NOKIAN PROFILES

R54 facade system

GENERAL

MATERIAL CHARACTERISTICS

Aluminium profiles

AW-6060 T6

Breaking strenght $f_{u\ (Rm)}$	190 N/mm^2
Yield strenght $f_{y\ (Rp\ 0,2)}$	150 N/mm^2
Elasticity modulus E	70 000 N/mm^2
Sliding factory G	27 000 N/mm^2
Density	2700 kg/m^3
Thermal expansion coefficient	23 · 10^{-6}/°C
Thermal conductivity	209 W/m^{2}K

Thermal breaks

Recycled-PVC

Tensile strenght	50 N/mm^2
Elasticity modulus E	2500 N/mm^2
Density	1400 kg/m^3
Thermal expansion coefficient	0,8 · 10^{-6}/°C
Thermal conductivity	0,19 W/m^{2}K

Gaskets

EPDM/cellular-EPDM

Tensile strenght	80±5 °Sh
Elasticity modulus	10 N/mm^2
Breaking strain	150 % min
Compression (22h/70°C)	25 % (max)

Screws

Delta coating	DT-DS 600 (DIN 50021)
or	
Stainless steel	A4

CROSS SECTION VALUES

Profile	I_x [cm^4]	W_x [cm^3]	I_y [cm^4]	W_y [cm^3]	A [mm^2]	Kg/m
R54-40	19,28	5,39	14,04	5,61	621	1,68
R54-60	42,58	9,84	18,78	7,51	710	1,92
R54-80	82,64	15,90	23,29	9,32	800	2,16
R54-100	141,58	22,99	29,19	11,68	911	2,46
R54-120	221,48	30,80	34,94	13,97	1018	2,75
R54-140	326,94	39,98	42,17	16,87	1151	3,11
R54-160	464,98	50,53	49,58	19,83	1292	3,49
R54-180	617,12	60,12	55,02	22,01	1387	3,75
R54-200	876,48	77,21	66,64	26,66	1651	4,46
R54-38	12,09	4,30	12,72	5,09	488	1,32
R54-48	20,00	6,22	15,19	6,07	531	1,44
R54-68	43,82	10,32	20,11	8,04	617	1,67
R54-88	82,40	15,45	26,23	10,49	737	1,99
R54-108	130,10	20,15	29,96	11,98	789	2,13
R54-128	196,22	26,05	34,89	13,96	875	2,36
R54-148	289,19	33,82	41,94	16,78	1013	2,73
R54-168	396,02	41,26	47,18	18,87	1105	2,98
R54-188	529,99	51,40	52,45	20,98	1353	3,65
R54-208	740,39	65,91	60,27	24,11	1444	3,90

LOADS AND STRUCTURAL REQUIREMENTS

LOADS

The loads are determined according to the Eurocodes EN 1190, EN1991-1-1, EN1991-1-3 and EN 1991-1-4

WIND LOAD

The wind load can be on flat terrain determined using the formula:

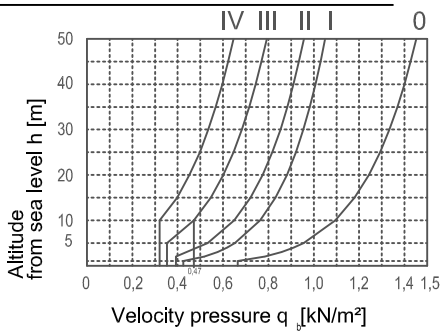
$q_b = \frac{1}{2} \cdot \rho \cdot v_b^2$ (EN 1991-1-4, formula 4.10)

q_b =Basic velocity pressure

ρ = air density (recommended 1,25 kg/m³)

v= Fundamental value of the wind velocity (mainland 21m/s)

Note! The shape of building or terrain can bring different factors. Here presented as simply as possible.



q =Wind load

C =Net pressure coefficient. See table below

Outer walls Load area	Negative pressure at corners		Negative pressure at center		Pressure inwards	
	A≥10 m²	A<1 m²	A≥10 m²	A<1 m²	A≥10 m²	A<1 m²
$C_{p,net}$	-1,5	-1,7	-1,1	-1,4	+1,1	+1,3

0 Open sea
I Wide, open area
II Farm land, occassional obstacles
III Suburban or Industrial areas, forests
IV City centres

Example

Altitude of facade from sea level 10 m
Location on continent: graph III
Velocity pressure q_b = 0,47 kN/m²
Loading width 2 m
Span 3 m
=>Loaded area 6 m²
Structure in the middle of wall (not in corner)
Net pressure coefficient $C_{p,net}$ = -1,22 (interpolated from table)
Wind load $q_{w,k}$ = -1,22 x 0,47 = 0,57 kN/m²

OTHER LOADS

In some cases building requlations also state further loads affecting the facade, see RakMK B1 (1998).

Horizontal line load (RakMK B1:3.2.7):
qk = 0,4 kN/m (normal and full capacity load) or
qk = 1,5 kN/m (maximum capacity load),
which affect the walls towards the outside on the lower edge of the window or one meter from the floor.

Vertical point load (RakMK B1:3.2.9):
a structure that a human might load with his weight must be checked for a vertical load Fk = 1,0 kN.

Line and point loads do not usually affect the dimensioning of the facade structure normatively, as the deflection caused by the wind load determines the sructure, and the profiles have a great strenght reserve.

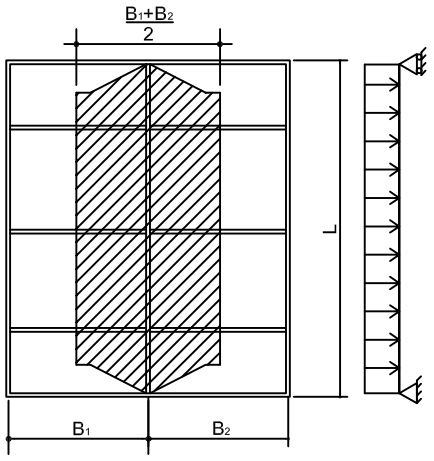
STRUCTURAL REQUIREMENTS

1. The permitted tensions for the AW-6060 T6 alloy, of which the N50si-series profiles are made, are $\sigma \leq 100$ N/mm²
2. The permitted deflection for a facade structure accordind EN 13830 is $y \leq l/200$, max. 15 mm
3. To ensure the durability of insulation glass, deflection along the glass panel's side lenght L must be limited to the value $y \leq l/300$
4. The deflection under the glass load on the wall level so that the profile does not touch the glass benealth at the base of the rebate (play 5 mm) must not exceed. $f \leq 3$ mm
5. The vertical profile above a window that can be opened must bend a maximum of 1 mm.

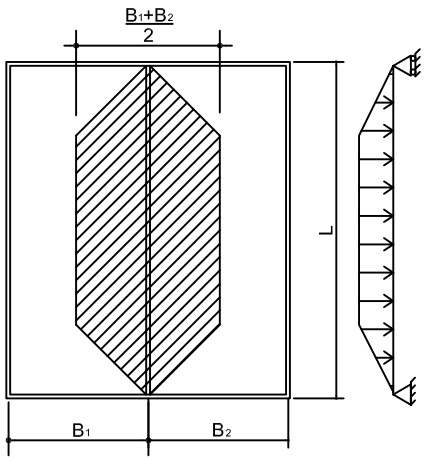
VERTICAL FRAME

WIND LOAD

Span divided into sections

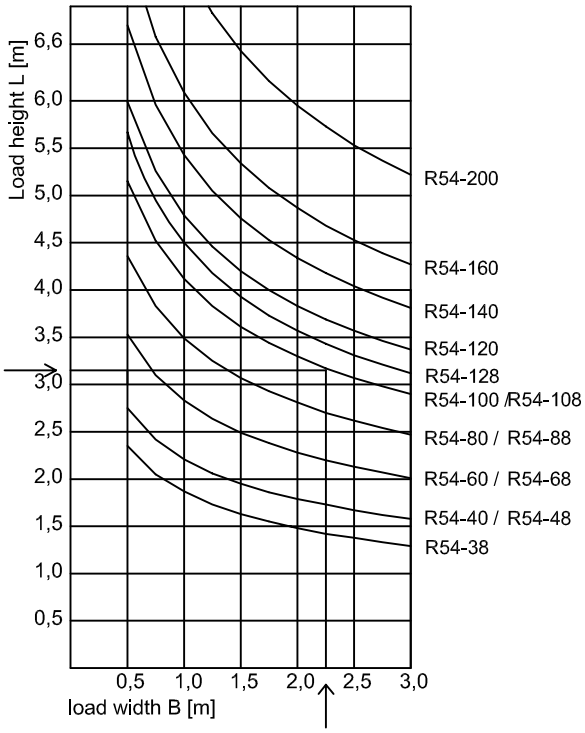


Span not divided into sections



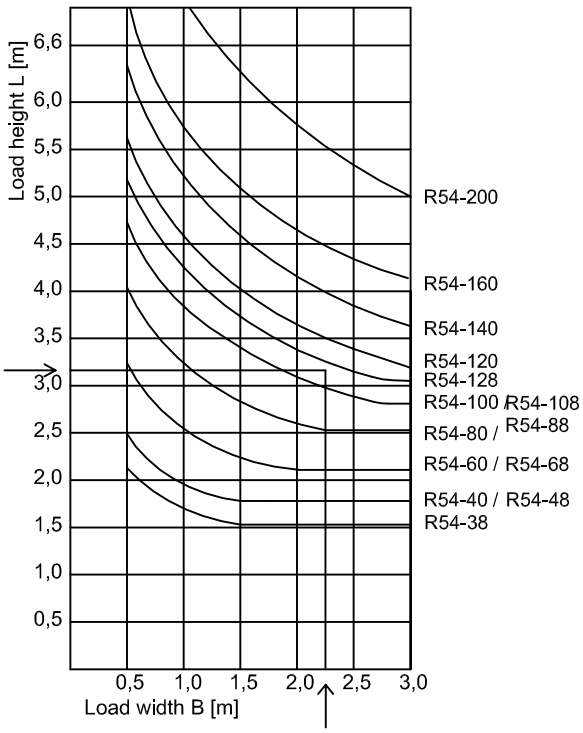
Dimensioning graph L/200

Wind load q = 0,5 kN/m²
Tension < 100 N/mm²
Maximum deflection L/200



Dimensioning graph L/300

Wind load q = 0,5 kN/m²
Tension < 100 N/mm²
Maximum deflection L/300



Design example

WIND LOAD:
Industrial area, terrain glass III
Structure height 10 m
-->wind load q = 0,5 kN/m²
B_1 = 2,5 m, B_2 =2,0 m, L = 3,3 m
Load width --> $\frac{B_1+B_2}{2}$ =2,25 m
Dimensioning graph of vertical frame (L/200)

--> Vertical frame R54-100

Design example

WIND LOAD:
Industrial area, terrain glass III
Structure height 10 m
-->wind load q = 0,5 kN/m²
B_1 = 2,5 m, B_2 =2,0 m, L = 3,3 m
Load width --> $\frac{B_1+B_2}{2}$ =2,25 m
Dimensioning graph of vertical frame (L/300)

--> Vertical frame R54-120

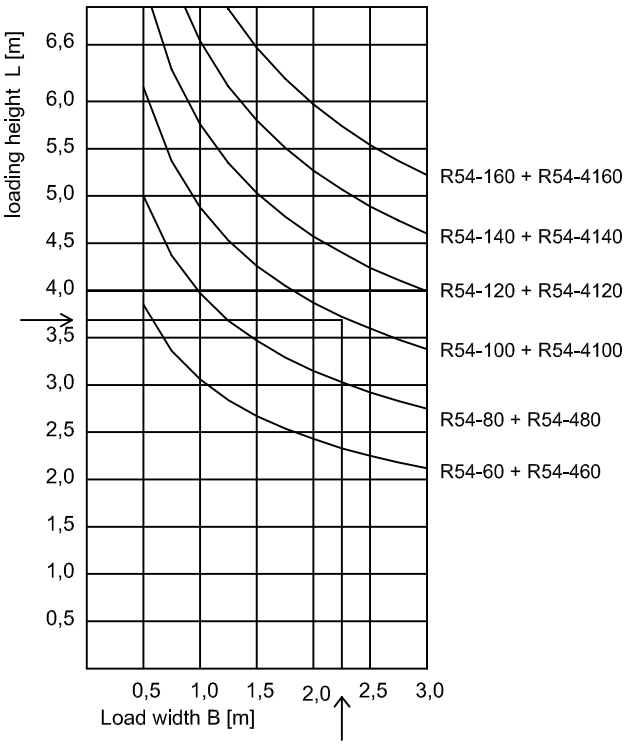
VERTICAL FRAME + REINFORECEMENT

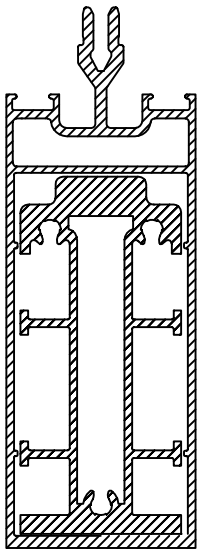
WIND LOAD

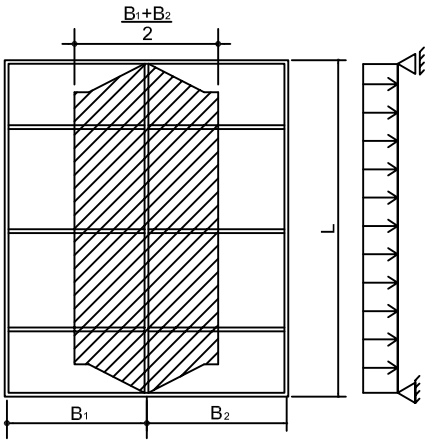
Span divided into sections

Dimensioning graph L/200

Wind load q = 0,5 kN/m²
Tension < 100 N/mm²
Maximum deflection L/200





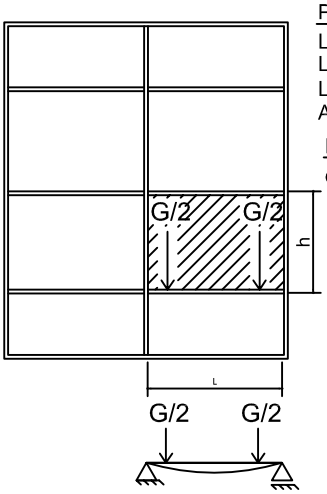


Design example

WIND LOAD:
Industrial area, terrain glass III
Structure height 10 m
-->wind load q = 0,5 kN/m²
B_1 = 2,5 m, B_2 =2,0 m, L = 3,7 m
Load width --> $\frac{B_1+B_2}{2}$ =2,25 m
Dimensioning graph of vertical frame (L/200)
--> Vertical frame R54-100 + R54-4100

HORIZONTAL FRAME

WEIGHT OF GLASS



Positioning glass pads and support pieces

Lenght of horizontal frame profile:
L < 2,5m; pads 100 mm from corners
L > 2,5m; pads L/8 from corners
A maximum of 4 support pieces

Deflection

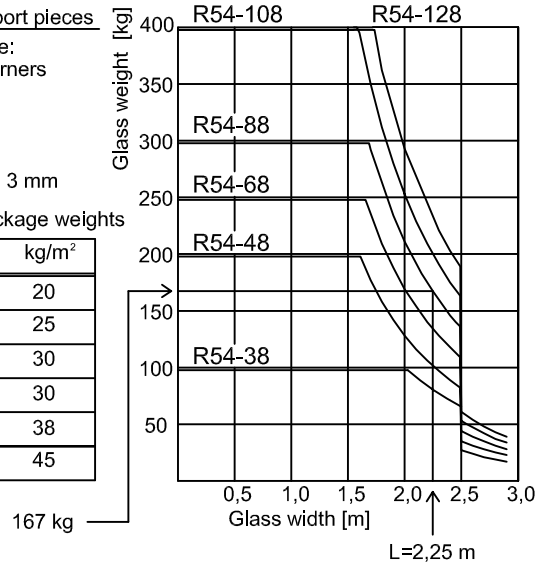
deflection of horizontal profile < 3 mm

Max. glass weight

Profile	kg
R54-38	100
R54-48	150
R54-68	250
R54-88	300
R54-108	400
R54-128	400

Glass package weights

Type	kg/m²
2K-4	20
2K-5	25
2K-6	30
3K-4	30
3K-5	38
3K-6	45



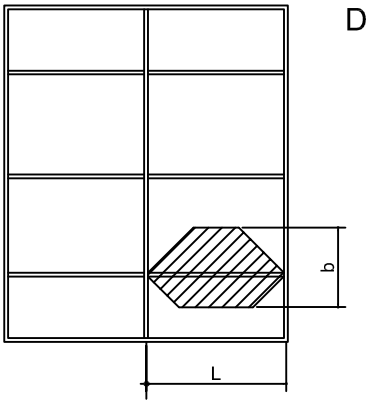
Design example

L = 2,25 m, h =1,95 m
3K-5 glass package --> 38 kg/m x 2,25 m x 1,95 m = 167 kg
Dimensioning graph of horizontal frame (glass weight)
--> horizontal frame R54-88
R54-88 max. glass weight
--> 300 kg > 167 kg ok
R54-LT50 max. load = 60 kg
--> 167 kg/60 kg/piece = 2.78 piece => 4pieces / 2 parallel.

Support piece capacity

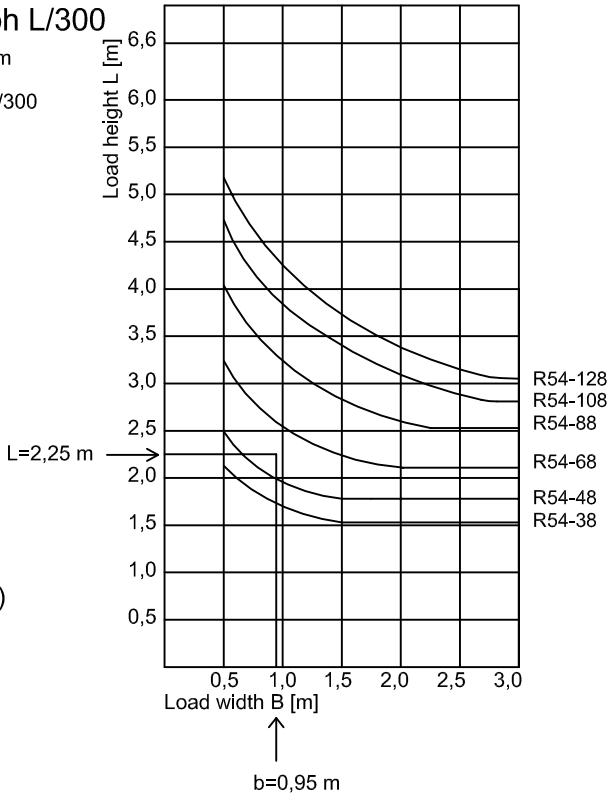
Support piece	Max. load per piece kg
R54-LT34	90
R54-LT40	80
R54-LT50	60
R54-LT56	40

WIND LOAD



Dimensioning graph L/300

Wind load q = 0,5 kN/m
Tension < 100 N/mm²
Maximum deflection L/300



Design example

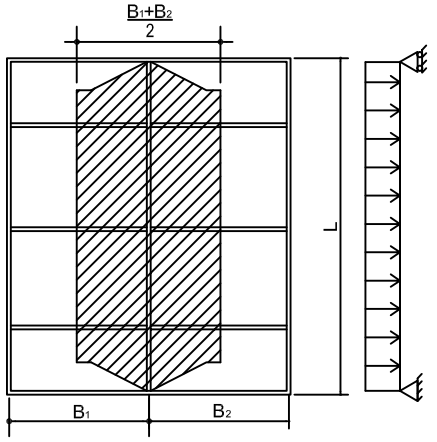
Industrial area, terrain class III
Structure height 10 m
-->wind load q = 0,5 kN/m²
L = 2,25 m, b = 0,95 m
Dimensioning graph of horizontal frame (wind load)
--> Horizontal frame R54-68

Dimensioning load glass weight ==> R54-88

PARTITION WALL

VERTICAL FRAME

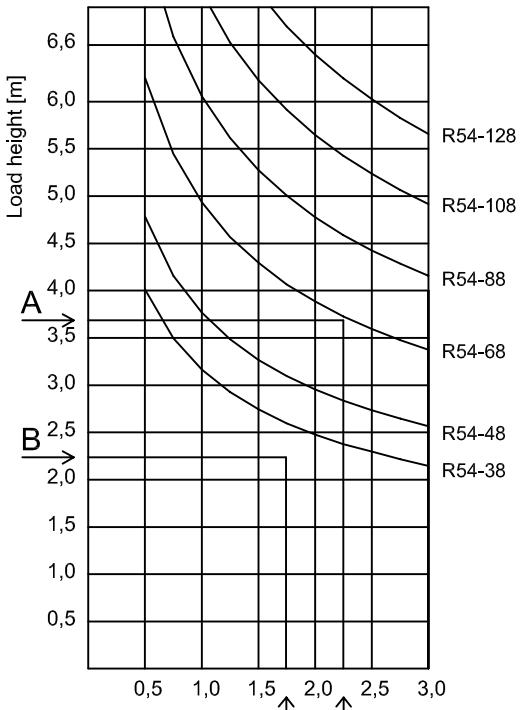
Span divided into sections



Design example A

Horizontal load q = 0,2 kN/m²
B_1 = 2,5 m, B_2 =2,0 m, L = 3,7 m
Load width --> $\frac{B_1+B_2}{2}$ =2,25 m
Dimensioning graph of frame (L/100)
--> Vertical frame R54-68

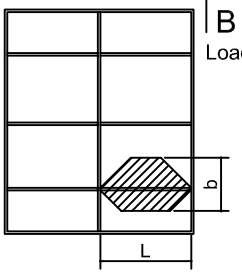
Dimensioning graph L/100
Horizontal load q = 0,2 kN/m²
Tension < 100 N/mm²
Maximum deflection L/100



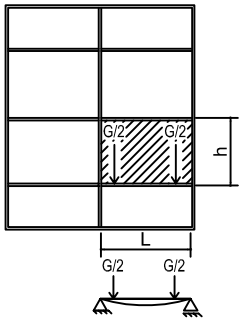
HORIZONTAL FRAME

Design example B

Horizontal load q = 0,2 kN/m²
b = 1.75 m, L = 2.25 m
Dimensioning graph of frame (L/100)
--> Horizontal frame R54-38



GLASS WEIGHT

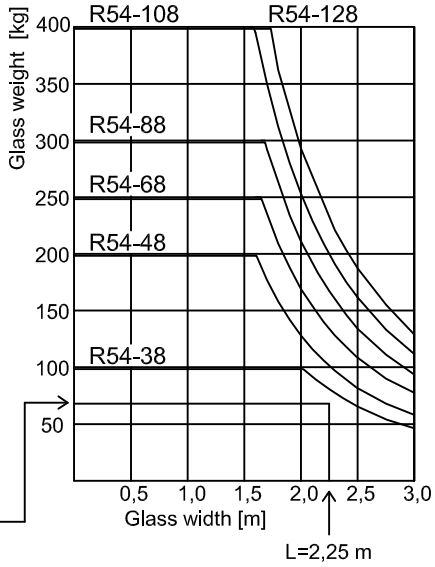


Max. glass weight

Profile	kg
R54-38	100
R54-48	150
R54-68	250
R54-88	300
R54-108	400
R54-128	400

Glass weights

Type	kg/m²
4 mm	10
5 mm	12.5
6 mm	15
7 mm	17.5
8 mm	20
9 mm	22.5



Design example

L = 2,25 m, h =1,95 m,
6 mm glass --> 15 kg/m² x 2,25 m x 1,95 m = 66 kg
Dimensioning graph glass weight
--> Horizontal frame R54-38
R54-38 max. glass weight
--> 100 kg > 66 kg ok

U-VALUE

REQUIREMENTS

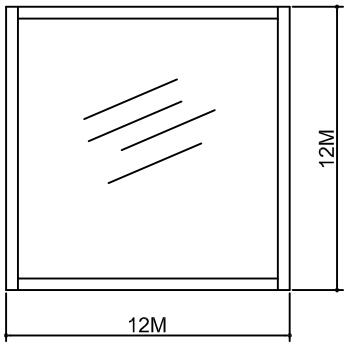
RakMK C3 requirements

Window and door piece	U-value/W/m K	
	Warm space	Semi-warm space
Aperture	2,1	3,1
Solid part of door, ventilation hatch	0,7	2,0
Display window	3,1	-

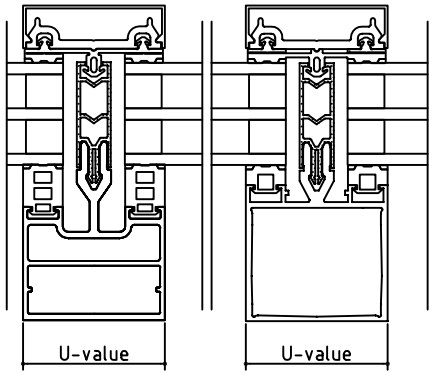
U-VALUES

R54 window 12M x 12M	U-value/W/m²K	
	Glass center	Average
2K4-12, float+IplusR	1,24	1,7
2K4-15, float+IplusR	1,18	1,64
2K5-15, float+IplusR	0,98	1,55
3K4-12, float+IplusR	0,9	1,26
3K4-15, float+IplusR	0,9	1,19

IplusR = selective glass with soft surface



Glazed R54 profile	U-value/W/m²K	
	Vertical profile	Horizontal profile
2K4-12, float+IplusR	3,98	4
2K4-15, float+IplusR	3,9	3,93
2K5-15, float+IplusR	3,74	3,6
3K4-12, float+IplusR	3,18	2,96
3K4-15, float+IplusR	2,52	2,39

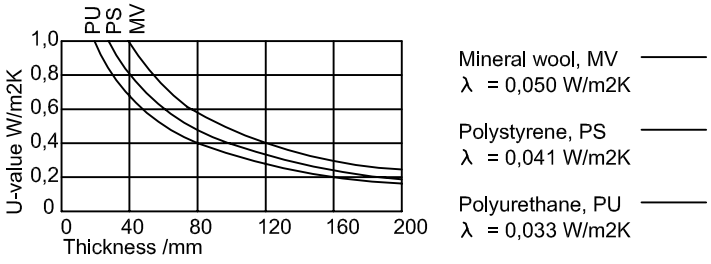


Example (R54 facade average thermal transmittance)

Structure	% share of facade	U-value
Glass 3K4-12. float+IplusR	85 %	0.9 W/m²K
Horizontal profile	10 %	2.96 W/m²K
Vertical profile	15 %	3.18 W/m²K

Average U-value 85/100x0.9 + 10/100x2.96 + 15/100 x 3.18 = 1.54 W/m²K

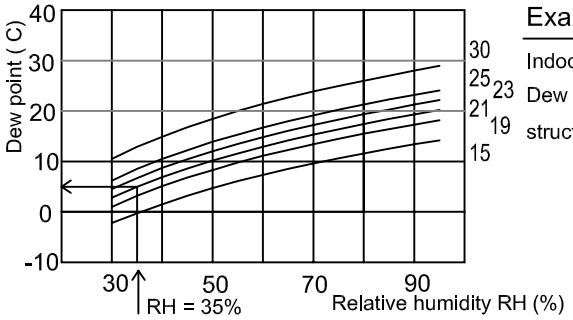
U-value of solid part



CONDENSATION AND THERMAL MOVEMENT

DEW POINT

If the temperature of the inner surface of the window drops below the saturation temperature of the air inside, i. e. the dew point, the water vapour indoors will condence on this surface. The dew point is dependent on the indoor air temperature and relative humidity, and can be obtained using the following graph.



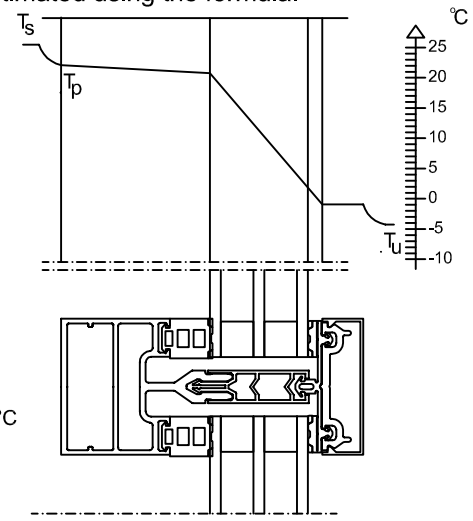
Example

Indoor air temperature Ts = 21°C, relative humidity = 35%.
Dew point from graph Tk = 5°C. As long as the surface temperature of the structure exceeds +4°C, no condensation will take place.

SURFACE TEMPERATURE

The surface temperature of the structure can be estimated using the formula:

$$T_p = T_u + \theta(T_s - T_u)$$



T_p = Temperature of inner surface
T_s = Indoor air temperature
T_u = Ambient temperature
T_k = Dew point temperature
θ = Relative surface temperature, i.e. inner surface temperature = 0 and air temperature +1
The R54 system's relative surface temperature θ is about 0,7

Example

Indoor air temperature Ts = 20°C, ambient temperature Tu = -10°C

$T_p = -10 + \theta\,(20-(-10)) = 11$ C

$T_p > T_k$ No danger of condensation.

THERMAL MOVEMENT

Thermal expansion coefficient of aluminium lenght

$a = 23 \cdot 10^{-6}$/K

Thermal movement can be calculated using the formula

$\varepsilon = \alpha\ \Delta T$; ΔT = Temperature difference

Extreme values of ambient temperature in Finland are

-45°C <Tu < +35°C

Tension if thermal expansion is prevented

$\sigma = E \cdot \varepsilon = E \cdot \alpha \cdot \Delta T$

Maximum values of thermal movement and tension

	Frame	Glazing and cover beads
Temperature		
Tmax	+ 33°C	+ 45°C
Tmin	± 0°C	- 35°C
Thermal movement		
max.	+ 0,3 mm/m	+ 0,6 mm/m
min.	- 0,5 mm/m	- 1,3 mm/m
Tension [1]		
max.	+ 32 N/mm^2	+ 89 N/mm^2
min.	- 21 N/mm^2	- 40 N/mm^2

Values have been calculated from the manufacturing temperature of +20°C

1) If thermal movement is prevented

SG-GLAZING METHOD

GENERAL

The SG-glazing can be built as two- or four-sided construction.
Double- or triple-glazed insulated glass
The insulation glass used in SG glazing is specially manufactured.

GLASS

Tempered safety glasses with TSH cut edges, min. thickness 6 mm.

GLASS PACKAGE

- Minimum structure double glazed 6-15
- Inner glass 6 mm (Always)
- Intermediate moulding 15 mm (aluminium)

The edge foaming of SG insulation glasses is performed with a two-component silicone-based adhesive foam suitable for glazing without mouldings. The foam must be developed to endure the warmth of the sun, and the strain caused by the UV radiation of the short-wave radiation of the sun.
In addition, an anodised U profile is attached to the SG insulation glass element at the factory during manufacturing.

ATTACHING THE GLASS PACKAGE TO THE BUILDING FRAME

The glass packages are attached mechanically from the U profiles to the actual frame of the R54 with the system's own fixing pieces.
THE NUMBER OF FIXING PIECES AND U PROFILES IS DETERMINED ACCORDING TO THE GLASS SIZE AND THE LOADS.

SEAM BETWEEN GLASSES

The weather-proofing SG glue seam between the glasses must be compatible with the SG foam of the glass packages.

