

E19 E1600

E52

TECHNICAL CATALOGUE

OPENING WINDOW AND DOOR SYSTEM
WITH THERMAL BREAK

E40

E45 Q72

E75 E8000

E2300

E70 E85

Q60

E45

WINDOW AND DOOR SYSTEM WITH THERMAL BREAK

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ETEM HISTORY

ETEM is a leading aluminium extrusion company. It was founded in 1971 as a part of the largest metal manufacturing holding in the Balkans. With over 40 years of experience ETEM is a fully integrated designer and producer of architectural systems and aluminium profiles for industrial applications.

Our mission is to listen and promptly respond to our customers' requests and design and manufacture aluminium products and systems, taking into consideration technical and aesthetic requirements.

ETEM focuses on sustainable development and has proven its concern about the protection of the natural environment by making considerable investments in anti-pollution measures and by optimizing production processes following the applicable standards of the European Union.

SERVICES WE PROVIDE

ETEM supports you with the following:

- ▷ design of conventional and bespoke architectural system solutions
- ▷ innovative engineering in the field of curtain walls, ventilated facades, doors, windows
- ▷ professional consultation and adequate technical advices ensured by our engineering team with wide experience in the field of profile extrusion as well as architectural systems' engineering

- ▷ reliable customer care constant support trainings, technical support and audits on site
- ▷ high quality engineering which guarantees offering the best solution according to the specific features of every single project
- ▷ managing the process of certification in accordance with the applicable European standards in Notified Bodies
- ▷ production of non-standard length profiles and non-standard processing high quality powder coating

ETEM PRODUCTS AND SUSTAINABLE DEVELOPMENT

SUSTAINABLE DEVELOPMENT IS DEVELOPMENT THAT MEETS THE NEEDS OF THE PRESENT WITHOUT COMPROMISING THE ABILITY OF FUTURE GENERATIONS TO MEET THEIR OWN NEEDS.*

For many, sustainable development is about environmental conservation. This is true but it also includes two other aspects: a social aspect and an economic aspect.

Sustainable development means striking the right balance between economic development, social equity and environmental protection.

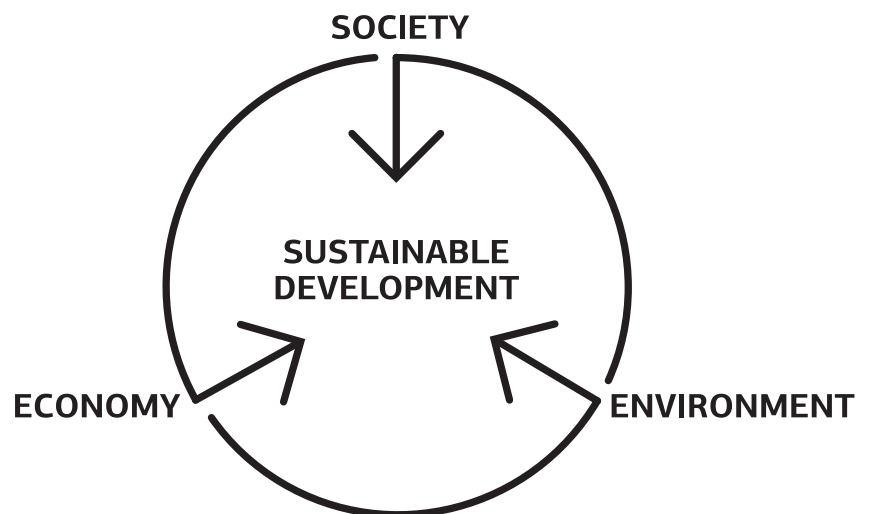
For us meeting this objective translates into the challenge of satisfying market demands at the lowest economic, social and environmental cost possible.

ETEM has always designed architectural systems which are in compliance with all requirements for achieving high energy efficiency.

In order to assure the comfort of the building inhabitants, ETEM systems adapt their functions to the changing environment.

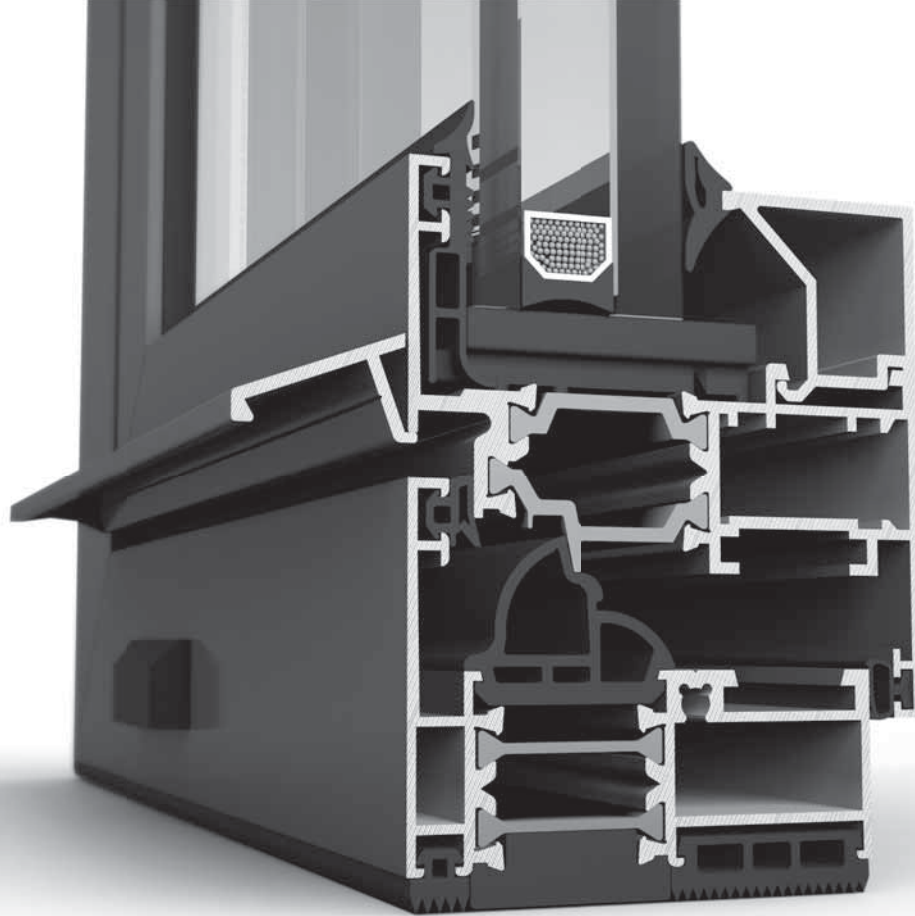
As a moderator between outside and inside our systems provide:

- › ENERGY EFFICIENCY
- › DAYLIGHT
- › SUN-SHADING
- › VENTILATION AND GOOD AIR QUALITY
- › SAFETY AND SECURITY



GENERAL INFORMATION

CONCEPT / ADVANTAGES / CERTIFICATES

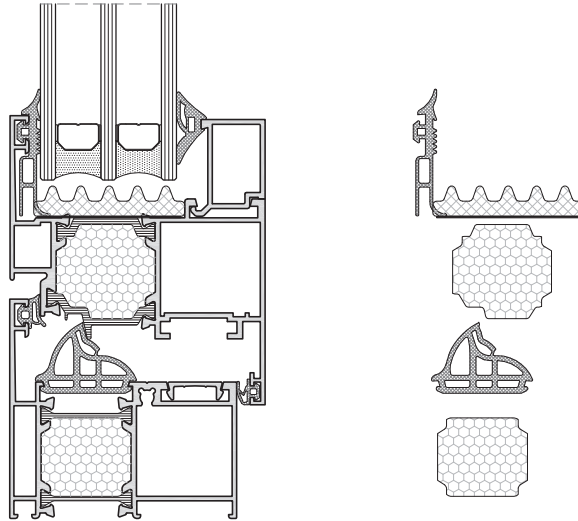


E45 CONCEPT

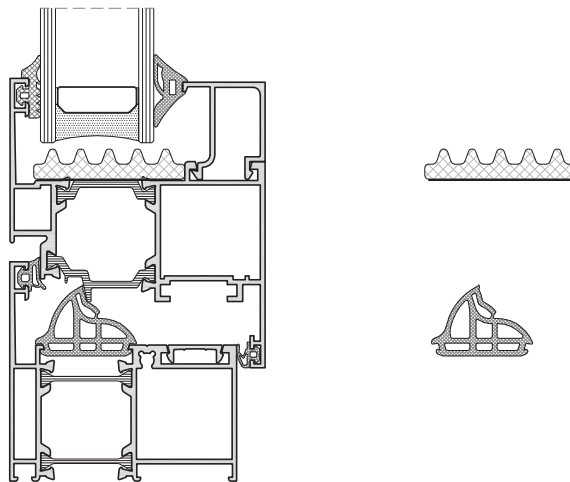
E45 IS AN ENERGY CONSERVATION SYSTEM FOR OPENING WINDOWS AND DOORS.

- Optimized for highest structural stability while using lowest amount of aluminium
- Profile re-inforcement at load bearing points
- Elegant straight or curved line; 60 mm system width in case of straight line type and 67.5 mm width in curved type
- Opening parts – opening at vertical axis, tilt and turn, opening at top or bottom horizontal axes, folding doors, parallel sliding
- Reliable pivot mechanism
- Window sashes for PVC hardware which enables multiple locks, hinges adjustment and fast mounting
- New elegant series with concealed sash
- Mechanism for smoke proof doors according to safety regulations
- Double glazing from 18 up to 49 mm

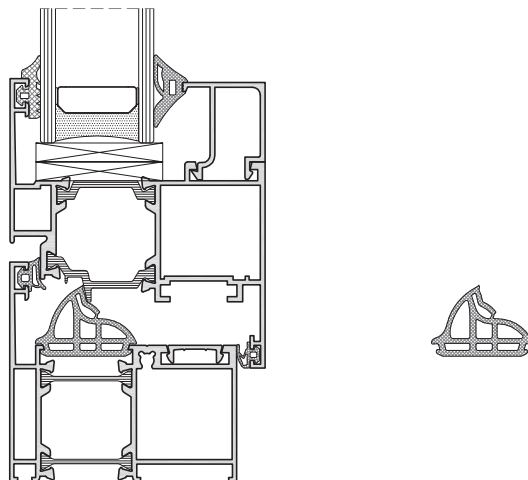
➤ ADVANCED SYSTEM



➤ IMPROVED SYSTEM



➤ BASIC SYSTEM



COMPLIANCE WITH APPLICABLE REGULATIONS

Production management

Quality Management system is certified in accordance with EN ISO 9001:2008.

Environmental management system is certified in accordance with EN ISO 14001.

Factory production control system is certified according to the requirements of EN 15088. All ETEM profiles are CE marked and in compliance with applicable European Standards.

ETEM is authorized to use the QUALICOAT quality sign for paint, lacquer and powder coating on aluminium for architectural applications.

Occupational Health & Safety Management System is certified in accordance with OHSAS 18001.

PERFORMANCE CHARACTERISTICS OF E45

Characteristic	Classification / value	Standard
Air permeability	Up to class 4	EN 1026 / EN 12207
Watertightness	Up to class E1950	EN 1027 / EN 12208
Resistance to wind load	Up to class C5	EN 12211 / EN 12210
Thermal transmittance	from 1.9 W/m ² .K	EN ISO 10077-2
Acoustic performance	Up to 42 dB	EN ISO 717-1
Burglar resistance	Class 2	EN 1627

CLASSIFICATION OF CHARACTERISTICS

for windows without resistance to fire and/or smoke leakage characteristics according to EN 14351-1

Characteristic / value / dimension	Classification / Value										
Resistance to wind load Test pressure P1 (Pa)	npd	1 (400)	2 (800)	3 (1200)	4 (1600)	5 (2000)	Exxxx (>2000)				
Resistance to wind load Frame deflection	npd	A (≤1/150)		B (≤1/200)		C (≤1/300)					
Resistance to snow and permanent load	npd	Declared information on the infill (e.g. type and thickness of glass)									
Reaction to fire	npd	F	E	D	C	B	A2	A1			
External fire performance	npd	According to EN 13501-5									
Watertightness Non-shielded (A) Test pressure (Pa)		1A (0)	2A (50)	3A (100)	4A (150)	5A (200)	6A (250)	7A (300)	8A (450)	9A (600)	Exxxx (>600)
Watertightness Shielded (B) Test pressure (Pa)	npd	1B (0)	2B (50)	3B (100)	4B (150)	5B (200)	6B (250)	7B (300)			
Dangerous substances	npd	As required by regulations									
Impact resistance Drop height (mm)	npd	200	300	450	700	950					
Load-bearing capacity of safety devices	npd ^a	Threshold value									
Acoustic performance Sound insulation R_w ($C;C_{tr}$) (dB)	npd	Declared values									
Thermal transmittance U_w ($W/(m^2.K)$)	npd	Declared values									
Radiation properties Solar factor (g)	npd	Declared values									
Radiation properties Light transmittance (τ_v)	npd	Declared values									
Air permeability Max. test pressure (Pa) Reference air permeability at 100 Pa ($m^3/(h \cdot m^2)$ or $m^3/(h \cdot m)$)	npd	1 (150) (50 or 12.50)	2 (300) (27 or 6.75)	3 (600) (9 or 2.25)	4 (600) (3 or 0.75)						
Operating forces^b	npd	1			2						
Mechanical strength	npd	1		2		3		4			
Ventilation Air flow exponent n Air flow characteristic K Air flow rates	npd	Declared values									
Bullet resistance	npd	FB1	FB2	FB3	FB4	FB5	FB6	FB7	FSG		
Explosion resistance Shock tube	npd	EPR1		EPR2		EPR3		EPR4			
Explosion resistance Range test	npd	EXR1		EXR2		EXR3		EXR4		EXR5	
Resistance to repeated opening and closing Number of cycles	npd	5000			10 000			20 000			
Behaviour between different climates	npd	Under development									
Burglar resistance	npd	1	2	3	4	5	6				

NOTE 1: npd: no performance determined

NOTE 2: The figures in brackets are for information

^a Only if safety device(s) is(are) not provided

^b Manually operated windows only

BUILDING PHYSICS

DIMENSIONING / FORMULAS / EXAMPLES

ALUMINIUM AS MATERIAL

ALUMINIUM IS A VERY YOUNG METAL, EXTRACTED FOR THE FIRST TIME IN 1854. COMMERCIALY PRODUCED AS A PRECIOUS METAL FROM 1886, ITS INDUSTRIAL PRODUCTION FOR CIVIL APPLICATIONS ONLY ACHIEVED WIDE USE IN THE 1950'S.

NOW ALUMINIUM PLAYS A KEY ROLE FOR THE SUSTAINABILITY OF NEW BUILDINGS AND THE RENOVATION OF EXISTING ONES. THANKS TO ITS PERFORMANCE PROPERTIES ALUMINIUM CONTRIBUTES TO THE ENERGY PERFORMANCE, SAFETY AND COMFORT OF NEW BUILDINGS.

ADVANTAGES

DESIGN FLEXIBILITY

The extrusion process offers an almost infinite range of forms and sections, allowing designers to integrate numerous functions into one profile

LONG SERVICE LIFE

Aluminium building products are made from alloys that are weatherproof, corrosion-resistant and immune to the harmful effects of UV rays, ensuring optimal performance over a very long period of time

HIGH STRENGTH-TO-WEIGHT RATIO

Thanks to the metal's inherent strength and stiffness, aluminium window and curtain wall frames can be very narrow. Material's light weight makes it easier to transport and handle on-site, reducing the risk of work-related injury

HIGH-REFLECTIVITY

This characteristic feature makes aluminium a very efficient material for light management. Aluminium shading devices can be used to reduce the need for air conditioning in summer

FIRE SAFETY

Aluminium does not burn and therefore is classified as a non-combustible construction material (European Fire Class A1). Aluminium alloys will nevertheless melt at around 6500 C, but without releasing harmful gases

NO RELEASE OF DANGEROUS SUBSTANCES

Several studies have proved that aluminium building products do not present a hazard to occupants or the surrounding environment. Aluminium building products have no negative impact, either on indoor air quality or on soil, surface and groundwater

OPTIMAL SECURITY

Where high security is required, specially designed, strengthened aluminium frames can be used. While the glass for such applications may well be heavy, the overall weight of the structure remains manageable thanks to the light weight of the aluminium frames.

ALLOYS

Aluminium in its pure form is a very soft metal. Thanks to the addition of alloying elements such as copper, manganese, magnesium, zinc, etc. and thanks to suitable production processes, the physical and mechanical properties can be varied in a wide range to satisfy the requirements of a large number of different applications.

ETEM profiles are extruded from the following alloys:

- EN AW-1050 [Al 99.5]
- EN AW-6060 [Al Mg Si]
- EN AW-6063 [Al Mg0,7 Si]
- EN AW-6061 [Al Mg1 Si Cu]
- EN AW-6005 [Al Si Mg]
- EN AW-6082 [Al Si1 Mg Mn]

The most common aluminium alloy which is used by ETEM is EN AW 6063. Here are the properties of this alloy:

MATERIAL PROPERTIES

Aluminium alloy	EN AW 6063 F22
Ultimate tensile strength	Rm = 210 N/mm ²
Yield strength	R _{p0.2} = 160 N/mm ²
Modulus of elasticity	Eal=70 000 N/mm ² = 7.10 ⁹ kg/m ²
Coefficient of thermal expansion	α=0.023 mm/m .K (up to 1.2 mm/m for difference up to 50°C)

EXTRUSION PROCESS

ETEM profiles are obtained through extrusion process, which consists of pushing a hot cylindrical bullet of aluminium through a shaped die. The extrusion process offers almost infinite range of forms and sections, allowing our designers to integrate numerous functions into one single profile.

aluminium surface, increasing hardness, corrosion and abrasion resistance. Anodizing gives a very decorative silver matt surface finish, and colored can also be obtained by sealing metallic dyes into the anodized layer.

FINISHING

POWDER COATING

It is a type of paint that is applied as a dry powder. Coating is applied on ETEM profiles electrostatically and then is cured under heat to allow it to flow and form a "skin".

ETEM is authorized to use the quality sign QUALICOAT for powder coatings on aluminium for architectural applications. A wide range of colors and gloss levels can be achieved.

ETEM also offers timber imitations painting, in addition to all RAL colors. The technology EZY provides the following colors: Golden Oak, Acero, Betulla, Mogano, Verde Scuro, Wenge, Noce Fiammato, Noce Chiaro, Ciliegio Rosso, Acacia Scuro, Ciliegio Antico, Noce Reale, Ciliegio Reale.

ANODIZING

It is an electrochemical process whereby to reinforce the natural oxide film on the

MAINTENANCE

Apart from routine cleaning for aesthetic reasons, ETEM aluminium profiles do not require any maintenance which translates into a major cost and ecological advantage over lifetime of the product.

RECYCLING

Aluminium scrap can be repeatedly recycled without any loss of value or properties. In many instances, aluminium is combined with other materials such as steel or plastics, which are most frequently mechanically separated from aluminium before being molten.

WIND LOAD

Wind action

The main influence over the facade is wind action, which depends mainly on the height of the curtain wall and location.

