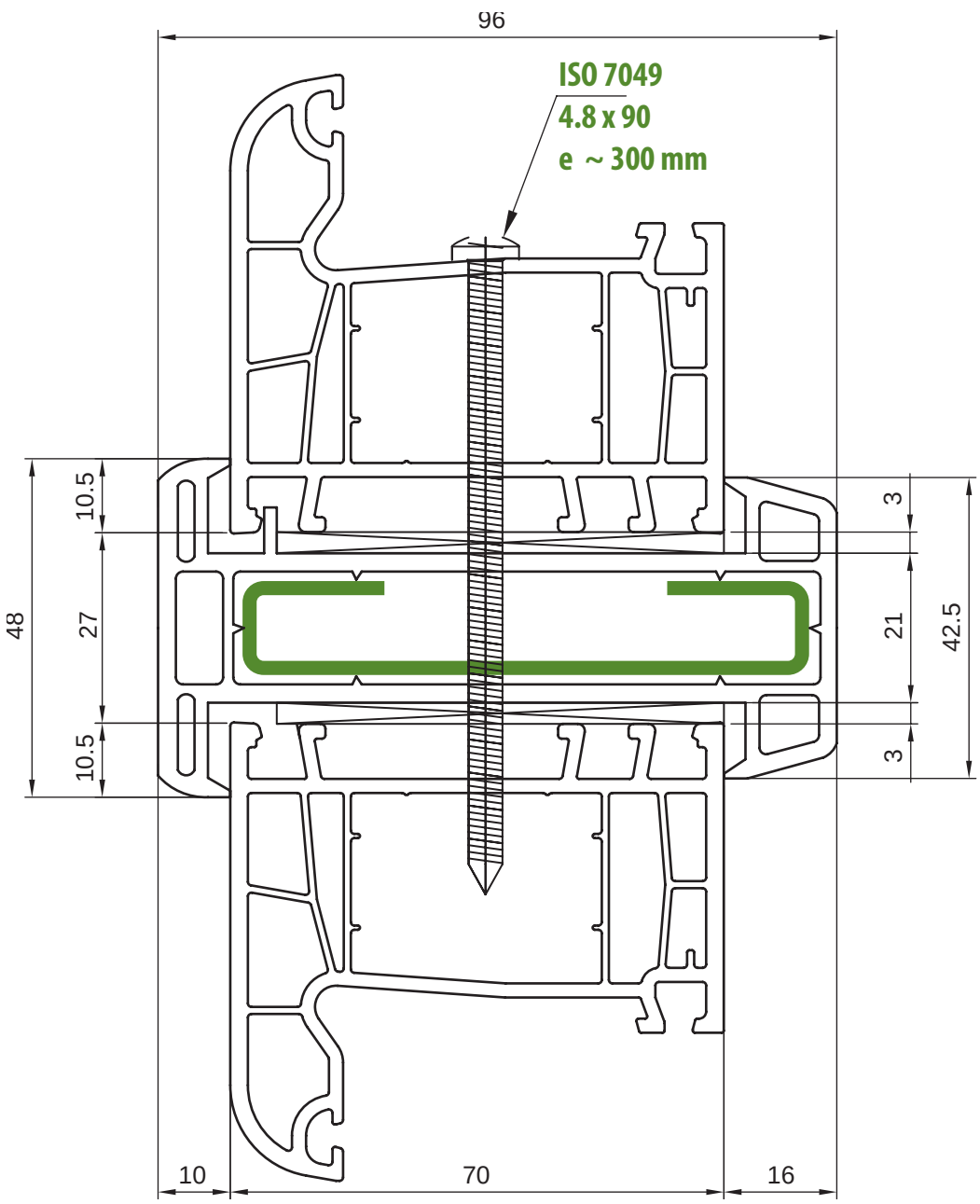
5.26 Frame 67010 with Structural Coupling 57068



5.27 Frame 67010 with Structural Coupling 57067



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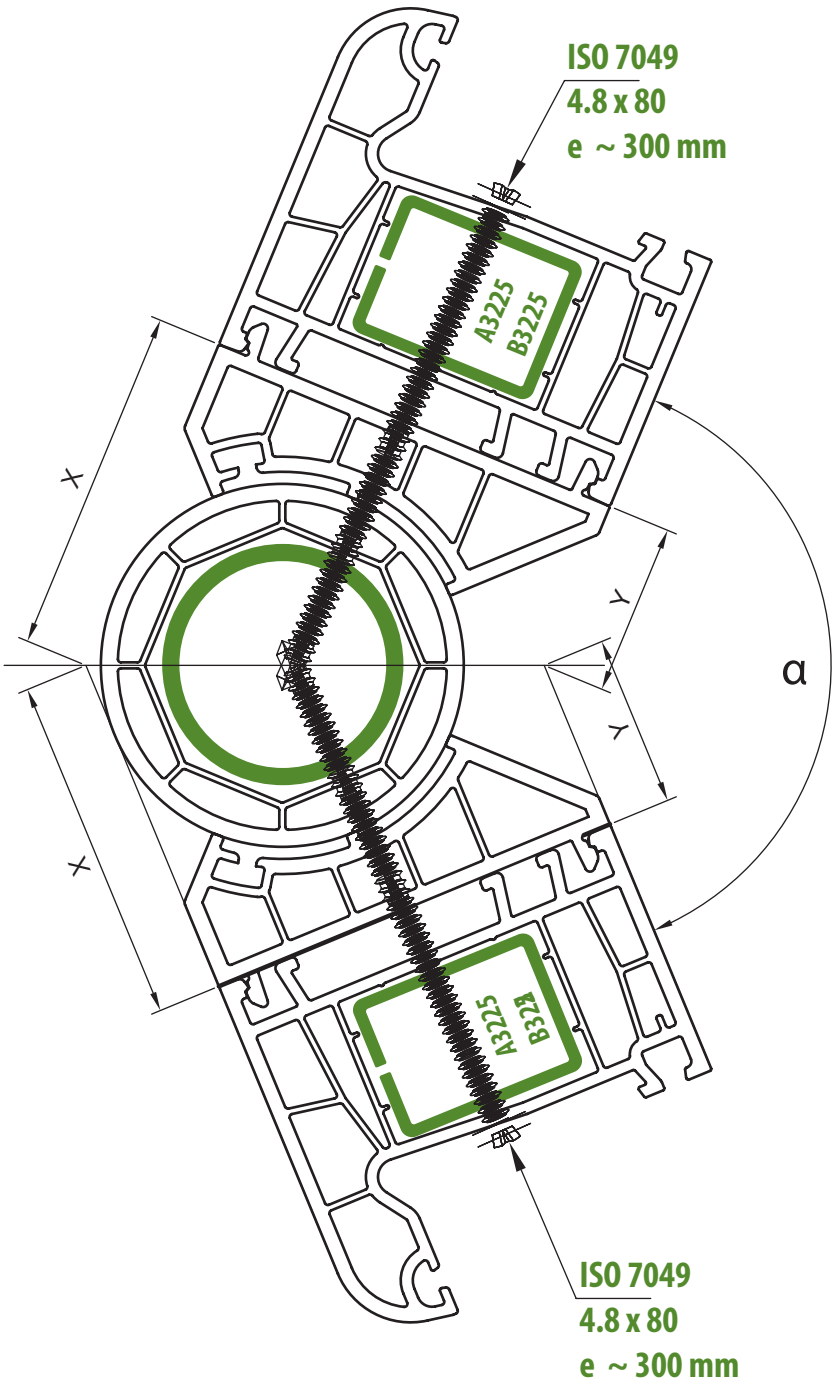
5.28 Frames 57010 with Bay Pole 57061 + 57062

calculating Outer dimensions for a known angle

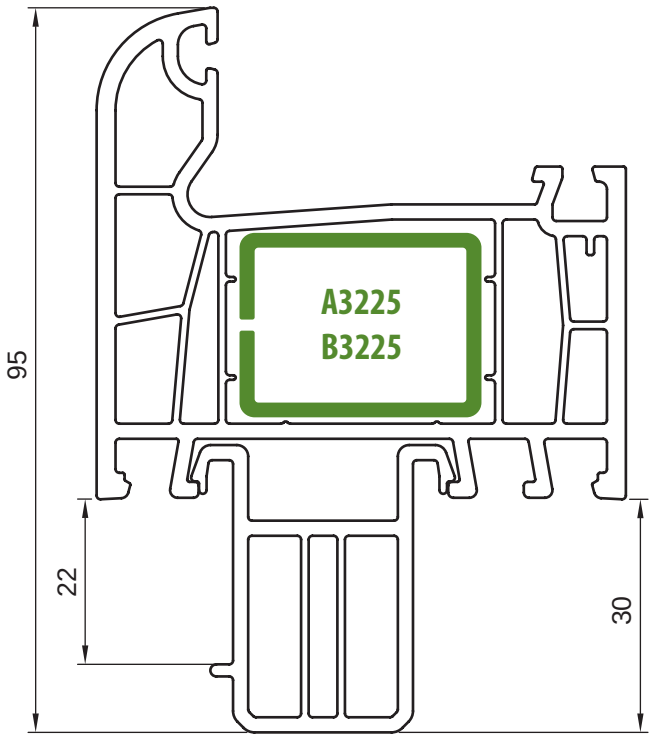


$$X = 45 + \frac{30}{tg(\alpha/2)}$$

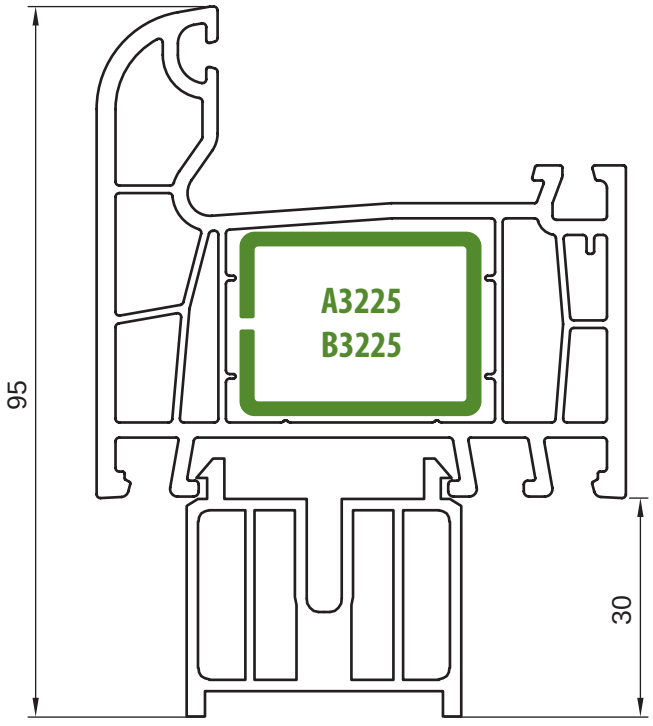
$$Y = 45 - \frac{30}{tg(\alpha/2)}$$

angle	Outer dimensions	
α	X (mm)	Y (mm)
90	75,0	15,0
95	72,5	17,5
100	70,2	19,8
105	68,0	22,0
110	66,0	24,0
115	64,1	25,9
120	62,3	27,7
125	60,6	29,4
130	59,0	31,0
135	57,4	32,6
140	55,9	34,1
145	54,5	35,5
150	53,0	37,0
155	51,7	38,3
160	50,3	39,7
165	48,9	41,1
170	47,6	42,4
175	46,3	43,7
180	45,0	45,0

5.29 Frame 57010 + Cill packers 57069 and 57070



Cill packer 57069



Cill packer 57070

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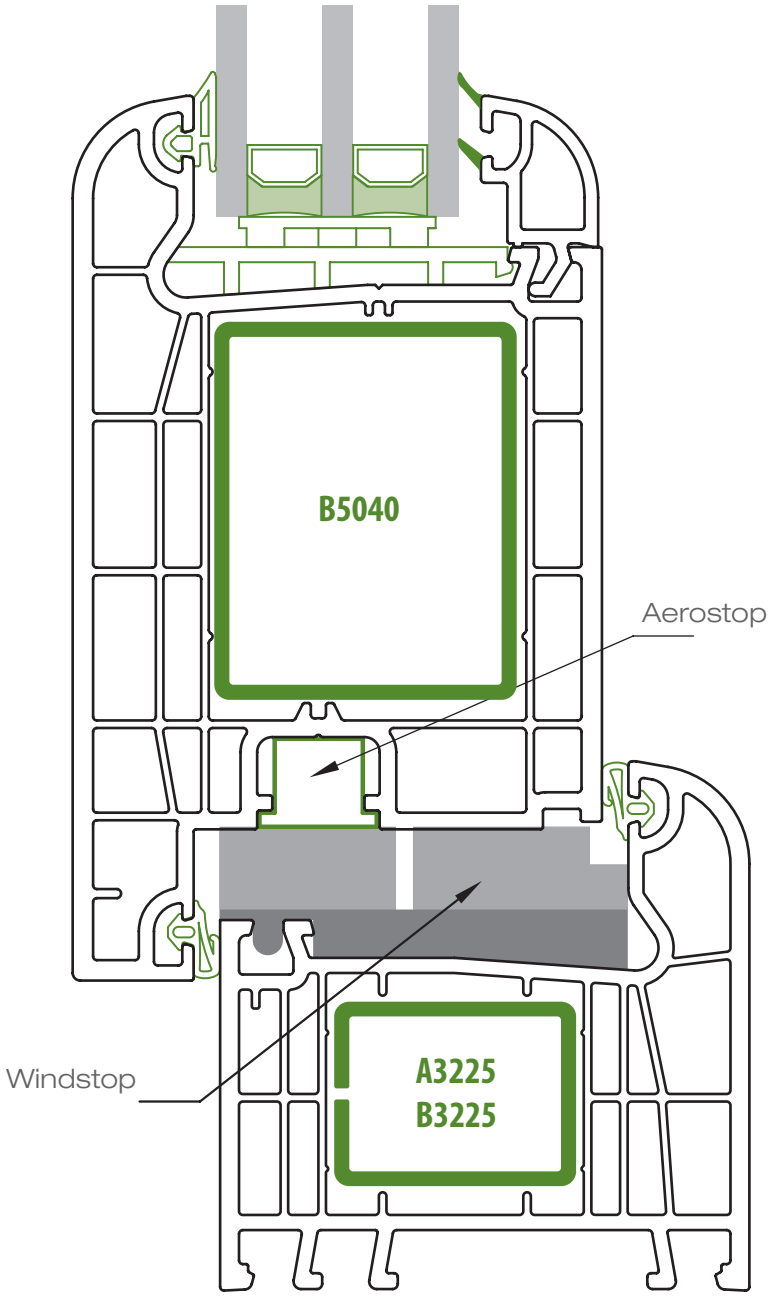
5. Detail Sheets

5.30 Frame 67011 + Windstop 47059 + Sash 47021 + Aerostop 47060



6. Preparation

6.1 Installing Metal Joint 57083 to Transom/Mullion 57030
6.2 Connecting Frame 67010 and Transom/Mullion 57030 with Metal Joint 57083
6.3 Connecting Meeting Rail 57031 with Sash 57021 (with end caps 57084)
6.4 Connecting Meeting Rail 57031 with sash 57021 (with end caps 57084)
6.5 Frame 67010 Preparation for Connecting Transom/Mullion 57030 using PVC Joint 57085
6.6 Connecting Frame 67010 and Transom/Mullion 57030 with PVC Joint 57085
6.7 Fixing Threshold Connector 47051 to Threshold 47050
6.8 Installation of Threshold 47050 to Frame 67010 with Threshold Connector 47051
6.9 Installation of Windstop 47059 to Frame 67010

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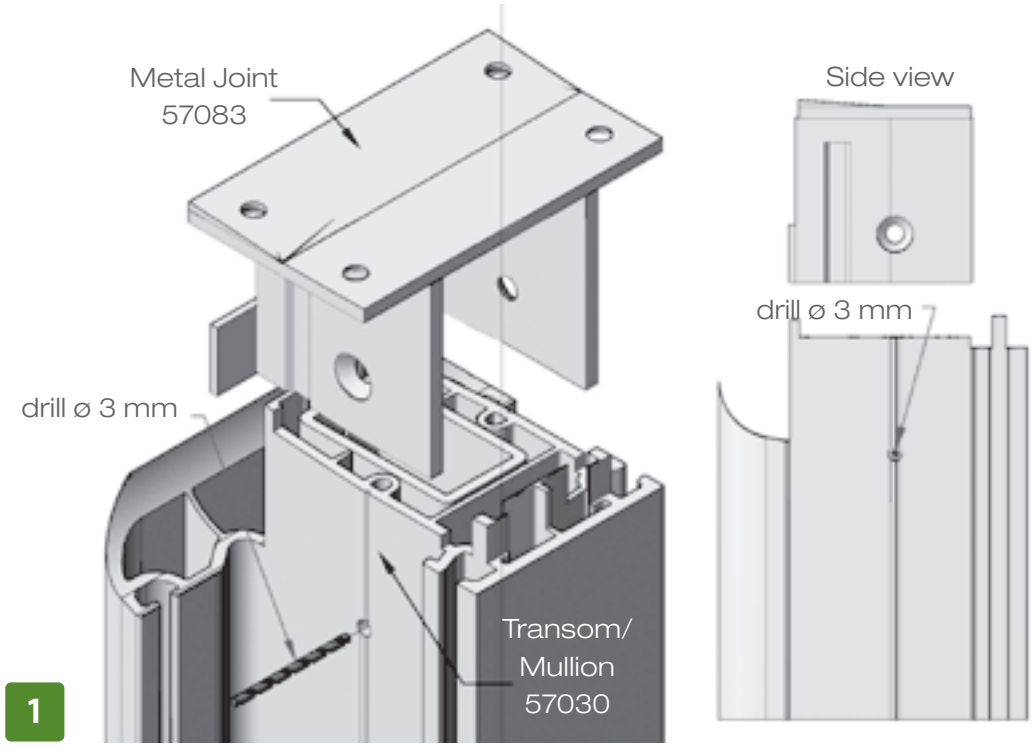
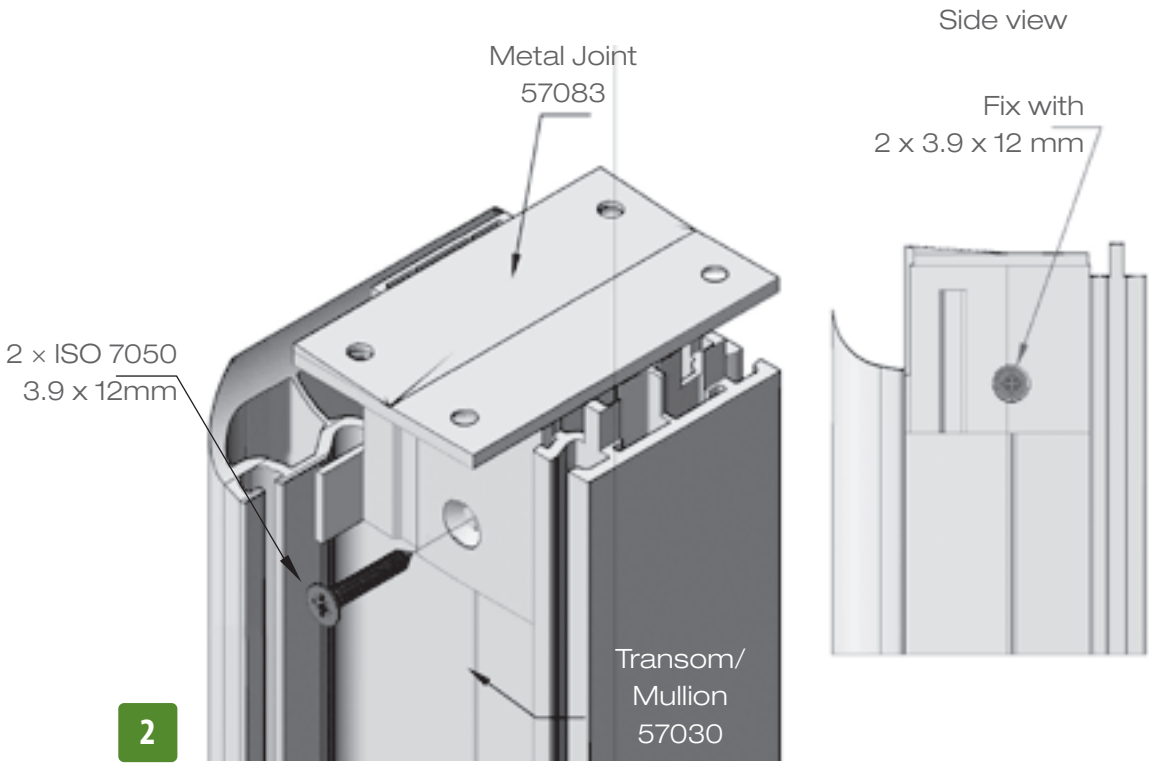
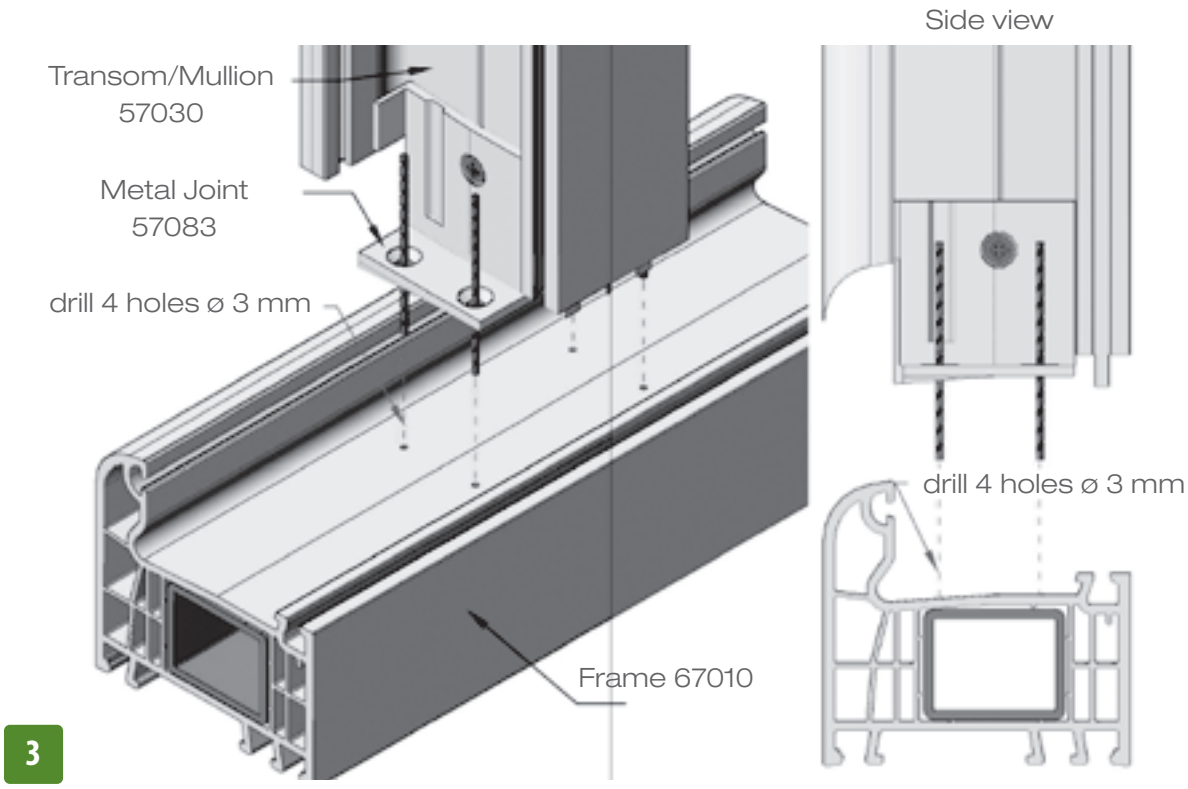
6. Preparation

6.1 Installing Metal Joint 57083 to Transom/Mullion 57030





6.2 Connecting Frame 67010 and Transom/Mullion 57030 with Metal Joint 57083



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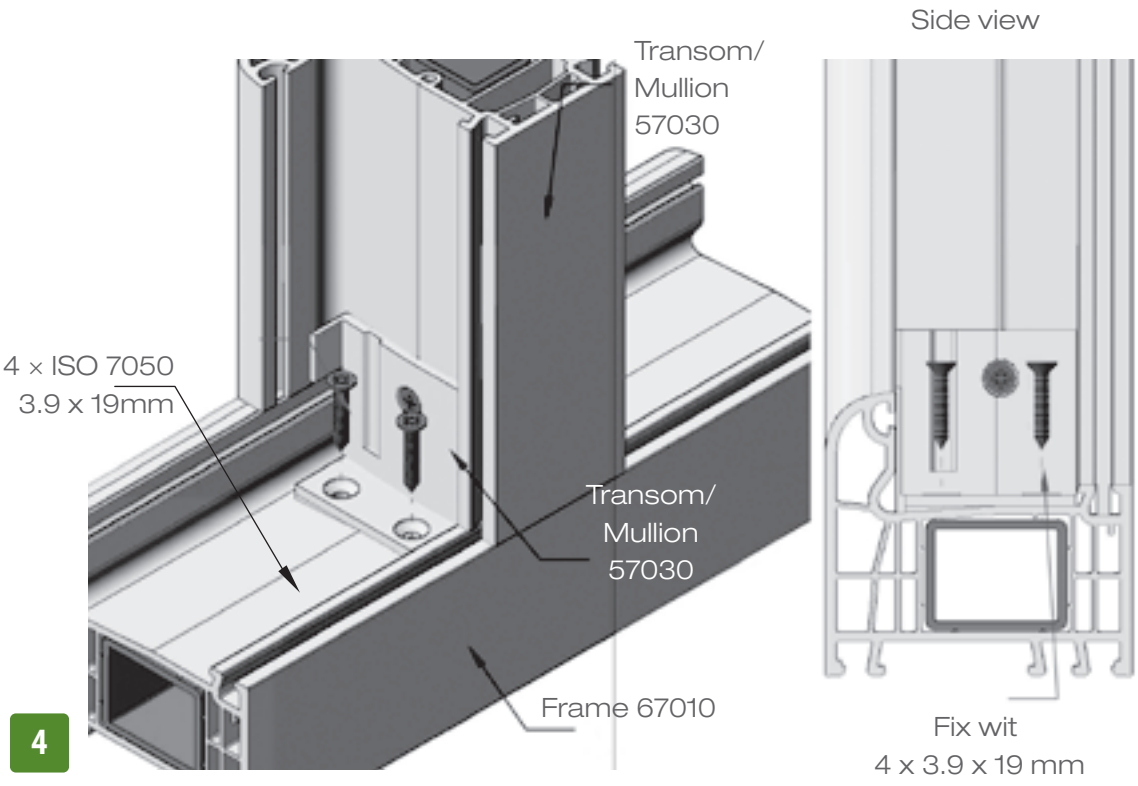

4

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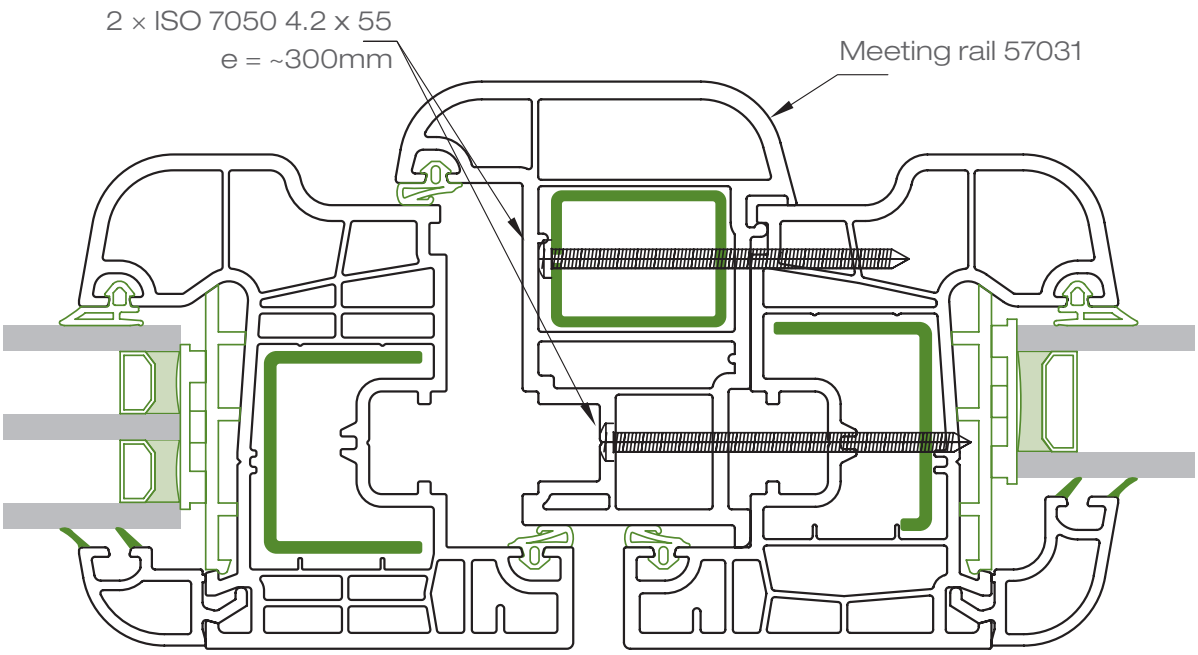
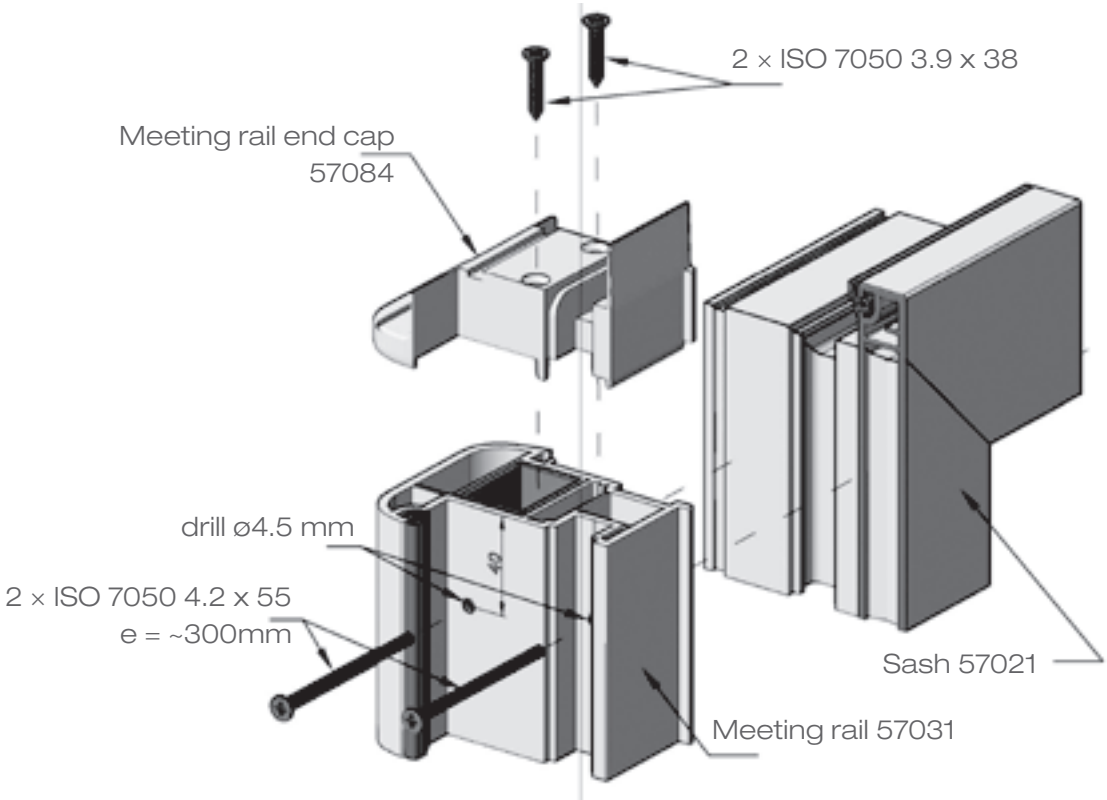
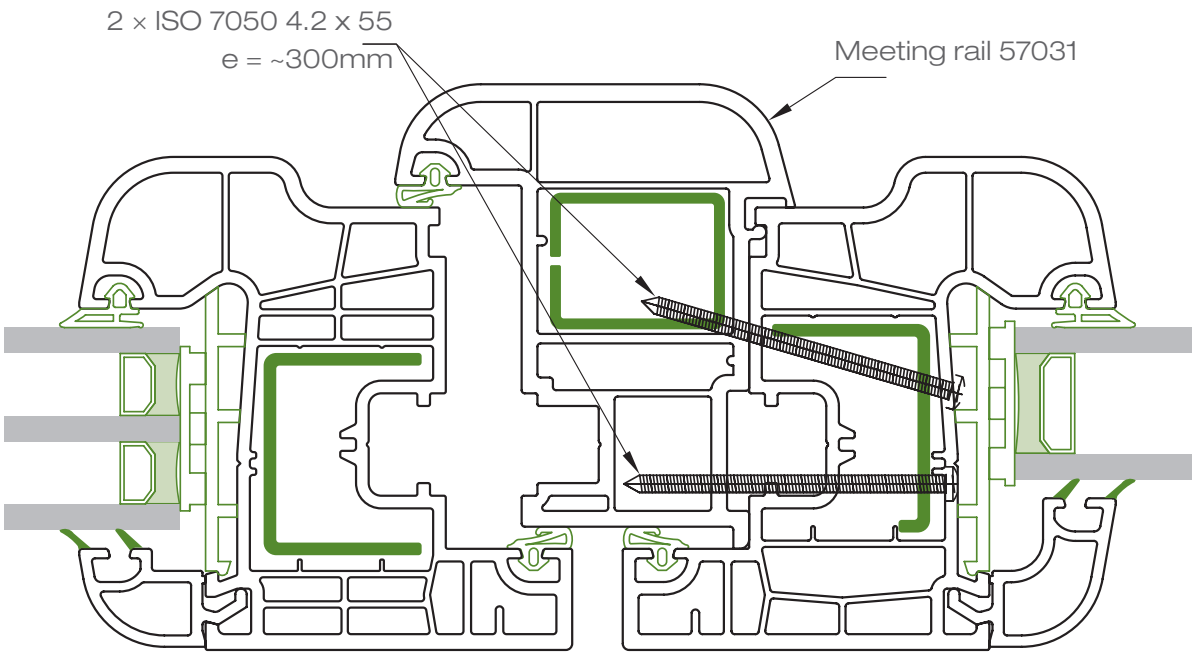
6. Preparation

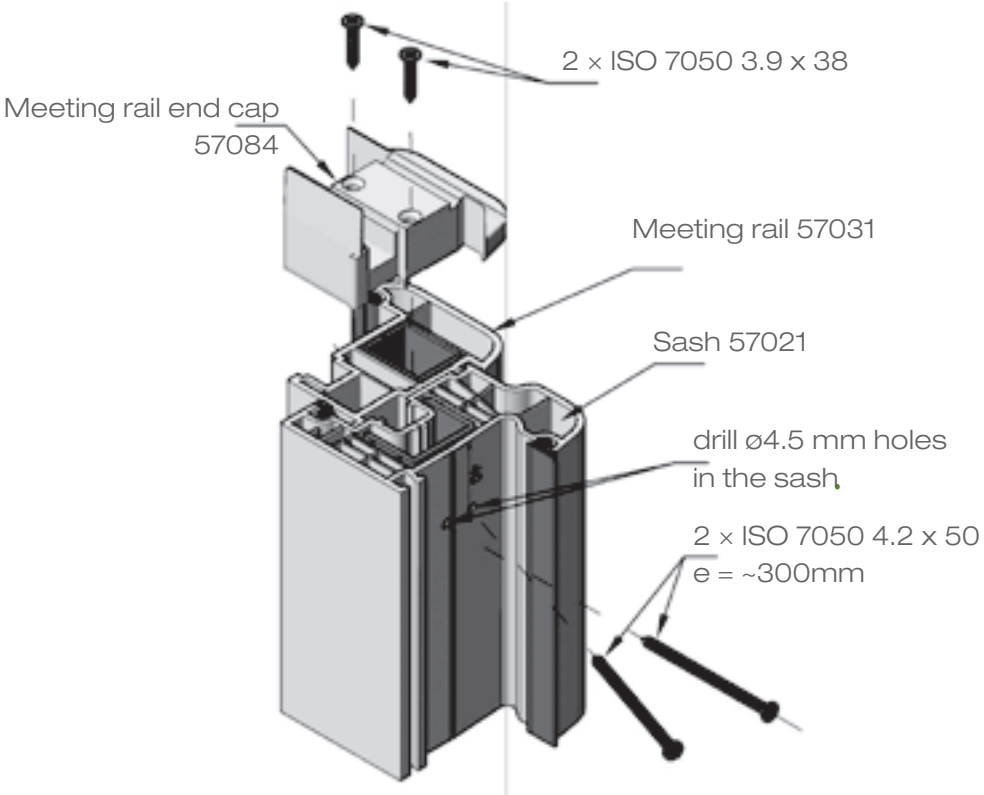
6.3 Connecting Meeting Rail 57031 with Sash 57021 (with end caps 57084)





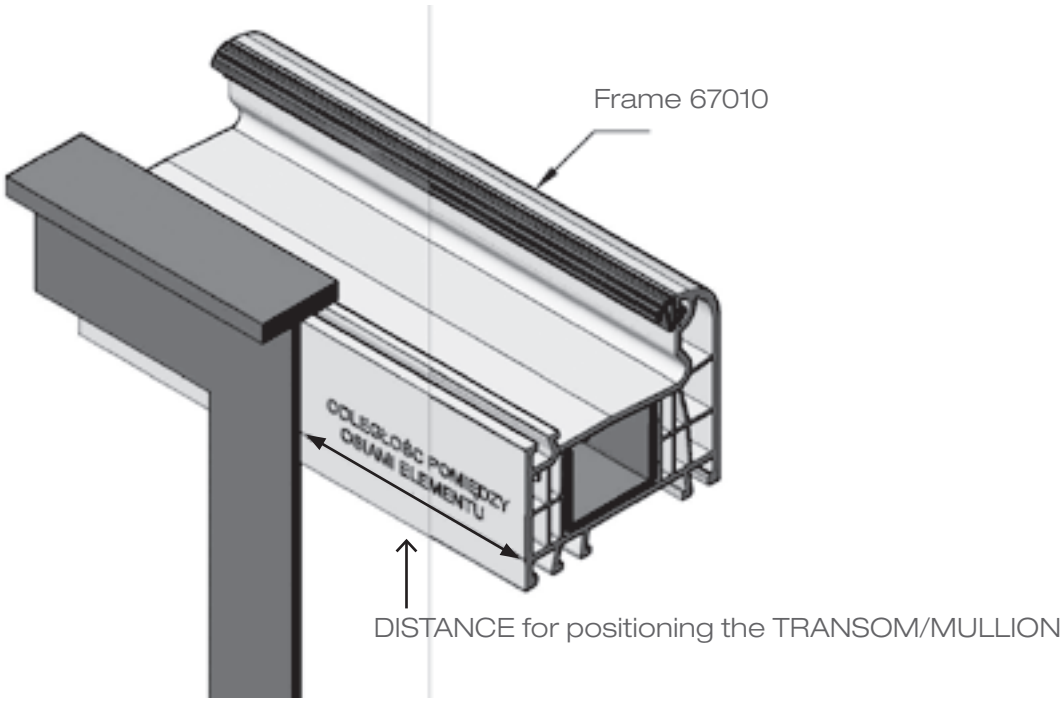
6.4 Connecting Meeting Rail 57031 with sash 57021 (with end caps 57084)



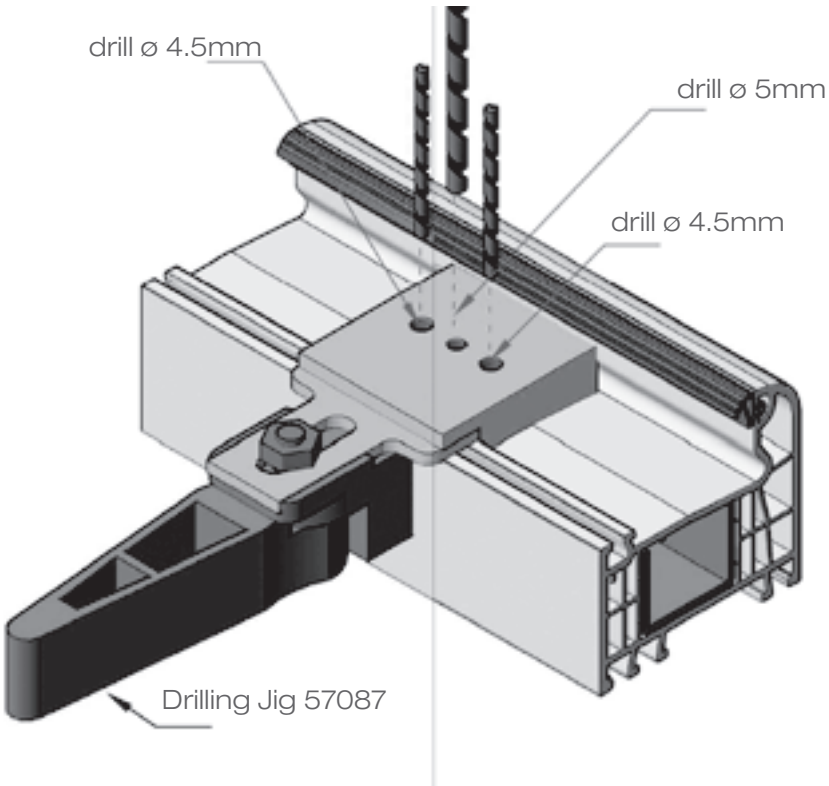


Issued: 01.02.2019

6.5 Frame 67010 Preparation for Connecting Transom/Mullion 57030 using PVC Joint 57085

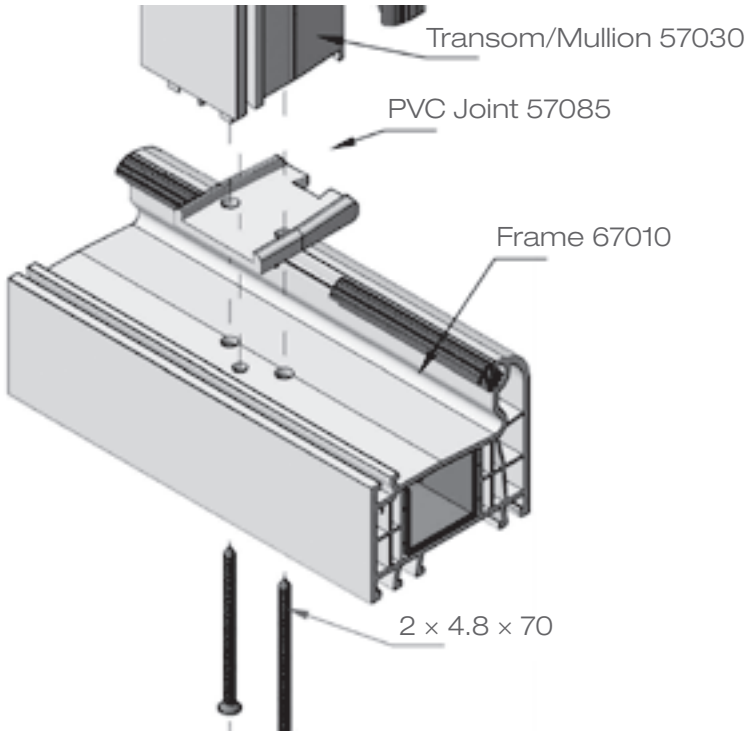


Mark the distance between the end of the frame profile and the position of centre line of transom/mullion.



Drill holes for the PVC joint through the entire profile and steel reinforcement.

6.6 Connecting Frame 67010 and Transom/Mullion 57030 with PVC Joint 57085



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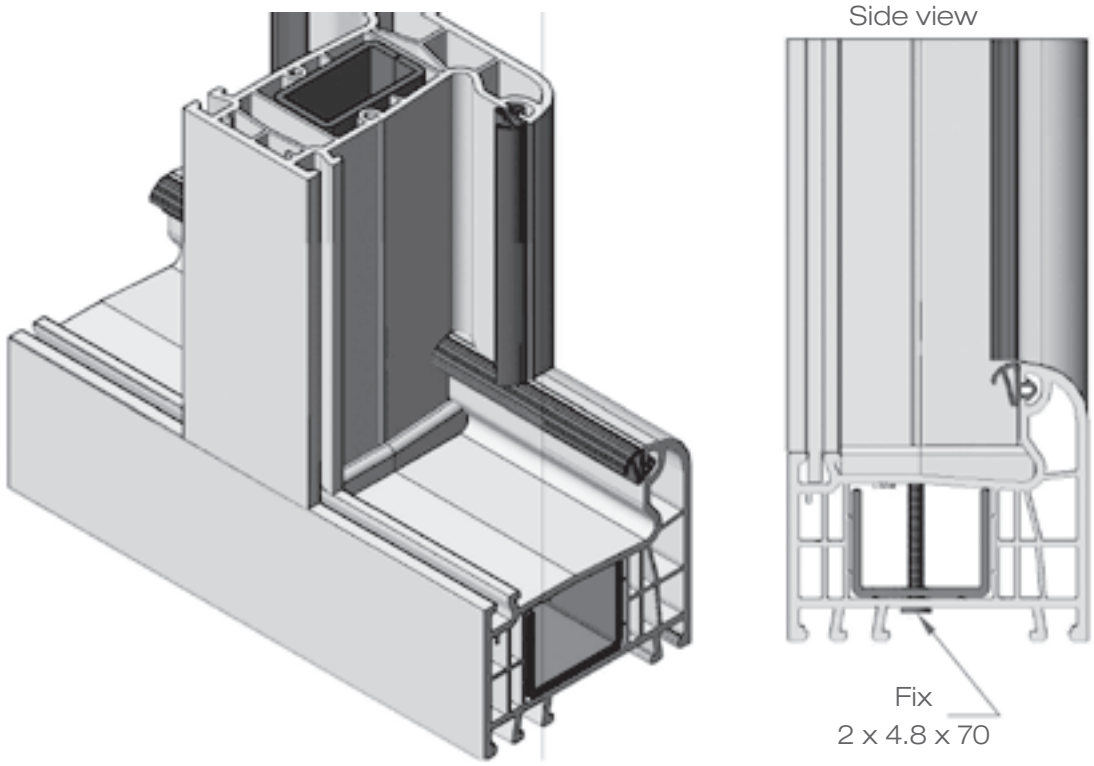

4

Position the transom/mullion in the frame and fix with screws

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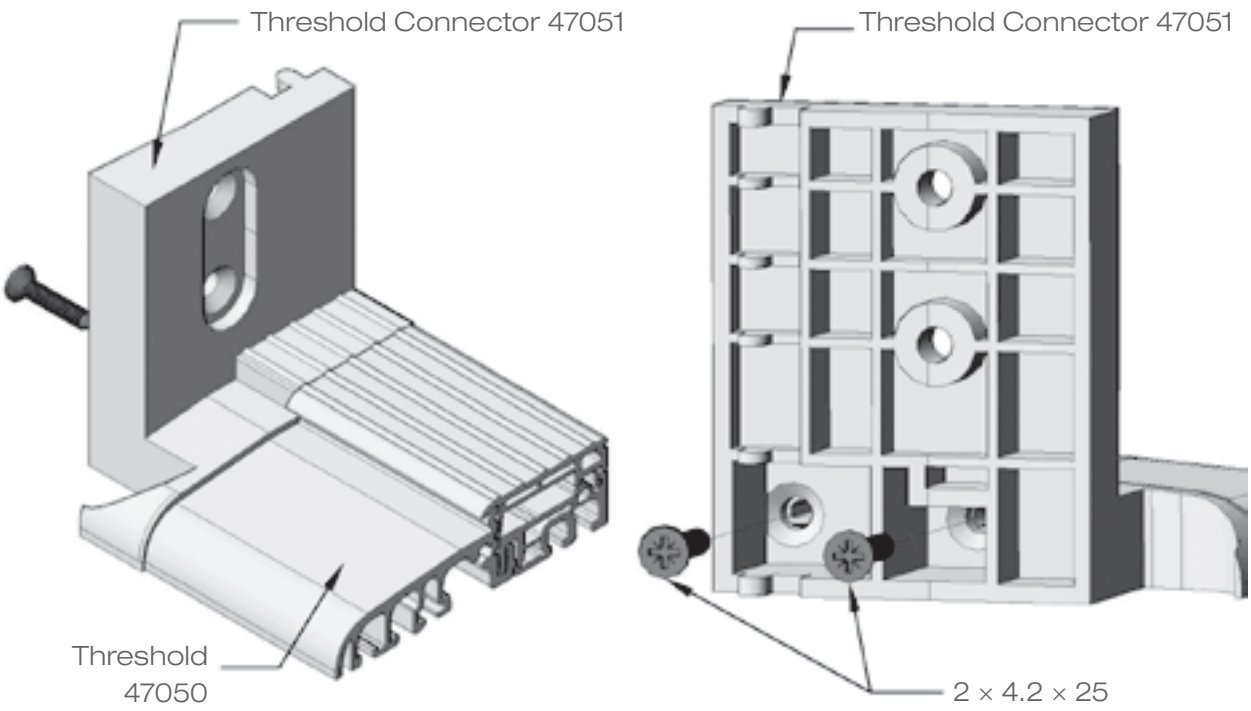
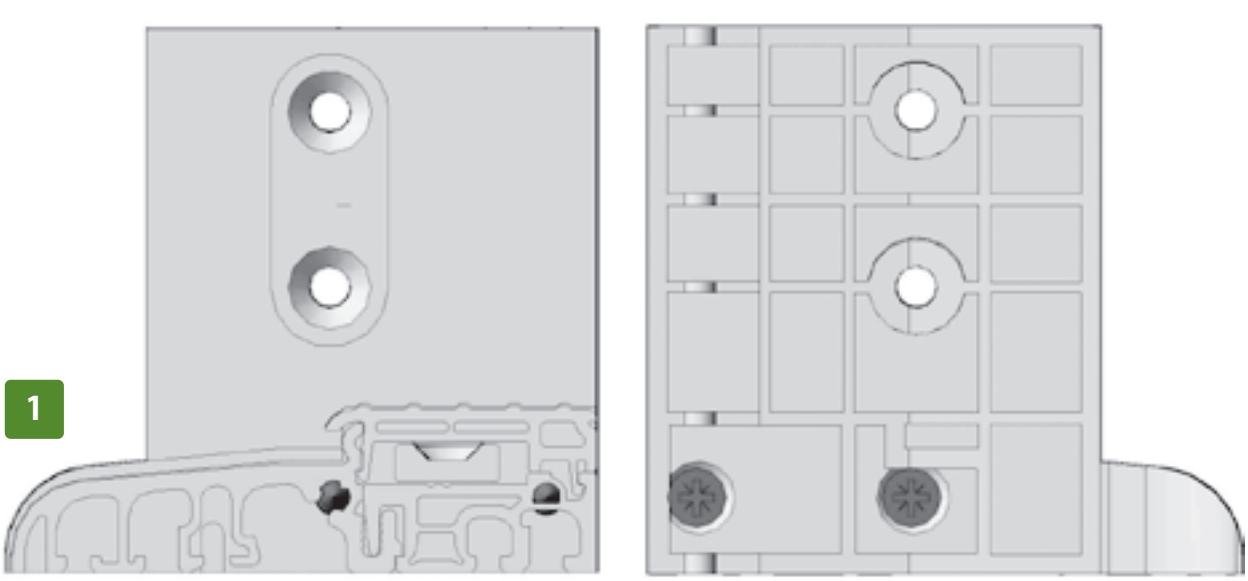
6. Preparation

6.7 Fixing Threshold Connector 47051 to Threshold 47050

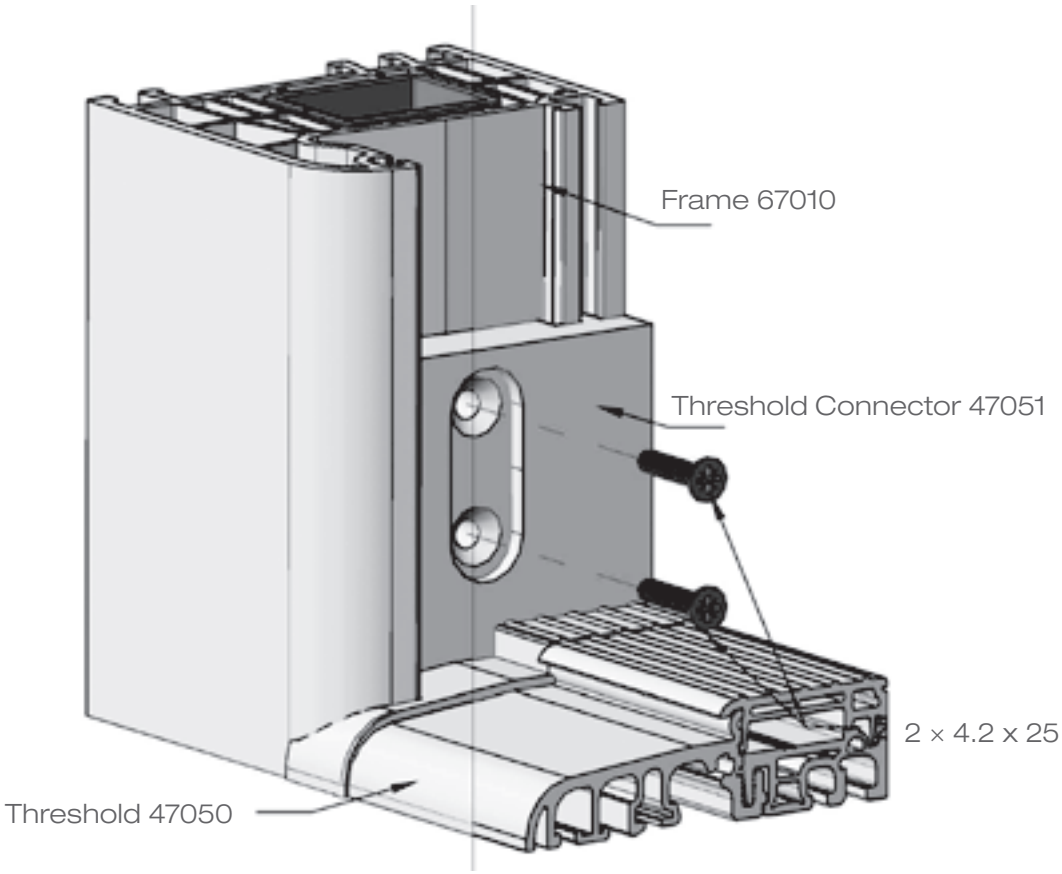


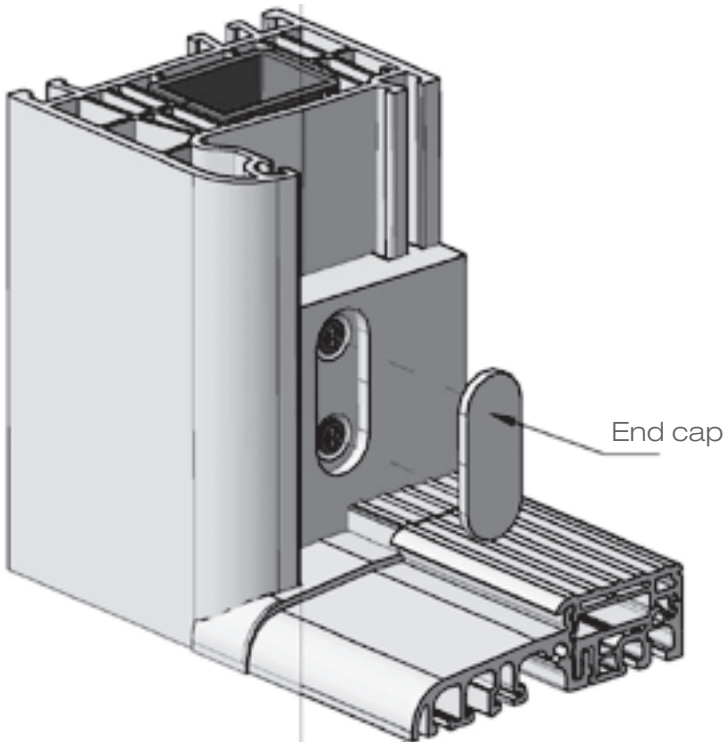
Side view



1

6.8 Installation of Threshold 47050 to Frame 67010 with Threshold Connector 47051

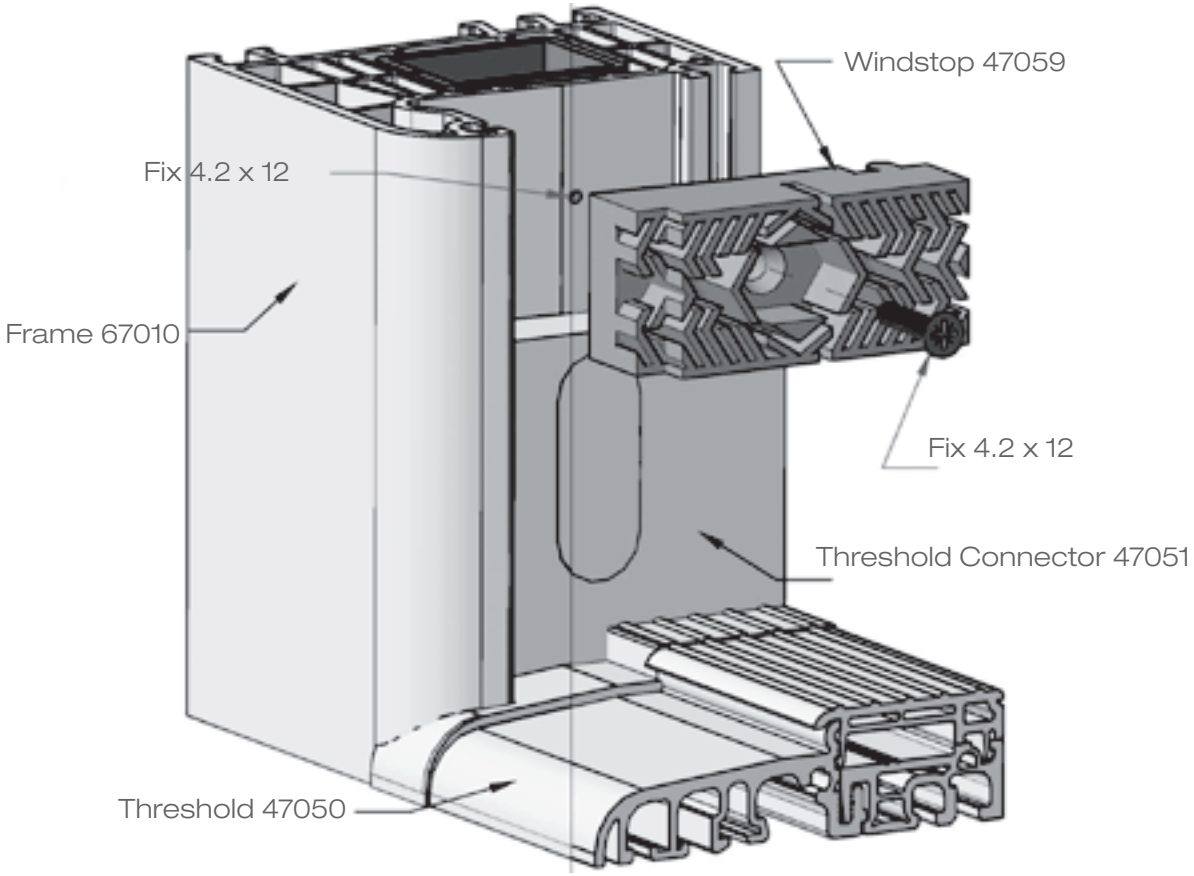


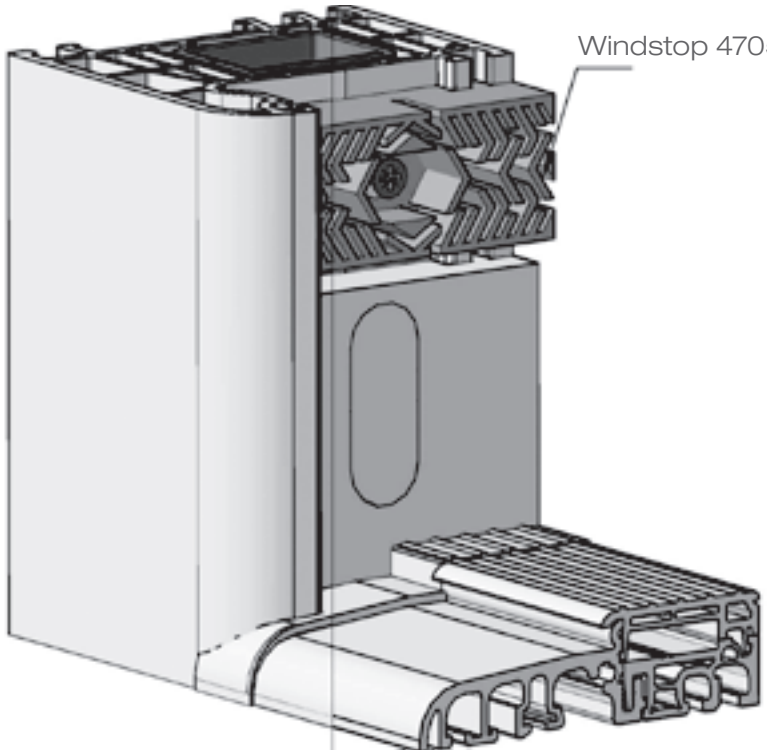


2

6. Preparation

6.9 Installation of Windstop 47059 to Frame 67010





7. Cutting Calculations

7.1 General Guidelines for Applying the Deduction Values
7.2 Calculation Example
7.3 Fixed Glazing in Frame
7.4 Fixed Glazing in Renovation Frame
7.5 Transom/Mullion and Dummy Bar in Vents
7.6 Single-Sash Window
7.7 Single-Sash Window with Renovation Frame
7.8 Two-Sash Window with Transom/Mullion
7.9 Two-Sash Window with Meeting Rail
7.10 Single-Sash Window with Fixed Glazing
7.11 Balcony Door with Aluminium Threshold

Issued: 01.02.2019

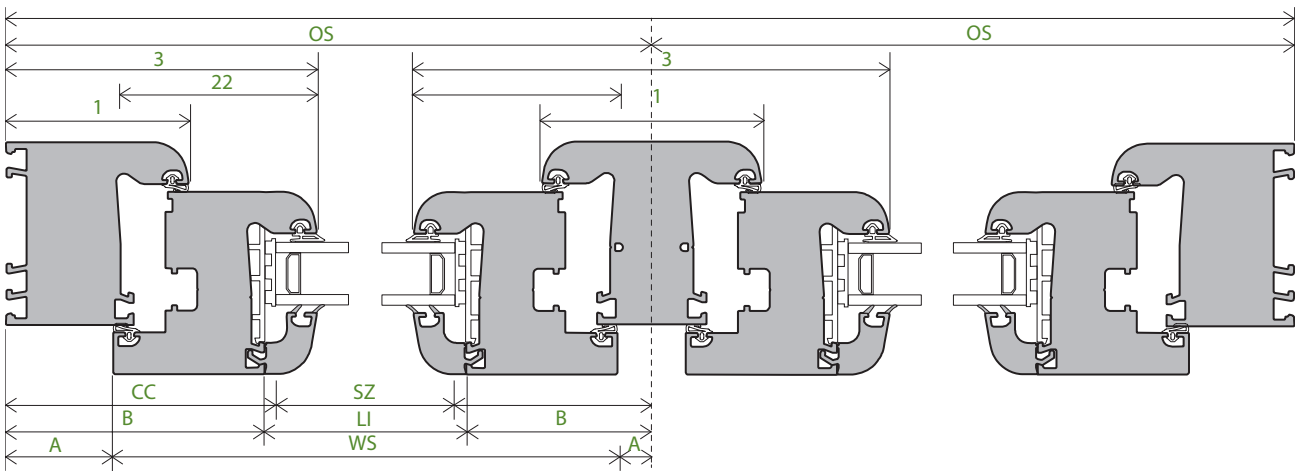
7. Cutting Calculations

7.1 General Guidelines for Applying the Deduction Values

To verify the deductions, sum up all of them used within the particular window/door design. Their sum should equal to the Outer dimensions of the window/door frame. Burn-off allowance also must be added for all welded elements.

Note:

The deduction values apply to welded or mechanically joined profiles. Depending on the available saw and welding machines, the profile lengths may change after processing (i.e. cutting or welding). Incorrect profile cutting may cause distortion of profile seals.



