



Technical catalogue
of window and door
profile system

INNOVATIVE
TECHNOLOGIES
POLISH PRODUCT

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1. General information

1.1 Physical parameters of PVC profiles

Test		Unit	Standard	SPECTRUM window profiles
1	Vicat softening temperature	°C	PN-93 C-89024 metod B	80,3
2	Impact resistance at -10°C		PN-EN- 477:1997	No cracks
3	Resistance to temp.+150°C		PN-EN- 478:1997	No noticeable changes on external surfaces, slightly deformed walls inside the structure
4	Tensile strength	Mpa	PN-81 C-89034	46,2
5	Impact tensile strength	Mpa	PN-72 C-04243	64,4
6	Charpy notch impact strength	KJ/m ²	PN-81 C-89029	55,3
7	Tensile elasticity coefficient	MPa	DIN 5345	2443
8	Thermal expansion	%	PN-EN-479:1997	1,7
9	Colour change after aging		PN-86 P-04906	5 number of grey scale, corresponding to a colour change of 0.
10	Density ρ	g/cm ³	PN-92 C-89035 metod B	1,44 ±0,02

1. General information

1.2 Quality Guarantee

Spectrum system profiles, manufactured from modified polyvinyl chloride, are the basis for making PVC windows and doors. Their production complies with the requirements of Polish standards (PN-88/B-10085), the requirements of the Building Research Institute and refers to the tests carried out in the Rosenheim Institute.

Spectrum guarantees the following for a period of 5 years:

- unchanged quality of material,
- flawless shaping of the profiles within the permitted tolerances,
- chemical resistance according to the table below,
- light resistance (colour durability) of white window profiles.

Difference in colour relative to the standard according to the 5th degree on grey scale. Warranty is void if Spectrum guidelines for reworking window profiles are not adhered to.

Warranty claims shall not be accepted in the case of defects arising as a result of:

- defects arising as a result of:
- exposure of the surface to solvents or aggressive cleaning agents,
- inappropriate storage and warehousing,
- incorrect assembly,
- improper treatment and maintenance,
- unusual external impacts,
- force majeure (e.g. natural disasters, fire),
- actions of end user or bystanders.

In case of justified complaints, we provide a cost-free replacement of material.

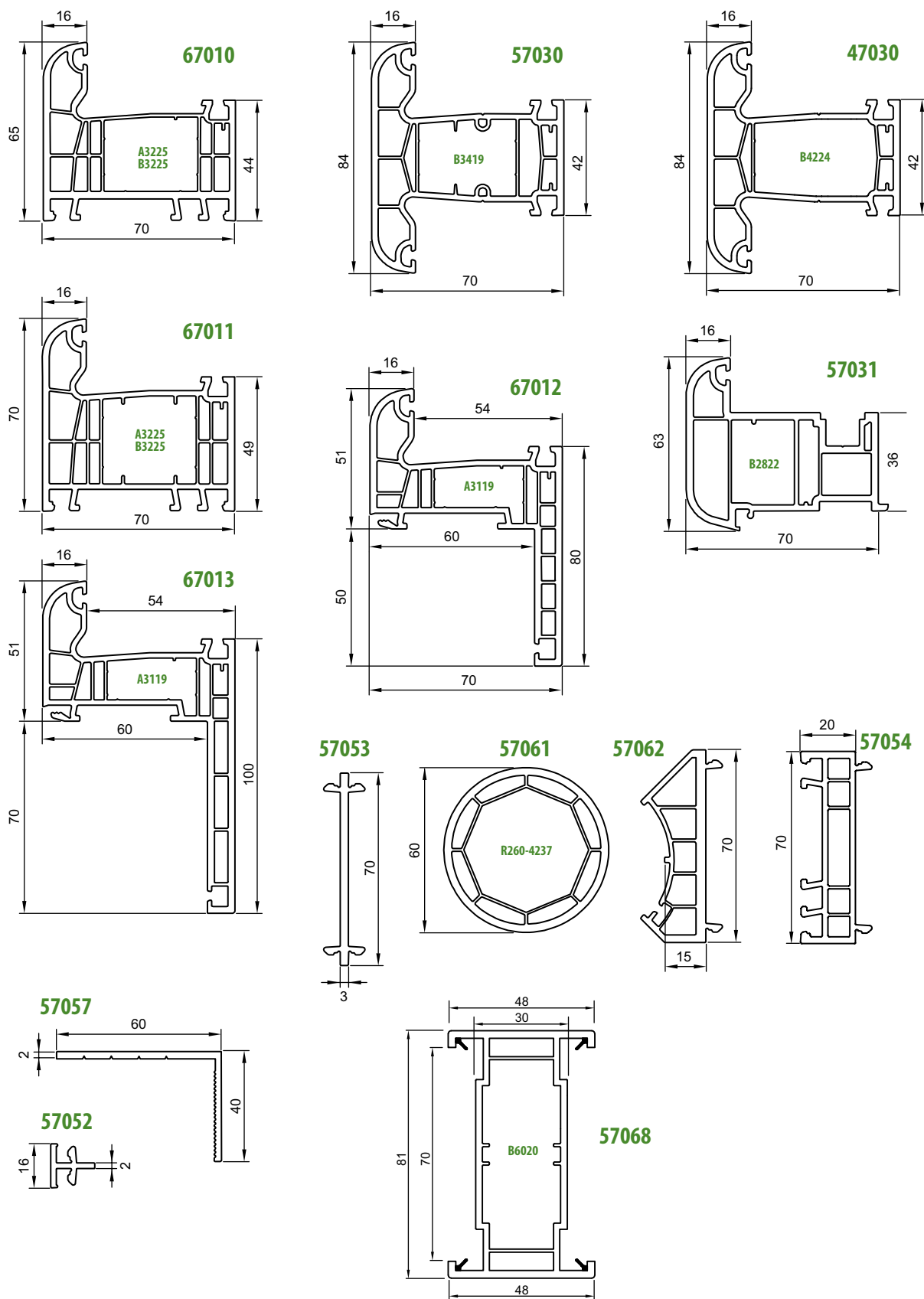
Any claims going beyond that, regardless of the legal basis, shall be ineffective.

The rules of complaint handling and the manner of complaint procedure are determined by Spectrum.

The validity of the warranty starts on the day of shipment.

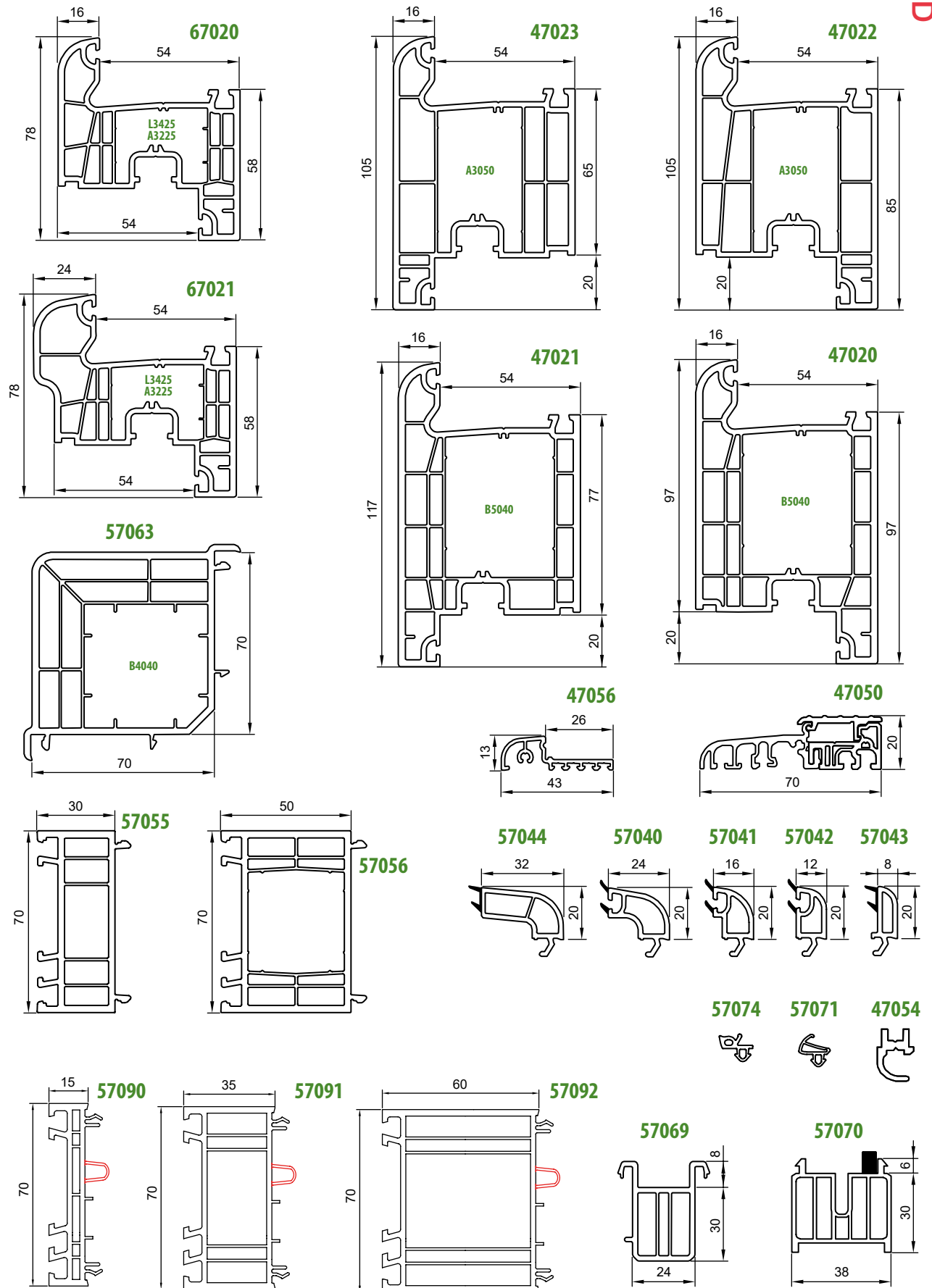
2. Overview of system components

2.1-1 Overview of PVC profiles



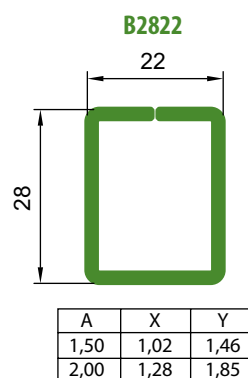
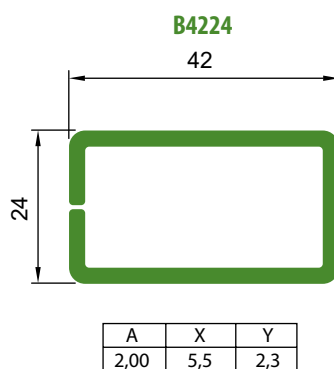
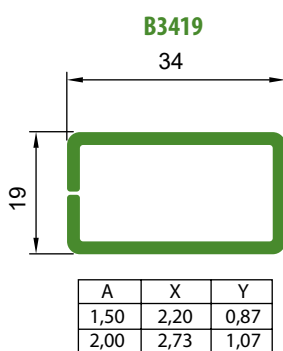
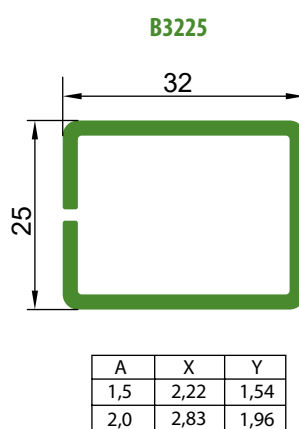
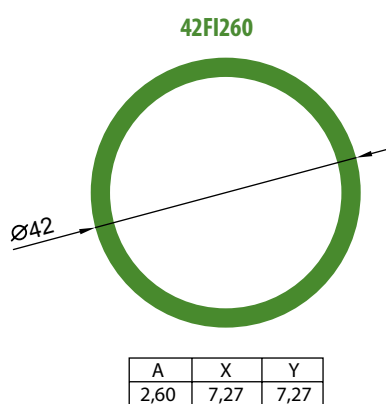
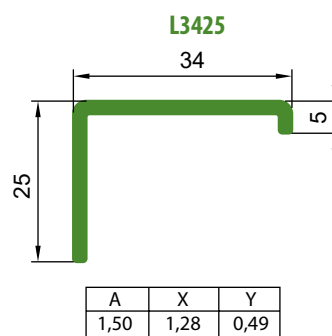
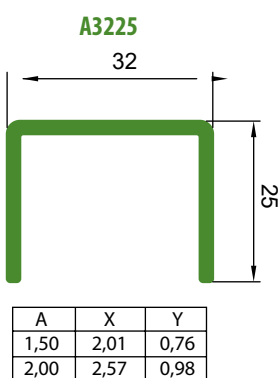
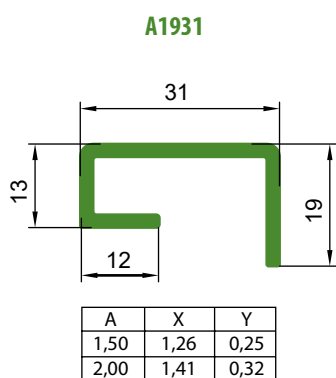
2. Overview of system components

2.1-2 Overview of PVC profiles



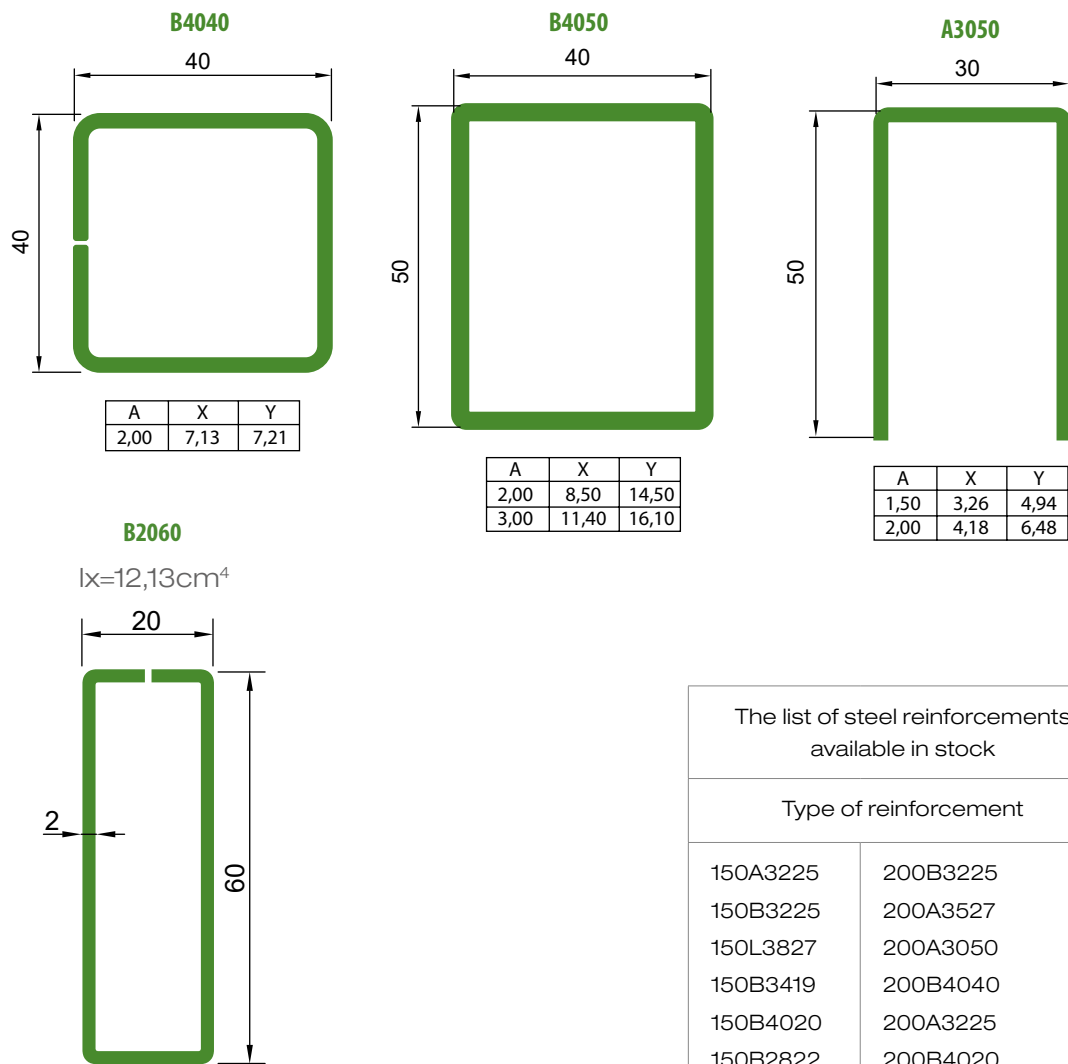
2. Overview of system components

2.2-1 Overview of profile reinforcements



2. Overview of system components

2.2-2 Overview of profile reinforcements



A - section steel thickness in mm
X - moment of inertia of steel in cm^4 in X plane
Y - moment of inertia of steel in cm^4 in Y plane

The list of steel reinforcements
available in stock

Type of reinforcement

150A3225	200B3225
150B3225	200A3527
150L3827	200A3050
150B3419	200B4040
150B4020	200A3225
150B2822	200B4020
150B3545	200B3545
150B3527	200B3527
150A1931	200B3419
150A3050	200a3528
150B4224	200L3425
150L3425	200B2060
150A3527	200B5040
150B3535	200S1170
150B1535	200L3827
150B3540	200B4555
	200B4224
	200B5050
	200B6523

3. Size limitations, maximum sash dimensions

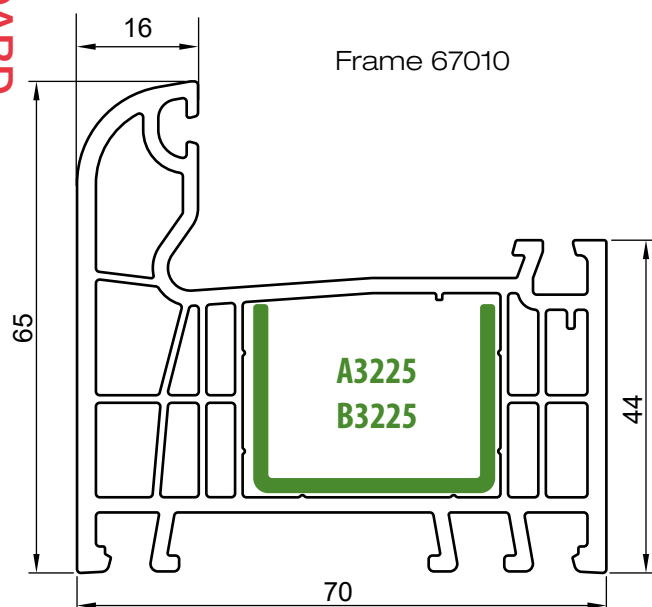
See Appendix 1.

4. Profile overview

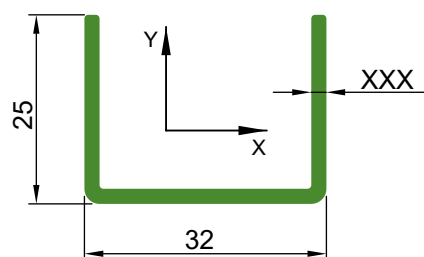
- 4.1 Frame 67010, Frame 67011
- 4.2 Sash 67020
- 4.3 Sash 67021
- 4.4 Renovation frame 67012
- 4.5 Renovation frame 67013
- 4.6 „Intermediate” sash Z 47022
- 4.7 „Intermediate” sash T 47023
- 4.8 „Heavy” sash Z 47020
- 4.9 „Heavy” sash T 47021
- 4.10 Fixed mullion 47030
- 4.11 Fixed mullion 57030
- 4.12 Floating mullion 57031
- 4.13 Glazing beads, frame connectors, angle connector
- 4.14 Frame extensions
- 4.15 Pipe connector 57061 + 57062
- 4.16 Connector 90° – 57063
- 4.17 Static connector 57068
- 4.18 Mounting profiles, gaskets
- 4.19 Accessories

4. Profile overview

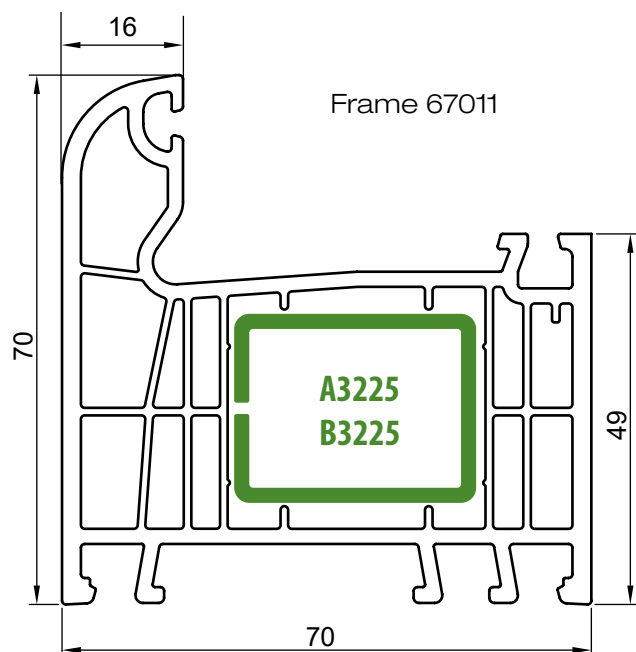
4.1 Frame 67010, Frame 67011



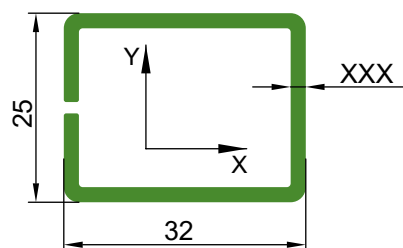
Reinforcement XXXA3225



symbol	x [mm]	lx [cm ⁴]	ly [cm ⁴]
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

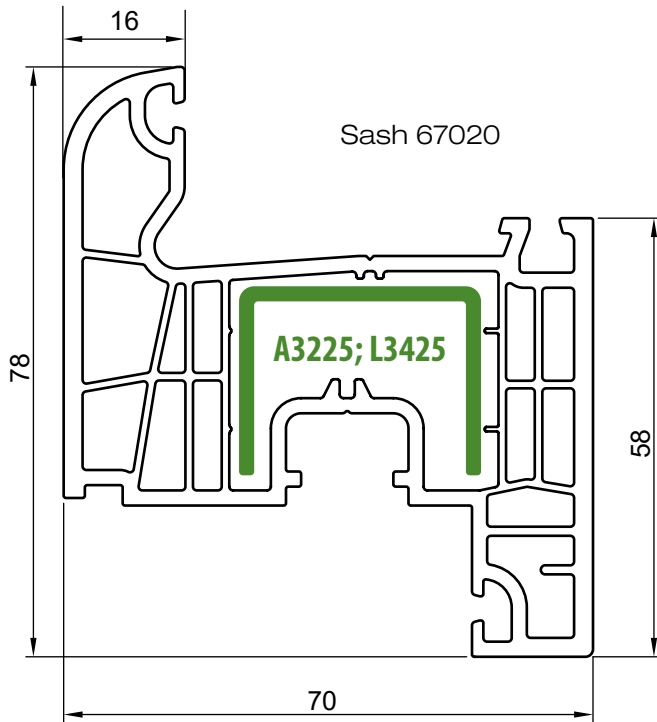


Reinforcement XXXB3225

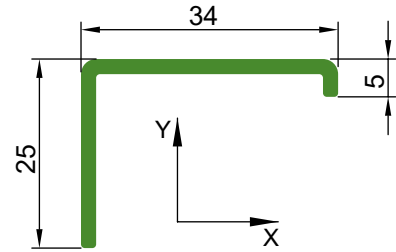


symbol	x [mm]	lx [cm ⁴]	ly [cm ⁴]
200B3225	2,00	2,8357	1,9581
175B3225	1,75	2,5360	1,7587
150B3225	1,50	2,2202	1,5459
120B3225	1,20	1,8661	1,3192

4. Profile overview
4.2 Sash 67020



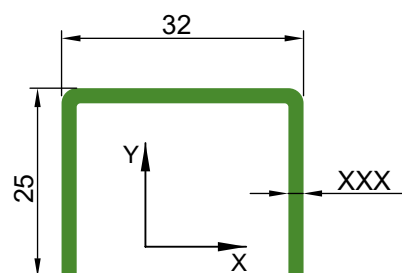
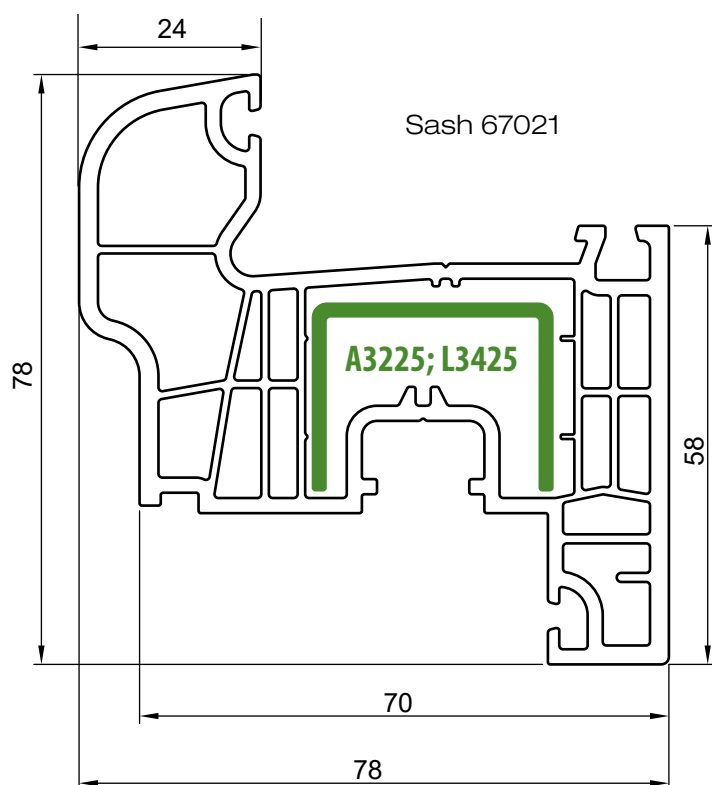
Reinforcement XXXL3425



symbol	x [mm]	lx [cm ⁴]	ly [cm ⁴]
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

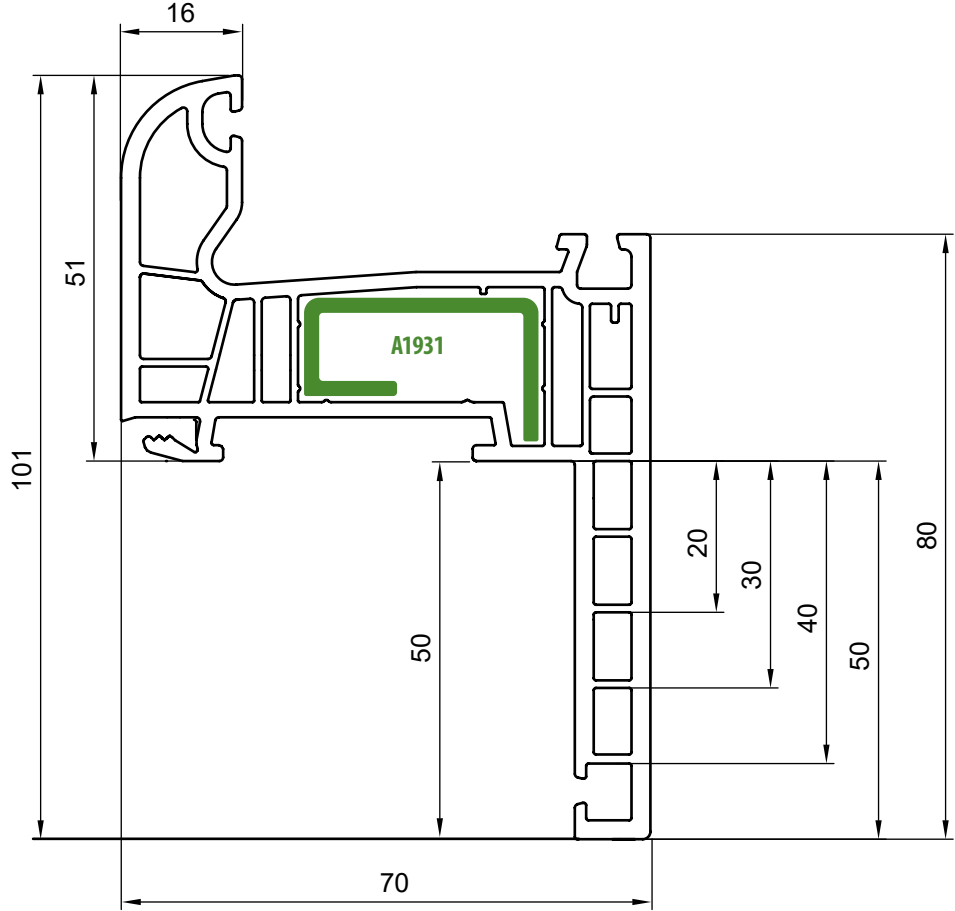
4. Profile overview

4.3 Sash 67021

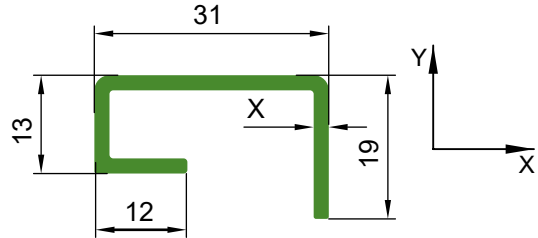


symbol	x [mm]	lx [cm ⁴]	ly [cm ⁴]
200A3225	2,00	2,5748	0,9811
175A3225	1,75	2,2972	0,8702
150A3225	1,50	2,0061	0,7556
120A3225	1,20	1,7013	0,6373

4. Profile overview
4.4 Renovation frame 67012

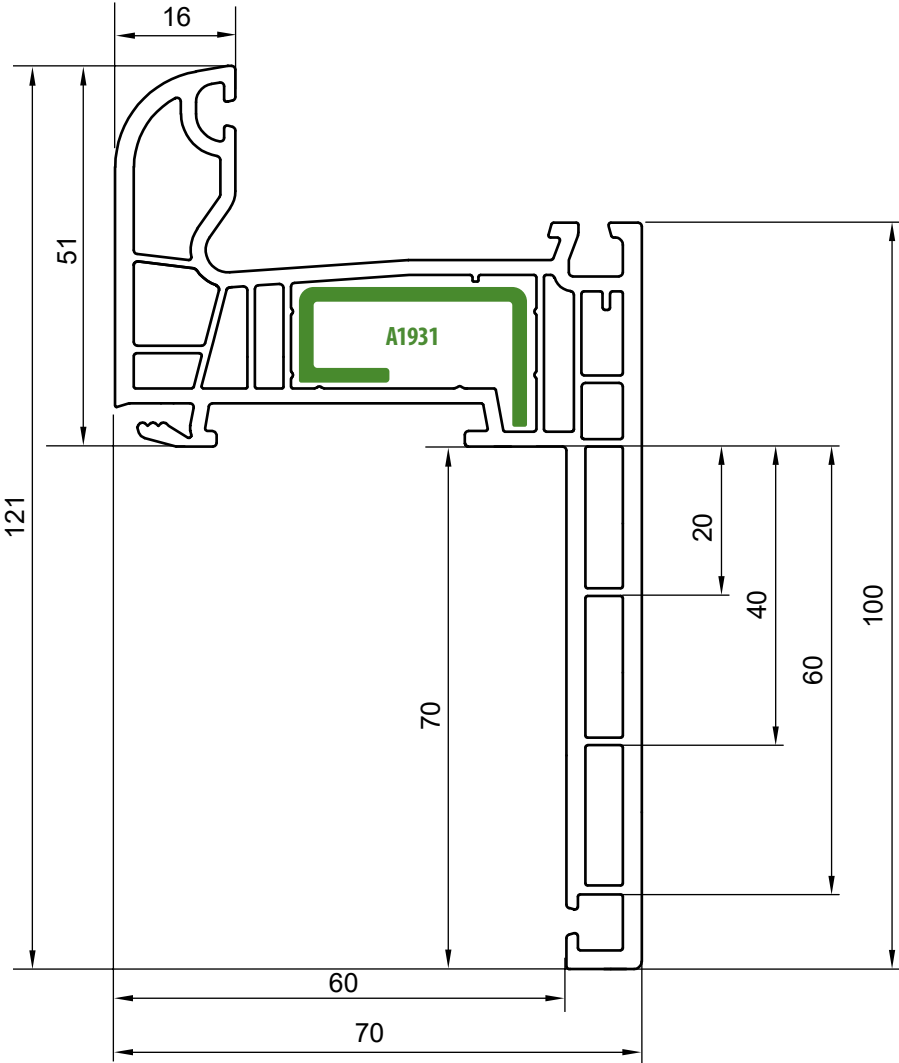


Reinforcement XXXA1931

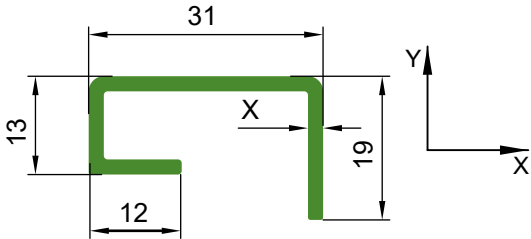


symbol	x [mm]	lx [cm ⁴]	ly [cm ⁴]
150A1931	1,50	1,41	0,32

4. Profile overview
4.5 Renovation frame 67013



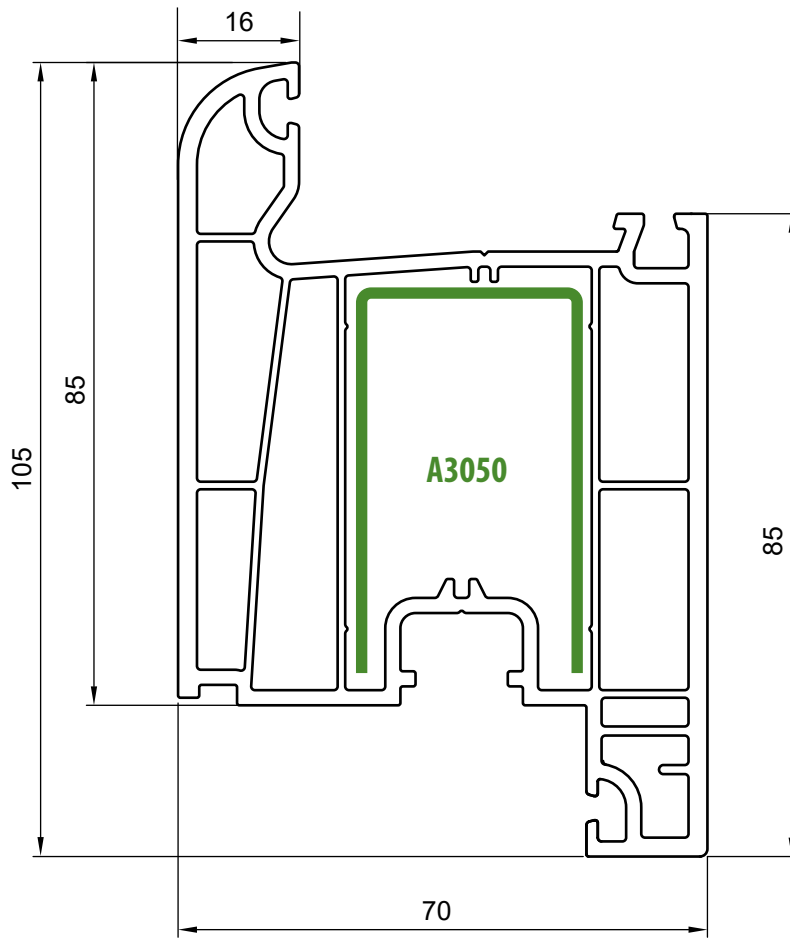
Reinforcement XXXA1931



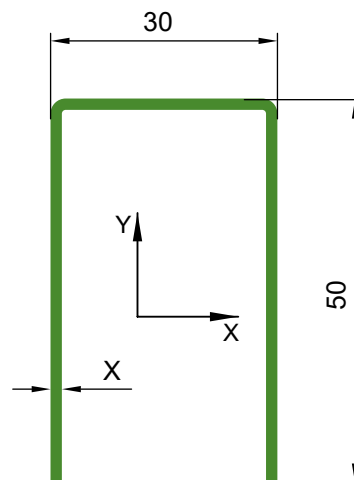
symbol	x [mm]	Ix [cm ⁴]	Iy [cm ⁴]
150A1931	1,50	1,41	0,32

4. Profile overview

4.6 „Intermediate” sash Z 47022



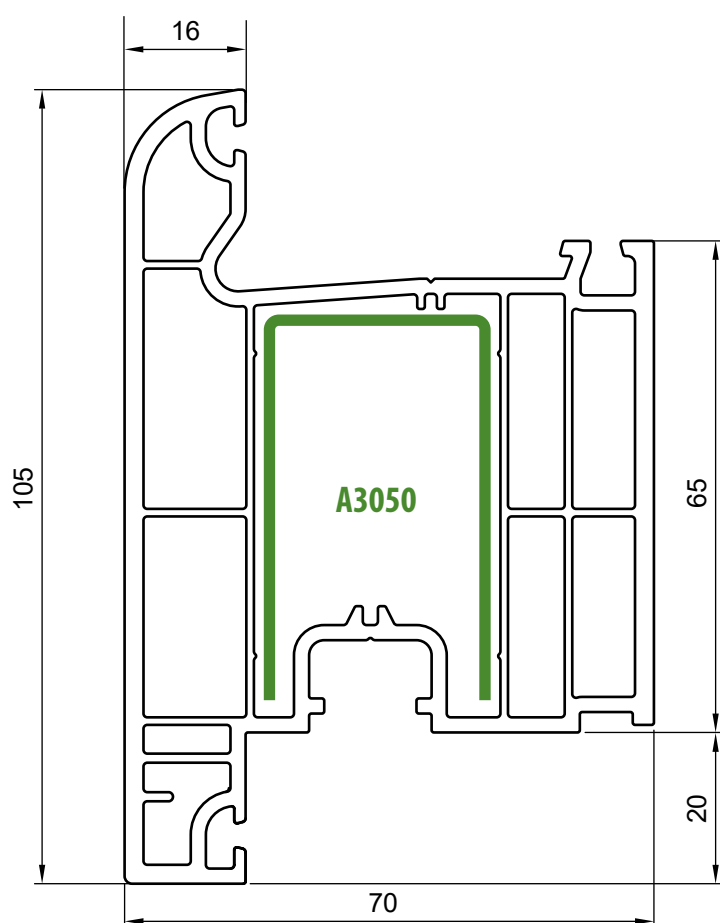
Reinforcement XXXA3050



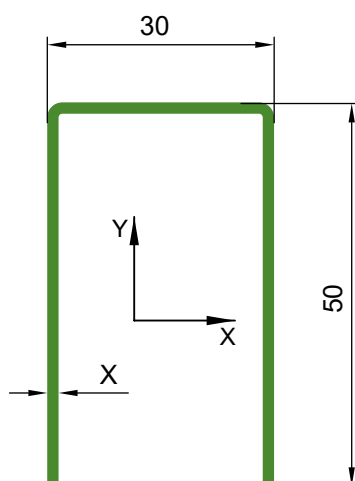
symbol	x [mm]	Ix [cm ⁴]	Iy [cm ⁴]
150A3050	1,50	3,26	4,94
200A3050	2,00	4,18	6,48

4. Profile overview

4.7 „Intermediate” sash T 47023

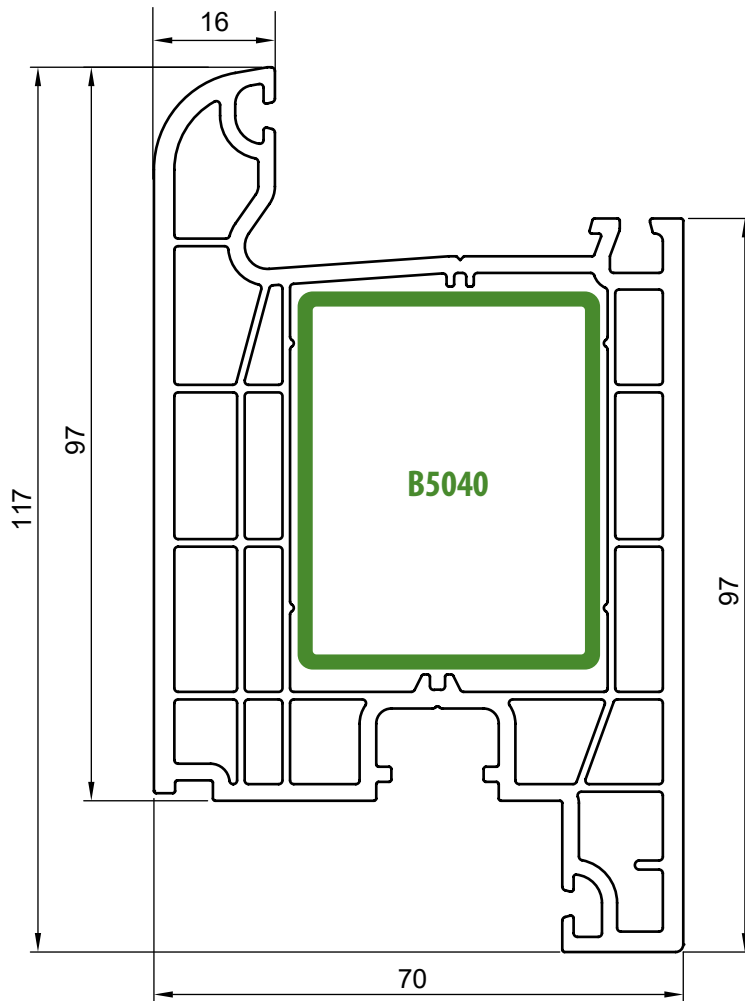


Reinforcement XXXA3050

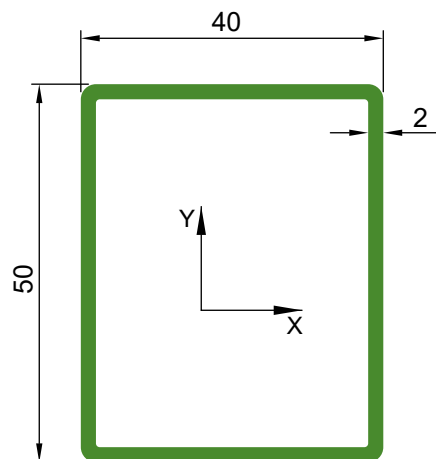


symbol	x [mm]	I _x [cm ⁴]	I _y [cm ⁴]
150A3050	1,50	3,26	4,94
200A3050	2,00	4,18	6,48

4. Profile overview
4.8 „Heavy” sash Z 47020

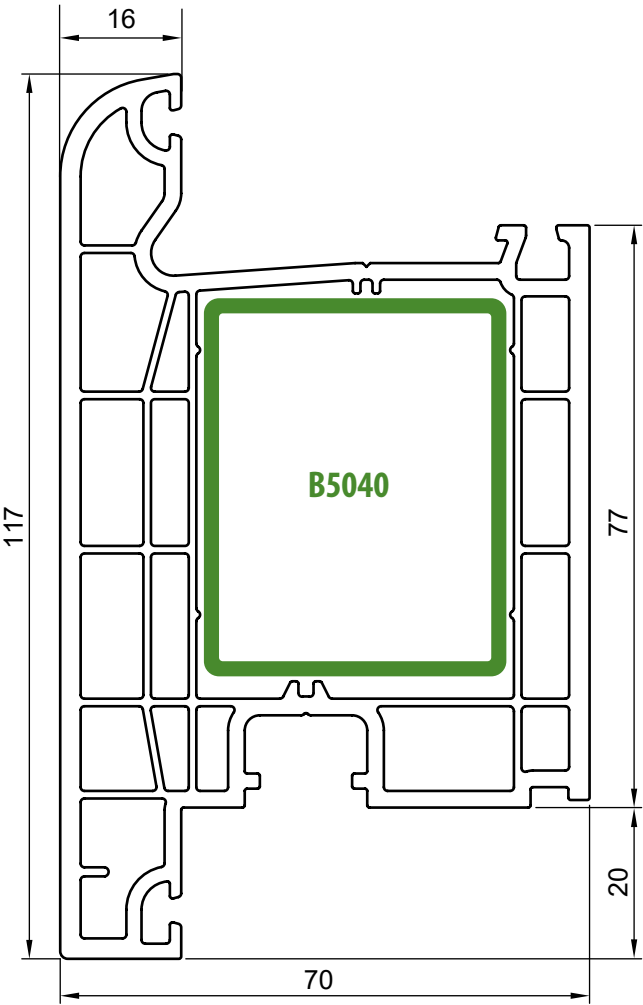


Reinforcement 200B5040

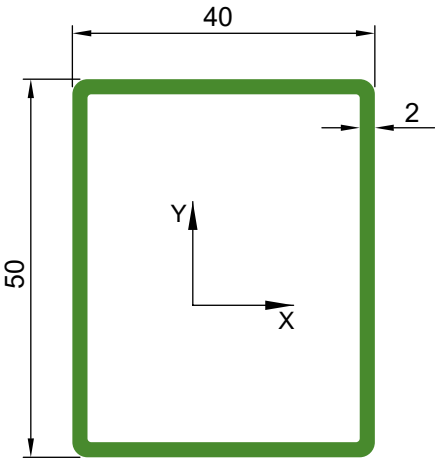


symbol	x [mm]	Ix [cm ⁴]	Iy [cm ⁴]
200B5040	2,00	8,657	12,154

4. Profile overview
4.9 „Heavy” sash T 47021

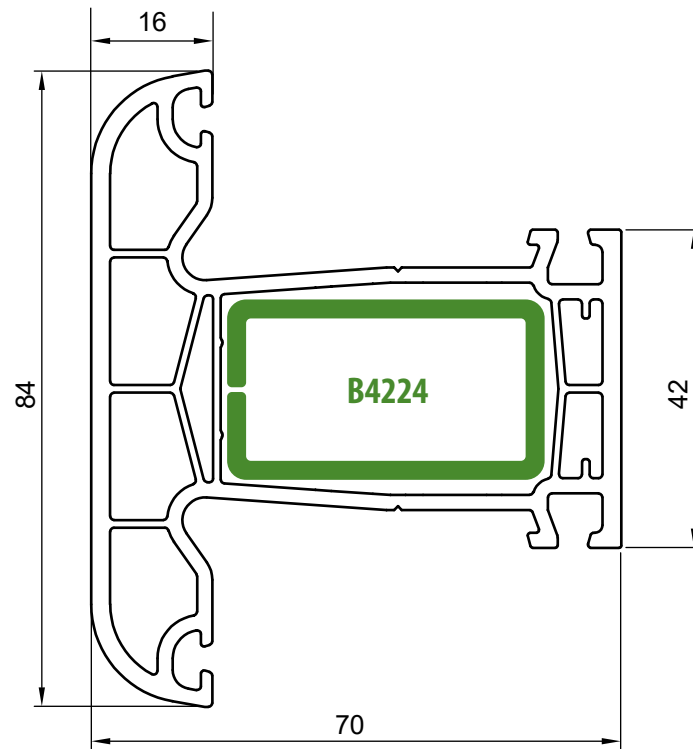


Reinforcement 200B5040

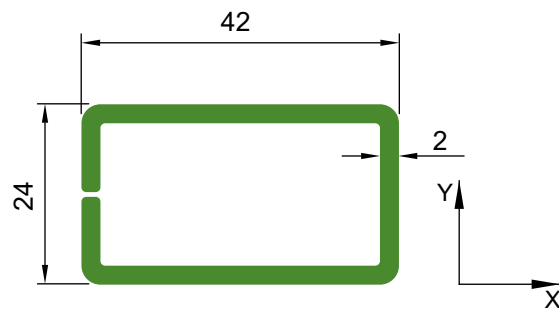


symbol	x [mm]	Ix [cm ⁴]	Iy [cm ⁴]
200B5040	2,00	8,657	12,154

4. Profile overview
4.10 Fixed mullion 47030



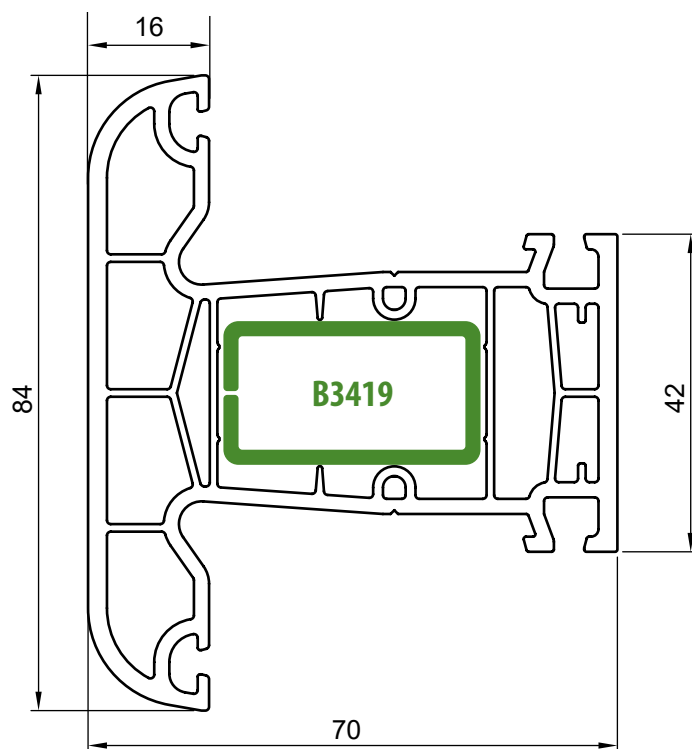
Reinforcement XXXB4224



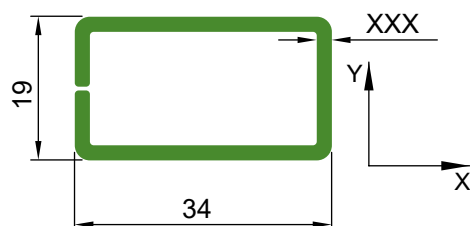
symbol	x [mm]	Ix [cm ⁴]	Iy [cm ⁴]
200B4224	2,00	5,5	2,3

4. Profile overview

4.11 Fixed mullion 57030

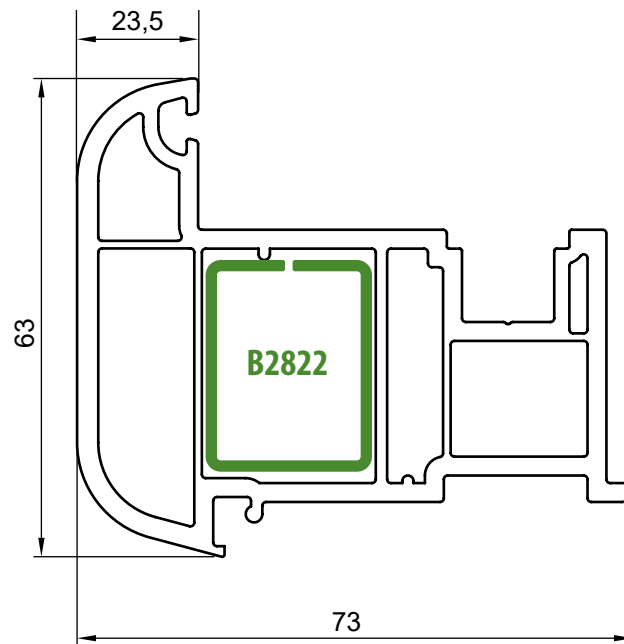


Reinforcement XXXB3419

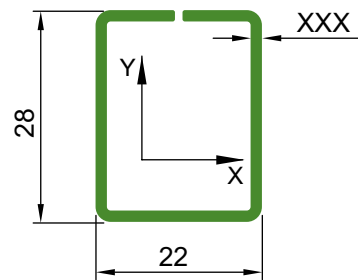


symbol	x [mm]	lx [cm ⁴]	ly [cm ⁴]
250B3419	2,50	3,2010	1,2376
200B3419	2,00	2,7280	1,0719
175B3419	1,75	2,4626	0,9755
150B3419	1,50	2,1962	0,8752
120B3419	1,20	1,9071	0,7288

4. Profile overview
4.12 Floating mullion 57031



Reinforcement XXXB2822

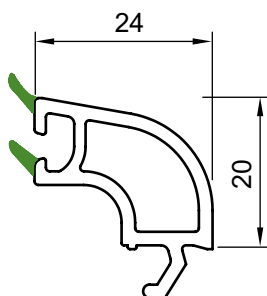


symbol	x [mm]	I _x [cm ⁴]	I _y [cm ⁴]
250B2822	2,50	1,506	2,197
200B2822	2,00	1,282	1,854
175B2822	1,75	1,155	1,664
150B2822	1,50	1,019	1,463

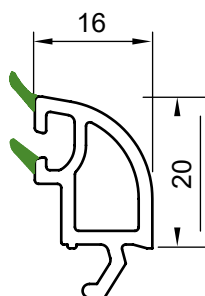
4. Profile overview

4.13 Glazing beads, frame connectors, angle connector

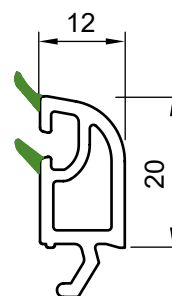
slat 57040
24 mm glazing unit



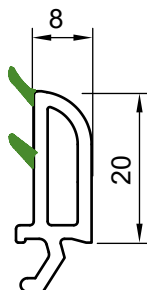
slat 57041
32 mm glazing unit



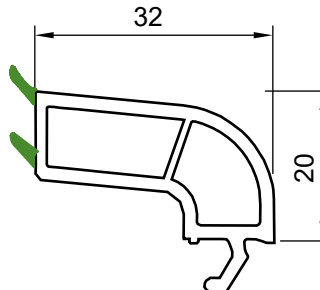
slat 57042
36 mm glazing unit



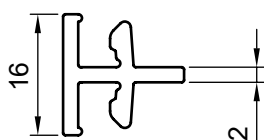
slat 57043
40 mm glazing unit



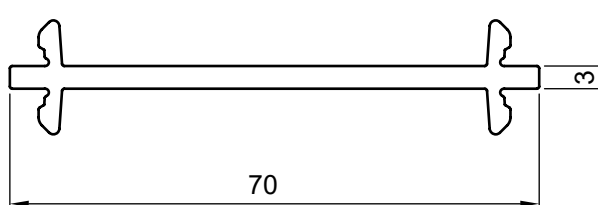
slat 57044
16 mm glazing unit



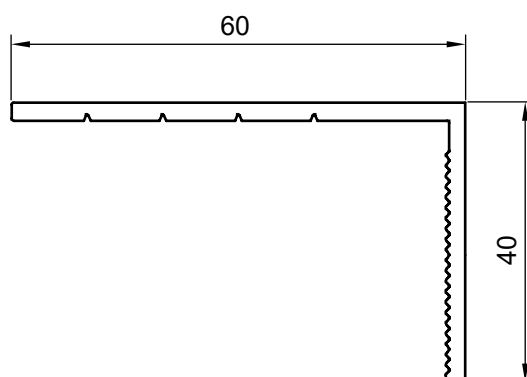
„H” connector 57052



frame connector 57053



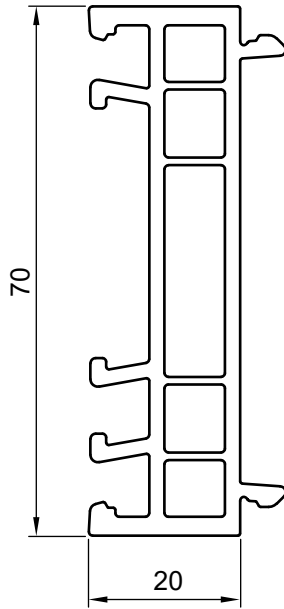
angle connector 57057



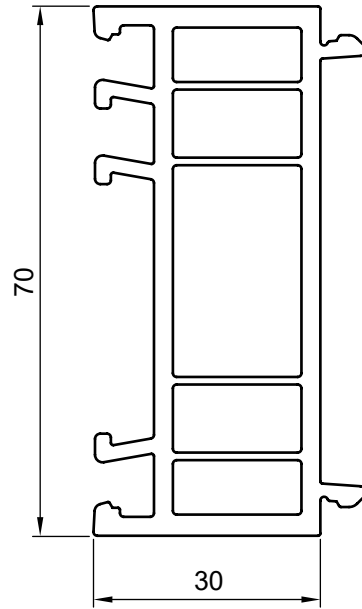
4. Profile overview

4.14 Frame extensions

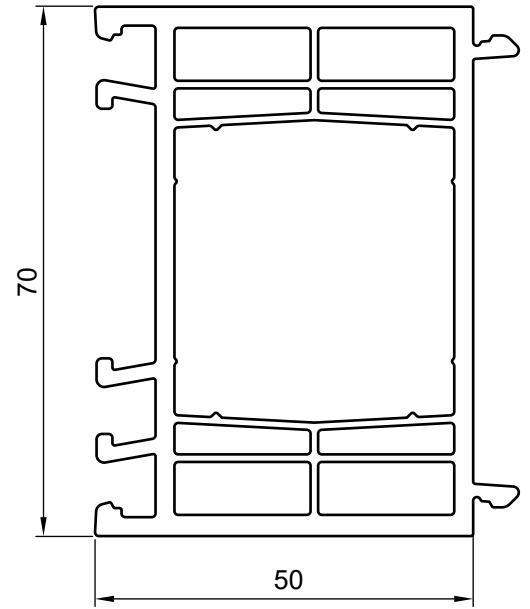
„20“ extension 57054



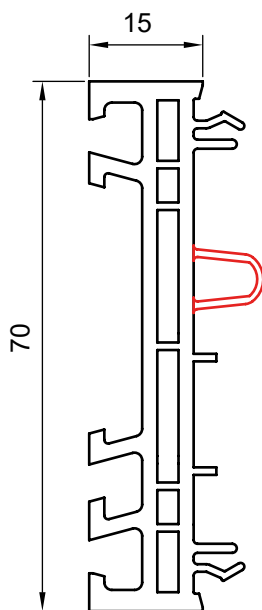
„30“ extension 57055



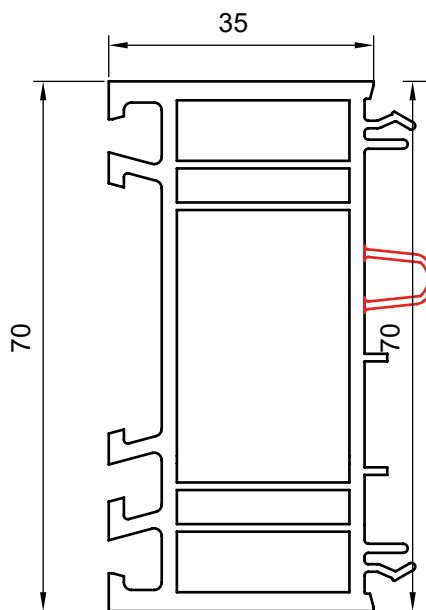
„50“ extension 57056



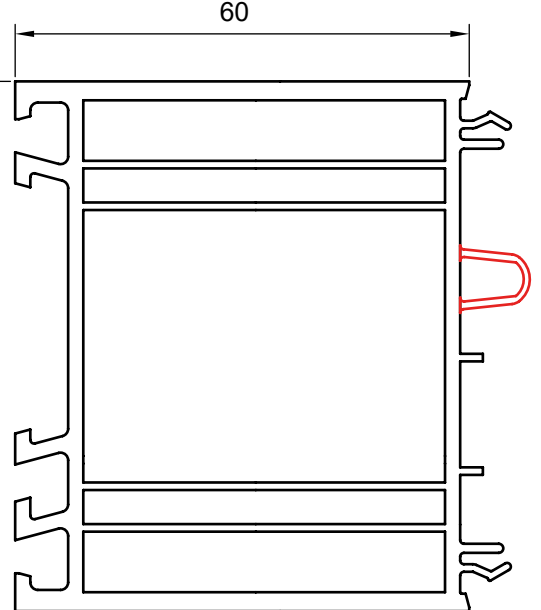
„15“ extension 57090



„35“ extension 57091

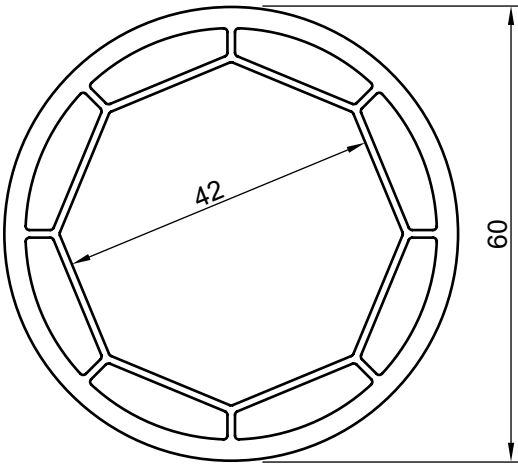


„65“ extension 57092

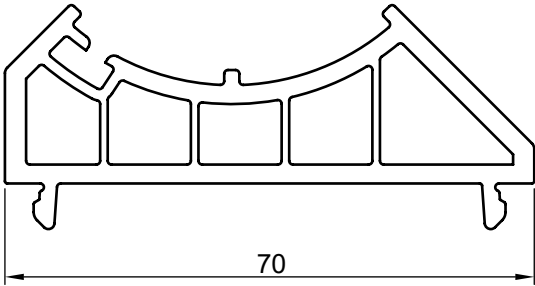


4. Profile overview
 4.15 Pipe connector 57061+57062

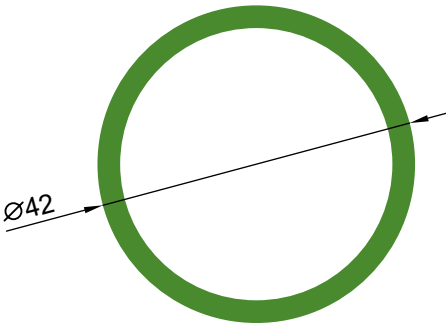
Adjustable angle
 connector tube 57061



Adjustable angle
 connector tube 57062



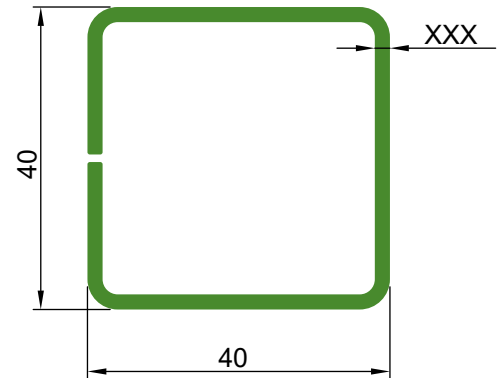
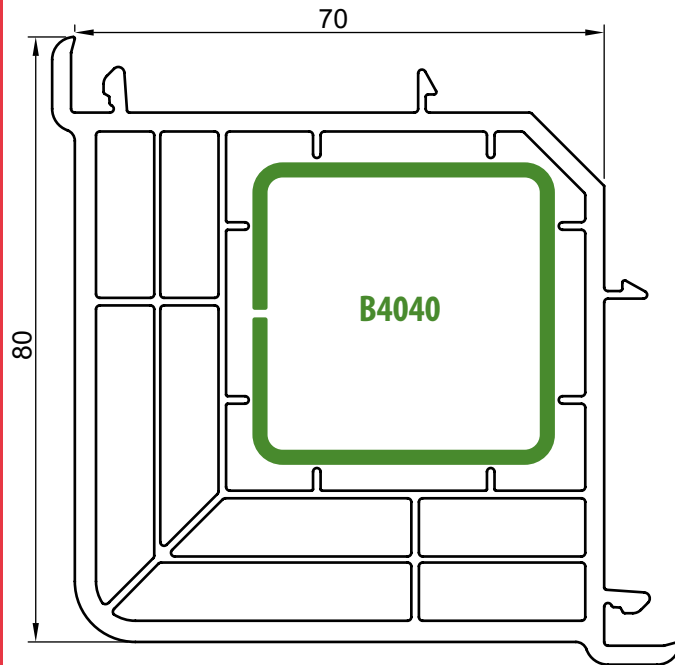
Reinforcement Ø 42/3,0
 Weight: 2950±3% g/m
 Moment of inertia I=7,0297 cm⁴



symbol	x [mm]	Ix [cm ⁴]	Iy [cm ⁴]
Fi42/3,0	3,00	7,0297	7,0297

4. Profile overview
4.16 90° connector – 57063

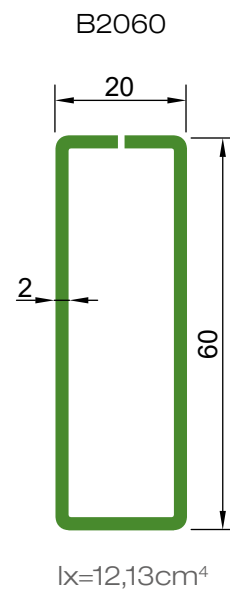
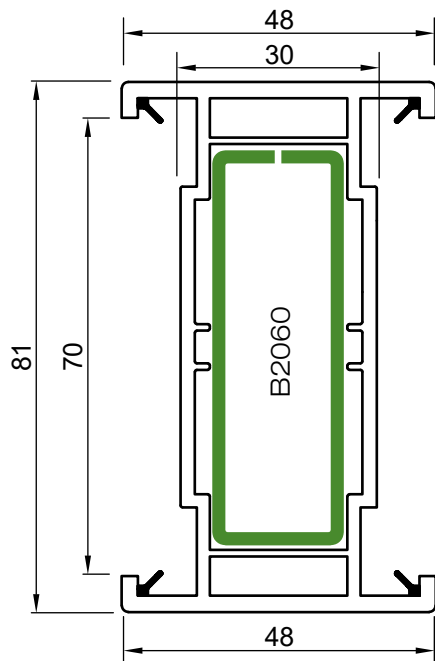
90° connector 57063



symbol	x [mm]	Ix [cm ⁴]	Iy [cm ⁴]
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

4. Profile overview

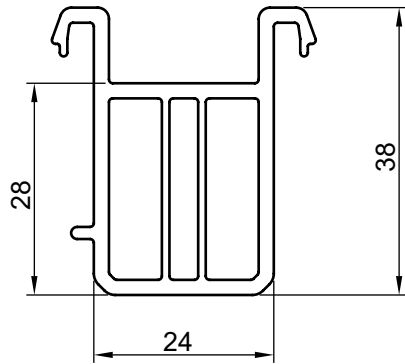
4.17 Static connector 57068



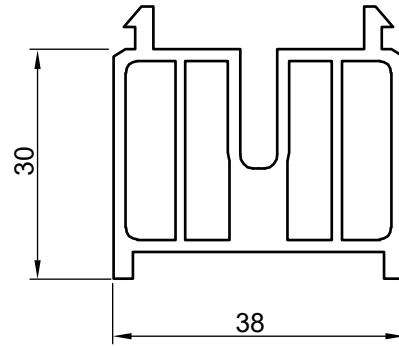
4. Profile overview

4.18 Mounting profiles, gaskets

Installation profile 57069



Installation profile 57070

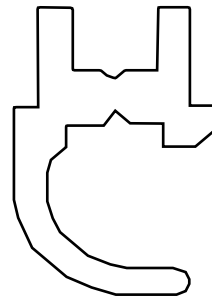


Gaskets

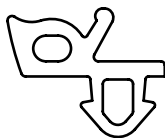
Rebate gasket 57071



Threshold gasket 47054

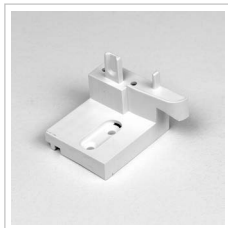


Glazing gasket 57074

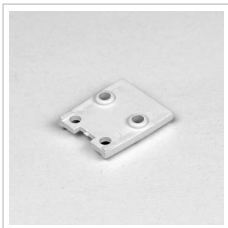


4. Profile overview

4.19 Accessories



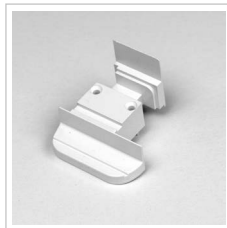
47051
Prestige threshold
connector



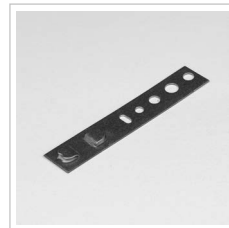
57085
Prestige plastic fixed
mullion connector



57083
Prestige metal fixed
mullion connector



57084
Prestige floating
mullion cover



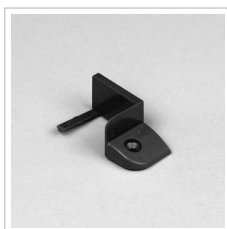
68082L
fixing anchor



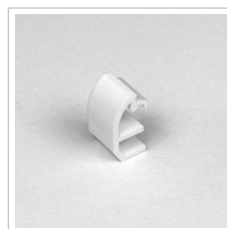
57081
glazing spacer
washer



57080
glazing base washer



47057
drip cover



57086
slider



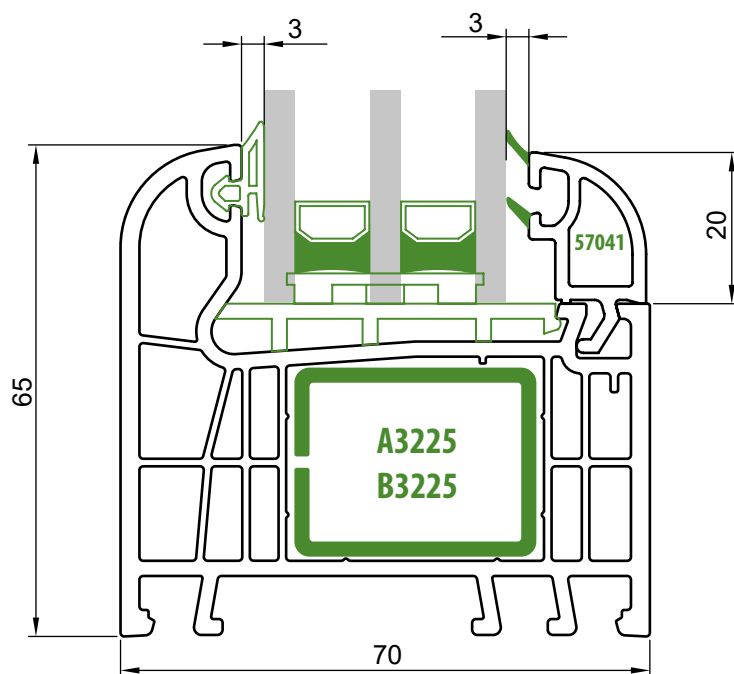
47053
weld bone

5. Assembly drawings

- 5.1 Frame 67010 - fixed glazing 32mm glazing unit
- 5.2 Frame 67010 + Sash 67020 - glazing with 24mm glazing unit
- 5.3 Frame 67010 + Sash 67021 - glazing with 32mm glazing unit
- 5.4 Frame 67011 + Sash 67020 - glazing with 32mm glazing unit
- 5.5 Frame 67011 + Sash 47021 - glazing with 32mm glazing unit
- 5.6 Frame 67011 + Sash 47020 - glazing with 32mm glazing unit
- 5.7 Frame 67011 + Sash 47023 - glazing with 32mm glazing unit
- 5.8 Frame 67011 + Sash 47022 - glazing with 32mm glazing unit
- 5.9 Renovation frame 67012 + sash 67021 - glazing with 32mm glazing unit
- 5.10 Fixed mullion 57030 - glazing with 24mm and 32mm glazing unit
- 5.11 Sash 67020 + Mullion 57030 + Sash 57020
- glazing with 24mm and 32mm glazing unit
- 5.12 Sash 67021 + Floating mullion 57031 + Sash 57021
- glazing with 24mm and 32mm glazing unit
- 5.13 Door sash 47020 + door threshold 47050 with brush seal
- 5.14 Door sash 47020 + door threshold 47050 with EPDM seal
- 5.15 Connection of frames 67010 using 90° connector 57063
- 5.16 Connection of frames 67010 using connectors 57052 and 57053
- 5.17 Connection of frames 67010 using static connector 57068
- 5.18 Connection of frames 67010 using pipe connector 57061+57062
- 5.19 Frame 67010 + mounting profiles 67010 and 57070
- 5.20 Frame 67011 + wind barrier 47059 + door sash 47021 + aero barrier 47060

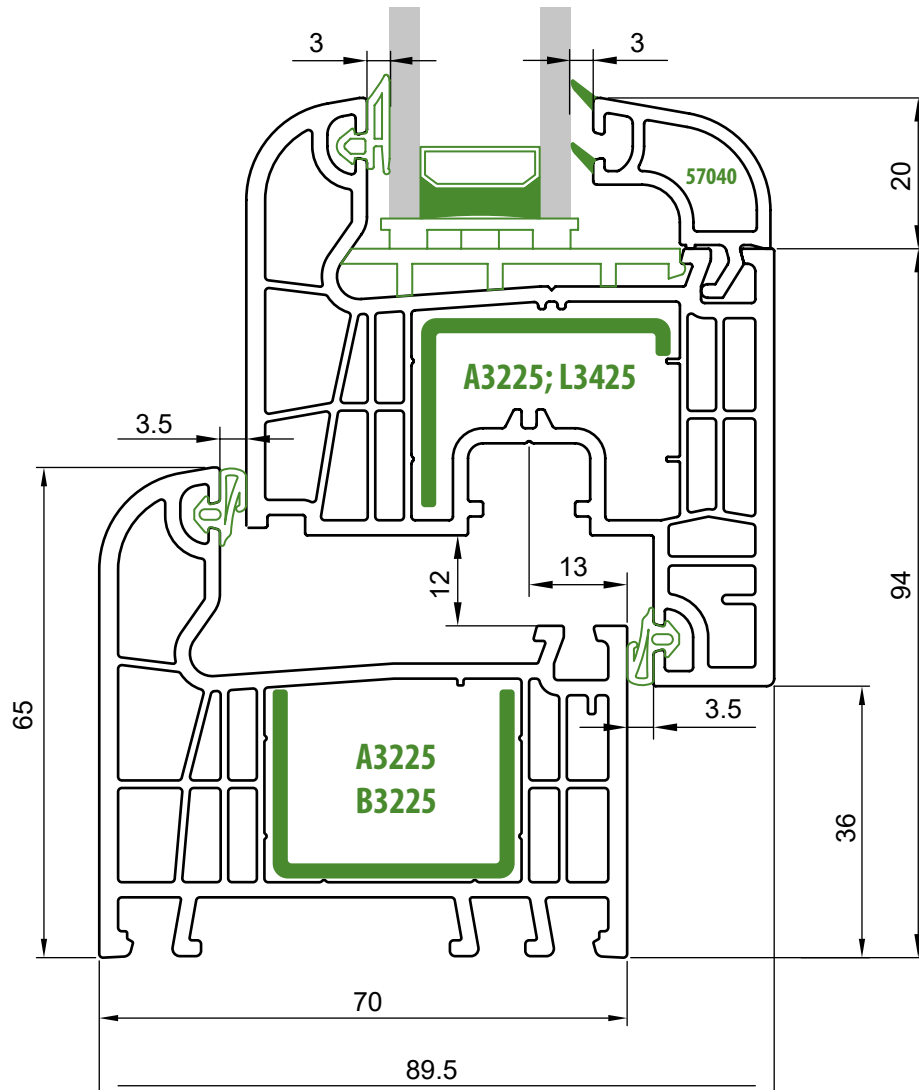
5. Assembly drawings

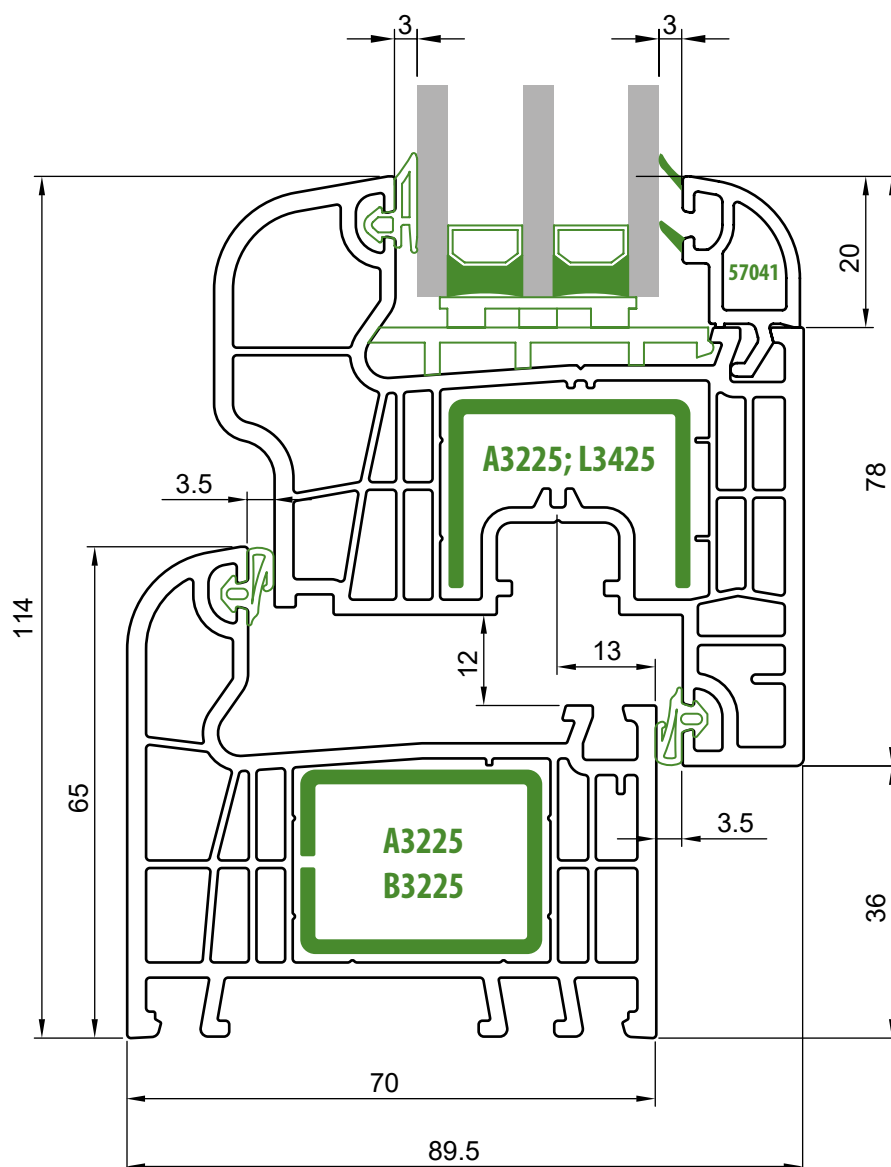
5.1 Frame 67010 - fixed glazing 32mm glazing unit



5. Assembly drawings

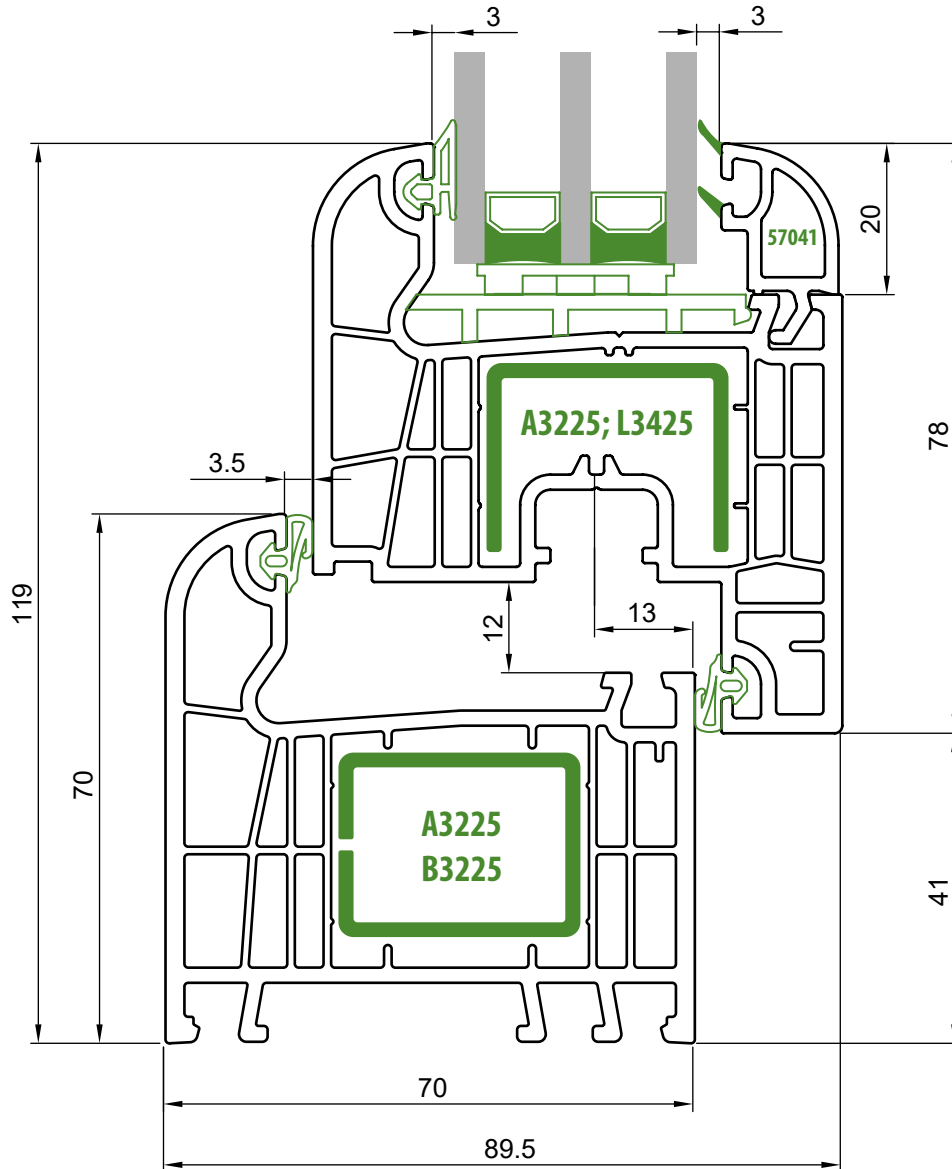
5.2 Frame 67010 + Sash 67020 - glazing with 24mm glazing unit

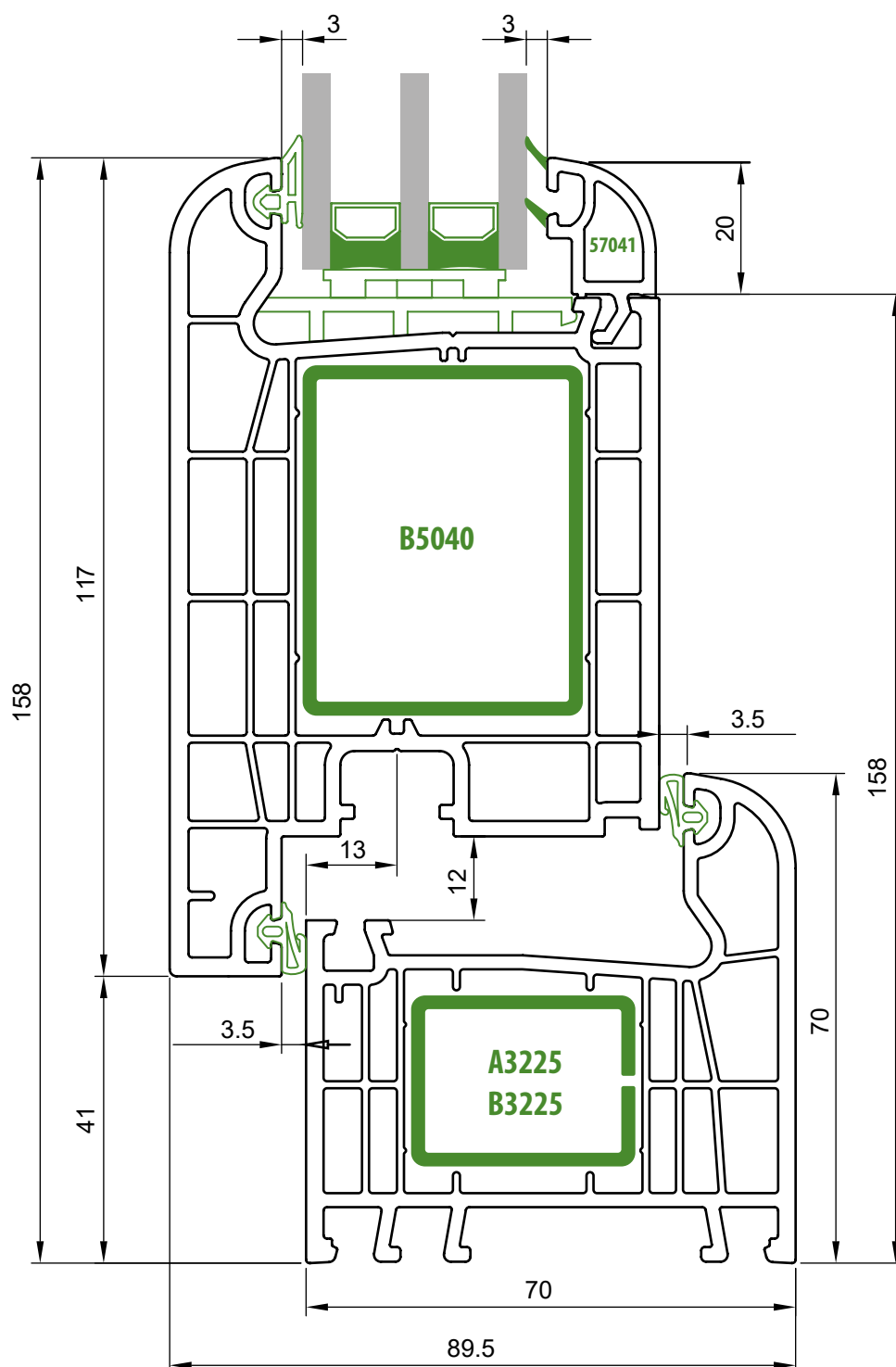




5. Assembly drawings

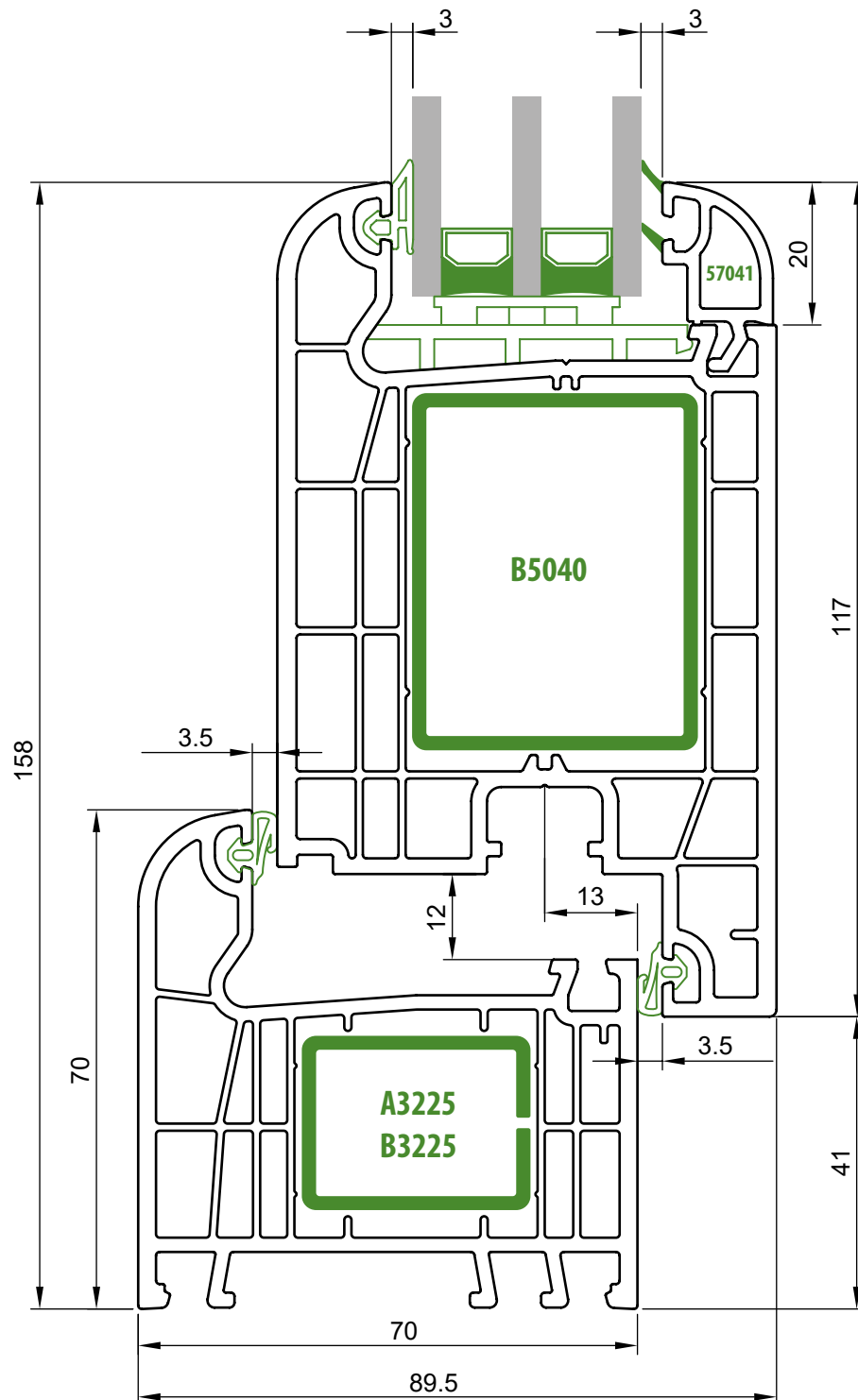
5.4 Frame 67011 + Sash 67020 - glazing with 32mm glazing unit





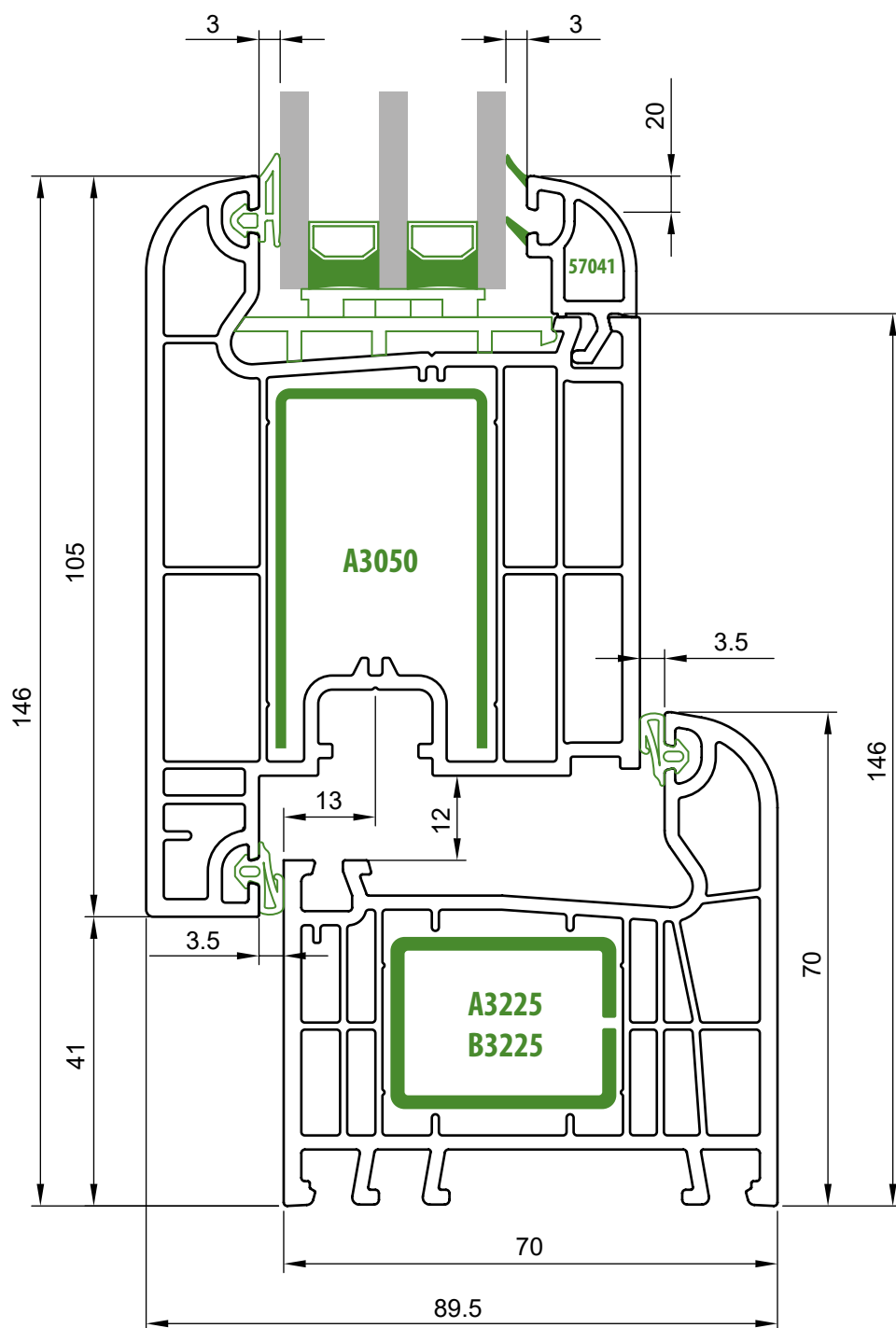
5. Assembly drawings

5.6 Frame 67011 + Sash 47020 - glazing with 32mm glazing unit



5. Assembly drawings

5.7 Frame 67011 + Sash 47023 - glazing with 32mm glazing unit



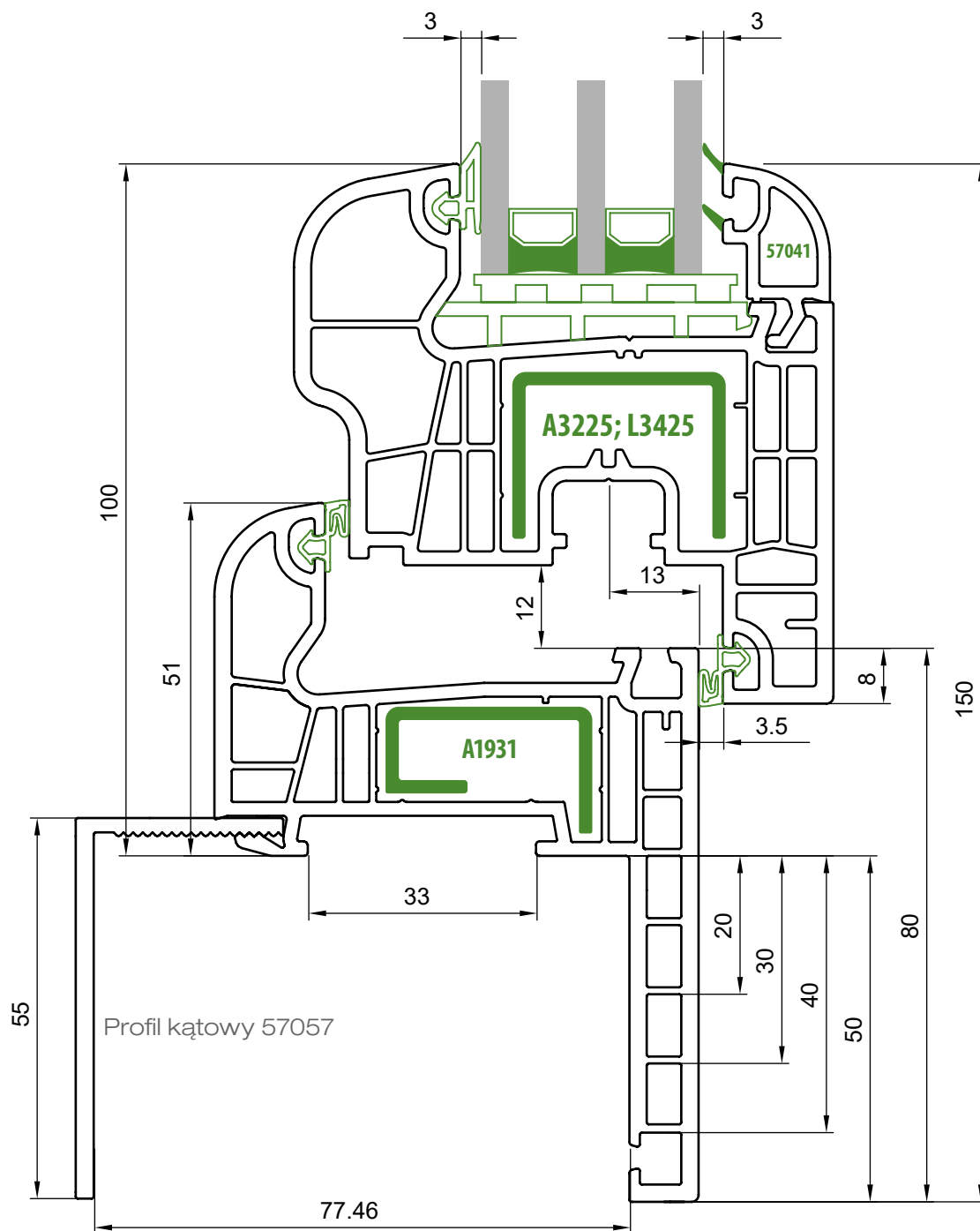
5.8 Frame 67011 + Sash 47022 - glazing with 32mm glazing unit