As a guideline, the wind pressure values with respect to the structure height are given in the table below:

Building Height	Wind Velocity	Wind Load		Wind Pressure		Wind Suction in a middle zone				Wind Suction in an edge zone	
		$q = \frac{V^2}{16}$		$Wp^* = 1.25 \times c_p \times q$		$h/b \leq 0.25$ $W_s = c_p \times q$ $c_p = 0.5$	$h/b \geq 0.5$ $W_s = c_p \times q$ $c_p = 0.7$	$b/8 \leq 2 \text{ m}$ $W_s = c_p \times q$ $c_p = 2.0$			
m	m/s	kg/m ²	kg/m ²	kg/m ²	kg/m ²	kg/m ²	kg/m ²	kg/m ²	kg/m ²	kg/m ²	kg/m ²
0 - 8	28.3	50	0.5	50	0.5	25	0.25	35	0.35	100	1.0
8 - 20	35.8	80	0.8	80	0.8	40	0.40	56	0.56	160	1.6
20 - 100	42.0	110	1.1	110	1.1	55	0.55	77	0.77	220	2.2
> 100	45.6	130	1.3	130	1.3	65	0.65	91	0.91	260	2.6

where:

h - building height, m

b - building width, m

v - wind velocity, m/s

q - wind load, kg/m² and kN/m²

$w_{p/s}$ - wind pressure / suction, kN/m²

c_p - correction factor

*Note: When calculating wind pressure w_p the load is increased with 25%

UNITS CONVERTER

1 m = 100 cm = 1000 mm

1 kg = 10 N

1 kN = 100 kg = 1000 N

1 kg/m² = 0.01 kN/m²

1 Pa = 1 N/m² = 0.1 kg/m²

1 kPa = 1000 Pa = 1 kN/m² = 100 kg/m²

1 MPa = 1000 kPa = 1 000 000 Pa

1 MPa = 1 N/mm² = 0.1 kN/cm² = 100 000 kg/m²

MULLION SELECTION

*Wind load actions:

The required moment of inertia of a mullion due to the wind action is given by:

a) triangle load

$$\text{If } \frac{H}{c} \leq 1, I_{yc} \geq \frac{w \cdot (H/2) \cdot H^4 \cdot 10^8}{120 \cdot E_{al} \cdot f_{max}}, \text{cm}^4$$

or

b) trapezoid load

$$\text{If } \frac{H}{c} > 1, I_{yc} \geq \frac{w \cdot (C/2) \cdot H^4}{1920 \cdot E_{al} \cdot f_{max}} \cdot 10^8 \cdot \left[25 - 40 \cdot \frac{(C/2)^2}{H^2} + 16 \cdot \frac{(C/2)^4}{H^4} \right], \text{cm}^4$$

Use the same method to calculate I_{yd}

Total of required moment of inertia:

$$I_y = I_{yc} + I_{yd}, \text{cm}^4$$

Where:

I_y - Moment of inertia of a transom, cm^4

w - Wind pressure, kg/m^2

E_{al} - Modulus of Elasticity of aluminium, kg/m^2

f_{max} - Maximum transom deflection, m

H - Length of a mullion, m

a, b - Distance between mullions, m

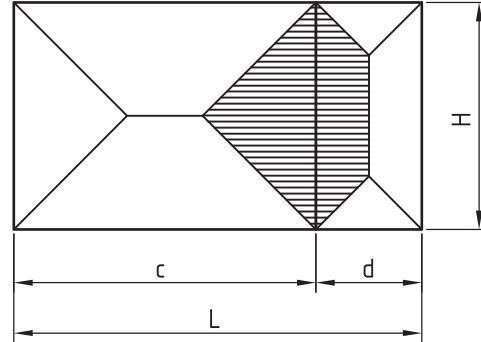
Maximum transom deflection f_{max} by wind load:

$$f = \frac{H}{200}, \text{m} \text{ or } 0.015 \text{ m} - \text{whichever is less (EN 14351-1)}$$

Use ETEM Catalogue to choose the appropriate mullion with I_y exceeding or equal to the required I_y .

Use ETEM Catalogue to choose the appropriate profile which characteristics exceed or are equal to both calculated values I_x and I_y .

Example:



Initial data:

$$H = 2,2 \text{ m}$$

$$w = 60 \text{ kg/m}^2$$

$$c = 2,4 \text{ m}$$

$$E_{al} = 7 \cdot 10^9 \text{ kg/m}^2$$

$$d = 0,8 \text{ m}$$

$$f = \frac{H}{200} = \frac{2,2}{200} = 0,011 \text{ m} \text{ or } 0,015 \text{ m (EN 14351-1)}$$

$\Rightarrow f_{max} = 0,011 \text{ m}$ in the following formulas:

$$\frac{H}{c} = \frac{2,2}{2,4} = 0,91 < 1$$

$$I_{yc} \geq \frac{w \cdot (H/2) \cdot H^4 \cdot 10^8}{120 \cdot E_{al} \cdot f_{max}}, \text{cm}^4$$

$$I_{yc} \geq \frac{60 \cdot (2,2/2) \cdot 2,2^4 \cdot 10^8}{120 \cdot 7 \cdot 10^9 \cdot 0,011}, \text{cm}^4 \Rightarrow I_{yc} \geq 16,73 \text{ cm}^4$$

$$\frac{H}{d} = \frac{2,2}{0,8} = 2,75 > 1$$

$$I_{yd} \geq \frac{w \cdot (d/2) \cdot H^4}{1920 \cdot E_{al} \cdot f_{max}} \cdot 10^8 \cdot \left[25 - 40 \cdot \frac{(d/2)^2}{H^2} + 16 \cdot \frac{(d/2)^4}{H^4} \right], \text{cm}^4$$

$$I_{yd} \geq \frac{60 \cdot (0,8/2) \cdot 2,2^4}{1920 \cdot 7 \cdot 10^9 \cdot 0,011} \cdot 10^8 \cdot \left[25 - 40 \cdot \frac{(0,8/2)^2}{2,2^2} + 16 \cdot \frac{(0,8/2)^4}{2,2^4} \right], \text{cm}^4$$

$$I_{yd} \geq 9,01 \text{ cm}^4$$

$$I_y = I_{yc} + I_{yd}, \text{cm}^4 \Rightarrow I_y = 16,73 + 9,01 = 25,74 \text{ cm}^4$$

Use ETEM Catalogue to choose the appropriate mullion with

$$I_y \geq 25,74 \text{ cm}^4$$

We choose mullion E45304 with $I_x = 35,34 \text{ cm}^4$

$$\text{and } I_y = 28,92 \text{ cm}^4$$

TRANSOM SELECTION

*Dead load actions:

*Glass pane self weight:

Weight of the glass pane G is calculated as follows:

The required moment of inertia of a transom due to the weight of the glazing is given by:

$$I_{x1} \geq \frac{G \cdot a \cdot 10^8}{48 \cdot E_{al} \cdot f_{max}} \cdot (3 \cdot L^2 - 4 \cdot a^2), \text{cm}^4$$

Where:

G - Weight of glass pane, kg

t - Glass pane thickness, mm

ρ_{glass} - Density of glass material, kg/m³/mm

l_g - Horizontal dimension of the glass pane, m

h_g - Vertical dimension of the glass pane, m

*Transom self weight:

The required moment of inertia of a transom due to its self weight is given by:

$$I_{x2} \geq \frac{5 \cdot q \cdot L^4 \cdot 10^8}{384 \cdot E_{al} \cdot f_{max}}, \text{cm}^4$$

Total of required moment of inertia:

$$I_x = I_{x1} + I_{x2}, \text{cm}^4$$

Where:

a=0,15 - Distance of a glazing supports of the glass pane, m

I_x - Moment of inertia of a transom, cm⁴

q - Self weight of a transom per linear meter, kg/m

E_{al} - Modulus of Elasticity of aluminium, kg/m²

f_{max} - Maximum transom deflection, m

L - Length of a transom, m

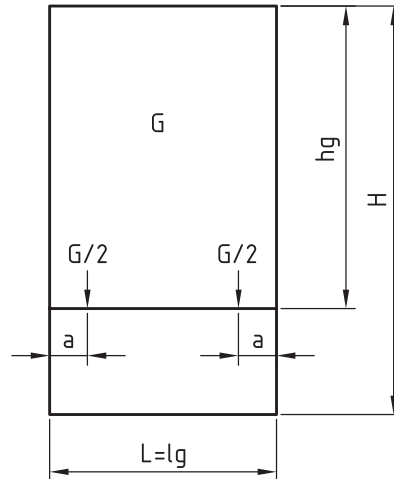
Maximum transom deflection f max by dead load:

$$f = \frac{L}{500}, \text{m} \quad \text{or} \quad 0,003 \text{ m} \quad \text{whichever is less (EN 14351-1)}$$

Use ETEM Catalogue to choose the appropriate transom with I_y exceeding or equal to the required I_y .

Use ETEM Catalogue to choose the appropriate profile which characteristics exceed or are equal to both calculated values I_x and I_y .

Example: $G = t \cdot \rho_{glass} \cdot l_g \cdot h_g$



Initial data:

$$t = 12 \text{ mm}$$

$$E_{al} = 7 \cdot 10^9 \text{ kg/m}^2$$

$$l_g = 1,5 \text{ m}$$

$$\rho_{glass} = 2,5 \text{ kg/m}^2/\text{mm}$$

$$h_g = 2,0 \text{ m}$$

$$q = 2 \text{ kg/m}$$

$$a = 0,15 \text{ m}$$

$$G = t \cdot \rho_{glass} \cdot l_g \cdot h_g = 10 \cdot 2,5 \cdot 1,5 \cdot 2,0 = 75 \text{ kg}$$

$$\Rightarrow f_{max} = \frac{L}{500} = \frac{1,5}{500} = 0,003 \text{ m} \quad \text{or} \quad 0,003 \text{ m (EN 14351-1)}$$

$$\Rightarrow f_{max} = 0,003 \text{ m in the following formulas:}$$

$$I_{x1} \geq \frac{G \cdot a \cdot 10^8}{48 \cdot E_{al} \cdot f_{max}} \cdot (3 \cdot L^2 - 4 \cdot a^2), \text{cm}^4$$

$$I_{x1} \geq \frac{75 \cdot 0,15 \cdot 10^8}{48 \cdot 7 \cdot 10^9 \cdot 0,003} \cdot (3 \cdot 1,5^2 - 4 \cdot 0,15^2), \text{cm}^4$$

$$I_{x1} \geq \frac{75 \cdot 0,15 \cdot 10^8}{48 \cdot 7 \cdot 10^9 \cdot 0,003} \cdot (3 \cdot 1,5^2 - 4 \cdot 0,15^2), \text{cm}^4 \Rightarrow I_{x1} \geq 7,43 \text{ cm}^4$$

$$I_{x2} \geq \frac{5 \cdot q \cdot L^4 \cdot 10^8}{384 \cdot E_{al} \cdot f_{max}}, \text{cm}^4 \quad I_{x2} \geq \frac{5 \cdot 2 \cdot 1,5^4 \cdot 10^8}{384 \cdot 7 \cdot 10^9 \cdot 0,003}, \text{cm}^4 \Rightarrow I_{x2} \geq 0,63 \text{ cm}^4$$

$$I_x = I_{x1} + I_{x2}, \text{cm}^4$$

$$I_x = 7,43 + 0,63 = 8,06 \text{ cm}^4$$

Use ETEM Catalogue to choose the appropriate transom with

$$I_x \geq 8,06 \text{ cm}^4$$

We choose transom E45300 with $I_x = 6,59 \text{ cm}^4$

$$\text{and } I_y = 17,02 \text{ cm}^4$$

TRANSOM SELECTION

*Wind load actions:

The required moment of inertia of a transom due to the wind action is given by:

a) triangle load

$$\text{If } \frac{L}{a} \leq 1, I_{ya} \geq \frac{w \cdot (L/2) \cdot L^4 \cdot 10^8}{120 \cdot E_{al} \cdot f_{max}}, \text{cm}^4$$

or

b) trapezoid load

$$\text{If } \frac{L}{a} > 1, I_{ya} \geq \frac{w \cdot (a/2) \cdot L^4}{1920 \cdot E_{al} \cdot f_{max}} \cdot 10^8 \cdot \left[25 - 40 \cdot \frac{(a/2)^2}{L^2} + 16 \cdot \frac{(a/2)^4}{L^4} \right], \text{cm}^4$$

Use the same method to calculate I_{xb}

Total of required moment of inertia:

$$I_y = I_{ya} + I_{yb}, \text{cm}^4$$

Where:

I_y - Moment of inertia of a transom, cm^4

w - Wind pressure, kg/m^2

E_{al} - Modulus of Elasticity of aluminium, kg/m^2

f_{max} - Maximum transom deflection, m

L - Length of a transom, m

a, b - Distance between transoms, m

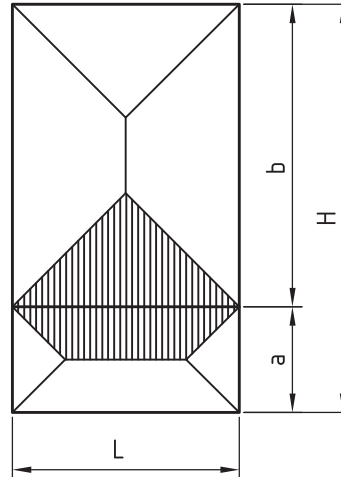
Maximum transom deflection f_{max} by wind load:

$$f = \frac{L}{200}, \text{m} \text{ or } 0.015 \text{ m} - \text{whichever is less (EN 14351-1)}$$

Use ETEM Catalogue to choose the appropriate transom with I_x exceeding or equal to the required I_x .

Use ETEM Catalogue to choose the appropriate profile which characteristics exceed or are equal to both calculated values I_x and I_y .

Example:



Initial data:

$$L = 1,5 \text{ m}$$

$$w = 60 \text{ kg/m}^2$$

$$a = 0,7 \text{ m}$$

$$E_{al} = 7.10 \text{ kg/m}^2$$

$$b = 2,0 \text{ m}$$

$$f = \frac{L}{200} = \frac{1,5}{200} = 0,0075 \text{ m or } 0,015 \text{ m (EN 14351-1)}$$

$\Rightarrow f_{max} = 0,0075 \text{ m}$ in the following formulas:

$$\frac{L}{a} = \frac{1,5}{0,7} = 2,14 > 1$$

$$I_{ya} \geq \frac{w \cdot (a/2) \cdot L^4}{1920 \cdot E_{al} \cdot f_{max}} \cdot 10^8 \cdot \left[25 - 40 \cdot \frac{(a/2)^2}{L^2} + 16 \cdot \frac{(a/2)^4}{L^4} \right], \text{cm}^4$$

$$I_{ya} \geq \frac{60 \cdot (0,7/2) \cdot 1,5^4}{1920 \cdot 7 \cdot 10^9 \cdot 0,0075} \cdot 10^8 \cdot \left[25 - 40 \cdot \frac{(0,7/2)^2}{1,5^2} + 16 \cdot \frac{(0,7/2)^4}{1,5^4} \right], \text{cm}^4$$

$$I_{ya} \geq 2,41 \text{ cm}^4$$

$$\frac{L}{b} = \frac{1,5}{2,0} = 0,75 < 1$$

$$I_{yb} \geq \frac{w \cdot (L/2) \cdot L^4 \cdot 10^8}{120 \cdot E_{al} \cdot f_{max}}, \text{cm}^4 \Rightarrow I_{yb} \geq \frac{60 \cdot (1,5/2) \cdot 1,5^4 \cdot 10^8}{120 \cdot 7 \cdot 10^9 \cdot 0,0075}, \text{cm}^4$$

$$\Rightarrow I_{yb} \geq 3,62 \text{ cm}^4$$

$$I_y = I_{ya} + I_{yb}, \text{cm}^4$$

$$\Rightarrow I_y = 2,41 + 3,62 = 6,03 \text{ cm}^4$$

Use ETEM Catalogue to choose the appropriate mullion with

$$I_y \geq 6,03 \text{ cm}^4$$

We choose mullion E45300 with $I_x = 6,59 \text{ cm}^4$

$$\text{and } I_y = 17,02 \text{ cm}^4$$

CALCULATION OF GLASS PANE THICKNESS

*Glazing thickness:

For single glazing the minimum thickness is given by the following equations:

$$a) \text{ If } \frac{h_g}{l_g} \leq 3, \quad t = \sqrt{\frac{10 \cdot l_g \cdot h_g \cdot w}{72}}, \text{mm}$$

or

$$b) \text{ If } \frac{h_g}{l_g} > 3, \quad t = \frac{l_g \cdot \sqrt{10 \cdot w}}{72}, \text{mm}$$

Where:

t - Minimum theoretical glass thickness, mm

w - Wind pressure, kg/m²

l_g - The smallest dimension of the glass pane, m

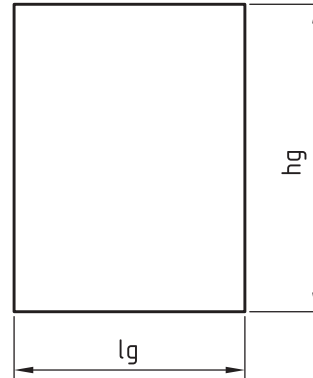
h_g - The largest dimension of the glass pane, m

For double glazing, the total thickness of both glasses in the panel is equal to the thickness of a single glass pane (evaluated using the above equations) multiplied by 1.5

For triple glazing, the total thickness of all glasses in the panel is equal to the thickness of a single glass pane (evaluated using the above equations) multiplied by 1.7

Always consult facade engineer or glazing manufacturer when calculating for required glazing thickness and maximum allowable dimensions.