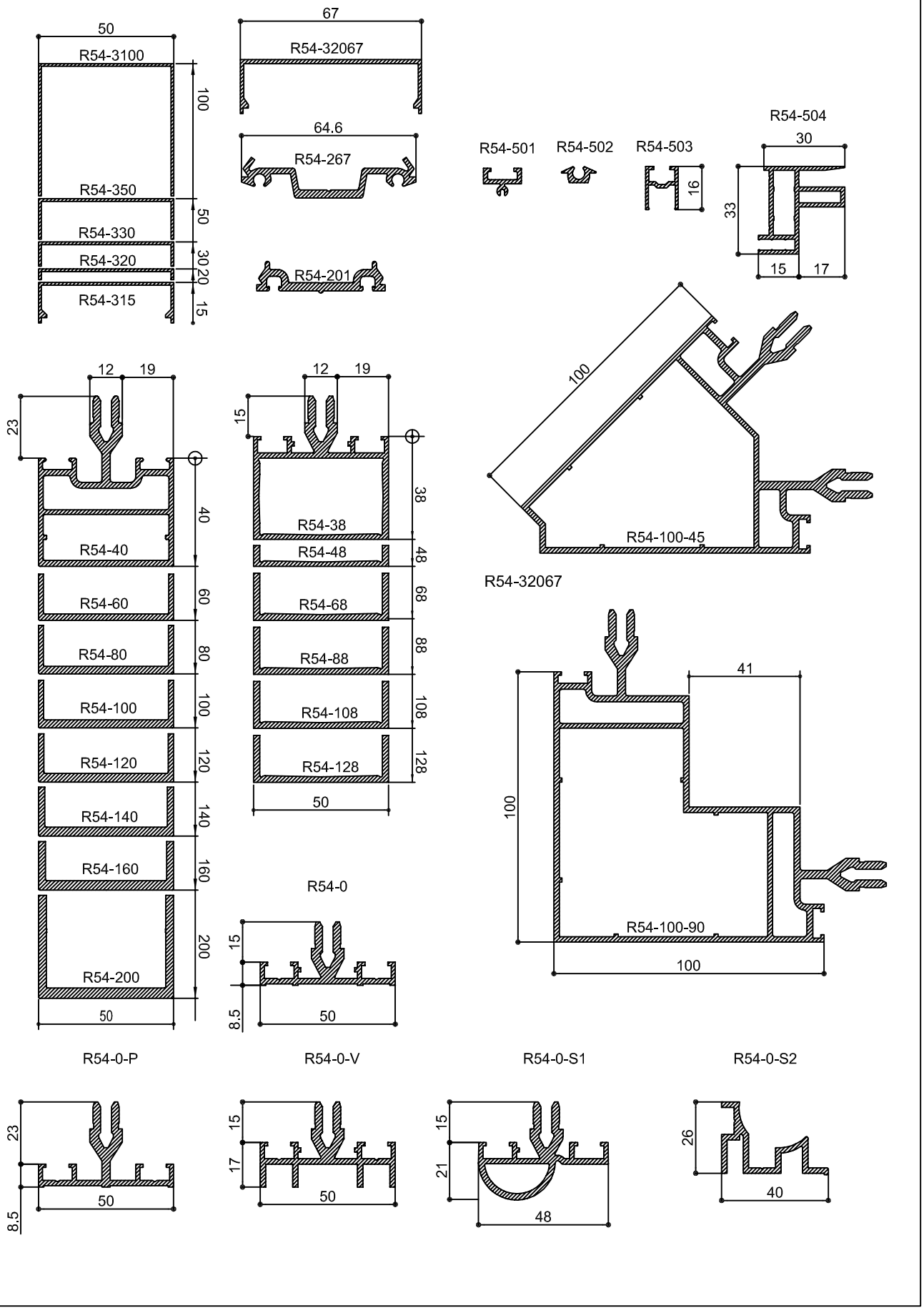
SG FOAM

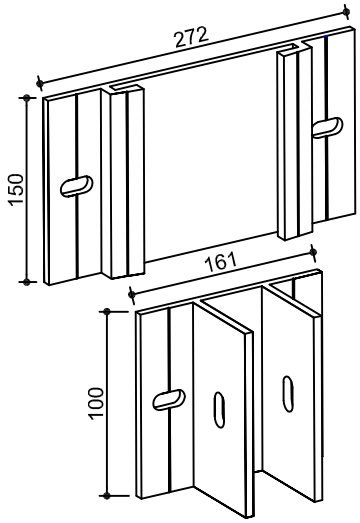
Proglaze II	Oy Tremco Finland Ltd
Spectrem 2	Oy Tremco Finland Ltd

When using foams by another manufacturer, the manufacturer and Nokian Profiles must be contacted

MAXIMUM SIZE OF THE GLASS PACKAGE

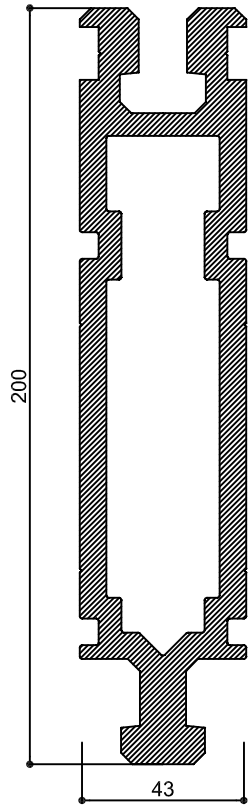
The maximum size of the glass package is 2000 mm x 3000 mm.


50
R54-3100
100
R54-350
50
R54-330
30
R54-320
20
R54-315
15
67
R54-32067
64.6
R54-267
R54-201
R54-501
R54-502
R54-503
16
R54-504
30
33
15
17
100
R54-100-45
R54-32067
12
19
23
R54-40
40
R54-60
60
R54-80
80
R54-100
100
R54-120
120
R54-140
140
R54-160
160
R54-200
200
50
12
19
15
R54-38
38
R54-48
48
R54-68
68
R54-88
88
R54-108
108
R54-128
128
50
41
100
R54-100-90
100
R54-0
15
8.5
50
R54-0-P
R54-0-V
R54-0-S1
R54-0-S2
23
8.5
50
15
17
50
15
21
48
26
40



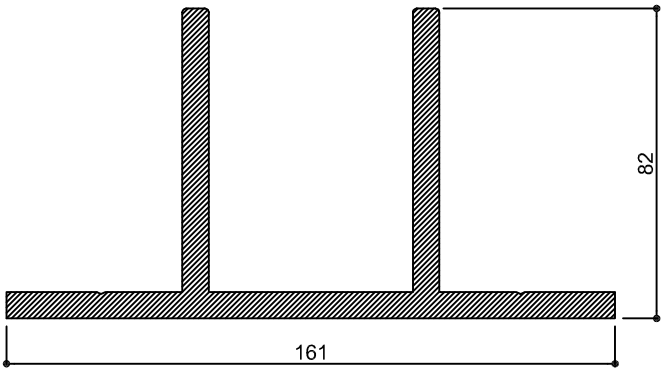
R54-702
Bed for fixing piece

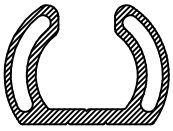
R54-701
Wall fixing piece



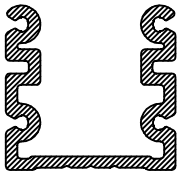
R54-402
Optional angle joint profile 90-180°
length6,6 m

R54-404
Wall fixing profile



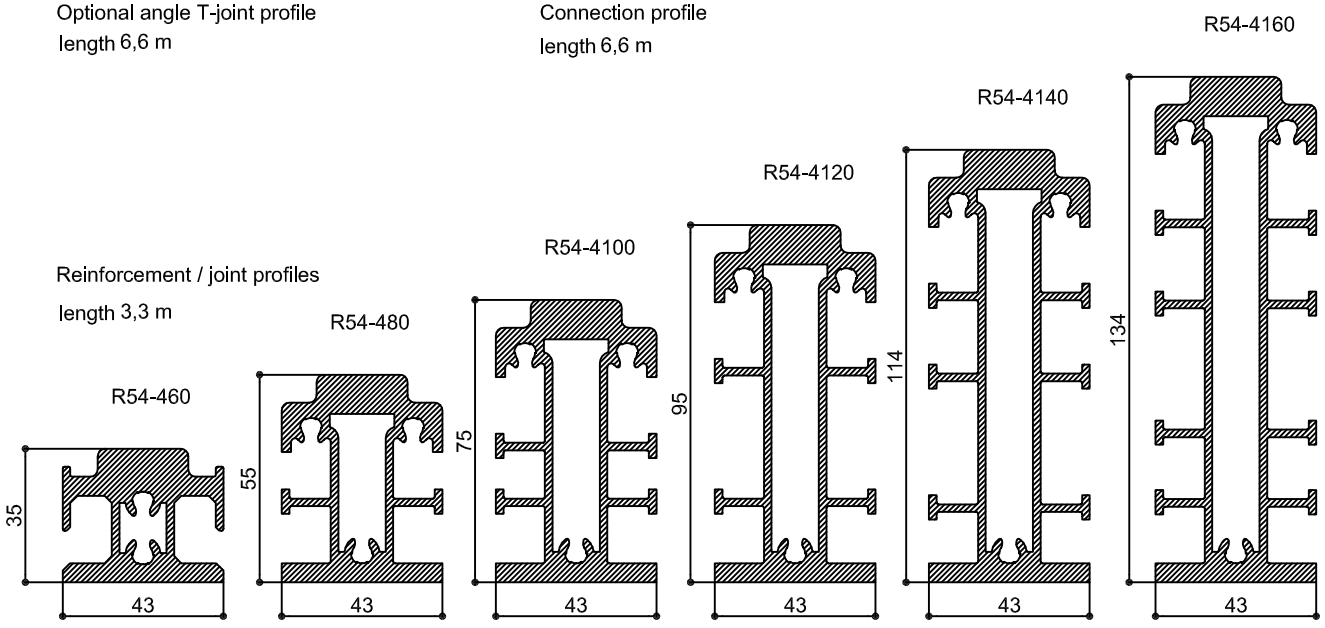


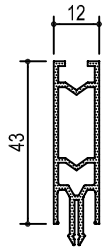
R54-428
Optional angle T-joint profile
length 6,6 m



R54-401
Connection profile
length 6,6 m

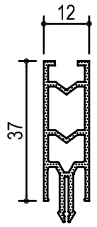
Reinforcement / joint profiles
length 3,3 m





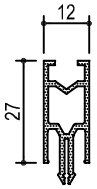
R54-L43

Thermal break profile
length 6,6 m plastic



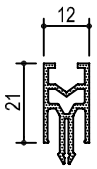
R54-L37

Thermal break profile
length 6,6 m plastic



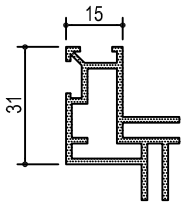
R54-L27

Thermal break profile
length 6,6 m plastic



R54-L21

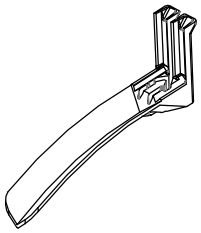
Thermal break profile
length 6,6 m plastic



R54-KJL
Frame profile

length 6,6 m plastic

N50si-TK
Ventilation piece
plastic



P15 Inner gasket
EPDM

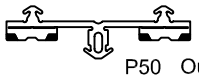
P13 Inner gasket
EPDM

P11 Inner gasket
EPDM

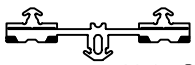
V7 Inner gasket
EPDM

V5 Inner gasket
EPDM

V3 Inner gasket
EPDM

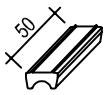


P50 Outer vertical gasket
EPDM



V50 Outer horizontal gasket
EPDM

U5 Outer gasket
EPDM

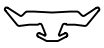


TL50 Lap joint gasket
EPDM

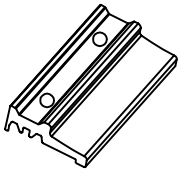
TJL Blind part gasket
EPDM

TKT Corner sealing gasket
EPDM

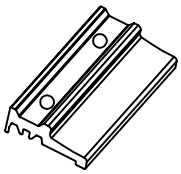
TSG SG - gasket
EPDM



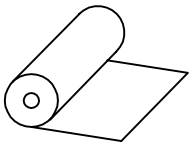
TSG3 SG - gasket
EPDM



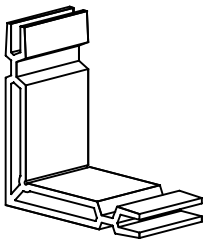
R54-SG
SG-fixing piece, normal



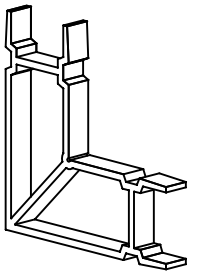
R54-SG-JL
SG-fixing piece, facade glass



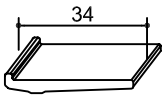
R54-TR
Sealing strip EPDM
B x L = 1 x 25 m



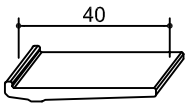
R54-802
Joint piece for rim profile (triple glazing)



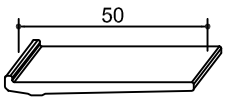
R54-803
Joint piece for rim profile (double glazing)



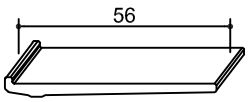
R54-LT34 Glass support piece L=100 mm



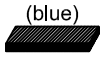
R54-LT40 Glass support piece L=100 mm



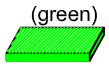
R54-LT50 Glass support piece L=100 mm



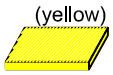
R54-LT56 Glass support piece L=100 mm



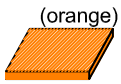
R54-K26 Glazing pad



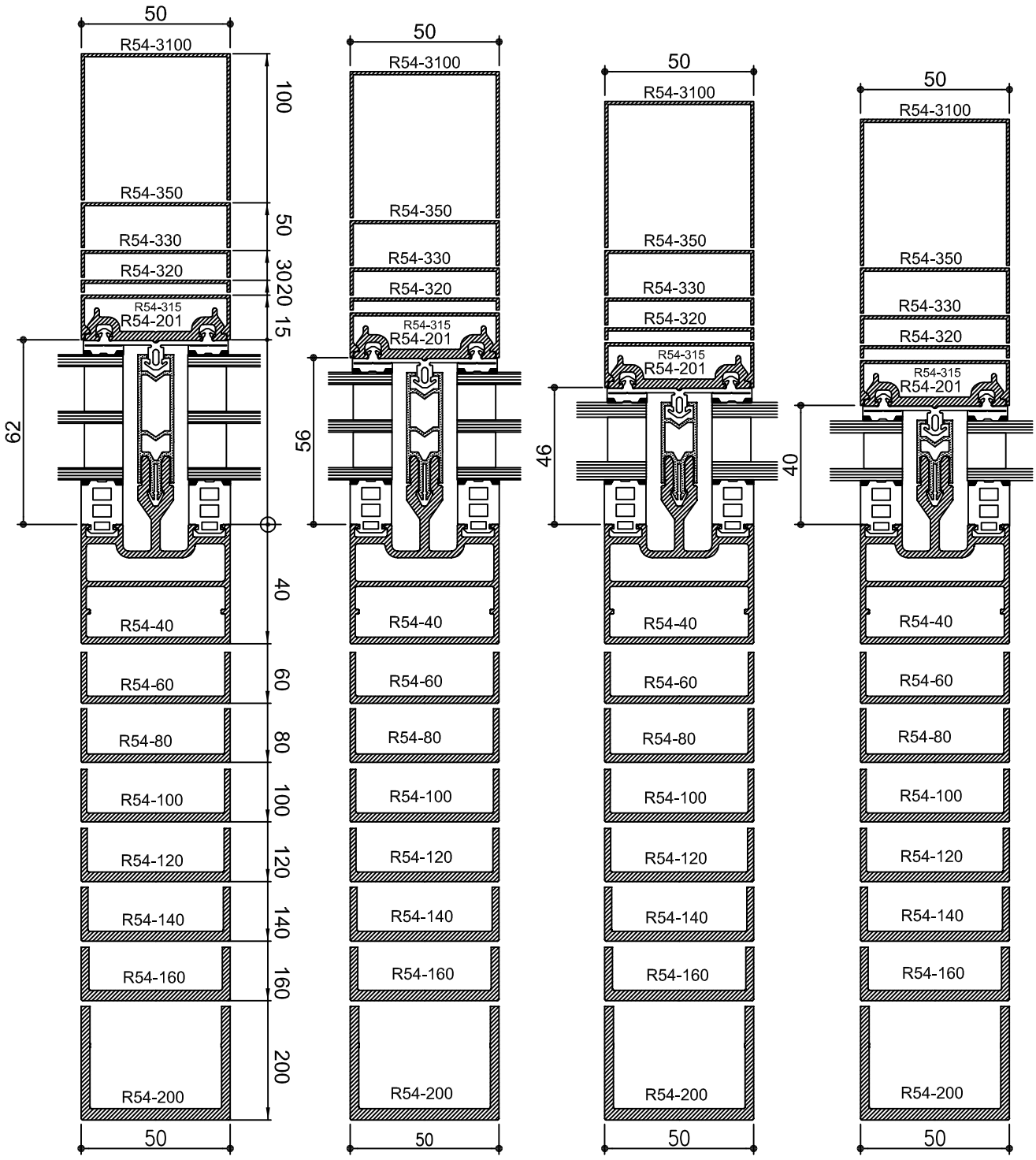
R54-K32 Glazing pad



R54-K42 Glazing pad



R54-K48 Glazing pad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R54-3100
R54-350
R54-330
R54-320
R54-315
R54-201
R54-40
R54-60
R54-80
R54-100
R54-120
R54-140
R54-160
R54-200
100
50
30
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15
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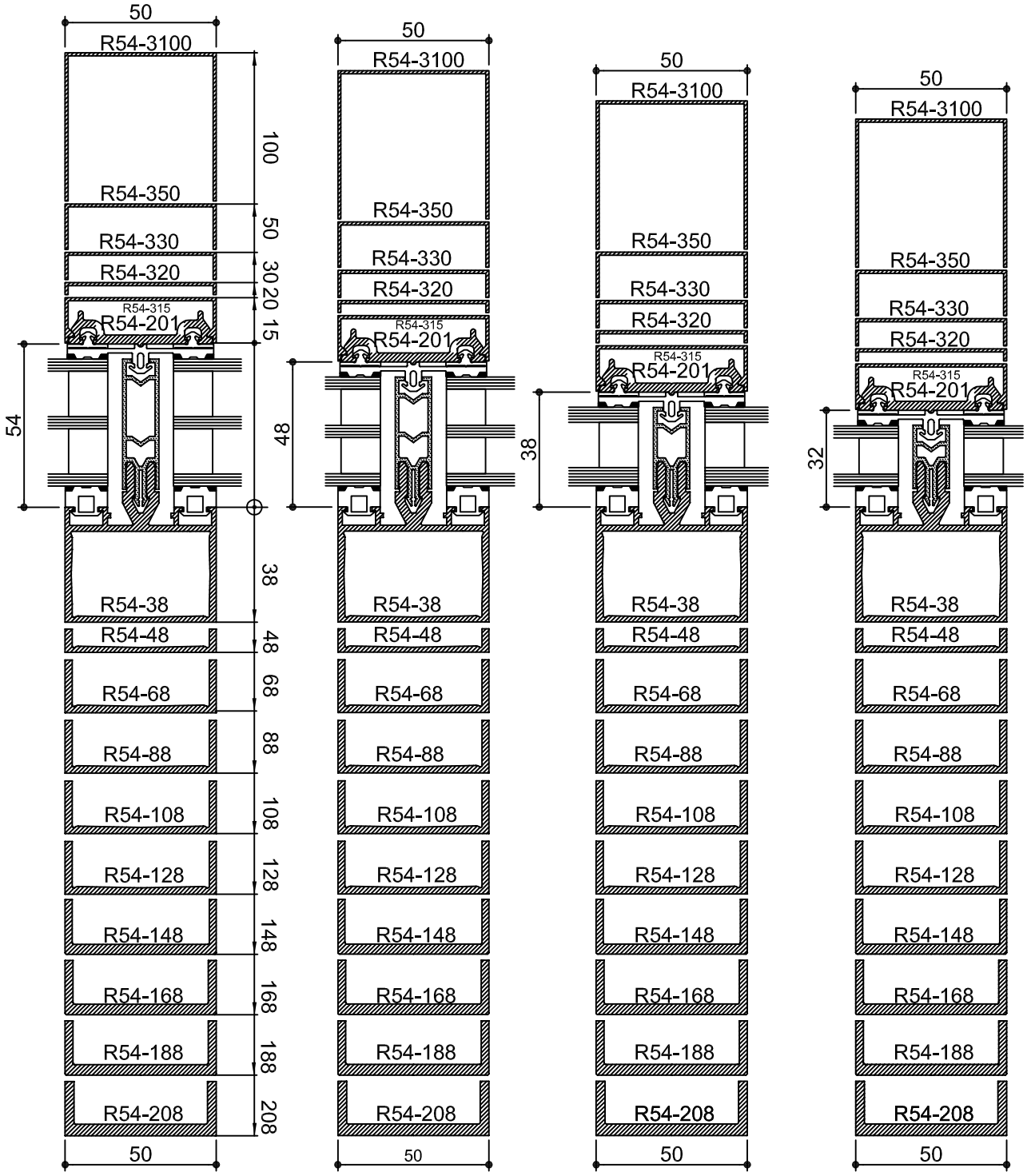
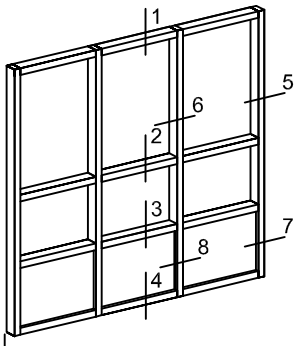
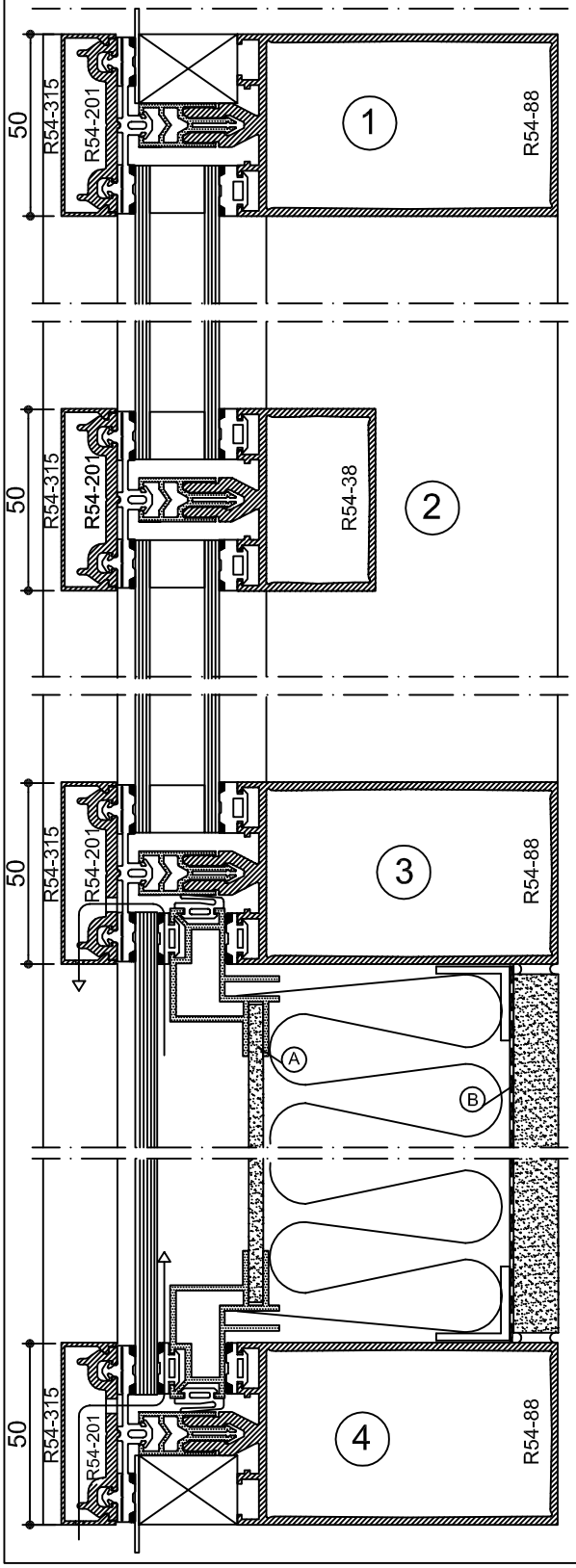
80
100
120
140
160
200
62
56
46
40

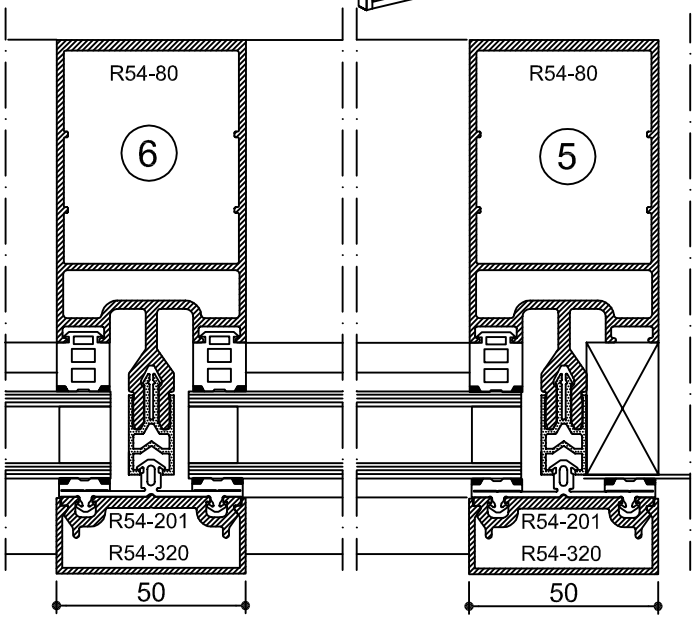


NOTE: The but-joint is mentioned separately in the designs

Note. Facade background painted or otherwise opaque.
Ventilation according to macine-shop folder instructions.

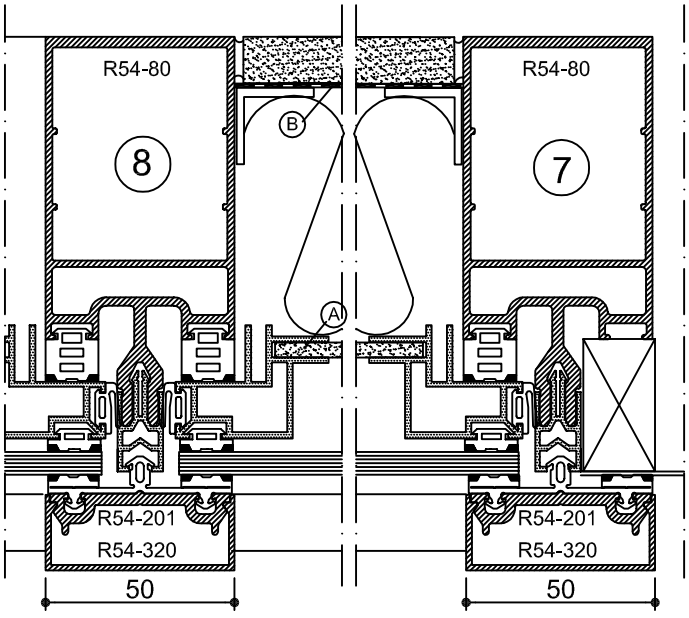




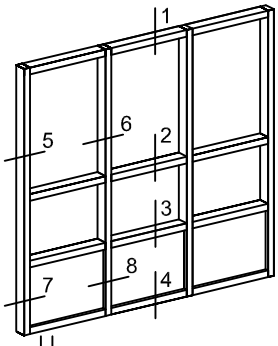


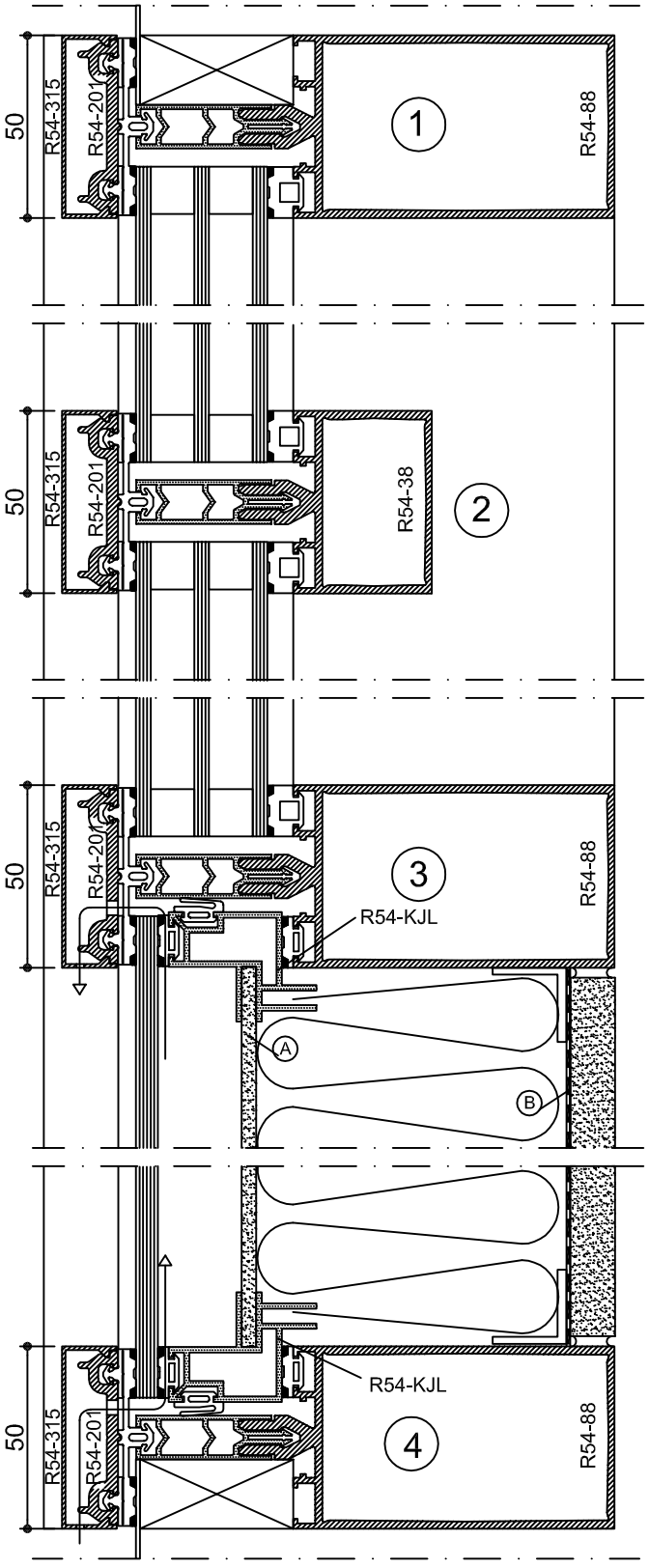
A = Luja wind barrier board (3.2 мм)

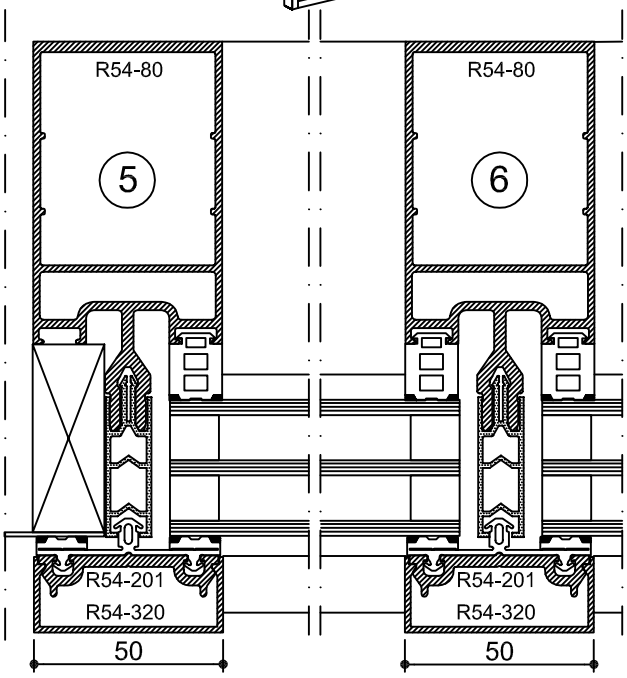
B = Vapour barrier



Note. Facade background painted or otherwise opaque.
Ventilation according to macine-shop folder instructions.