5. Assembly drawings

5.9 Renovation frame 67012 + sash 67021

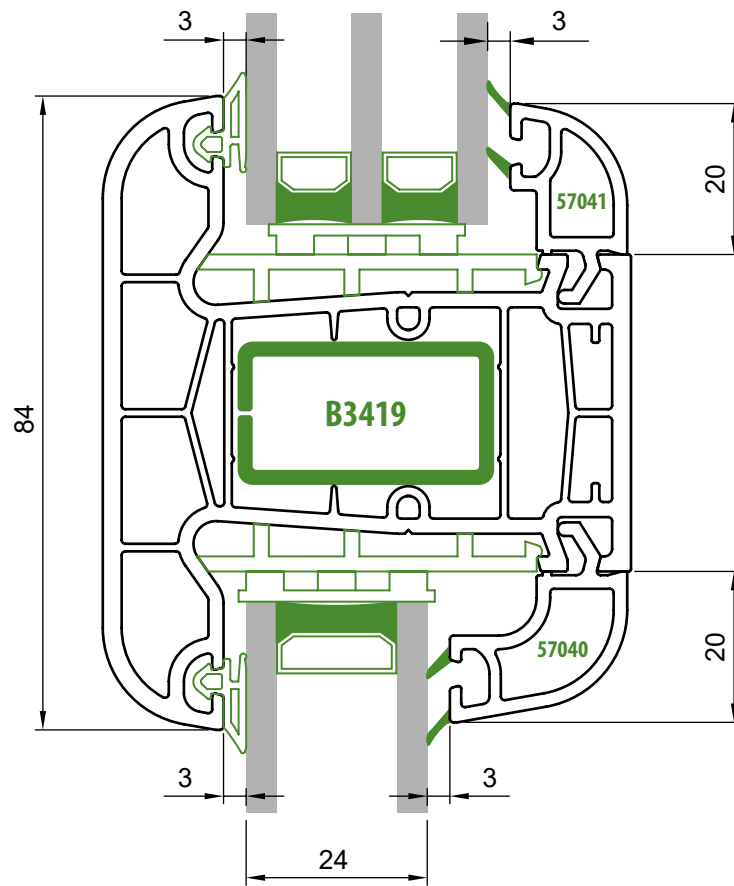
- glazing with 32mm glazing unit



5. Assembly drawings

5.10 Fixed mullion 57030

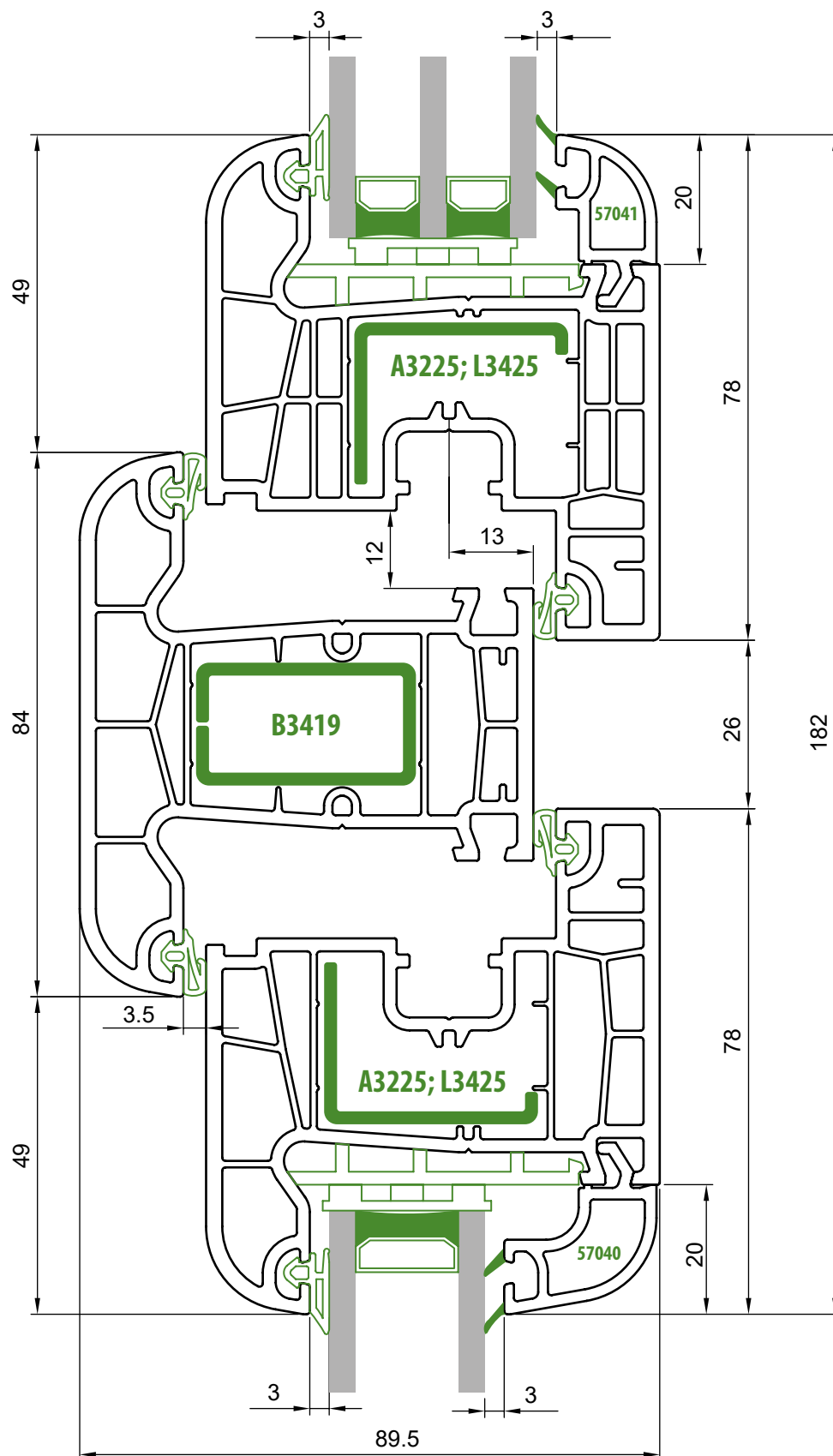
- glazing with 24mm and 32mm glazing unit



5. Assembly drawings

5.11 Sash 67020 + Mullion 57030 + Sash 57020

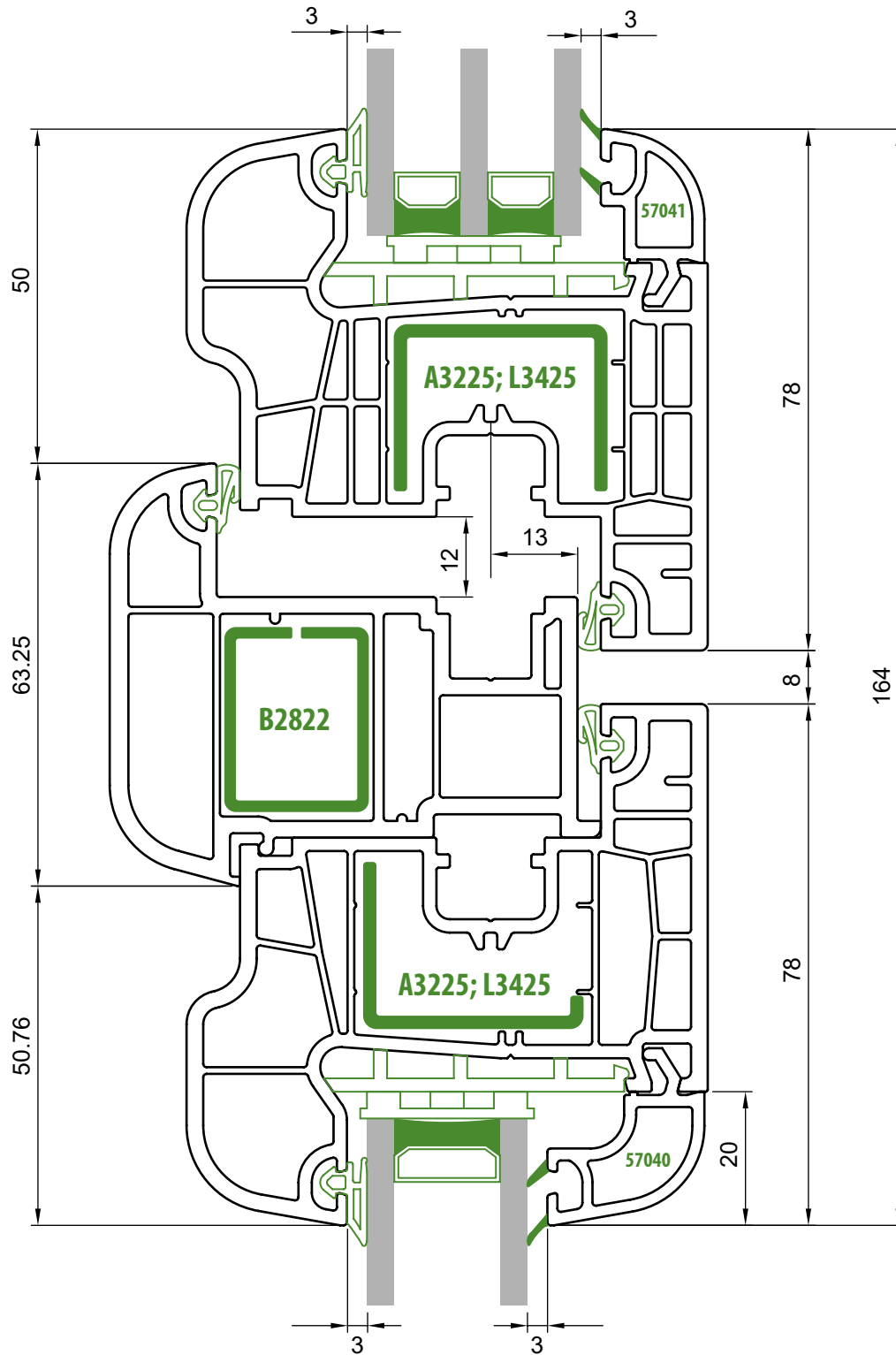
- glazing with 24mm and 32mm glazing unit



5. Assembly drawings

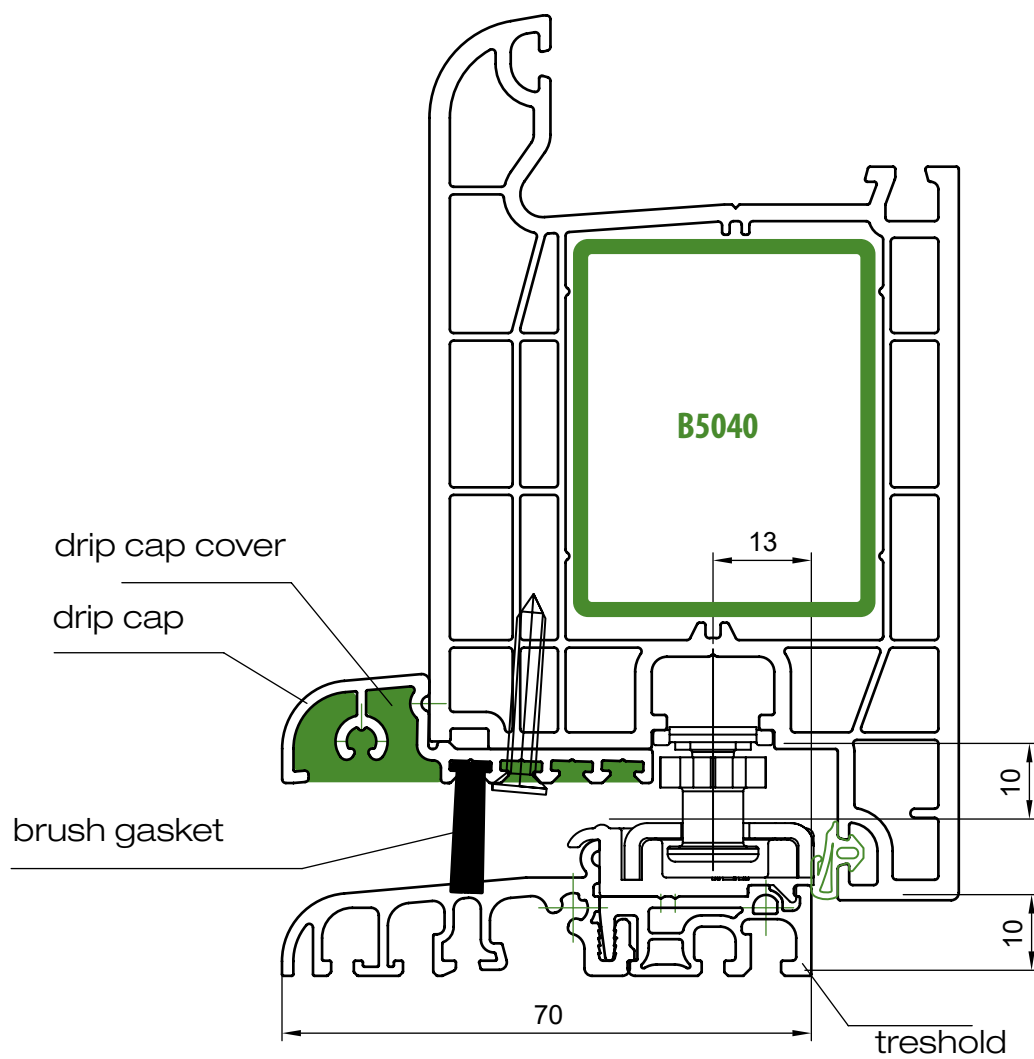
5.12 Sash 67021 + Floating mullion 57031 + Sash 57021

- glazing with 24mm and 32mm glazing unit



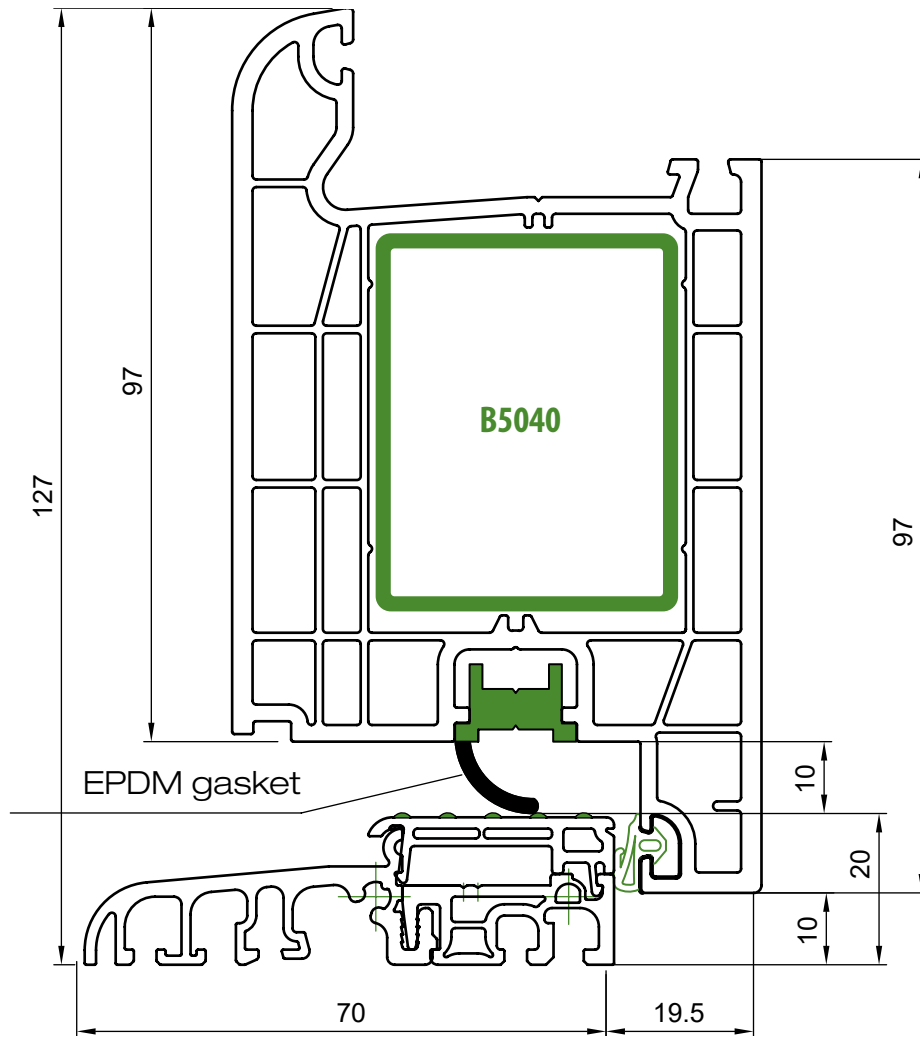
5. Assembly drawings

5.13 Door sash 47020 + door threshold 47050 with brush seal



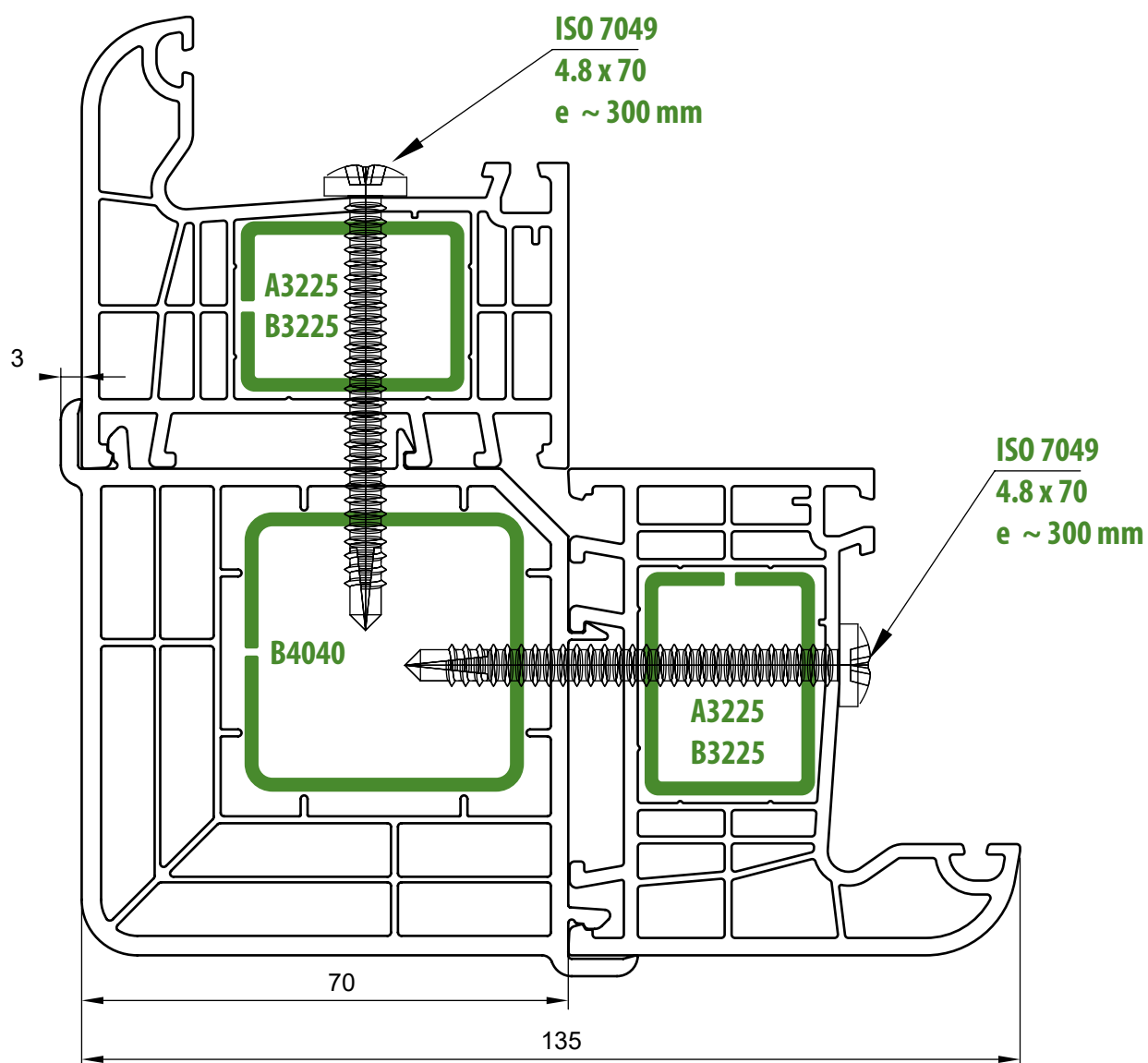
5. Assembly drawings

5.14 Door sash 47020 + door threshold 47050 with EPDM seal



5. Assembly drawings

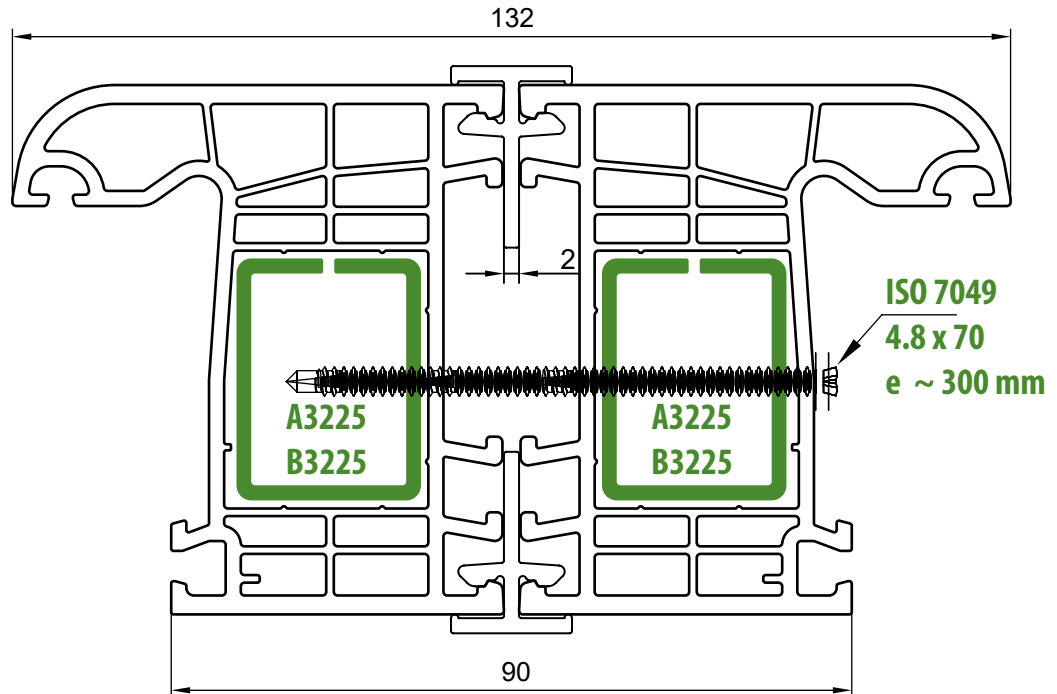
5.15 Connection of frames 67010 using 90° connector 57063



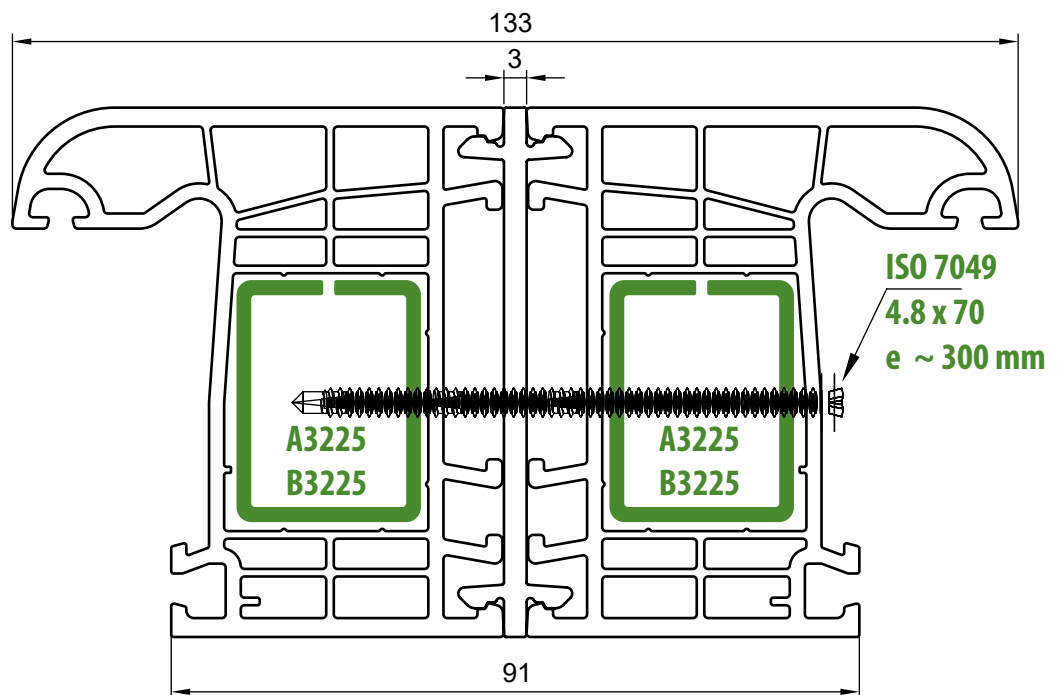
5. Assembly drawings

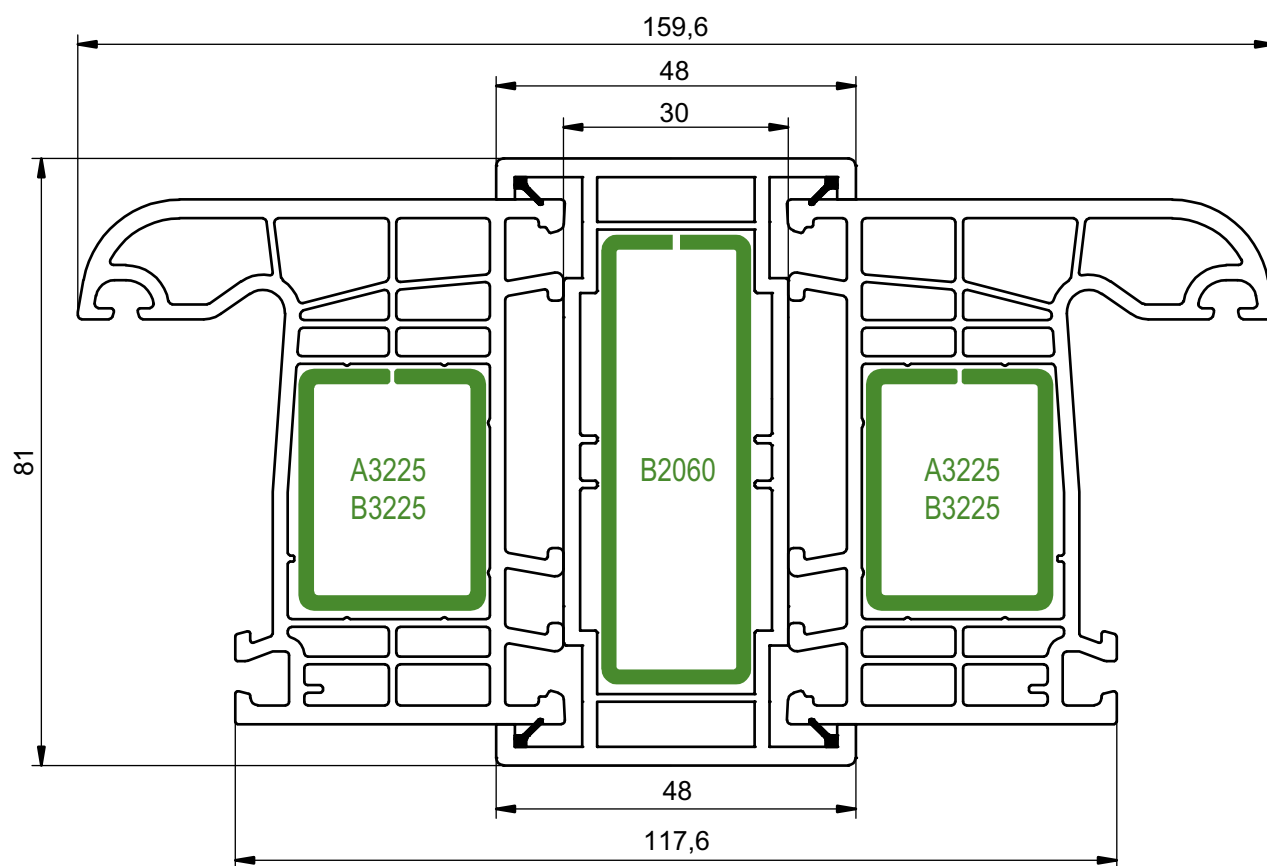
5.16 Connection of frames 67010 using connectors 57052 and 57053

Connector 57052



Connector 57053

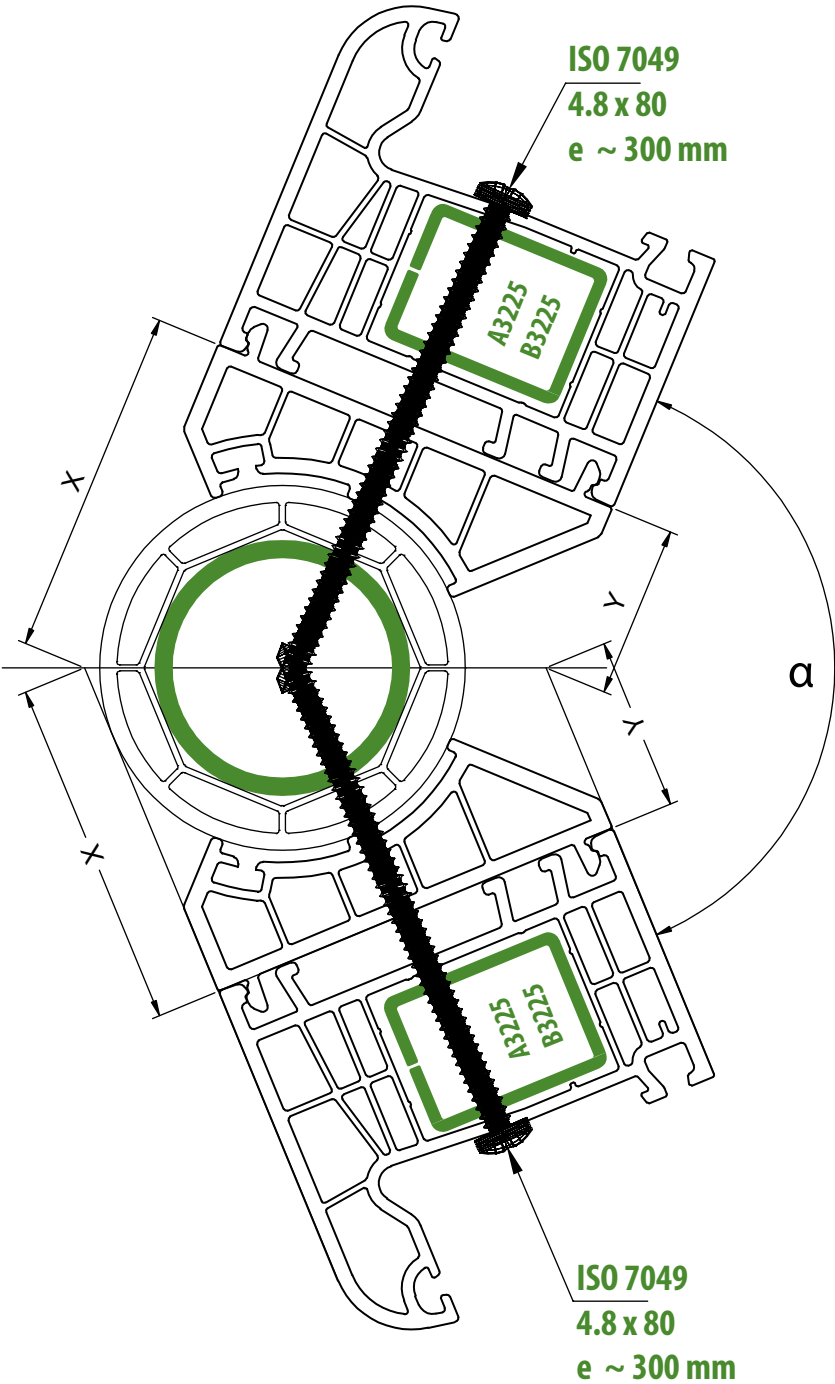




5. Assembly drawings

5.18 Connection of frames 67010 using pipe connector 57061 + 57062

Calculation of external dimensions with assumed (known) angle



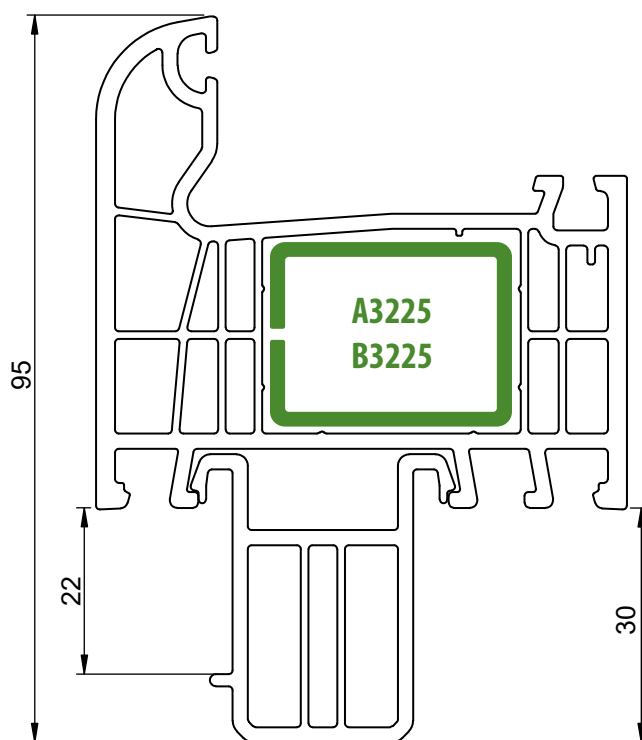
$$X = 45 + \frac{30}{\tan(\alpha/2)}$$

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

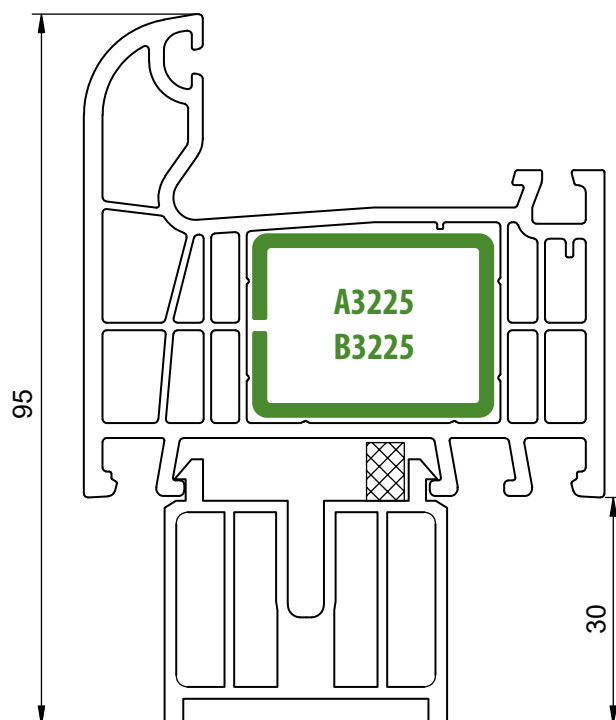
Assumed angle	External dimensions	
α	X(mm)	Y(mm)
90	75,0	15,0
95	72,5	17,5
100	70,2	19,8
105	68,0	22,0
110	66,0	24,0
115	64,1	25,9
120	62,3	27,7
125	60,6	29,4
130	59,0	31,0
135	57,4	32,6
140	55,9	34,1
145	54,5	35,5
150	53,0	37,0
155	51,7	38,3
160	50,3	39,7
165	48,9	41,1
170	47,6	42,4
175	46,3	43,7
180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

5. Assembly drawings

5.19 Frame 67010 + mounting profiles 57069 and 57070



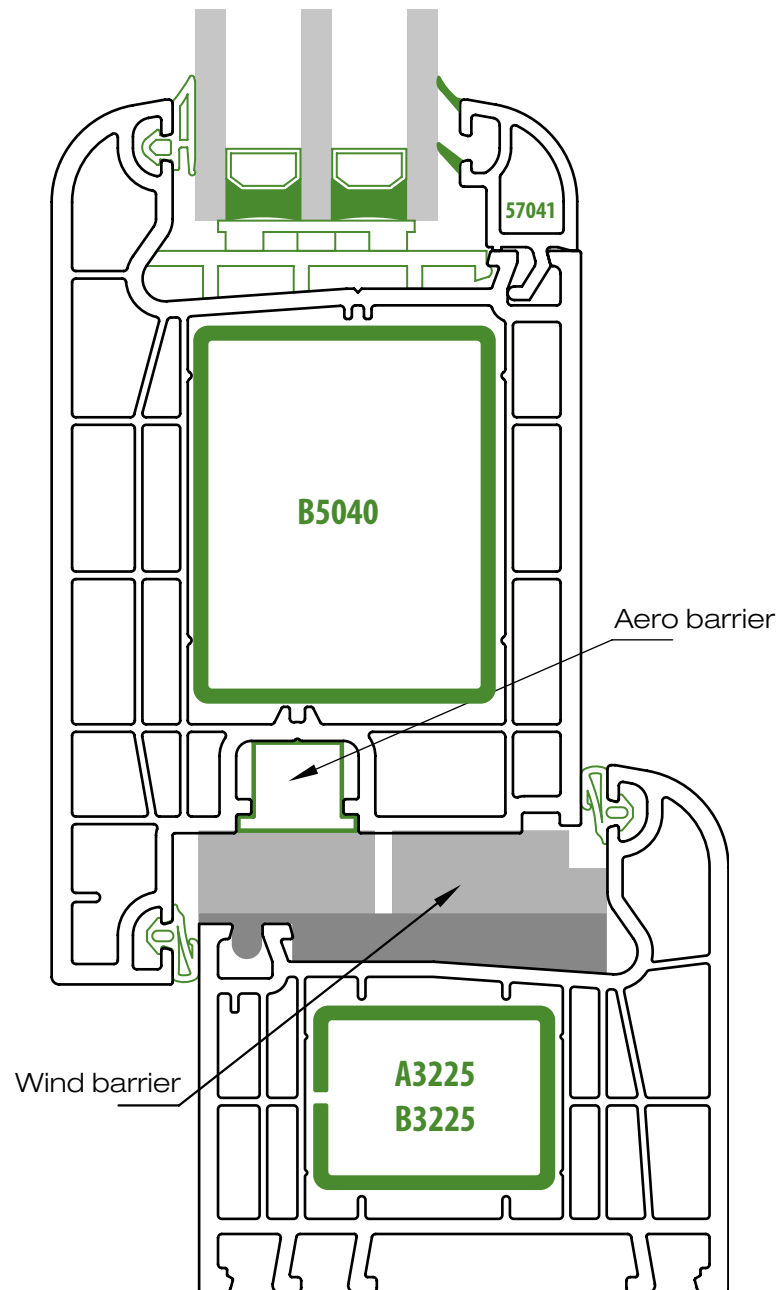
profile 57069



profile 57070

5. Assembly drawings

5.20 Frame 67011 + wind barrier 47059 + door sash 47021
+ aero barrier 47060

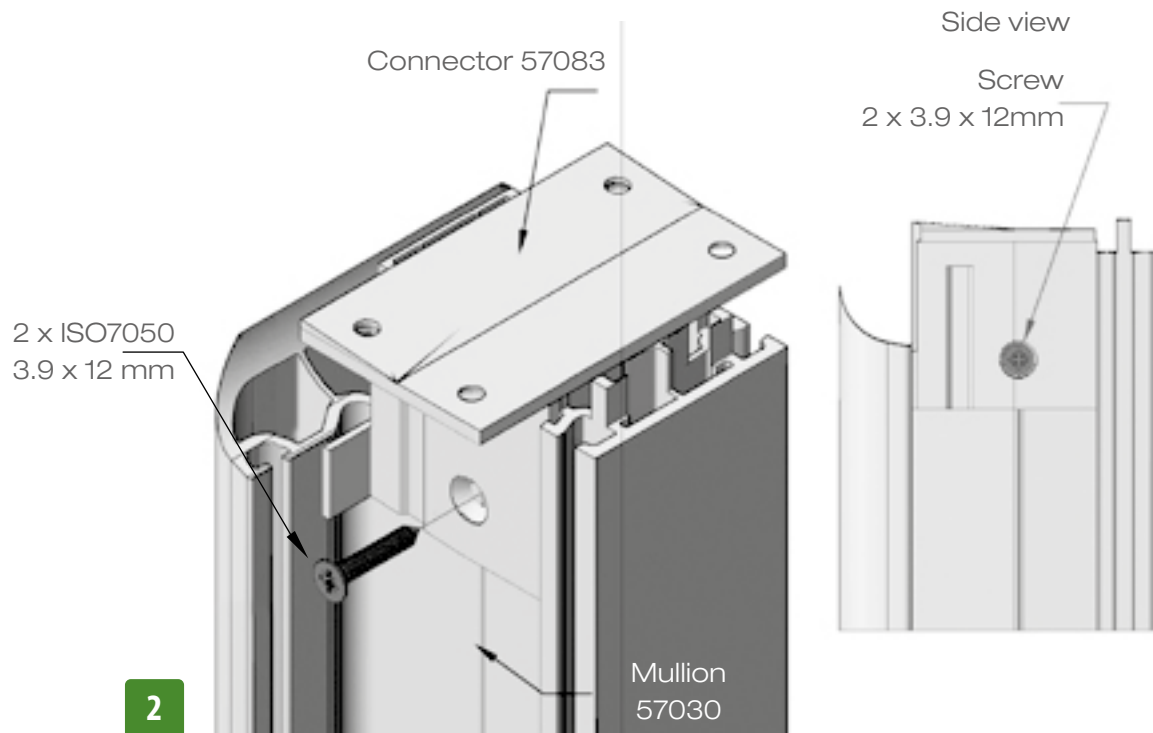
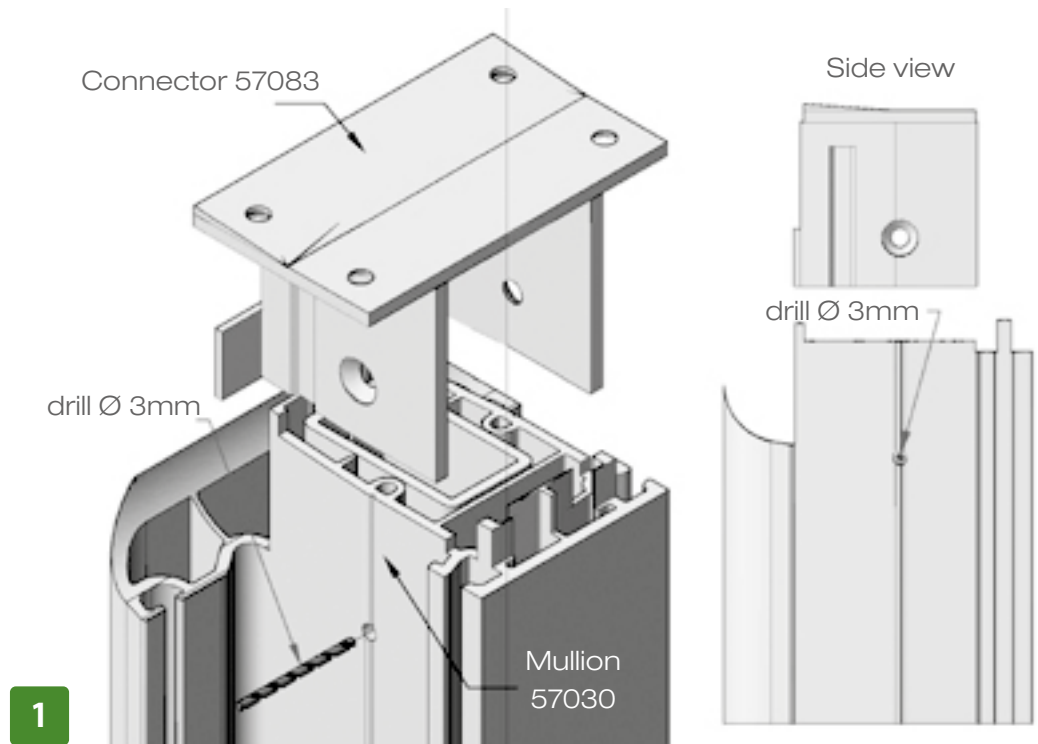


6. Assembly diagrams

- 6.1 Assembly of metal mullion connector 57083 to fixed mullion 57030
- 6.2 Connection of frame 67010 and fixed mullion 57030 using metal mullion connector 57083
- 6.3 Connection of floating mullion 57031 to sash 67021 (with cover plugs 57084 mounted)
- 6.4 Connection of floating mullion 57031 to sash 67021 (with cover plugs 57084 mounted)
- 6.5 Preparation of frame 67010 for connection to mullion 57030 using plastic fixed mullion connector 57085
- 6.6 Connection of frame 67010 and fixed mullion 57030 using plastic mullion connector 57085
- 6.7 Mounting of threshold connector 47051 to threshold 47050
- 6.8 Mounting of threshold 47050 to frame 67010 using threshold connector 47051
- 6.9 Mounting of wind barrier 47059 to frame 67010

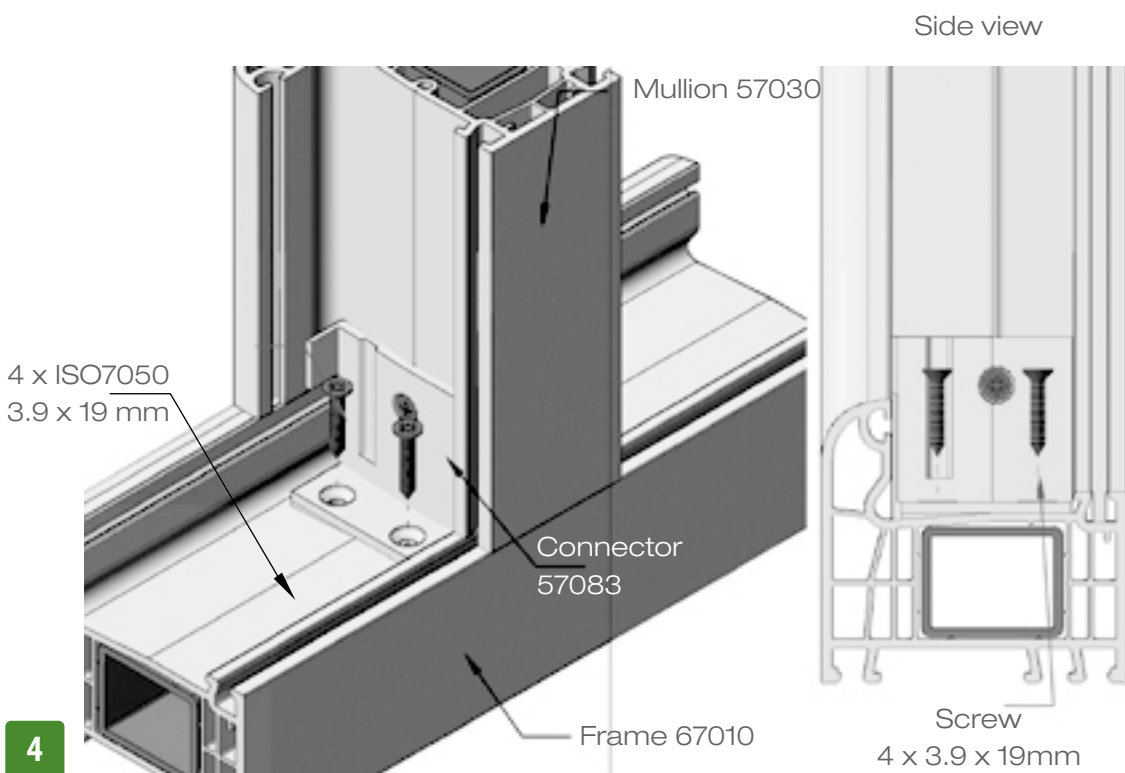
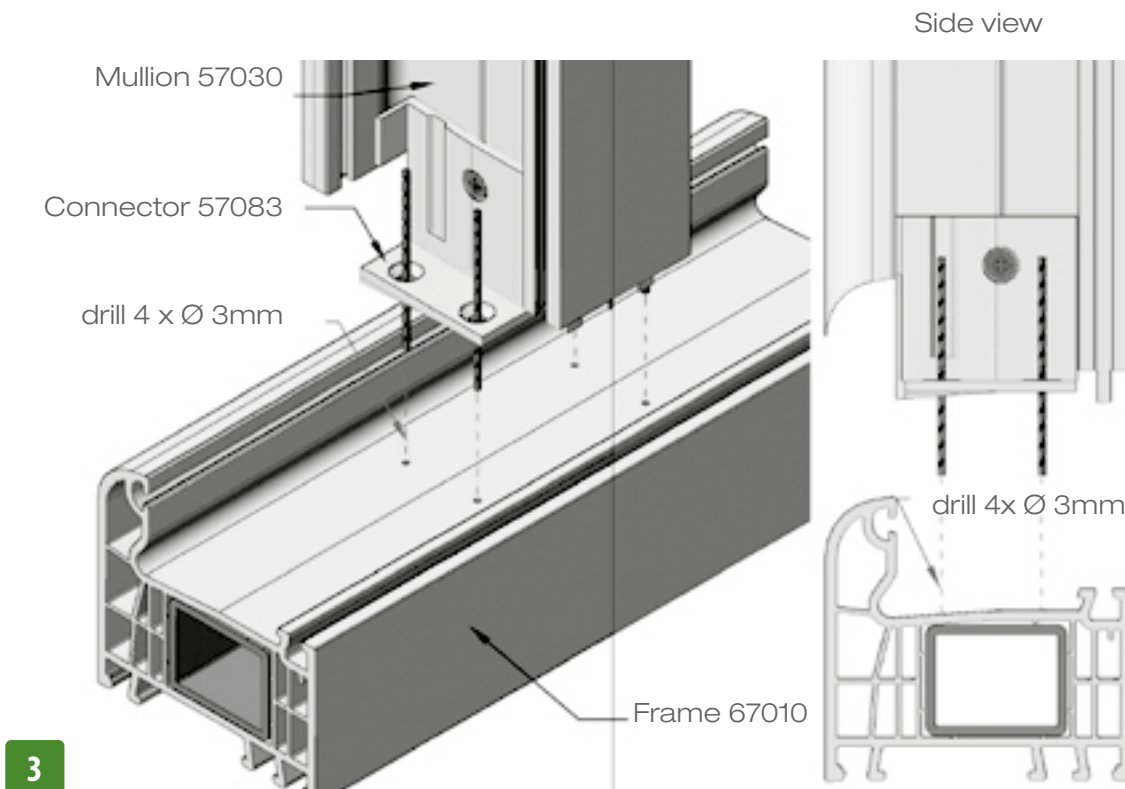
6. Assembly diagrams

6.1 Assembly of metal mullion connector 57083 to fixed mullion 57030



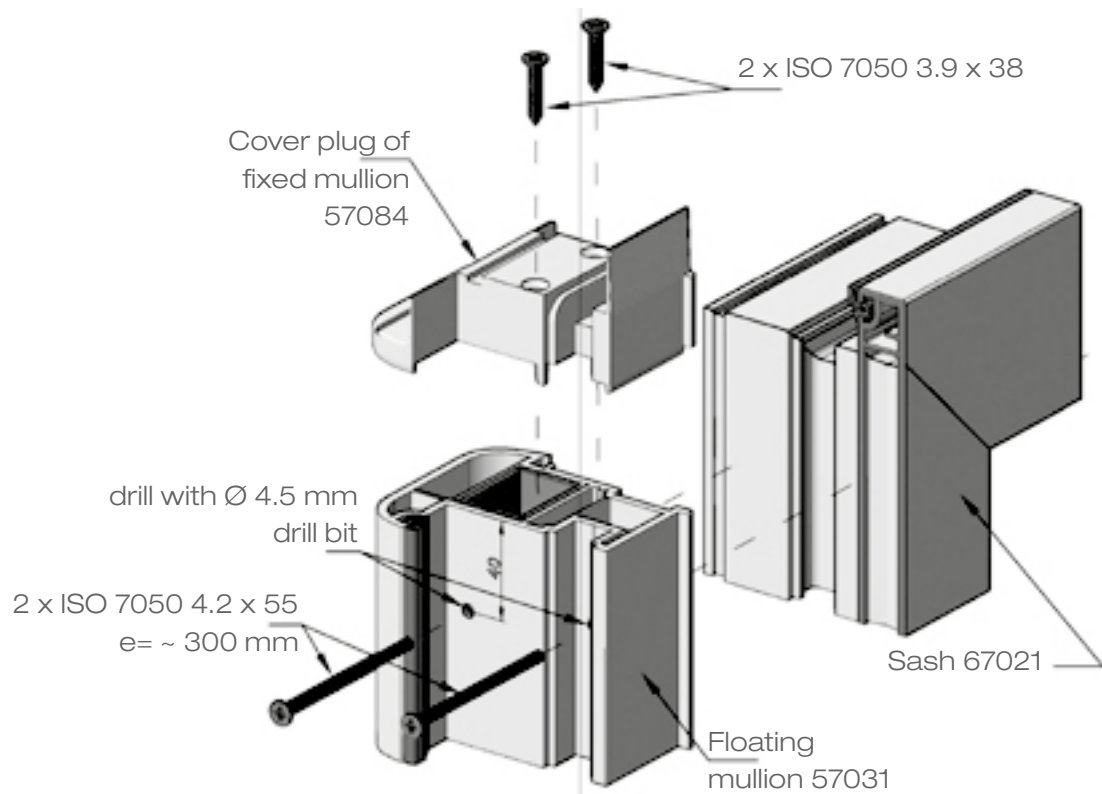
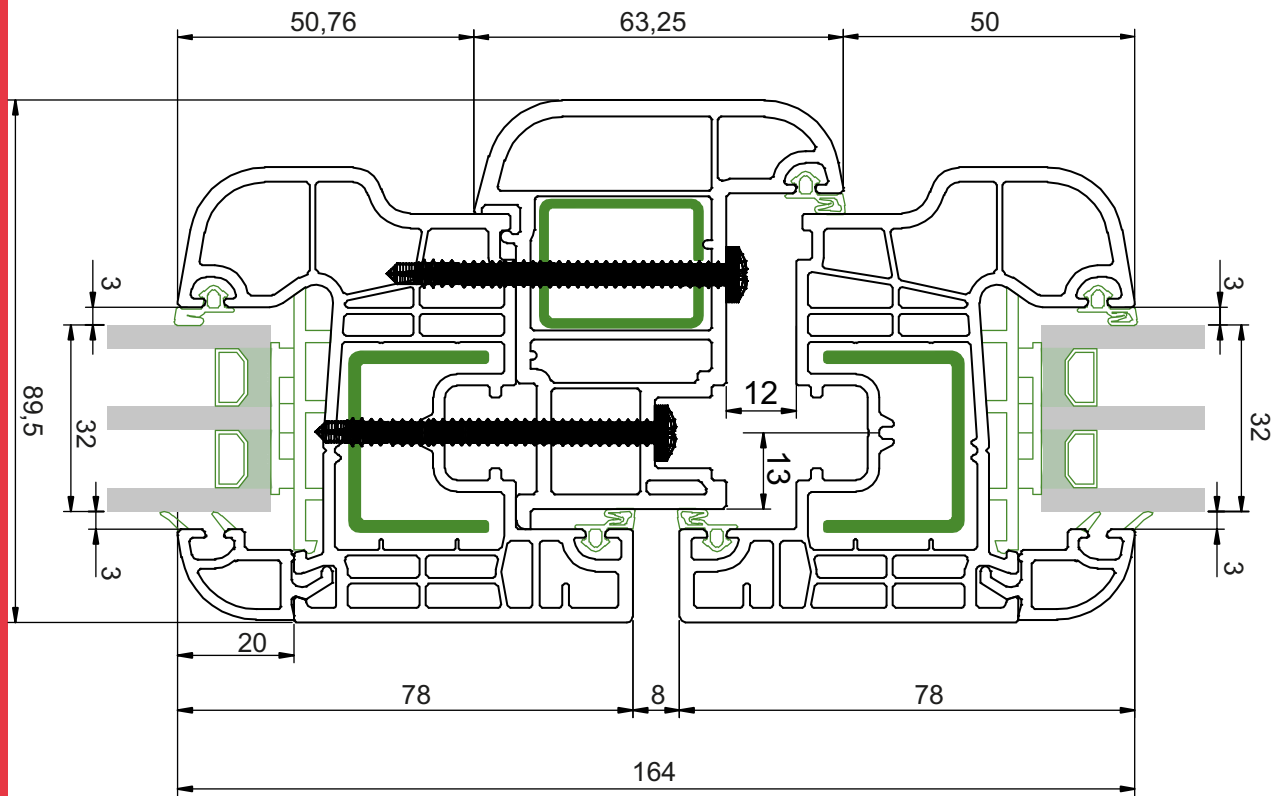
6. Assembly diagrams

6.2 Connection of frame 67010 and fixed mullion 57030 using metal mullion connector 57083



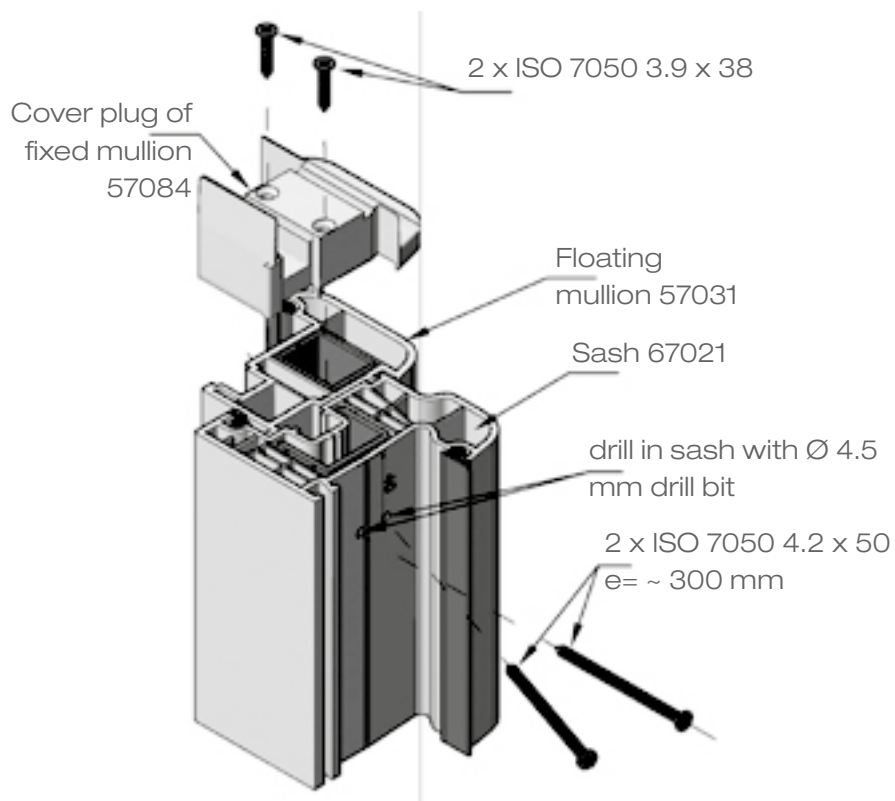
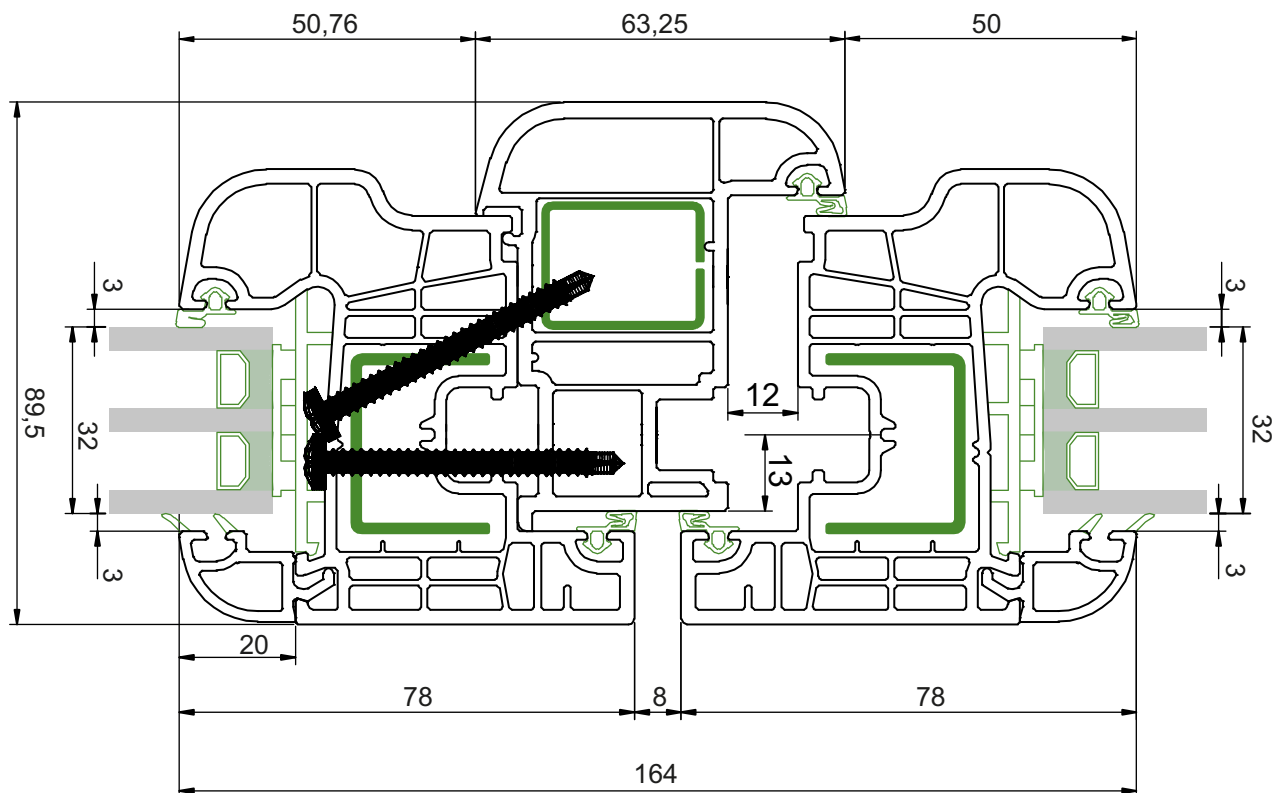
6. Assembly diagrams

6.3 Connection of floating mullion 57031 to sash 67021 (with cover plugs 57084 mounted)



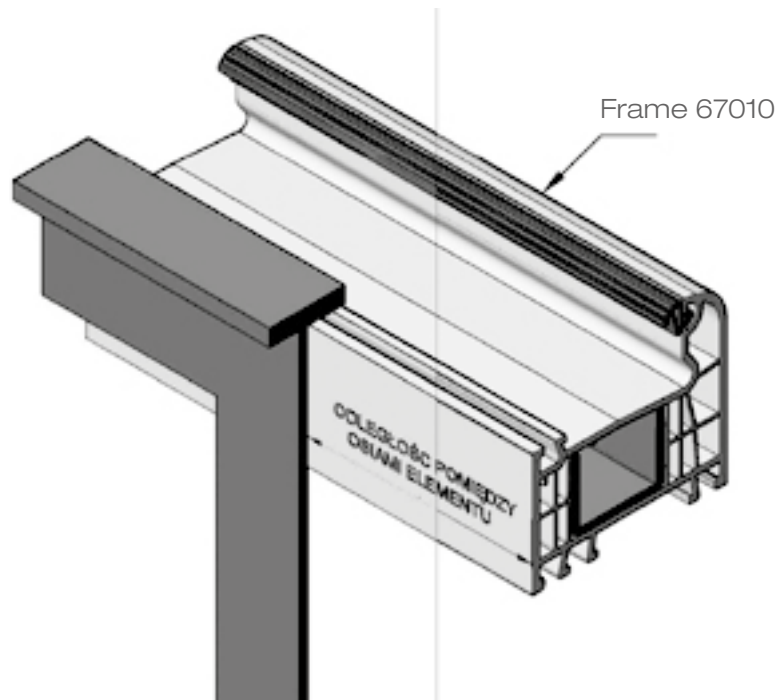
6. Assembly diagrams

6.4 Connection of floating mullion 57031 to sash 67021 (with cover plugs 57084 mounted)

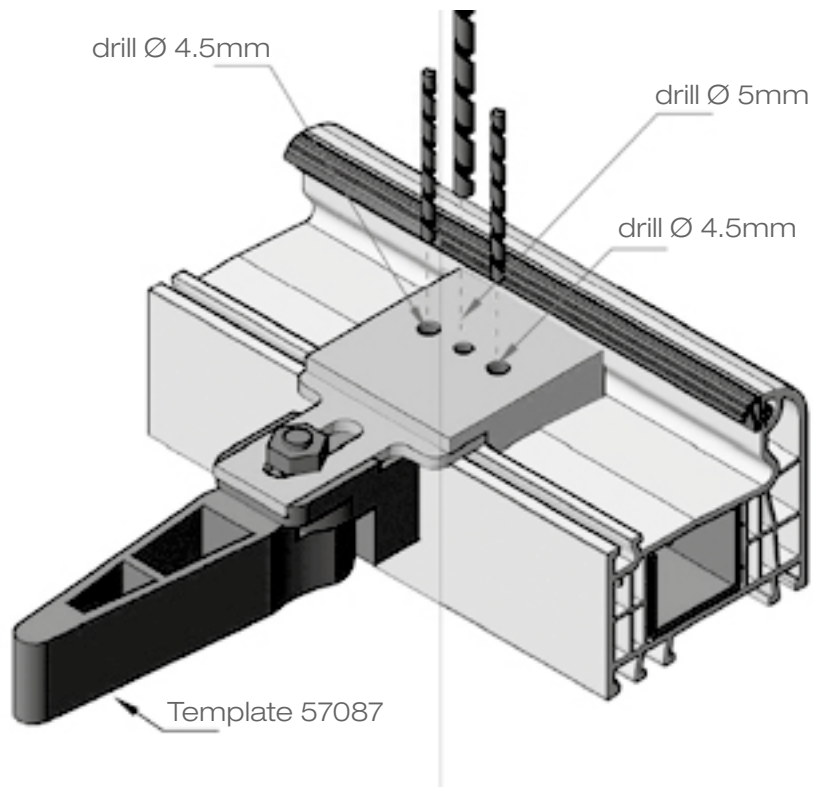


6. Assembly diagrams

6.5 Preparation of frame 67010 for connection to mullion 57030 using plastic fixed mullion connector 57085



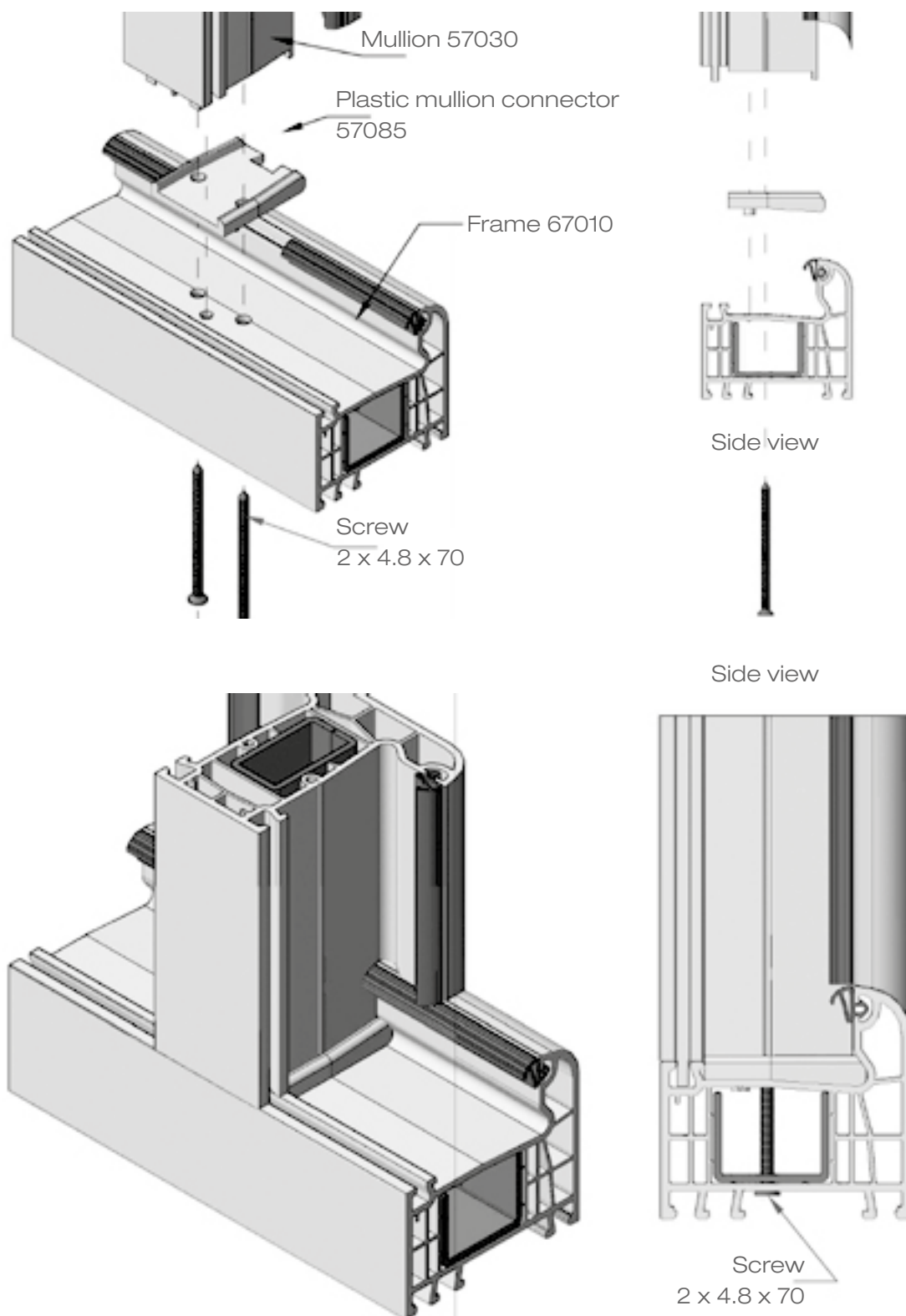
Mark the distance between the axes of the element on the frame.



Drill holes for the plastic mullion connector through the entire height of the profile and reinforcements

6. Assembly diagrams

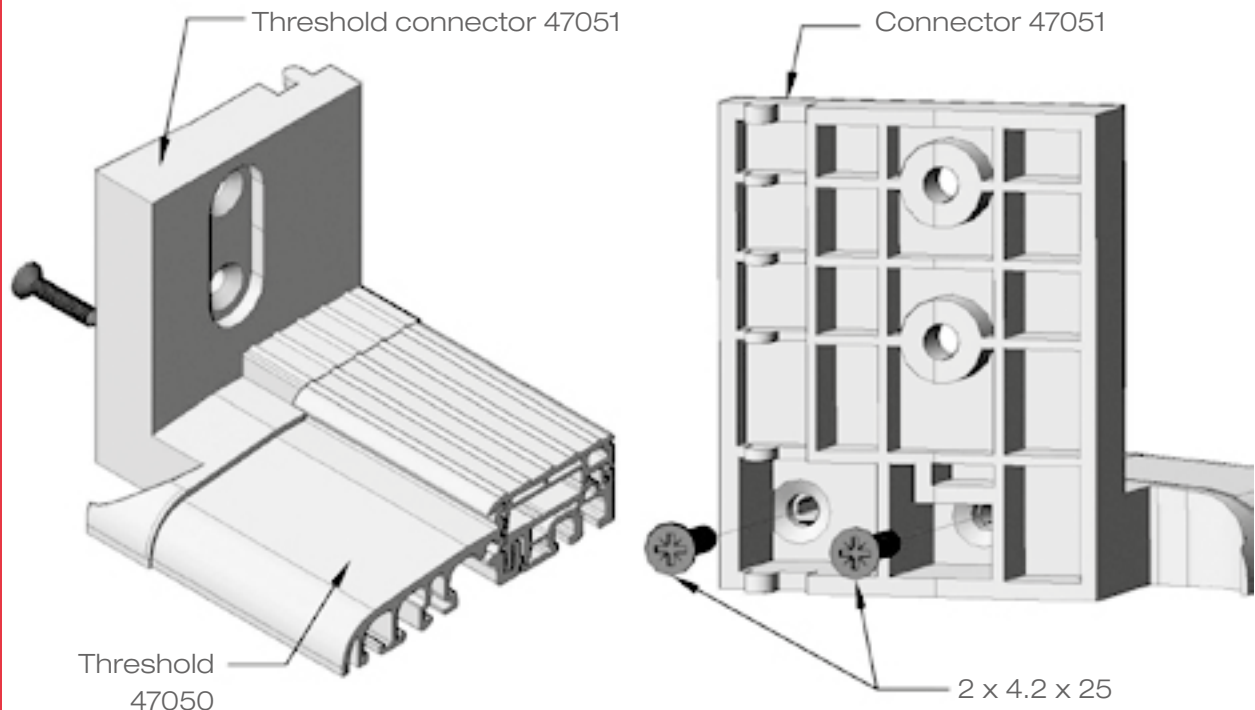
6.6 Connection of frame 67010 and fixed mullion 57030 using plastic mullion connector 57085



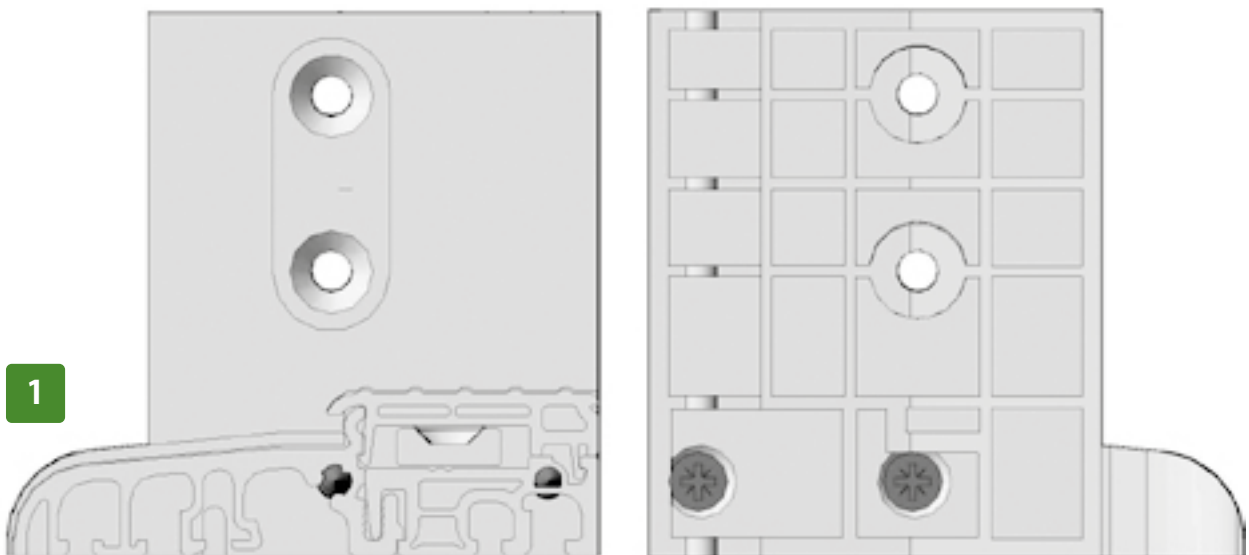
Place the mullion in the frame and screw together with screws

6. Assembly diagrams

6.7 Mounting of threshold connector 47051 to threshold 47050

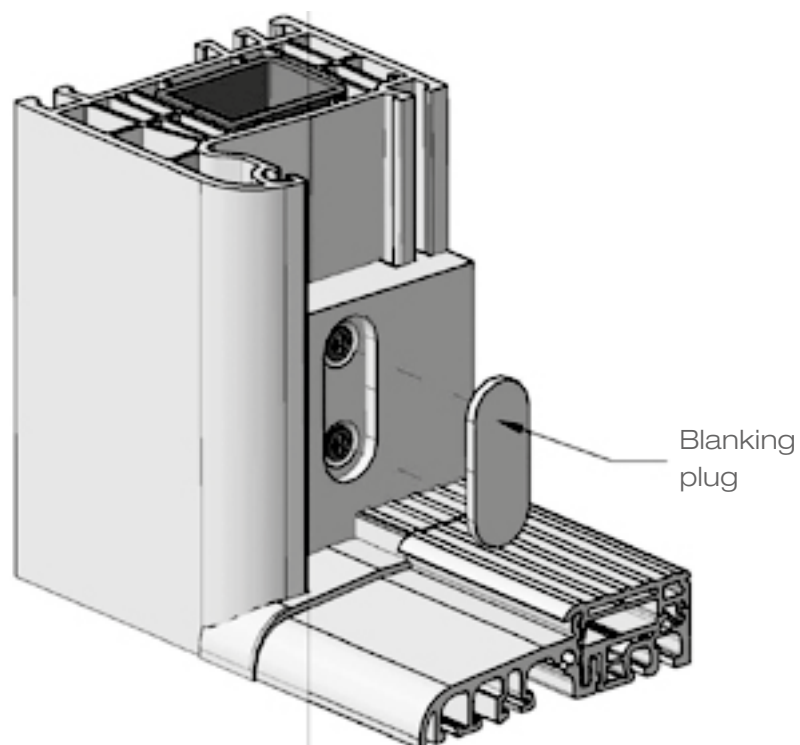
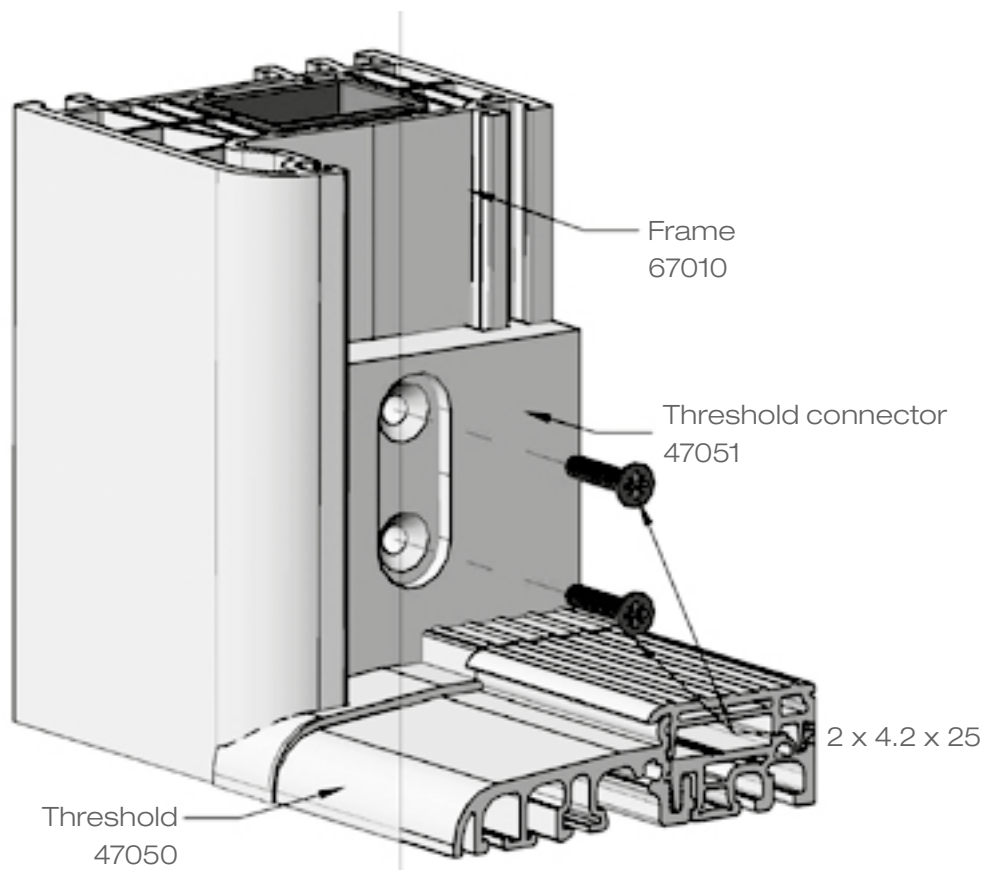


Side view



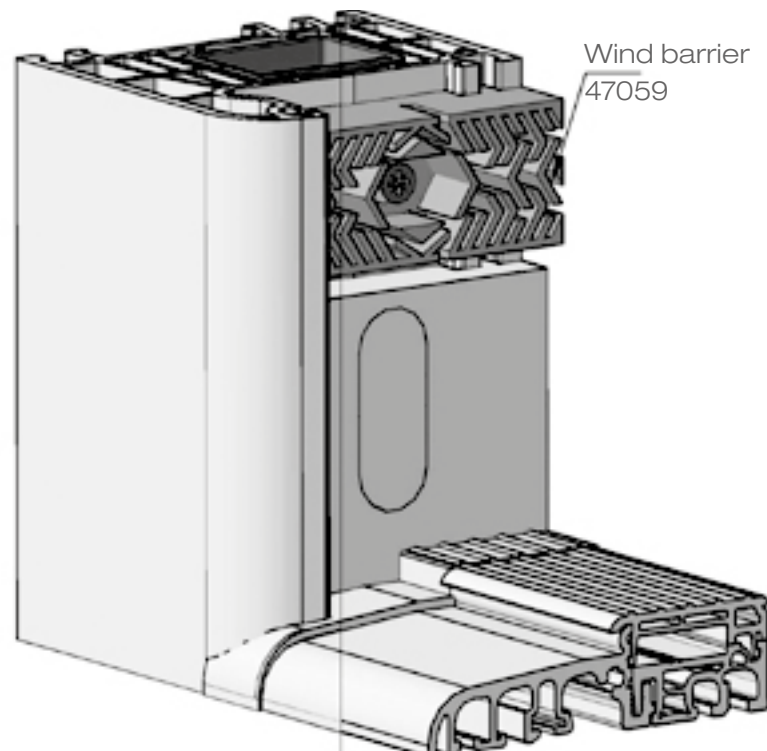
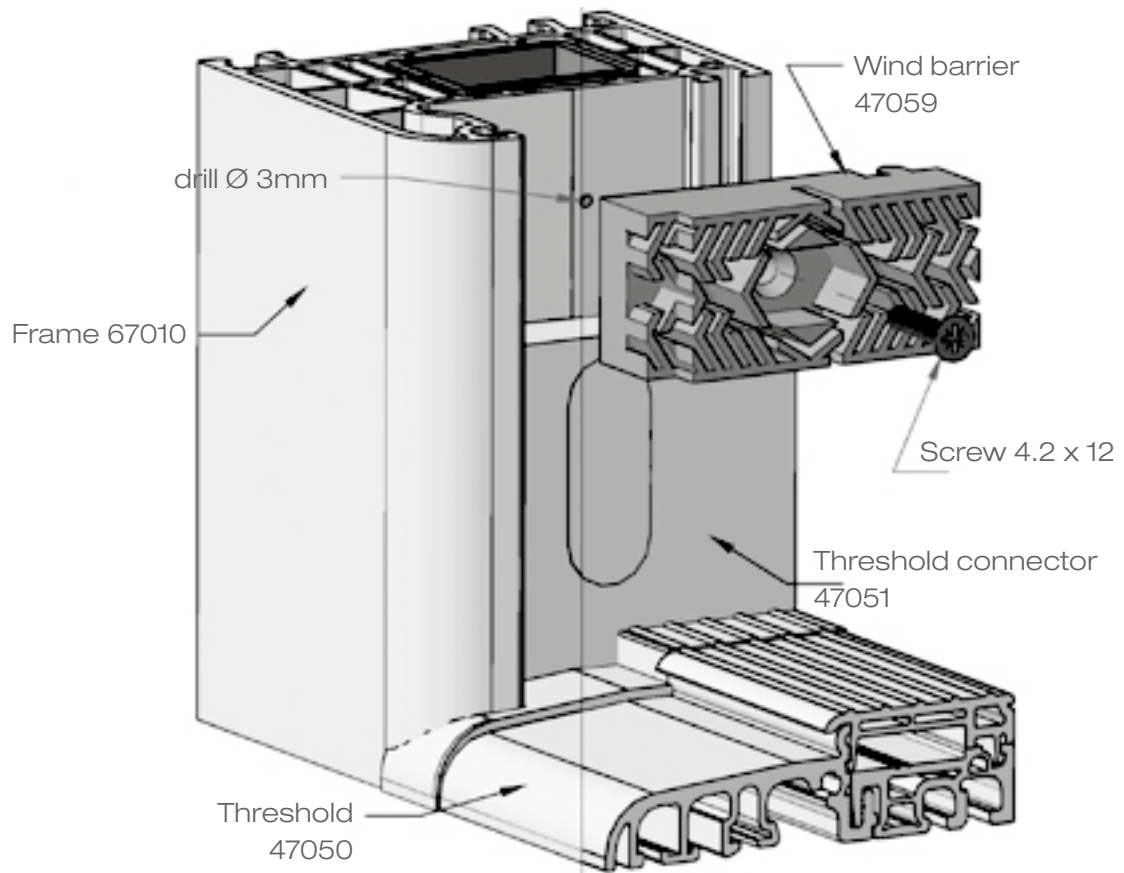
6. Assembly diagrams

6.8 Mounting of threshold 47050 to frame 67010 using threshold connector 47051



6. Assembly diagrams

6.9 Mounting of wind barrier 47059 to frame 67010



7. Assembly dimensions

- 7.1 General information - rules for the use of corrections
- 7.2 Calculation example
- 7.3 Fixed glazing in frame
- 7.4 Fixed glazing in renovation frame
- 7.5 Structural muntin
- 7.6 Single-sash window
- 7.7 Single-sash window - renovation frame
- 7.8 Double-sash window - fixed mullion
- 7.9 Double-sash window - floating mullion
- 7.10 Double-sash window with FIX
- 7.11 Balcony doors, exterior with aluminium threshold
- 7.12 Fixed mullion correction 57030
- 7.13 Floating mullion correction 57031

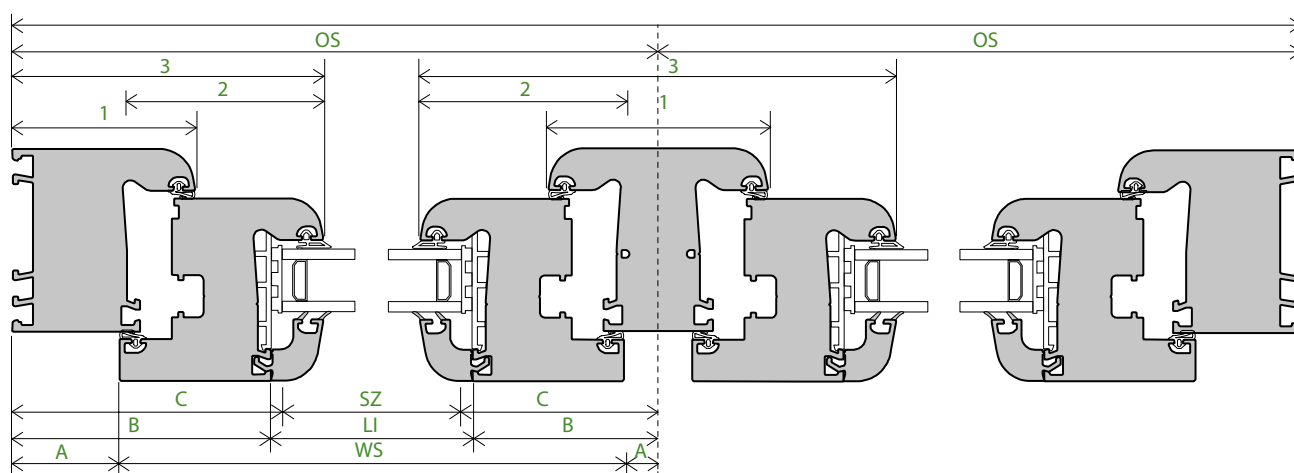
7. Assembly dimensions

7.1 General information - rules for the use of corrections

Determining the dimensional correction consists in summing up the corrections for individual profile combinations in the window. The dimensions of the given corrections are counted based on the external dimensions of the frame and based on the dimensions of the lites given in the axes of the mullions (for a floating mullion, the axis is located in the middle of the distance between the ends of the rebates of cooperating leaves). For welded parts, an appropriate welding allowance must be added.

Please note:

The profile corrections specified in this section apply to finished profile elements after welding or mechanical connection. Depending on the window manufacturer's machine park for cutting and welding profiles, there may be situations in which there are unusual changes in the required length of profiles after processing, i.e. cutting or welding. Improper cutting of profiles may affect the deformation of gaskets implemented into the profiles.