Example:



Initial data:

$$l_g = 1,5 \text{ m}$$

$$h_g = 2,0 \text{ m}$$

$$w = 60 \text{ kg/m}^2$$

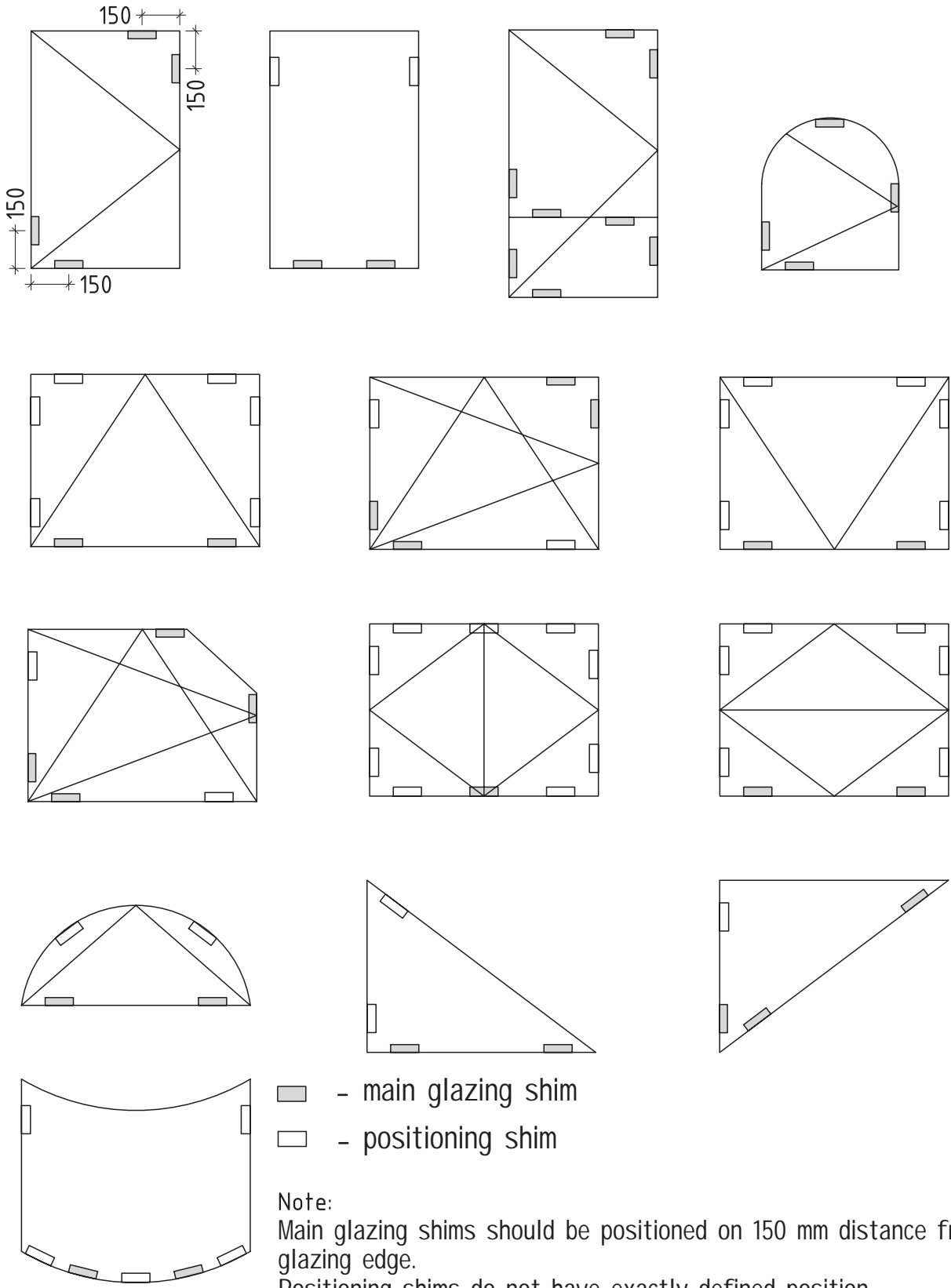
$$\frac{h_g}{l_g} = \frac{2}{1,5} = 1,33 \leq 3$$

$$t = \sqrt{\frac{10 \cdot l_g \cdot h_g \cdot w}{72}} = \sqrt{\frac{10 \cdot 1,5 \cdot 2 \cdot 60}{72}} = \sqrt{\frac{1800}{72}} = 5 \text{ mm}$$

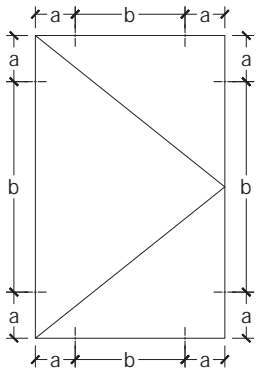
$$\text{For double glazing } t_{\text{req}} = 1,5 \cdot 5 = 7,5 \text{ mm}$$

We choose double glazing 5/14/5

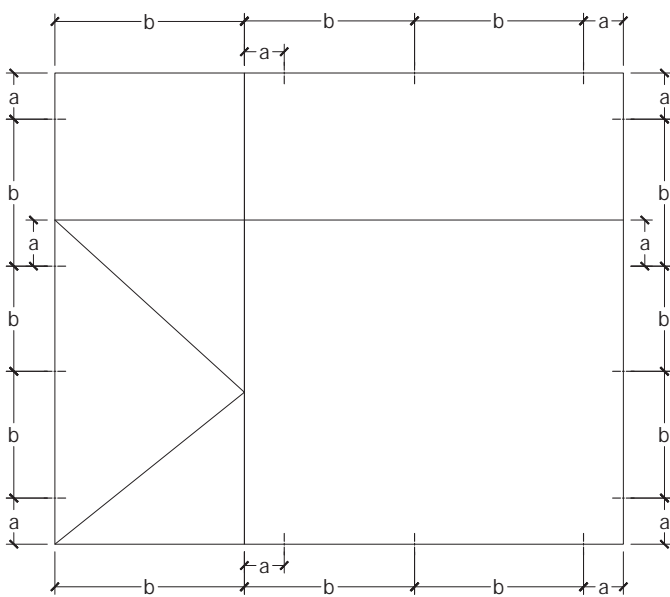
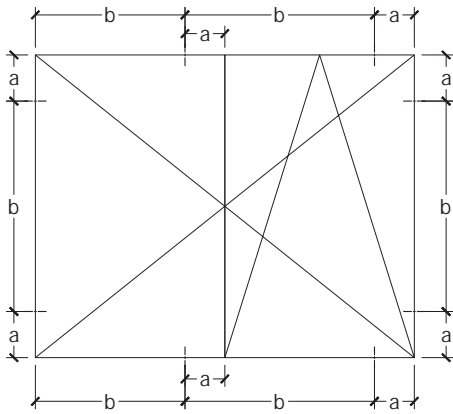
GLAZING SHIMS



POSITION OF ANCHORS



$a = 150 \div 200 \text{ mm}$
 $b \leq 800 \text{ mm}$

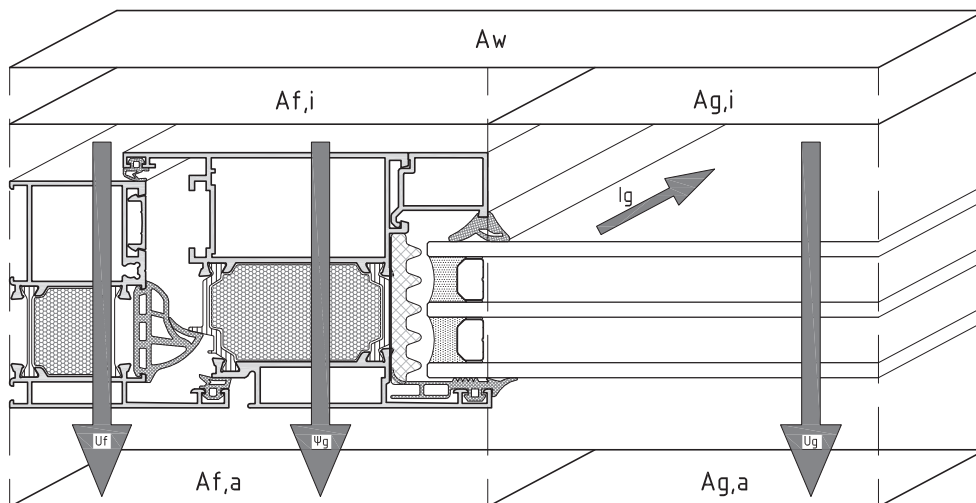


METHOD FOR CALCULATION OF THERMAL TRANSMITTANCE ACCORDING to EN ISO 10077-2

$$U_w = \frac{A_g \times U_g + A_f \times U_f + l_g \times \psi_g}{A_g + A_f} \quad (1)$$

- U_w - thermo-transmittance coefficient of the whole structure
- U_g - glass thermal transmittance coefficient
- U_f - thermo-transmittance coefficient of the aluminium frame (frame and sash)
- ψ_g - spacer linear thermal transmittance
- l_g - total length of the spacer
- A_g - glass area
- A_f - aluminium frame area (frame and sash)

- U_w - is calculated by formula (1)
- U_g - is given by the glass manufacturer
- U_f - is given by the manufacturer of the aluminium profiles



EXAMPLE FOR CALCULATING THERMAL TRANSMITTANCE COEFFICIENT

frame: E45 U_f 1.9 $W/(m^2K)$

spacer: warm edge ψ_g 0.051 $W/(m^2K)$

glass: triple glazing U_g 1.00 $W/(m^2K)$

window width: 1.00 m

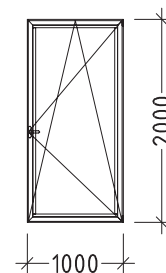
window height: 2.00 m

length of glass edge l_g : 4,89 m

$A_g = 1.3 \text{ m}^2$; $A_f = 0.7 \text{ m}^2$

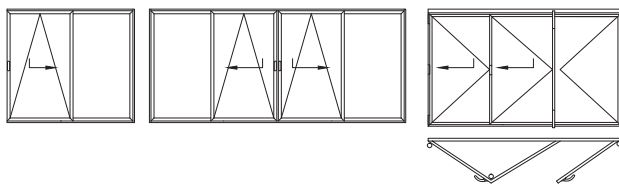
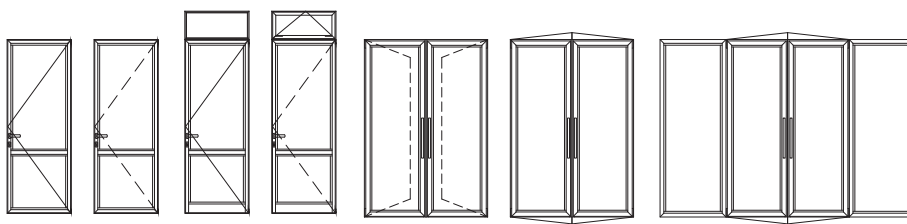
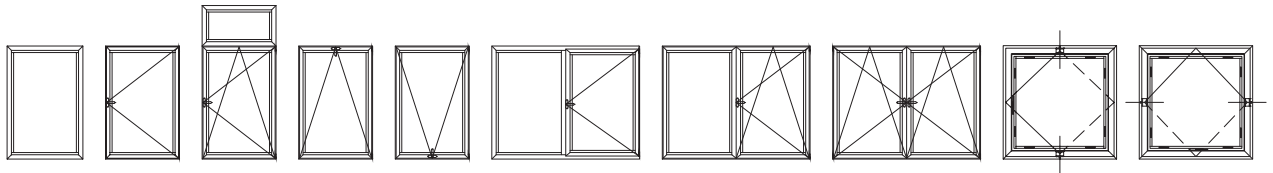
$$U_w = \frac{1.3 \times 1 + 0.7 \times 1.9 + 4.89 \times 0.051}{1.24 + 0.76}$$

$U_w \approx 1,44 \text{ W}/(m^2 \text{ K})$

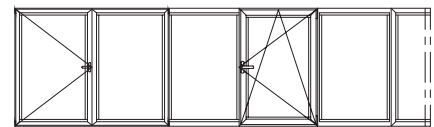


TABLES

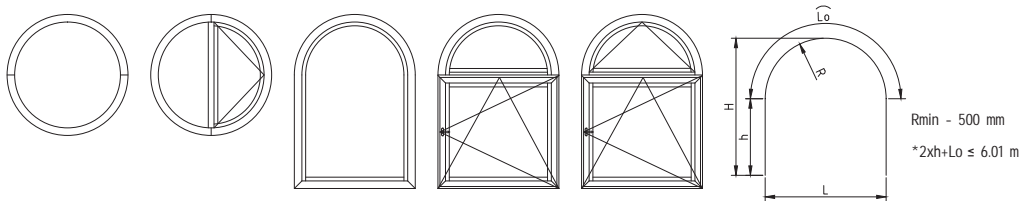
TYPES / LIST OF PROFILES / CHARACTERISTICS



opening schemes:
321:330:431:541:550;
532:651:633:761:770:743


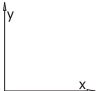
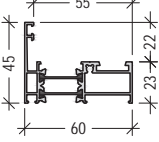
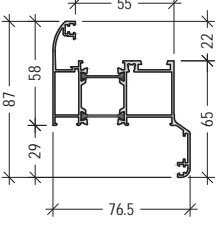
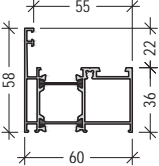
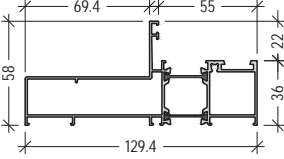
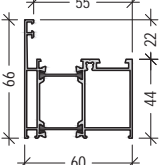
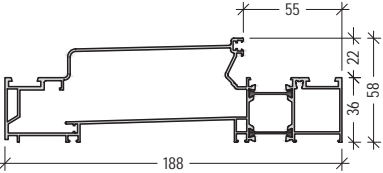
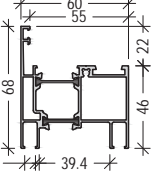
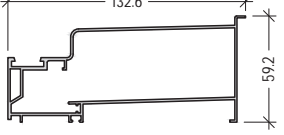
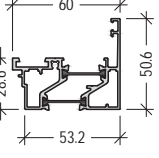
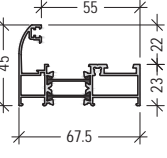
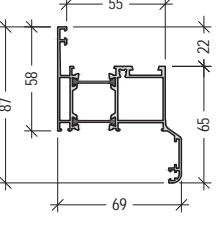
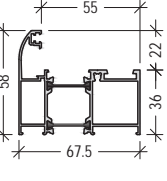


Hidden vent



opening system with thermal break

E45

code		profile	weight length moment of inertia	code		profile	weight length moment of inertia
E45100			935 g/m L=6.01 m $I_x=3.37 \text{ cm}^4$ $I_y=13.69 \text{ cm}^4$	E45161			1386 g/m L=6.01 m $I_x=18.37 \text{ cm}^4$ $I_y=32.85 \text{ cm}^4$
E45101			1116 g/m L=6.01 m $I_x=7.96 \text{ cm}^4$ $I_y=17.06 \text{ cm}^4$	E45190			1610 g/m L=6.01 m $I_x=10.77 \text{ cm}^4$ $I_y=83.97 \text{ cm}^4$
E45102			1227 g/m L=6.01 m $I_x=12.32 \text{ cm}^4$ $I_y=19.13 \text{ cm}^4$	E45130			2523 g/m L=6.01 m $I_x=26.24 \text{ cm}^4$ $I_y=332.64 \text{ cm}^4$
E45121			1311 g/m L=6.01 m $I_x=11.62 \text{ cm}^4$ $I_y=20.71 \text{ cm}^4$	E40135			1627 g/m L=6.01 m $I_x=20 \text{ cm}^4$ $I_y=117.58 \text{ cm}^4$
E45171 reverse profile			1164 g/m L=6.01 m $I_x=5.64 \text{ cm}^4$ $I_y=15.52 \text{ cm}^4$	E45150			1024 g/m L=6.01 m $I_x=4.36 \text{ cm}^4$ $I_y=17.84 \text{ cm}^4$
E45111			1297 g/m L=6.01 m $I_x=16.13 \text{ cm}^4$ $I_y=26.33 \text{ cm}^4$	E45151			1205 g/m L=6.01 m $I_x=9.66 \text{ cm}^4$ $I_y=21.81 \text{ cm}^4$

L45-01

opening system with thermal break

E45

code	profile	weight length moment of inertia	code	profile	weight length moment of inertia
E45152		1316 g/m L=6.01 m $I_x=14.58 \text{ cm}^4$ $I_y=24.25 \text{ cm}^4$	E45200		1169 g/m L=6.01 m $I_x=5.96 \text{ cm}^4$ $I_y=21.93 \text{ cm}^4$
E45154		1373 g/m L=6.01 m $I_x=12.92 \text{ cm}^4$ $I_y=34.65 \text{ cm}^4$	E45201		1295 g/m L=6.01 m $I_x=10.79 \text{ cm}^4$ $I_y=25.72 \text{ cm}^4$
E45153		1535 g/m L=6.01 m $I_x=17.25 \text{ cm}^4$ $I_y=67.58 \text{ cm}^4$	E45202		1589g/m L=6.01 m $I_x=27.35 \text{ cm}^4$ $I_y=33.21 \text{ cm}^4$
E45180		997 g/m L=6.01 m $I_x=3.53 \text{ cm}^4$ $I_y=16.66 \text{ cm}^4$	E45240		1600 g/m L=6.01 m $I_x=26.92 \text{ cm}^4$ $I_y=32.38 \text{ cm}^4$
E45185		1238 g/m L=6.01 m $I_x=13.09 \text{ cm}^4$ $I_y=17.67 \text{ cm}^4$	E45250		1198 g/m L=6.01 m $I_x=7.32 \text{ cm}^4$ $I_y=22.18 \text{ cm}^4$
E45160 hidden vent		1132 g/m L=6.01 m $I_x=10.33 \text{ cm}^4$ $I_y=21.94 \text{ cm}^4$	E45251		1327 g/m L=6.01 m $I_x=12.73 \text{ cm}^4$ $I_y=25.89 \text{ cm}^4$

L45-02

opening system with thermal break

E45

code	profile	weight length moment of inertia	code	profile	weight length moment of inertia
E45252		1630 g/m L=6.01 m Ix=30.6 cm ⁴ Iy=33.33 cm ⁴	E45271 PVC		1450 g/m L=6.01 m Ix=15.21 cm ⁴ Iy=29.22 cm ⁴
E45290		1641 g/m L=6.01 m Ix=29.81 cm ⁴ Iy=32.45 cm ⁴	E45272 PVC		1867 g/m L=6.01 m Ix=41.48 cm ⁴ Iy=39.5 cm ⁴
E45281		1281 g/m L=6.01 m Ix=10.83 cm ⁴ Iy=23.78 cm ⁴	E45275 PVC		1399 g/m L=6.01 m Ix=13.11 cm ⁴ Iy=26.98 cm ⁴
E45221 PVC		1416 g/m L=6.01 m Ix=13.14 cm ⁴ Iy=29 cm ⁴	E45295 PVC		1872g/m L=6.01 m Ix=40.47 cm ⁴ Iy=38.32 cm ⁴
E45222 PVC		1836 g/m L=6.01 m Ix=37.76 cm ⁴ Iy=39.29 cm ⁴	E45260 hidden vent		1217 g/m L=6.01 m Ix=5.46 cm ⁴ Iy=18.43 cm ⁴
E45245 PVC		1833 g/m L=6.01 m Ix=37 cm ⁴ Iy=38.26 cm ⁴	E45241		1524 g/m L=6.01 m Ix=15.98 cm ⁴ Iy=28.57 cm ⁴

L45-03

opening system with thermal break

E45

code	profile	weight length moment of inertia	code	profile	weight length moment of inertia
E45230 pivot mechanism		1523 g/m L=6.01 m $I_x=14.5 \text{ cm}^4$ $I_y=28.98 \text{ cm}^4$	E45351		1872 g/m L=6.01 m $I_x=28.62 \text{ cm}^4$ $I_y=44.17 \text{ cm}^4$
E40530 pivot mechanism		1099 g/m L=6.01 m $I_x=7.87 \text{ cm}^4$ $I_y=9.96 \text{ cm}^4$	E45302		2020 g/m L=6.01 m $I_x=19.77 \text{ cm}^4$ $I_y=77.41 \text{ cm}^4$
E45300		1138 g/m L=6.01 m $I_x=6.59 \text{ cm}^4$ $I_y=17.02 \text{ cm}^4$	E45303		2677 g/m L=6.01 m $I_x=137.04 \text{ cm}^4$ $I_y=47 \text{ cm}^4$
E45301		1340 g/m L=6.01 m $I_x=13.26 \text{ cm}^4$ $I_y=20.52 \text{ cm}^4$	E45331		2310 g/m L=6.01 m $I_x=88.7 \text{ cm}^4$ $I_y=41.83 \text{ cm}^4$
E45304		1664 g/m L=6.01 m $I_x=35.34 \text{ cm}^4$ $I_y=26.63 \text{ cm}^4$	E45340		1354 g/m L=6.01 m $I_x=13.22 \text{ cm}^4$ $I_y=26.25 \text{ cm}^4$
E45350		1472 g/m L=6.01 m $I_x=17.3 \text{ cm}^4$ $I_y=26.61 \text{ cm}^4$	E45330		2426 g/m L=6.01 m $I_x=117 \text{ cm}^4$ $I_y=60.53 \text{ cm}^4$