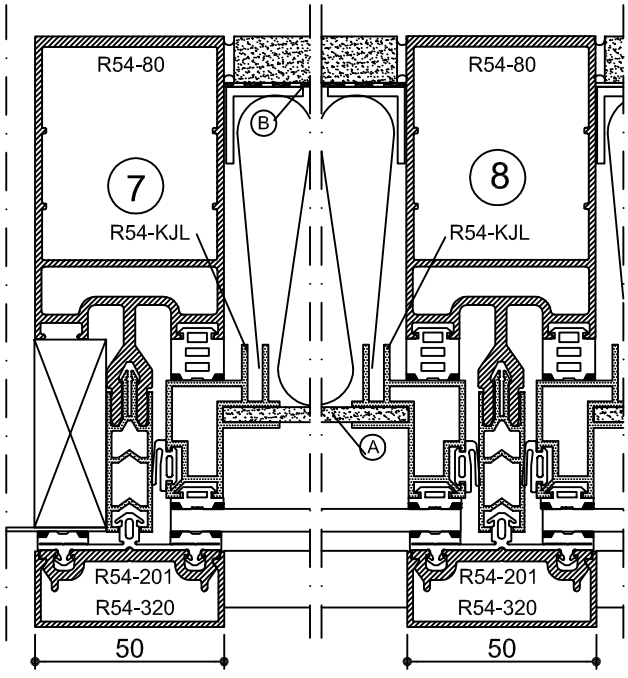




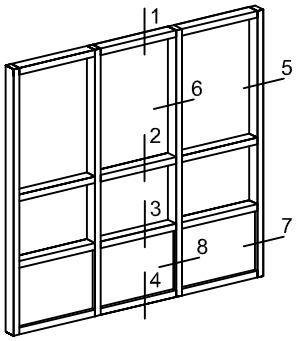


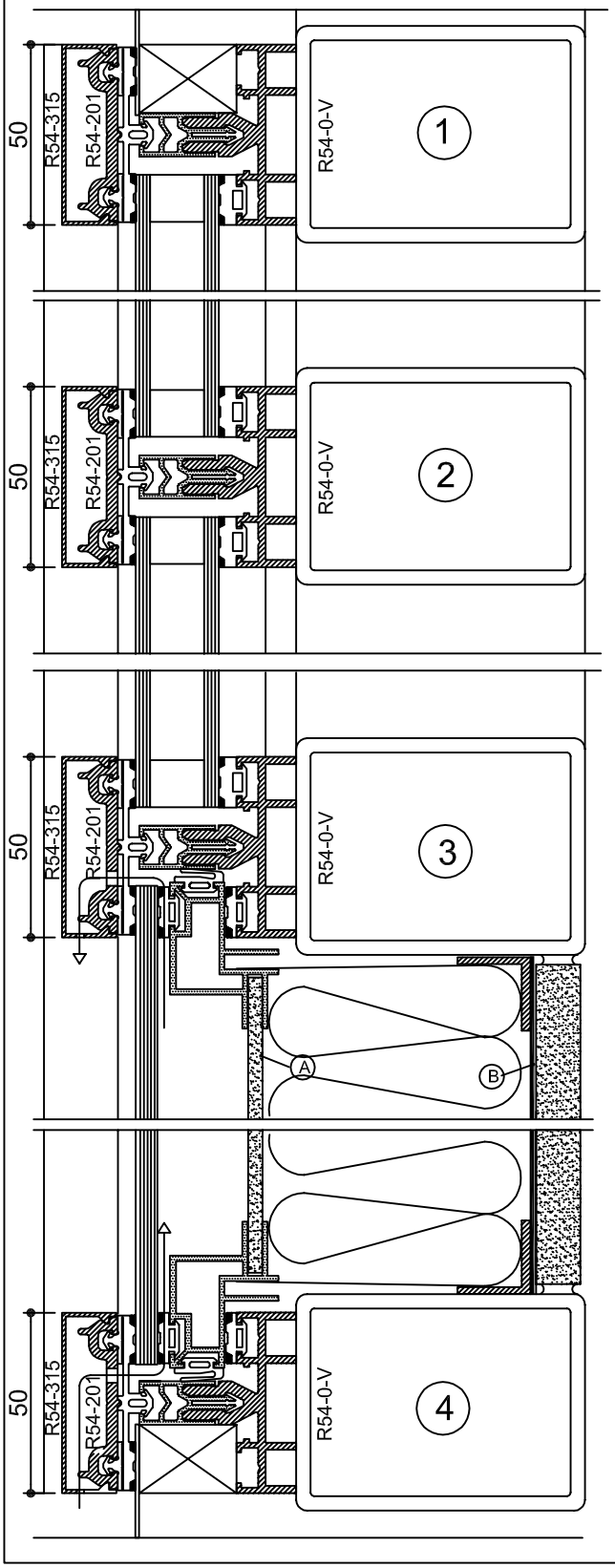
A = Luja wind barrier board (3.2 мм)

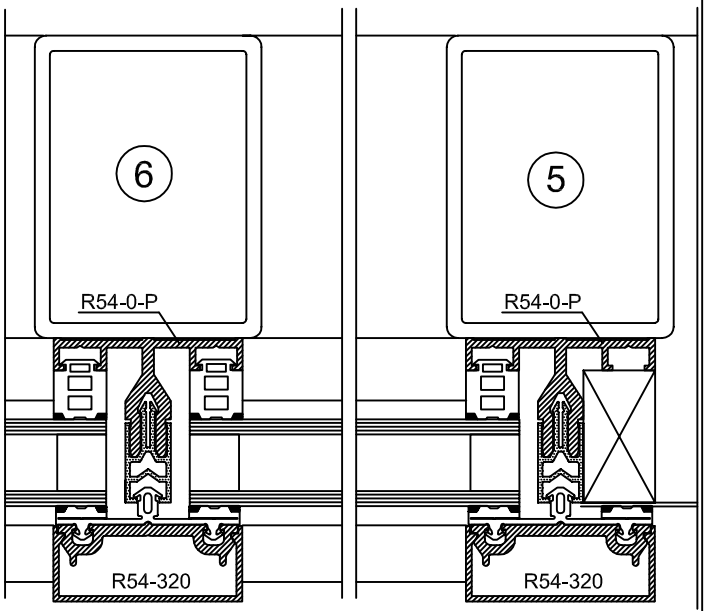
B = Vapour barrier



Note. Facade background painted or otherwise opaque.
Ventilation according to macine-shop folder instructions.

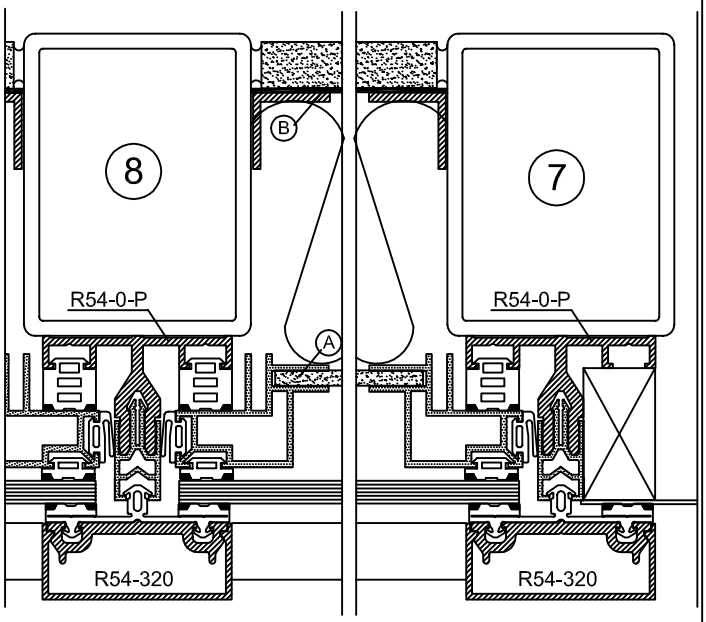


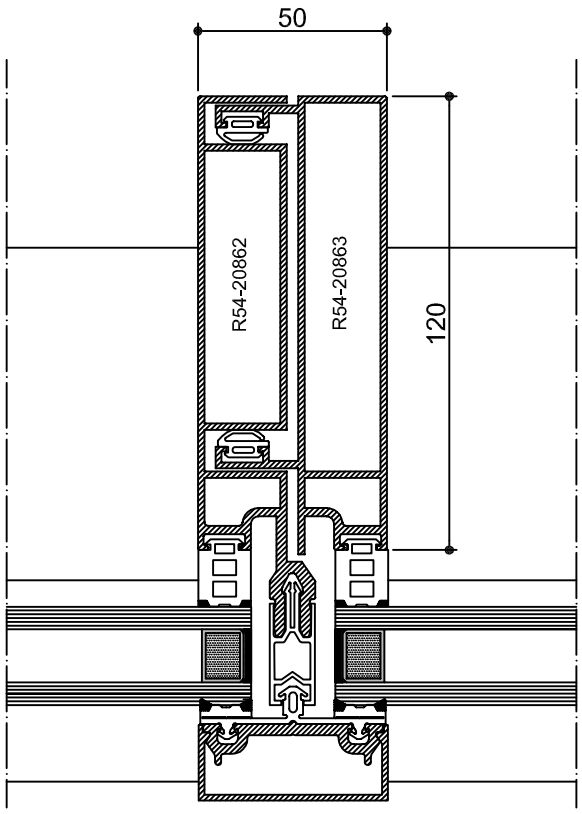




A = Luja wind barrier board (3.2 мм)

B = Vapour barrier

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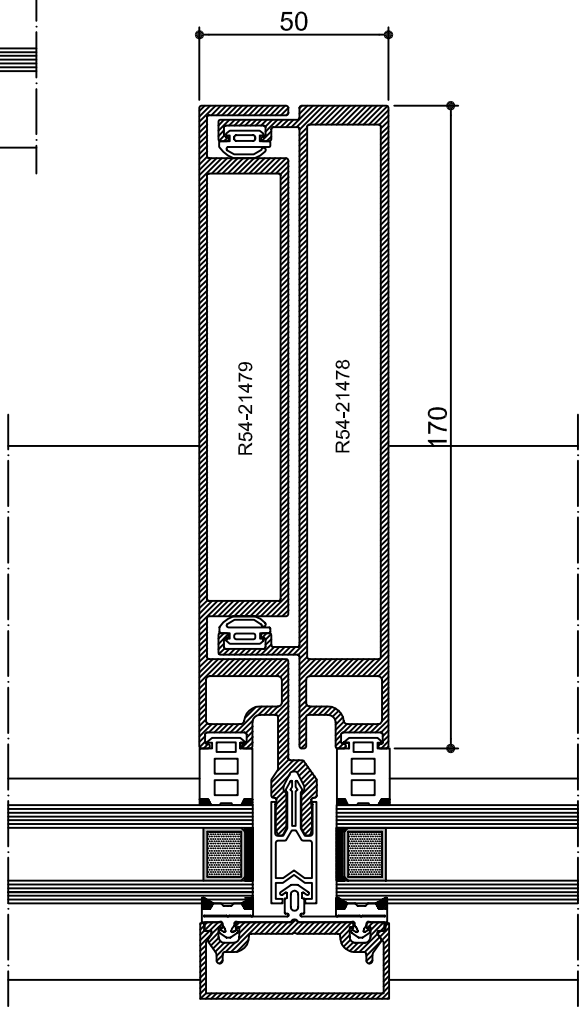
R54-20862
R54-20863
120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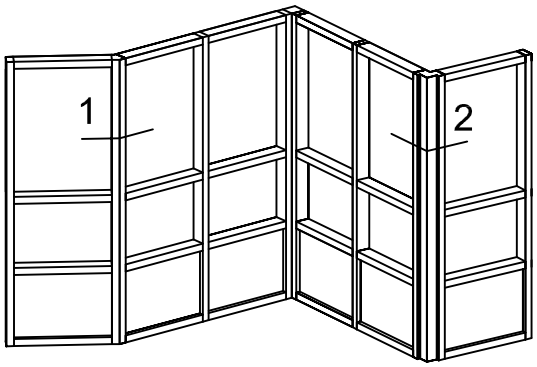
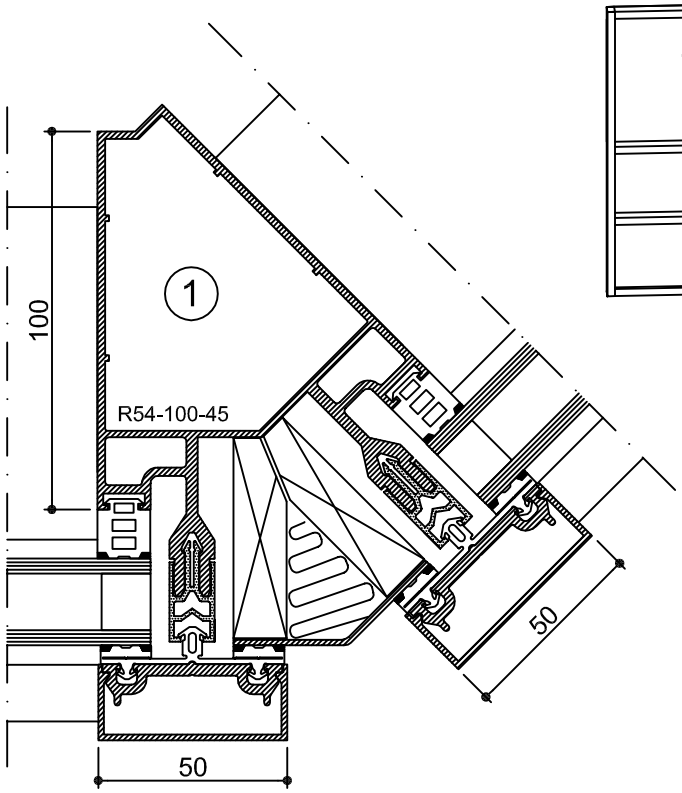
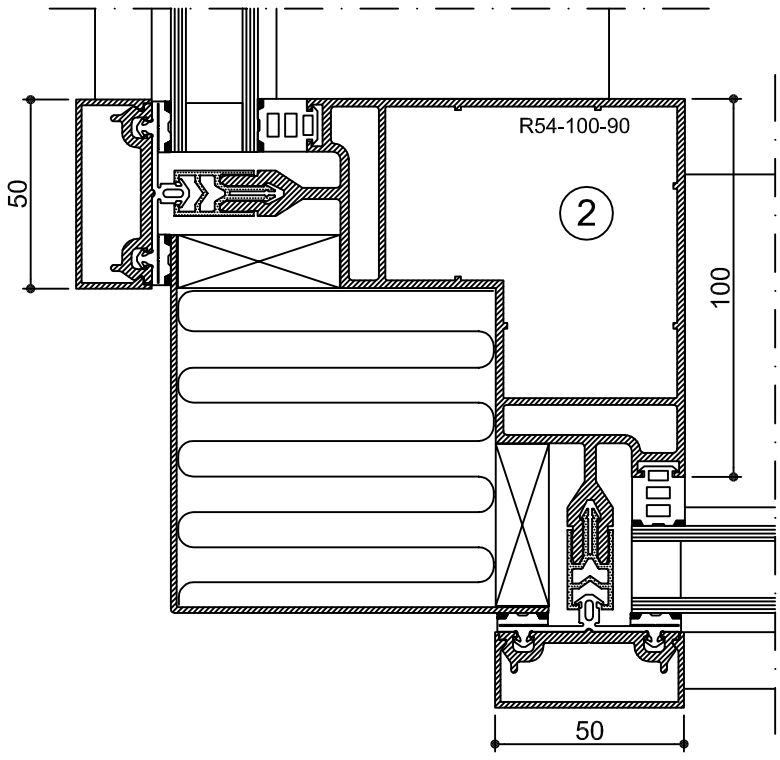
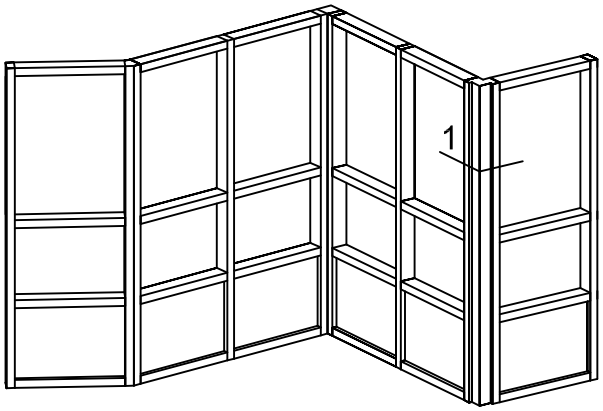
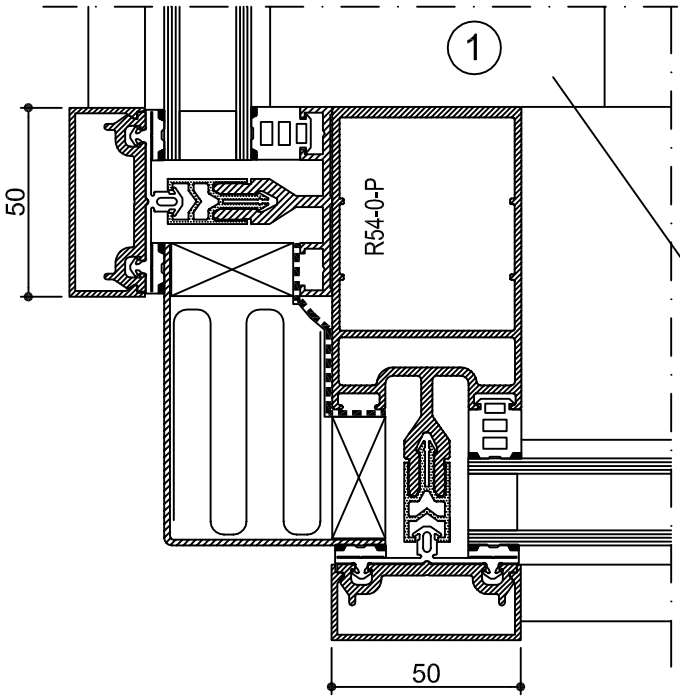
R54-21479
R54-21478
170


1
2

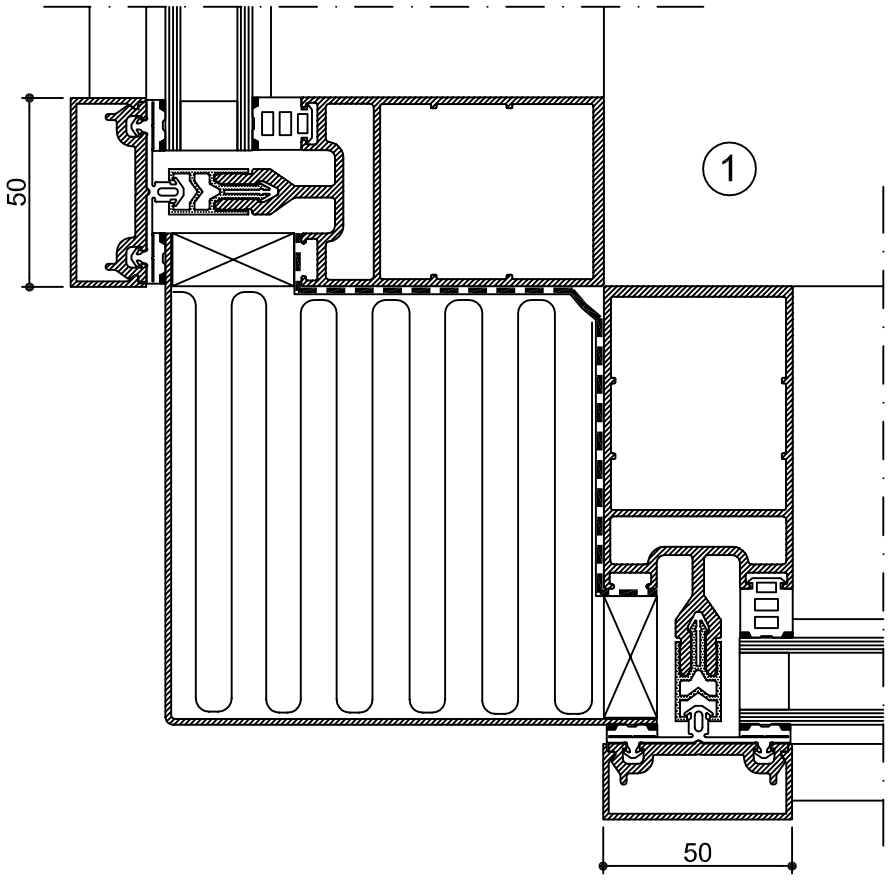

1
100
R54-100-45
50
50


R54-100-90
2
50
100
50





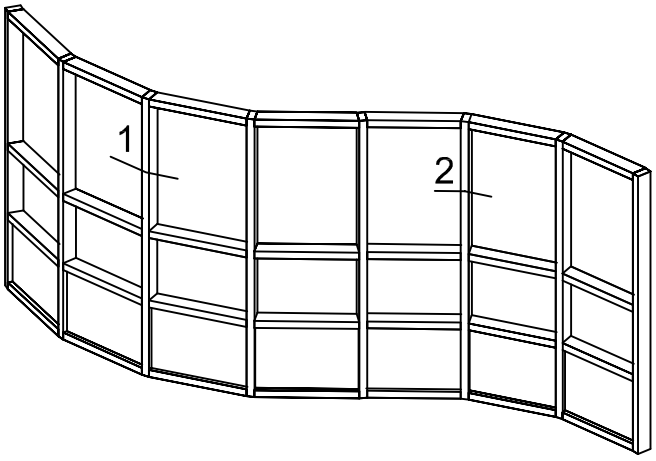
Depth of transome has to be checked if it differs to the transome on the other side of the corner

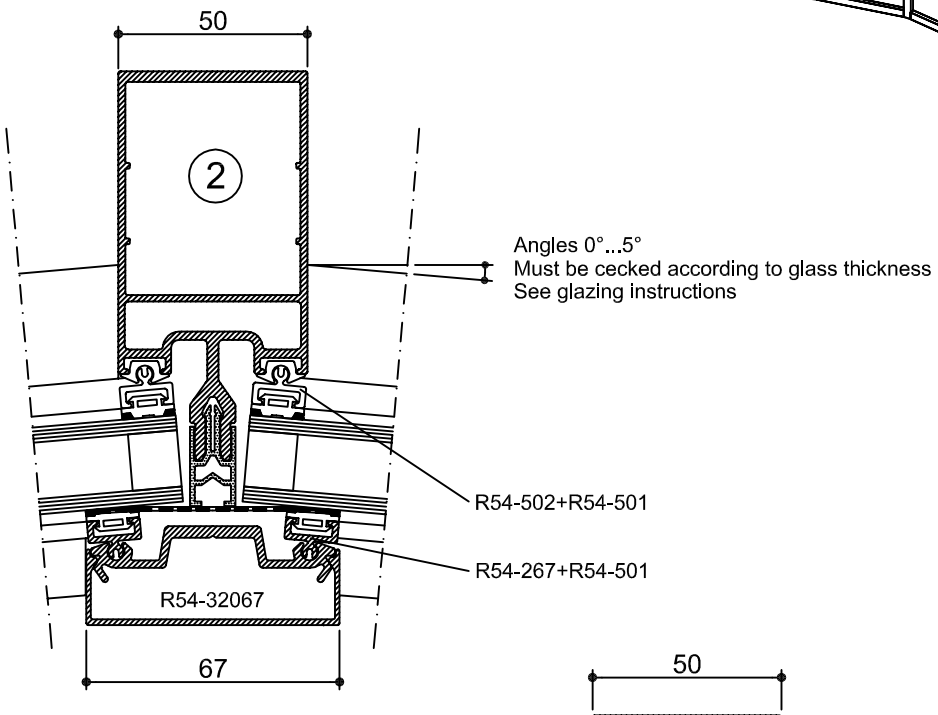


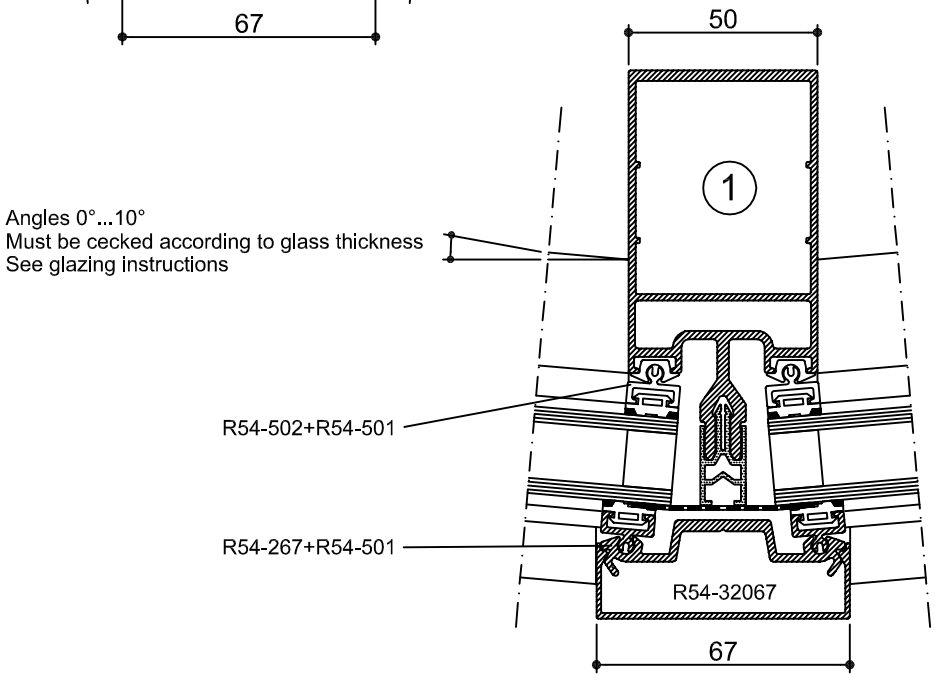
R54

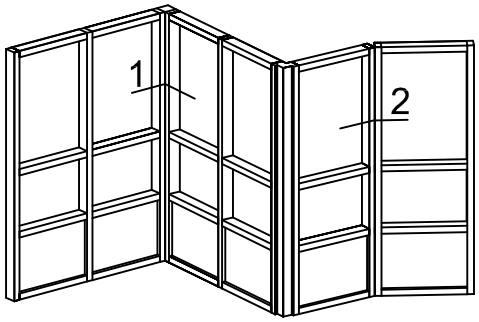
Lap-joint 90° external angle with 2 profiles

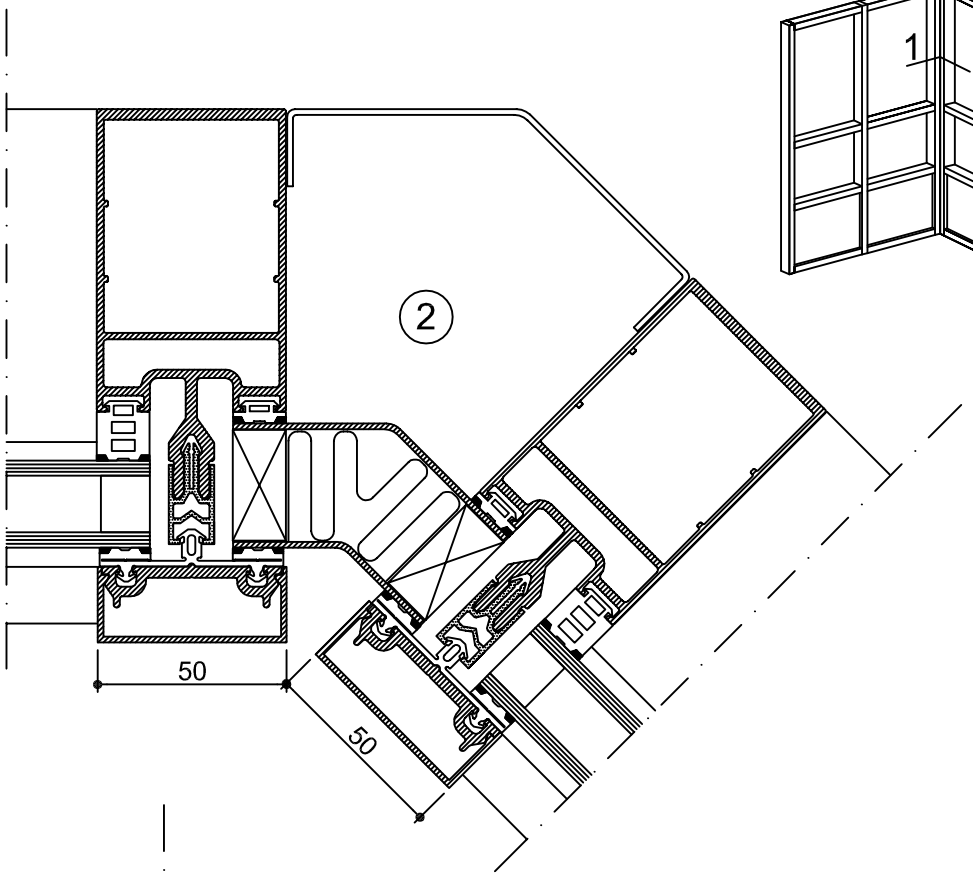
NOKIAN PROFILES

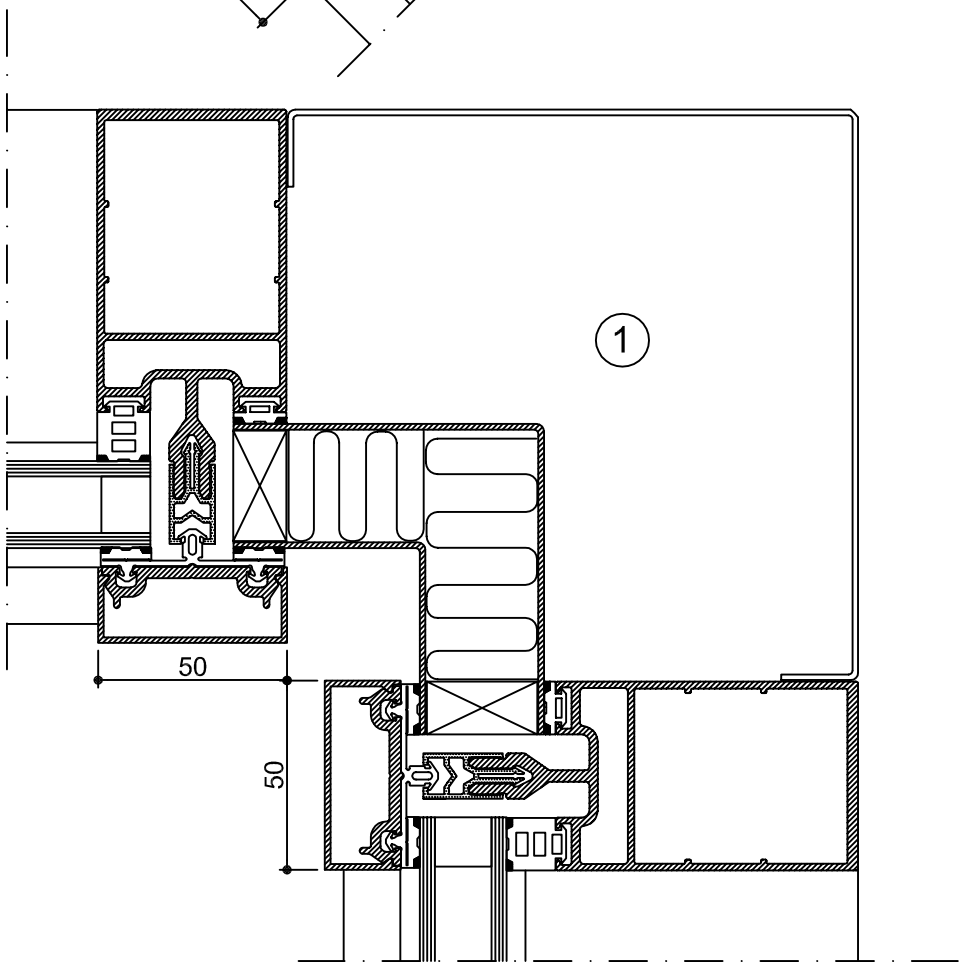

1
2


50
2
Angles 0°...5°
Must be cecked according to glass thickness
See glazing instructions
R54-502+R54-501
R54-267+R54-501
R54-32067
67


50
1
Angles 0°...10°
Must be cecked according to glass thickness
See glazing instructions
R54-502+R54-501
R54-267+R54-501
R54-32067
67







R54

Lap-joint 45° and 90° internal angles

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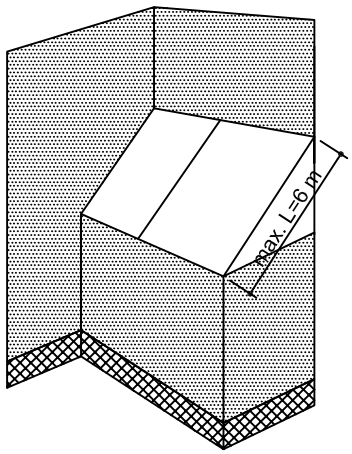
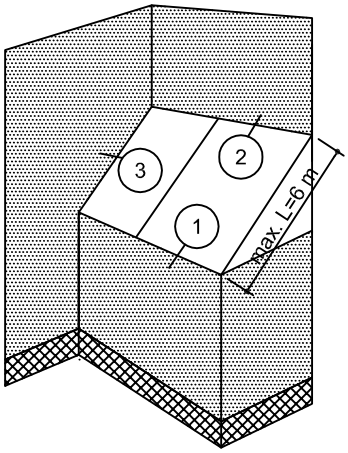
01.07.2014