Abbreviations:

OS Transom/Mullion or meeting rail axis dimensions

WS Outer dimensions of sash (welded)

LI Glazing bead dimensions

SZ Glazing unit dimensions

WR Outer dimensions of frame (welded)

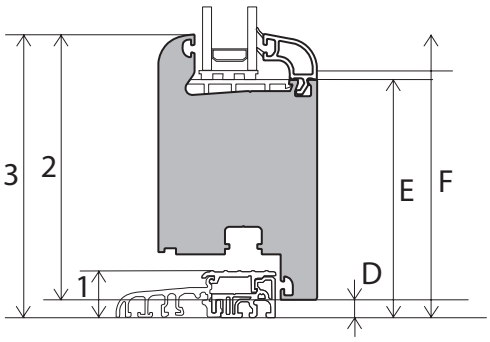
1 Outer dimensions of profiles: frames, mullions and thresholds

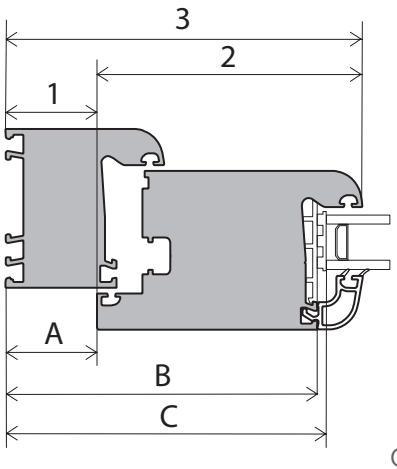
2 Outer dimensions of sash profile

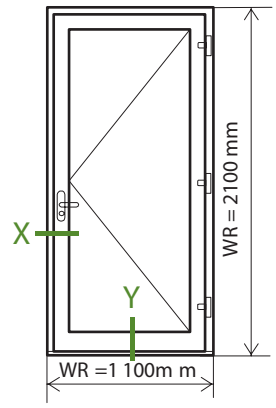
3 Outer dimensions of construction made of: frames, sashes and mullions

A, B, ... Constant values depending on profiles used

7.2 Calculation Example

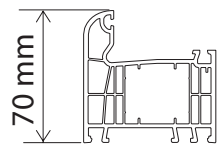
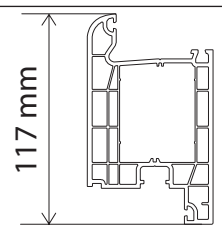


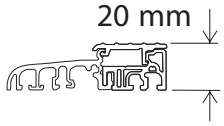
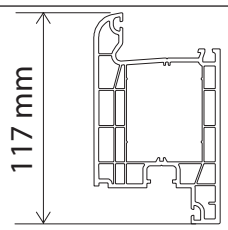




Outside dimension:

WR	1100x2100 mm
Frame	67011 70 mm
Sash	47020 117 mm

1		
2		
3	158	
A WS	-41	
B LI	-138	
C SZ	-142	

1		
2		
3	127	
D WS	-10	
E LI	-107	
F SZ	-111	

Calculation example results

Horizontally (X) applied deduction values for left frame/sash and right frame/sash

Vertically (Y) applied deduction values for threshold/sash and top frame/sash

WS = WR - 2A	1100 mm - 82 mm	1018 mm
LI = WR - 2B	1100 mm - 276 mm	824 mm
SZ = WR - 2C	1100 mm - 284 mm	816 mm
WS = WR - (D+A)	2100 mm - 51 mm	2049 mm
LI = WR - (E+B)	2100 mm - 245 mm	1855 mm
SZ = WR - (F+C)	2100 mm - 253 mm	1847 mm

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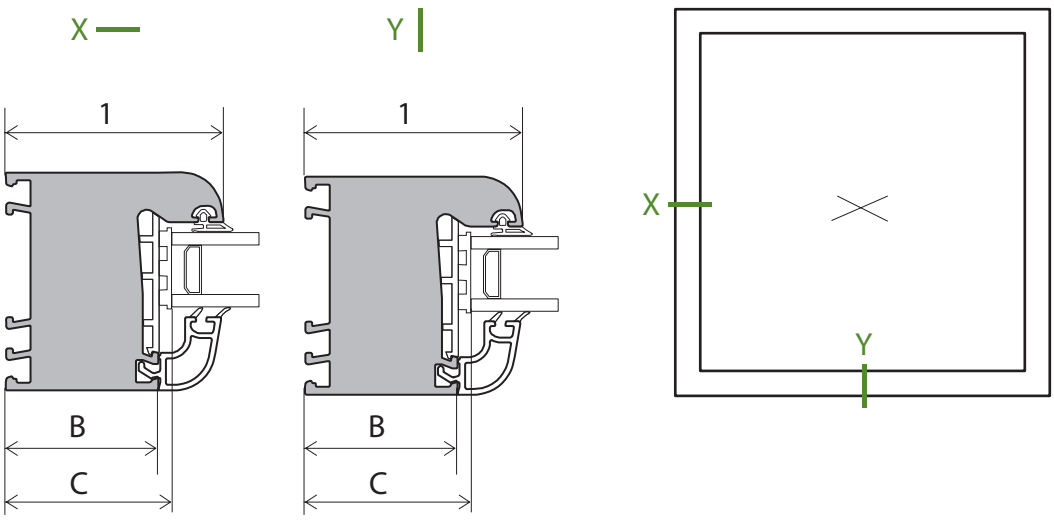
7. Cutting Calculations

7.3 Fixed Glazing in Frame



Profile height (mm)		1		
		65 mm **67010**	64 mm **68010**	70 mm **67011**
Deduction value (mm)	B LI	-44	-44	-49
	C SZ	-48	-48	-53

Abbreviations:

OS Transom/Mullion or meeting rail axis dimensions

WS Outer dimensions of sash (welded)

LI Glazing bead dimensions

SZ Glazing unit dimensions

WR Outer dimensions of frame (welded)

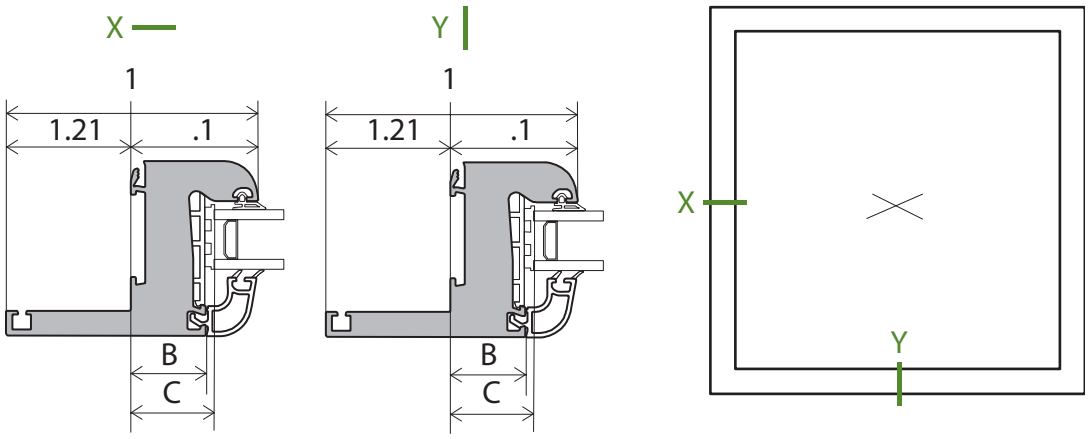
1 Outer dimensions of profiles: frames, mullions and thresholds

2 Outer dimensions of sash profile

3 Outer dimensions of construction made of: frames, sashes and mullions

A, B, ... Constant values depending on profiles used

7.4 Fixed Glazing in Renovation Frame



Profile height (mm)		101 mm **67012**	121 mm **67013**
	1		
	1.1	51	51
	1.2	50	70
Deduction value (mm)	B LI	-30	-30
	C SZ	-34	-34

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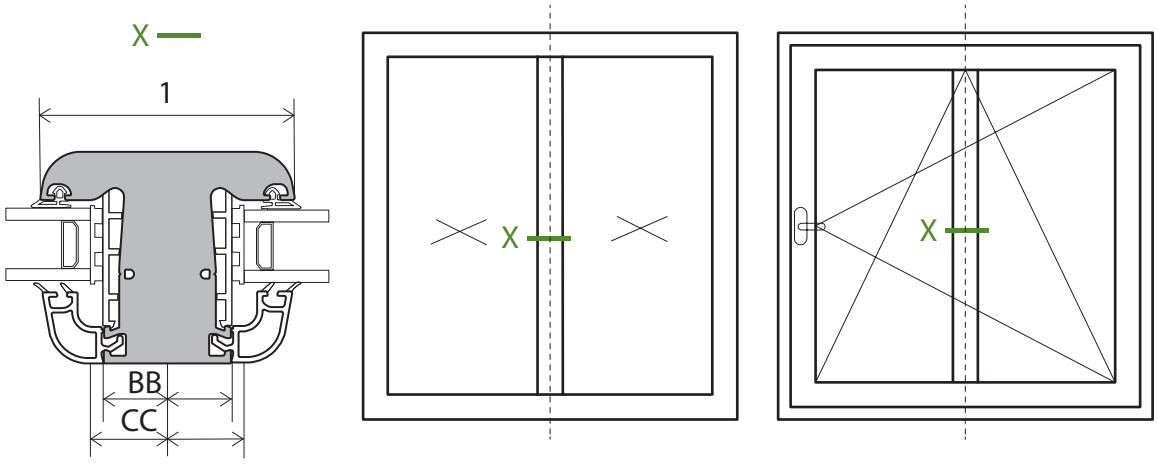
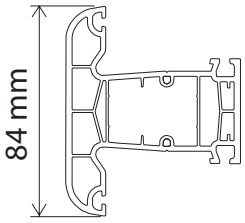
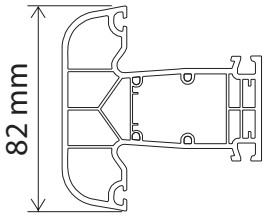
7. Cutting Calculations

7.5 Transom/Mullion and Dummy Bar in Vents



Profile height (mm)	1	 84 mm **57030**	 82 mm **68030**
Deduction value (mm)	B LI	-21	-21
	C SZ	-25	-25

Abbreviations:

OS Transom/Mullion or meeting rail axis dimensions

WS Outer dimensions of sash (welded)

LI Glazing bead dimensions

SZ Glazing unit dimensions

WR Outer dimensions of frame (welded)

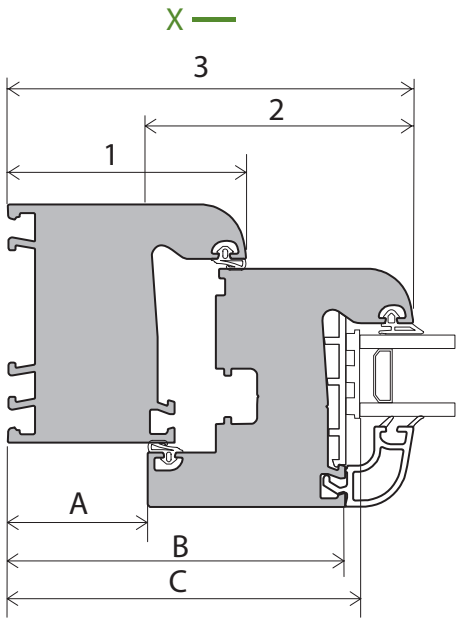
1 Outer dimensions of profiles: frames, mullions and thresholds

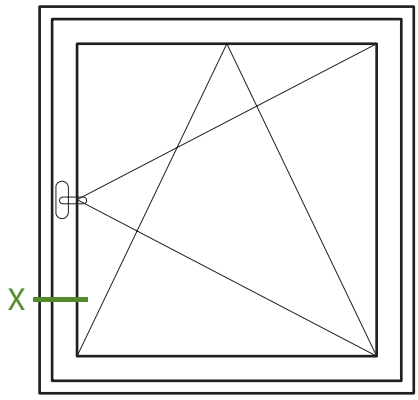
2 Outer dimensions of sash profile

3 Outer dimensions of construction made of: frames, sashes and mullions

A, B, ... Constant values depending on profiles used

7.6 Single-Sash Window





Profile height (mm)										
	1	65 mm 67010			64 mm 68010			70 mm 67011		
	2	67020, 67021, 67022	47022, 47023	47020, 47021	67020, 67021, 67022	47022, 47023	47020, 47021	67020, 67021, 67022	47022, 47023	47020, 47021
Deduction value (mm)	3	114	141	153	114	141	153	119	146	158
	A WS	-36	-36	-36	-36	-36	-36	-41	-41	-41
	B LI	-94	-121	-133	-94	-121	-133	-99	-126	-138
	C SZ	-98	-125	-137	-98	-125	-137	-103	-130	-142

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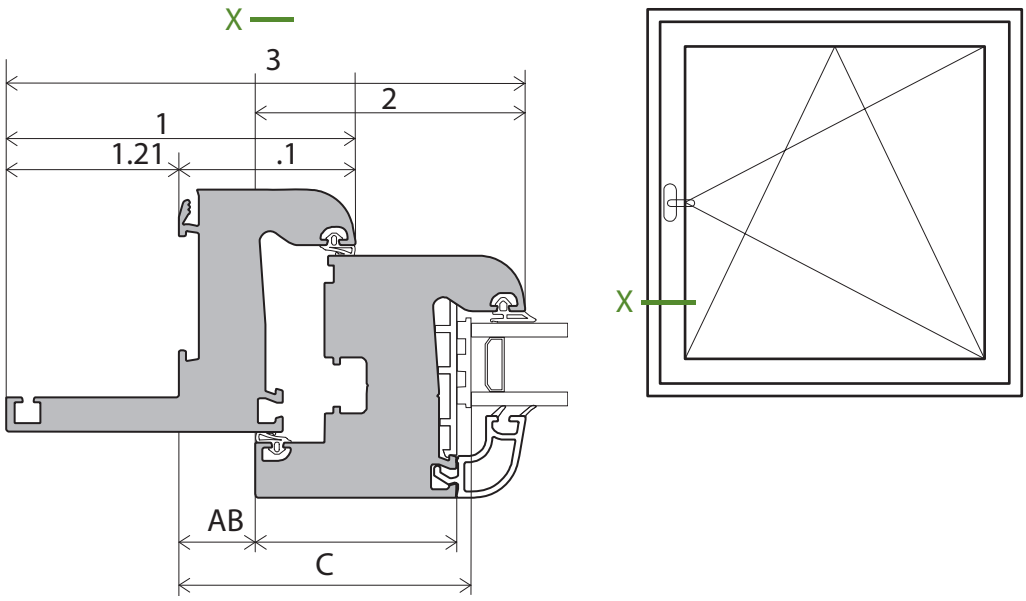
7.7 Single-Sash Window with Renovation Frame



Profile height (mm)		67012			67013		
	1	101 mm			121 mm		
	2	67020 (78 mm), 67021 (78 mm), 67022 (78 mm)	47022 (105 mm)	47020 (117 mm)	67020 (78 mm), 67021 (78 mm), 67022 (78 mm)	47022 (105 mm)	47020 (117 mm)
Deduction value (mm)	3	150	177	189	150	177	189
	A WS	-22	-22	-22	-22	-22	-22
	B LI	-80	-107	-119	-80	-107	-119
	C SZ	-84	-111	-123	-84	-111	-123

Abbreviations:

OS Transom/Mullion or meeting rail axis dimensions

WS Outer dimensions of sash (welded)

LI Glazing bead dimensions

SZ Glazing unit dimensions

WR Outer dimensions of frame (welded)

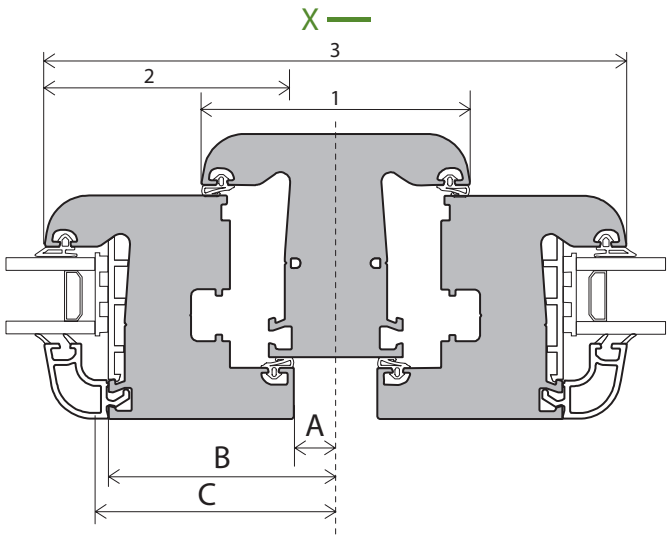
1 Outer dimensions of profiles: frames, mullions and thresholds

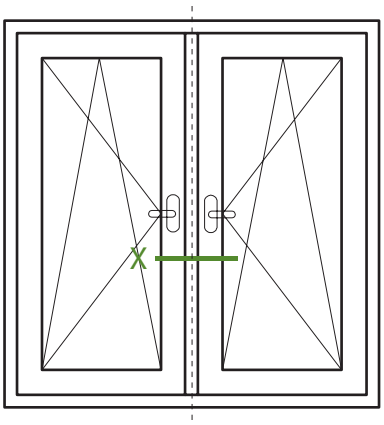
2 Outer dimensions of sash profile

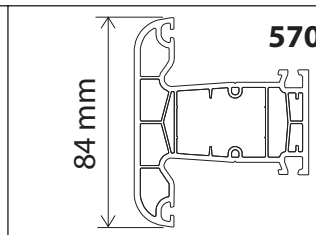
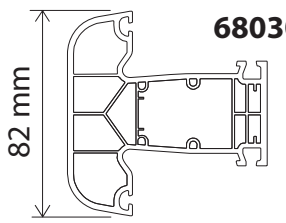
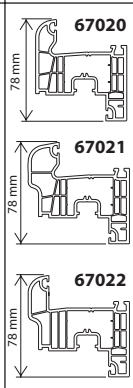
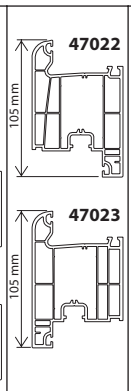
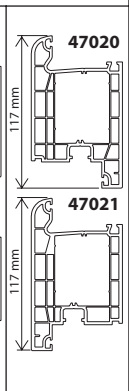
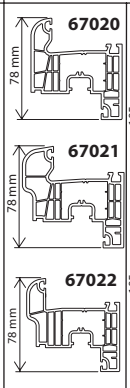
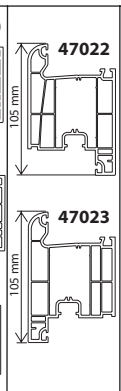
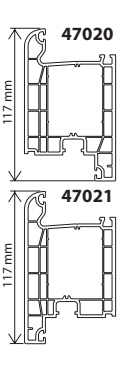
3 Outer dimensions of construction made of: frames, sashes and mullions

A, B, ... Constant values depending on profiles used

7.8 Two-Sash Window with Transom/Mullion





Profile height (mm)							
	1						
	2						
Deduction value (mm)	3	182	236	260	182	236	260
	A WS	-13	-13	-13	-13	-13	-13
	B LI	-71	-98	-110	-71	-98	-110
	C SZ	-75	-102	-114	-75	-102	-114

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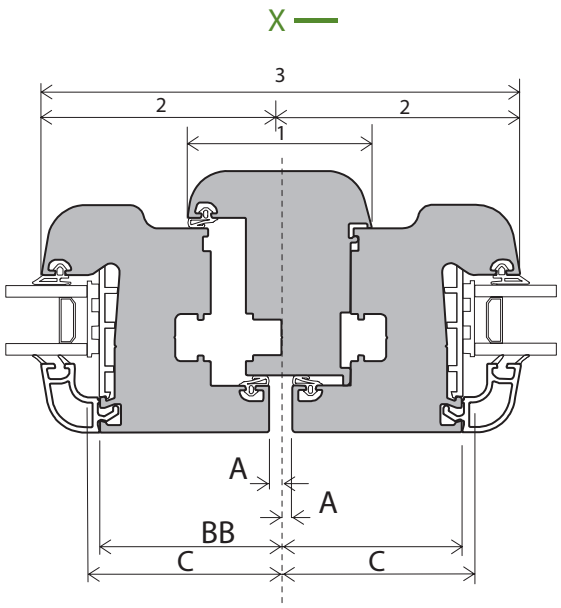
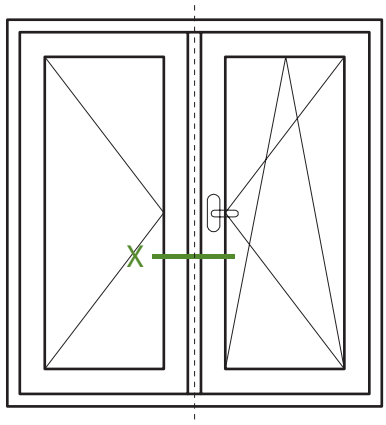
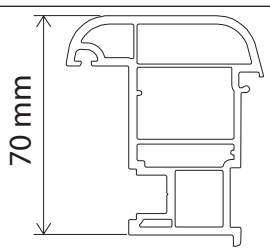
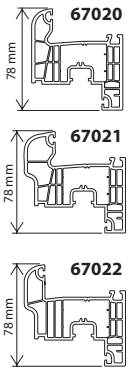
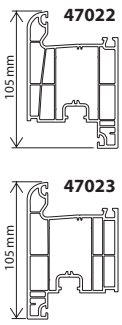
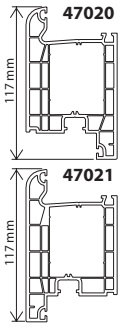
7. Cutting Calculations

7.9 Two-Sash Window with Meeting Rail





Profile height (mm)				
	1	 70 mm **57031**		
	2	 78 mm **67020** 78 mm **67021** 78 mm **67022**	 105 mm **47022** 105 mm **47023**	 117 mm **47020** 117 mm **47021**
Deduction value (mm)	3	164	218	242
	A WS	-4	-4	-4
	B LI	-62	-89	-101
	C SZ	-66	-93	-105

Abbreviations:

OS Transom/Mullion or meeting rail axis dimensions

WS Outer dimensions of sash (welded)

LI Glazing bead dimensions

SZ Glazing unit dimensions

WR Outer dimensions of frame (welded)

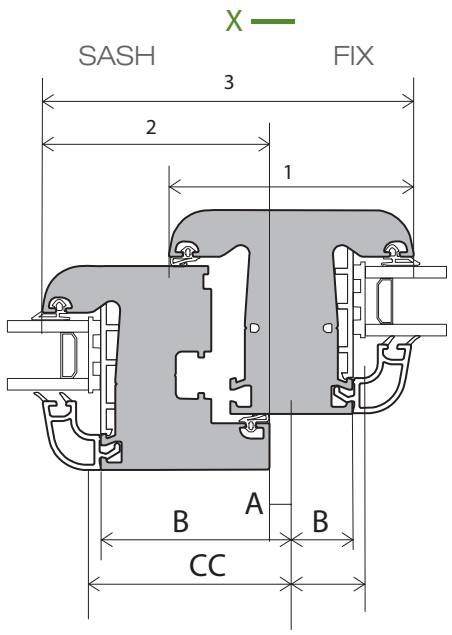
1 Outer dimensions of profiles: frames, mullions and thresholds

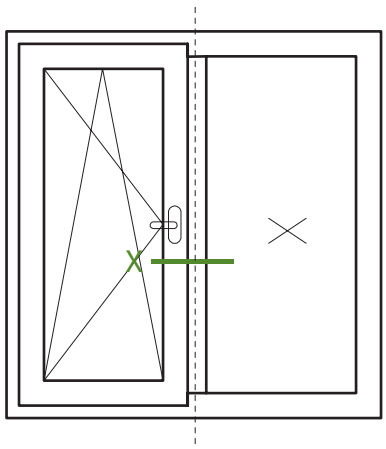
2 Outer dimensions of sash profile

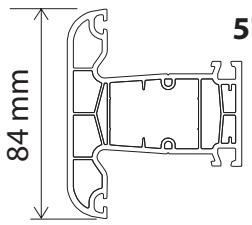
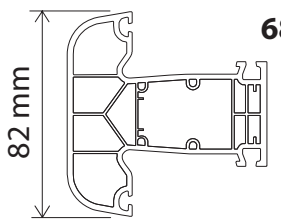
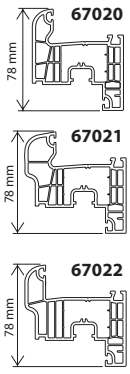
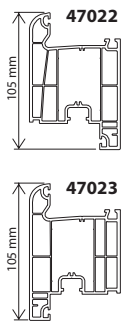
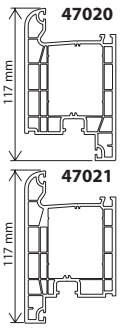
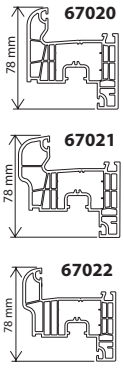
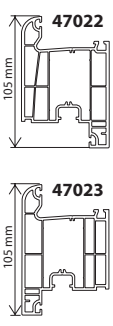
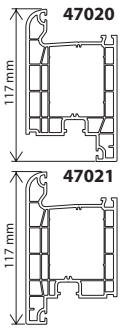
3 Outer dimensions of construction made of: frames, sashes and mullions

A, B, ... Constant values depending on profiles used

7.10 Single-Sash Window with Fixed Glazing





Profile height (mm)							
	1	 57030 84 mm			 68030 82 mm		
	2	 67020 78 mm 67021 78 mm 67022 78 mm	 47022 105 mm 47023 105 mm	 47020 117 mm 47021 117 mm	 67020 78 mm 67021 78 mm 67022 78 mm	 47022 105 mm 47023 105 mm	 47020 117 mm 47021 117 mm
Deduction value (mm)	3	133	160	170	132	159	171	
	A WS	-13	-13	-13	-13	-13	-13	
	B LI	-91 -21	-118 -21	-130 -21	-91 -21	-118 -21	-130 -21	SASH FIX
	C SZ	-95 -25	-122 -25	-134 -25	-95 -25	-122 -25	-134 -25	

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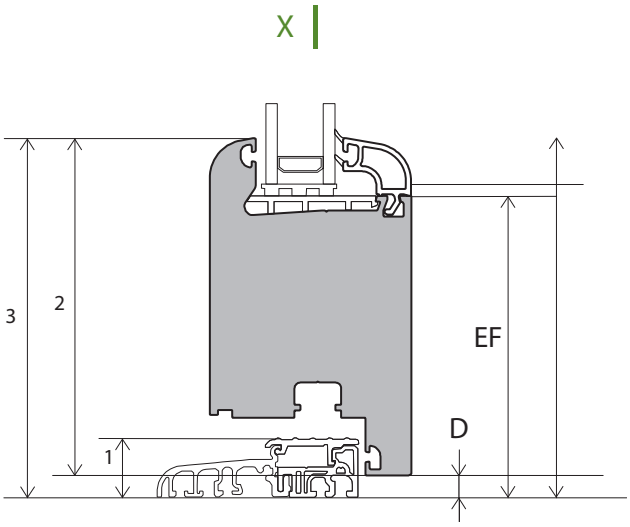
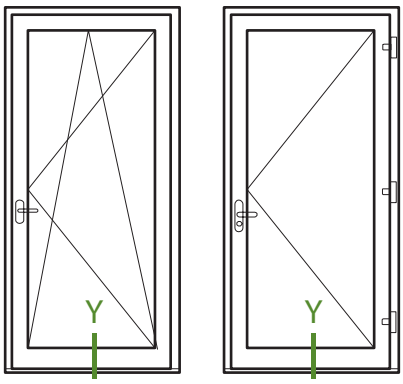
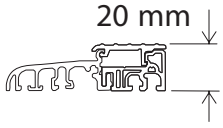
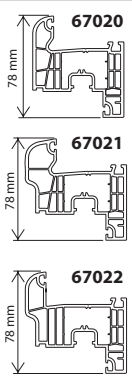
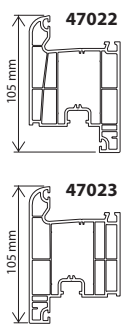
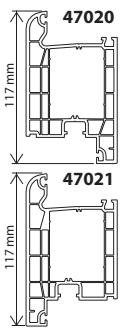
7. Cutting Calculations

7.11 Balcony Door with Aluminium Threshold





Profile height (mm)				
	1	20 mm  **47050**		
	2	 67020 78 mm; 67021 78 mm; 67022 78 mm	 47022 105 mm; 47023 105 mm	 47020 117 mm; 47021 117 mm
Deduction value (mm)	38	8	115	127
	D WS	-10	-10	-10
	E LI	-68	-95	-107
	F SZ	-72	-99	-111

Abbreviations:

OS Transom/Mullion or meeting rail axis dimensions

WS Outer dimensions of sash (welded)

LI Glazing bead dimensions

SZ Glazing unit dimensions

WR Outer dimensions of frame (welded)

1 Outer dimensions of profiles: frames, mullions and thresholds

2 Outer dimensions of sash profile

3 Outer dimensions of construction made of: frames, sashes and mullions

A, B, ... Constant values depending on profiles used

Contents

1. Product Guide
2. Maximum Sash Sizes (size limits)
3. Overview of Profiles
4. Detail Sheets
5. Preparation
6. Cutting Calculations

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1. Product Guide

1.1 Overview of PVC Profiles
1.2 Overview of PVC Profiles
1.3 Reinforcements

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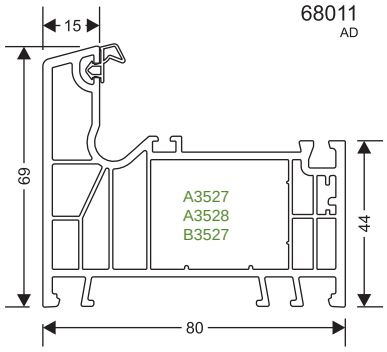
68011
AD



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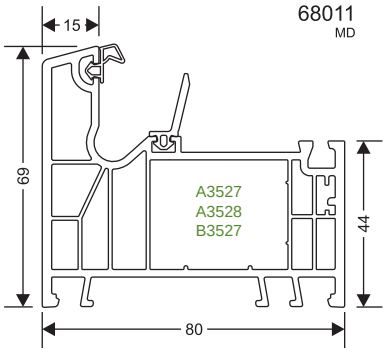

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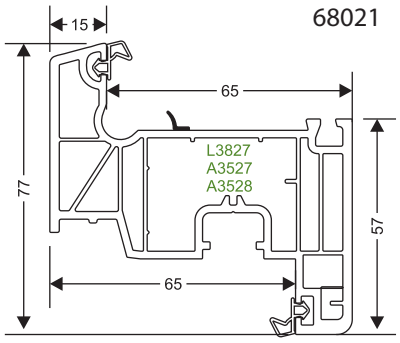

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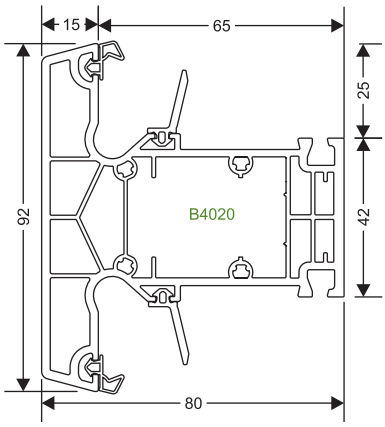

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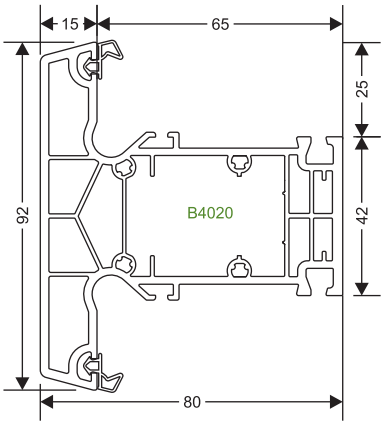

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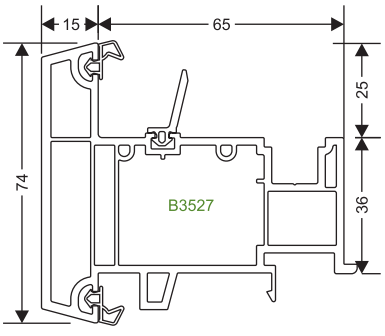

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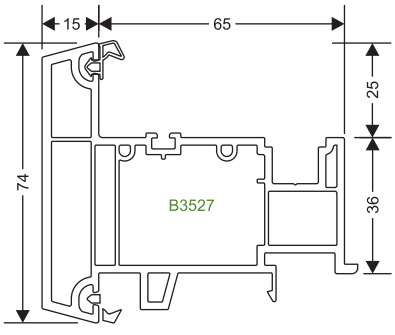

1. Product Guide

1.2 Overview of PVC Profiles

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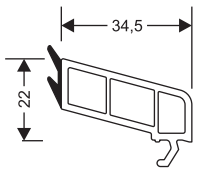
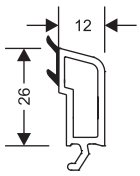


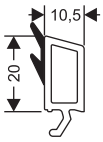
24 mm glazing unit

68644



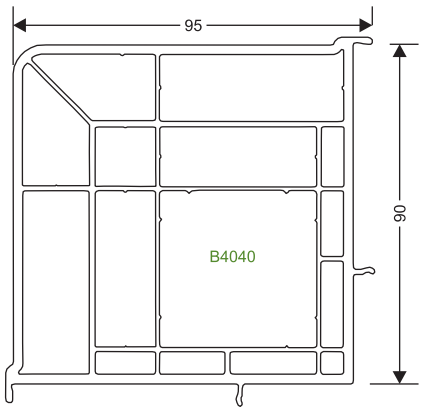
48 mm glazing unit

68040



48 mm glazing unit

68063

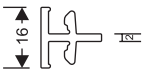


57074

57071

68072

57052



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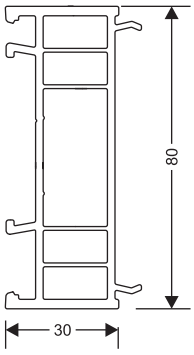

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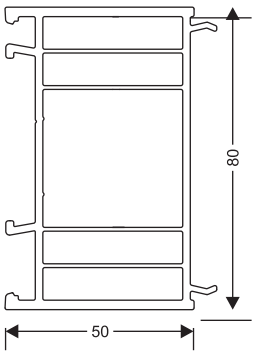

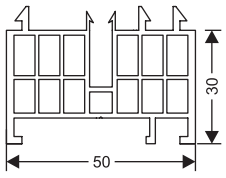

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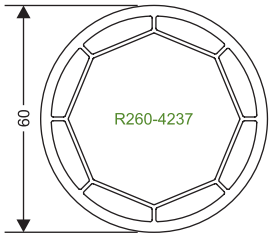

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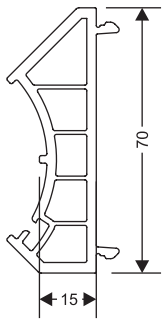

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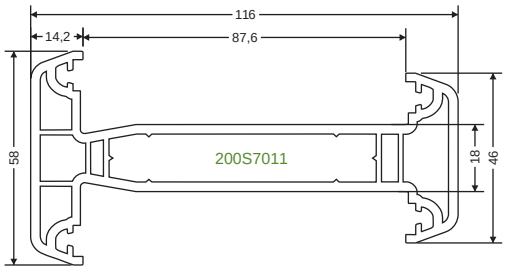

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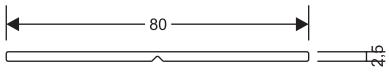
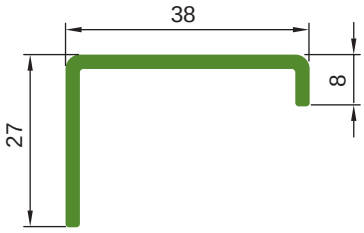


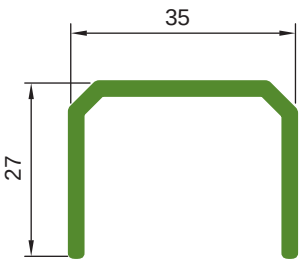
1.3 Reinforcements

L3827



A	X	Y
1,50	1,94	0,62

A3527



A	X	Y
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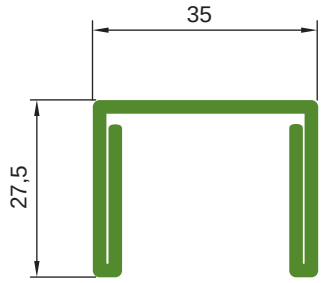
2,00	3,18	1,20

A3528



A	X	Y
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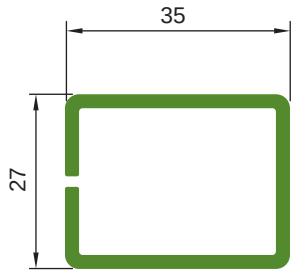
2,50	6,18	2,48

B3527



A	X	Y
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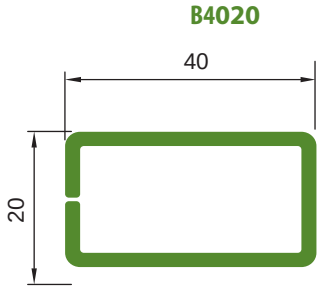
2,00	3,70	2,50

B4020



A	X	Y
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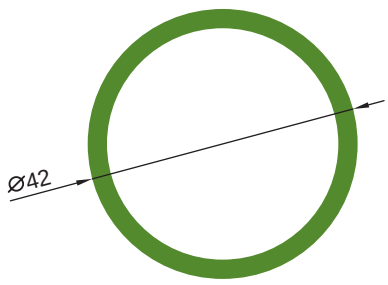
2,00	1,41	4,24

R260-4237



A	X	Y
2,60	7,27	7,27

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2. Maximum Sash Sizes (size limits)

2.1 General Information

2.2 Maximum Single-Frame Sizes

2.3 Maximum Window and Balcony Door Sizes - sash and multi-sash windows with transom/mullion

2.4 Maximum Window and Balcony Door Sizes - sash and multi-sash windows with with meeting rail

2.5 Maximum Tilt Windows Sizes

2. Maximum Sash Sizes (size limits)

2.1 General Information

Wind load is one of the key factors to consider when designing a window. Based on the resistance to wind load, suitable window and door elements are selected, including PVC profiles and reinforcements, allowing for the size limits, glazing unit or panel weight and method of assembly.

General:

- size limits apply to the outer dimensions of the sashes;
- distances between hinges or locks (hooks) ≤800 mm;
- observe the guidelines of hardware suppliers regarding permissible loads and permissible sash size, regardless of the permissible size defined by the PVC profile system supplier;
- all coloured windows (foiled, paint coated or aluminium covered) require min. 2 mm thick reinforcements (steel sections).

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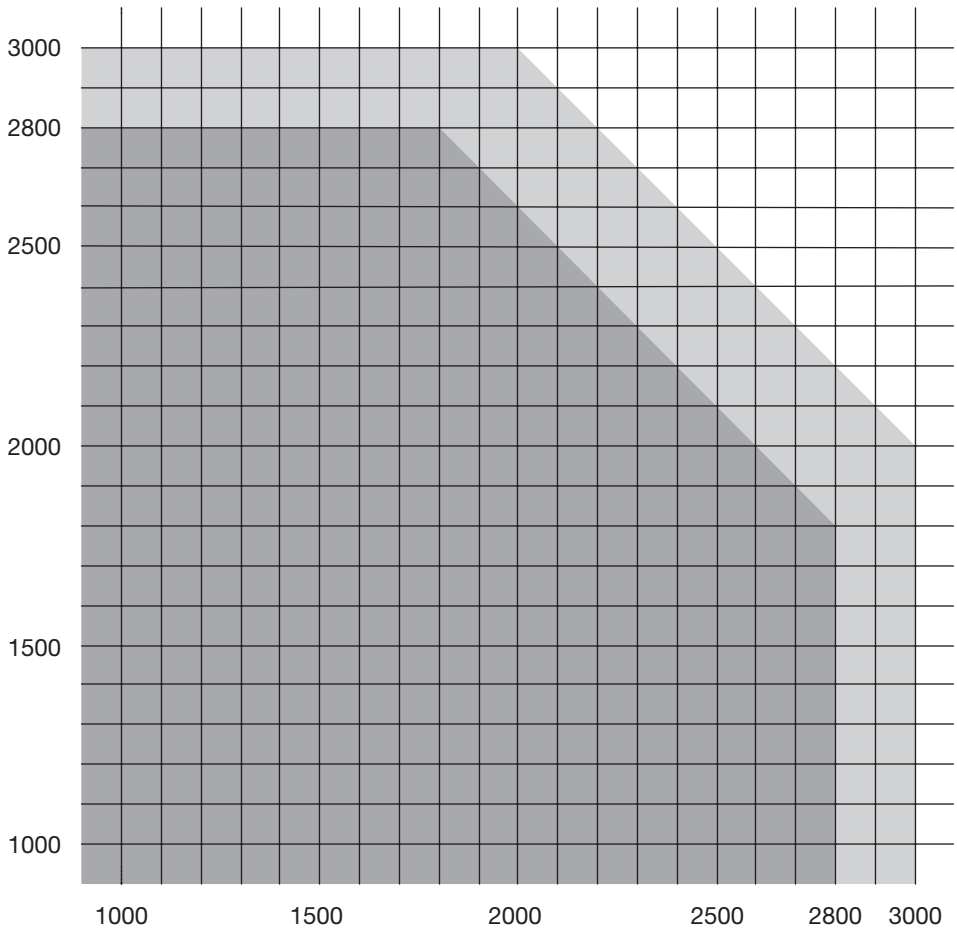
2. Maximum Sash Sizes (size limits)

2.2 Maximum Single-Frame Sizes

Maximum frame sizes for multi-sash windows and doors	White profiles	Coloured profiles
Maximum side length	300 cm	280 cm
Maximum surface area	6,0 m2	5,0 m2

Maximum frame dimensions, Outer dimension in mm



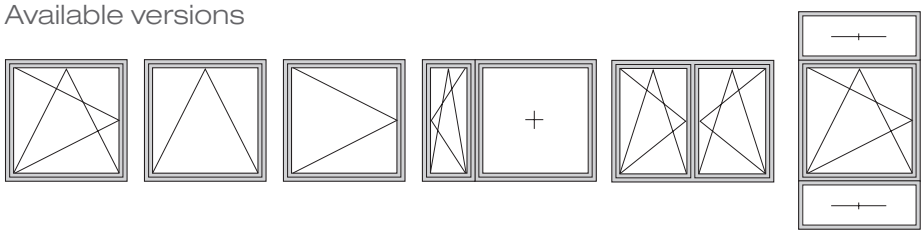
	Maximum permissible dimensions		
	Maximum width (mm)	Maximum height (mm)	Maximum surface area (m²)
White	3,000	3,000	6.00
Colour	2,800	2,800	5.00

2. Maximum Sash Sizes (size limits)

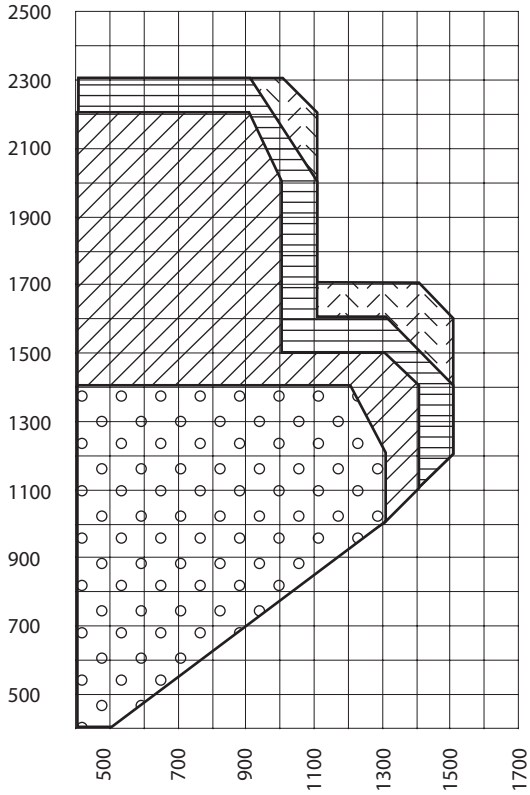
2.3 Maximum Window and Balcony Door Sizes

single-sash and multi-sash with transom/mullion and multi-sash with meeting rail.

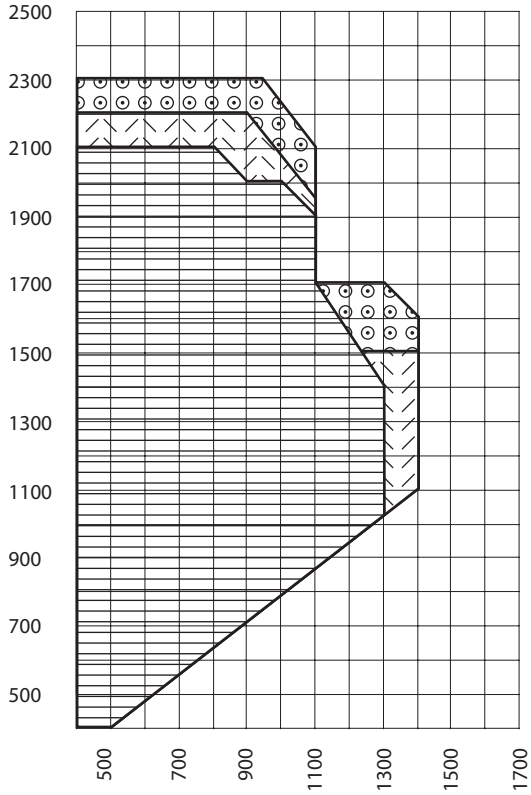
Available versions

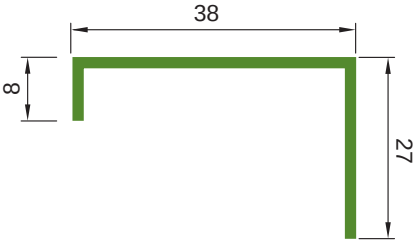


White profiles
Glazing unit up to 30 kg/m2

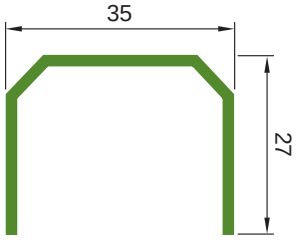


Coloured profiles
Glazing unit up to 30 kg/m2

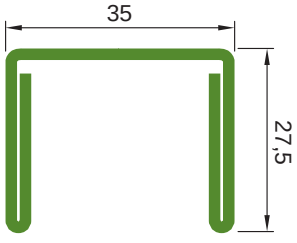




	INDEX	x (mm)	Ix (cm⁴)	Iy (cm⁴)
	150L3827	1,50	1,94	0,62



	INDEX	x (mm)	Ix (cm⁴)	Iy (cm⁴)
	150A3527	1,50	2,48	0,93
	200A3527	2,00	3,18	1,20
	300A3527	3,00	4,20	1,70



	INDEX	x (mm)	Ix (cm⁴)	Iy (cm⁴)
	200A3528	2,00	5,24	1,98
	250A3528	2,5	6,18	2,42

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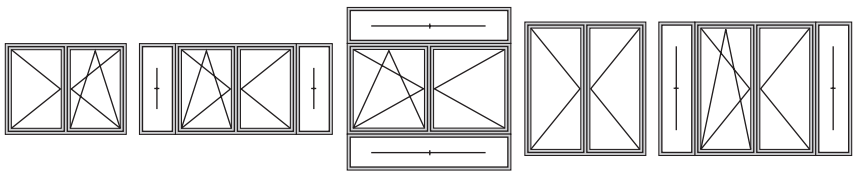
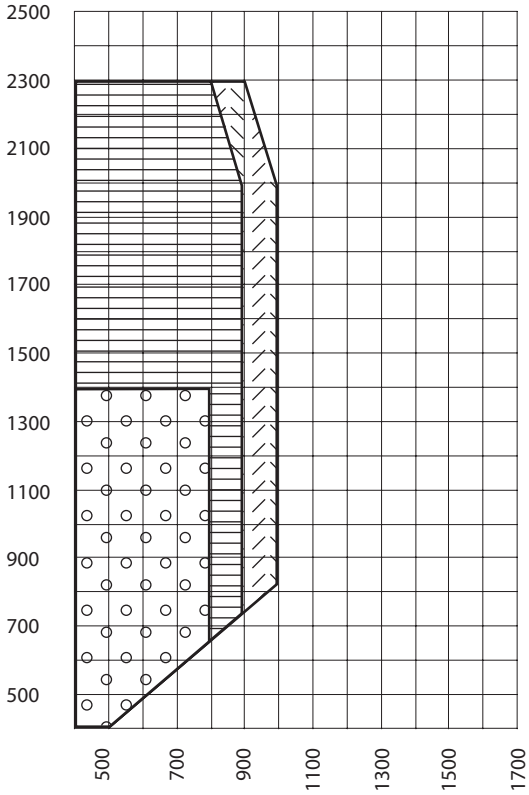
2. Maximum Sash Sizes (size limits)

2.4 Maximum Window and Balcony Door Sizes - sash and multi-sash windows with with meeting rail

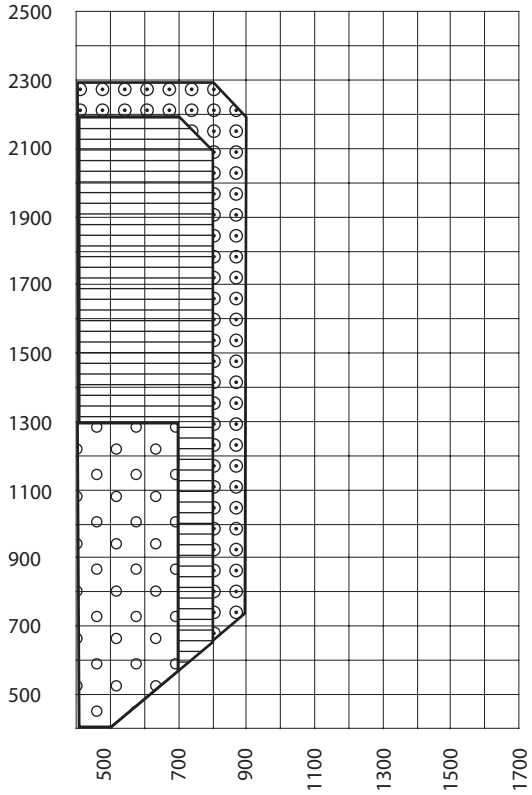
Available versions

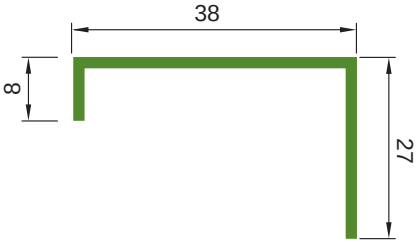


White profiles
Glazing unit up to 30 kg/m2

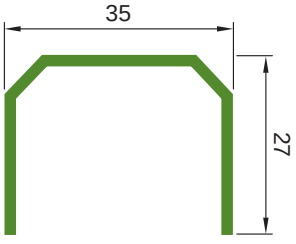


Coloured profiles
Glazing unit up to 30 kg/m2

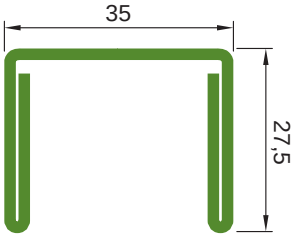




	INDEX	x (mm)	Ix (cm⁴)	Ix (cm⁴)
	150L3827	1,50	1,94	0,62



	INDEX	x (mm)	Ix (cm⁴)	Ix (cm⁴)
	150A3527	1,50	2,48	0,93
	200A3527	2,00	3,18	1,20
	300A3527	3,00	4,20	1,70

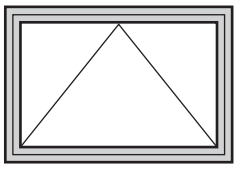


	INDEX	x (mm)	Ix (cm⁴)	Ix (cm⁴)
	200A3528	2,00	5,24	1,98
	250A3528	2,5	6,18	2,42

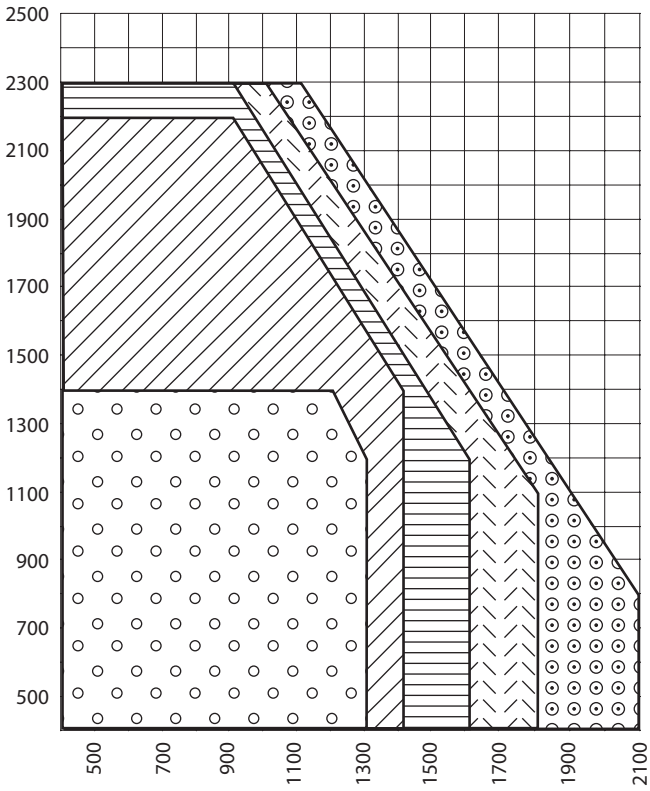
2. Maximum Sash Sizes (size limits)

2.5 Maximum Tilt Windows Sizes

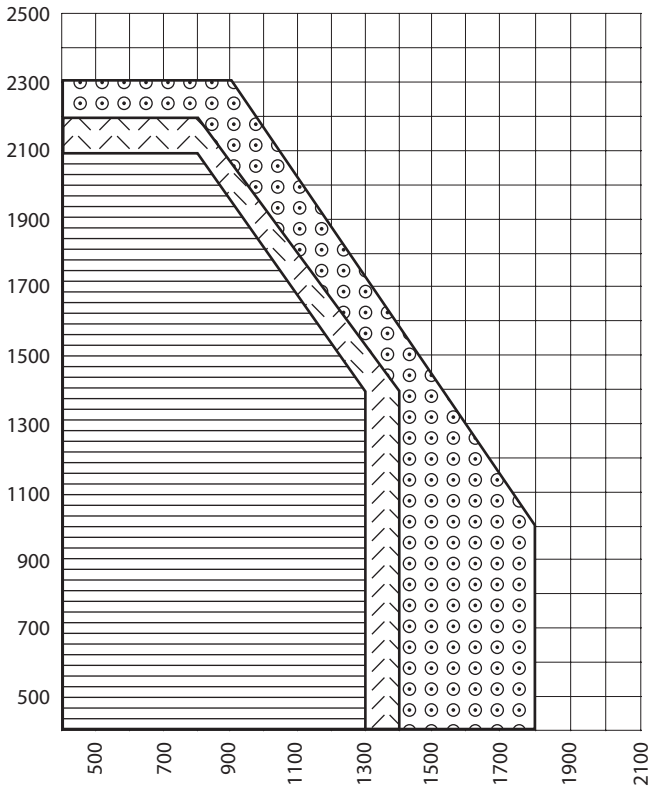
Available versions

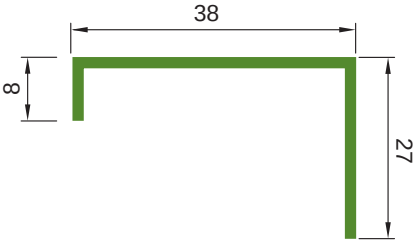


White profiles
Glazing unit up to 30 kg/m2

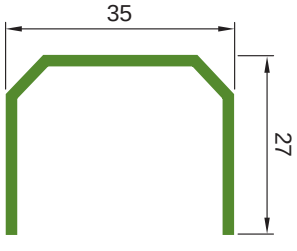


Coloured profiles
Glazing unit up to 30 kg/m2

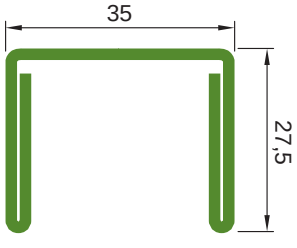




	INDEX	x (mm)	Ix (cm⁴)	Iy (cm⁴)
	150L3827	1,50	1,94	0,62



	INDEX	x (mm)	Ix (cm⁴)	Iy (cm⁴)
	150A3527	1,50	2,48	0,93
	200A3527	2,00	3,18	1,20
	300A3527	3,00	4,20	1,70



	INDEX	x (mm)	Ix (cm⁴)	Iy (cm⁴)
	200A3528	2,00	5,24	1,98
	250A3528	2,5	6,18	2,42

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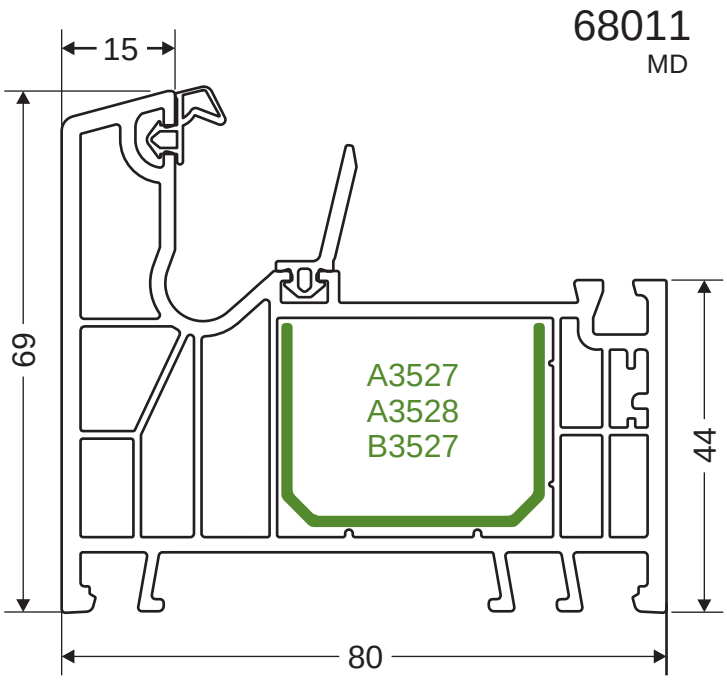
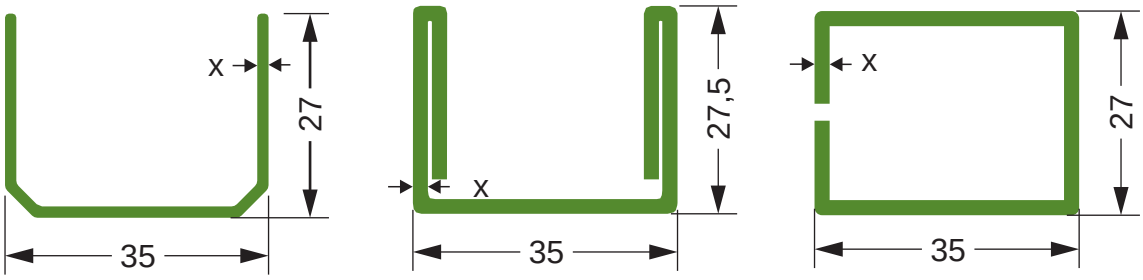
3. Overview of Profiles

3.1 Frame 68011
3.2 Sash 68021
3.3 Transom/Mullion 68032
3.4 Meeting rail 68033
3.5 90° Bay Post 68063
3.6 Bay pole 57061 & Bay Pole Adapter 57062
3.7 Structural Transom/Mullion 68667 + 200S1070

3.1 Frame 68011





reinforcement

reinforce-ment	x (mm)	Ix (cm^4)	Iy (cm^4)
150A3527	1,5	0,9257	2,4761
200A3527	2,0	1,2004	3,1759

reinforce-ment	x (mm)	Ix (cm^4)	Iy (cm^4)
200A3527	2,0	5,24	1,98
250A3527	2,5	6,18	2,48

reinforce-ment	x (mm)	Ix (mm^4)	Iy (mm^4)
150B3527	1,5	2,86	1,98
200B3527	2,0	3,70	2,50

Profile	colour	EPDM gasket		
68011AD	S/C		57071	TOUCHING PVC
	S/C		68072	CENTRAL SEAL
	S/C		57074	TOUCHING GLASS

Profile	colour	EPDM gasket		
68011MD	S/C	—	—	—

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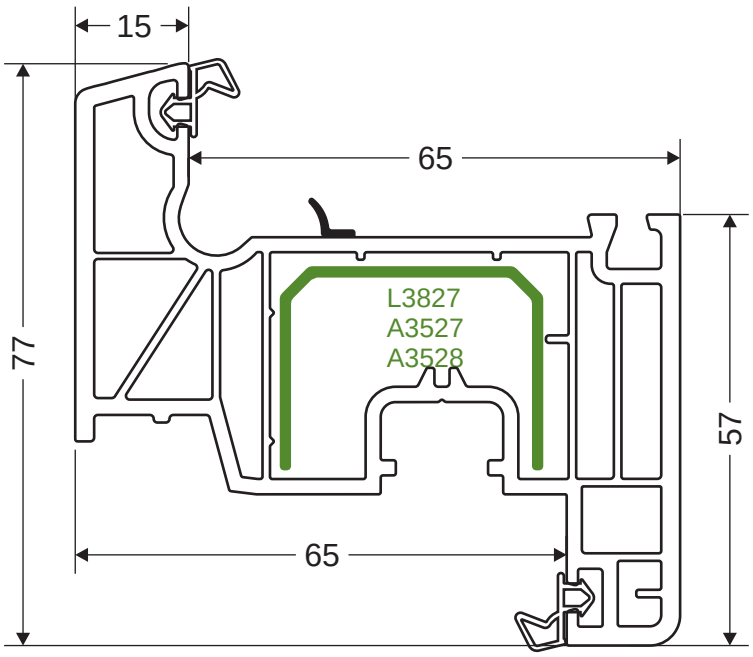
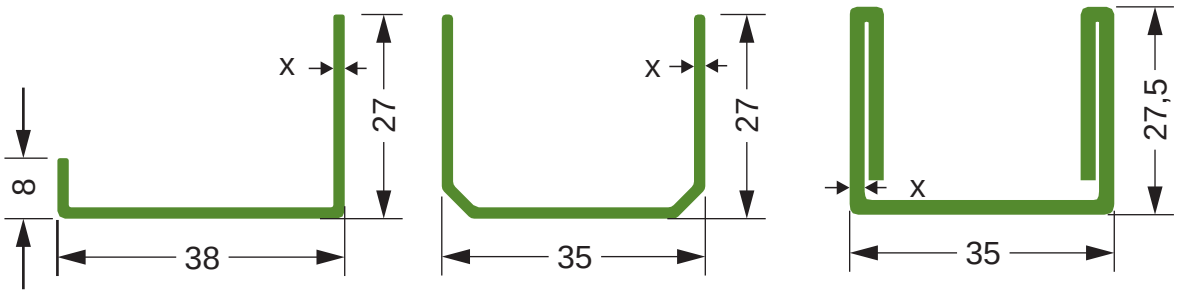
3. Overview of Profiles

3.2 Sash 68021





reinforce-ment	x (mm)	Ix (cm⁴)	Iy (cm⁴)
150A3827	1,5	0,6214	1,9409

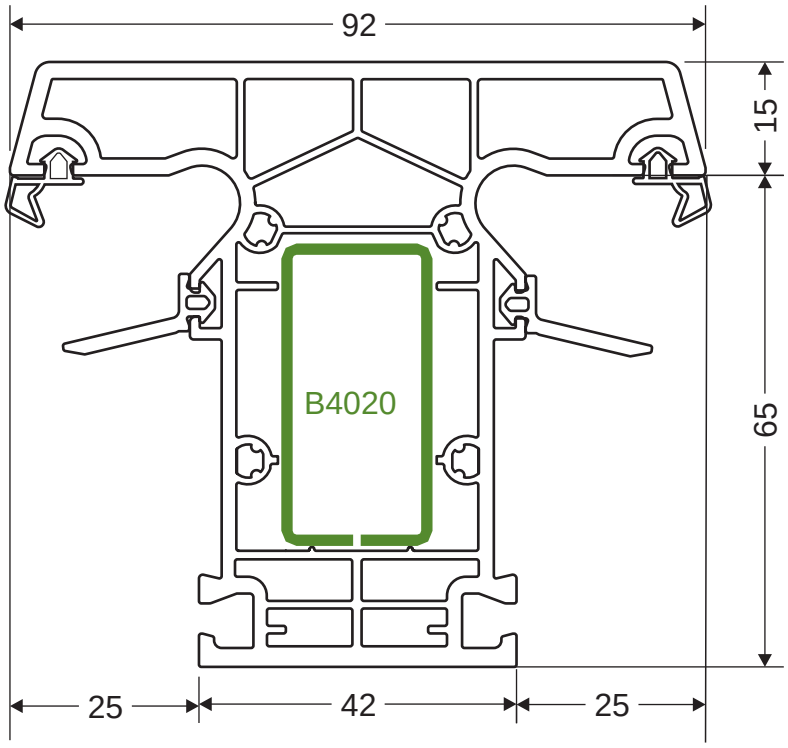
reinforce-ment	x (mm)	Ix (cm⁴)	Iy (cm⁴)
150A3527	1,5	0,9257	2,4761
200A3527	2,0	1,2004	3,1759

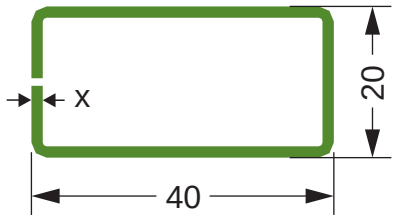
reinforce-ment	x (mm)	Ix (cm⁴)	Iy (cm⁴)
200A3527	2,0	5,24	1,98
250A3527	2,5	6,18	2,48

Profile	colour	EPDM gasket		
68021	S C		57071	TOUCHING PVC
	S C		57074	TOUCHING GLASS

Profile	colour	EPDM gasket		
68020U	S C	—	—	—

3.3 Transom/Mullion 68032





reinforce-ment	x (mm)	Ix (cm⁴)	Iy (cm⁴)
150B4020	1,5	1,12	3,31
200B4020	2,0	1,41	4,24

Profile	colour	EPDM gasket		
68031 AD	S/C		57071	TOUCHING PVC
	S/C		68072	CENTRAL SEAL
	S/C		57074	TOUCHING GLASS

Profile	colour	EPDM gasket		
68031MD S/C	S/C	—	—	—

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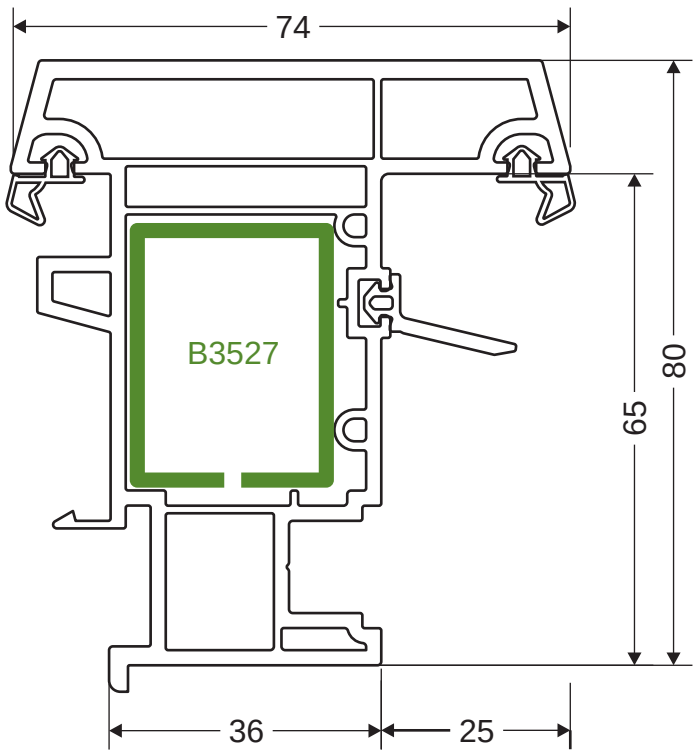
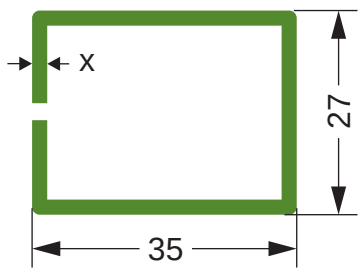
3.4 Meeting rail 68033



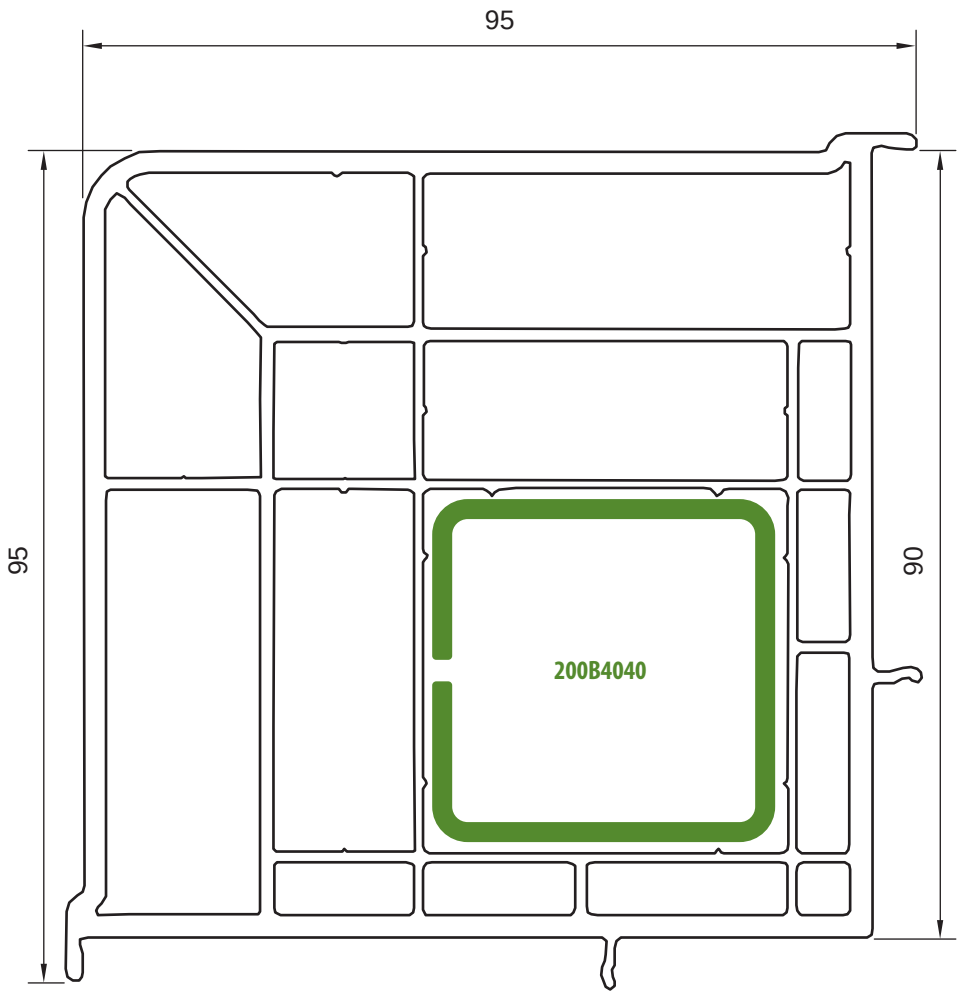


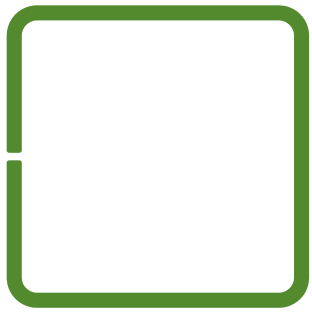
reinforce-ment	x (mm)	Ix (cm⁴)	Iy (cm⁴)
150B3527	1,5	2,86	1,98
200B3527	2,0	3,70	2,50