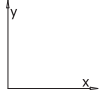


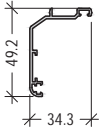
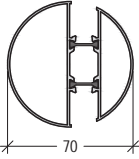
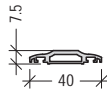
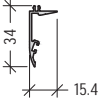
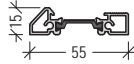
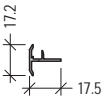
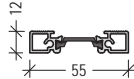

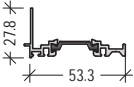
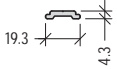
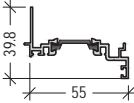
L45-04

code	profile	weight length moment of inertia	code	profile	weight length moment of inertia
E45360 hidden vent		1344 g/m L=6.01 m $I_x=14.94 \text{ cm}^4$ $I_y=26.32 \text{ cm}^4$	E45550		1287 g/m L=6.01 m $I_x=7.98 \text{ cm}^4$ $I_y=24.09 \text{ cm}^4$
E45361 hidden vent		1487 g/m L=6.01 m $I_x=25.2 \text{ cm}^4$ $I_y=29.2 \text{ cm}^4$	E45580		1260 g/m L=6.01 m $I_x=6.82 \text{ cm}^4$ $I_y=22.3 \text{ cm}^4$
E40660		486 g/m L=6.01 m	E45540 PVC		1283 g/m L=6.01 m $I_x=8.6 \text{ cm}^4$ $I_y=20.52 \text{ cm}^4$
E45655		756 g/m L=6.01 m $I_x=0.71 \text{ cm}^4$ $I_y=10.25 \text{ cm}^4$	E45540AV PVC		1287 g/m L=6.01 m $I_x=8.6 \text{ cm}^4$ $I_y=20.52 \text{ cm}^4$
E45656		1585 g/m L=6.01 m $I_x=8.84 \text{ cm}^4$ $I_y=90.81 \text{ cm}^4$	E45590 PVC		1353 g/m L=6.01 m $I_x=10.23 \text{ cm}^4$ $I_y=25.41 \text{ cm}^4$
E45500		1217 g/m L=6.01 m $I_x=6.58 \text{ cm}^4$ $I_y=19.44 \text{ cm}^4$	E40600		2038 g/m L=6.01 m $I_x=30.82 \text{ cm}^4$ $I_y=30.82 \text{ cm}^4$

L45-05

opening system with thermal break


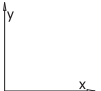
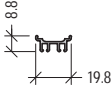
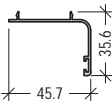






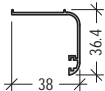
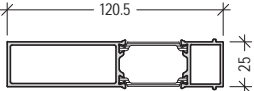
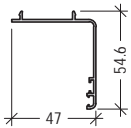
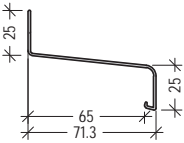
E45

code		profile	weight length moment of inertia	code		profile	weight length moment of inertia
E40601			1549 g/m L=6.01 m $I_x=18.87 \text{ cm}^4$ $I_y=12.44 \text{ cm}^4$	E40605			381 g/m L=6.01 m
E40603			1276 g/m L=6.01 m $I_x=17.76 \text{ cm}^4$ $I_y=17.27 \text{ cm}^4$	E40650			338 g/m L=6.01 m
E40602			203 g/m L=6.01 m	E45800			566 g/m L=6.01 m
E40604			113 g/m L=6.01 m	E45801			553 g/m L=6.01 m
E23600			66.5 g/m L=6.01 m	E45810			505 g/m L=6.01 m
E2308			159 g/m L= 4.4 m	E45811			580 g/m L=6.01 m

L45-06

opening system with thermal break

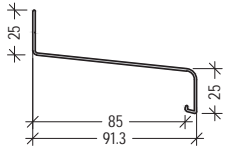
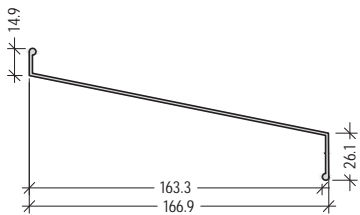
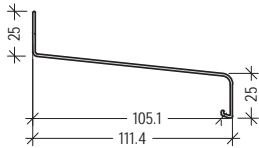
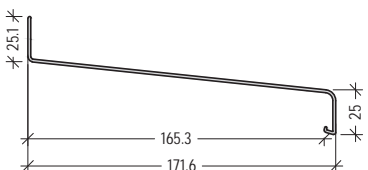
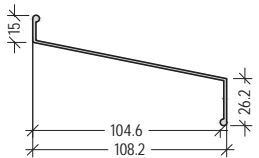
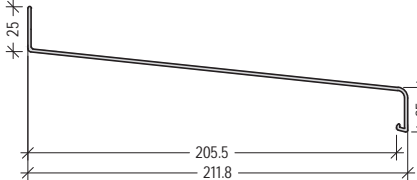
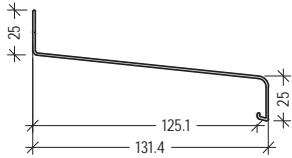
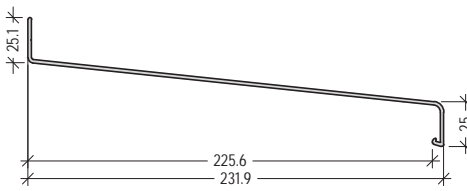
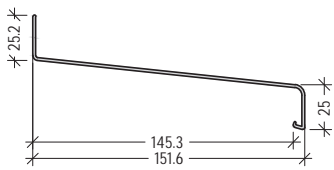
E45

code		profile	weight length moment of inertia	code		profile	weight length moment of inertia
E40812			135 g/m L=6.01 m	E1127			288 g/m L=6.01 m
E40813			265 g/m L=6.01 m	E40651			203 g/m L=6.01 m
E40820			143 g/m L=6.01 m	E62600			84.5 g/m L=6.01 m
E2357			144 g/m L=6.01 m	E40995			155.4 g/m L=6.01 m
E5366			269 g/m L=6.01 m	E50690			1550 g/m L=6.01 m $I_x=5.03 \text{ cm}^4$ $I_y=79.15 \text{ cm}^4$
E1115			408 g/m L=6.01 m	E62130			366 g/m L=6.01 m $I_x=2.41 \text{ cm}^4$ $I_y=11.8 \text{ cm}^4$

L45-07

opening system with thermal break

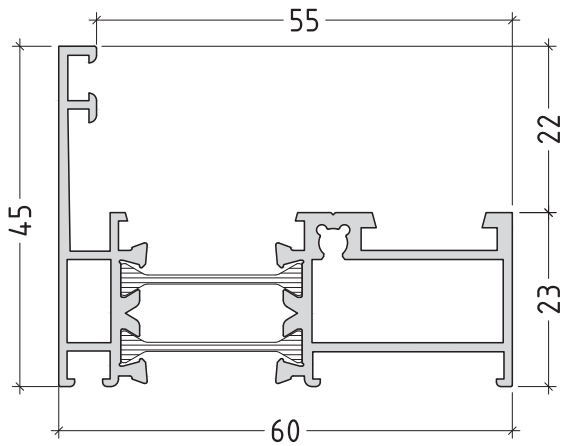
E45

code	profile	weight length moment of inertia	code	profile	weight length moment of inertia
E62131		501 g/m L=6.01 m Ix=2.71 cm ⁴ Iy=21.36 cm ⁴	E62101		847 g/m L=6.01 m L=6.3 m Ix=8.65 cm ⁴ Iy=105.51 cm ⁴
E62132		615 g/m L=6.01 m Ix=3.26 cm ⁴ Iy=37.19 cm ⁴	E62135		959 g/m L=6.01 m L=6.03 m Ix=5.24 cm ⁴ Iy=124.28 cm ⁴
E62100		620 g/m L=6.01 m Ix=4.69 cm ⁴ Iy=35.66 cm ⁴	E62137		1275 g/m L=6.01 m L=6.3 m Ix=7.44 cm ⁴ Iy=240.2 cm ⁴
E62133		690 g/m L=6.01 m Ix3.68 cm ⁴ Iy=56 cm ⁴	E62138		1445 g/m L=6.01 m L=6.3 m Ix=8.79 cm ⁴ Iy=319.27 cm ⁴
E62134		872 g/m L=6.01 m Ix=4.63 cm ⁴ Iy=90.62 cm ⁴			