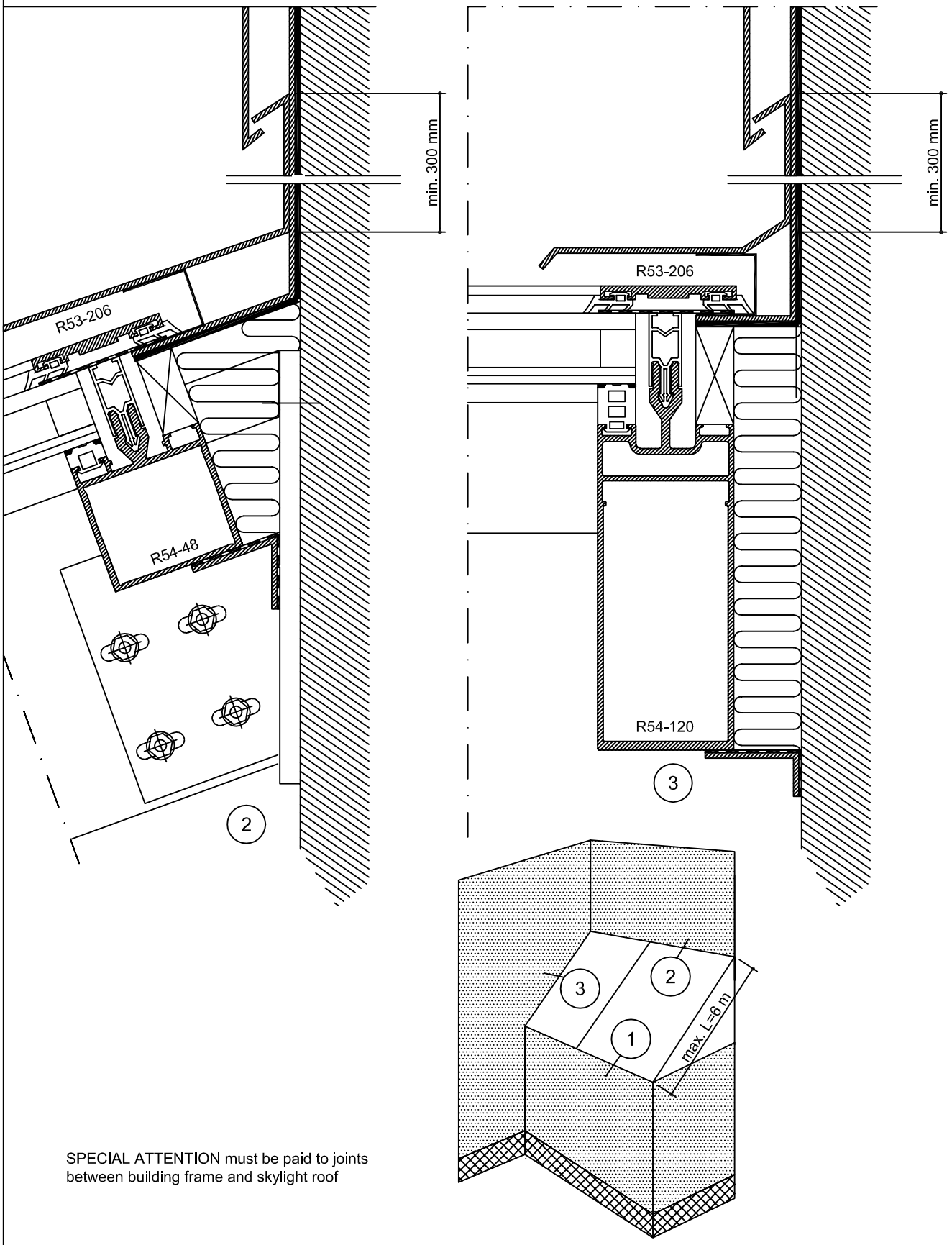
R54 LIGHT ROOF

- possible roof shapes: desk and ridge roof
- R54 light roof does not have inside condensation grooves
- roof max. length: 6 m
- all profile connections must be made with lap-joint
- R54 0-frames can not be used for light roofs
- all grooves in vertical profile MUST be brought outside from the eaves
- for outside sealing glazing bead R53-206 with gasket 611 or 619 together with butyl tape must be used
- DIN 7981 A2 stainless steel screws with EPDM sealing plate must be used for fastening glazing beads

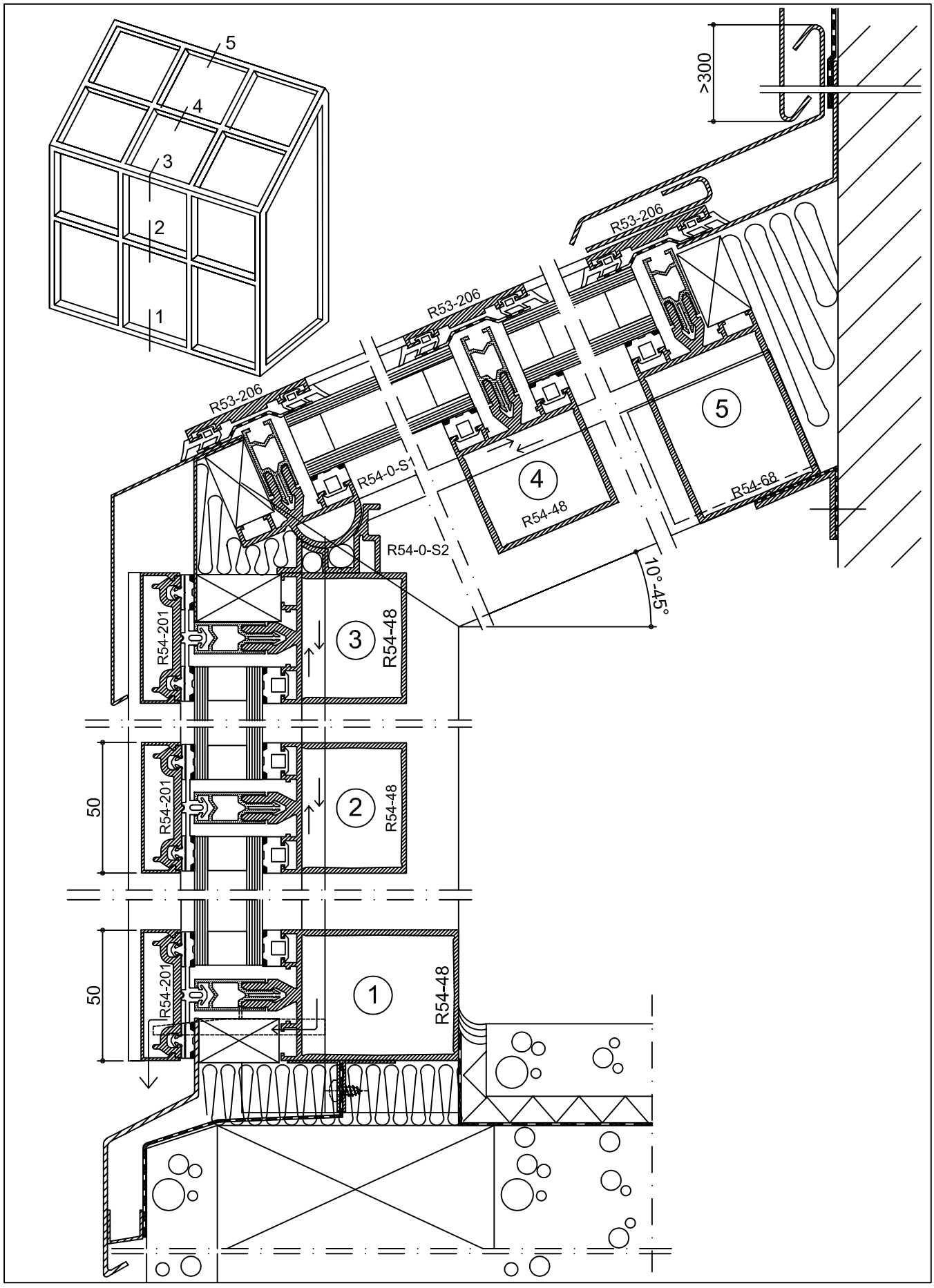




U-value of the building frame ≥ U-value of the glass.



SPECIAL ATTENTION must be paid to joints between building frame and skylight roof



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R54

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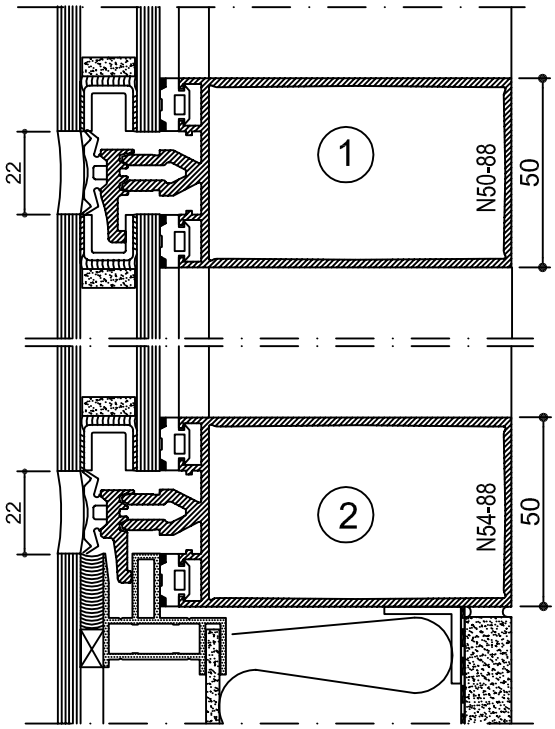
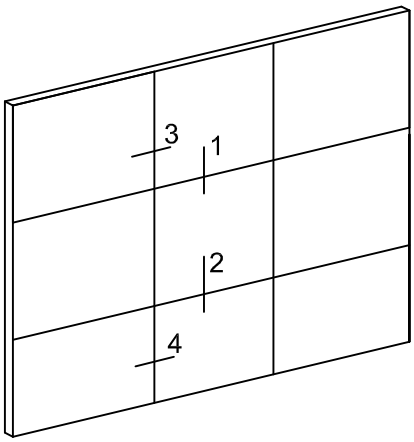
9

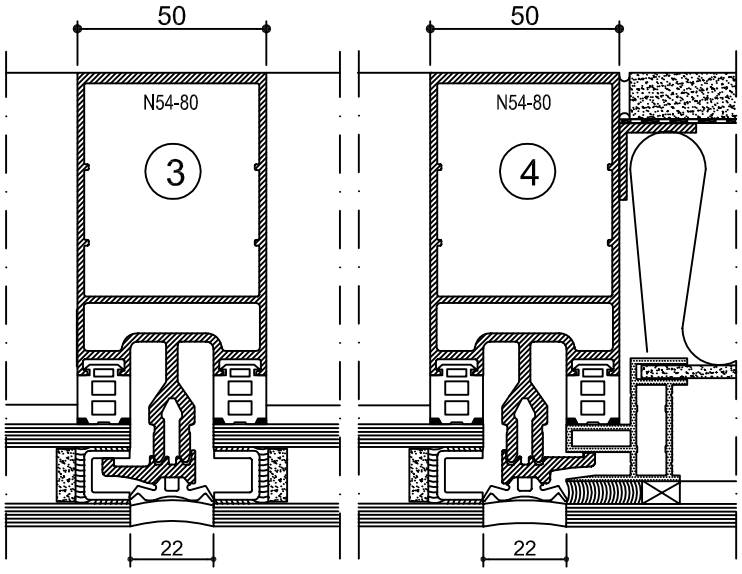
Facade and light roof joint

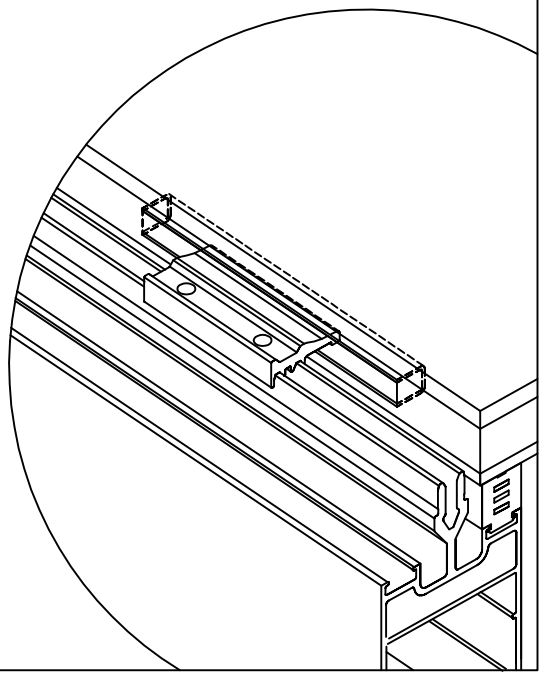
6.4



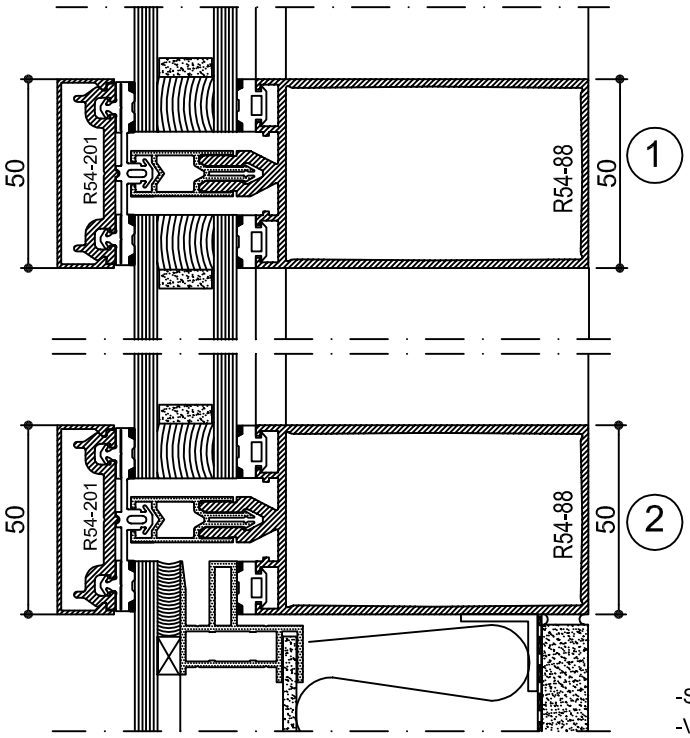


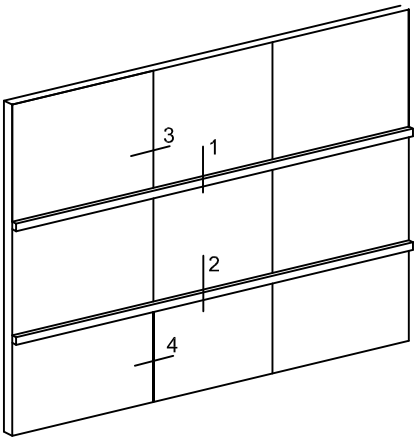
-Structural design, see design criteria
-Ventilation according to macine-shop folder instructions
-Gaskets and glass dimensions, see glazing instruction



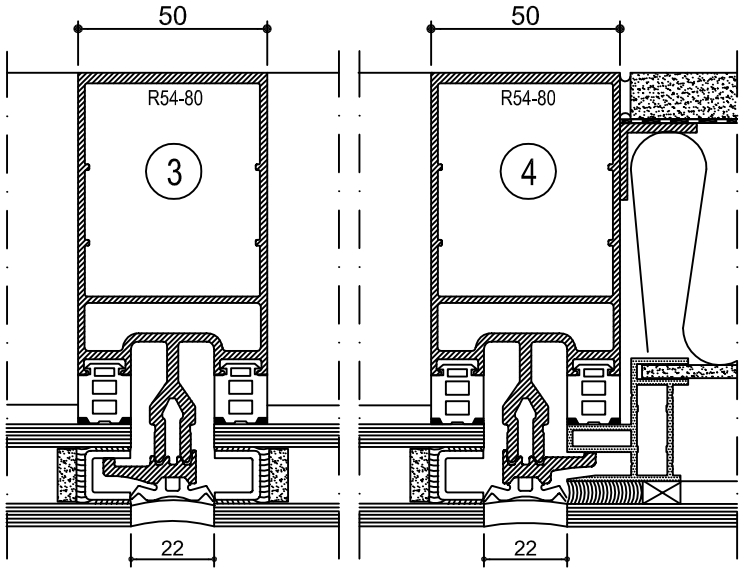


Pat. pend.





-Structural design, see design criteria
-Ventilation according to macine-shop folder instructions
-Gaskets and glass dimensions, see glazing instruction



Pat. pend.

R54 SG

Facade without surface beads, 2-sides (vertical)

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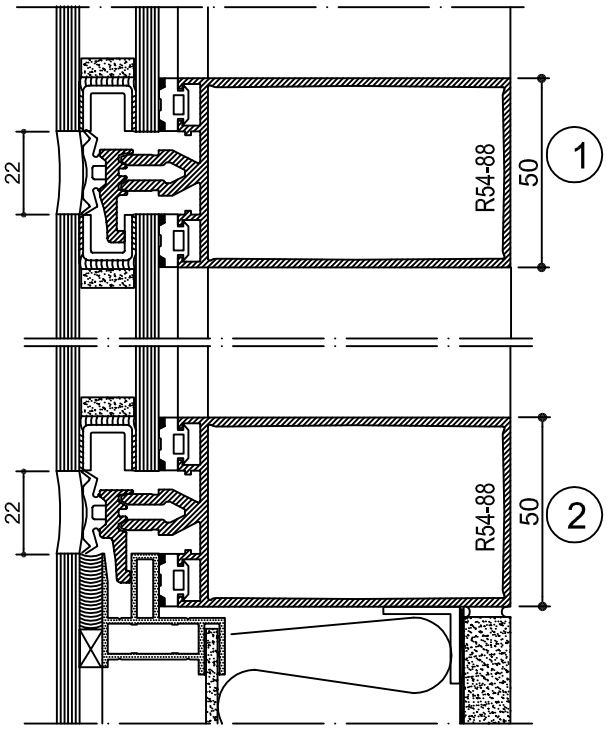
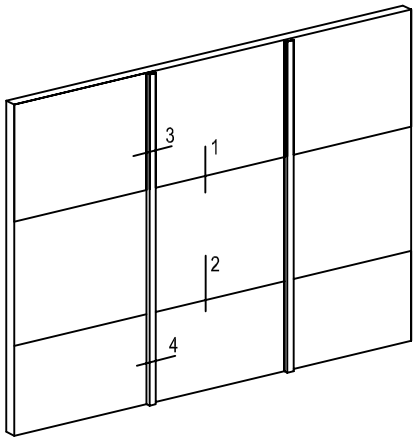
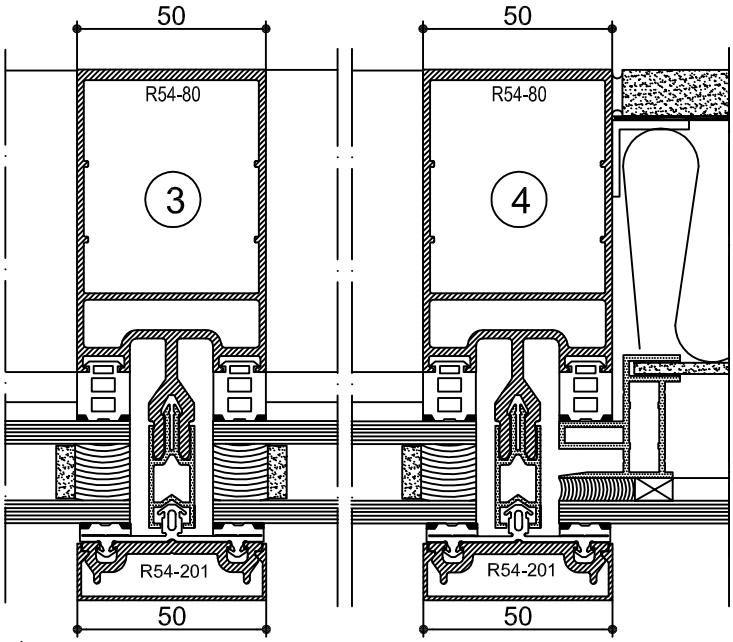
9

7.2

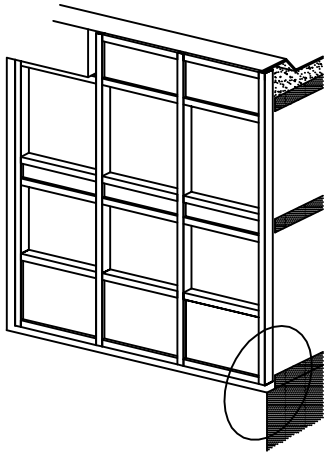


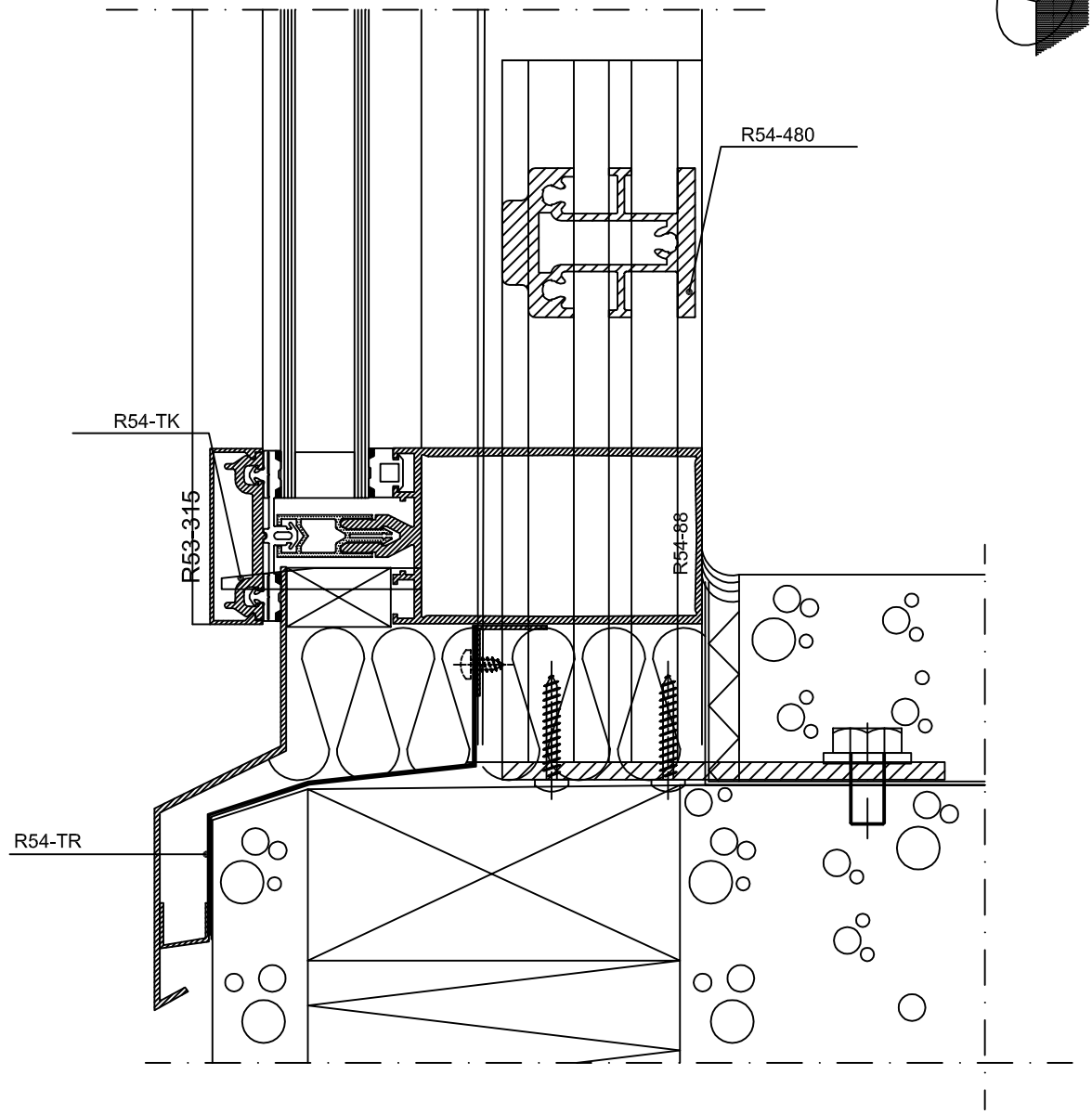


-Structural design, see design criteria
-Ventilation according to macine-shop folder instructions
-Gaskets and glass dimensions, see glazing instruction



Pat. pend.





R54

Connection of lower end to building frame

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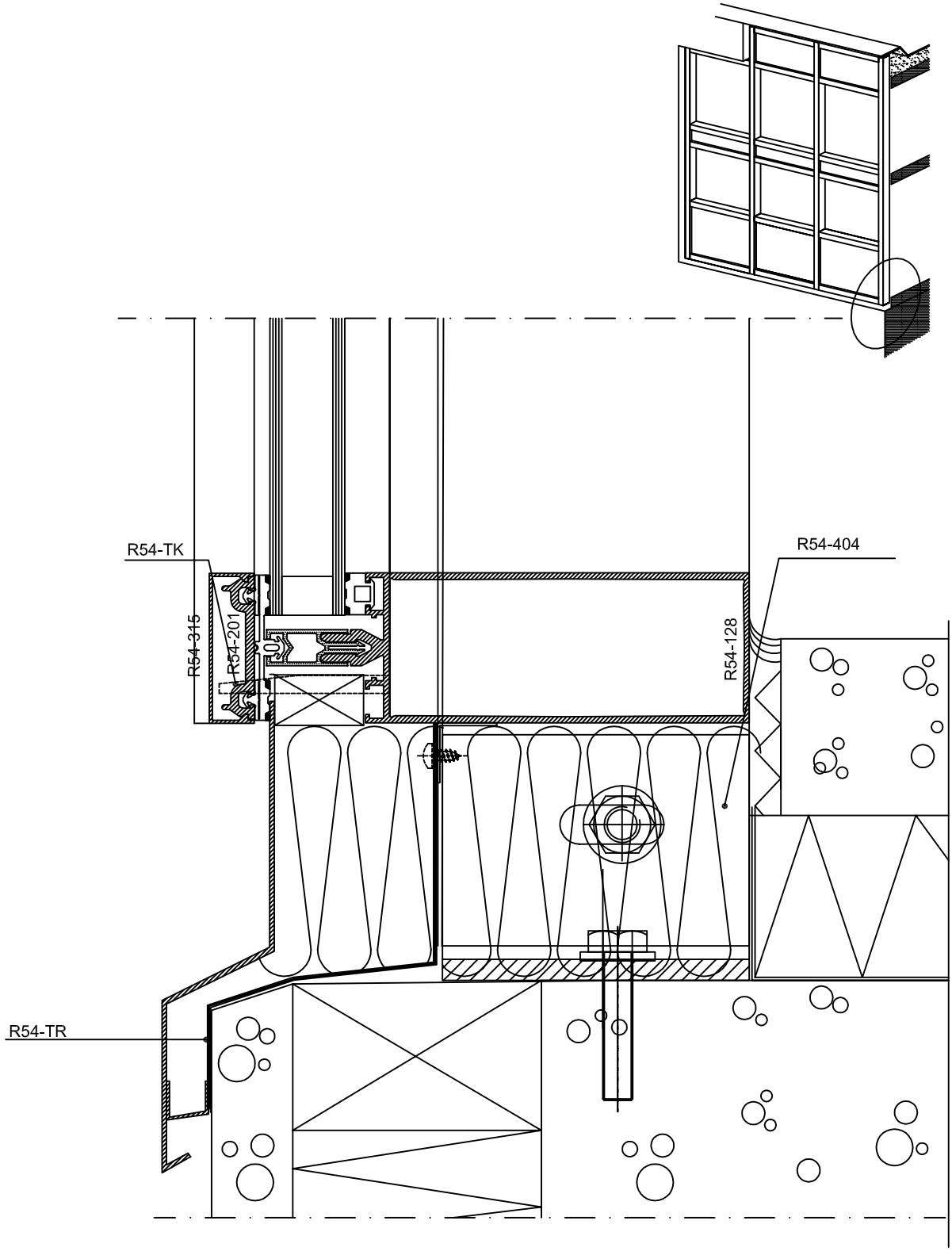
9

8.1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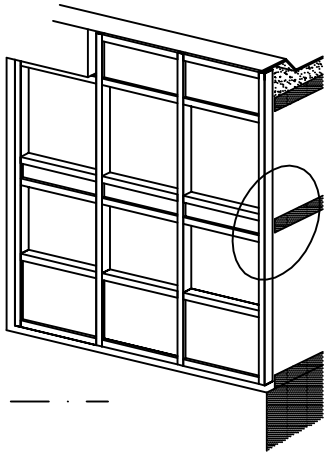
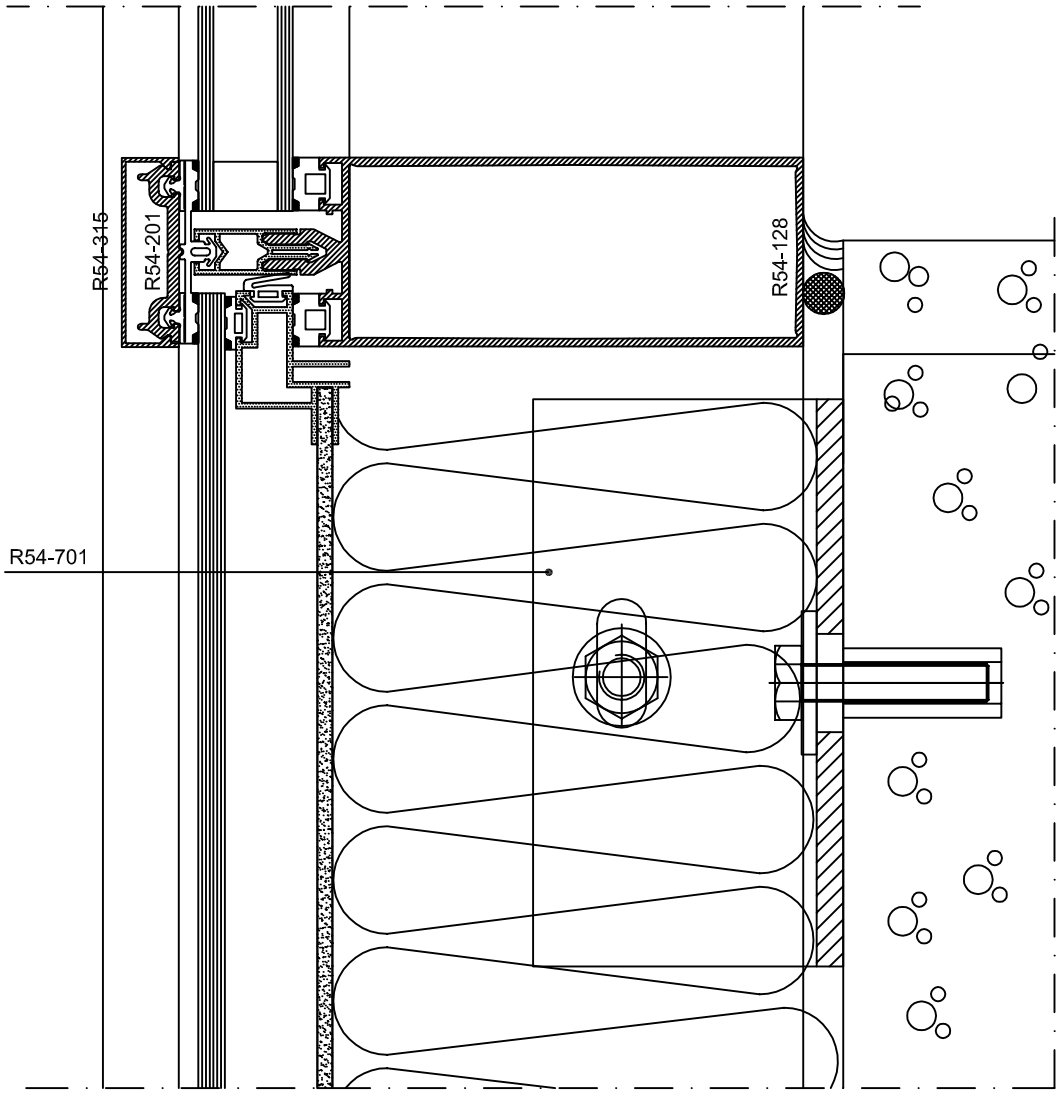
R54-315
R54-201
R54-404
R54-128
R54-TR