Profile	colour	EPDM gasket		
68033 AD	S / C		57071	TOUCHING PVC
	S / C		68072	TOUCHING GLASS

Profile	colour	EPDM gasket		
68032MD S/C	S / C	—	—	—

3.5 90° Bay Post 68063





reinforce-ment	x (mm)	Ix (cm⁴)	Iy (cm⁴)
200B4040	2,0	7,13	7,21

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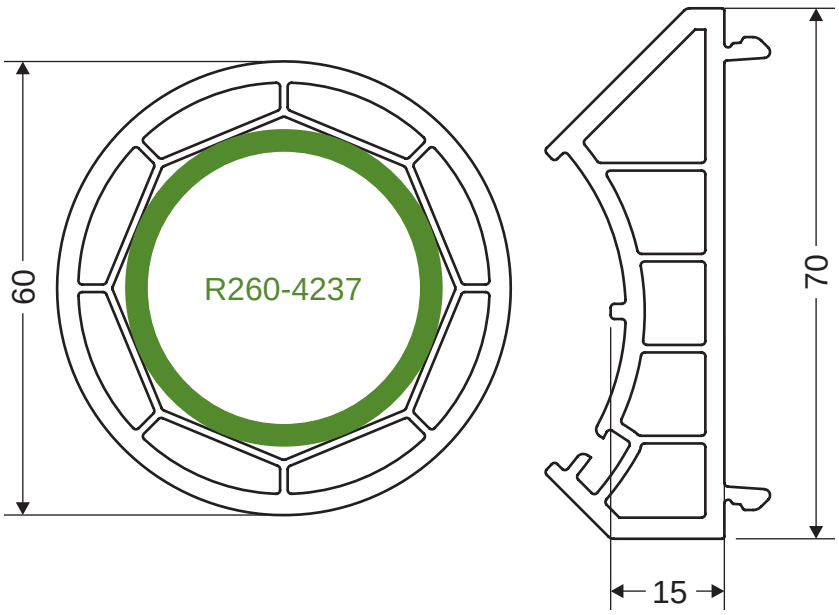
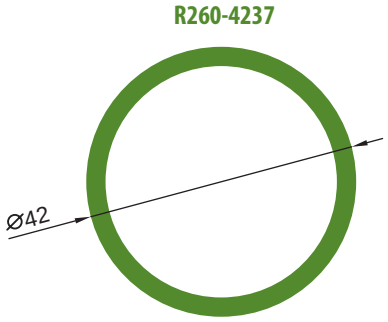
3.6 Bay pole 57061 & Bay Pole Adapter 57062

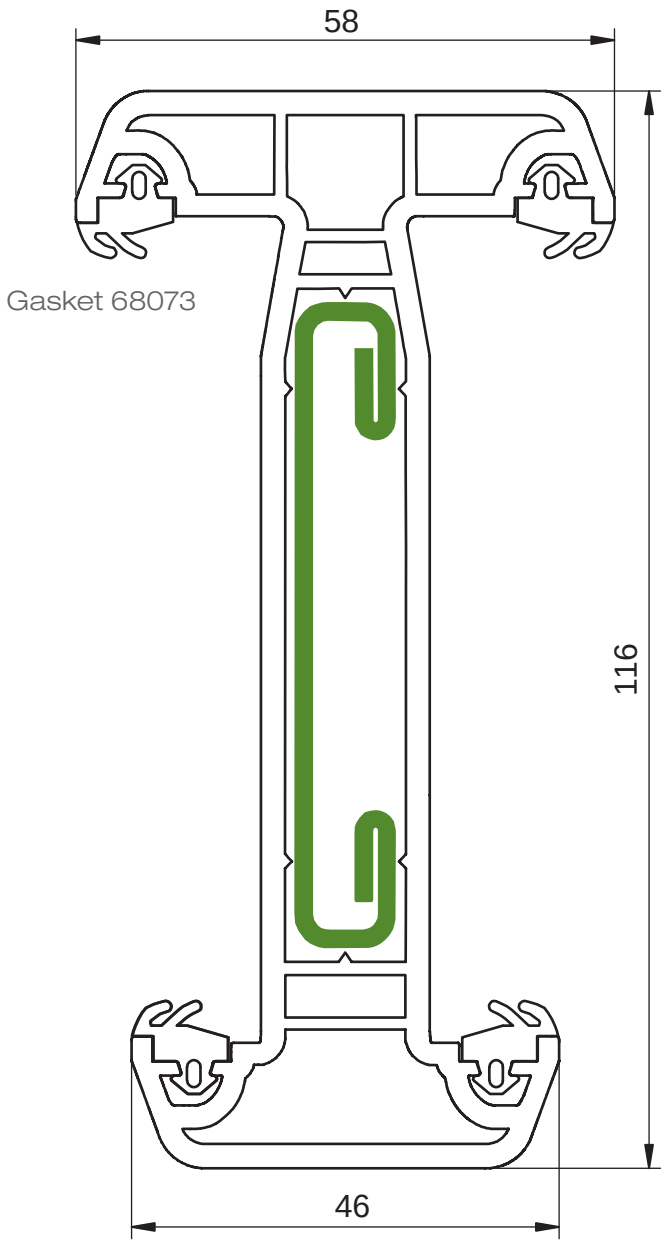
57061 57062





A	X	Y
2,60	7,27	7,27

3.7 Structural Transom/Mullion 68667+200S1070



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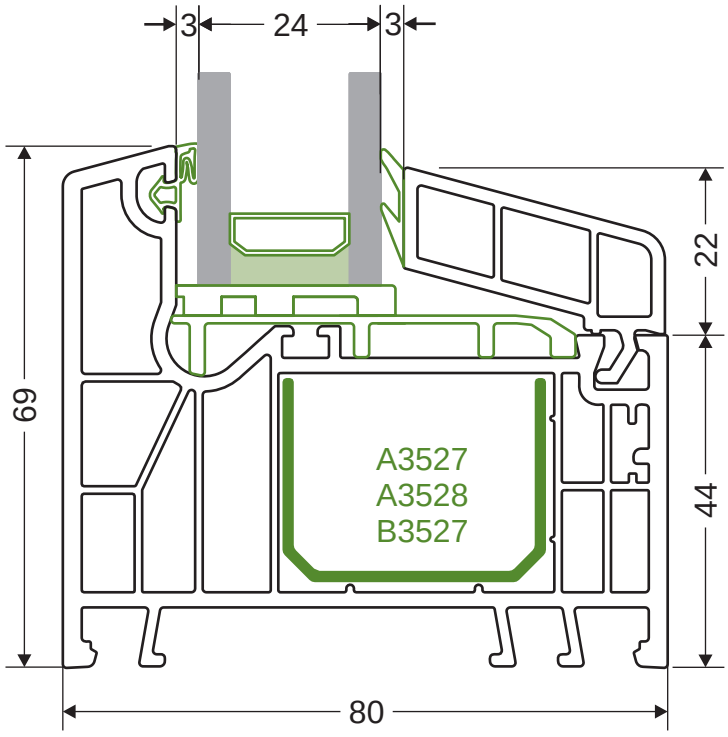
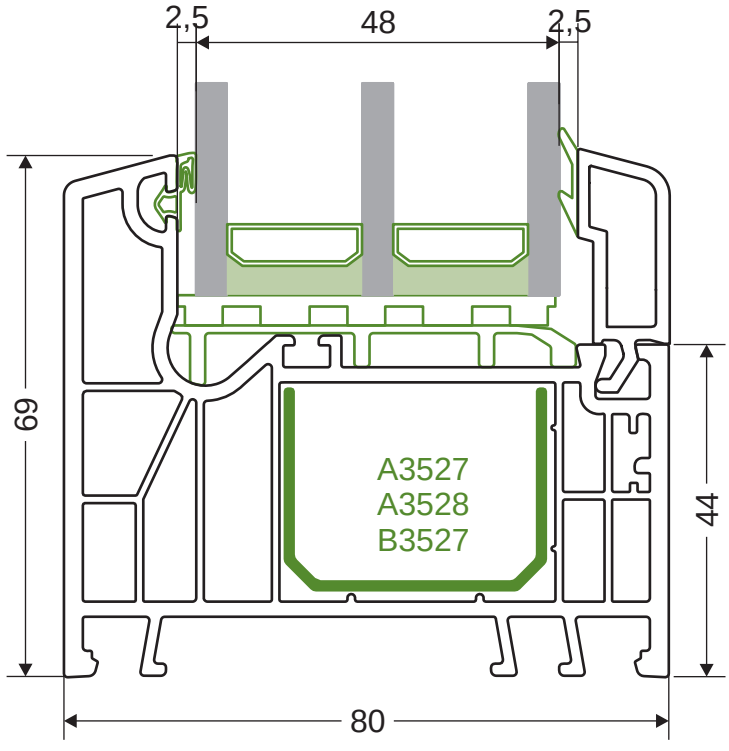
4. Detail Sheets

4.1 Frame 68011 – Fixed Glazing, 24 mm and 48 mm glazing unit
4.2 Frame 68011 + Sash 68021 – 24 mm glazing unit
4.3 Frame 68011 + Sash 68021 – 48 mm glazing unit
4.4 Transom/Mullion 68032 + Sashes 68021 – 24 mm glazing unit
4.5 Meeting rail 68033 with Sashes 68021 – 24 mm glazing unit
4.6 Transom/Mullion 68032 with Sash 68021 – Fixed Glazing, 24 mm glazing unit
4.7 Transom/Mullion 68032 – Fixed Glazing, 24 mm glazing unit
4.8 Frame 68011 with Coupling Profile 57052
4.9 Frame 68011 with Structural Coupling 68667
4.10 Frame 68011 with 90° Bay Post 68063
4.11 Frame 68011 with Bay Pole 57061 + 57062 + 68063
4.12 Frame 68011 + Cill Packer

4.1 Frame 68011 – Fixed Glazing, 24 mm and 48 mm glazing unit





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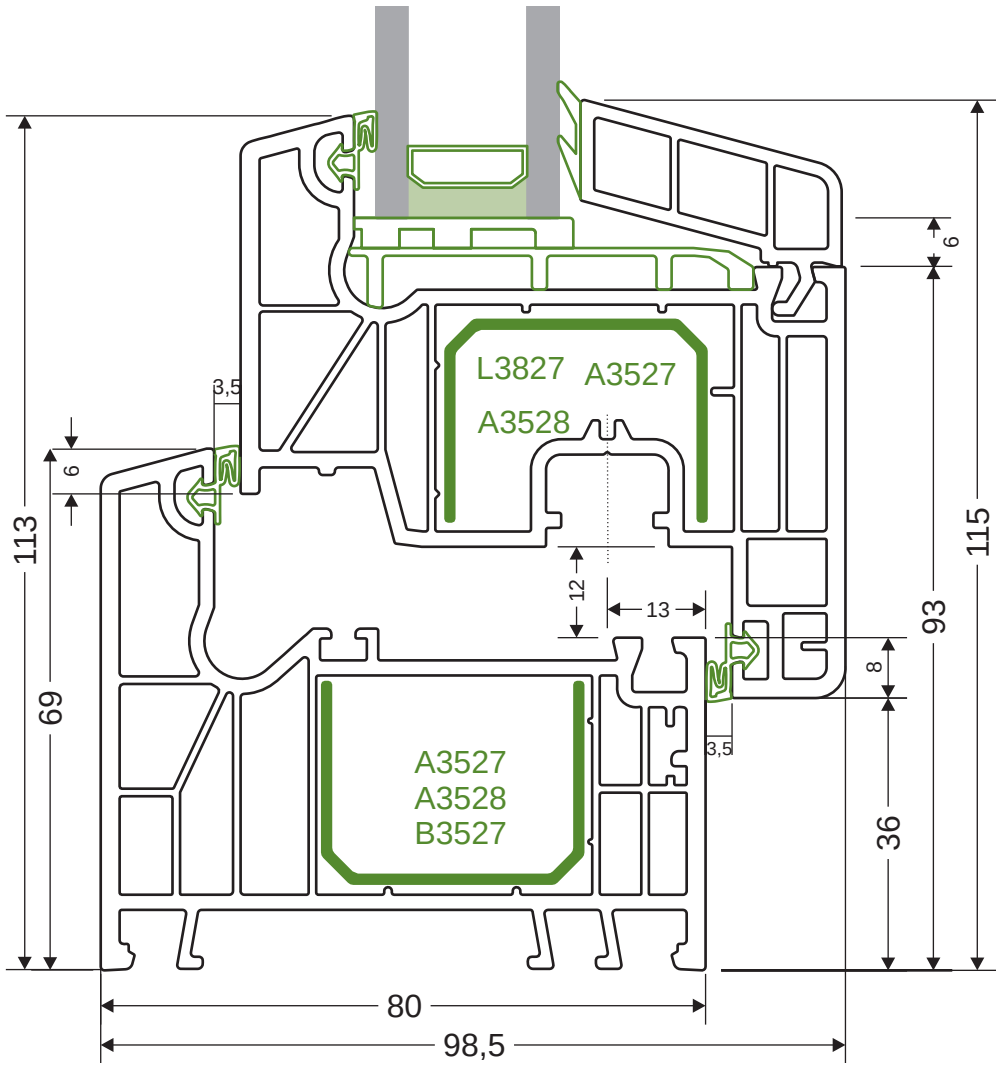
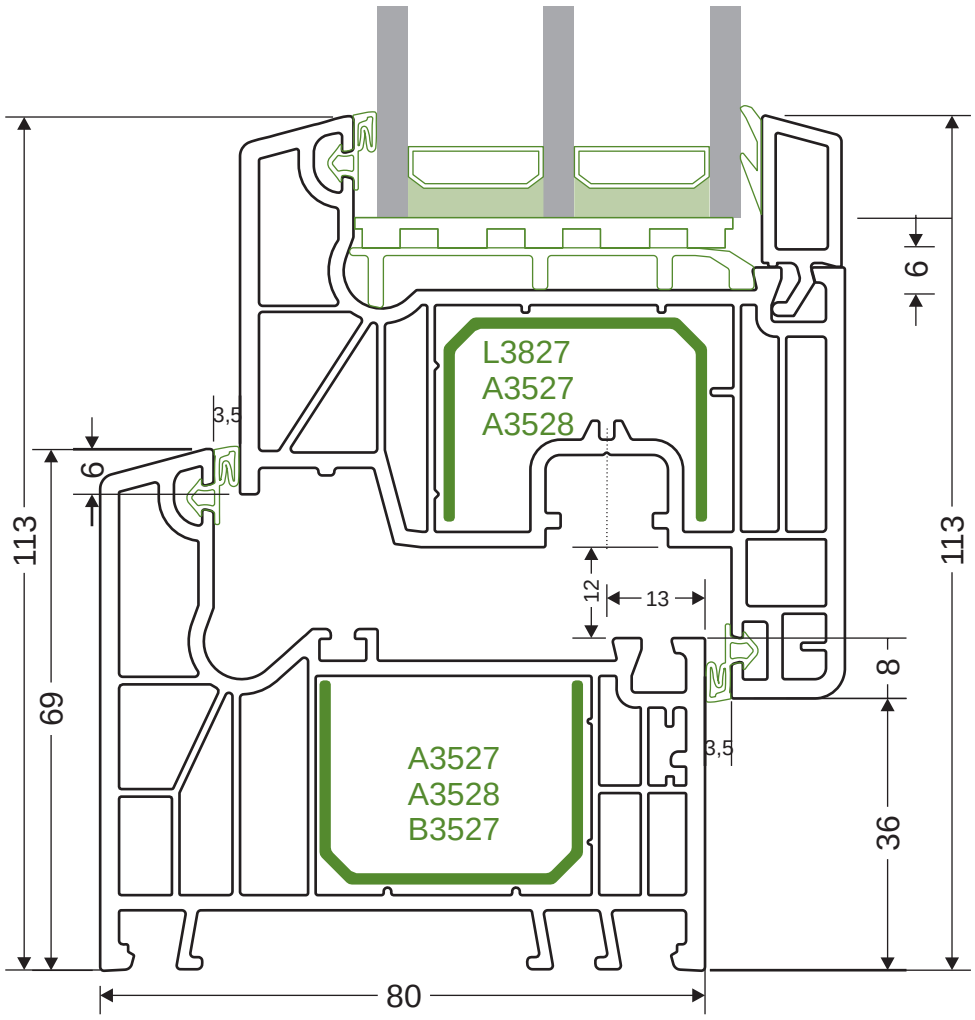
4.2 Frame 68011 + Sash 68021 – 24 mm glazing unit



4.3 Frame 68011 + Sash 68021 – 48 mm glazing unit



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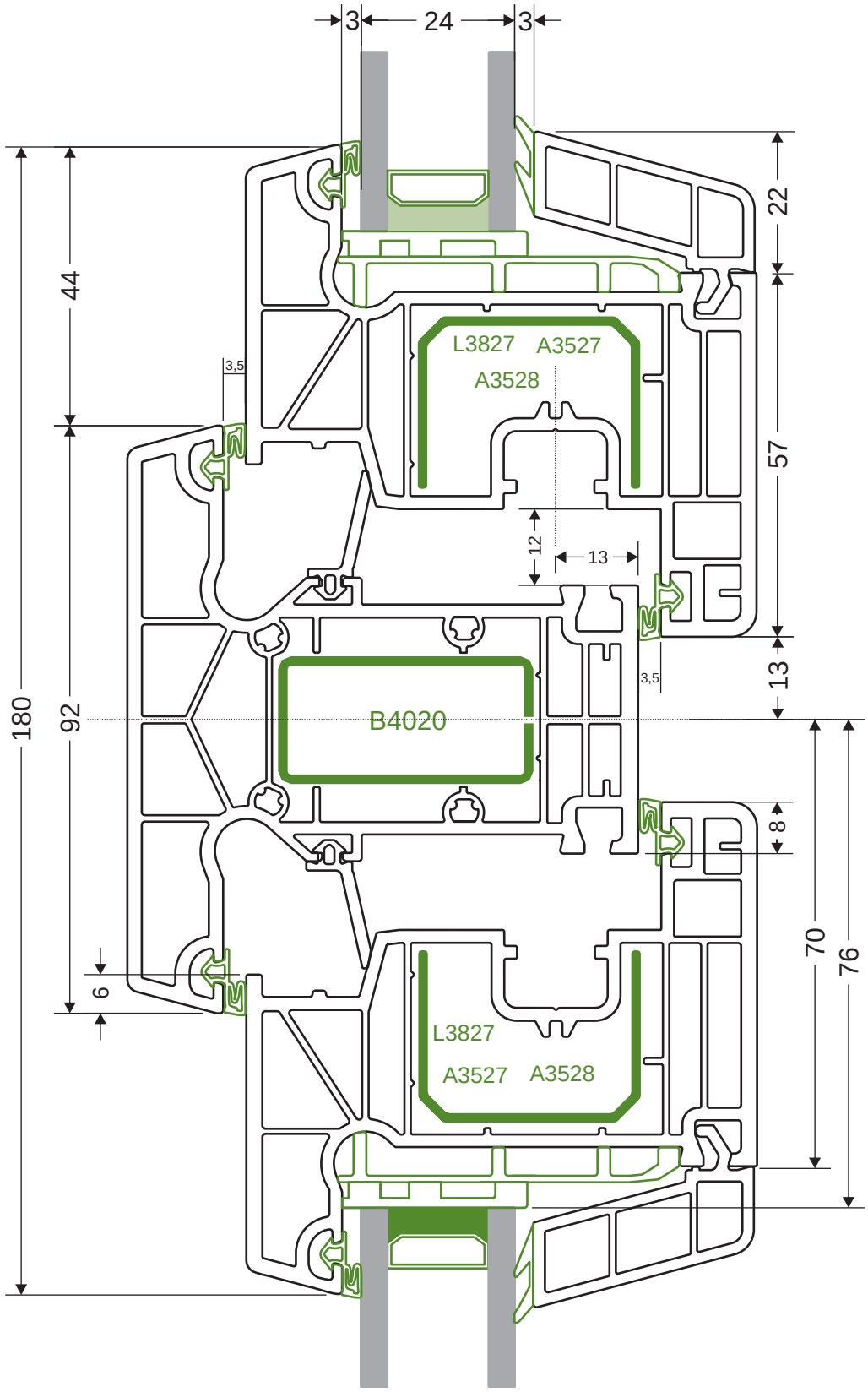
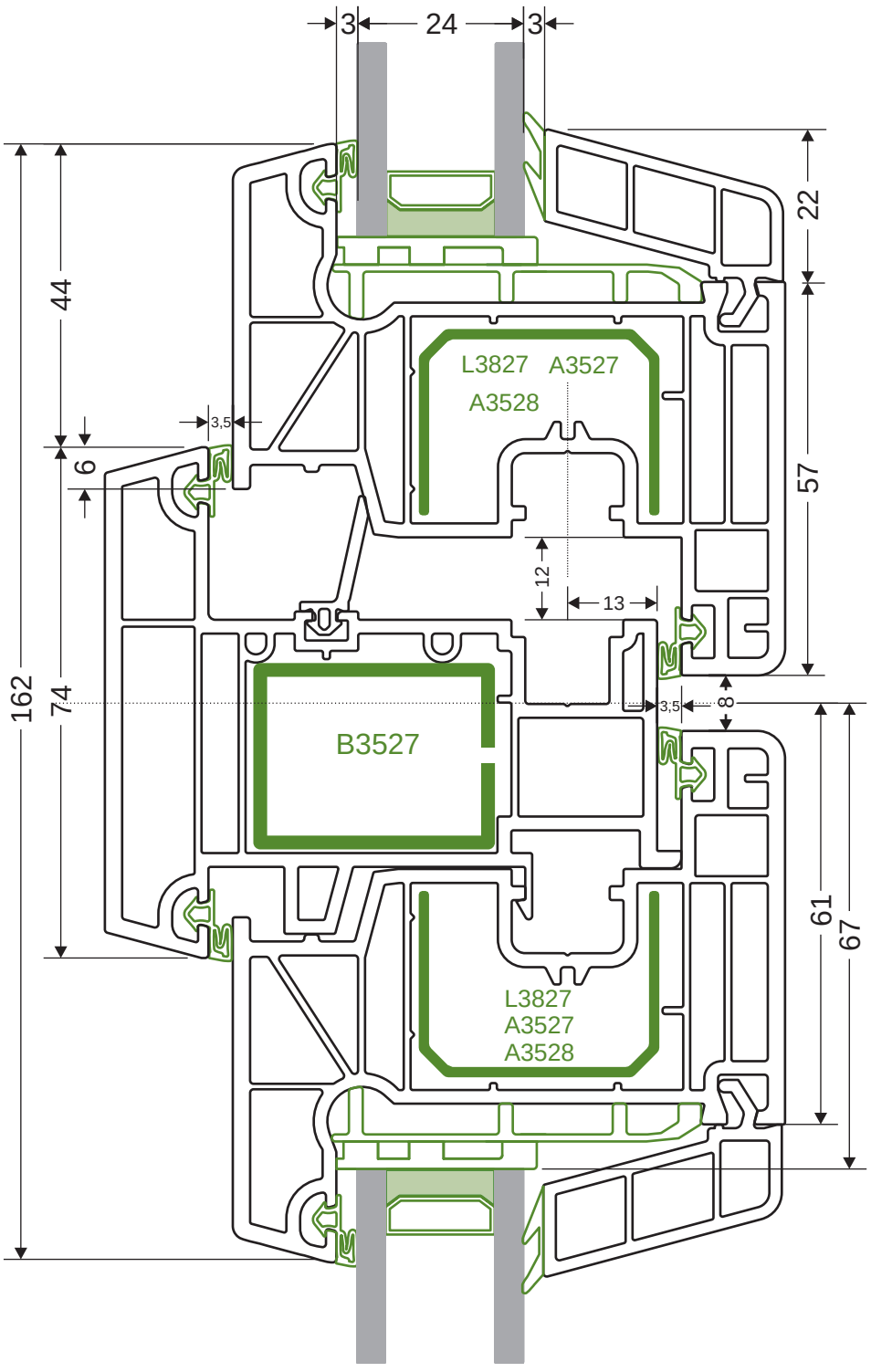
4.4 Transom/Mullion 68032 + Sashes 68021 – 24 mm glazing unit



4.5 Meeting rail 68033 with Sashes 68021 – 24 mm glazing unit



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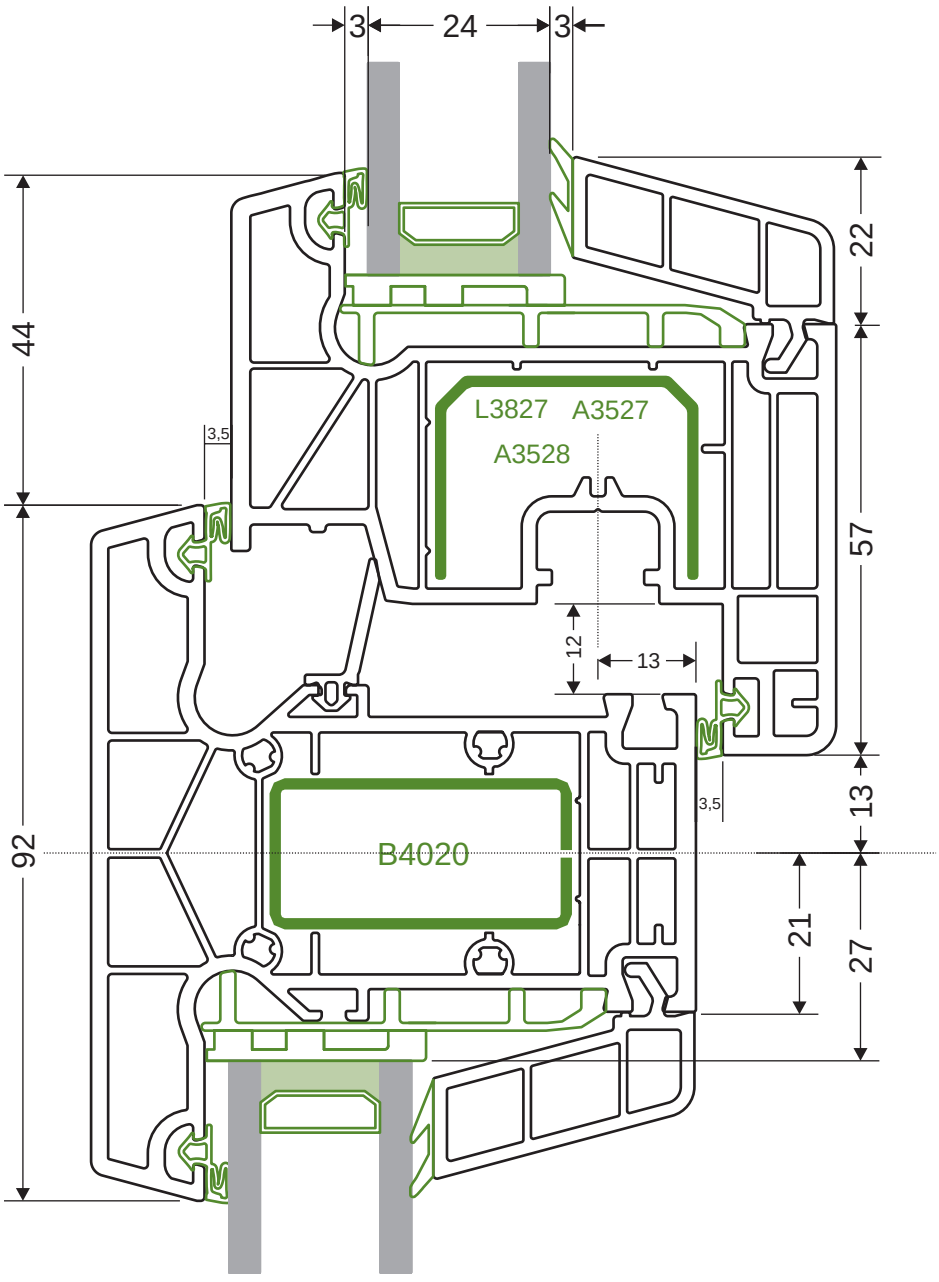
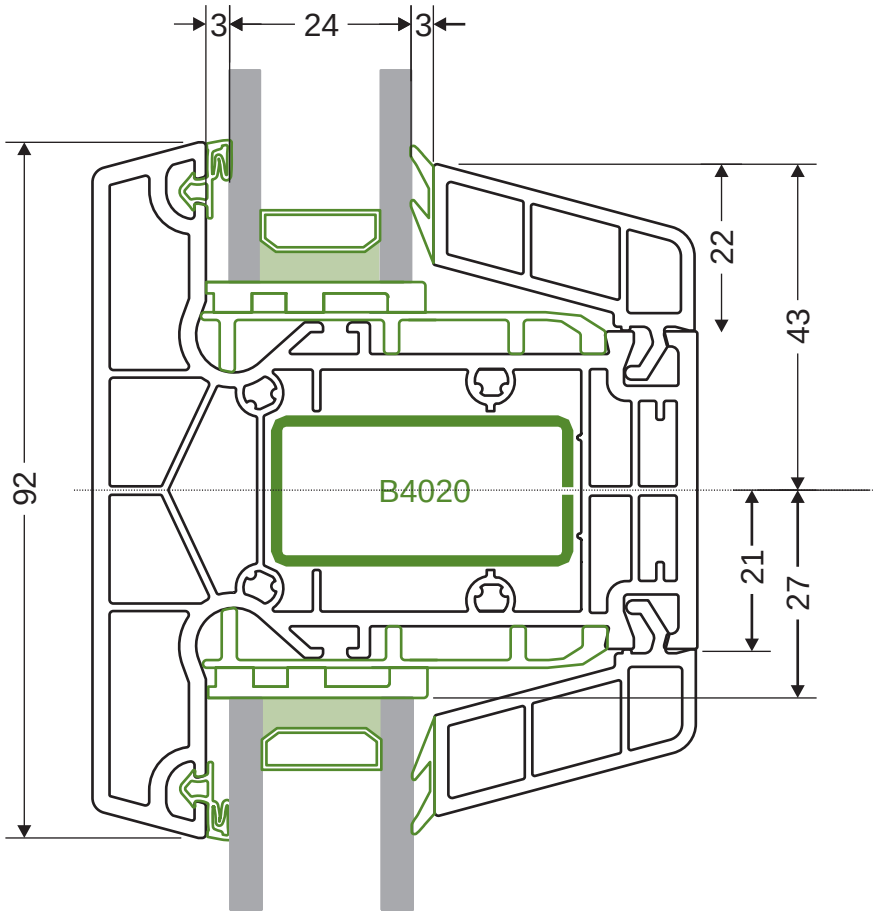
4.6 Transom/Mullion 68032 with Sash 68021 – Fixed Glazing, 24 mm glazing unit



4.7 Transom/Mullion 68032 – Fixed Glazing, 24 mm glazing unit



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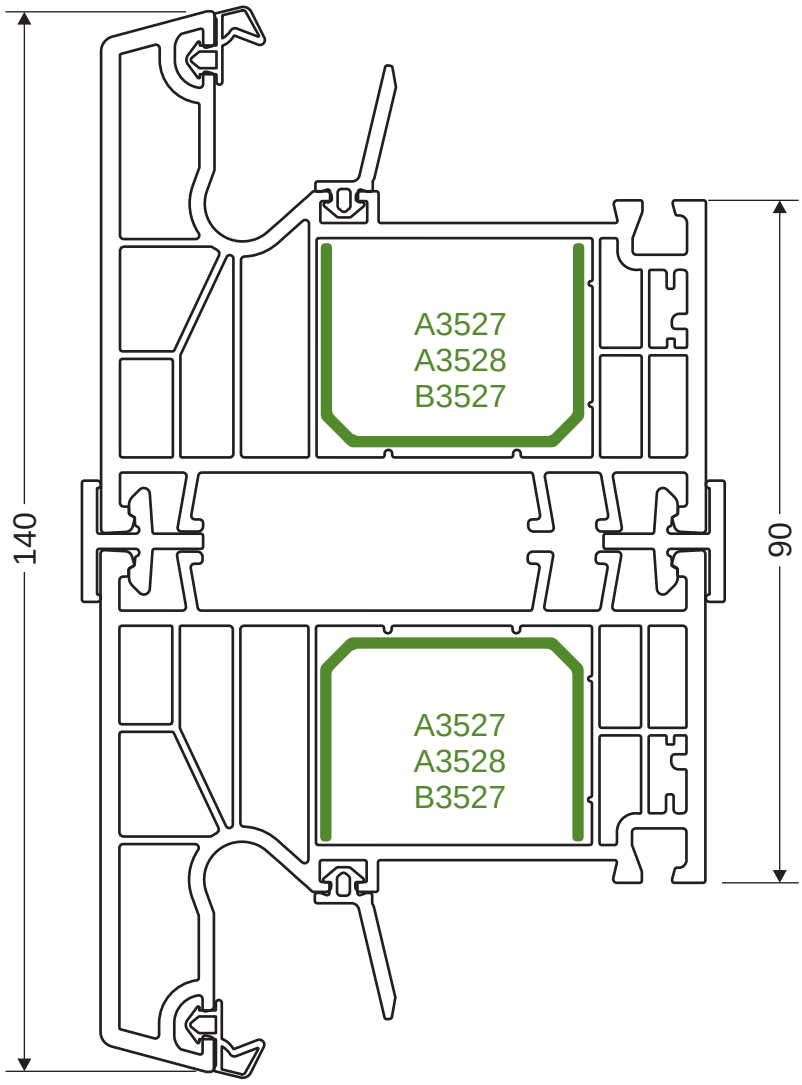
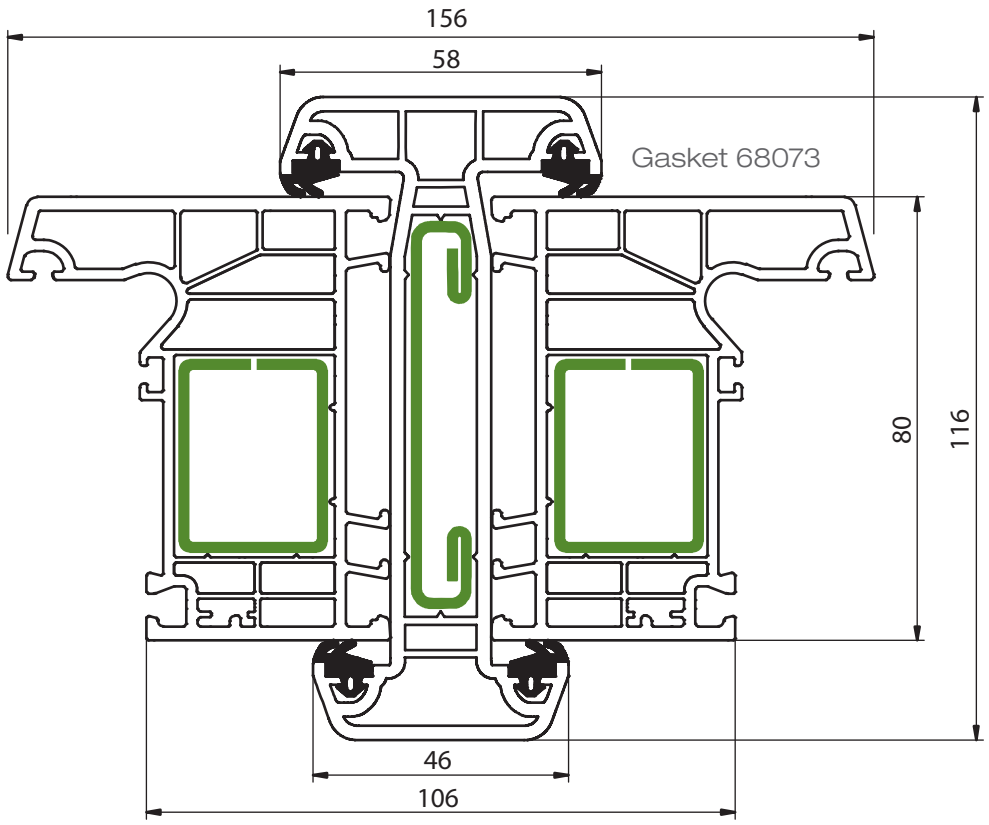
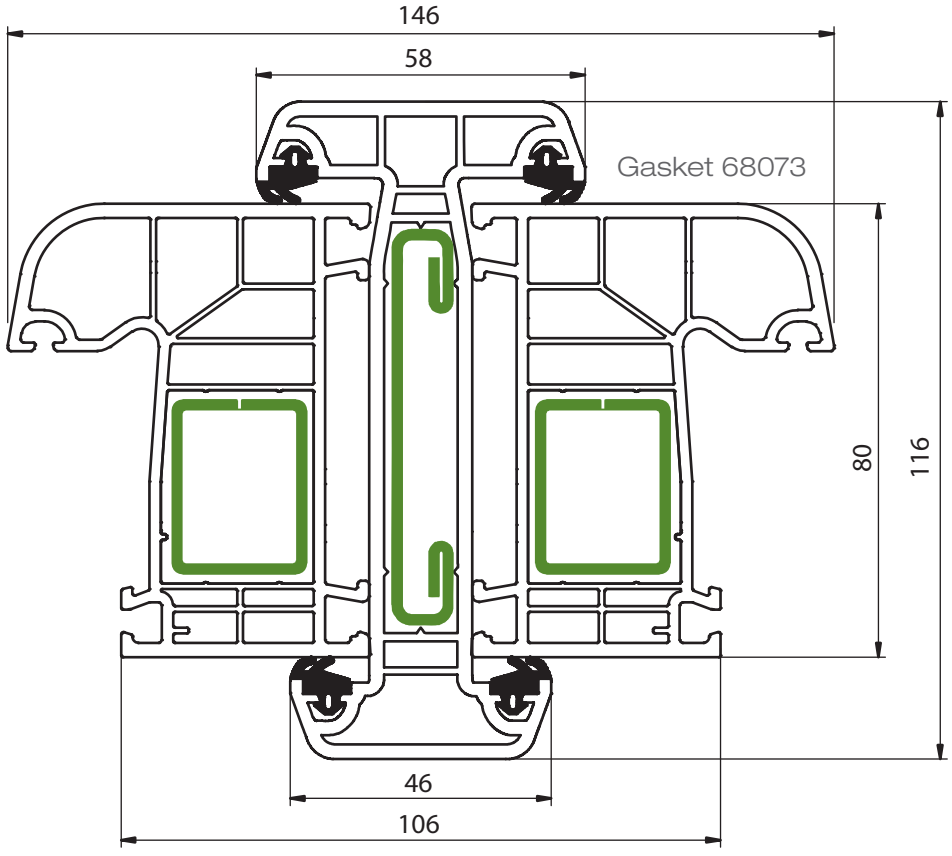
4.8 Frame 68011 with Coupling Profile 57052



4.9 Frame 68011 with Structural Coupling 68667





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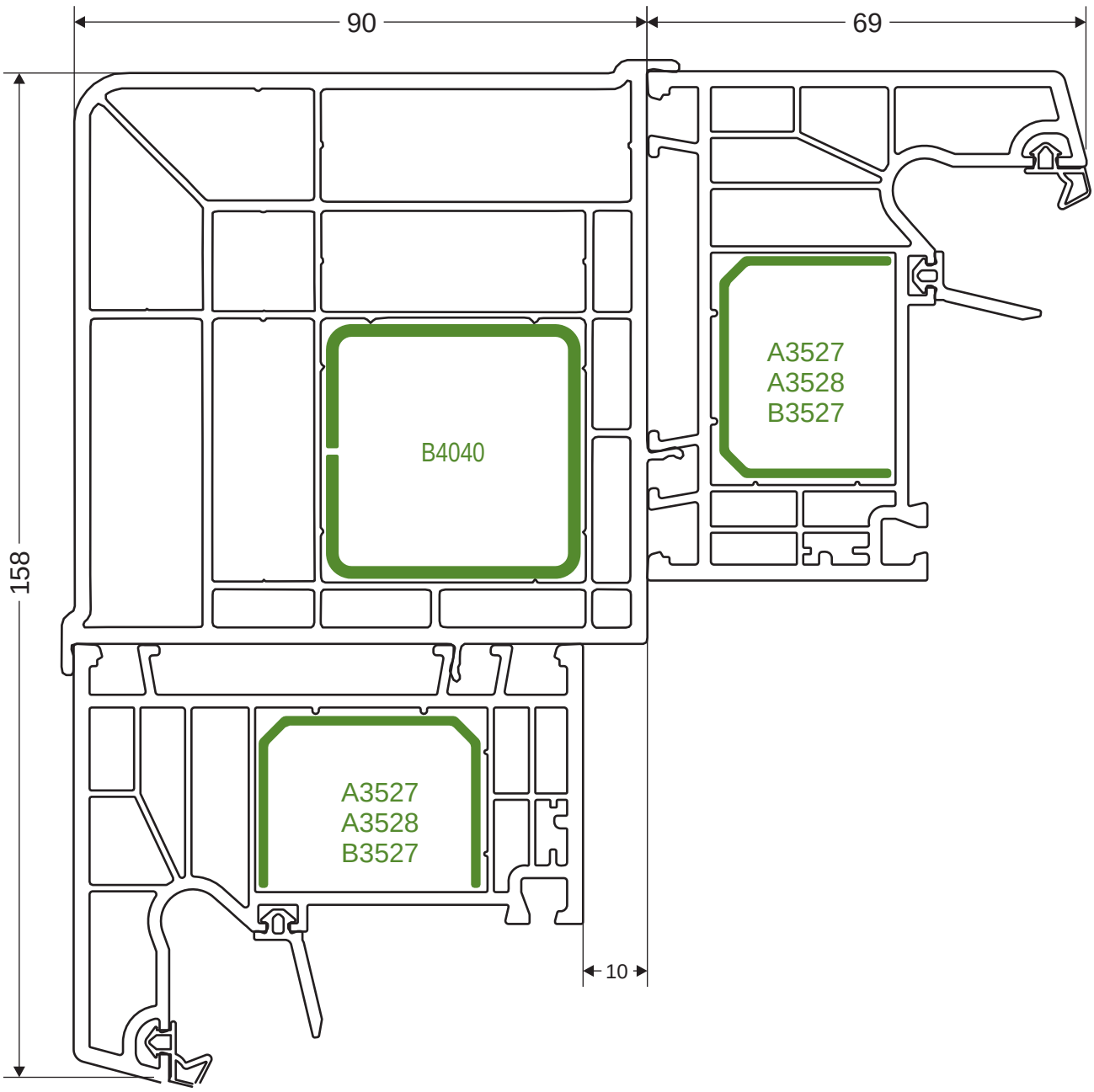
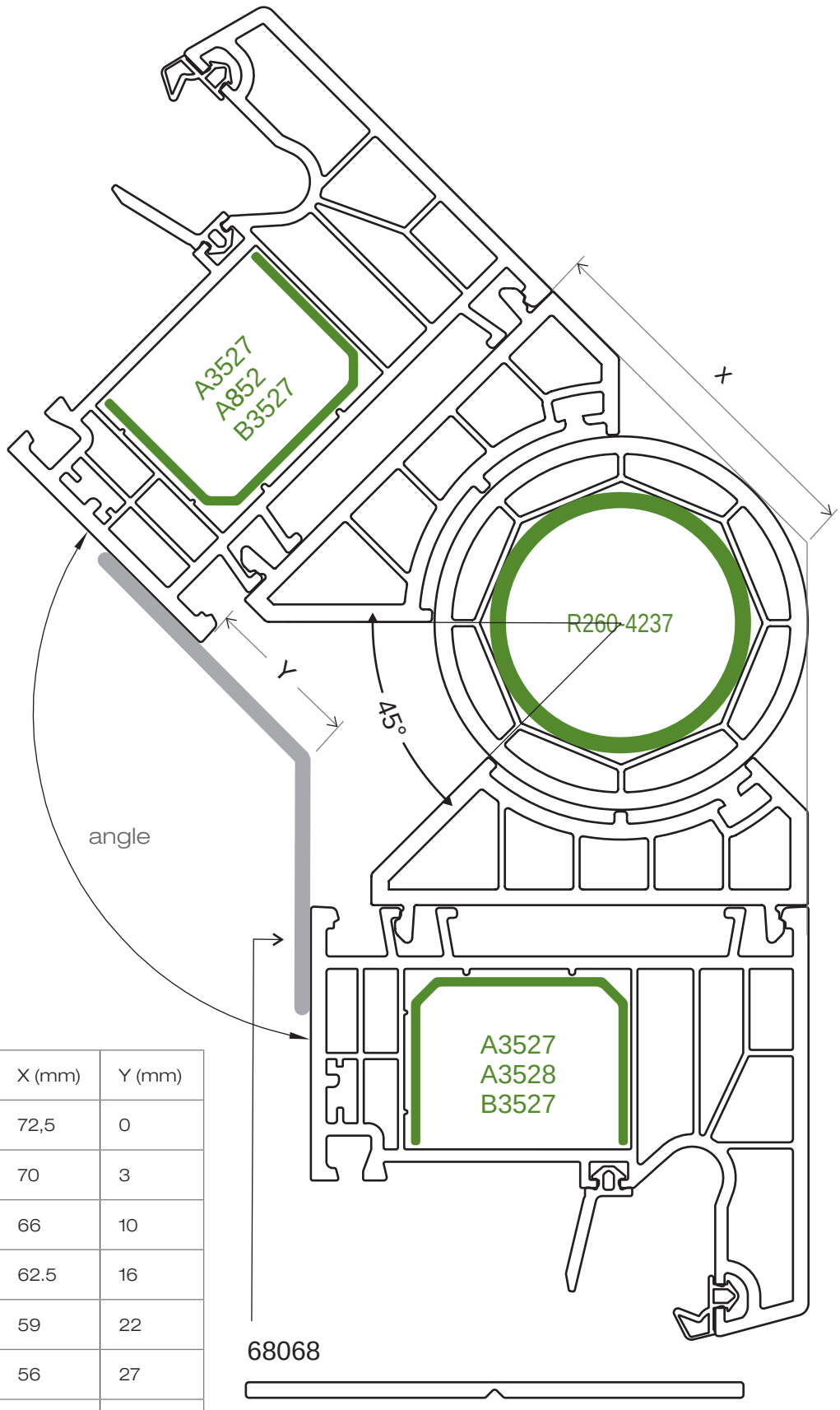
4.10 Frame 68011 with 90° Bay Post 68063



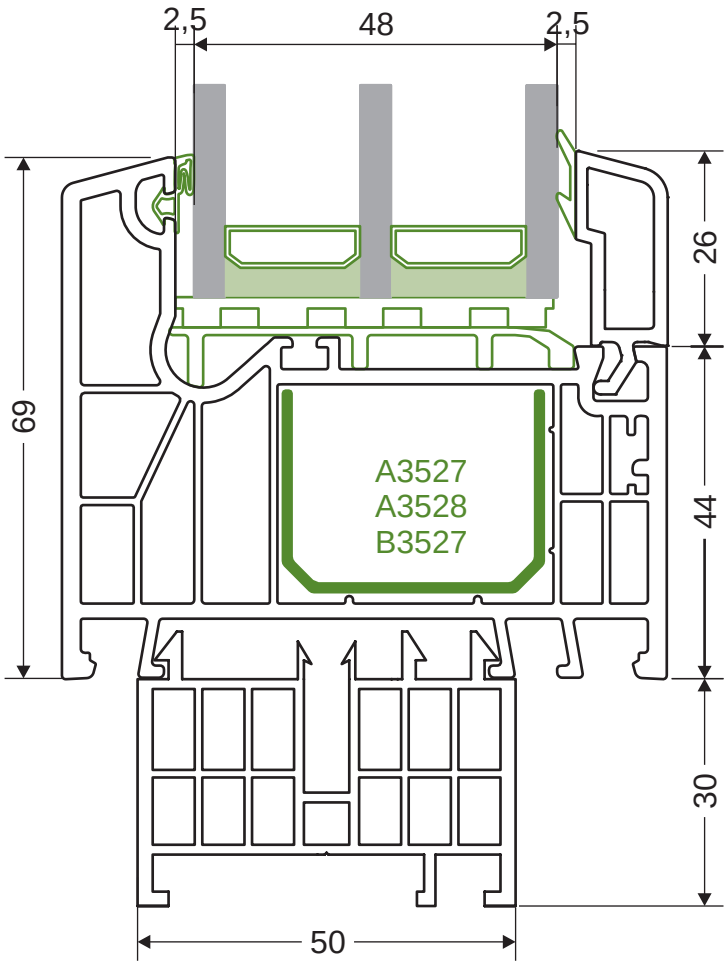
4.11 Frame 68011 with Bay Pole 57061 + 57062 + 68063



angle	X (mm)	Y (mm)
90	72,5	0
100	70	3
110	66	10
120	62.5	16
130	59	22
140	56	27
150	53	31.5
160	50	36.2
170	48	40.5
180	45	45

Issued: 01.02.2019

4.12 Frame 68011 + Cill Packer



5. Preparation

5.1 Installing Metail Joint 68083L to Transom/Mullion 68032

5.2 Connecting Frame 68011 and Transom/Mullion 68032 with Metal Joint 68083L

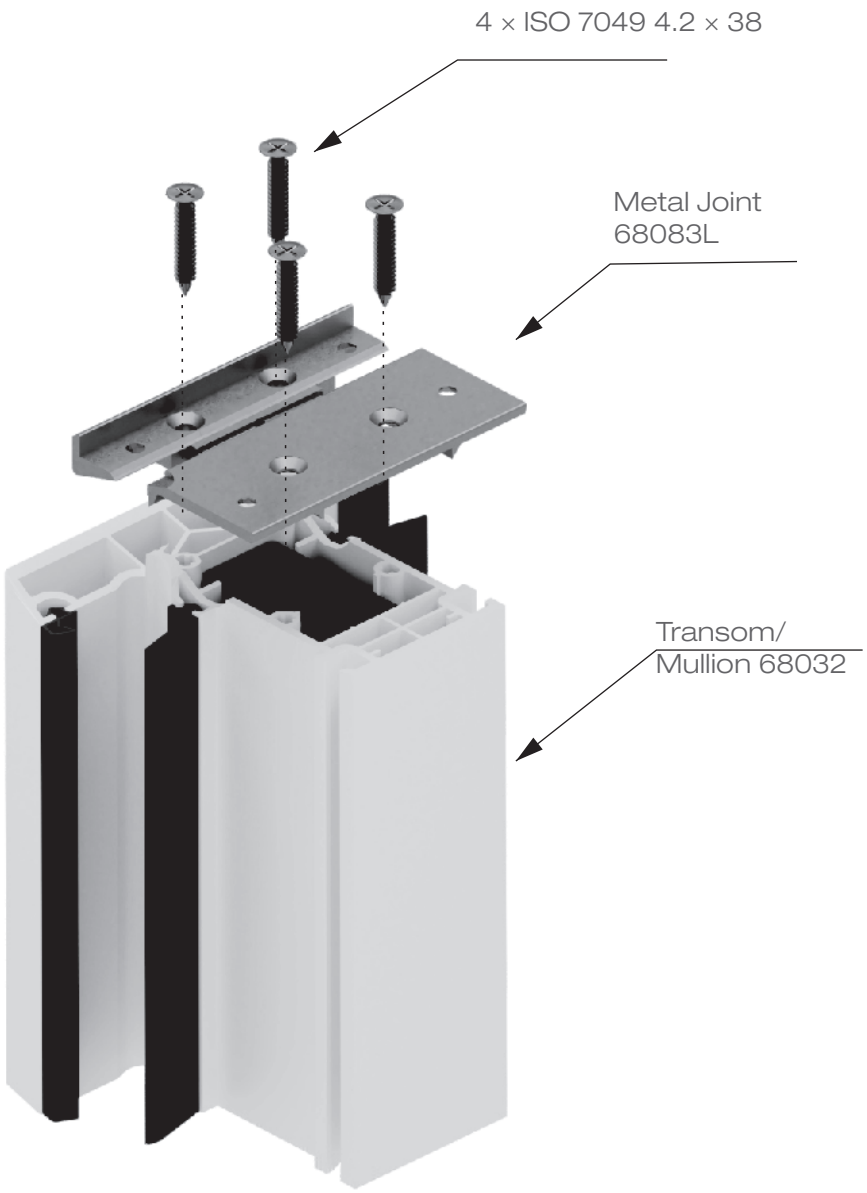
5.3 Connecting Frame 68011 and Transom/Mullion 68032 with PVC Joint 68085L

5.4 Connecting Meeting rail 68033 with Sash 68021 (with end caps 68084)

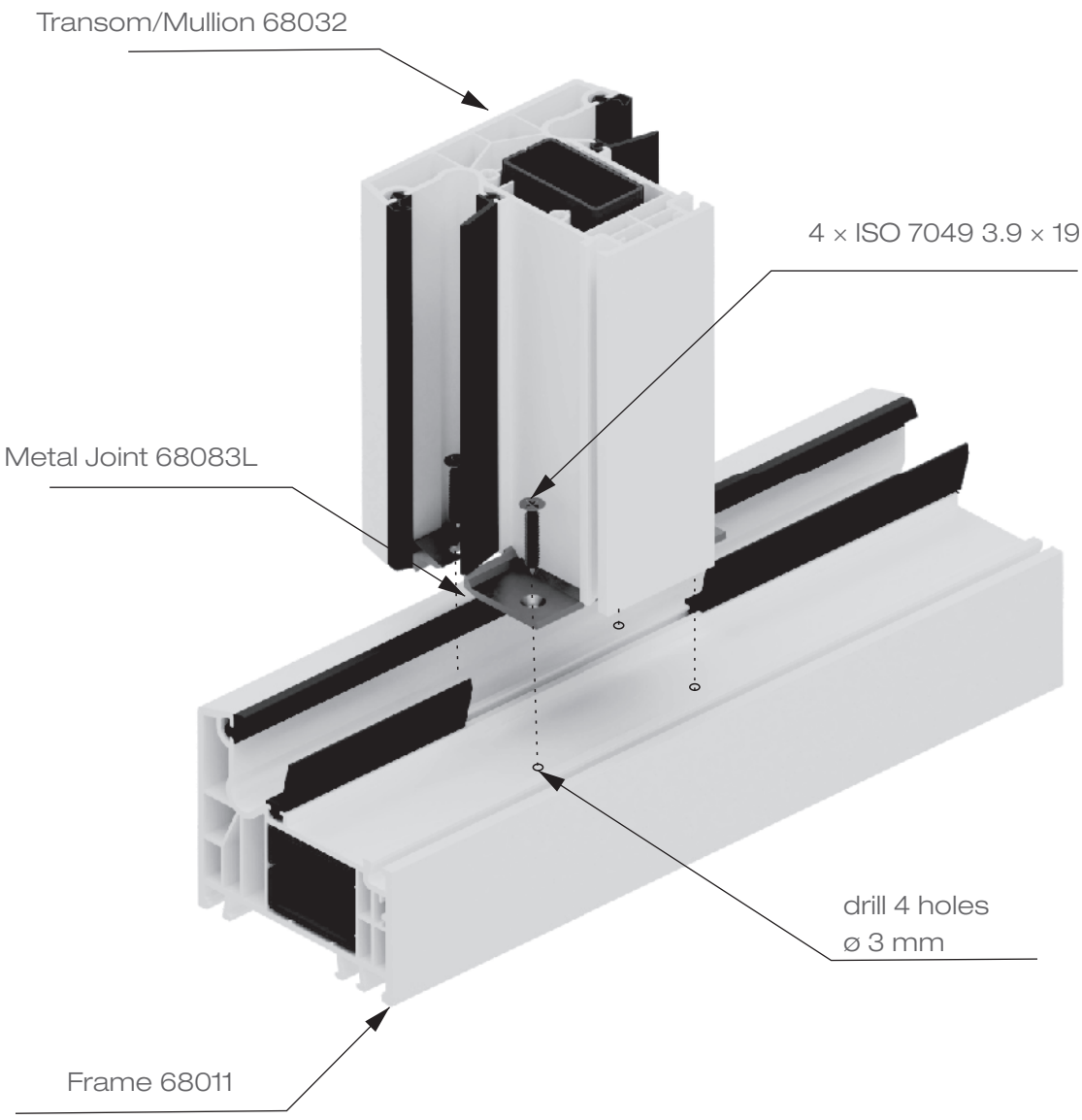
Issued: 01.02.2019

5. Preparation

5.1 Installing Metail Joint 68083L to Transom/Mullion 68032



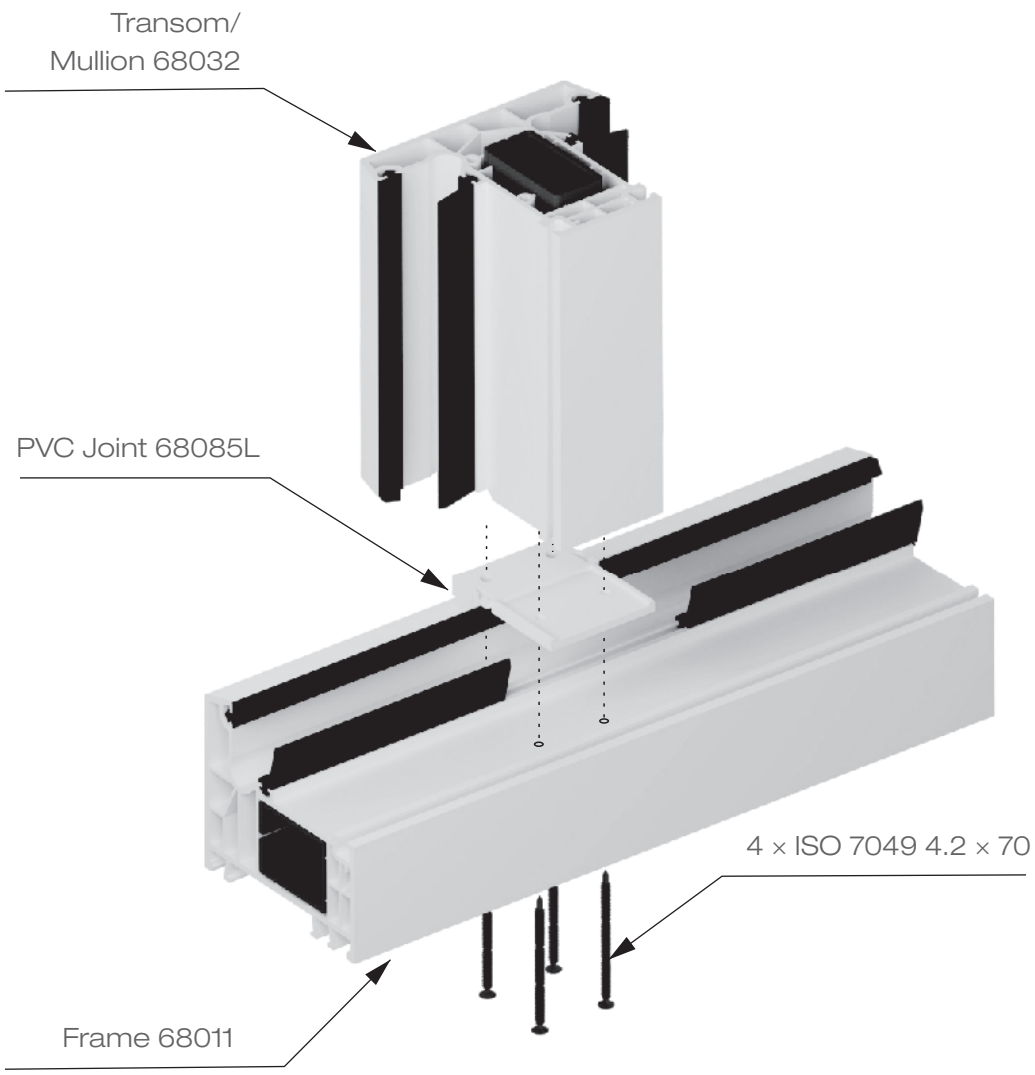
5.2 Connecting Frame 68011 and Transom/Mullion 68032 with Metal Joint 68083L



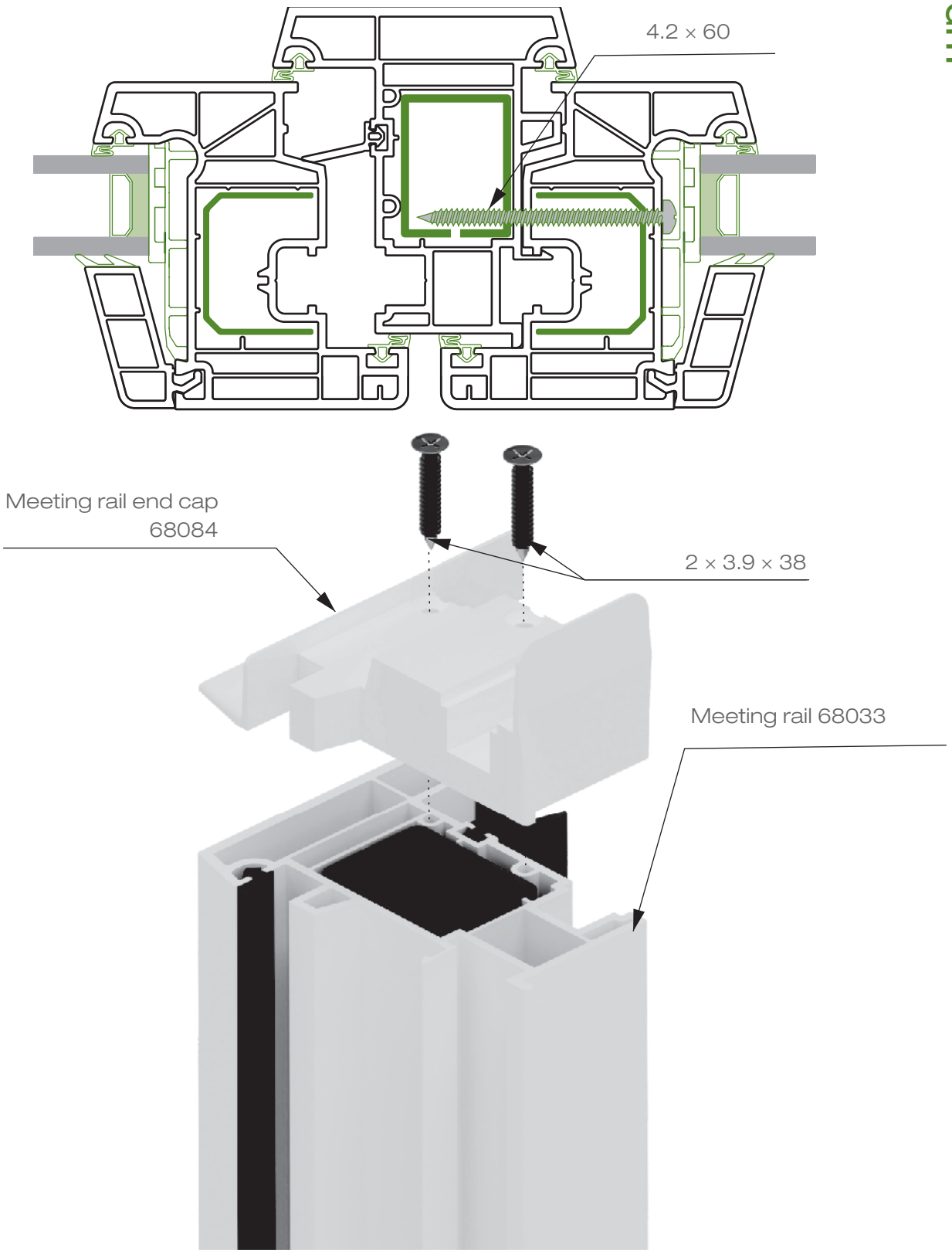
Issued: 01.02.2019

5. Preparation

5.3 Connecting Frame 68011 and Transom/Mullion 68032 with PVC Joint 68085L



5.4 Connecting Meeting rail 68033 with Sash 68021 (with end caps 68084)



Issued: 01.02.2019

6. Cutting Calculations

6.1 General Guidelines for Applying the Deduction Values
6.2 Fixed Glazing in Frame
6.3 Transom/Mullion and Dummy Bar in Vents
6.4 Single-Sash Window
6.5 Two-Sash Window with Transom/Mullion
6.6 Two-Sash Window with Meeting Rail
6.7 Single – Sash Window with Fixed Glazing

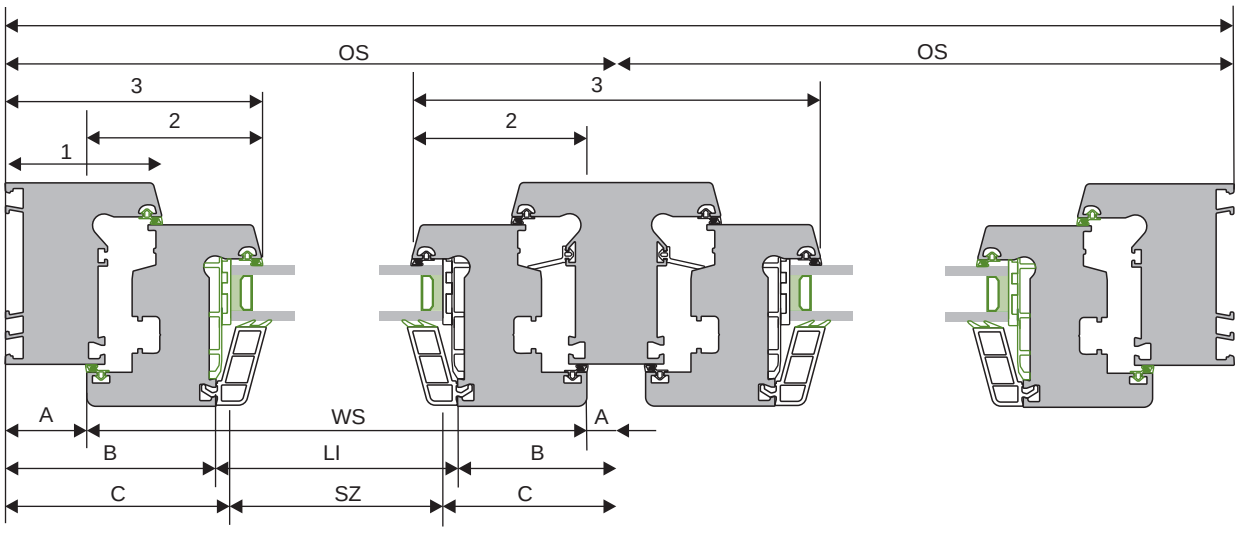
6. Cutting Calculations

6.1 General Guidelines for Applying the Deduction Values

To verify the deductions, sum up all of them used within the particular window/door design. Their sum should equal to the Outer dimensions of the window/door frame. Burn-off allowance also must be added for all welded elements.