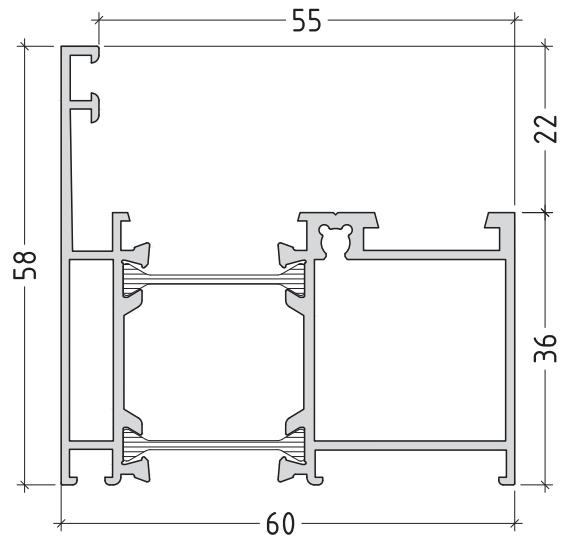
PROFILES

DRAWINGS / SCALE 1:1

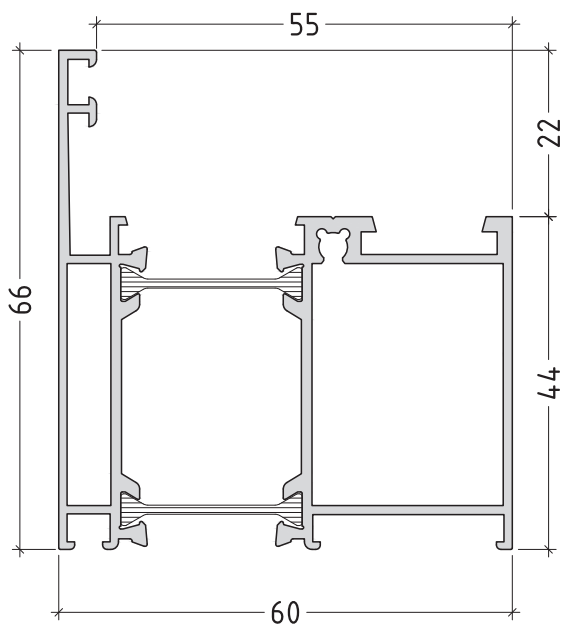
E45100
935 g/m



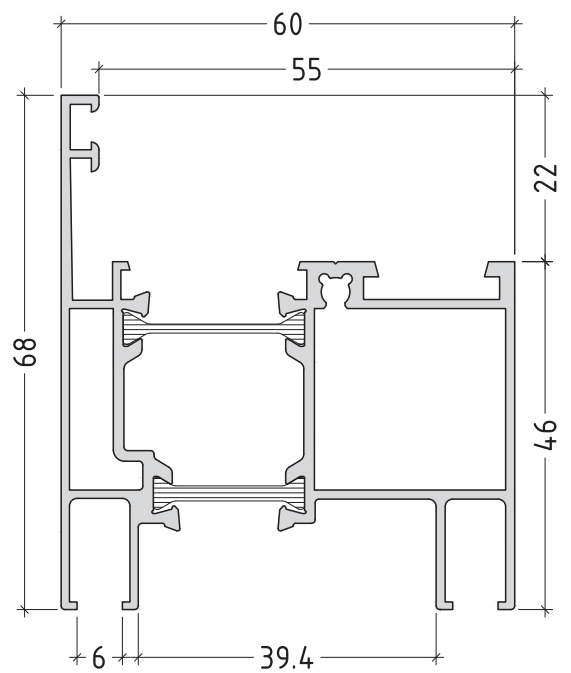
E45101
1116 g/m



E45102
1227 g/m



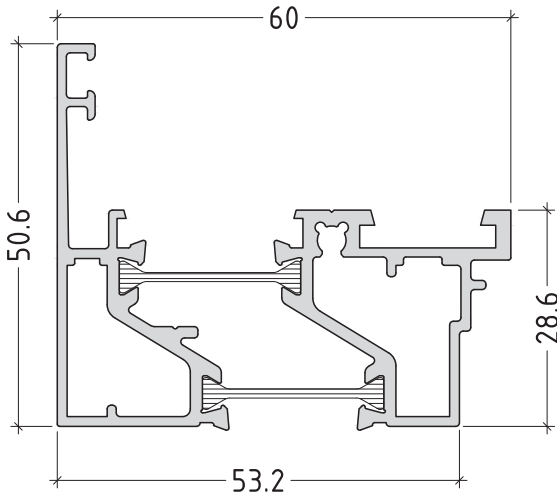
E45121
1311 g/m



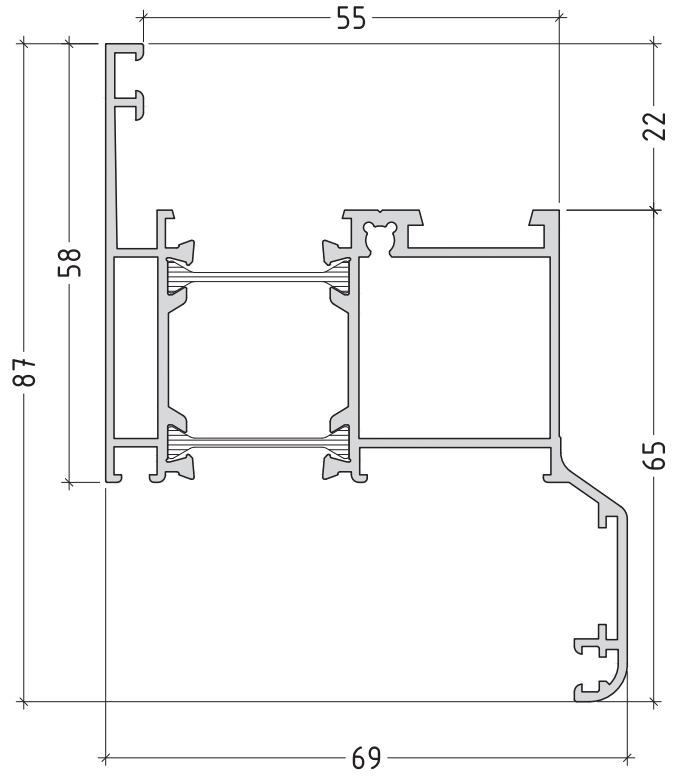
scale : 1:1

P45-01

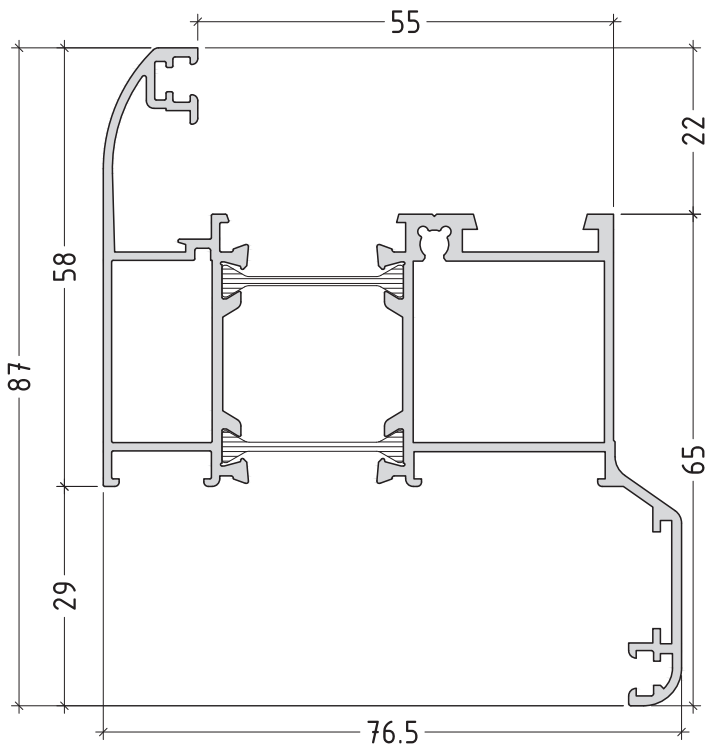
E45171 reverse profile
1164 g/m



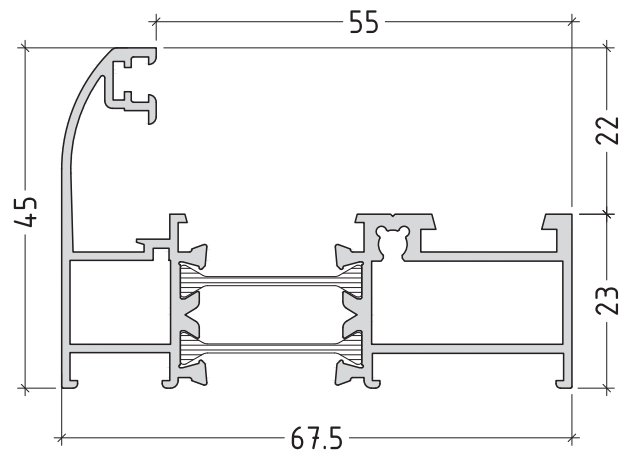
E45111
1297 g/m



E45161
1386 g/m



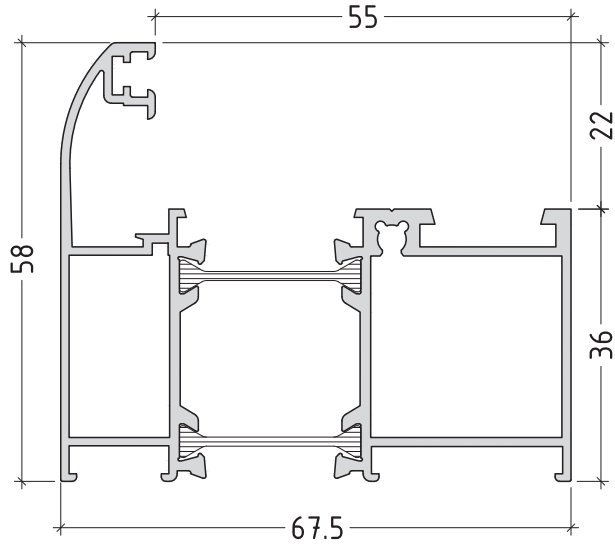
E45150
1024 g/m



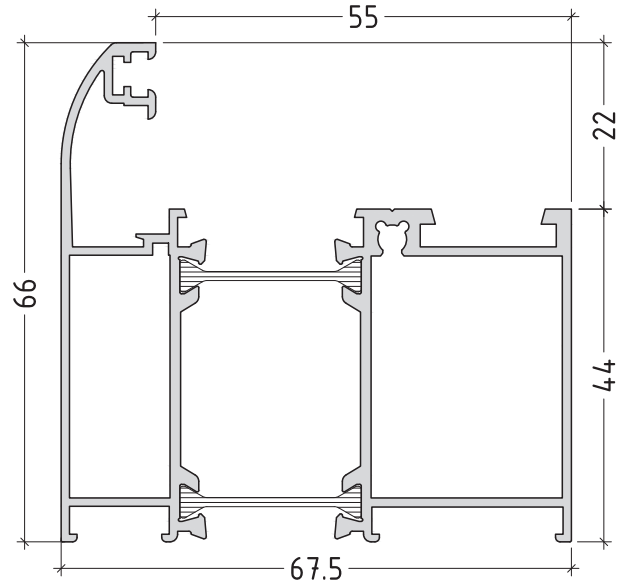
scale : 1:1

P45-02

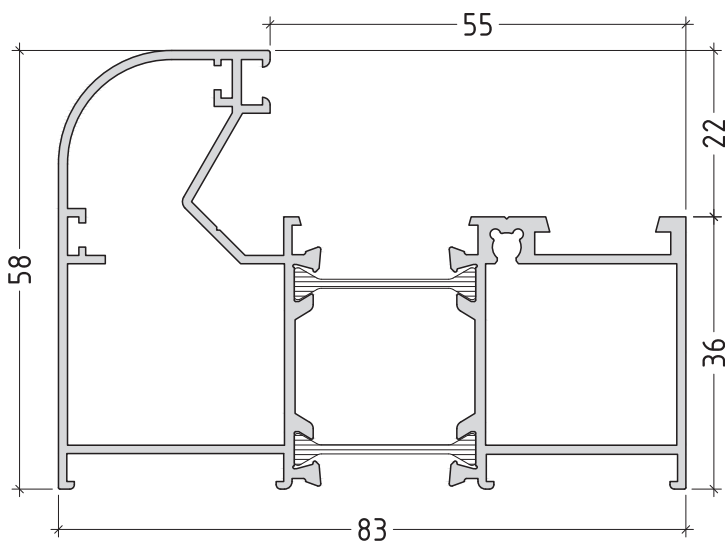
E45151
1205 g/m



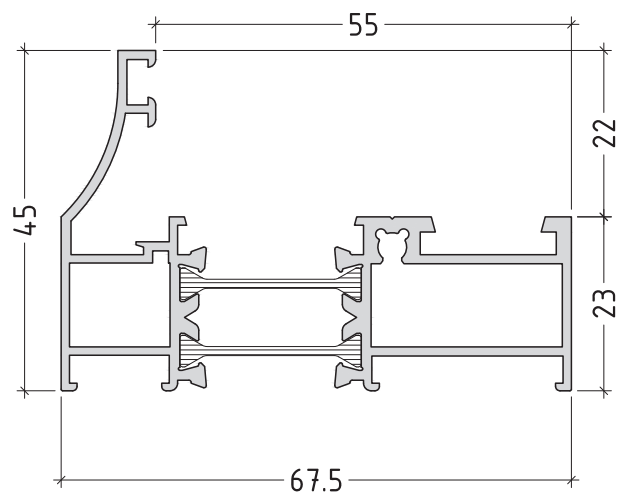
E45152