**Abbreviations used:**

OS (Fixed or floating) mullion axis dimension

WS External dimension of entire sash (after welding)

LI Strip dimension

SZ Glazing unit dimension

WR External dimension of complete frame (after welding)

1 External dimensions of profiles, incl. frames, mullions and thresholds

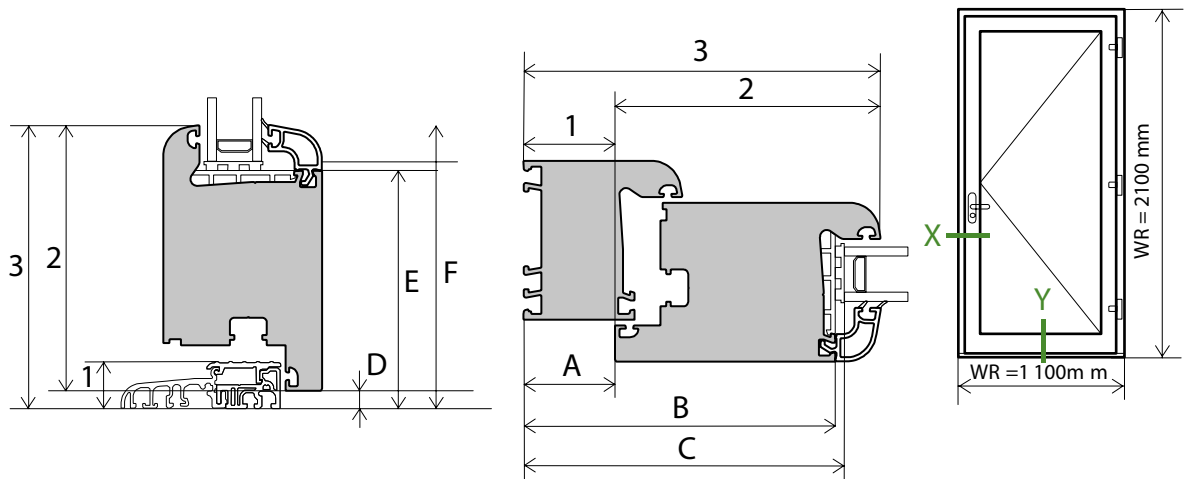
2 External dimension of sash profile

3 External dimension of assemblies of profiles, incl. frames, sashes, mullions

A, B, ... Values to be calculated depending on the profiles used

7. Assembly dimensions

7.2 Calculation example



External dimension:

WR 1100x2100 mm

Frame 67011 70 mm

Sash 47020 117 mm

1	70 mm
2	117 mm
3	158
A WS	-41
B LI	-138
C SZ	-142

1	20 mm
2	117 mm
3	127
D WS	-10
E LI	-107
F SZ	-111

Results of sample calculations

Lateral (X) combinations from left: frame/sash and right: frame/sash, total corrections

Vertical (Y) combinations: threshold with sash, frame with sash

$$WS = WR - 2A \quad 1100 \text{ mm} - 82 \text{ mm} \quad 1018 \text{ mm}$$

$$LI = WR - 2B \quad 1100 \text{ mm} - 276 \text{ mm} \quad 824 \text{ mm}$$

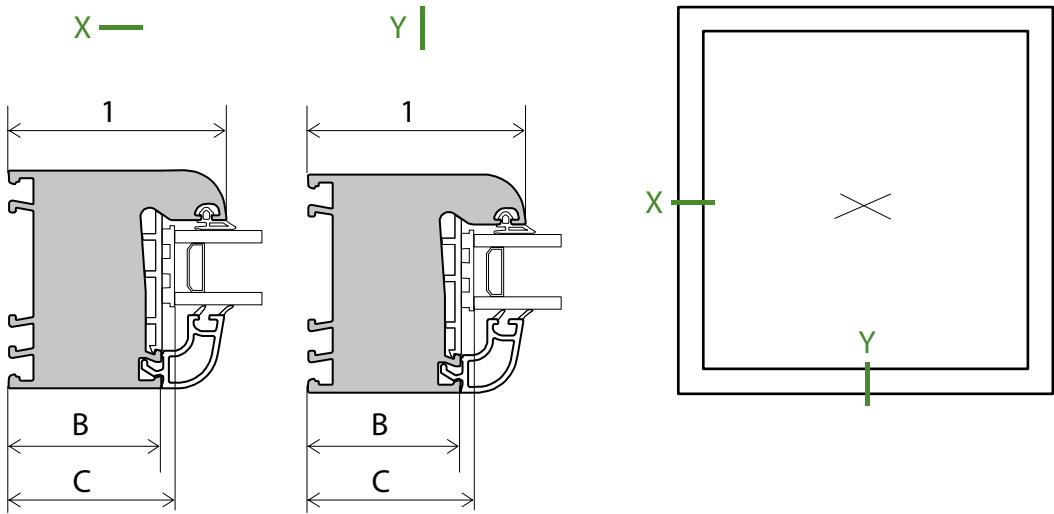
$$SZ = WR - 2C \quad 1100 \text{ mm} - 284 \text{ mm} \quad 816 \text{ mm}$$

$$WS = WR - (D+A) \quad 2100 \text{ mm} - 51 \text{ mm} \quad 2049 \text{ mm}$$

$$LI = WR - (E+B) \quad 2100 \text{ mm} - 245 \text{ mm} \quad 1855 \text{ mm}$$

$$SZ = WR - (F+C) \quad 2100 \text{ mm} - 253 \text{ mm} \quad 1847 \text{ mm}$$

7. Assembly dimensions
7.3 Fixed glazing in frame

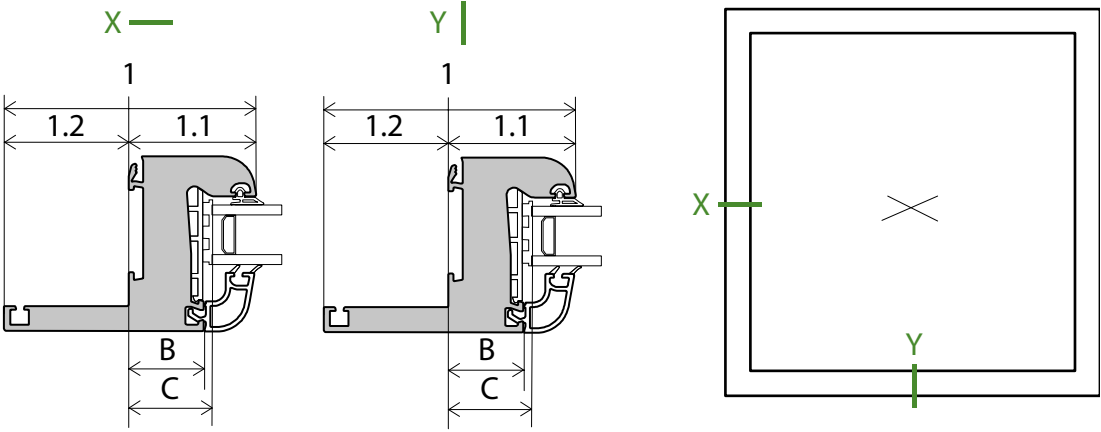


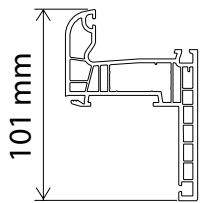
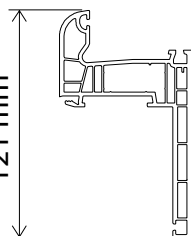
Profile height (mm)	1	 65 mm 67010	 70 mm 67011
Dimensional correction (mm)	B LI	-44	-49
	C SZ	-48	-53

Abbreviations used:

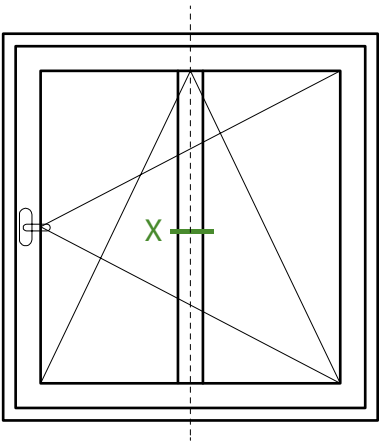
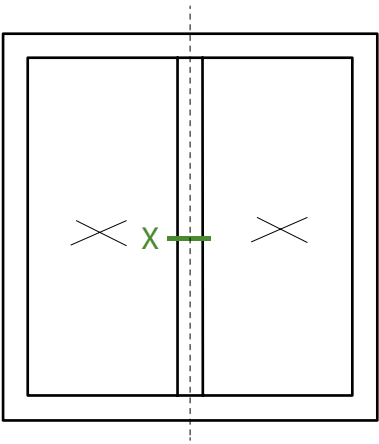
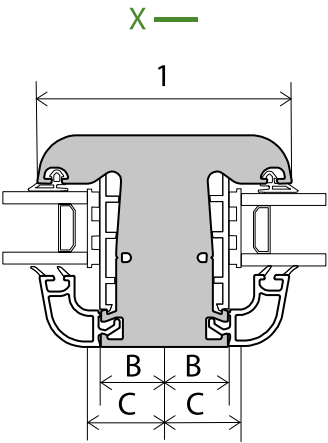
OS (Fixed or floating) mullion axis dimension	1 External dimensions of profiles, incl. frames, mullions and thresholds
WS External dimension of entire sash (after welding)	2 External dimension of sash profile
LI Strip dimension	3 External dimension of assemblies of profiles, incl. frames, sashes, mullions
SZ Glazing unit dimension	A, B, ... Values to be calculated depending on the profiles used
WR External dimension of complete frame (after welding)	

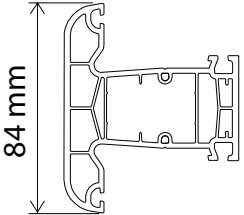
7. Assembly dimensions
7.4 Fixed glazing in renovation frame



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

7. Assembly dimensions
7.5 Structural muntin



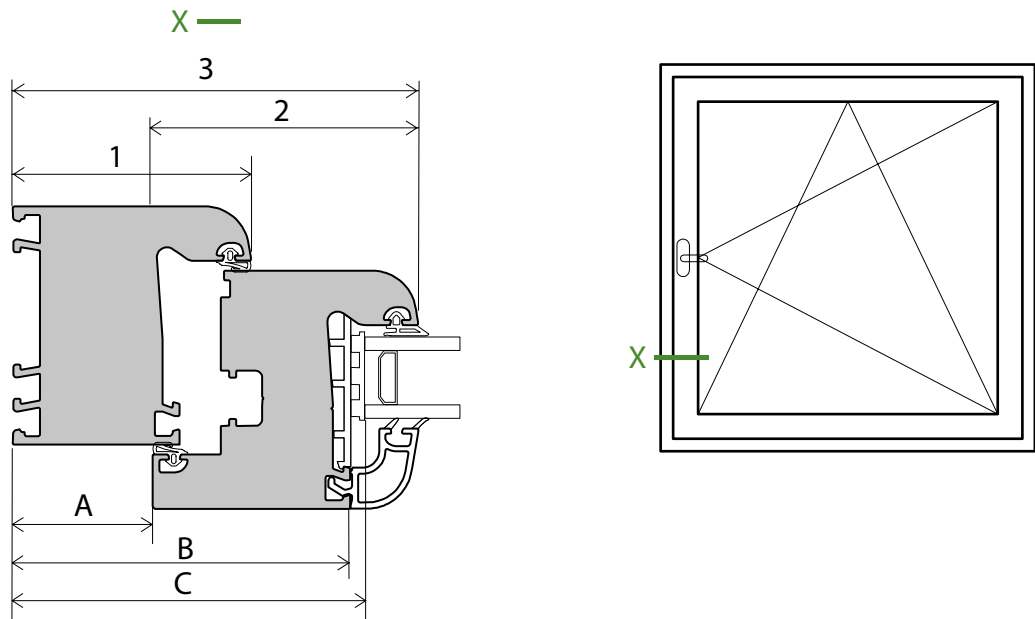
Profile height (mm)	1	 57030
Dimensional correction (mm)	B LI	-21
	C SZ	-25

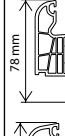
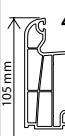
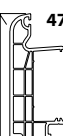
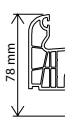
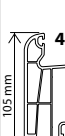
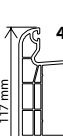
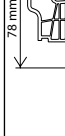
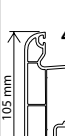
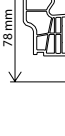
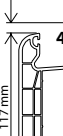
Abbreviations used:

OS (Fixed or floating) mullion axis dimension	1 External dimensions of profiles, incl. frames, mullions and thresholds
WS External dimension of entire sash (after welding)	2 External dimension of sash profile
LI Strip dimension	3 External dimension of assemblies of profiles, incl. frames, sashes, mullions
SZ Glazing unit dimension	A, B, ... Values to be calculated depending on the profiles used
WR External dimension of complete frame (after welding)	

7. Assembly dimensions

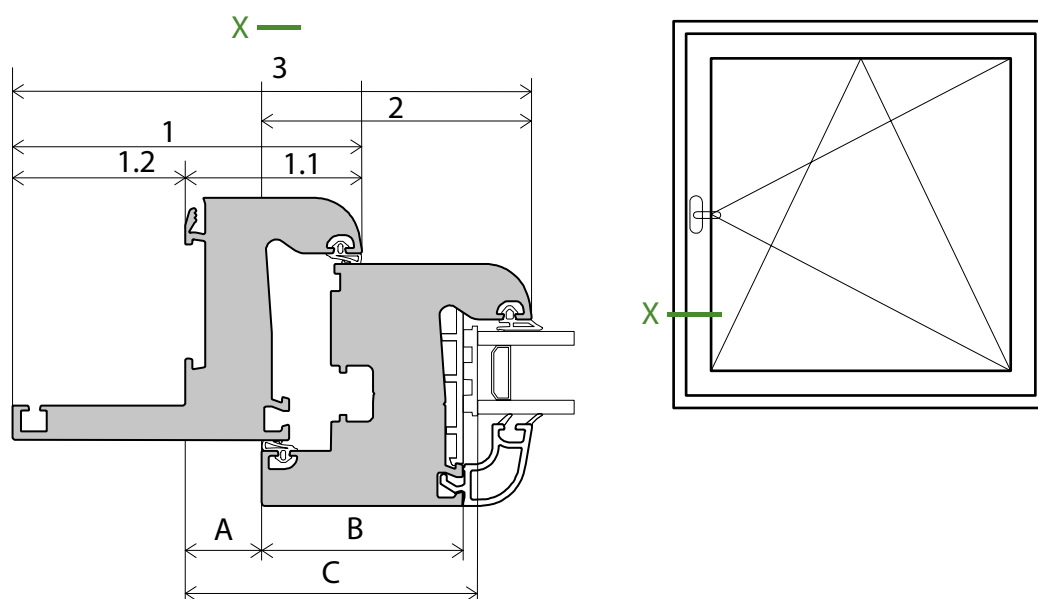
7.6 Single-sash window



Profile height (mm)	1	67010			67011		
		65 mm				70 mm	
2	2						
							
Dimensional correction (mm)	3	114	141	153	119	146	158
	A	-36	-36	-36	-41	-41	-41
	B	-94	-121	-133	-99	-126	-138
	C	-98	-125	-137	-103	-130	-142

7. Assembly dimensions

7.7 Single-sash window - renovation frame



Profile height (mm)	1	67012			67013		
	2	67020 78 mm	47022 105 mm	47020 117 mm	67020 78 mm	47022 105 mm	47020 117 mm
Dimensional correction (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 used:

OS (Fixed or floating) mullion axis dimension

WS External dimension of entire sash (after welding)

LI Strip dimension

SZ Glazing unit dimension

WR External dimension of complete frame (after welding)

1 External dimensions of profiles, incl. frames, mullions and thresholds

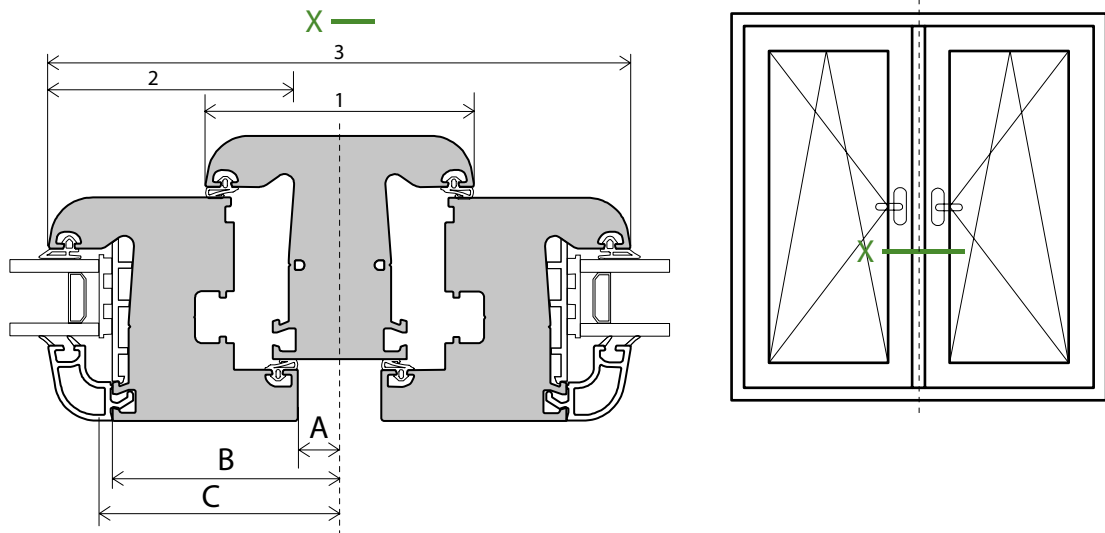
2 External dimension of sash profile

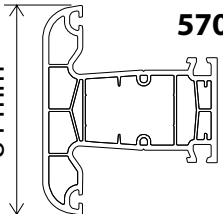
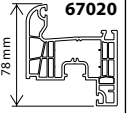
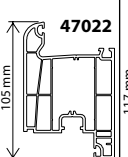
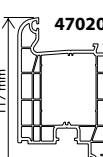
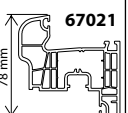
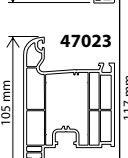
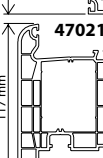
3 External dimension of assemblies of profiles, incl. frames, sashes, mullions

A, B, ... Values to be calculated depending on the profiles used

7. Assembly dimensions

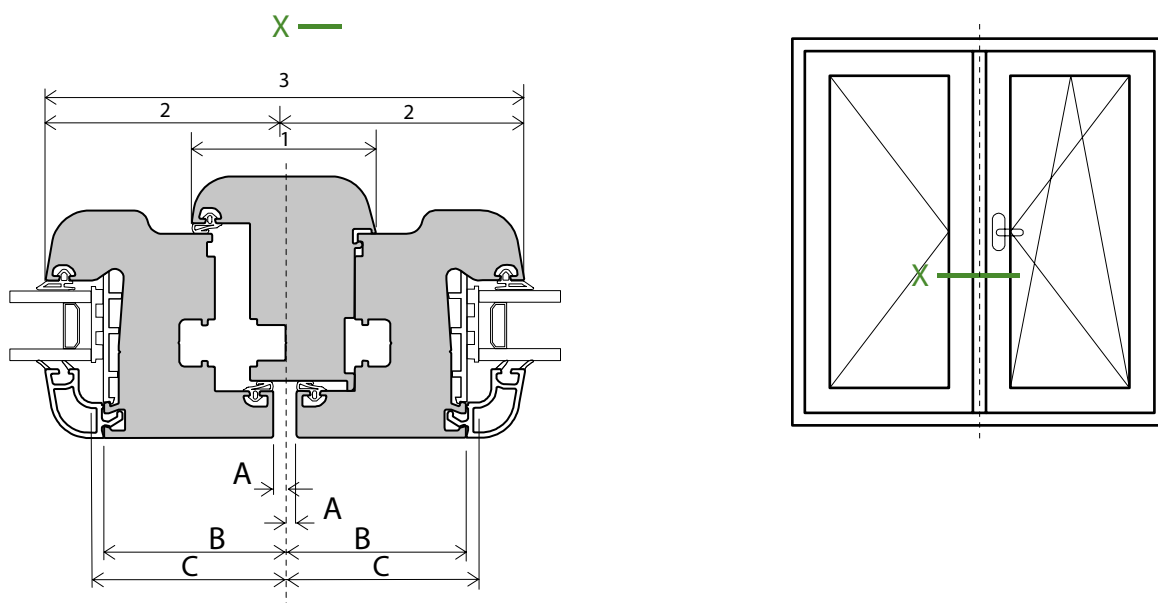
7.8 Double-sash window - fixed mullion

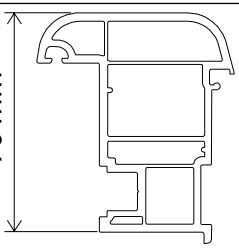
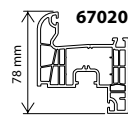
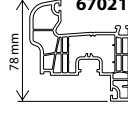
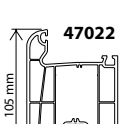
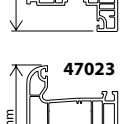
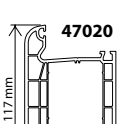
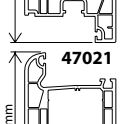


Profile height (mm)		84 mm		
1				
2		 78 mm	 105 mm	 117 mm
		 78 mm	 105 mm	 117 mm
Dimensional correction (mm)	3	182	236	260
	A WS	-13	-13	-13
	B LI	-71	-98	-110
	C SZ	-75	-102	-114

7. Assembly dimensions

7.9 Double-sash window - floating mullion



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

Abbreviations used:

OS (Fixed or floating) mullion axis dimension

WS External dimension of entire sash (after welding)

LI Strip dimension

SZ Glazing unit dimension

WR External dimension of complete frame (after welding)

1 External dimensions of profiles, incl. frames, mullions and thresholds

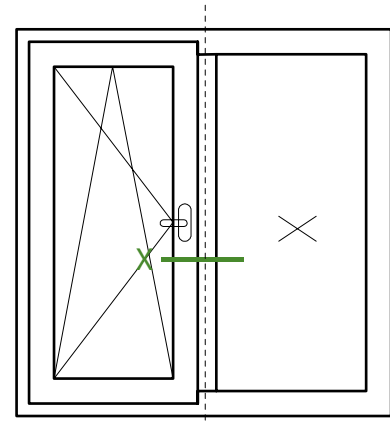
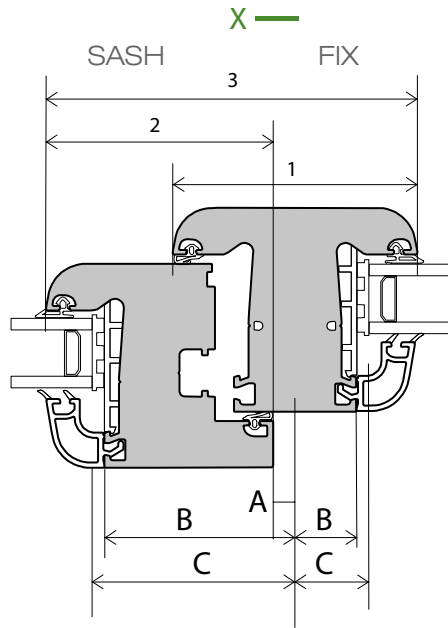
2 External dimension of sash profile

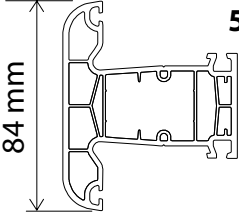
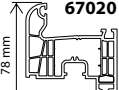
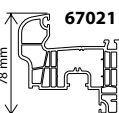
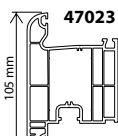
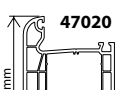
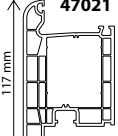
3 External dimension of assemblies of profiles, incl. frames, sashes, mullions

A, B, ... Values to be calculated depending on the profiles used

7. Assembly dimensions

7.10 Double-sash window with FIX

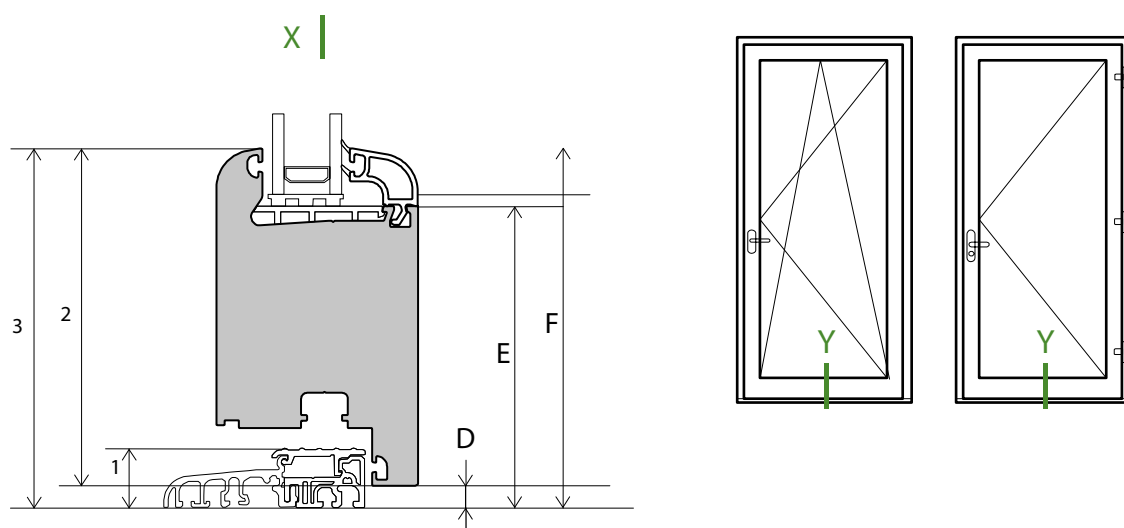


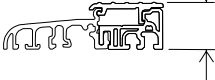
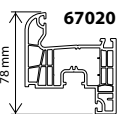
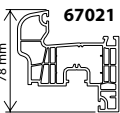
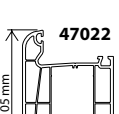
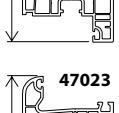
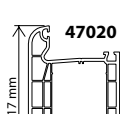
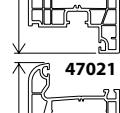
Profile height (mm)	1	 57030 84 mm		
	2	 67020 78 mm  67021 78 mm	 47022 105 mm  47023 105 mm	 47020 117 mm  47021 117 mm
Dimensional correction (mm)	3	133	160	170
	A WS	-13	-13	-13
	B LI	-91 -21	-118 -21	-130 -21
	C SZ	-95 -25	-122 -25	-134 -25

Sash
FIX

7. Assembly dimensions

7.11 Balcony doors, exterior with aluminium threshold



Profile height (mm)	1	 47050		
	2	 67020  67021	 47022  47023	 47020  47021
Dimensional correction (mm)	3	88	115	127
	D WS	-10	-10	-10
	E LI	-68	-95	-107
	F SZ	-72	-99	-111

Abbreviations used:

OS (Fixed or floating) mullion axis dimension

WS External dimension of entire sash (after welding)

LI Strip dimension

SZ Glazing unit dimension

WR External dimension of complete frame (after welding)

1 External dimensions of profiles, incl. frames, mullions and thresholds

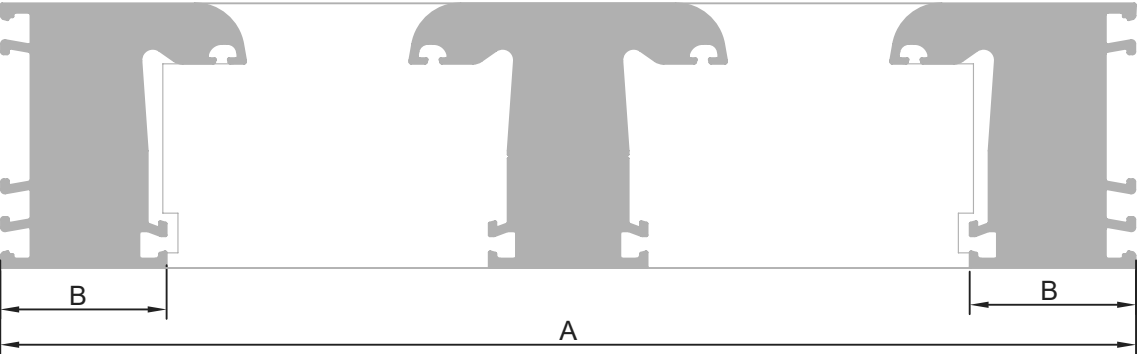
2 External dimension of sash profile

3 External dimension of assemblies of profiles, incl. frames, sashes, mullions

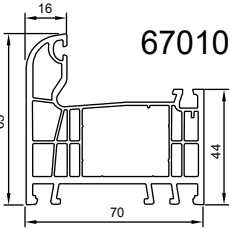
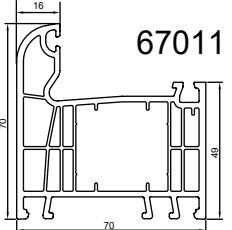
A, B, ... Values to be calculated depending on the profiles used

7. Assembly dimensions
7.12 Fixed mullion correction 57030

Mullion length calculation 57030

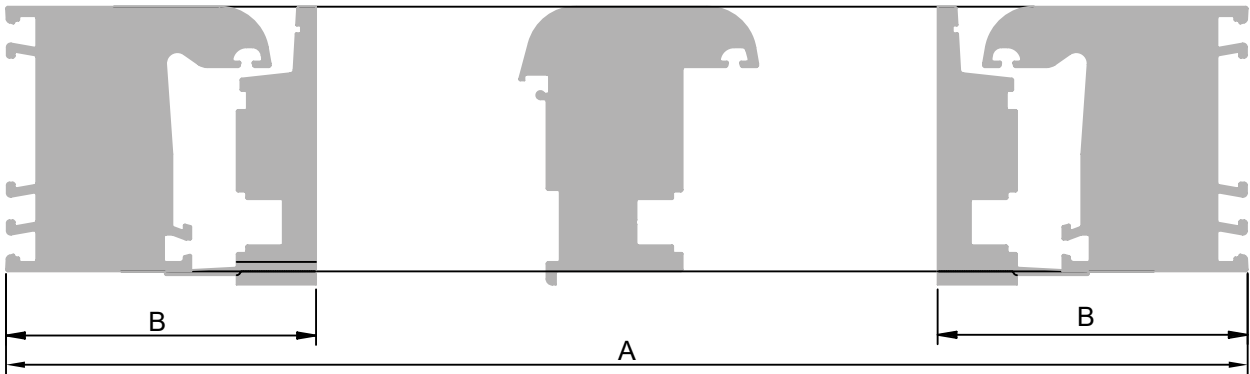


DS - fixed mullion length = $A - 2B$

1	 67010	 67011
B	-42	-47

7. Assembly dimensions
7.13 Floating mullion correction 57031

Mullion length calculation 57031



1	67010	67011
B	-77	-82

8. Execution guidelines

8.1 Drainage lines

8. Execution guidelines

8.1 Drainage lines

Milling and drilling of technical holes.

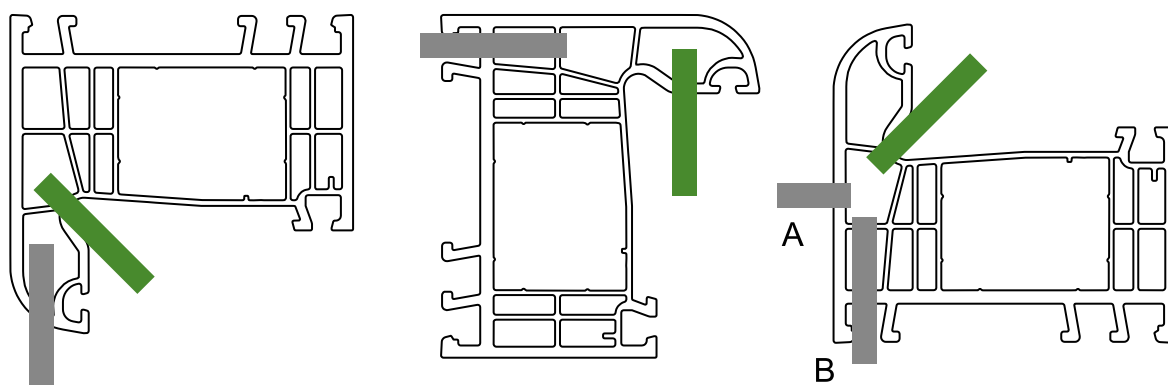
The proper functioning of PVC windows and doors requires the making of various types of openings in the appropriate profile chambers. They are intended to remove rainwater so that it does not penetrate indoors. The outer chambers of the profiles must also be ventilated and the pressure compensation in the chambers most exposed to heat must be carried out. This only applies to „coloured” profiles. Drainage and pressure equalization holes in the chambers of coloured/veneer profiles.

If the windows are made of profiles whose external side is veneered, painted, with an aluminium overlay - then the profiles heat up to higher temperatures, even above 70°C. Such a strong heating of the profile chambers, a significant increase in pressure in the profile exterior chambers may lead to deformations, bulges in profile walls.

Therefore, all chambers of coloured profiles, whether large or small, shall feature pressure compensation holes (decompression holes).

The decompression holes shall be included in all main and additional profiles. Furthermore, it should be noted that access to decompression holes must not be hindered after the glazing and complete mounting of the window.

Milling and drilling holes in frames of „coloured” profiles.



Pressure equalization in external chambers. Use a 5 mm drill bit and make decompression holes in the marked chambers. Applies to the top window elements.

Ventilation of vertical window elements. Use a 5mm drill bit and make ventilation holes in the marked chambers. Make the holes in vertical window elements at a distance of 200mm from the upper part of the rebate.

Drainage of lower frame elements. Drainage holes are „beans” of size 5x30mm, 6x30mm or 8mm diameter holes. A - chamber drainage to the outside, B - chamber drainage from below. Drainages A and B are alternative. The distance between drainage holes made outside and inside must be at least 50mm.

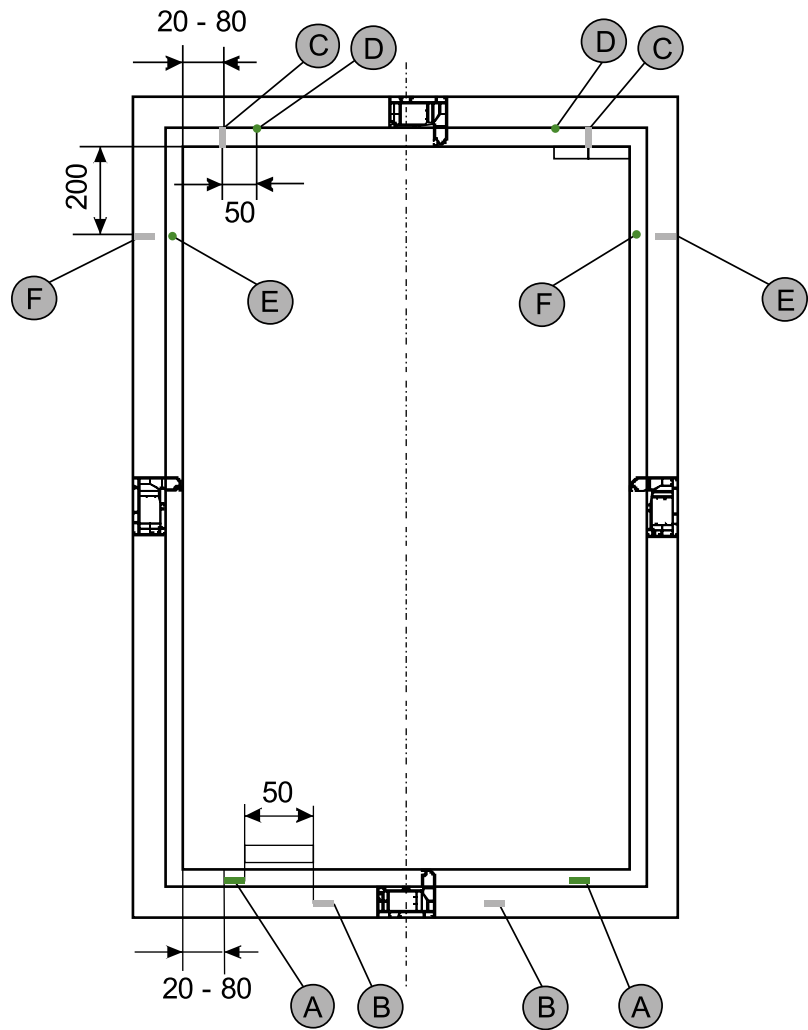
8. Execution guidelines 8.1 Drainage lines

Table 1. Number of millings and drillings - frames.

Window frame size		Number of millings and drillings					
		Drainage points		Pressure equalization		Ventilation	
		A	B	C	D	E	F
Clear dimension of given lite	≤ 600 mm	2	1 at center	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

Drilling or milling from inside the profile (green)

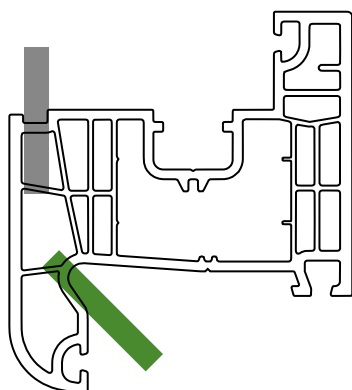
Drilling or milling from inside the profile (grey)



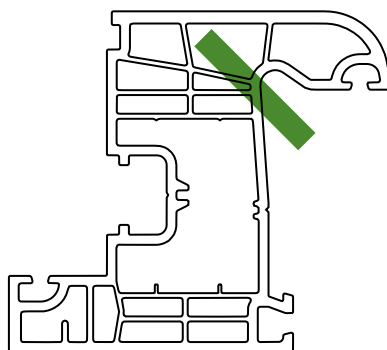
8. Execution guidelines

8.1 Drainage lines

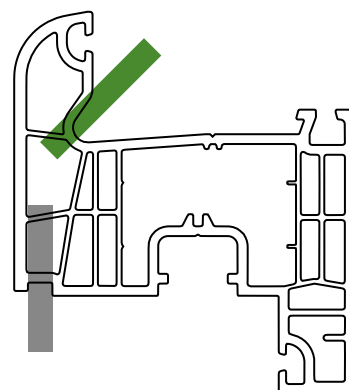
Milling and drilling holes in „coloured” sashes



Pressure equalization in external chambers. Make decompression holes with 5x30mm, 6x30mm „beans” in the marked chambers. Applies to the top window elements.



Ventilation of vertical window elements. Use a 5 mm drill bit and make ventilation holes in the marked chambers. Make the holes in vertical window elements at a distance of 200 mm from the upper part of the rebate.



Drainage of lower sash elements. Drainage holes are „beans” of size 5x30mm, 6x30mm or 8mm diameter holes. The distance between drainage holes made outside and inside must be at least 50mm.

Table 2. Number of millings and drillings - sashes.

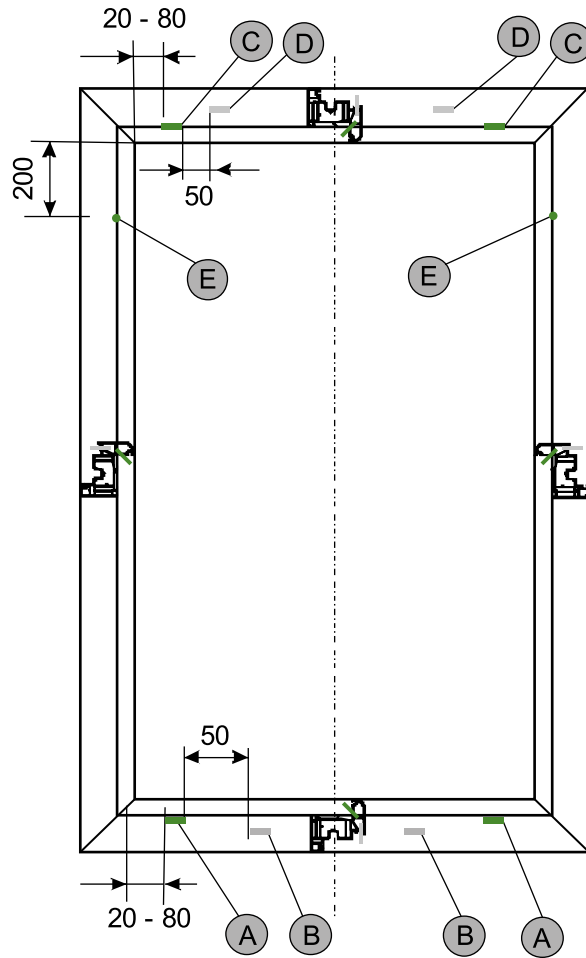
Window frame size		Number of millings and drillings				
		Drainage points		Pressure equalization		Ventilation
		A	B	C	D	F
Clear dimension of given lite	≤ 600 mm	2	1 at center	1 at center	2	2
	600 - 1300 mm	2	2	2	2	2
	1300 - 2000 mm	3	2	2	2	2
	≥ 2000 mm	3	3	2	2	2

 Drilling or milling from inside the profile (green)

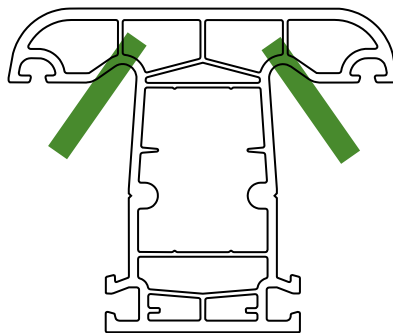
 Drilling or milling from inside the profile (grey)

8. Execution guidelines

8.1 Drainage lines



Milling and drilling holes in vertical profiles of fixed mullions and structural muntins - „coloured”.

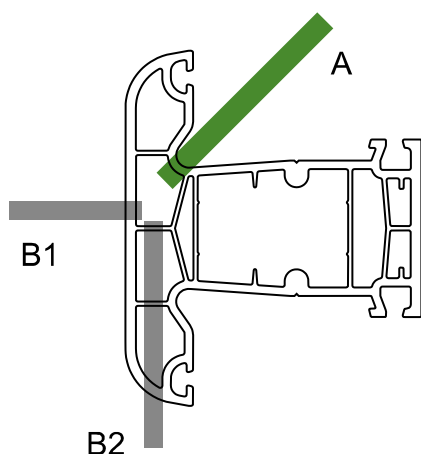


Ventilation of vertical window elements (fixed mullions and structural muntins).

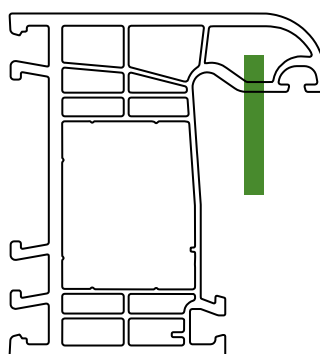
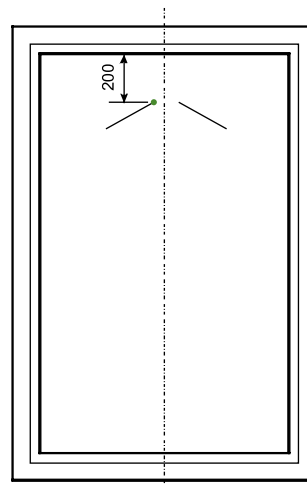
Use a 5 mm drill bit and make ventilation holes in the marked chambers. Holes should be made in the vertical elements of windows at a distance of 200 mm counting from the top part of the rebate of the lite in which it is mounted.

8. Execution guidelines

8.1 Drainage lines

Milling and drilling holes in horizontal profiles of fixed mullions and structural muntins - „coloured”.

Drainage of horizontal mullions or structural muntins. Drainage holes are „beans” of size 5x30mm, 6x30mm or 8mm diameter holes. A - chamber drainage to the outside, B - chamber drainage from below. Drainages A and B are alternative. The distance between drainage holes made outside and inside must be at least 50mm.



Ventilation of the vertical elements of window lite elements, divided by transoms/splits. Use a 5 mm drill bit and make ventilation holes in the marked chambers. Make the holes in vertical window elements at a distance of 200 mm from the upper part of the rebate.

Tabela 3. Liczba frezowań i wierceń - słupki stałe poziome.

Window frame size		Number of millings and drillings				
		Drainage points		Pressure equalization		Ventilation
		A	B	C	D	F
Clear dimension of given lite	≤ 600 mm	2	1 at center	1 at center	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

 Drilling or milling from inside the profile (green)

 Drilling or milling from inside the profile (grey)

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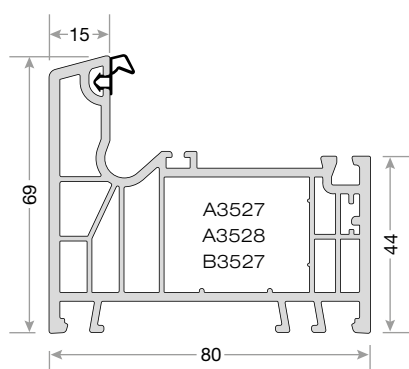
1. Overview of system components
2. Size limitations, maximum sash dimensions.
3. Profile overview
4. Assemblies
5. Assembly diagrams
6. Assembly dimensions
7. Execution guidelines

1. Overview of system component

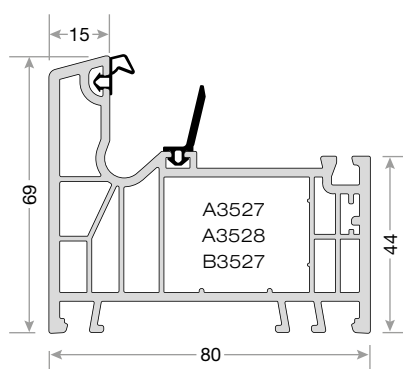
- 1.1 Main profiles
- 1.2 Additional profiles
- 1.3 Reinforcements

1. Overview of system components

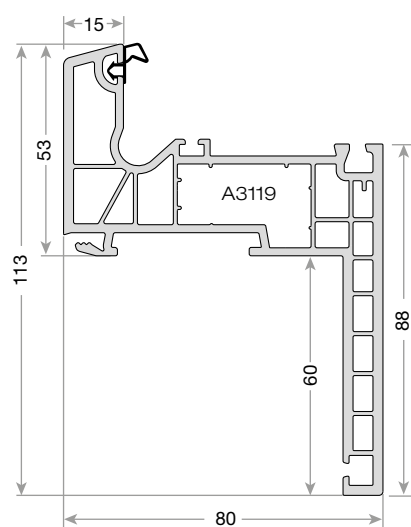
1.1 Main profiles



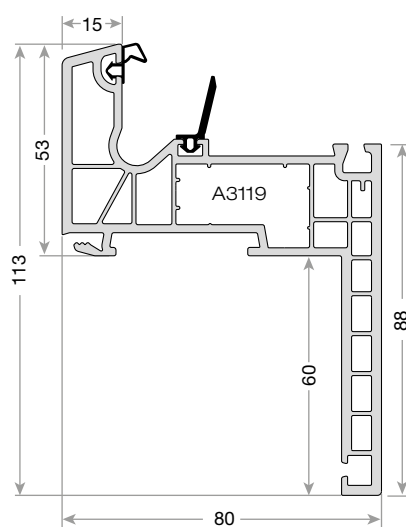
68011 AD



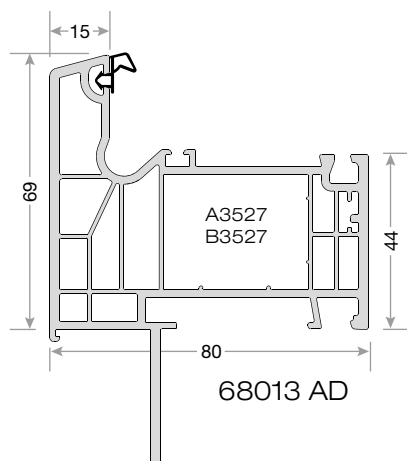
68011 MD



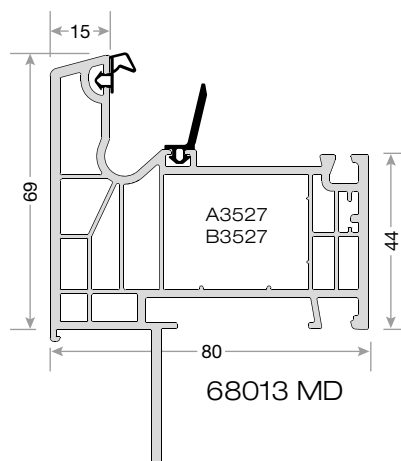
68012 AD



68012 MD



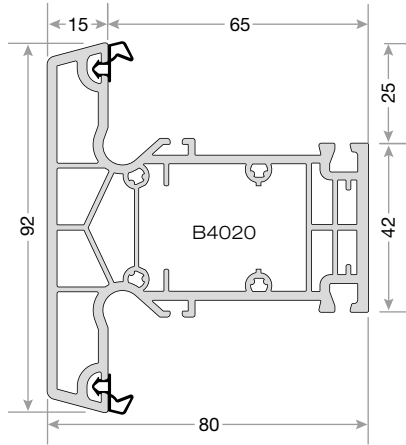
68013 AD



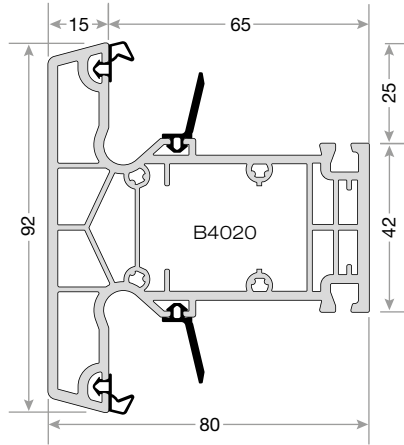
68013 MD

1. Overview of system components

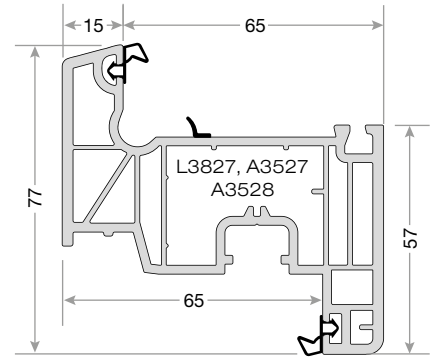
1.1 Main profiles



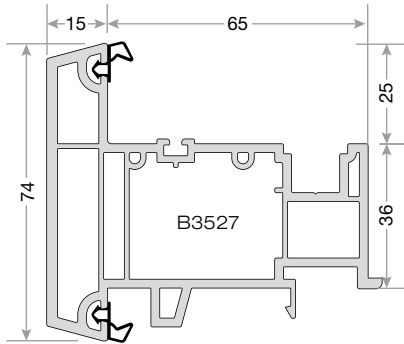
68032 AD



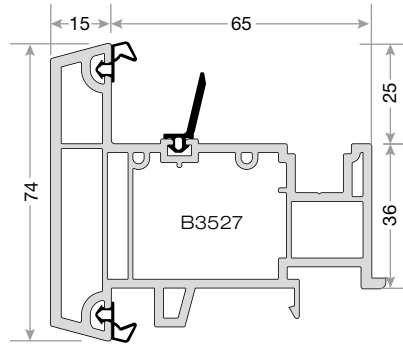
68032 MD



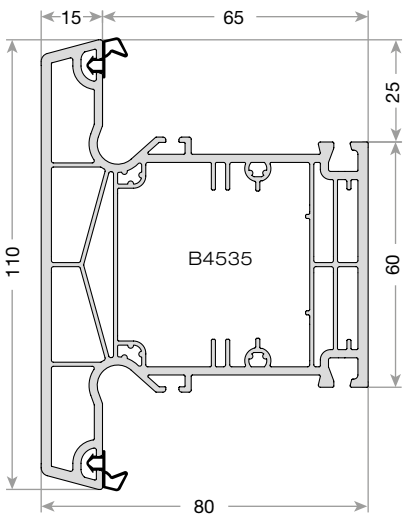
68021



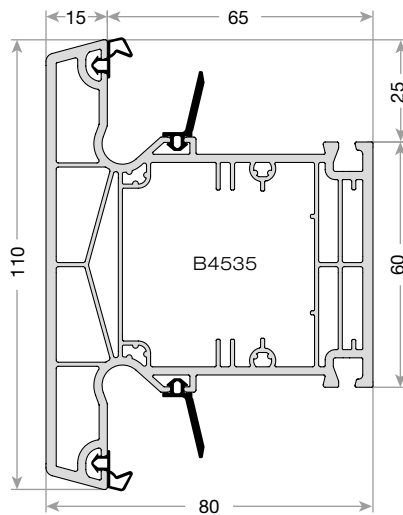
68033 AD



68033 MD



58030 AD

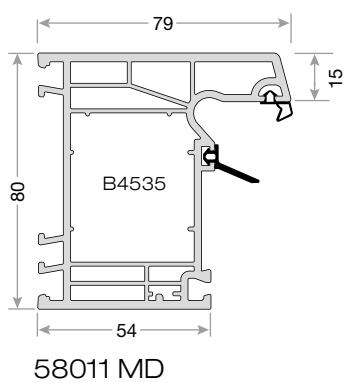
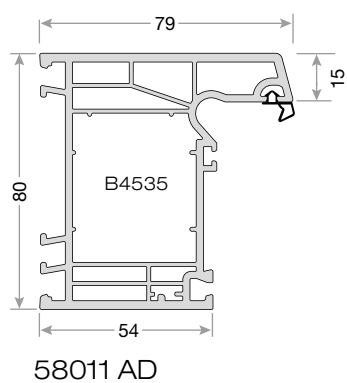
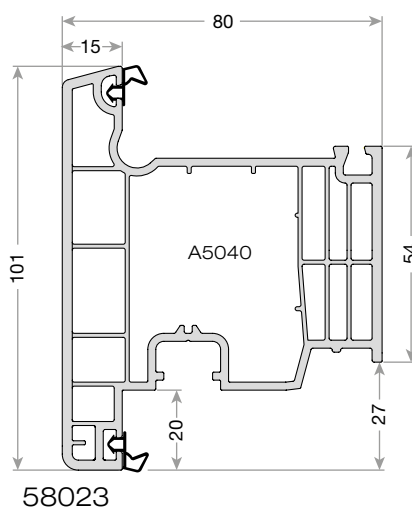
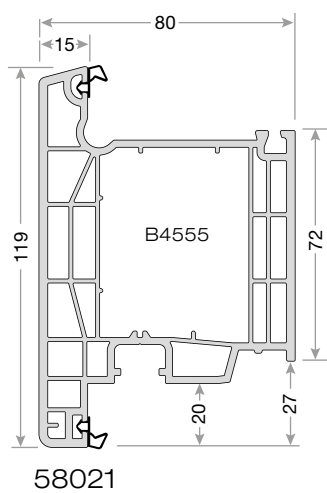
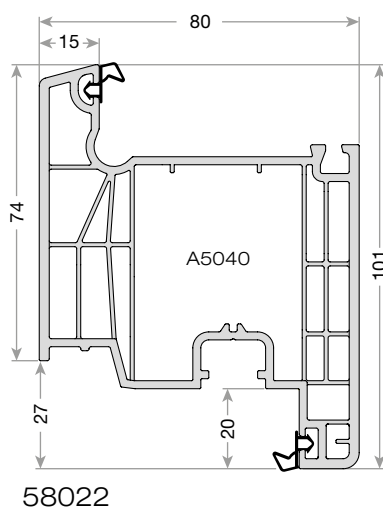
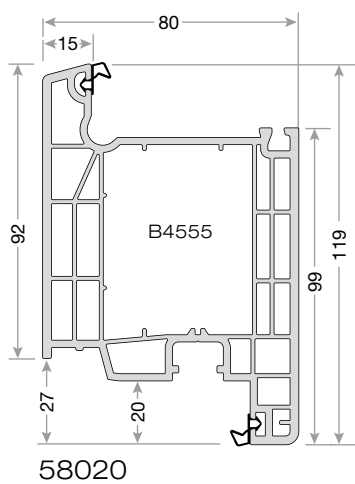


58030 MD

1. Overview of system components

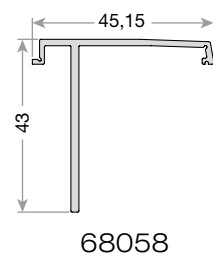
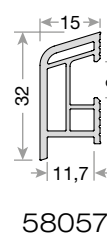
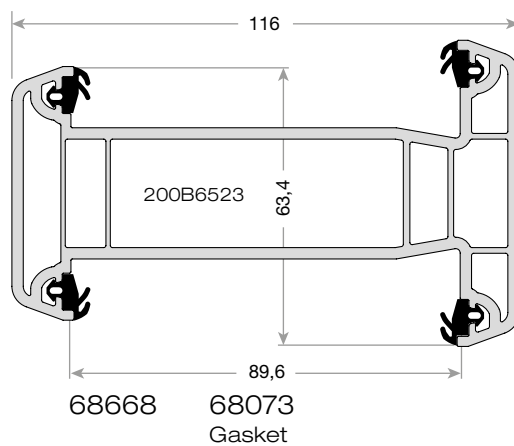
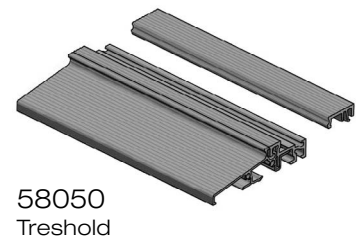
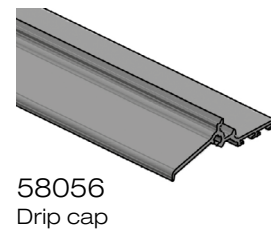
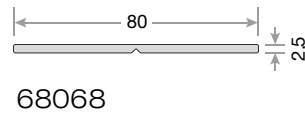
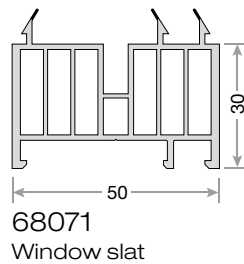
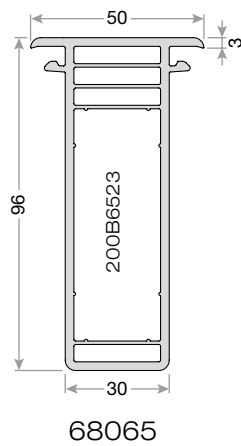
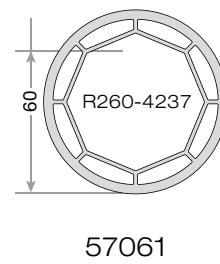
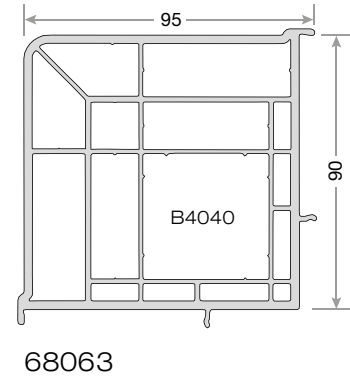
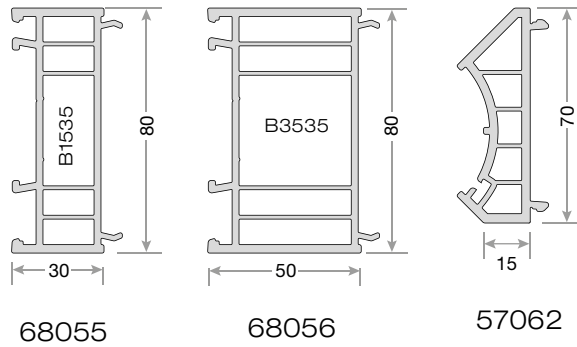
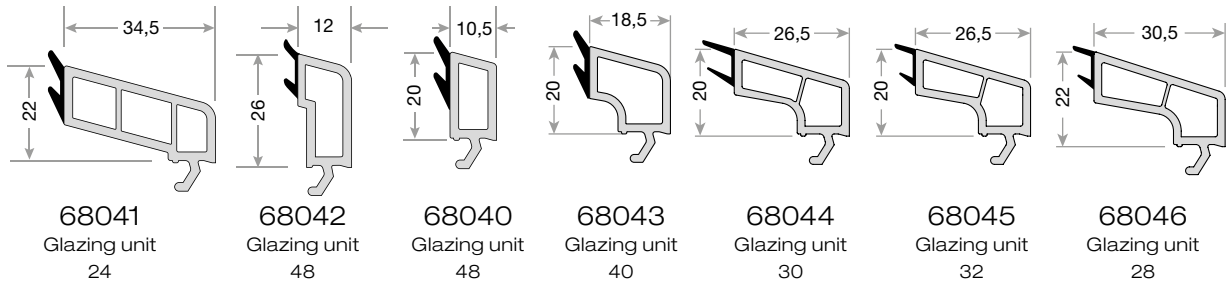
1.1 Main profiles

Door profiles



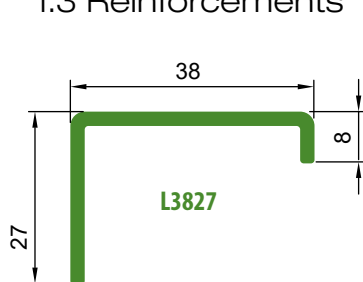
1. Overview of system components

1.2 Additional profiles

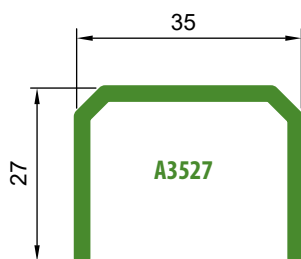


1. Overview of system components

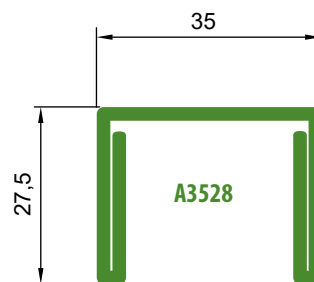
1.3 Reinforcements



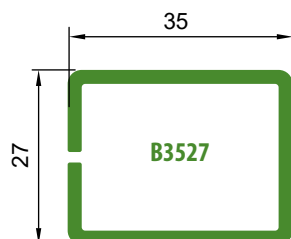
A	X	Y
1,50	1,94	0,62



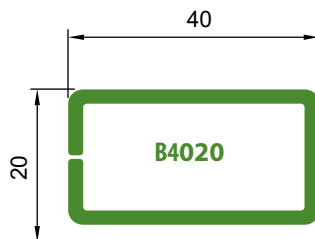
A	X	Y
1,50	2,48	0,93
2,00	3,18	1,20



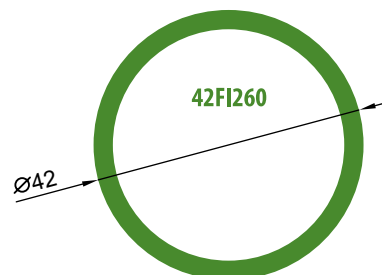
A	X	Y
2,00	5,24	1,98
2,50	6,18	2,48



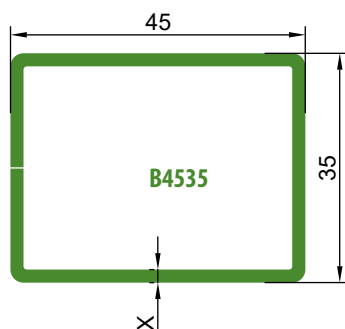
A	X	Y
1,50	2,86	1,98
2,00	3,70	2,50



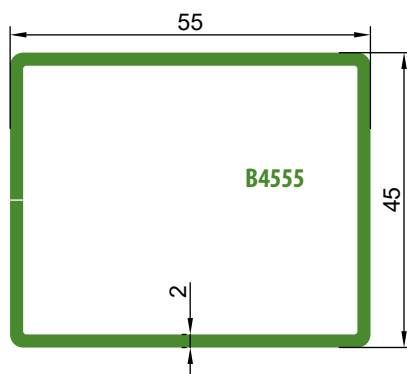
A	X	Y
1,50	1,12	3,31
2,00	1,41	4,24



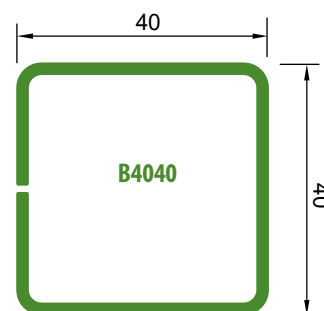
A	X	Y
2,60	7,27	7,27



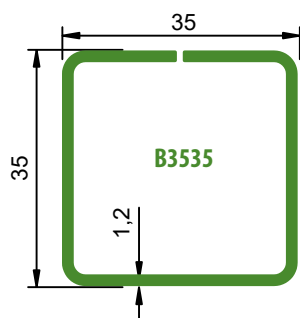
symbol	x [mm]	lx [cm ⁴]	ly [cm ⁴]
150B4535	1,50	6,6	4,5
200B4535	2,0	8,6	5,8



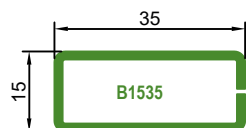
symbol	x [mm]	lx [cm ⁴]	ly [cm ⁴]
200B4555	2	16,8	12,3



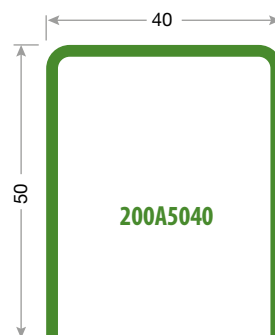
symbol	x [mm]	lx [cm ⁴]	ly [cm ⁴]
200B4040	2,0	7,13	7,21



symbol	x [mm]	lx [cm ⁴]	ly [cm ⁴]
120B3535	1,2	3,02	2,98



symbol	x [mm]	lx [cm ⁴]	ly [cm ⁴]
150B1535	1,5	1,94	5,07



symbol	x [mm]	lx [cm ⁴]	ly [cm ⁴]
200A5040	2,0	7,80	7,04



symbol	x [mm]	lx [cm ⁴]	ly [cm ⁴]
200B6523	2,0	17,02	4,30

2. Size limitations

- maximum sash dimensions

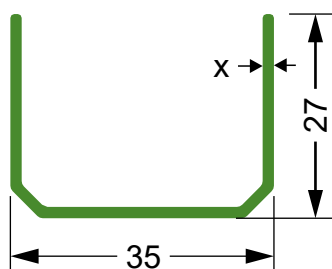
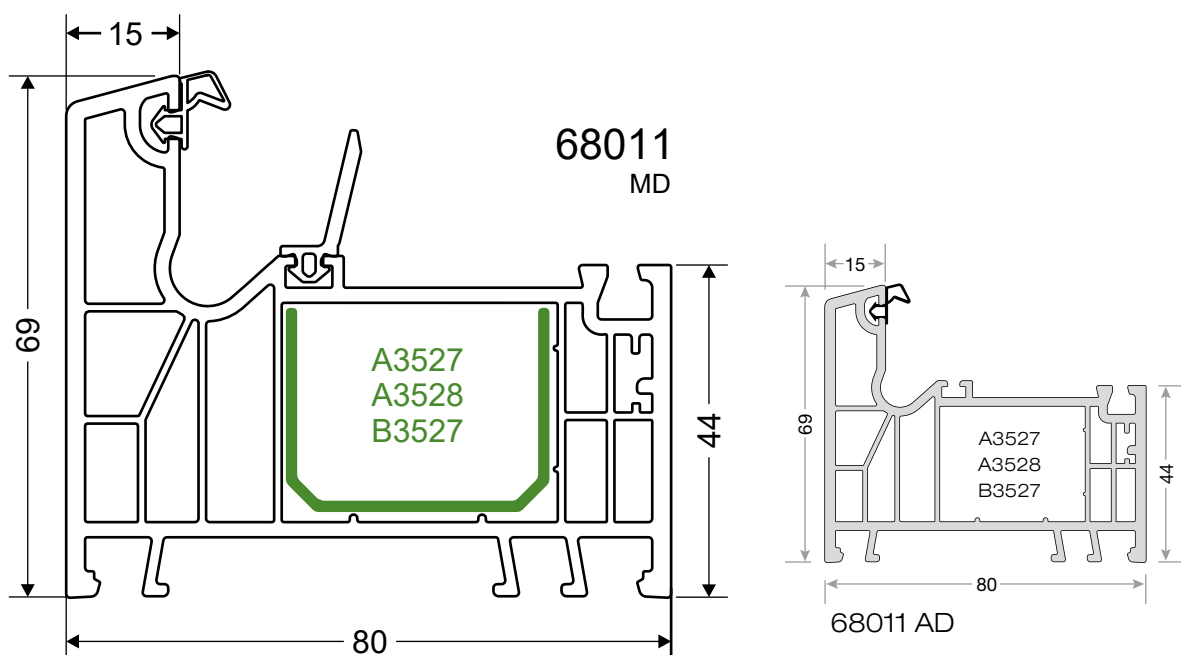
See Appendix 1.

3. Profile overview

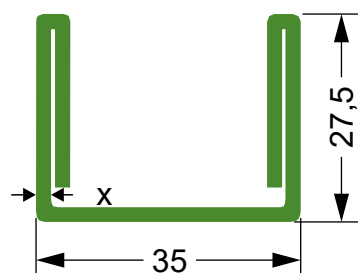
- 3.1 Frame 68011
- 3.2 Renovation frame 68012
- 3.3 Frame 68013
- 3.4 Sash 68021
- 3.5 Fixed mullion 68032
- 3.6 Fixed mullion 58030
- 3.7 Floating mullion 68033
- 3.8 Door frame 58011
- 3.9 „Intermediate” sash Z 58022
- 3.10 „Intermediate” sash T 58023
- 3.11 Door sash „heavy” Z 58020
- 3.12 Door sash „heavy” T 58021
- 3.13 Connector 90° 68064
- 3.14 Pipe connector 57061 and adapter 57062
- 3.15 Static connector 68668 + 200B6523
- 3.16 Static connector 68065 + 200B6523
- 3.17 Accessories

3. Profile overview

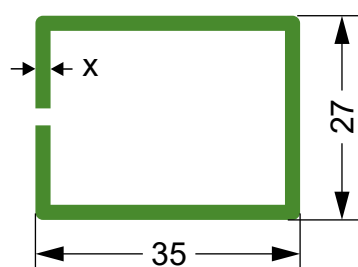
3.1 Frame 68011



symbol	x [mm]	I _x [cm ⁴]	I _y [cm ⁴]
150A3527	1,5	2,4761	0,9257
200A3527	2,0	3,1759	1,2004

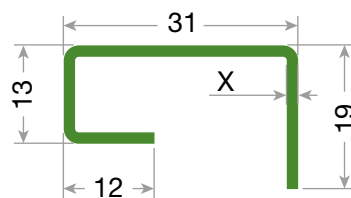
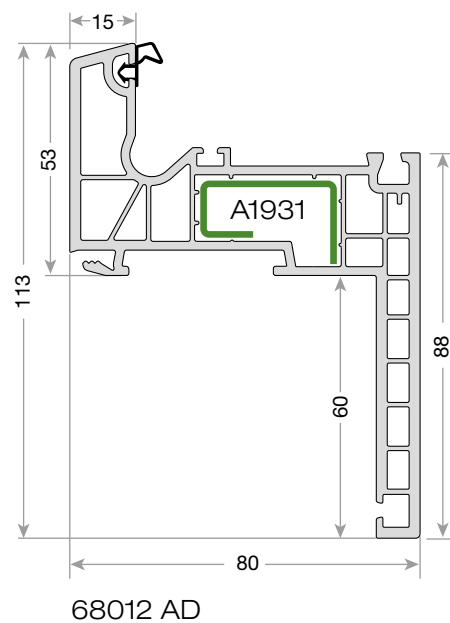
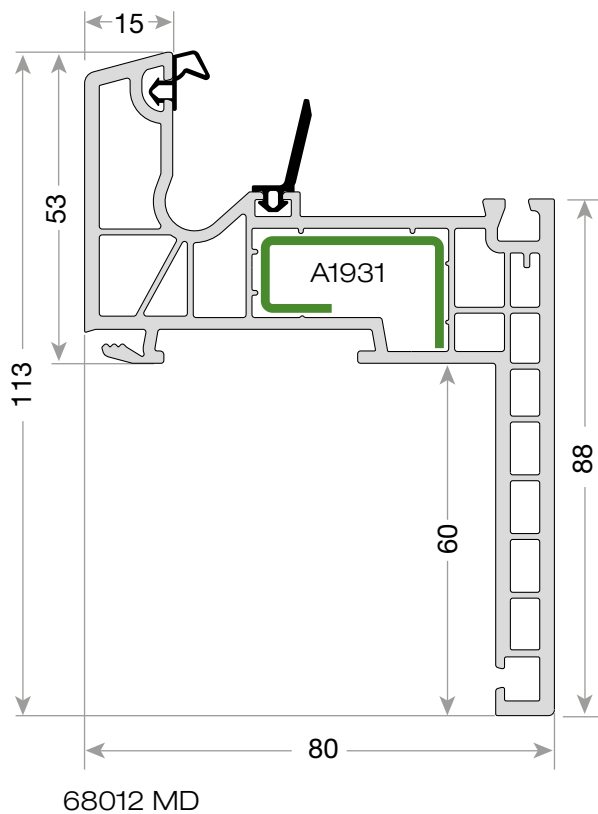


symbol	x [mm]	I _x [cm ⁴]	I _y [cm ⁴]
200A3528	2,0	5,24	1,98
250A3528	2,5	6,18	2,48



symbol	x [mm]	I _x [cm ⁴]	I _y [cm ⁴]
150B3527	1,5	2,86	1,98
200B3527	2,0	3,70	2,50

3. Profile overview
3.2 Renovation frame 68012

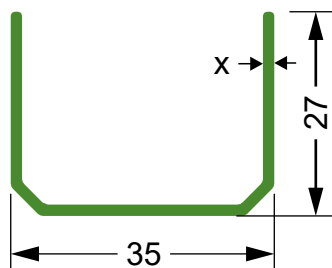
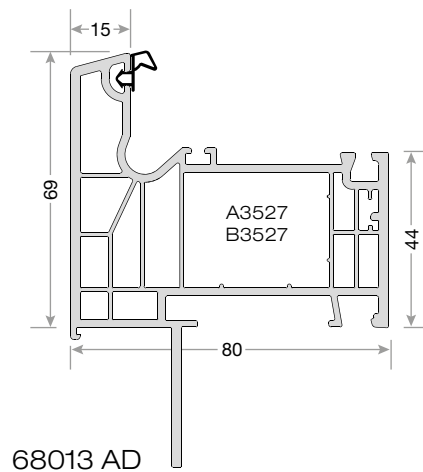
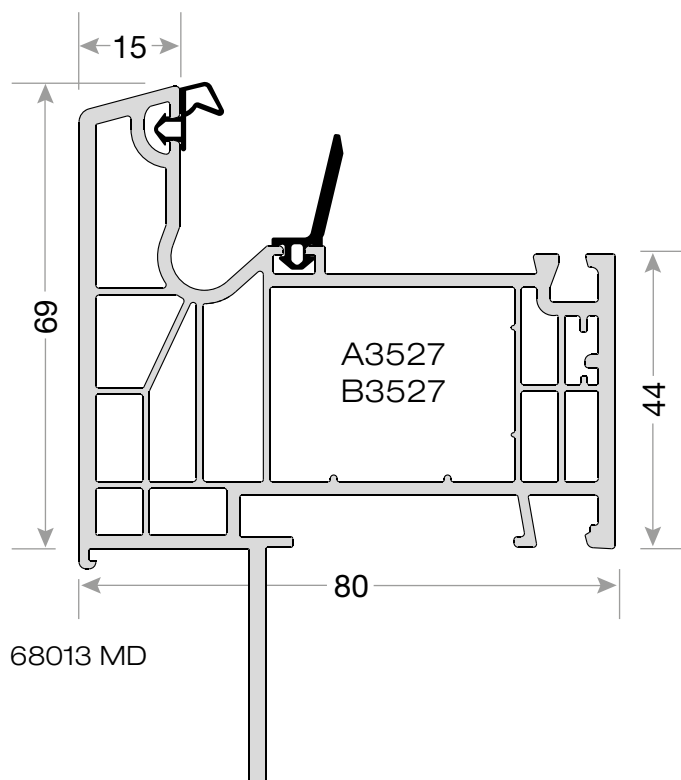


symbol	x [mm]	Ix [cm ⁴]	Iy [cm ⁴]
150A1931	1,5	1,41	0,32

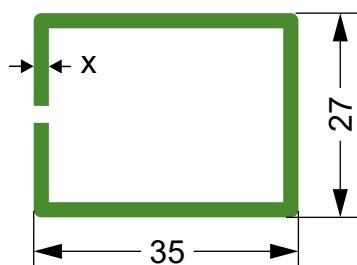
Reinforcement XXX1931

3. Profile overview

3.3 Frame 68013



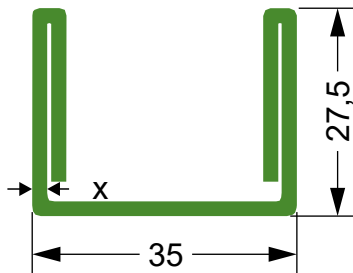
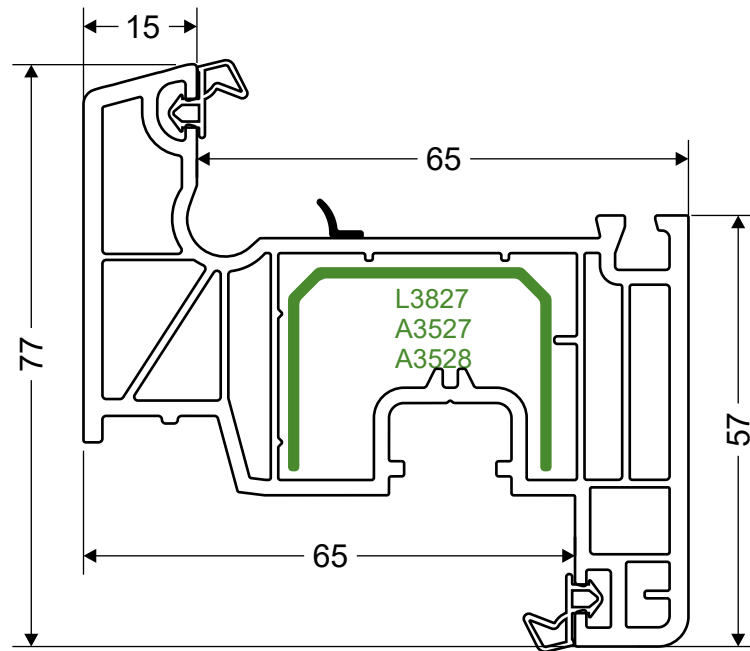
symbol	x [mm]	I _x [cm ⁴]	I _y [cm ⁴]
150A3527	1,5	2,4761	0,9257
200A3527	2,0	3,1759	1,2004



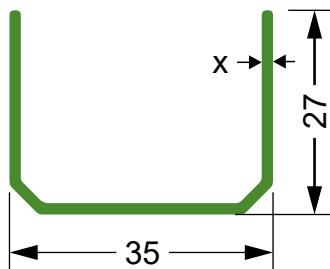
symbol	x [mm]	I _x [cm ⁴]	I _y [cm ⁴]
150B3527	1,5	2,86	1,98
200B3527	2,0	3,70	2,50

3. Profile overview

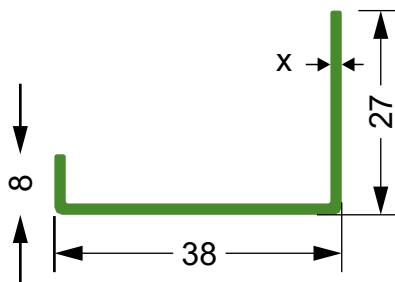
3.4 Sash 68021



symbol	x [mm]	I _x [cm ⁴]	I _y [cm ⁴]
200A3528	2,0	5,24	1,98
250A3528	2,5	6,18	2,48



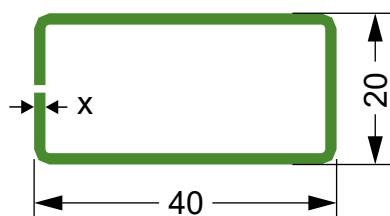
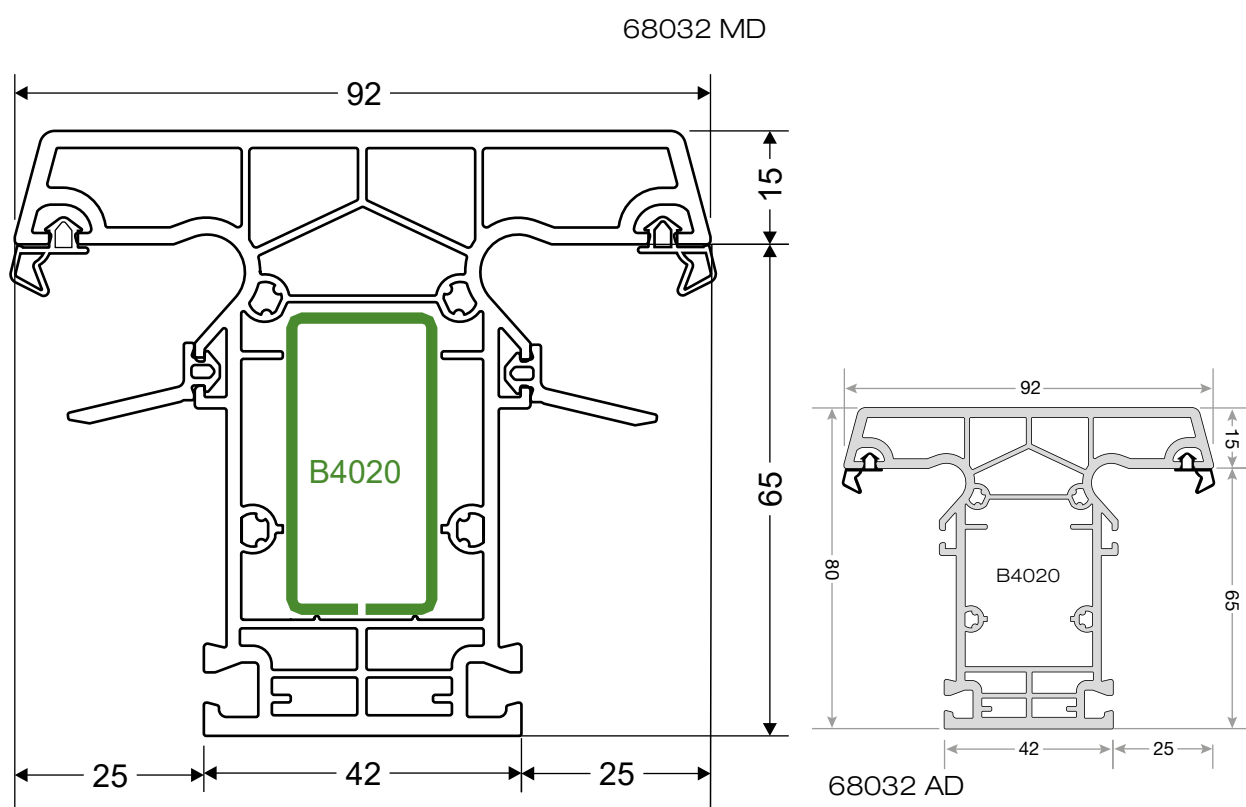
symbol	x [mm]	I _x [cm ⁴]	I _y [cm ⁴]
150A3527	1,5	2,4761	0,9257
200A3527	2,0	3,1759	1,2004



symbol	x [mm]	I _x [cm ⁴]	I _y [cm ⁴]
150A3827	1,5	1,9409	0,6214

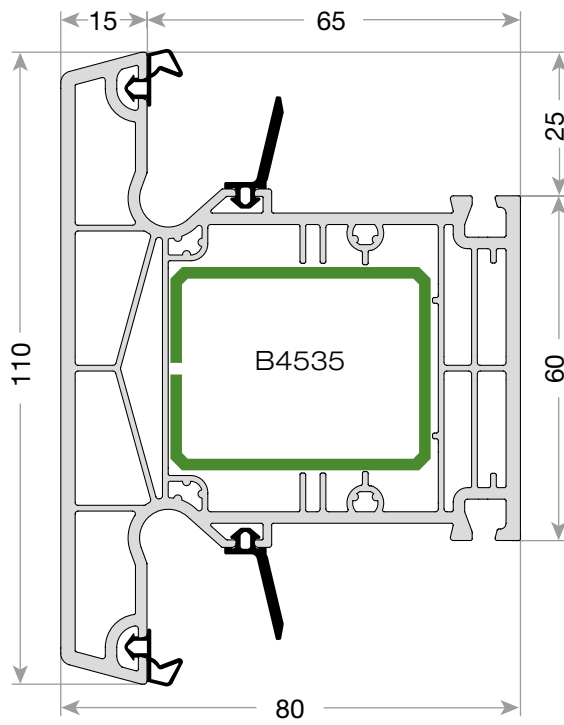
3. Profile overview

3.5 Fixed mullion 68032

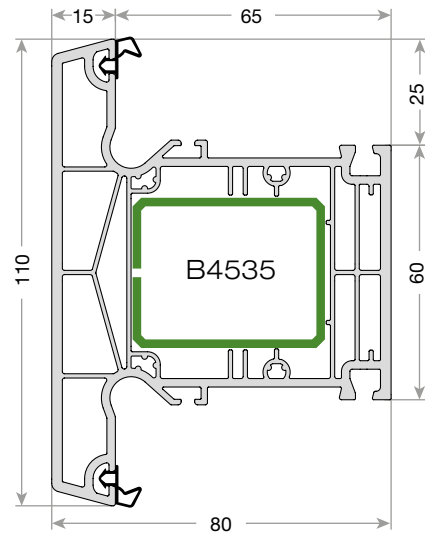


symbol	x [mm]	I _x [cm ⁴]	I _y [cm ⁴]
150B4020	1,5	3,31	1,12
200B4020	2,0	4,24	1,41

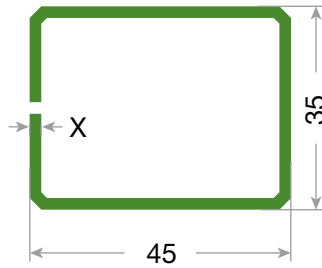
3. Profile overview
3.6 Fixed mullion 58030



58030 MD



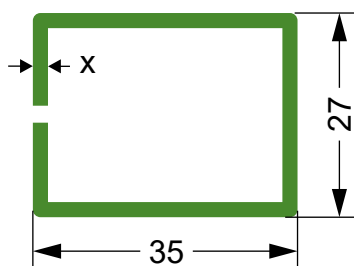
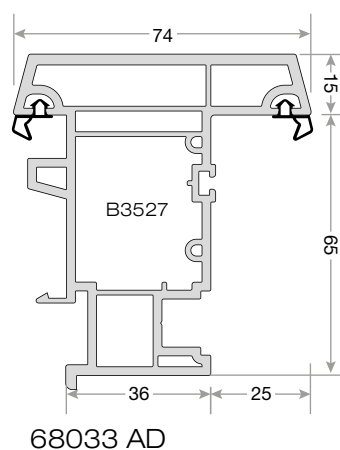
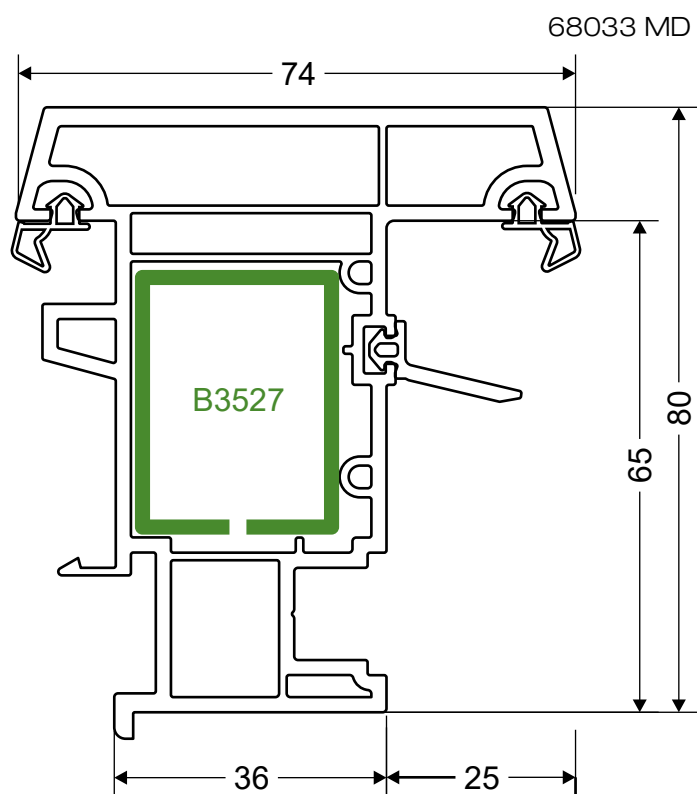
58030 AD



symbol	x [mm]	Ix [cm ⁴]	Iy [cm ⁴]
150B4535	1,5	6,6	4,5
200B4535	2,0	8,6	5,8

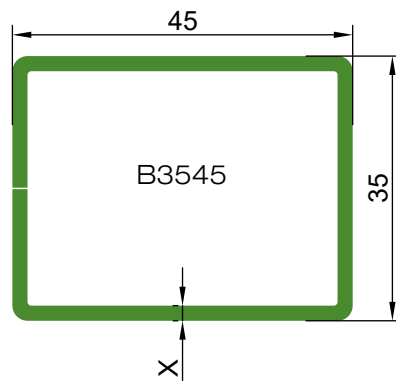
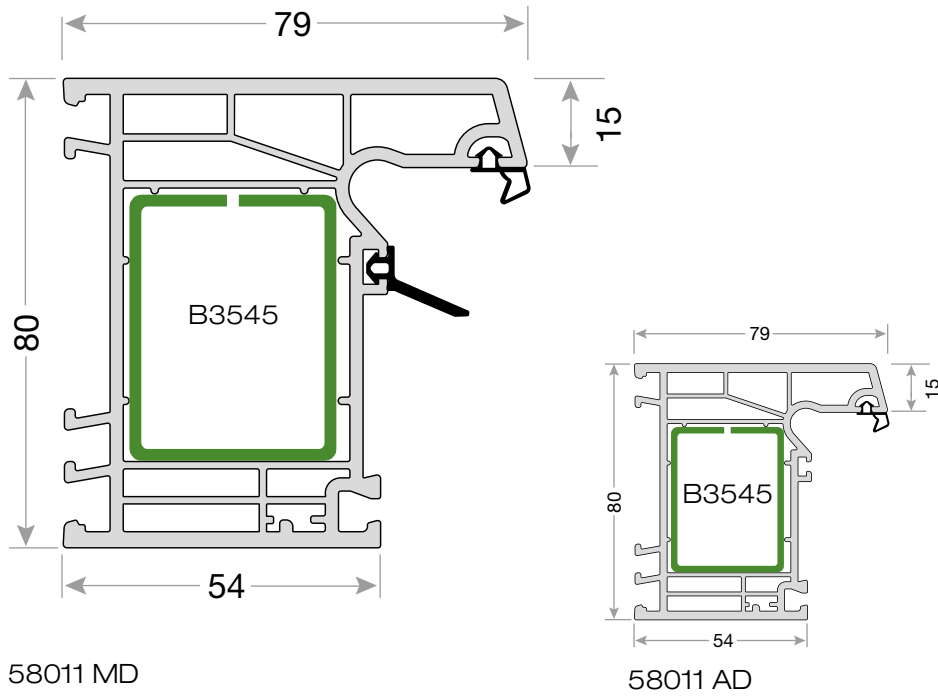
3. Profile overview

3.7 Floating mullion 68033



symbol	x [mm]	Ix [cm ⁴]	Iy [cm ⁴]
150B3527	1,5	2,86	1,98
200B3527	2,0	3,70	2,50

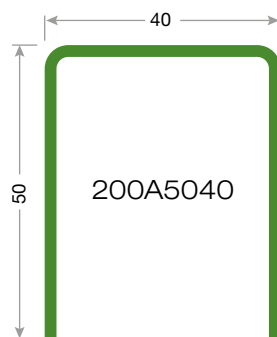
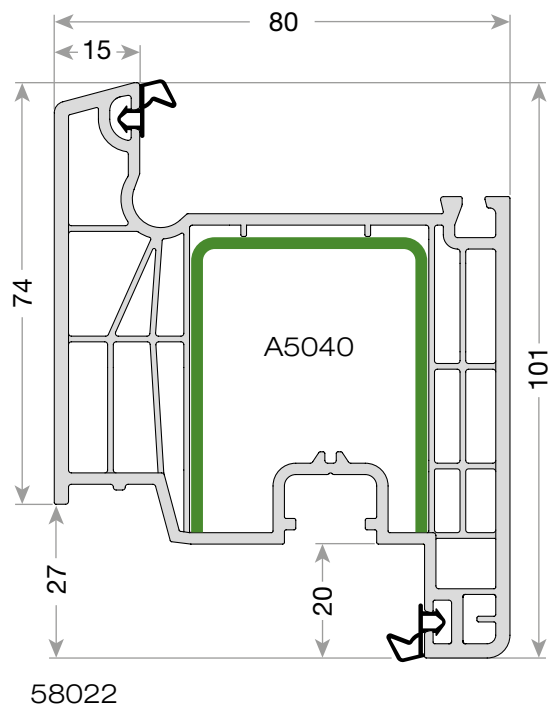
3. Profile overview
3.8 Door frame 58011



symbol	x [mm]	Ix [cm ⁴]	Iy [cm ⁴]
150B3545	1,5	6,52	4,51
200B3545	2,0	8,66	5,67

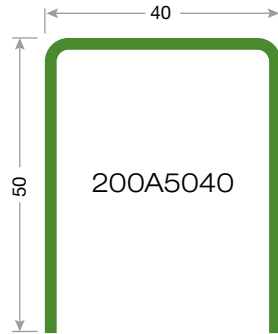
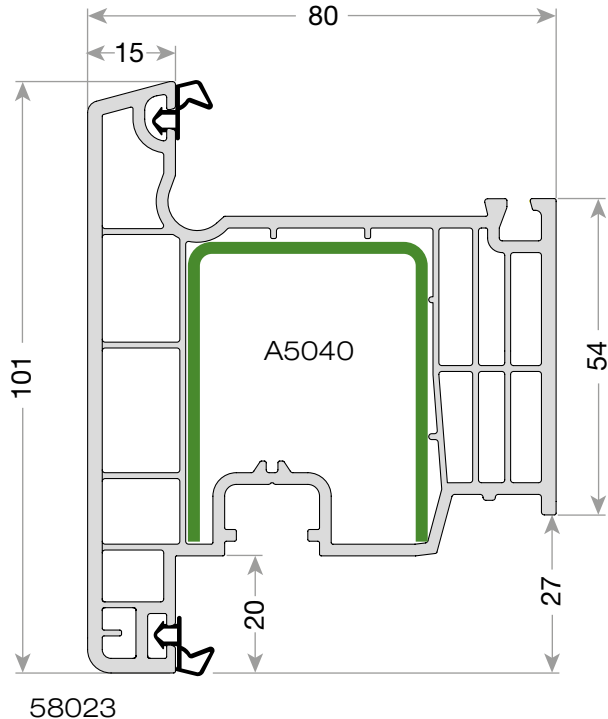
3. Profile overview

3.9 „Intermediate” sash Z 58022

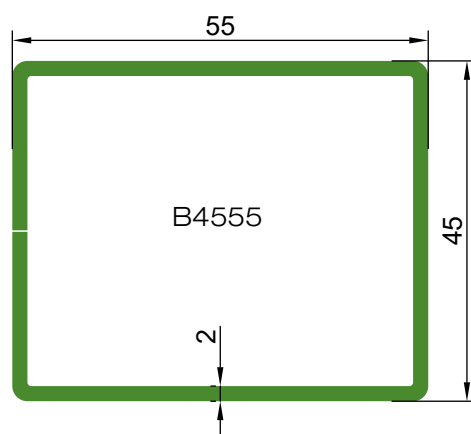
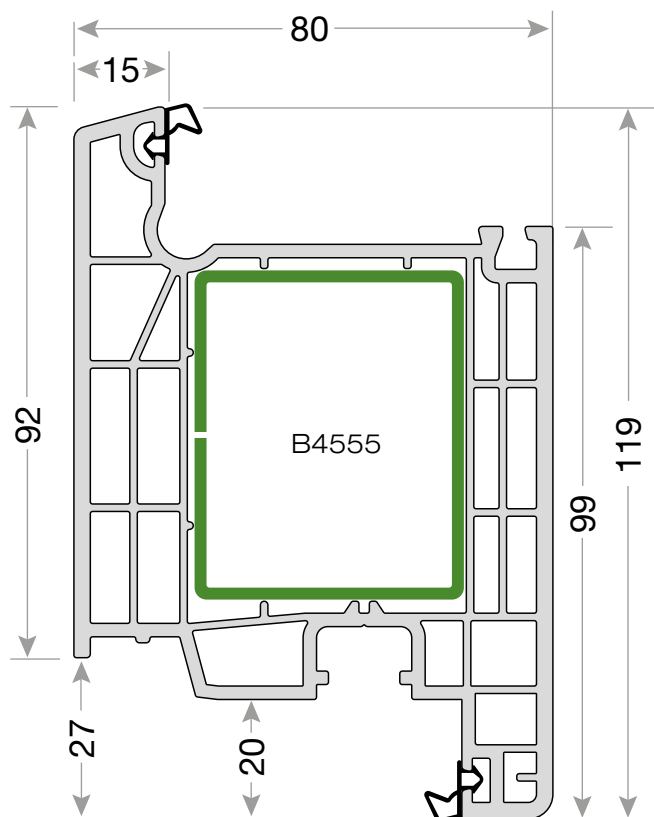


symbol	x [mm]	Ix [cm ⁴]	Iy [cm ⁴]
200A5040	2,0	7,80	7,04

3. Profile overview
3.10 „Intermediate” sash T 58023

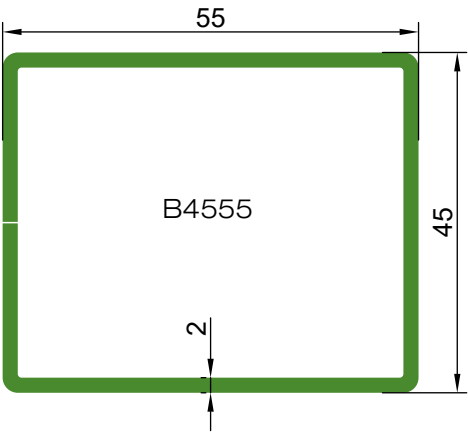
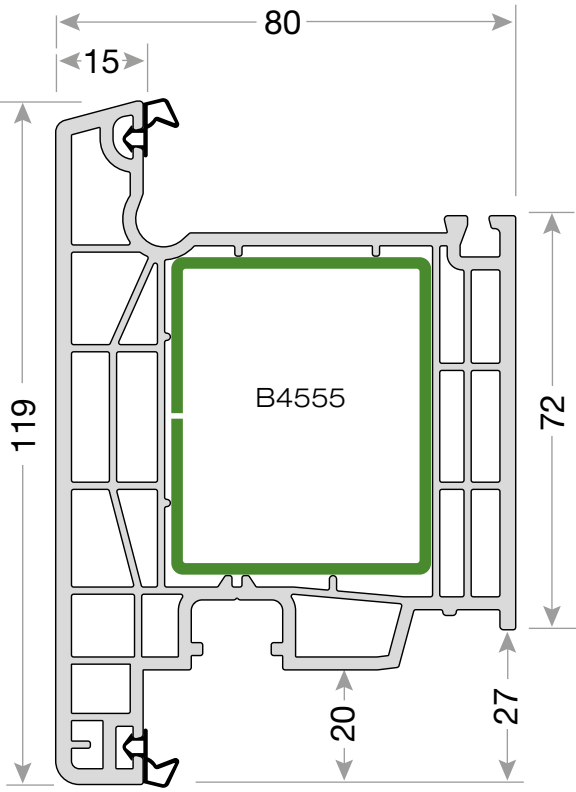


symbol	x [mm]	Ix [cm ⁴]	Iy [cm ⁴]
200A5040	2,0	7,80	7,04



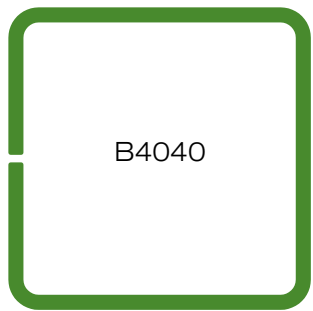
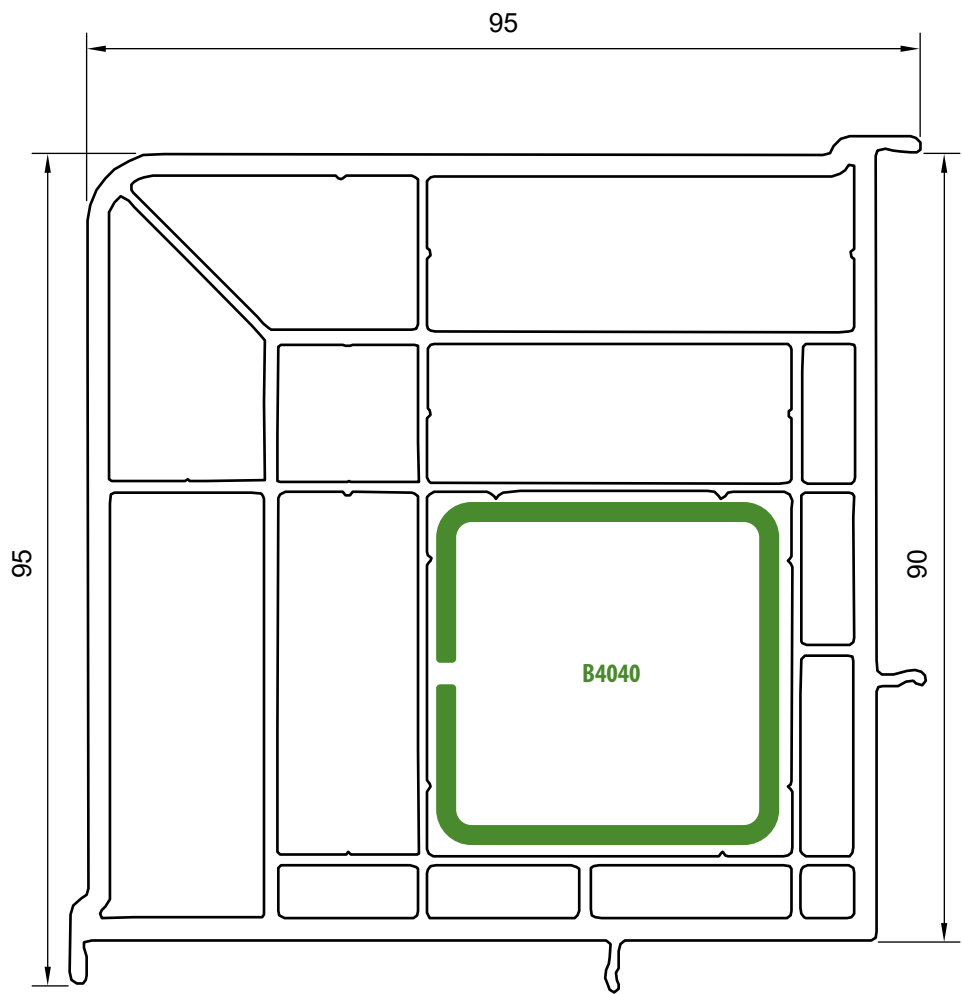
symbol	x [mm]	Ix [cm ⁴]	Iy [cm ⁴]
200B4555	2	16,8	12,3

3. Profile overview
3.12 Door sash „heavy” T 58021



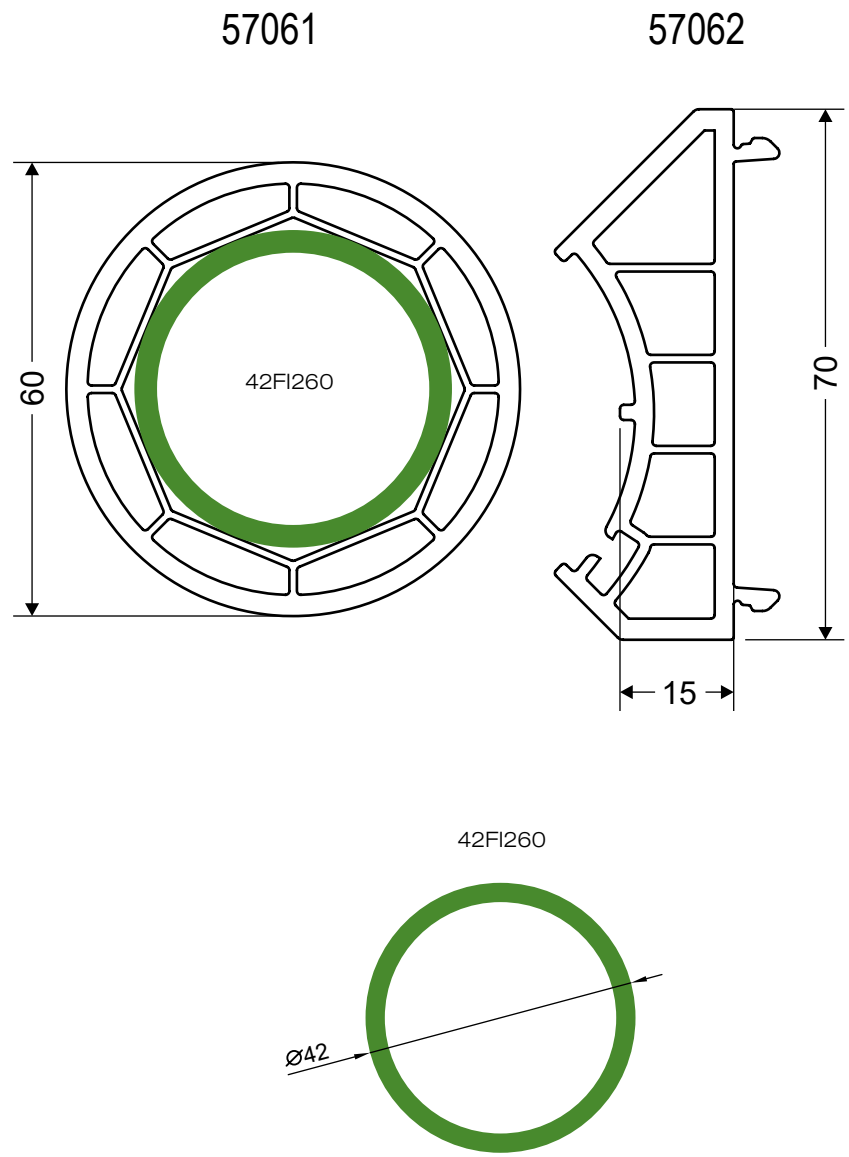
symbol	x [mm]	Ix [cm ⁴]	Iy [cm ⁴]
200B4555	2	16,8	12,3