Note:

The deduction values apply to welded or mechanically joined profiles. Depending on the available saw and welding machines, the profile lengths may change after processing (i.e. cutting or welding). Incorrect profile cutting may cause distortion of profile seals.



Abbreviations:

OS Transom/Mullion or meeting rail axis dimensions

WS Outer dimensions of sash (welded)

LI Glazing bead dimensions

SZ Glazing unit dimensions

WR Outer dimensions of frame (welded)

1 Outer dimensions of profiles: frames, mullions and thresholds

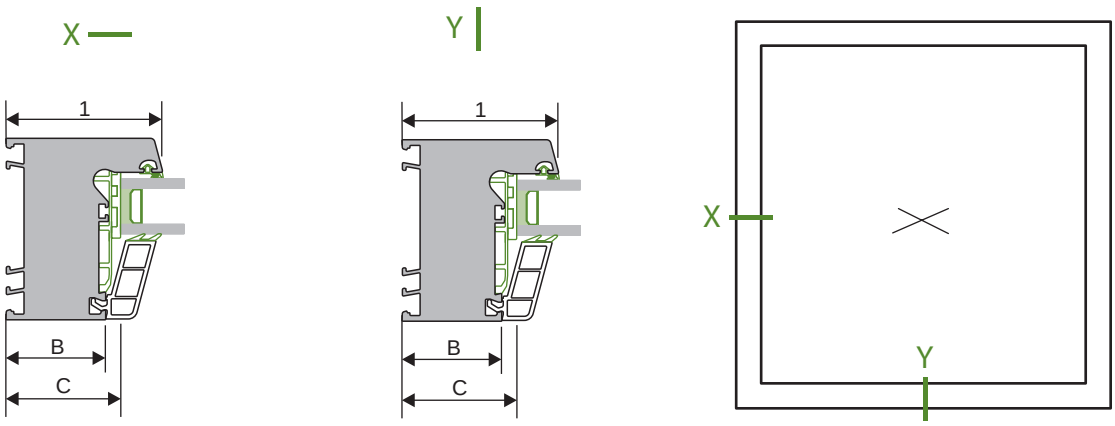
2 Outer dimensions of sash profile

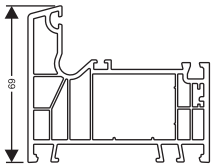
3 Outer dimensions of construction made of: frames, sashes and mullions

A, B, ... Constant values depending on profiles used

6. Cutting Calculations

6.2 Fixed Glazing in Frame



profile height (mm)	1	 68011 (69)
Deduction value (mm)	B LI	-44
	C SZ	-50

Abbreviations:

OS Transom/Mullion or meeting rail axis dimensions

WS Outer dimensions of sash (welded)

LI Glazing bead dimensions

SZ Glazing unit dimensions

WR Outer dimensions of frame (welded)

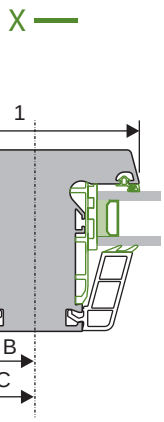
1 Outer dimensions of profiles: frames, mullions and thresholds

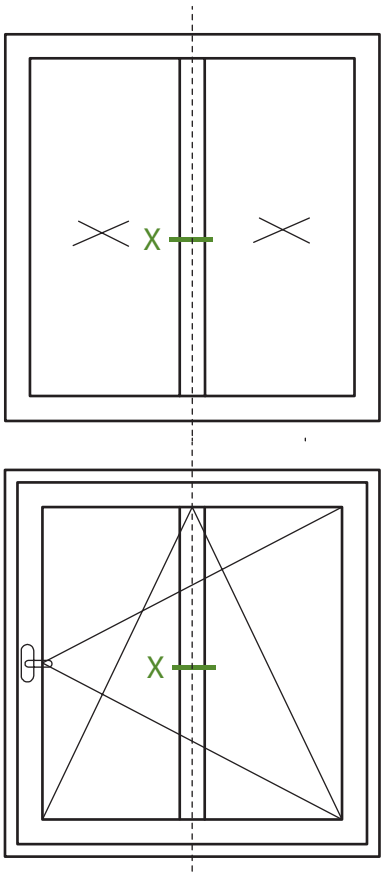
2 Outer dimensions of sash profile

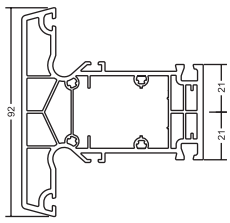
3 Outer dimensions of construction made of: frames, sashes and mullions

A, B, ... Constant values depending on profiles used

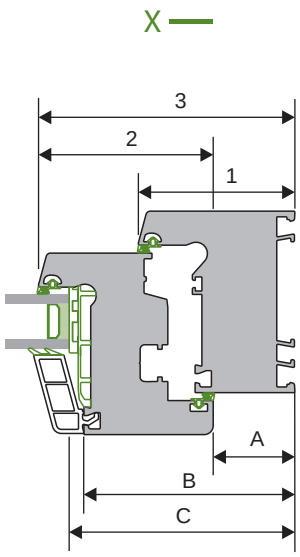
6.3 Transom/Mullion and Dummy Bar in Vents

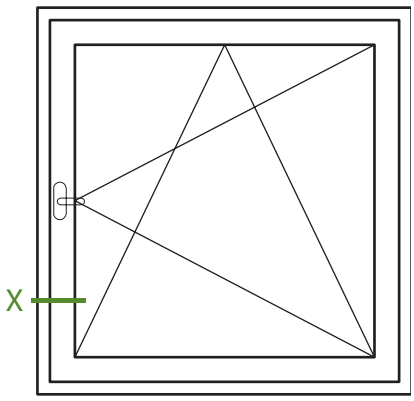


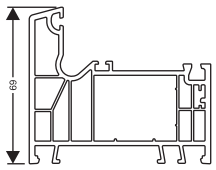
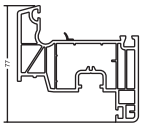


profile height (mm)	1	 68032 (92)
Deduction value (mm)	B LI	-21
	C SZ	-27

6.4 Single-Sash Window





profile height (mm)	1	 68011 (69)
	2	 68021 (77)
	3	115
Deduction value (mm)	A WS	-36
	B LI	-93
	C SZ	-99

Abbreviations:

OS Transom/Mullion or meeting rail axis dimensions

WS Outer dimensions of sash (welded)

LI Glazing bead dimensions

SZ Glazing unit dimensions

WR Outer dimensions of frame (welded)

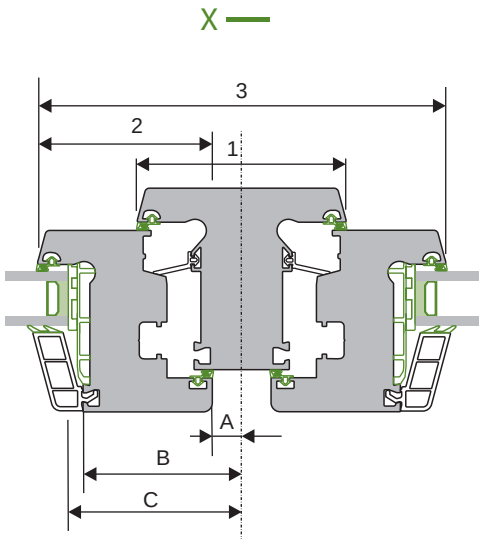
1 Outer dimensions of profiles: frames, mullions and thresholds

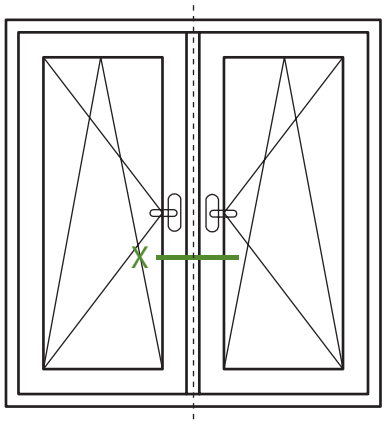
2 Outer dimensions of sash profile

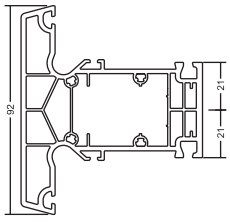
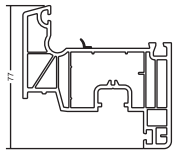
3 Outer dimensions of construction made of: frames, sashes and mullions

A, B, ... Constant values depending on profiles used

6.5 Two-Sash Window with Transom/Mullion





profile height (mm)	1	 68032 (92)
	2	 68021 (77)
	3	180
Deduction value (mm)	A WS	-13
	B LI	-70
	C SZ	-76

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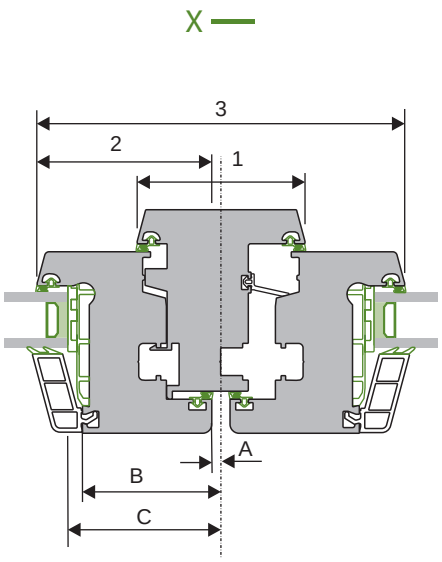
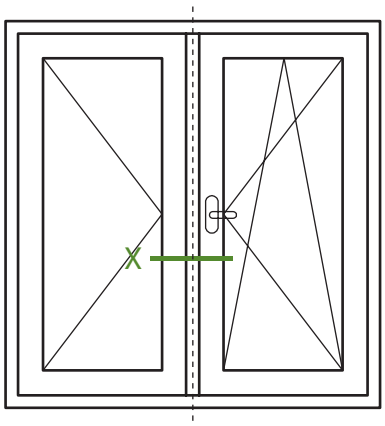
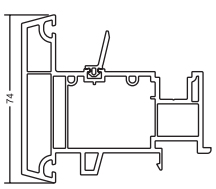
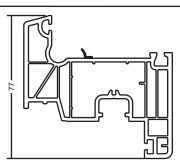
6.6 Two-Sash Window with Meeting Rail





profile height (mm)	1		68033 (74)
	2		68021 (77)
	3		162
Deduction value (mm)	A WS		-4
	B LI		-61
	C SZ		-67

Abbreviations:

OS Transom/Mullion or meeting rail axis dimensions

WS Outer dimensions of sash (welded)

LI Glazing bead dimensions

SZ Glazing unit dimensions

WR Outer dimensions of frame (welded)

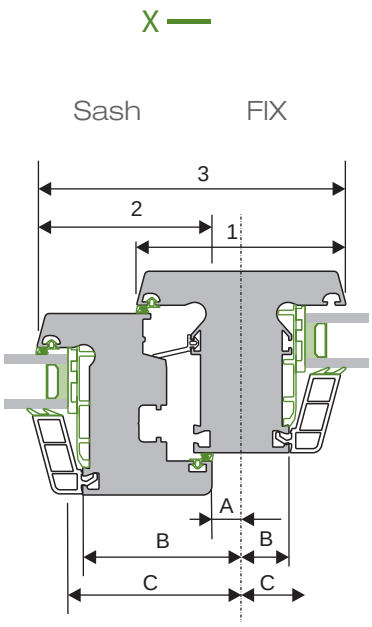
1 Outer dimensions of profiles: frames, mullions and thresholds

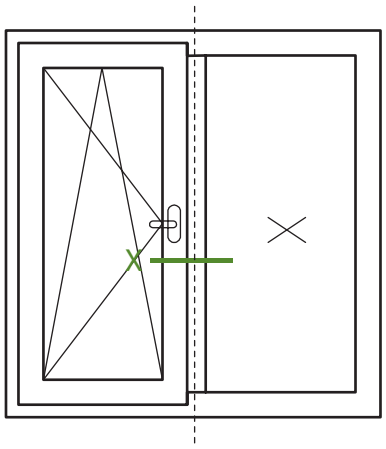
2 Outer dimensions of sash profile

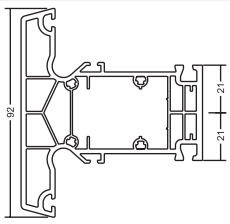
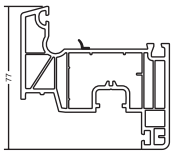
3 Outer dimensions of construction made of: frames, sashes and mullions

A, B, ... Constant values depending on profiles used

6.7 Single – Sash Window with Fixed Glazing





profile height (mm)	1	 68032 (92)	
	2	 68021 (77)	
	3	136	
Deduction value (mm)	A WS	-13	
	B	-70	Sash
	LI	-21	FIX
	C	-76	Sash
	SZ	-27	FIX

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2. Maximum Sash Sizes (size limits)
3. Overview of Profiles
4. Detail Sheets
5. Preparation
6. Cutting Calculations
7. Statics
8. Guide to Profile Assembly

Issued: 01.02.2019

1. Product Guide

1. Quality Guarantee
1.1 Overview of PVC Profiles
1.2 Overview of PVC Profiles
1.3 Reinforcements

1.1 Quality Guarantee

WITAL system profiles made of modified polyvinyl chloride are the basic components of PVC windows and doors. The manufacturing process conforms to relevant Polish standards (PN-88 / B-10085), the Building Research Institute requirements and is certified by the Rosenheim Institute.

PW WITAL offers a 5-year warranty on:

- material quality;
- overall profile dimensions and tolerances;
- chemical resistance, see Table below;
- UV resistance of white window profiles;

Difference in colour compared to a 5-step grey scale. This guarantee is valid only if the products are used in accordance with PW WITAL instructions on processing the window profiles.

This guarantee is not valid when damage is caused as a consequence of:

- using solvents or aggressive detergents;
- improper storage;
- incorrect assembly;
- improper operation and maintenance;
- unexpected external factors;
- force majeure (e.g. natural disasters, fire);
- end-user or third-party actions.

If the guarantee claim is approved, the faulty element will be replaced free of charge.
The guarantee covers the replacement only, irrespective of other statutory rights.
PW WITAL sets out the rules of handling claims and claim procedures.

Issued: 01.02.2019

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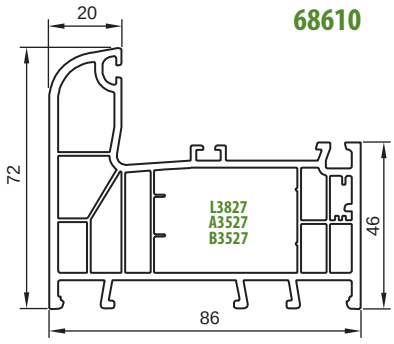

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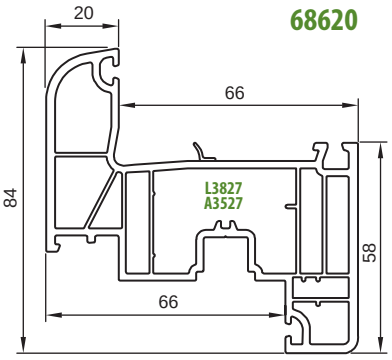

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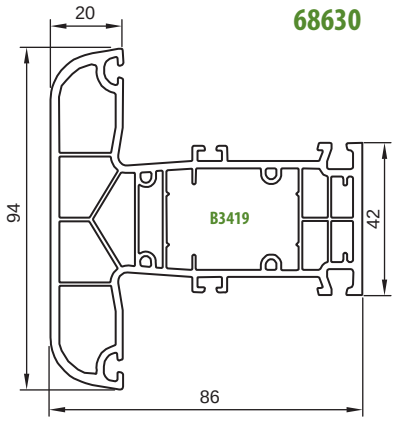

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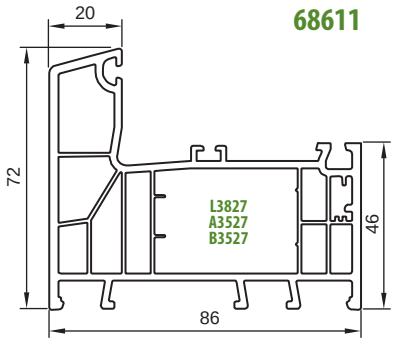

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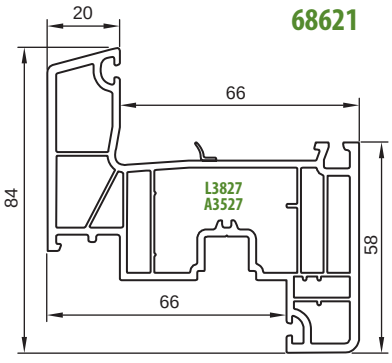

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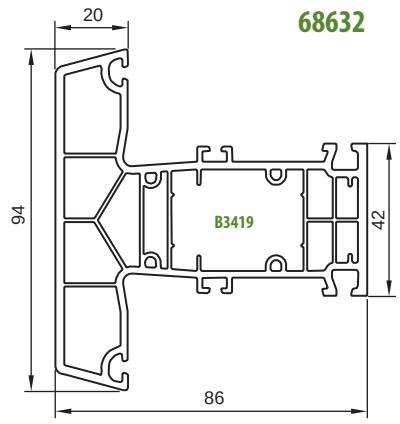

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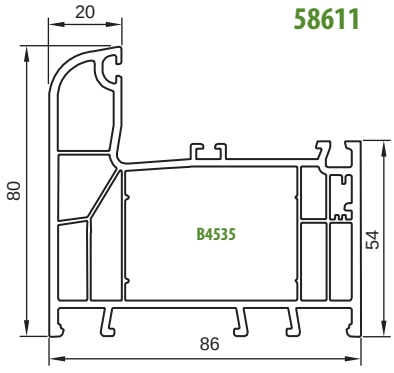

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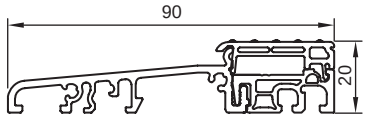

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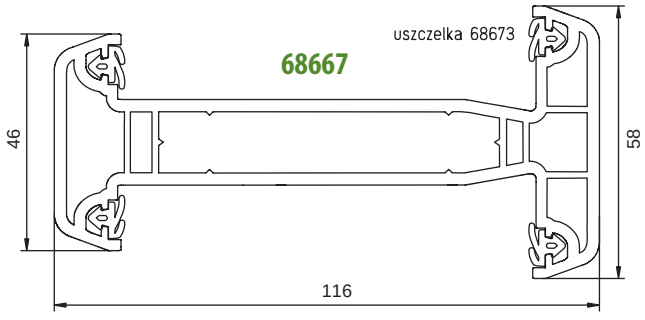

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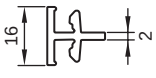

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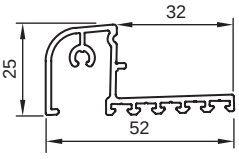

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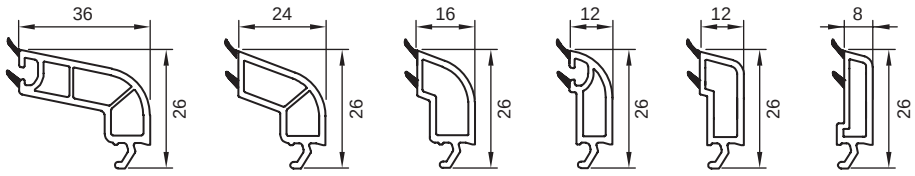

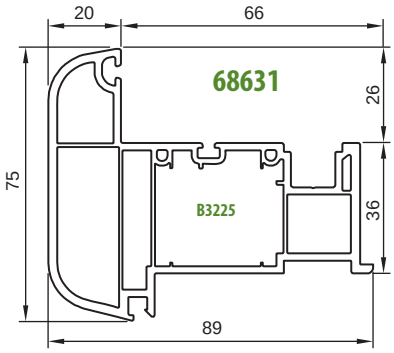
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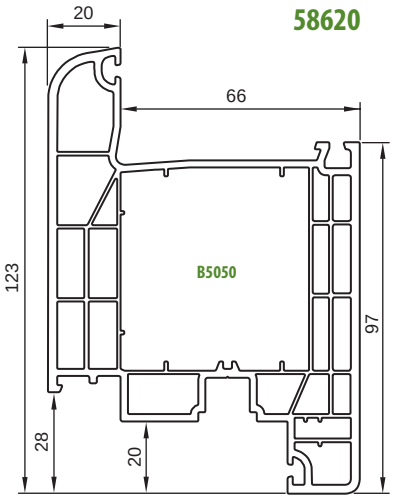
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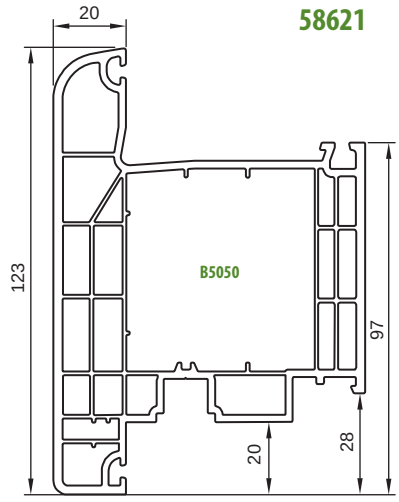
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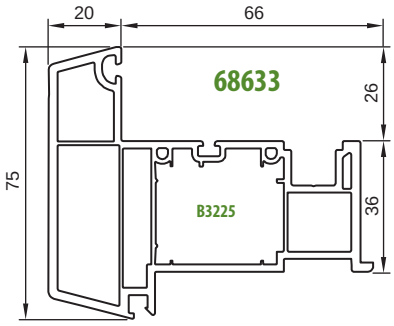
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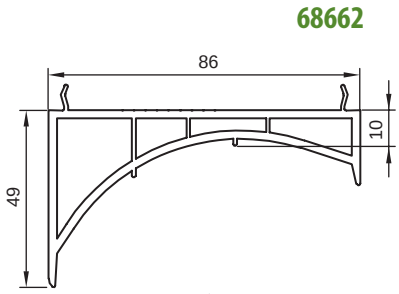
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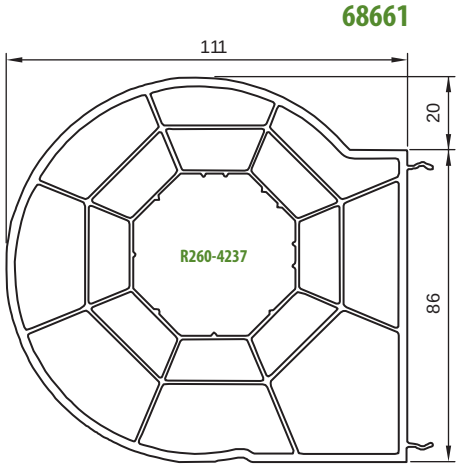
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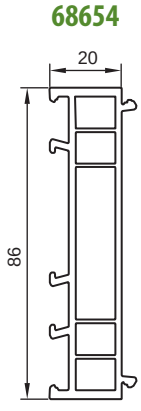
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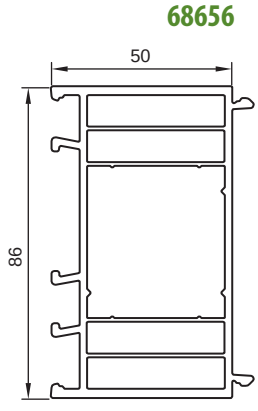
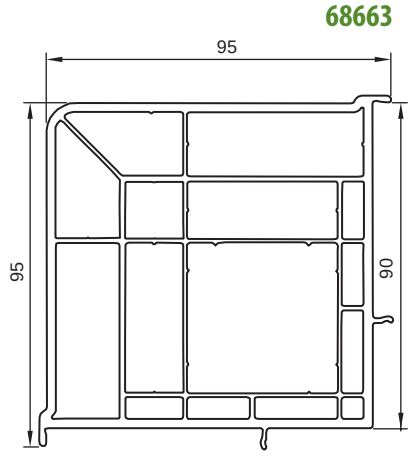
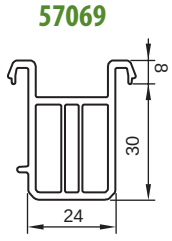
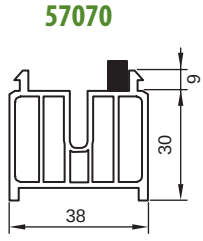
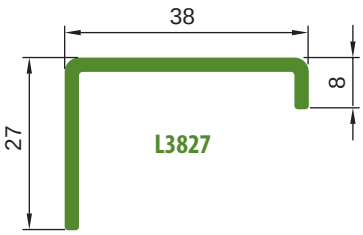

68656
50
86

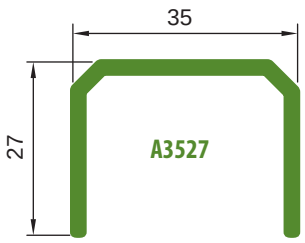

68663
95
95
90


57069
8
30
24

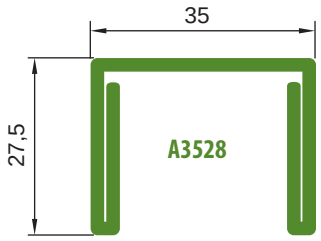

57070
9
30
38



A	X	Y
1,50	1,94	0,62

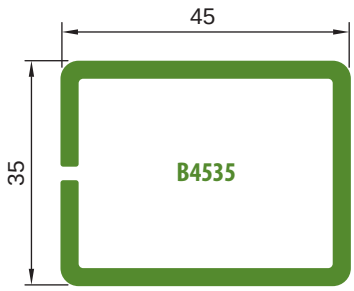


A	X	Y
1,50	2,48	0,93
2,00	3,18	1,20

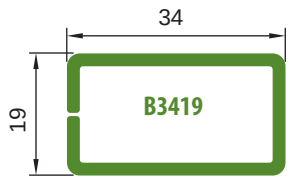


A	X	Y
2,00	5,24	1,98
2,50	6,18	2,48

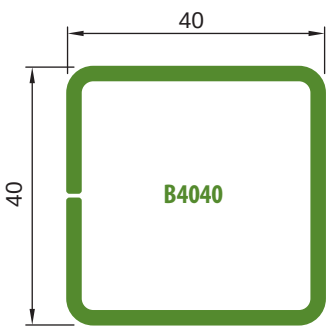
A	X	Y
2,60	7,27	7,27



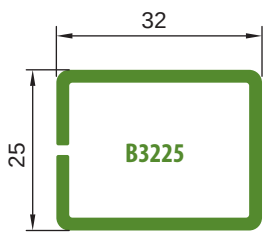
A	X	Y
1,50	xxx	xxx
2,00	8,66	5,67



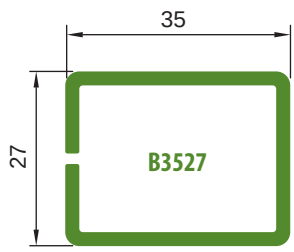
A	X	Y
1,50	2,20	0,87
2,00	2,73	1,07



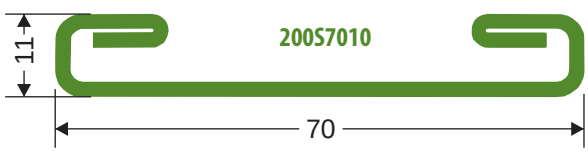
A	X	Y
2,00	7,13	7,21



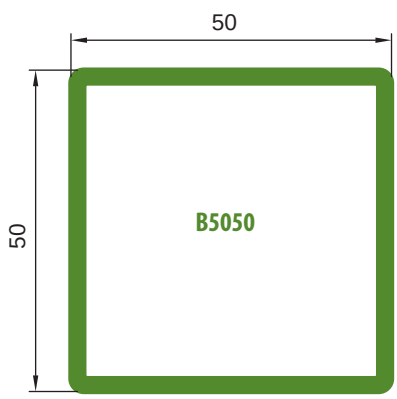
A	X	Y
1,50	2,22	1,55
2,00	2,84	1,96



A	X	Y
1,50	2,86	1,98
2,00	3,70	2,50



reinforce-ment	x (mm)	Ix (cm⁴)	Iy (cm⁴)
S7010	2,0	15,1	0,38



A	X	Y
2,00	14,70	14,70
3,00	20,00	20,00

L	M	I	A	P
1	A3119	150A3119	1,50	67012 67013
		200A3119	2,00	
2	A3225	150A3225	1,50	67020 67021 68010 67020 67021 67022
		200A3225	2,00	
3	A3050	150A3119	1,50	47022 47023
		150A3119	2,00	
4	A3527	150A3527	1,50	68610 68620 68611 68621
		150A3527	2,00	
5	L3827	150L3827	1,50	68620 68621
6	L3425	150L3425	1,50	68620 68621
7	B3419	150B3419	1,50	57030 68630 68632
		200B3419	2,00	
8	B2822	150B2822	1,50	57031
		200B2822	2,00	
9	B3225	150B3225	1,50	57010 67010 68010 68031 68033
		200B3225	2,00	
10	B3527	150B3527	1,50	68610 68611
		200B3527	2,00	
11	B3528	250B3528	2,50	68620 68621
		300B3528	3,00	
12	B4535	150B4535	1,50	58611
		200B4535	2,00	
13	B4040	200B4040	2,00	57063 68663
14	B4050	200B4050	2,00	47020 47021
15	B5050	200B5050	2,00	58620 58621
16	R4237	260R4237	2,60	57061 58661
17	S14022	150S14022	1,50	57065
18	S12422	150S12422	1,50	57065
		200S12422	2,00	57067
19	S13820	200V3628	2,00	57064
20	V3628			

L – consecutive number
M – reinforcement model/shape
I – reinforcement index
A – steel thickness in mm
X – steel moment of inertia in X plane in cm⁴
Y – steel moment of inertia in Y plane in cm⁴

2. Maximum Sash Sizes (size limits)

2.1 General Information

2.2 Maximum Single-Frame Sizes

2.3 – 2.7. Maximum Window and Balcony Door Sizes - single-sash and multi-sash with transom/mullion and multi-sash with meeting rail with 24 mm glazing unit at 400 Pa to 2,000 Pa wind load

2.8. – 2.12. Maximum Window and Balcony Door Sizes - single-sash and multi-sash with transom/mullion and multi-sash with meeting rail with 48 mm glazing unit at 400 Pa to 2,000 Pa wind load

Issued: 01.02.2019

2. Maximum Sash Sizes (size limits)

2.1 General Information

Wind load is one of the key factors to consider when designing a window. Based on the resistance to wind load, suitable window and door elements are selected, including PVC profiles and reinforcements, allowing for the size limits, glazing unit or panel weight and method of assembly.

General:

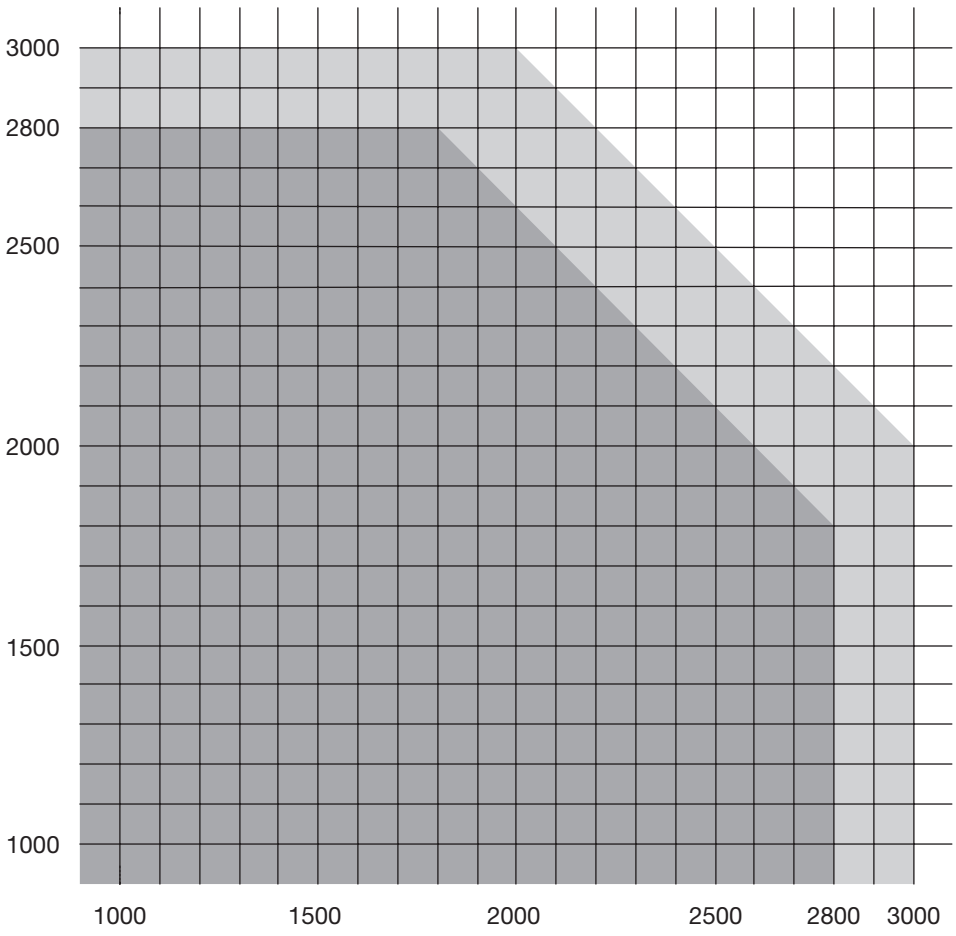
- size limits apply to the outer dimensions of the sashes;
- distances between hinges or locks (hooks) ≤800 mm;
- observe the guidelines of hardware suppliers regarding permissible loads and permissible sash size, regardless of the permissible size defined by the PVC profile system supplier;
- all coloured windows (foiled, paint coated or aluminium covered) require min. 2 mm thick reinforcements (steel sections).

2. Maximum Sash Sizes (size limits)

2.2 Maximum single-frame dimensions

Maximum frame sizes for multi-sash windows and doors	White profiles	Coloured profiles
Maximum side length	300 cm	280 cm
Maximum surface area	6,0 m2	5,0 m2

Maximum frame dimensions, Outer dimension in mm



	Maximum permissible dimensions		
	Maximum width (mm)	Maximum height (mm)	Maximum surface area (m^2)
White	3000	3000	6,00
Colour	2800	2800	5,00

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2. Maximum Sash Sizes (size limits)

2.3 Maximum Window and Balcony Door Sizes

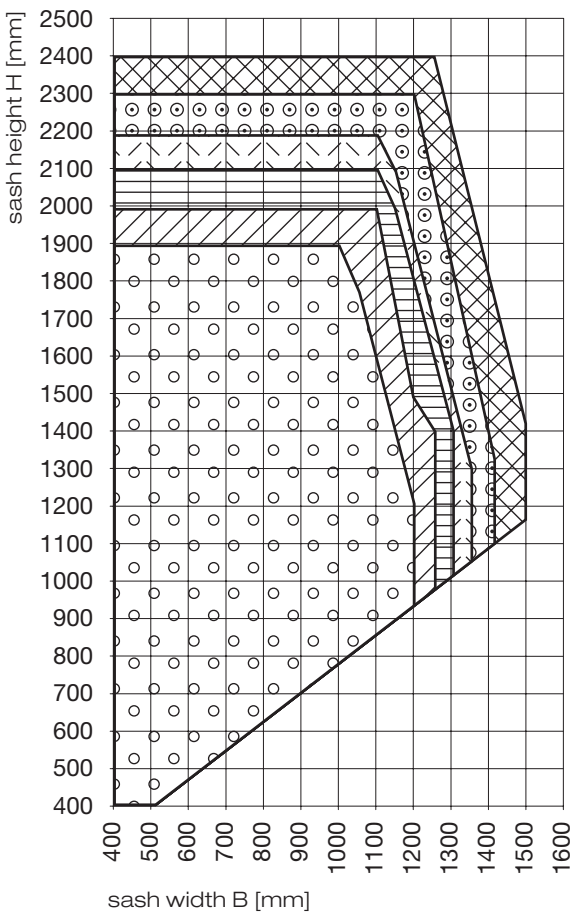
single-sash and multi-sash with transom/mullion and multi-sash with meeting rail with 24 mm glazing unit at 400 Pa to 2,000 Pa wind load

wind load	400Pa
glazing unit	24mm
frame deflection	L/300

Maximum sash sizes for 86 mm sash profiles.
Single-sash turn/tilt-and-turn windows (or combination windows with transom/mullions and multi-sash turn/tilt-and-turn windows with meeting rail).

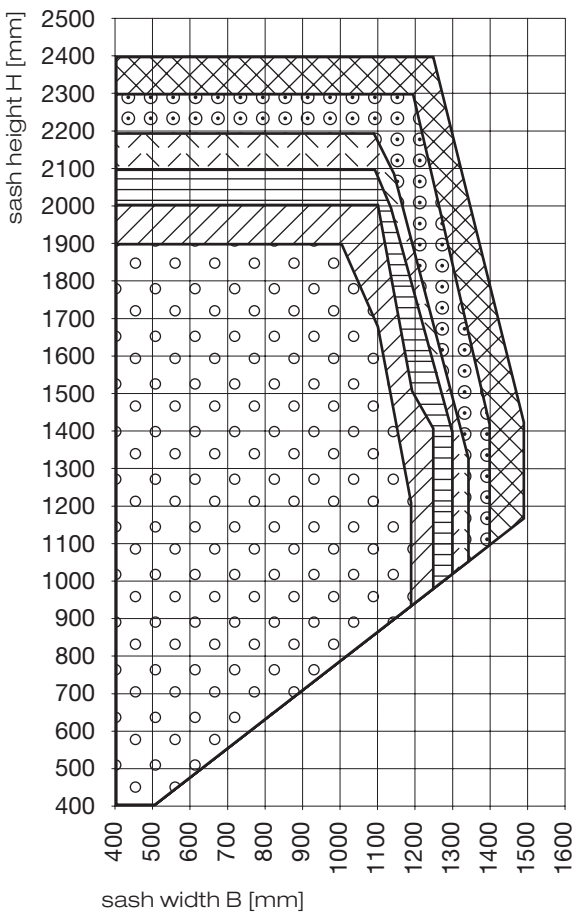
Single-sash windows (or combination windows with transom/mullions)

White

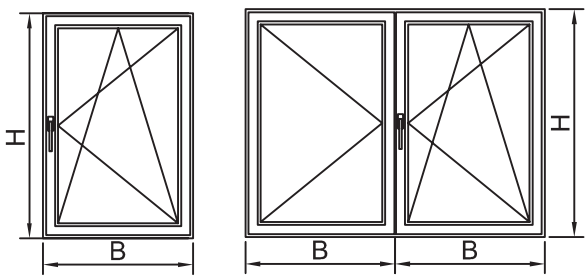


Multi-sash turn/tilt-and-turn windows with meeting rail

White



Maximum sash sizes for foiled profiles are reduced by 10%.



colour	reinforcement no.	reinforcement size [mm]
	250A3527	35 × 27 × 2.5
	200A3527	35 × 27 × 2.0
	150A3827	38 × 27 × 8 × 2.5
	250L3527	35 × 27 × 1.5
	200L3827	38 × 27 × 8 × 2.0
	150L3827	38 × 27 × 8 × 1.5

2. Maximum Sash Sizes (size limits)

2.4 Maximum Window and Balcony Door Sizes

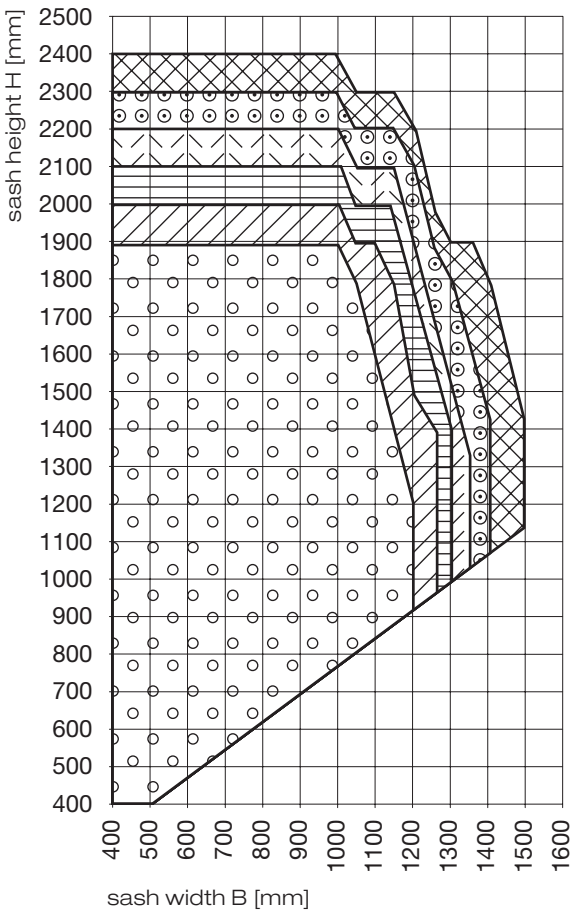
single-sash and multi-sash with transom/mullion and multi-sash with meeting rail with 24 mm glazing unit at 400 Pa to 2,000 Pa wind load

wind load	800Pa
glazing unit	24mm
frame deflection	L/300

Maximum sash sizes for 86 mm sash profiles.
Single-sash turn/tilt-and-turn windows (or combination windows with transom/mullions and multi-sash turn/tilt-and-turn windows with meeting rail).

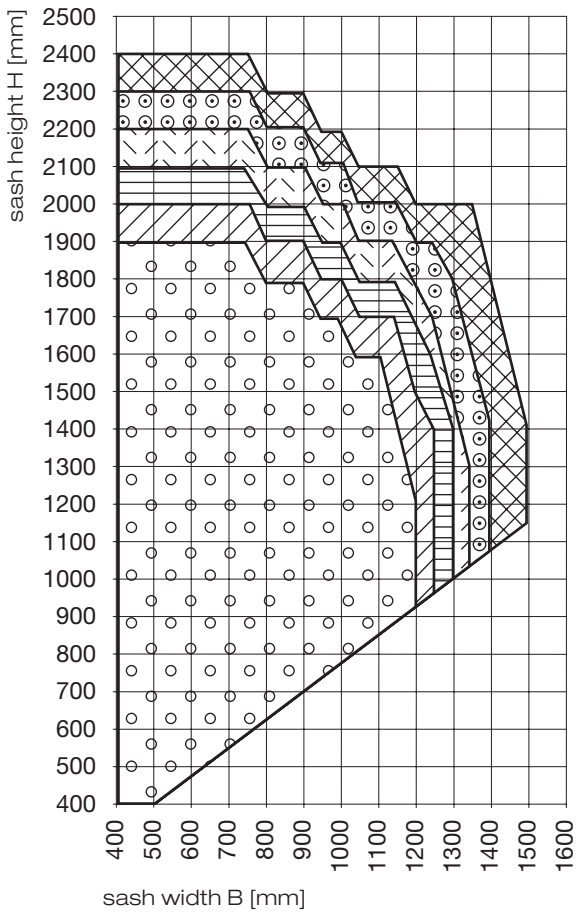
Single-sash windows (or combination windows with transom/mullions)

White

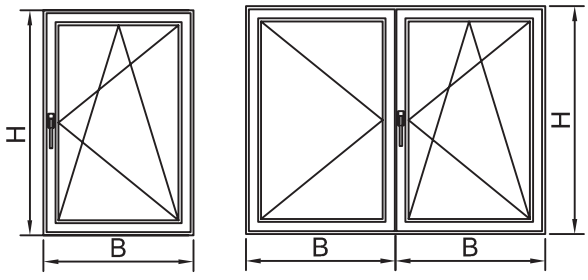


Multi-sash turn/tilt-and-turn windows with meeting rail

White



Maximum sash sizes for foiled profiles are reduced by 10%.



colour	reinforcement no.	reinforcement size [mm]
	250A3527	35 × 27 × 2.5
	200A3527	35 × 27 × 2.0
	150A3827	38 × 27 × 8 × 2.5
	250L3527	35 × 27 × 1.5
	200L3827	38 × 27 × 8 × 2.0
	150L3827	38 × 27 × 8 × 1.5

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2. Maximum Sash Sizes (size limits)

2.5 Maximum Window and Balcony Door Sizes

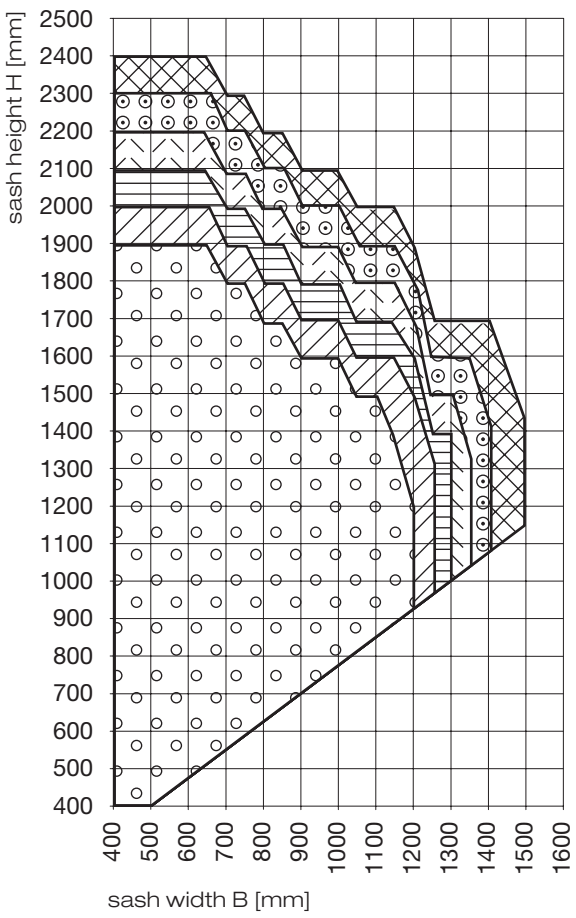
single-sash and multi-sash with transom/mullion and multi-sash with meeting rail with 24 mm glazing unit at 400 Pa to 2,000 Pa wind load,000 Pa wind load

wind load	1200Pa
glazing unit	24mm
frame deflection	L/300

Maximum sash sizes for 86 mm sash profiles.
Single-sash turn/tilt-and-turn windows (or combination windows with transom/mullions and multi-sash turn/tilt-and-turn windows with meeting rail).

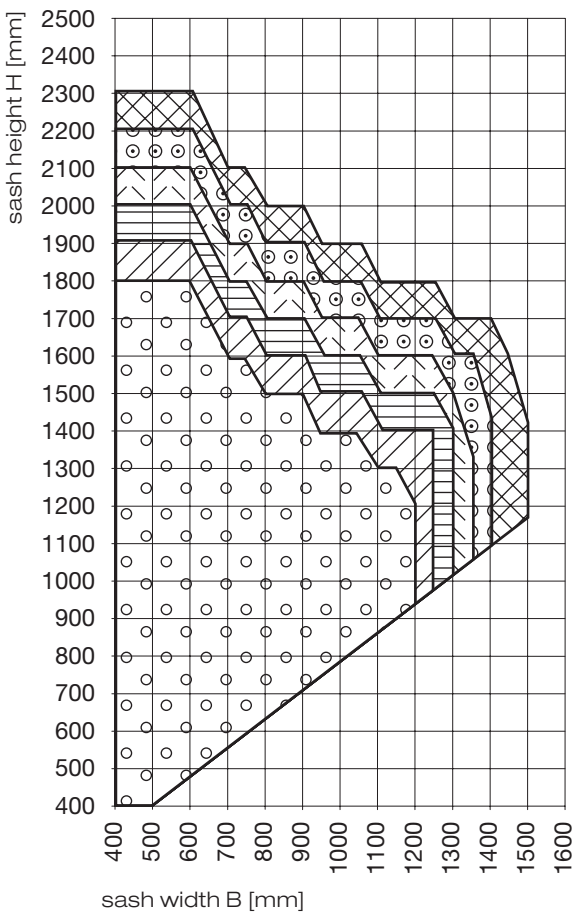
Single-sash windows (or combination windows with transom/mullions)

White

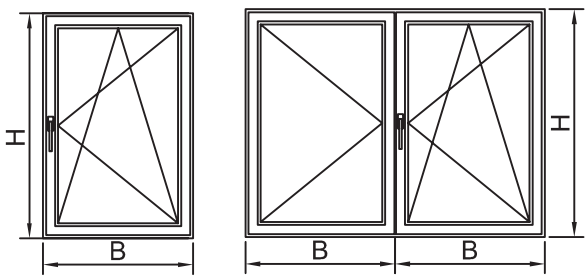


Multi-sash turn/tilt-and-turn windows with meeting rail

White



Maximum sash sizes for foiled profiles are reduced by 10%.



colour	reinforcement no.	reinforcement size [mm]
	250A3527	35 × 27 × 2.5
	200A3527	35 × 27 × 2.0
	150A3827	38 × 27 × 8 × 2.5
	250L3527	35 × 27 × 1.5
	200L3827	38 × 27 × 8 × 2.0
	150L3827	38 × 27 × 8 × 1.5

2. Maximum Sash Sizes (size limits)

2.6 Maximum Window and Balcony Door Sizes

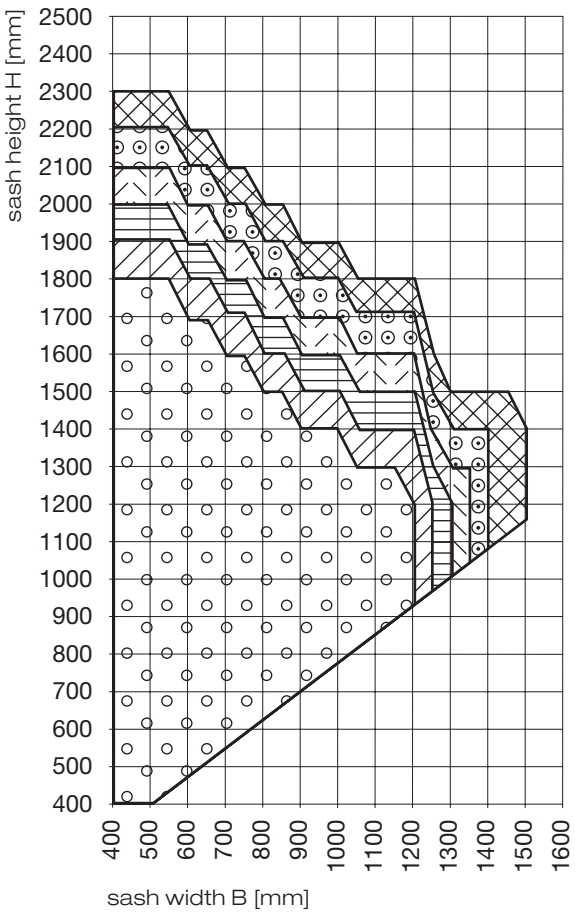
single-sash and multi-sash with transom/mullion and multi-sash with meeting rail with 24 mm glazing unit at 400 Pa to 2,000 Pa wind load

wind load	1600Pa
glazing unit	24mm
frame deflection	L/300

Maximum sash sizes for 86 mm sash profiles.
Single-sash turn/tilt-and-turn windows (or combination windows with transom/mullions and multi-sash turn/tilt-and-turn windows with meeting rail).

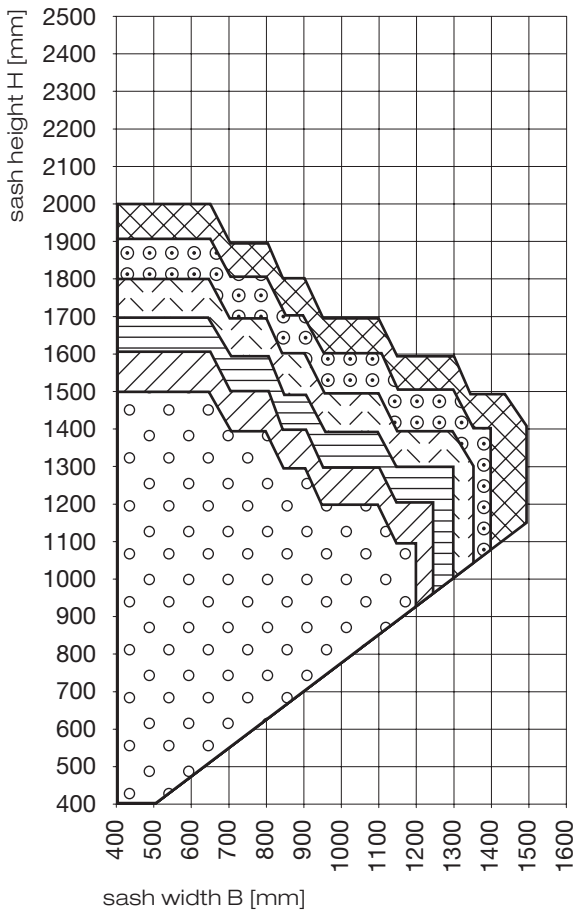
Single-sash windows (or combination windows with transom/mullions)

White

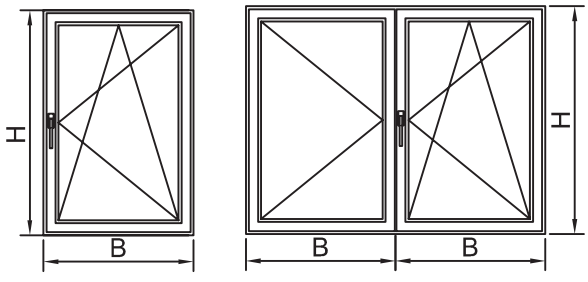


Multi-sash turn/tilt-and-turn windows with meeting rail

White



Maximum sash sizes for foiled profiles are reduced by 10%.



colour	reinforcement no.	reinforcement size [mm]
	250A3527	35 × 27 × 2.5
	200A3527	35 × 27 × 2.0
	150A3827	38 × 27 × 8 × 2.5
	250L3527	35 × 27 × 1.5
	200L3827	38 × 27 × 8 × 2.0
	150L3827	38 × 27 × 8 × 1.5

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2. Maximum Sash Sizes (size limits)

2.7 Maximum Window and Balcony Door Sizes

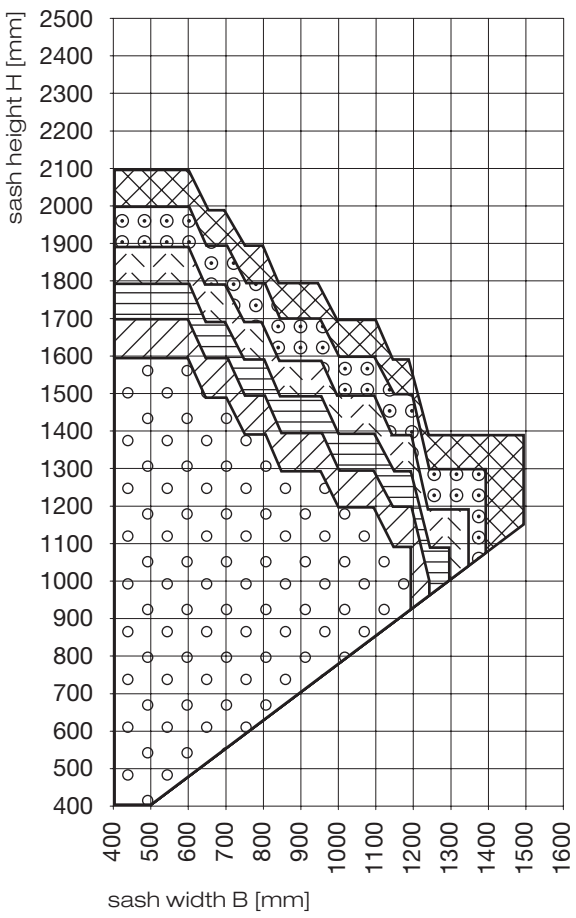
single-sash and multi-sash with transom/mullion and multi-sash with meeting rail with 24 mm glazing unit at 400 Pa to 2,000 Pa wind load

wind load	2000Pa
glazing unit	24mm
frame deflection	L/300

Maximum sash sizes for 86 mm sash profiles.
Single-sash turn/tilt-and-turn windows (or combination windows with transom/mullions and multi-sash turn/tilt-and-turn windows with meeting rail).

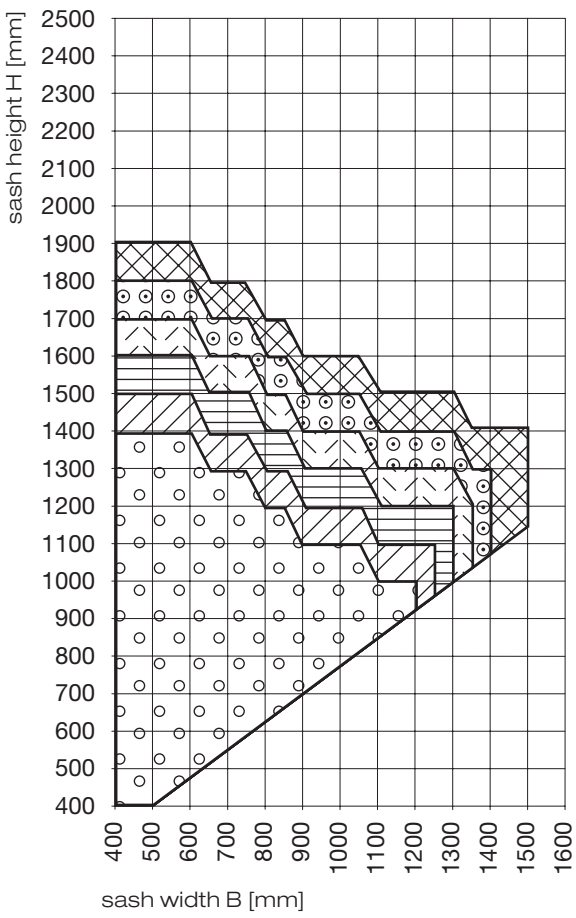
Single-sash windows (or combination windows with transom/mullions)

White

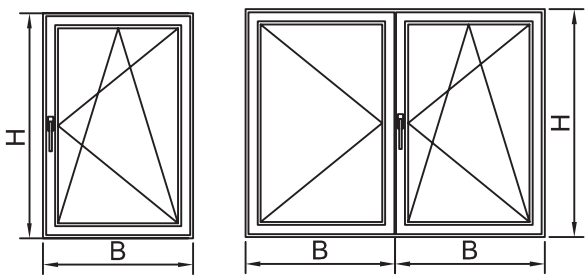


Multi-sash turn/tilt-and-turn windows with meeting rail

White



Maximum sash sizes for foiled profiles are reduced by 10%.



colour	reinforcement no.	reinforcement size [mm]
	250A3527	35 × 27 × 2.5
	200A3527	35 × 27 × 2.0
	150A3827	38 × 27 × 8 × 2.5
	250L3527	35 × 27 × 1.5
	200L3827	38 × 27 × 8 × 2.0
	150L3827	38 × 27 × 8 × 1.5

2. Maximum Sash Sizes (size limits)

2.8 Maximum Window and Balcony Door Sizes

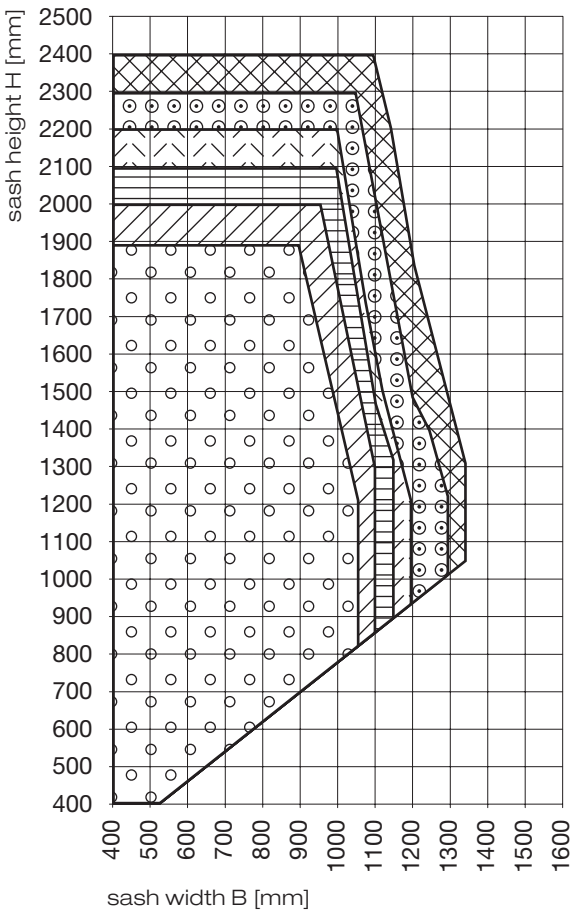
single-sash and multi-sash with transom/mullion and multi-sash with meeting rail with 48 mm glazing unit at 400 Pa to 2,000 Pa wind load

wind load	400Pa
glazing unit	48mm
frame deflection	L/300

Maximum sash sizes for 86 mm sash profiles.
Single-sash turn/tilt-and-turn windows (or combination windows with transom/mullions and multi-sash turn/tilt-and-turn windows with meeting rail).

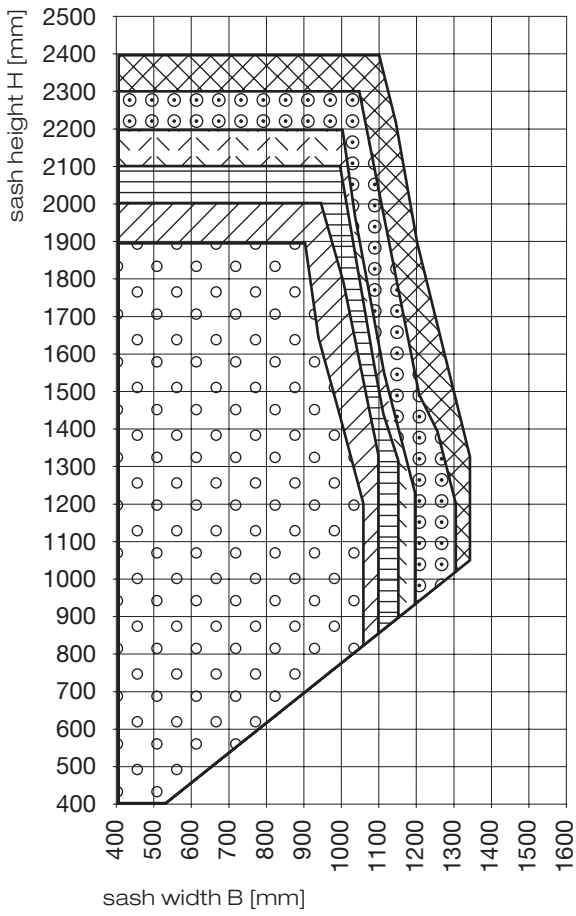
Single-sash windows (or combination windows with transom/mullions)

White

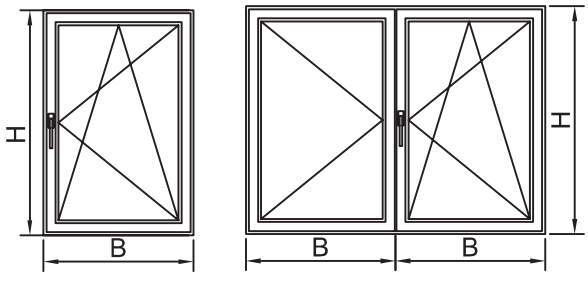


Multi-sash turn/tilt-and-turn windows with meeting rail

White



Maximum sash sizes for foiled profiles are reduced by 10%.



colour	reinforcement no.	reinforcement size [mm]
	250A3527	35 × 27 × 2.5
	200A3527	35 × 27 × 2.0
	150A3827	38 × 27 × 8 × 2.5
	250L3527	35 × 27 × 1.5
	200L3827	38 × 27 × 8 × 2.0
	150L3827	38 × 27 × 8 × 1.5

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2. Maximum Sash Sizes (size limits)

2.9 Maximum Window and Balcony Door Sizes

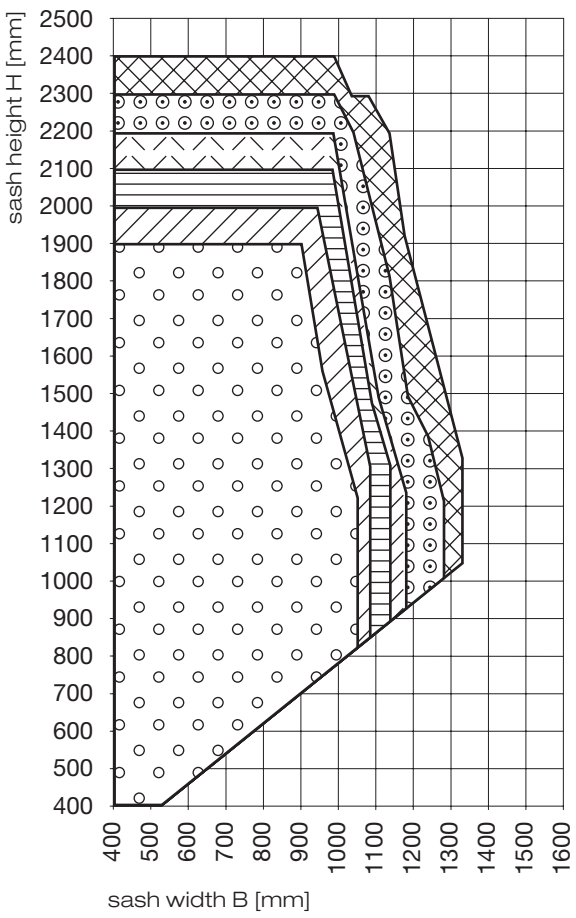
single-sash and multi-sash with transom/mullion and multi-sash with meeting rail with 48 mm glazing unit at 400 Pa to 2,000 Pa wind load

wind load	800Pa
glazing unit	48mm
frame deflection	L/300

Maximum sash sizes for 86 mm sash profiles.
Single-sash turn/tilt-and-turn windows (or combination windows with transom/mullions and multi-sash turn/tilt-and-turn windows with meeting rail).