1316 g/m



E45154
1373 g/m

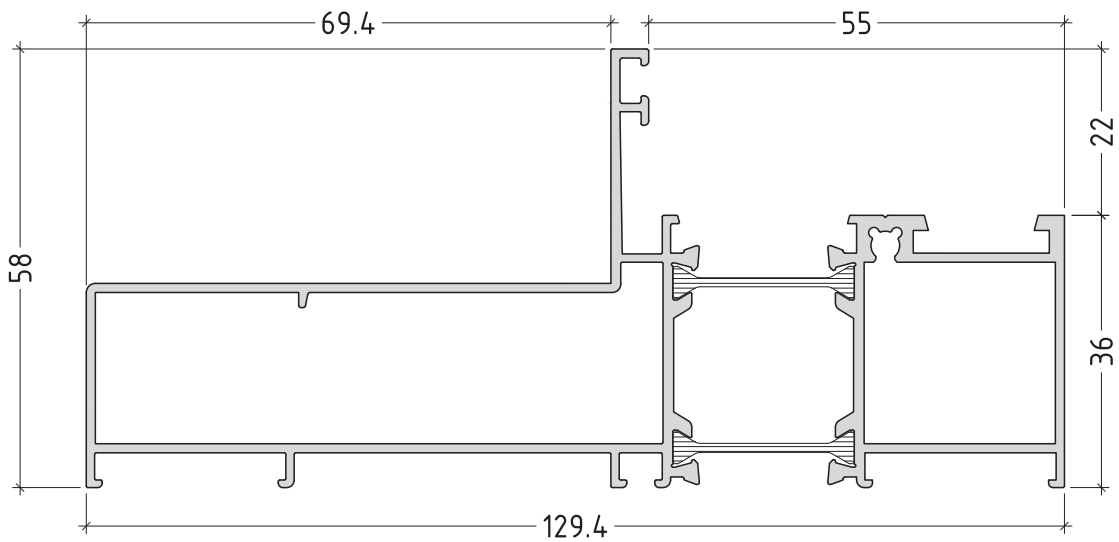


E45180
997 g/m

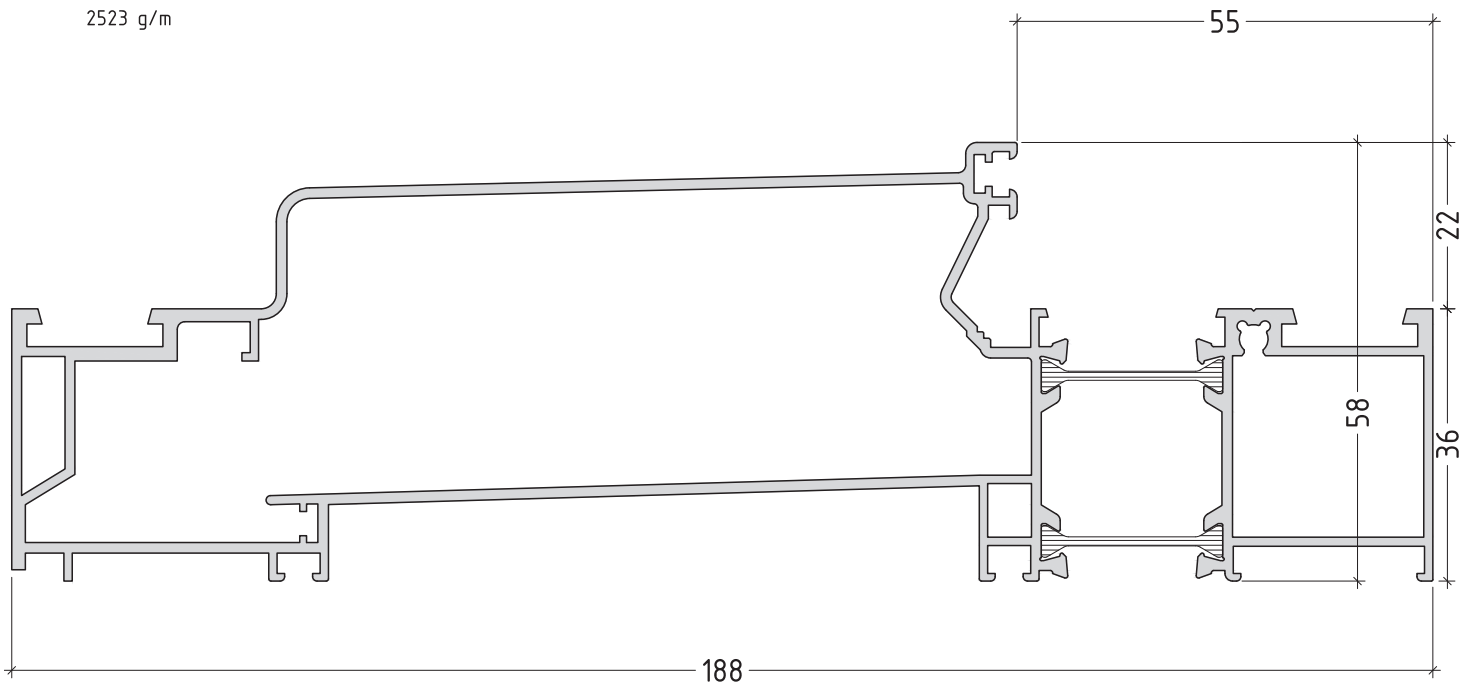


scale : 1:1

E45190
1610 g/m



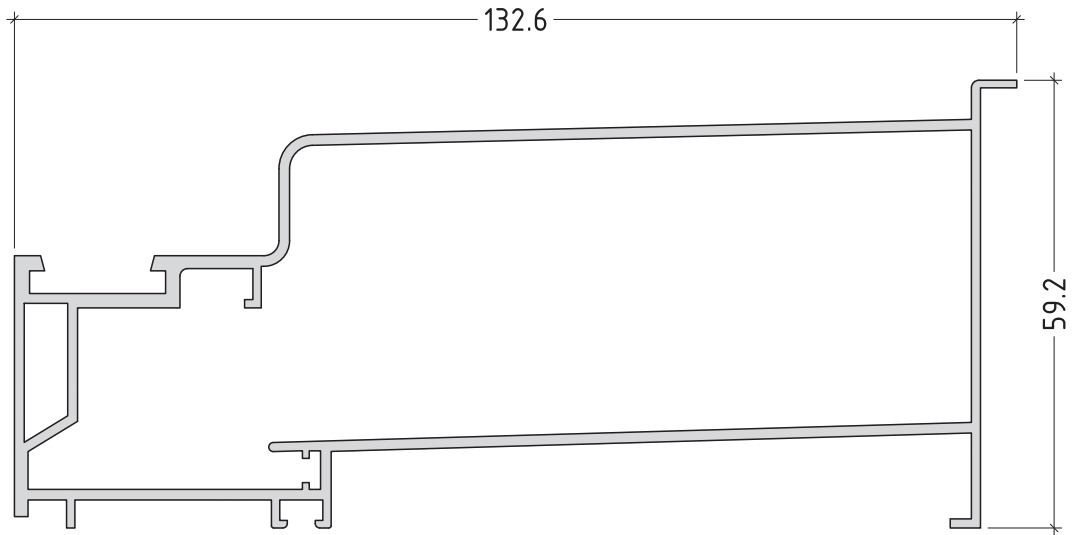
E45130
2523 g/m



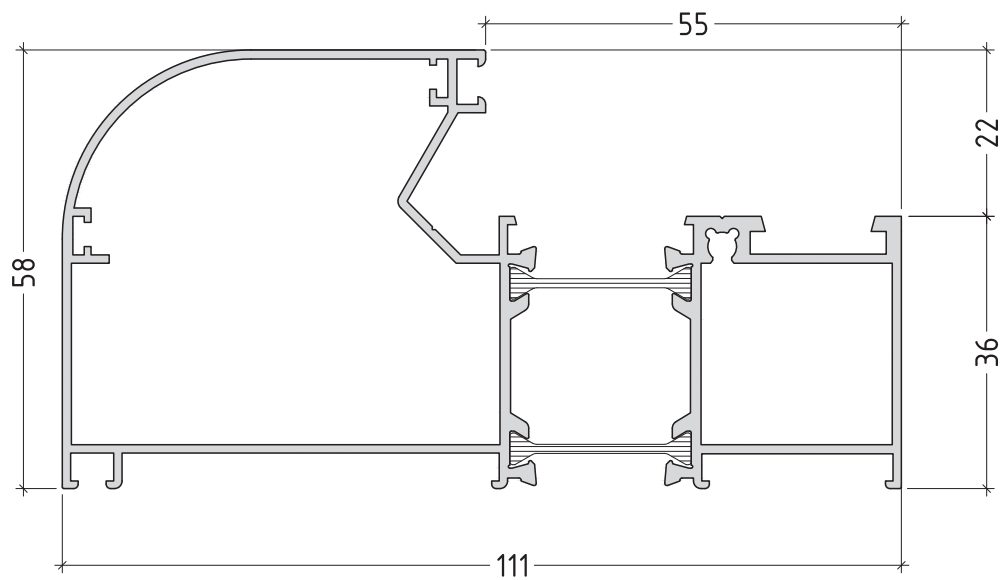
scale : 1:1

P45-04

E40135
1627 g/m



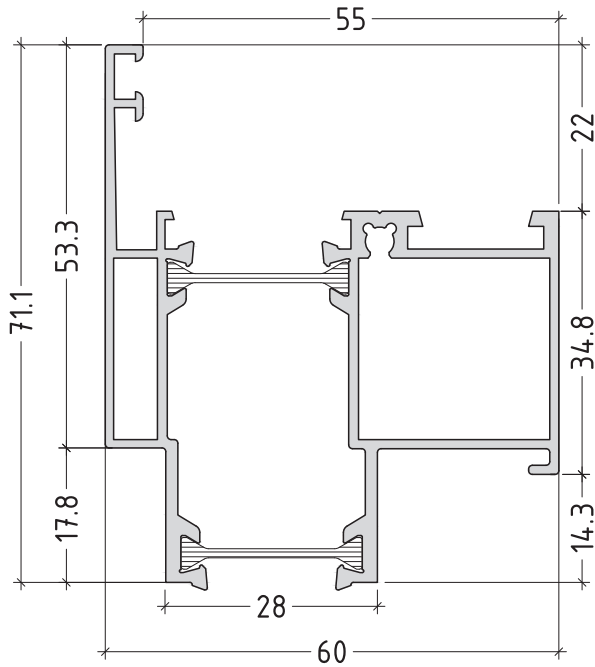
E45153
1535 g/m



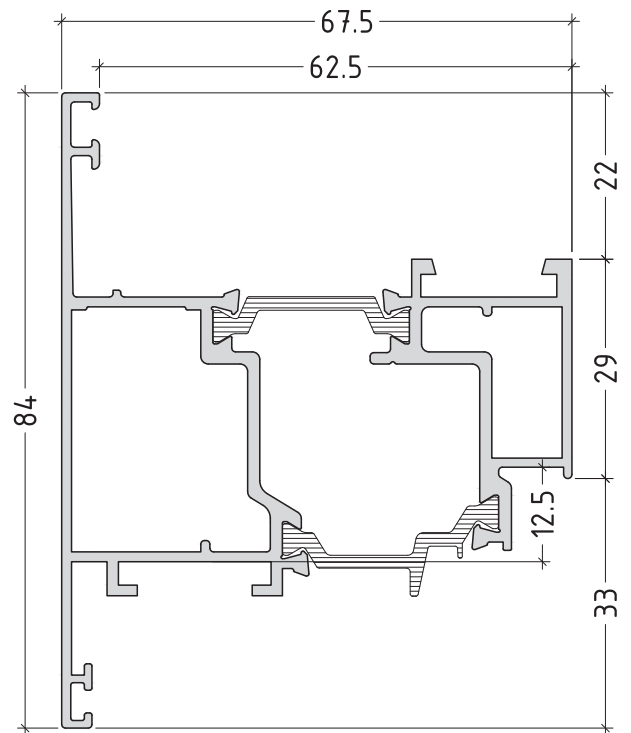
scale : 1:1

P45-05

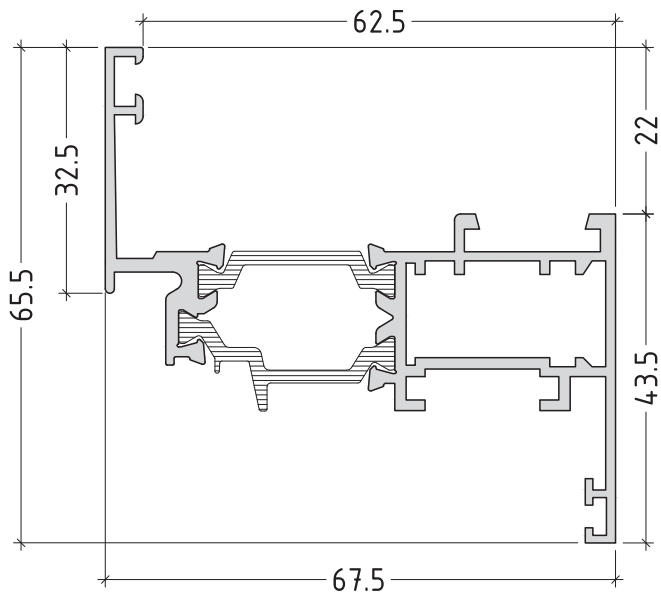
E45185
1238 g/m



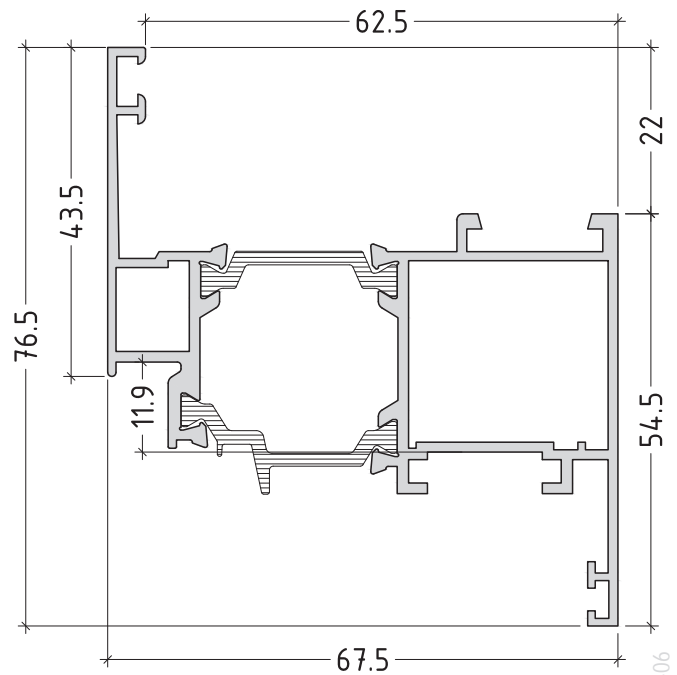
E45241
1524 g/m



E45200
1295 g/m

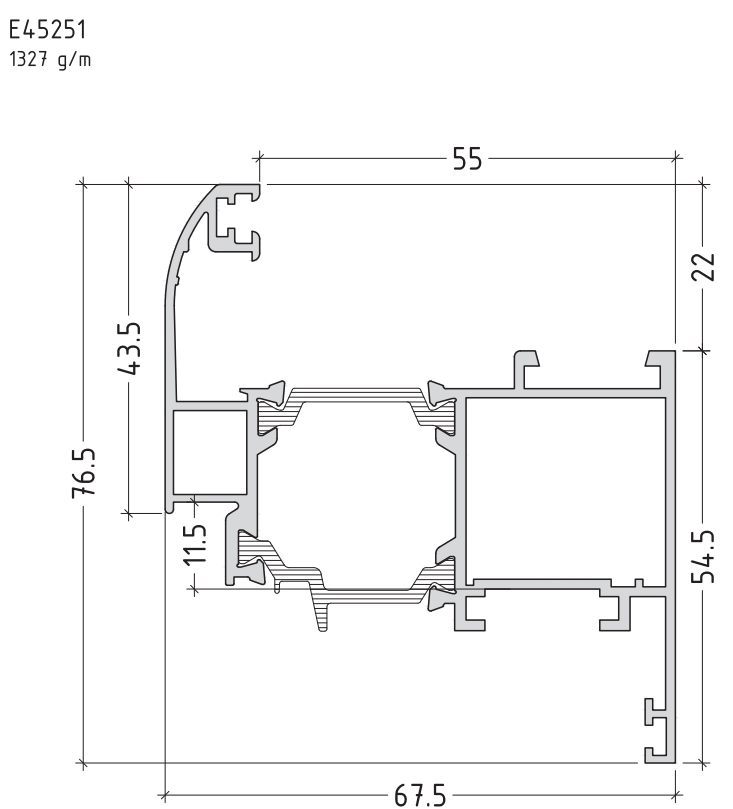
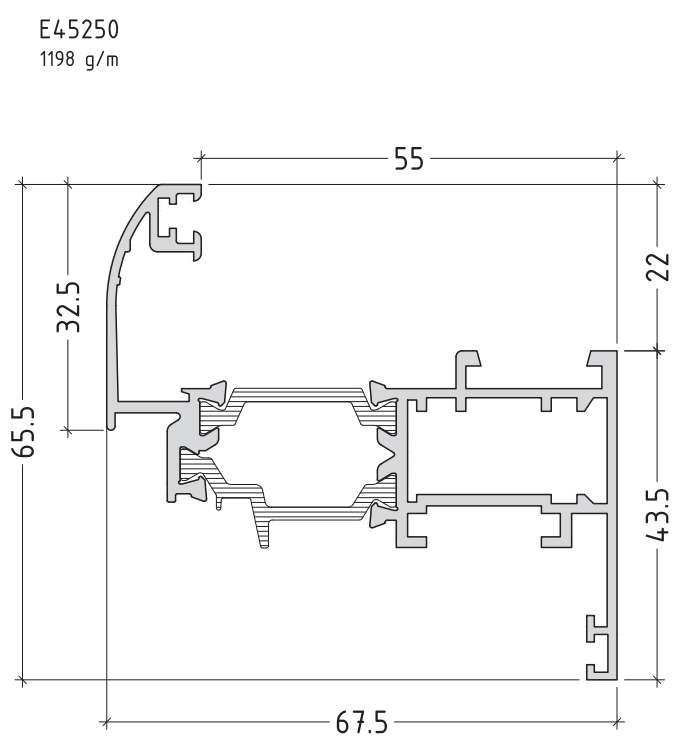
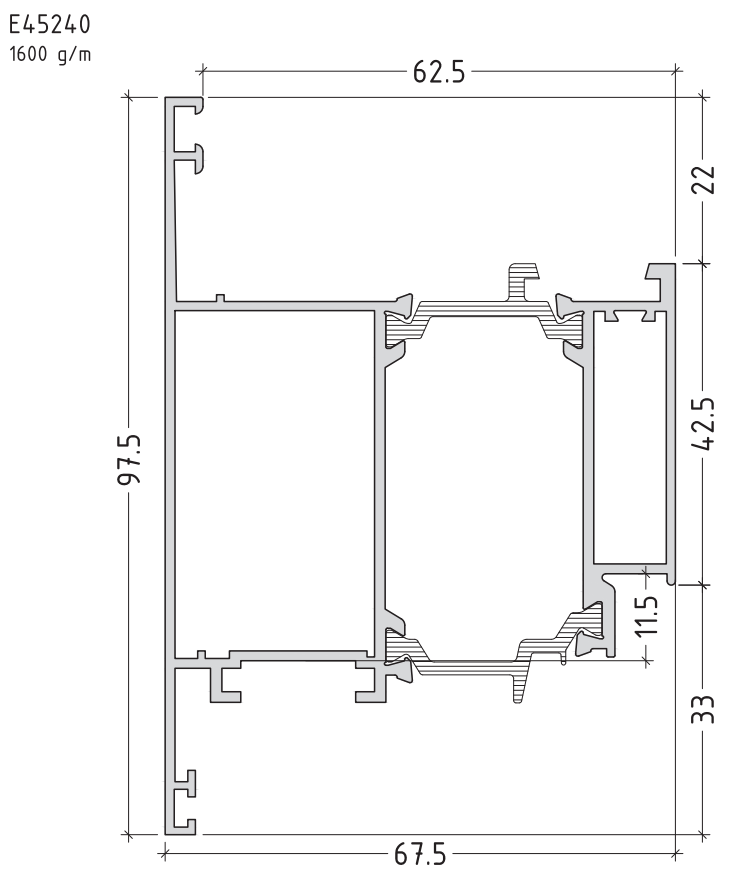
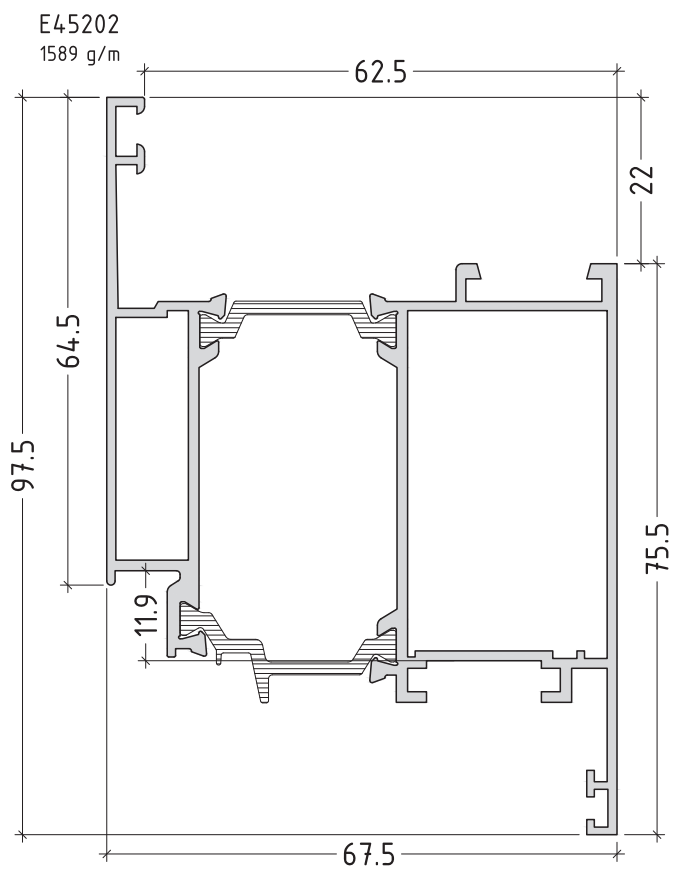