3. Profile overview
3.13 Connector 90° 68064



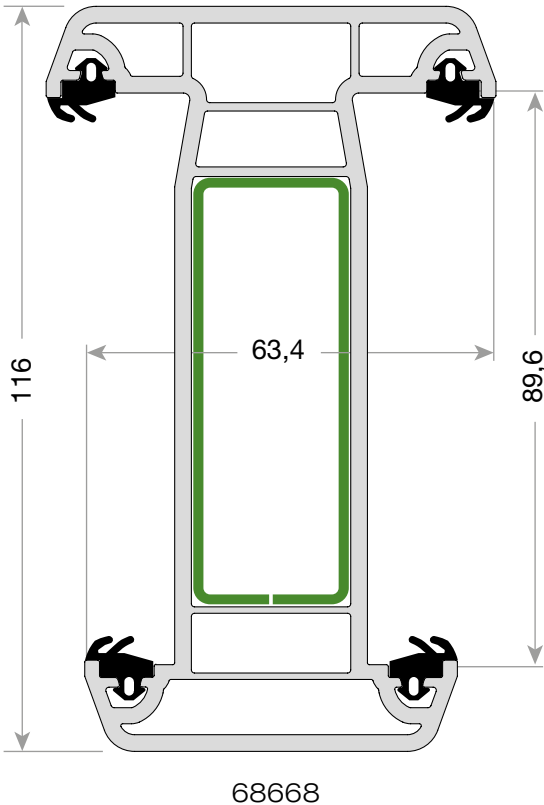
symbol	x [mm]	lx [cm ⁴]	ly [cm ⁴]
200B4040	2,0	7,13	7,21

3. Profile overview
3.14 Pipe connector 57061 and adapter 57062

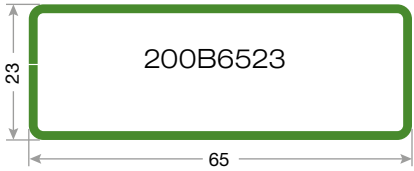


A	X	Y
2,60	7,27	7,27

3. Profile overview
3.15 Static connector 68668 + 200B6523

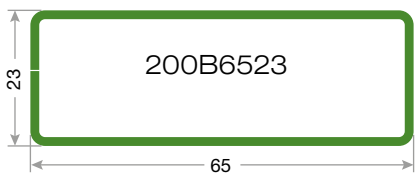
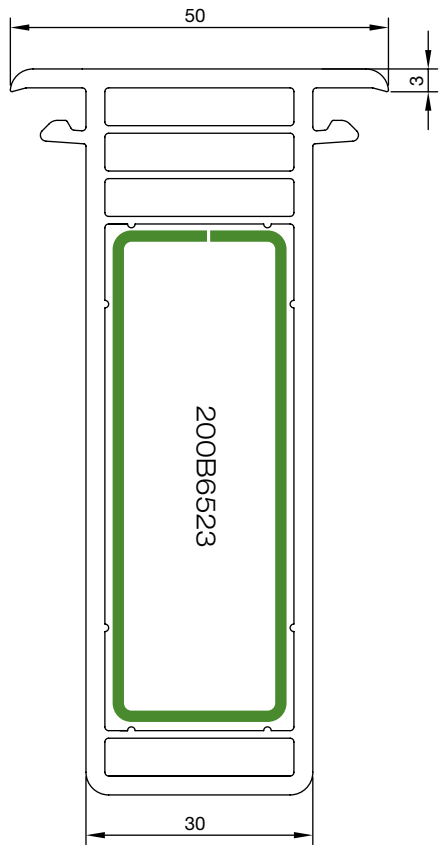


68073
Gasket



symbol	x [mm]	Ix [cm ⁴]	Iy [cm ⁴]
200B6523	2,0	17,02	4,30

3. Profile overview
3.16 Static connector 68065 + 200B6523



symbol	x [mm]	Ix [cm ⁴]	Iy [cm ⁴]
200B6523	2,0	17,02	4,30

3. Profile overview

3.17 Accessories



68083
metal mullion
connector



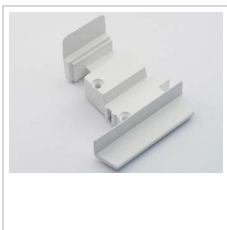
68082L
fixing anchor



68085K
mullion connector



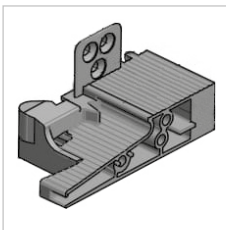
68080K
base pad



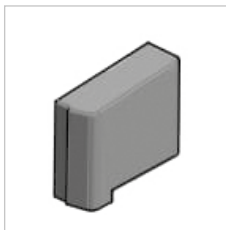
68084K
floating mullion
cover



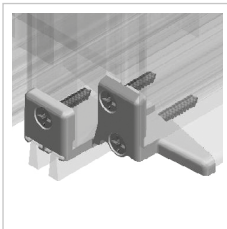
P-52
Washer (1mm to
6mm)



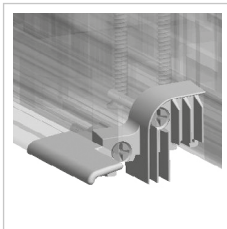
58051
Threshold
connector



58059
Wind barrier



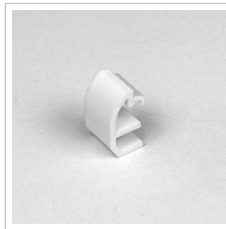
58058
Drip cover



58060
Sealing of floating
mullion



58053
Weld bone



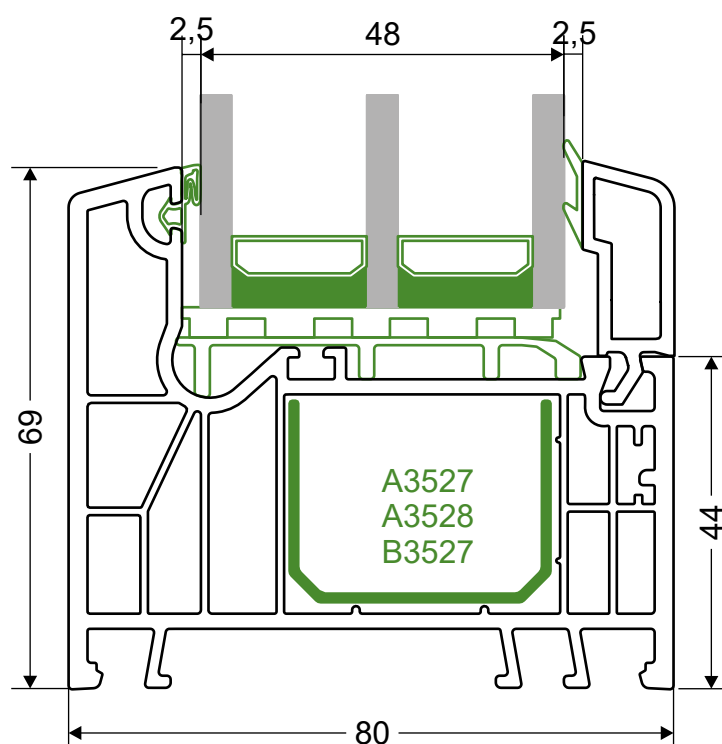
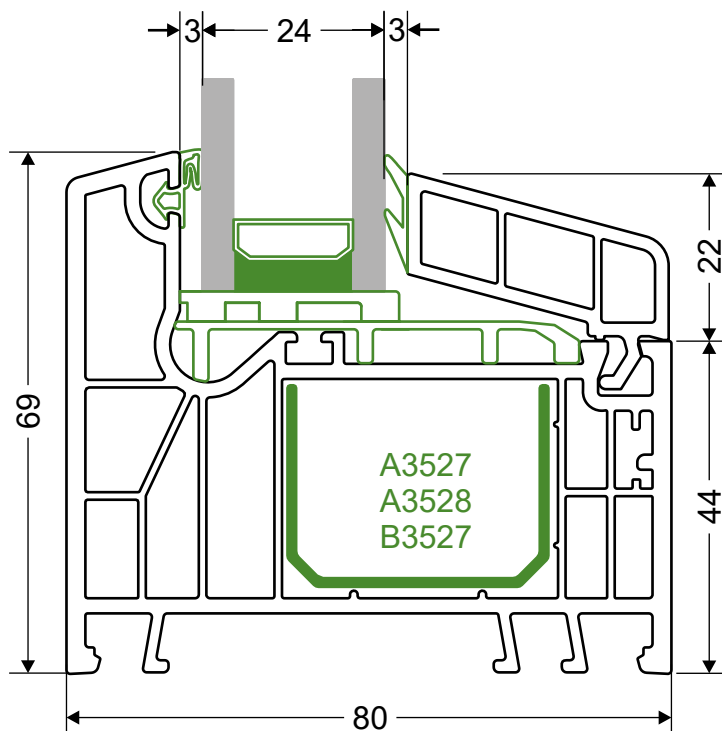
57086
slider

4. Assemblies

- 4.1 Frame 68011 - fixed glazing with 24mm and 48mm glazing unit
- 4.2 Frame 68011 + Sash 68021 - glazing with 24mm glazing unit
- 4.3 Frame 68011 + Sash 68021 - glazing with 48mm glazing unit
- 4.4 Renovation frame 68012 + sash 67021 - glazing with 24mm glazing unit
- 4.5 Frame 68013 + Sash 68021 - glazing with 48mm glazing unit
- 4.6 Frame 68013 + Sash 68021 + mounting profile 68071
- glazing with 48mm glazing unit
- 4.7 Fixed mullion 68032 + sashes 68021 - glazing with 24mm glazing unit
- 4.8 Fixed mullion 58030 + sashes 68021 - glazing with 48mm glazing unit
- 4.9 Floating mullion 68033 with sashes 68021 - glazing with 24mm glazing unit
- 4.10 Fixed mullion 68032 with sash 68021 + fixed glazing with 24mm glazing unit
- 4.11 Fixed mullion 68032 - fixed glazing with 24mm glazing unit
- 4.12 Fixed mullion 58030 - fixed glazing with 48mm glazing unit
- 4.13 Frame 58011 + door sash 58020 - glazing with 48mm glazing unit
- 4.14 Frame 58011 + door sash 58021 - glazing with 48mm glazing unit
- 4.15 Sash 58021 + fixed mullion 68032 + sash 58021 - glazing with 48mm glazing unit
- 4.16 Sash 58021 + floating mullion 68033 + sash 58021 - glazing with 48mm glazing unit
- 4.17 Sash 58020 + fixed mullion 68032 + sash 58020 - glazing with 48mm glazing unit
- 4.18 Sash 58020 + floating mullion 58033 + sash 58020 - glazing with 48mm glazing unit
- 4.19 Door sash 58020 + threshold 58050
- 4.20 Door sash 58021 + threshold 58050
- 4.21 Frame 58011+ intermediate sash Z 58022- glazing with 48mm glazing unit
- 4.22 Frame 58011+ intermediate sash T 58023- glazing with 48mm glazing unit
- 4.23 Frame 68011+ intermediate sash Z 58022- glazing with 48mm glazing unit
- 4.24 Frame 68011+ intermediate sash T 58023- glazing with 48mm glazing unit
- 4.25 Sash 58022 + fixed mullion 58030 - glazing with 48mm glazing unit
- 4.26 Sash 58023 + fixed mullion 58030 - glazing with 48mm glazing unit
- 4.27 Sash 58022 + floating mullion 68033 - glazing with 48mm glazing unit
- 4.28 Sash 58023 + floating mullion 68033 - glazing with 48mm glazing unit
- 4.29 Sash 58022 + fixed mullion 68032 - glazing with 48mm glazing unit
- 4.30 Sash 58023 + fixed mullion 68032 - glazing with 48mm glazing unit
- 4.31 Connection of frames 68011 with connector 57052
- 4.32 Connection of frames 68011 with static connector 68065
- 4.33 Connection of frames 68011 with static connector 68668
- 4.34 Connection of frames 68011 using 90° connector 68064
- 4.35 Connection of frames 68011 with pipe connector 57061+ 57062 + 68064
- 4.36 Frame 68011 + mounting profile 68071
- 4.37 Sash 68021 + drip cap 58057
- 4.38 Frame 68011 + nailing fin 68058

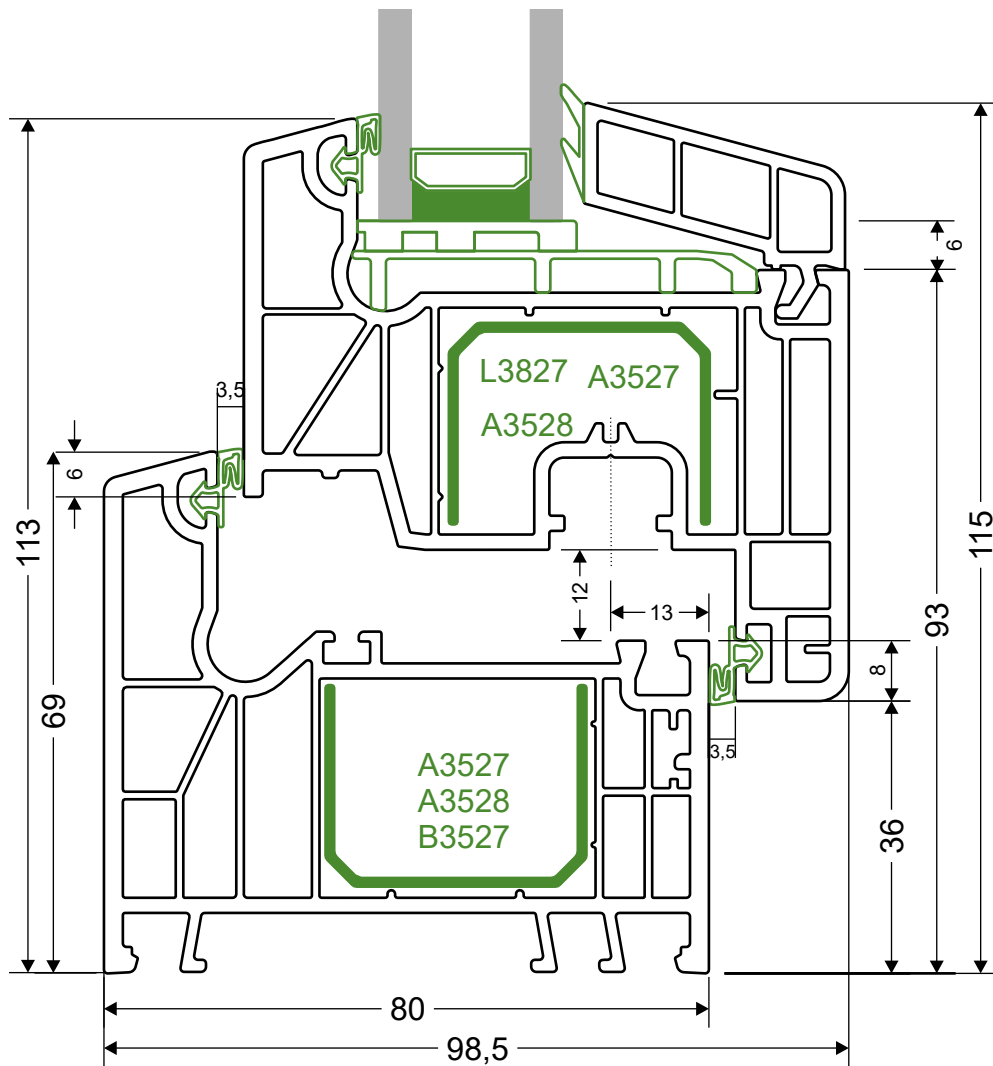
4. Assemblies

4.1 Frame 68011 - fixed glazing with 24mm and 48mm glazing unit



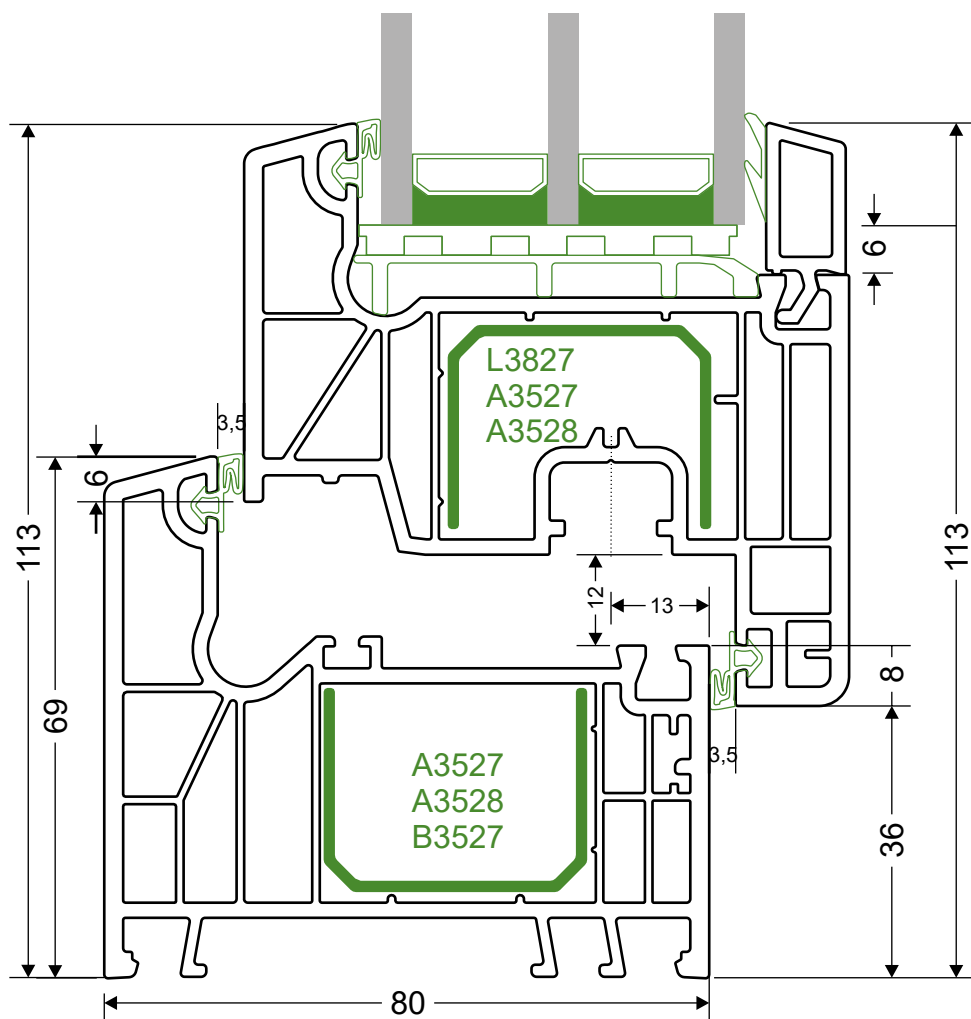
4. Assemblies

4.2 Frame 68011 + Sash 68021 - glazing with 24mm glazing unit



4. Assemblies

4.3 Frame 68011 + Sash 68021 - glazing with 48mm glazing unit



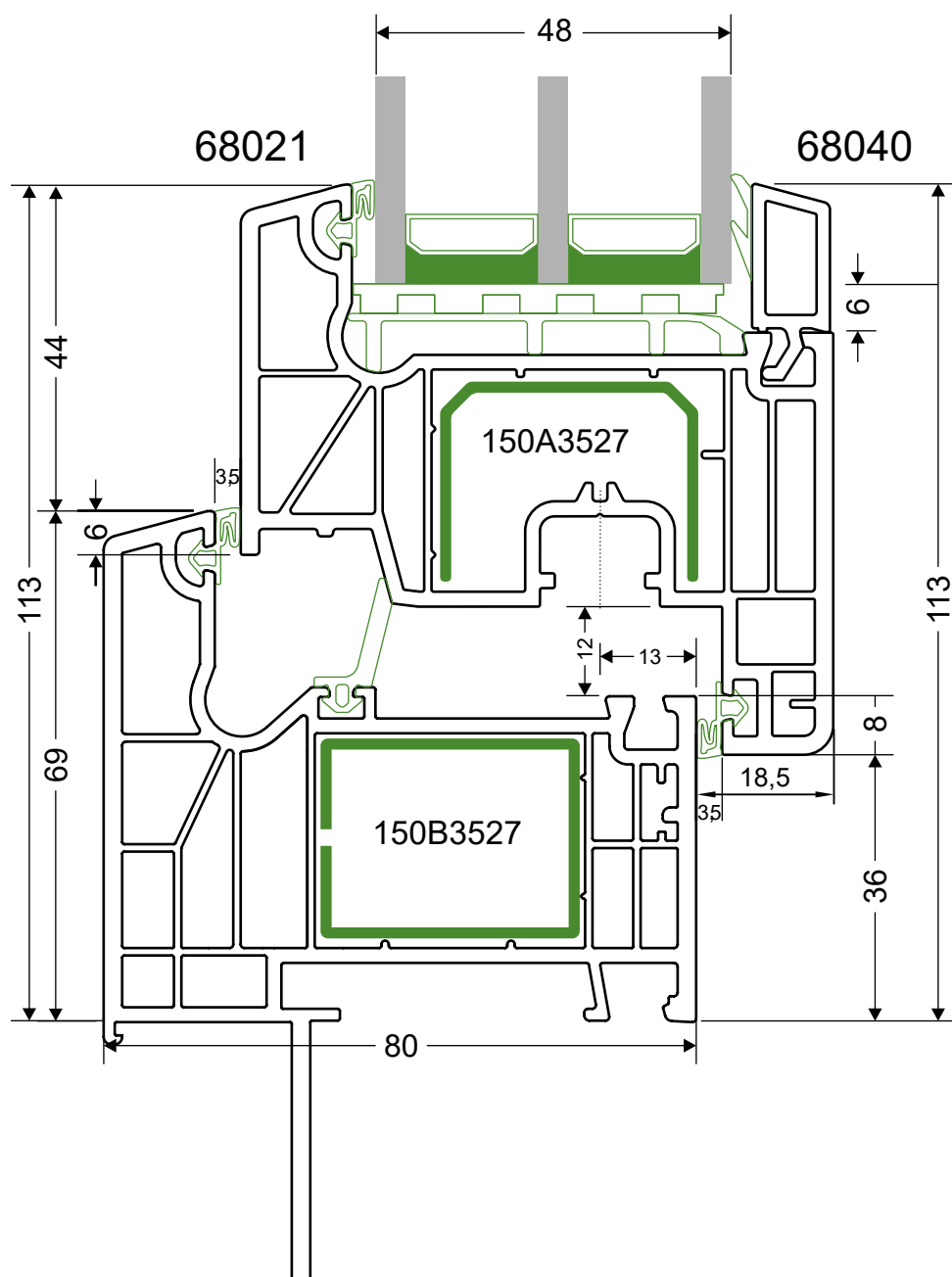
- glazing with 24mm glazing unit



4. Assemblies

4.5 Frame 68013 + Sash 68021

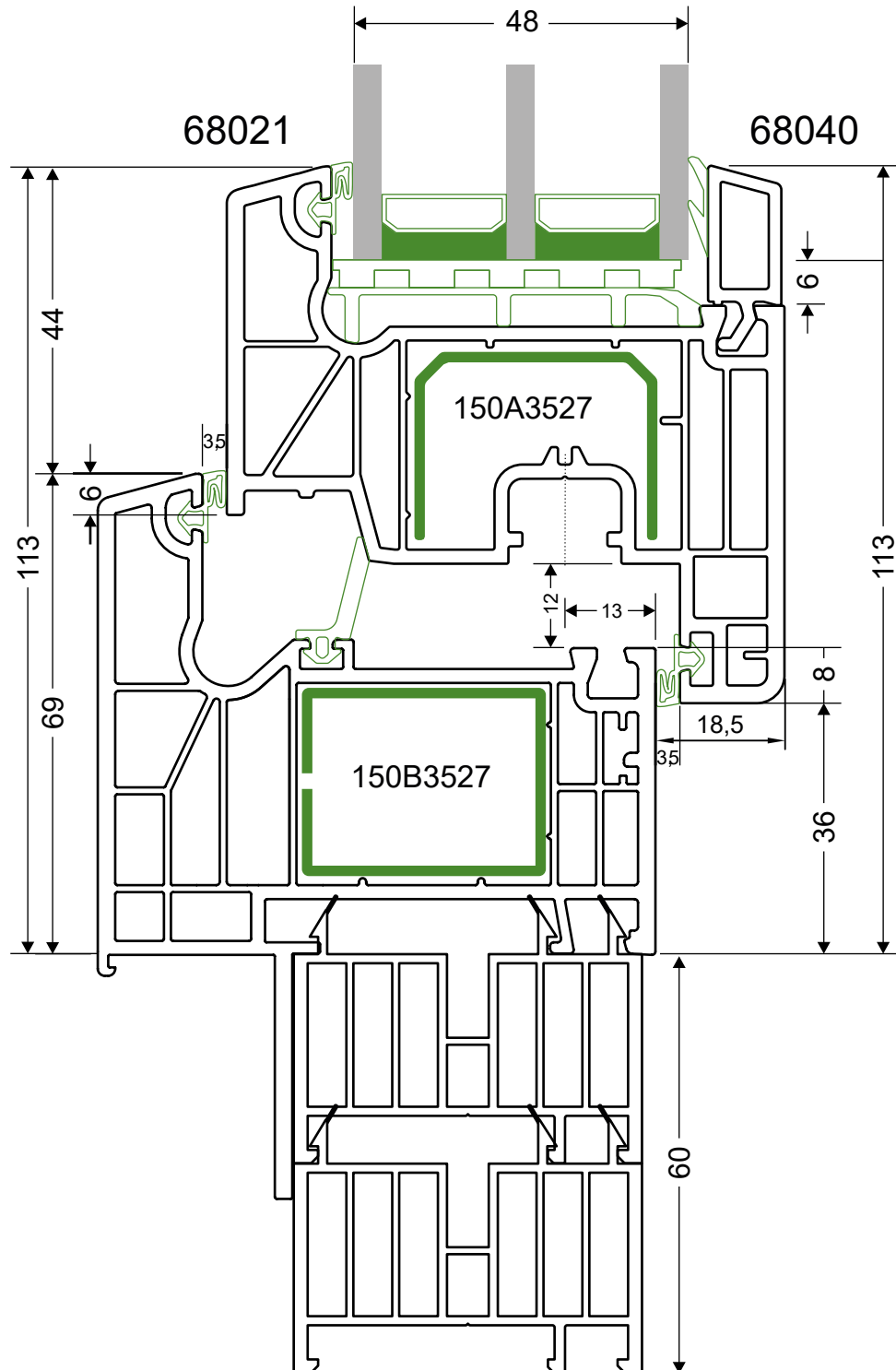
– glazing with 48mm glazing unit



4. Assemblies

4.6 Frame 68013 + Sash 68021 + mounting profile 68071

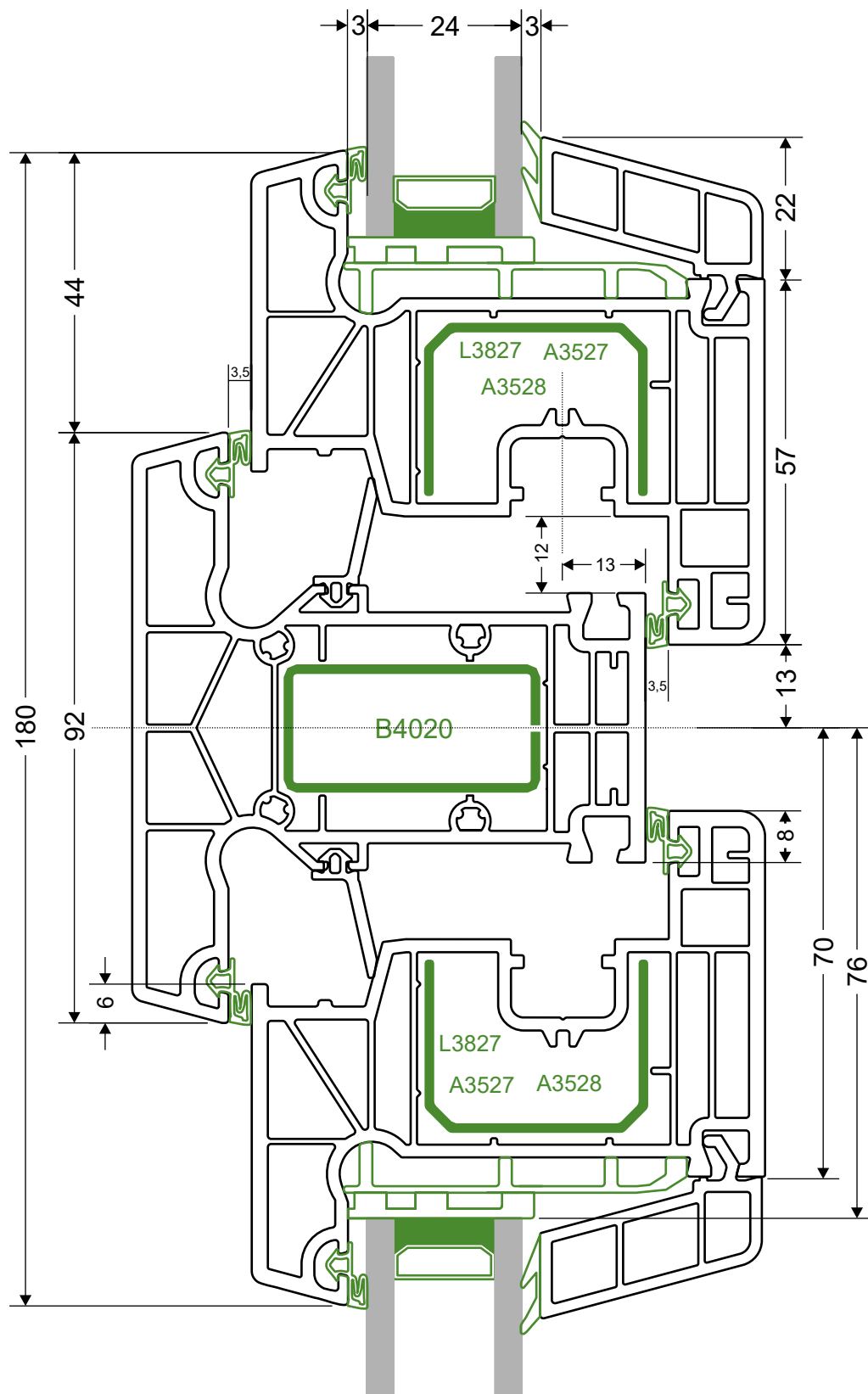
– glazing with 48mm glazing unit



4. Assemblies

4.7 Fixed mullion 68032 + sashes 68021

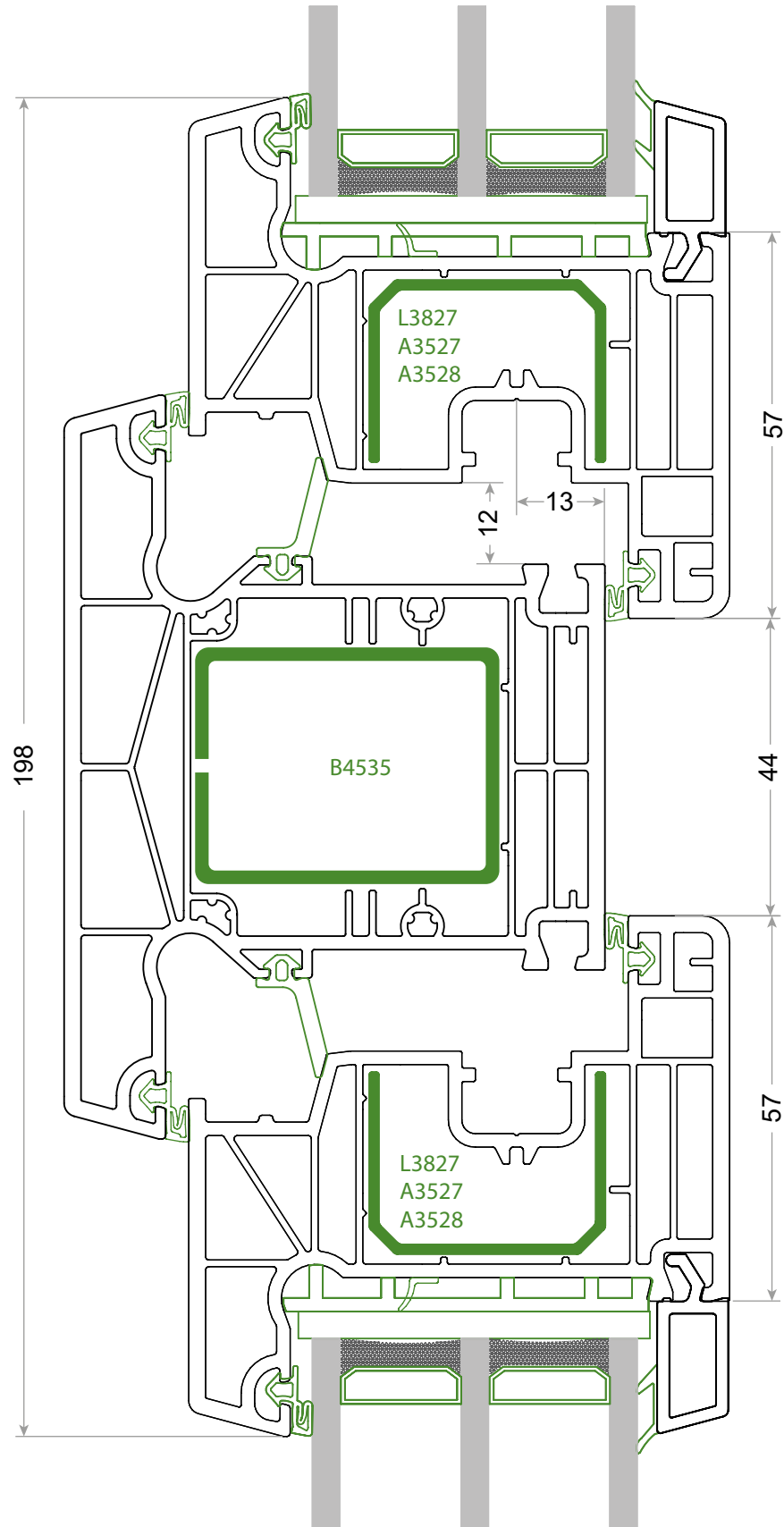
- glazing with 24mm glazing unit



4. Assemblies

4.8 Fixed mullion 58030 + sashes 68021

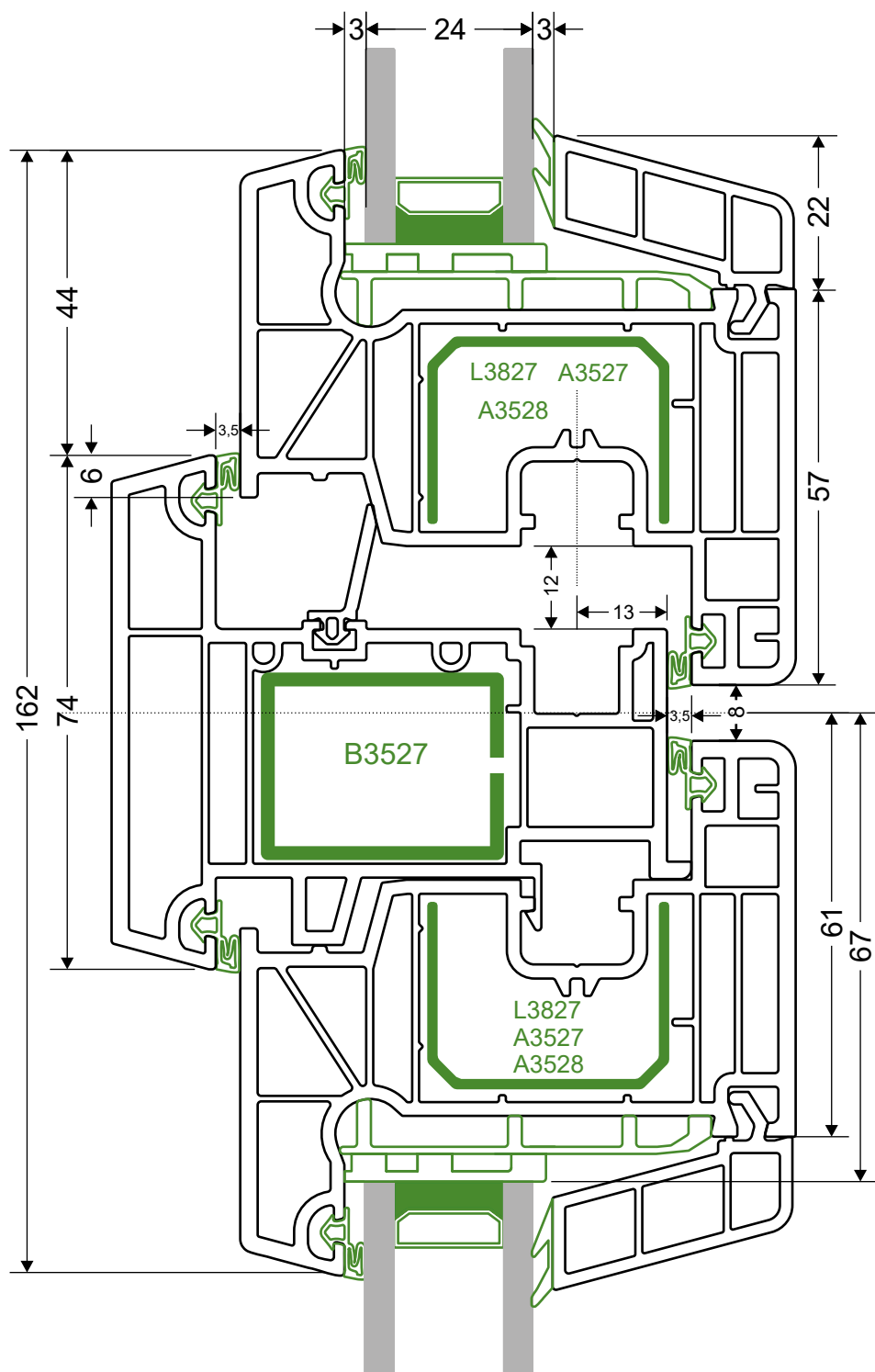
- glazing with 48mm glazing unit



4. Assemblies

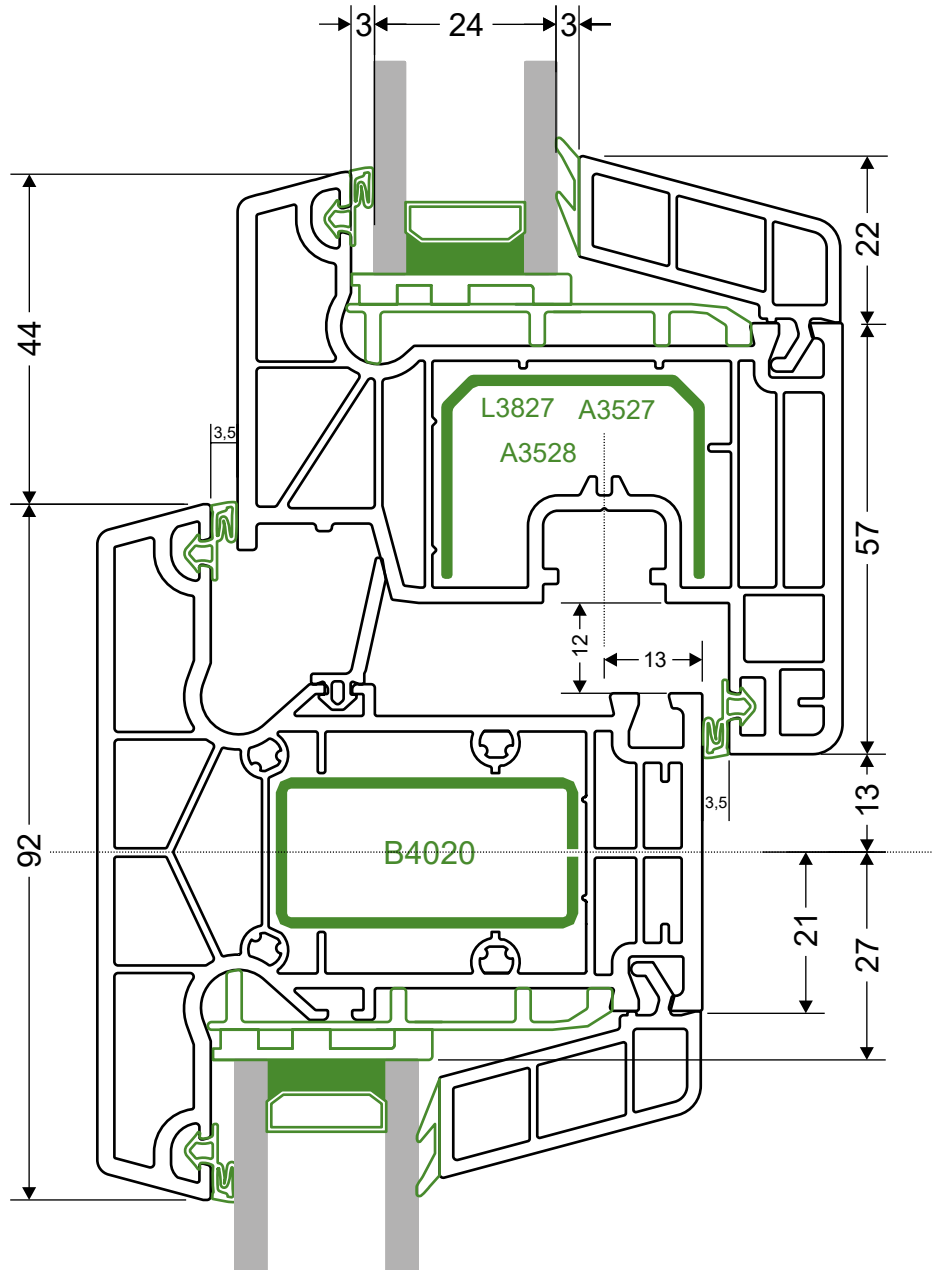
4.9 Floating mullion 68033 with sashes 68021

- glazing with 24mm glazing unit



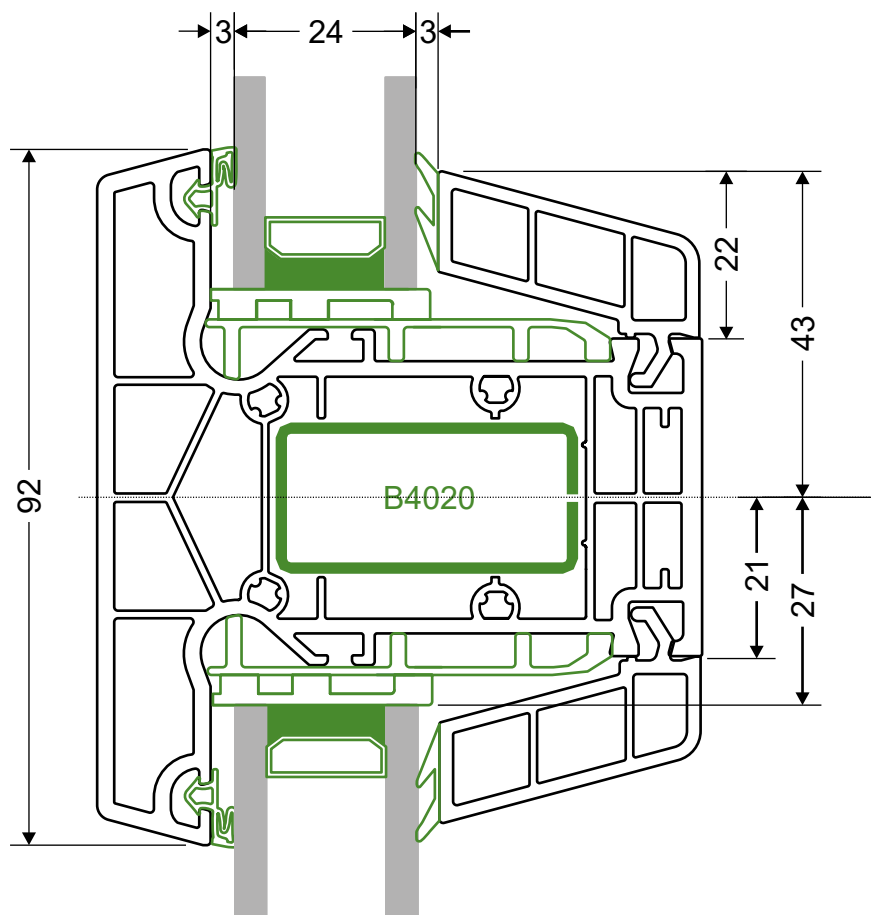
4. Assemblies

4.10 Fixed mullion 68032 with sash 68021 + fixed glazing with 24mm glazing unit



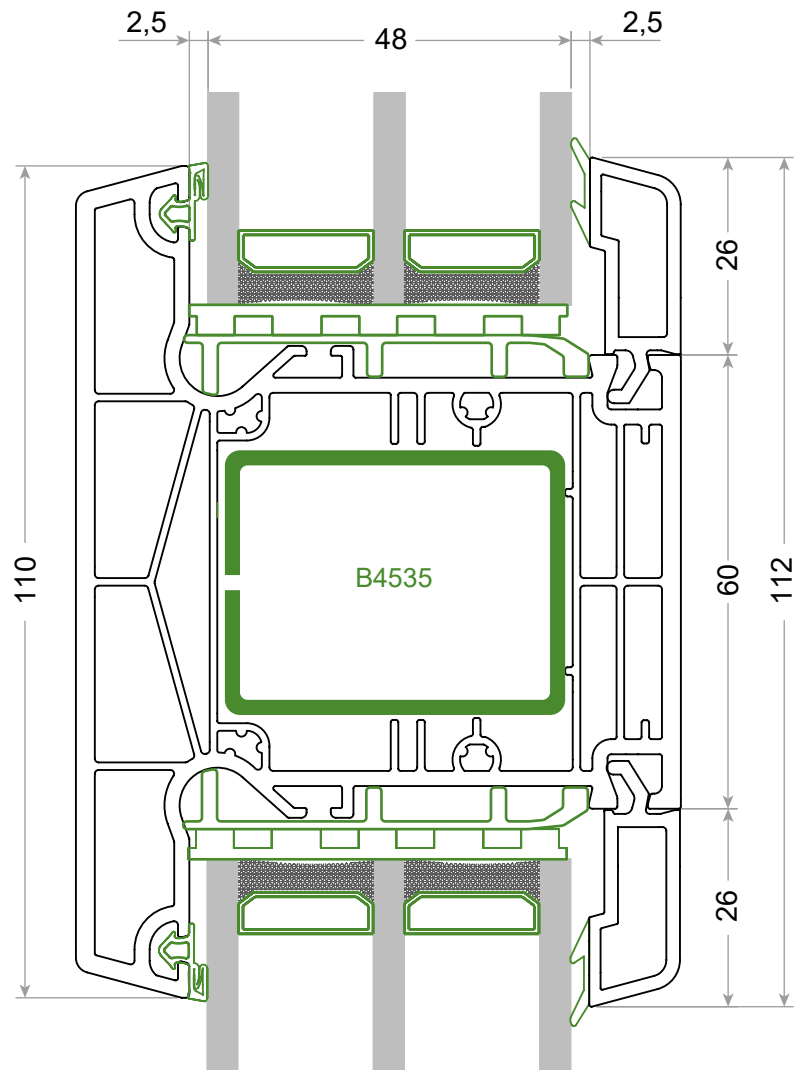
4. Assemblies

4.11 Fixed mullion 68032 - fixed glazing with 24mm glazing unit



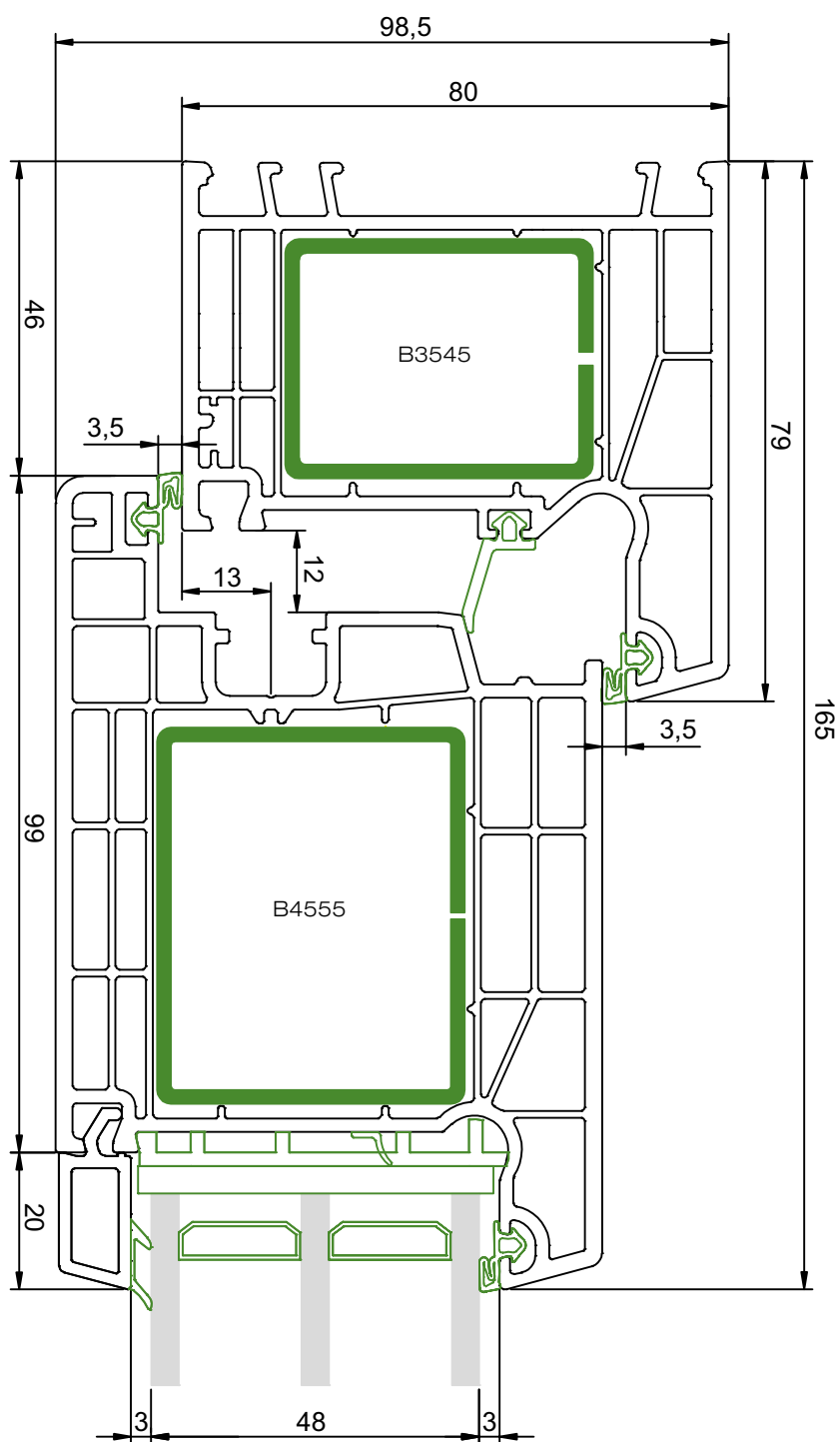
4. Assemblies

4.12 Fixed mullion 58030 - fixed glazing with 48mm glazing unit



4.13 Frame 58011 + door sash 58020

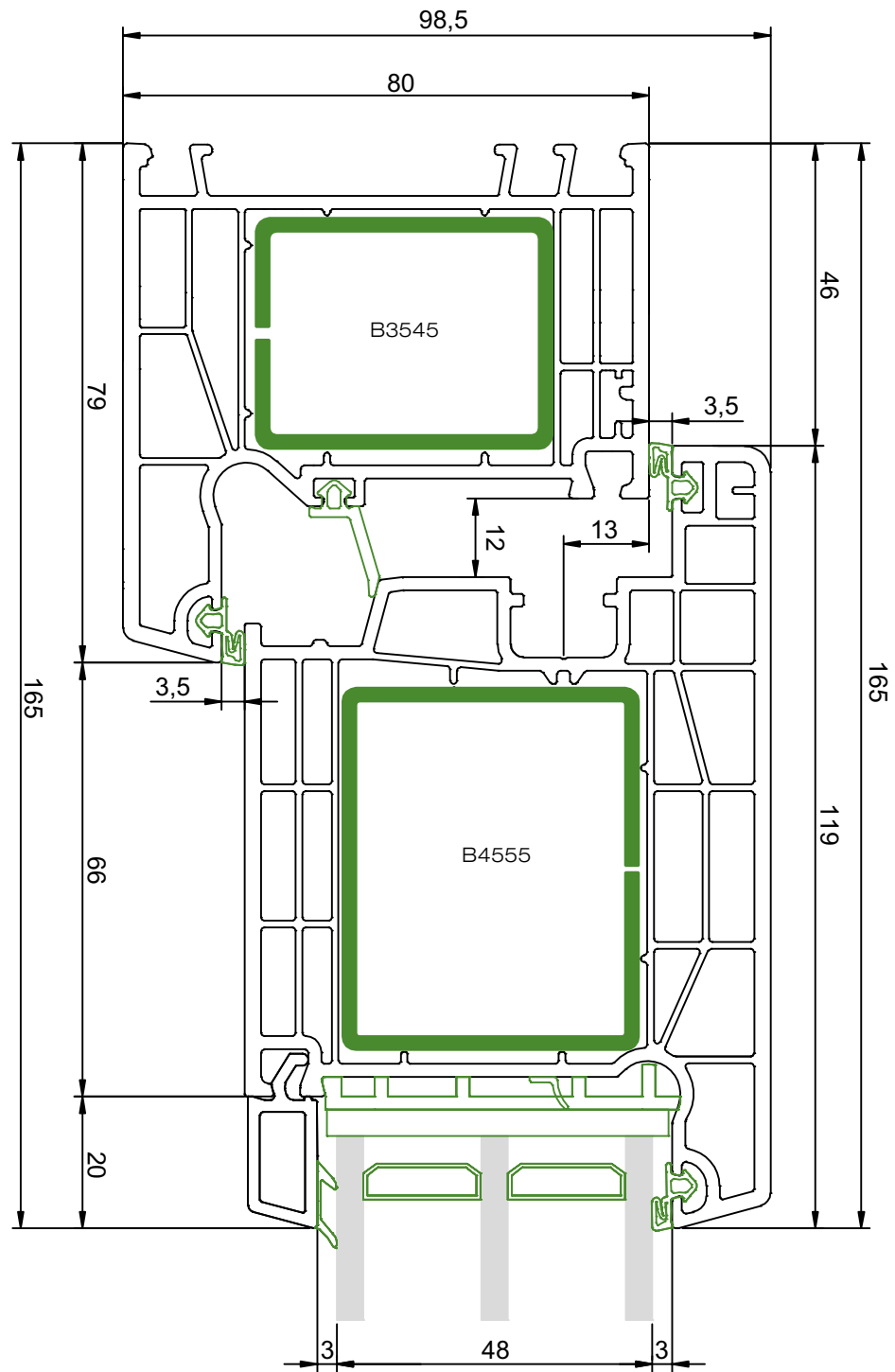
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4. Assemblies

4.14 Frame 58011 + door sash 58021

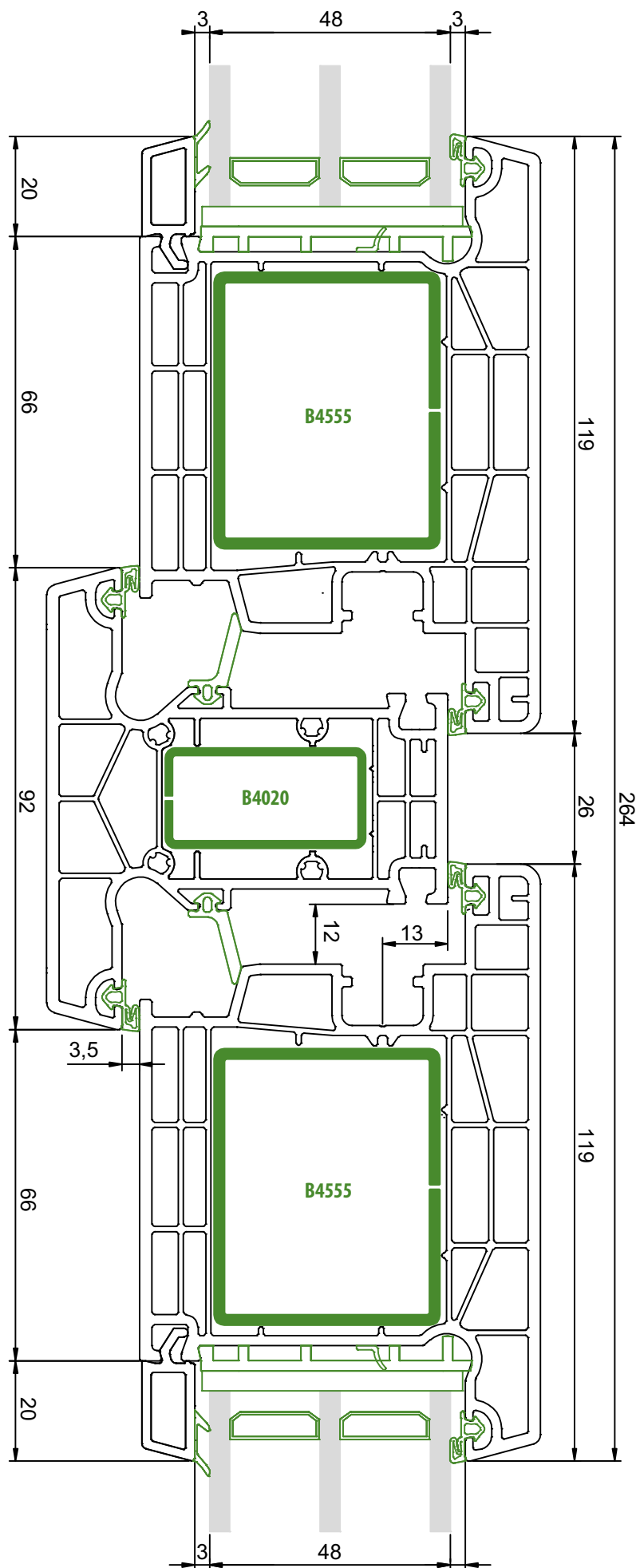
- glazing with 48mm glazing unit



4. Assemblies

4.15 Sash 58021 + fixed mullion 68032 + sash 58021

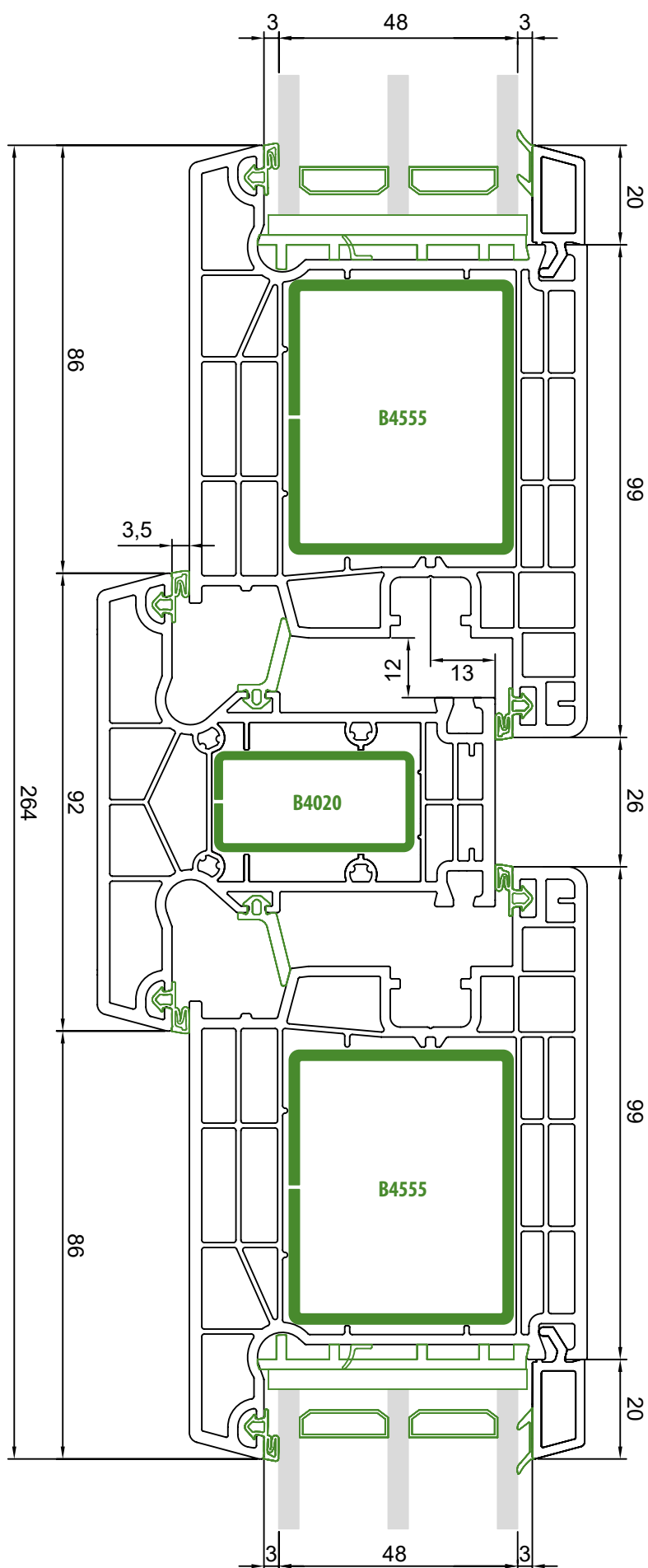
- glazing with 48mm glazing unit



Catalogue release date:: 03.2025

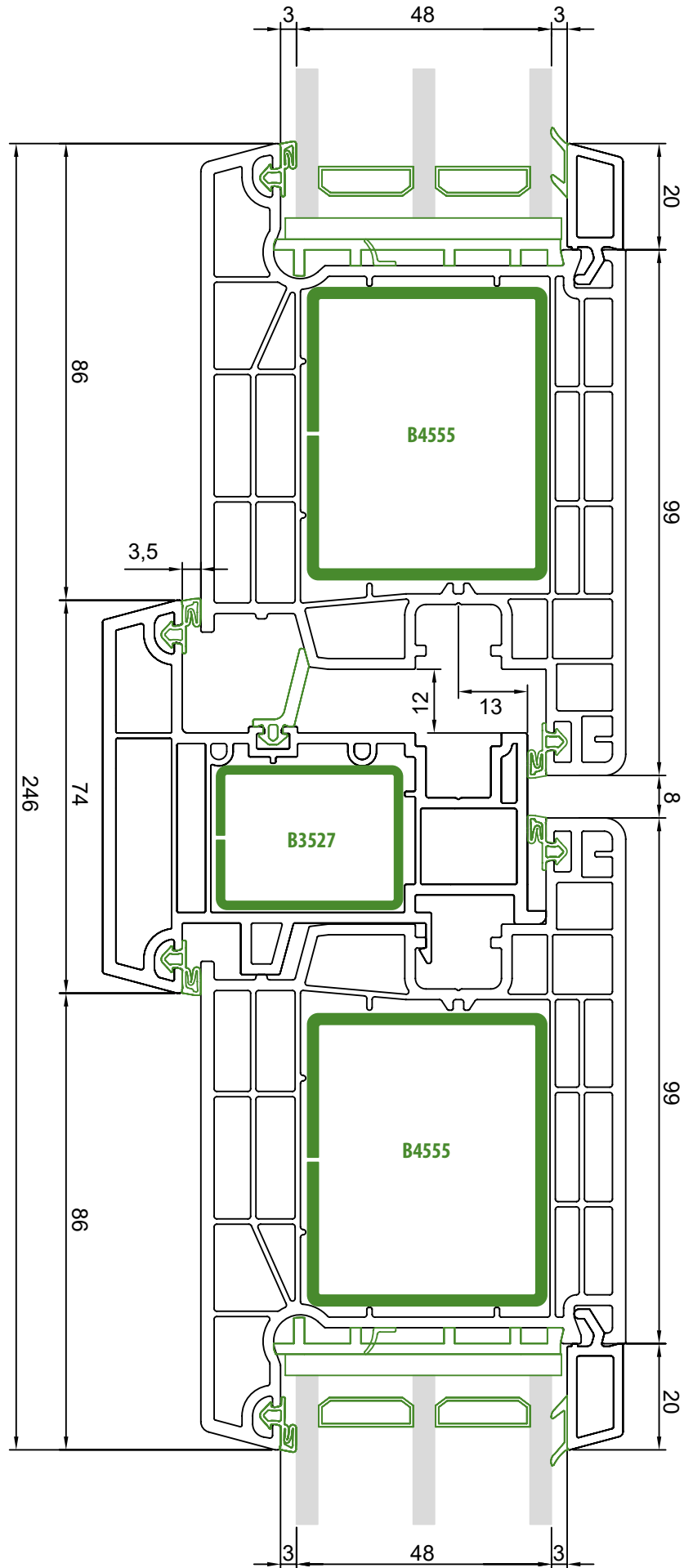


4.17 Sash 58020 + fixed mullion 68032 + sash 58020 - glazing with 48mm glazing unit



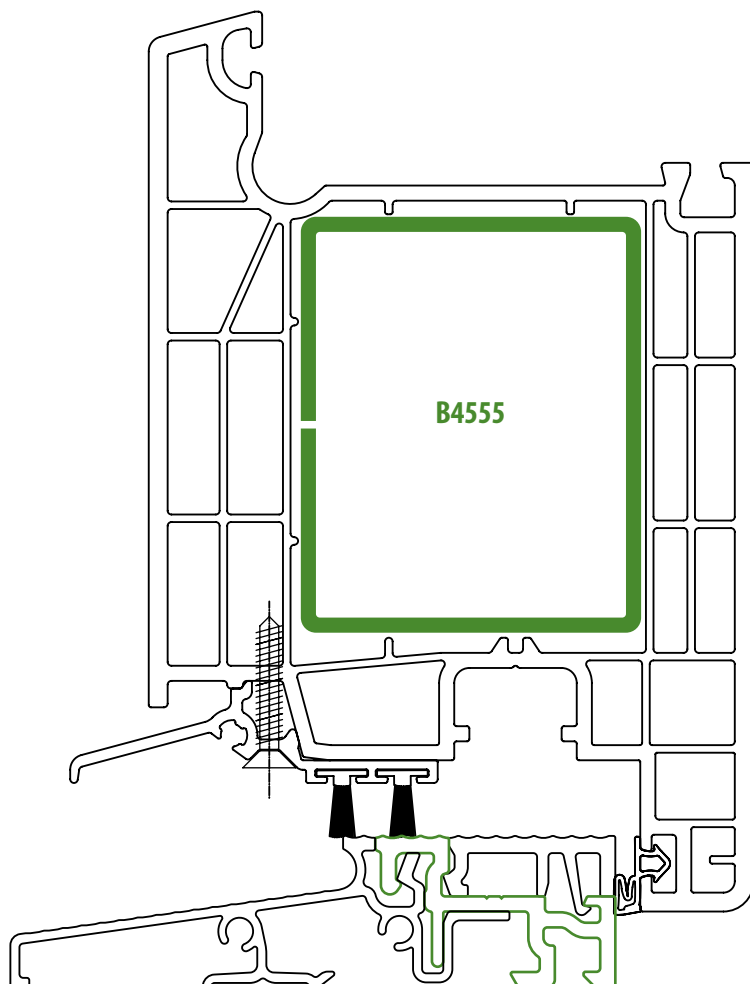
4. Assemblies

4.18 Sash 58020 + floating mullion 58033 + sash 58020 - glazing with 48mm glazing unit



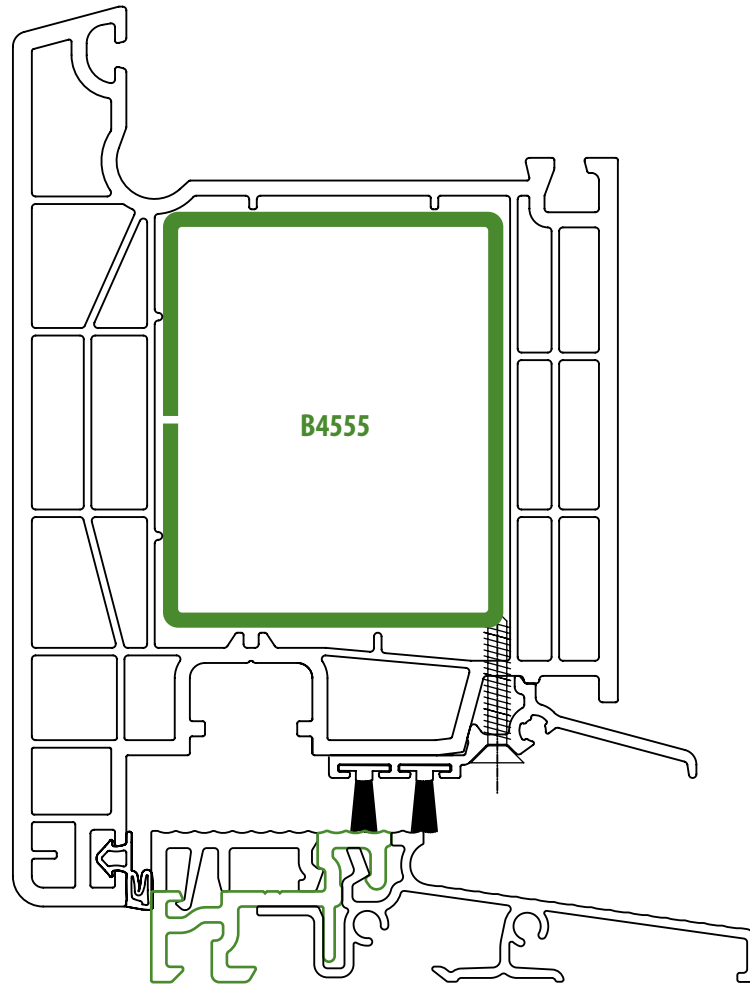
4. Assemblies

4.19 Door sash 58020 + threshold 58050



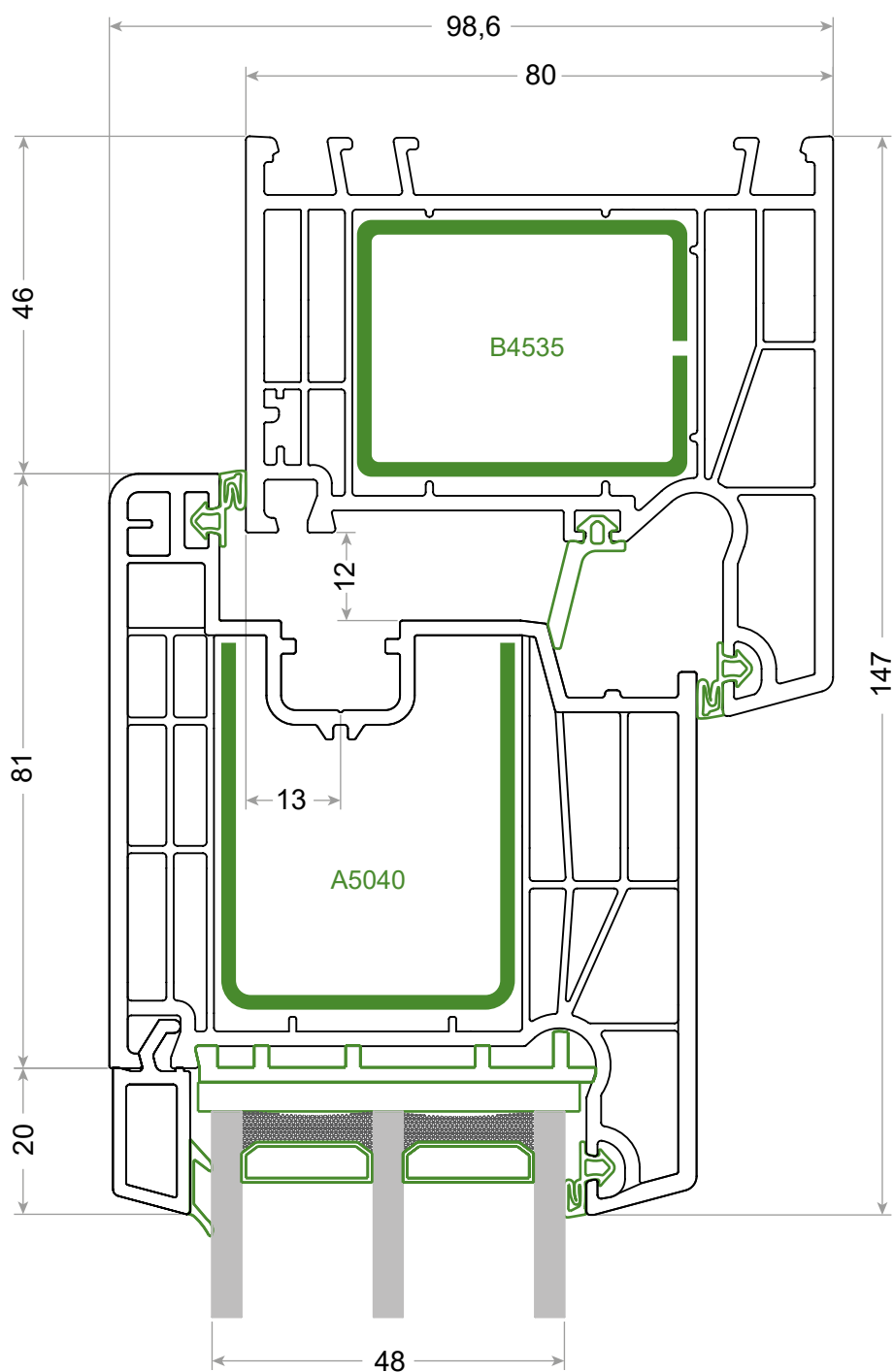
4. Assemblies

4.20 Door sash 58021 + threshold 58050



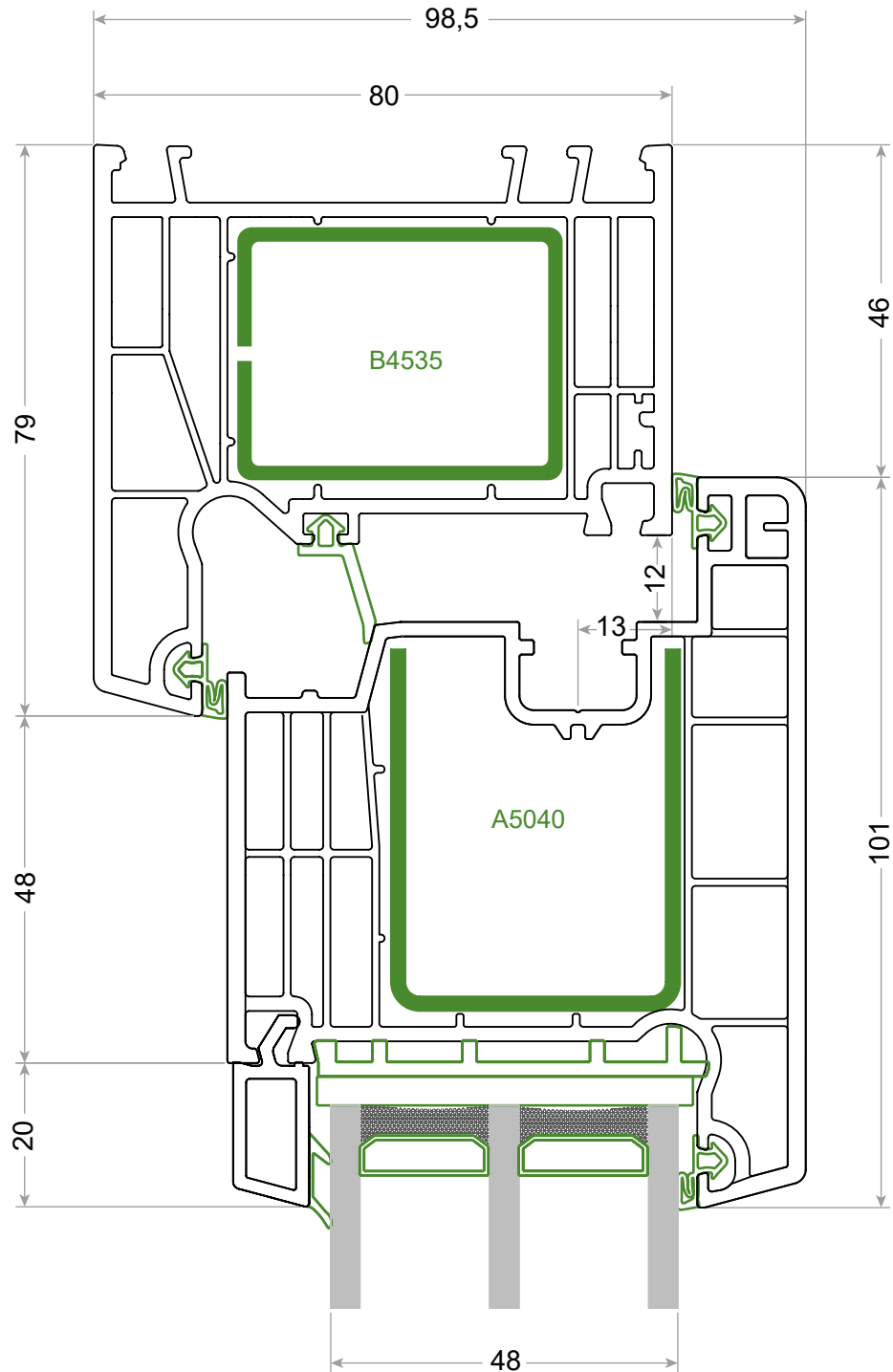
4. Złożenia 4. Assemblies

4.21 Frame 58011+ intermediate sash Z 58022- glazing with 48mm glazing unit



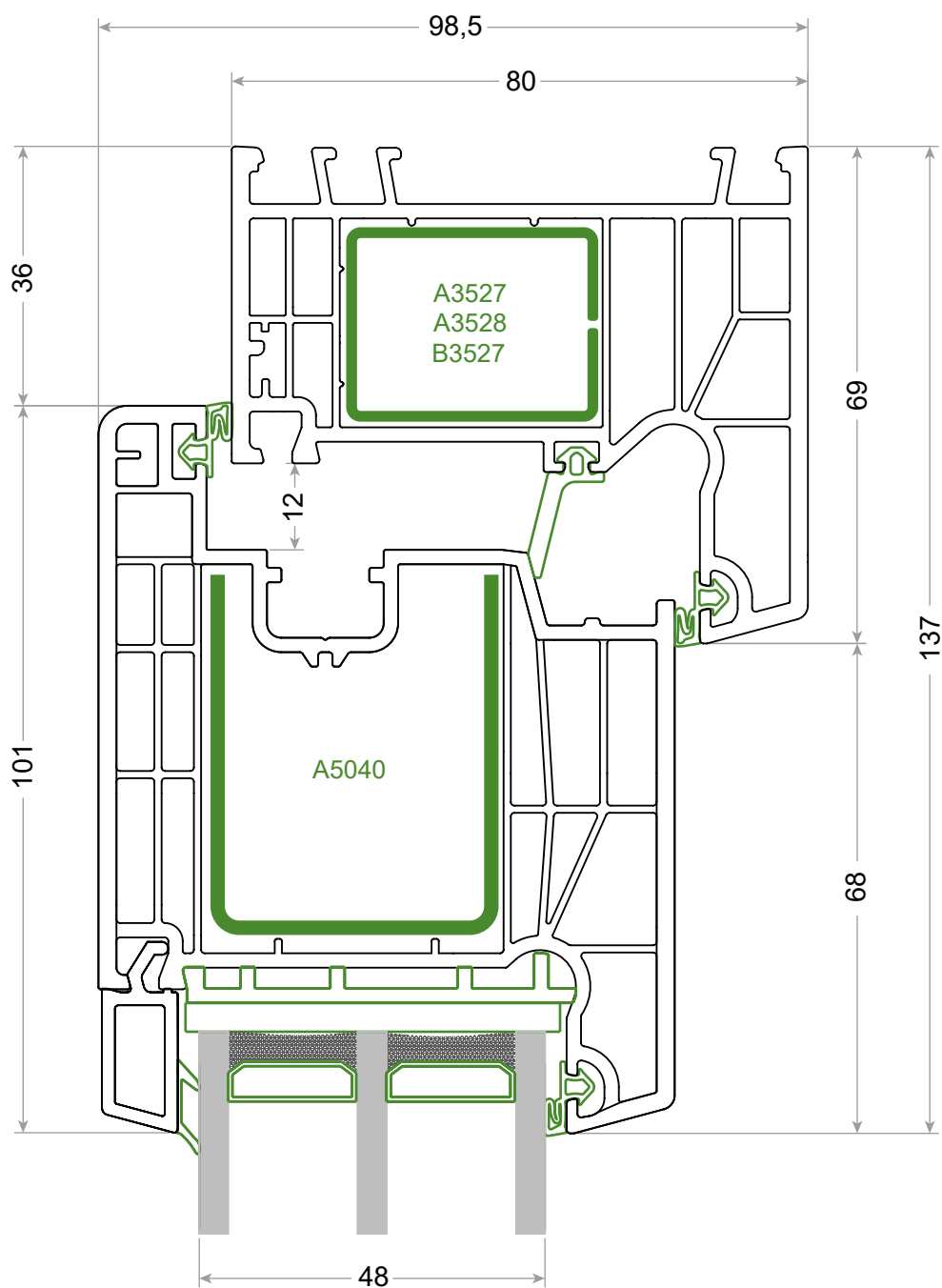
4. Assemblies

4.22 Frame 58011+ intermediate sash T 58023- glazing with 48mm glazing unit

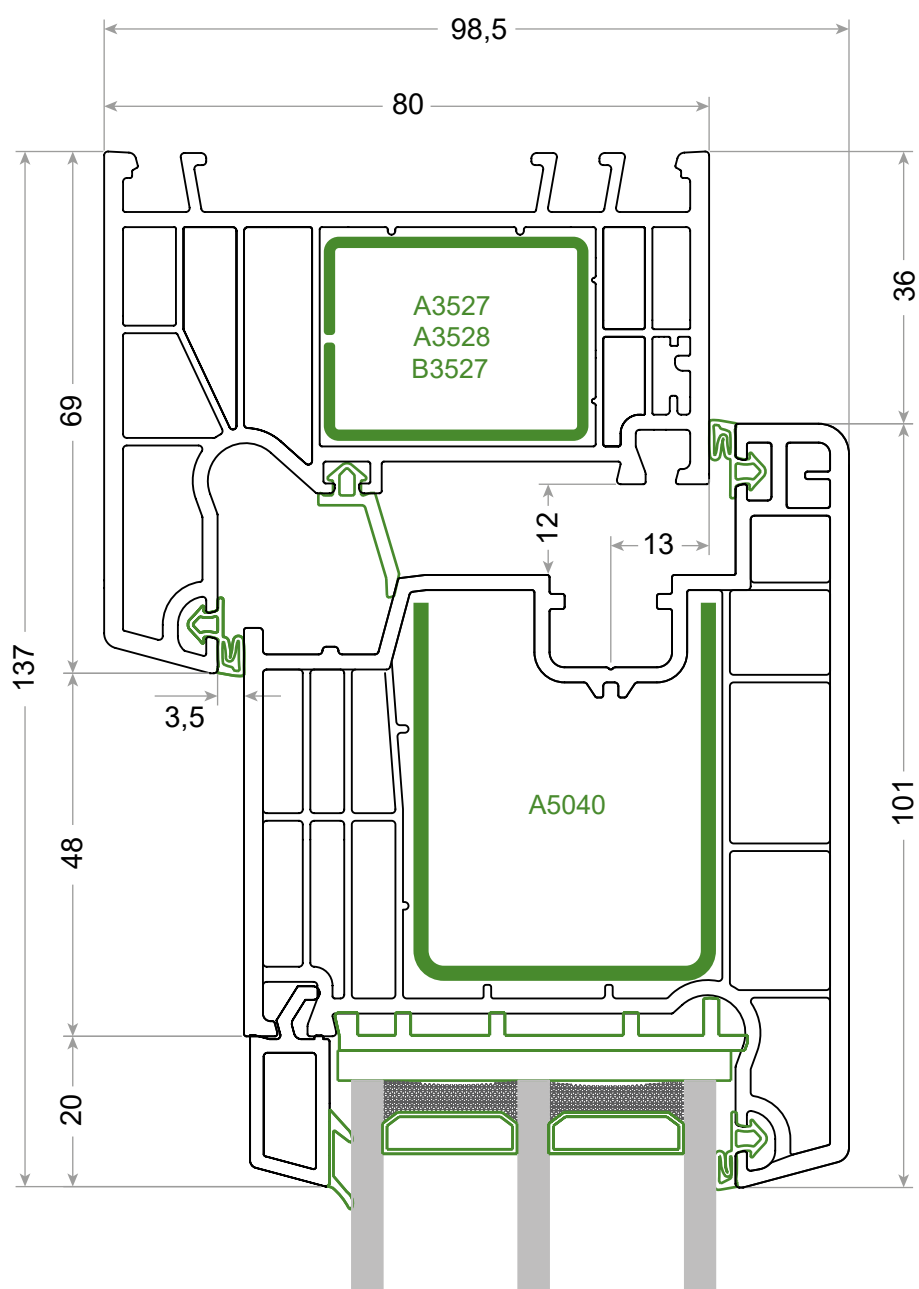


4. Assemblies

4.23 Frame 68011+ intermediate sash Z 58022- glazing with 48mm glazing unit



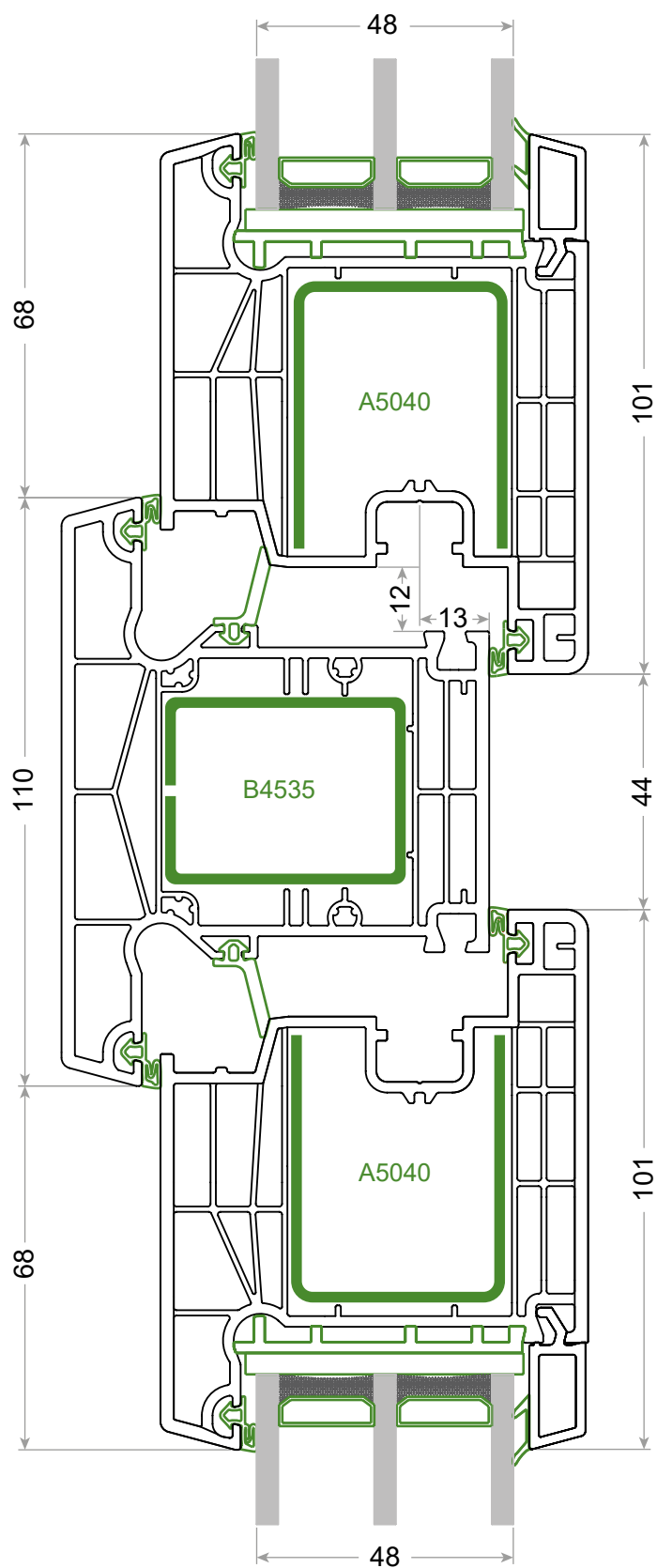
- glazing with 48mm glazing unit



4. Assemblies

4.25 Sash 58022 + fixed mullion 58030

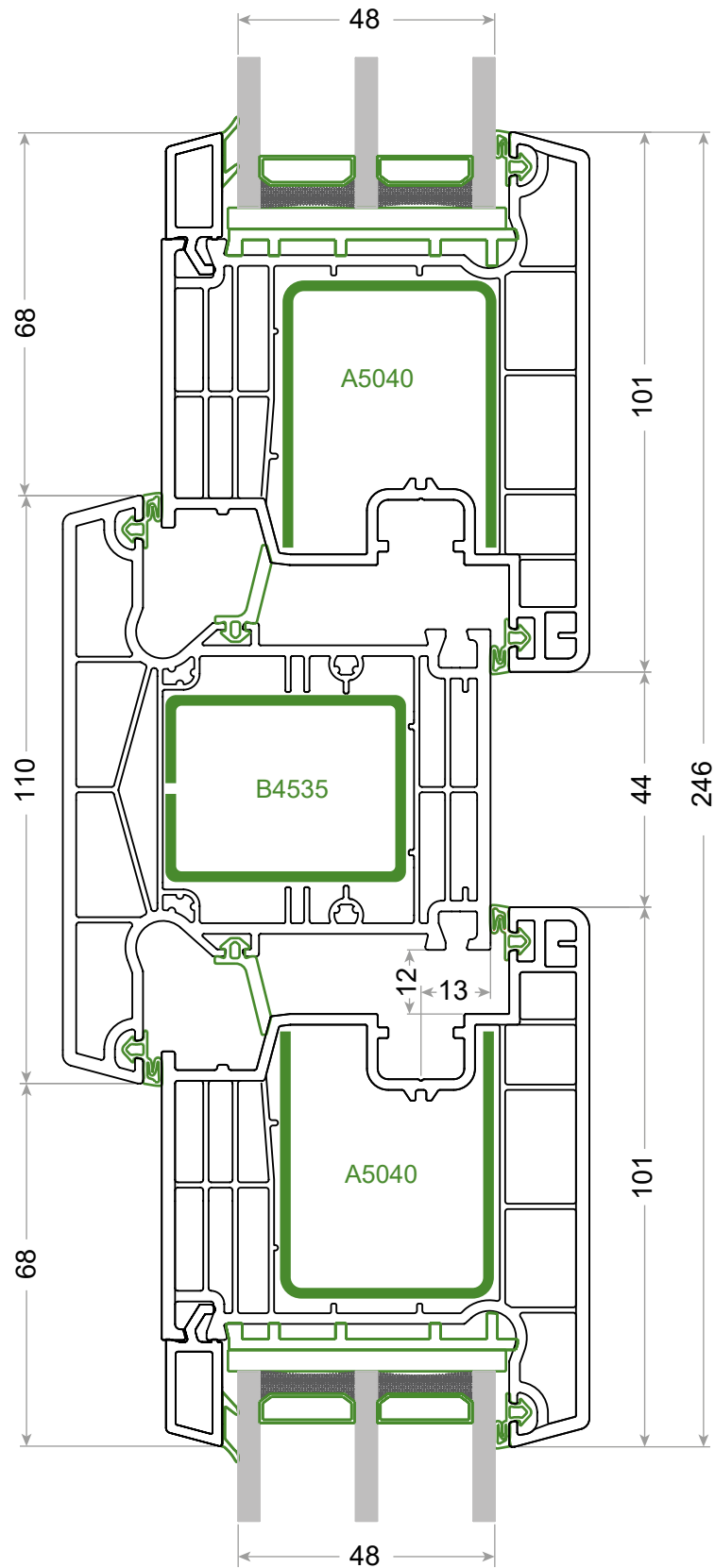
- glazing with 48mm glazing unit



4. Assemblies

4.26 Sash 58023 + fixed mullion 58030

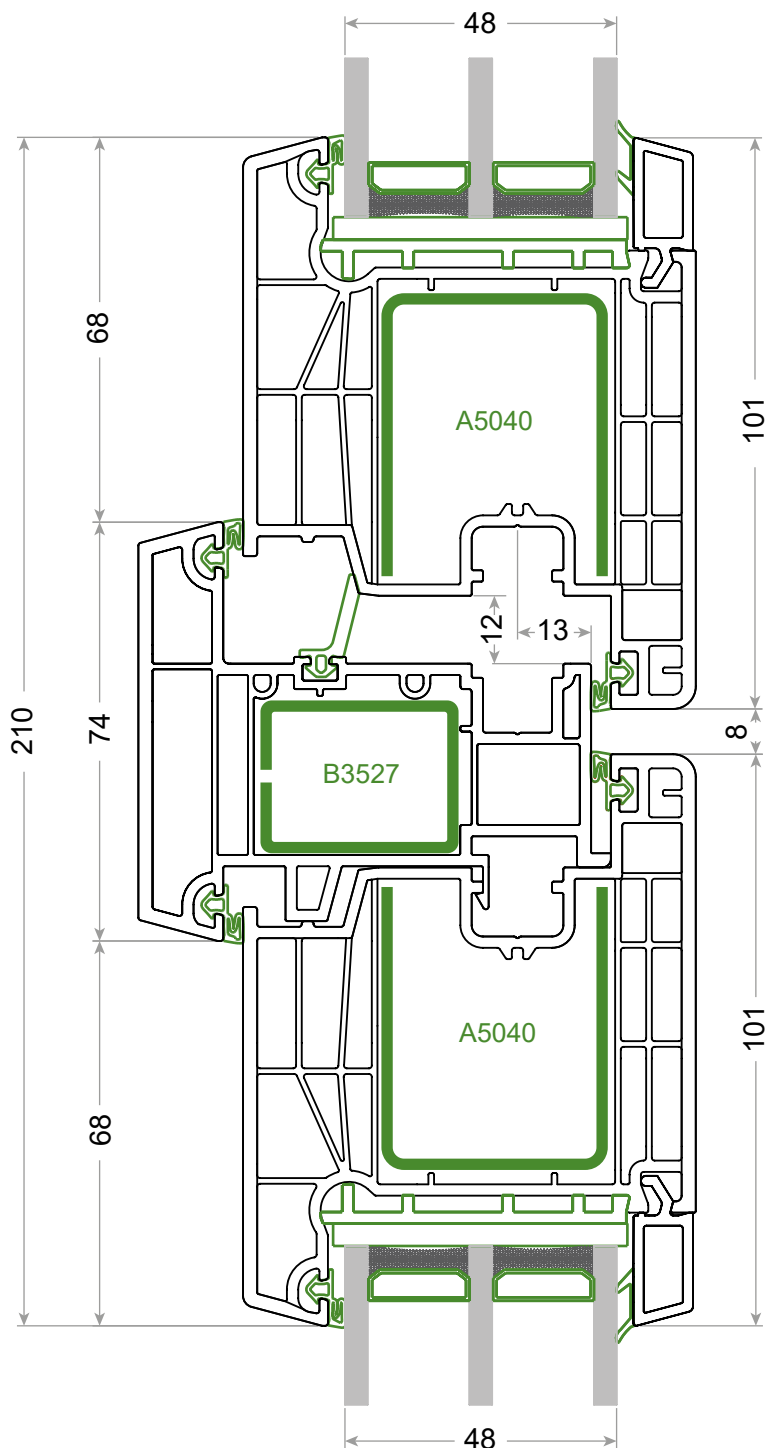
- glazing with 48mm glazing unit



4. Assemblies

4.27 Sash 58022 + floating mullion 68033

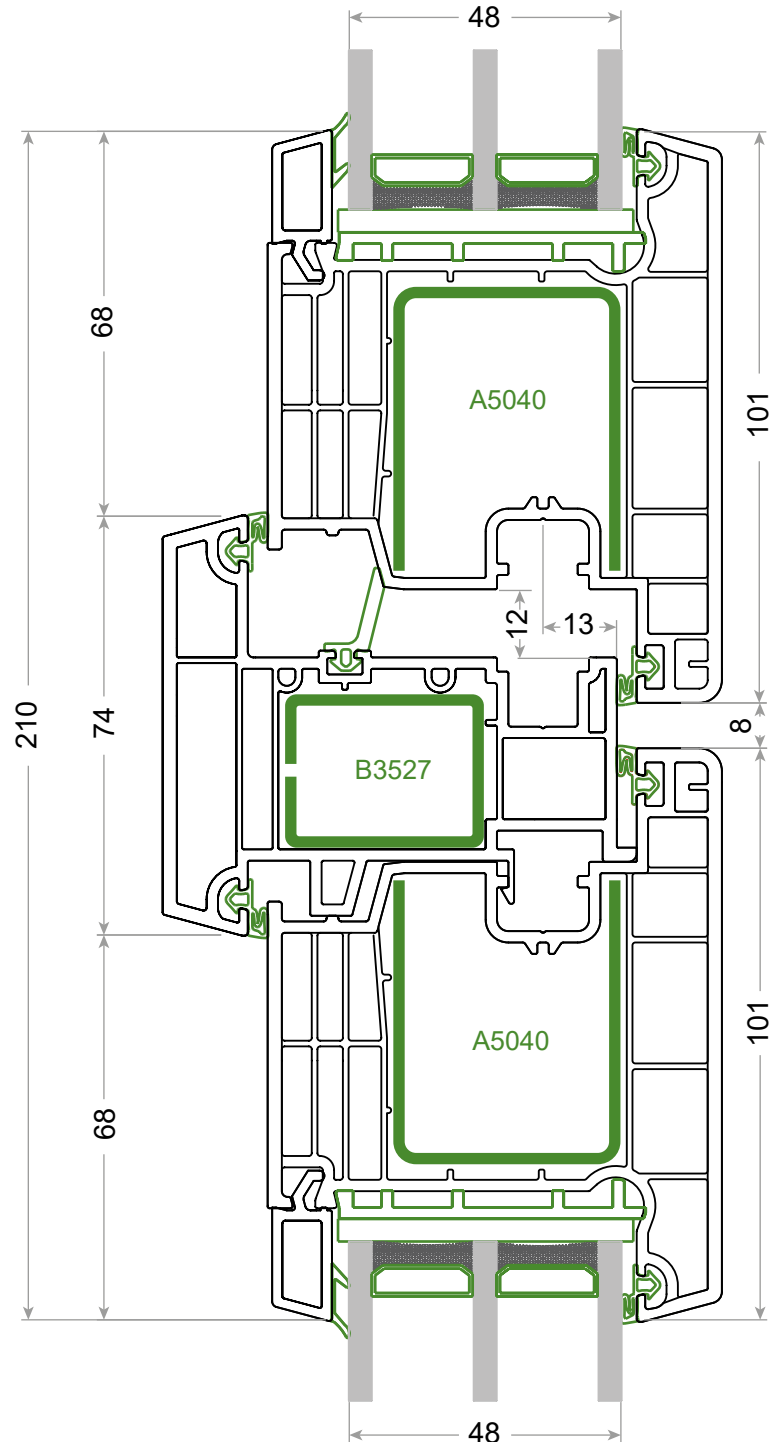
- glazing with 48mm glazing unit



4. Assemblies

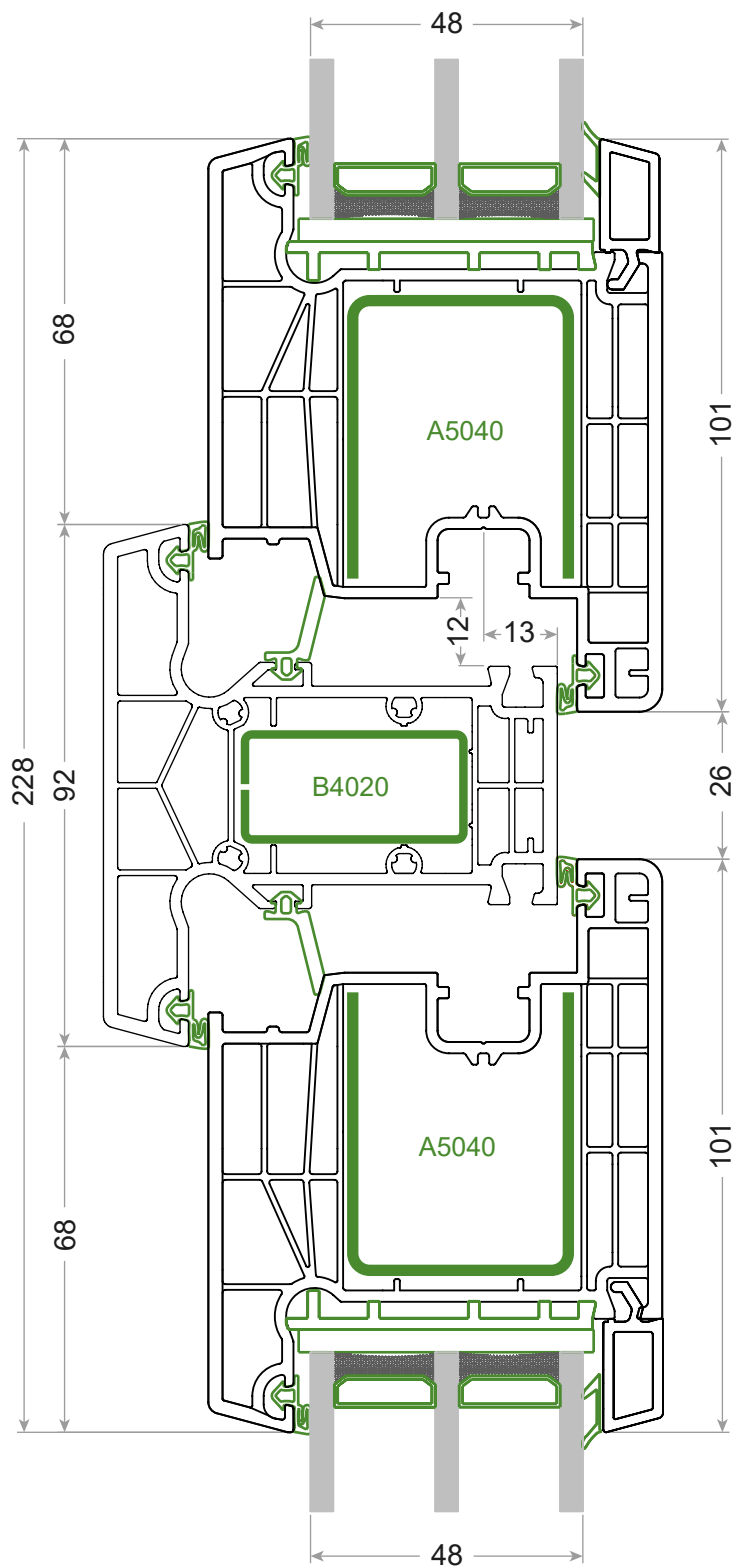
4.28 Sash 58023 + floating mullion 68033