R54

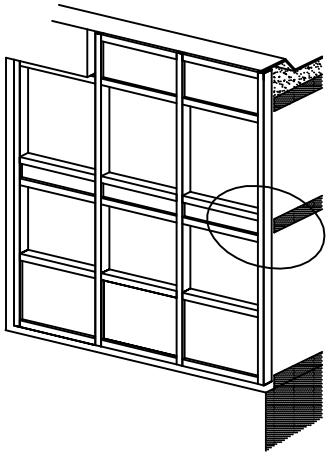
Fixing of wall to building frame

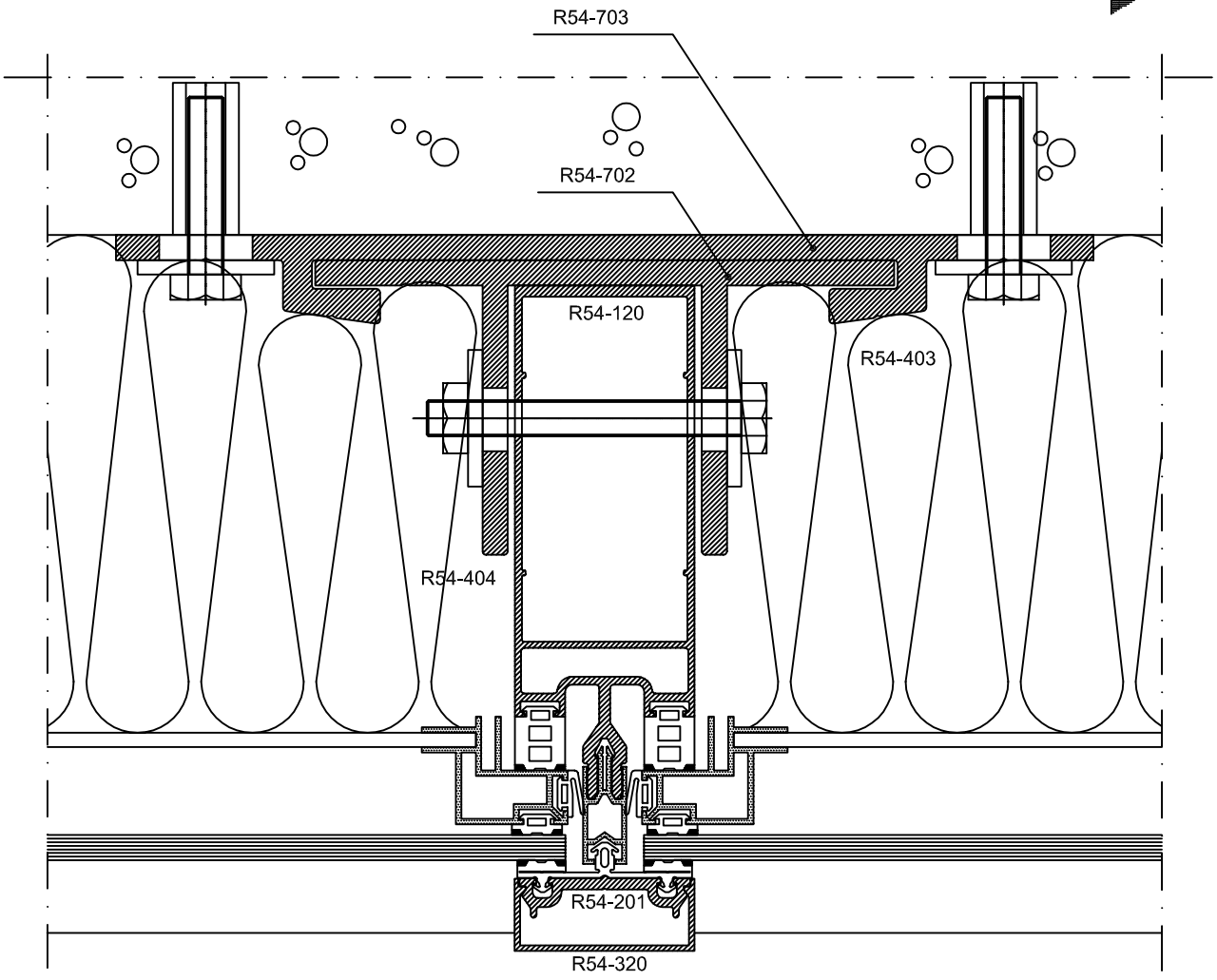
NOKIAN PROFILES

01.07.2014

9

8.3

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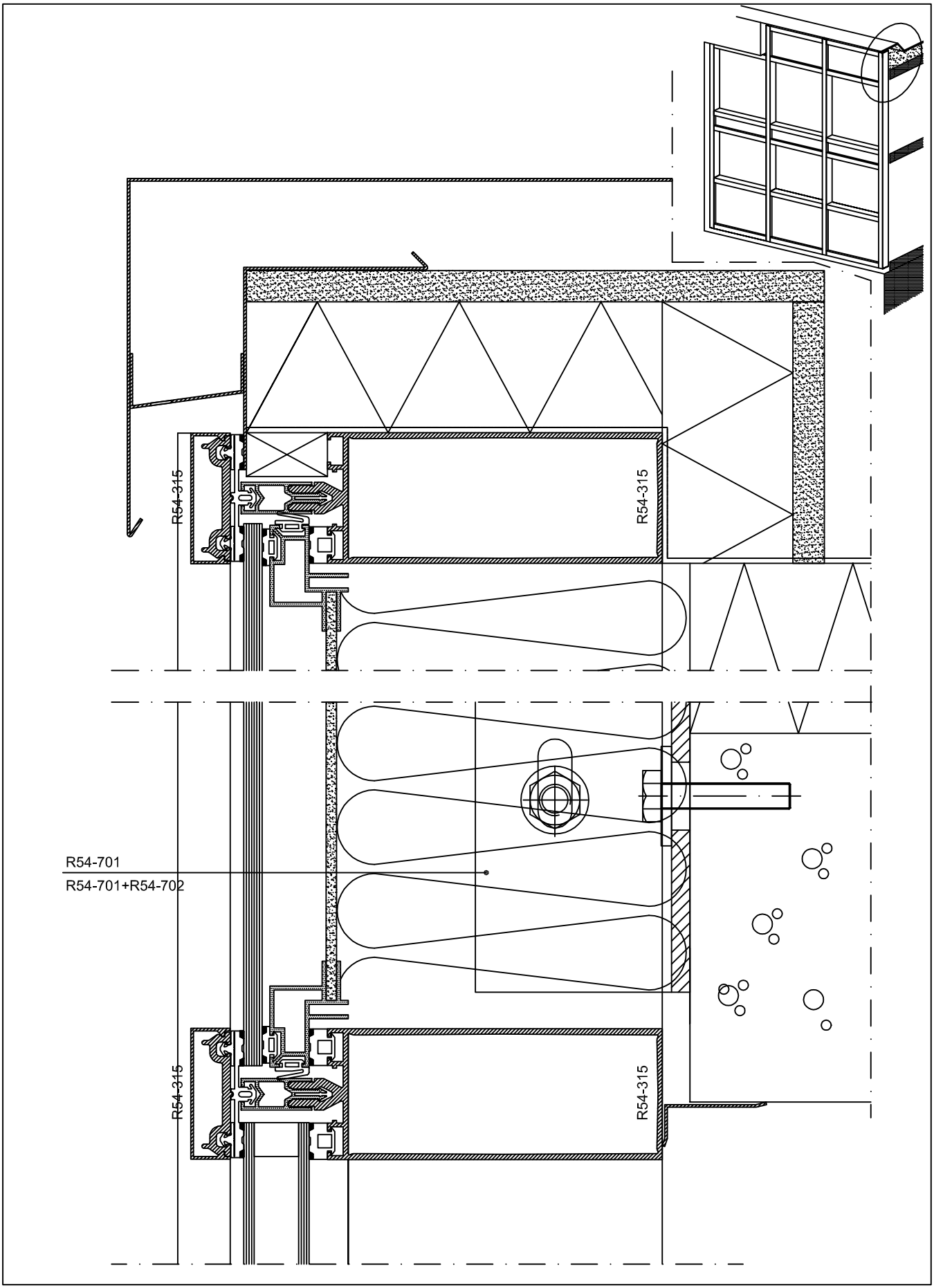
R54-702
R54-120
R54-403
R54-404
R54-201
R54-320



R54

Fixing of wall wall upper end of wall to frame

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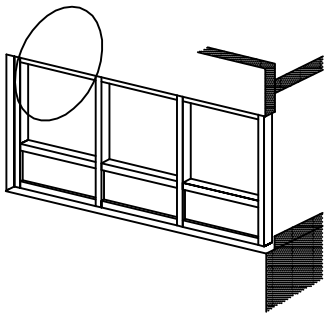
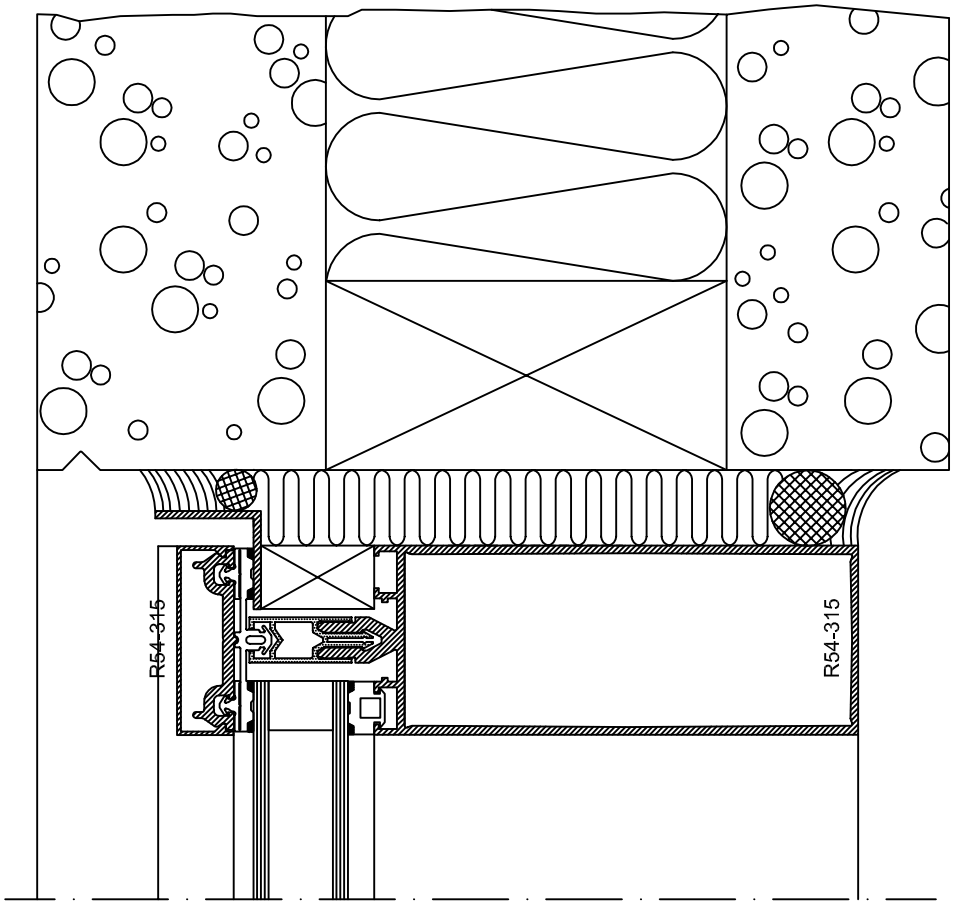
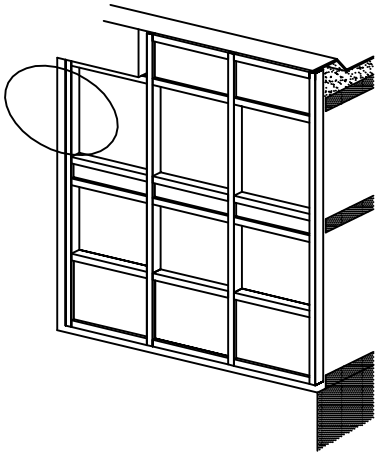
01.07.2014

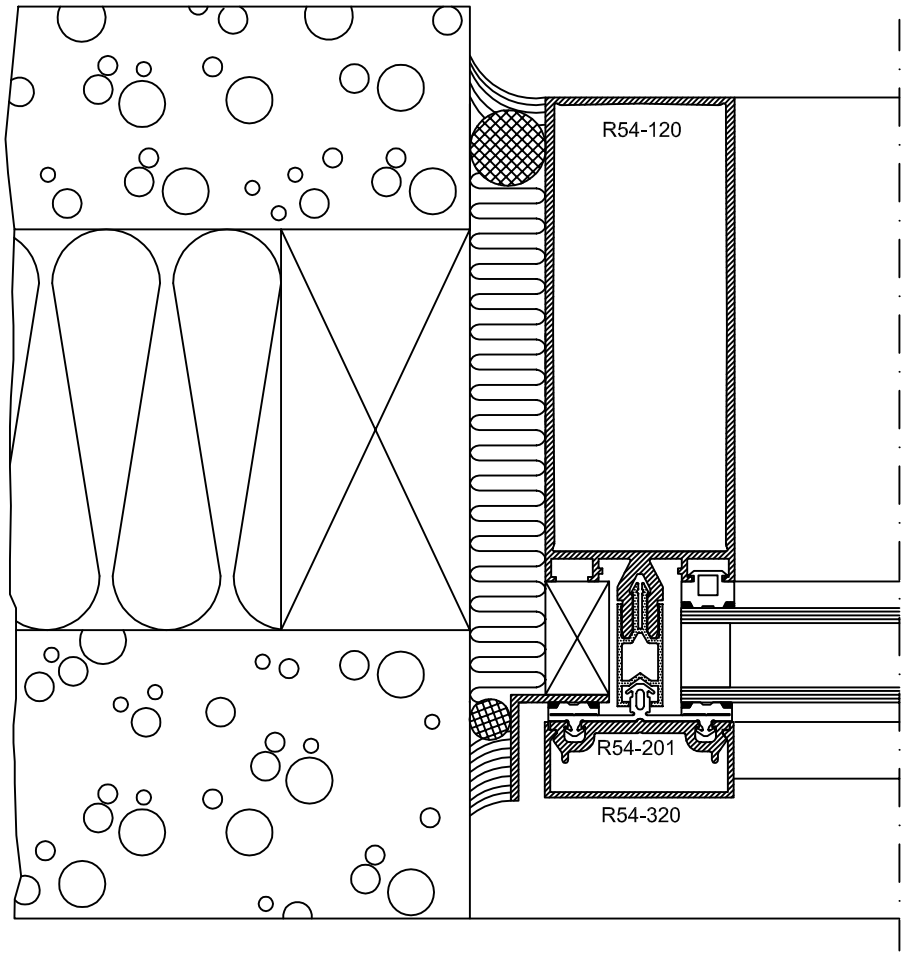
9

8.5




R54-315
R54-315





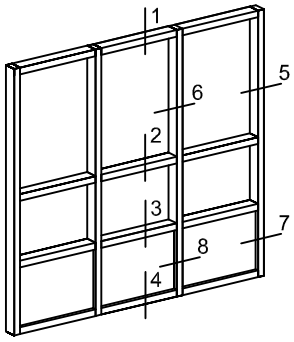
R54

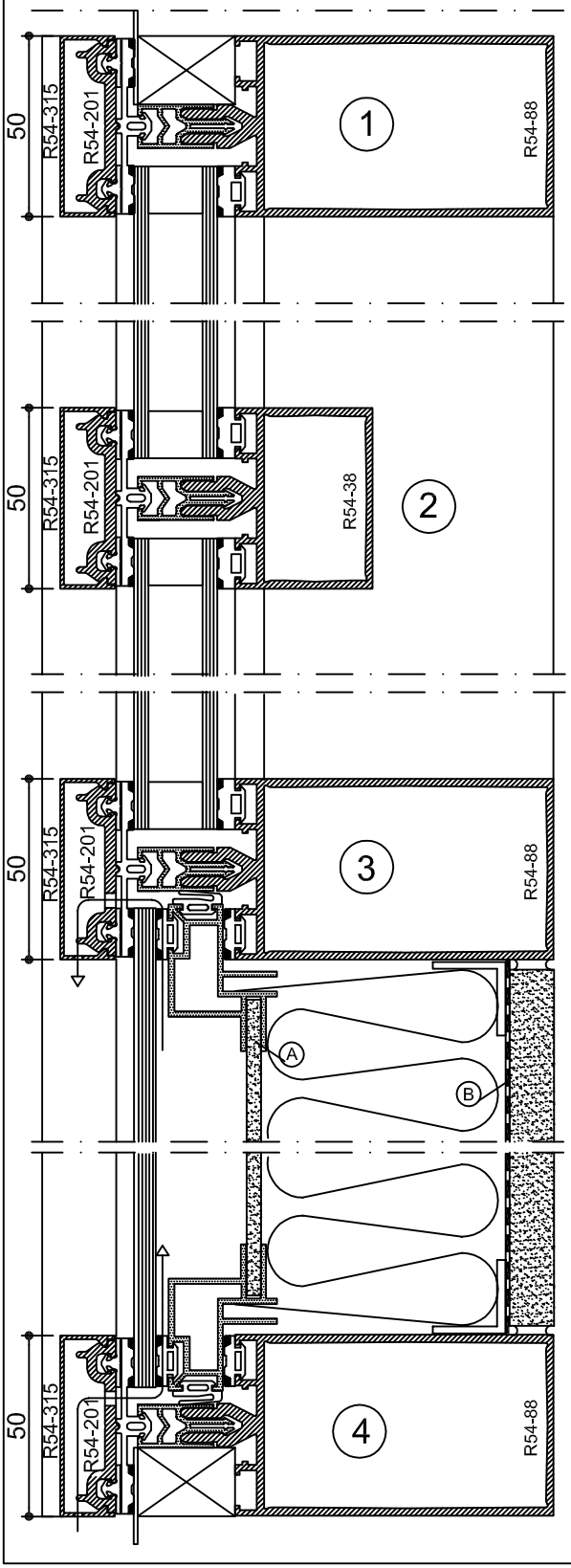
Fixing of wall to building frame

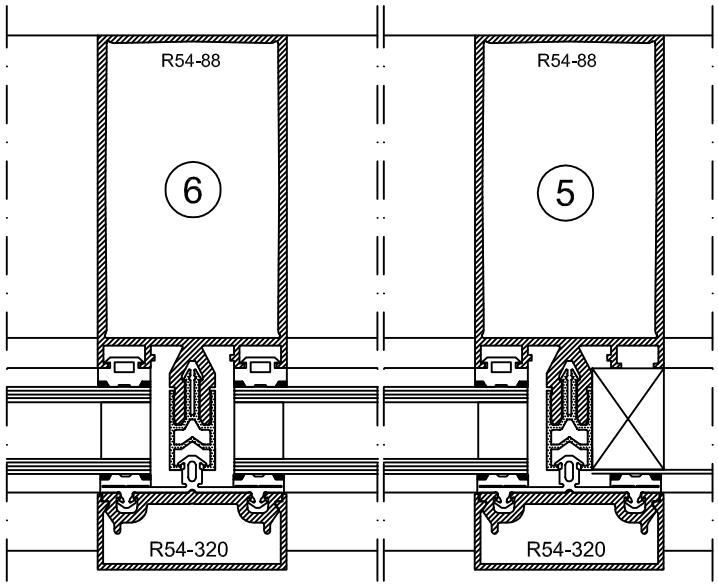
NOKIAN PROFILES

01.07.2014

Note. Facade background painted or otherwise opaque.
Ventilation according to macine-shop folder instructions.

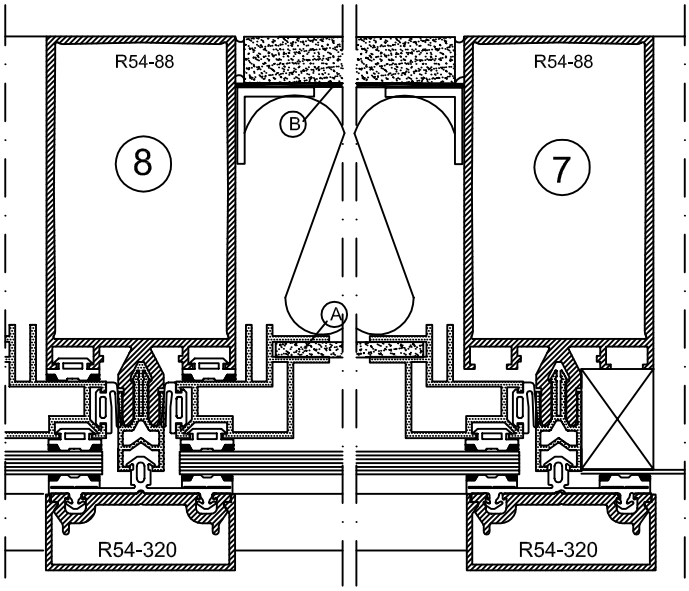




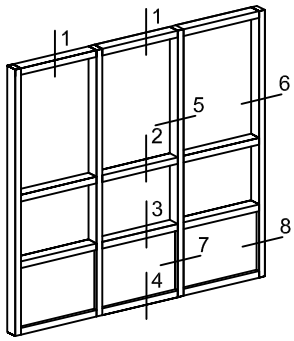


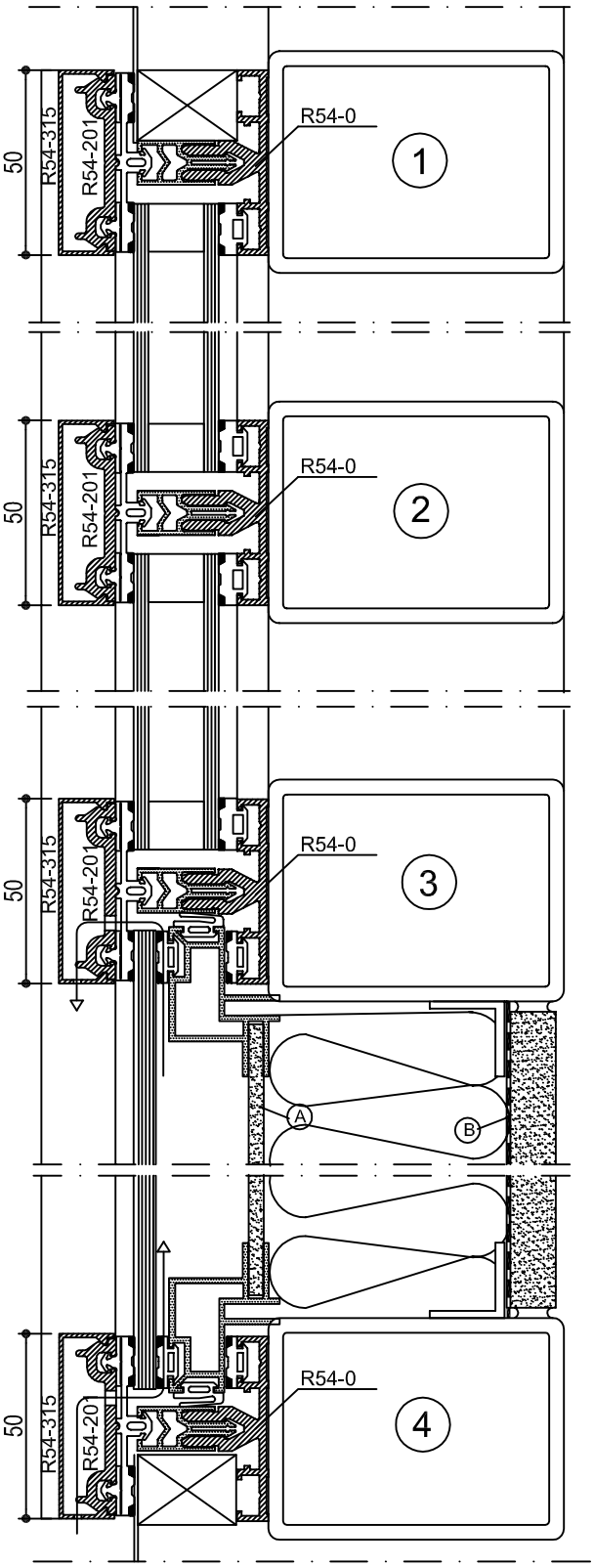
A = Luja wind barrier board (3.2 mm)

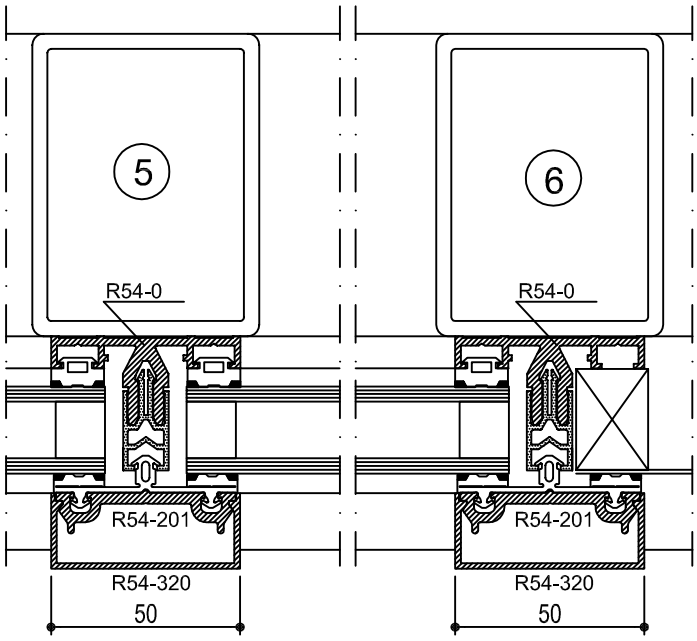
B = Vapour barrier



Note. Facade background painted or otherwise opaque.
Ventilation according to macine-shop folder instructions.