E45201
1295 g/m



scale : 1:1

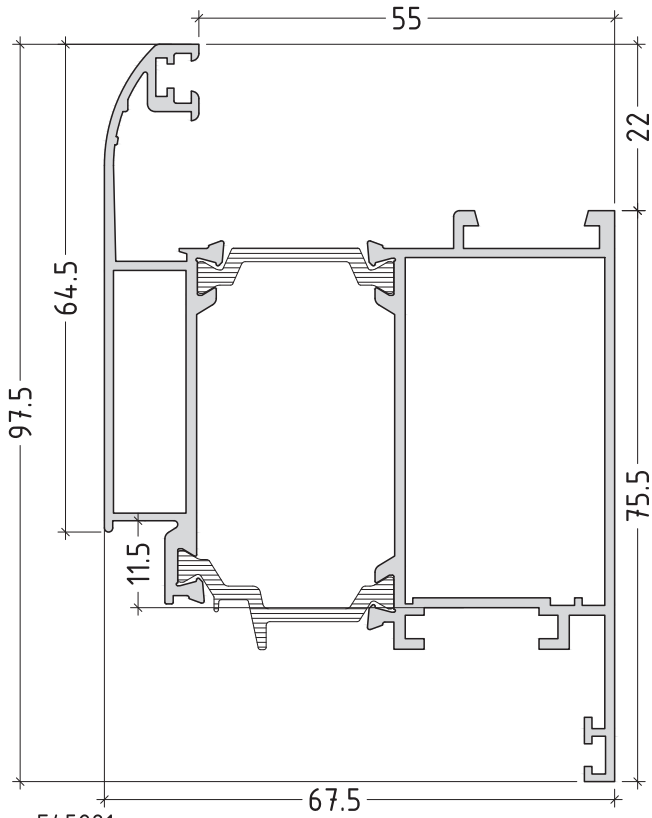
P45-06



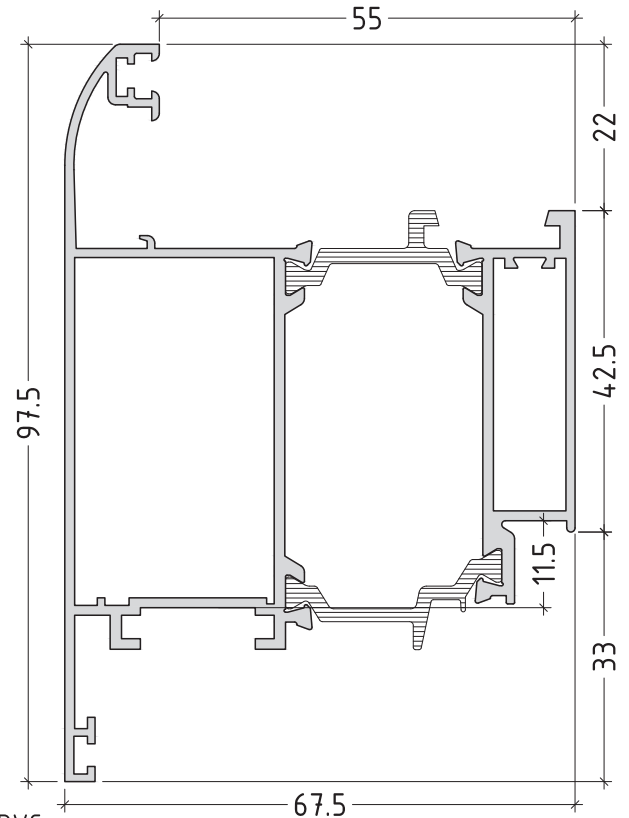
scale : 1:1

P45-07

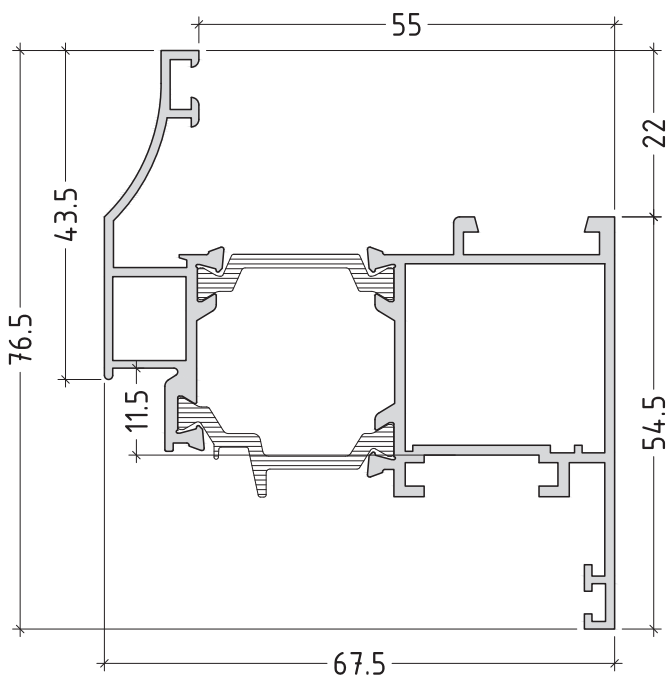
E45252
1630 g/m



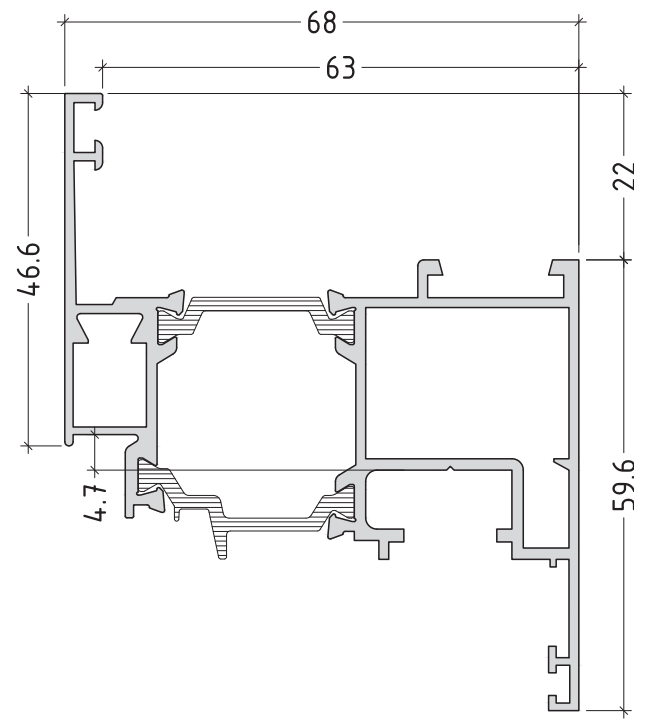
E45290
1641 g/m



E45281
1281 g/m



E45221 PVC
1416 g/m



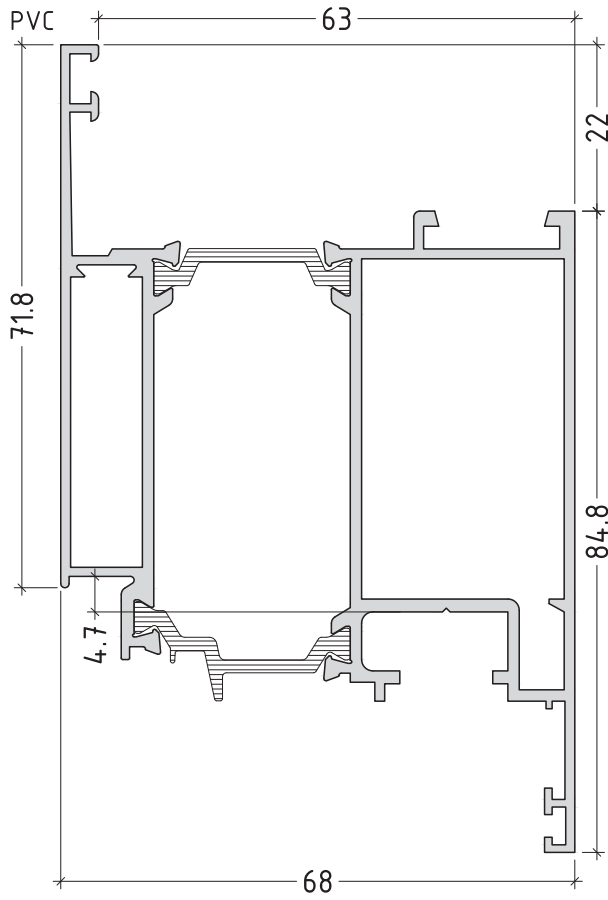
scale : 1:1

P45-08

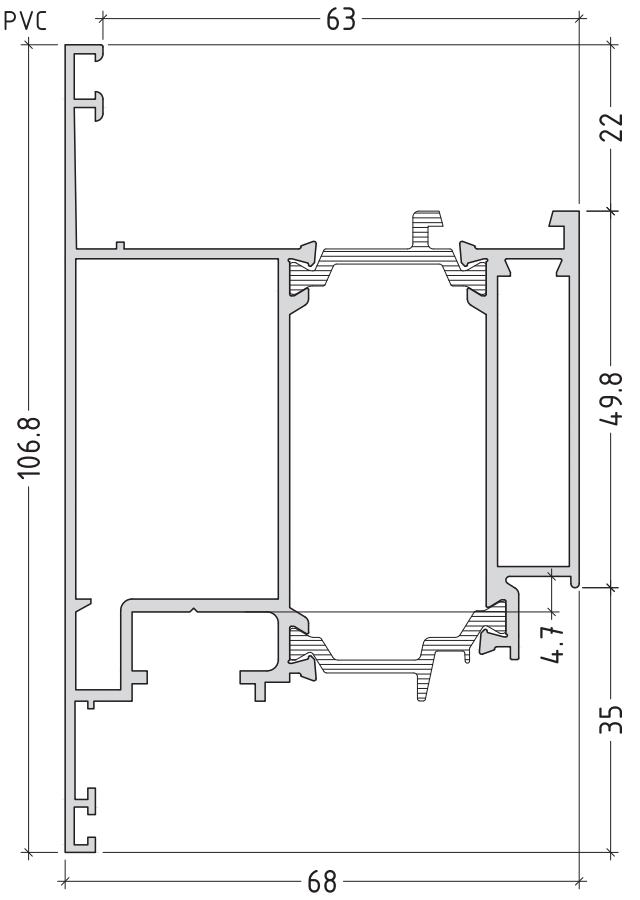
opening system with thermal break

E45

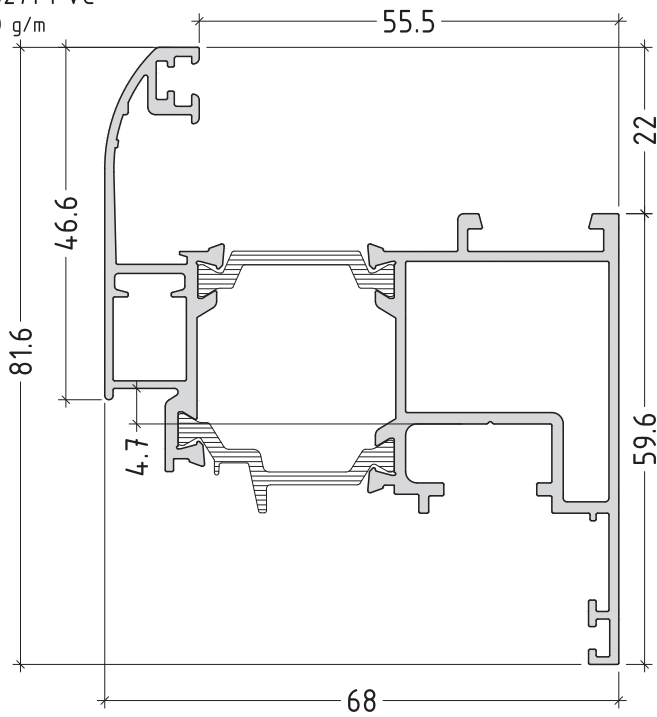
E45222 PVC
1836 g/m



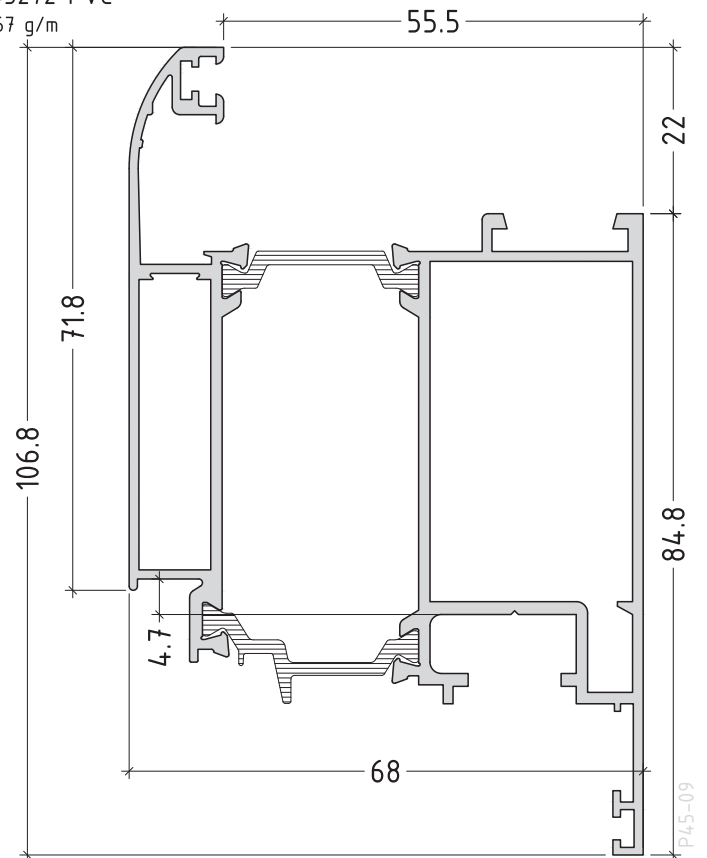
E45245 PVC
1833 g/m



E45271 PVC
1450 g/m



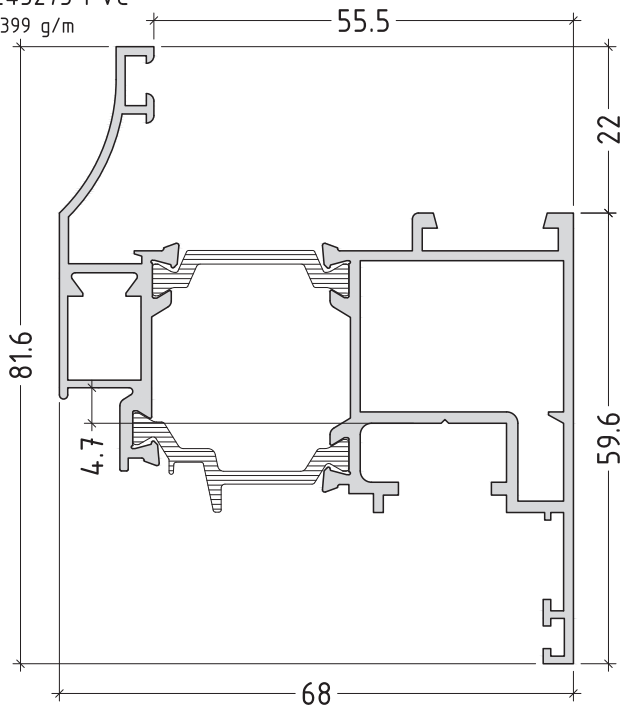
E45272 PVC
1867 g/m



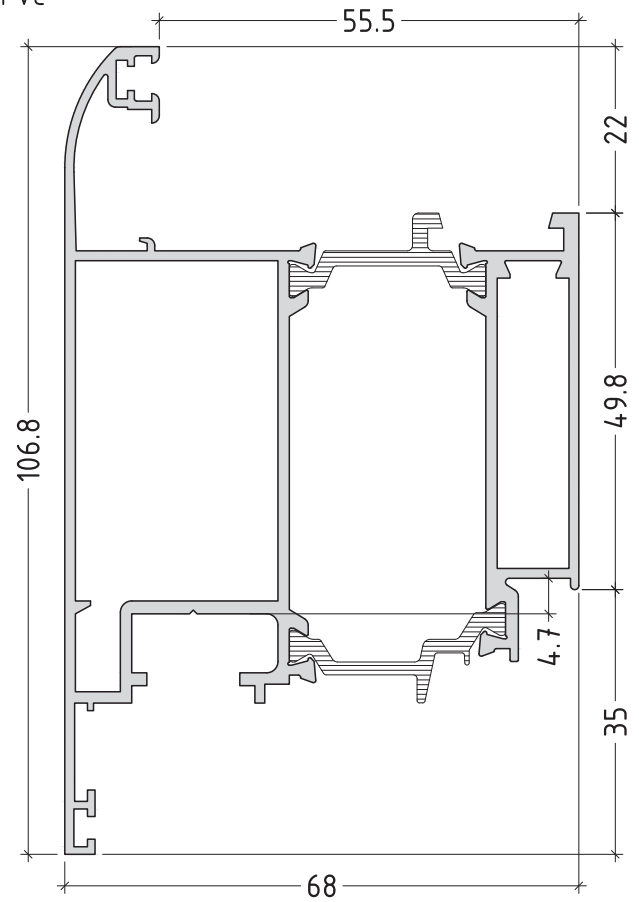
P45-09

scale : 1:1

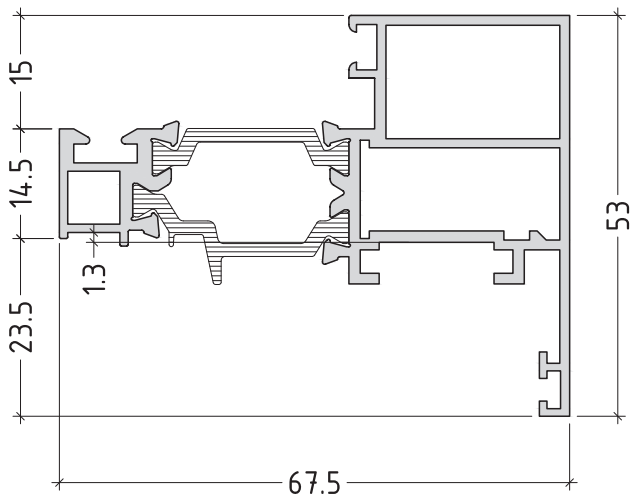
E45275 PVC
1399 g/m



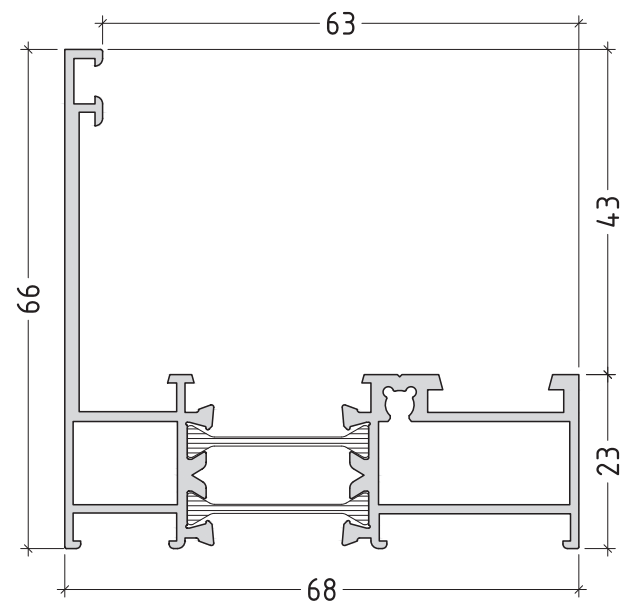
E45295 PVC
1872 g/m



E45260 hidden vent
1217 g/m



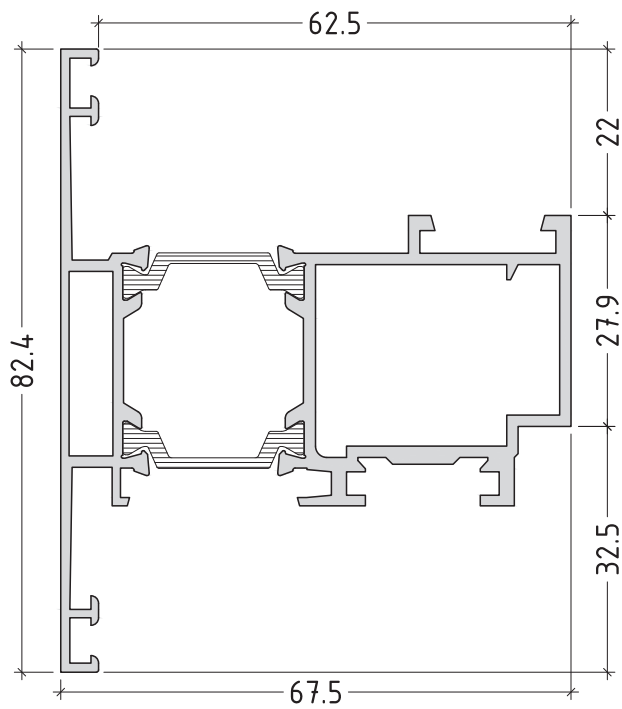
E45160 hidden vent
1132 g/m



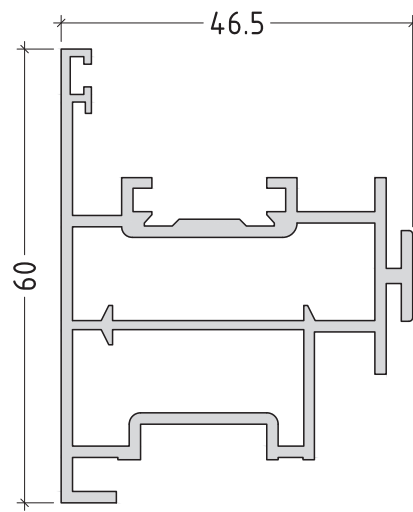
scale : 1:1

P45-10

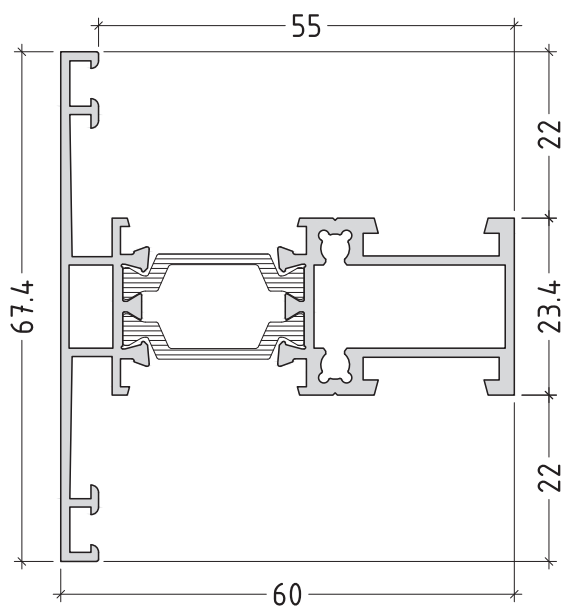
E45230 pivot mechanism
1523 g/m



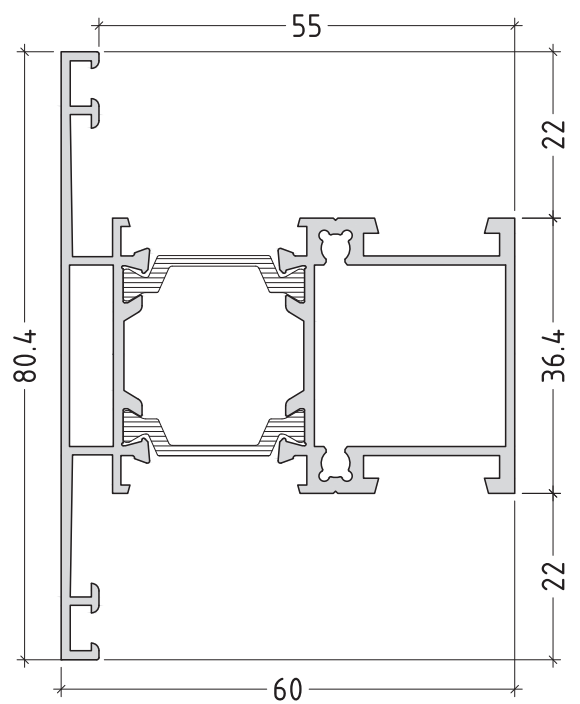
E40530 pivot mechanism
1099 g/m



E45300
1138 g/m



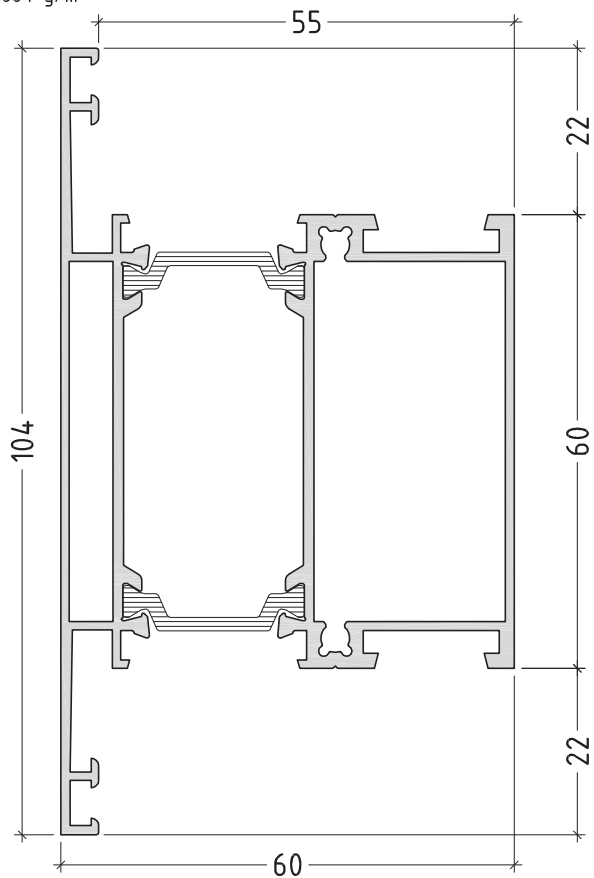
E45301
1340 g/m