- glazing with 48mm glazing unit



4.29 Sash 58022 + fixed mullion 68032

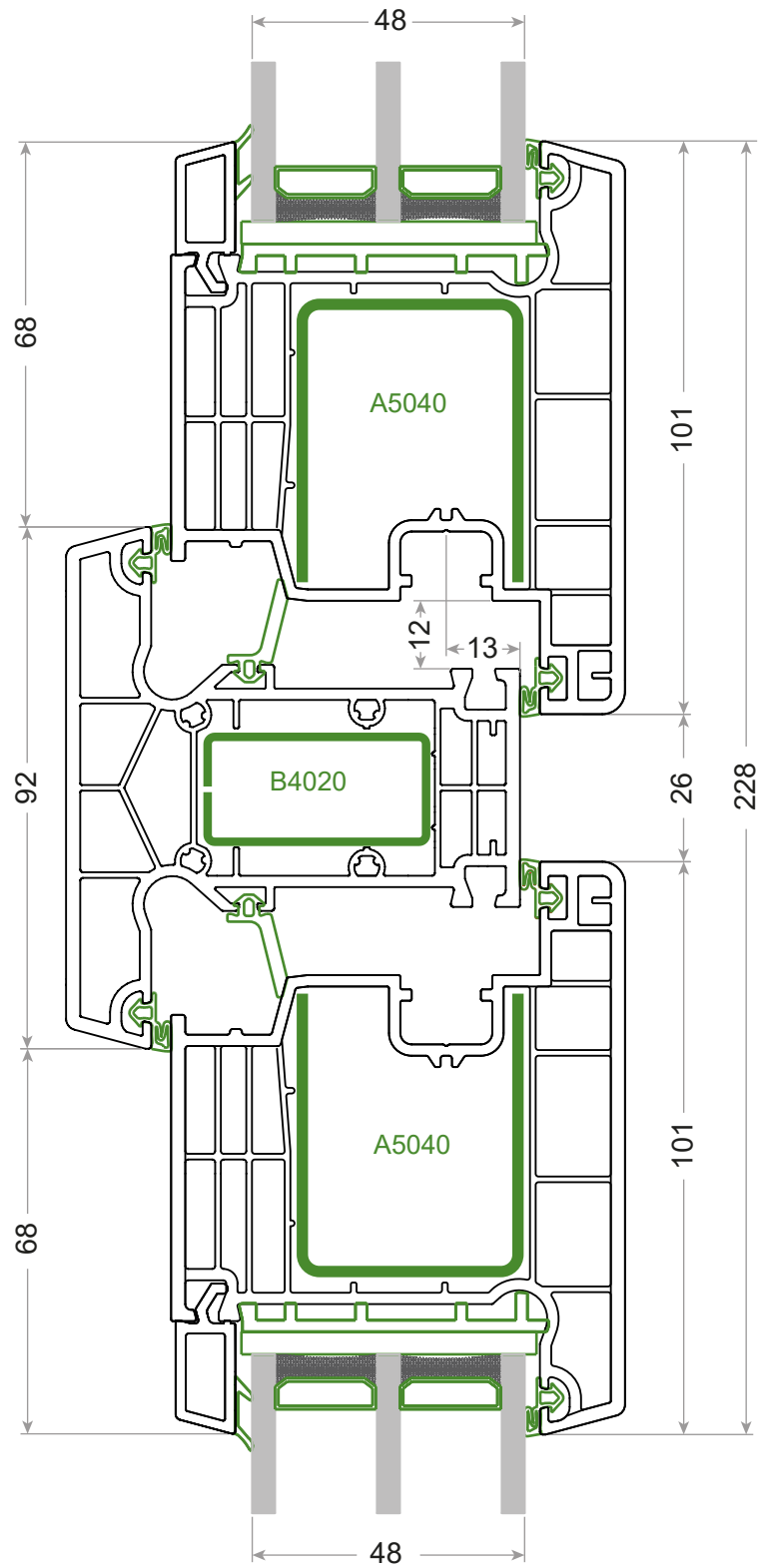
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4. Assemblies

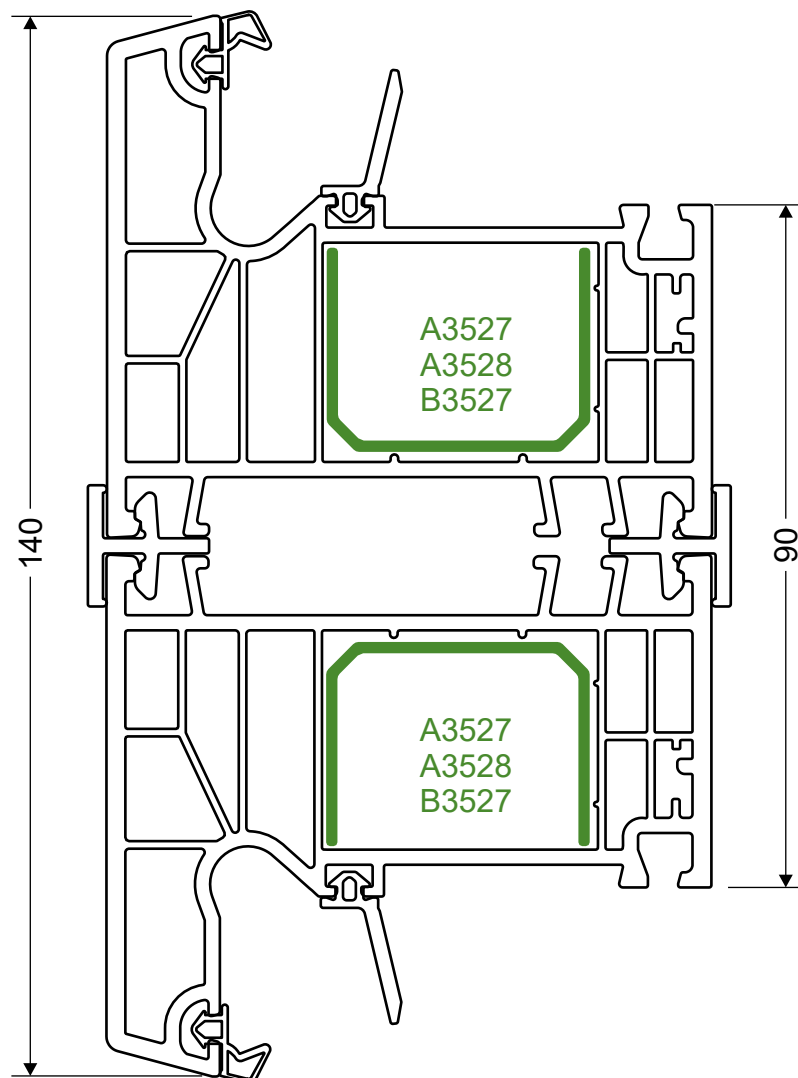
4.30 Sash 58023 + fixed mullion 68032

- glazing with 48mm glazing unit



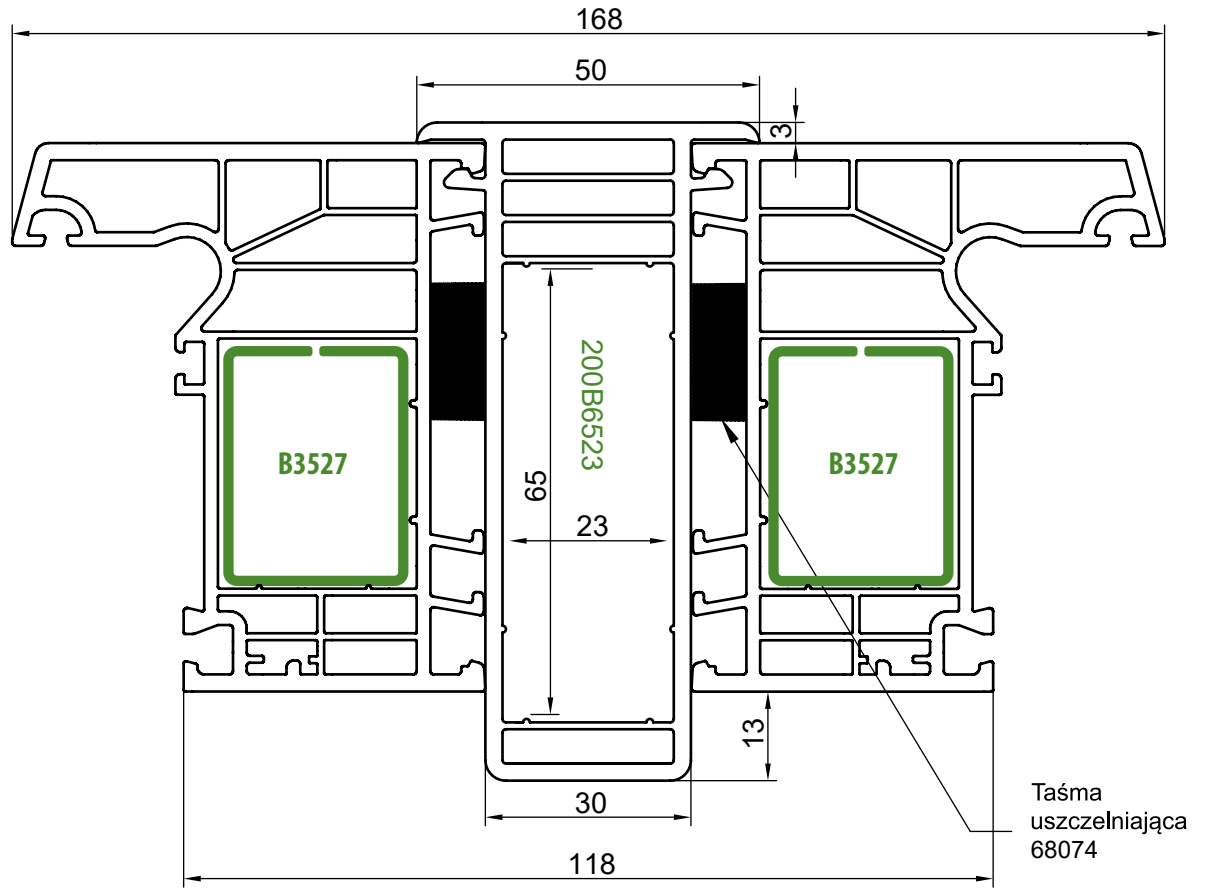
4. Assemblies

4.31 Connection of frames 68011 with connector 57052



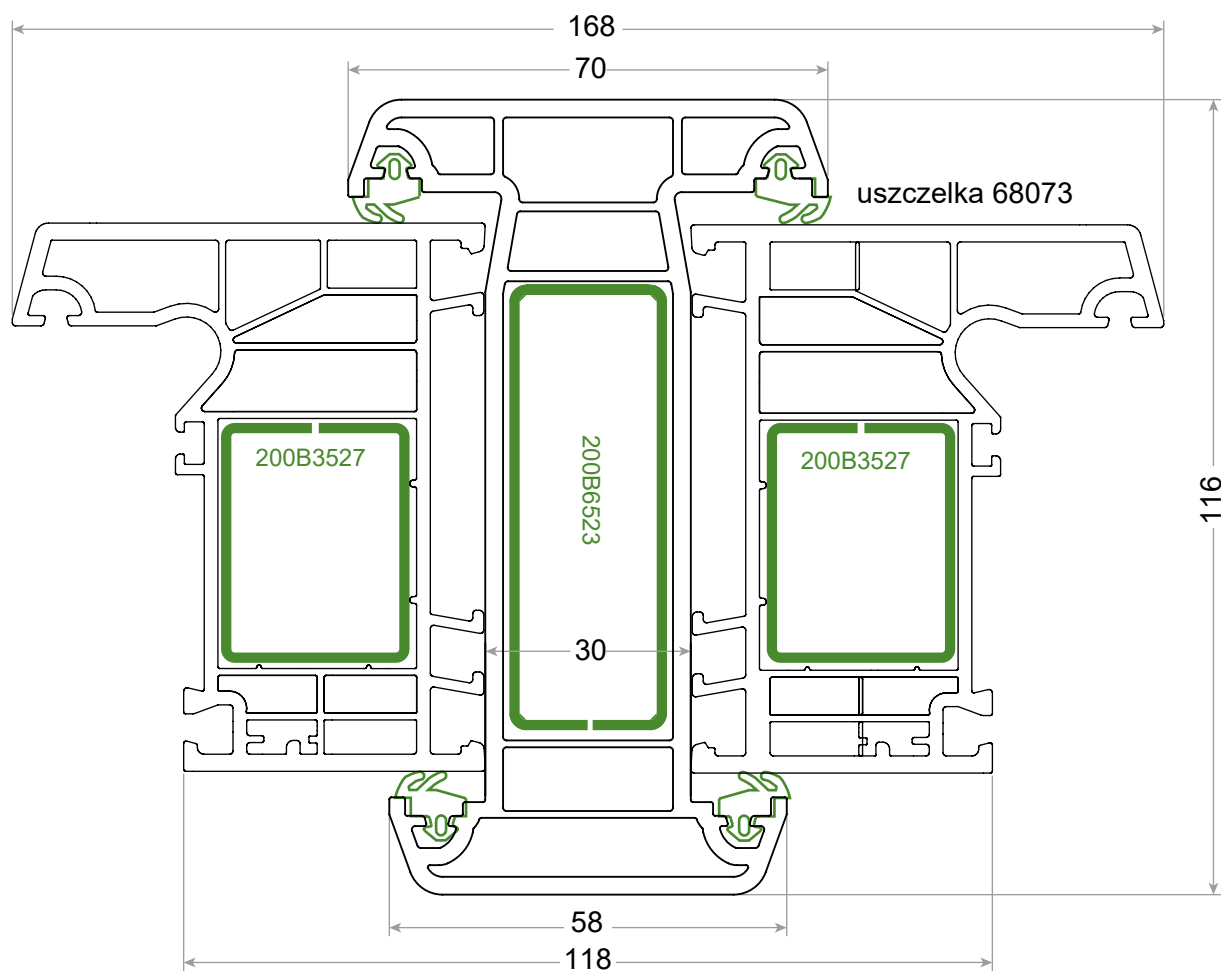
4. Assemblies

4.32 Connection of frames 68011 with static connector 68065



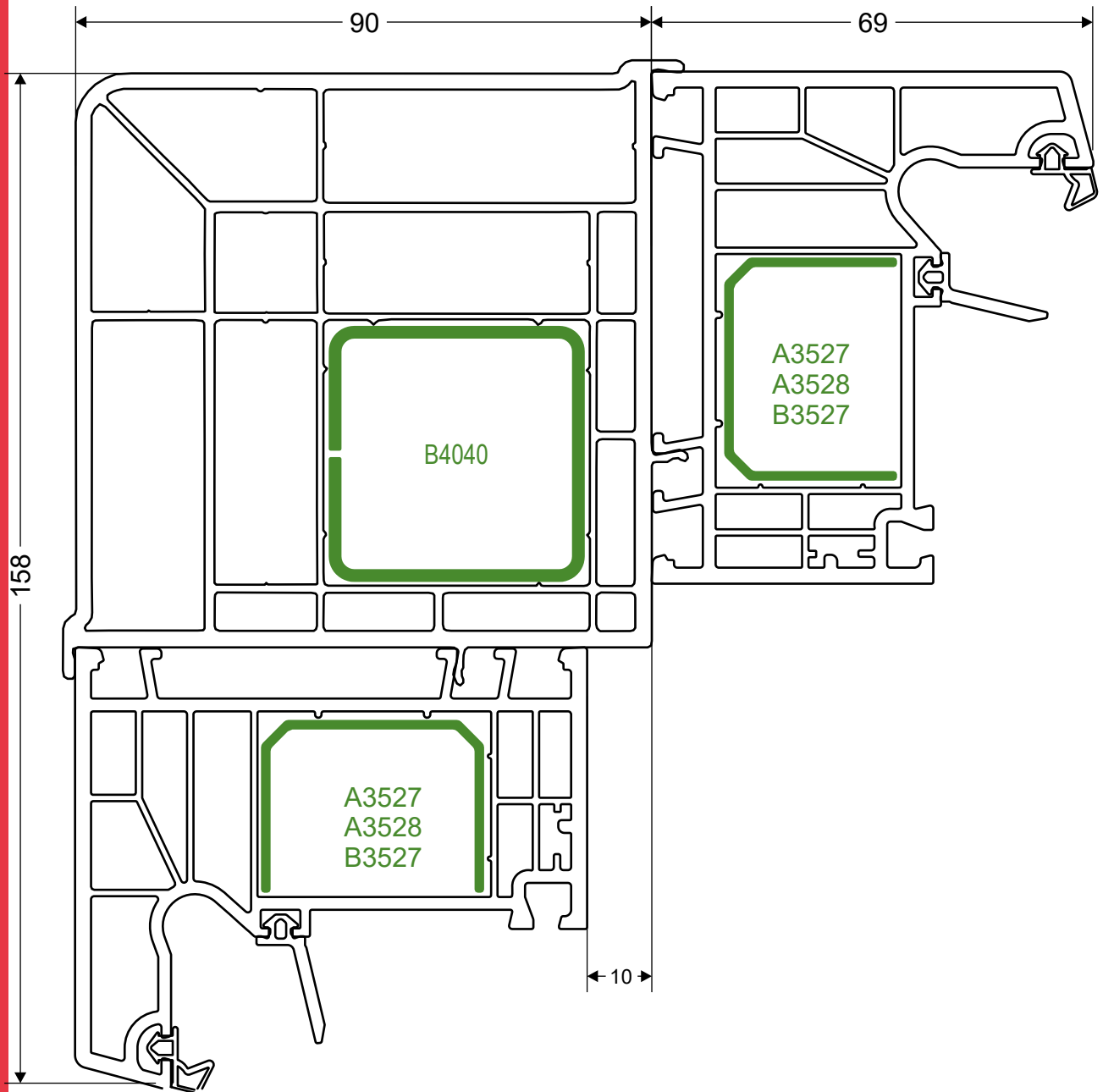
4. Assemblies

4.33 Connection of frames 68011 with static connector 68668

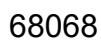


4. Assemblies

4.34 Connection of frames 68011 using 90° connector 68064



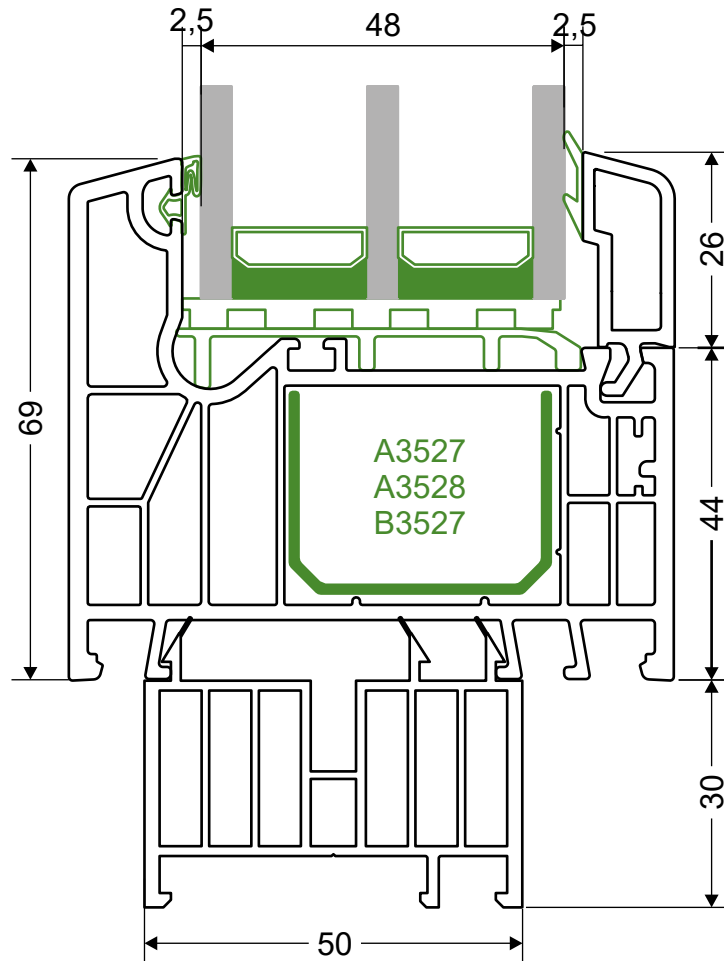
4.35 Connection of frames 68011 with pipe connector 57061+57062 + 68064



zakładany kąt	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

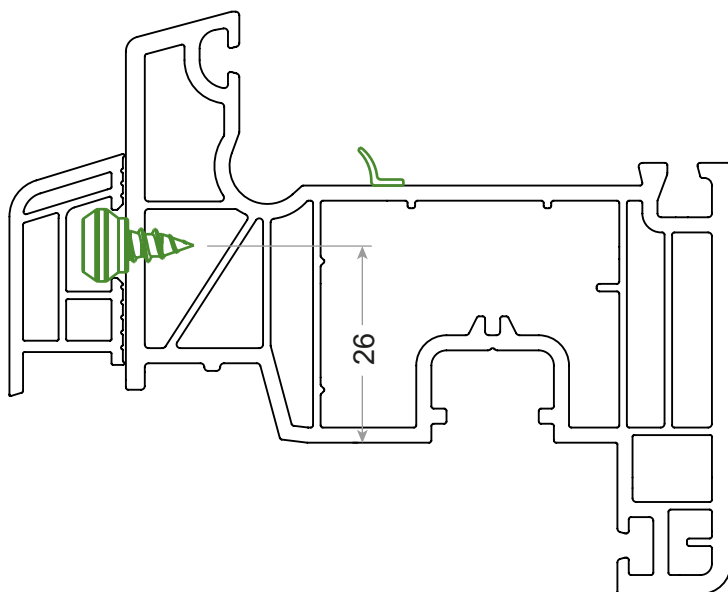
4. Assemblies

4.36 Frame 68011 + mounting profile 68071



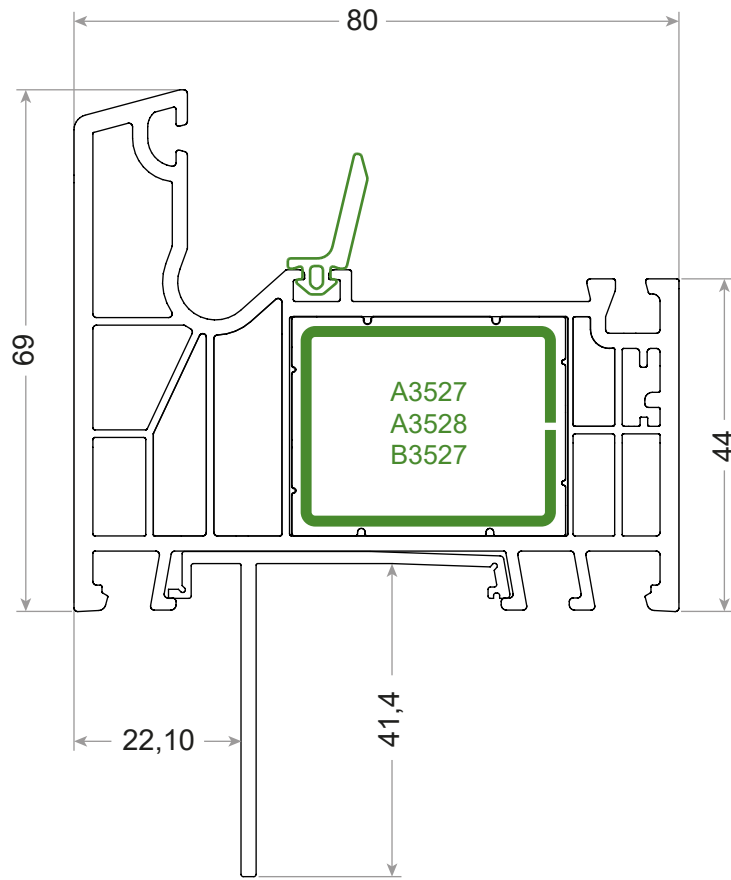
4. Assemblies

4.37 Sash 68021 + drip cap 58057



4. Assemblies

4.38 Frame 68011 + nailing fin 68058

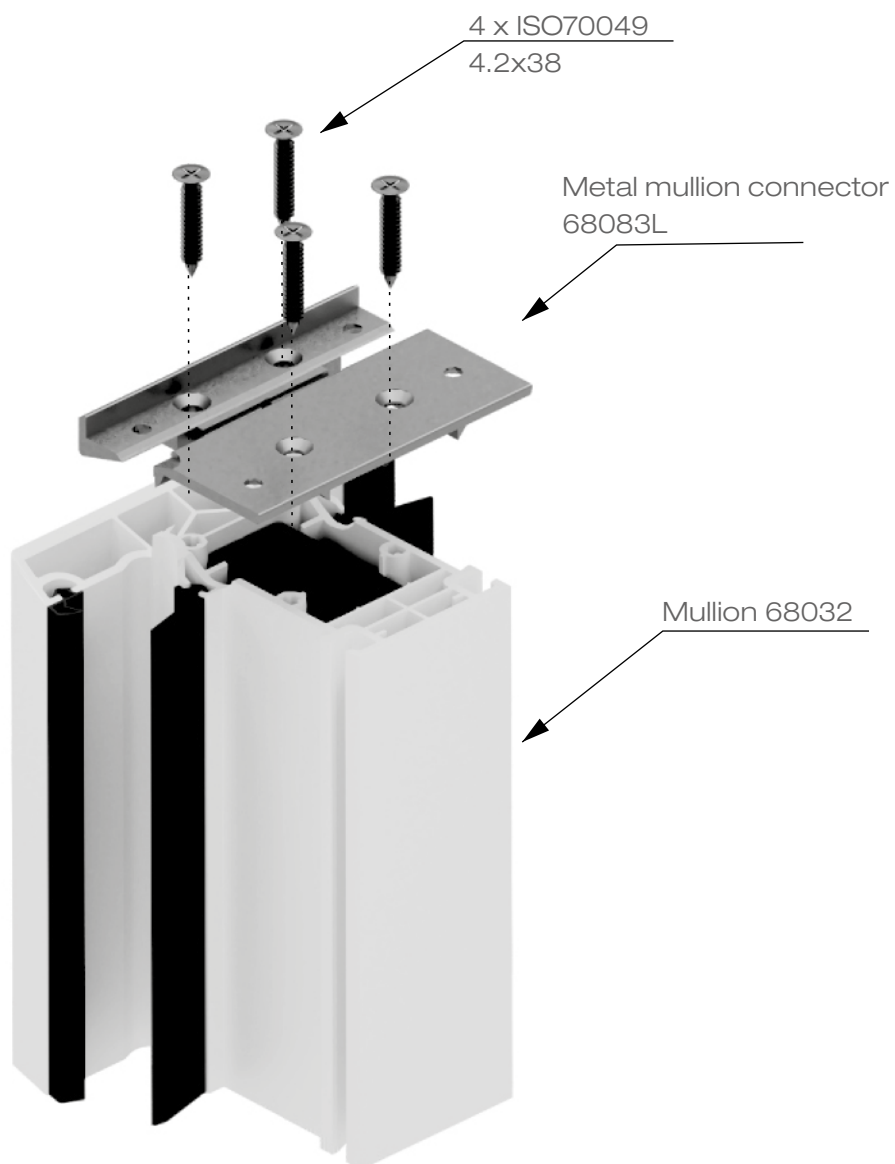


5. Assembly diagrams

- 5.1 Mounting of metal connector 68083L to mullion 68032
- 5.2 Connection of frame 68011 and mullion 68032
using metal mullion connector 68083L
- 5.3 Connection of frame 68011 with fixed mullion 68032
using plastic connector 68085L
- 5.4 Connection of floating mullion 68033 with sash 68021
(with cover plugs 68084 mounted)
- 5.5 Mounting of threshold 58050 and drip 58056
- 5.6 Mounting of floating mullion seal 68033 with threshold 58050

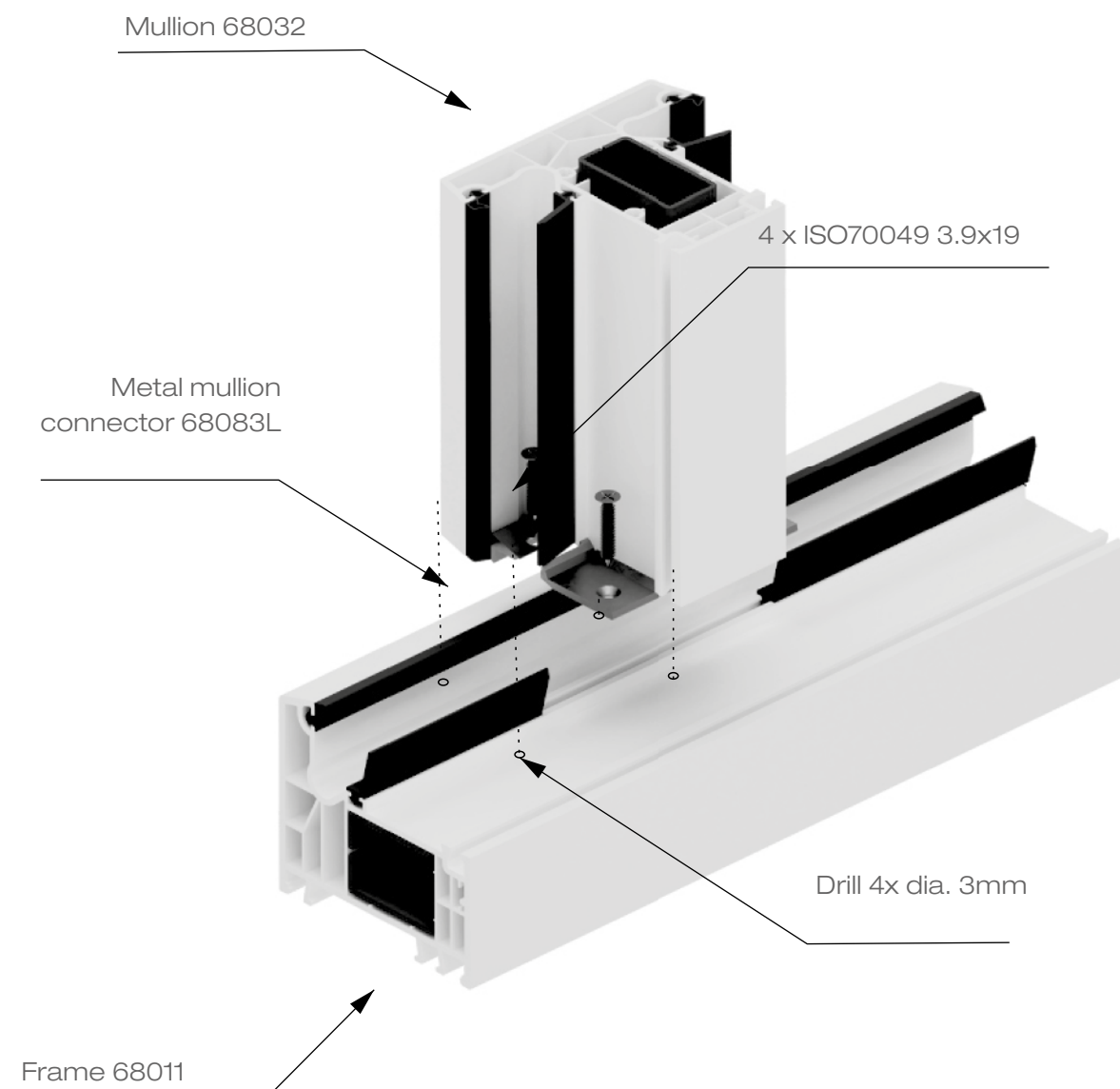
5. Assembly diagrams

5.1 Mounting of metal connector 68083L to mullion 68032



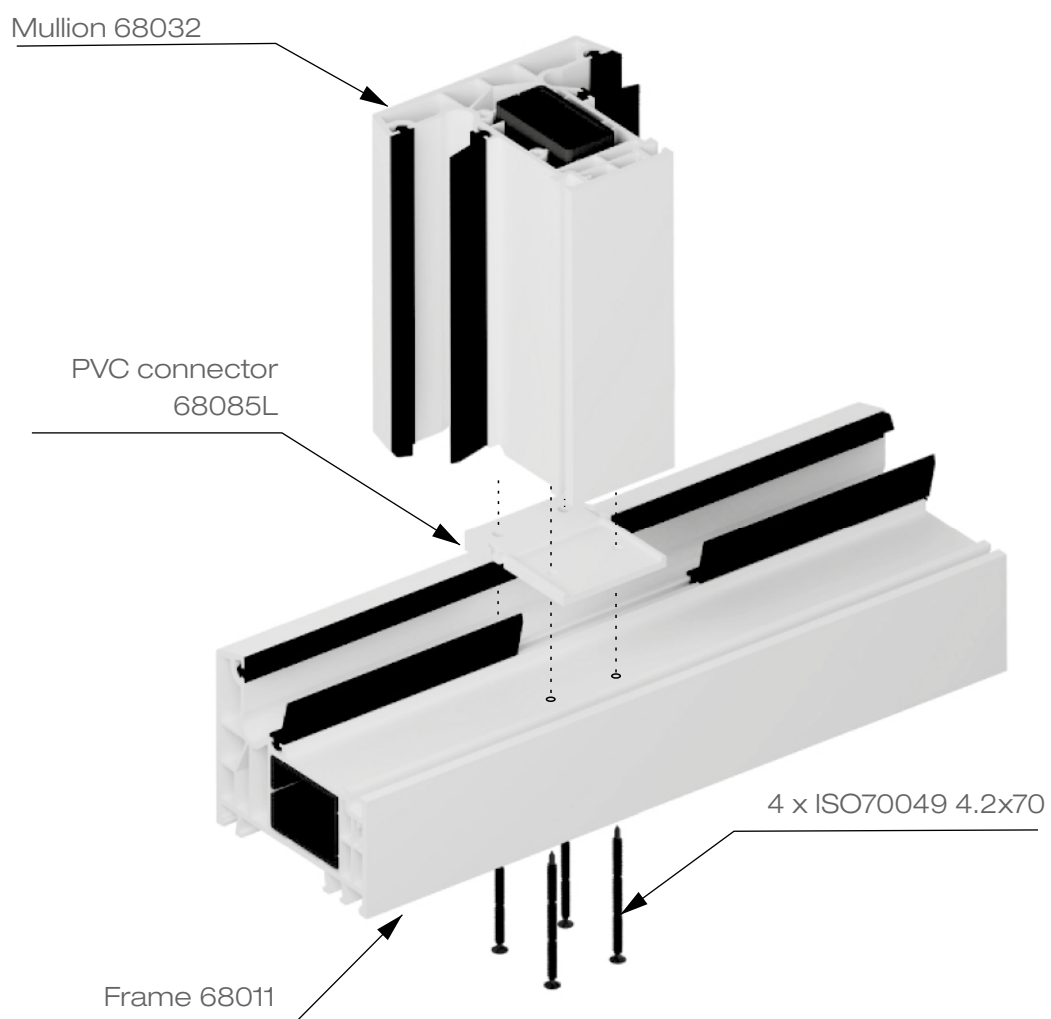
5. Assembly diagrams

5.2 Connection of frame 68011 and mullion 68032 using metal mullion connector 68083L



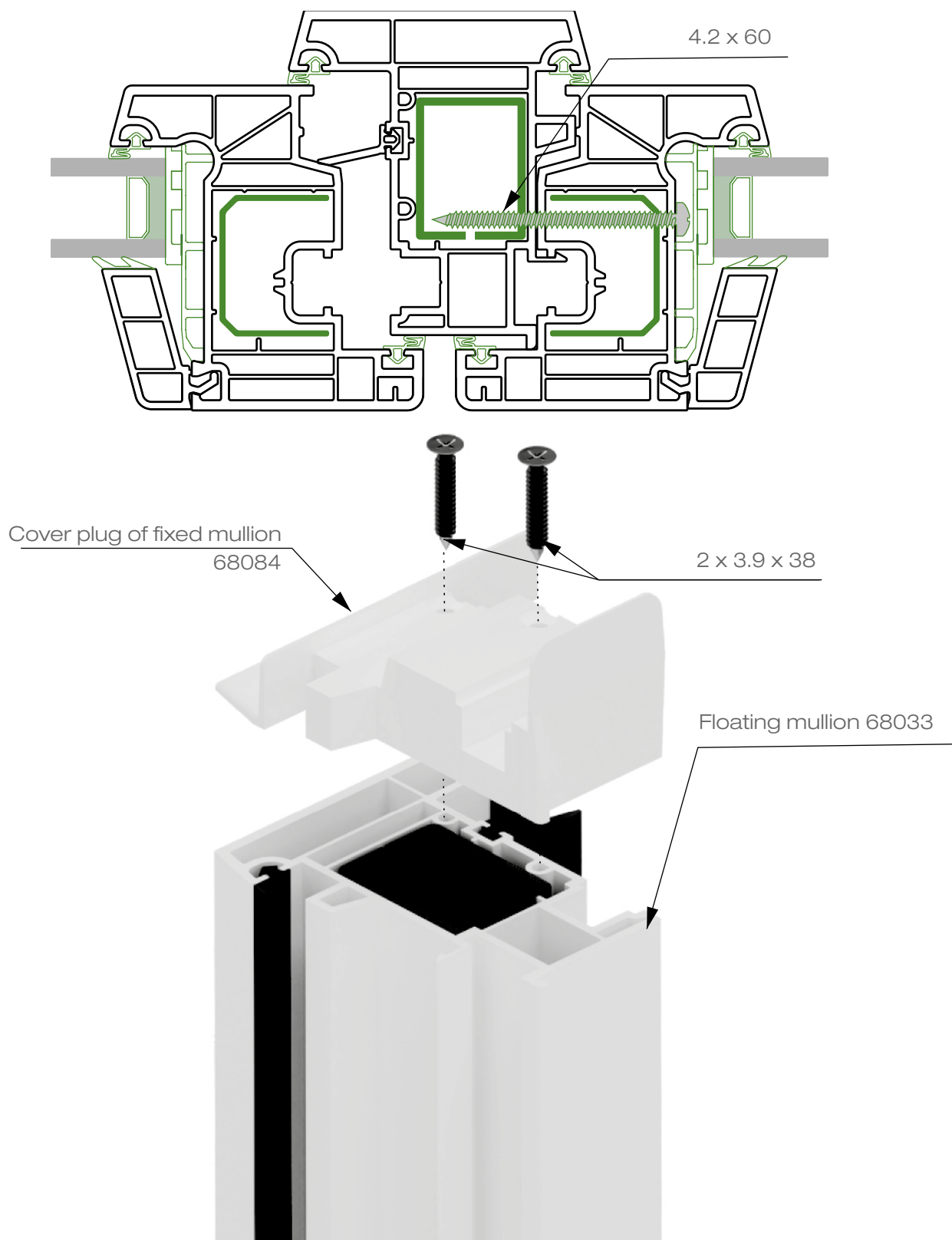
5. Assembly diagrams

5.3 Connection of frame 68011 with fixed mullion 68032 using plastic connector 68085L



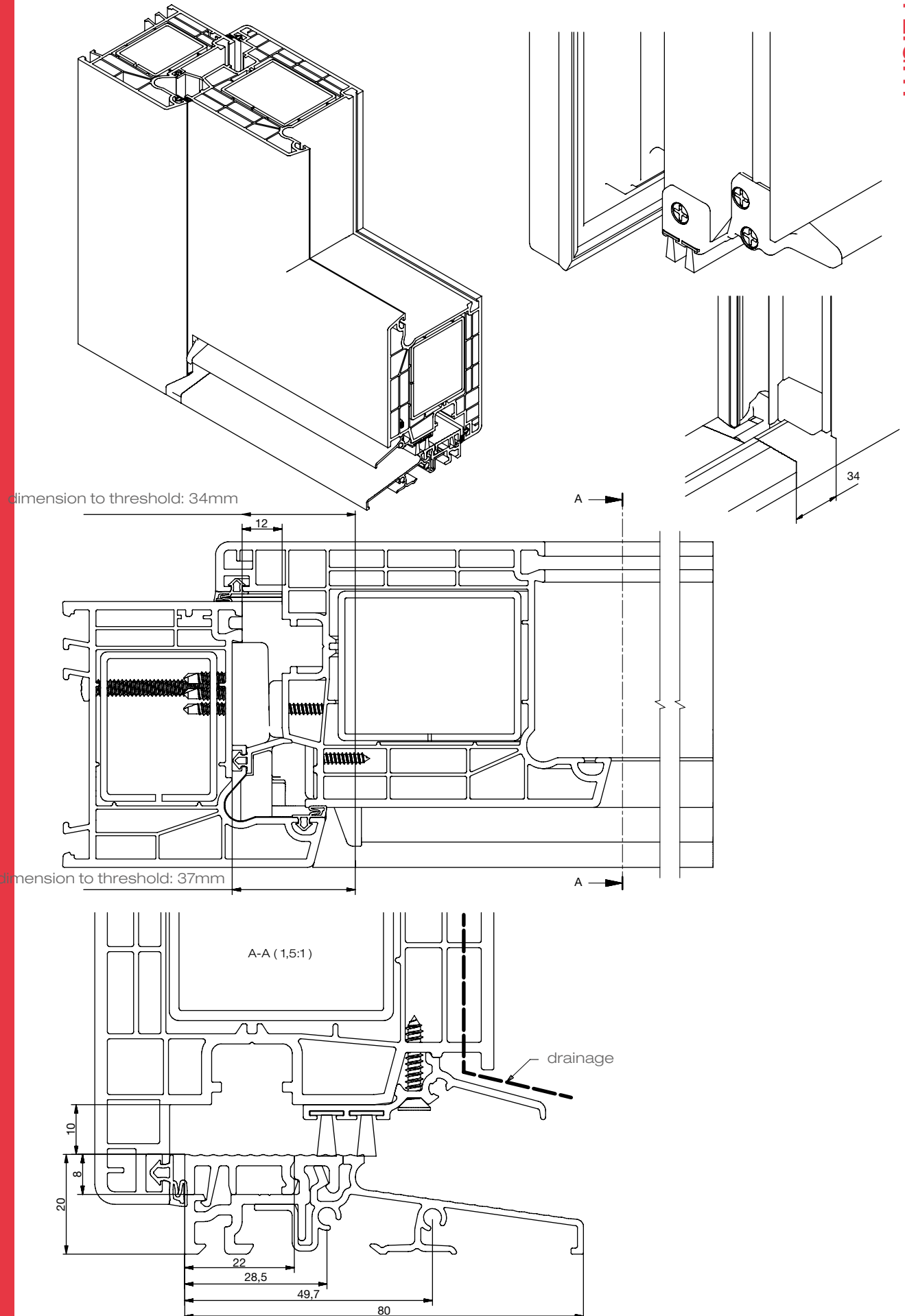
5. Assembly diagrams

5.4 Connection of floating mullion 68033 with sash 68021 (with cover plugs 68084 mounted)



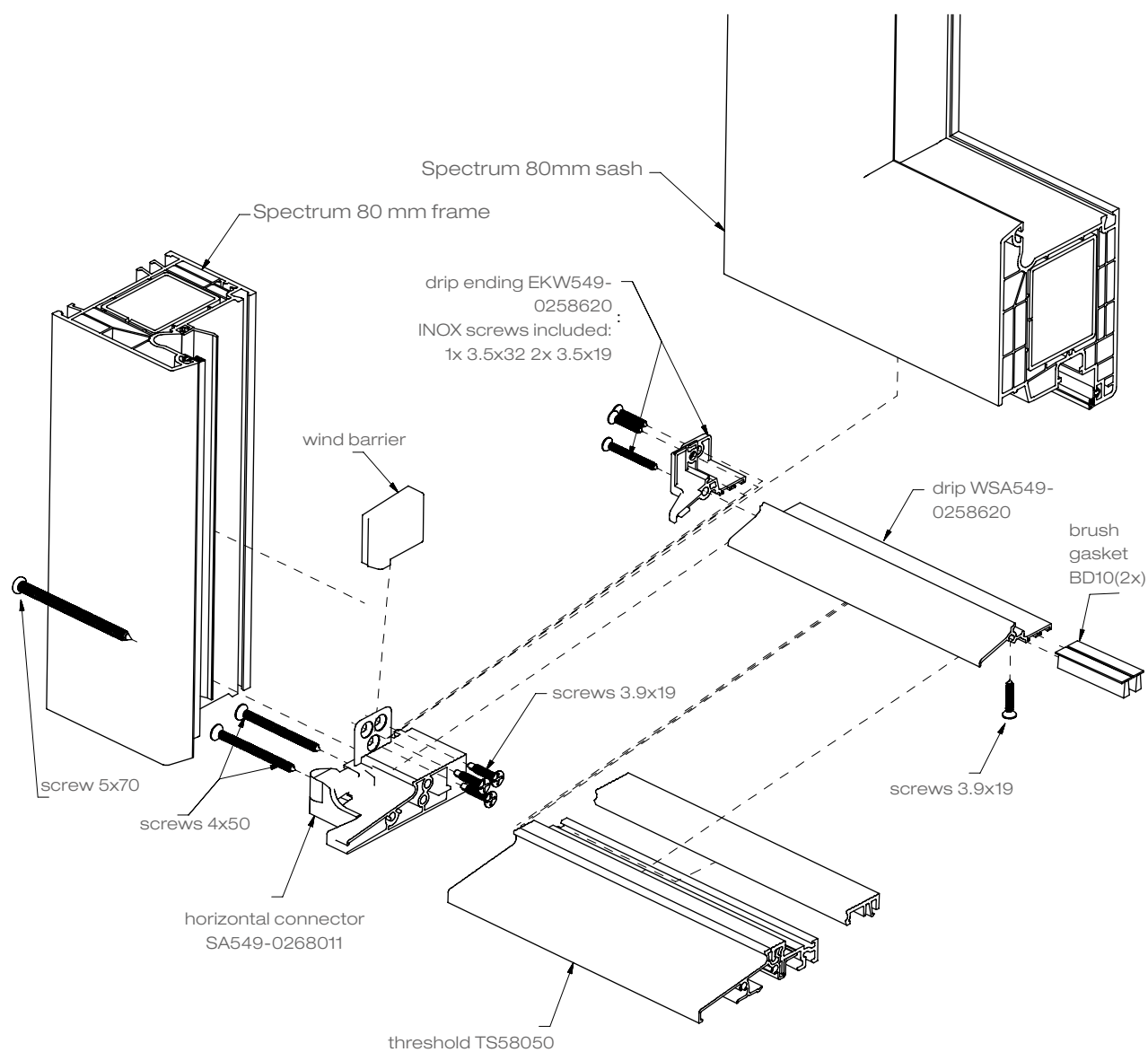
5. Assembly diagrams

5.5 Mounting of threshold 58050 and drip 58056



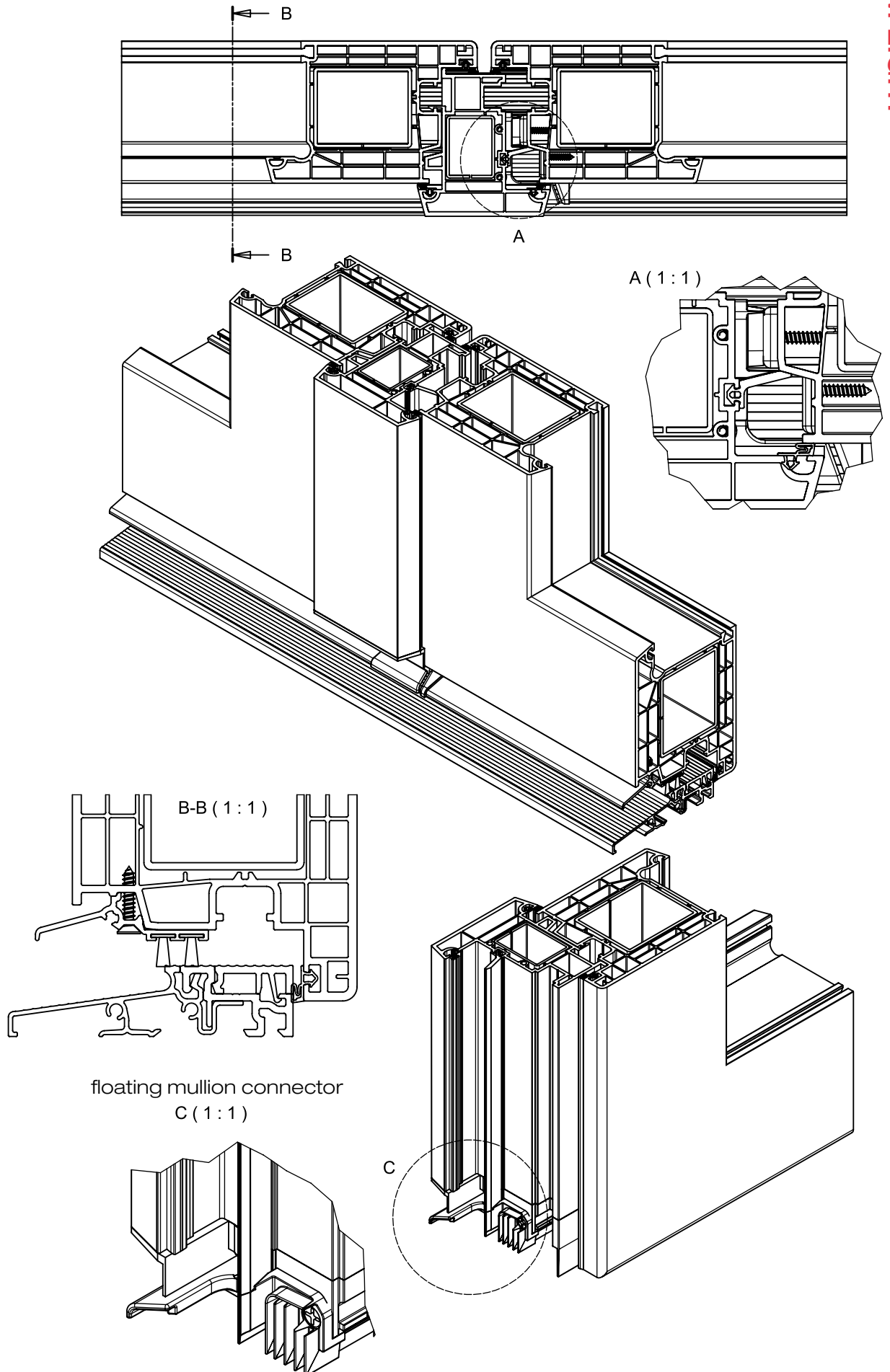
5. Assembly diagrams

5.5 Mounting of threshold 58050 and drip 58056



5. Assembly diagrams

5.6 Mounting of floating mullion seal 68033 with threshold 58050



6. Assembly dimensions

- 6.1 General information
- 6.2 Fixed glazing in frame 68011
- 6.3 Fixed glazing in frame 58011
- 6.4 Structural muntin
- 6.5 Single-sash window
- 6.6 Double-sash window with fixed mullion
- 6.7 Double- sash window with floating mullion
- 6.8 Double- sash window with fixed part
- 6.9 Balcony doors, exterior with aluminium threshold
- 6.10 Calculation example
- 6.11 Length correction of fixed mullion 68032
- 6.12 Length correction of floating mullion 68033

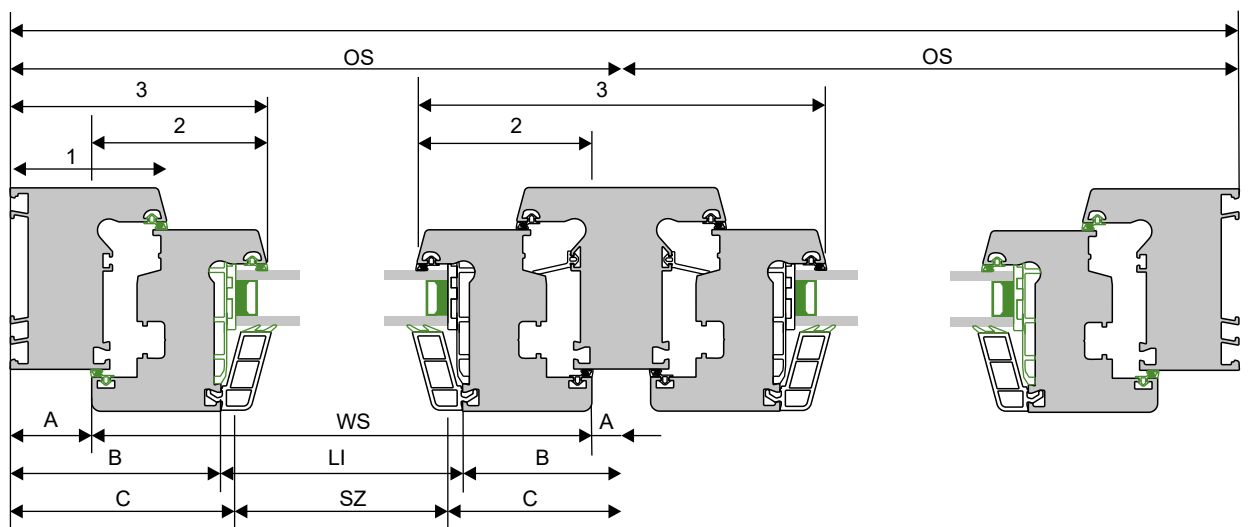
6. Assembly dimensions

6.1 General information

Determining the dimensional correction consists in summing up the corrections for individual profile combinations in the window. The dimensions of the corrections are counted based on the external dimensions of the frame and based on the dimensions of the lites given in the axes of the mullions (for a floating mullion, the axis is located in the middle of the distance between the ends of the rebates of cooperating leaves). For welded parts, an appropriate welding allowance must be added.

Please note:

The profile corrections specified in this section apply to finished profile elements after welding or mechanical connection. Depending on the window manufacturer's machine park for cutting and welding profiles, there may be situations in which there are unusual changes in the required length of profiles after processing, i.e. cutting or welding. Improper cutting of profiles may affect the deformation of gaskets implemented into the profiles.



Abbreviations used:

OS (Fixed or floating) mullion axis dimension

WS External dimension of entire sash (after welding)

LI Strip dimension

SZ Glazing unit dimension

WR External dimension of complete frame (after welding)

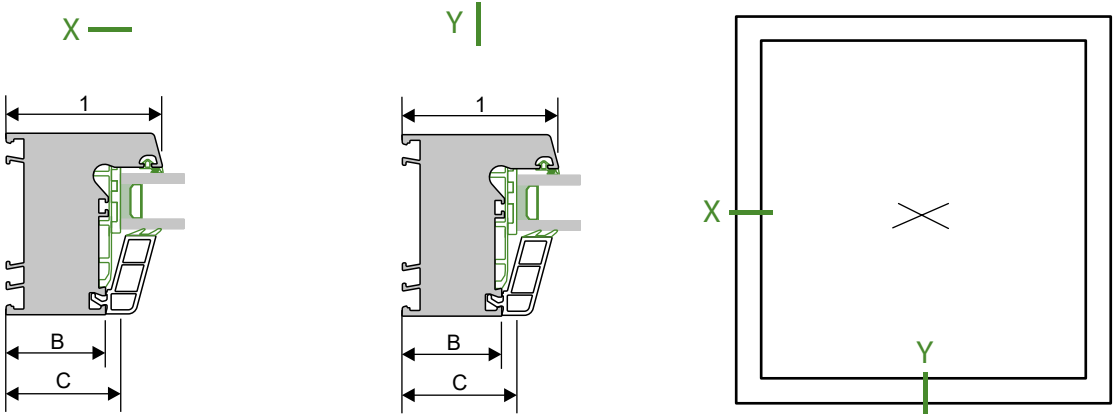
1 External dimensions of profiles, incl. frames, mullions and thresholds

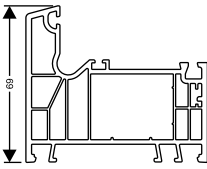
2 External dimension of sash profile

3 External dimension of assemblies of profiles, incl. frames, sashes, mullions

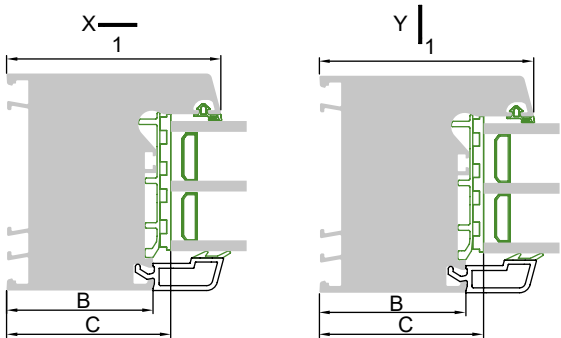
A, B, ... Values to be calculated depending on the profiles used

6. Assembly dimensions
6.2 Fixed glazing in frame 68011



Profile height (mm)	1	 68011 (69)
Dimensional correction (mm)	B LI	-44
	C SZ	-50

6. Assembly dimensions
6.3 Fixed glazing in frame 58011



Profile height (mm)	1	79 80 54 15 58011 (79)
Dimensional correction (mm)	B LI	-54
	C SZ	-60

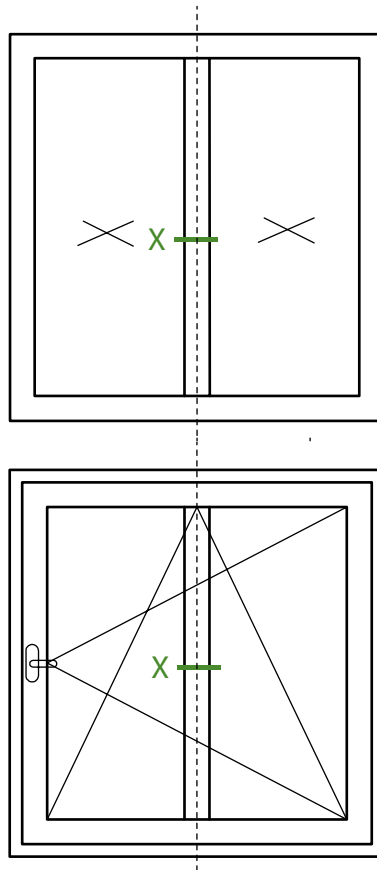
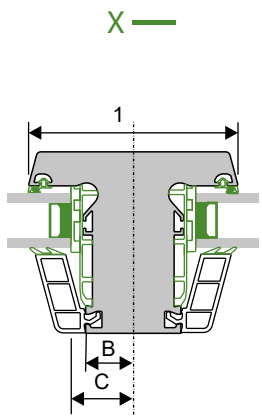
Abbreviations used:

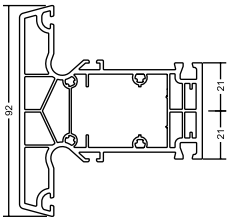
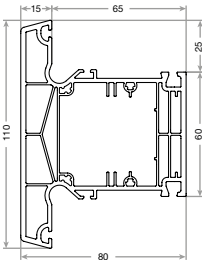
- OS** (Fixed or floating) mullion axis dimension
- WS** External dimension of entire sash (after welding)
- LI** Strip dimension
- SZ** Glazing unit dimension
- WR** External dimension of complete frame (after welding)

- 1** External dimensions of profiles, incl. frames, mullions and thresholds
- 2** External dimension of sash profile
- 3** External dimension of assemblies of profiles, incl. frames, sashes, mullions
- A, B, ...** Values to be calculated depending on the profiles used

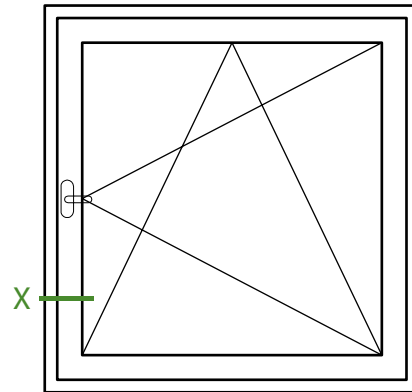
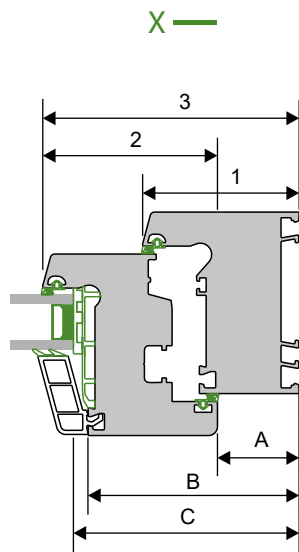
6. Assembly dimensions

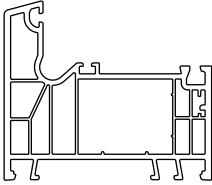
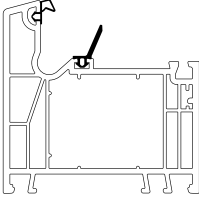
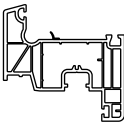
6.4 Structural muntin



Profile height (mm)	1	 68032 (92)	 58030 (110)
	B LI	-21	-30
Dimensional correction (mm)	C SZ	-27	-36

6. Assembly dimensions 6.5 Single-sash window



Profile height (mm)	1	68011 (69) 			58011 (79) 		
	2	68021 (77) 	58020 (119) 58021 (119)	58022 (101) 58023 (101)	68021 (77)	58020 (119) 58021 (119)	58022 (101) 58023 (101)
	3	113	155	137	123	165	147
Dimensional correction (mm)	A WS	-36	-36	-36	-46	-46	-46
	B Li	-93	-135	-117	-103	-145	-127
	C SZ	-99	-141	-123	-109	-151	-133

Abbreviations used:

OS (Fixed or floating) mullion axis dimension

WS External dimension of entire sash (after welding)

LI Strip dimension

SZ Glazing unit dimension

WR External dimension of complete frame (after welding)

1 External dimensions of profiles, incl. frames, mullions and thresholds

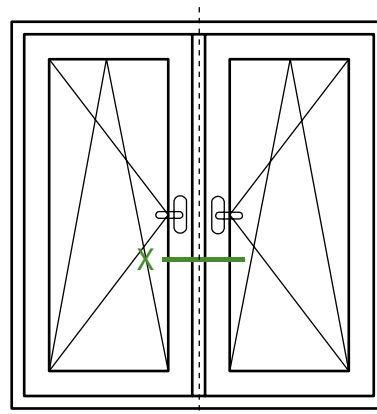
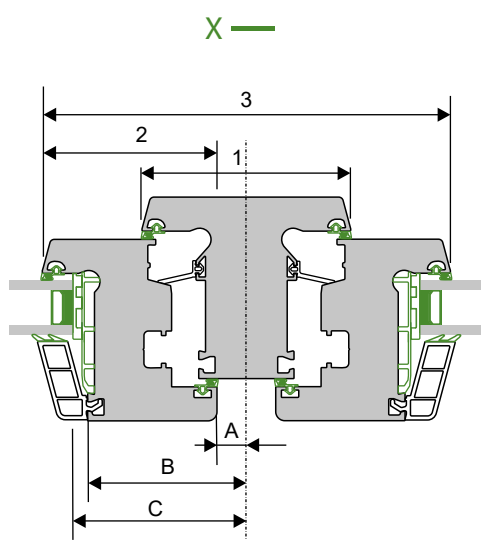
2 External dimension of sash profile

3 External dimension of assemblies of profiles, incl. frames, sashes, mullions

A, B, ... Values to be calculated depending on the profiles used

6. Assembly dimensions

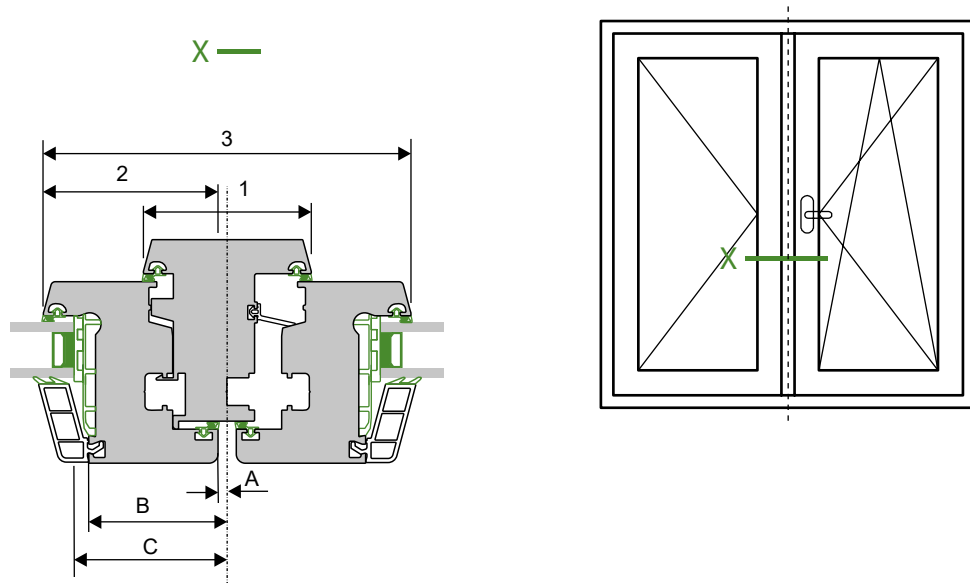
6.6 Double-sash window with fixed mullion



Profile height (mm)	1	68032 (92)			58030 (110)		
	2	68021 (77)	58020 (119) 58021 (119)	58022 (101) 58023 (101)	68021 (77)	58020 (119) 58021 (119)	58022 (101) 58023 (101)
	3	180	264	228	198	282	246
Dimensional correction (mm)	A WS	-13	-13	-13	-22	-22	-22
	B Li	-70	-112	-94	-79	-121	-103
	C sz	-76	-118	-100	-85	-127	-109

6. Assembly dimensions

6.7 Double- sash window with floating mullion



Profile height (mm)	1	68033 (74)		
	2	68021 (77)	58020 (119) 58021 (119)	58022 (101) 58023 (101)
	3	162	246	210
Dimensional correction (mm)	A WS	-4	-4	-4
	B LI	-61	-103	-85
	C SZ	-67	-109	-91

Abbreviations used:

OS (Fixed or floating) mullion axis dimension

WS External dimension of entire sash (after welding)

LI Strip dimension

SZ Glazing unit dimension

WR External dimension of complete frame (after welding)

1 External dimensions of profiles, incl. frames, mullions and thresholds

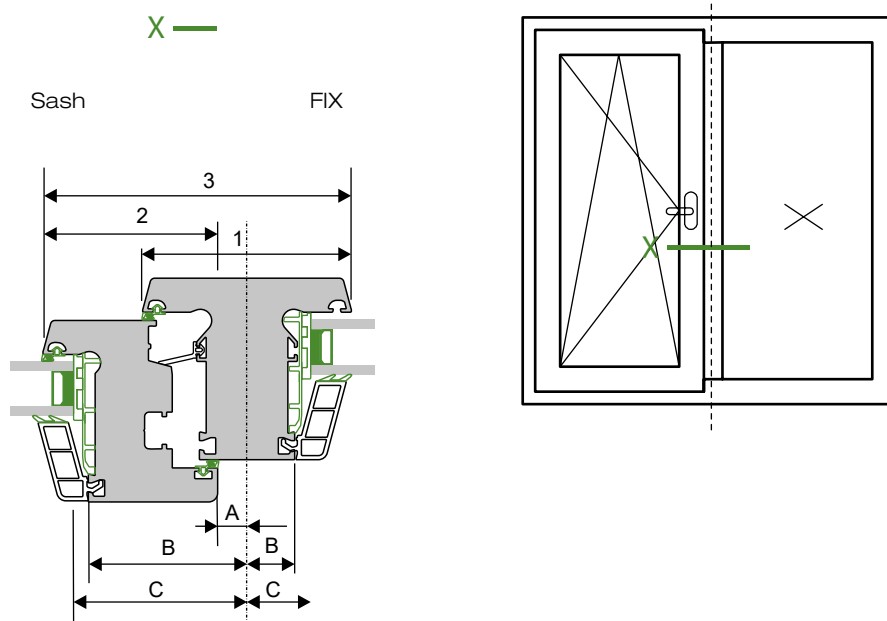
2 External dimension of sash profile

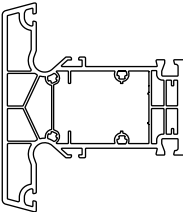
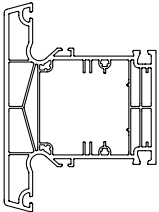
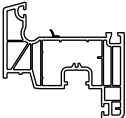
3 External dimension of assemblies of profiles, incl. frames, sashes, mullions

A, B, ... Values to be calculated depending on the profiles used

6. Assembly dimensions

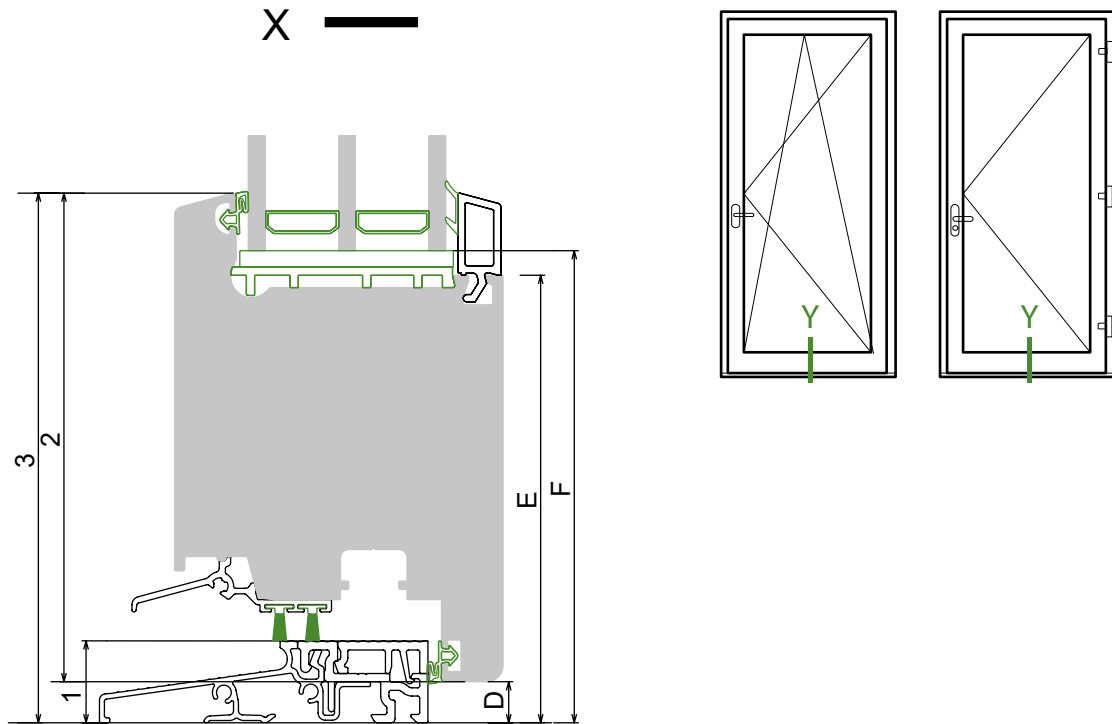
6.8 Double- sash window with fixed part



Profile height (mm)	1	68032 (92) 				58030 (110) 					
	2	68021 (77) 	58020 (119) 58021 (119)		58022 (101) 58023 (101)		68021 (77)	58020 (119) 58021 (119)		58022 (101) 58023 (101)	
	3	180	264		228		198	282		246	
Dimensional correction (mm)	A WS	-13	-13		-13		-22	-22		-22	
	B Li	-70	Skrzydło	-112	Skrzydło	-94	-79	Skrzydło	-121	Skrzydło	-103
			FIX	-21	FIX	-21	-30	FIX	-30	FIX	-30
	C sz	-76	Skrzydło	-118	Skrzydło	-100	-85	Skrzydło	-127	Skrzydło	-109
			FIX	-27	FIX	-27	-36	FIX	-36	FIX	-36

6. Assembly dimensions

6.9 Balcony doors, exterior with aluminium threshold



Profile height (mm)	1	58050			
	2	68021 (77) 	58020 (119) 58021 (119)	58022 (101) 58023 (101)	
	3	87	129	111	
Dimensional correction (mm)	D WS	-10	-10	-10	
	E Li	-67	-109	-91	
	F SZ	-73	-115	-97	

Abbreviations used:

OS (Fixed or floating) mullion axis dimension

WS External dimension of entire sash (after welding)

LI Strip dimension

SZ Glazing unit dimension

WR External dimension of complete frame (after welding)

1 External dimensions of profiles, incl. frames, mullions and thresholds

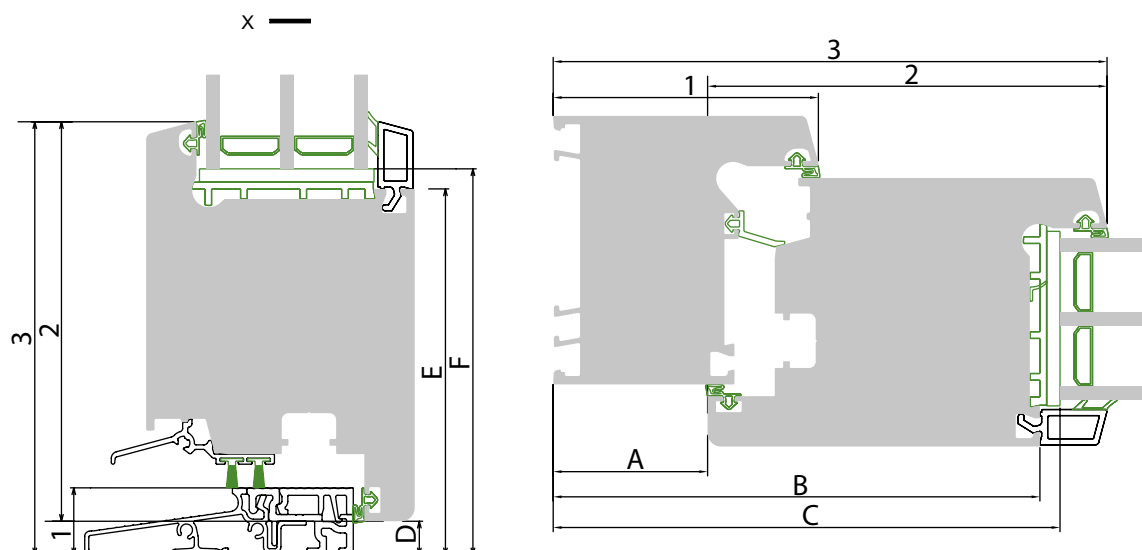
2 External dimension of sash profile

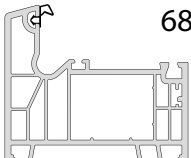
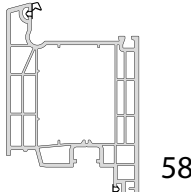
3 External dimension of assemblies of profiles, incl. frames, sashes, mullions

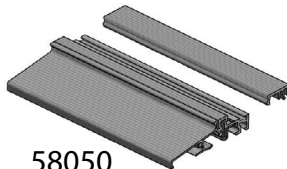
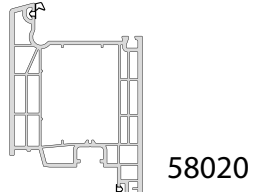
A, B, ... Values to be calculated depending on the profiles used

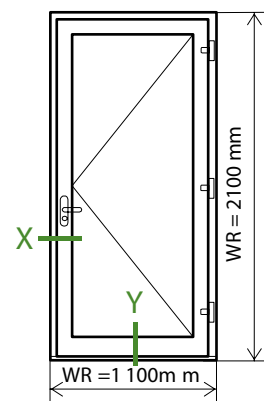
6. Assembly dimensions

6.10 Calculation example



1		68011
2		58020
3		165
A		-46
WS		
B		-145
LI		
C		-151
SZ		

1		58050
2		58020
3		129
D		-10
WS		
E		-109
LI		
F		-115
SZ		



External dimension:
WR 1100x2100 mm
Rama 58011 80 mm
Skrzydło 58020 119 mm

Results of sample calculations

Lateral (X) combinations from left: frame/sash and right: frame/sash, total corrections

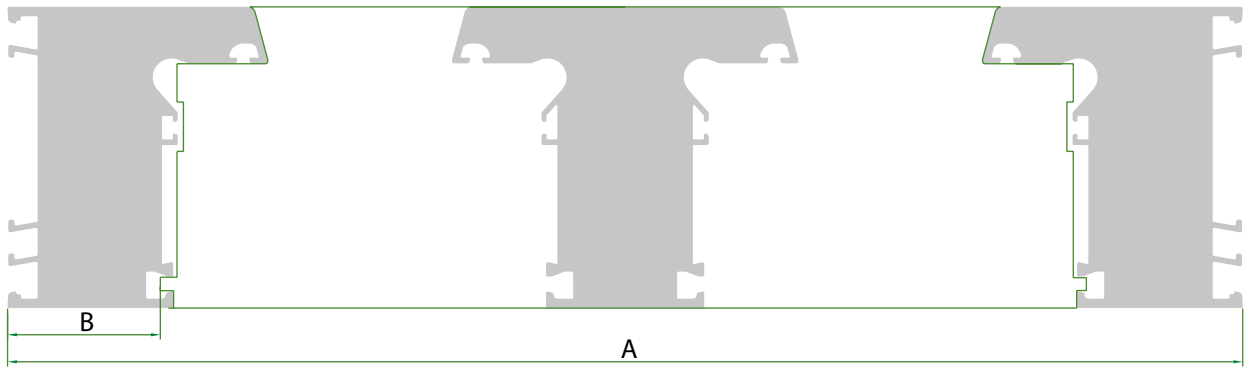
Vertical (Y) combinations: threshold with sash, frame with sash

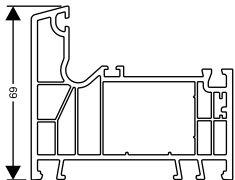
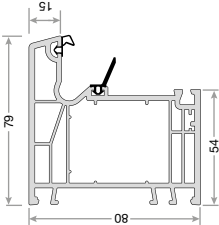
$$\begin{aligned} \text{WS} &= \text{WR} - 2\text{A} & 1100 \text{ mm} - 92 \text{ mm} &= 1008 \text{ mm} \\ \text{LI} &= \text{WR} - 2\text{B} & 1100 \text{ mm} - 290 \text{ mm} &= 810 \text{ mm} \\ \text{SZ} &= \text{WR} - 2\text{C} & 1100 \text{ mm} - 302 \text{ mm} &= 798 \text{ mm} \end{aligned}$$

$$\begin{aligned} \text{WS} &= \text{WR} - (\text{D} + \text{A}) & 2100 \text{ mm} - 56 \text{ mm} &= 2044 \text{ mm} \\ \text{LI} &= \text{WR} - (\text{E} + \text{B}) & 2100 \text{ mm} - 254 \text{ mm} &= 1846 \text{ mm} \\ \text{SZ} &= \text{WR} - (\text{F} + \text{C}) & 2100 \text{ mm} - 266 \text{ mm} &= 1834 \text{ mm} \end{aligned}$$

6. Assembly dimensions
6.11 Length correction of fixed mullion 68032

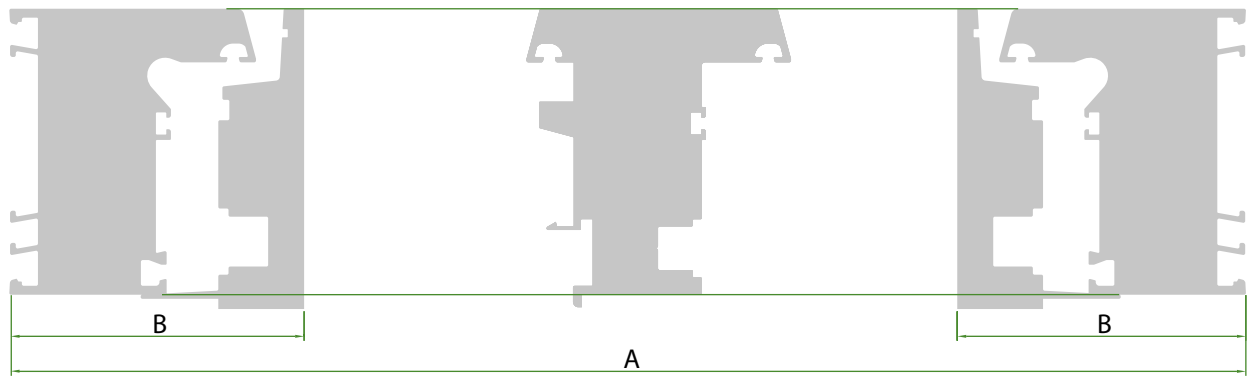
Mullion length calculation 68032



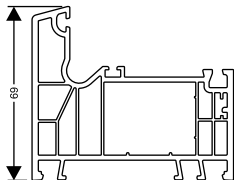
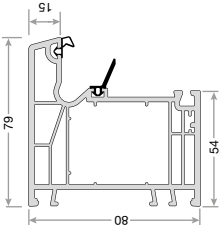
1	 68011	 58011
B	-42	-52

6. Assembly dimensions
6.12 Length correction of floating mullion 68033

Mullion length calculation 68032



DSR - floating mullion length = A-2B

1	 68011	 58011
B	-77	-87

7. Execution guidelines

7.1 Functions and execution of technical holes

Types of technical holes and their purpose:

1. DRAINAGE HOLES (white and veneered profiles):
drainage of rainwater so that it does not penetrate into the room
2. DECOMPRESSION HOLES (veneered, painted profiles):
cooling/ventilating the outer chambers of all main and secondary profiles
3. PRESSURE EQUALIZING HOLES (white, veneered and painted profiles):
in a locked window, between the frame and the sash, an air chamber is created, the pressure of which should correspond to the external pressure in order to ensure effective rainwater drainage.

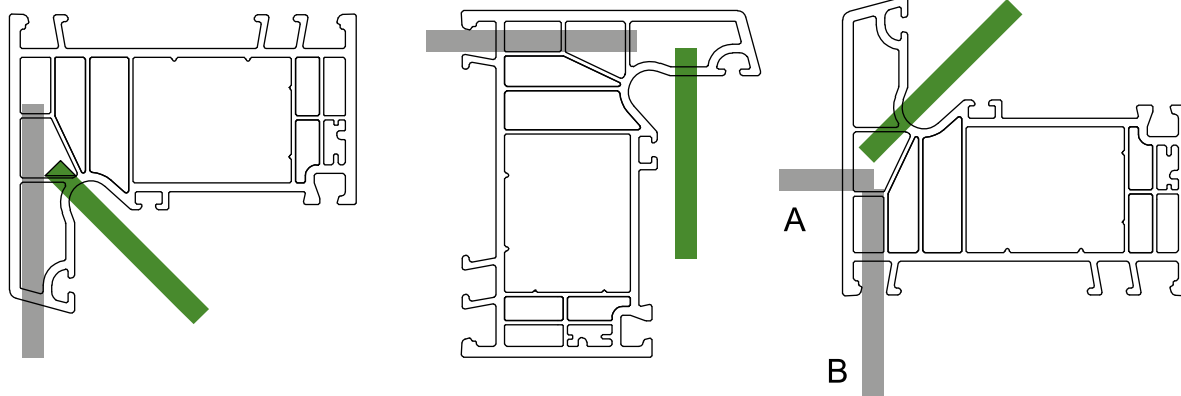
Milling and drilling of technical holes.

The proper functioning of PVC windows and doors requires the execution of various types of openings in the appropriate profile chambers. They are intended to remove rainwater so that it does not penetrate into the room. The outer chambers of the profiles must also be ventilated and the pressure compensation in the chambers most exposed to heat must be carried out. This only applies to „coloured” profiles. Drainage and pressure equalization holes in the chambers of coloured/veneer profiles.

If the windows are made of profiles whose external side is veneered, painted, with an aluminium overlay - then the profiles heat up to higher temperatures, even above 70°C. Such a strong heating of the profile chambers, a significant increase in pressure in the profile exterior chambers may lead to deformations, bulges in profile walls.

Therefore, all chambers of coloured profiles, whether large or small, shall feature pressure compensation holes (decompression holes).

The decompression holes shall be included in all main and additional profiles. Furthermore, it should be noted that access to decompression holes must not be hindered after the glazing and complete mounting of the window.

Milling and drilling holes in profile frames.

Pressure equalization in external chambers. Use a 6 mm drill bit and make decompression holes in the marked chambers. Applies to the top window elements.

Ventilation of vertical window elements. Use a 5mm drill bit and make ventilation holes in the marked chambers. Make the holes in vertical window elements at a distance of 200mm from the upper part of the rebate.

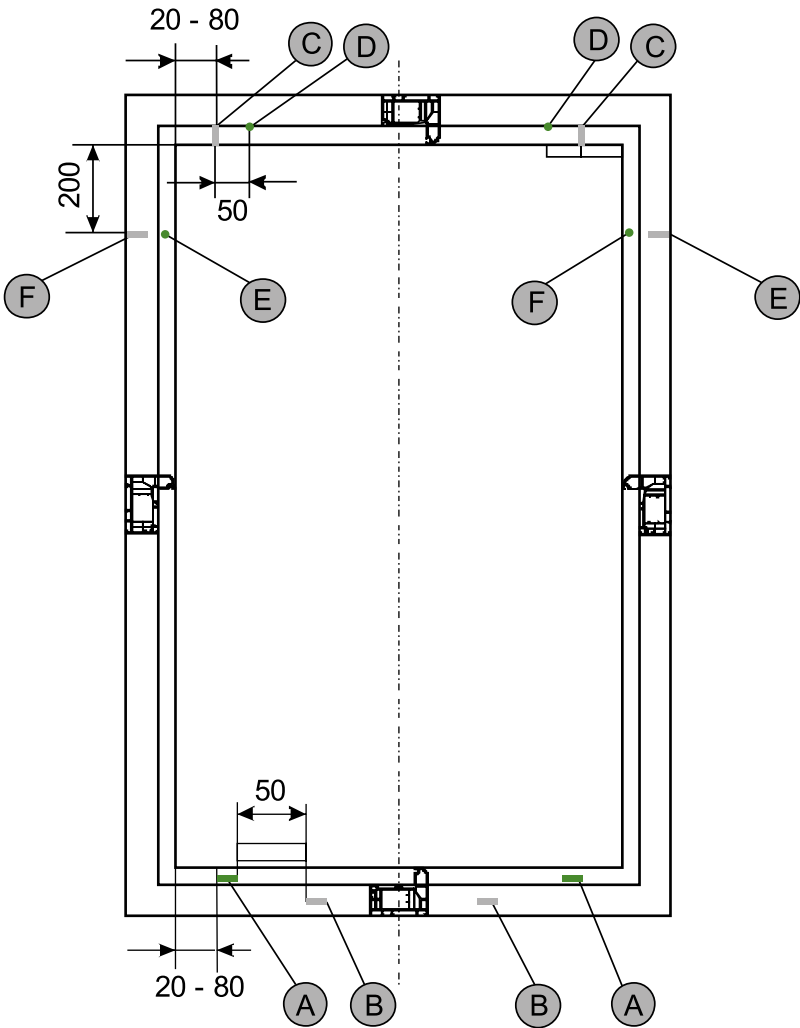
Drainage of lower frame elements. Drainage holes are „beans” of size 5x30mm, 6x30mm or 8mm diameter holes. A - chamber drainage to the outside, B - chamber drainage from below. Drainages A and B are alternative. The distance between drainage holes made outside and inside must be at least 50mm.

7. Execution guidelines
7.1 Functions and execution of technical holes

Table 1. Number of millings and drillings - frames.

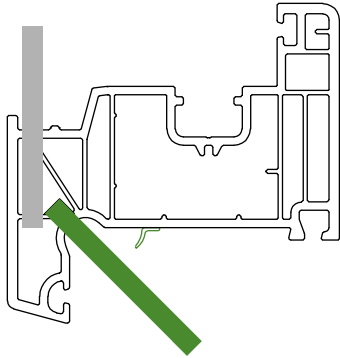
Window frame size		Number of millings and drillings					
		Drainage points		Pressure equalization		Ventilation	
		A	B	C	D	E	F
Clear dimension of given lite	≤ 600 mm	2	1 at center	2	2	2	2
	600 - 1300 mm	2	2	2	2	2	2
	1300 - 2000 mm	3	2	2	2	2	2
	≥ 2000 mm	3	3	2	2	2	2

- Drilling or milling from inside the profile (green)
- Drilling or milling from outside the profile (grey)

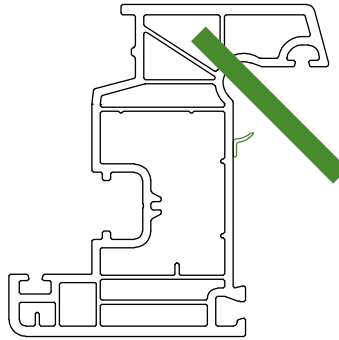


7. Execution guidelines

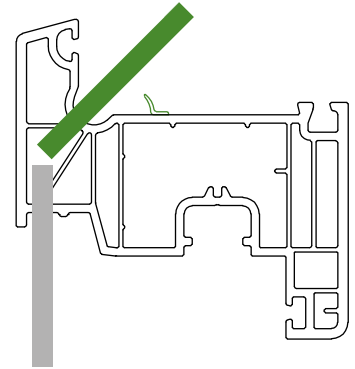
7.1 Functions and execution of technical holes

Milling and drilling holes in sashes.

Pressure equalization in external chambers. Decompression holes in the form of „beans“ of size B 5x30mm, 6x30mm and holes of diameter 6 mm should be made in the marked chambers. Applies to the top window elements.



Ventilation of vertical window elements. Use a 5 mm drill bit and make ventilation holes in the marked chambers. Make the holes in vertical window elements at a distance of 200 mm from the upper part of the rebate.



Drainage of lower sash elements. Drainage holes are „beans“ of size 5x30mm, 6x30mm or 8mm diameter holes. The distance between drainage holes made outside and inside must be at least 50mm.

Table 2. Number of millings and drillings - sashes.

Window frame size		Number of millings and drillings				
		Drainage points		Pressure equalization		Ventilation
		A	B	C	D	F
Clear dimension of given lite	≤ 600 mm	2	1 at center	1 at center	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



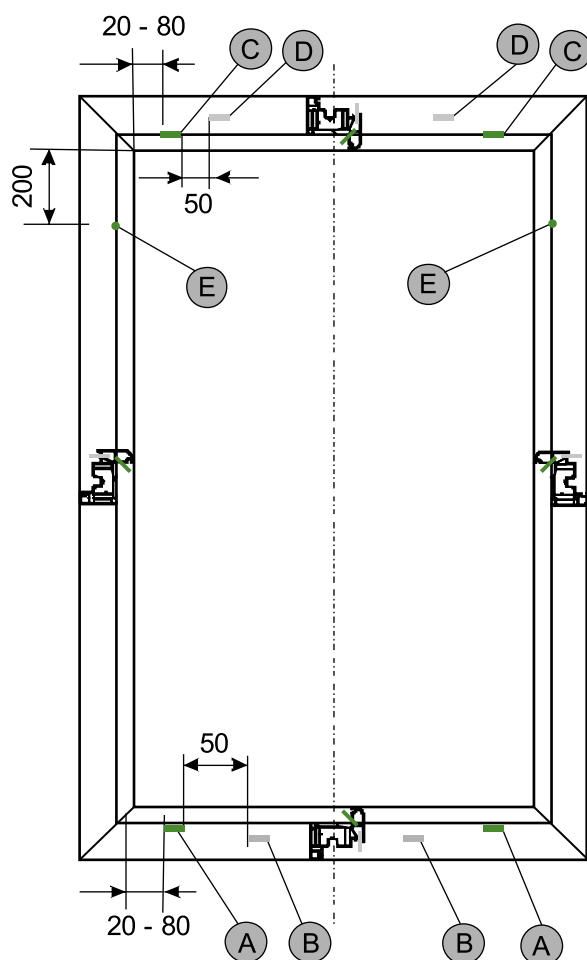
Drilling or milling from inside the profile (green)



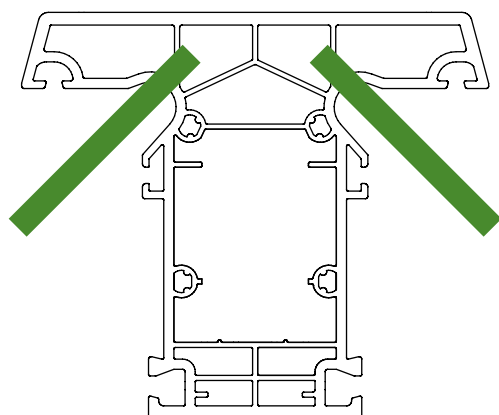
Drilling or milling from outside the profile (grey)

7. Execution guidelines

7.1 Functions and execution of technical holes



Milling and drilling holes in vertical profiles of fixed mullions and structural muntins.