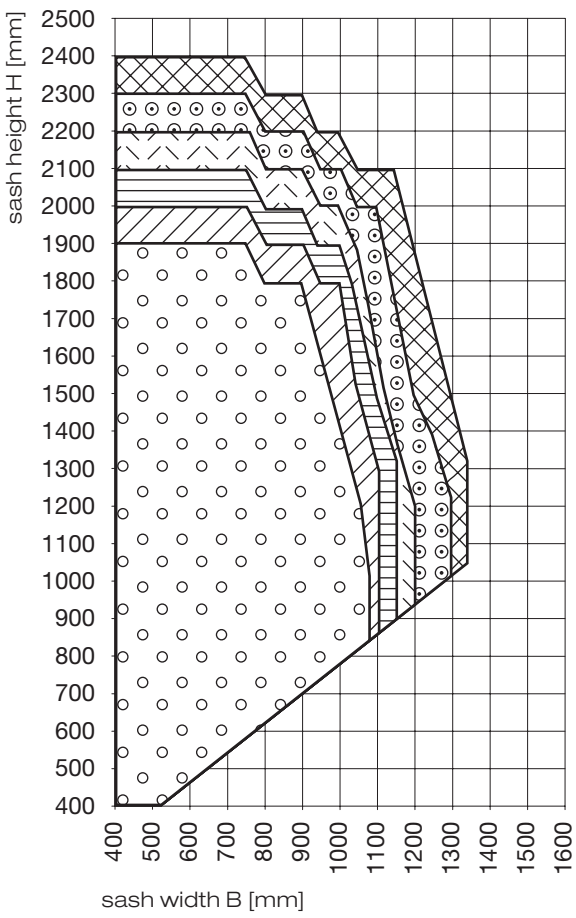
Single-sash windows (or combination windows with transom/mullions)

White

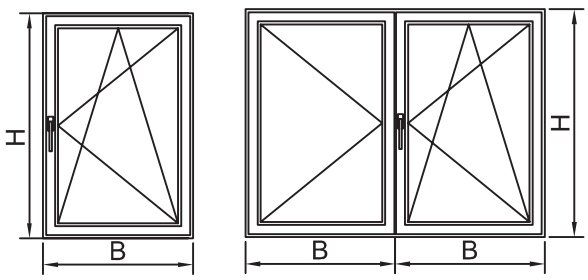


Multi-sash turn/tilt-and-turn windows with meeting rail

White



Maximum sash sizes for foiled profiles are reduced by 10%.



colour	reinforcement no.	reinforcement size [mm]
	250A3527	35 × 27 × 2.5
	200A3527	35 × 27 × 2.0
	150A3827	38 × 27 × 8 × 2.5
	250L3527	35 × 27 × 1.5
	200L3827	38 × 27 × 8 × 2.0
	150L3827	38 × 27 × 8 × 1.5

2. Maximum Sash Sizes (size limits)

2.10 Maximum Window and Balcony Door Sizes

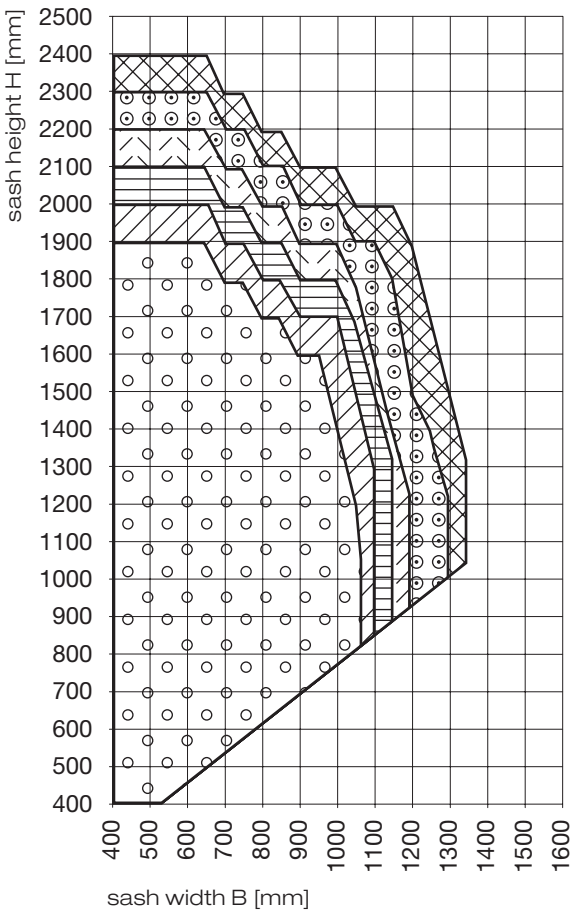
single-sash and multi-sash with transom/mullion and multi-sash with meeting rail with 48 mm glazing unit at 400 Pa to 2,000 Pa wind load

wind load	1200Pa
glazing unit	48mm
frame deflection	L/300

Maximum sash sizes for 86 mm sash profiles.
Single-sash turn/tilt-and-turn windows (or combination windows with transom/mullions and multi-sash turn/tilt-and-turn windows with meeting rail).

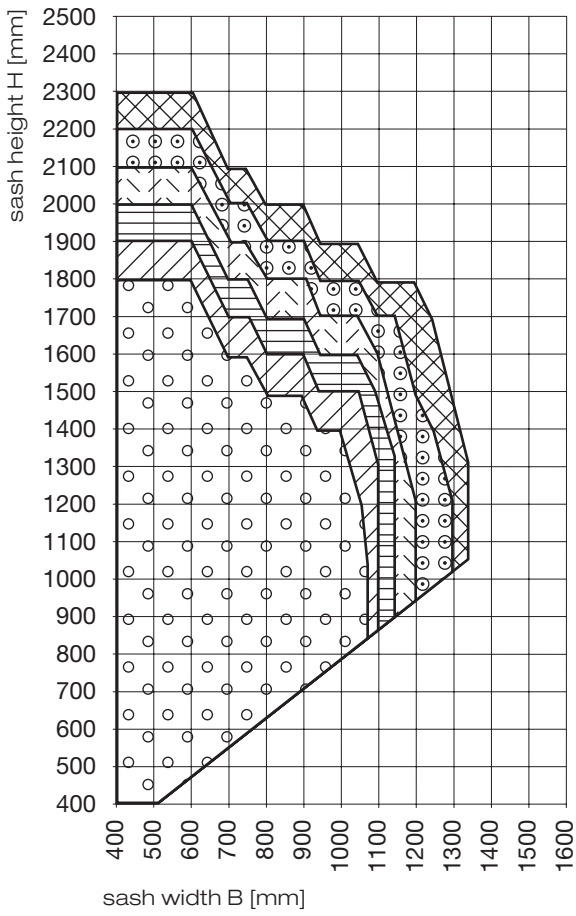
Single-sash windows (or combination windows with transom/mullions)

White

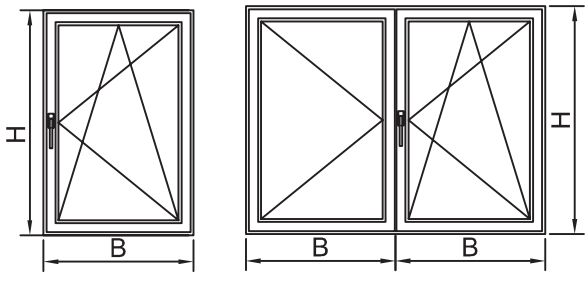


Multi-sash turn/tilt-and-turn windows with meeting rail

White



Maximum sash sizes for foiled profiles are reduced by 10%.



colour	reinforcement no.	reinforcement size [mm]
	250A3527	35 × 27 × 2.5
	200A3527	35 × 27 × 2.0
	150A3827	38 × 27 × 8 × 2.5
	250L3527	35 × 27 × 1.5
	200L3827	38 × 27 × 8 × 2.0
	150L3827	38 × 27 × 8 × 1.5

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2. Maximum Sash Sizes (size limits)

2.11 Maximum Window and Balcony Door Sizes

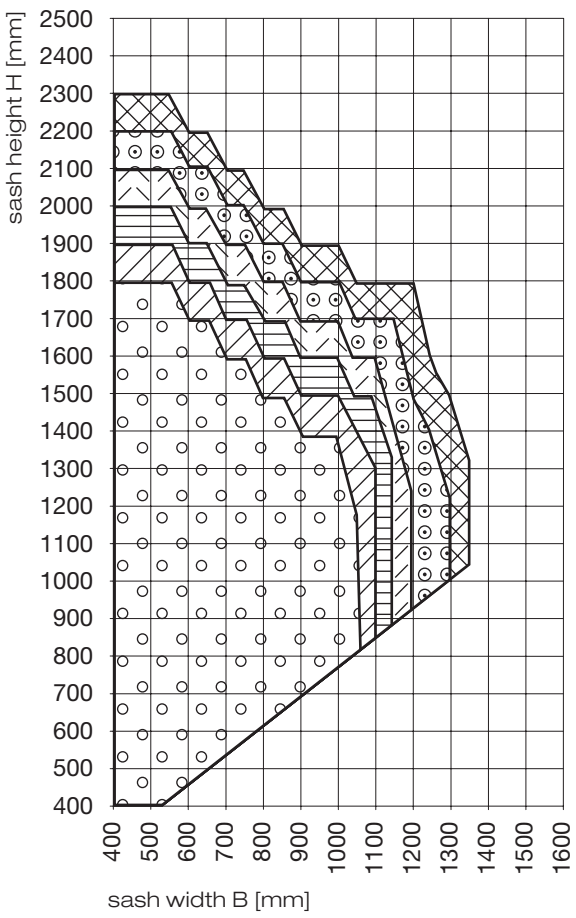
single-sash and multi-sash with transom/mullion and multi-sash with meeting rail with 48 mm glazing unit at 400 Pa to 2,000 Pa wind load

wind load	1600Pa
glazing unit	48mm
frame deflection	L/300

Maximum sash sizes for 86 mm sash profiles.
Single-sash turn/tilt-and-turn windows (or combination windows with transom/mullions and multi-sash turn/tilt-and-turn windows with meeting rail).

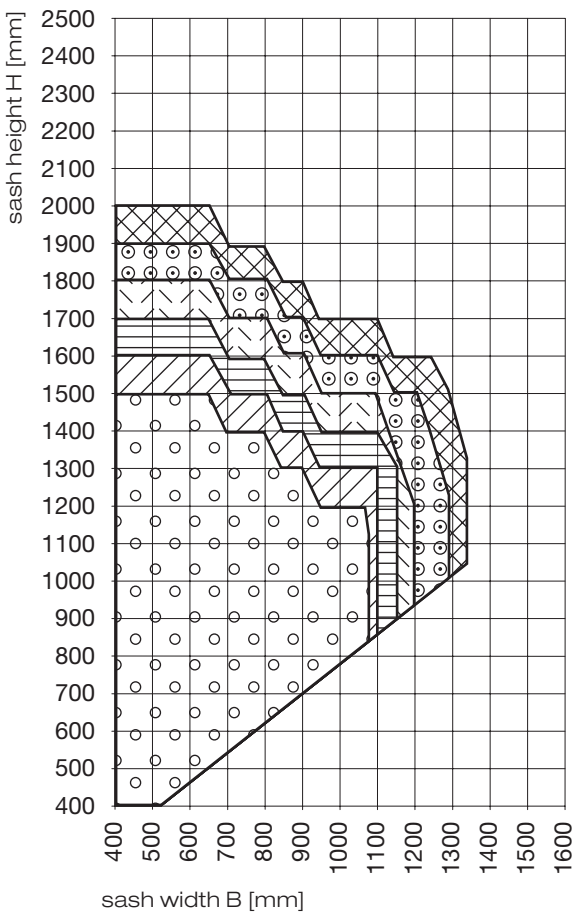
Single-sash windows (or combination windows with transom/mullions)

White

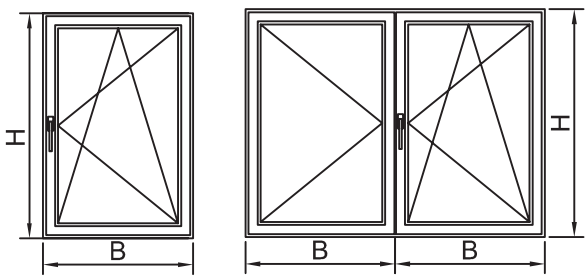


Multi-sash turn/tilt-and-turn windows with meeting rail

White



Maximum sash sizes for foiled profiles are reduced by 10%.



colour	reinforcement no.	reinforcement size [mm]
	250A3527	35 × 27 × 2.5
	200A3527	35 × 27 × 2.0
	150A3827	38 × 27 × 8 × 2.5
	250L3527	35 × 27 × 1.5
	200L3827	38 × 27 × 8 × 2.0
	150L3827	38 × 27 × 8 × 1.5

2. Maximum Sash Sizes (size limits)

2.12 Maximum Window and Balcony Door Sizes

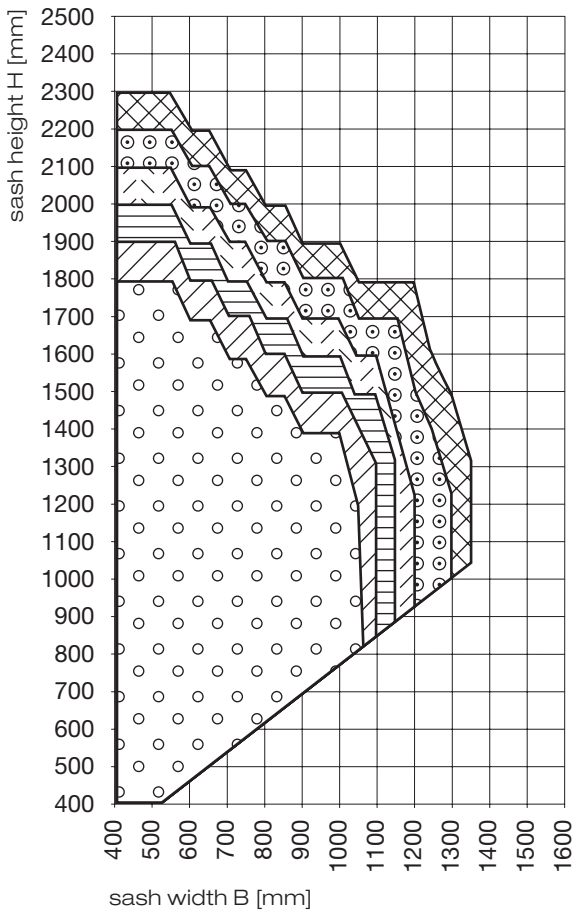
single-sash and multi-sash with transom/mullion and multi-sash with meeting rail with 48 mm glazing unit at 400 Pa to 2,000 Pa wind load

wind load	2000Pa
glazing unit	48mm
frame deflection	L/300

Maximum sash sizes for 86 mm sash profiles.
Single-sash turn/tilt-and-turn windows (or combination windows with transom/mullions and multi-sash turn/tilt-and-turn windows with meeting rail).

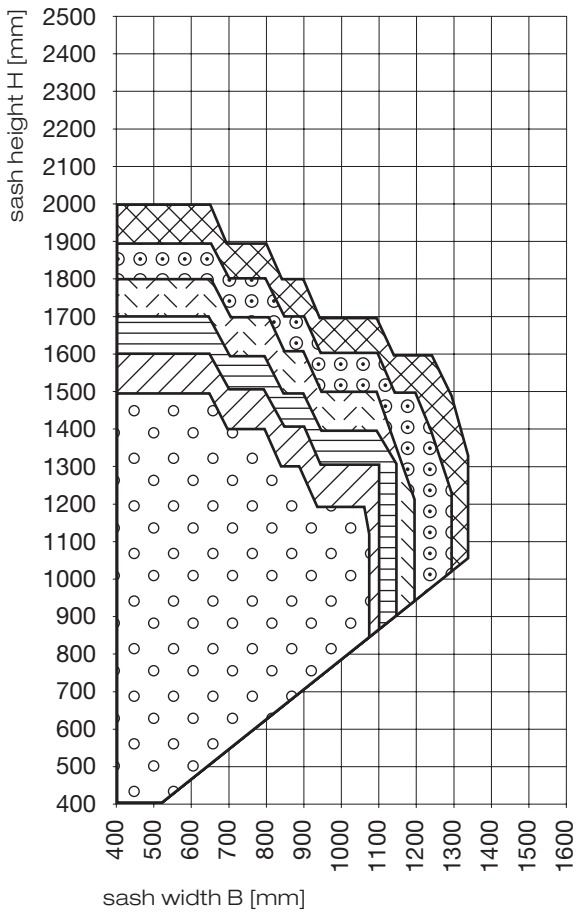
Single-sash windows (or combination windows with transom/mullions)

White

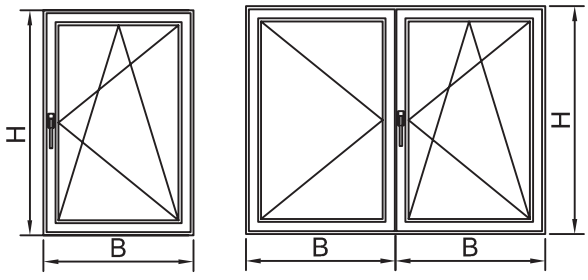


Multi-sash turn/tilt-and-turn windows with meeting rail

White



Maximum sash sizes for foiled profiles are reduced by 10%.



colour	reinforcement no.	reinforcement size [mm]
	250A3527	35 × 27 × 2.5
	200A3527	35 × 27 × 2.0
	150A3827	38 × 27 × 8 × 2.5
	250L3527	35 × 27 × 1.5
	200L3827	38 × 27 × 8 × 2.0
	150L3827	38 × 27 × 8 × 1.5

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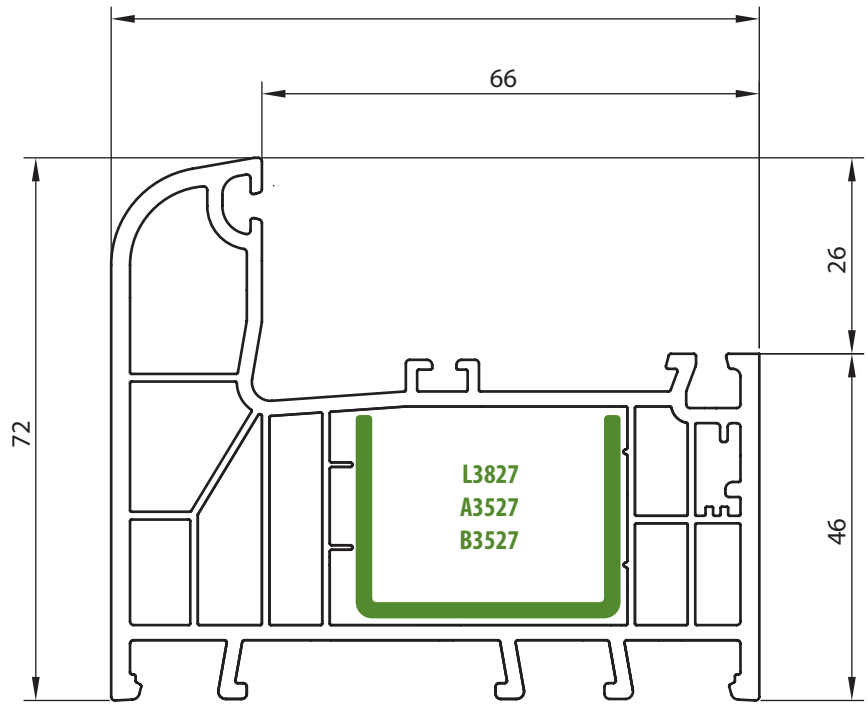
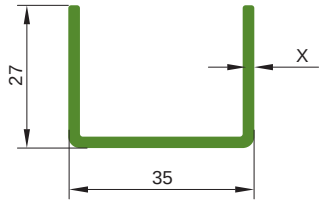
3. Overview of profiles

3.1 Frame 68610
3.2 Frame 68611
3.3 Door Frame 58611
3.4 Sash 68620
3.5 Sash 68621
3.6 In-Opening Door Sash Z 58620
3.7 Out-Opening Door Sash T 58621
3.8 Transom/Mullion 68630
3.9 Transom/Mullion 68632
3.10 Meeting rail 68631
3.11 Meeting rail 68633
3.12 Glazing Beads, Coupling Mullions
3.13 Frame Packers
3.14 90° Bay Post 68063
3.15 Bay Pole 68661 + Adapter 68662, Cill Packers
3.16 Accessories

3.1 Frame 68610

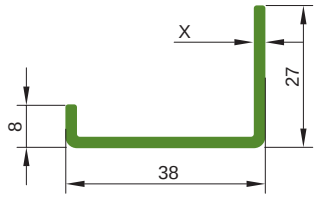


reinforcement XXXA3527



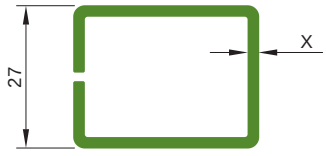
reinforcement symbol	x [mm]	Ix [mm4]	Iy [mm4]
150A3527	1,5	0,9257	2,4761
200A3527	2,0	1,2004	3,1759

reinforcement XXXL3827

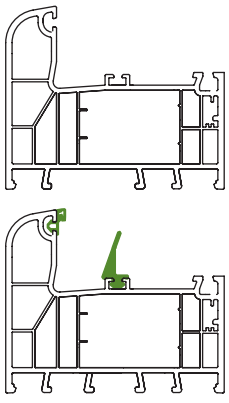


reinforcement symbol	x [mm]	Ix [mm4]	Iy [mm4]
150L3827	1,51	0,6214	,9409

reinforcement XXXB3527



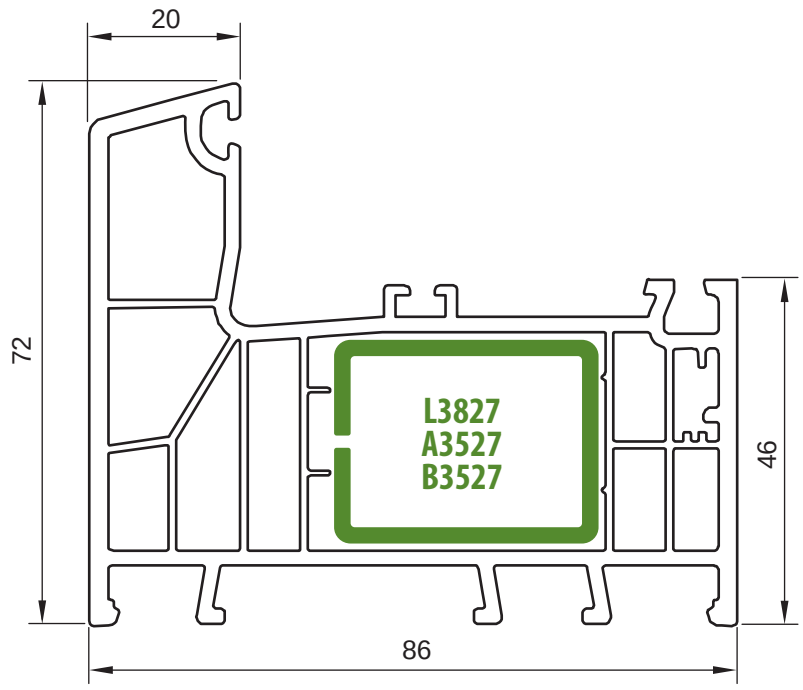
symbol wzmocnienia	x [mm]	Ix [mm4]
150B3527	1,51	,9762



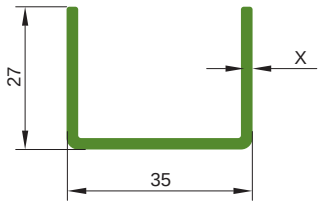
Profile	colour	EPDM gasket		
68610 AD	S C		57071	TOUCHING PVC
	S C		68672	CENTRAL SEAL
	S C		57074	TOUCHING GLASS

Profile	colour	EPDM gasket		
68610MD S C	S C	—	—	—

3.2 Frame 68611

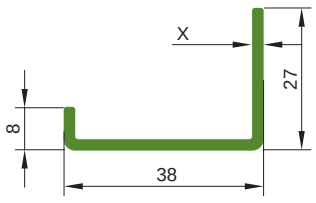


reinforcement XXXA3527



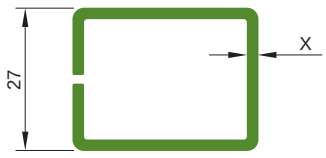
reinforcement symbol	x [mm]	Ix [mm4]	Iy [mm4]
150A3527	1,5	0,9257	2,4761
200A3527	2,0	1,2004	3,1759

reinforcement XXXL3827

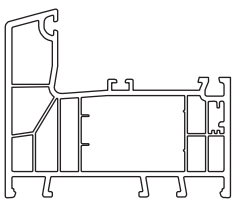


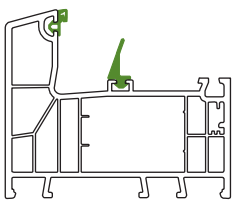
reinforcement symbol	x [mm]	Ix [mm4]	Iy [mm4]
150L3827	1,51	0,6214	,9409

reinforcement XXXB3527



reinforcement symbol	x [mm]	Ix [mm4]	Iy [mm4]
150B3527	1,52	1,9762	,8641

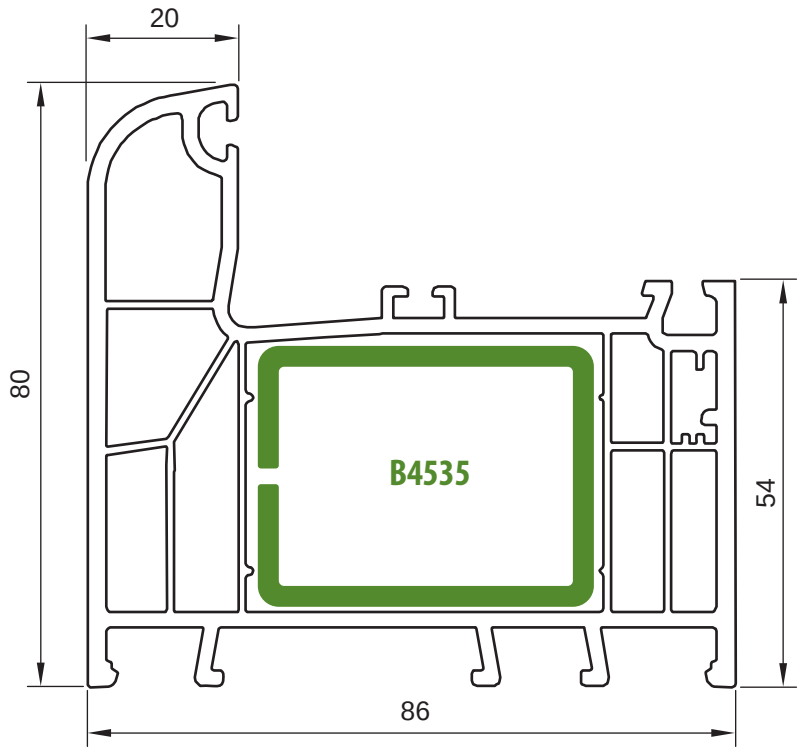




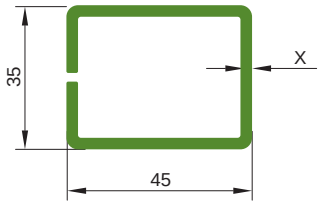
Profile	colour		EPDM gasket	
68611 AD	S C	ab	57071	TOUCHING PVC
	S C	ab	68672	CENTRAL SEAL
	S C	ab	57074	TOUCHING GLASS

Profile	colour	EPDM gasket		
68611MD	S C	—	—	—

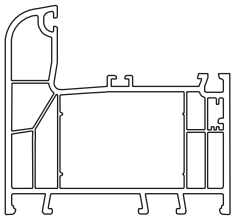
3.3 Door frame 58611



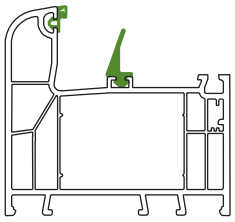
reinforcement
XXXB4535



reinforcement symbol	x [mm]	Ix [mm4]	Iy [mm4]
150B3545	1,5	XXX	XXX
200B3545	2,0	8,66	5,67



Profile	colour	EPDM gasket		
58611 AD	S C	57071	TOUCHING PVC
	S C	68672	CENTRAL SEAL
	S C	57074	TOUCHING GLASS



Profile	colour	EPDM gasket		
58611MD	S C	—	—	—

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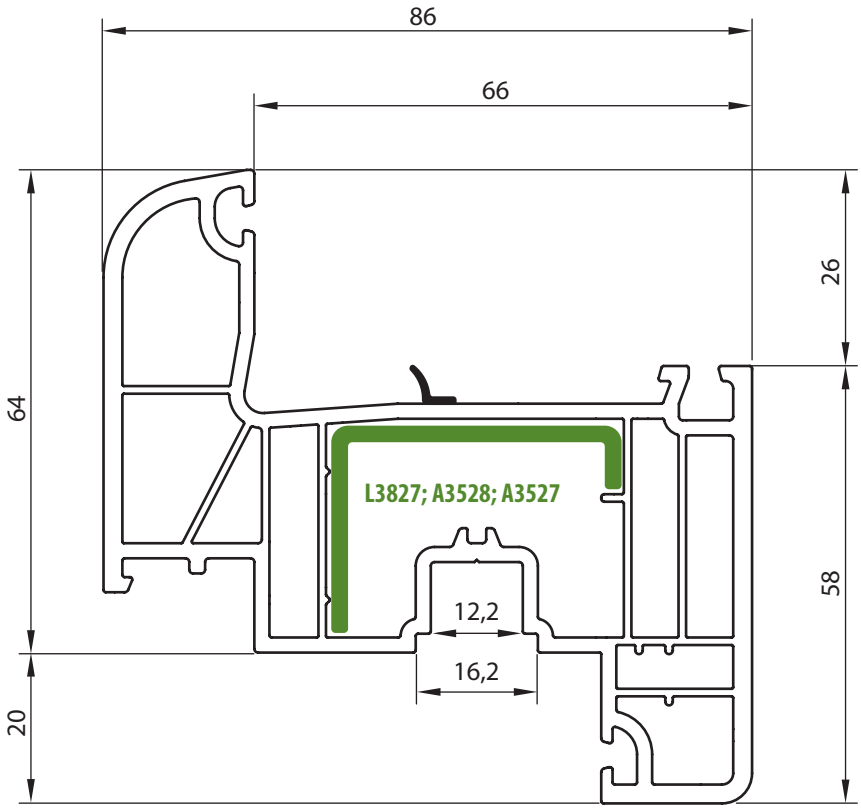
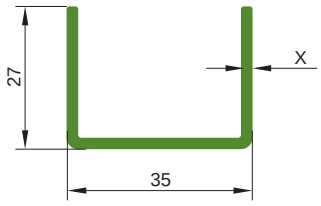
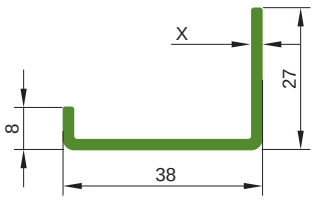


reinforcement XXXA3527



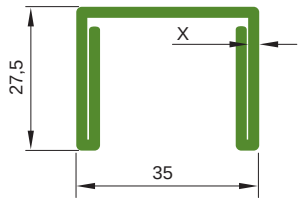
reinforcement symbol	x [mm]	Ix [mm4]	Iy [mm4]
150A3527	1,5	0,9257	2,4761
200A3527	2,0	1,2004	3,1759

reinforcement XXXL3827

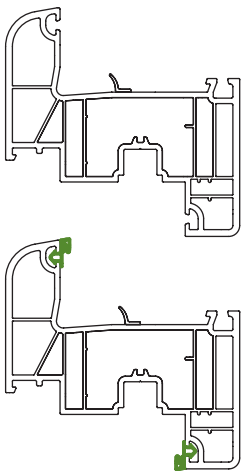


reinforcement symbol	x [mm]	Ix [mm4]	Iy [mm4]
150L3827	1,51	0,6214	,9409

reinforcement XXXA3528



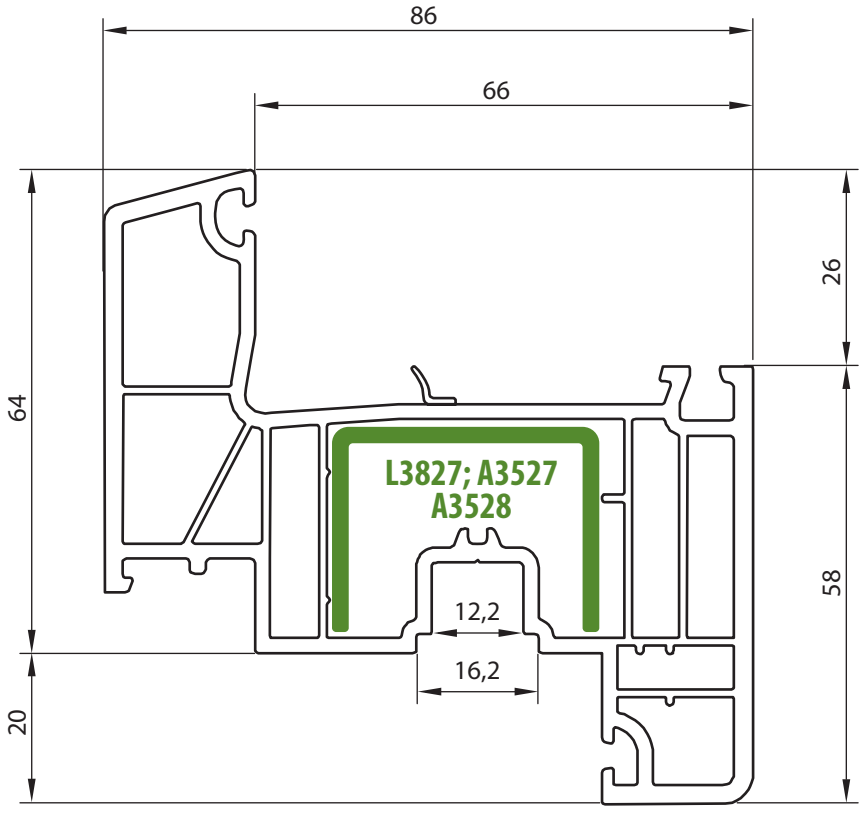
reinforcement symbol	x [mm]	Ix [mm4]	Iy [mm4]
200A3528	2,0	5,24	1,98
250A3528	2,5	6,18	2,48



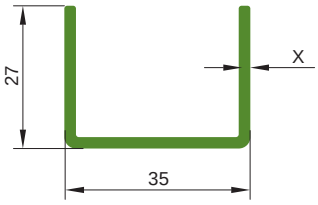
Profile	colour	EPDM gasket		
68620	S C		57071	TOUCHING PVC
	S C		57074	TOUCHING GLASS

Profile	colour	EPDM gasket		
68620U	S C	—	—	—

Rama 68621

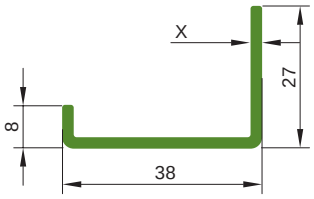


reinforcement
XXXA3527



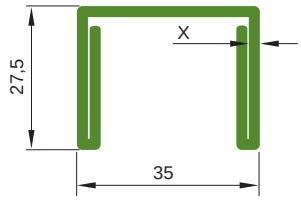
reinforcement symbol	x [mm]	Ix [mm4]	Iy [mm4]
150A3527	1,5	0,9257	2,4761
200A3527	2,0	1,2004	3,1759

reinforcement
XXXL3827

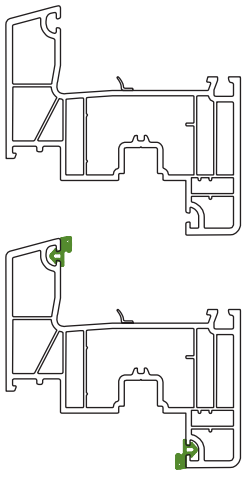


reinforcement symbol	x [mm]	Ix [mm4]	Iy [mm4]
150L3827	1,51	0,6214	,9409

reinforcement
XXXA3528



reinforcement symbol	x [mm]	Ix [mm4]	Iy [mm4]
200A3528	2,0	5,24	1,98
250A3528	2,5	6,18	2,48



Profile	colour	EPDM gasket		
68621	S C		57071	TOUCHING PVC
	S C		57074	TOUCHING GLASS

Profile	colour	EPDM gasket		
68621U S C	S C	—	—	—

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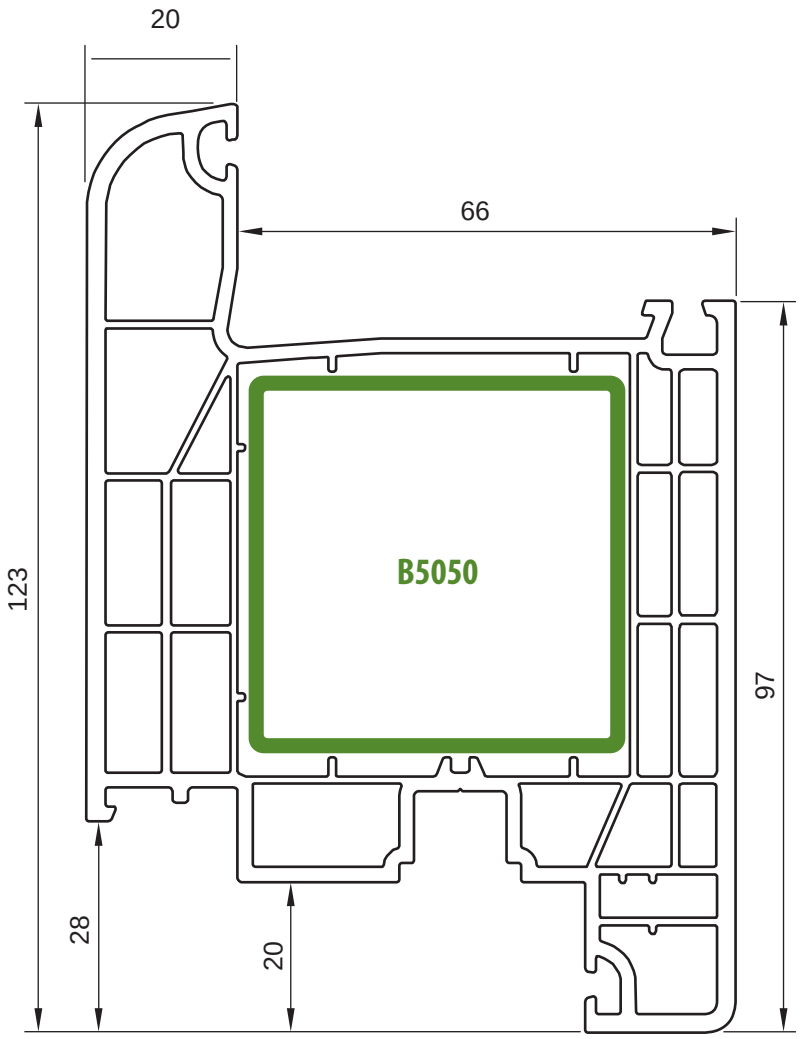
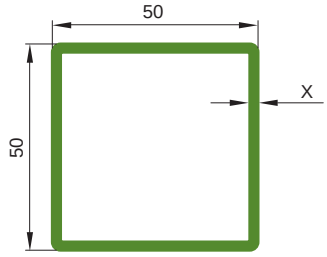
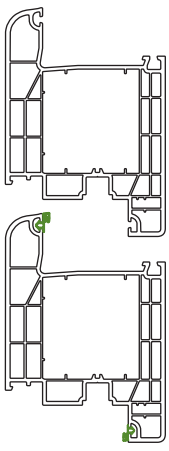
3.6 In-Opening Door Sash Z 58620



reinforcement
XXXB5050



reinforcement symbol	x [mm]	Ix [mm4]	Iy [mm4]
200B5050	2,0	14,70	14,70
300B5050	3,0	20,00	20,20

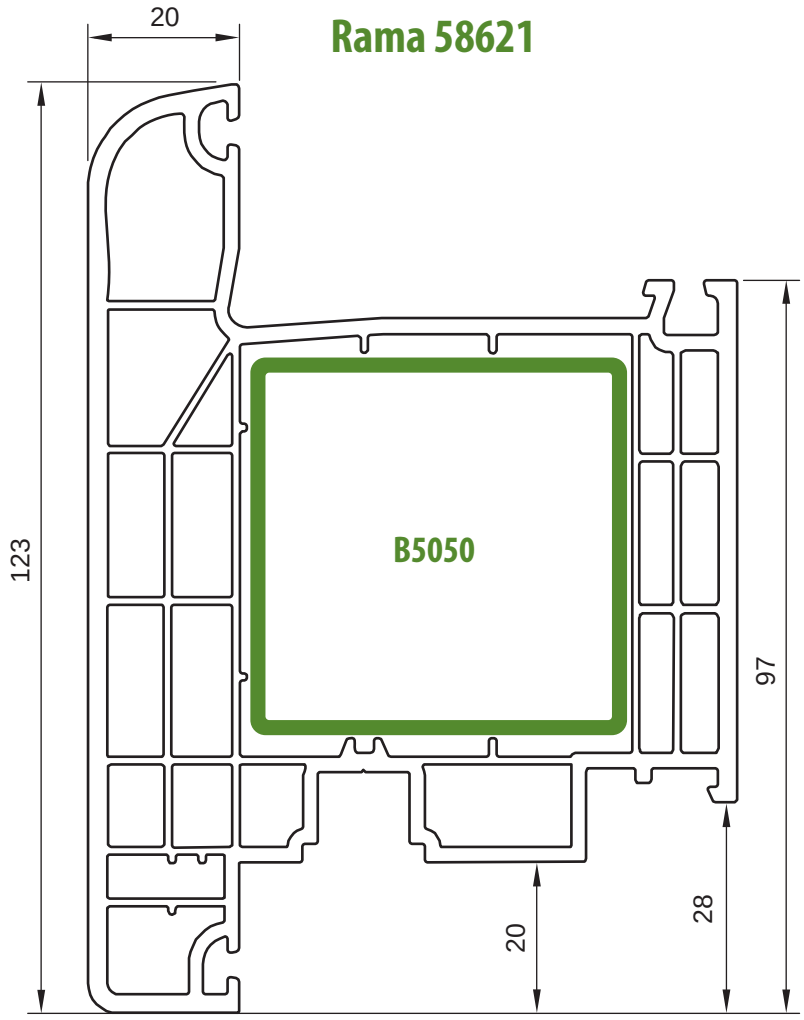


Profile	colour	EPDM gasket		
58620	S / C		57071	TOUCHING PVC
	S / C		57074	TOUCHING GLASS

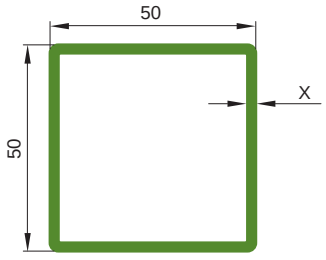
Profile	colour	EPDM gasket		
58620U	S / C	—	—	—

3.7 Out-Opening Door Sash T 58621

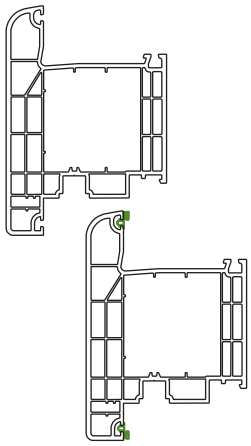
Rama 58621



reinforcement
XXXB5050



reinforcement symbol	x [mm]	Ix [mm4]	Iy [mm4]
200B5050	2,0	14,70	14,70
300B5050	3,0	20,00	20,20

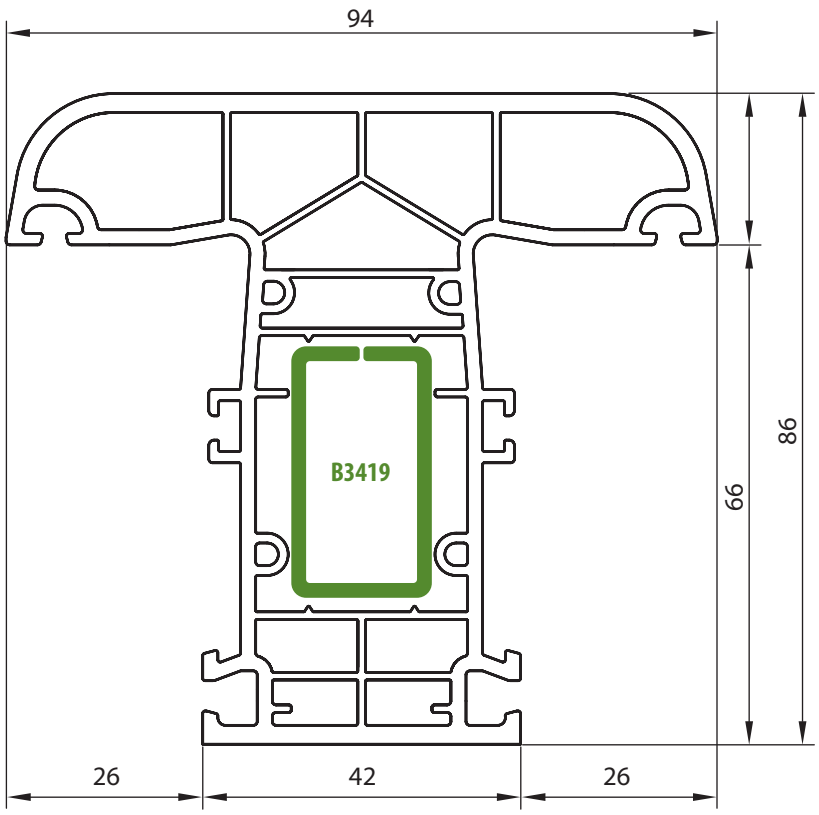


Profile	colour	EPDM gasket		
58621	S/C		57071	TOUCHING PVC
	S/C		57074	TOUCHING GLASS

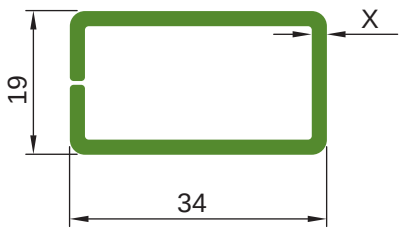
Profile	colour	EPDM gasket		
58621U S/C	S/C	—	—	—

3. Overview of profiles

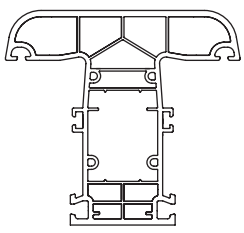
3.8 Transom/Mullion 68630



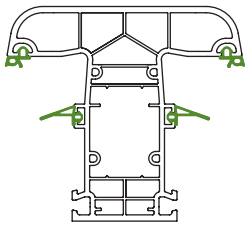
reinforcement
XXXB3419



reinforcement symbol	x [mm]	Ix [mm4]	Iy [mm4]
150B3419	1,5	0,8752	2,1962
200B3419	2,0	1,0719	2,7280

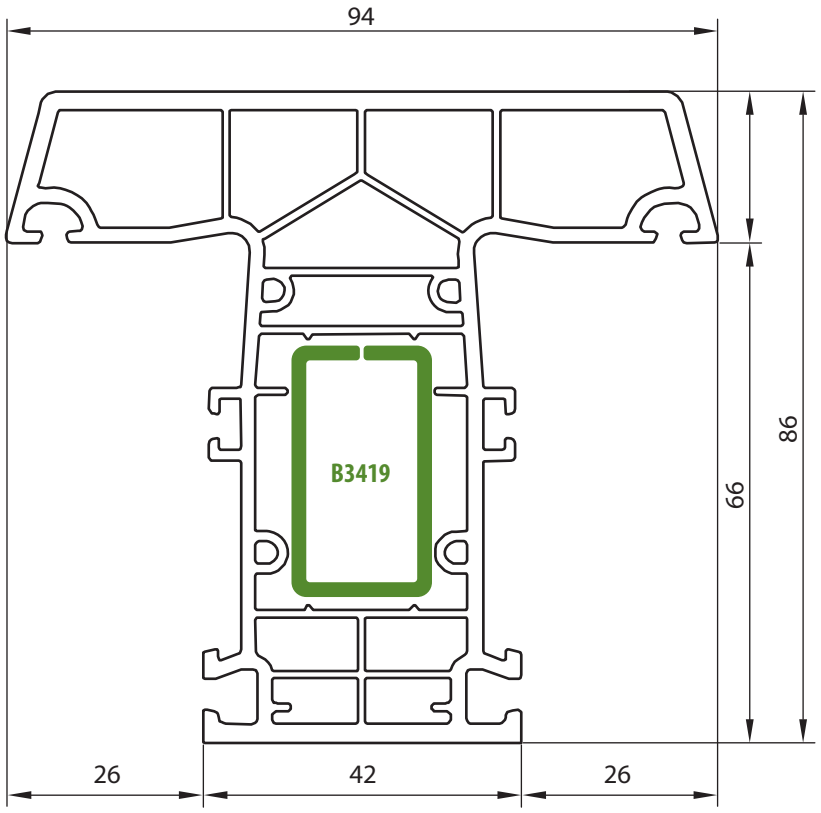


Profile	colour	EPDM gasket		
68630 AD	S C		57071	TOUCHING PVC
	S C		68672	CENTRAL SEAL
	S C		57074	TOUCHING GLASS

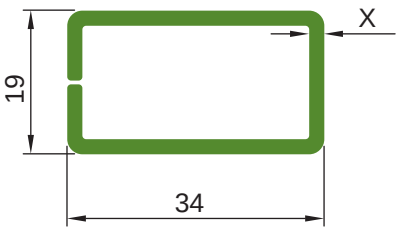


Profile	colour	EPDM gasket		
68630MD	S C	—	—	—

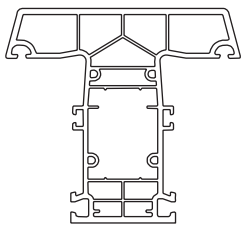
3.9 Transom/Mullion 68632



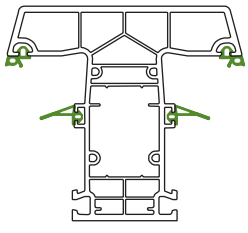
reinforcement
XXXB3419



reinforcement symbol	x [mm]	Ix [mm4]	Iy [mm4]
150B3419	1,5	0,8752	2,1962
200B3419	2,0	1,0719	2,7280



Profile	colour	EPDM gasket		
68632 AD	S C		57071	TOUCHING PVC
	S C		68672	CENTRAL SEAL
	S C		57074	TOUCHING GLASS



Profile	colour	EPDM gasket		
68632MD	S C	—	—	—

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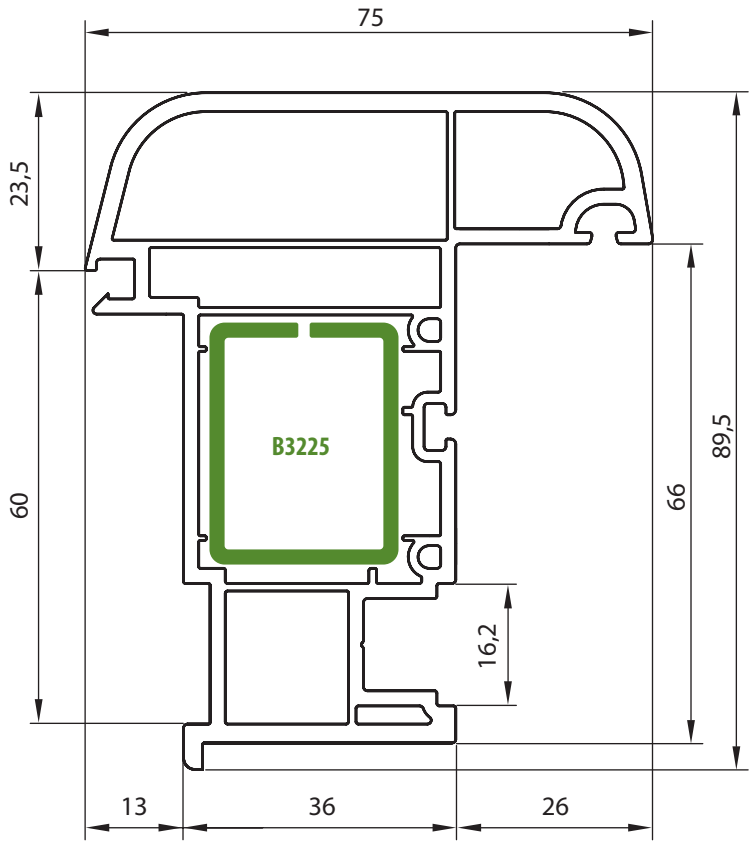
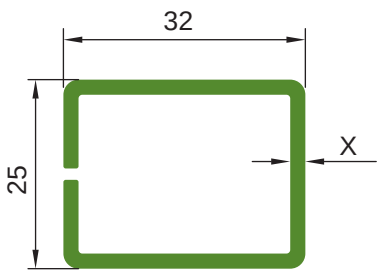
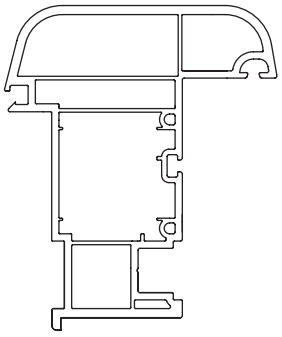
3.10 Meeting rail 68631



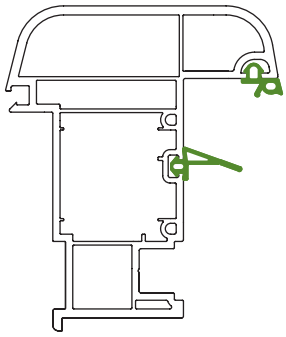
reinforcement
XXXB3225



reinforcement symbol	x [mm]	Ix [mm4]	Iy [mm4]
150B3225	1,5	2,22	1,55
200B3225	2,0	1,9581	2,8357

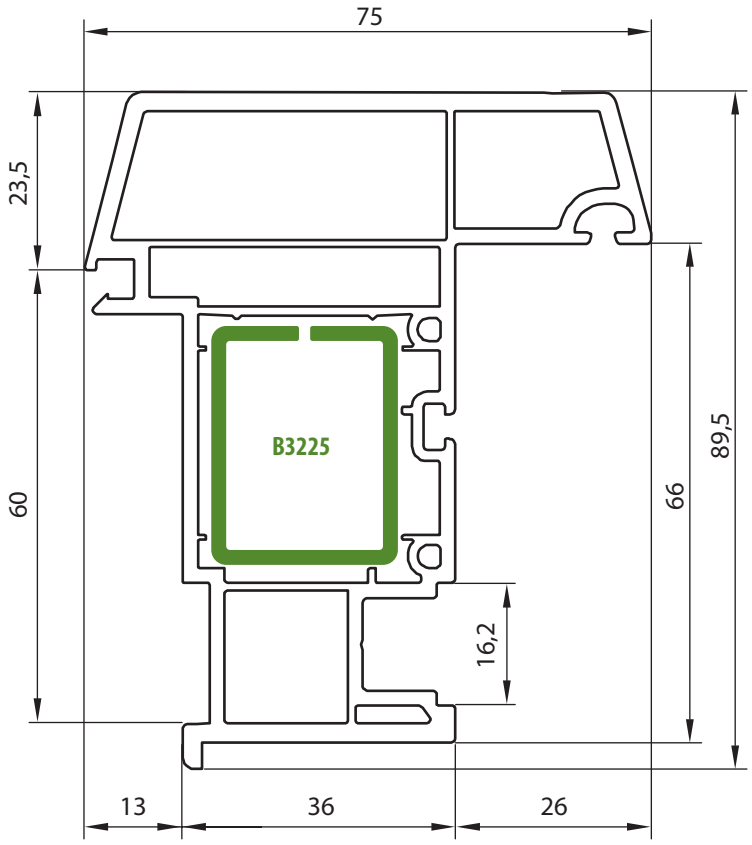


Profile	colour	EPDM gasket		
68631 AD	S C		57071	TOUCHING PVC
	S C		68672	TOUCHING GLASS

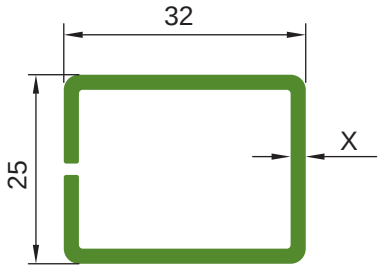


Profile	colour	EPDM gasket		
68631MD S C	S C	—	—	—

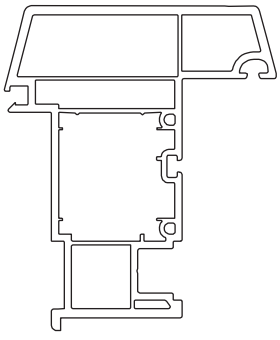
3.11 Meeting rail 68633



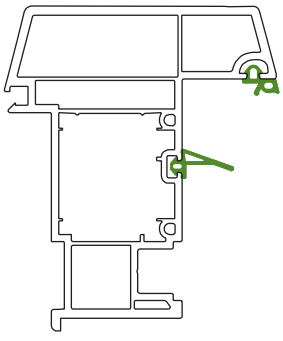
reinforcement
XXXB3225



reinforcement symbol	x [mm]	Ix [mm4]	Iy [mm4]
150B3225	1,5	2,22	1,55
200B3225	2,0	1,9581	2,8357



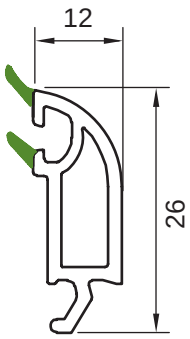
Profile	colour	EPDM gasket		
68633 AD	S / C	4	57071	TOUCHING PVC
	S / C	4	68672	TOUCHING GLASS



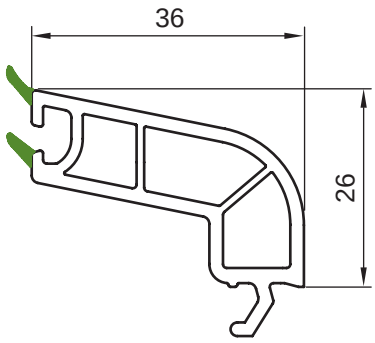
Profile	colour	EPDM gasket		
68633MD S/C	S / C	—	—	—

3.12 Glazing Beads, Coupling Mullions

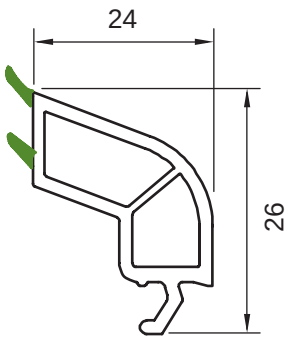
glazing bead 68640
*glazing unit 48 mm



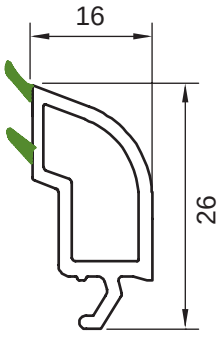
glazing bead 68641
*glazing unit 24 mm



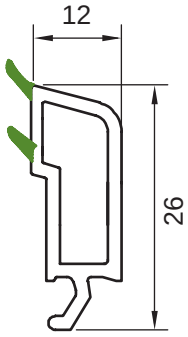
glazing bead 68642
*glazing unit 36 mm



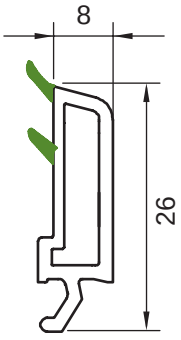
glazing bead 68643
*glazing unit 44 mm



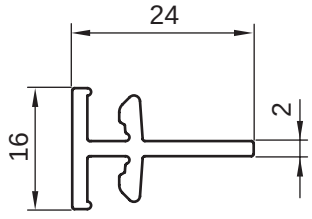
glazing bead 68644
*glazing unit 48 mm



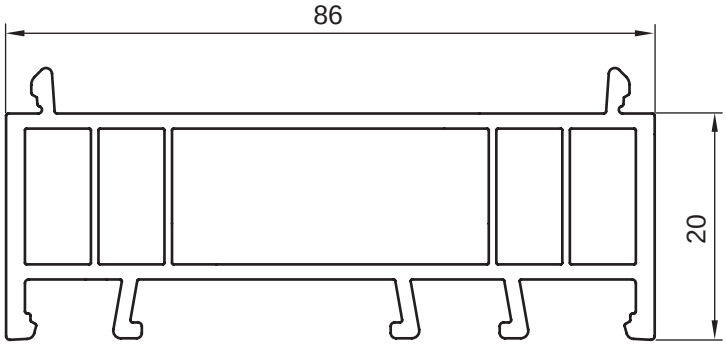
glazing bead 68645
*glazing unit 52 mm



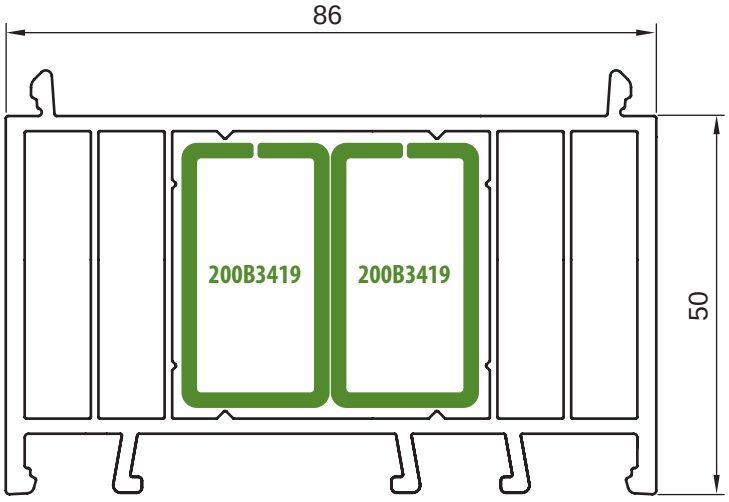
H Coupling 57052



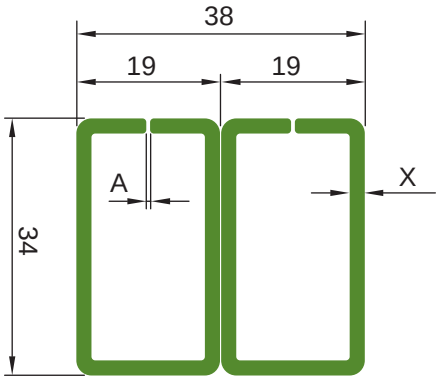
Packer 20mm 68654



Packer 50mm 68656



Reinforcement
200B3419



reinforcement symbol	x [mm]
2 x 200B3419	2,00

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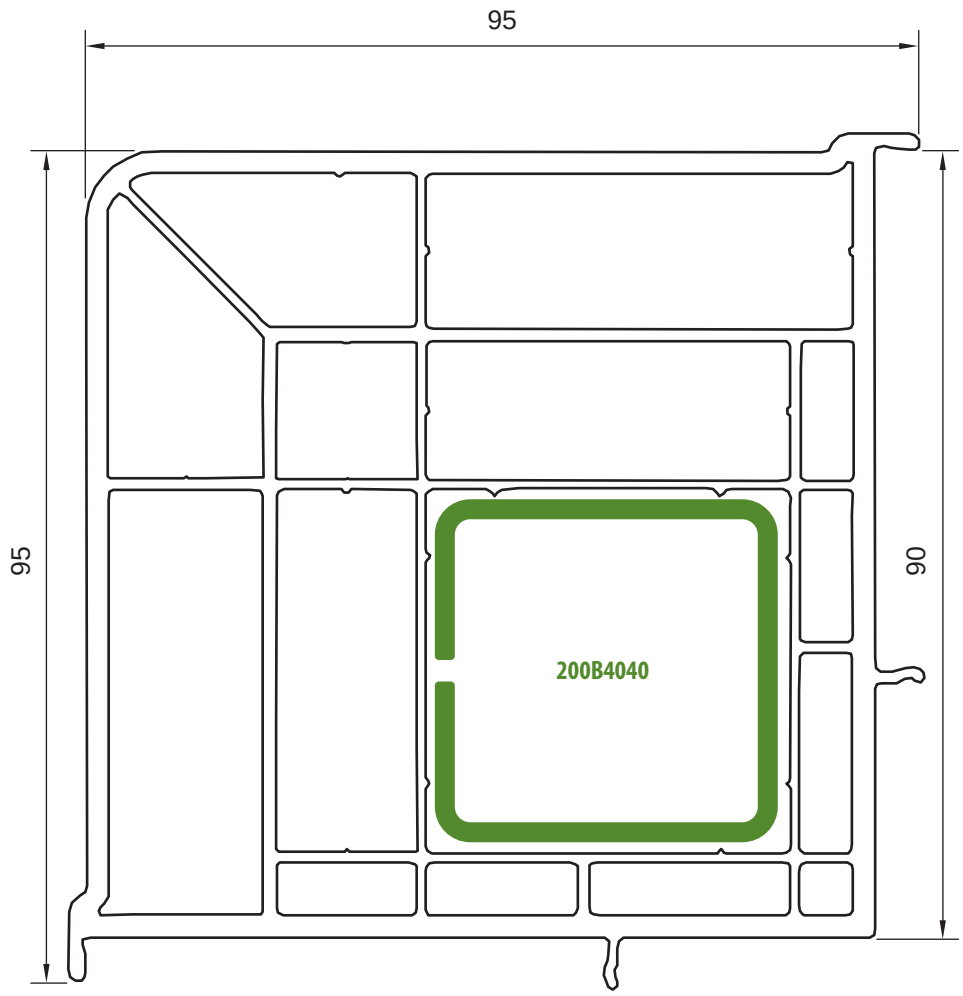
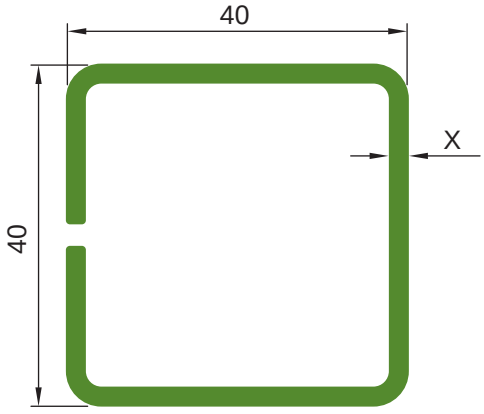
3.14 90° Bay Post 68063



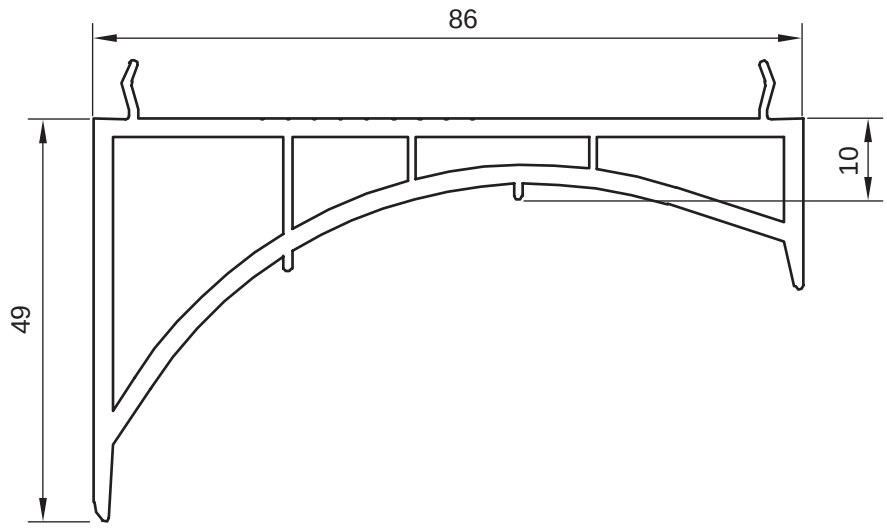
Reinforcement 200B4040



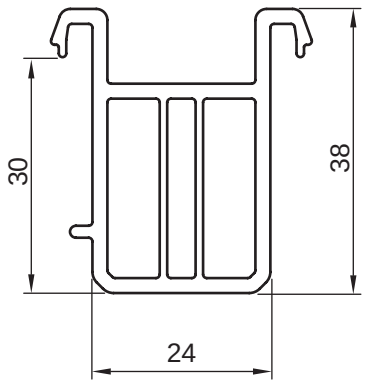
reinforcement symbol	x [mm]
200B4040	2,00