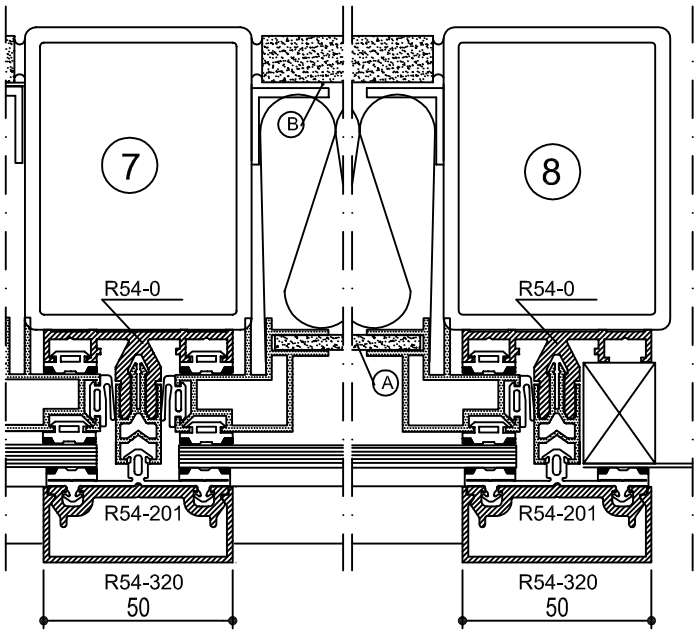


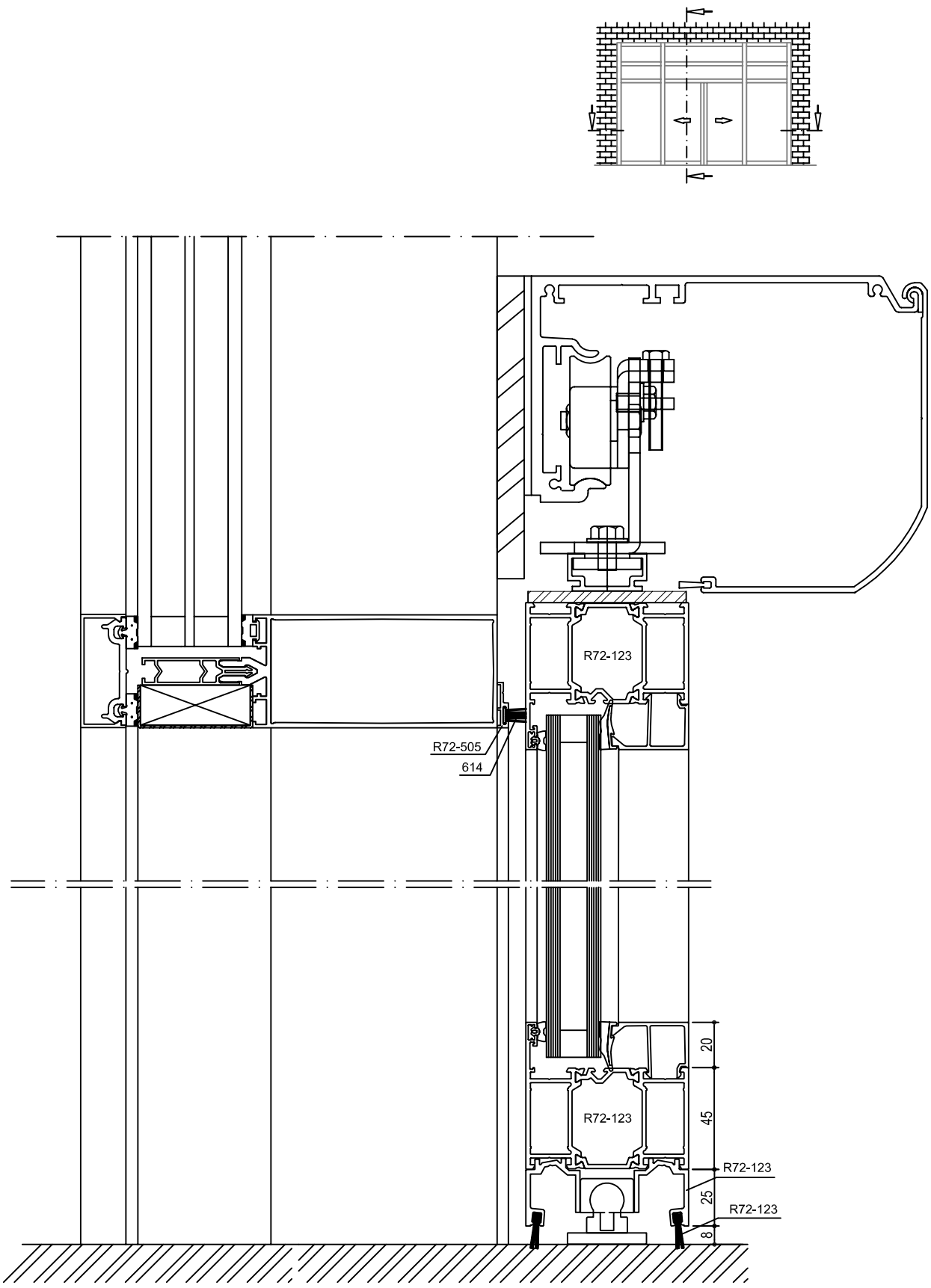


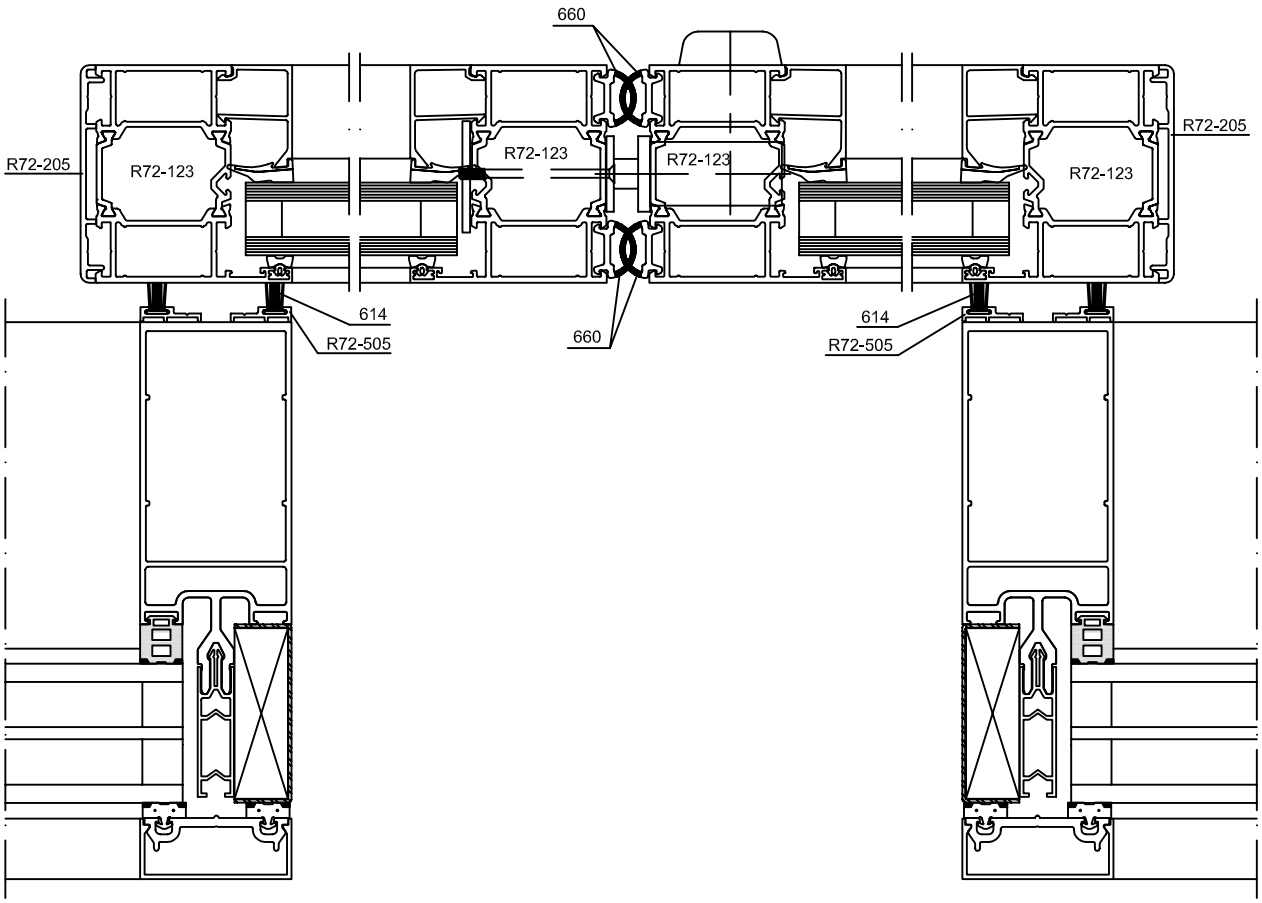


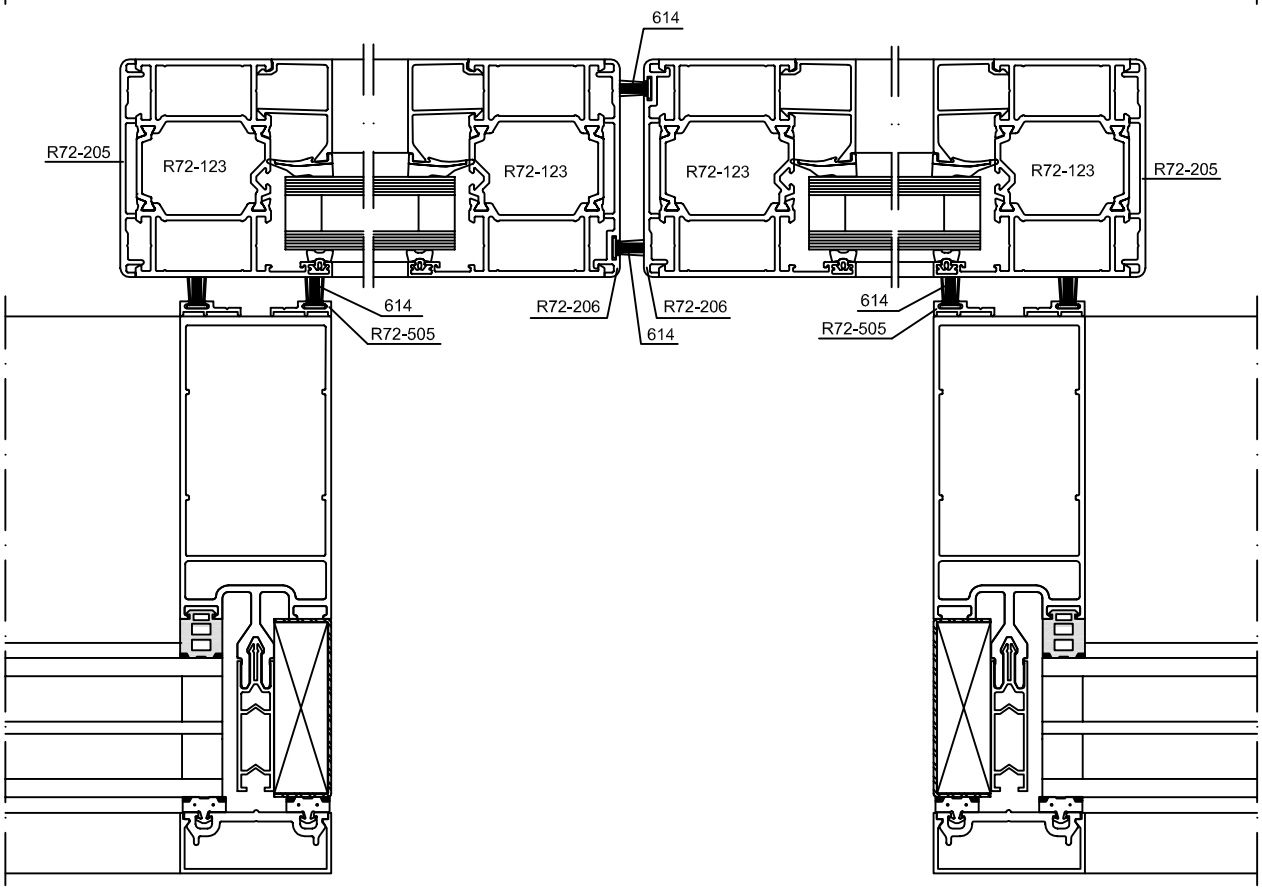
A = Luja wind barrier board (3.2 mm)

B = Vapour barrier

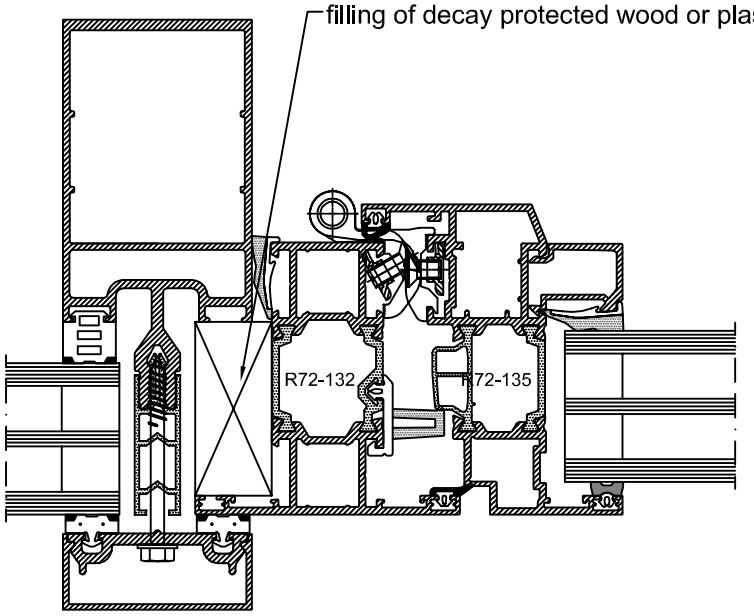


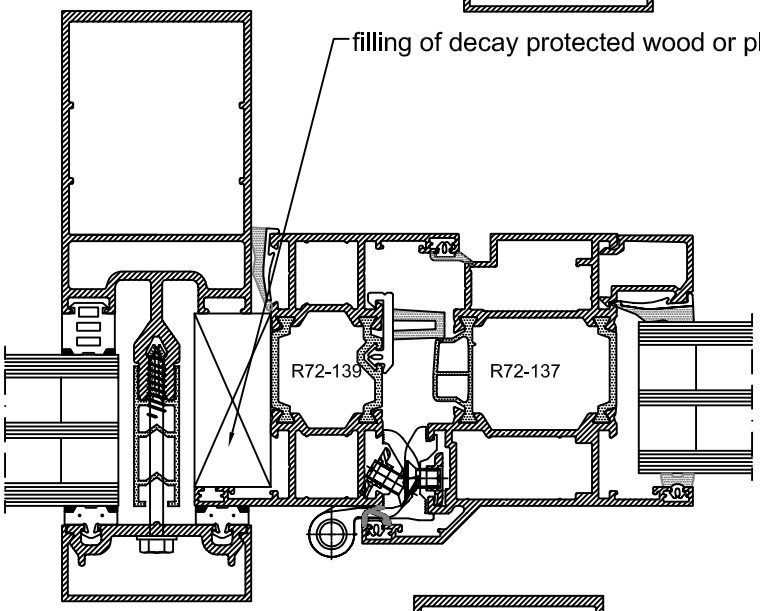

R72-123
R72-505
614
20
45
R72-123
25
R72-123
8


660
R72-205
R72-123
R72-123
R72-123
R72-123
R72-205
614
R72-505
660
614
R72-505


614
R72-205
R72-123
R72-123
R72-123
R72-123
R72-205
614
R72-505
R72-206
R72-206
614
614
R72-505

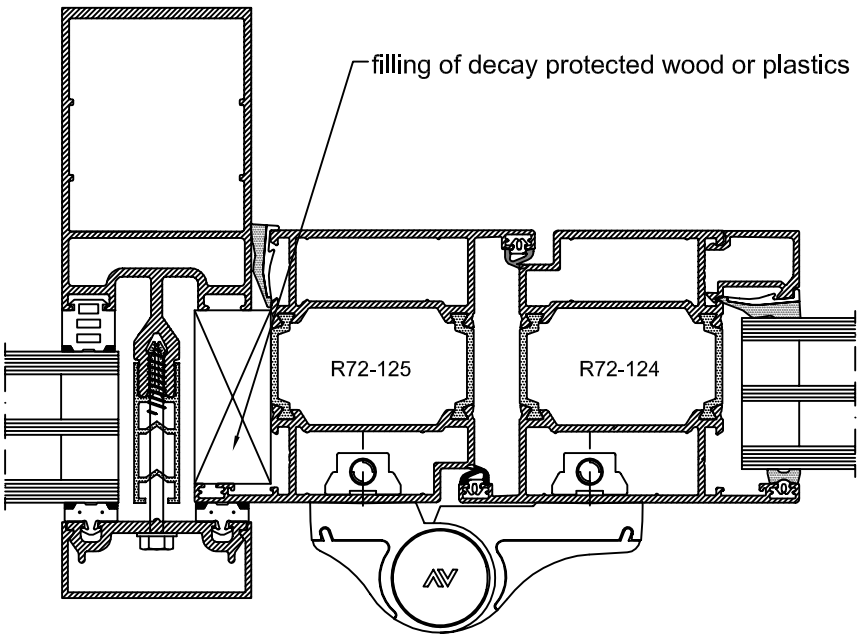
R72 inwards opening window





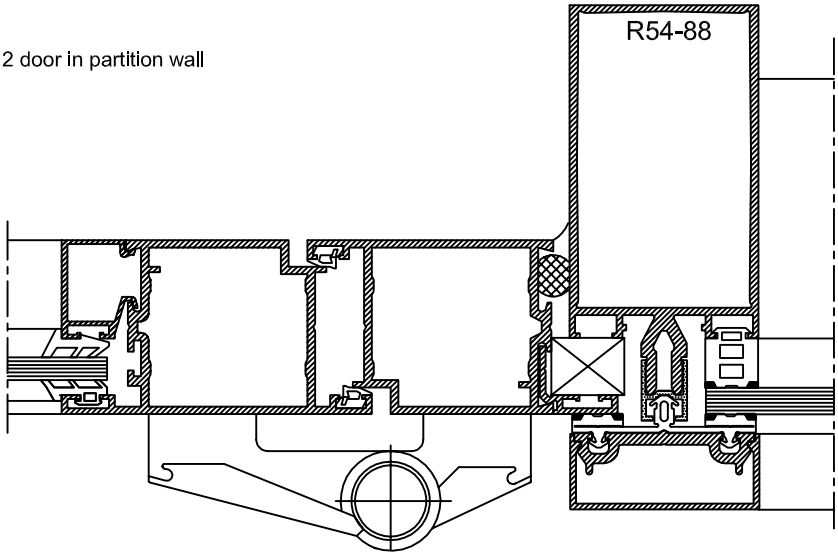
R72 outwards opening window

R72 door



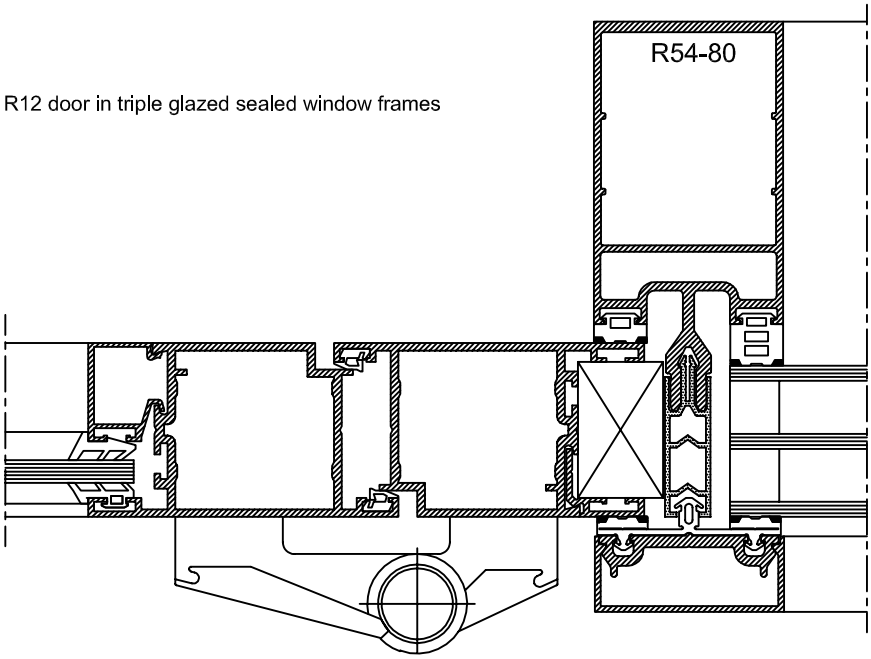
R12 door in partition wall

R54-88



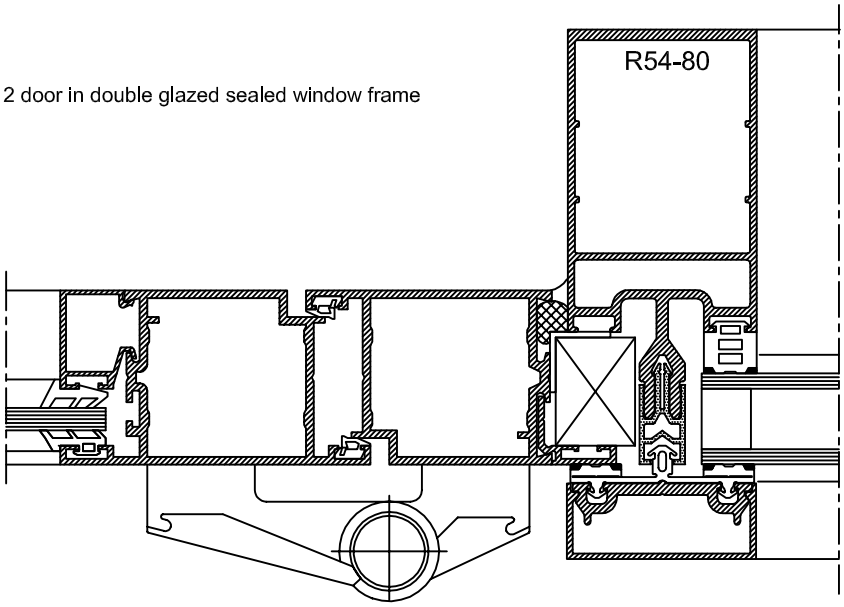
R12 door in triple glazed sealed window frames

R54-80



R12 door in double glazed sealed window frame

R54-80



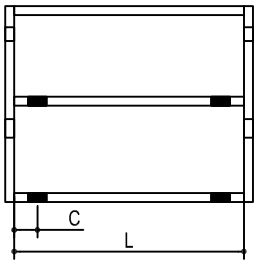
Общая информация

До начала остекления необходимо убедиться в чистоте фальцев, штапиков и стекол. Нижняя часть должна быть абсолютно прямой. Уплотнители, используемые при остеклении, должны подходить друг к другу и быть химически нейтральными по отношению к друг другу. при остеклении надо соблюдать особенную тщательность.

Остекление

Типы прокладок

- Несущие прокладки стекла, передающие вес оконного стекла раме
- Поддерживающие прокладки, обеспечивающие удержание оконного стекла на месте.



Несущая прокладка стекла

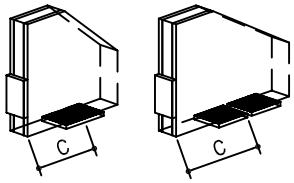
Прокладка остекления

Несущие прокладки стекла

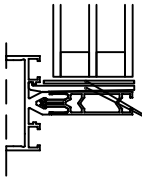
Несущие прокладки должны быть соответствующими системе R54 прокладками R54-K26...K42. Под несущей прокладкой ВСЕГДА используется поддерживающий элемент R54-LT34...LT56, за исключением остекления перегородок. Основания выбора опорных прокладок и элементов представлены в иллюстрациях инструкций по остеклению. Принцип размещения опорных прокладок представлен в таблице ниже:

Нагрузка на прокладку остекления:

Прокладка остекления	макс вес стекл. элемента (кг)
R54-LT34	180
R54-LT40	160
R54-LT50	120
R54-LT56	80



Если L < 2500 mm, C = 100 mm
Если L > 2500 mm, C = L/8 mm



Опорная прокладка и опорный элемент

Опорные прокладки

Длина поддерживающих прокладок может быть 50...100 мм, в зависимости от размеров стекла, а ширина такая же, как у поддерживающих прокладок. Несущие прокладки должны быть изготовлены из мягкой пластмассы, и не должны влиять на функции поддерживаюших прокладок.

Уплотнители

При отрезании уплотнителей необходимо принять во внимание их усадку прим. на 5%. Угловые соединения и стыки уплотнителей для гарантии заполняются герметиком. При установке уплотнителей желательно избегать надставок. При герметизации используются исключительно уплотнители и герметики, одобренные Nokian Profiles Oy.

Бутиловые полосы

При изготовлении стен со свободным углом и световых фонарей под внешними уплотнителями используется бутиловая полоса. В конструкциях со свободным углом бутиловая полоса используется в вертикальном каркасе, в световых фонарях как в вертикальном, так и в горизонтальном каркасах. Бутиловая полоса должна находить на стекло как мин. на 5 мм. Поверхность стекла должна быть сухой и чистой во время наклейки полосы. В световых фонарях в местах крестовых стыков полоса накладывается сплошной лентой. Изготовитель рекомендует заранее проделать отверстия в местах установки шурупов остекления, чтобы полоса не накручивалась на резьбу, либо обработать шурупы минеральным маслом.

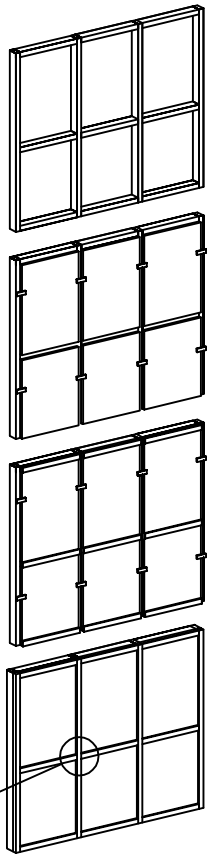
Штапики

Крепление штапиков согласно инструкции каталога механической мастерской

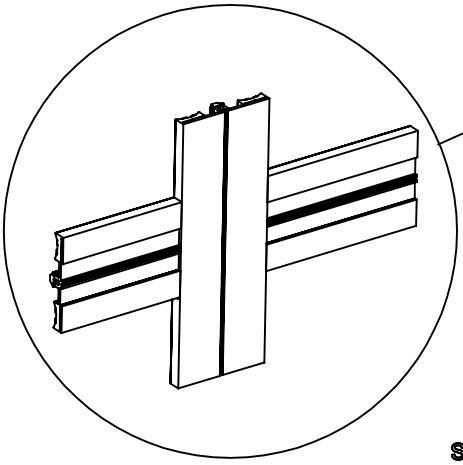
Настоящая инструкция по остеклению носит принципиальный характер. За саму работу по остеклению мы, естественно, отвечать не можем.

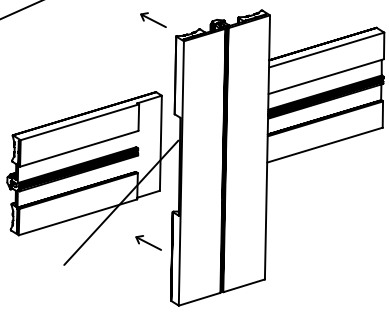
INSTALLATION ORDER

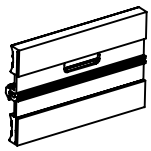
1. Inner gaskets, thermal brakes and glass bearing pieces and -pads
2. Overlapping glasses/glass elements are fixed with temporal fixing pieces (you can also move on straight to place 3.)
3. Install the outer horizontal gakets and glazing beads.
4. Remove the temporal fixing pieces.
5. Install the outer vertical gaskets and glazing beads.



SEALING





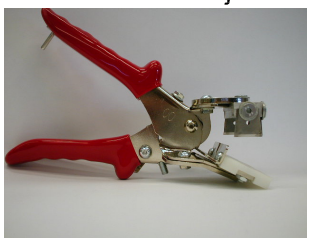


Ventilation hole:
- But joint
- Facade glazing

sealing mass: EPDM Seal BSR 50-50 (SIMSON)

Gasket joints are cut by special scissors:

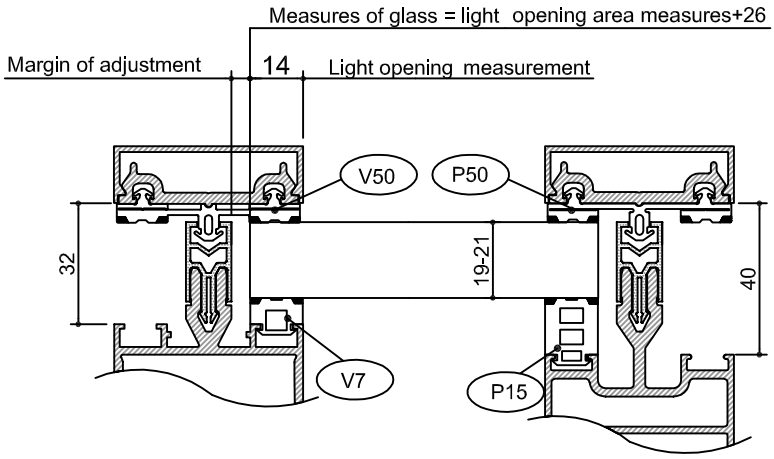
SWR-33-04 Cross joints

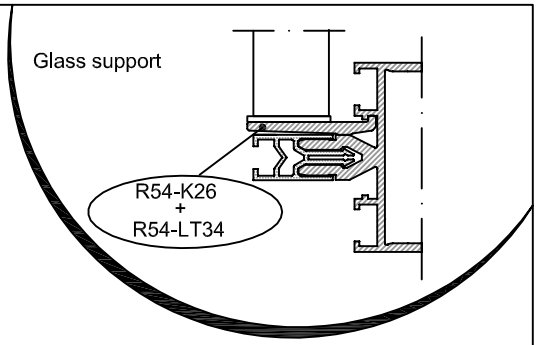


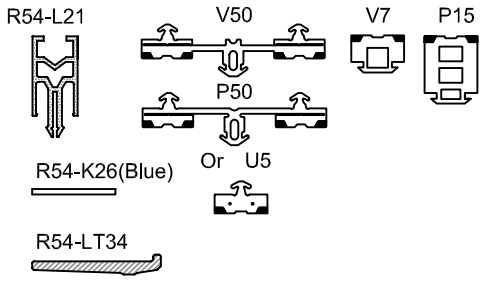
WL-33-04 ventilation holes to gaskets

TI-58-04 Straight cutting of gaskets

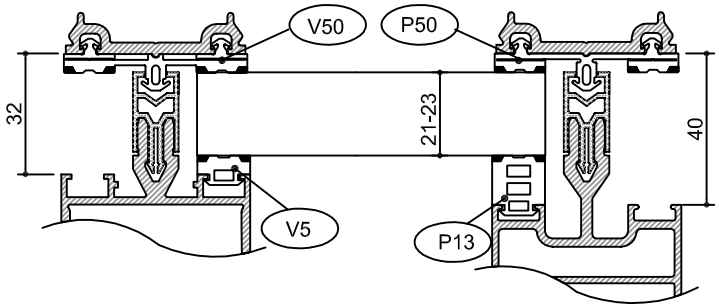
19-21 mm

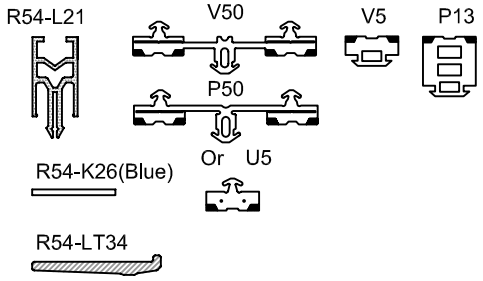




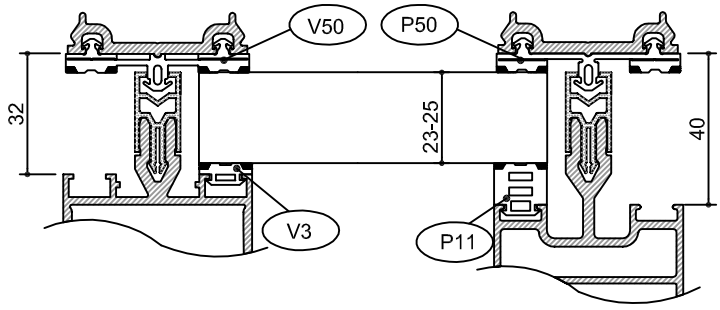


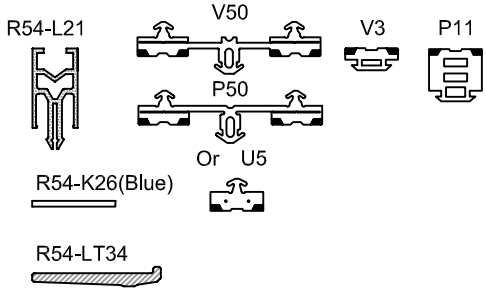
21-23 mm



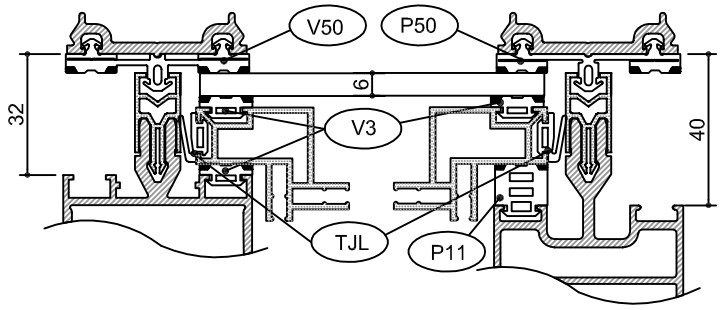


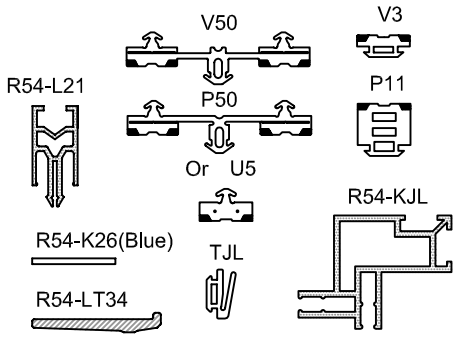
23-25 mm



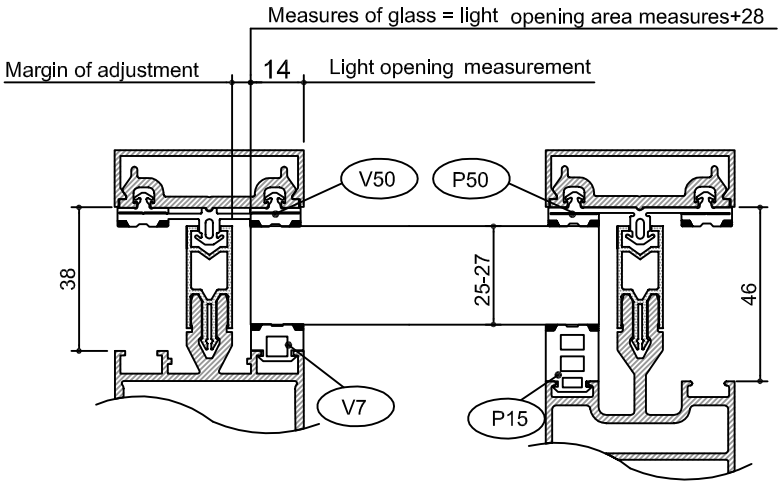


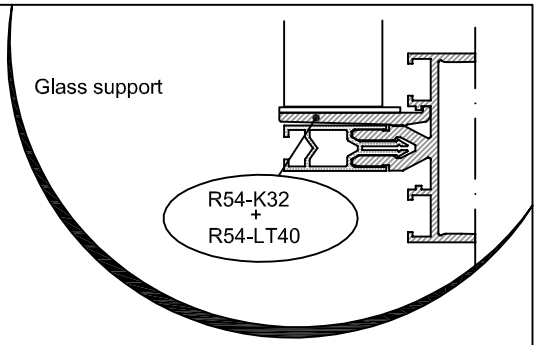
Facade glass

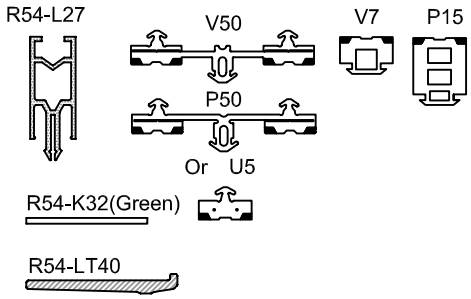




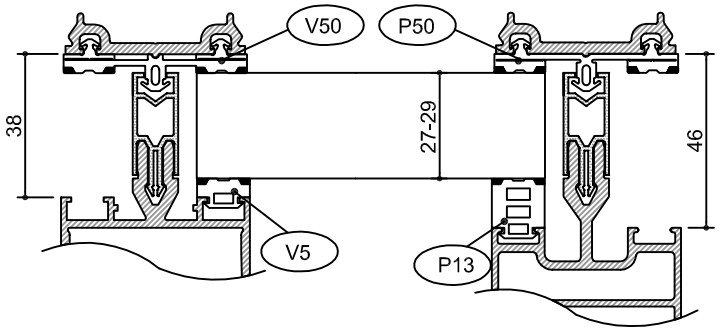
25-27 mm

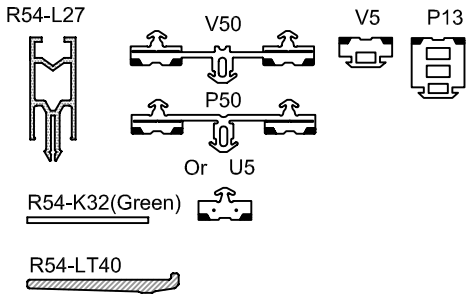




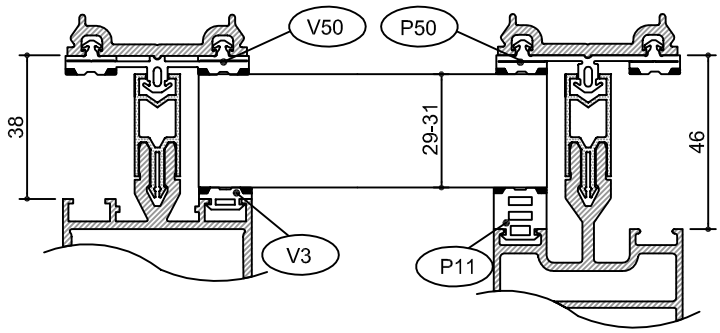


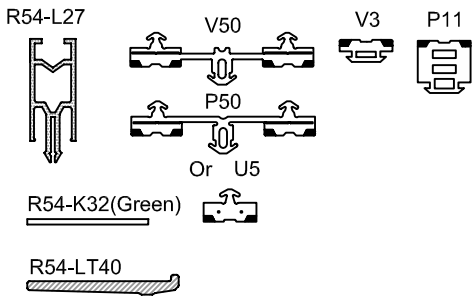
27-29 mm



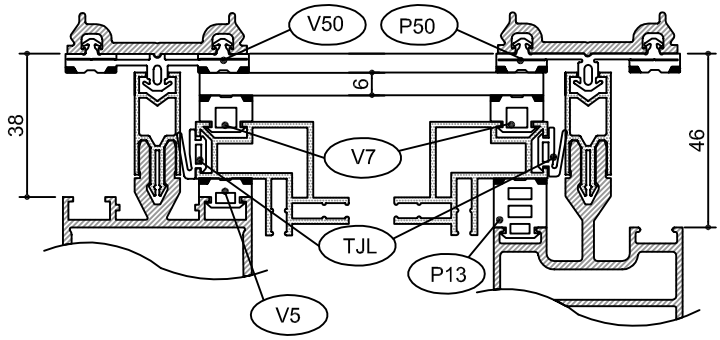


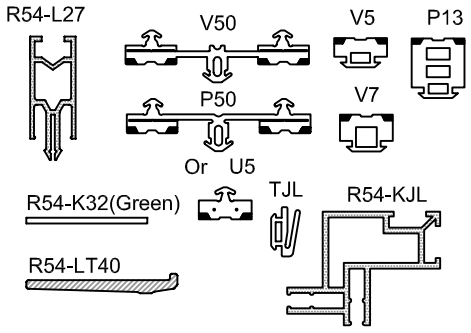
29-31 mm



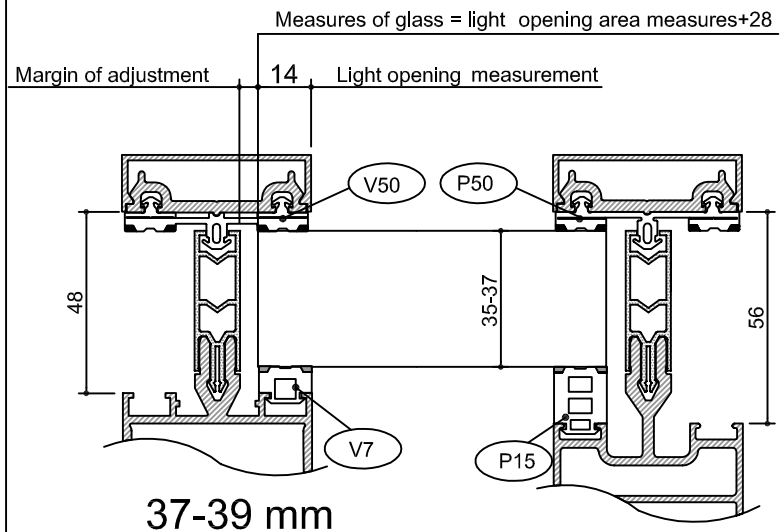


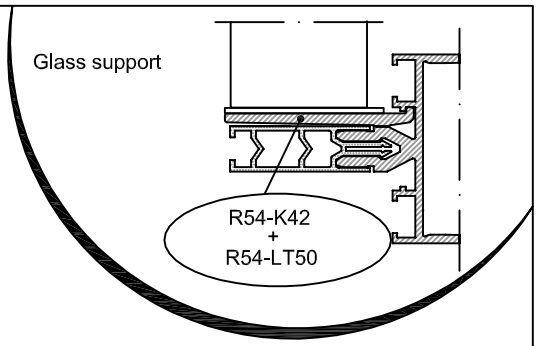
Facade glass

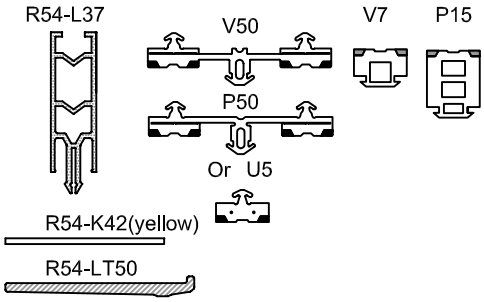




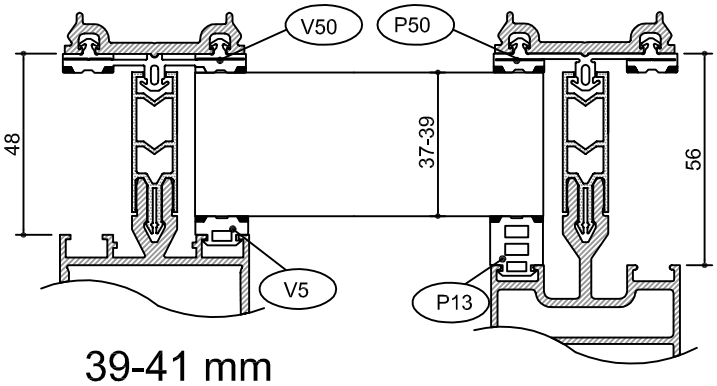
35-37 mm

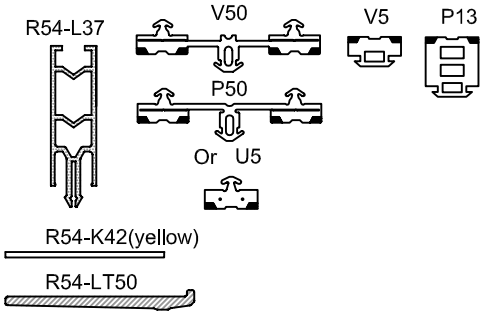




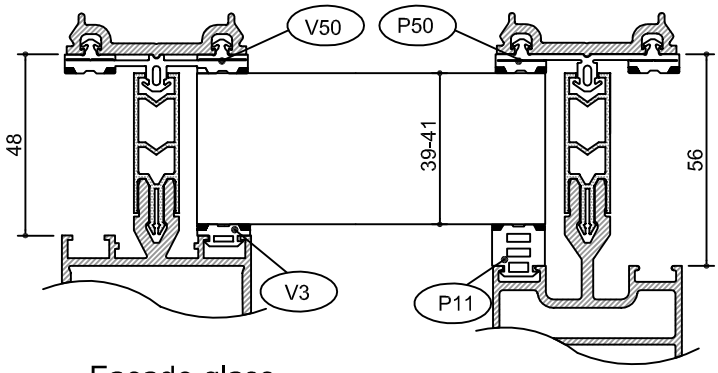


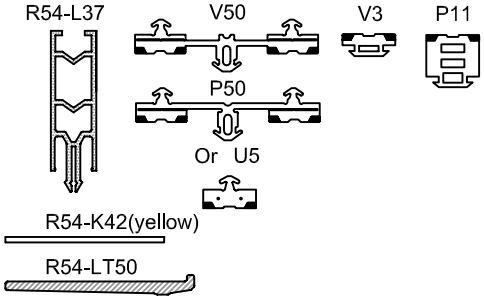
37-39 mm



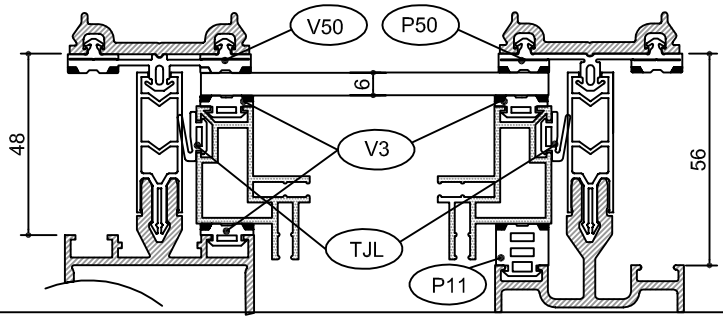


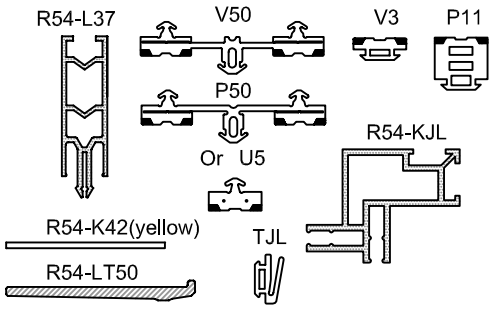
39-41 mm



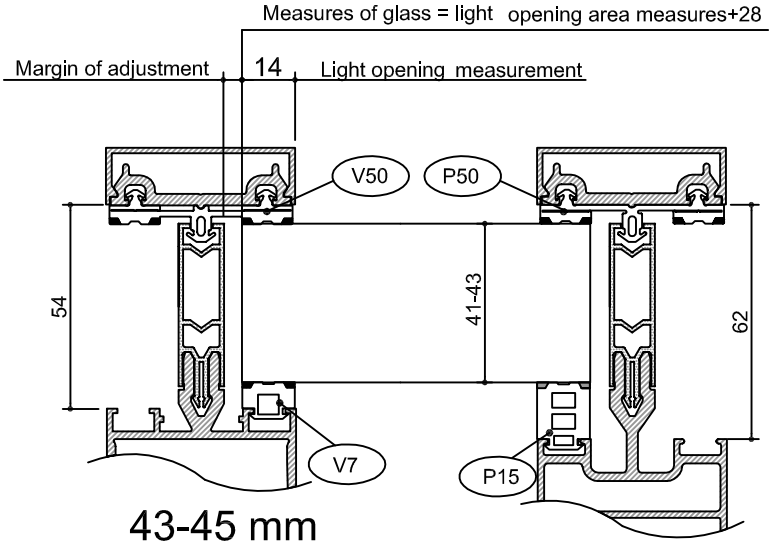


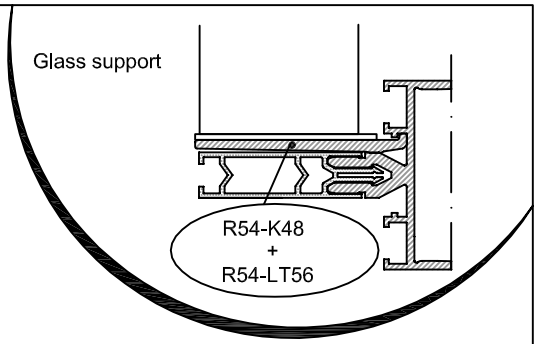
Facade glass

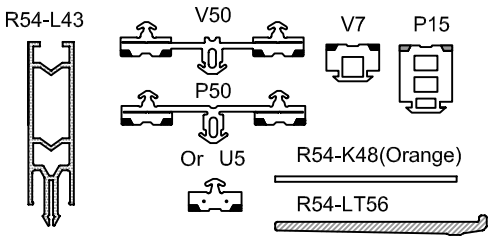




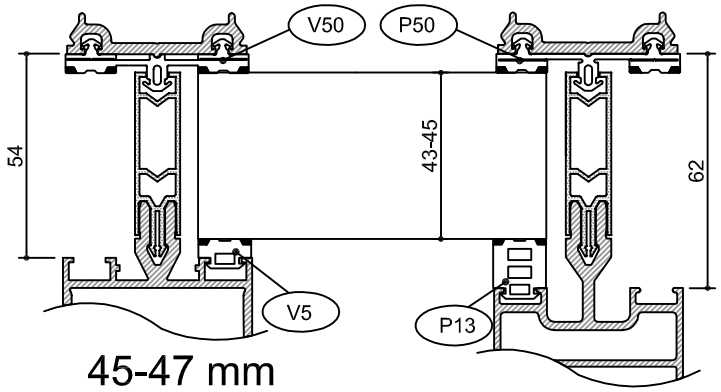
41-43 mm

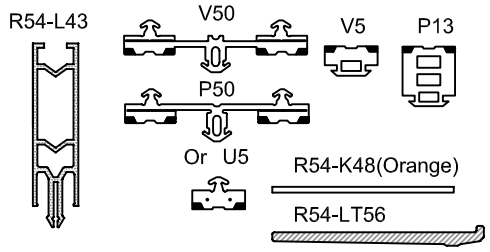




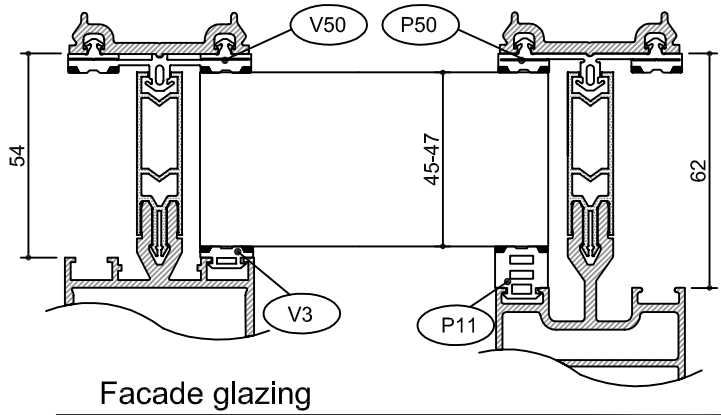


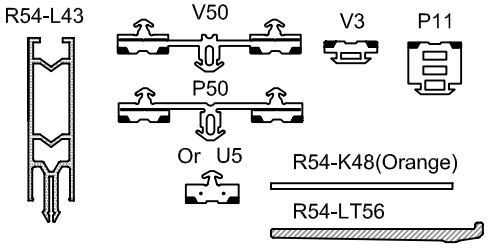
43-45 mm



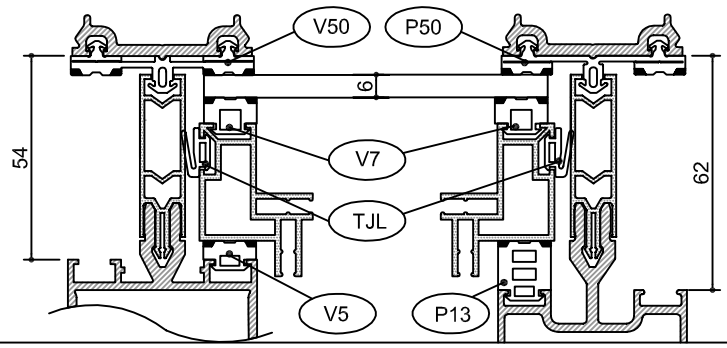


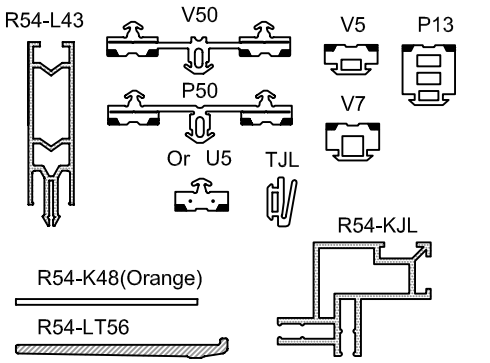
45-47 mm





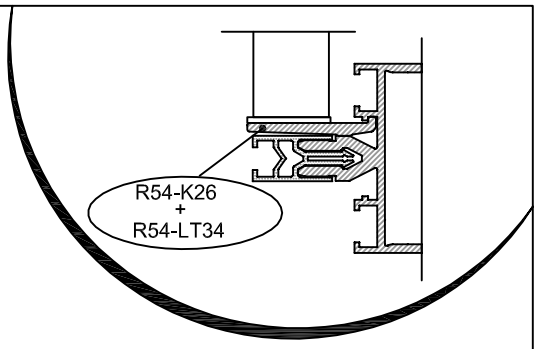
Facade glazing

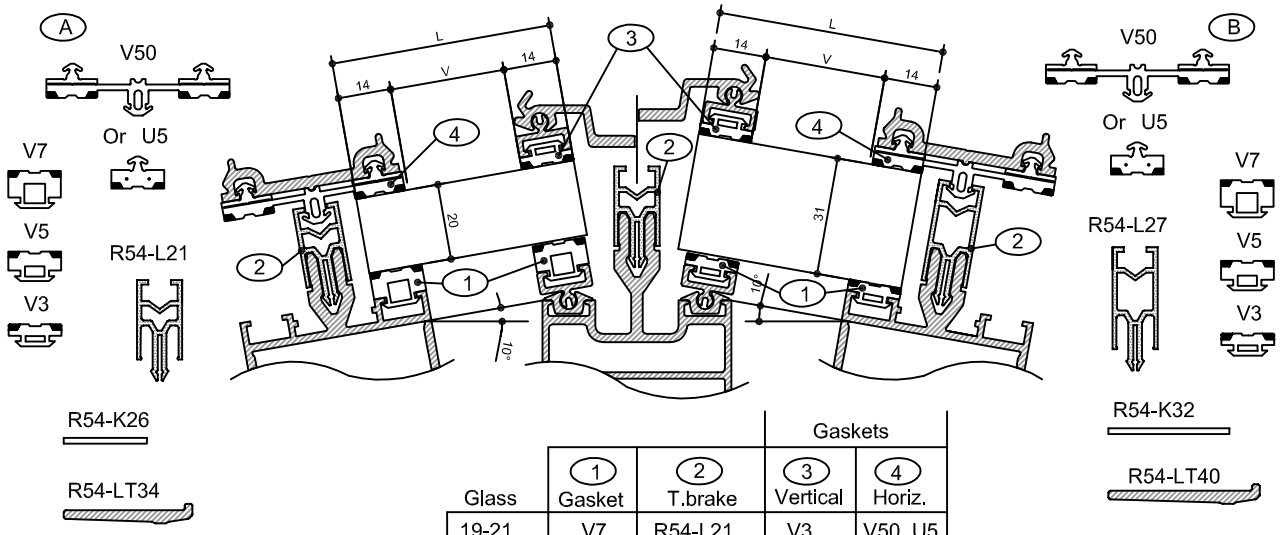




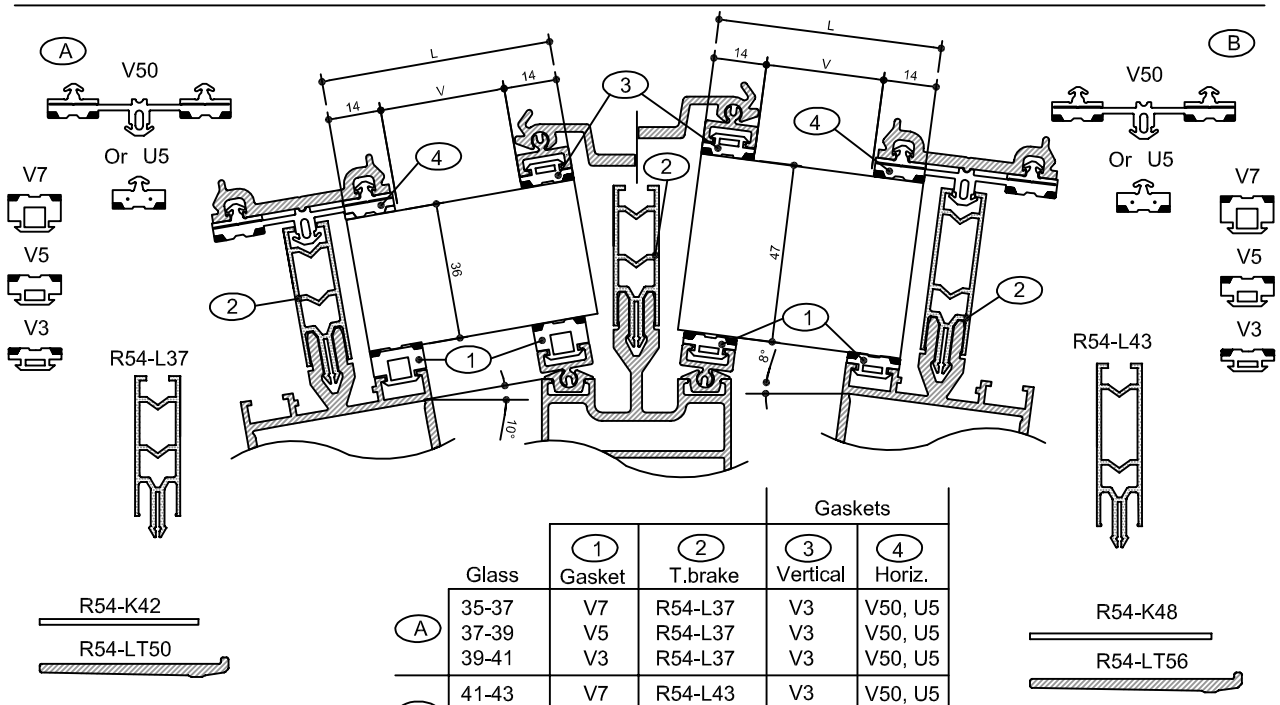
L = Measures of glass

V = Light opening measurement





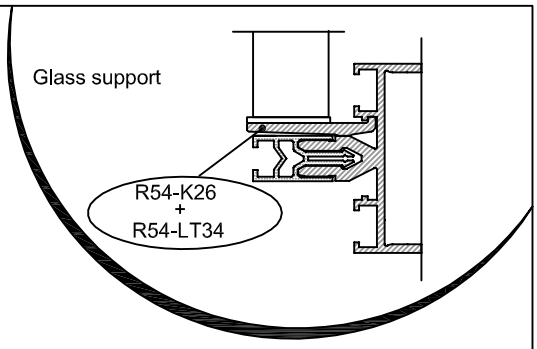
	Glass	1 Gasket	2 T.brake	Gaskets 3 Vertical	Gaskets 4 Horiz.
A	19-21	V7	R54-L21	V3	V50, U5
	21-23	V5	R54-L21	V3	V50, U5
	23-25	V3	R54-L21	V3	V50, U5
B	25-27	V7	R54-L27	V3	V50, U5
	27-29	V5	R54-L27	V3	V50, U5
	29-31	V3	R54-L27	V3	V50, U5

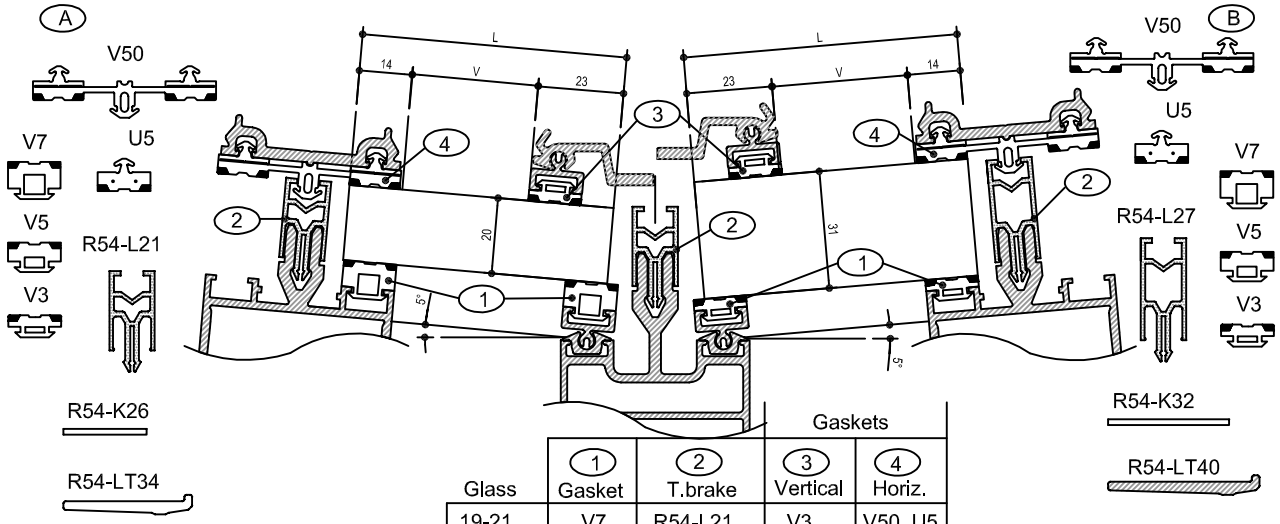


	Glass	1 Gasket	2 T.brake	Gaskets 3 Vertical	Gaskets 4 Horiz.
A	35-37	V7	R54-L37	V3	V50, U5
	37-39	V5	R54-L37	V3	V50, U5
	39-41	V3	R54-L37	V3	V50, U5
B	41-43	V7	R54-L43	V3	V50, U5
	43-45	V5	R54-L43	V3	V50, U5
	45-47	V3	R54-L43	V3	V50, U5

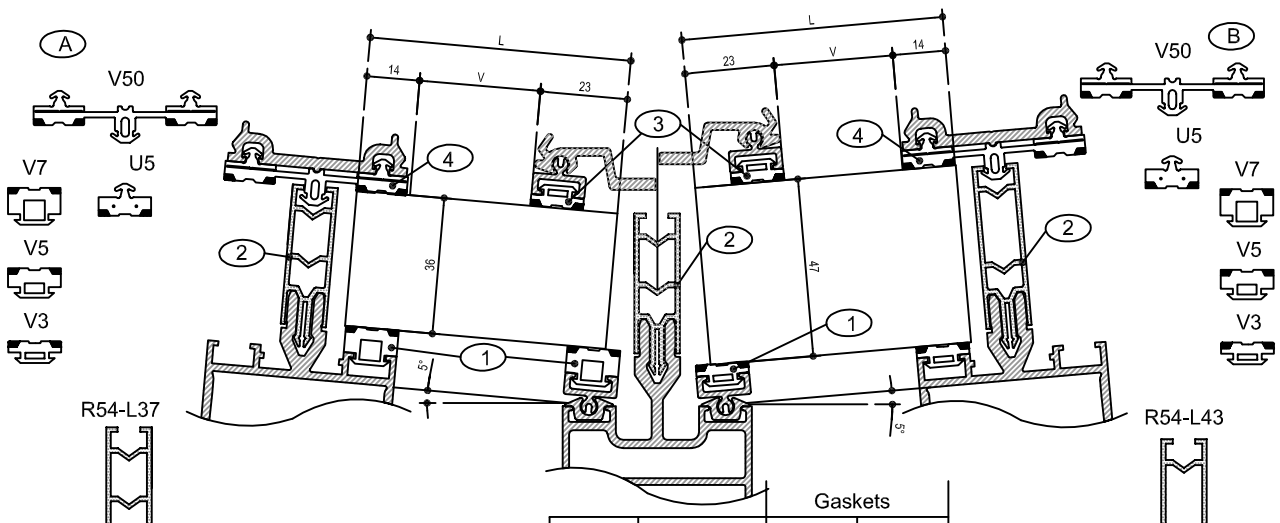
L = Measures of glass

V = Light opening measurement



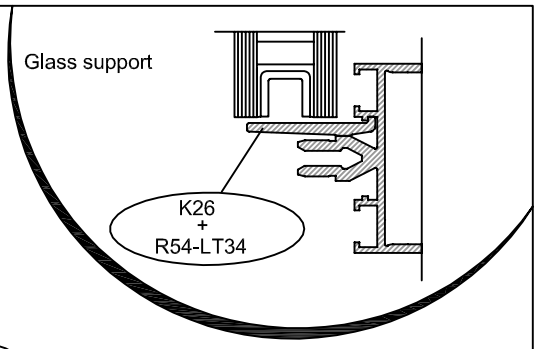


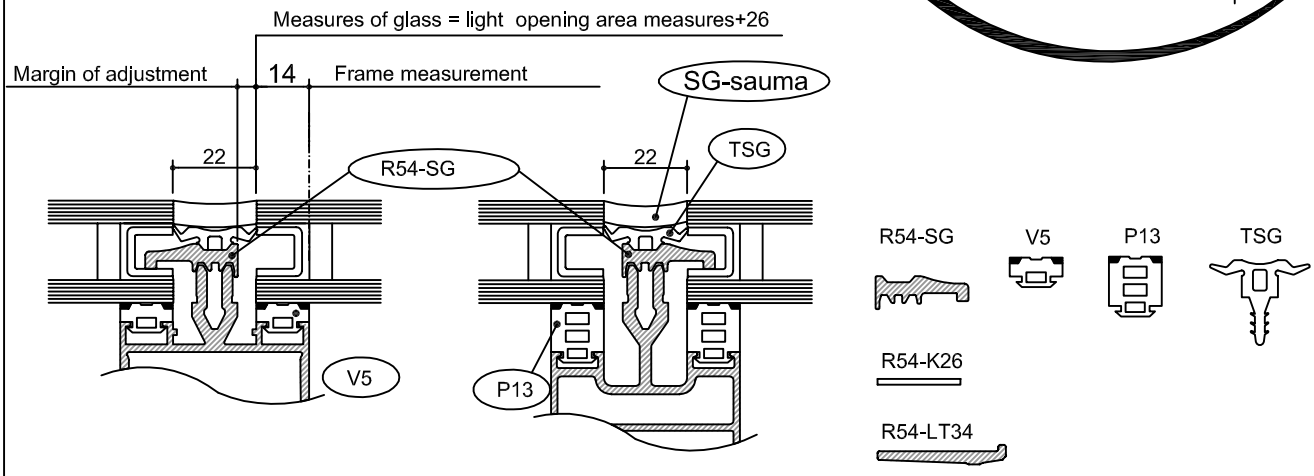
	Glass	Gaskets 1 Gasket	2 T.brake	3 Vertical	4 Horiz.
A	19-21	V7	R54-L21	V3	V50, U5
	21-23	V5	R54-L21	V3	V50, U5
	23-25	V3	R54-L21	V3	V50, U5
B	25-27	V7	R54-L27	V3	V50, U5
	27-29	V5	R54-L27	V3	V50, U5
	29-31	V3	R54-L27	V3	V50, U5



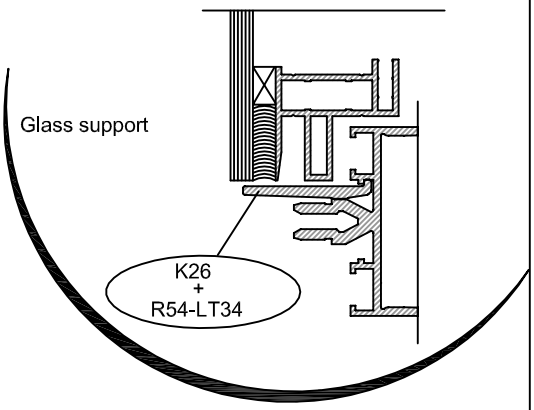
	Glass	Gaskets 1 Gasket	2 T.brake	3 Vertical	4 Horiz.
A	35-37	V7	R54-L37	V3	V50, U5
	37-39	V5	R54-L37	V3	V50, U5
	39-41	V3	R54-L37	V3	V50, U5
B	41-43	V7	R54-L43	V3	V50, U5
	43-45	V5	R54-L43	V3	V50, U5
	45-47	V3	R54-L43	V3	V50, U5

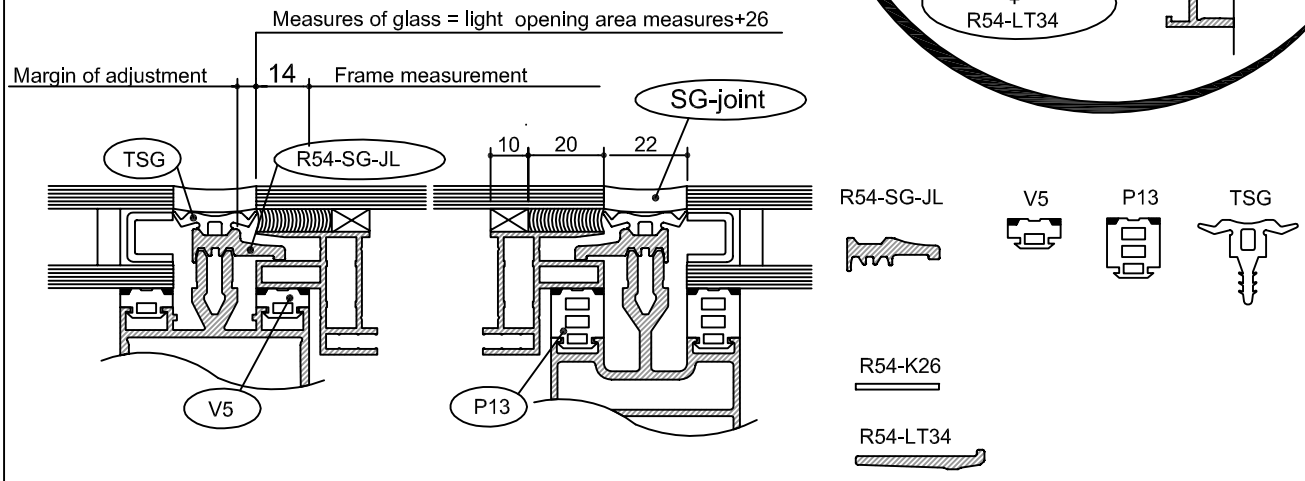
SG glass package 27 mm





SG Facade glass





SG-INSTRUCTIONS

GLASS
The glass packages used in SG glazing are specially manufactured.
They are tempered safety glasss with TSH cut adges, min. thickness 6 mm
In R54-SG system the inner glass is always 6 mm and the intermadiate moulding 15 mm.
The number of fixing pieces (R54-SG and R54-SG-JL) is determined according to the glass size and the loads.