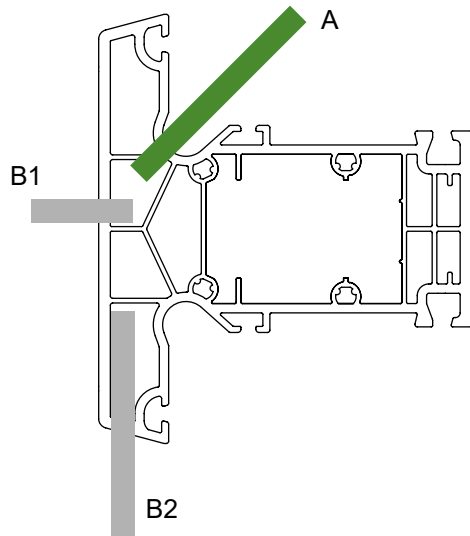


Ventilation of vertical window elements (fixed mullions and structural muntins).

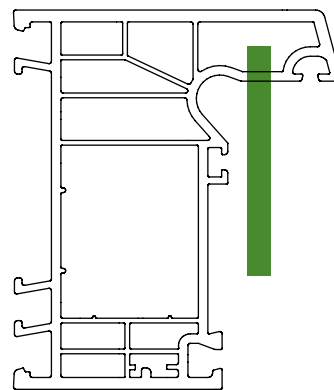
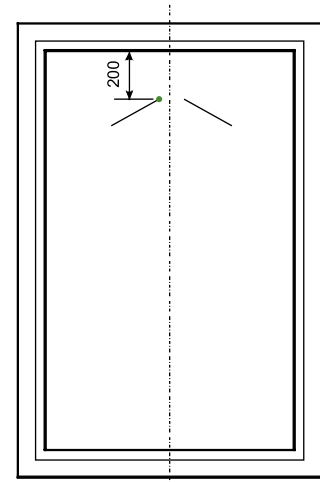
Use a 5 mm drill bit and make ventilation holes in the marked chambers. Holes should be made in the vertical elements of windows at a distance of 200 mm counting from the top part of the rebate of the lite in which it is mounted.

7. Execution guidelines

7.1 Functions and execution of technical holes

Milling and drilling holes in horizontal profiles of fixed mullions and horizontal structural muntins.

Drainage of horizontal mullions or structural muntins. Drainage holes are „beans” of size 5x30mm, 6x30mm or 8mm diameter holes. B1 drainage of chamber outside, B2 - drainage of chamber at the bottom. Drainages B1 and B2 are alternative. The distance between drainage holes made outside and inside must be at least 50mm.



Ventilation of the vertical elements of window lite elements, divided by transoms/splits. Use a 6 mm drill bit and make ventilation holes in the marked chambers. Make the holes in vertical window elements at a distance of 200 mm from the upper part of the rebate.

Table 3. Number of millings and drillings - horizontal fixed mullions.

Window frame size		Number of millings and drillings				
		Drainage points		Pressure equalization		Ventilation
		A	B	C	D	F
Clear dimension of given lite	≤ 600 mm	2	1 at center	1 at center	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

 Drilling or milling from inside the profile (green)

 Drilling or milling from outside the profile (grey)

Table of contents

1. Overview of system components
2. Maximum sash dimensions (size limitations)
3. Profile overview
4. Assemblies
5. Assembly diagrams
6. Assembly dimensions
7. Statics
8. Execution guidelines for profiles

1. Overview of system components

- 1. General information
 - 1.1 Overview of system components
 - 1.2 Main and additional profiles
 - 1.3 Reinforcements

1. Overview of system components

1.1 General information

Spectrum system profiles, manufactured from modified polyvinyl chloride, are the basis for making PVC windows and doors. Their production complies with the requirements of Polish standards (PN-88/B-10085), the requirements of the Building Research Institute and refers to the tests carried out in the Rosenheim Institute.

Spectrum guarantees the following for a period of 5 years:

- unchanged quality of material,
- flawless shaping of the profiles within the permitted tolerances,
- chemical resistance according to the table below,
- light resistance (colour durability) of white window profiles.

Difference in colour relative to the standard according to the 5th degree on grey scale.

Warranty is void if Spectrum guidelines for reworking window profiles are not adhered to.

Warranty claims shall not be accepted in the case of defects arising as a result of:

- exposure of the surface to solvents or aggressive cleaning agents,
- inappropriate storage and warehousing,
- incorrect assembly,
- improper treatment and maintenance,
- unusual external impacts,
- force majeure (e.g. natural disasters, fire),
- actions of end user or bystanders.

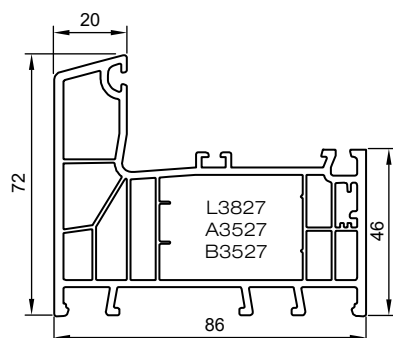
In case of justified complaints, we provide a cost-free replacement of material.

Any claims going beyond that, regardless of the legal basis, shall be ineffective.

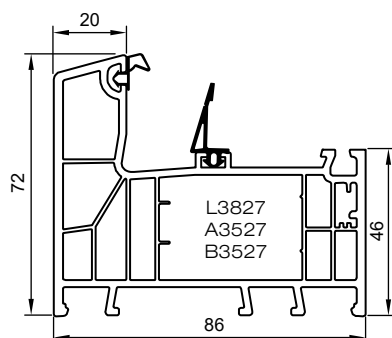
The rules of complaint handling and the manner of complaint procedure are determined by Spectrum.

1. Overview of system components

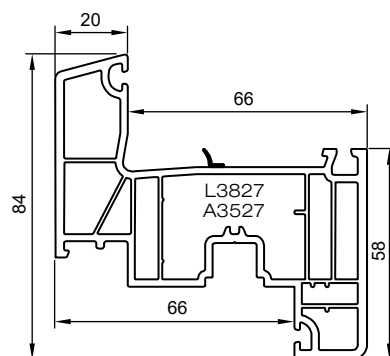
1.2 Main and additional profiles



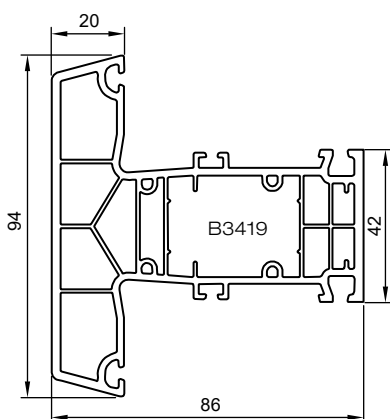
68611 AD



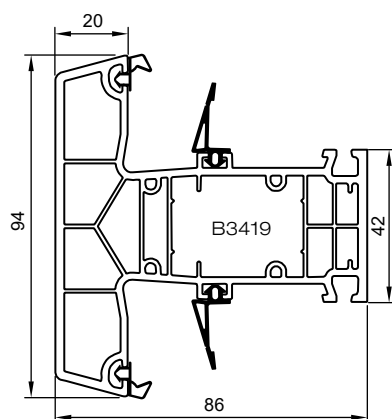
68611 MD



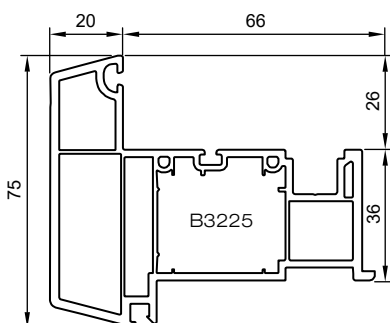
68621



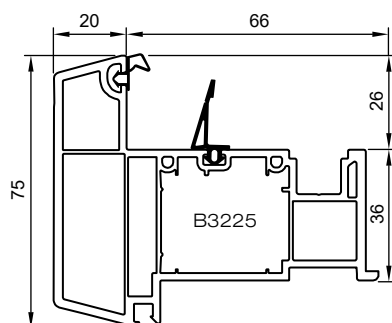
68632 AD



68632 MD



68633 AD

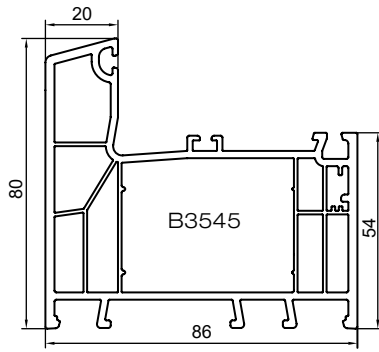


68633 MD

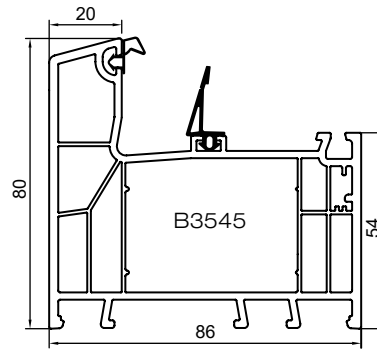
1. Overview of system components

1.2 Main and additional profiles

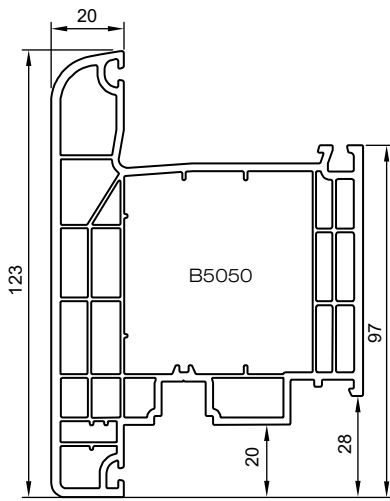
Door profiles



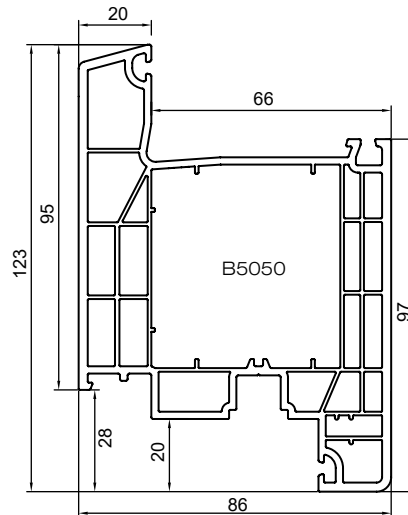
58612 AD



58612 MD



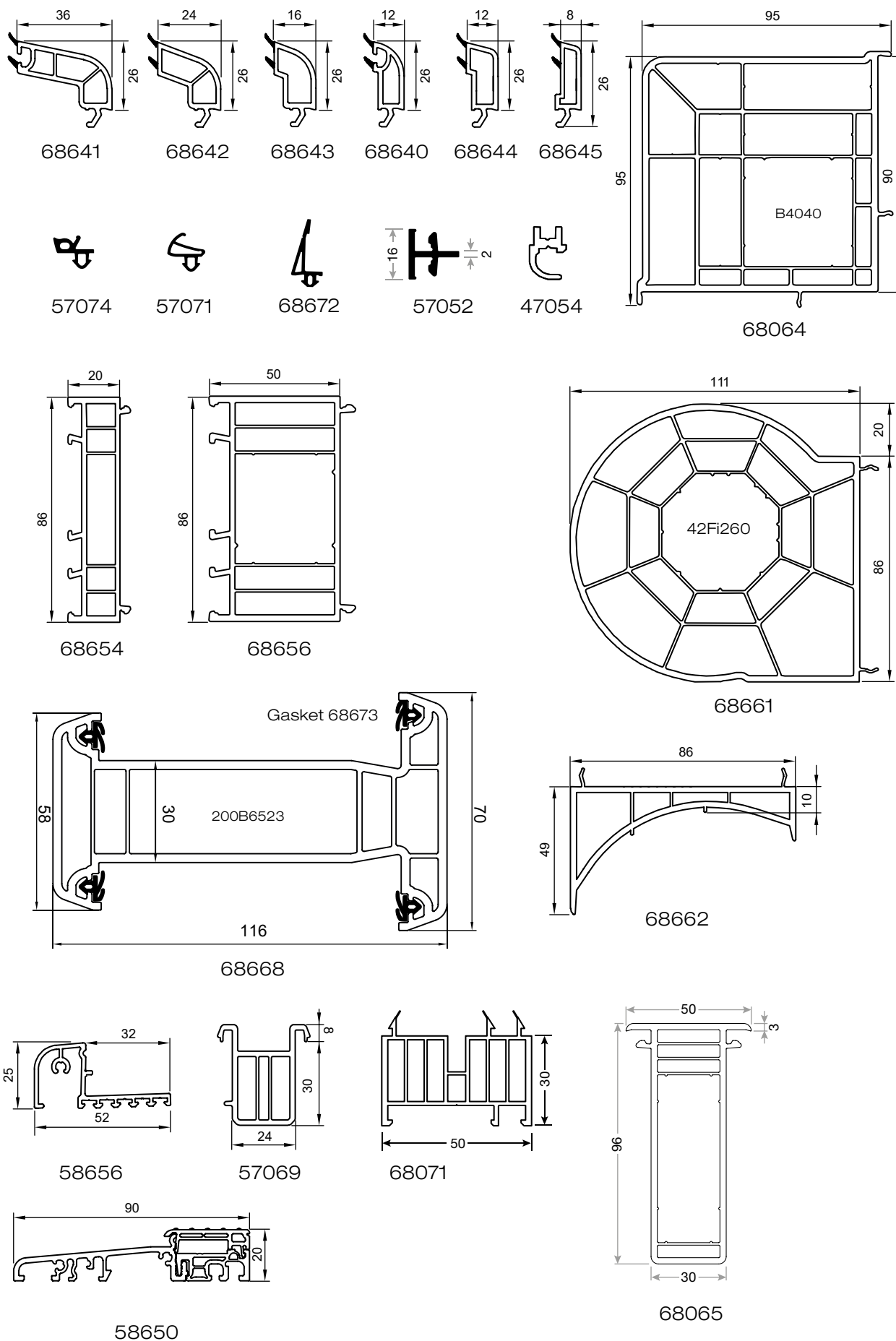
58621



58622

1. Overview of system components

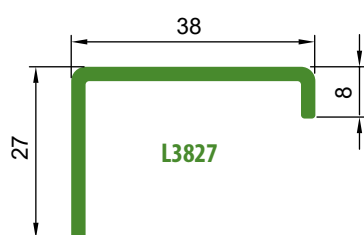
1.2 Main and additional profiles



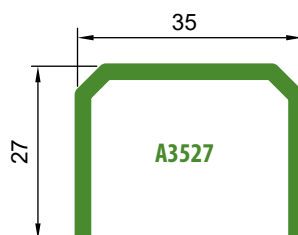
1. Overview of system components

1.3 Wzmocnienia

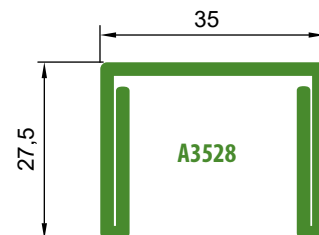
THERM



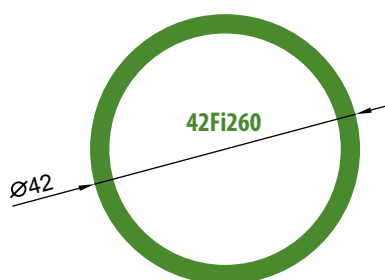
A	X	Y
1,50	1,94	0,62



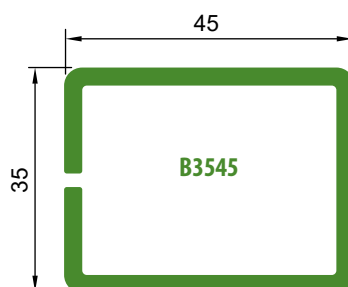
A	X	Y
1,50	2,48	0,93
2,00	3,18	1,20



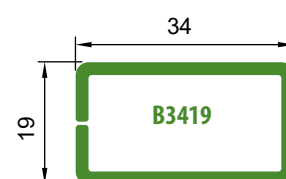
A	X	Y
2,00	5,24	1,98
2,50	6,18	2,48



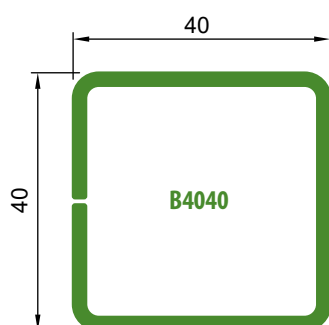
A	X	Y
2,60	7,27	7,27



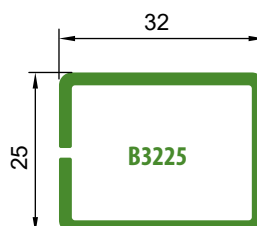
A	X	Y
1,50	6,52	4,51
2,00	8,66	5,67



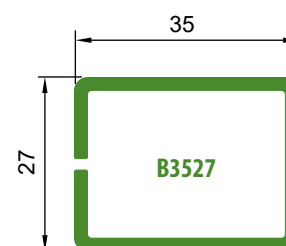
A	X	Y
1,50	2,20	0,87
2,00	2,73	1,07



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



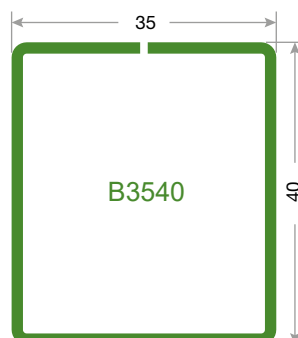
A	X	Y
1,50	2,22	1,55
2,00	2,84	1,96



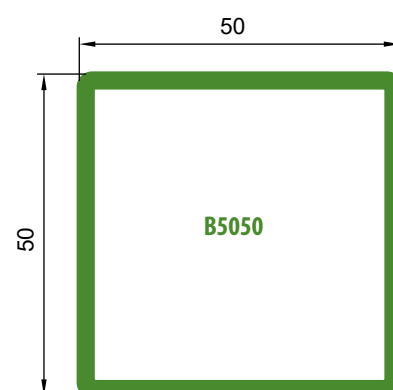
A	X	Y
1,50	2,86	1,98
2,00	3,70	2,50



symbol	x [mm]	Ix [cm ⁴]	Iy [cm ⁴]
200B6523	2,0	17,02	4,30



symbol	x [mm]	Ix [cm ⁴]	Iy [cm ⁴]
150B3540	1,5	4,97	4,09



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

2. Size limitations, maximum sash dimensions

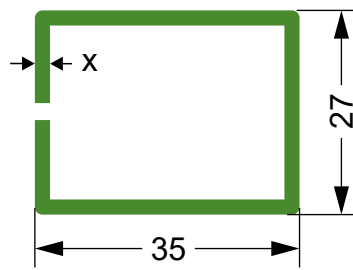
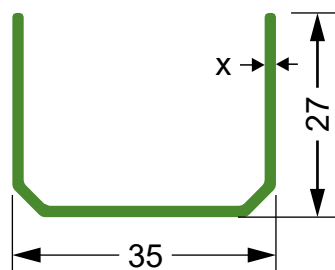
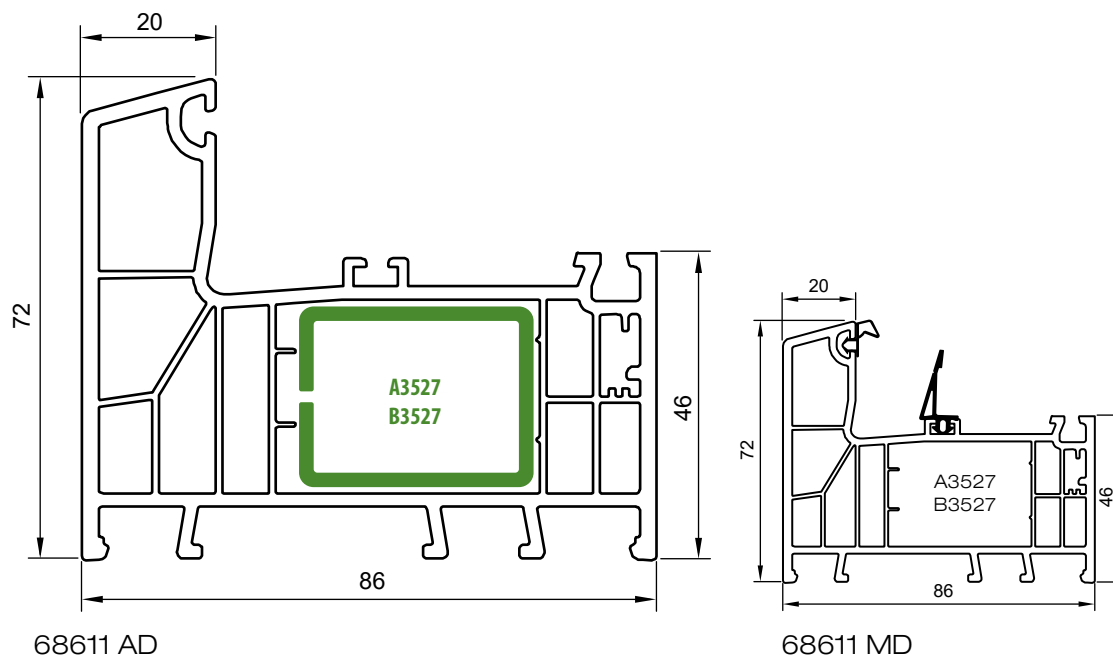
See Appendix 1.

3. Profile overview

- 3.1 Frame 68611
- 3.2 Door frame 58612
- 3.3 Sash 68621
- 3.4 Door sash T 58621
- 3.5 Door sash Z 58622
- 3.6 Fixed mullion 68632
- 3.7 Floating mullion 68633
- 3.8 Glazing beads, frame connectors
- 3.9 Frame extensions
- 3.10 Connector 90° 68064
- 3.11 Pipe connector 68661 + adapter 68662, assembly profiles
- 3.12 Accessories

3. Profile overview

3.1 Frame 68611



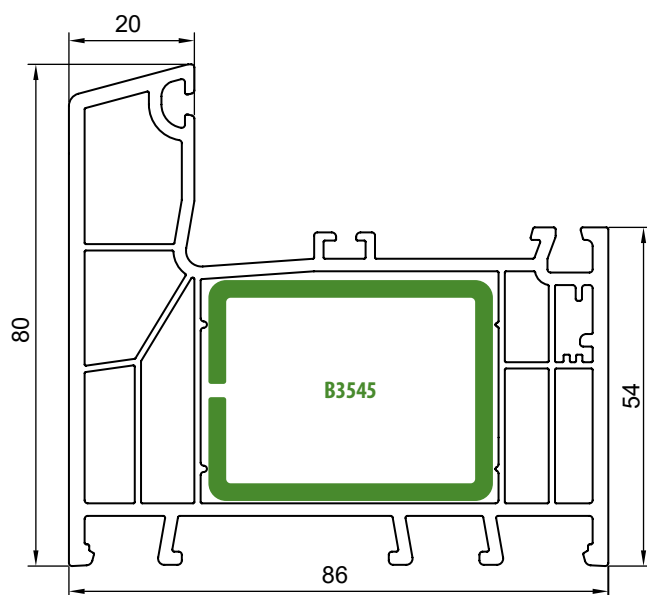
symbol	x [mm]	I _x [cm ⁴]	I _y [cm ⁴]
150A3527	1,5	2,4761	0,9257
200A3527	2,0	3,1759	1,2004

symbol	x [mm]	I _x [cm ⁴]	I _y [cm ⁴]
150B3527	1,5	2,86	1,98
200B3527	2,0	3,70	2,50

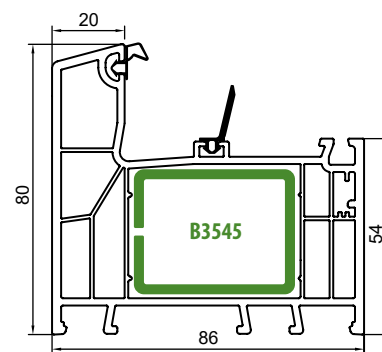
3. Profile overview

3.2 Door frame 58612

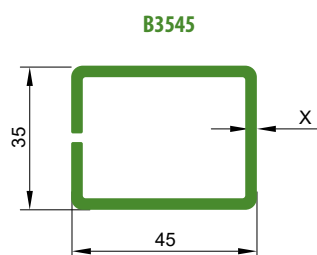
THERM



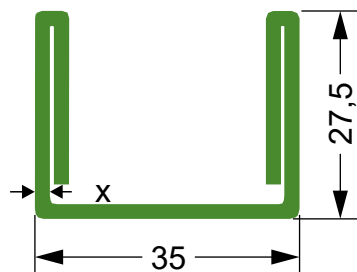
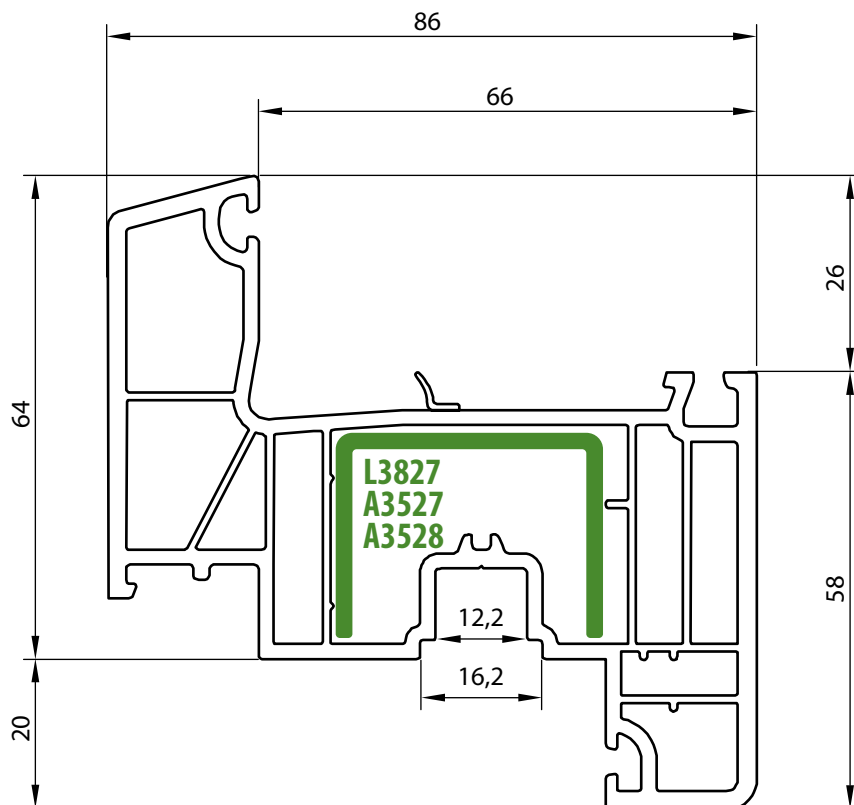
58612 AD



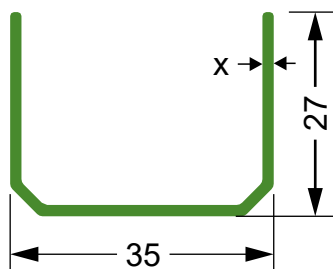
58612 MD



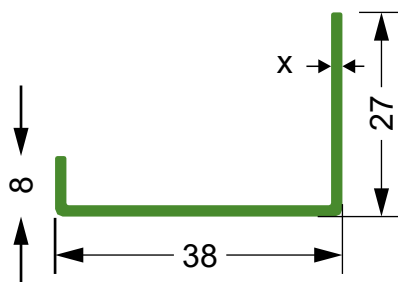
symbol	x [mm]	Ix [cm ⁴]	Iy [cm ⁴]
150B3545	1,5	6,52	4,51
200B3545	2,0	8,66	5,67



symbol	x [mm]	I _x [cm ⁴]	I _y [cm ⁴]
200A3528	2,0	5,24	1,98
250A3528	2,5	6,18	2,48

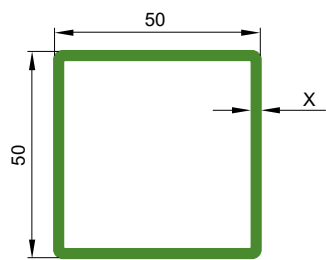
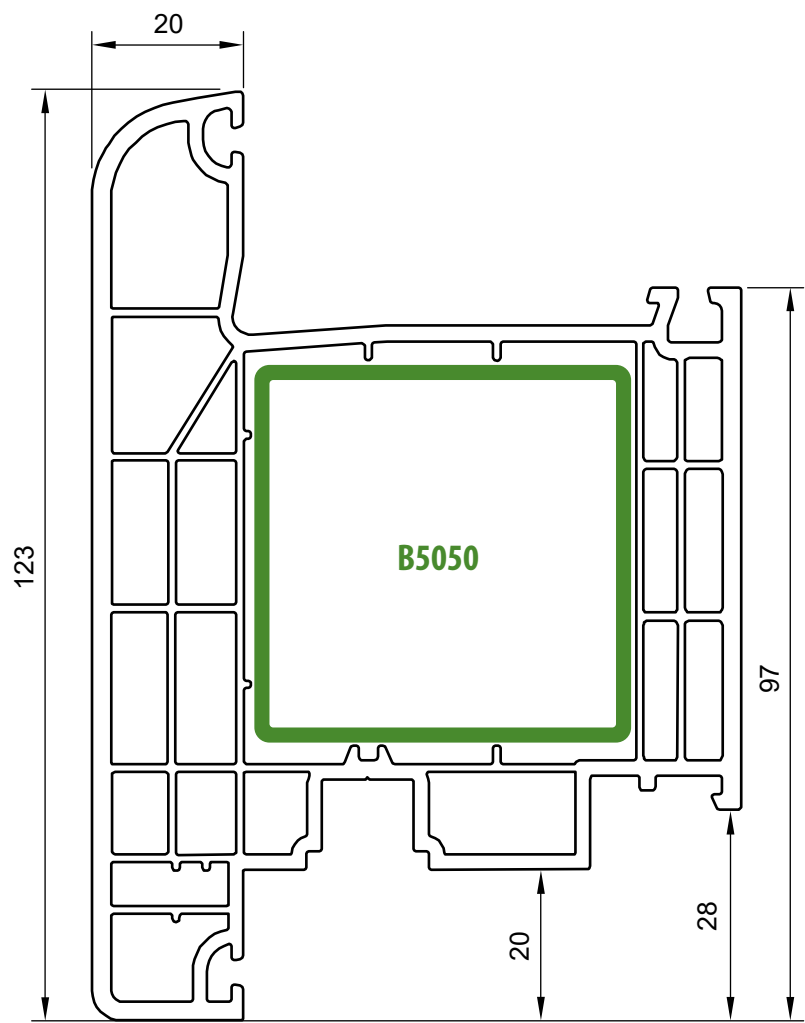


symbol	x [mm]	I _x [cm ⁴]	I _y [cm ⁴]
150A3527	1,5	2,4761	0,9257
200A3527	2,0	3,1759	1,2004



symbol	x [mm]	I _x [cm ⁴]	I _y [cm ⁴]
150A3827	1,5	1,9409	0,6214

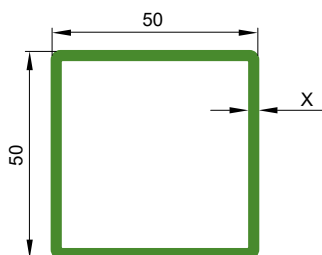
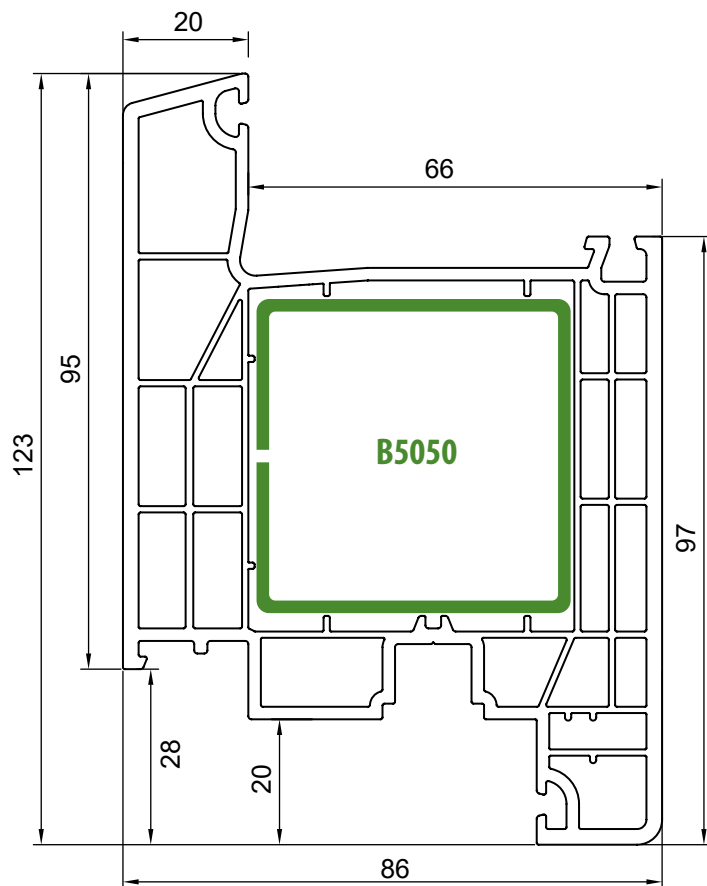
3. Profile overview
3.4 Door sash T 58621



symbol	x [mm]	I _x [cm ⁴]	I _y [cm ⁴]
200B5050	2,0	14,70	14,70
300B5050	3,0	20,00	20,20

3. Profile overview

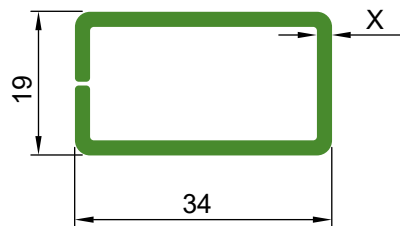
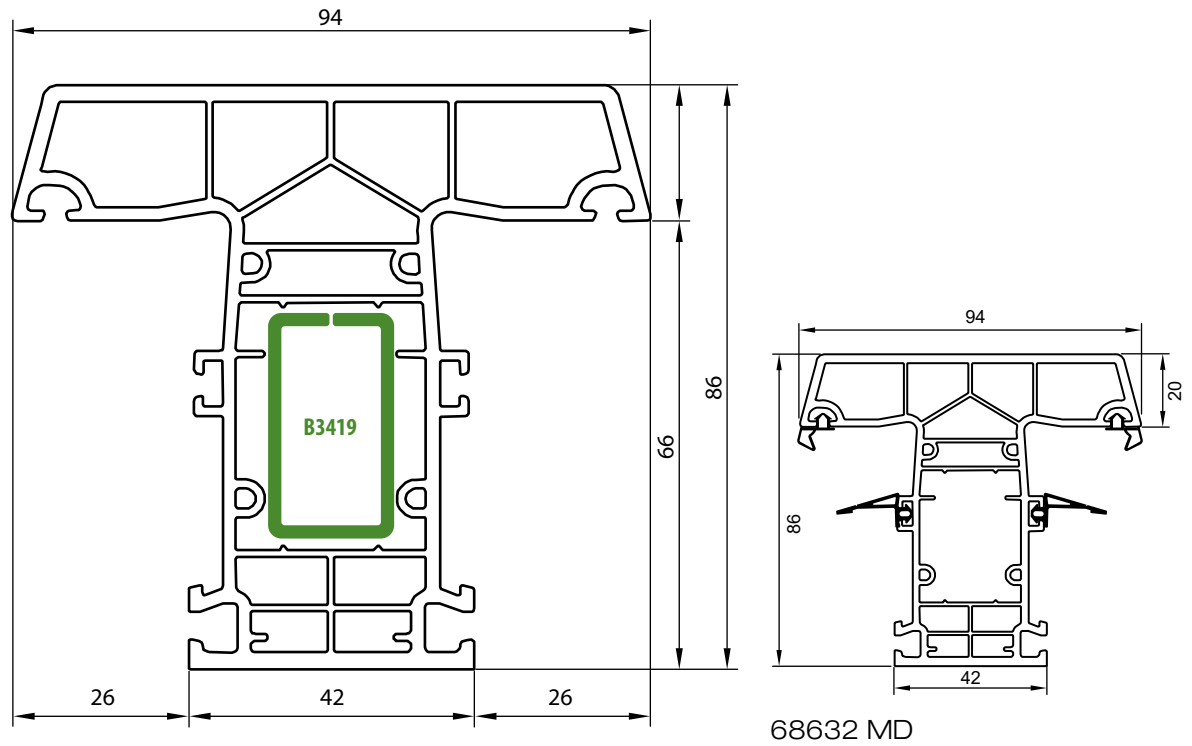
3.5 Door sash Z 58622



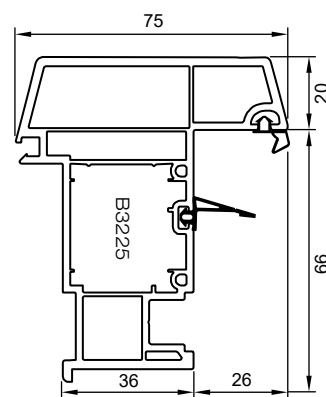
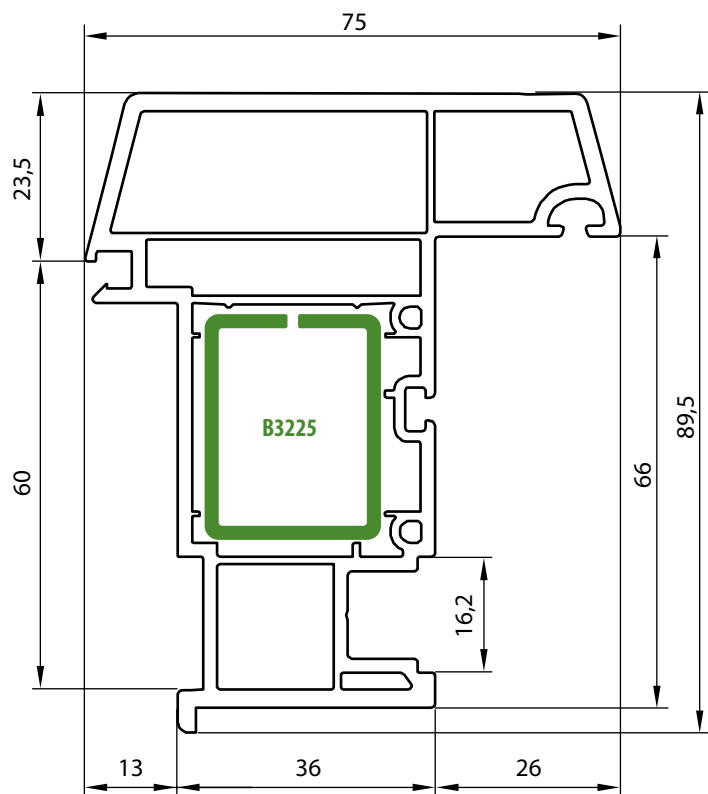
symbol	x [mm]	I _x [cm ⁴]	I _y [cm ⁴]
200B5050	2,0	14,70	14,70
300B5050	3,0	20,00	20,20

3. Profile overview

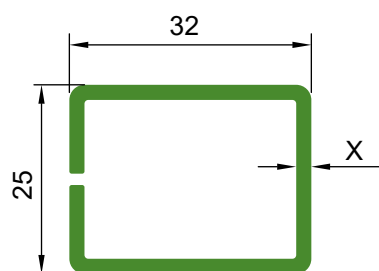
3.6 Fixed mullion 68632



symbol	x [mm]	lx [cm ⁴]	ly [cm ⁴]
150B3419	1,50	2,1962	0,8752
200B3419	2,00	2,7280	1,0719



68633 MD

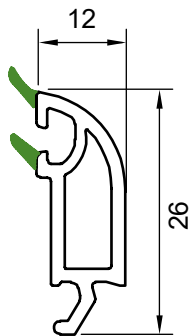


symbol	x [mm]	Ix [cm ⁴]	Iy [cm ⁴]
150B3225	1,50	2,2202	1,5459
200B3225	2,00	2,8357	1,9581

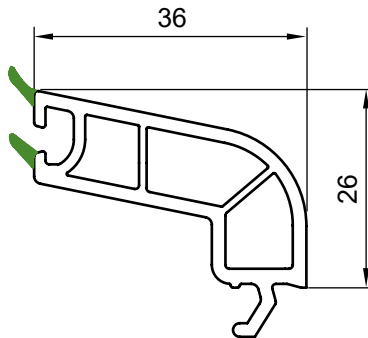
3. Profile overview

3.8 Glazing beads, frame connectors

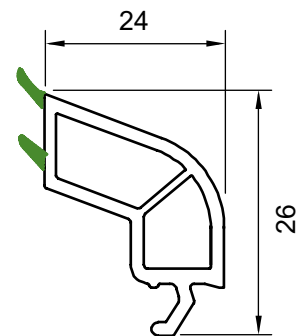
glazing bead 68640
* 48 mm glazing unit



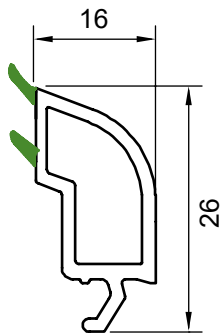
glazing bead 68641
* 24 mm glazing unit



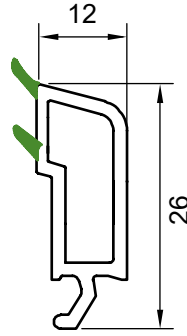
glazing bead 68642
* 36 mm glazing unit



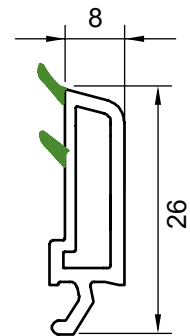
glazing bead 68643
* 44 mm glazing unit



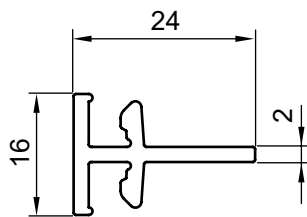
glazing bead 68644
* 48 mm glazing unit



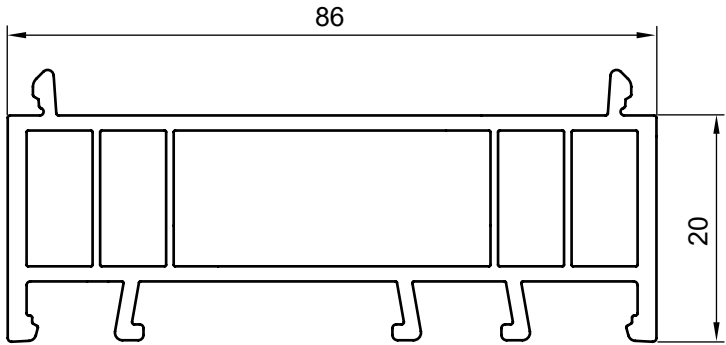
glazing bead 68645
* 52 mm glazing unit



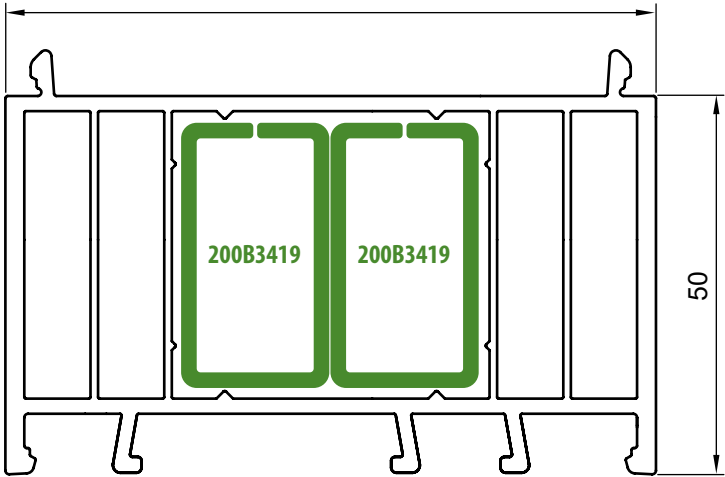
"H" connector 57052



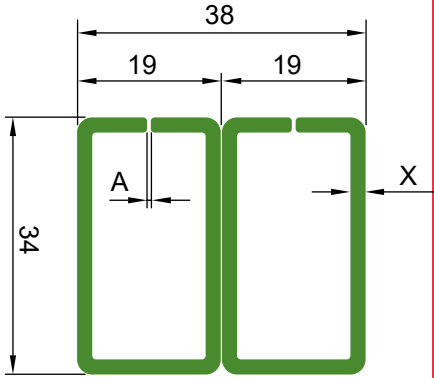
“20” extension 68654



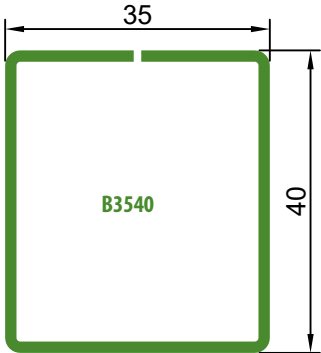
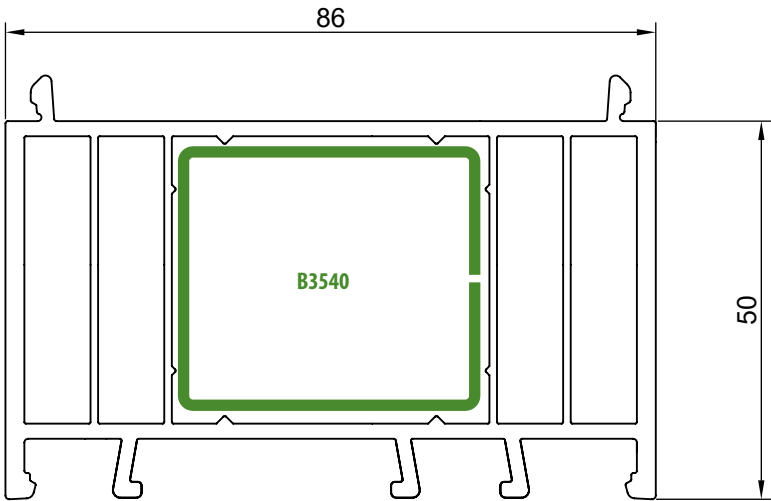
“50” extension 68656



Reinforcement
200B3419



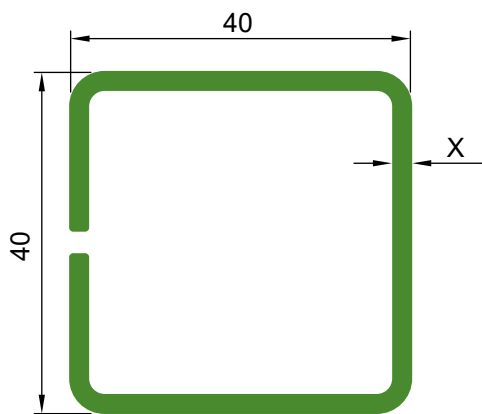
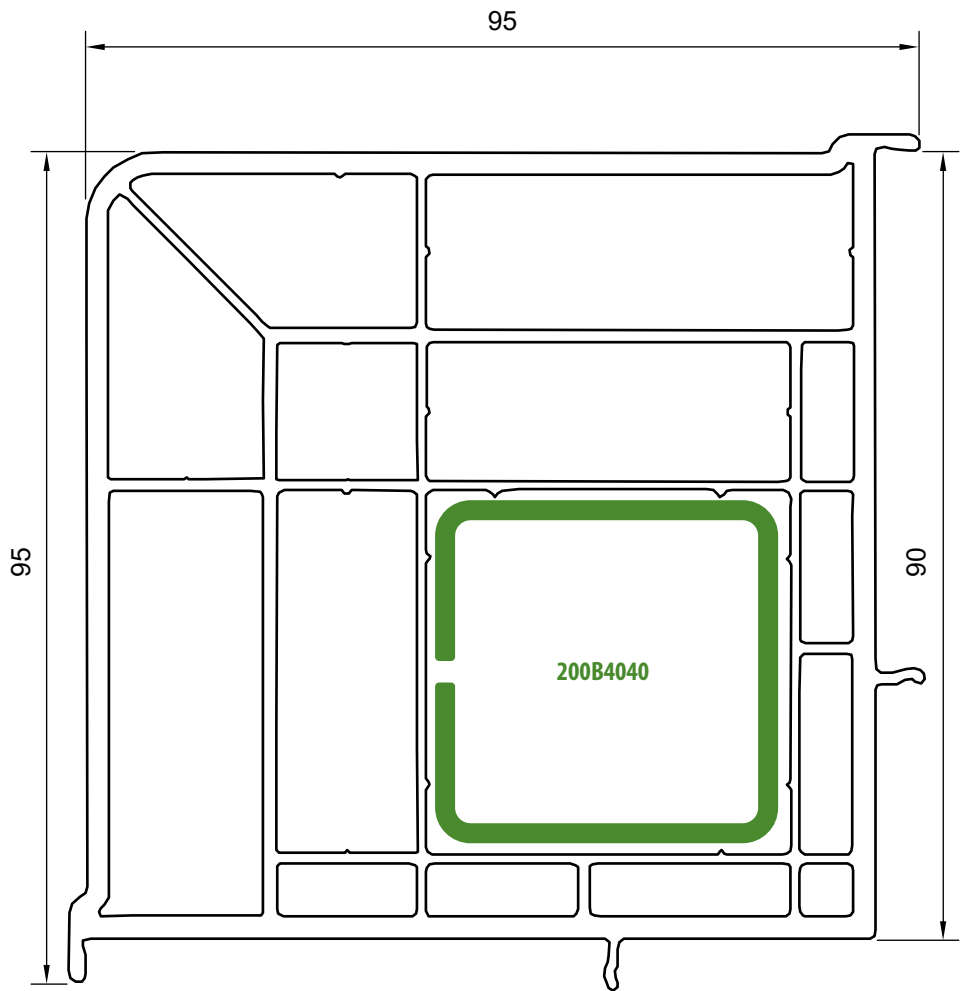
symbol	x [mm]
2 x 200B3419	2,00



symbol	x [mm]	Ix [cm ⁴]	Iy [cm ⁴]
150B3540	1,5	4,97	4,09

3. Profile overview
3.10 Connector 90° 68064

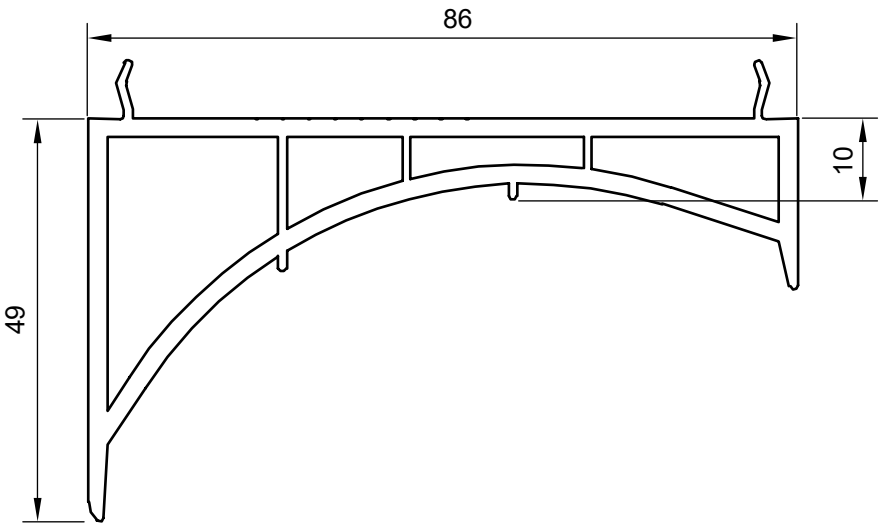
THERM



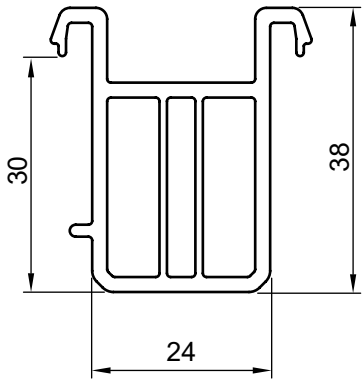
symbol	x [mm]	Ix [cm ⁴]	Iy [cm ⁴]
200B4040	2,0	7,13	7,21

3. Profile overview
3.11 Pipe connector 68661 + adapter 68662, assembly profiles

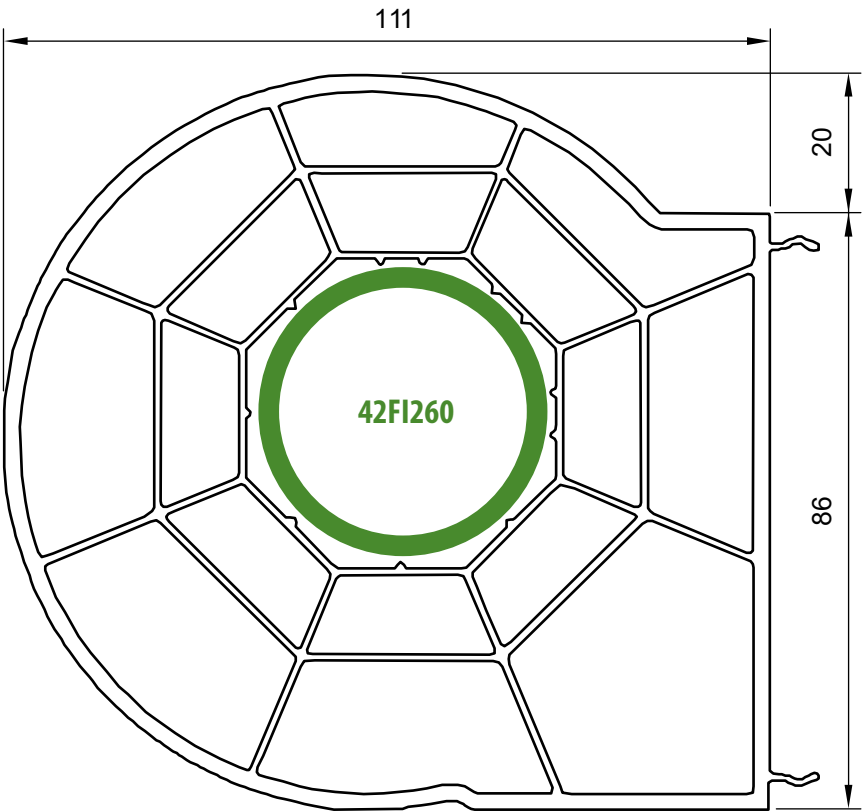
Adjustable angle connector element 68662



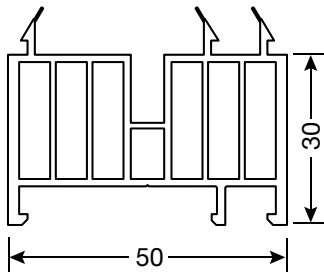
Installation profile 57069



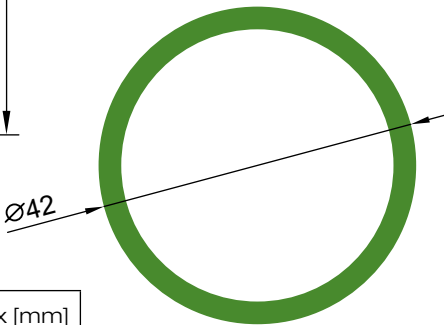
Adjustable angle connector element 68661



Mounting profile with gasket 68071



Reinforcement R260-4327



symbol	x [mm]
R260-4327	2,00

3. Profile overview

3.12 Accessories



68683
Metal mullion
connector



68680
Base washer for
glazing



68681
Spacer washer for
glazing



57082
Mounting anchor



68684K
floating mullion
cover



68699
Mullion mounting
template -
connection by
plastic connector



68685
Plastic mullion
connector



58651K
Threshold
connector



58652
Weld bone grab



58653
Weld bone



58658
Drip cover



68686
Corner gasket

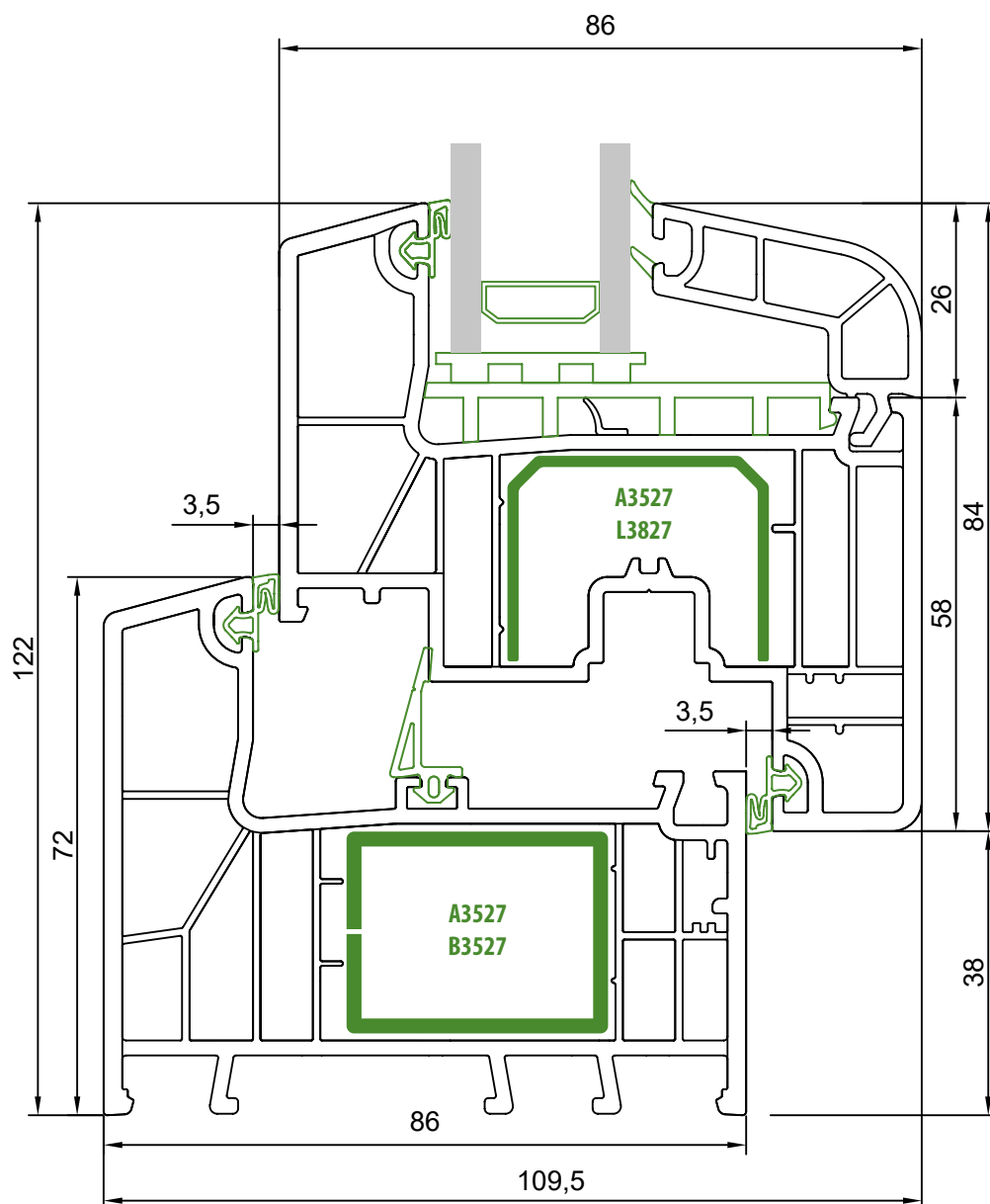
4. Assemblies

- 4.1 Frame 68611 + sash 68621 - glazing with 24mm glazing unit
- 4.2 Frame 68611 + sash 68621 - glazing with 48mm glazing unit
- 4.3 Mullion 68632 + sash 68621 - glazing with 24mm glazing unit
- 4.4 Mullion 68632 + sash 68621 - glazing with 48mm glazing unit
- 4.5 Floating mullion 68633 + sash 68621 - glazing with 24mm glazing unit
- 4.6 Floating mullion 68633 + sash 68621 - glazing with 48mm glazing unit
- 4.7 Frame 68611 - fixed glazing with 24mm and 48mm glazing unit
- 4.8 Fixed mullion 68632 - fixed glazing with 24mm and 48mm glazing unit
- 4.9 Connection of frames 68611 with connector 57052
- 4.10 Connection of frames 68611 with static connector 68668
- 4.11 Connection of frames 68611 with static connector 68065
- 4.12 Connection of frames 68611 with pipe connector 68661
- 4.13 Frame 68611 + mounting profile 68071
- 4.14 Connection of frames 68611 with 90° connector 68064
- 4.15 Frame 58612 + sash 58621 - glazing with 48mm glazing unit
- 4.16 Frame 58612 + sash 58622 - glazing with 48mm glazing unit
- 4.17 Sash 58621 + door threshold 58650
- 4.18 Sash 58622 + door threshold 58650
- 4.19 Sash 58621 + mullion 68632 + sash 58621 - glazing with 48mm glazing unit
- 4.20 Sash 58622 + mullion 68632 + sash 58622 - glazing with 48mm glazing unit
- 4.21 Sash 58621 + floating mullion 68633 + sash 58621 - glazing with 48mm glazing unit
- 4.22 Sash 58622 + floating mullion 68633 + sash 58622 - glazing with 48mm glazing

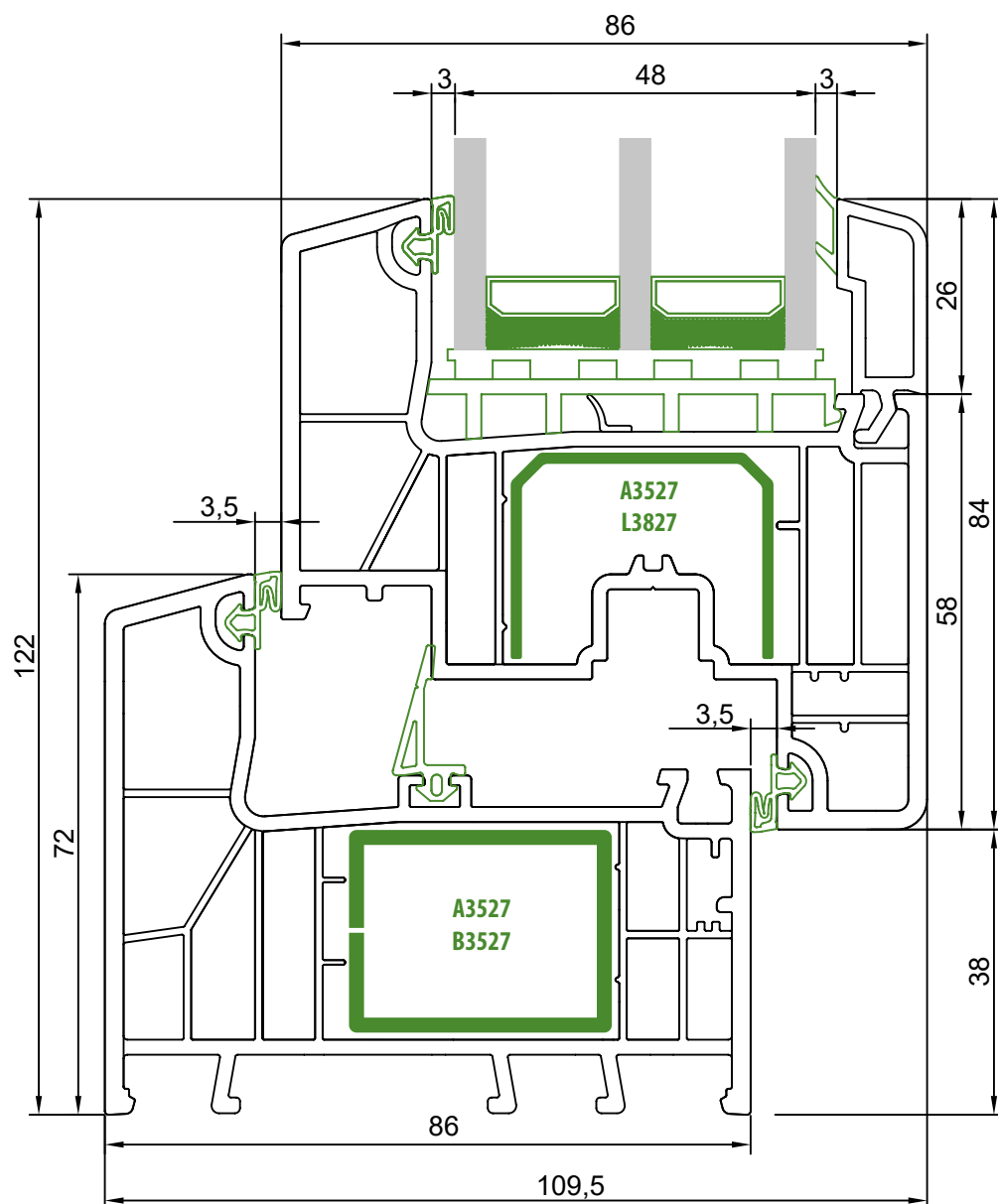
4. Assemblies

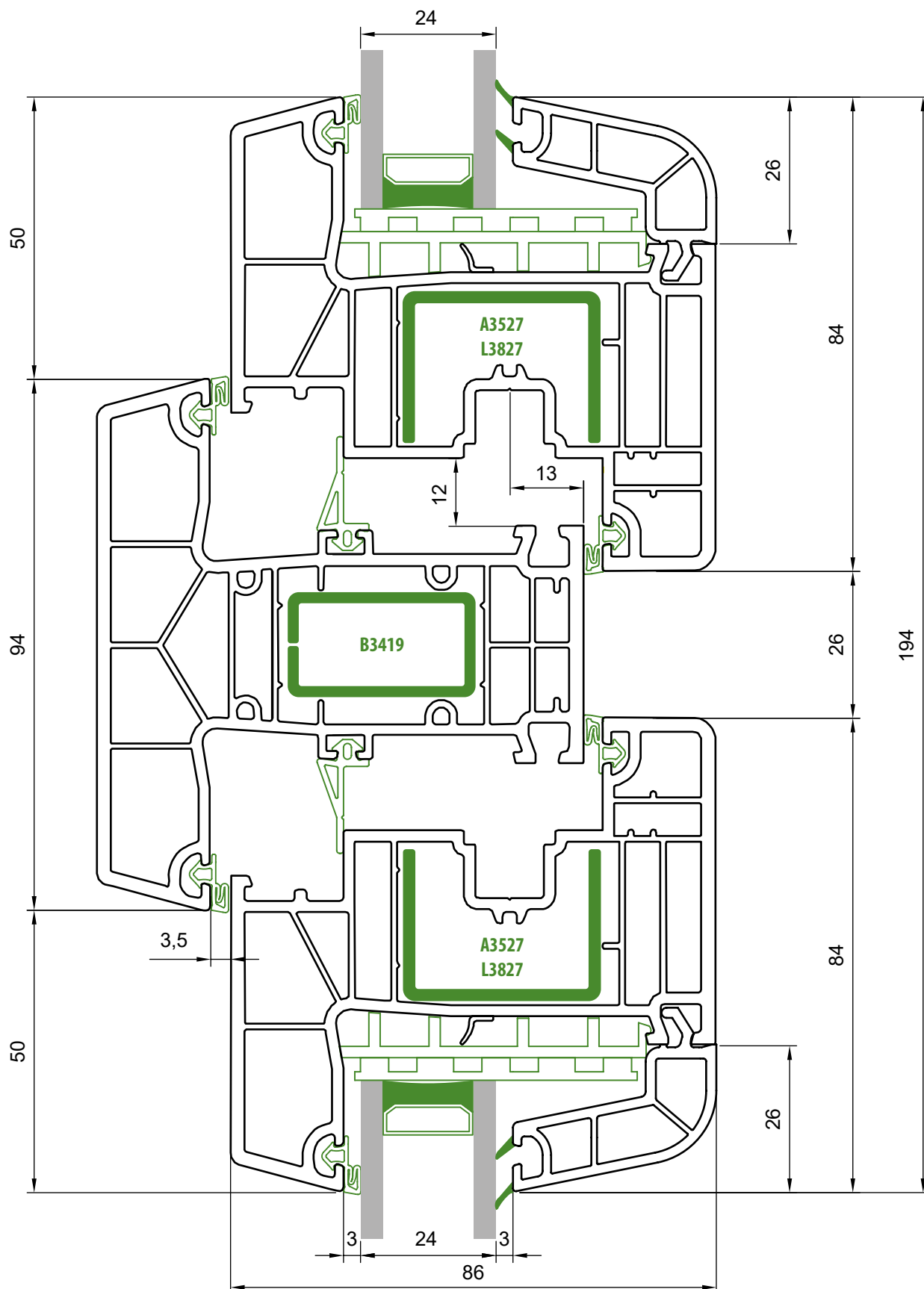
4.1 Frame 68611 + sash 68621 - glazing with 24mm glazing unit

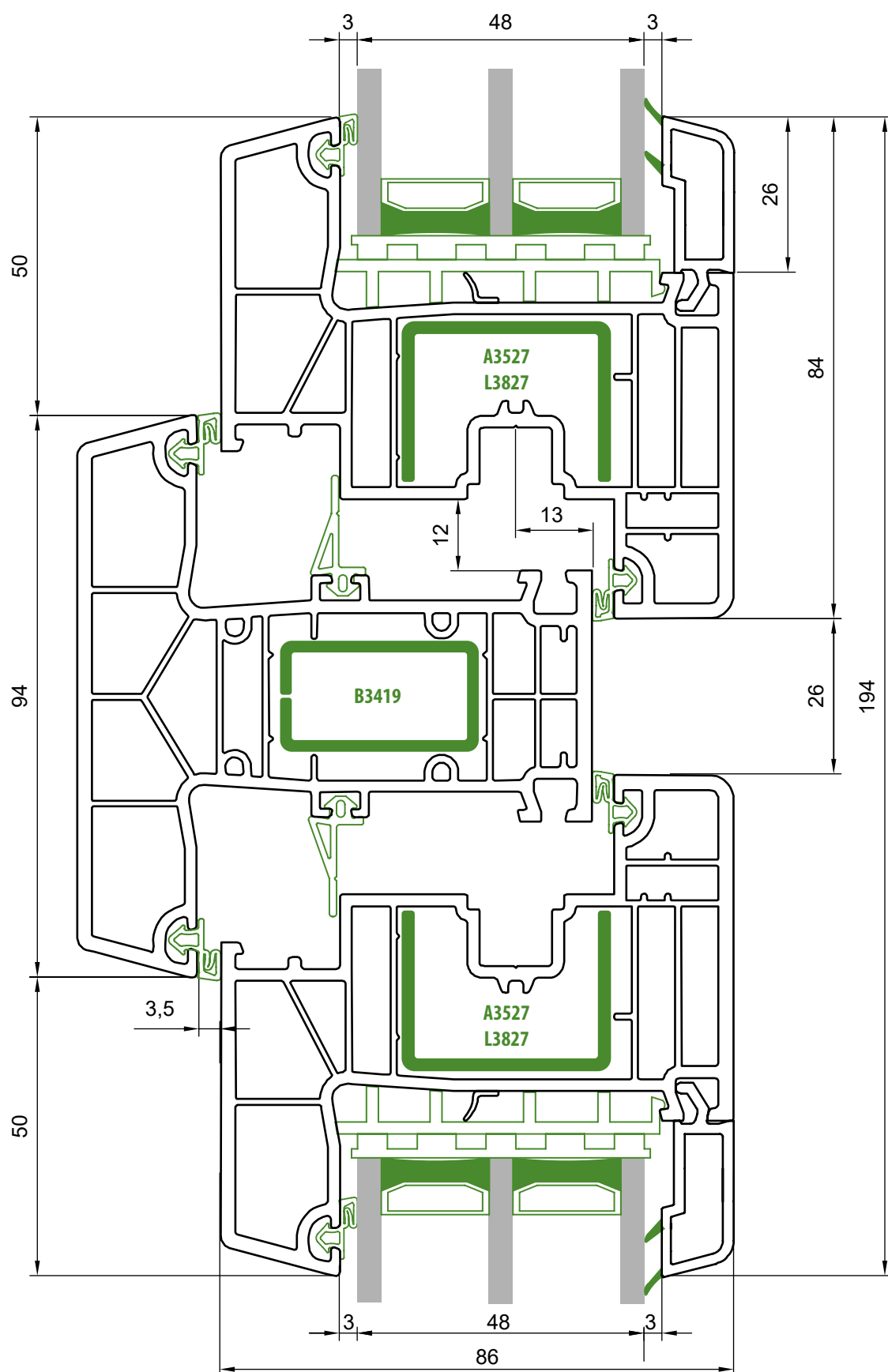
THERM



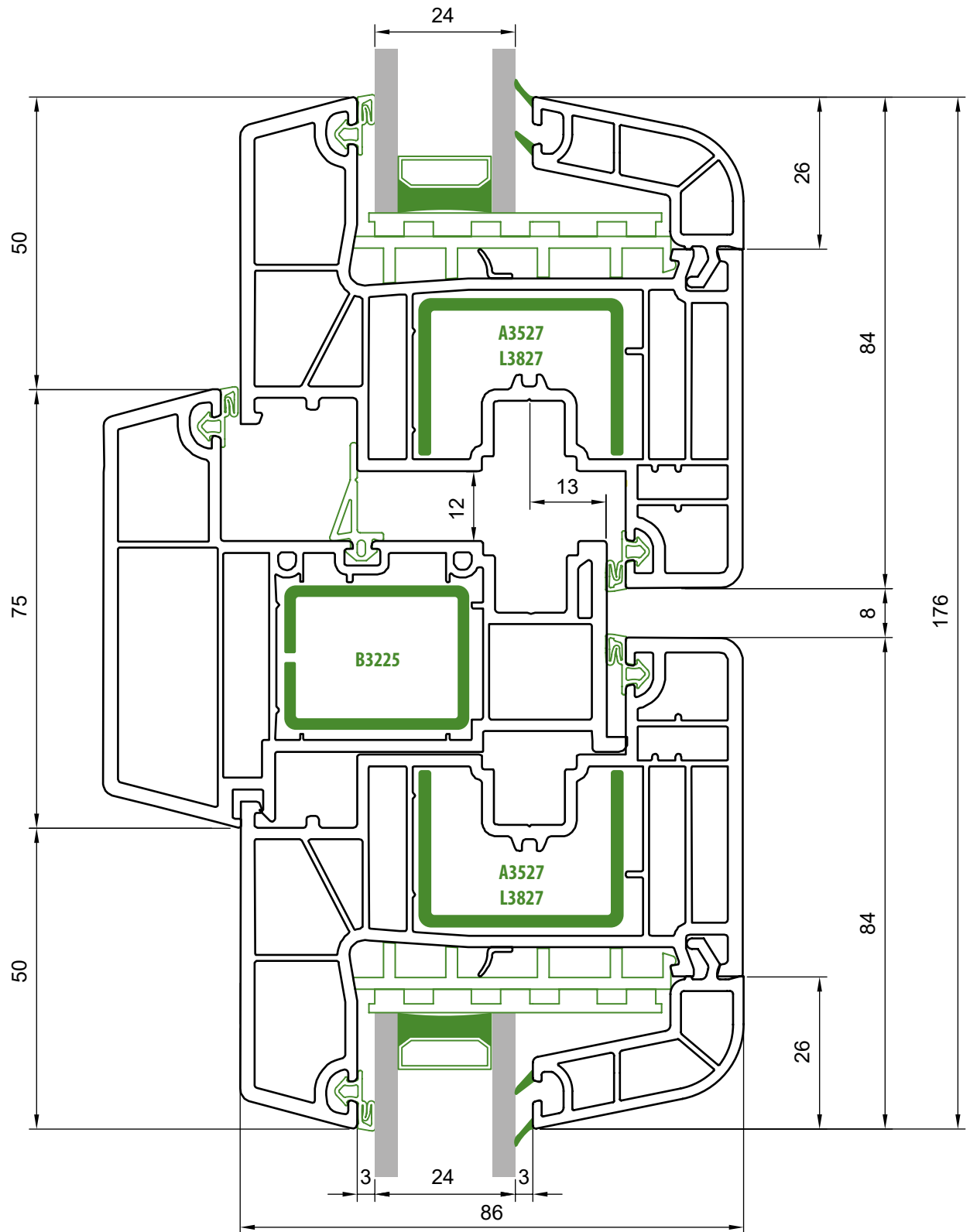
4.2 Frame 68611 + sash 68621 - glazing with 48mm glazing unit

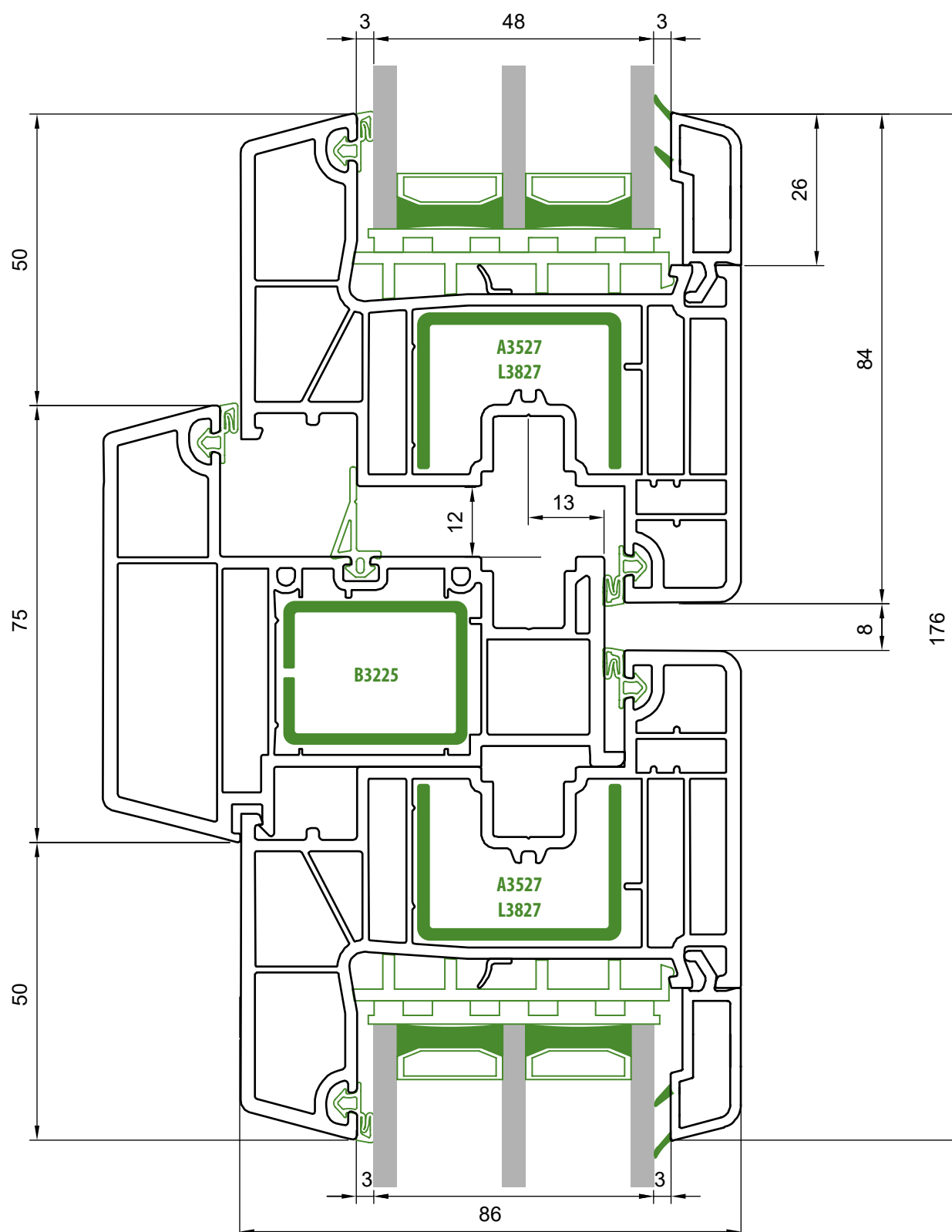






- glazing with 24mm glazing unit

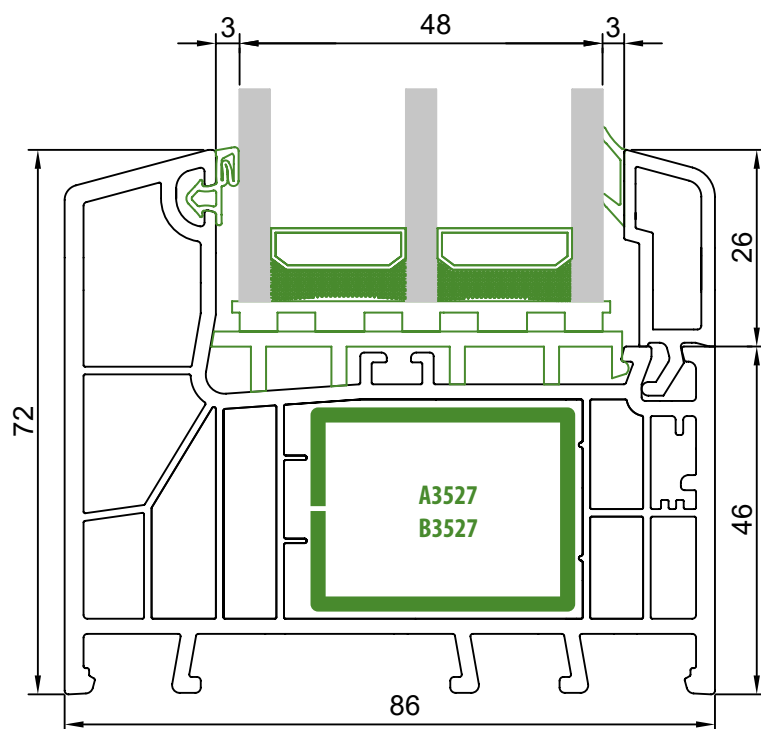
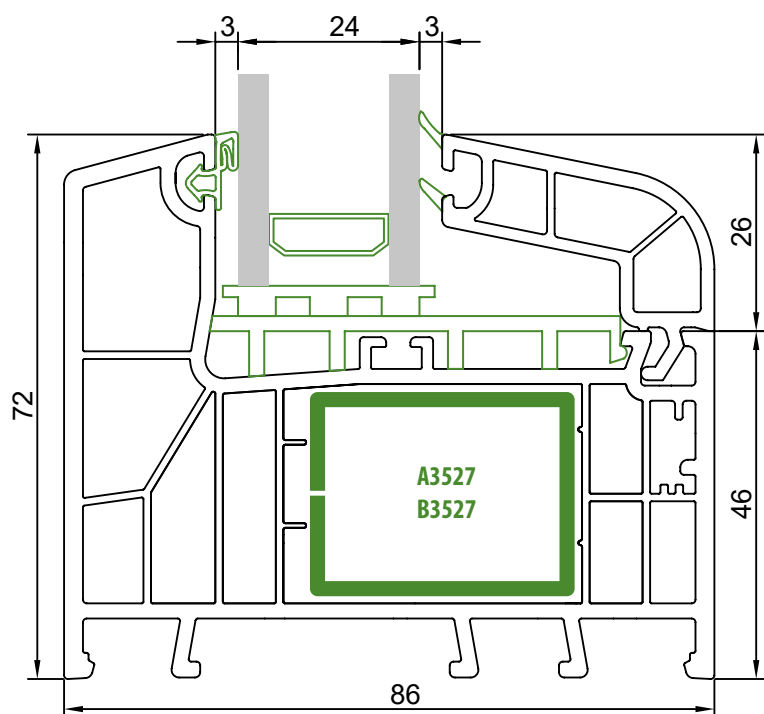




4. Assemblies

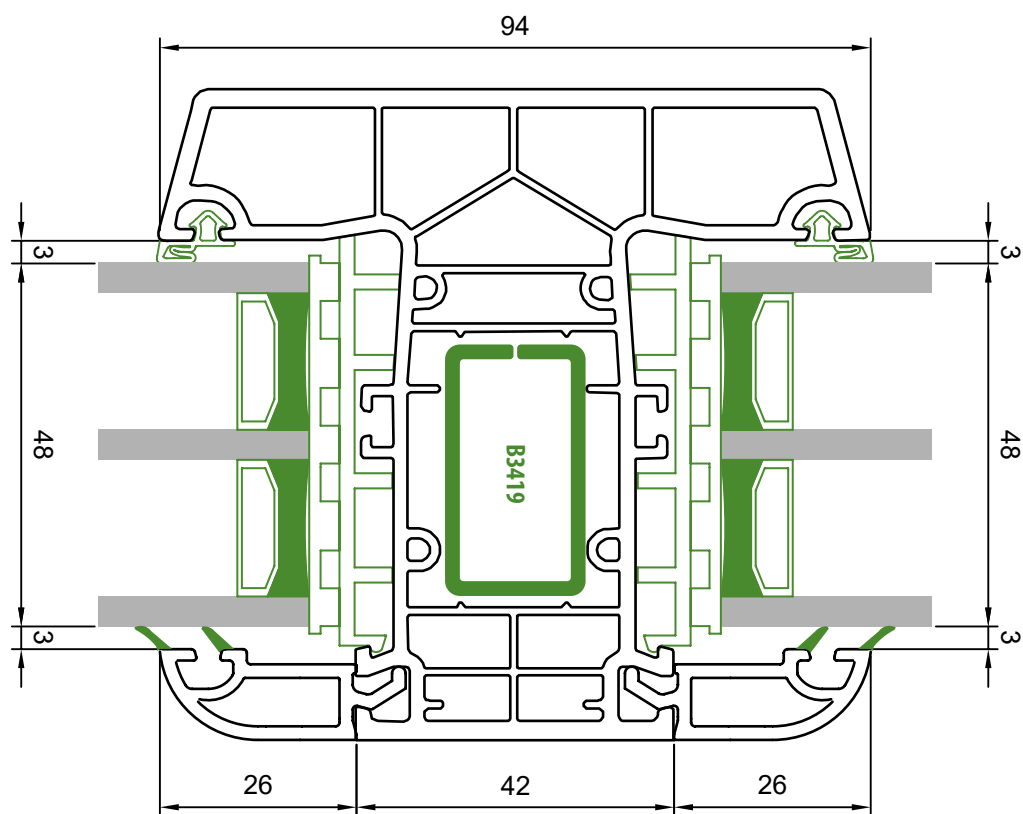
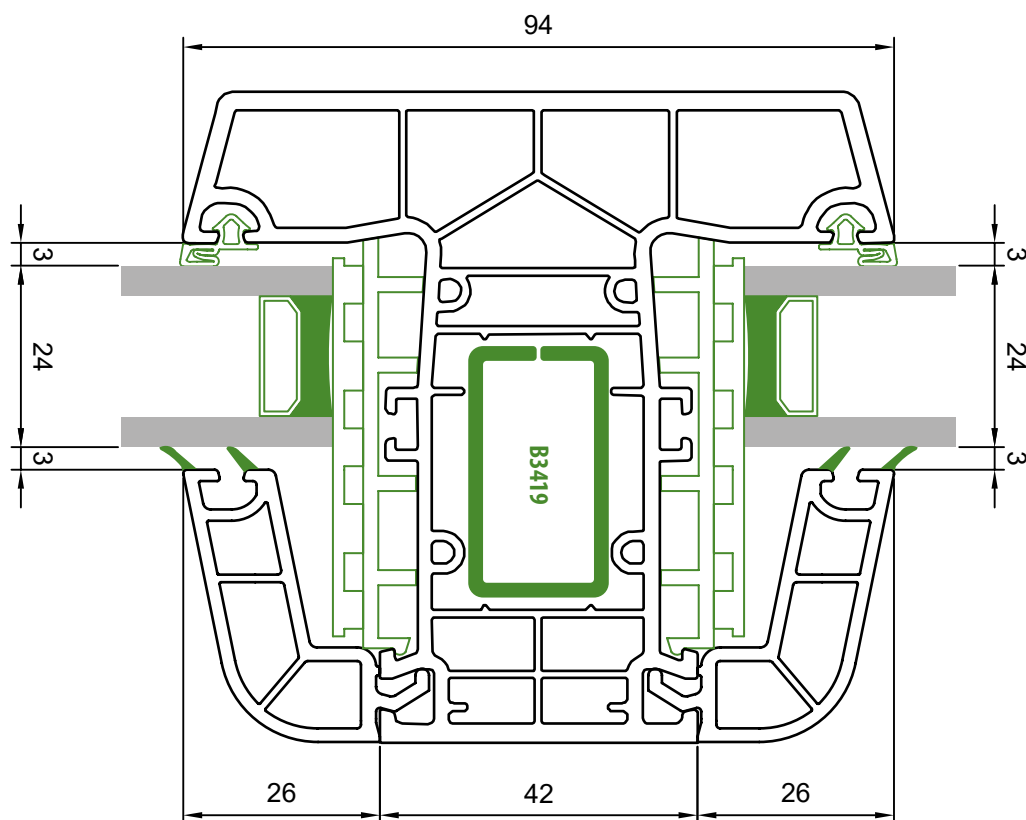
4.7 Frame 68611 - fixed glazing with 24mm and 48mm glazing unit

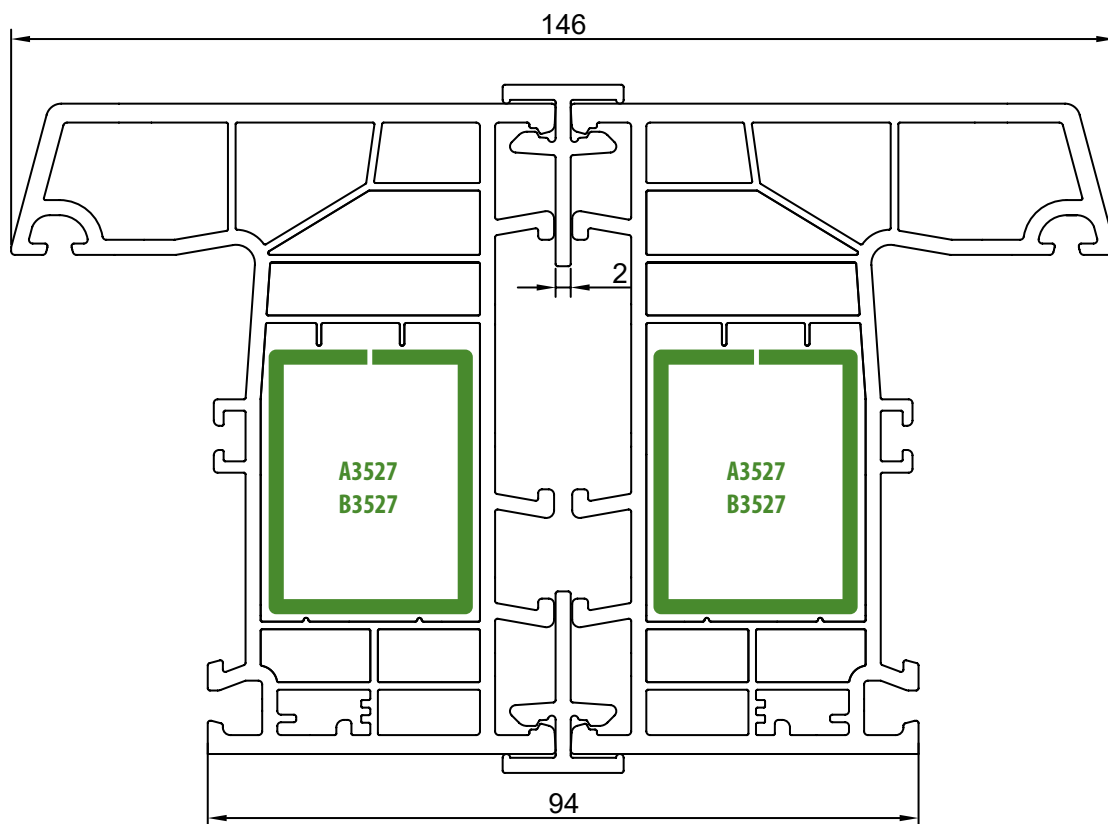
THERM

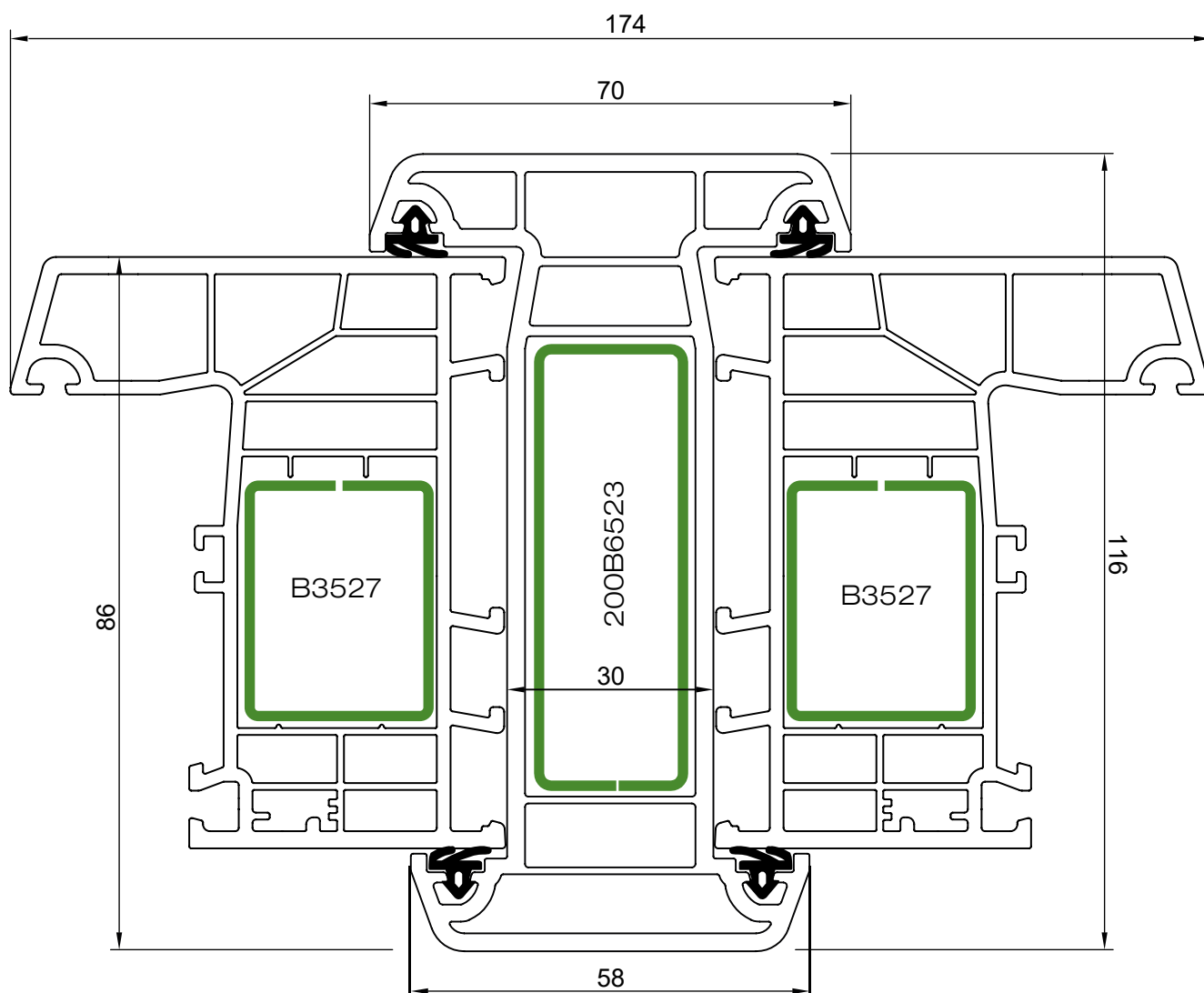


4. Assemblies

4.8 Fixed mullion 68632 - fixed glazing with 24mm and 48mm glazing unit

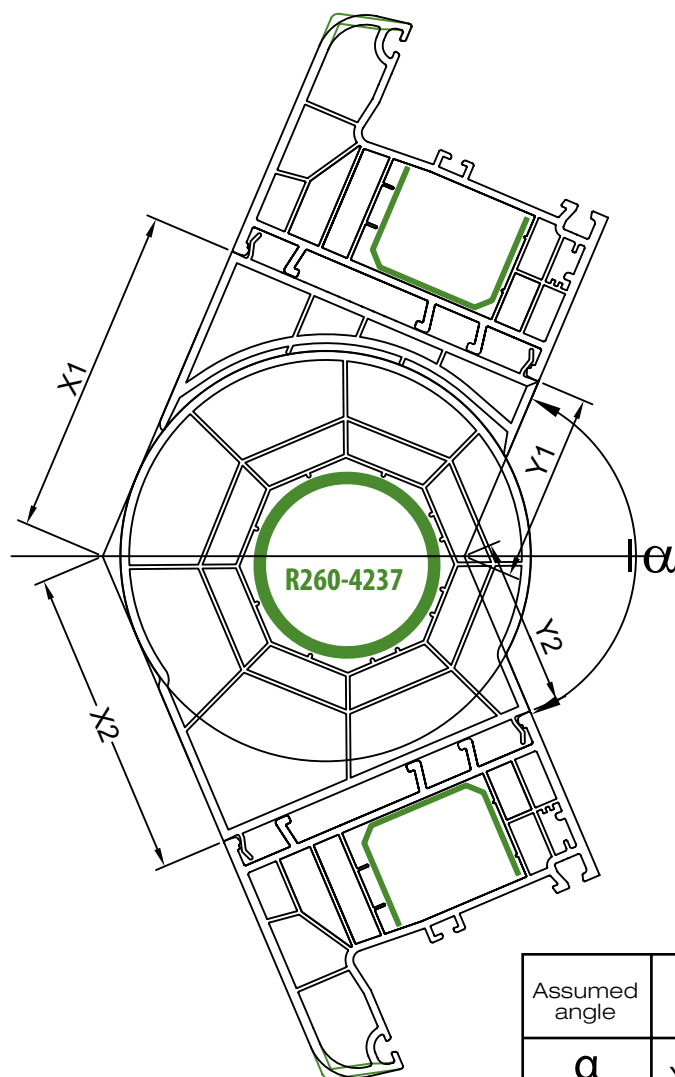








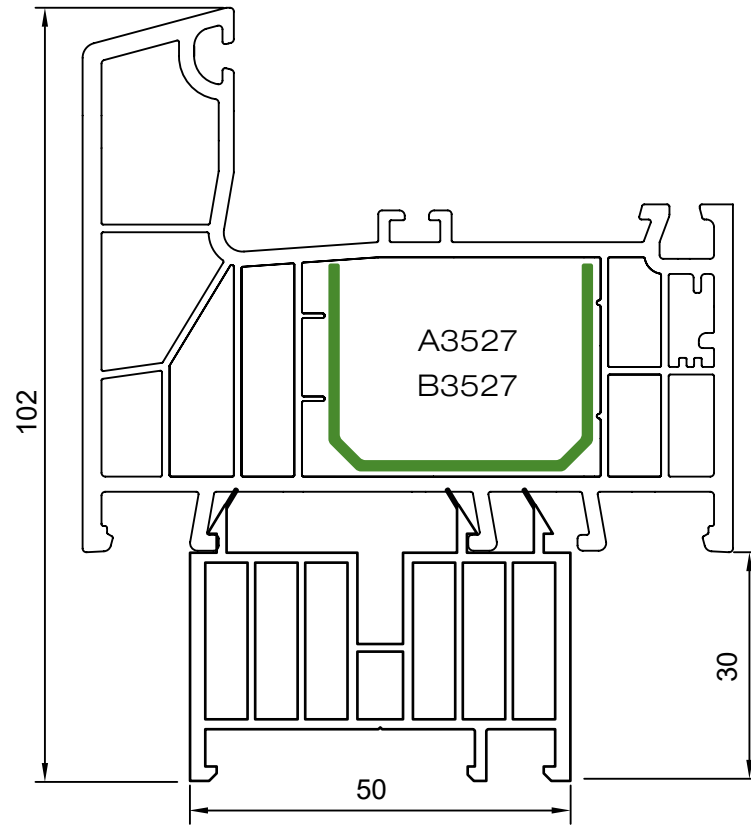
4.12 Connection of frames 68611 with pipe connector 68661