3.15 Bay Pole 68661 + Adapter 68662, Cill Packers

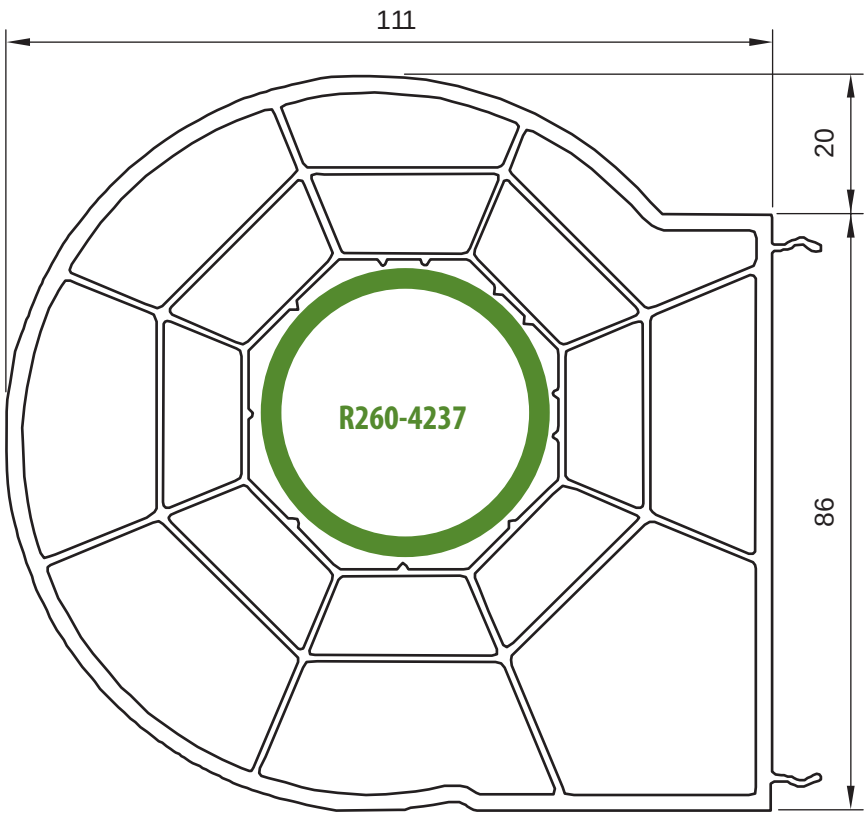
Bay Pole Adapter 68662



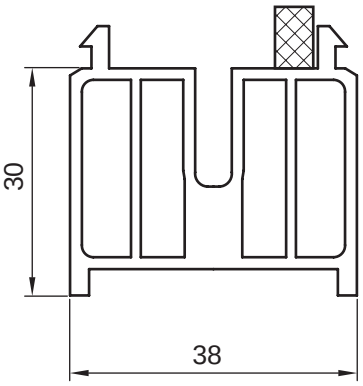
Cill Packer 57069



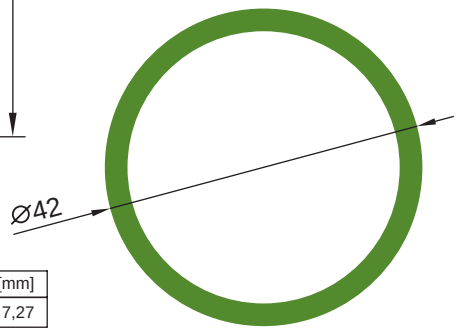
Bay Pole 68661



Cill Packer with Gasket 57070



Reinforcement R260-4327



reinforcement symbol	x [mm]
R260-4327	7,27

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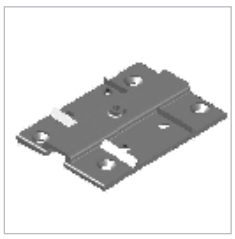
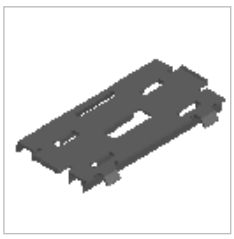
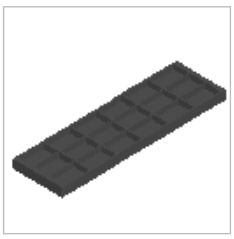


68683
Transom/Mullion
Metal Joint



68680
Glazing Packer

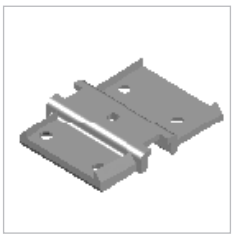


68681
Spacer for Glazing

57082
Fixing Lug

68684
Meeting rail end cap

68699
Drilling Jig for fixing
the PVC Joint



68685
Transom/Mullion
PVC Joint

4. Detail Sheets

4.1 Frame 68610 + Sash 68620 – 24 mm glazing unit
4.2 Frame 68610 + Sash 68620 – 48 mm glazing unit
4.3 Transom/Mullion 68630 + Sash 68620 – 24 mm glazing unit
4.4 Transom/Mullion 68632 + Sash 68621 – 24 mm glazing unit
4.5 Transom/Mullion 68630 + Sash 68620 – 48 mm glazing unit
4.6 Transom/Mullion 68632 + Sash 68621 – 48 mm glazing unit
4.7 Meeting Rail 68631 + Sash 68620 – 24 mm glazing unit
4.8 Meeting Rail 68633 + Sash 68621 – 24 mm glazing unit
4.9 Meeting Rail 68631 + Sash 68620 – 48 mm glazing unit
4.10 Meeting Rail 68633 + Sash 68621 – 48 mm glazing unit
4.11 Frame 68610 – Fixed Glazing, 24 mm and 48 mm glazing unit
4.12 Transom/Mullion 68630 – Fixed Glazing, 24 mm and 48 mm glazing unit
4.13 Transom/Mullion 68632 – Fixed Glazing, 24 mm and 48 mm glazing unit
4.14 Frame 68610 with Coupling Profile 57052
4.15 Frame 68610 with Structural Coupling 68667 + 200S1170
4.16 Frame 68610 with Bay Pole
4.17 Frame 68610 + Cill Packer 57070
4.18 Frame 68610 with 90° Bay Post 68063
4.19 Frame 68611 with 90° Bay Post 68063
4.20 Frame 58611 + Sash 58620 – 48 mm glazing unit
4.21 Frame 58611 + Sash 58621 – 48 mm glazing unit
4.22 Sash 58620 + Door Threshold 58650
4.23 Sash 58621 + Door Threshold 58650

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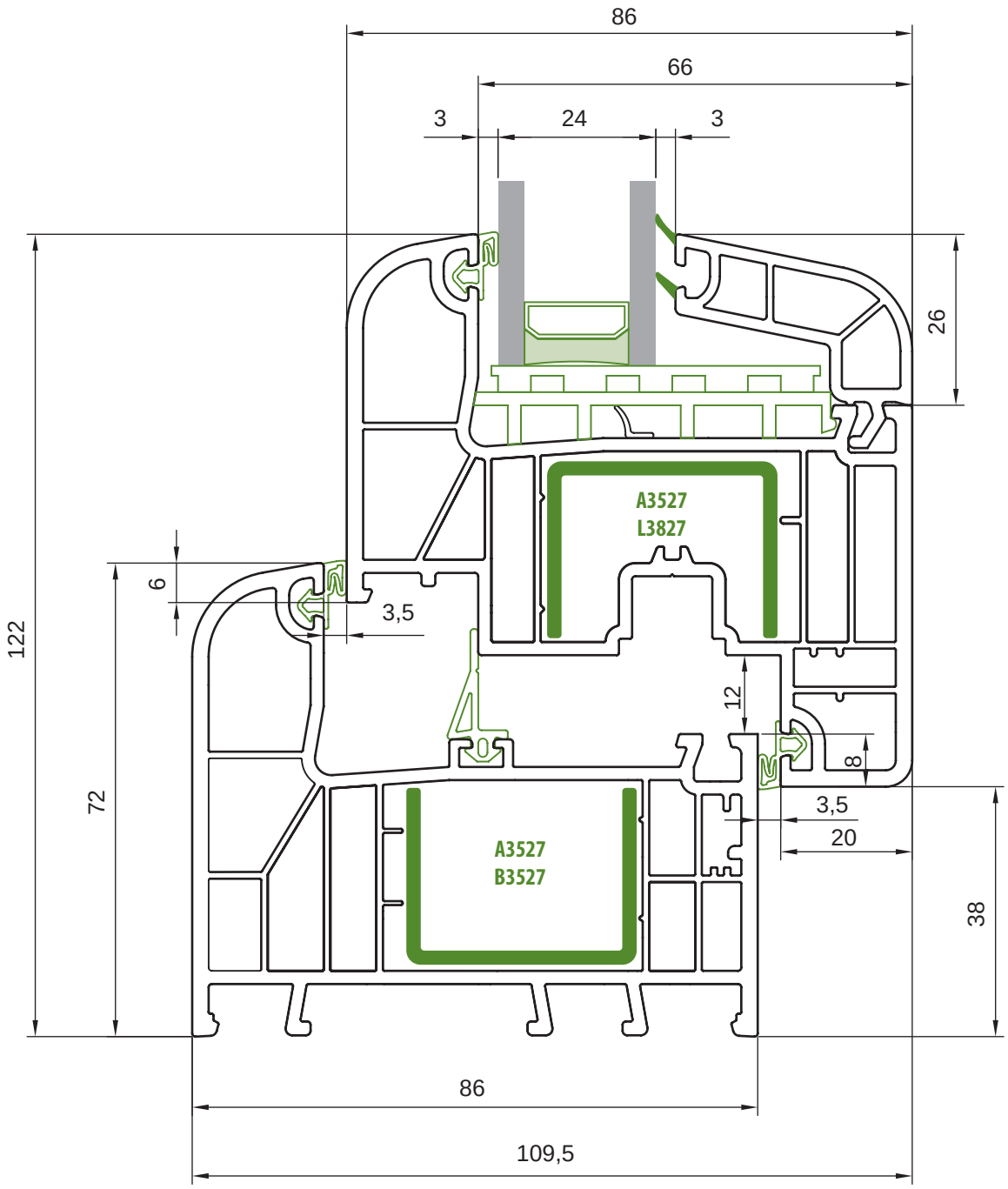
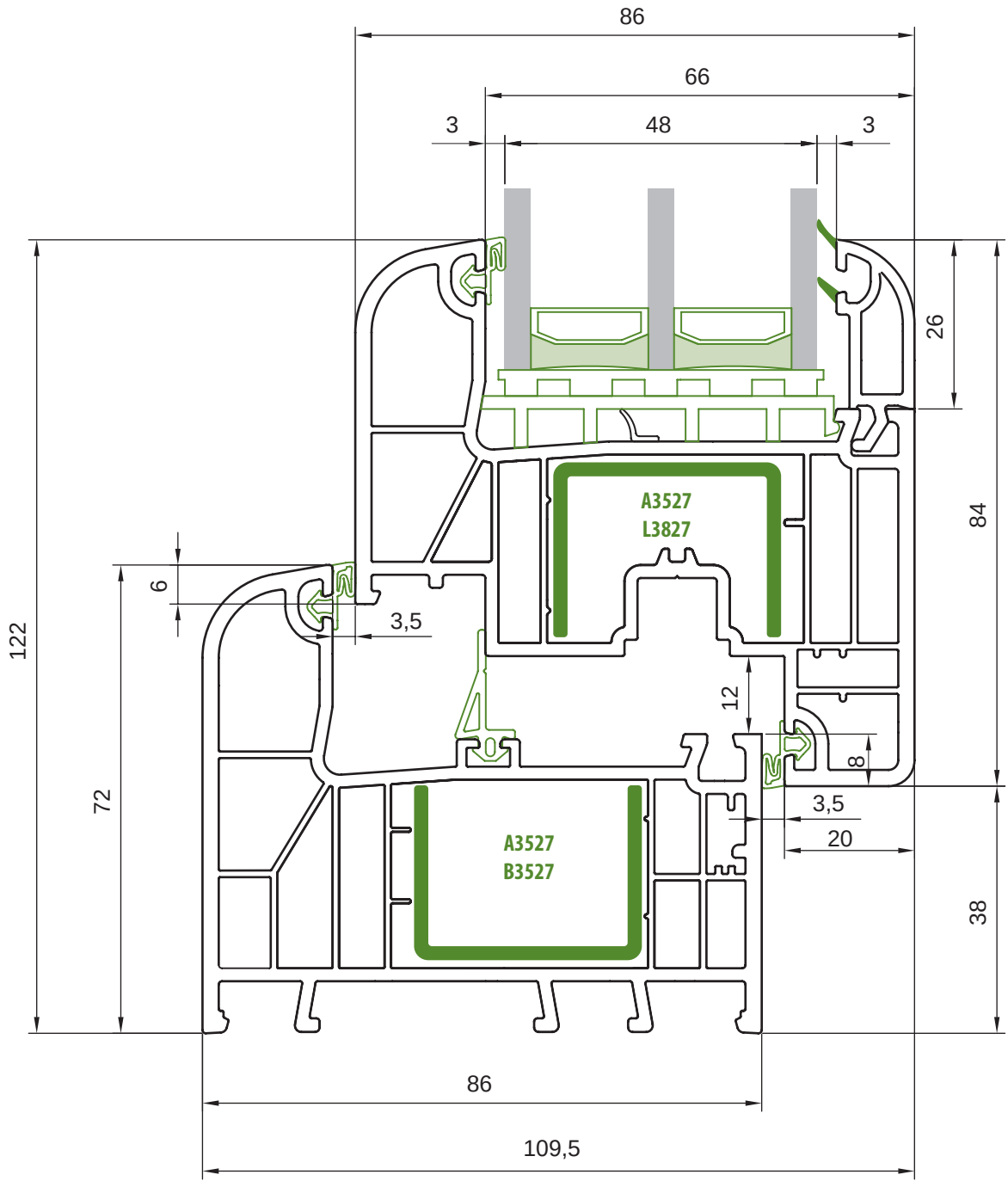
4.1 Frame 68610 + Sash 68620 – 24 mm glazing unit



4.2 Frame 68610 + Sash 68620 – 48 mm glazing unit



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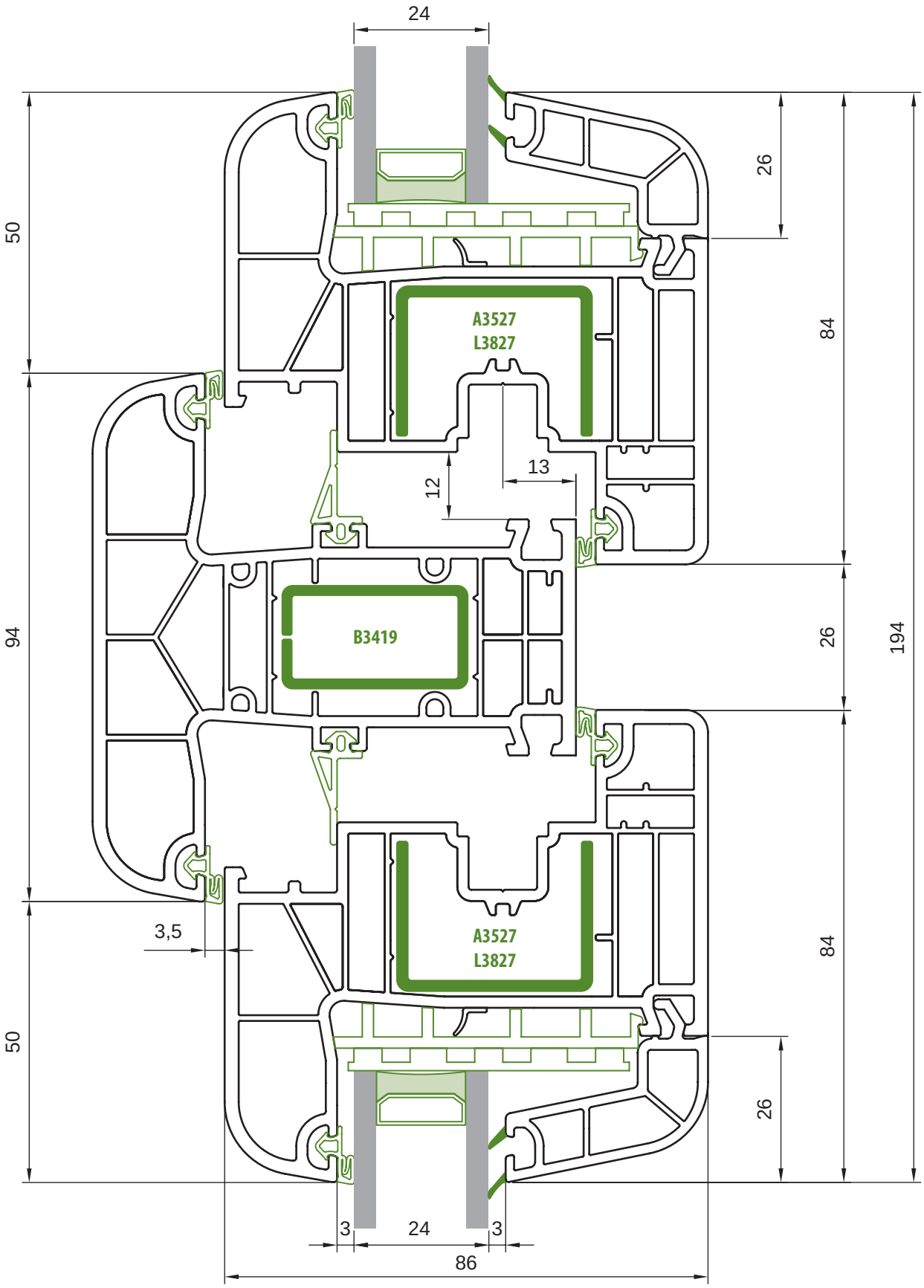
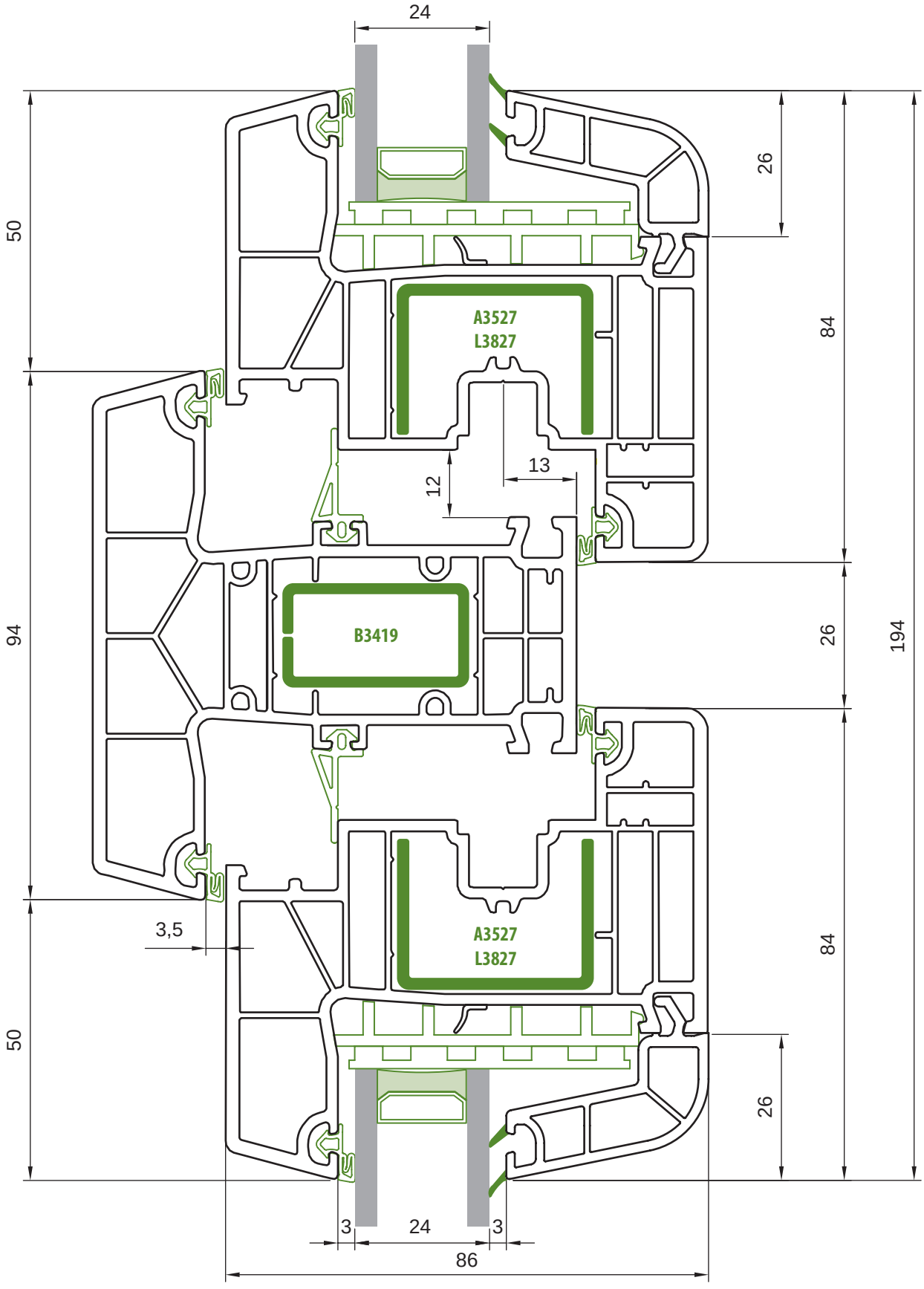
4.3 Transom/Mullion 68630 + Sash 68620 – 24 mm glazing unit



4.4 Transom/Mullion 68632 + Sash 68621 – 24 mm glazing unit



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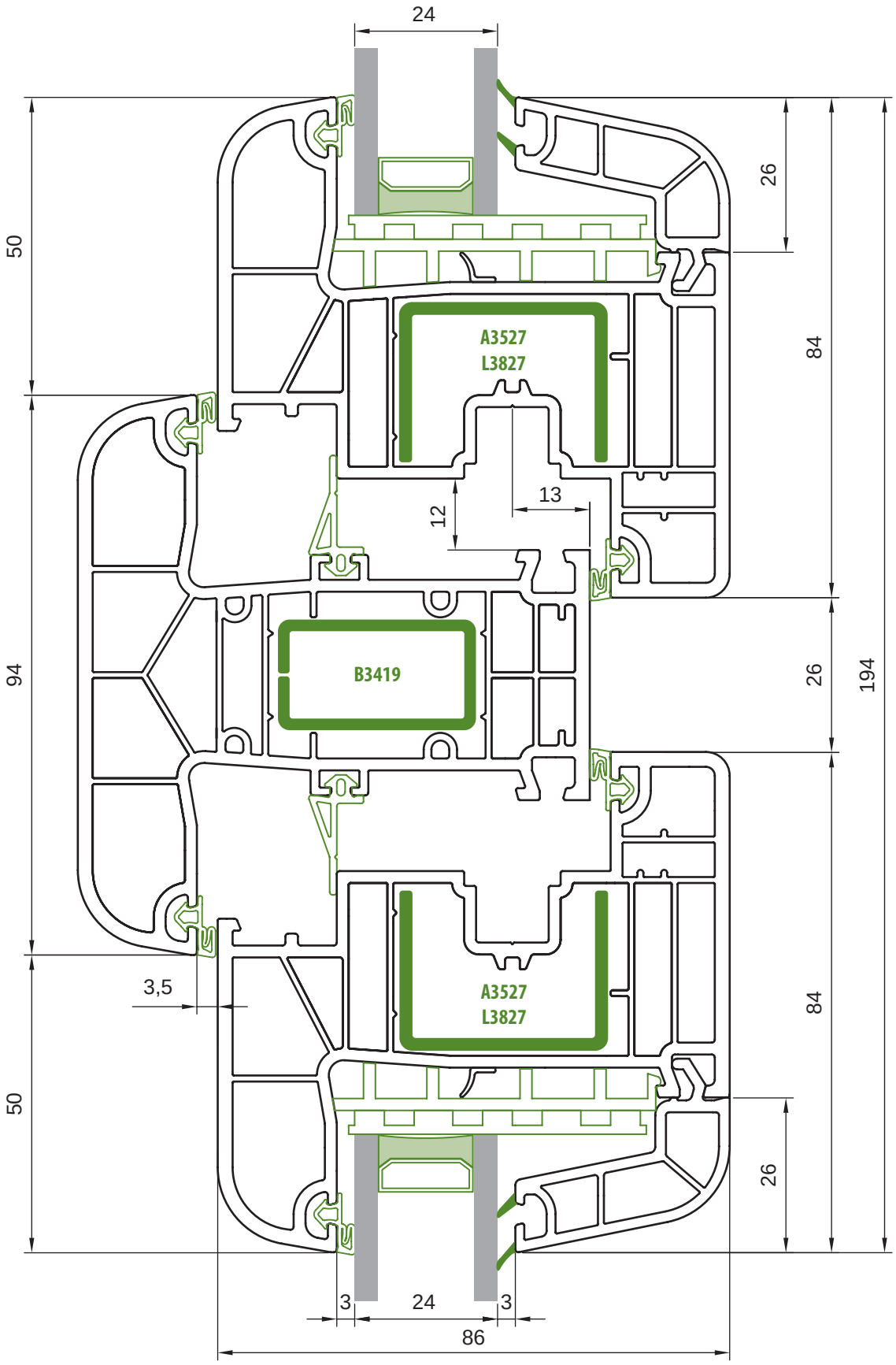
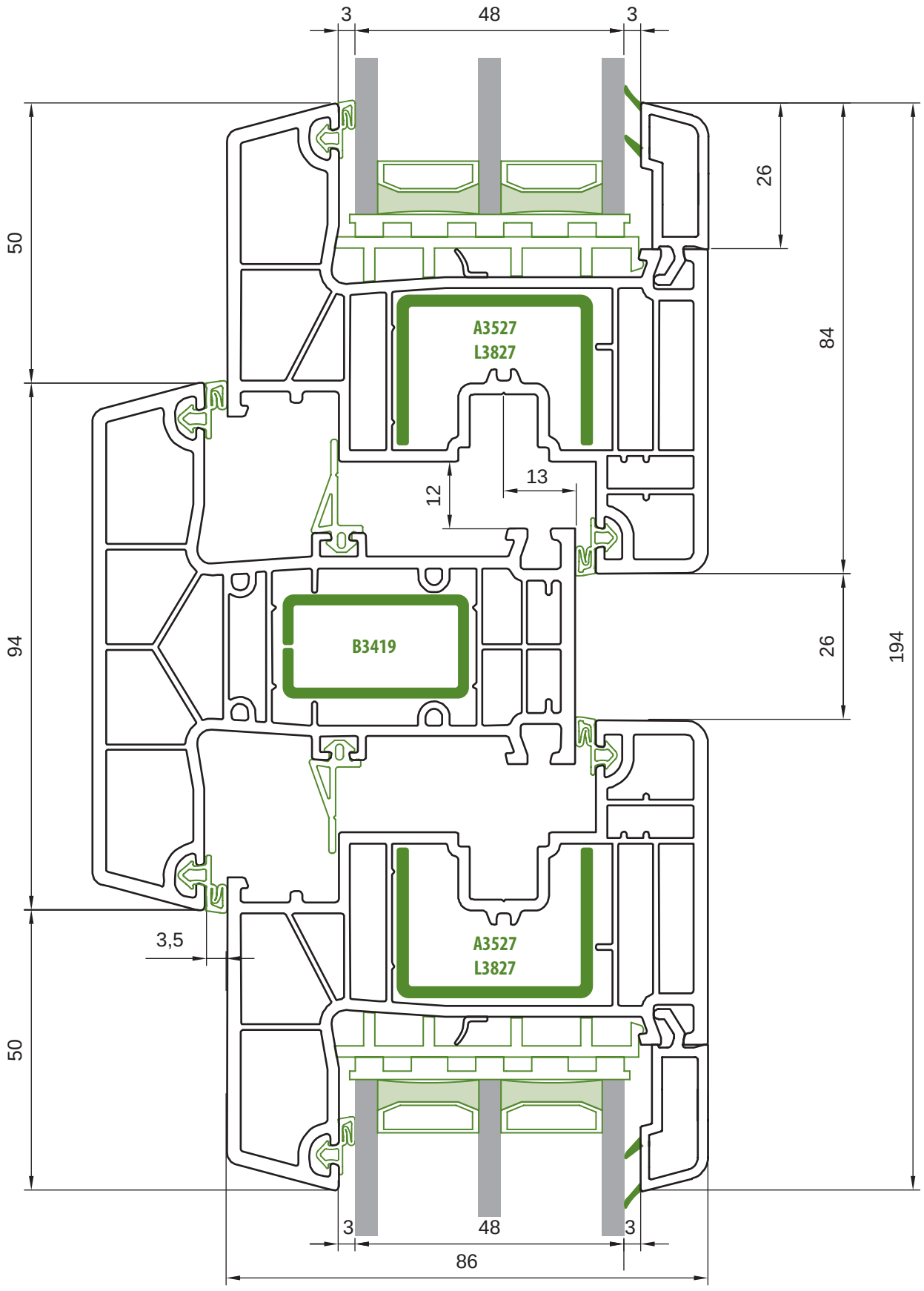
4.5 Transom/Mullion 68630 + Sash 68620 – 48 mm glazing unit



4.6 Transom/Mullion 68632 + Sash 68621 – 48 mm glazing unit



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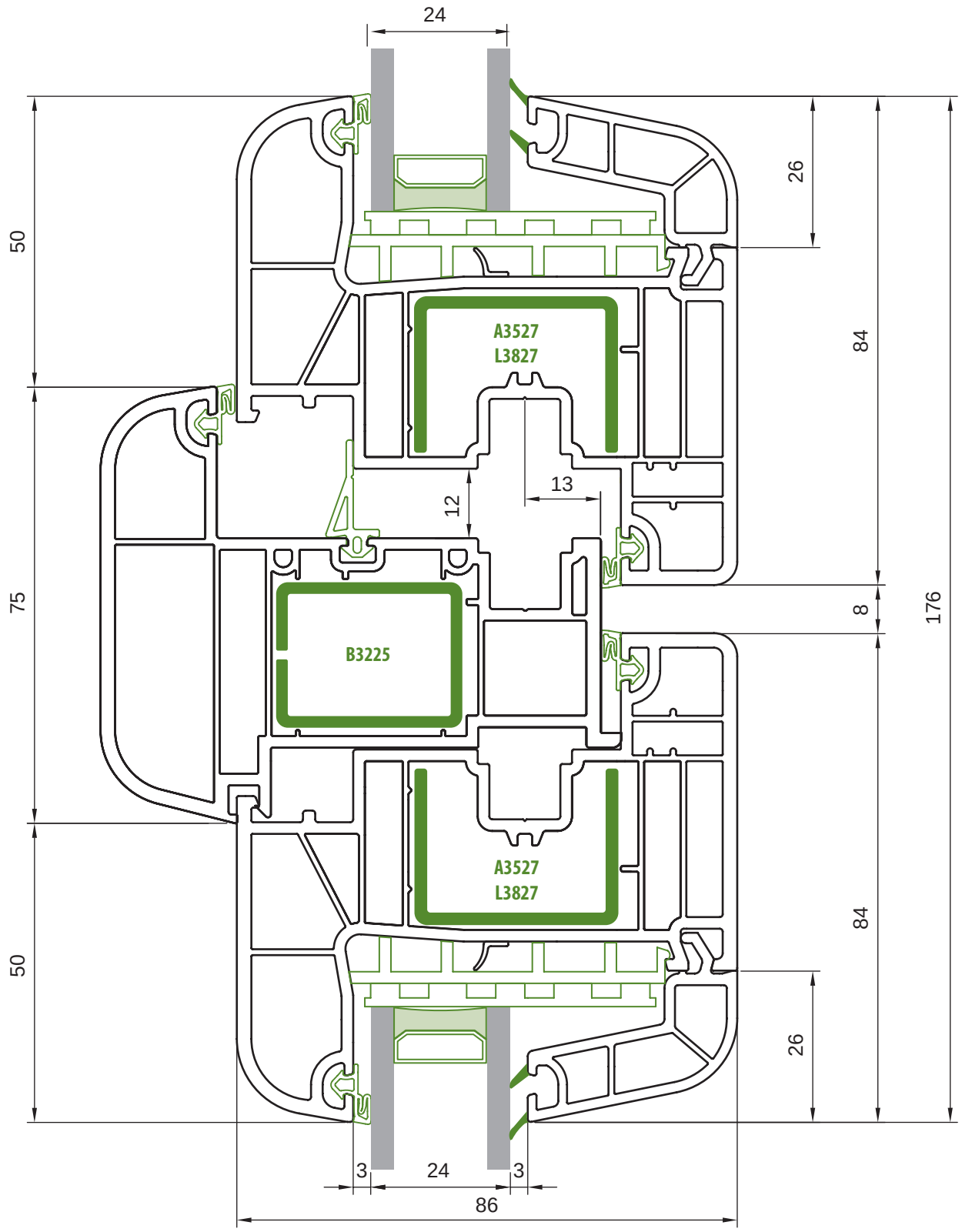
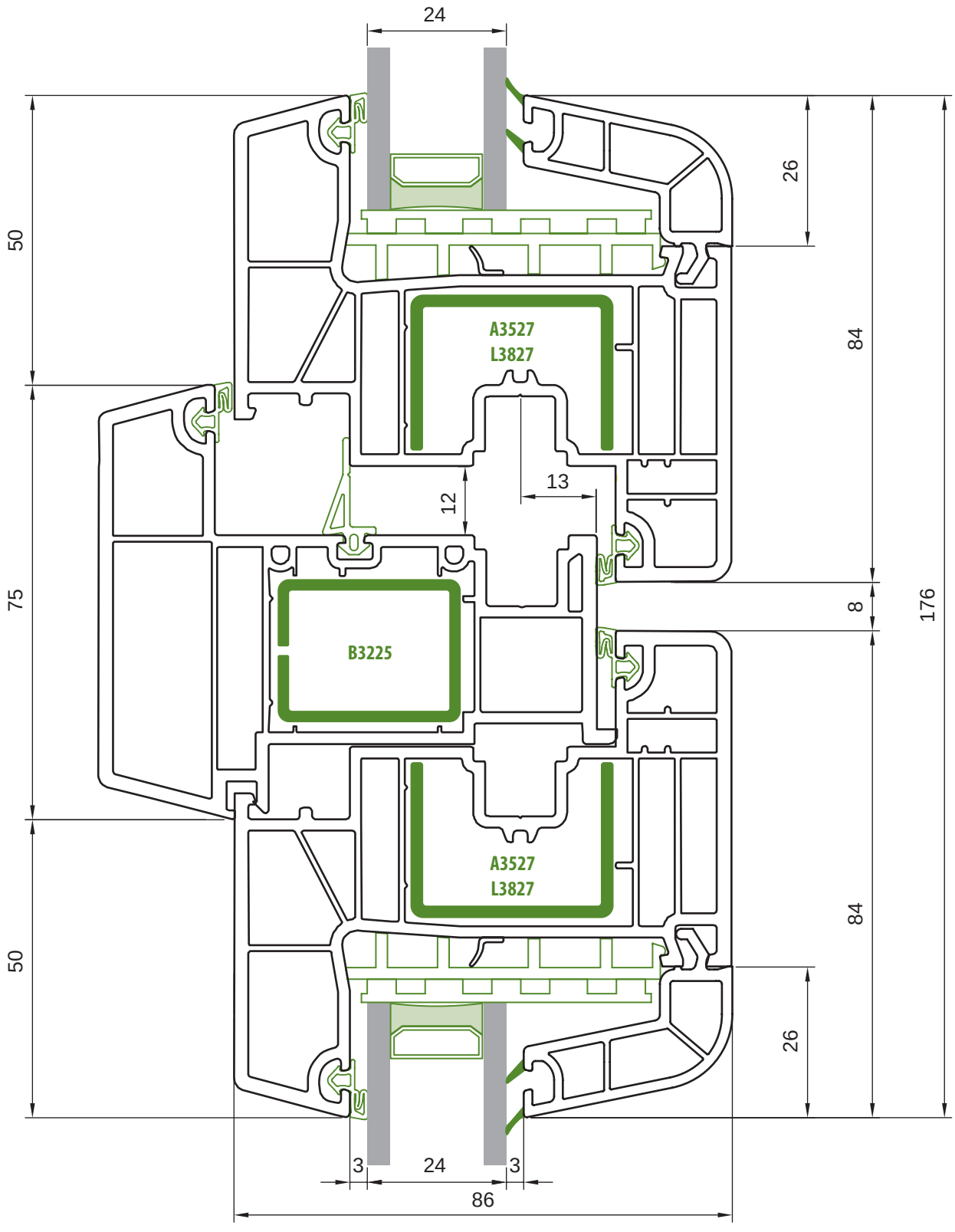
4.7 Meeting Rail 68631 + Sash 68620 – 24 mm glazing unit



4.8 Meeting Rail 68633 + Sash 68621 – 24 mm glazing unit



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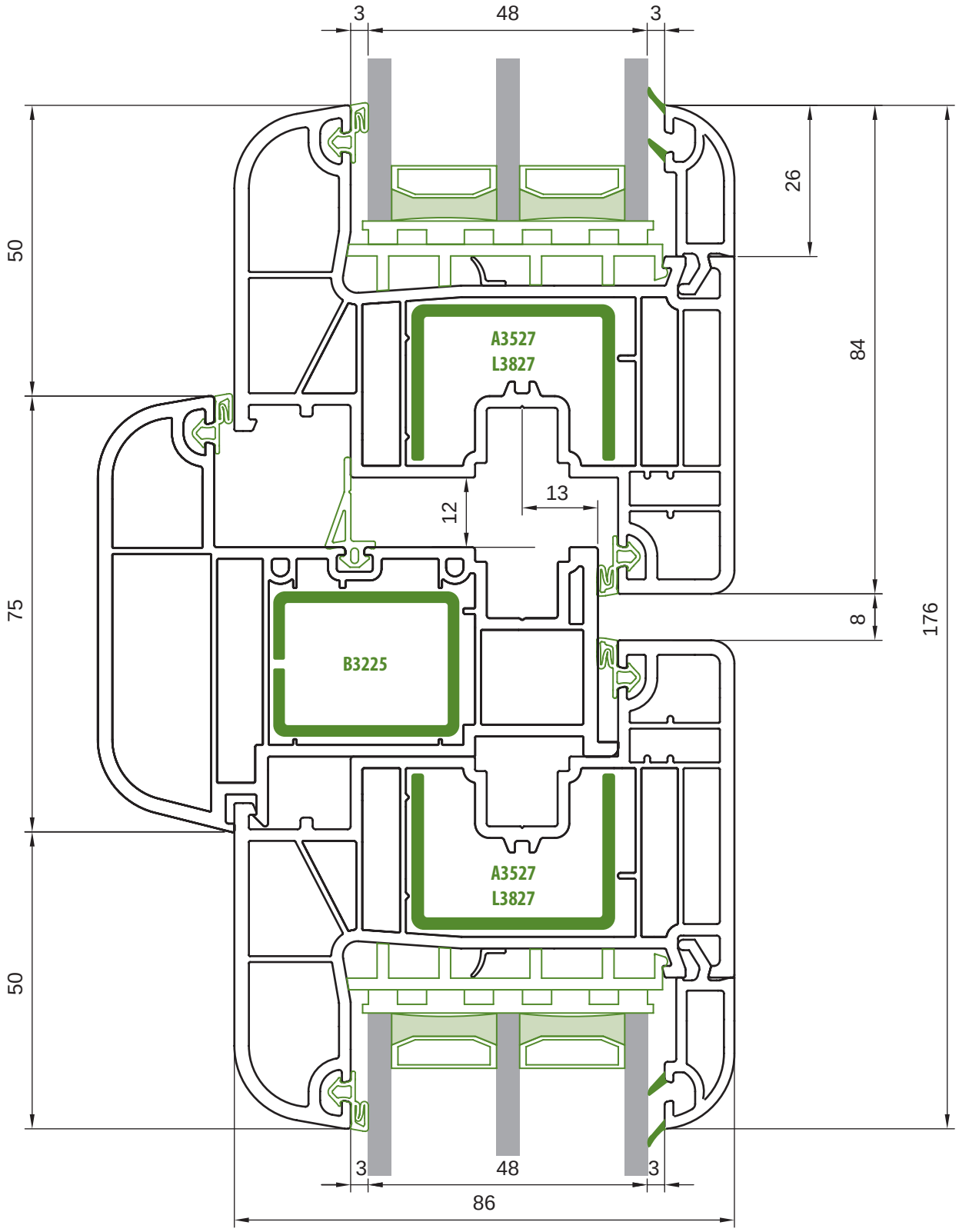
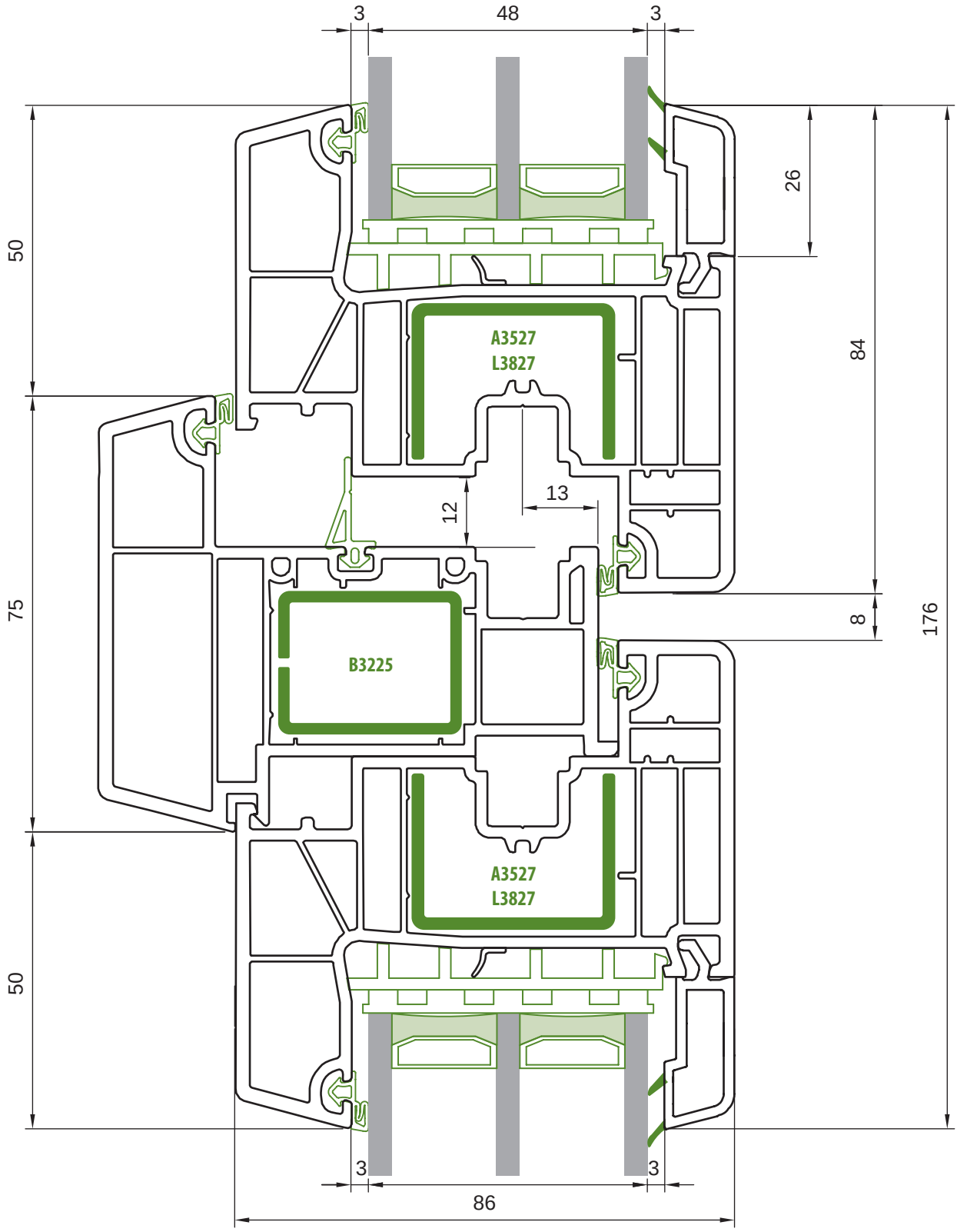
4.9 Meeting Rail 68631 + Sash 68620 – 48 mm glazing unit



4.10 Meeting Rail 68633 + Sash 68621 – 48 mm glazing unit



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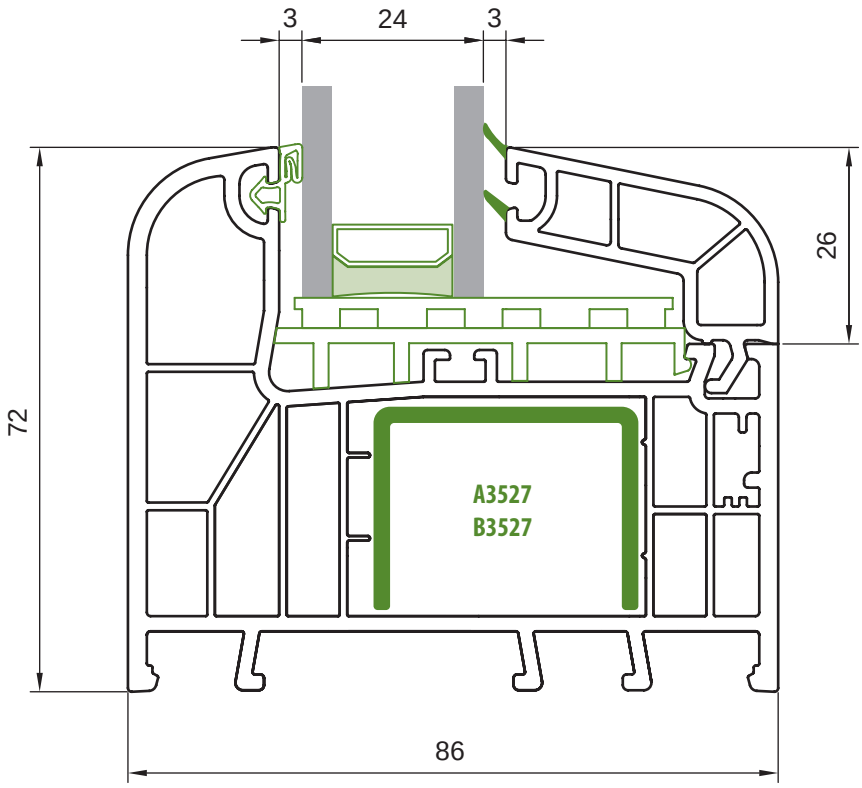
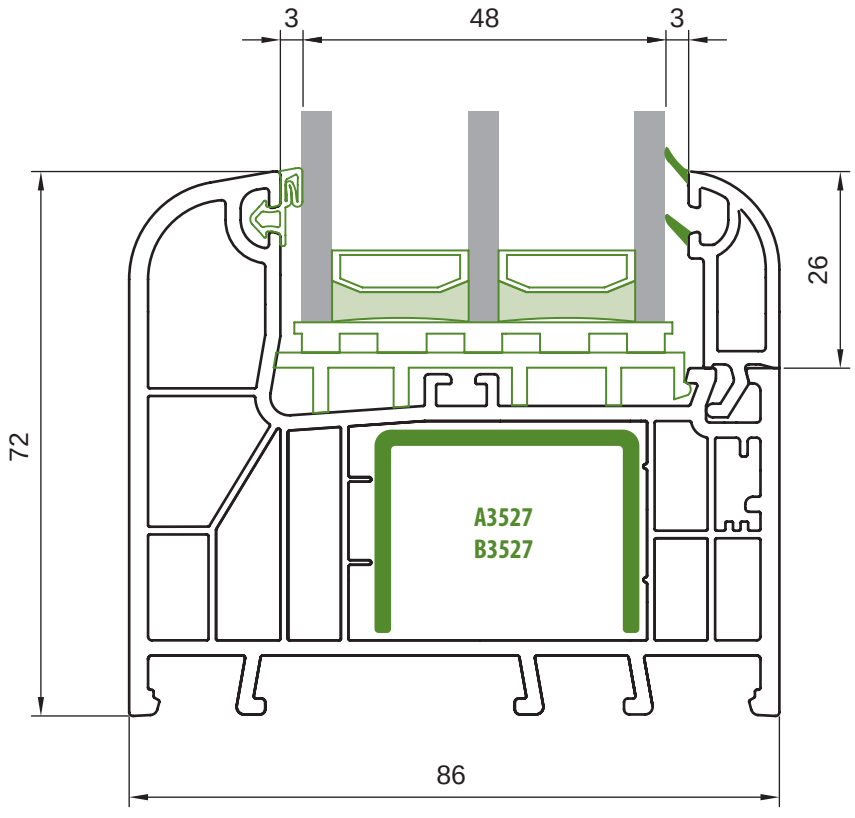
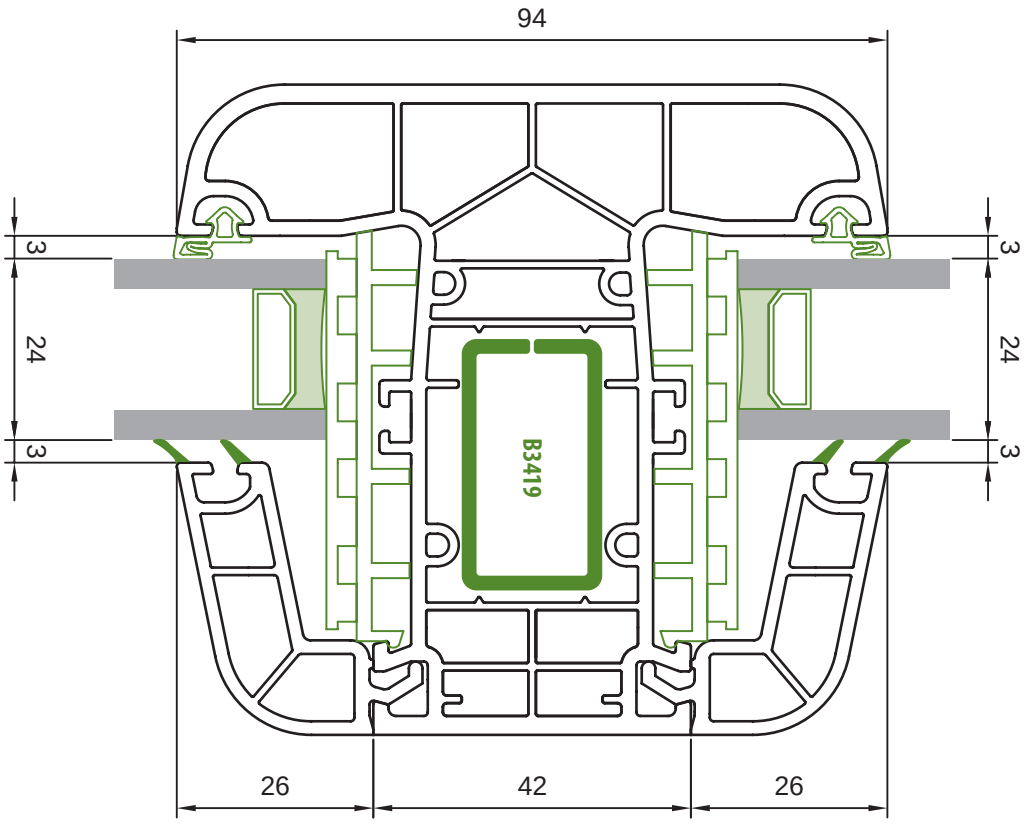
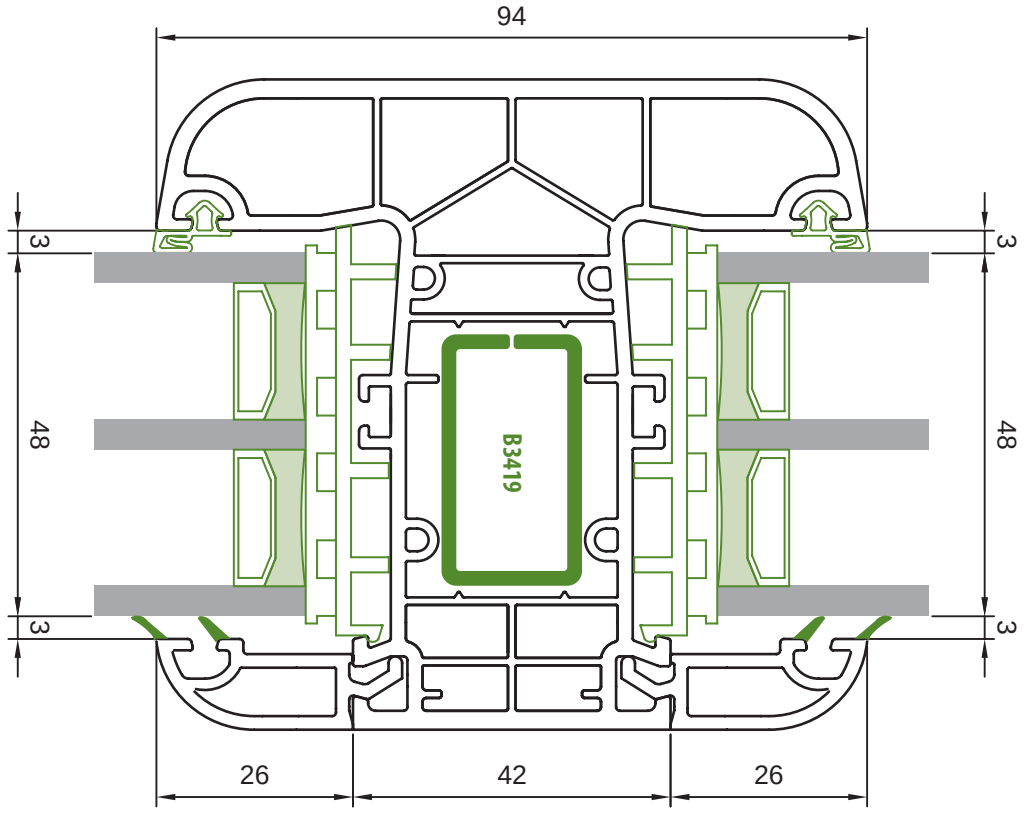
4.11 Frame 68610 – Fixed Glazing, 24 mm and 48 mm glazing unit





4.12 Transom/Mullion 68630 – Fixed Glazing, 24 mm and 48 mm glazing unit





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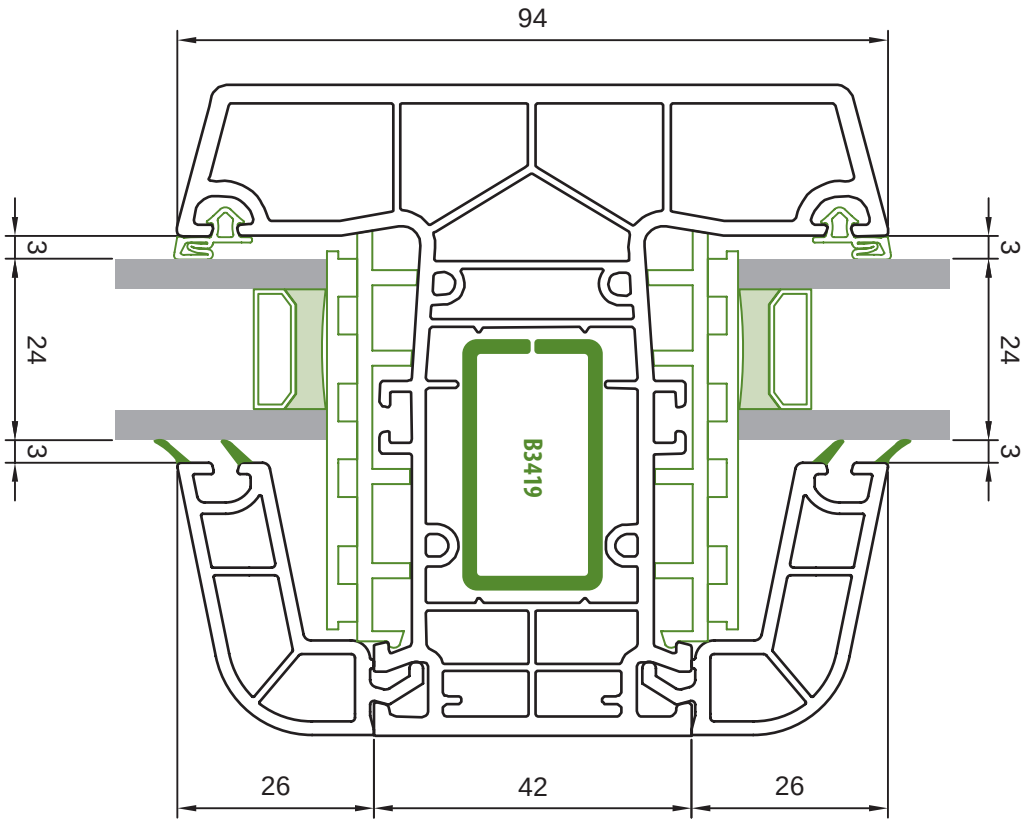
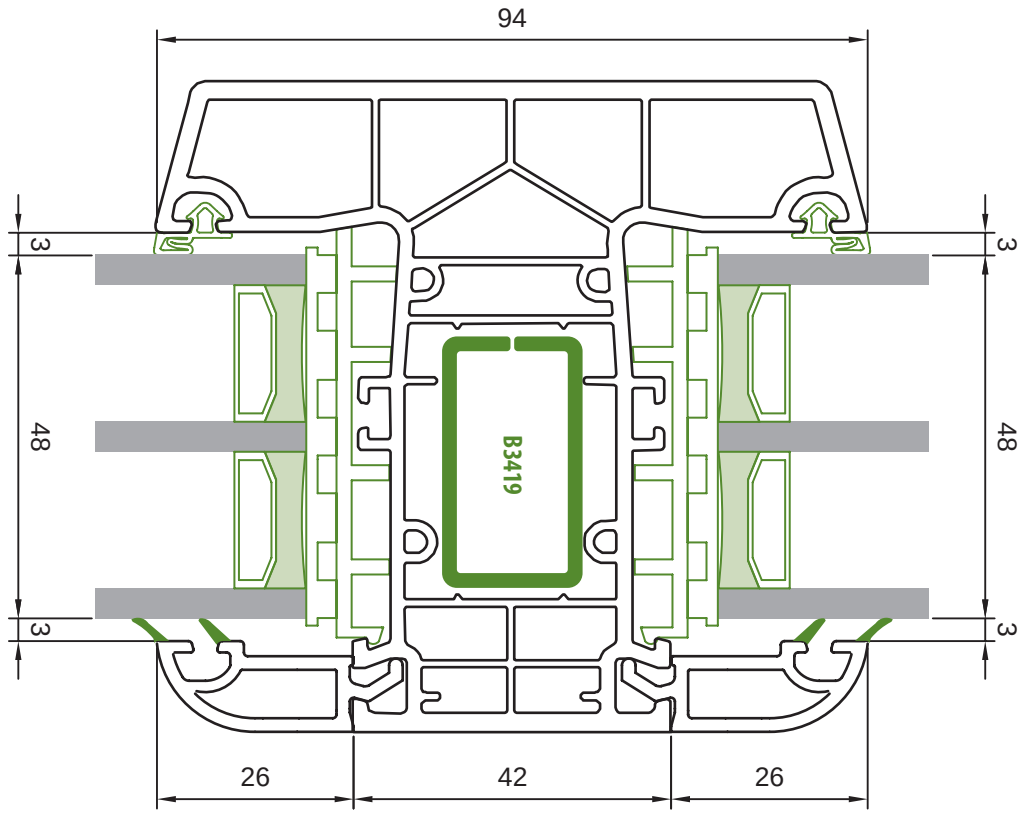
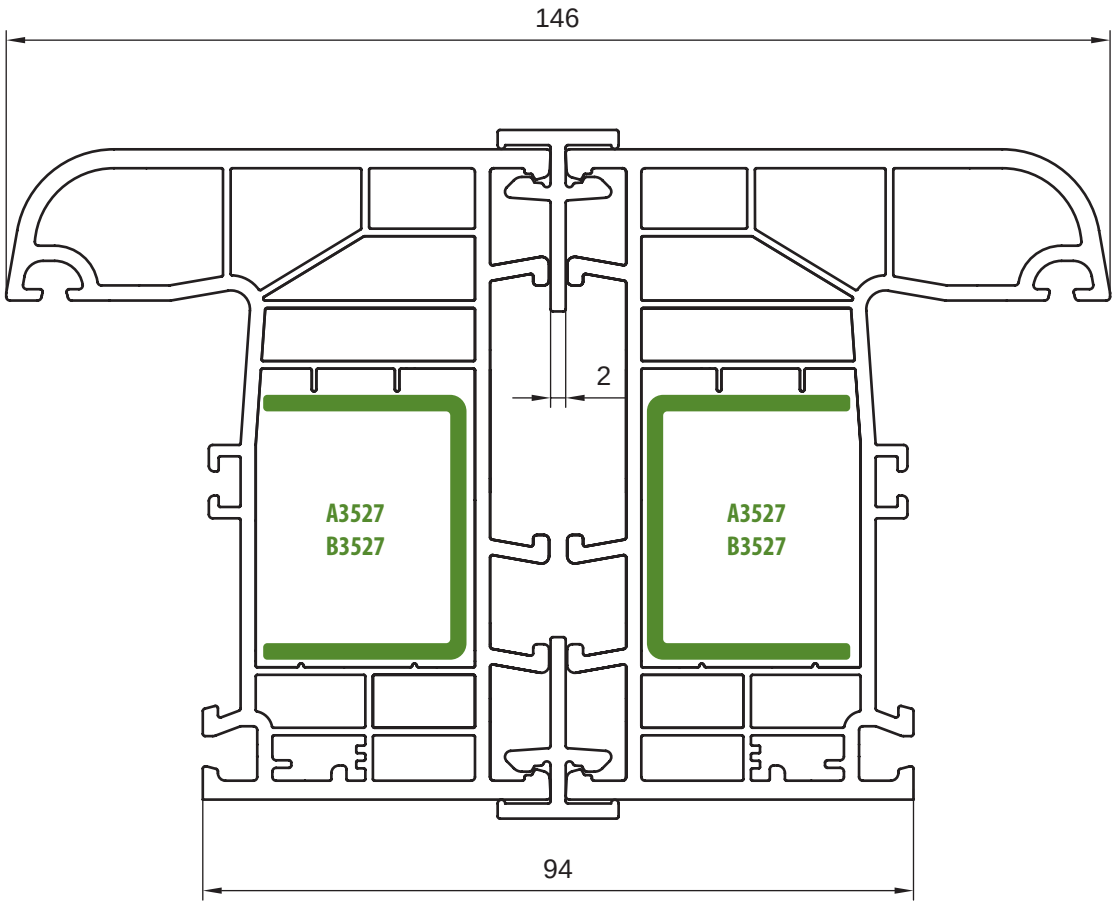
4.13 Transom/Mullion 68632 – Fixed Glazing, 24 mm and 48 mm glazing unit





4.14 Frame 68610 with Coupling Profile 57052



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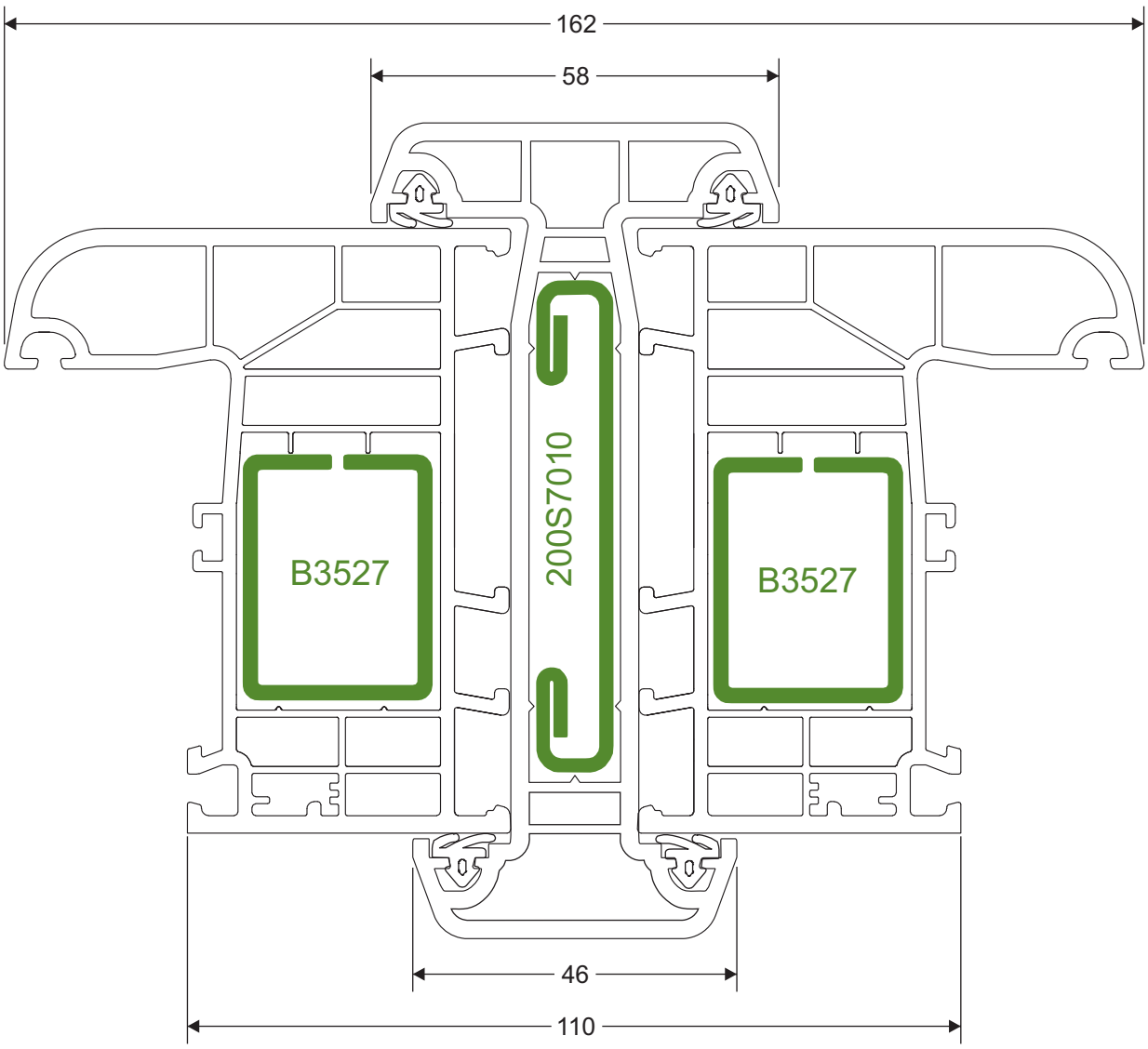
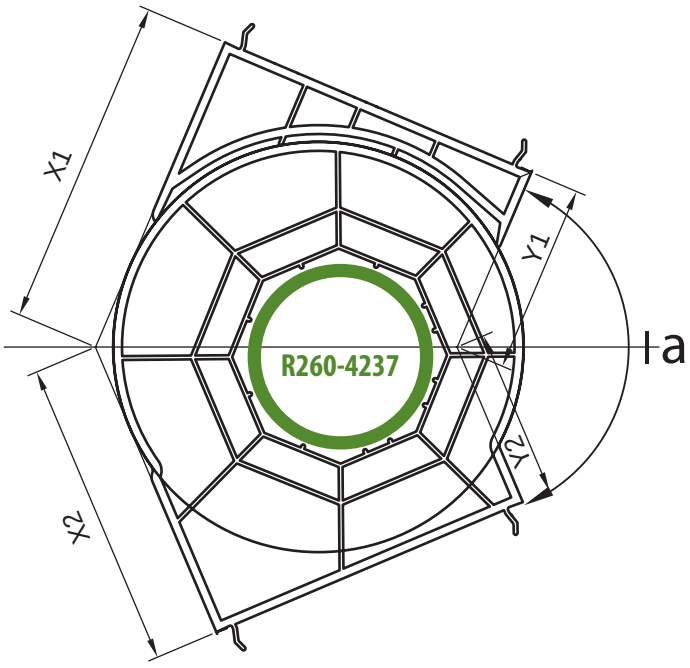
4.15 Frame 68610 with Structural Coupling 68667 + 200S1170