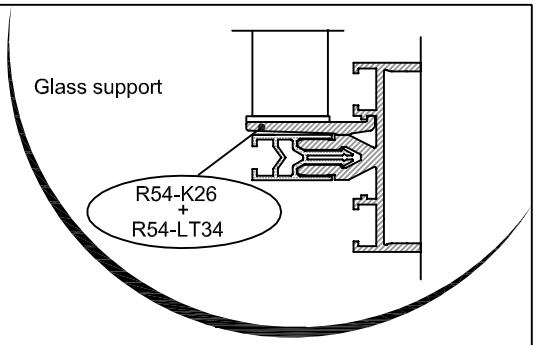
SG SEAM
The SG glue seam for weather-proofing purposes between the glasses must be compatible with
the SG foam of the glass packages.

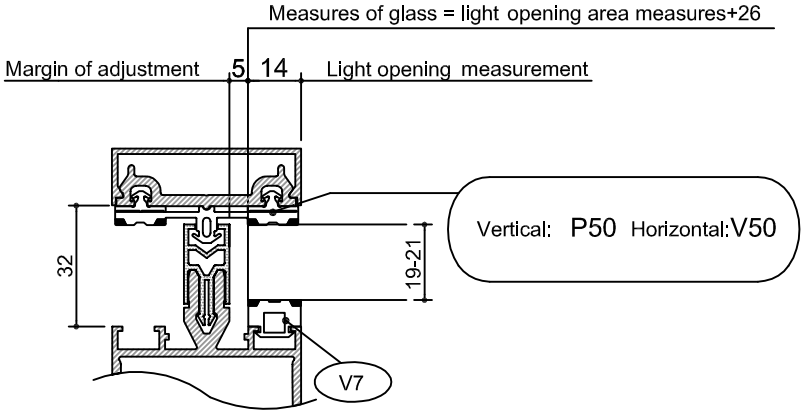
SG FOAM
Proglaze II (Oy Tremco Finland Ltd)
When using foams by another manufacturer, the manufacturer and Nokian Profiles must be contacted.

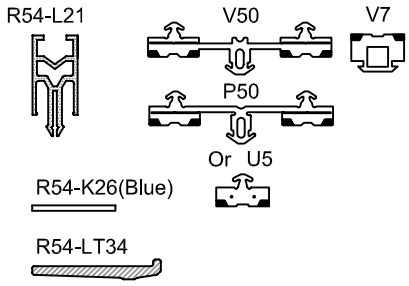
MAXIMUM SIZE OF THE GLASS PACKAGE 2000 mm x 3000 mm.

Before the planning and manufacturing R54-SG, it is recommended that Nokian Profiles is contacted.

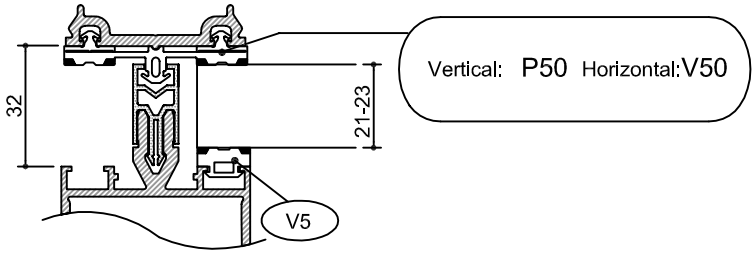
19-21 mm

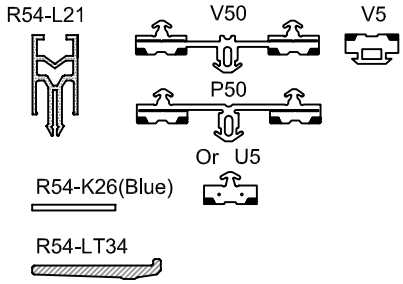




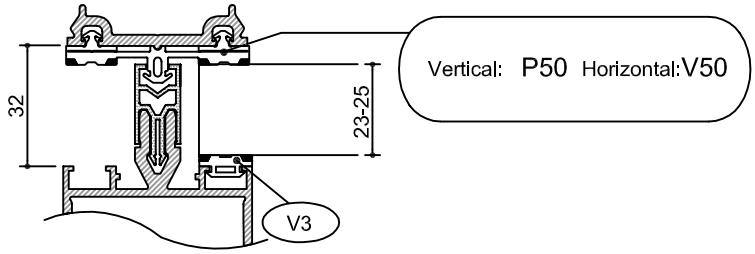


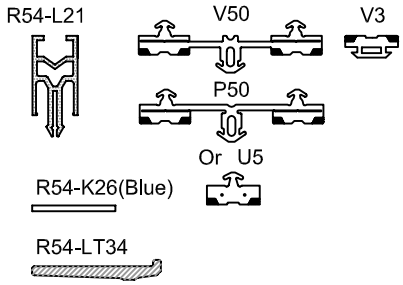
21-23 mm



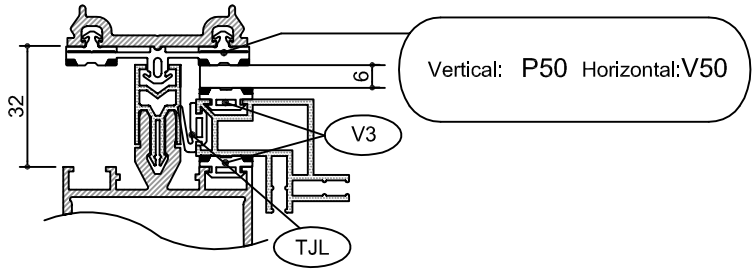


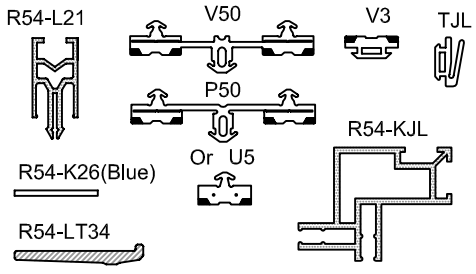
23-25 mm



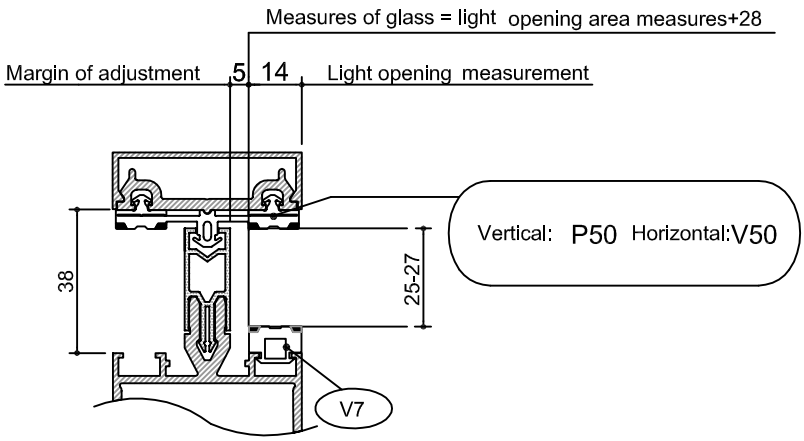


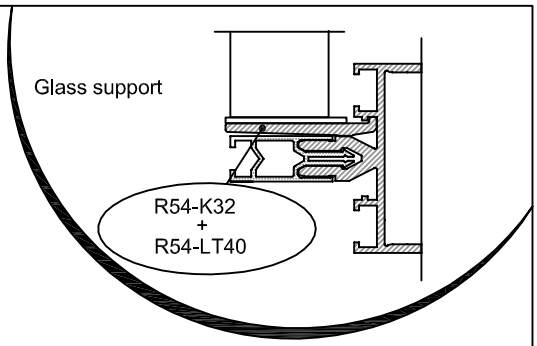
Facade glazing

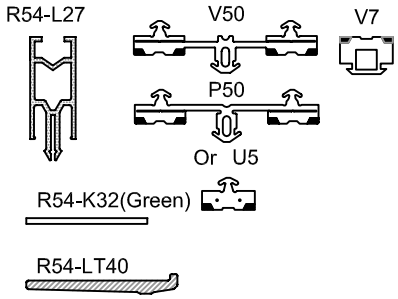




25-27 mm







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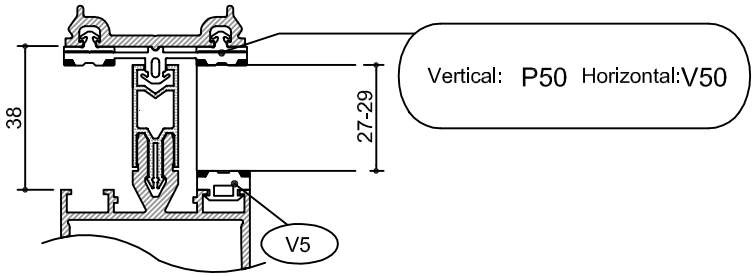

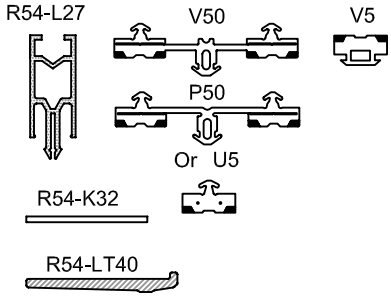

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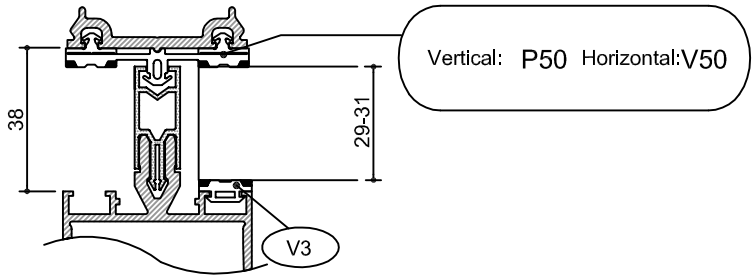
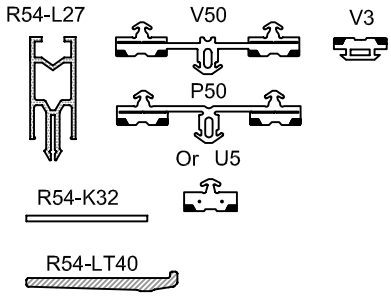
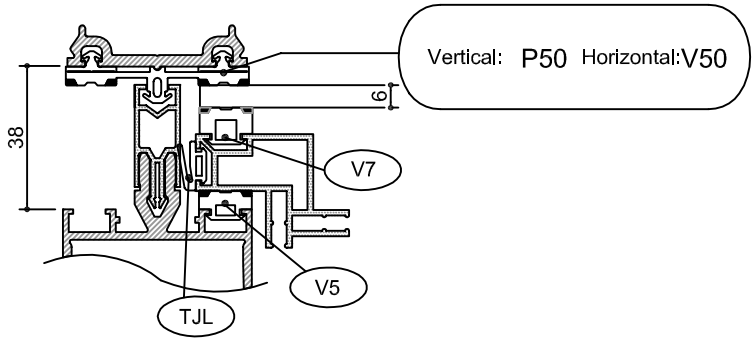
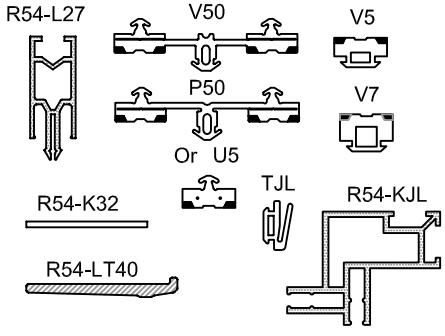


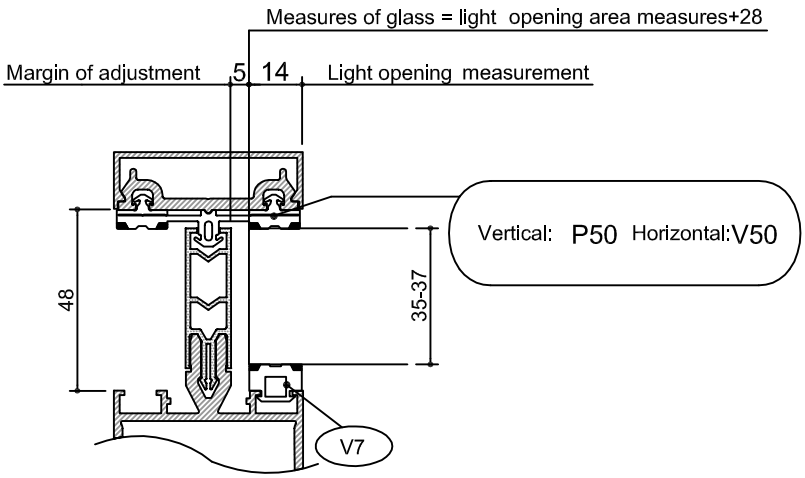


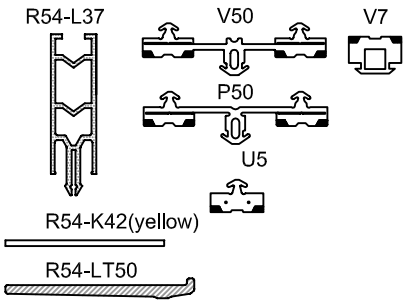
Facade glazing

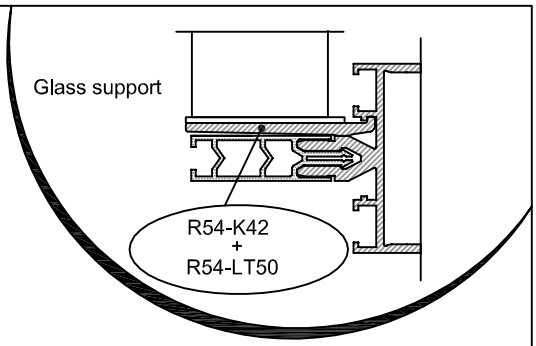




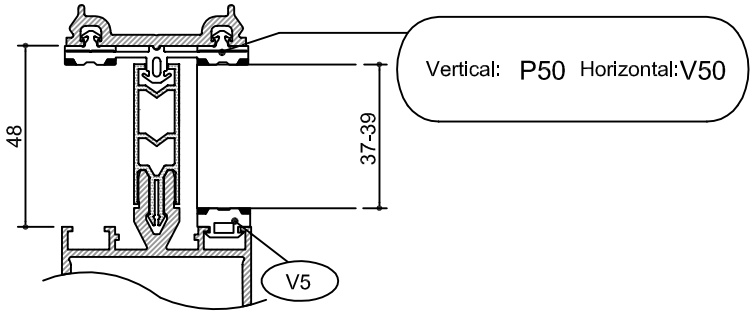
35-37 mm

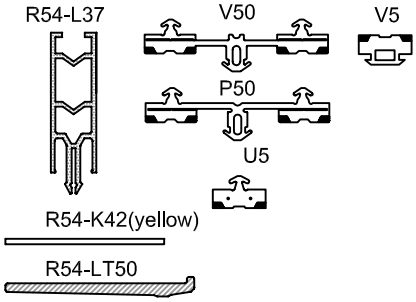






37-39mm





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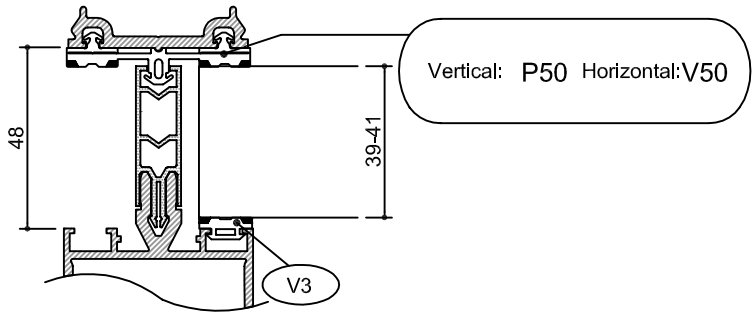
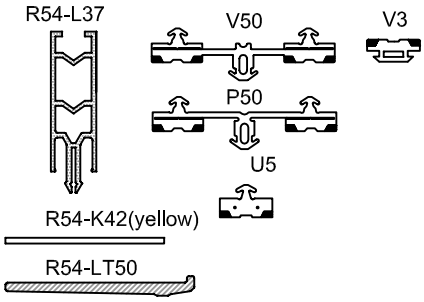
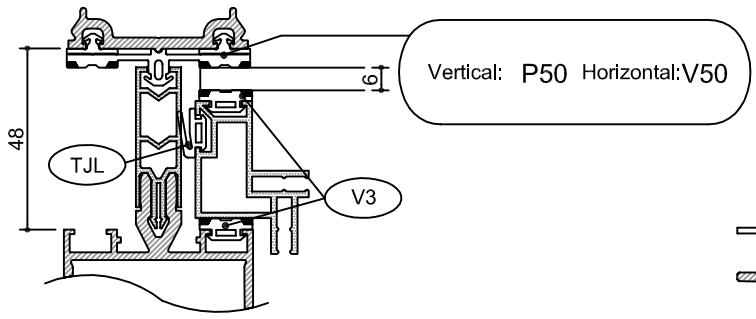
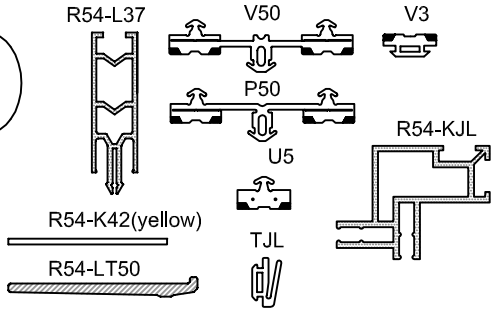


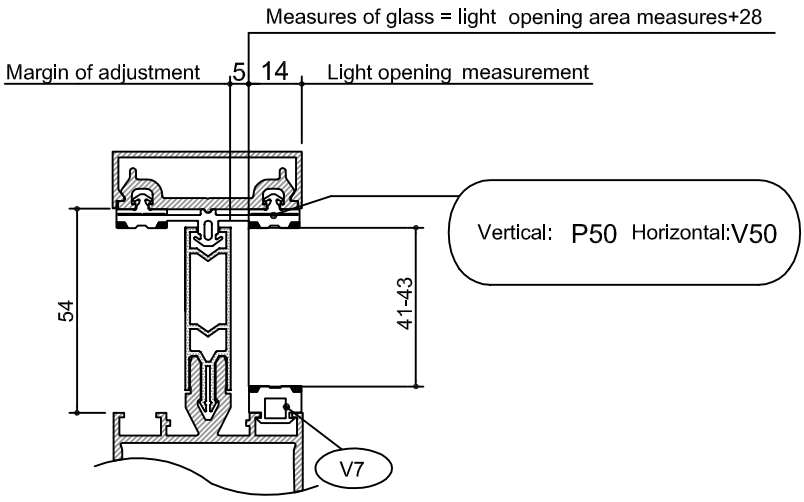


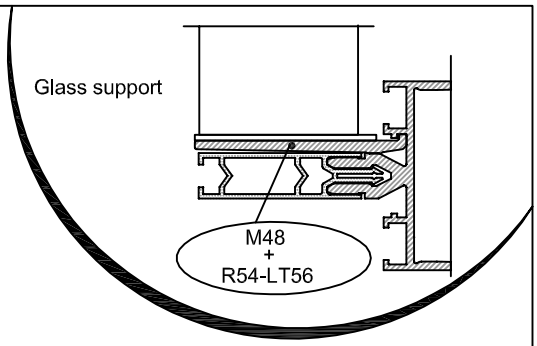
Facade glazing

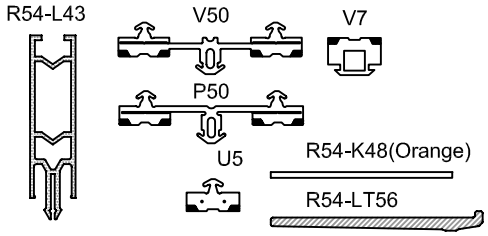




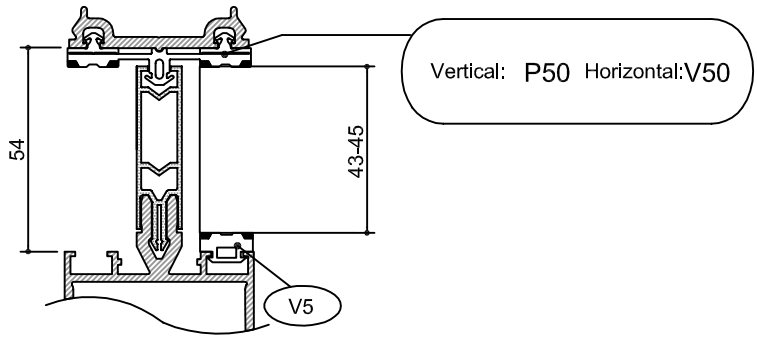
41-43 mm

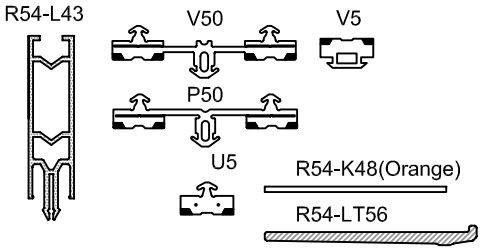






43-45 mm





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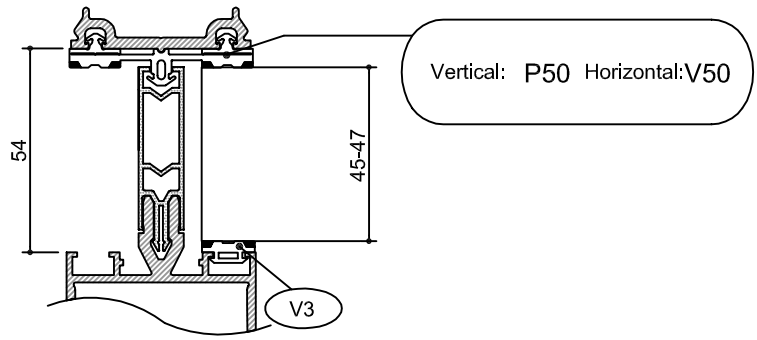
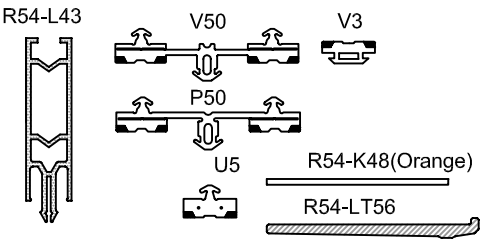
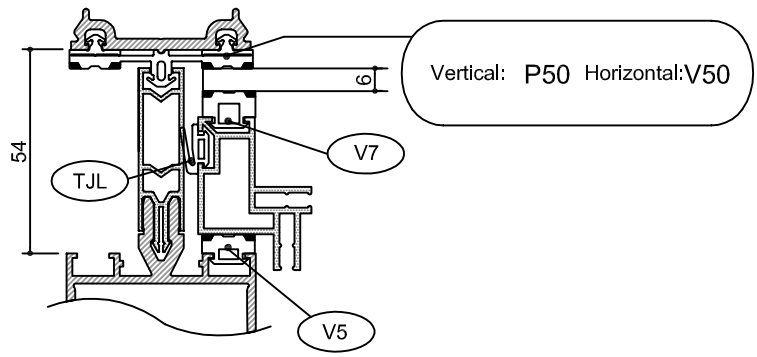
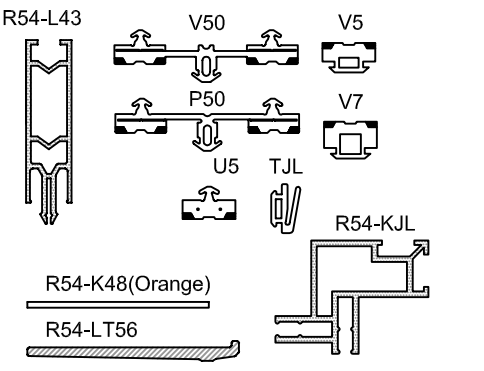




Facade glazing





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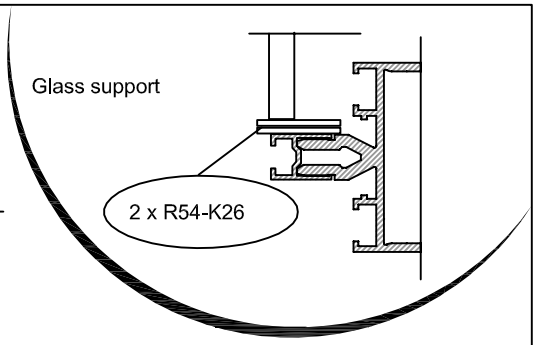

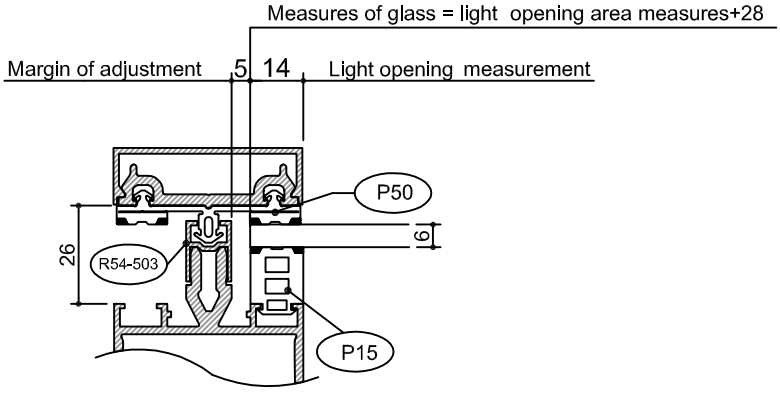

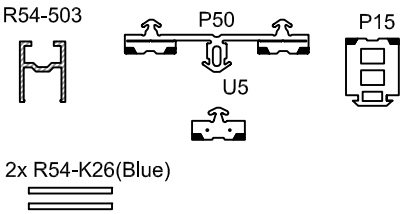

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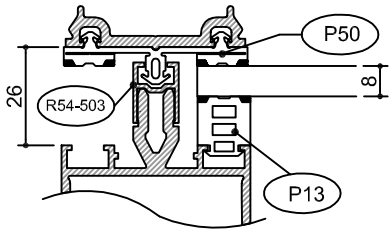
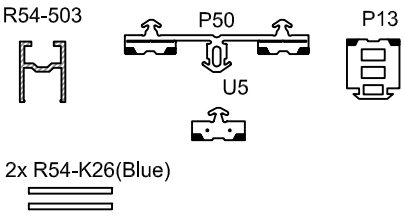
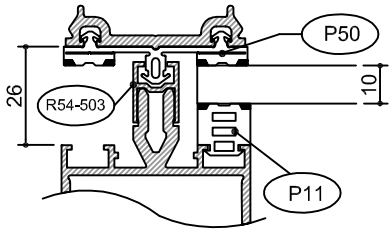
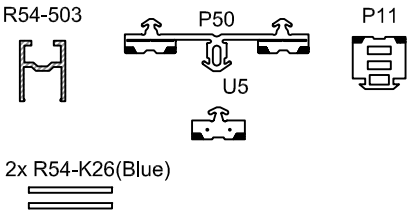


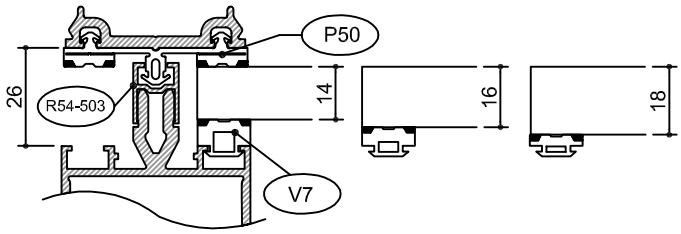


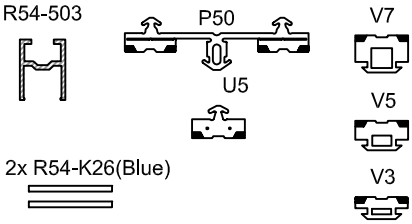
10 mm





Panel





R54 Facade system Specification

1. Type

Thermally insulated aluminium-framed r54 facades are built according to the r54 instructions, either with a lap joint tecnique or an end-to-end joint technique. The end-to-end joint must be separately mentioned in the plans.)

2. Materials

- Profiles AW-6060 T6
- Gaskets EPDM-rubber
- Thermal breaks, recycled PVC
- Screws DT-DS 600 DIN 50021 or A4

3. Surface finishing

Anodisind

The aluminium profiles can be surface-treated by anodising, which is a light- and weather-proof method.

Colour.....

Painting

Polyester powder coating in desired colour, baked, base treatment by chromating

Colour.....

4. Glazing

The glazing type is..... the selections regarding glazing and related mate are performed according to glazing instruction R54. Only gaskets approved by Nokian Profiles are used for the sealing.

5. Confiquration

The R54 structures are built according to instructions given by Nokian Profiles. (Machine-shop folder)

6. Connection to the building frame

The structures are attached to the building frame so that the loads on the structures are reliably transmitted to the frame, and that the deformations of the building frame and the thermal movements do not harm the structures. the fixing elements are either R54 fixing pieces, or elements made from stainless material. The seam between the R54 structure and the building frame is sealed appropriately.

7. Construction time shielding

When needed, the aluminium profile surfaces must be shielded from moulding, plaster and welding splashes and spatter, and from mechanical damages occurring during construction.

8. Functional requirements

the sructure must withstand all loads defined in the regulations, and convey them to the building frame. The structure must be implemented so that the finished structure funcktions in a controllable manner in all respects.

9. Facade maintenance

the facade is washed with clean water and a sponge. A mild detergent with a neutral pH value (5 to 7) can be used. Alkalic detergents MUST NOT BE USED.

10. Enviromental specifications

The R54 enviromental specification is available at the Rakennustietosäätiö. (www.rts

SYSTEM:	R54 Facade system
MATERIALS:	Alloy EN AW-6060 (AlMgSi) EN 573 EN 755 and DIN 1748
PROFILE MEASUREMENTS:	EN 755 or DIN 1748 EN 12020 or DIN 17615
SURFACE TREATMENTS:	Anodizing Layer thickness SFS-EN ISO 2360 Sealing SFS-EN 12373-5 or ISO 2932 Powder coating Layer thickness SFS-EN ISO 2360 Cross-cut test SFS-EN ISO 2409
QUALITY MANAGEMENT:	Nokian Profiles processes are following the standard ISO 9001.
ENVIRONMENTAL MANAGEMENT:	Nokian Profiles processes are following the standard ISO 14001.

Architectural systems Nokian Profiilit Oy has a 40 years history. Based on our experience we can note that the life expectancy of the material as well as of the surface treatment with regular and proper service are expected to be 50 years.

Nokian Profiilit Oy
Architectural systems