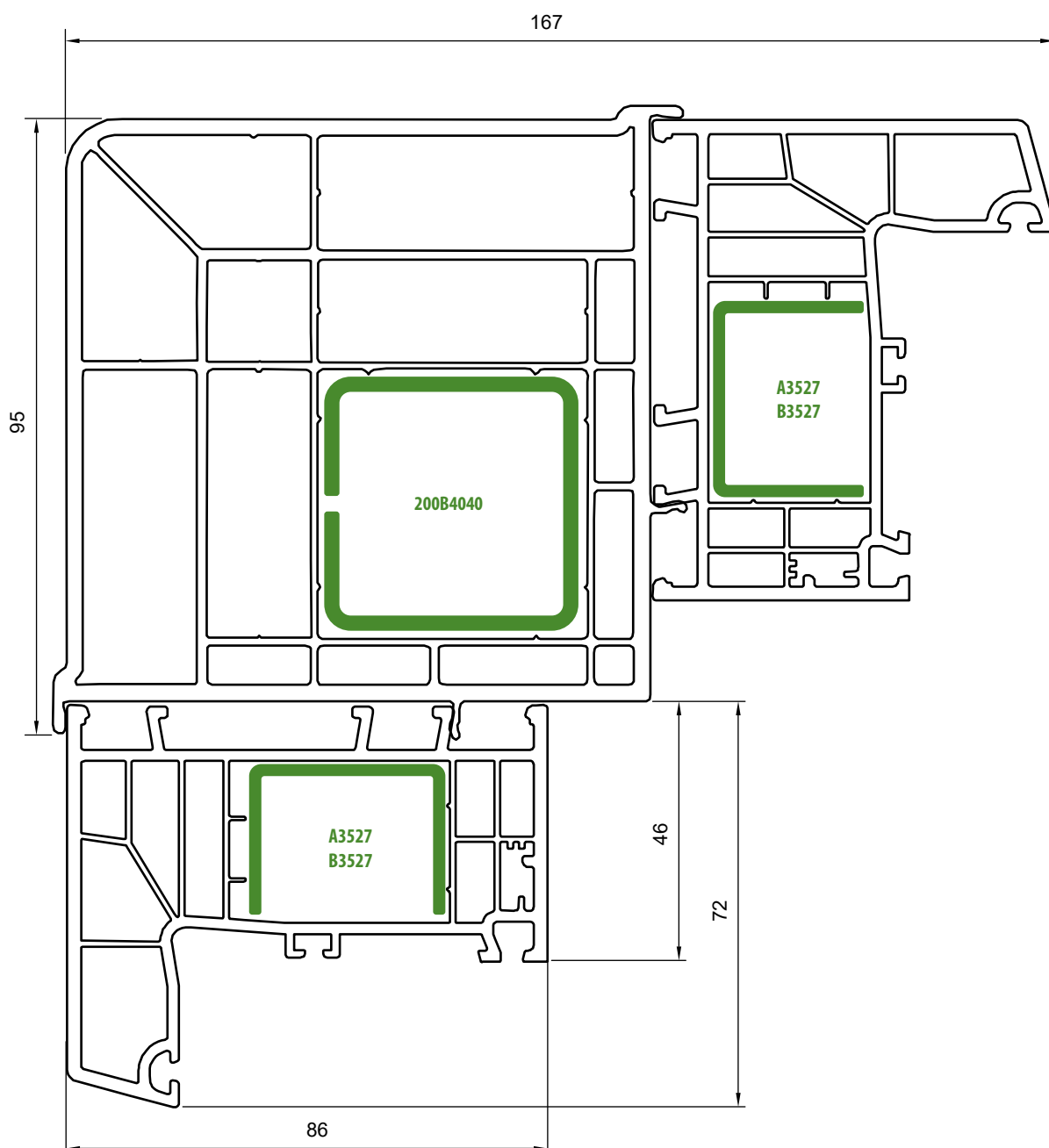


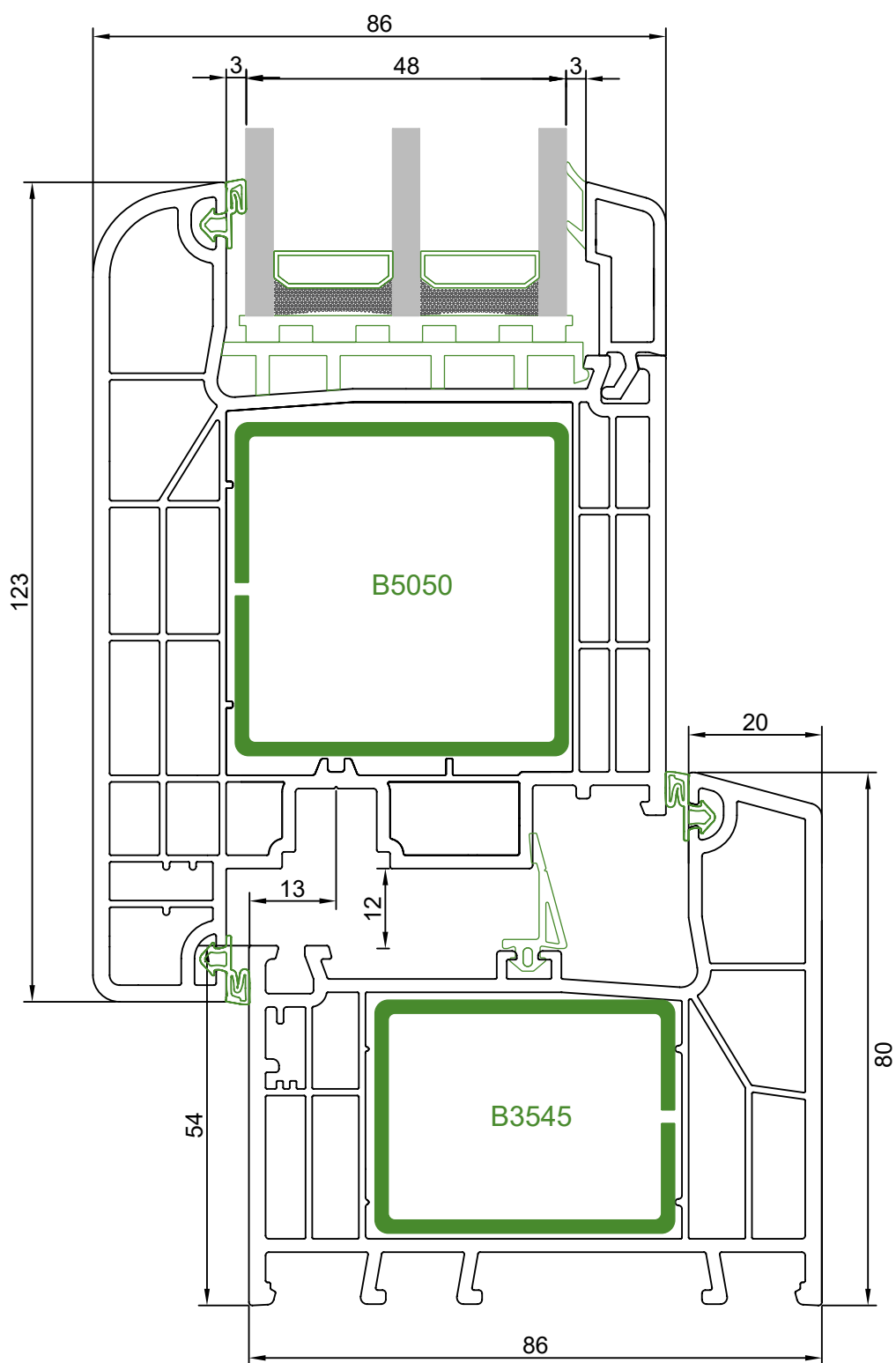
Assumed angle	External dimensions			
α	X1 [mm]	X2 [mm]	Y1 [mm]	Y2 [mm]
90°	116,0	110,5	30,0	24,4
95°	111,6	106,1	32,7	27,2
100°	107,5	102,0	35,3	29,8
105°	103,7	98,2	37,7	32,1
110°	100,1	94,6	39,9	34,3
115°	96,8	91,3	42,0	36,4
120°	93,6	88,1	43,9	38,4
125°	90,6	85,1	45,8	40,3
130°	87,7	82,2	47,6	42,1
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

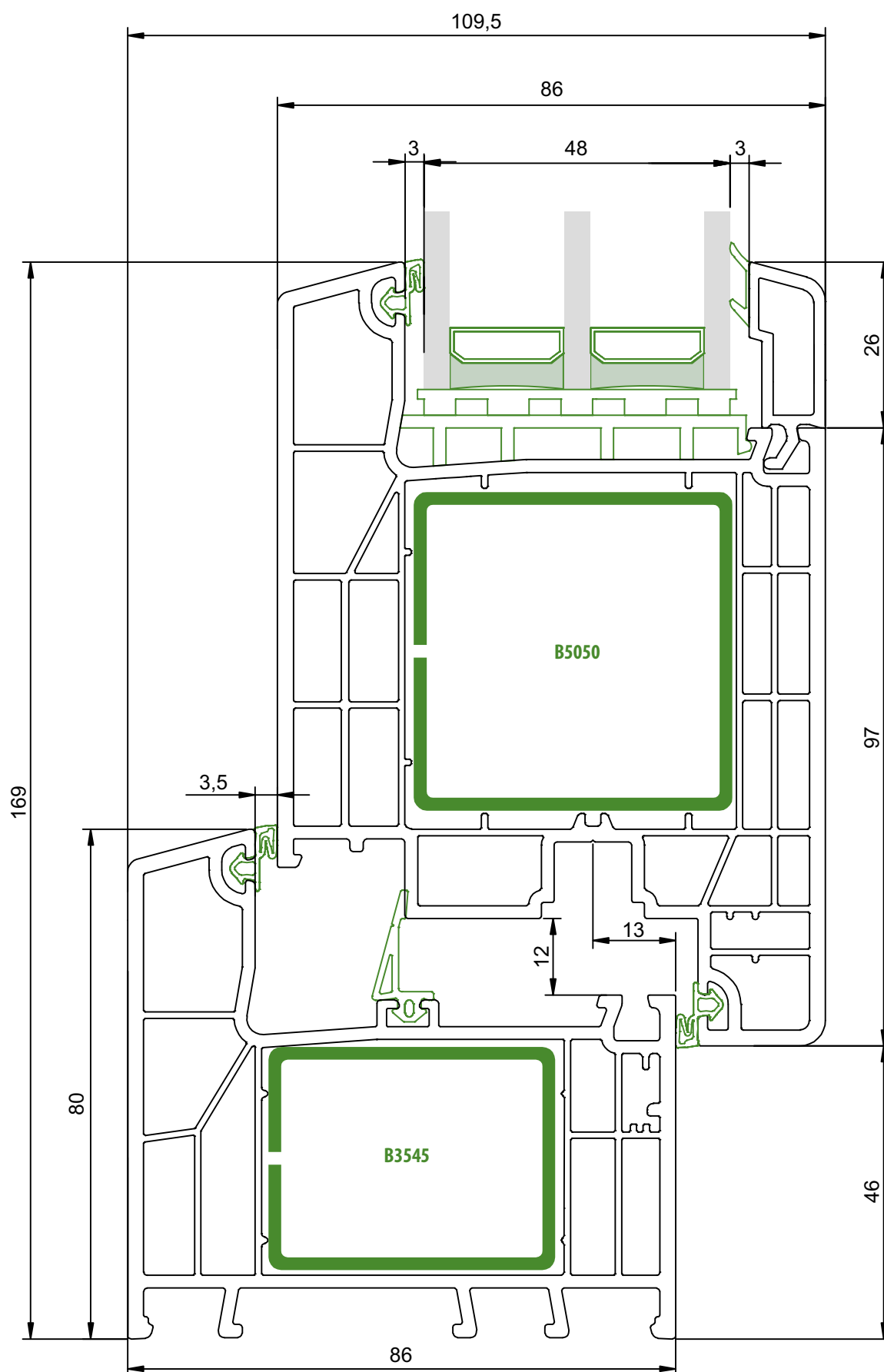
4. Assemblies

4.13 Frame 68611 + mounting profile 68071



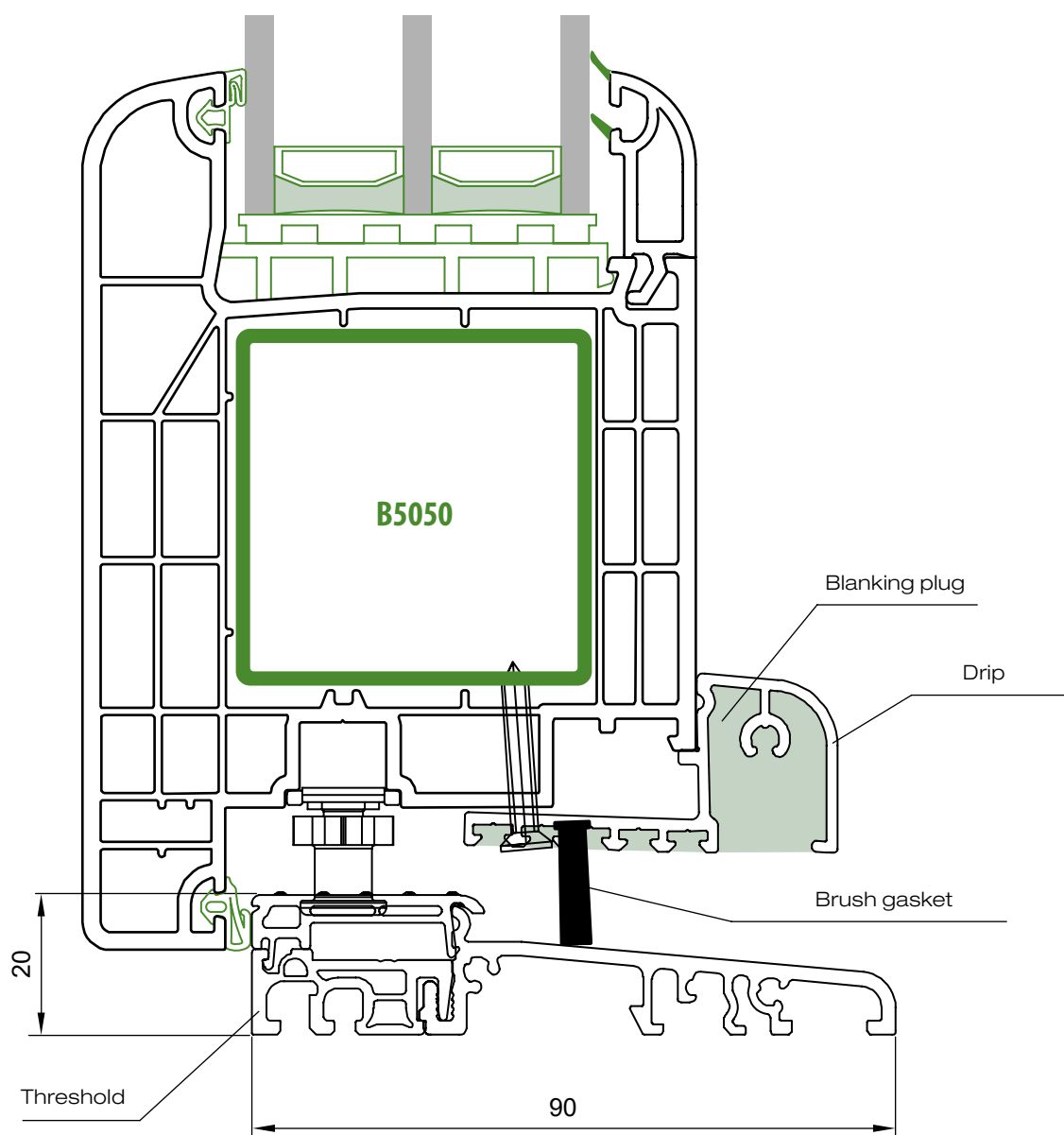


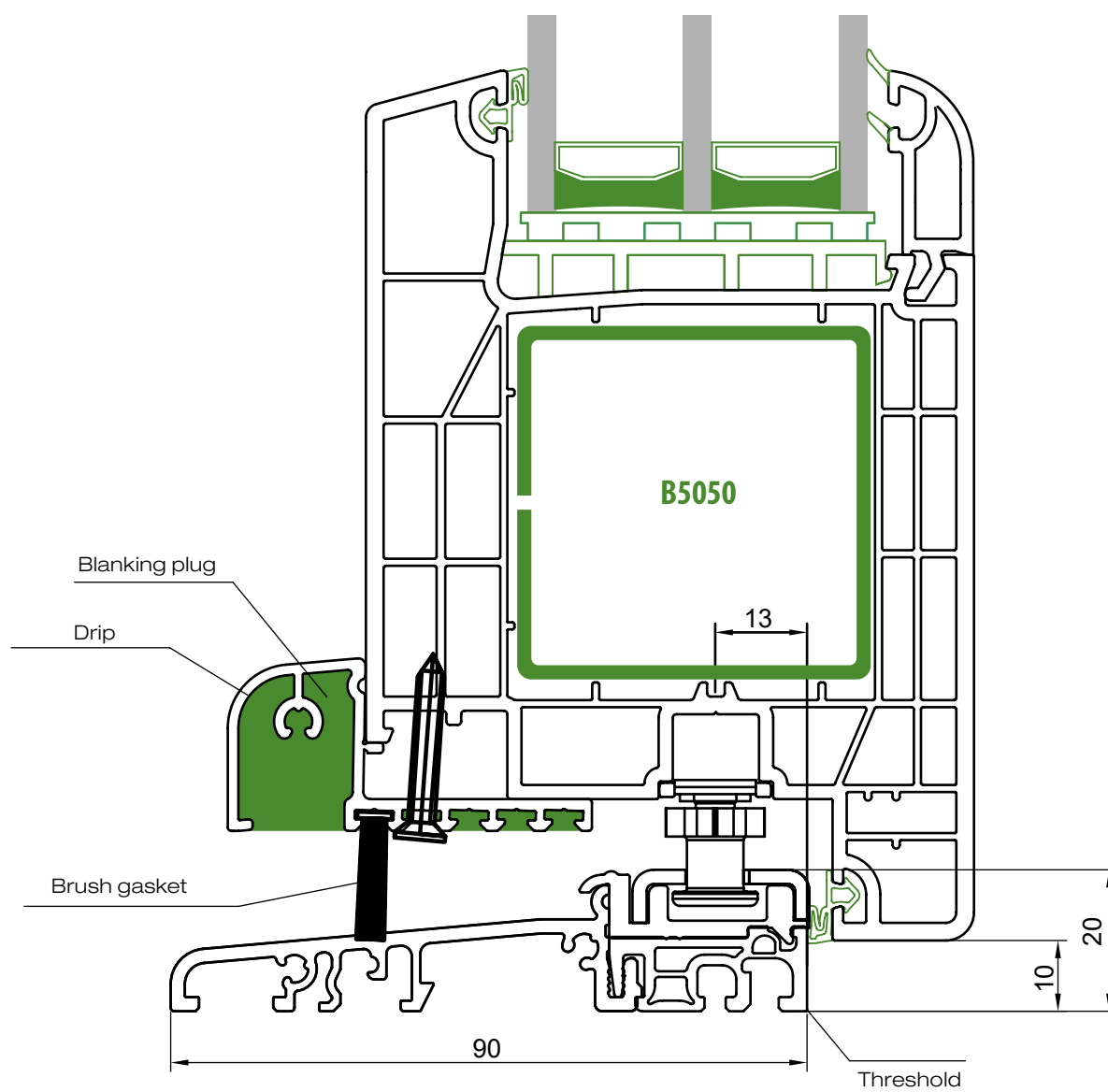




4. Assemblies
4.17 Sash 58621 + door threshold 58650

THERM

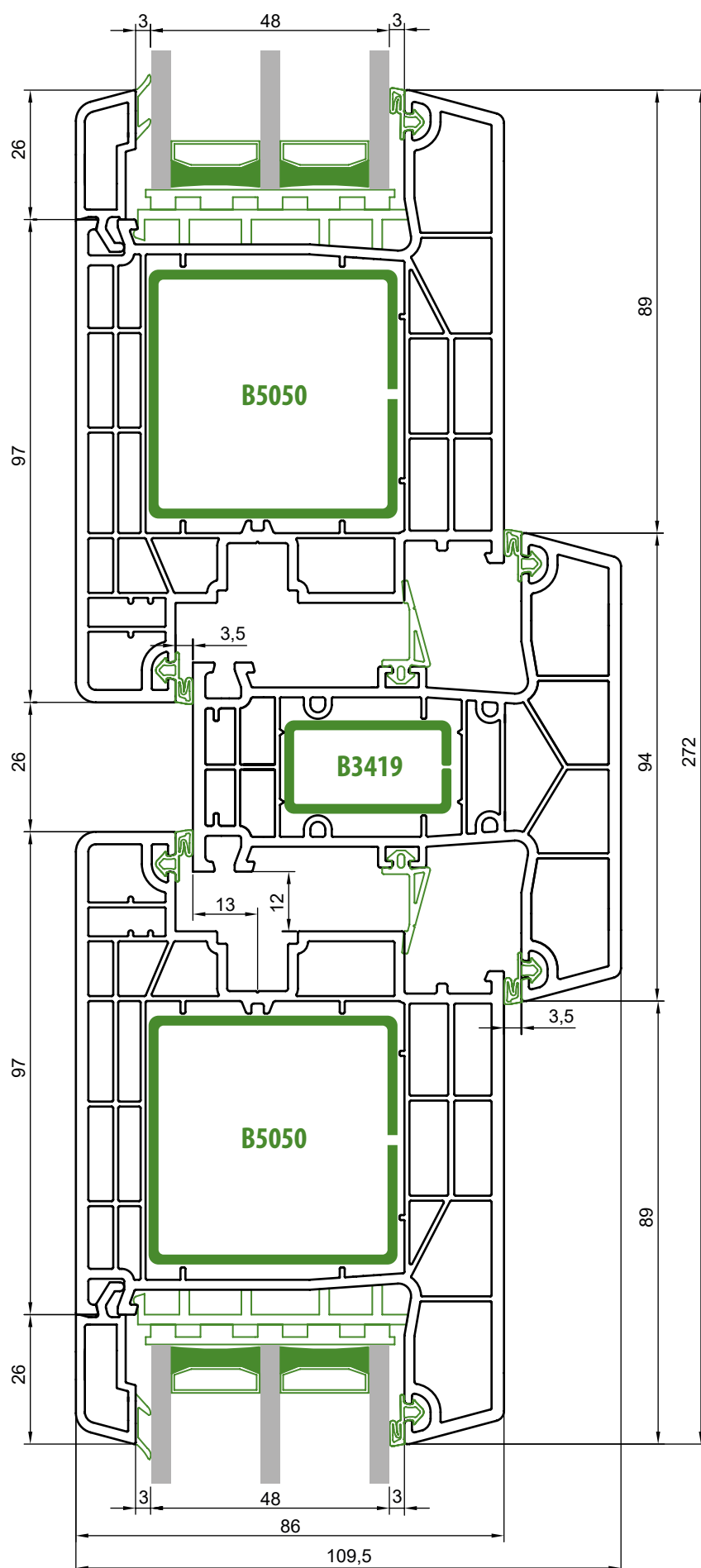




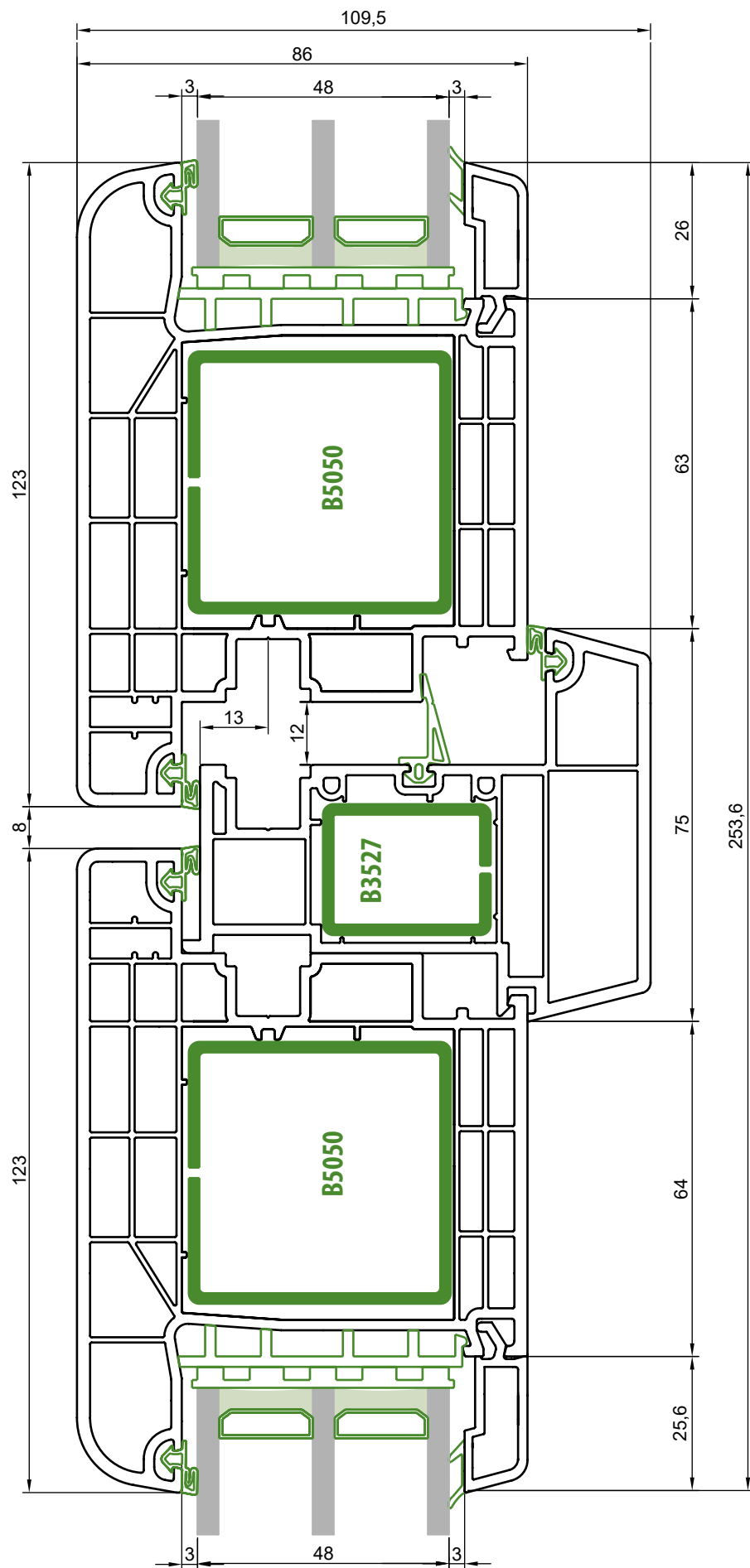
4. Assemblies

4.20 Sash 58622 + mullion 68632 + sash 58622

- glazing with 48mm glazing unit



- glazing with 48mm glazing unit



4.22 Sash 58622 + floating mullion 68633 + sash 58622
- glazing with 48mm glazing unit

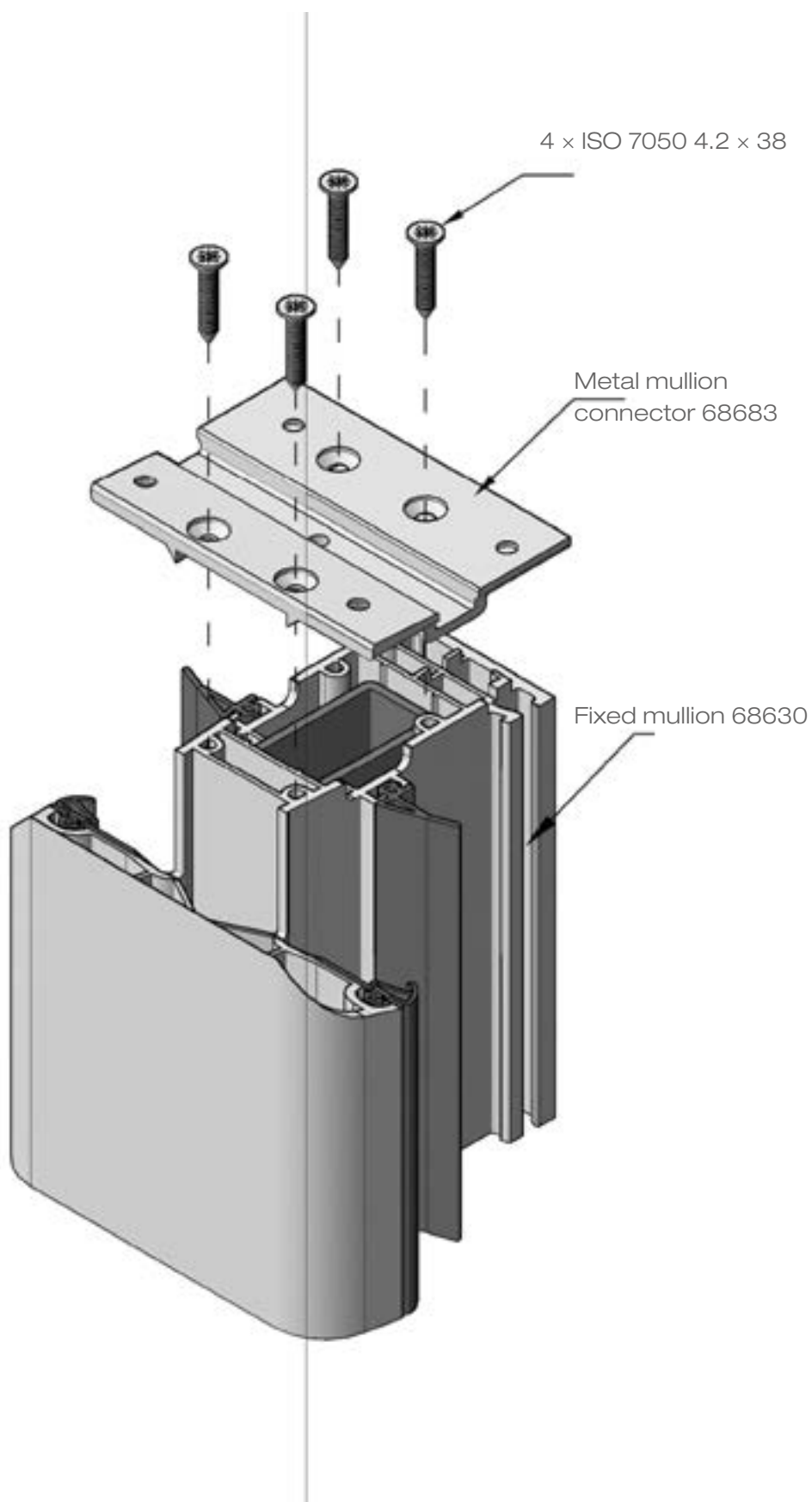


5. Assembly diagrams

- 5.1 Mounting of metal connector 68683 to mullion 68630
- 5.2 Connection of frame 68610 and mullion 68630 using metal mullion connector 68683
- 5.3 Connection of floating mullion 68631 to sash 68620 (with cover plugs 68684 mounted)
- 5.4 Preparation of frame 68610 for connection to mullion 68630 using plastic fixed mullion connector 68685
- 5.5 Connection of frame 68610 with fixed mullion 68630 using plastic connector 68685

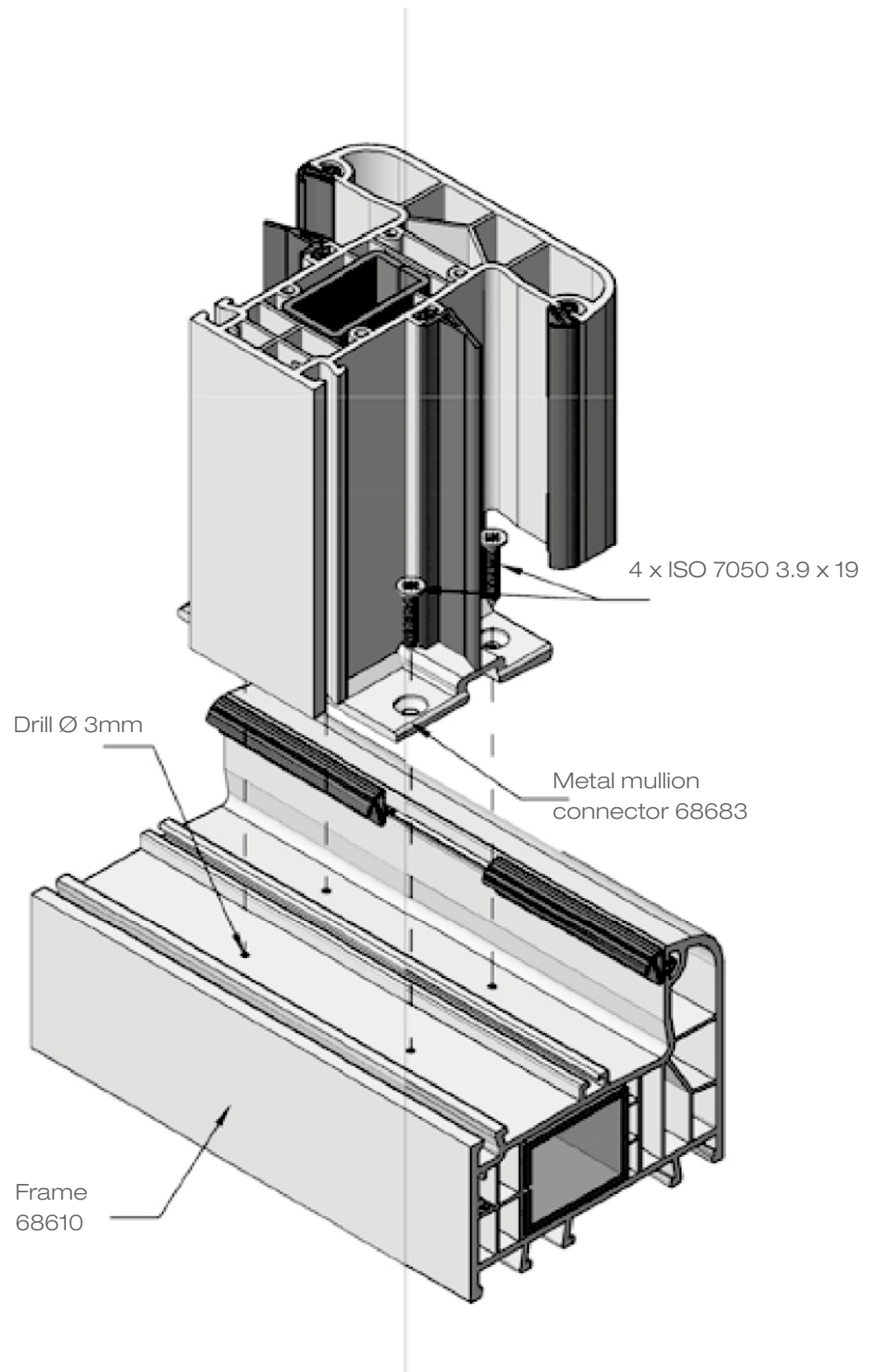
5. Schematy montażowe

5.1 Mounting of metal connector 68683 to mullion 68630

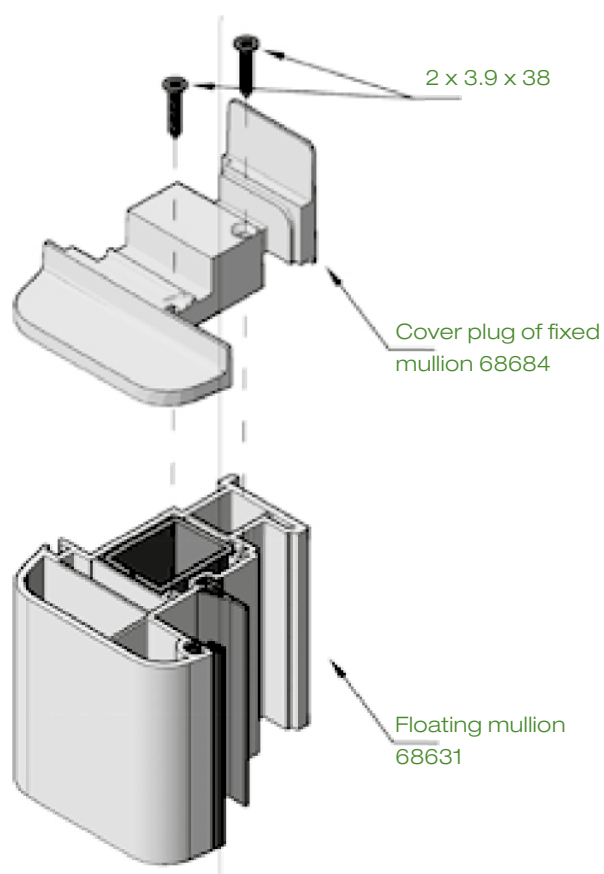
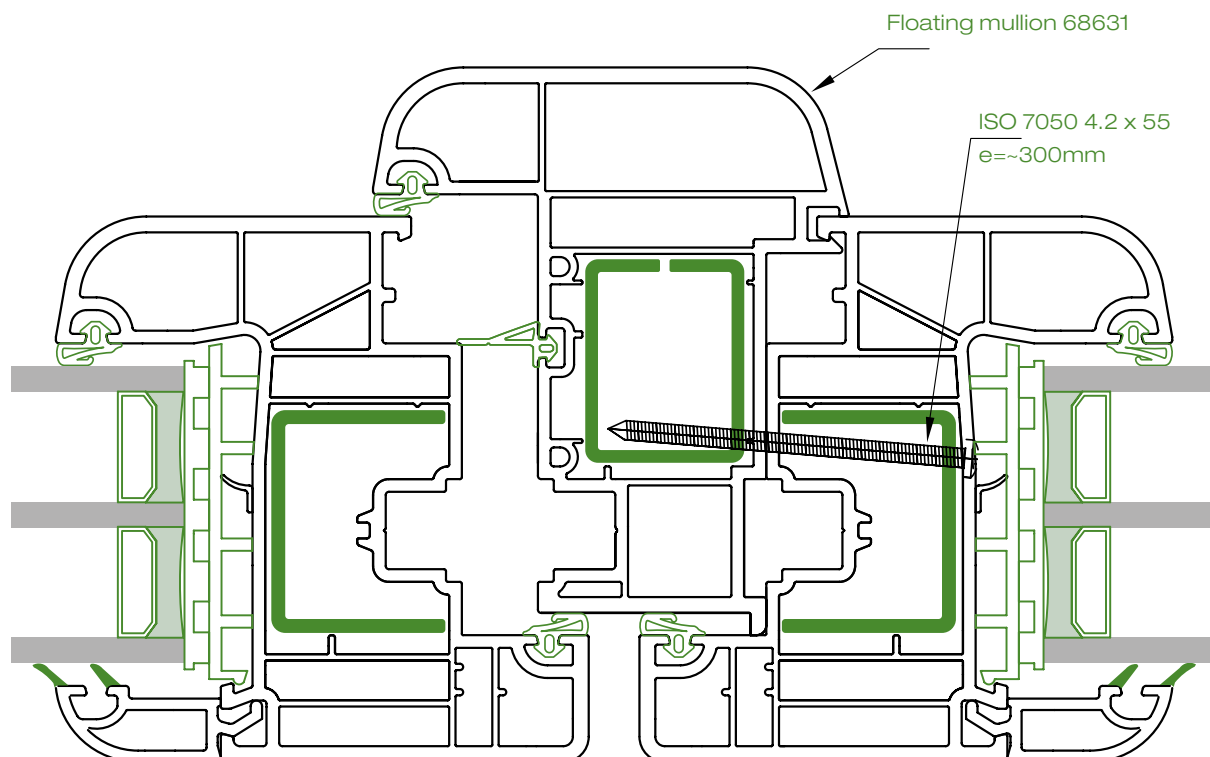


5. Schematy montażowe

5.2 Connection of frame 68610 and mullion 68630 using metal mullion connector 68683



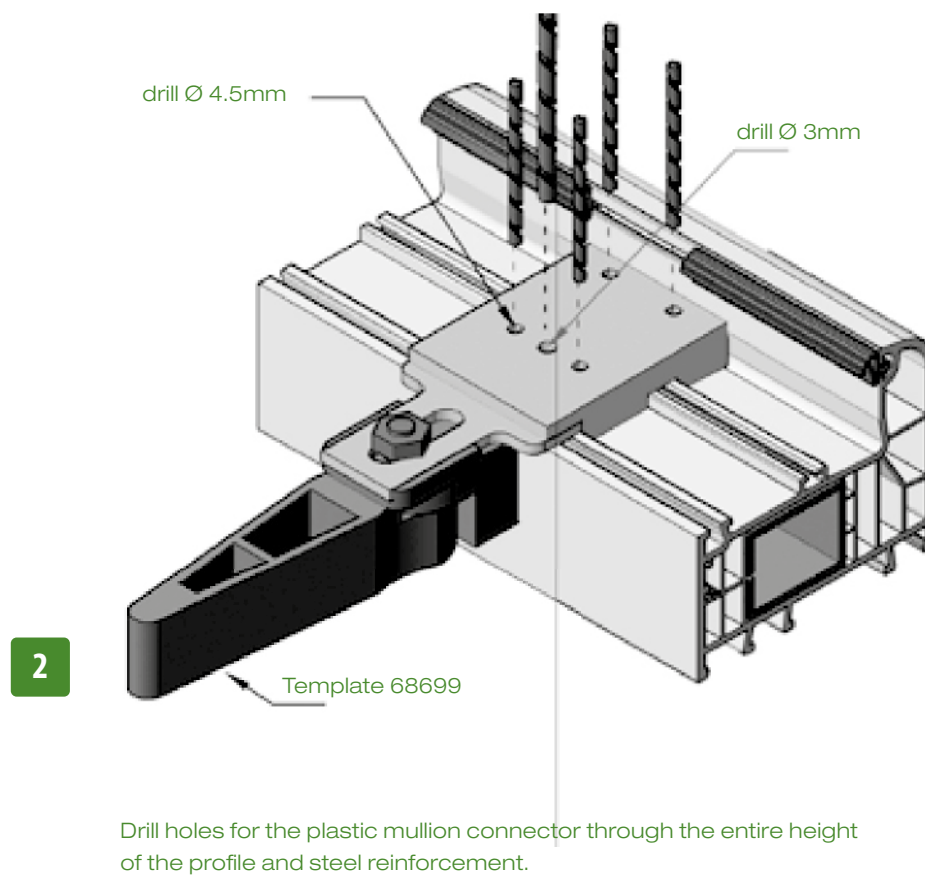
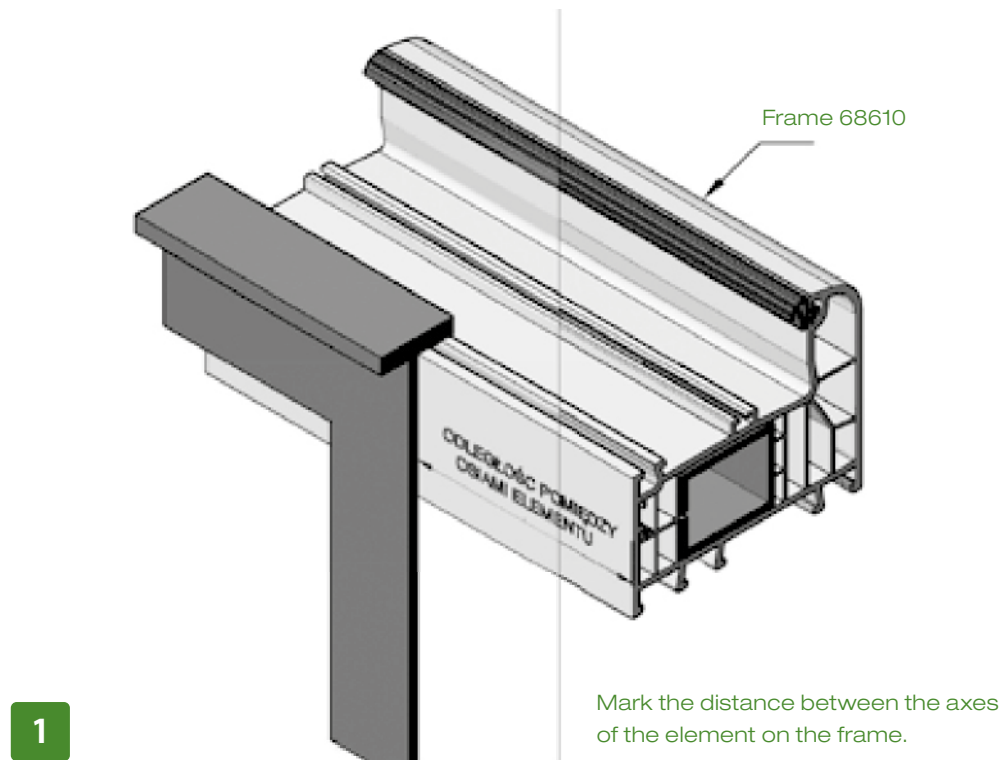
5. Schematy montażowe

5.3 Connection of floating mullion 68631 to sash 68620
(with cover plugs 68684 mounted)

5. Schematy montażowe

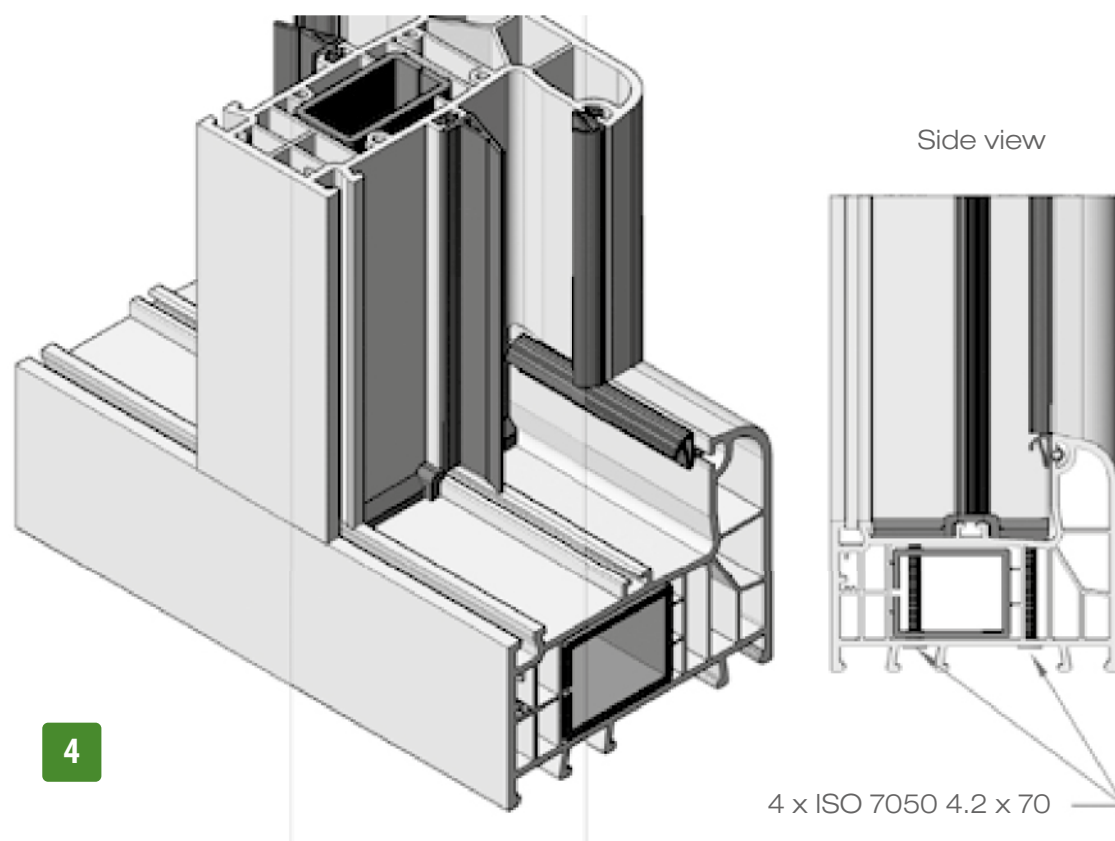
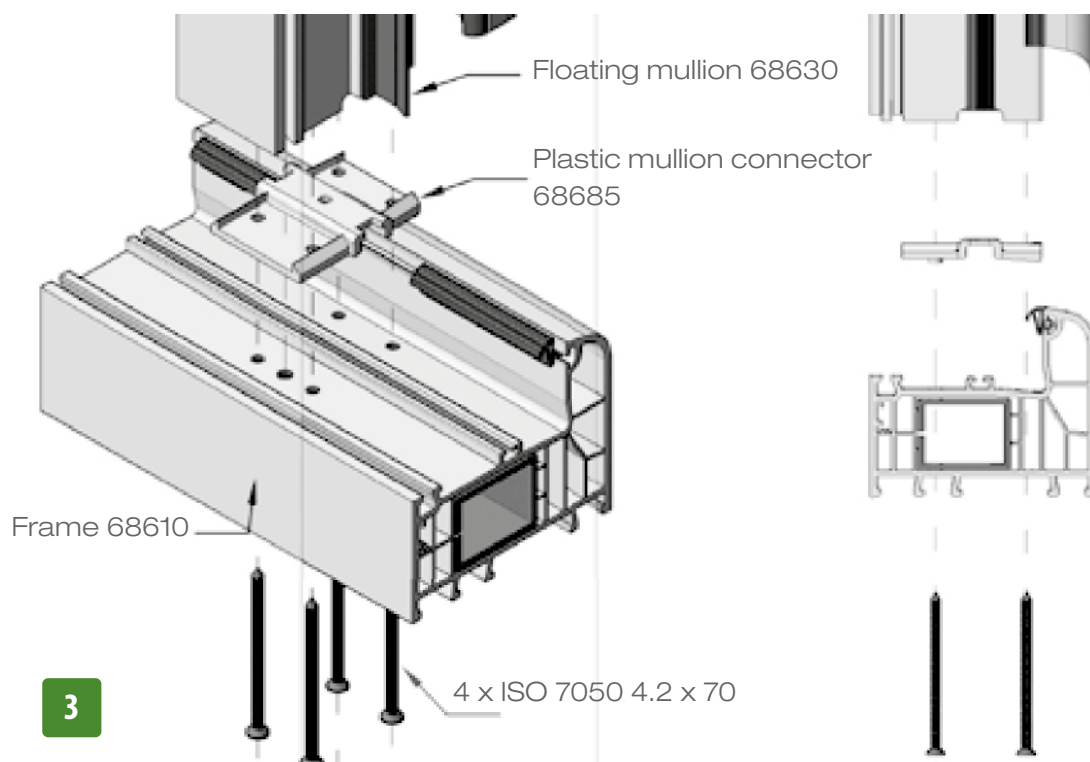
5.4 Preparation of frame 68610 for connection to mullion 68630 using plastic fixed mullion connector 6868

Floating mullion 68631



5. Schematy montażowe

5.5 Connection of frame 68610 with fixed mullion 68630 using plastic connector 68685



Place the mullion in the frame and screw together with screws

6. Assembly dimensions

- 6.1 General information
- 6.2 Calculation example
- 6.3 Fixed glazing in frame
- 6.4 Structural muntin
- 6.5 Single-sash window
- 6.6 Double-sash window with fixed mullion
- 6.7 Double-sash window with fixed part
- 6.8 Double-sash window with floating mullion
- 6.9 Threshold in balcony and exterior doors
- 6.10 Length correction of fixed mullion 68630 and 68632
- 6.11 Length correction of floating mullion 68631 and 68633

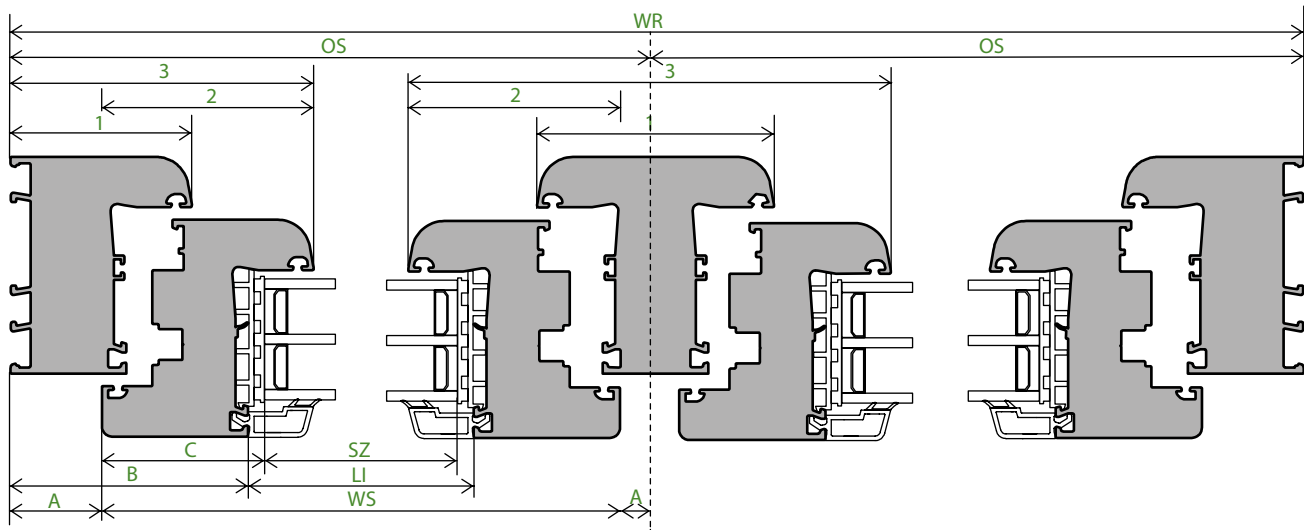
6. Assembly dimensions

6.1 General information

Determining the dimensional correction consists in summing up the corrections for individual profile combinations in the window. The dimensions of the corrections are counted based on the external dimensions of the frame and based on the dimensions of the lites given in the axes of the mullions (for a floating mullion, the axis is located in the middle of the distance between the ends of the rebates of cooperating leaves). For welded parts, an appropriate welding allowance must be added.

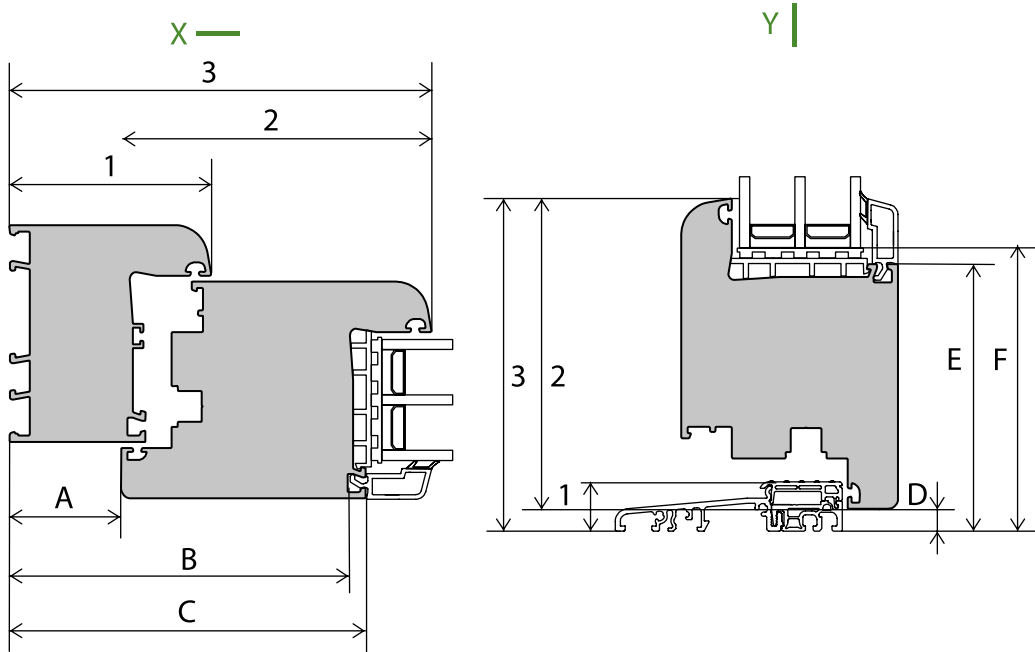
Please note:

The profile corrections specified in this section apply to finished profile elements after welding or mechanical connection. Depending on the window manufacturer's machine park for cutting and welding profiles, there may be situations in which there are unusual changes in the required length of profiles after processing, i.e. cutting or welding. Improper cutting of profiles may affect the deformation of gaskets implemented into the profiles.



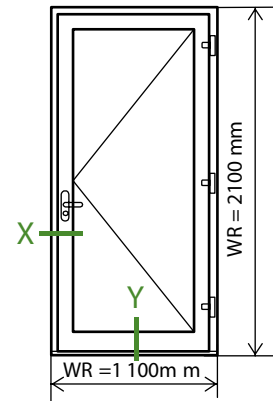
6. Assembly dimensions

6.2 Calculation 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



External dimension

WR – 1100mm x 2100mm

Rama – 80mm

Skrzydło – 123mm

Results of sample calculations

Lateral (X) combinations from left: frame/sash and right: frame/sash, total corrections

Vertical (Y) combinations: threshold with sash, frame with sash

$$WS = WR - 2A = 1100\text{mm} - 92\text{mm} = 1008\text{mm}$$

$$LI = WR - 2B = 1100\text{mm} - 286\text{mm} = 814\text{mm}$$

$$SZ = WR - 2C = 1100\text{mm} - 298\text{mm} = 802\text{mm}$$

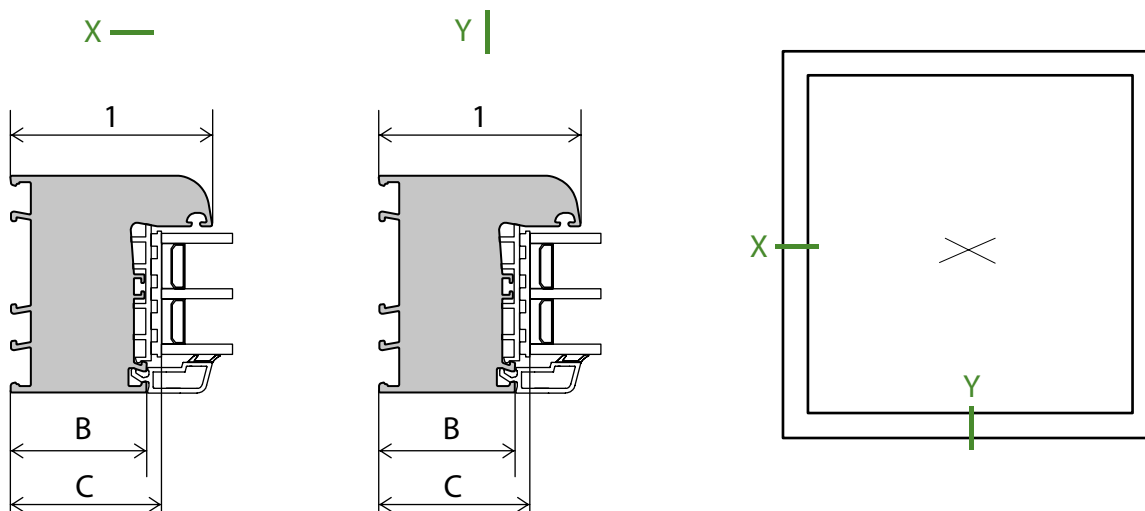
$$WS = WR - (D + A) = 2100\text{mm} - 56\text{mm} = 2044\text{mm}$$

$$LI = WR - (E + B) = 2100\text{mm} - 250\text{mm} = 1850\text{mm}$$

$$SZ = WR - (F + C) = 2100\text{mm} - 262\text{mm} = 1838\text{mm}$$

6. Assembly dimensions

6.3 Fixed glazing in frame



Profile height (mm)	1	 72 mm 68611	 80 mm 58612
Dimensional correction (mm)	B	-46	-54
	LI		
C		-52	-60
	SZ		

Abbreviations used:

OS (Fixed or floating) mullion axis dimension

WS External dimension of entire sash (after welding)

LI Strip dimension

SZ Glazing unit dimension

WR External dimension of complete frame (after welding)

1 External dimensions of profiles, incl. frames, mullions and thresholds

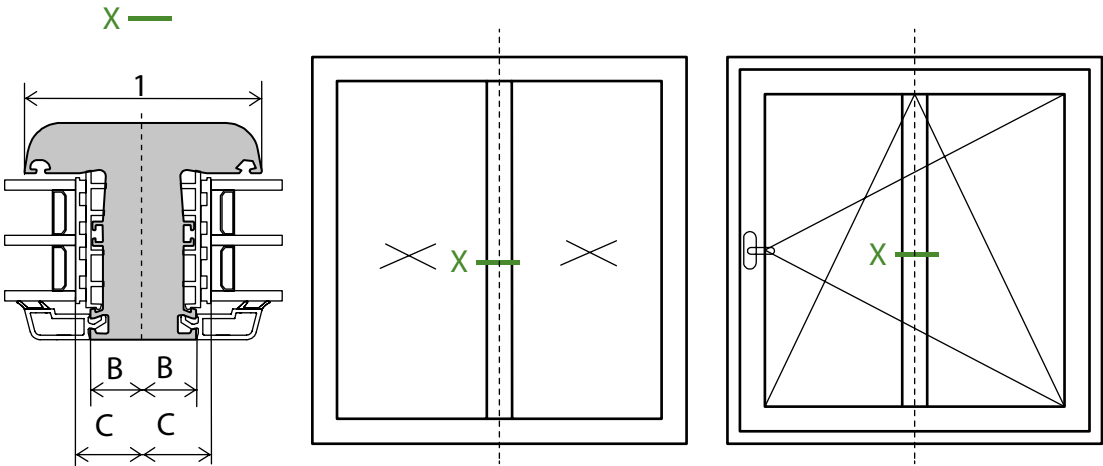
2 External dimension of sash profile

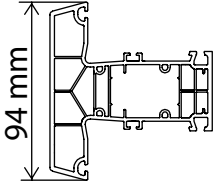
3 External dimension of assemblies of profiles, incl. frames, sashes, mullions

A, B, ... Values to be calculated depending on the profiles used

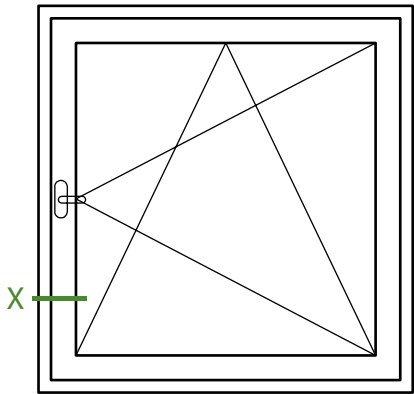
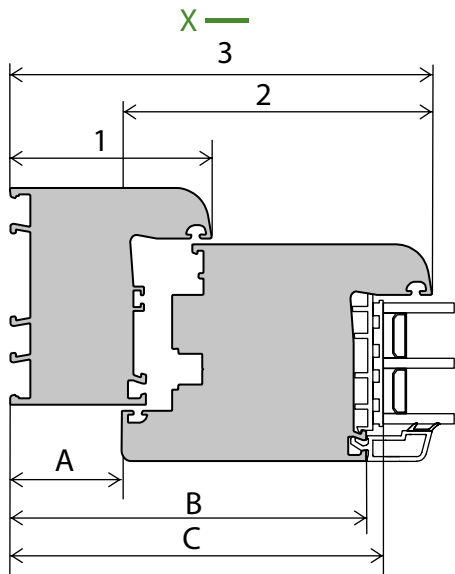
6. Assembly dimensions
6.4 Structural muntin

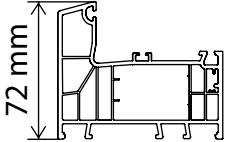
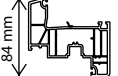
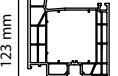
THERM

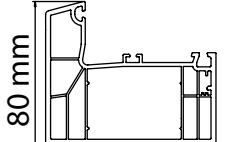
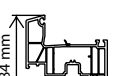
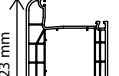


Dimensional correction (mm)	1	 68632
	B LI	-21
	C SZ	-29

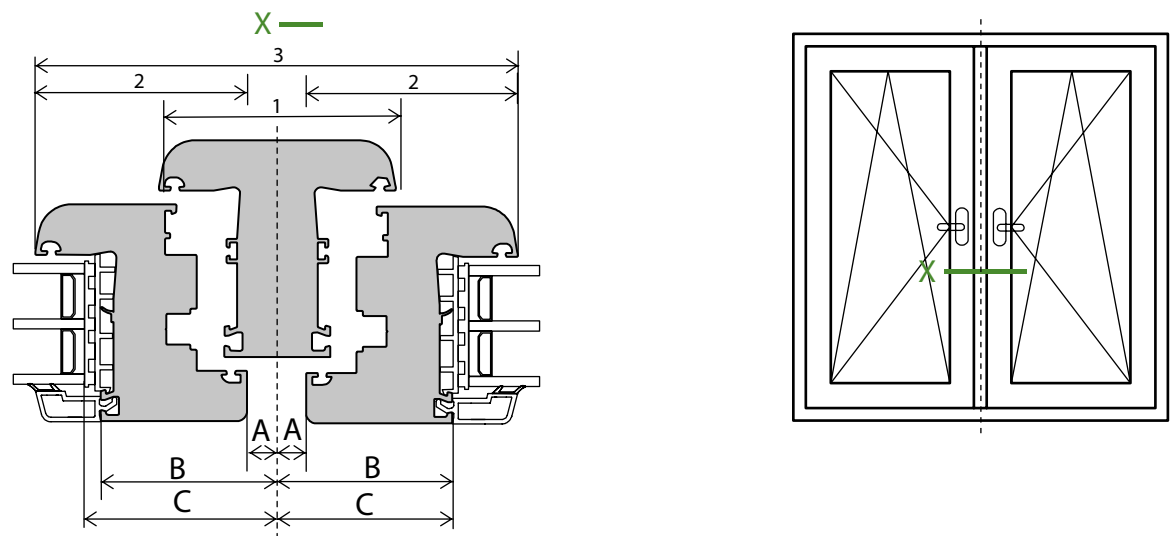
6. Assembly dimensions
6.5 Single-sash window

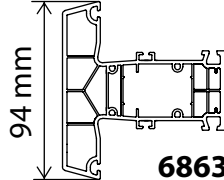
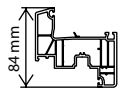
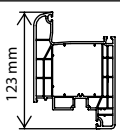


Profile height (mm)	1	 68611	
	2	 84 mm	 123 mm
	3	122	161
Dimensional correction (mm)	A WS	-38	-38
	B LI	-96	-135
	C SZ	-102	-141

Profile height (mm)	1	 58612	
	2	 84 mm	 123 mm
	3	122	161
Dimensional correction (mm)	A WS	-46	-46
	B LI	-104	-143
	C SZ	-110	-149

6. Assembly dimensions
6.6 Double-sash window with fixed mullion



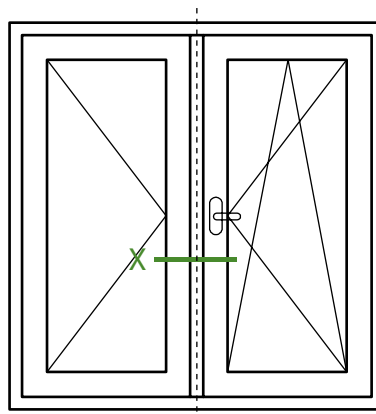
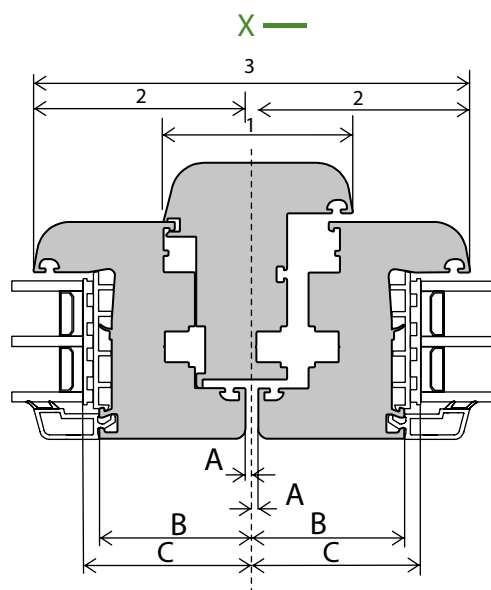
Profile height (mm)	1	 94 mm	
	2	 84 mm	 123 mm
	3	194	227
Dimensional correction (mm)	A WS	-13	-13
	B LI	-71	-110
	C SZ	-77	-116

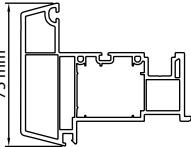
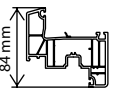
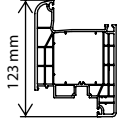
Abbreviations used:

OS (Fixed or floating) mullion axis dimension	1 External dimensions of profiles, incl. frames, mullions and thresholds
WS External dimension of entire sash (after welding)	2 External dimension of sash profile
LI Strip dimension	3 External dimension of assemblies of profiles, incl. frames, sashes, mullions
SZ Glazing unit dimension	A, B, ... Values to be calculated depending on the profiles used
WR External dimension of complete frame (after welding)	

6. Assembly dimensions

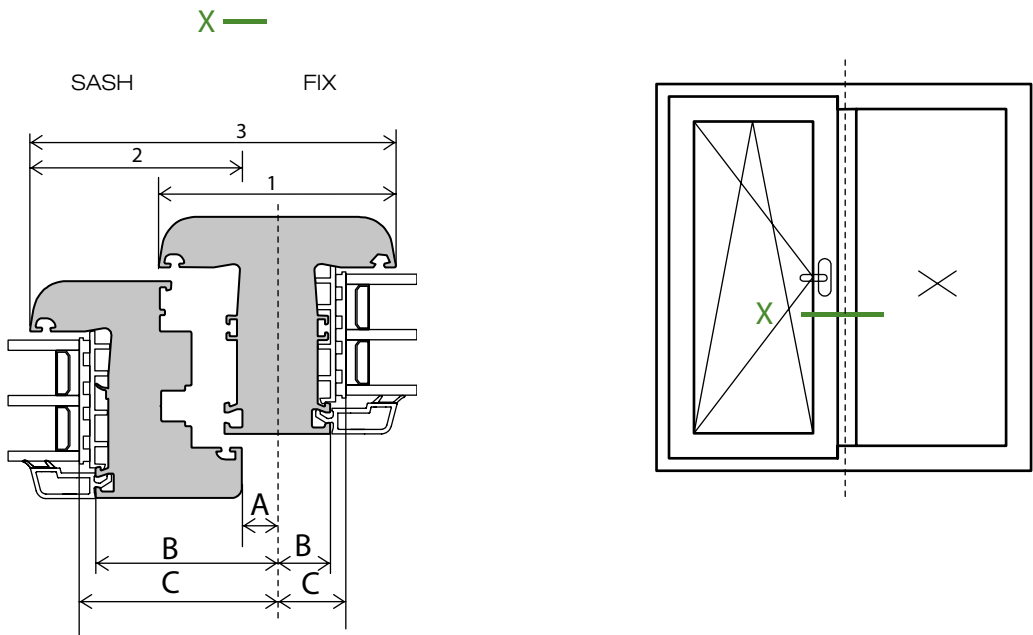
6.7 Double-sash window with fixed part

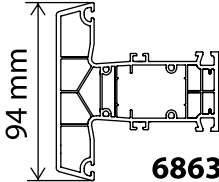
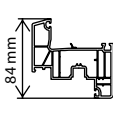
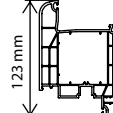


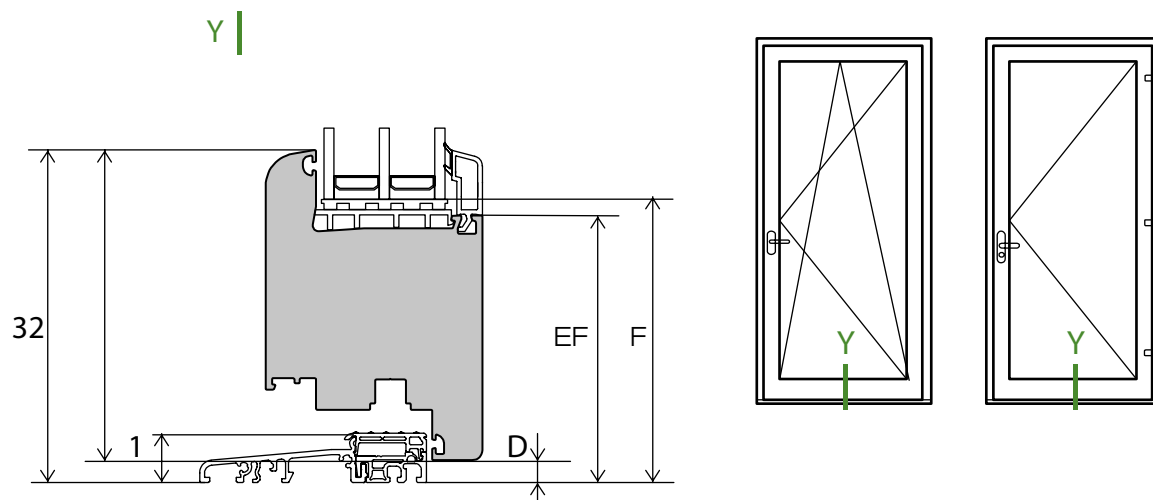
Profile height (mm)	1	 75 mm	
	2	 84 mm	 123 mm
	3	175	254
Dimensional correction (mm)	A WS	-4	-4
	B LI	-62	-101
	C SZ	-68	-107

Abbreviations used:**OS** (Fixed or floating) mullion axis dimension**WS** External dimension of entire sash (after welding)**LI** Strip dimension**SZ** Glazing unit dimension**WR** External dimension of complete frame (after welding)**1** External dimensions of profiles, incl. frames, mullions and thresholds**2** External dimension of sash profile**3** External dimension of assemblies of profiles, incl. frames, sashes, mullions**A, B, ...** Values to be calculated depending on the profiles used

6. Assembly dimensions
6.8 Double- sash window with floating mullion



Profile height (mm)	1	 68632		
	2			
	3	144	183	
Dimensional correction (mm)	A WS	-13	-13	
	B LI	-71	-110	SASH
		-21	-21	FIX
	C SZ	-77	-116	SASH
		-27	-27	FIX

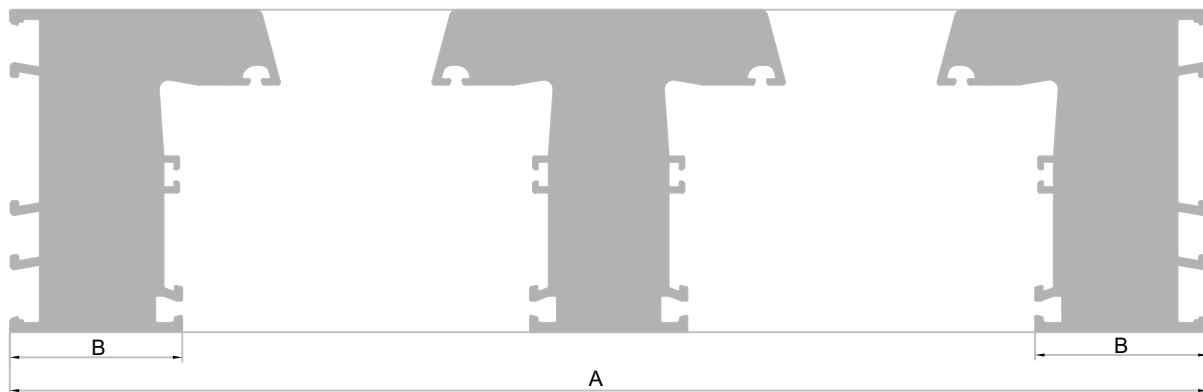


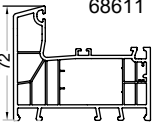
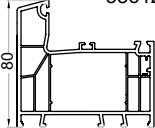
Profile height (mm)	20 mm			
	1			
	2			
Dimensional correction (mm)	3	94	133	133
	D WS	-10	-10	-10
	E LI	-68	-107	-107
F SZ		-74	-113	-113

Abbreviations used:**OS** (Fixed or floating) mullion axis dimension**WS** External dimension of entire sash (after welding)**LI** Strip dimension**SZ** Glazing unit dimension**WR** External dimension of complete frame (after welding)**1** External dimensions of profiles, incl. frames, mullions and thresholds**2** External dimension of sash profile**3** External dimension of assemblies of profiles, incl. frames, sashes, mullions**A, B, ...** Values to be calculated depending on the profiles used

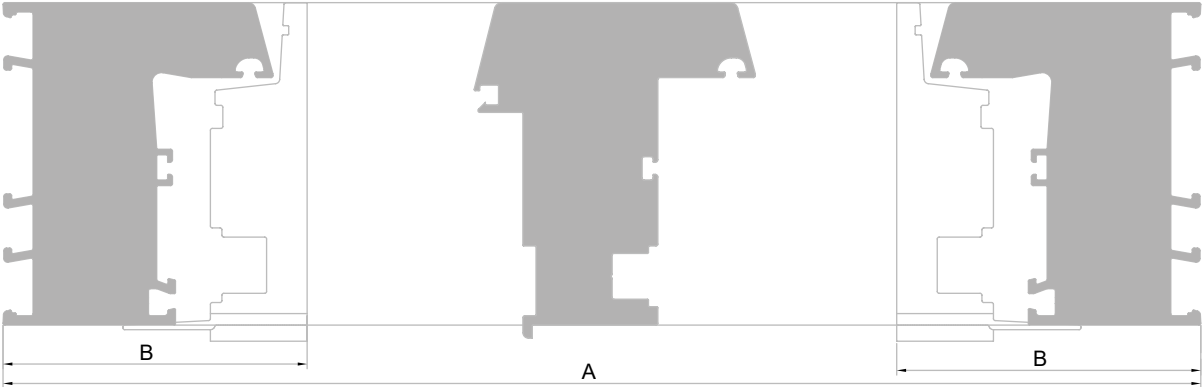
6. Assembly dimensions

6.10 Length correction of fixed mullion 68630 and 68632



DSR = A-2B		
1	 68611	 58612
B	-44	-52

6. Assembly dimensions
6.11 Length correction of floating mullion 68631 and 68633



DSR = A-2B		
1	68611	58612
B	-78.5	-86.5

7. Statics

- 7.1 General information
- 7.2 Guidelines for profile reinforcement
- 7.3 Wind loads
- 7.4 Calculation example
- 7.5 Table - required moments of inertia

7. Statics

7.1 General information

The design of Spectrum window systems is based on the combination of multi-chamber high-strength PVC profiles with steel reinforcements. The low modulus of elasticity of PVC profiles (about 70 times smaller than steel reinforcements) makes it necessary to reinforce them with corrosion-resistant steel sections, whose task is to provide the window elements with adequate stiffness and load-bearing capacity, necessary to transfer loads from own weight, glazing, wind pressure and suction, thermal deformations and PROPER usage of the window.

The window is not designed to carry loads other than those listed above and cannot be a load-bearing structural element of the building in which it is incorporated.

A static strength calculation in compliance with DIN 18056 is necessary when:

- **the window area is greater than 9.0 m²,**
- **the length of one of the sides exceeds 2.0 m.**

The static strength calculations of a window element consist in determining its stiffness in a plane, necessary to transmit a load acting perpendicular to that plane. The wind pressure and suction load acts perpendicular to the window plane and the own weight and glass weight acts parallel to this plane.

The calculation does not take into account the stiffness of the PVC profiles but only the stiffness of the steel reinforcement.

The bending stiffness of the element is determined according to DIN 18056, where the maximum deflection of the element under perpendicular load must not exceed:

- 1/300 of its span,
- and must be lower than 8.0 mm.

It is assumed that the glazing unit must not carry any loads other than its own weight and wind pressure and suction.

This means that it is not possible to take into account the supporting effect of glazing in the static strength calculations. Due to the necessity to ensure proper work of the hardware, the maximum deflection under its own weight must not exceed:

- 1/300 of its span,
- 3.0 mm.

7. Statics

7.2 Guidelines for profile reinforcement

PVC window profiles should be reinforced with hot-dip galvanized steel or aluminium profiles. This reinforcement prevents the profiles from deflecting under heavy wind load or temperature changes. The reinforcements are selected in such a way that, on the one hand, appropriate parameters of slot permeability and rainwater tightness in accordance with DIN 18055 are ensured and, on the other hand, the static regulations in accordance with DIN 1055 and 18056 are observed.

The reinforcement profiles are cut at an angle of 90° or 45° and slid into the chamber intended for reinforcement before welding the PVC profiles. In all sash profiles the reinforcements should end at most 10 mm before the inner corner. This excludes the possibility of unacceptable deflections due to too short a reinforcement.

The reinforcement in each profile should be screwed as close as possible to the corners, at intervals of approximately 300 mm.

Steel reinforcements not mounted in closed profile chambers must be permanently protected against corrosion at the points of cutting.

The screwing together of reinforcements in door profiles should be carried out in such a way that the door sash profile lies on the side to which the hinges will be screwed. Otherwise, local collapses of the profile may occur when the hinges are tightened.

Due to increased thermal stress, reinforcements in coloured and veneered profiles should be tightened at intervals of 150-200 mm at the most. Zaleca się także stosowanie wzmocnień o zwiększonej sztywności (**thickness at least 2 mm**). The distances of the screws from the corners of the sashes and frames can be the same as for white profiles.

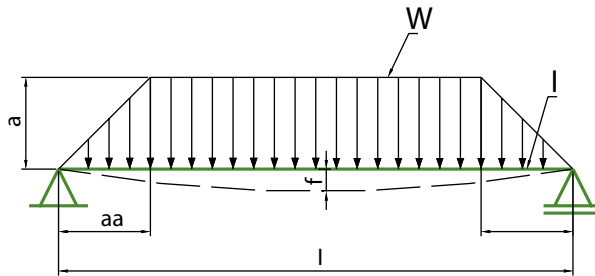
7. Statics

7.3 Wind loads

According to DIN 1055, the wind pressure force is determined as follows, depending on the height of the building:

Window height above ground level (m)	Ordinary buildings (kN/m ²)	Skyscrapers (kN/m ²)
Below 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 stiffness of the element under wind pressure loads perpendicular to the plane of the window shall be determined from the following static diagram:



For the above model the following formula applies:

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

where:

w – wind pressure [kN/m²]

a – width of the load area [cm]

L – span of the element [cm]

f_{dop} – permissible deflection of element [mm]

I_{x_{wym}} – required moment of inertia of the element [cm⁴]

E – Young modulus of elasticity for steel [GPa]

The width of the load area shall be determined as follows:

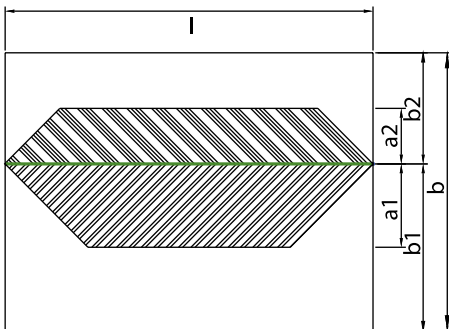


Fig. 6.2.4.
Diagram of wind pressure load on crossbar

$$\text{gdzie: } a1 = \frac{b1}{2} \text{ oraz } a2 = \frac{b2}{2}$$

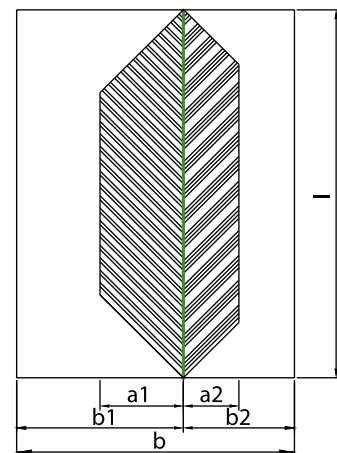


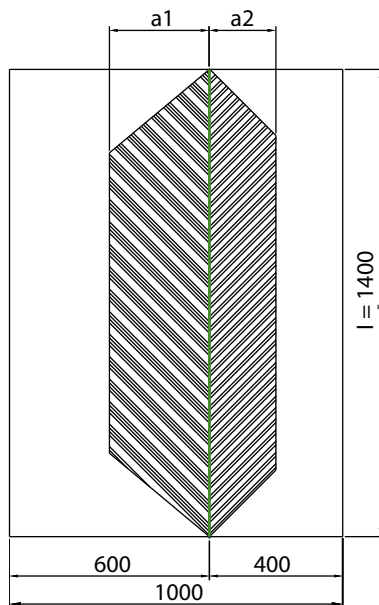
Fig. 6.2.3.
Diagram of wind pressure load on mullion

The stiffness of the element is calculated separately for load widths a1 and a2 and then the results are added up.

7. Statics

7.4 Calculation example

Calculation of the moment of inertia of mullion for wind pressure



Data:

Ordinary building

Window height: below 8 m a.s.l.

Span $L = 1400$ mm

Load width $b1 = 600$ m

Load width $b2 = 400$ m

Correction factor = 1.0

Correction factor = 1.0

Calculation:

Calculation of the required moment of inertia:

Span L	1400mm	From the moments of inertia table:
Width of load $a1$	300 mm	$I_{a1} = 0,90\text{cm}^4$
Width of load $a2$	200mm	$+ I_{a2} = 0,60 \text{ cm}^4$
Required moment of inertia		$I_{wym} = 1,50 \text{ cm}^4$

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

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

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

7. Statics

7.5 Table - required moments of inertia

The calculation of the moment of inertia applies to steel profiles. If aluminium profiles are used, these values must be multiplied by 3. Maximum permitted deflection: $l/300$ or 8 mm.

		Profile length (cm).														
		400	390	380	370	360	350	340	330	320	310	300	290	280	270	260
Load width (cm):	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	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	214,00	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	163,80	143,40	124,90	108,20								
		325,90	289,30	255,80	225,20	197,20	171,80	148,70								

XXX,XX

Upper row: moment of inertia (cm 4) for building height up to 8 m.

XXX,XX

Middle row: moment of inertia (cm4) for building height up to 20m.

XXX,XX

Lower row: moment of inertia (cm4) for building height up to 100m.

7. Statics

7.5 Table - required moments of inertia

The calculation of the moment of inertia applies to steel profiles. If aluminium profiles are used, multiply this value by 3. Maximum permitted deflection: $l/300$ or 8 mm.

Profile length (cm).		250	240	230	220	210	200	190	180	170	160	150	140	130	120	110	100
Load width (cm):	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
	30	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
		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
	40	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
	50	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
	60	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
		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
	70	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	2,10	1,57	1,14	0,79
	80	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		
	90	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		
		11,20	9,40	8,10	7,00	6,00	5,10	4,30	3,52	2,87	2,30	1,80	1,37				
	100	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				
	110	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						
	120	26,90	22,50	19,50	16,70	14,20	11,90	9,90	8,12	6,53	5,15						
		13,10	10,90	9,40	8,00	6,80	5,60	4,60	3,75								
	130	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								
	140	13,80	11,40	9,80	8,30	6,90	5,70										
		22,10	18,30	15,70	13,20	11,10	9,10										
	150	30,40	25,20	21,50	18,20	15,20	12,60										
		14,30	11,70	10,00	8,40												
	160	22,80	18,80	16,00	13,40												
		31,40	25,80	21,90	18,40												
	170	14,50	11,80														
		23,20	19,00														
	180	31,90	26,10														

8. Execution guidelines

- 8.1 Manufacturing technology
- 8.2 Delivery and storage
- 8.3 Profiles cutting
- 8.4 Drainage
- 8.5 Welding
- 8.6 Glazing
- 8.7 Tooling for production

8.1 Manufacturing technology

Components for the production of hard PVC profiles.

Spectrum profiles are made of impact-resistant hardened PVC. They are produced by extrusion (moulding on extruders) from a mixture of different materials, the main component of which is thermoplastic polyvinyl chloride (PVC). Polyvinyl chloride is one of the oldest plastics. It is currently classified as a standard plastic alongside polyethylene (PE), polypropylene (PP) and polystyrol (PS). Unlike the other materials mentioned, it is not made of carbon and hydrogen alone, but of carbon, hydrogen and chlorine.

Thanks to the admixture of various chemical components improving the functional properties of PVC, the use of polyvinyl chloride is very wide. The most important stage of PVC production is the mixing phase, where the amount of softeners added determines the division of PVC into hard PVC and soft PVC.

The type of PVC obtained, hard 2/3 softeners or soft PVC 1/3 softeners, determines its application.

Typical PVC products are: pipes, window and door profiles, roller blinds, floorings, roofing films, cable insulation, car tarpaulins (usually polyester fabrics with a soft PVC layer), structural foam wallpapers, chassis corrosion protection, artificial leather, disks, tablet packaging, medical technology products, e.g. blood bags and infusion hoses, shower curtains, furniture edges. In the case of window profiles, the impact-resistant material that does not generally contain softeners and with the right selection of ingredients, allows to obtain a product with the following characteristics:

- high mechanical strength, rigidity and hardness
- impact resistance and scratch resistance
- possibility to use in the temperature range from -30°C to +70°C
- high abrasion resistance
- flame retardant and quick extinguishing outside the fire source
- good resistance to chemicals and weather conditions - good welding properties
- no negative impact on human health

The base for crude PVC is crude oil and salt. Petroleum produces ethylene and salt chlorine. Ethylene and chlorine react with each other to form polyvinyl chloride (in gaseous form) in a polymerization process. The product of this reaction is white fine powder. To increase the impact resistance, PVC for window profiles is not produced in pure form, but as a copolymer in combination of PVC and acrylic ester.

8. Execution guidelines

8.1 Manufacturing technology

Cured polyvinyl chloride (cured PVC) profiles.

The starting material for the production of PVC profiles is a mixture of components, consisting of pure powder or granules, which is formed on the basis of PVC and an amount of additives specified in the recipe. All components of the mixture, after thorough automatic mixing, during which they are heated or cooled down, go as a finished raw material to the storage silos or extruder container. An extruder is a device which presses PVC profiles through a prepared die being a reproduction of the profile cross-section.

The refining components of PVC powder/granulate are:

- titanium dioxide as a white pigment,
- chalk (calcium carbonate) as a filling material and increasing stiffness and heat resistance,
- stabilizers; prevent thermal damage during processing and during use and oxidation and weather damage,
- in particular as a result of UV radiation, they are critical for ensuring the profiles' adequate ageing strength. Stabilizers are
- essentially inorganic and organic salts of metals: lead, zinc, calcium, barium and/or tin,
- release agents; they reduce the viscosity of the moulded mass during production or act as a lubricant between the mass of molten plastic and the metal walls of the machine and tools,
- agents improving material flow properties during thermoplastic forming,
- dyes, such as soot and organic dyes.

The suppliers of raw PVC and additives are well-known companies operating in the chemical industry. Owing to its properties, PVC has been used as a material for the production of window profiles since late 1960s. PVC compound for the production of window profiles, when evaluating all its properties, achieves better physical, chemical and mechanical parameters than other plastics, whose individual properties may exceed those of PVC.

This is the main reason why PVC continues to be the best material for window profiles.

The prepared mixture from the extruder tank is transported in a screw press channel, pressed under pressure (screws rotating in opposite directions), fused, homogenized and formed into a profile through a die/tool.

The moulded profile extruded from the die is calibrated while being held in the mould, cooled, signed with an article number and cut to pieces of length 6.50m.

8.2 Delivery and storage

Delivery.

All main profiles are covered on both sides with a protective film during the production process in order to optimally protect the visible profile surfaces from damage and soiling.

The protective film is UV resistant up to 6 months. However, it is recommended to cover the profiles storage with tarpaulin to protect them from direct sunlight and also from precipitation. Such a protection guarantees easy removal of the foil after the installation of finished windows in the building.

PVC profiles may be packed on non-returnable pallets or in containers.
Pallets / containers must be stored on an even and smooth surface.

Storage

Unless the profiles are stored in containers or on pallets, they should be stored on special racks. The distance between the rack supports must not be more than 1 m. The length of profile sections extending beyond the rack may not be longer than 0.5 m. If there are no racks and the profiles are stored on the floor, they should be laid on joists and on an even ground, observing the above-mentioned dimensions. The joists between the individual layers should be placed at right angles to each other. The heaviest profiles shall be laid at the bottom.

PVC window profiles may also be stored outside. Spectrum wraps the contents of each pallet in plastic film. This film provides protection against sun, wind and water. However, the plastic film may be damaged during transport and it is recommended to cover the pallets with a tarpaulin.

The profiles must be stored for at least 24 hours at room temperature before they can be processed. This guarantees high quality production.

The profiles must be arranged during transport in such a way that the profiles are as little overloaded as possible.

When using a forklift truck for unloading, the lift arm must be secured against direct contact with the PVC profile. This rule also applies to profiles covered with veneer.

The protective film should remain on the profile surface until the window is installed in the building. Then it may be removed. This film protects against scratches and the "spot leaving" effect.

8. Execution guidelines

8.3 Profiles cutting

The profiles to be processed must be seasoned for at least 24 hours at the shop floor temperature (15° - 18°C).

Two-headed saws adapted to cutting at an angle, equipped with a pneumatic profile clamping device and pneumatic saw feed are used to cut profiles.

This is to prevent the profile from shifting during cutting.

The decisive condition for correct cutting is to set the cutting angle to 45° on the length of the profile and 90° on the external and internal surface of the profile over the entire cutting section.

Therefore, the profile saw must be regularly inspected and adjusted if necessary.

The saw should be cleaned frequently due to debris or other contamination. Using single-head saws for cutting the main profiles to be welded should be avoided.

After setting up the saw, it should be checked whether the saw blade is suitable for PVC cutting and whether it is sharp. A spare disc should always be at hand. A blunt disc may cause uneven cutting. The disc must be properly tapered to allow proper cutting and to avoid PVC depositing on it. The build-up of PVC pieces on the saw blade increases friction and reduces speed, which is the reason for poor cutting quality. Fat, dirt and other contaminants are normally removed with acetone or other means.

The edges to be welded should be clean and free of dust and oil from the lubricating unit of the compressed air system. This oil very often floats in the air, so cutting and welding should be organised in such a way that the time between these operations is as short as possible. If the oil has settled on the surface to be welded, it must be cleaned before the welding operation.

8.4 Drainage

Types of technical holes and their purpose:

1. DRAINAGE HOLES (white and veneered profiles):
drainage of rainwater so that it does not penetrate into the room
2. DECOMPRESSION HOLES (veneered, painted profiles):
cooling/ventilating the outer chambers of all main and secondary profiles
3. PRESSURE EQUALIZING HOLES (white, veneered and painted profiles):
in a locked window, between the frame and the sash, an air chamber is created, the pressure of which should correspond to the external pressure in order to ensure effective rainwater drainage.

Milling and drilling of technical holes.

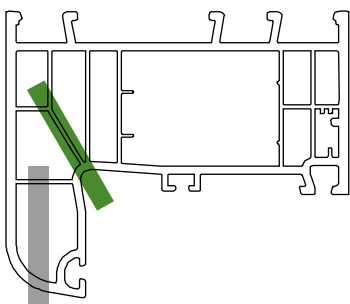
The proper functioning of PVC windows and doors requires the execution of various types of openings in the appropriate profile chambers. They are intended to remove rainwater so that it does not penetrate into the room. The outer chambers of the profiles must also be ventilated and the pressure equalization in the chambers most exposed to heat must be carried out. This only applies to „coloured” profiles. Water drainage holes and pressure holes for equalizing pressure in the profiles of coloured/veneered profiles.