4.16 Frame 68610 with Bay Pole



Angle	Outer dimensions			
a	X1 [mm]	X2 [mm]	Y1 [mm]	Y2 [mm]
90°	116,0	110,5	30,0	24,4
95°	111,6	106,1	32,7	27,2
100°	107,5	102,0	35,3	29,8
105°	103,7	98,2	37,7	32,1
110°	100,1	94,6	39,9	34,3
115°	96,8	91,3	42,0	36,4
120°	93,6	88,1	43,9	38,4
125°	90,6	85,1	45,8	40,3
130°	87,7	82,2	47,6	42,1
135°	85,0	79,5	49,3	43,8
140°	82,3	76,8	51,0	45,5
145°	79,7	74,2	52,6	47,1
150°	77,2	71,7	54,2	48,6
155°	74,8	69,2	55,7	50,2
160°	72,4	66,8	57,2	51,7
165°	70,0	64,5	58,7	53,1
170°	67,7	62,1	60,1	54,6
175°	65,3	59,8	61,6	56,1
180°	63,0	57,5	63,0	57,5

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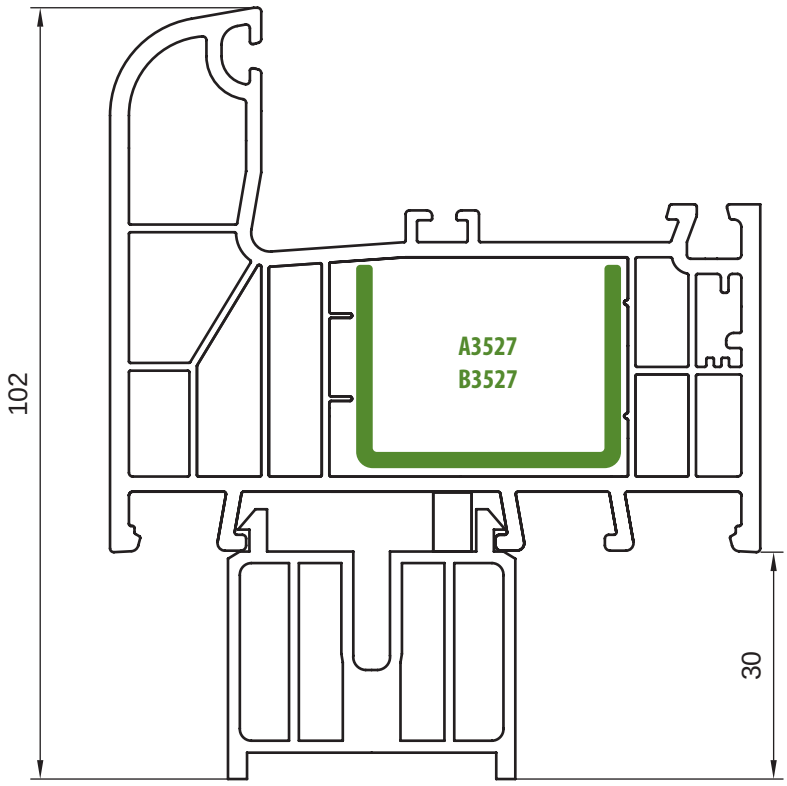
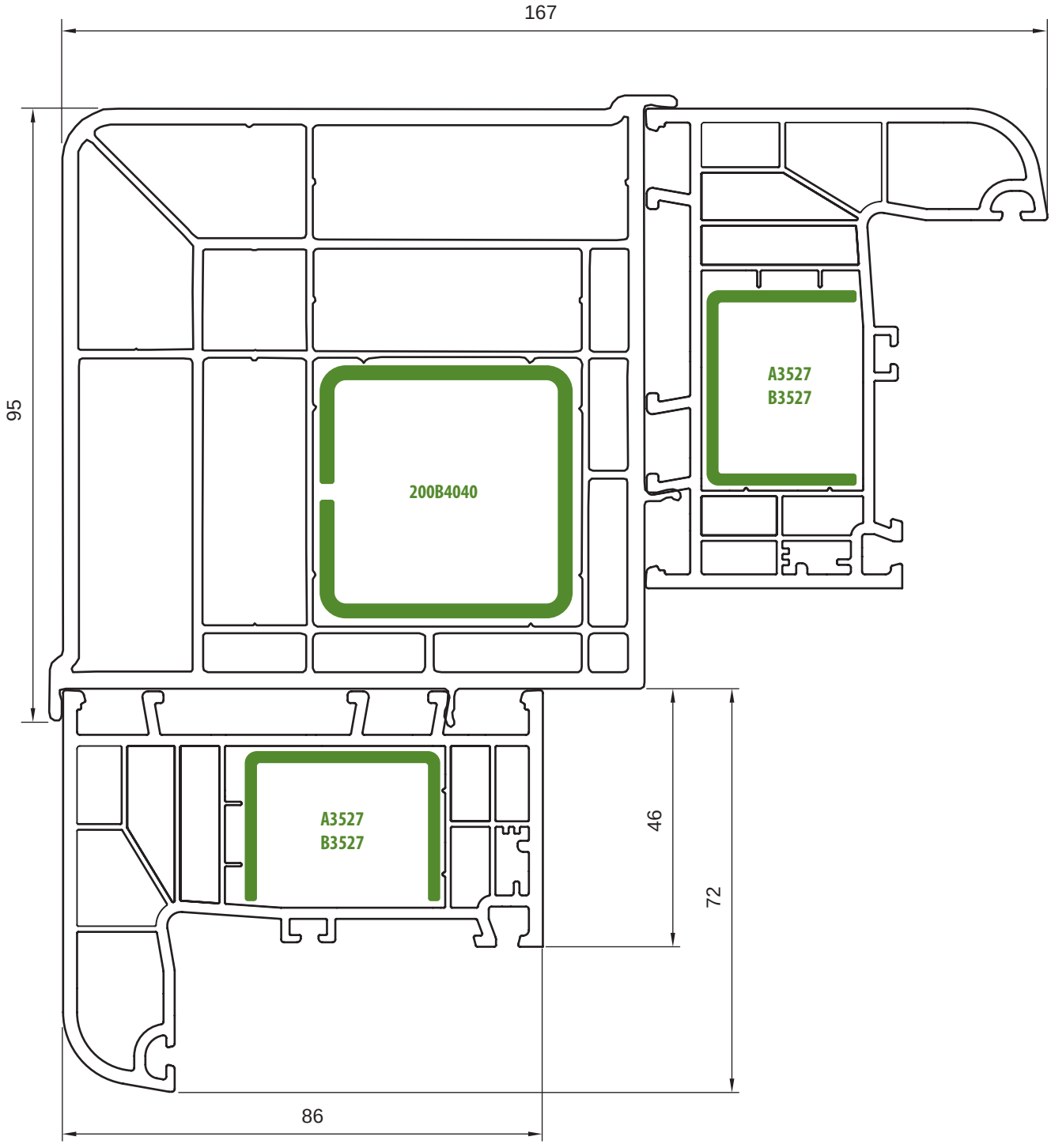
4.17 Frame 68610 + Cill Packer 57070



4.18 Frame 68610 with 90° Bay Post 68063



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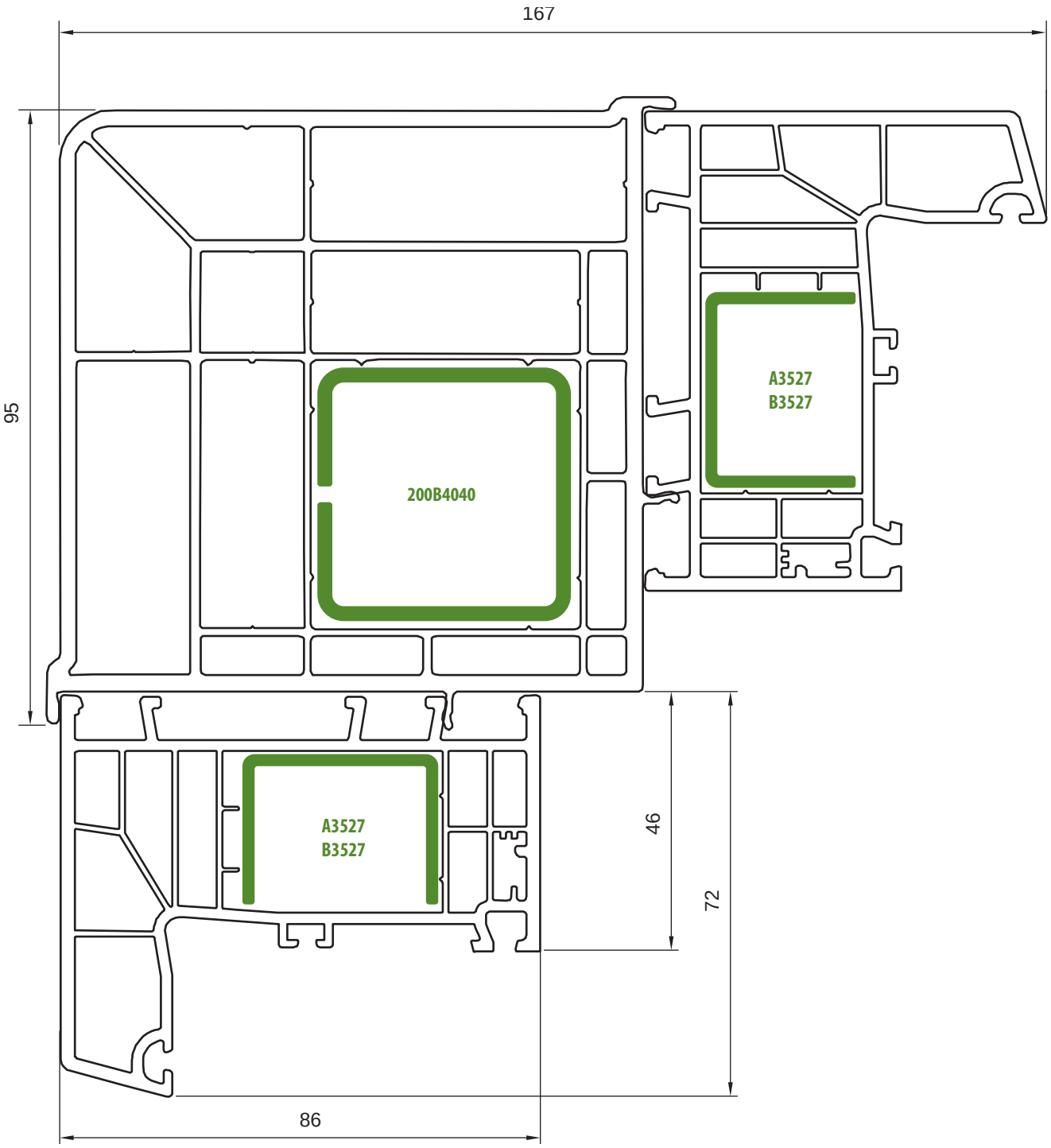
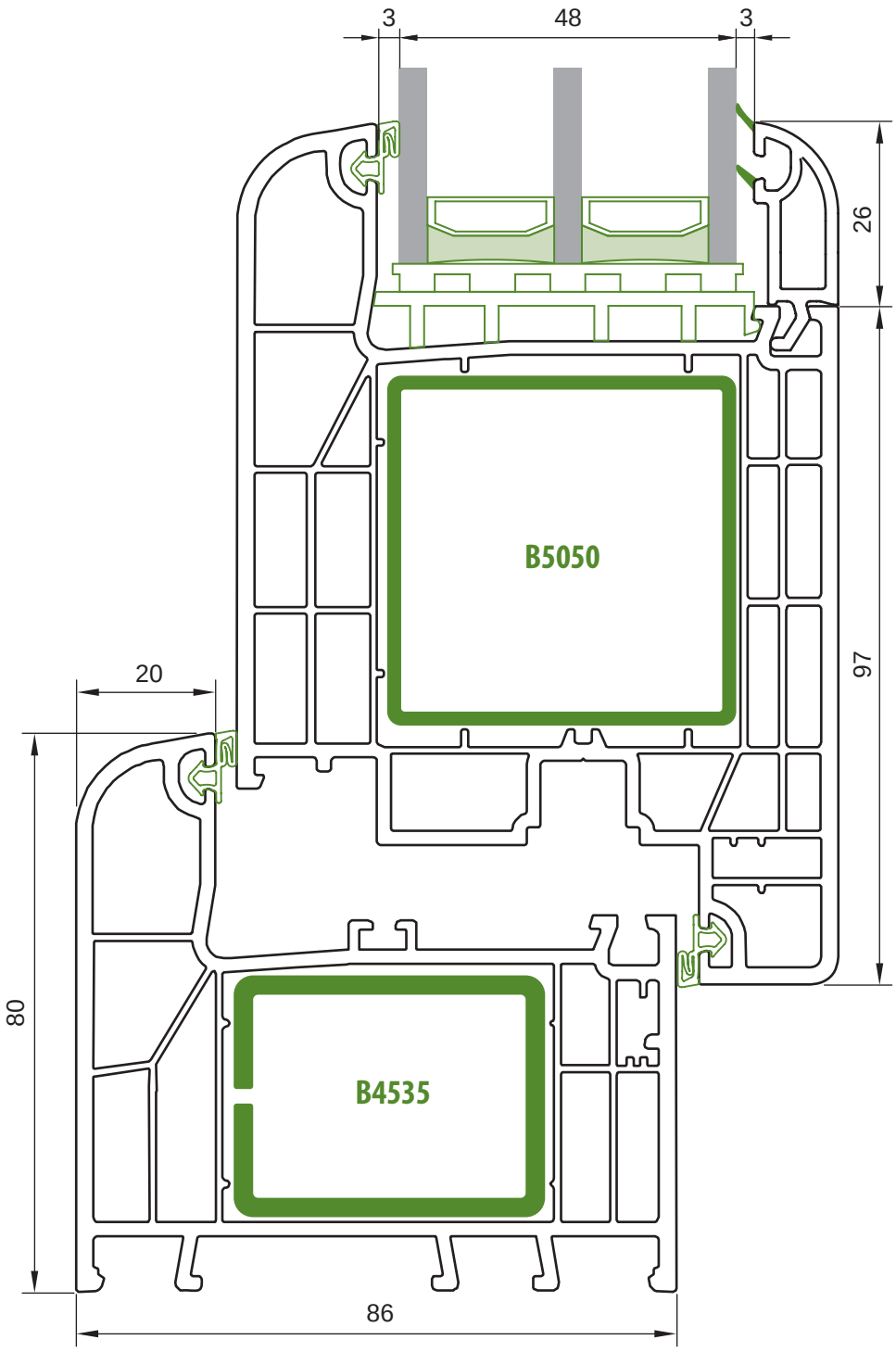
4.19 Frame 68611 with 90° Bay Post 68063



4.20 Frame 58611 + Sash 58620 – 48 mm glazing unit



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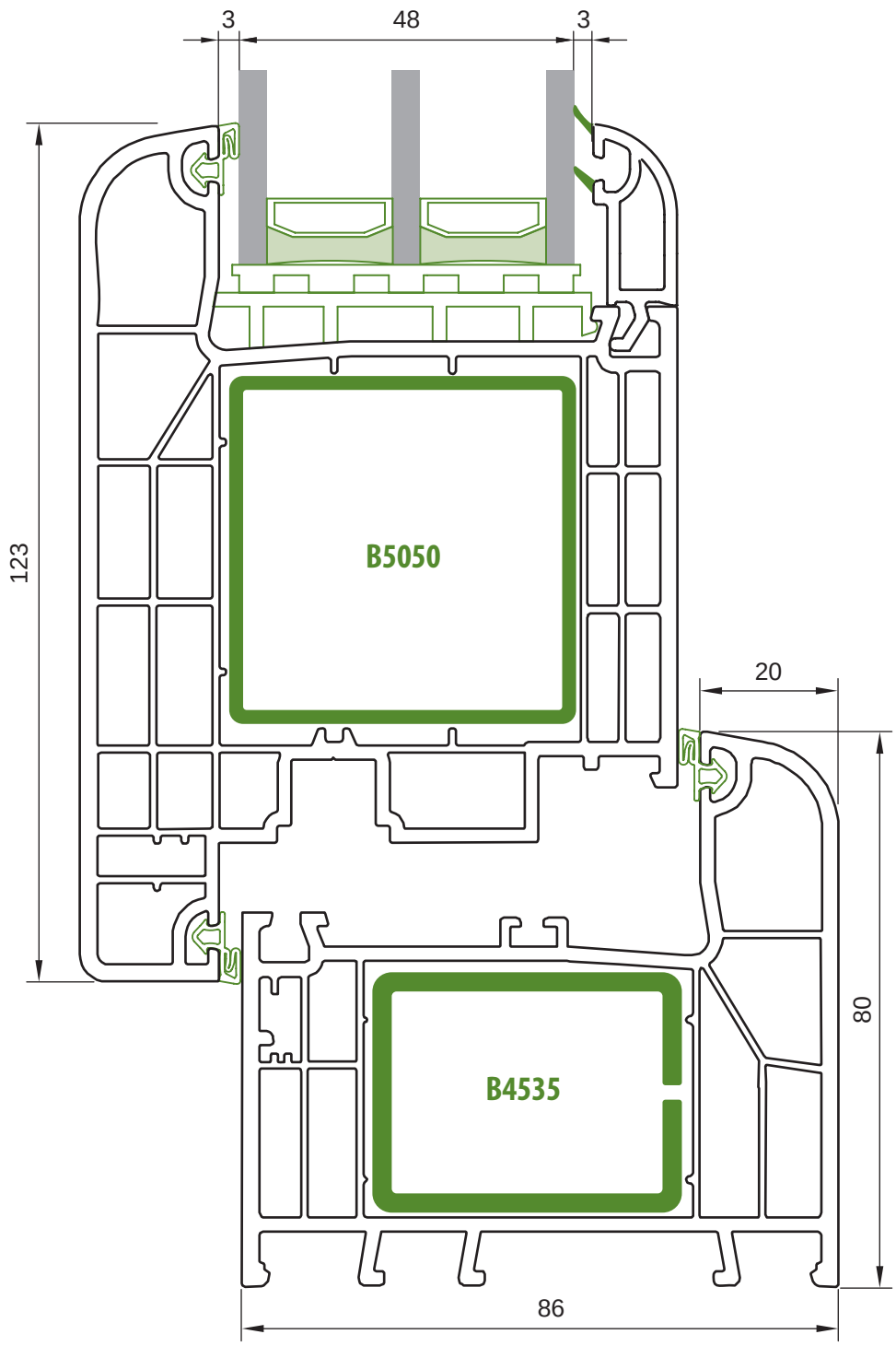
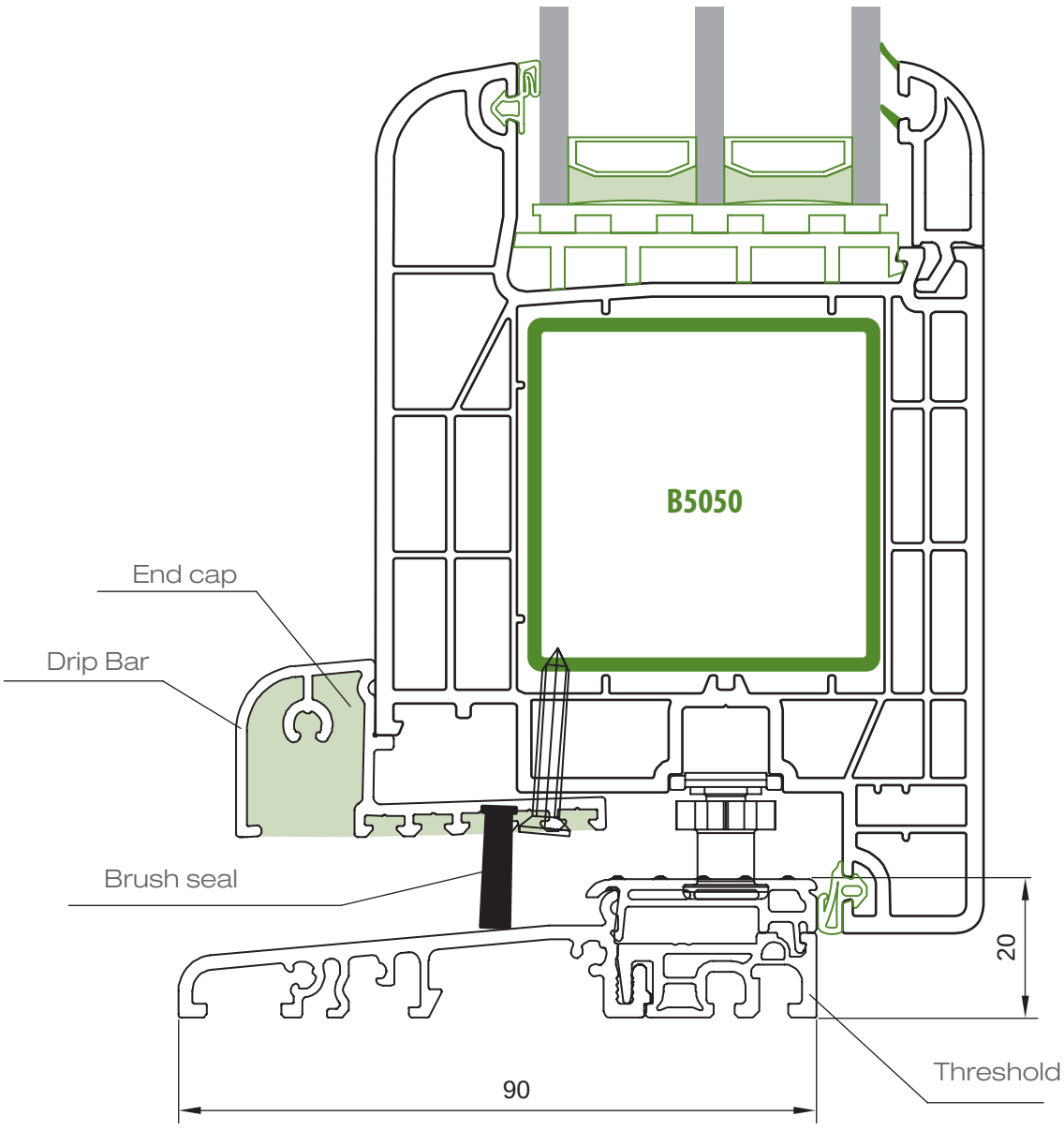
4.21 Frame 58611 + Sash 58621 – 48 mm glazing unit



4.22 Sash 58620 + Door Threshold 58650



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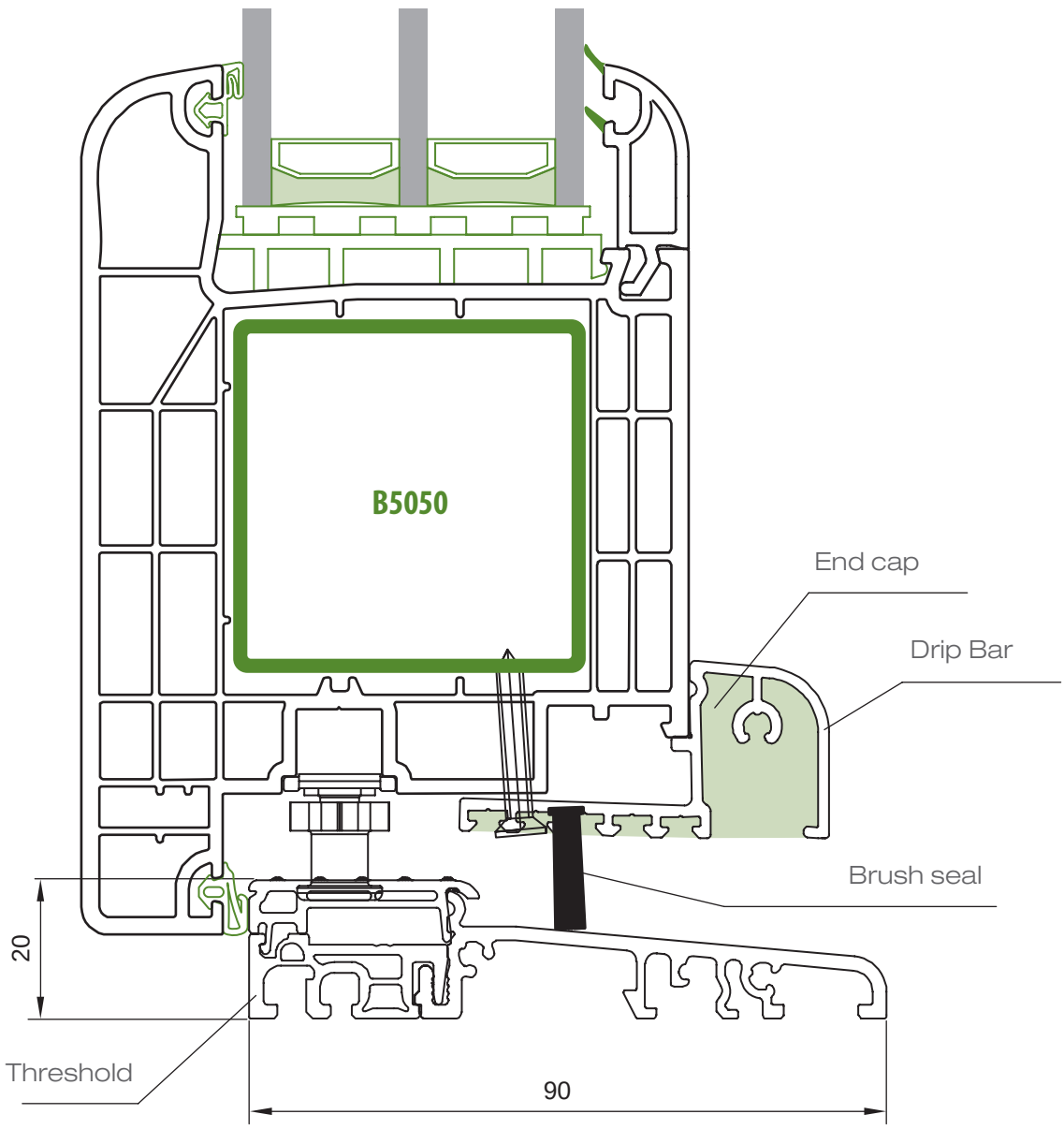
4.23 Sash 58621 + Door Threshold 58650



5. Preparation

5.1 Installing Metal Joint 68683 to Transom/Mullion 68630

5.2 Connecting Frame 68610 and Transom/Mullion 68630 with Metal Joint 68683

5.3 Connecting Meeting Rail 68631 with Sash 68620 (with end caps 68684)

5.4 Frame 68610 Preparation for Connecting Transom/Mullion 68630 using PVC Joint 68685

5.5 Connecting Frame 68610 and Transom/Mullion 68630 with PVC Joint 68685

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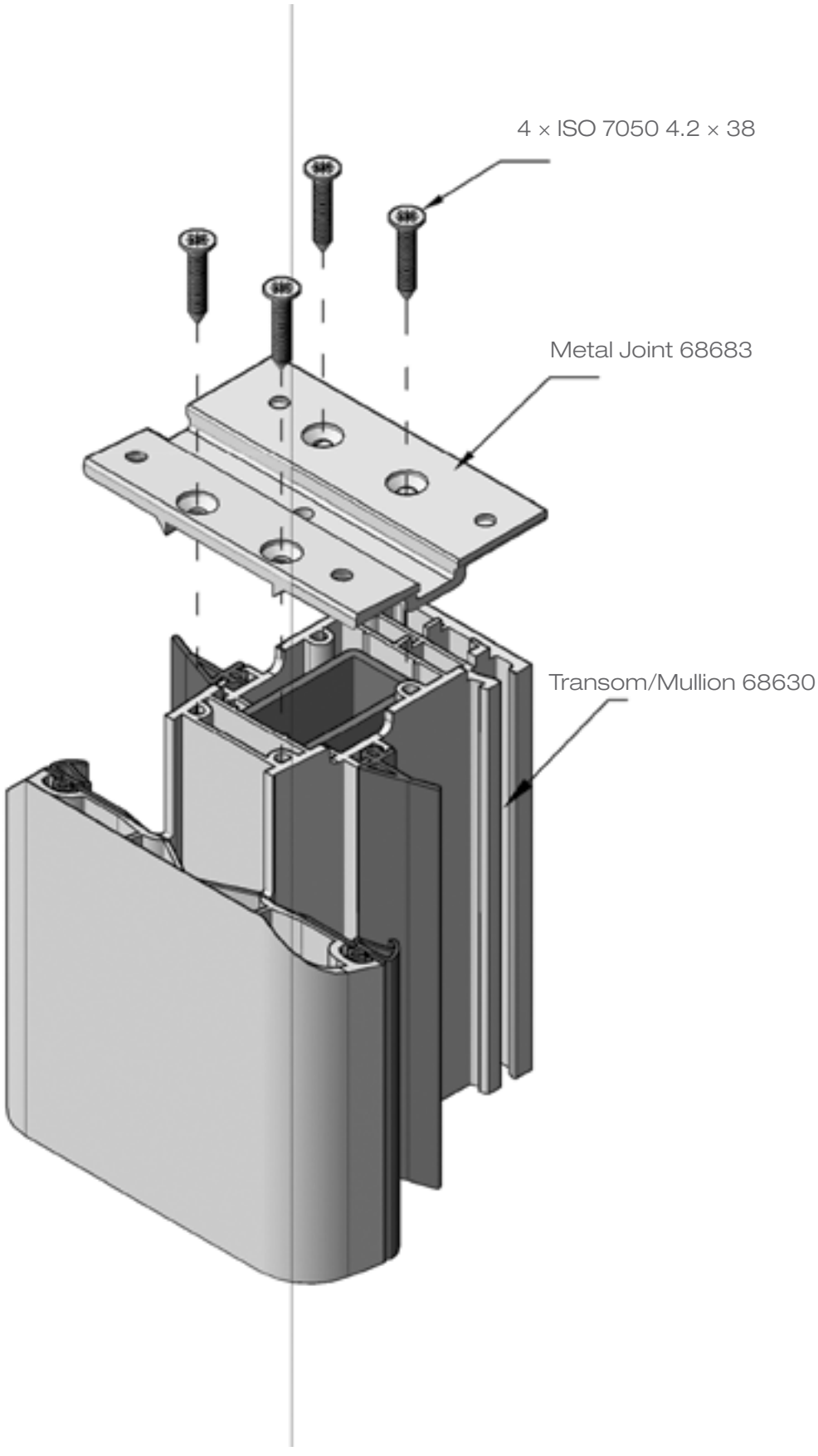
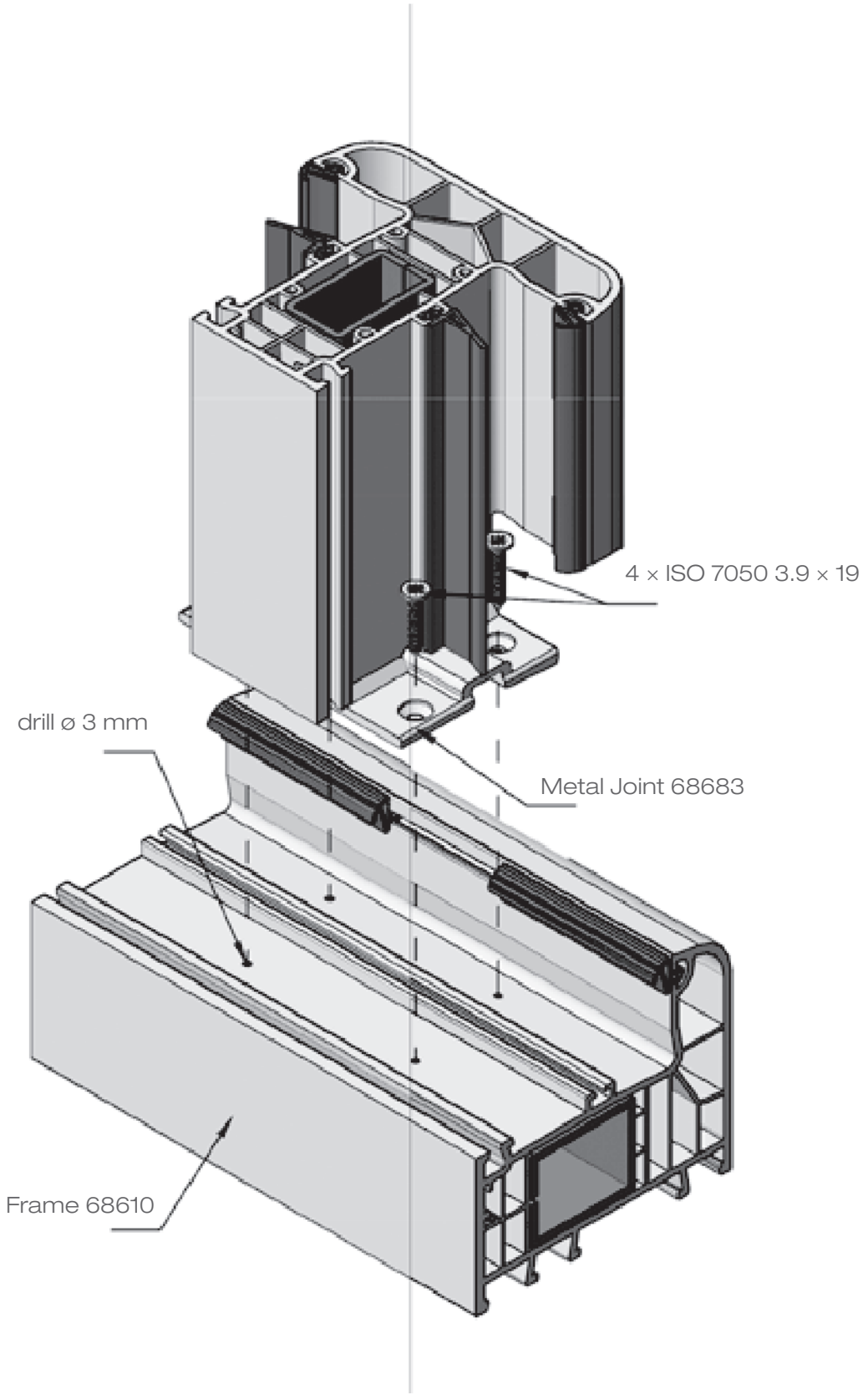
5. Preparation

5.1 Installing Metal Joint 68683 to Transom/Mullion 68630



5.2 Connecting Frame 68610 and Transom/Mullion 68630 with Metal Joint 68683



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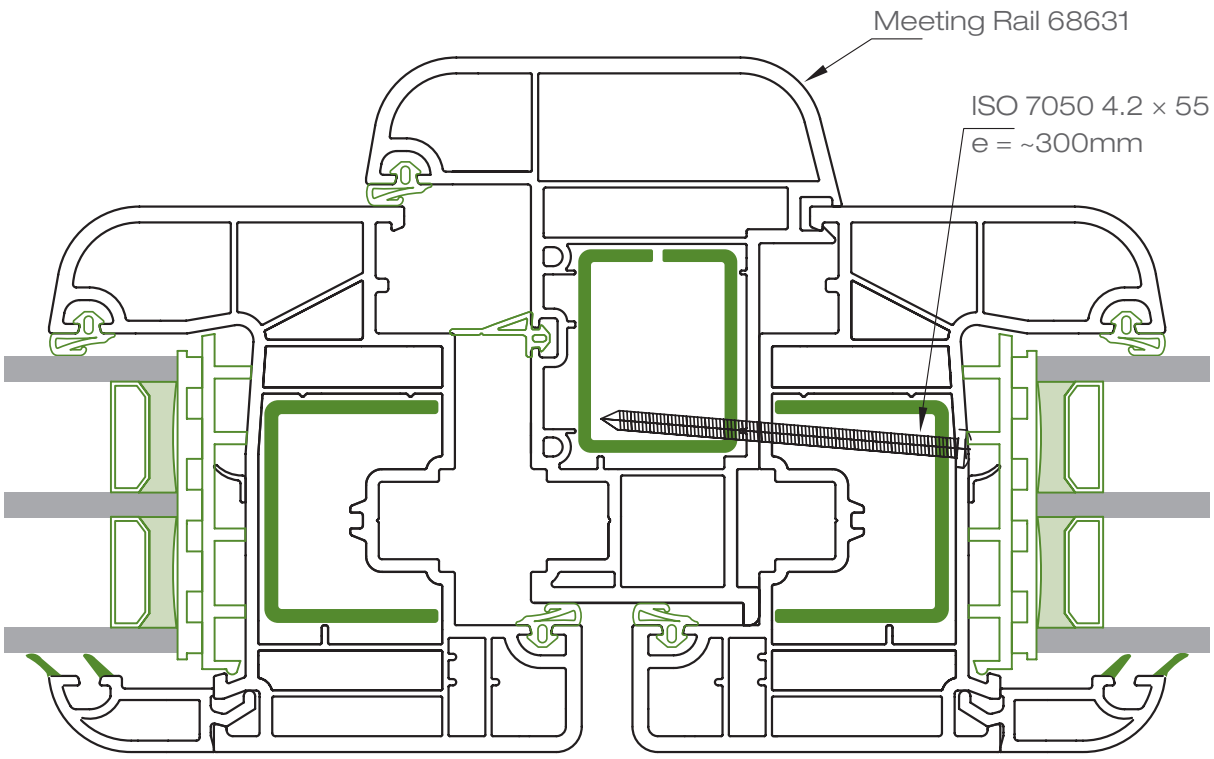
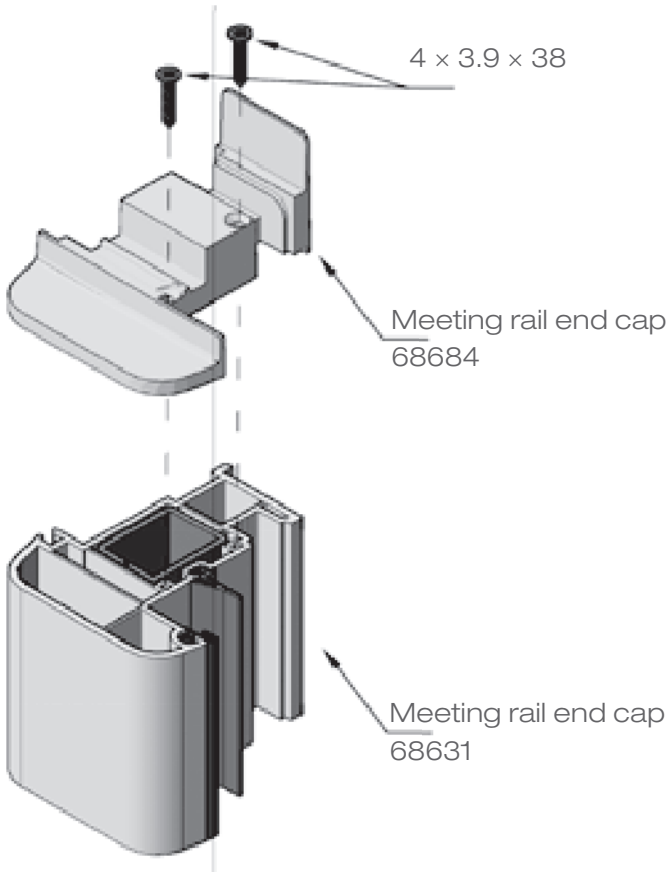
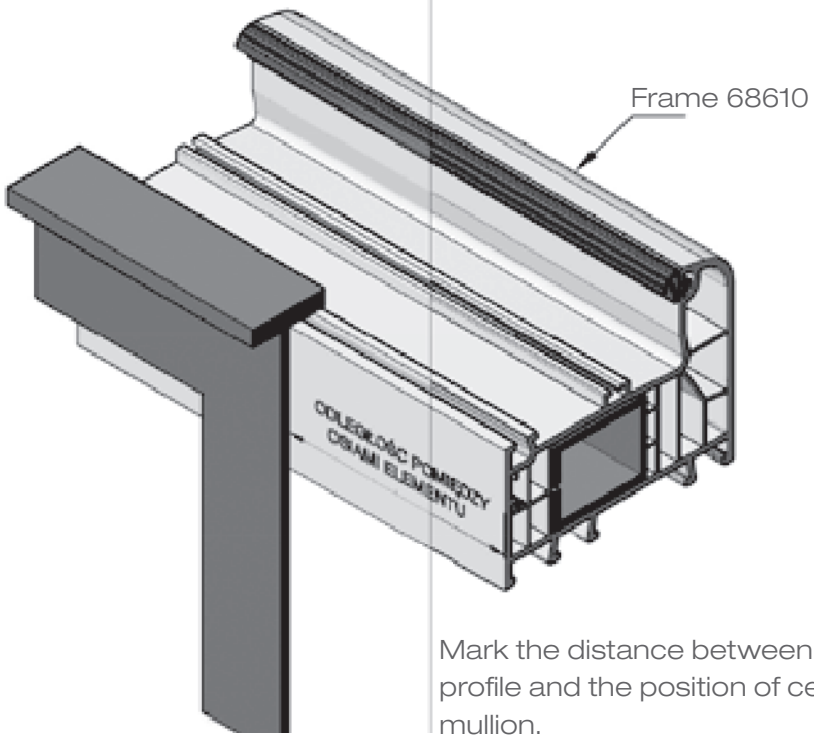
5. Preparation

5.3 Connecting Meeting Rail 68631 with Sash 68620 (with end caps 68684)



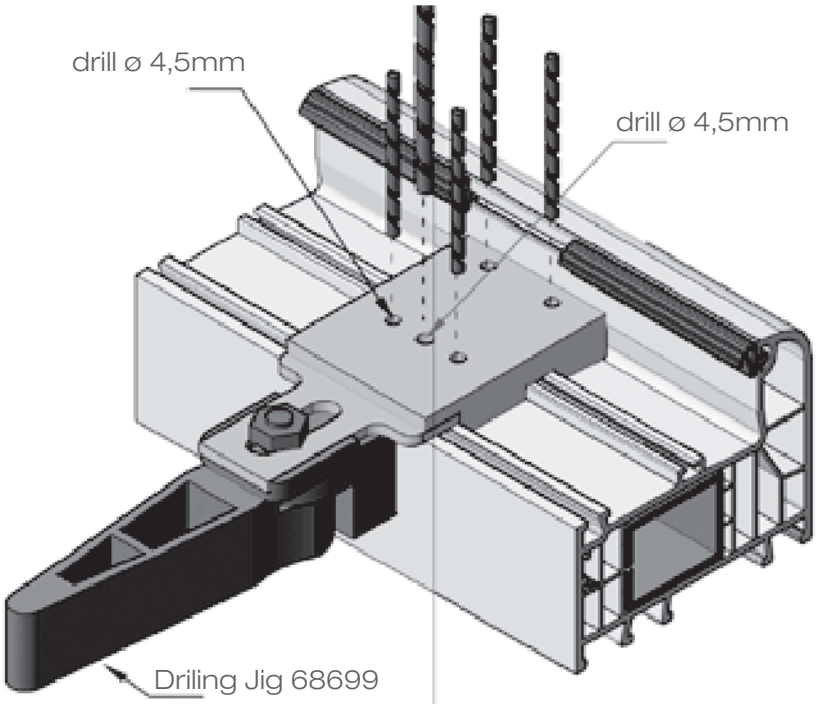


5.4 Frame 68610 Preparation for Connecting Transom/Mullion 68630 using PVC Joint 68685



1

Mark the distance between the end of the frame profile and the position of centre line of transom/ mullion.



2

Drill holes for the PVC joint through the entire profile and steel reinforcement.

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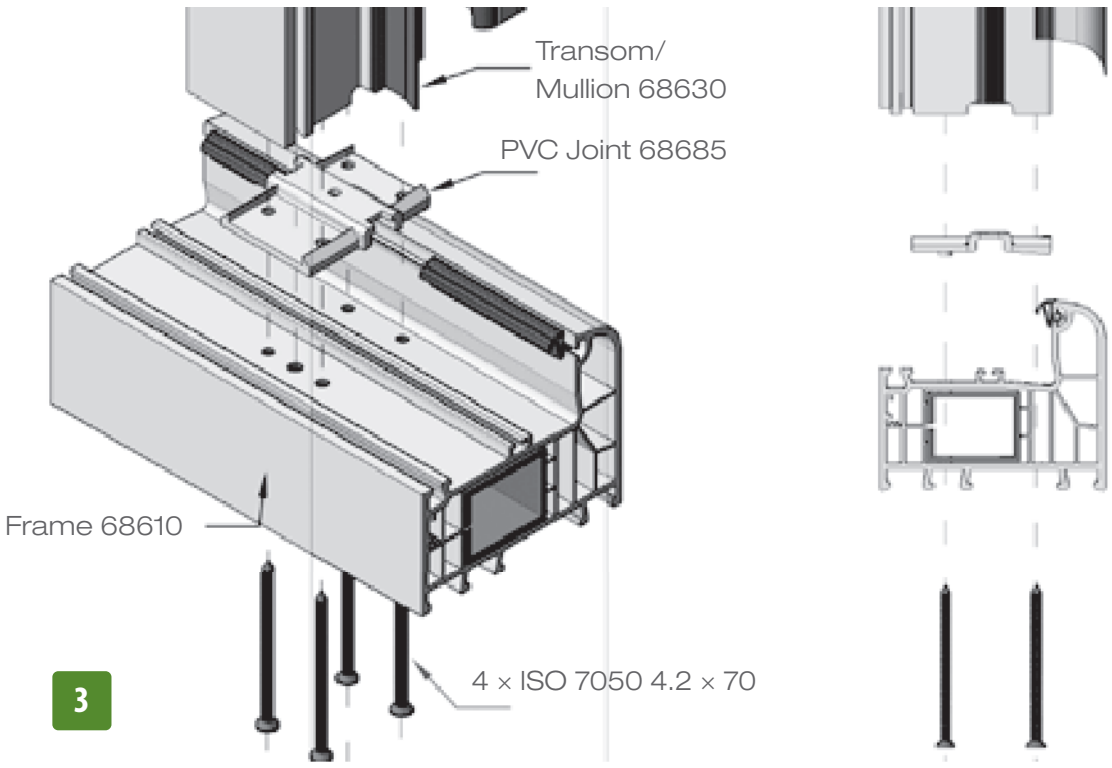
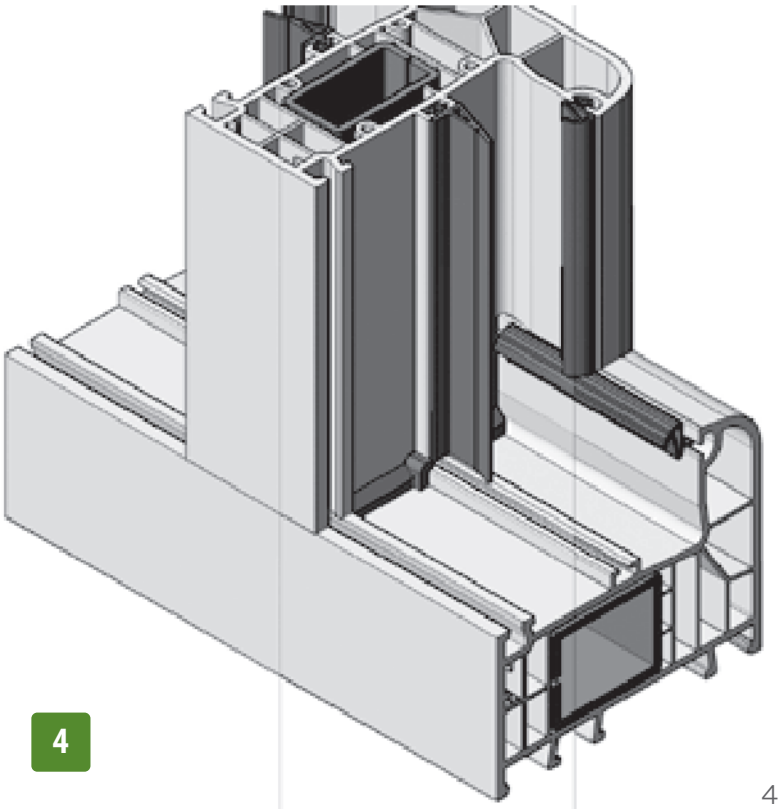
5. Preparation

5.5 Connecting Frame 68610 and Transom/Mullion 68630 with PVC Joint 68685



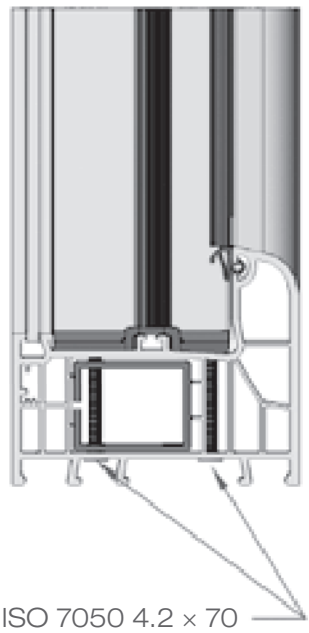
3



4

Position the mullion in the frame and fix with screws

Side view



6. Cutting Calculations

6.1 General Guidelines for Applying the Deduction Values
6.2 Calculations Example
6.3 Fixed Glazing in Frame
6.4 Transom/Mullion and Dummy Bar in Vents
6.5Single-Sash Window
6.6 Two-Sash Window with Transom/Mullion
6.7 Two-Sash Window with Meeting Rail
6.8 Single-Sash Window with Fixed Glazing
6.9 Door with Aluminium Threshold

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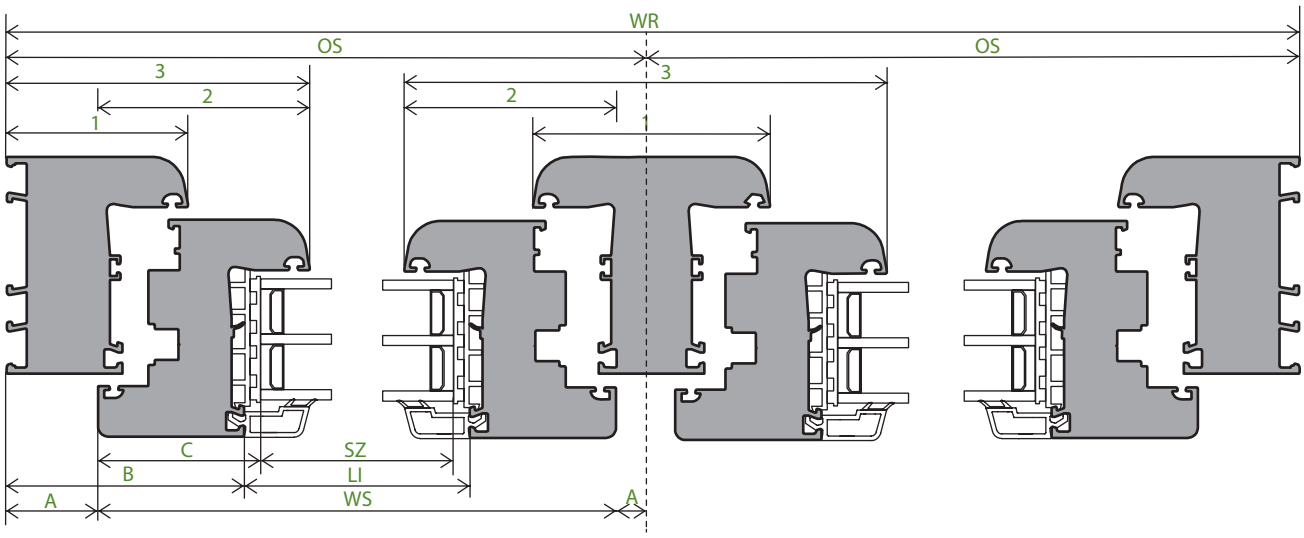
6. Cutting Calculations

6.1 General Guidelines for Applying the Deduction Values

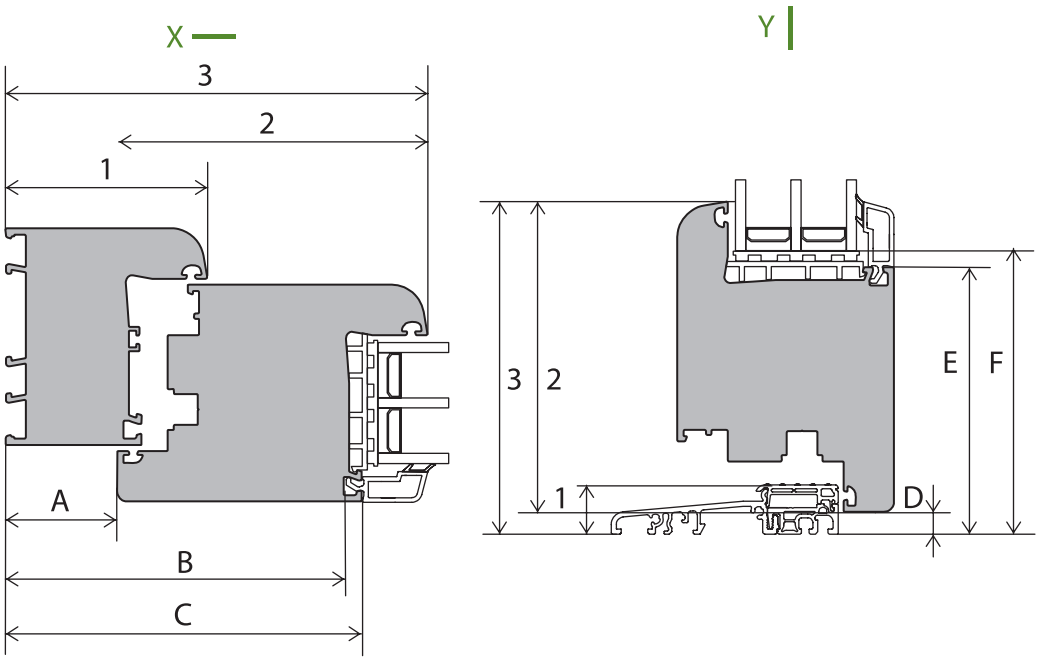
To verify the deductions, sum up all of them used within the particular window/door design. Their sum should equal to the Outer dimensions of the window/door frame. Burn-off allowance also must be added for all welded elements.

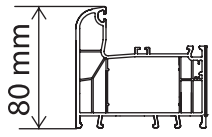
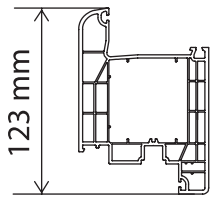
Note:

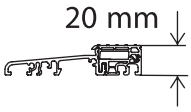
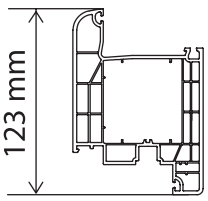
The deduction values apply to welded or mechanically joined profiles. Depending on the available saw and welding machines, the profile lengths may change after processing (i.e. cutting or welding). Incorrect profile cutting may cause distortion of profile seals.

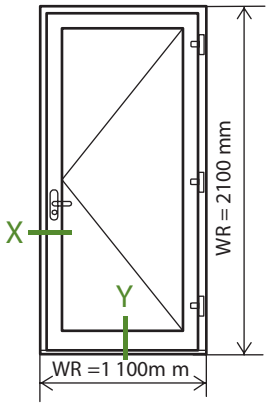


6.2 Calculations Example



1	
2	
3	169
A WS	-46
B LI	-143
C SZ	-149

1	
2	
3	133
D WS	-10
E LI	-107
F SZ	-113



Outer dimension

WR – 1100mm × 2100mm

Frame – 80mm

Sash – 123mm

Calculation example results

Horizontally (X) applied deduction values for left frame/sash and right frame/sash

Vertically (Y) applied deduction values for threshold/sash and top frame/sash

WS = WR-2A = 1100mm-92mm =1008mm

LI = WR-2B = 1100mm-286mm = 814mm

SZ = WR-2C = 1100mm-298mm = 802mm

WS = WR-(D+A) = 2100mm-56mm = 2044mm

LI = WR-(E+B) = 2100mm-250mm = 1850mm

SZ = WR-(F+C) = 2100mm-262mm = 1838mm

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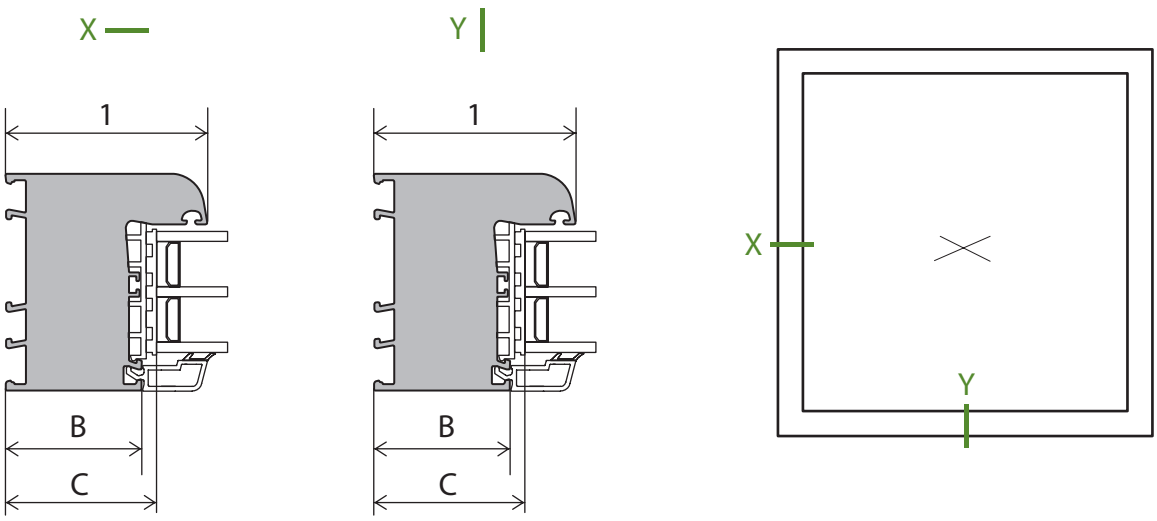
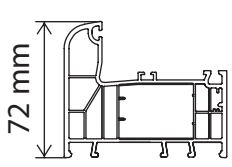
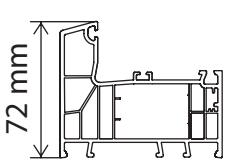
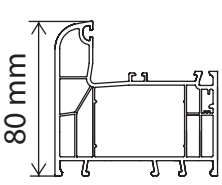
6.3 Fixed Glazing in Frame

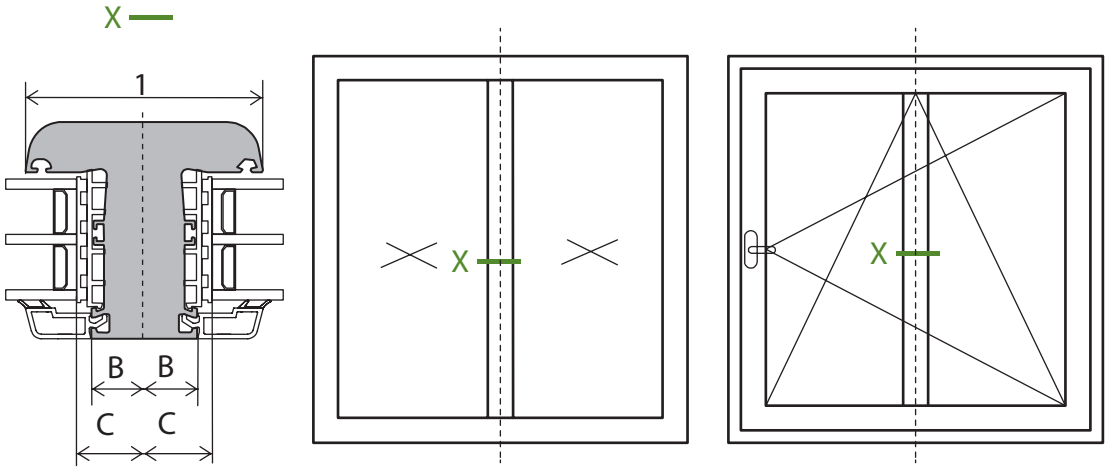


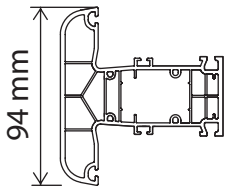
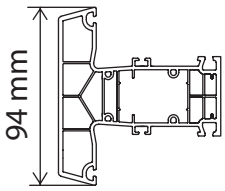
Profile height (mm)	1	 72 mm **68610**	 72 mm **68611**	 80 mm **58610**
Deduction value (mm)	B LI	-46	-46	-54
	C SZ	-52	-52	-60

Abbreviations:

OS Transom/Mullion or meeting rail axis dimensions
WS Outer dimensions of sash (welded)
LI Glazing bead dimensions
SZ Glazing unit dimensions
WR Outer dimensions of frame (welded)

1 Outer dimensions of profiles: frames, mullions and thresholds
2 Outer dimensions of sash profile
3 Outer dimensions of construction made of: frames, sashes and mullions
A, B, ... Constant values depending on profiles used



Profile height (mm)	1	 **68630**	 **68632**
Deduction value (mm)	B LI	-21-	21
	C SZ	-29	-29

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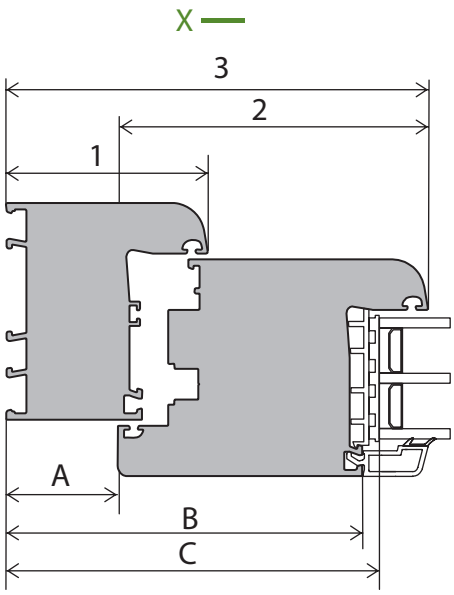
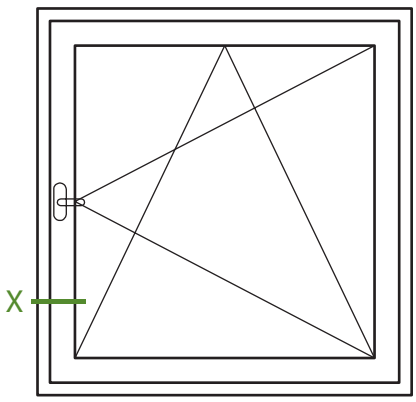
6. Cutting Calculations

6.5 Single-Sash Window





Profile height (mm)										
	1	72 mm **68610**			72 mm **68611**			80 mm **58611**		
	2	84 mm	84 mm	123 mm	84 mm	84 mm	123 mm	84 mm	84 mm	123 mm
	3	1221	22	1611	22	122	161	1221	22	161
Deduction value (mm)	A WS	-38	-38-	38	-38	-38	-38	-46	-46	-46
	B LI	-96-	96	-135	-96-	96	-135	-104	-104	-143
	C SZ	-102	-102	-141	-102	-102	-141	-110	-110	-149

Abbreviations:

OS Transom/Mullion or meeting rail axis dimensions

WS Outer dimensions of sash (welded)

LI Glazing bead dimensions

SZ Glazing unit dimensions

WR Outer dimensions of frame (welded)

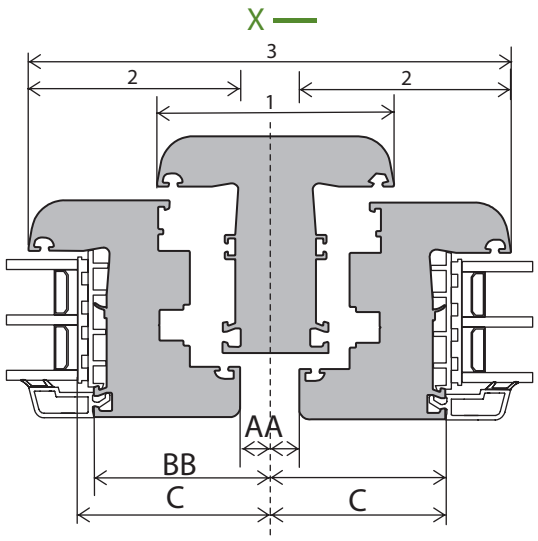
1 Outer dimensions of profiles: frames, mullions and thresholds

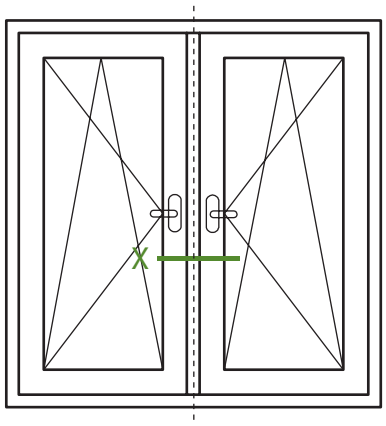
2 Outer dimensions of sash profile

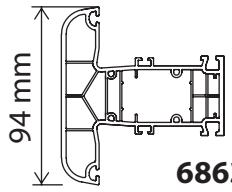
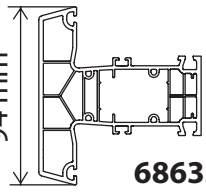
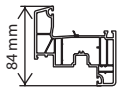
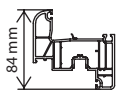
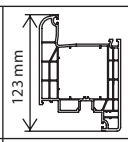
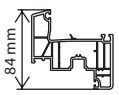
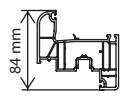
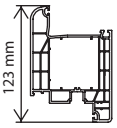
3 Outer dimensions of construction made of: frames, sashes and mullions

A, B, ... Constant values depending on profiles used

6.6 Two-Sash Window with Transom/Mullion





Profile height (mm)	1	 94 mm **68630**			 94 mm **68632**		
	2	 84 mm	 84 mm	 123 mm	 84 mm	 84 mm	 123 mm
	3	1941	194	272	94	1942	72
Deduction value (mm)	A WS	-13-	13	-13	-13-	13	-13
	B LI	-71-	71	-110	-71-	71	-110
	C SZ	-77-	77	-116	-77-	77	-116

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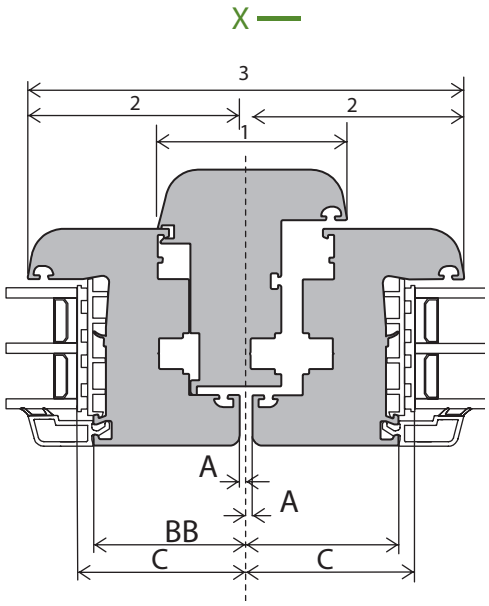
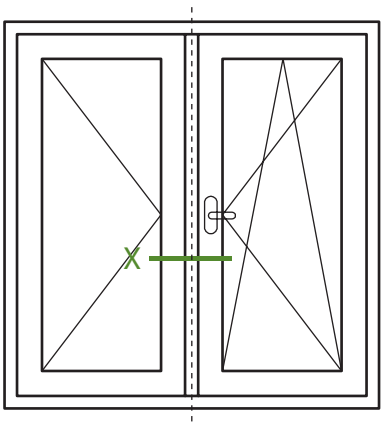
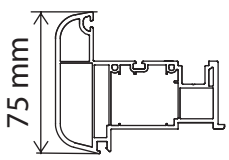
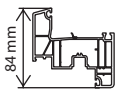
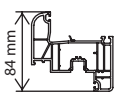
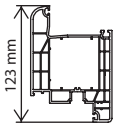
6.7 Two-Sash Window with Meeting Rail





Profile height (mm)	1	 **68631**		
	2			
	3	1761	76	254
Deduction value (mm)	A WS	-4	-4	-4
	B LI	-62-	62	-101
	C SZ	-68-	68	-107

Abbreviations:

OS Transom/Mullion or meeting rail axis dimensions

WS Outer dimensions of sash (welded)

LI Glazing bead dimensions

SZ Glazing unit dimensions

WR Outer dimensions of frame (welded)

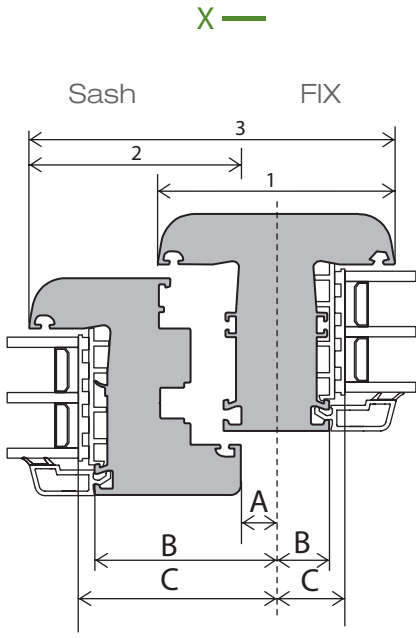
1 Outer dimensions of profiles: frames, mullions and thresholds

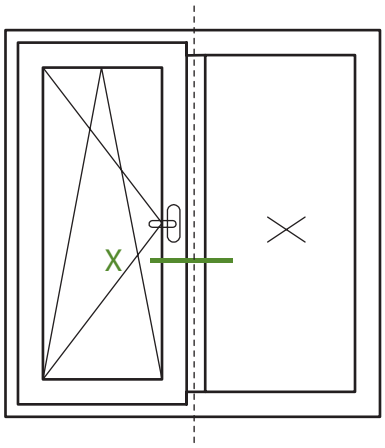
2 Outer dimensions of sash profile

3 Outer dimensions of construction made of: frames, sashes and mullions

A, B, ... Constant values depending on profiles used

6.8 Single-Sash Window with Fixed Glazing





Profile height (mm)	1	94 mm 68630			94 mm 68632			
	2	84 mm	84 mm	123 mm	84 mm	84 mm	123 mm	
	3	1441	1441	83	44	1441	83	
Deduction value (mm)	A WS	-13	-13	-13	-13	-13	-13	
	B	-71	-71	-110	-71	-71	-110	Sash
	LI	-21	-21	-21-	-21-	21	21	FIX
	C	-77	-77	-116	-77-	77	-116	Sash
	SZ	-27	-27	-27-	-27-	27	27	FIX

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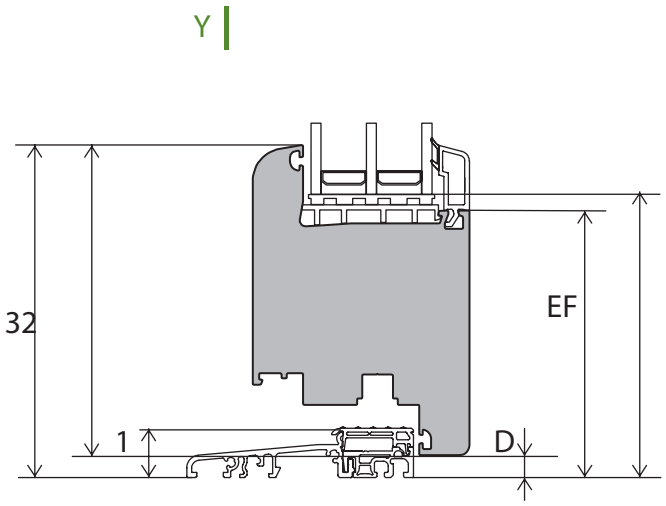
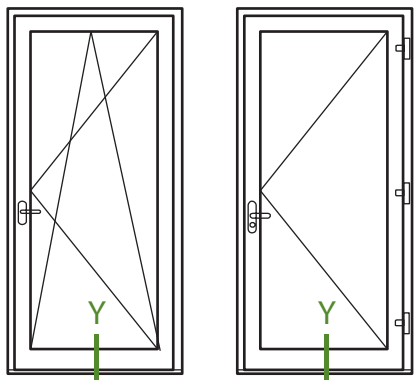
6. Cutting Calculations

6.9 Door with Aluminium Threshold





Profile height (mm)	1	20 mm			
	2	84 mm	84 mm	123 mm	123 mm
	3	94	94	1331	33
Deduction value (mm)	D WS	-10-	-10	-10	10
	E LI	-68	-68	-107	-107
	F SZ	-74-	74	-113	-113

Abbreviations:

OS Transom/Mullion or meeting rail axis dimensions

WS Outer dimensions of sash (welded)

LI Glazing bead dimensions

SZ Glazing unit dimensions

WR Outer dimensions of frame (welded)

1 Outer dimensions of profiles: frames, mullions and thresholds

2 Outer dimensions of sash profile

3 Outer dimensions of construction made of: frames, sashes and mullions

A, B, ... Constant values depending on profiles used

7. Statics

7.1 General Information
7.2 Guidelines to Reinforcements
7.3 Wind loading
7.4 Calculation Example
7.5 Table – required moment of inertia

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7. Statics

7.1 General Information

Window systems made by WITAL are high-impact PolyVinyl Chloride multi-chamber profiles with steel reinforcements. Low „Young's modulus" of PVC profiles (70 times lower than steel reinforcements) means that the profiles must be reinforced with galvanized steel sections to ensure rigidity and load capacity to support own weight, glazing unit weight, wind pressure, heat distortions and to ensure correct operation of the window.