If the windows are made of profiles whose external side is veneered, painted, with an aluminium overlay - then the profiles heat up to higher temperatures, even above 70°C. Such a strong heating of the profile chambers, a significant increase in pressure in the profile exterior chambers may lead to deformations, bulges in profile walls.

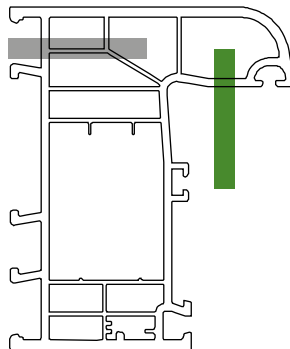
Therefore, all chambers of coloured profiles, whether large or small, shall feature pressure compensation holes (decompression holes).

The decompression holes shall be included in all main and additional profiles. Furthermore, it should be noted that access to decompression holes must not be hindered after the glazing and complete mounting of the window.

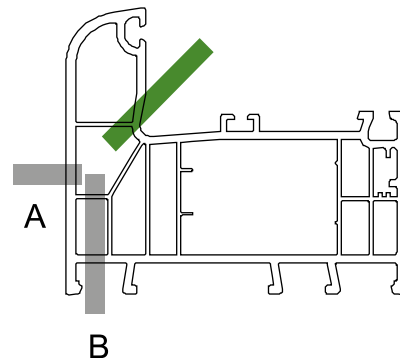
Milling and drilling holes in profile frames.



Pressure equalization in external chambers. Use a 5 mm drill bit and make decompression holes in the marked chambers. Applies to the top window elements.



Ventilation of vertical window elements. Use a 5mm drill bit and make ventilation holes in the marked chambers. Make the holes in vertical window elements at a distance of 200mm from the upper part of the rebate.



Drainage of lower frame elements. Drainage holes are „beans” of size 5x30mm, 6x30mm or 8mm diameter holes. A - chamber drainage to the outside, B - chamber drainage from below. Drainages A and B are alternative. The distance between drainage holes made outside and inside must be at least 50mm.

8. Execution guidelines

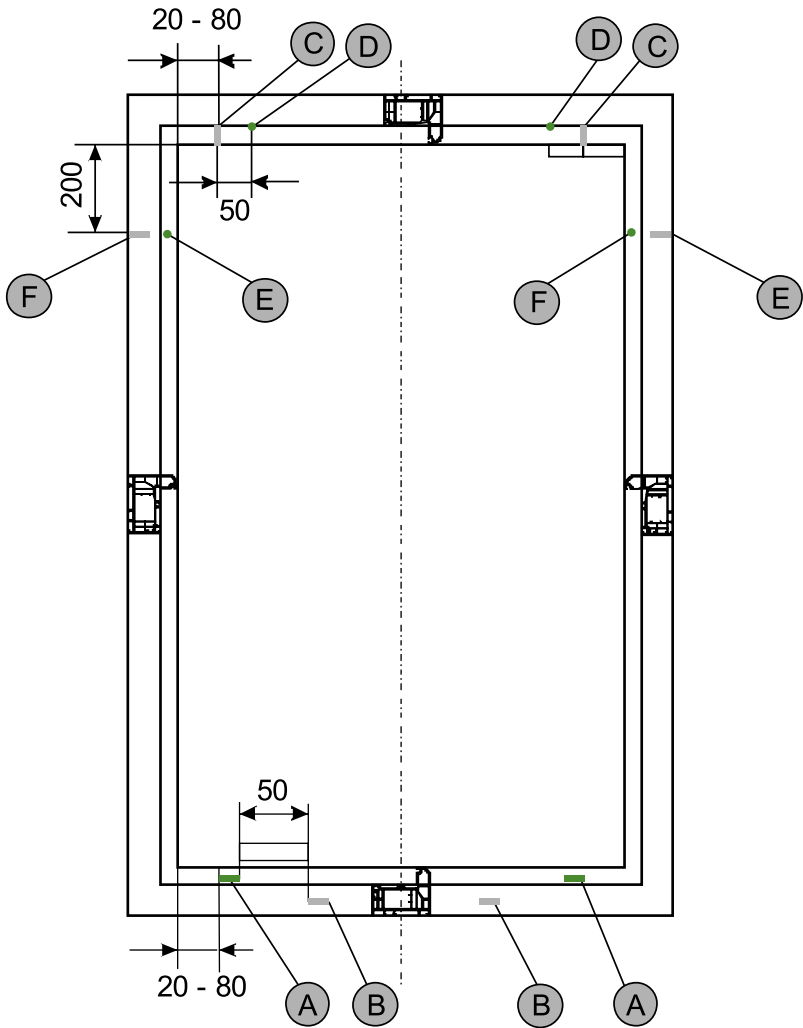
8.4 Drainage

Table 1. Number of millings and drillings - frames.

Window frame size		Number of millings and drillings					
		Drainage points		Pressure equalization		Ventilation	
		A	B	C	D	E	F
Clear dimension of given lite	≤ 600 mm	2	1 at center	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

Drilling or milling from inside the profile (green)

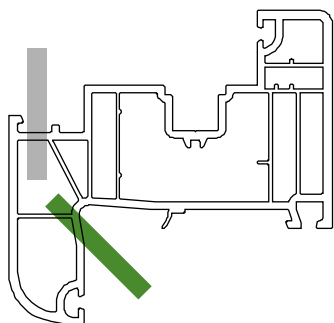
Drilling or milling from outside the profile (grey)



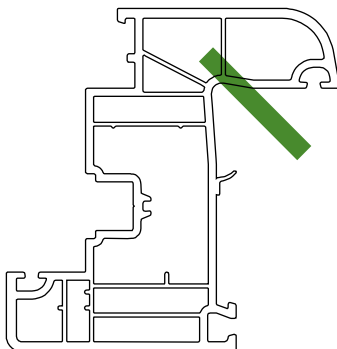
8. Execution guidelines

8.4 Drainage

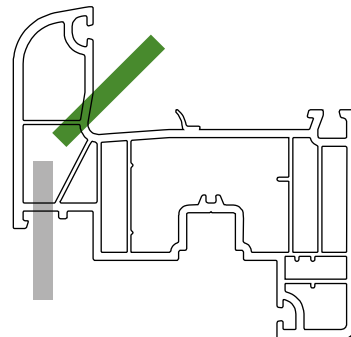
Milling and drilling holes in „coloured” sashes.



Pressure equalization in external chambers. Decompression holes should be made, i.e. 5x30mm, 6x30mm beans and holes with a diameter of 6 mm should be made in the marked chambers. Applies to the top window elements.



Ventilation of vertical window elements. Use a 5 mm drill bit and make ventilation holes in the marked chambers. Make the holes in vertical window elements at a distance of 200 mm from the upper part of the rebate.



Drainage of lower sash elements. Drainage holes are „beans” of size 5x30mm, 6x30mm or 8mm diameter holes. The distance between drainage holes made outside and inside must be at least 50mm.

Tabela 2. Liczba frezowań i wierceń - skrzydła.

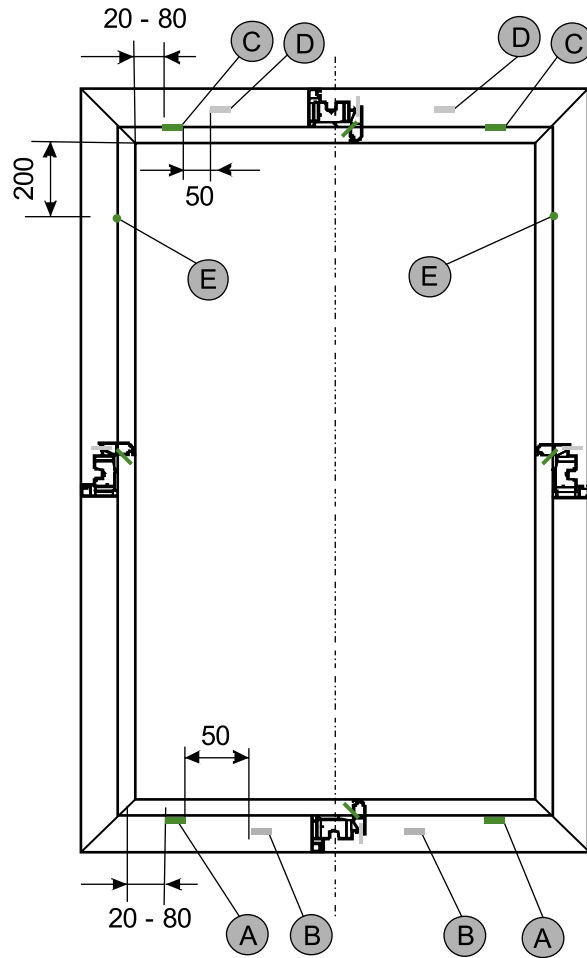
Window frame size		Number of millings and drillings				
		Drainage points		Pressure equalization		Ventilation
		A	B	C	D	F
Clear dimension of given lite	≤ 600 mm	2	1 at center	1 at center	2	2
	600 - 1300 mm	2	2	2	2	2
	1300 - 2000 mm	3	2	2	2	2
	≥ 2000 mm	3	3	2	2	2

Drilling or milling from inside the profile (green)

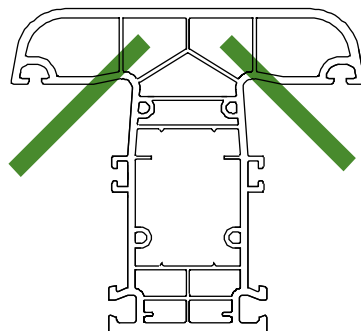
Drilling or milling from outside the profile (grey)

8. Execution guidelines

8.4 Drainage



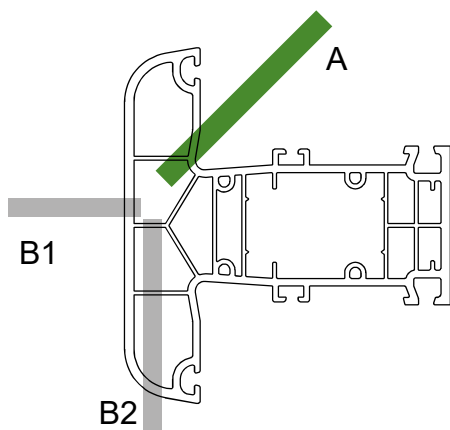
Milling and drilling holes in vertical profiles of fixed mullions and structural muntins.



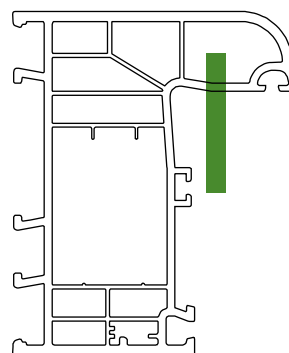
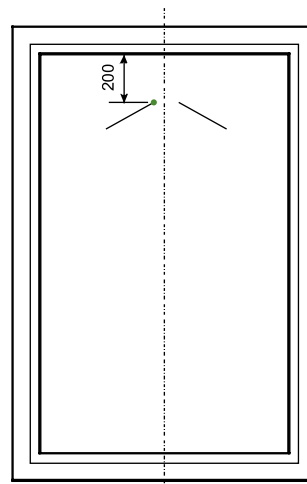
Ventilation of vertical window elements (fixed mullions and structural muntins).

Use a 5 mm drill bit and make ventilation holes in the marked chambers. Holes should be made in the vertical elements of windows at a distance of 200 mm counting from the top part of the rebate of the lite in which it is mounted.

Milling and drilling holes in horizontal profiles of fixed mullions and horizontal structural muntins.



Drainage of horizontal mullions or structural muntins. Drainage holes are „beans” of size 5x30mm, 6x30mm or 8mm diameter holes. B1 drainage of chamber outside, B2 - drainage of chamber at the bottom. Drainages B1 and B2 are alternative. The distance between drainage holes made outside and inside must be at least 50mm.



Ventilation of the vertical elements of window lite elements, divided by transoms/splits. Use a 5 mm drill bit and make ventilation holes in the marked chambers. Make the holes in vertical window elements at a distance of 200 mm from the upper part of the rebate.

Table 3. Number of millings and drillings - horizontal fixed mullions.

Window frame size		Number of millings and drillings				
		Drainage points		Pressure equalization		Ventilation
		A	B	C	D	F
Clear dimension of given lite	≤ 600 mm	2	1 at center	1 at center	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

 Drilling or milling from inside the profile (green)

 Drilling or milling from outside the profile (grey)

8. Execution guidelines

8.5 Welding

Frame and sash profiles are connected by blunt welding.

The strength of the corner determines whether the window has sufficient strength to balance the forces that occur during frame installation and the loads associated with changes in length as a result of fluctuations in temperature and glass weight, as well as those resulting from daily window use.

A welding machine may be defined as a device that connects two plastic objects without introducing foreign material. The welding process consists in heating the plastic elements to a temperature of about 235-240° C (which is exactly 4° lower than the point where the plastic starts to yellow slightly) and then joining them under pressure.

In order to achieve optimum welding power, it is essential that the welding machine is correctly positioned in relation to the parameters of the material and components to be welded.

In the following part of this document, only welding machines that are equipped with stopping blades will be discussed, as these are used in almost all cases.

The following points should be checked:

The distance between the stopping blades shall not be less than 2 mm. The ideal distance is 2.5 mm. The distance should be measured when simulating the cold phase welding process.

If the interval is less than the specified one, it must be corrected. When checking and adjusting, make sure that the span at both ends of the profile is the same (symmetrically to the centerline of the welding machine). It should be corrected if necessary. It is important to ensure that the air supply is switched off during adjustments.

For this purpose, please refer to the machine description.

The temperature of the stopping blades must be controlled. The temperature of the blades is about 40°C. It is possible that the temperature on the thermostat does not match the blades temperature.

Therefore, measure the temperature and adjust the thermostat setting if necessary. The correct setting of the thermostat should be marked on the housing.

The heating plate must be „loose“, according to the operating instructions; in case of difficulties, contact the seller. The heating plate should be smooth, without scratches or contamination. All cables and electrical connections must be in working order. The temperature sensors must be positioned in accordance with the manufacturer's instructions and must be adapted to the type of device specified in the manual. The Teflon coating on the sealing surface must be securely attached, clean and not scratched or punctured. Check the type of Teflon: the machine supplier has supplied the correct type of Teflon. It is recommended to dry Teflon once a day: in the morning with soft paper/tissue without washing agents - to remove dirt and contamination. Always have a spare Teflon (Teflon coating) in stock.

When welding profiles, support guides must be used to prevent the profiles from moving, turning and deforming.

8. Execution guidelines

8.5 Welding

The support guides shape is fitted to the profiles and the way they are mounted depends on the welding machine model. It must be ensured that they are mounted in accordance with the currently welded profile (longitudinally) and positioned accordingly. The support guide must be mounted so that it does not protrude beyond the stopping blade. The support guide should have sharp edges. Behind the sharp edge there should be a groove to collect the outflowing material. All control units and guides of the welding machine must be cleaned of dust. If necessary, they must be readjusted. In case of difficulties, contact the company selling the device.

The profiles should be welded as soon as possible after cutting, as the dust from the cut ends may weaken the weld and cause a black line on the weld.

Process parameters setting:

Profiles mounting pressure:	$4,5 < p1 < 5 \text{ bar}$ Pressure that ensures that the profile is firmly held in the machine during the process.
Pressure of pressing the profiles to the welding machine mirror (heating plate):	$3,5 < p2 < 4 \text{ bar}$ Pressure required during contact of the heating plate with profiles.
Profile pressure after heating (cooling):	$3,5 < p2 < 4 \text{ bar}$ Welding pressure required for the profiles to be permanently welded after heating.
Warm-up time:	$t1 = 30 \text{ seconds}$ Contact time of heating plate with welded parts. $t1 = 45 \text{ seconds}$ When welding with angle connector.
Opening time:	$t2 = 2 \text{ seconds}$ The time between „opening” the welding machine, removing the heating plate and connecting the heated elements. The shortest time should be sought to avoid the formation of the so-called „peel”.
Welding time:	$t3 = 30 \text{ seconds}$ Time of pressing the welded elements.

8. Execution guidelines

8.5 Welding

Processing of welded joints.

Welded parts should never be stored on the floor, but on trolleys or pallets.

After welding, do not mill the welded profiles for approx. 5 minutes in order to ensure the proper strength of the welds.

The processing may be done manually or by machine.

Manual cleaning is performed with a chisel or special knife (don Carlos knife) to obtain a joint even with the surface of the profile face.

Machine cleaning is performed by an automatic cleaning machine, which leaves a small cavity along the entire joint. Care should be taken to ensure that the depth of the resulting groove is minimal. The creation of a large cavity reduces the joint cross-section and thus weakens the strength of the corner.

The treated weld face does not require any additional treatment such as grinding or polishing as this damages the surface and causes unnecessary dust and dirt to settle on the polished surfaces. Dust and dirt do not damage the profiles as such, but polished surfaces are more susceptible to damage.

8. Execution guidelines

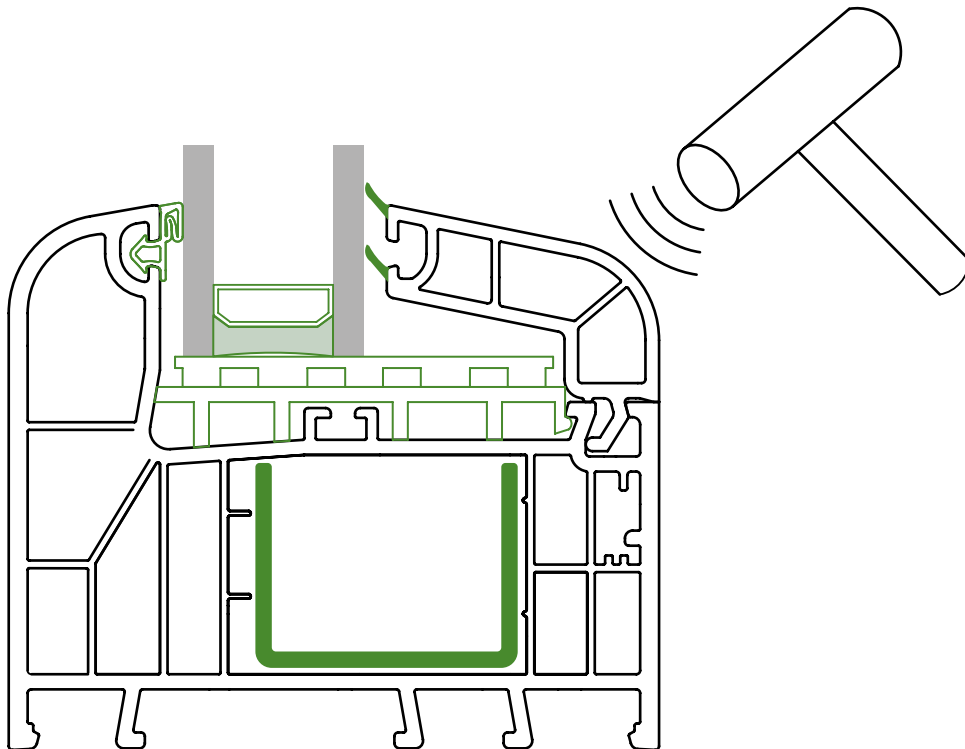
8.6 Glazing

The glazing units are mounted on the so-called supporting blocks. In addition, they are held by glazing beads.

The glazing unit must be secured against movement by using an appropriate arrangement of supporting blocks (see drawings). Stress relief should be sought due to the possible cracking of the panes.

When proceeding to install the glazing bead, it must first be inserted into the frame, bending both ends at the same time. Then, slamming with a rubber mallet from the edge to the center of the frame, the entire bead should be installed. For slats cut at an angle of 45°, shorter slats must be fitted first and then longer ones. When overlapping the glazing beads, the bottom beads must be mounted first.

The bead is removed using the „Don Carlos” knife, first by pulling the bead out from within the frame and then removing it completely.



8. Execution guidelines

8.6 Glazing

Guidelines for the distribution of supporting blocks.

The glazing unit should be mounted using blocks. The blocks support the pane, immobilize it and regulate its distance from the ground.

The blocks should not be installed in places where they will obstruct ventilation and water drainage.

Three types of blocks are used, each of which has a different function:

TYPE 1

Supporting blocks - take up loads between the pane and the ground and therefore give stability to the window elements.

TYPE 2

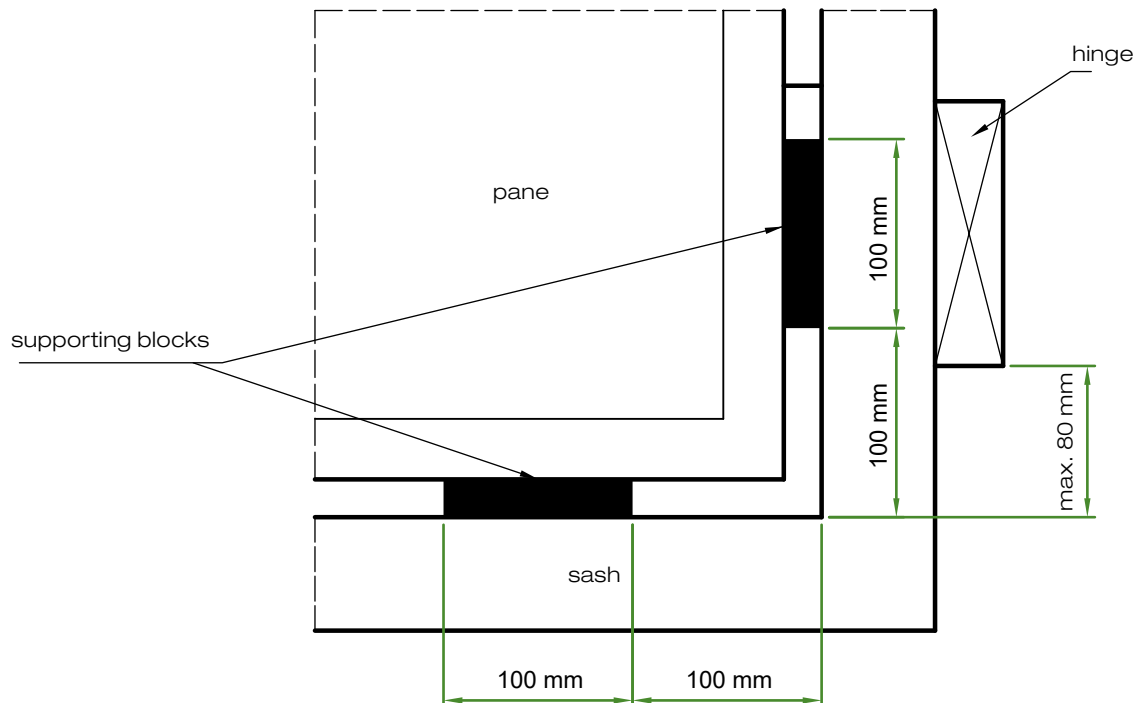
Supporting blocks - provide a fixed distance between the edge of the pane and the ground.

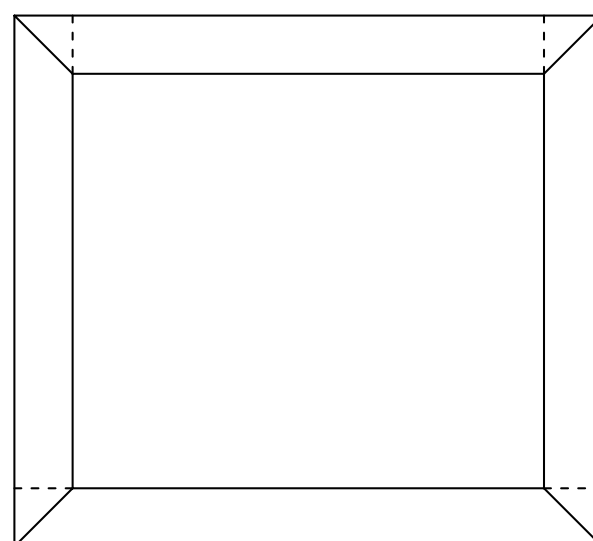
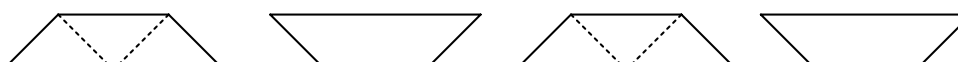
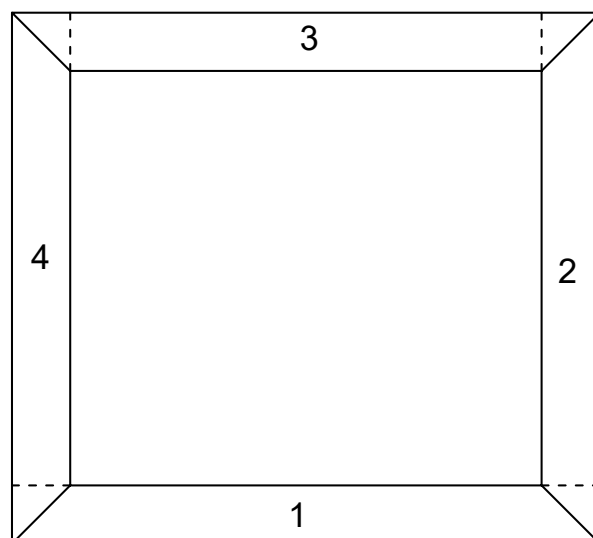
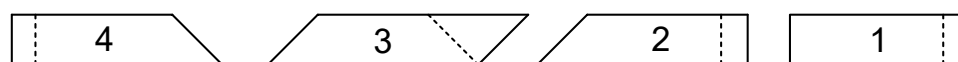
They should be used when the side wall of the pane is longer than 500 mm.

If this length is less than 500 mm the use of spacers is not necessary.

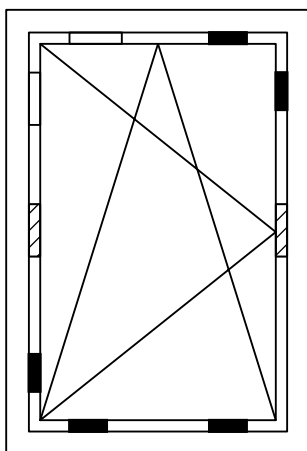
TYPE 3

Supporting blocks - are used to ensure the proper functioning of the hardware and the centering of the pane during transport and use.

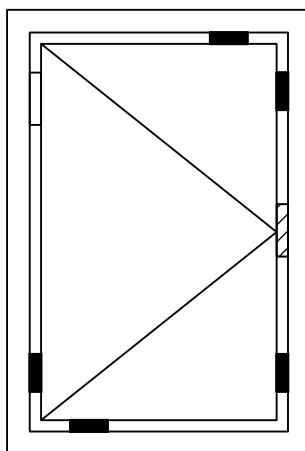




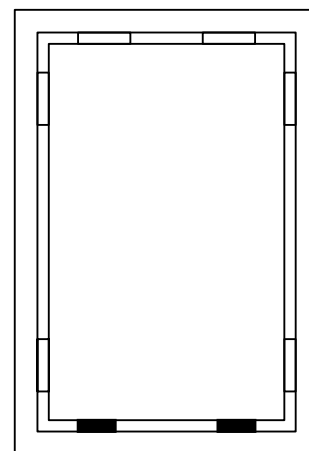
Guide to positioning the support packers.



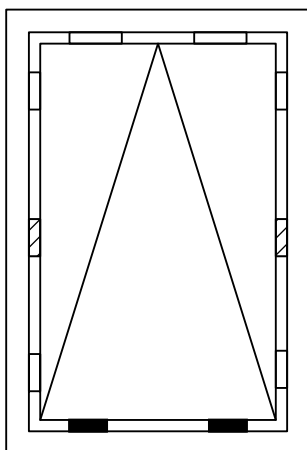
tilt / turn



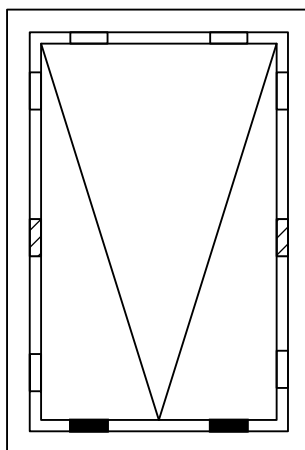
turn



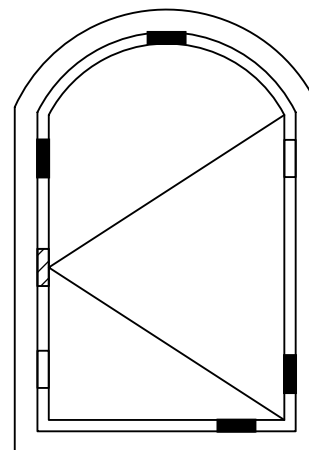
fixed glazing



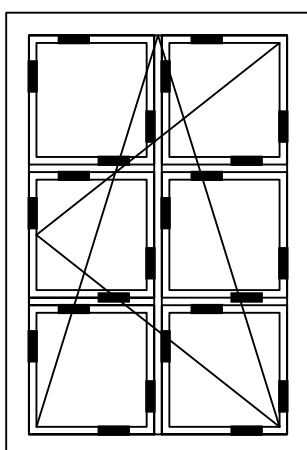
tilt



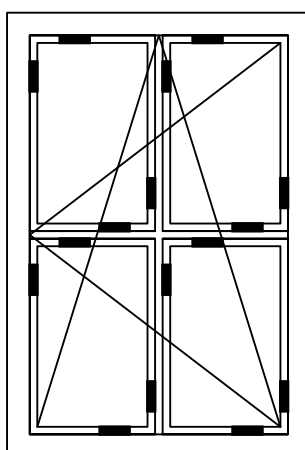
tilt



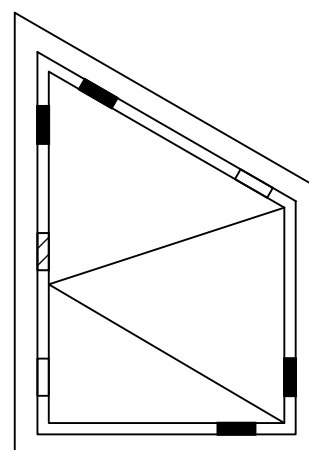
turn with arch



window with muntins



window with muntins



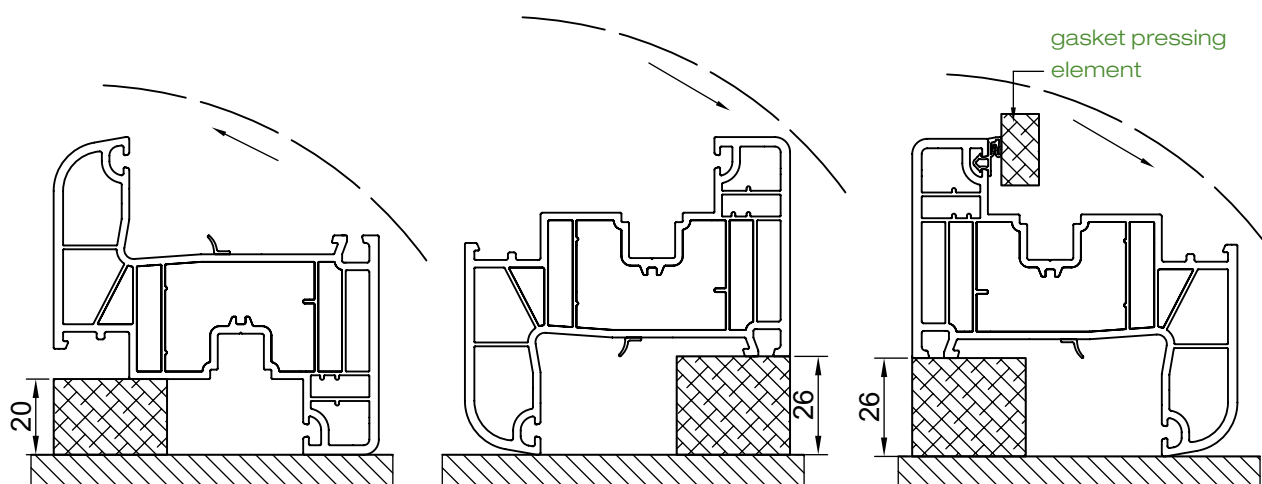
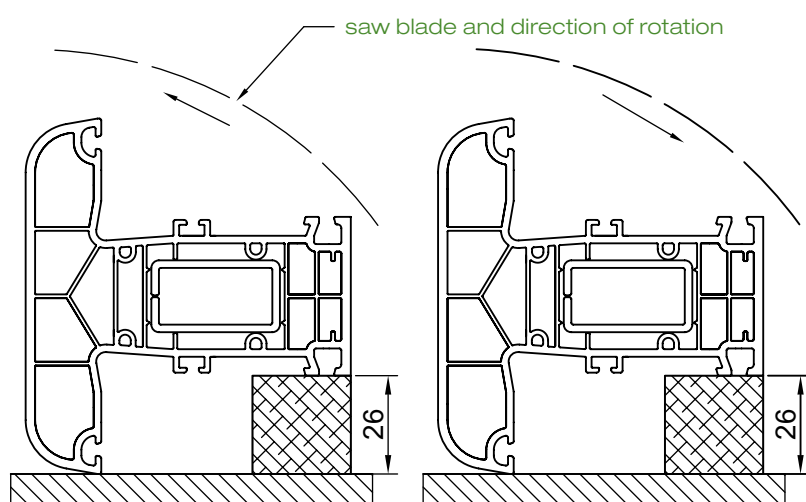
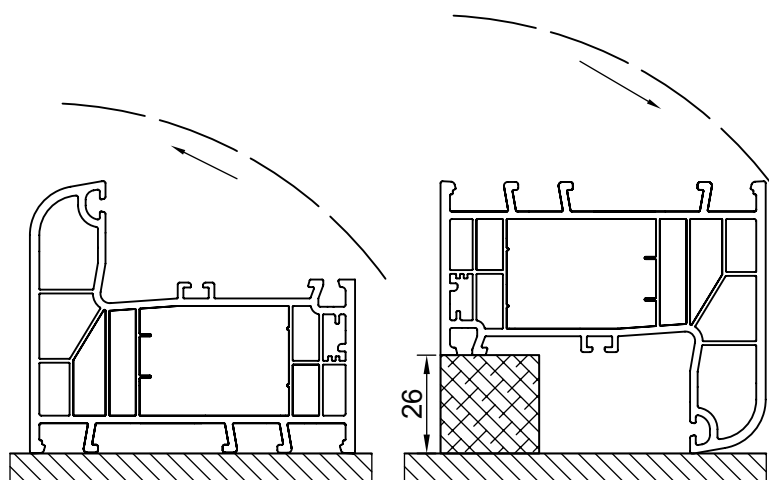
turn, slanted

 spacer blocks

 slanted blocks

 supporting blocks

Saw pads.

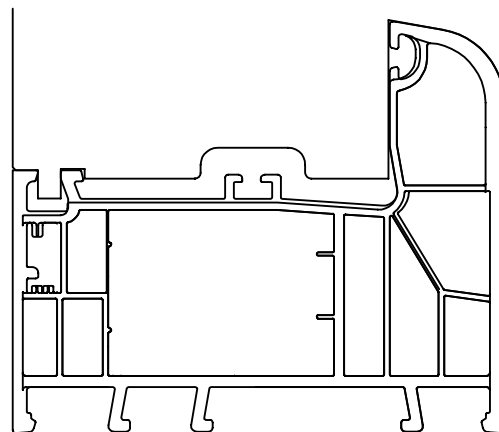
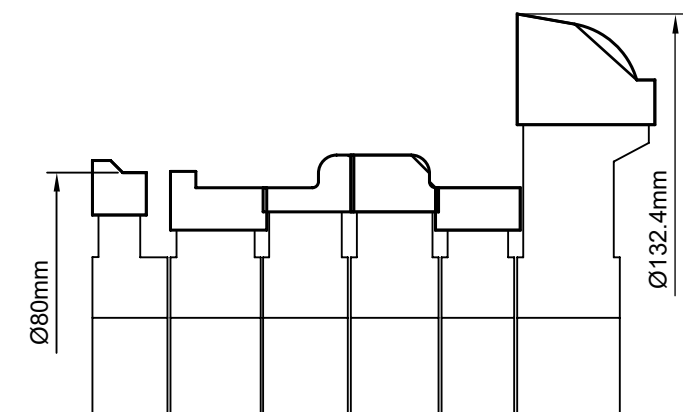
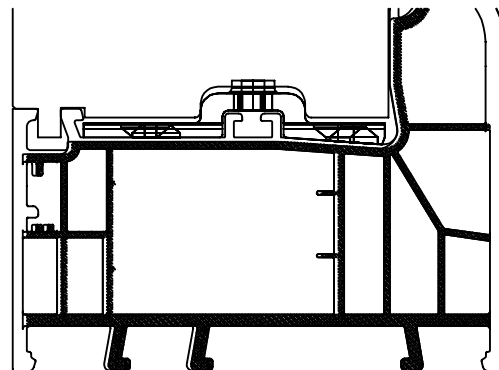
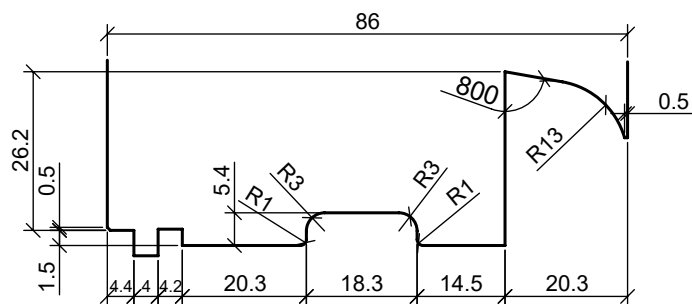


8. Execution guidelines

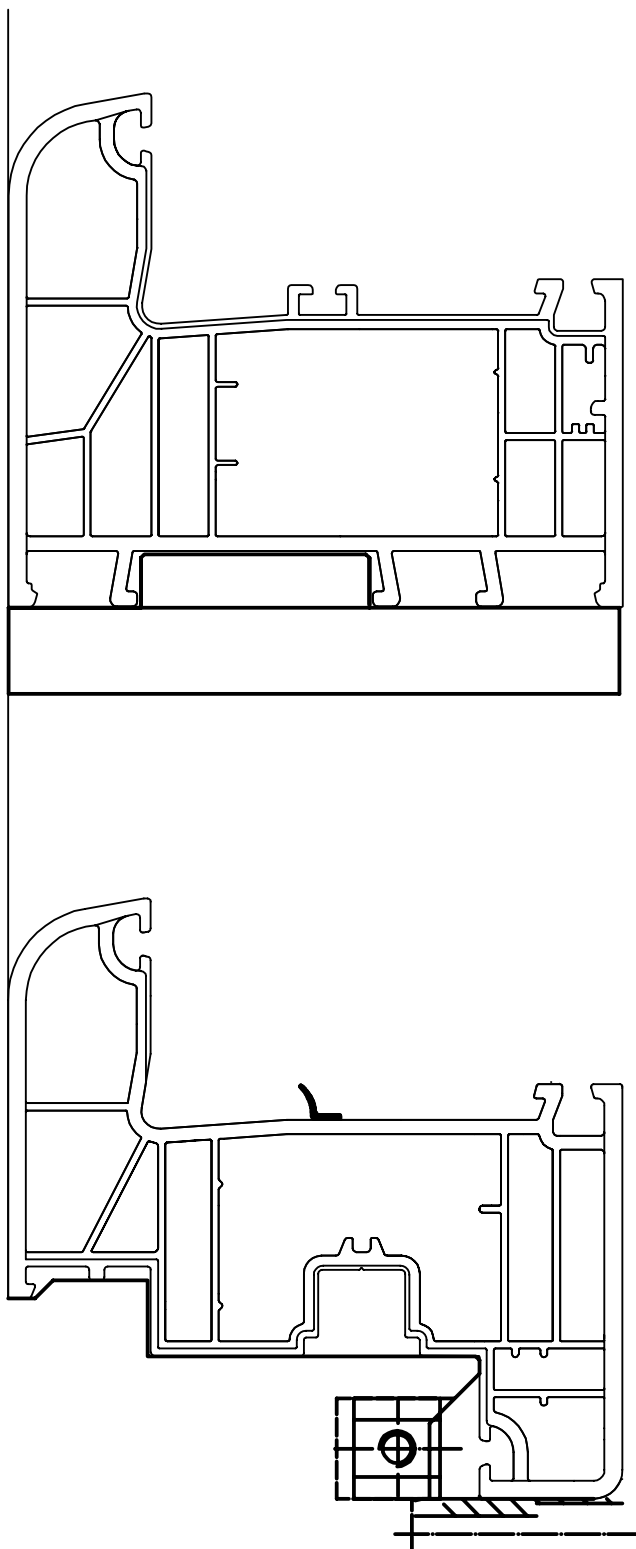
8.7 Tooling for production

THERM

Milling pattern.

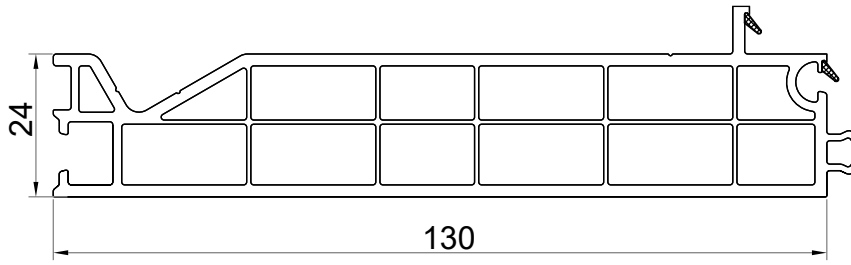


Resistance.

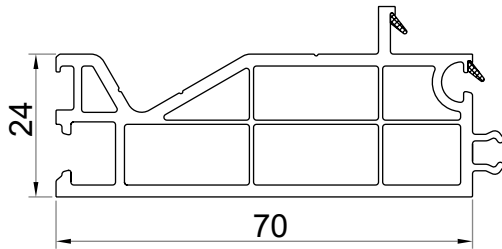


Cassonetto system components and assembly

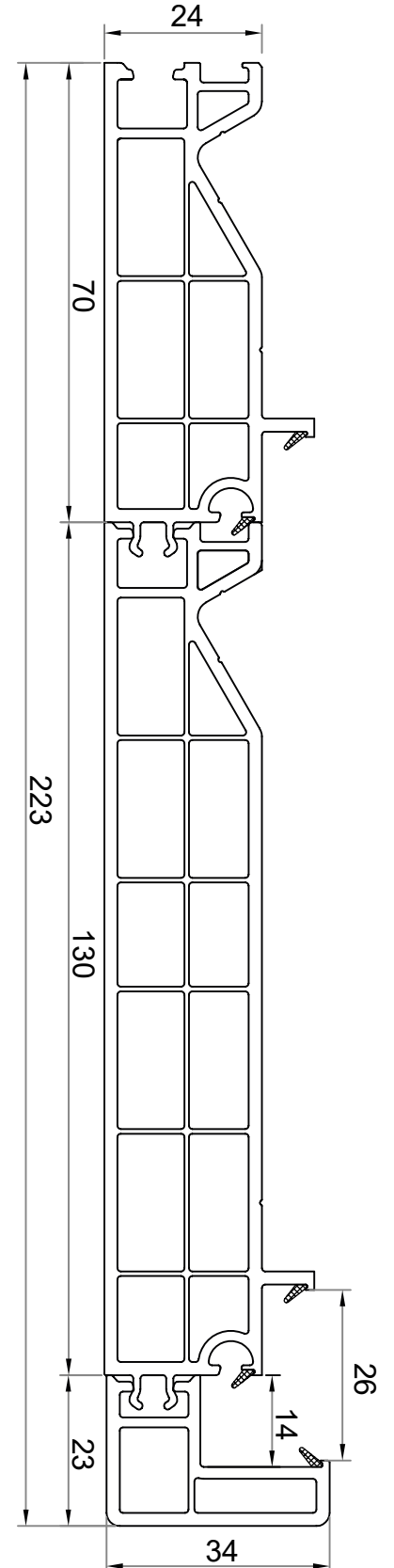
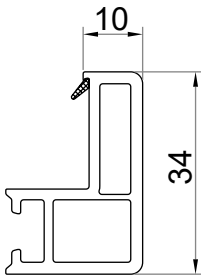
80130 - Base profile 24mm x 130mm



80070 - Base profile 24mm x 130mm



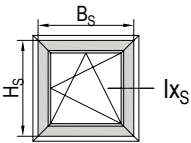
80034 - Clipping profile 10mm x 34mm



Appendix 1

Size limitations, maximum sash dimensions.

Guidelines for the use of reinforcements / statics
Maximum sash dimensions



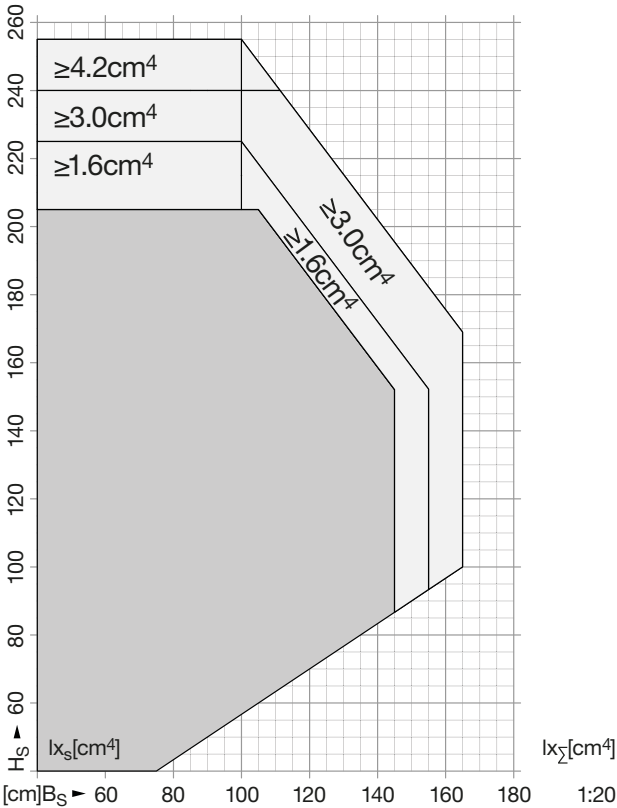
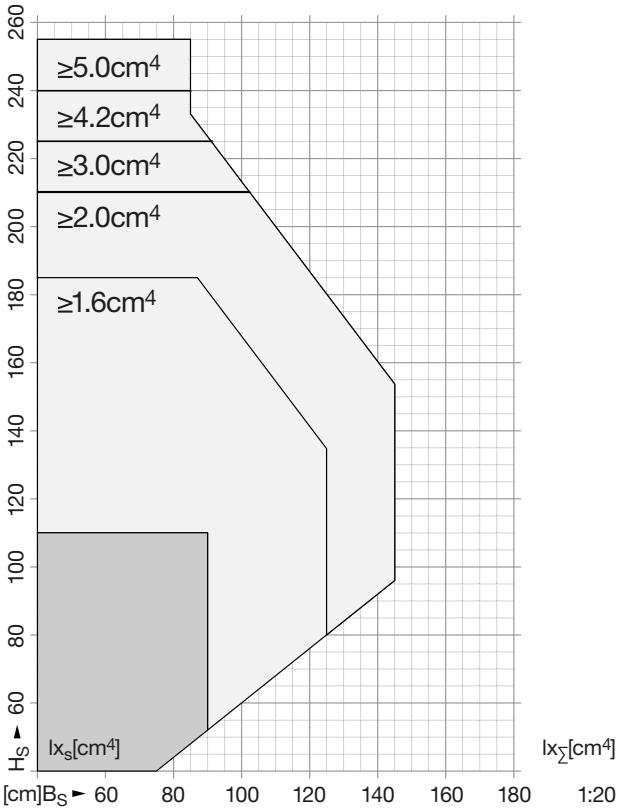
1 sash ≤ 130kg
or as required by the hardware manufacturer

glass thickness	[mm] (t ₁ +t ₂ ...) t _Σ = 4 6 8 10 12 14 16 18 20 22 ...
glass weight	[kg/m ²]-2.5× t _Σ = 10 15 20 25 30 35 40 45 50 55 ...

assembly: frame - sash		single-sash				
max. locking distance !	-> S ≥ 77mm	[mm]	750	750	700	
	-> S ≥ 76mm	[mm]	750	750	650	
air permeability	EN 12207	grade	-	3	4	
watertightness	EN 12208	grade	4A	7A	9A	

conventional glazing, white

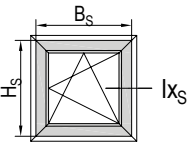
glued-in glass, white



- Sash with reinforcement
- Sash without reinforcement (up to 30 kg)

- Sash with reinforcement
- Sash without reinforcement (up to 30 kg)

Guidelines for the use of reinforcements / statics
Maximum sash dimensions

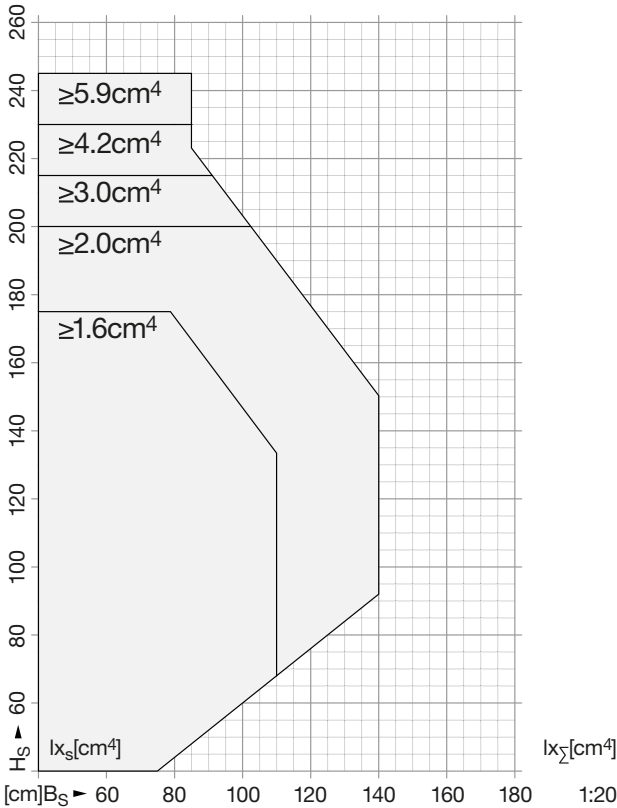


1 sash ≤ 130kg
or as required by the hardware manufacturer

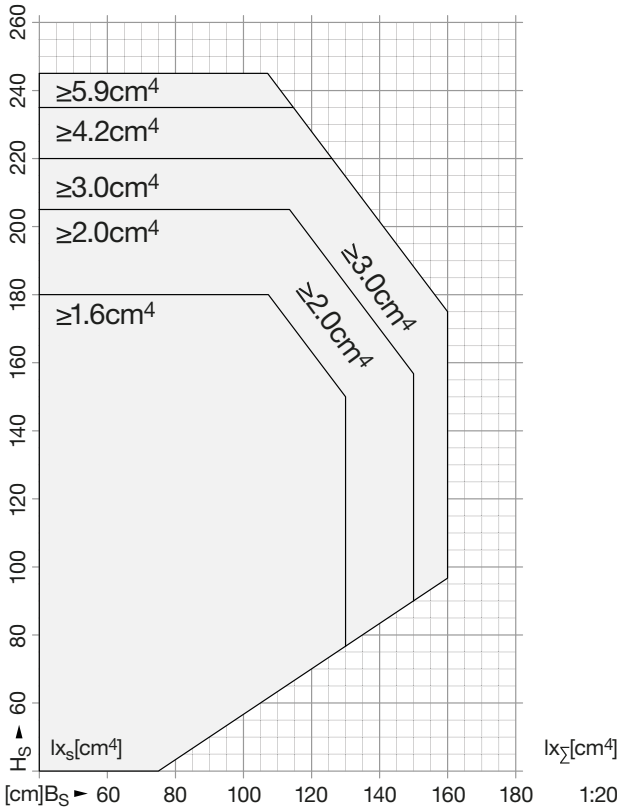
glass thickness	[mm] (t ₁ +t ₂ ...) t _Σ = 4 6 8 10 12 14 16 18 20 22 ...
glass weight	[kg/m ²]-2.5× t _Σ = 10 15 20 25 30 35 40 45 50 55 ...

assembly: frame - sash		single-sash				
max. locking distance ❗	-> S ≥ 77mm	[mm]	750	750	700	
	-> S ≥ 76mm	[mm]	750	750	650	
air permeability	EN 12207	grade	-	3	4	
watertightness	EN 12208	grade	4A	7A	9A	

conventional glazing, coloured



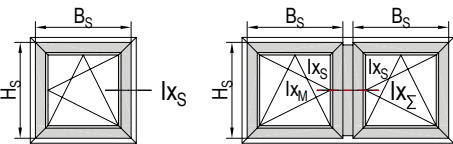
glued-in glass, coloured



□ Sash with reinforcement

□ Sash with reinforcement

Guidelines for the use of reinforcements / statics
Maximum sash dimensions



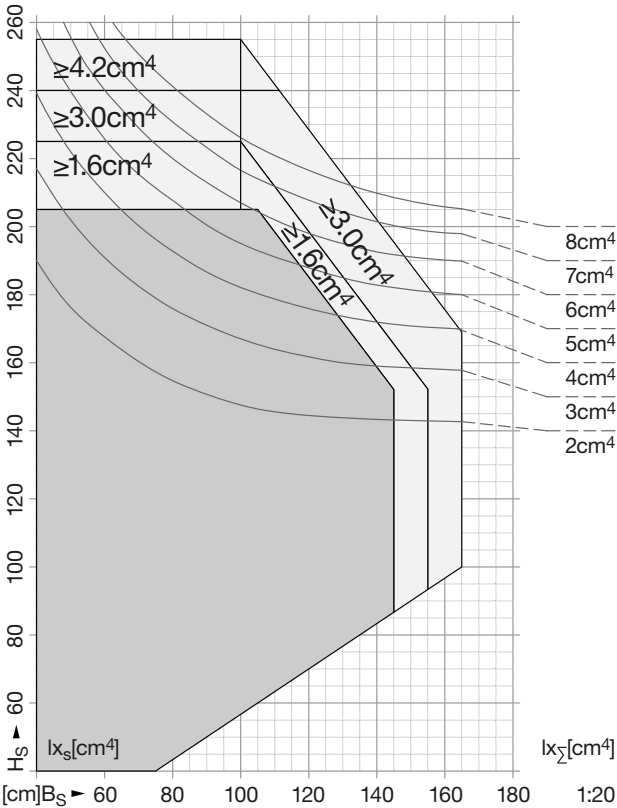
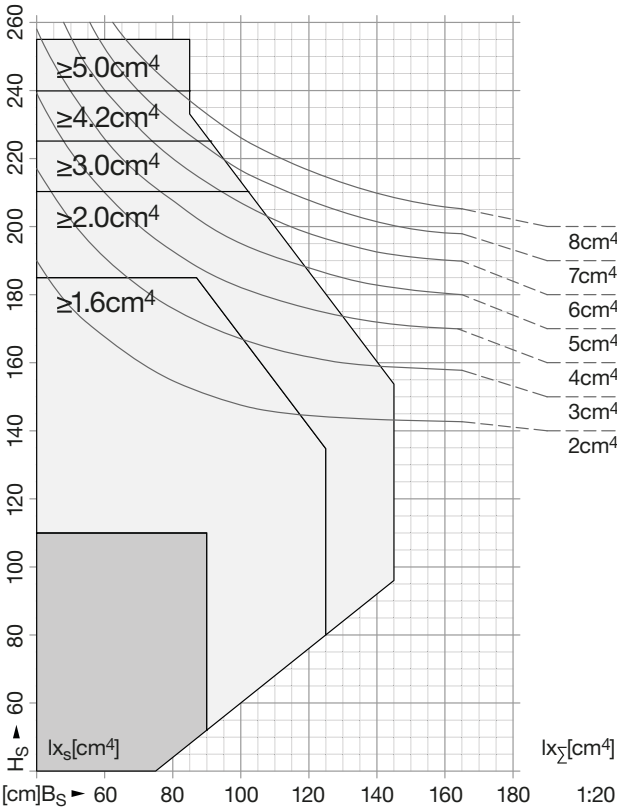
1 sash ≤ 130kg
or as required by the hardware manufacturer

glass thickness	[mm] (t ₁ +t ₂ ...) t _Σ = 4 6 8 10 12 14 16 18 20 22 ...
glass weight	[kg/m ²]-2.5× t _Σ = 10 15 20 25 30 35 40 45 50 55 ...

assembly: frame - sash		single-sash				
assembly: sash - mullion - sash		2-sash				
assembly: sash - floating mullion - sash						
resistance to wind load	EN 12210	klasa				C1
max. locking distance 	-> S ≥ 77mm	[mm]	750	750	700	
	-> S ≥ 76mm	[mm]	750	750	650	
air permeability	EN 12207	grade	-	3	4	
watertightness	EN 12208	grade	4A	7A	9A	

conventional glazing, white

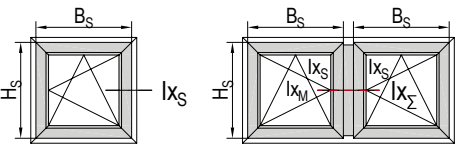
glued-in glass, white



- Sash with reinforcement
- Sash without reinforcement (up to 30 kg)

- Sash with reinforcement
- Sash without reinforcement (up to 30 kg)

Guidelines for the use of reinforcements / statics
Maximum sash dimensions

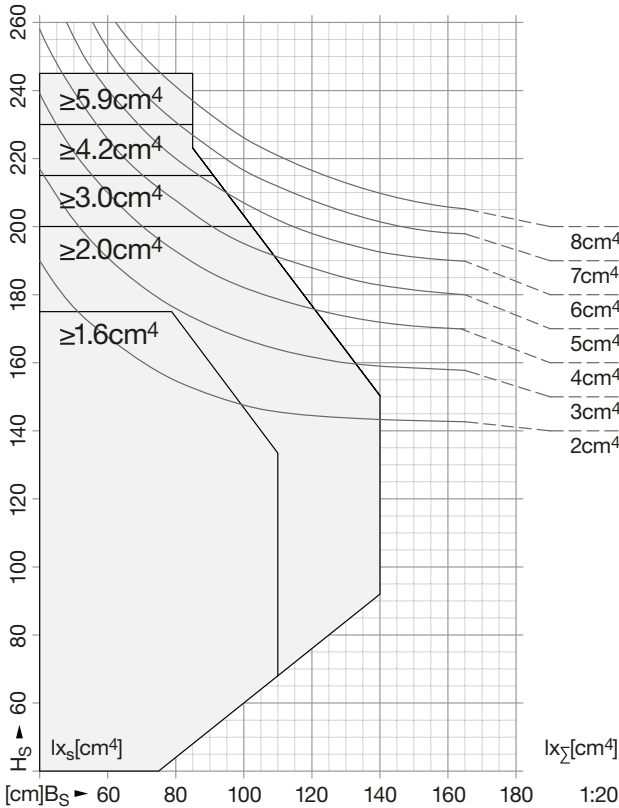


1 sash ≤ 130kg
or as required by the hardware manufacturer

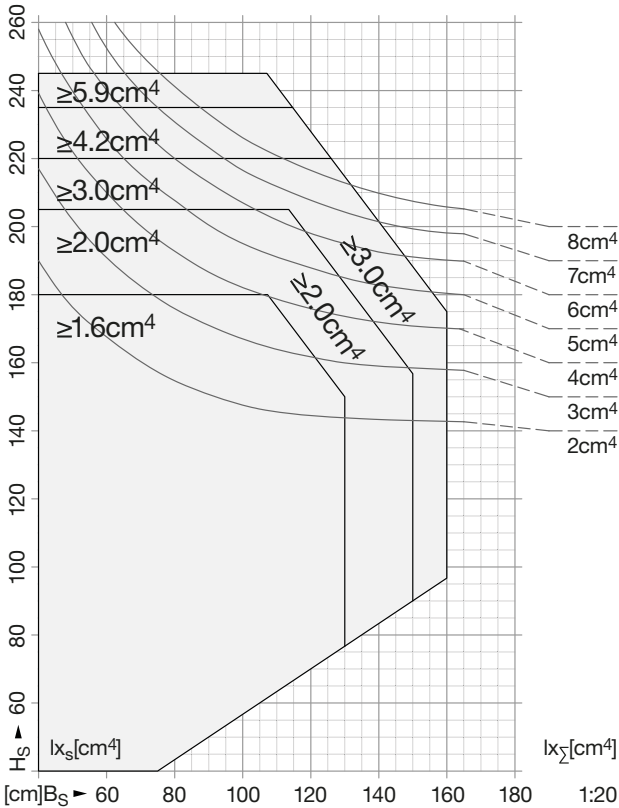
glass thickness	[mm] (t ₁ +t ₂ ...) t _Σ = 4 6 8 10 12 14 16 18 20 22 ...
glass weight	[kg/m ²]-2.5× t _Σ = 10 15 20 25 30 35 40 45 50 55 ...

assembly: frame - sash		single-sash				
assembly: sash - mullion - sash		2-sash				
assembly: sash - floating mullion - sash						
resistance to wind load	EN 12210	klasa				C1
max. locking distance ❗	-> S ≥ 77mm	[mm]	750	750	700	
	-> S ≥ 76mm	[mm]	750	750	650	
air permeability	EN 12207	grade	-	3	4	
watertightness	EN 12208	grade	4A	7A	9A	

conventional glazing, coloured



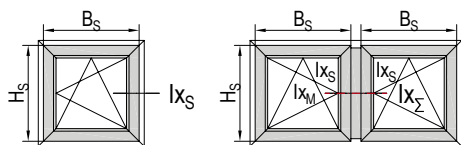
glued-in glass, coloured



□ Sash with reinforcement

□ Sash with reinforcement

Maximum sash dimensions

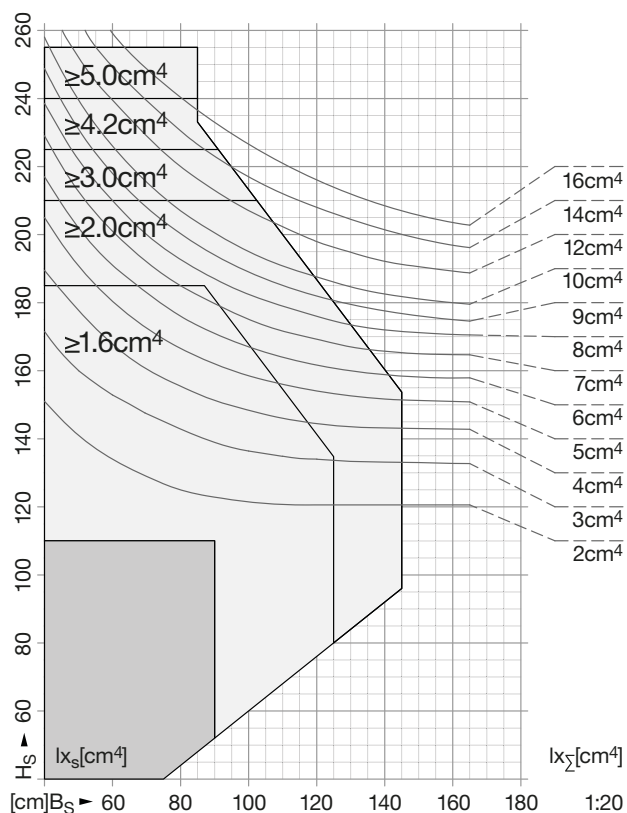
1 sash $\leq 130\text{kg}$

or as required by the hardware manufacturer

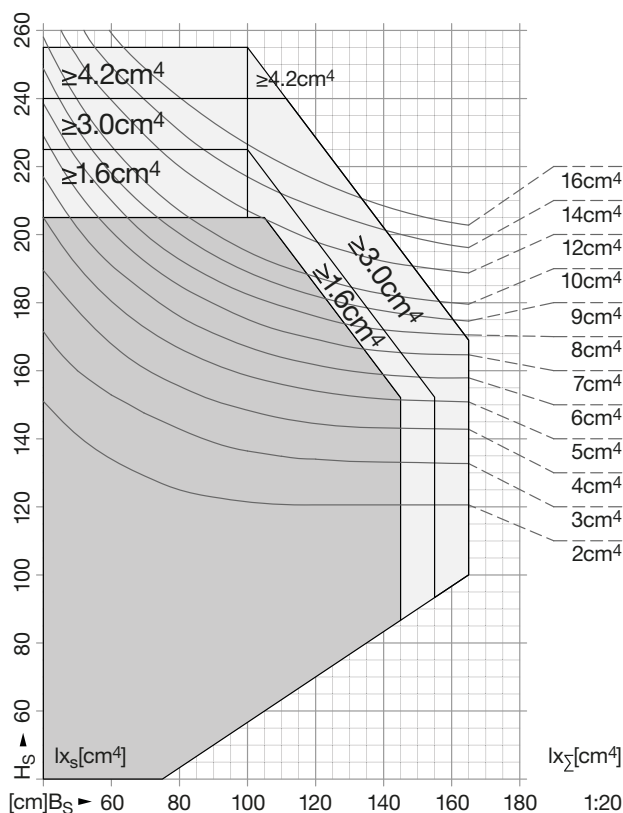
glass thickness	[mm] ($t_1+t_2...$) $t_z = 4 \mid 6 \mid 8 \mid 10 \mid 12 \mid 14 \mid 16 \mid 18 \mid 20 \mid 22 \dots$
glass weight	[kg/m ²] $\sim 2.5 \times t_z = 10 \mid 15 \mid 20 \mid 25 \mid 30 \mid 35 \mid 40 \mid 45 \mid 50 \mid 55 \dots$

assembly: frame - sash	single-sash					
assembly: sash - mullion - sash	2-sash					
assembly: sash - floating mullion - sash						
resistance to wind load	EN 12210	klasa				C2
max. locking distance ❗	-> $S \geq 77\text{mm}$	[mm]	750	750	700	
	-> $S \geq 76\text{mm}$	[mm]	750	750	650	
air permeability	EN 12207	grade	-	3	4	
watertightness	EN 12208	grade	4A	7A	9A	

conventional glazing, white



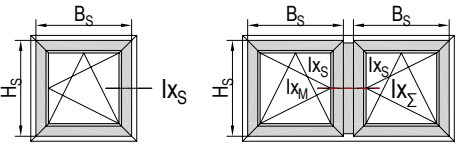
glued-in glass, white



- Sash with reinforcement
- Sash without reinforcement (up to 30 kg)

- Sash with reinforcement
- Sash without reinforcement (up to 30 kg)

Maximum sash dimensions

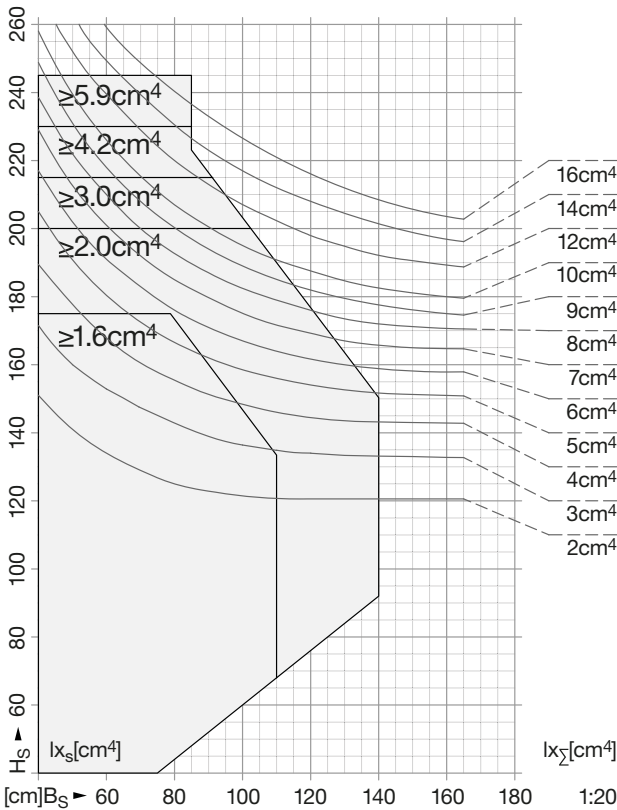


1 sash $\leq 130\text{kg}$
or as required by the hardware manufacturer

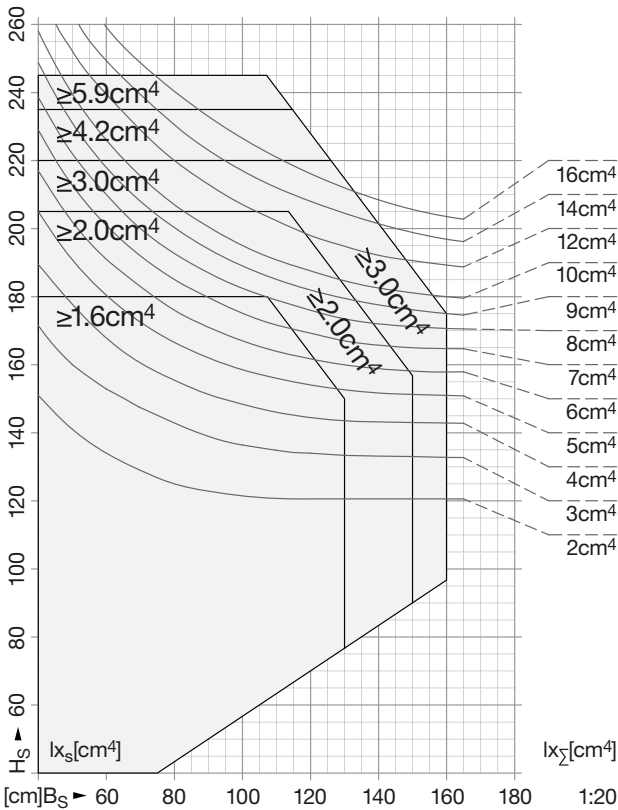
glass thickness	[mm] ($t_1+t_2\ldots$) $t_{\Sigma}= 4 \mid 6 \mid 8 \mid 10 \mid 12 \mid 14 \mid 16 \mid 18 \mid 20 \mid 22 \ldots$
glass weight	[kg/m ²] $\sim 2.5 \times t_{\Sigma}= 10 \mid 15 \mid 20 \mid 25 \mid 30 \mid 35 \mid 40 \mid 45 \mid 50 \mid 55 \ldots$

assembly: frame - sash		single-sash				
assembly: sash - mullion - sash		2-sash				
assembly: sash - floating mullion - sash						
resistance to wind load	EN 12210	klasa				C2
max. locking distance ❗	-> $S \geq 77\text{mm}$	[mm]	750	750	700	
	-> $S \geq 76\text{mm}$	[mm]	750	750	650	
air permeability	EN 12207	grade	-	3	4	
watertightness	EN 12208	grade	4A	7A	9A	

conventional glazing, coloured



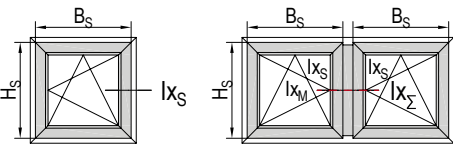
glued-in glass, coloured



 Sash with reinforcement

 Sash with reinforcement

Guidelines for the use of reinforcements / statics
Maximum sash dimensions



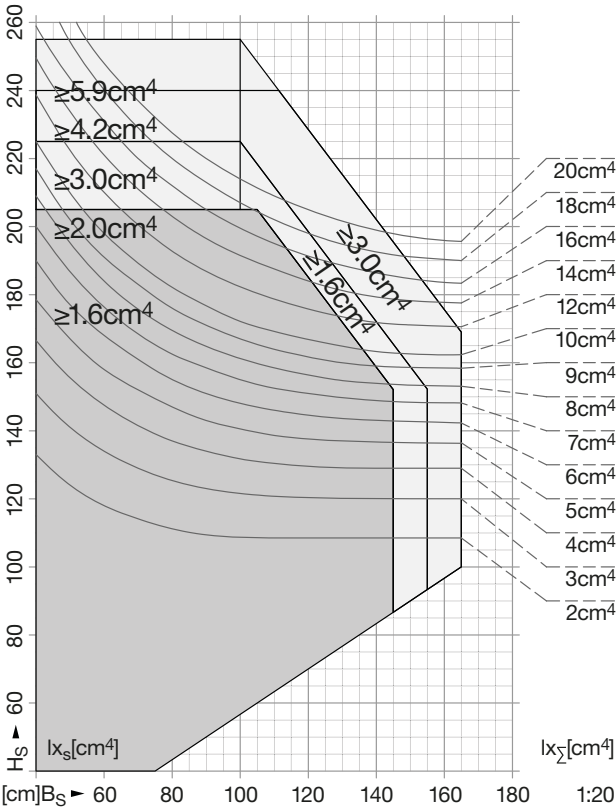
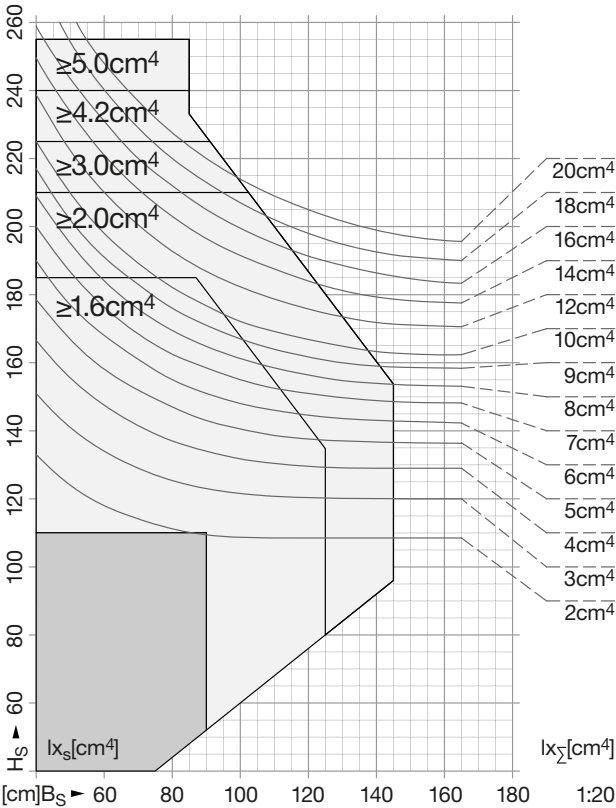
1 sash $\leq 130\text{kg}$
or as required by the hardware manufacturer

glass thickness	[mm] ($t_1+t_2...$) $t_{\Sigma} = 4 \mid 6 \mid 8 \mid 10 \mid 12 \mid 14 \mid 16 \mid 18 \mid 20 \mid 22 \dots$
glass weight	[kg/m ²] $\sim 2.5 \times t_{\Sigma} = 10 \mid 15 \mid 20 \mid 25 \mid 30 \mid 35 \mid 40 \mid 45 \mid 50 \mid 55 \dots$

assembly: frame - sash		single-sash				
assembly: sash - mullion - sash		2-sash				
assembly: sash - floating mullion - sash						
resistance to wind load	EN 12210	klasa				C3
max. locking distance ⚠	-> S ≥ 77mm	[mm]	750	750	700	
	-> S ≥ 76mm	[mm]	750	750	650	
air permeability	EN 12207	grade	-	3	4	
watertightness	EN 12208	grade	4A	7A	9A	

conventional glazing, white

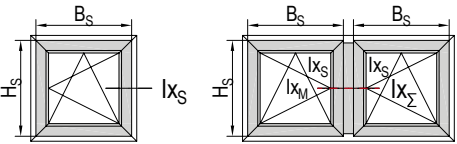
glued-in glass, white



-  Sash with reinforcement
-  Sash without reinforcement (up to 30 kg)

-  Sash with reinforcement
-  Sash without reinforcement (up to 30 kg)

Maximum sash dimensions

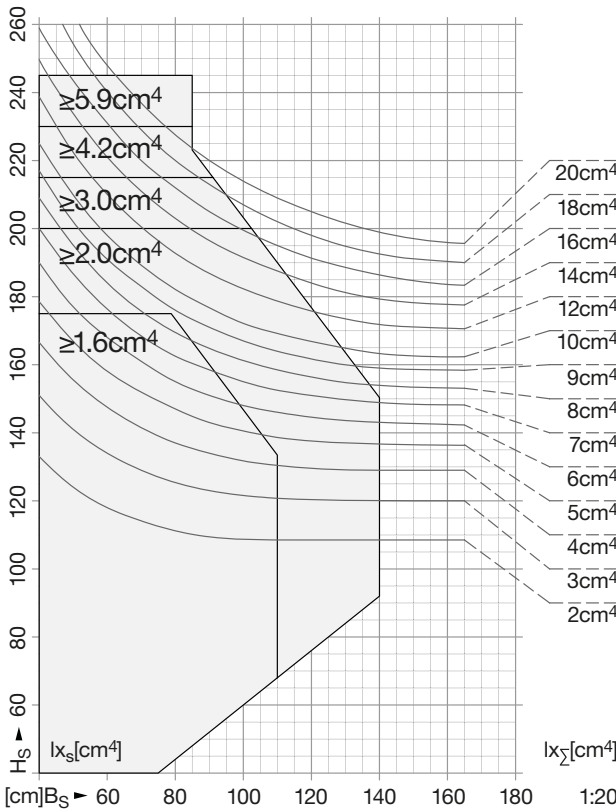


1 sash $\leq 130\text{kg}$
or as required by the hardware manufacturer

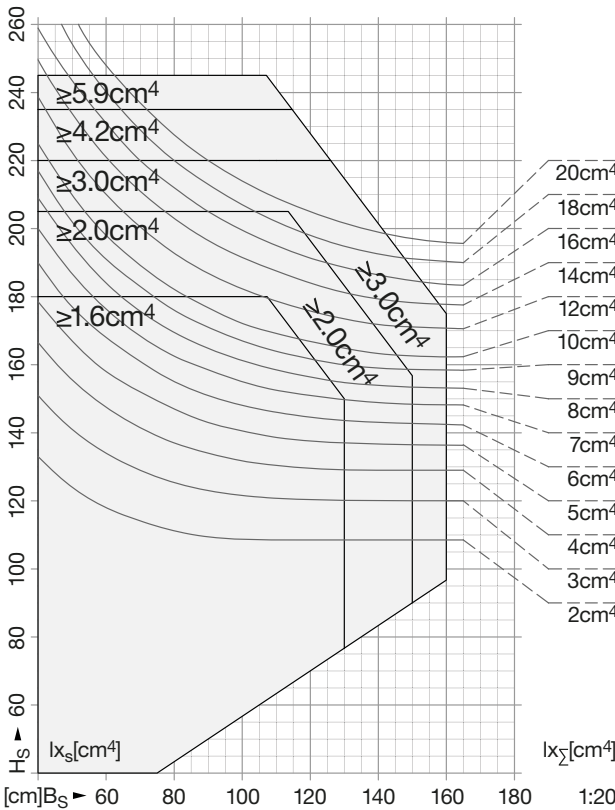
glass thickness	[mm] ($t_1+t_2\ldots$) $t_{\Sigma}= 4 \mid 6 \mid 8 \mid 10 \mid 12 \mid 14 \mid 16 \mid 18 \mid 20 \mid 22 \ldots$
glass weight	[kg/m ²] $\sim 2.5 \times t_{\Sigma}= 10 \mid 15 \mid 20 \mid 25 \mid 30 \mid 35 \mid 40 \mid 45 \mid 50 \mid 55 \ldots$

assembly: frame - sash		single-sash				
assembly: sash - mullion - sash		2-sash				
assembly: sash - floating mullion - sash						
resistance to wind load	EN 12210	klasa				C3
max. locking distance	-> S ≥ 77mm	[mm]	750	750	700	
	-> S ≥ 76mm	[mm]	750	750	650	
air permeability	EN 12207	grade	-	3	4	
watertightness	EN 12208	grade	4A	7A	9A	

conventional glazing, coloured



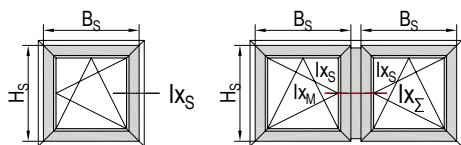
glued-in glass, coloured



Sash with reinforcement

Sash with reinforcement

Maximum sash dimensions

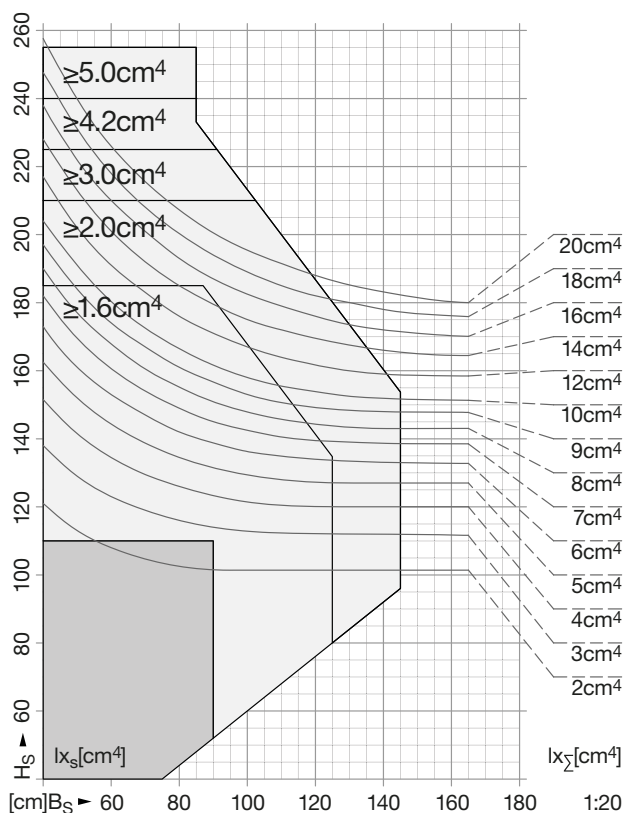
1 sash $\leq 130\text{kg}$

or as required by the hardware manufacturer

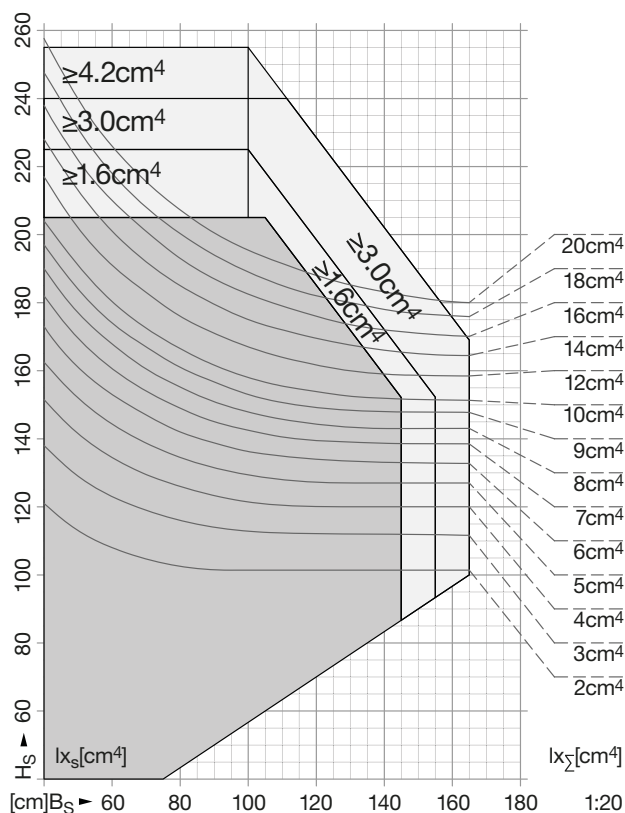
glass thickness	[mm] ($t_1+t_2...$) $t_{\Sigma} = 4 \mid 6 \mid 8 \mid 10 \mid 12 \mid 14 \mid 16 \mid 18 \mid 20 \mid 22 \dots$
glass weight	[kg/m ²] $\sim 2.5 \times t_{\Sigma} = 10 \mid 15 \mid 20 \mid 25 \mid 30 \mid 35 \mid 40 \mid 45 \mid 50 \mid 55 \dots$

assembly: frame - sash	single-sash					
assembly: sash - mullion - sash	2-sash					
assembly: sash - floating mullion - sash						
resistance to wind load	EN 12210	klasa				C4
max. locking distance 	$\rightarrow S \geq 77\text{mm}$	[mm]	750	750	700	
	$\rightarrow S \geq 76\text{mm}$	[mm]	750	750	650	
air permeability	EN 12207	grade	-	3	4	
watertightness	EN 12208	grade	4A	7A	9A	

conventional glazing, white



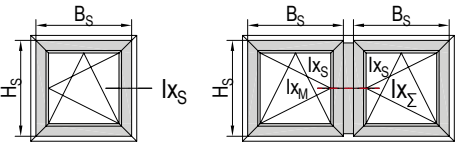
glued-in glass, white



-  Sash with reinforcement
-  Sash without reinforcement (up to 30 kg)

-  Sash with reinforcement
-  Sash without reinforcement (up to 30 kg)

Maximum sash dimensions

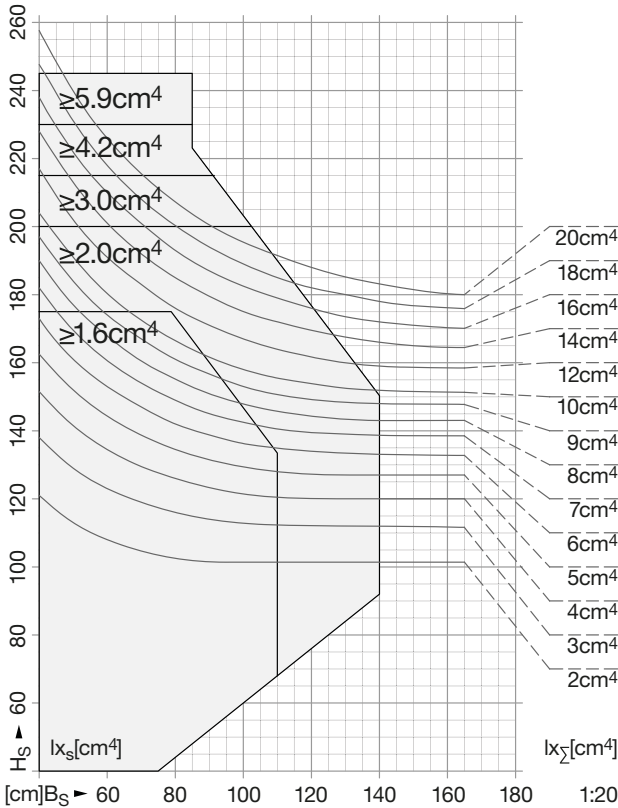


1 sash ≤ 130kg
or as required by the hardware manufacturer

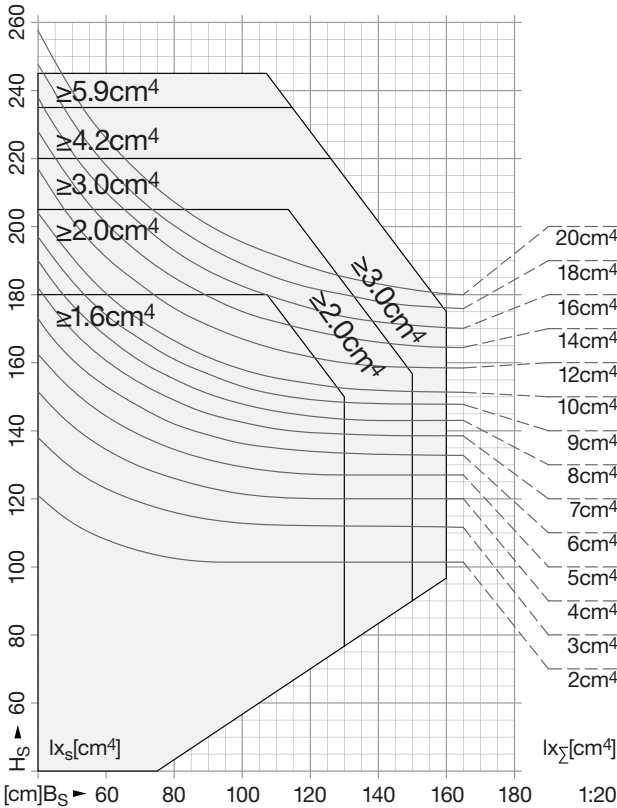
glass thickness	[mm] (t ₁ +t ₂ ...) t _Σ = 4 6 8 10 12 14 16 18 20 22 ...
glass weight	[kg/m ²] ~2.5× t _Σ = 10 15 20 25 30 35 40 45 50 55 ...

assembly: frame - sash		single-sash				
assembly: sash - mullion - sash		2-sash				
assembly: sash - floating mullion - sash						
resistance to wind load	EN 12210	klasa				C4
max. locking distance ❗	-> S ≥ 77mm	[mm]	750	750	700	
	-> S ≥ 76mm	[mm]	750	750	650	
air permeability	EN 12207	grade	-	3	4	
watertightness	EN 12208	grade	4A	7A	9A	

conventional glazing, coloured



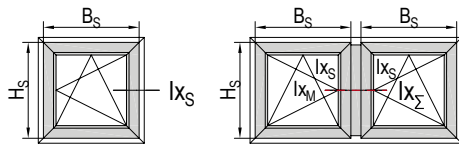
glued-in glass, coloured



□ Sash with reinforcement

□ Sash with reinforcement

Maximum sash dimensions

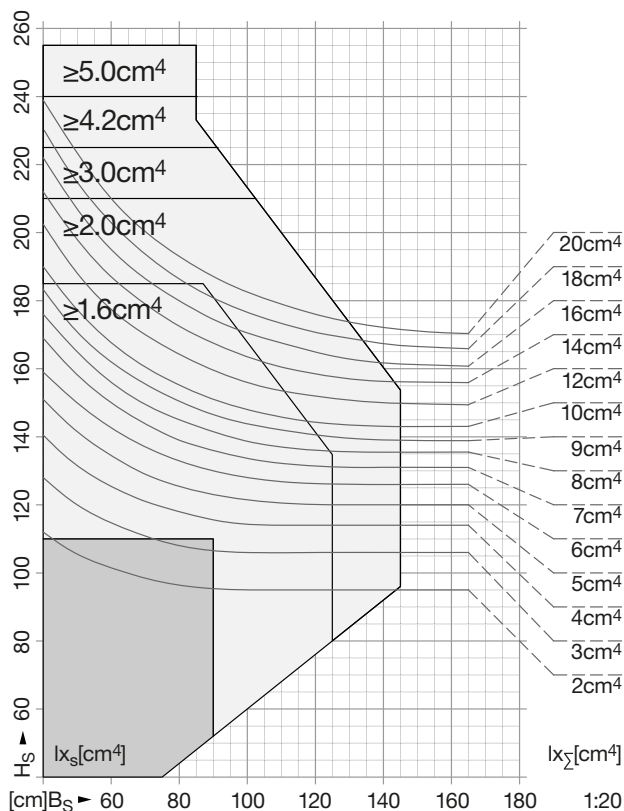
1 sash $\leq 130\text{kg}$

or as required by the hardware manufacturer

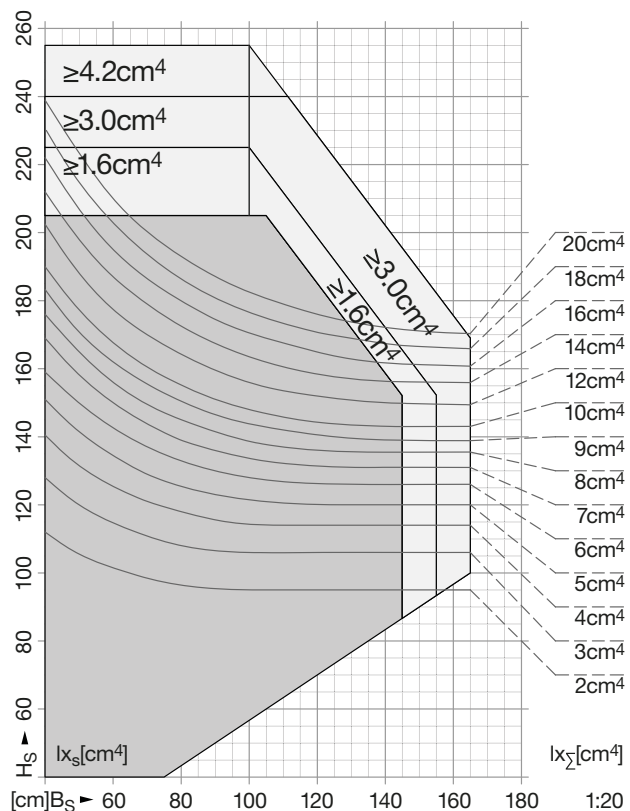
glass thickness	[mm] ($t_1+t_2...$) $t_{\Sigma} = 4 \mid 6 \mid 8 \mid 10 \mid 12 \mid 14 \mid 16 \mid 18 \mid 20 \mid 22 \dots$
glass weight	[kg/m ²] $\sim 2.5 \times t_{\Sigma} = 10 \mid 15 \mid 20 \mid 25 \mid 30 \mid 35 \mid 40 \mid 45 \mid 50 \mid 55 \dots$

assembly: frame - sash		single-sash				
assembly: sash - mullion - sash		2-sash				
assembly: sash - floating mullion - sash						
resistance to wind load	EN 12210	klasa				C5
max. locking distance ❗	-> S ≥ 77mm	[mm]	750	750	700	
	-> S ≥ 76mm	[mm]	750	750	650	
air permeability	EN 12207	grade	-	3	4	
watertightness	EN 12208	grade	4A	7A	9A	

conventional glazing, white



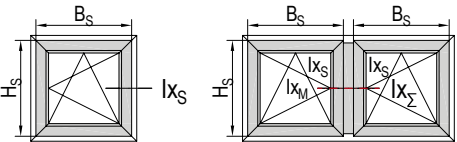
glued-in glass, white



- ☐ Sash with reinforcement
☐ Sash without reinforcement (up to 30 kg)

- ☐ Sash with reinforcement
☐ Sash without reinforcement (up to 30 kg)

Maximum sash dimensions

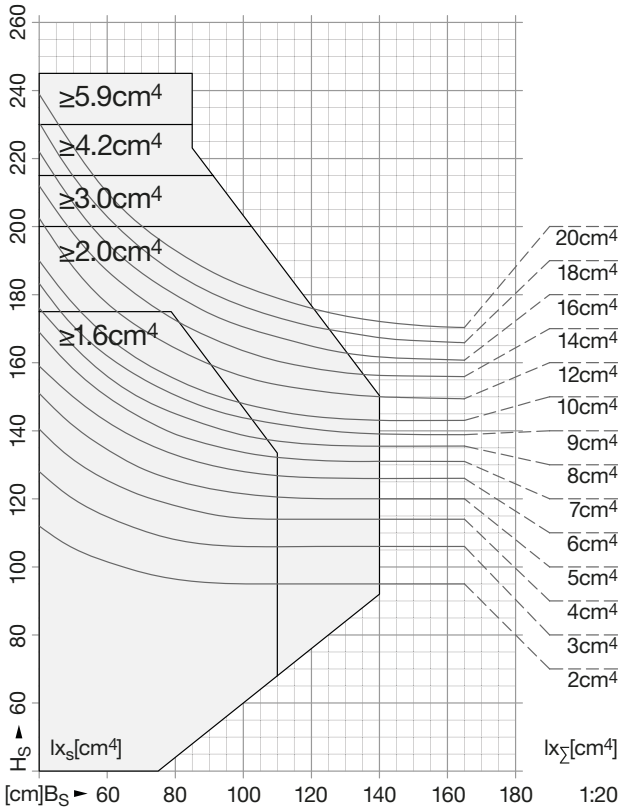


1 sash ≤ 130kg
or as required by the hardware manufacturer

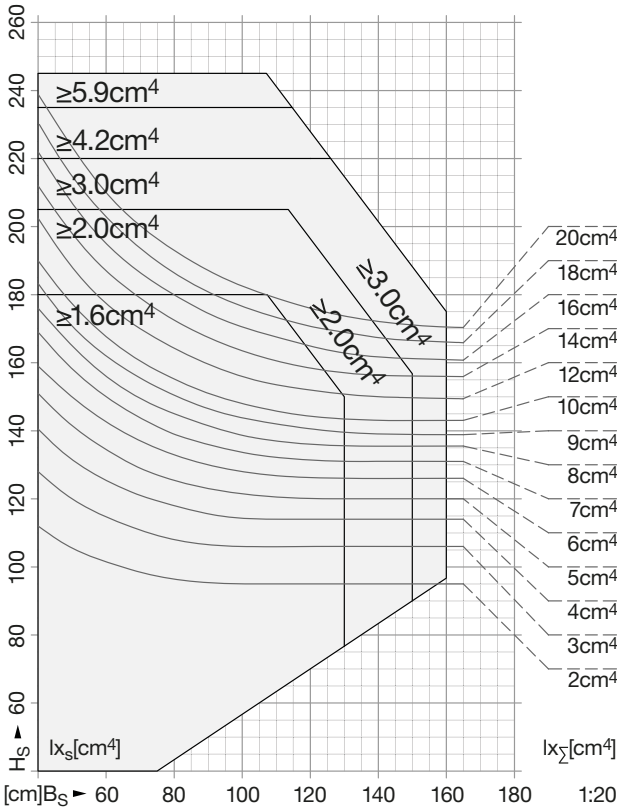
glass thickness	[mm] (t ₁ +t ₂ ...) t _Σ = 4 6 8 10 12 14 16 18 20 22 ...
glass weight	[kg/m ²]-2.5× t _Σ = 10 15 20 25 30 35 40 45 50 55 ...

assembly: frame - sash		single-sash				
assembly: sash - mullion - sash		2-sash				
assembly: sash - floating mullion - sash						
resistance to wind load	EN 12210	klasa				C5
max. locking distance ❗	-> S ≥ 77mm	[mm]	750	750	700	
	-> S ≥ 76mm	[mm]	750	750	650	
air permeability	EN 12207	grade	-	3	4	
watertightness	EN 12208	grade	4A	7A	9A	

conventional glazing, coloured



glued-in glass, coloured



□ Sash with reinforcement

□ Sash with reinforcement