The window is not designed to transfer other loads and should not be used as a load-bearing element in any structure.

- Structural calculations in accordance with DIN 18056 are required if:
- **window surface area is over 9.0 m2,**
- **length of a single side is exceeding 2.0 m.**

Structural calculations for windows involve determining its rigidity in a plane, while transfering any loads perpendicular to its plane. Wind pressure differences are perpendicular to the window plane, whereas gravity load and glazing unit weights are parallel to the window plane.
The calculations do not allow for PVC profile rigidity and allow only for steel reinforcement rigidity.

The bending rigidity is determined in accordance with DIN 18056, and the maximum deflection under perpendicular load must not exceed:

- **1/300 span, and**
- **must be less than 8.0 mm.**

The glazing unit must not transfer any loads except for its own weight and the differences of wind pressure.

Structural calculations must not allow for the load-bearing properties of the glazing units or panels. To ensure correct operation of window hardware, maximum deflection under gravity load must not exceed:

- **1/300 span, and**
- **3.0 mm**

7.2 Guidelines to Reinforcements

PVC window profiles are reinforced with galvanised steel or aluminium sections. Reinforcement prevents profile deflection due to high wind load or changes in temperature. The selected reinforcements help to ensure proper air permeability, watertightness in accordance with DIN 18055 and resistance to wind load in accordance with DIN 1055 and 18056 of the construction.

The reinforcing profiles are cut at 90° or 45° and inserted into the reinforcement chamber before welding. For all sash profiles, the reinforcements must end at least 10 mm before the inner corner to prevent deflection due to incorrect reinforcement length.

Each reinforcement must be fixed with screws approximately in 300mm distances and as close to the corners as possible.

Cut and exposed steel reinforcement sections must be protected against corrosion.

When reinforcing, the door sash profile should be placed on the hinge side, otherwise the profile may deflect after the hinges are installed.

Due to increased thermal stresses, the reinforcements in coloured and foiled profiles must be fixed at 150 to 200 mm distances. Stronger reinforcement sections (**min. thickness 2 mm**) are recommended. The distances between the screws and the frame/sash corners are the same as for the white profiles.

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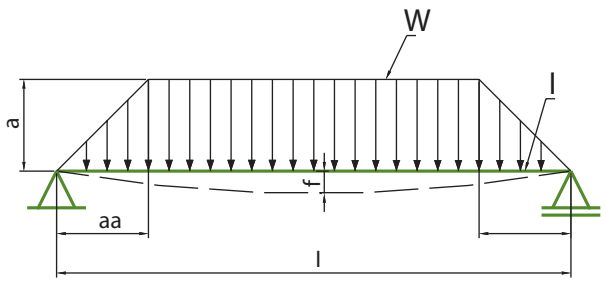
In accordance with DIN 1055, the wind pressure is assumed depending on the height of the building:

Window height above ground (m)	Standard buildings (kN/m2)	Apartment towers (kN/m2)
Less than 8.0 m	0.60	0.80
8.0 m - 20.0 m	0.96	1.28
20.0 m - 100.0 m	1.32	1.76
Over 100.0 m	1.56	2.08

The required rigidity under wind pressure perpendicular to the window surface is determined using the following loading diagram:



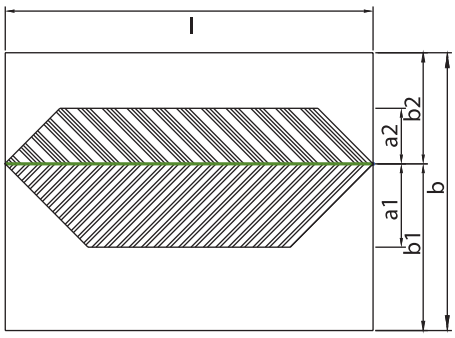
The following equation is used for the model:

$$Ix_{wym} = \frac{a \times w \times 10\text{-}4 \times (5 \times L^2 - 4 \times a^2)^2}{1920 \times E \times f_{dop}}$$

where:

w – wind pressure [kN/m2]
a – width of load applied area [cm]
L – element span [cm]
$\mathbf{f_{dop}}$ – permissible deflection [mm]
$\mathbf{Ix_{wym}}$ – required moment of inertia [cm^4]
E – Young's modulus of steel [GPa]

Area of load application is calculated as follows:



where: $a1 = \frac{b1}{2}$ and $a2 = \frac{b2}{2}$

Figure 6.2.4.
Loading diagram - transom under wind pressure

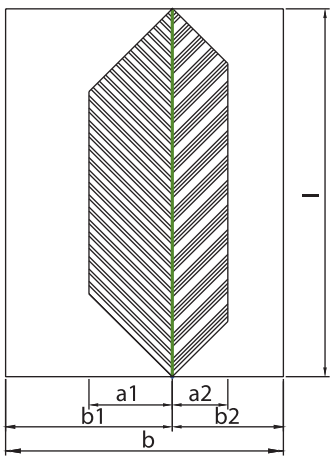
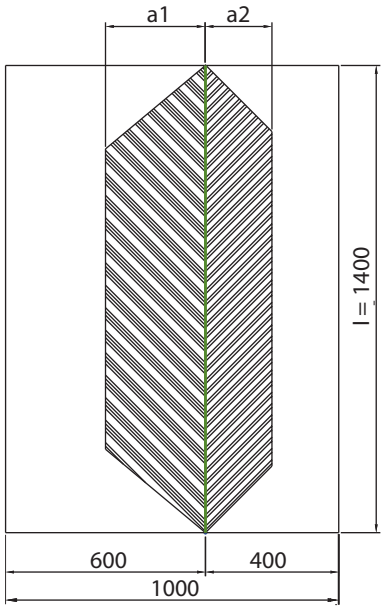


Figure 6.2.3.
Loading diagram - mullion under wind pressure

Rigidity is calculated individually for the load width a1 and a2 and the results are added.

7.4 Calculation Example

Calculating moment of inertia of a mullion under wind pressure:



Diagram

Data:
Standard building
Window height: less than 8 m above ground
Span L = 1,400 mm
Load width b1 = 600 m
Load width b2 = 400 m
Correction factor = 1.0
Correction factor = 1.0

Calculations:

Calculating the required moment of inertia:

Span L	1400mm	From the moment of inertia chart:
Load width a1	300 mm	I_{a1} = 0,90cm^4
Load width a2	200mm	+ I_{a2} = 0,60 cm^4
Required moment of inertia		I_{wym} = 1,50 cm^4

Correction factor	k = 1,00
Correction factor	m = 1,00

Total required moment of inertia	I_{wym} = 1,50cm^4

Select a reinforcement with $I > I_{wym}$

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7.5 Table – Required Moment of Inertia

Calculation of the moment of inertia applies to steel profiles only. For aluminium profiles, the value is multiplied by 3. Maximum permissible deflection: l/300 or 8 mm.

Load width (cm)

Profile length (cm)	400	390	380	370	360	350	340	330	320	310	300	290	280	270	260
20	23,70	21,40	19,30	17,30	15,50	13,90	12,40	11,00	9,70	8,50	7,50	6,50	5,70	4,90	4,20
	37,90	34,30	30,90	27,80	24,90	22,20	19,80	17,50	15,50	13,70	12,00	10,40	9,10	7,80	6,70
	52,20	47,10	42,50	38,20	34,20	30,50	27,20	24,10	21,30	18,80	16,50	14,40	12,50	10,80	9,30
30	35,40	32,00	28,80	25,90	23,20	20,70	18,40	16,30	14,40	12,70	11,10	9,70	8,40	7,30	6,20
	56,60	51,20	46,10	41,10	37,10	33,10	29,50	26,10	23,10	20,30	17,80	15,50	13,50	11,60	10,00
	77,90	13,70	70,30	63,40	56,90	51,00	45,50	40,50	35,90	31,70	27,90	24,50	21,30	18,50	16,00
40	46,90	42,30	38,10	34,20	30,60	27,30	24,30	21,50	19,00	16,70	14,60	12,80	11,10	9,50	8,20
	75,00	67,70	61,00	54,70	49,00	43,70	38,90	34,50	30,40	26,80	23,40	20,40	17,70	15,30	13,10
	103,10	93,10	83,80	75,30	67,40	60,10	53,50	47,40	41,80	36,80	32,20	28,10	24,30	21,00	18,00
50	58,00	52,40	47,10	42,30	37,90	33,80	30,00	26,60	23,40	20,60	18,00	15,70	13,60	11,70	10,00
	92,90	83,80	75,40	67,70	60,60	54,00	48,00	42,50	37,50	32,90	28,80	25,10	21,70	18,70	16,00
	127,70	115,20	103,70	93,10	83,30	74,30	66,00	58,50	51,60	45,30	39,60	34,50	29,90	25,70	22,00
60	68,90	62,10	55,90	50,10	44,80	39,90	35,50	31,50	27,60	24,20	21,20	18,40	15,90	13,70	11,70
	110,20	99,40	89,40	80,20	71,70	63,90	56,70	50,20	44,20	38,80	33,90	29,40	25,50	21,90	18,70
	151,50	136,70	122,90	110,30	98,60	87,80	78,00	69,00	60,80	53,30	46,60	40,50	35,00	30,10	25,70
70	79,30	71,50	64,20	57,60	51,40	45,80	40,60	35,90	31,60	27,70	24,10	20,90	18,10	15,50	13,20
	126,90	114,40	102,80	92,10	82,30	73,20	65,00	57,40	50,50	44,30	38,60	33,50	28,90	24,30	21,10
	174,50	157,20	141,30	126,60	113,10	100,70	89,30	78,90	69,50	60,90	53,10	46,00	39,70	34,10	29,00
80	89,20	89,20	72,20	64,60	57,60	51,30	45,40	40,10	35,20	30,80	26,80	23,20	20,00	17,10	14,50
	142,80	128,60	115,50	103,40	92,20	82,00	72,70	64,10	56,30	49,30	42,90	37,10	32,00	27,30	23,20
	196,30	176,80	158,80	142,10	126,80	112,80	99,90	88,10	77,50	67,70	59,00	51,10	44,00	37,60	32,00
90	98,60	88,70	79,60	71,20	63,40	56,30	49,80	43,90	38,50	33,60	29,20	25,20	21,60	18,50	15,60
	157,80	142,00	127,40	113,90	101,50	90,10	79,70	70,20	61,60	53,80	46,70	40,30	34,60	29,50	25,00
	217,00	195,20	175,10	156,60	139,60	123,90	109,60	96,60	84,70	74,00	64,20	55,50	47,60	40,60	34,40
100	107,40	96,60	86,50	77,30	68,80	61,00	53,80	47,30	41,40	36,10	31,30	26,90	23,00	19,60	16,50
	171,90	154,50	138,40	123,60	110,00	97,50	86,10	75,80	66,30	57,80	50,00	43,10	36,90	31,30	26,40
	236,40	21,40	190,30	170,00	151,30	134,10	118,40	104,20	91,20	79,40	68,80	59,20	50,70	43,10	36,30
110	115,60	103,80	92,80	82,80	73,60	65,10	57,40	50,40	44,00	38,20	33,00	28,30	24,20	20,40	17,20
	184,90	166,00	148,50	132,50	117,70	104,20	91,80	80,60	70,40	61,10	52,80	45,30	38,70	32,70	27,50
	254,30	228,30	204,20	182,10	161,80	143,20	126,30	110,80	96,70	84,00	72,60	62,30	53,10	45,00	37,80
120	123,00	110,30	98,50	87,70	77,80	68,70	60,50	52,90	46,10	39,90	34,40	29,40	25,00	21,00	17,60
	196,80	176,50	157,70	140,40	124,50	110,00	96,70	84,70	73,70	63,90	55,00	47,00	39,90	33,60	28,10
	270,70	242,60	216,80	193,00	171,20	151,20	133,00	116,40	101,40	87,80	75,60	64,70	54,90	46,30	38,60
130	129,70	116,10	103,60	92,00	81,50	71,80	63,00	55,00	47,80	41,20	35,40	30,10	25,40	21,30	17,70
	207,50	185,80	165,70	147,20	130,30	114,90	100,80	88,00	76,40	66,00	56,60	48,20	40,70	34,10	28,30
	285,40	255,40	227,80	202,50	179,20	158,00	138,60	121,00	105,10	90,70	77,80	66,30	56,00	46,90	38,90
140	135,60	121,20	107,90	95,70	84,50	74,30	65,00	56,60	49,00	42,10	36,00	30,50	25,60		
	217,00	193,30	172,60	153,10	135,20	118,90	104,00	90,50	78,30	67,40	57,50	48,80	41,00		
	298,30	266,60	237,30	210,50	185,90	163,40	143,00	124,50	107,70	92,60	79,10	67,00	56,30		
150	140,70	125,40	111,40	98,60	86,90	76,20	66,40	57,60	49,70	42,50	36,20				
	225,00	200,70	178,30	157,80	139,00	121,90	106,30	92,20	79,50	68,10	57,90				
	309,40	276,00	245,20	216,90	191,10	167,60	146,20	126,80	109,30	93,60	79,60				
160	144,80	128,90	114,30	100,80	88,60	77,40	67,30	58,20	49,90						
	231,70	206,20	182,80	161,40	141,80	123,90	107,70	93,10	79,90						
	318,60	283,60	251,40	221,90	194,90	170,40	148,10	128,00	109,90						
170	148,10	131,50	116,30	102,30	89,60	78,10	67,60								
	237,00	210,40	186,00	463,80	143,40	124,90	108,20								
	325,90	289,30	255,80	225,20	197,20	171,80	148,70								

XXX,XX	Top row: moment of inertia (cm^4) for up to 8 m high buildings;
XXX,XX	Middle row: moment of inertia (cm^4) for up to 20 m high buildings;
XXX,XX	Bottom row: moment of inertia (cm^4) for up to 100 m high buildings;

7.5 Table – required moment of inertia

Calculation of the moment of inertia applies to steel profiles only. For aluminium profiles, the value is multiplied by 3. Maximum permissible deflection: l/300 or 8 mm.

Load width (cm)

Profile length (cm)	250	240	230	220	210	200	190	180	170	160	150	140	130	120	110	100
20	3,60	3,10	2,70	2,30	2,00	1,80	1,50	1,28	1,07	0,89	0,73	0,59	0,47	0,37	0,28	0,21
	5,80	4,90	4,30	3,80	3,30	2,80	2,40	2,04	1,72	1,43	1,17	0,95	76,00	0,59	0,45	0,33
	7,90	6,70	5,90	5,20	4,50	3,90	3,30	2,81	2,36	1,96	1,61	1,30	1,04	0,81	0,62	0,46
30	5,30	4,50	4,00	3,50	3,00	2,60	2,20	1,87	1,56	1,30	1,08	0,85	0,67	0,52	0,39	0,29
	8,50	7,20	6,30	5,50	4,80	4,10	3,50	2,99	2,50	2,07	1,69	1,36	1,08	0,84	0,63	0,46
	11,70	9,90	8,70	7,60	6,60	5,70	4,90	4,11	3,44	2,85	2,33	1,88	1,48	1,15	0,87	0,63
40	7,00	5,90	5,20	4,50	3,90	3,30	2,80	2,40	2,00	1,65	1,34	1,07	0,84	0,64	0,48	0,34
	11,20	9,40	8,30	7,20	6,20	5,40	4,60	3,84	3,21	2,64	2,14	1,71	1,34	1,02	0,76	0,54
	15,30	13,00	11,40	9,90	8,60	7,40	6,30	5,28	4,41	3,63	2,95	2,35	1,84	1,41	1,05	0,75
50	8,50	7,20	6,30	5,50	4,70	4,00	3,40	2,87	2,38	1,94	1,56	1,23	0,95	0,72	0,52	0,36
	13,60	11,50	10,10	8,70	7,50	6,40	5,50	4,58	3,80	3,11	2,50	1,98	1,52	1,14	0,83	0,57
	18,70	15,80	13,80	12,00	10,40	8,90	7,50	6,30	5,23	4,27	3,44	2,72	3,10	1,57	1,14	0,79
60	9,90	8,40	7,30	6,30	5,40	4,60	3,90	3,24	2,67	2,16	1,72	1,34	1,01	0,74		
	15,90	13,40	11,70	10,10	8,70	7,40	6,20	5,19	4,27	3,46	2,75	2,14	1,62	1,16		
	21,80	18,40	16,00	13,90	11,90	10,10	8,60	7,13	5,87	4,75	3,78	2,94	2,23	1,63		
70	11,20	9,40	8,10	7,00	6,00	5,10	4,30	3,52	2,87	2,30	1,80	1,37				
	17,90	15,00	13,00	11,20	9,60	8,10	6,80	5,63	4,59	3,67	2,88	2,20				
	24,60	20,60	17,90	15,50	13,20	11,20	9,40	7,74	6,31	5,05	3,96	3,02				
80	12,20	10,20	8,90	7,60	6,50	5,40	4,50	3,69	2,97	2,34						
	19,60	16,40	14,20	12,20	10,30	8,70	7,20	5,91	4,75	3,74						
	26,90	22,50	19,50	16,70	14,20	11,90	9,90	8,12	6,53	5,15						
90	13,10	10,90	9,40	8,00	6,80	5,60	4,60	3,75								
	21,00	17,50	15,10	12,80	10,80	9,00	7,40	6,00								
	28,90	24,10	20,70	17,70	14,90	12,40	10,20	8,25								
100	13,80	11,40	9,80	8,30	6,90	5,70										
	22,10	18,30	15,70	13,20	11,10	9,10										
	30,40	25,20	21,50	18,20	15,20	12,60										
110	14,30	11,70	10,00	8,40												
	22,80	18,80	16,00	13,40												
	31,40	25,80	21,90	18,40												
120	14,50	11,80														
	23,20	19,00														
	31,90	26,10														

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8. General Guidelines

8.1 PVC Extrusion Technology
8.2 Handling & Storage
8.3 Cutting
8.4 Drainage
8.5 Welding
8.6 Glazing
8.7 Manufacturing equipment

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Components used in rigid PVC manufacturing.

WITAL profiles are made of impact-resistant rigid PVC manufactured in an extrusion process using extrusion machines from a mixture of components including thermoplastic polyvinyl chloride (PVC). Polyvinyl chloride is one of the first known plastics. Along with polyethylene (PE), polypropylene (PP) and polystyrene (PS) it is one of the most commonly used plastics.
Unlike other plastics, it contains not only carbon and hydrogen but carbon, hydrogen and chlorine.

Available additives for improving the performance of PVC products allow a wide range of applications. One of the most important factor in PVC extrusion is mixing. The amount of plasticiser used at this stage determines the properties of rigid PVC and flexible PVC.

The type of PVC (rigid PVC - 2/3 plasticisers or flexible PVC - 1/3 plasticisers) determines its applications.

Standard PVC products include pipes, window and door profiles, roller shutters, laminate flooring panels and resilient flooring, roof membranes, cable insulations, tarpaulins (polyester fabrics with PVC lining), embossed wallpapers, anti-corrosion chassis protection, faux leathers, slabs, blister packaging, medical products, blood bags, infusion tubes, shower curtains and furniture edge trims.
In window profiles, use of the impact-resistant material - a mixture of carefully selected components without plasticisers - allows to manufacture products with the following properties:

- high mechanical strength, rigidity and hardness;
- impact and scratch resistance;
- working temperature from -30°C to +70°C;
- high abrasive wear resistance;
- fire-retardant and self-extinguishing;
- good chemical and weather resistance; - good weldability;
- no adverse effects on health.

PVC is mainly made from two basic substances - salt and crude oil. The salt is used to obtain chlorine and the crude oil is used to obtain ethylene. Ethylene and chlorine react to form gaseous vinyl chloride that is used to produce the polymer polyvinyl chloride (fine white powder).
To increase the impact resistance, PVC for window profiles is a copolymer of PVC and acrylic esters.

Rigid polyvinyl chloride profiles (rigid PVC).

PVC profiles are manufactured using a mixture of components including pure pulverized or granulated PVC and additives. All components are mixed, heated or cooled and transferred as a raw material to a storage tank or to a hopper of the extrusion machine. The extrusion machine is a device extruding the PVC profiles through a mould/die with a shape corresponding to the cross-section of the profile.

The properties of pulverized or granulated PVC can be improved using the following additives:

- titanium dioxide as a white dye;
- chalk (calcium carbonate) as a filler for improved stiffness and thermal properties;
- stabilizing agents for preventing thermal damage during processing and use and for preventing oxidation and damage due to weather conditions;
- in particular, UV radiation. Stabilizing agents improve the ageing resistance of PVC profiles. Stabilizing agents include inorganic and organic metal salts: lead, zinc, calcium, barium and/or tin;
- release agents for reducing the mixture viscosity in the manufacturing process or for lubrication between the molten plastic and metal surfaces of machines and tools;
- plasticisers for improved flow properties of material during thermoplastic moulding;
- dyes, including soot and organic dyes.

PVC and additives are available at many chemical manufacturers.

Due to its unique properties, PVC has been used as a material for manufacturing window profiles since the late 1960s. A PVC mixture for manufacturing window profiles shows overall better physical, chemical and mechanical properties than other plastics, however, other plastics may show individual properties better than PVC. This is the main reason PVC is still the material of choice for manufacturing window profiles.

The mixtures from the hopper of the extrusion machine is transferred by a screw conveyor, kneaded under pressure (two screws turning in opposite directions), melted, homogenized and moulded into the shape of the profile by an extrusion die or a special tool. The extruded profile is calibrated in the mould, cooled, marked with a product number and cut to size (6.50 m long sections).

Transport.
All main profiles in the manufacturing process are laminated with a plastic film to protect the exposed profile surfaces against damage and soiling.

The protective film provides UV resistance for up to 6 months. Stored profile should be covered with a tarpaulin to protect against direct sunlight and weather conditions. Proper storage conditions make it easier to remove the protective film from installed windows.

PVC profiles can be delivered on non-returnable pallets or in containers.
The pallets/containers must be stored on even and smooth surface.

Storage .
If the profiles are not stored in containers or on pallets, special racks must be used. A distance between the rack supports must not exceed 1 m. The length of protruding profiles must not exceed 0.5 m. The profiles stored on the ground must be supported on joists on an even surface, following the same guidelines. The joists between the layers must be perpendicular to each other. Store the heaviest profiles at the bottom.

PVC window profiles can also be stored outdoors. WITAL shrink-wraps each pallet for protection against sunlight, wind and water. Since the shrink wrap can be damaged in transport, it is recommended to cover the pallets with a tarpaulin.

Before processing, the profiles must be stored at room temperature for at least 24 hours to guarantee the highest quality.
Avoid excessive load on the profiles during transport.

When using forklift for loading/unloading the profiles, use a padding on the fork surfaces in direct contact with PVC profiles (also applies to foiled profiles).

The protective film protects the profiles against scratching and staining and must be removed after installation.

8.3 Cutting

The profiles must be placed for 24 hours at 15° – 18°C (production floor temperature).

Use double head mitre saw with pneumatic clamp and pneumatic feed for cutting the profiles to prevent profile shifting during cutting.

A proper cut requires a 45° cutting angle at the profile length and 90° cutting angle at the inner and outer profile surface along its cross-section.

Regularly check and adjust saw parameters as necessary.
Regularly remove cuttings and debris. Do not use single head mitre saws for cutting the main profiles for welding.
Check if the saw blade is sharp and compatible with PVC. Keep a spare saw blade at hand.
Dull saw blade will leave a jagged edge. The saw blade must be tapered for easy cutting and to prevent accumulation of dust from cutting. Accumulated dust will increase friction, reduce speed and may affect the cutting quality. Remove grease, dust and dirt with acetone or other suitable cleaning agent.

Welded edges must be clean and free from dust and oil from the compressed air system lubrication. The oil mist may settle on the surfaces; keep the time between cutting and welding to a minimum. Remove oil from all welded surfaces before welding.

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Milling and drilling the drain holes.

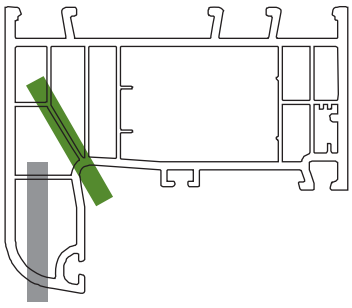
Correct operation of PVC doors and windows requires a number of drain holes to be made in selected profile chambers to drain the rain water away. The external profile chambers must be vented and the pressure in the chambers susceptible to heating (coloured profiles only) must be equalised. Drain holes and pressure equalisation holes are also required in coloured and foiled profiles.

In windows made of foiled, paint coated or aluminium lined profiles, the external profile surfaces may heat up to over 70°C. High temperature and pressure inside the profile chambers may cause deformation and buckling.

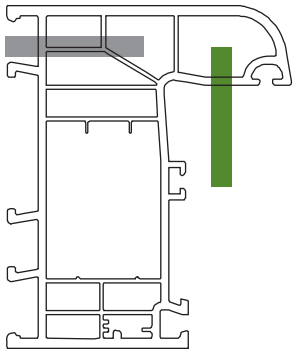
All coloured profile chambers, both small and large, require pressure equalisation holes (decompression holes).

The decompression holes must be made in all the main and additional profiles. Access to the decompression holes must not be blocked after glazing and installation.

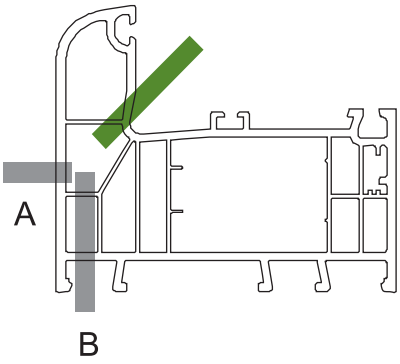
Milling and drilling holes in coloured profile frames



Pressure equalisation in the outer chambers. Use a 5 mm drill to drill the decompression holes in the marked chambers. Applies to top window elements.



Venting the vertical window elements. Use a 5 mm drill to drill the vent holes in the marked chambers. Drill the holes in vertical window elements at least 200 mm from the top of the rebate.



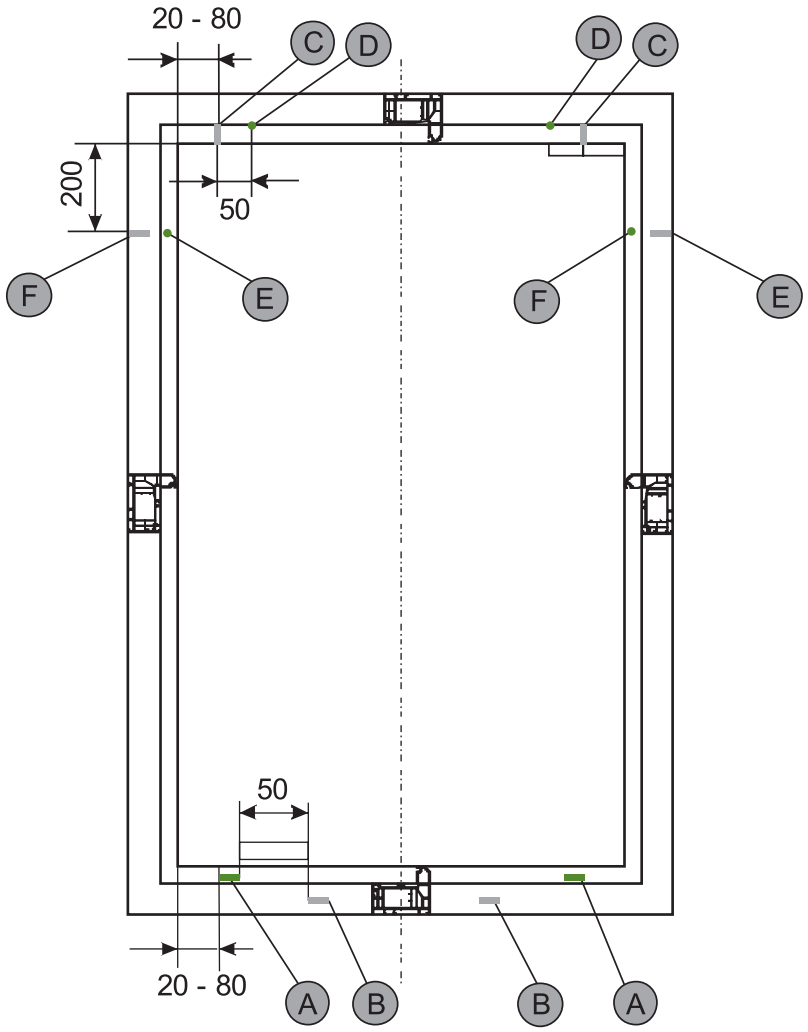
Drainage at the bottom section of the frame. Drain holes (slotted holes) 5x30 mm, 6x30 mm or 8 mm holes. A – chamber drainage to the outside, B – chamber drainage at the bottom. Drain holes A and B are optional. A distance between the drain holes (inside and outside) must be at least 50 mm.

Table 1. Milled and drilled holes - frames.

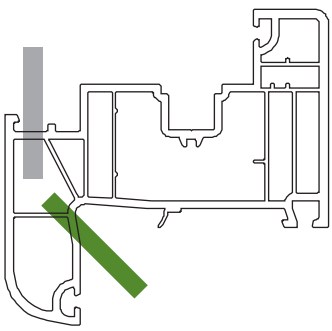
Window frame dimensions		Milled and drilled holes					
		Drainage		pressure equalisation		Ventilation	
		A	B	C	D	E	F
inside dimensions of the chamber	≤ 600 mm	2	1 w środku	2	2	2	2
	600 - 1300 mm	2	2	2	2	2	2
	1300 - 2000 mm	3	2	2	2	2	2
	≥ 2000 mm	3	3	2	2	2	2

Holes milled or drilled from the inside of the profile (green)

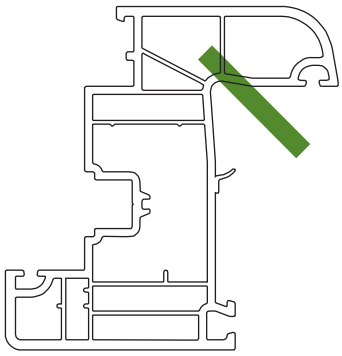
Holes milled or drilled from the inside of the profile (grey)



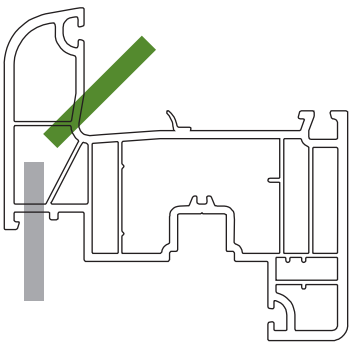
Milling and drilling holes in coloured sashes.



Pressure equalisation in the outer chambers. Mill 5x30 mm and 6x30 mm slotted holes in the marked chambers. Applies to top window elements.



Venting the vertical window elements. Use a 5 mm drill to drill the decompression holes in the marked chambers. Drill the holes in vertical window elements at least 200 mm from the top of the rebate.



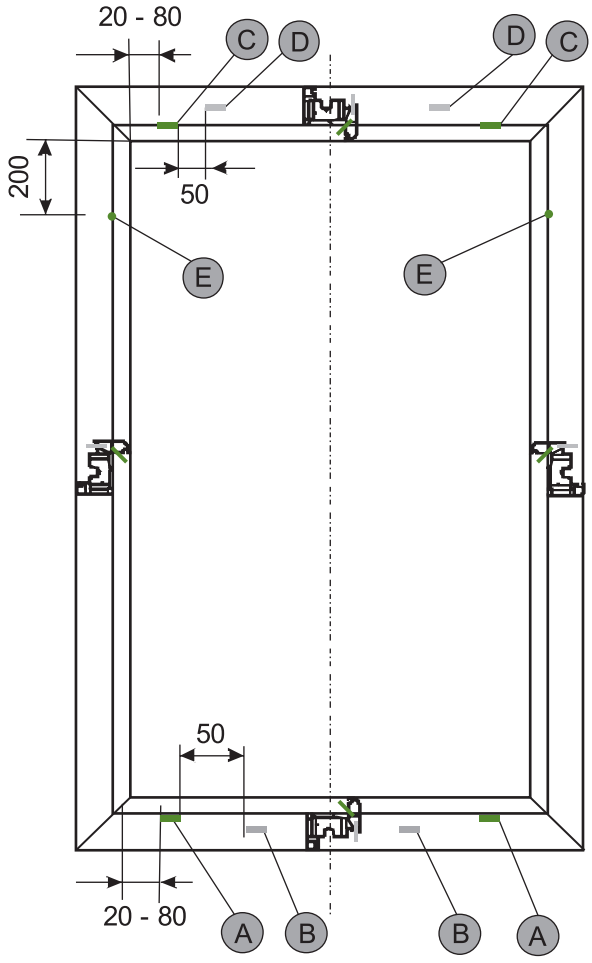
Drainage at the bottom section of the sash. Drain holes (slotted holes) 5x30 mm, 6x30 mm or 8 mm holes. A distance between the drain holes (inside and outside) must be at least 50 mm.

Table 2. Milled and drilled holes - sashes.

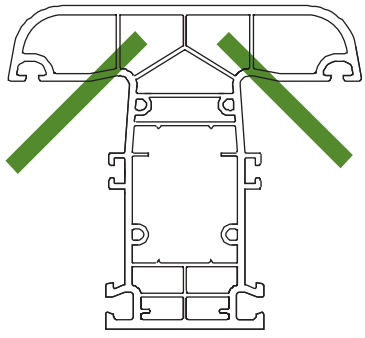
Window frame dimensions		Milled and drilled holes				
		Drainage		pressure equalisation		Ventilation
		A	B	C	D	F
inside dimensions of the chamber	≤ 600 mm	2	1 inside	1 inside	2	2
	600 - 1300 mm	2	2	2	2	2
	1300 - 2000 mm	3	2	2	2	2
	≥ 2000 mm	3	3	2	2	2

Holes milled or drilled from the inside of the profile (green)

Holes milled or drilled from the inside of the profile (grey)



Milling and drilling holes in coloured vertical mullions and non-removable dividers.



Venting the vertical window elements (transom/mullions and dummy bars in vents).
Use a 5 mm drill to drill the decompression holes in the marked chambers. Drill the holes in vertical window elements at least 200 mm from the top of the rebate.

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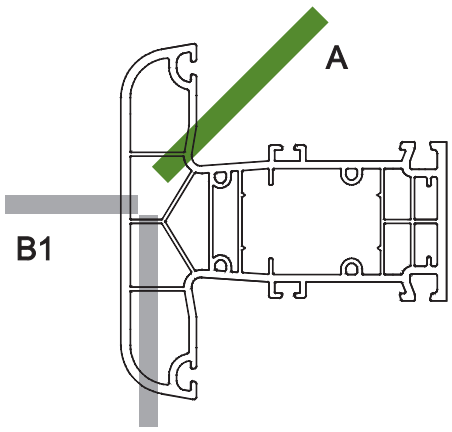
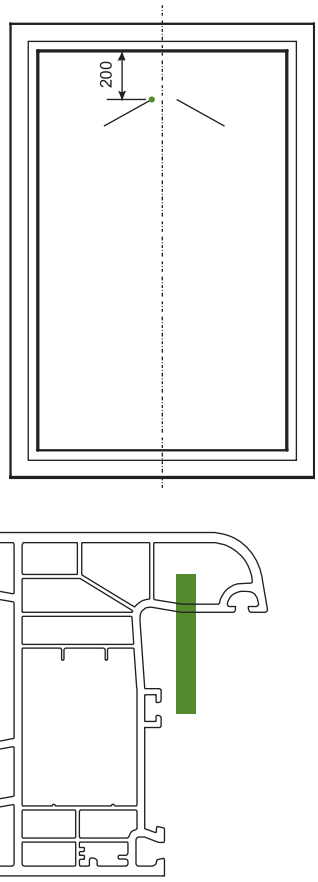
Milling and drilling holes in coloured horizontal mullions and non-removable dividers.



Drain holes in vertical mullions and dummy bars in vents. Drain holes (slotted holes) 5x30 mm, 6x30 mm or 8 mm holes. A – chamber drainage to the outside, B – chamber drainage at the bottom. Drain holes A and B are optional. A distance between the drain holes (inside and outside) must be at least 50 mm.



Venting the vertical mullions separated with transoms/transom bars. Use a 5 mm drill to drill the decompression holes in the marked chambers. Drill the holes in vertical window elements at least 200 mm from the top of the rebate.

Table 3. Milled and drilled holes - horizontal transoms.

Window frame dimensions		Milled and drilled holes				
		Drainage		pressure equalisation		Ventilation
		A	B	C	D	F
inside dimensions of the chamber	≤ 600 mm	2	1 inside	1 inside	2	2
	600 - 1300 mm	2	2	2	2	2
	1300 - 2000 mm	3	2	2	2	2
	≥ 2000 mm	3	3	2	2	2

Holes milled or drilled from the inside of the profile (green)

Holes milled or drilled from the inside of the profile (grey)

8.5 Welding

Frame and sash profiles are joined by pressure butt welding.

The strength of the corner determines the capability of the window to compensate the forces exerted during frame installation and loads resulting from changes in length due to temperature variations, glazing unit weight and daily use.

A welding machine is a device for joining two plastic elements without introducing any other materials. In the welding process, the plastic elements are heated to approx. 235-240°C (exactly 4° lower than the point in which the plastic starts to turn slightly yellow) and joined under pressure.

Welding machine must be configured for a specific material and element to ensure optimum strength.
Commonly used welding machines with limiting blades will be discussed further below.

Check the following: A gap between the limiting blades must be at least 2 mm. The gap should ideally be 2.5 mm. Measure the gap during a trial run (low temperature welding).
Adjust the gap as necessary. Make sure the span on both ends of the profile is the same (symmetrical to the welding machine axis). Adjust the span as necessary. Make sure the air supply is disabled during the adjustments.
Refer to the Operation and Maintenance Manual of the welding machine.

Check the temperature of the limiting blades. The temperature at the blades should be approx. 40°C. Temperature shown by a thermostat may differ from the actual temperature at the blades. Measure the temperature at the blades and adjust the thermostat accordingly. Mark the correct thermostat setting on the housing.

The heating plate must move freely; consult the supplier if guidance is required. The heating plate must be smooth, without scratches and dirt. Check all cables and connections. Install the temperature sensors in accordance with the manufacturer's instructions; the sensors must be compatible with the machine. PTFE lining on the welding surface must be properly attached, clean and must not be scratched or damaged. Check if correct PTFE type is used. Dry the PTFE lining daily: every morning using a soft paper/tissue without any cleaning agents to remove dust and dirt. Keep spare PTFE lining at hand.

Use supporting welding blocks to prevent shifting, turning or distortion of the profiles.

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8.5 Welding

Shape of the welding blocks conforms to the shape of the profiles and the installation method depends on the welding machine type. Make sure the welding blocks are installed along the profile and adjusted correctly. The supporting welding blocks must not protrude beyond the limiting blade. The guide must have sharp edges with a groove for collecting melted material behind the edges. All control units and guides must be clean. Adjust as necessary. Consult the supplier if guidance is required. Weld the profiles immediately after cutting; the accumulated dust may weaken the weld and cause a black line to form.

Setting the process parameters:

Profile clamping pressure:	4.5 < p1 < 5 bar Pressure providing reliable profile clamping in the machine during welding.
Profile clamping pressure to the welding machine surface (heating plate):	3.5 < p2 < 4 bar The pressure required during heating plate contact with the profiles.
Profile clamping pressure after heating (cooling):	3.5 < p2 < 4 bar Welding pressure required for the profiles to join properly after heating.
Heating time:	t1 = 30 seconds Heating plate contact time with welded elements. t1 = 45 seconds Profile welding to angle cover.
Opening time:	t2 = 2 seconds Time between opening the welding machine, removing the heating plate and joining the heated elements. Set the shortest time possible to prevent pock marks.
Welding time:	t3 = 30 seconds Contact time for welded elements.

Finishing the welded joints .

Welded elements must not be stored on the ground and should be stored on trolleys or on pallets.

After welding, wait 5 minutes before milling the joints to make sure the proper strength is reached.

The joints can be milled manually or automatically.

Use a chisel or special knife (Don Carlos knife) and ensure all joints are flush with the profile surface.

An automatic cleaning machine leaves a shallow groove along the joint. Ensure the groove depth is as low as possible. Deep grooves reduce the cross section and may affect the corner strength.

The joints do not require additional processing (grinding or polishing) which may damage the surface and cause dust to accumulate on the polished surfaces. Dust and impurities will not damage the profiles, however the surface may lose gloss.

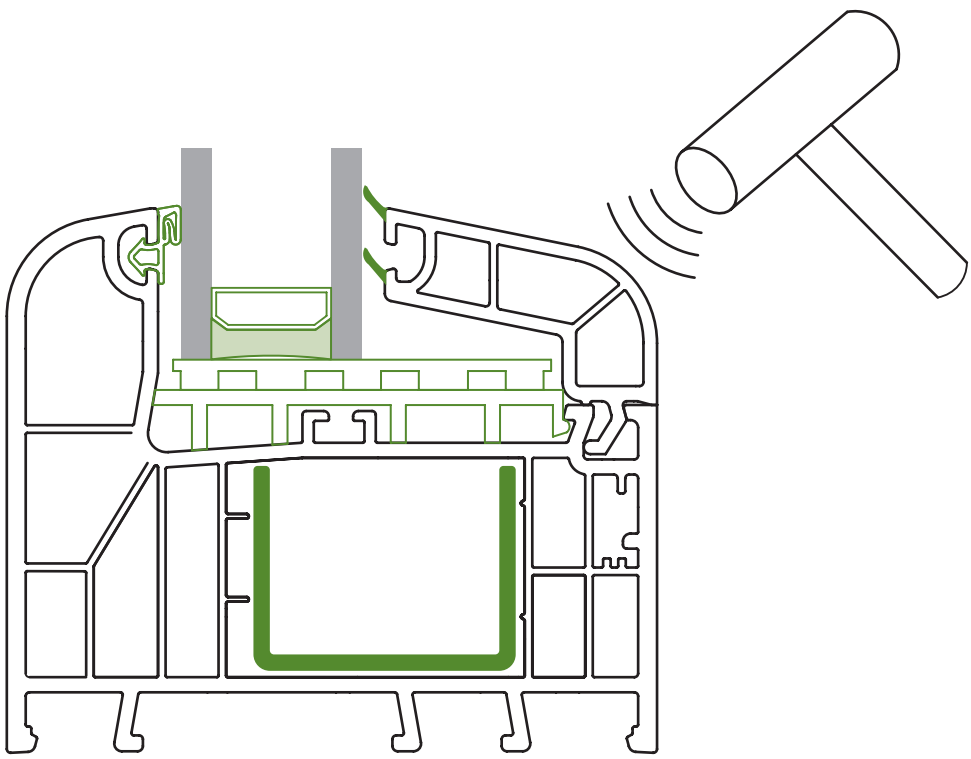
8.6 Glazing

The glazing units are mounted on support packers and held in place with the glazing beads.

The glazing unit must be secured against shifting with the support packers (see drawings). Any stresses should be eliminated to prevent damage to the glazing unit.

Insert the glazing bead into the frame bending both ends simultaneously. Use a rubber mallet to fit the glazing bead starting from the middle of the frame and moving towards the corner. For glazing beads cut at 45°, install the shorter beads first. For lap joined glazing beads, install the bottom glazing bead first.

Remove the glazing bead with a Don Carlos glazing bead removal knife to remove the glazing bead from the frame and from the window.



Guide to positioning the support packers.

The glazing units are mounted on support packers. The packers support, fix and keep the distance between the edge of the glazing unit and the base.

Do not block vents and drains with packers.

Available packer types:

TYPE 1

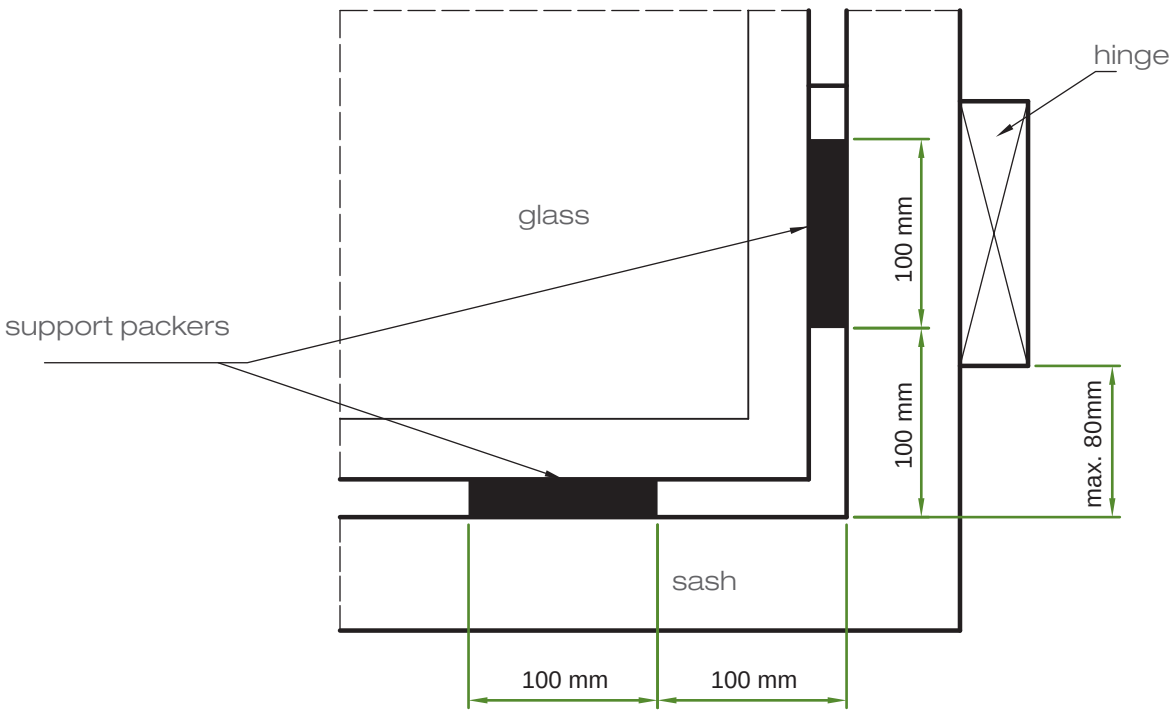
Support packers - transfer loads between the glazing unit and the base to stabilize the window elements.

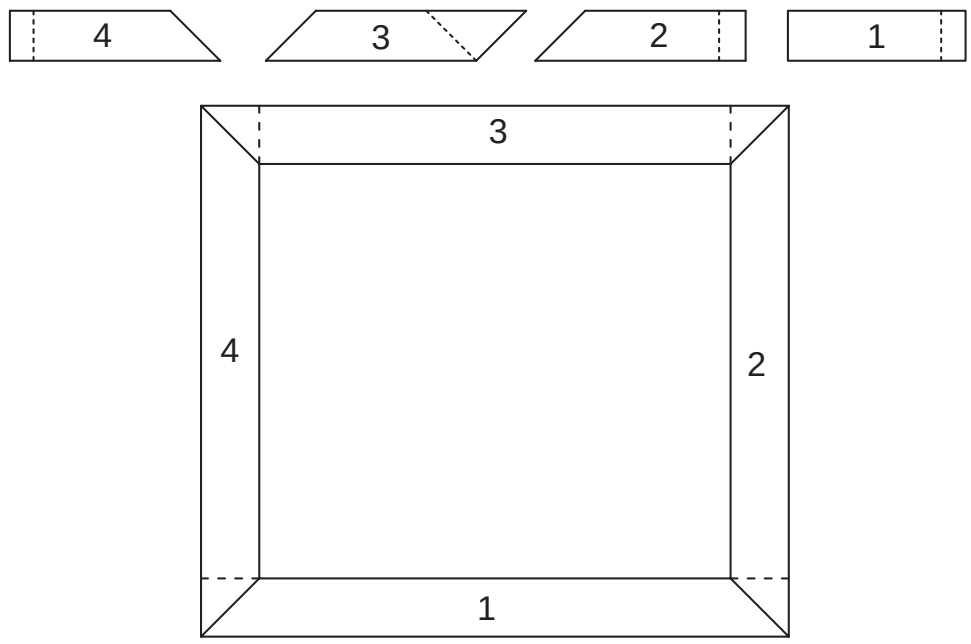
TYPE 2

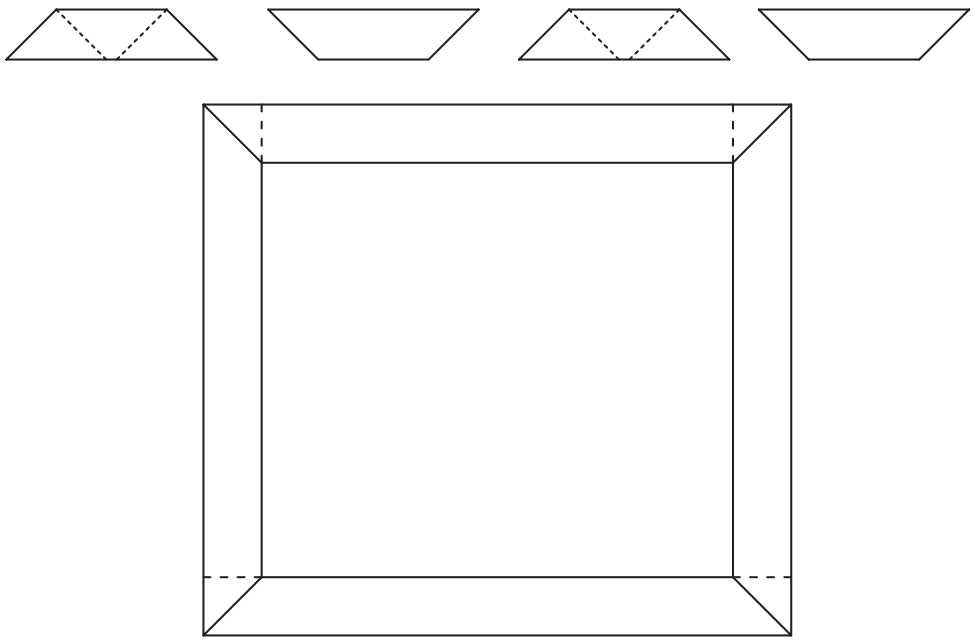
Spacer packers - keep the distance between the edge of the glazing unit and the base.
Use, if any side of the glazing unit longer than 500 mm.
If the length is shorter than 500 mm, the spacer packers are not required.

TYPE 3

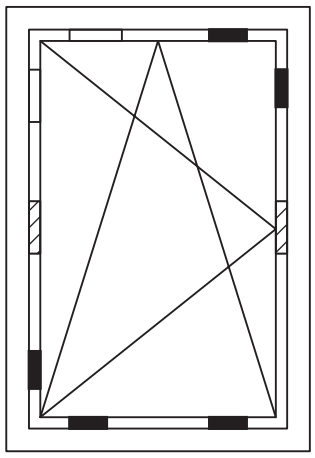
Contact point packers - ensure correct operation of the window fittings and alight the glazing unit during transport and use.



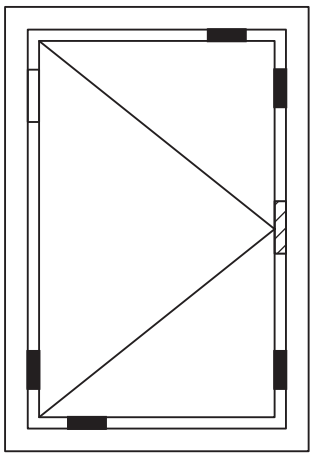




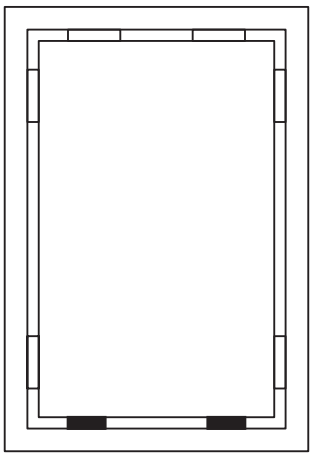
Guide to positioning the support packers.



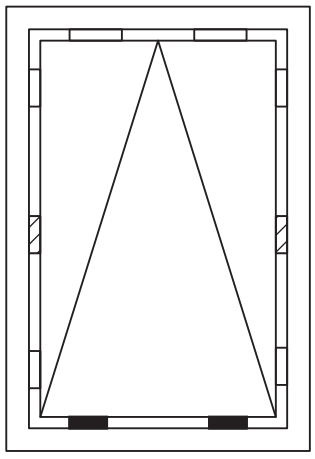
tilt and turn



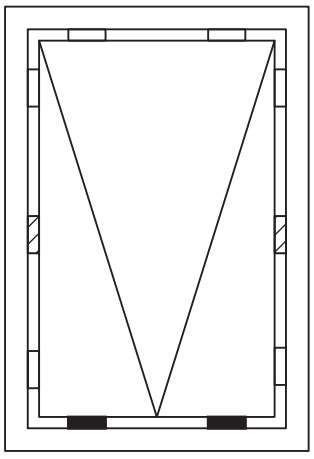
casement



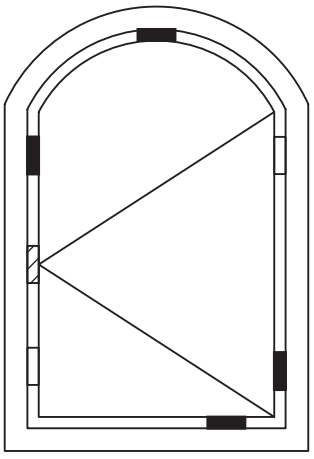
fixed glazing



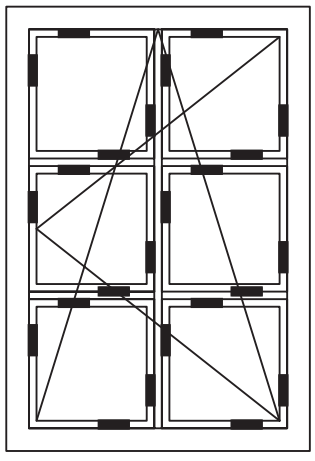
tilt



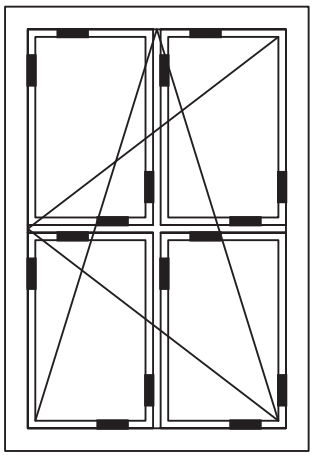
tilt



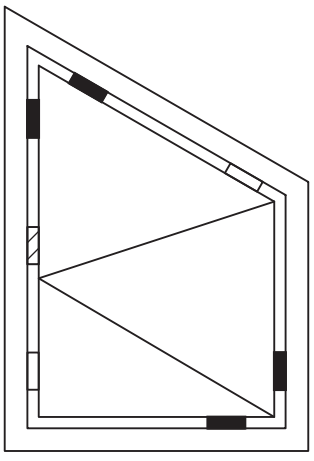
arched casement



window with dummy bars



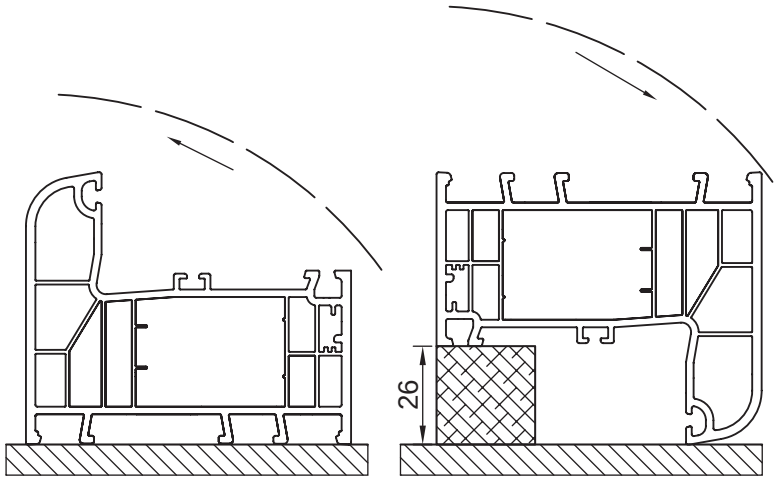
window with dummy bars

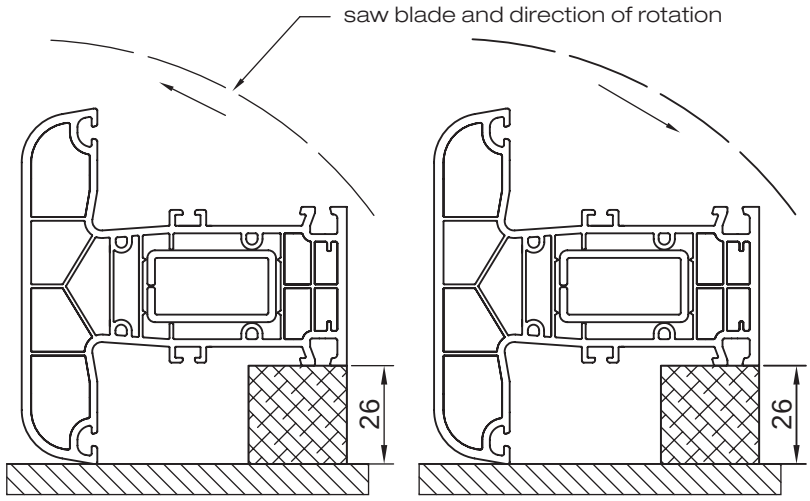


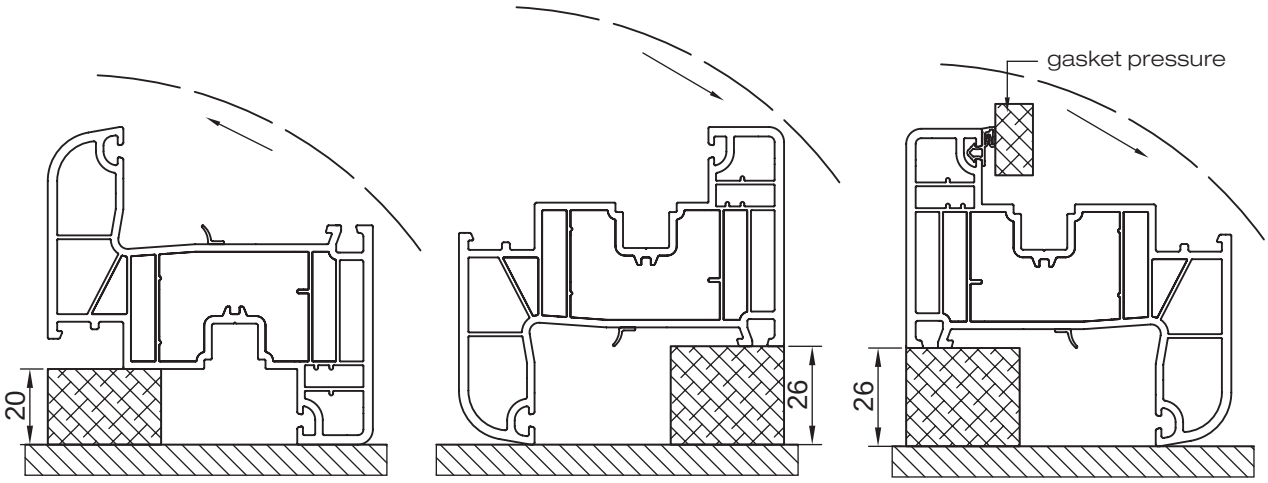
Shaped casement

spacer packers wedge packers contact point packers

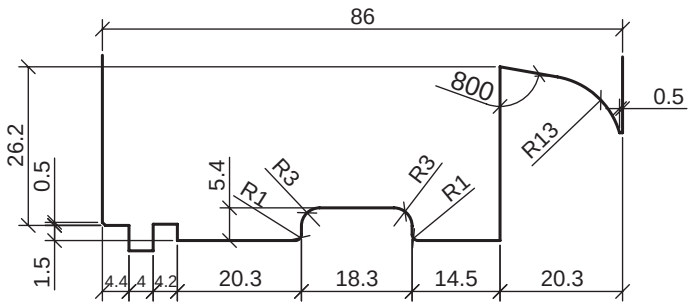
Saw blocks.

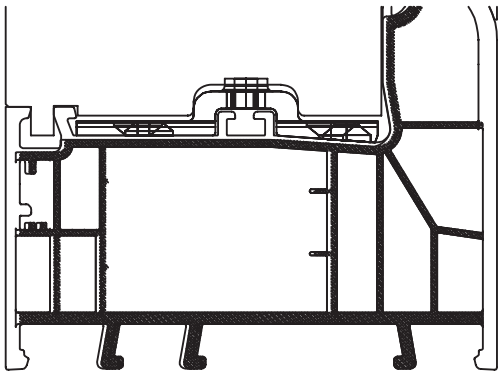


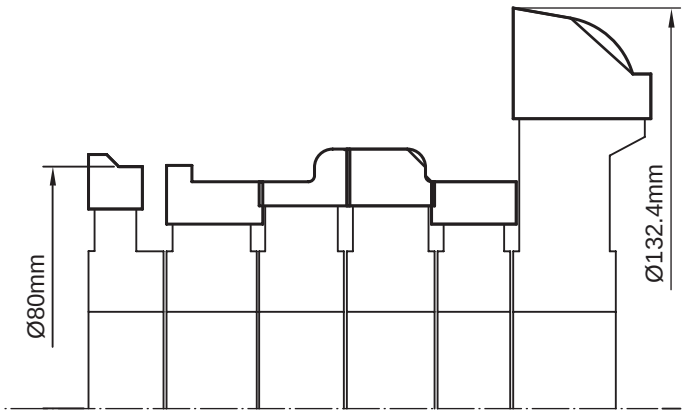


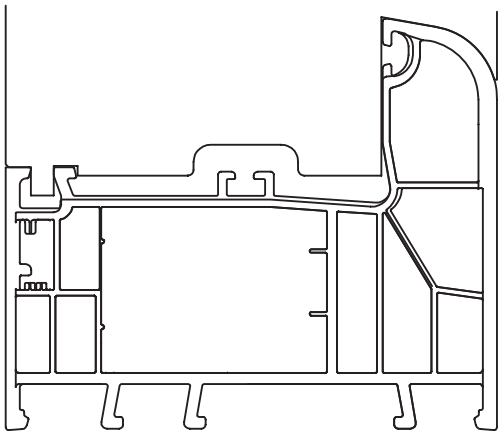


End Millers


86
800
0.5
R13
26.2
0.5
5.4
R3
R1
R3
R1
1.5
4.4
4
4.2
20.3
18.3
14.5
20.3




Ø80mm
Ø132.4mm



Welding Blocks