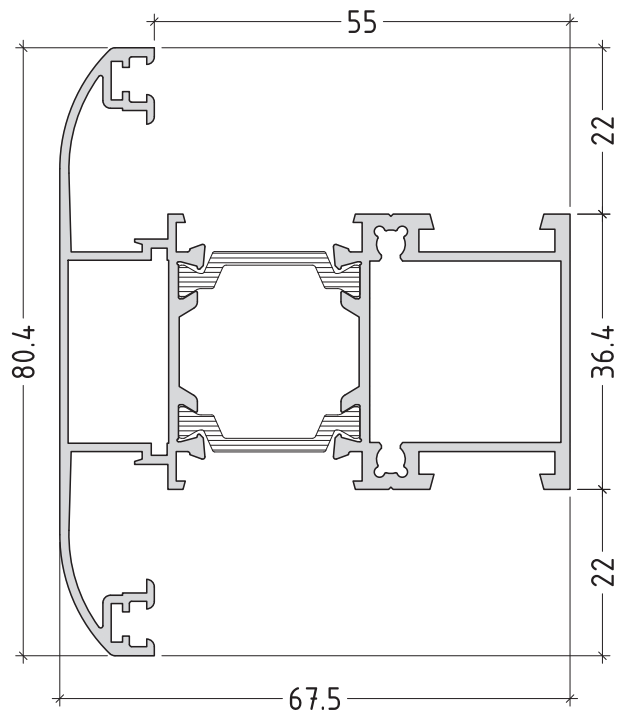
scale : 1:1

P45-11

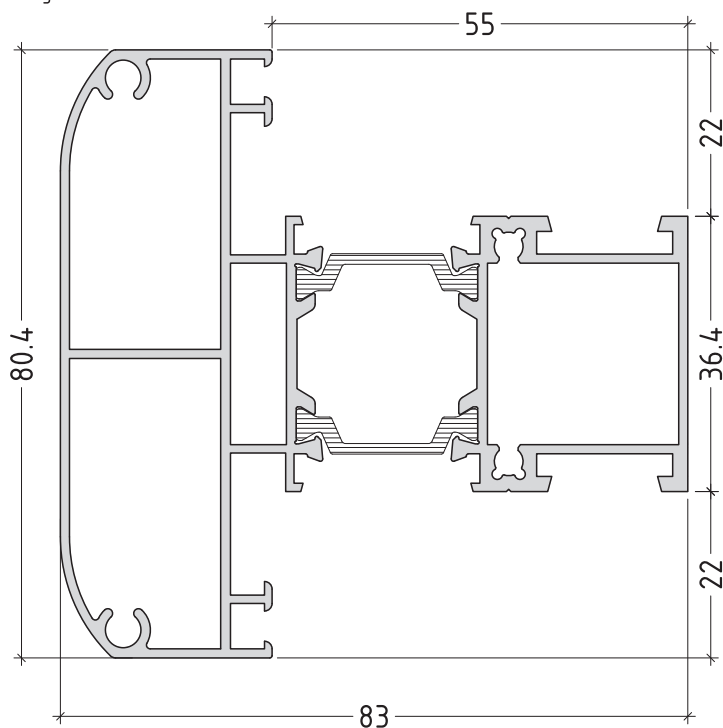
E45304
1664 g/m



E45350
1472 g/m



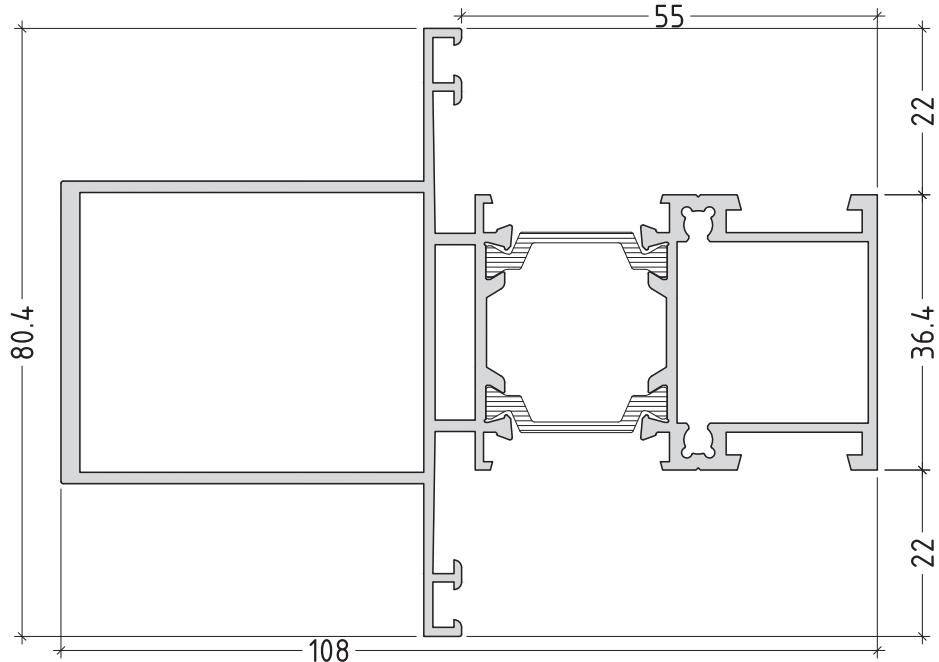
E45351
1872 g/m



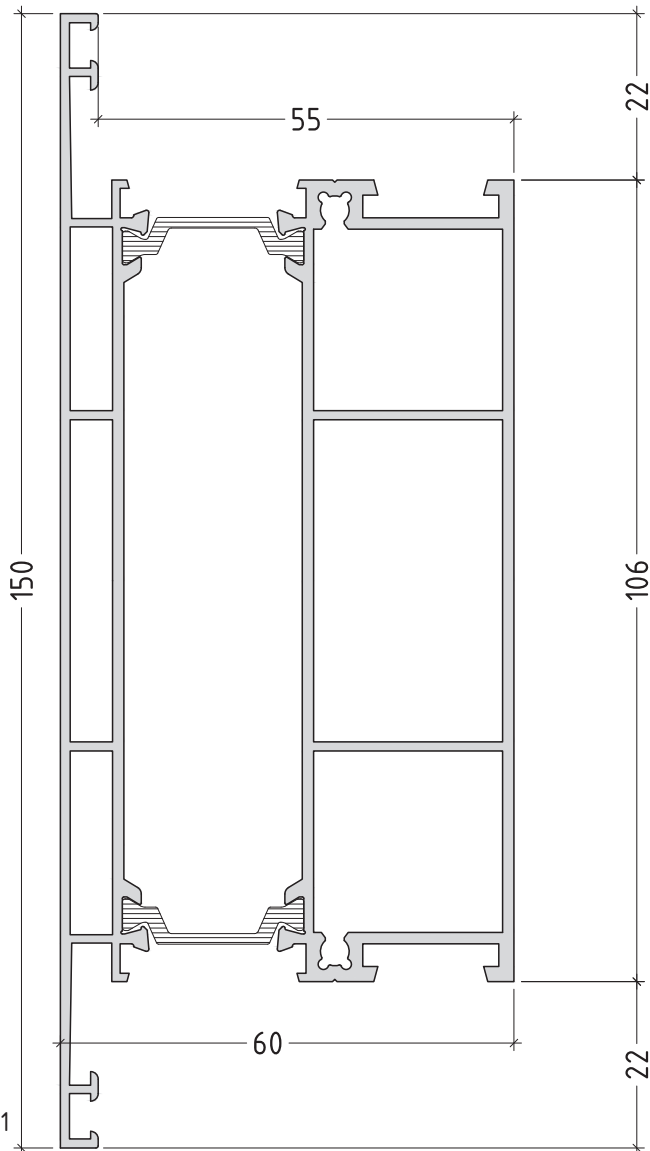
scale : 1:1

P45-12

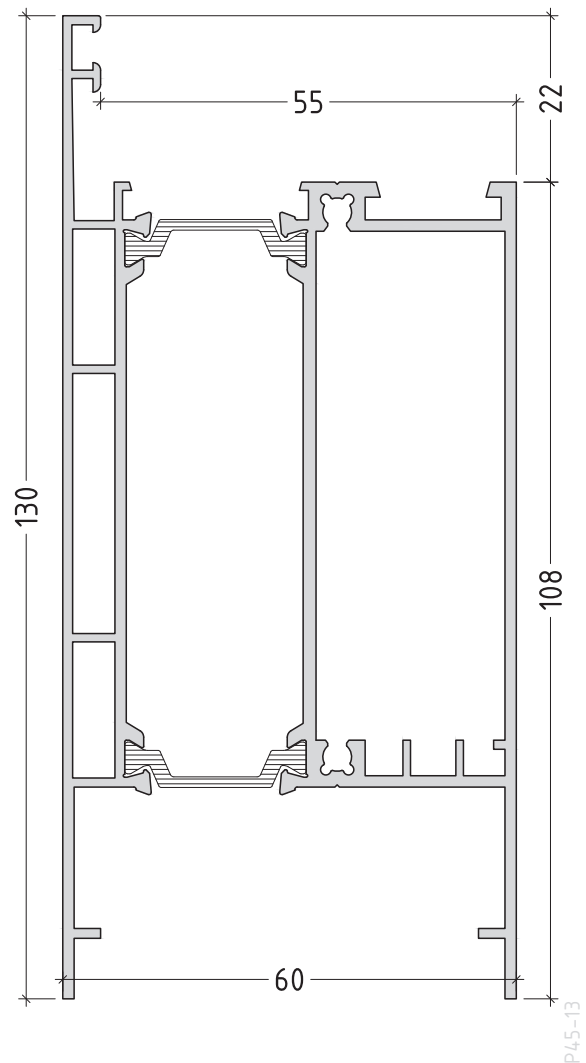
E45302
2020 g/m



E45303
2677 g/m



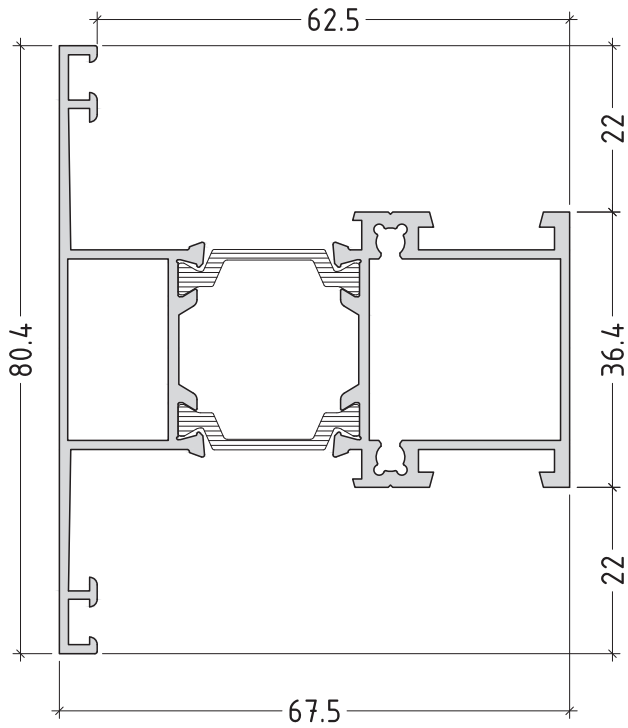
E45331
2310 g/m



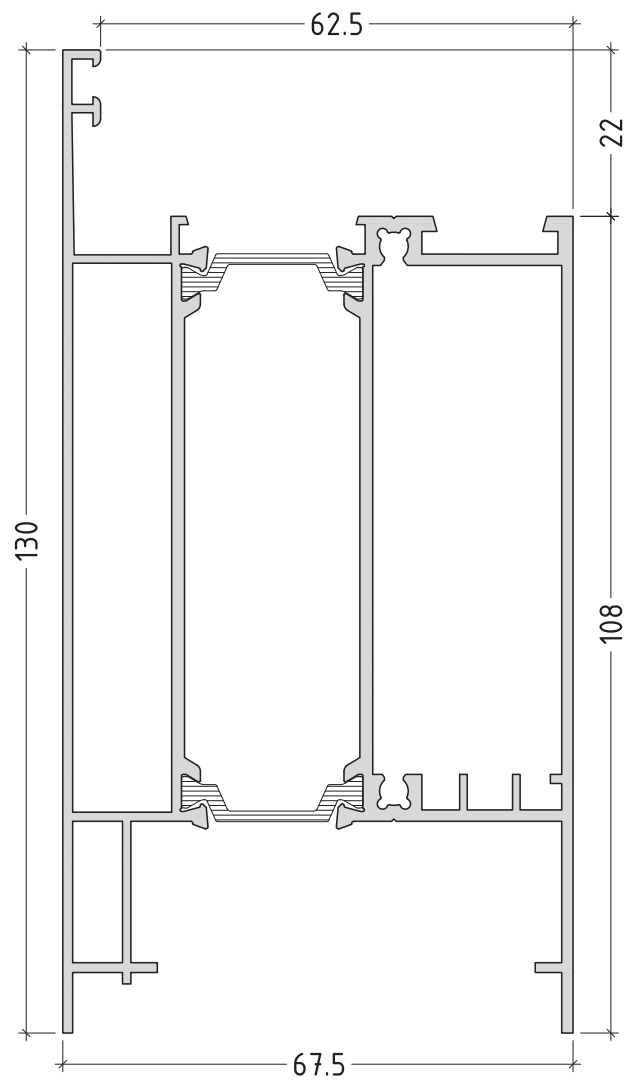
scale : 1:1

P45-13

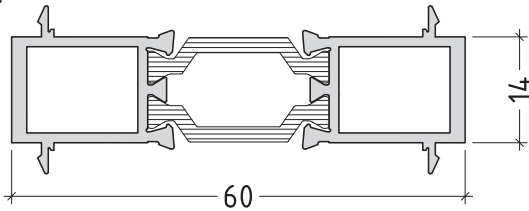
E45340
1354 g/m



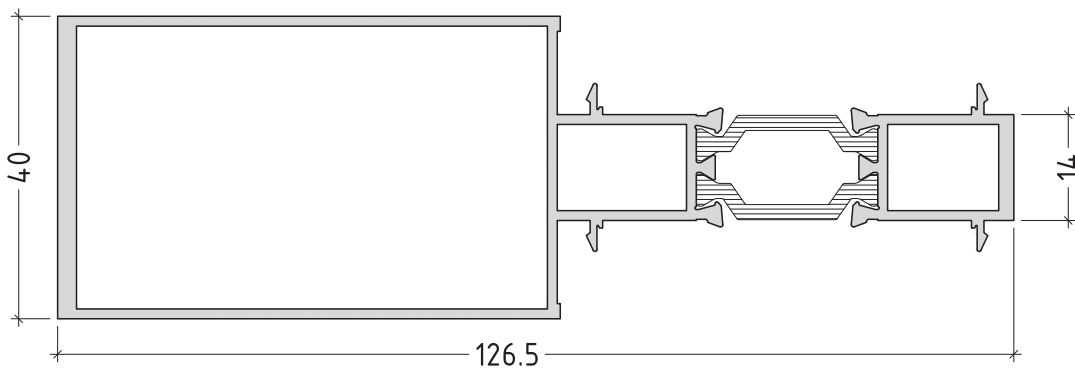
E45330
2426 g/m



E45655
756 g/m



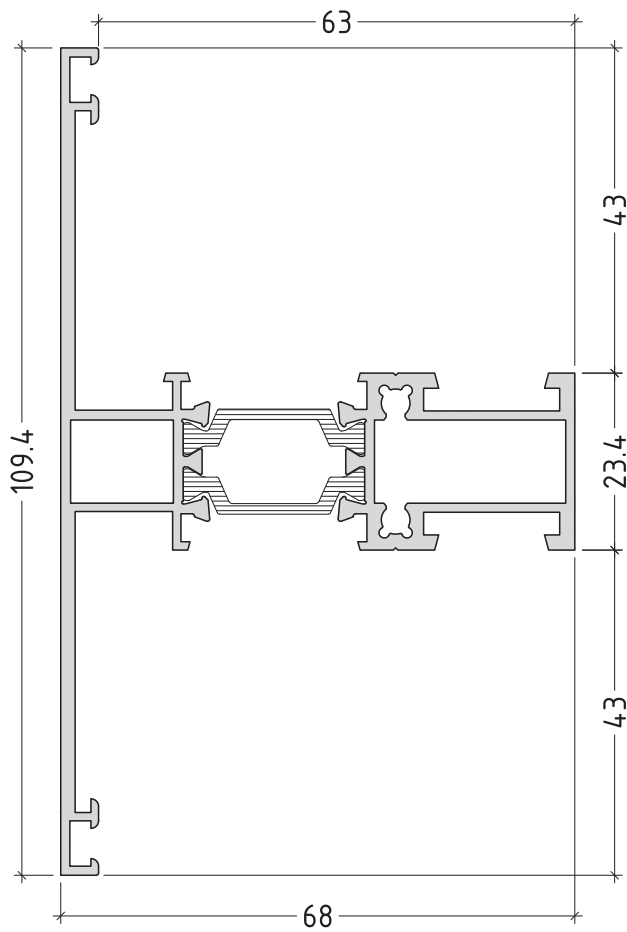
E45656
1585 g/m



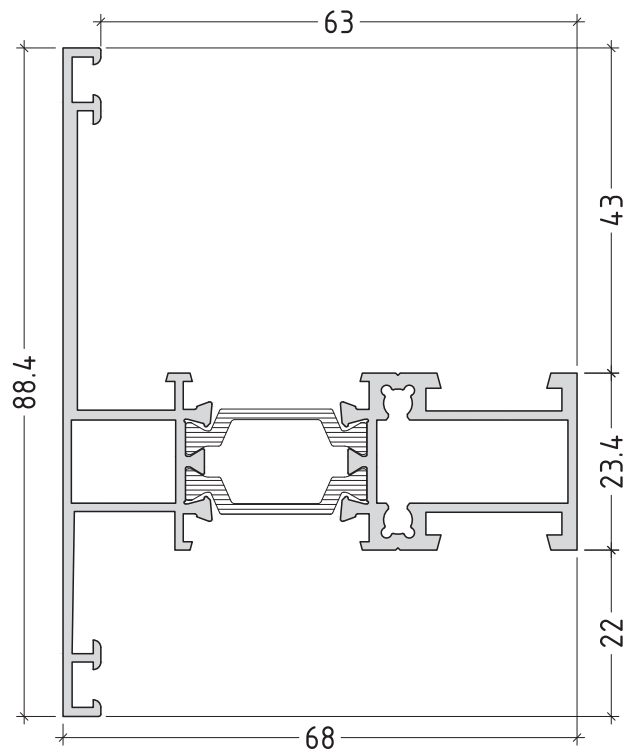
scale : 1:1

P45-14

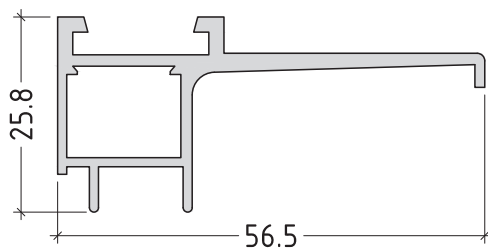
E45361 hidden vent
1487 g/m



E45360 hidden vent
1344 g/m

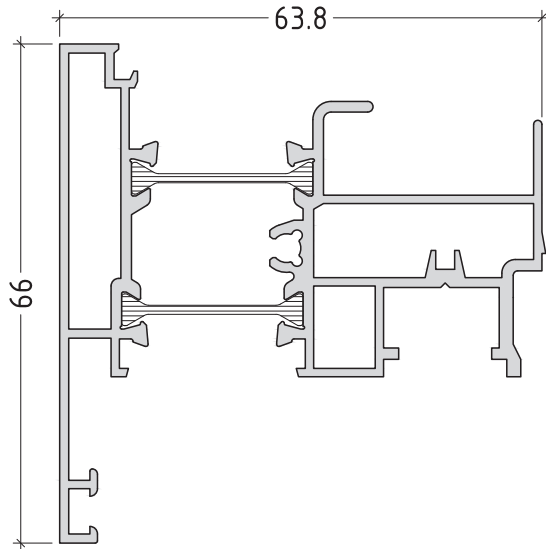


E40660
486 g/m

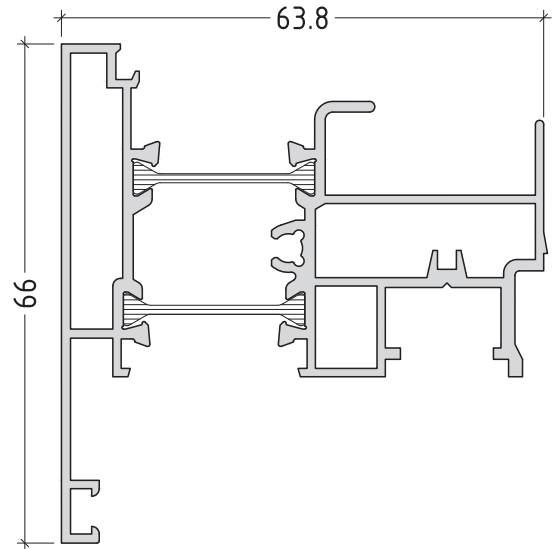


scale : 1:1

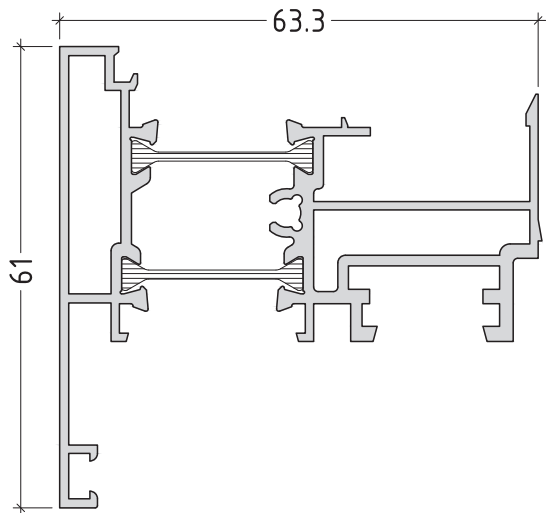
E45540 AV PVC
1287 g/m



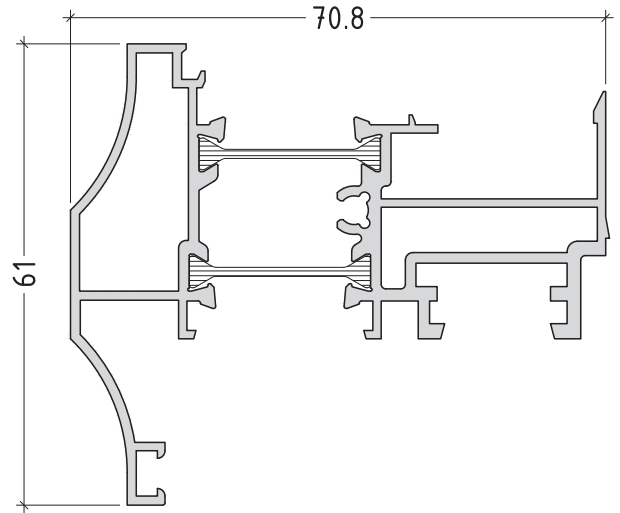
E45540 PVC
1283 g/m



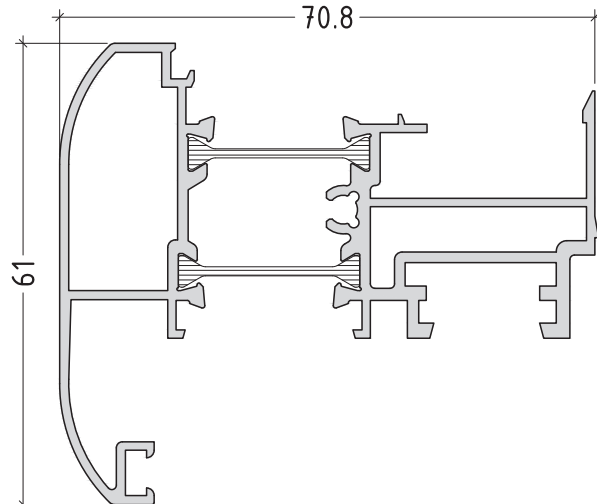
E45500
1217 g/m



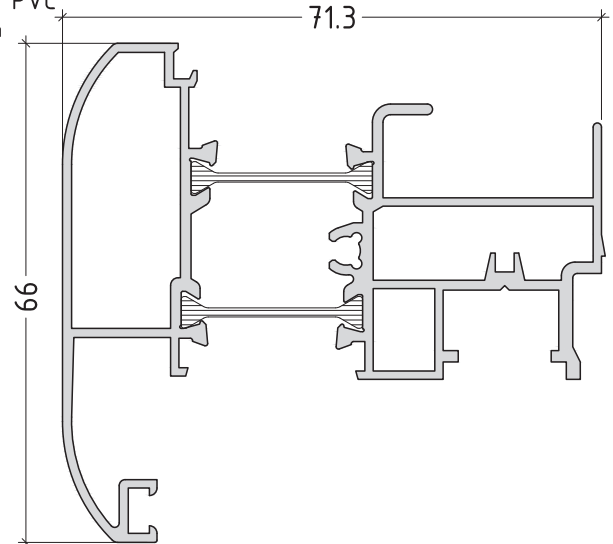
E45580
1260 g/m



E45550
1287 g/m



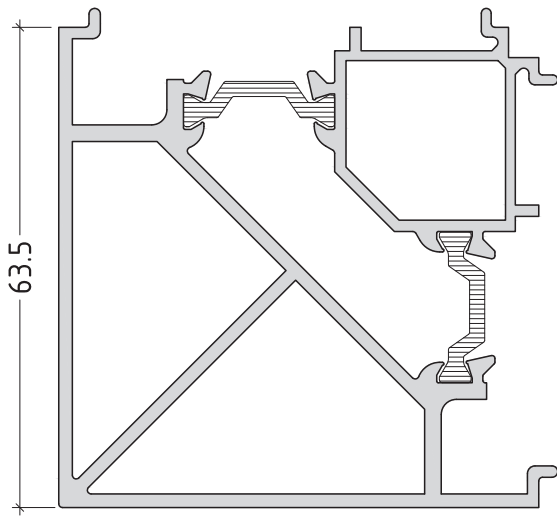
E45590 PVC
1353 g/m



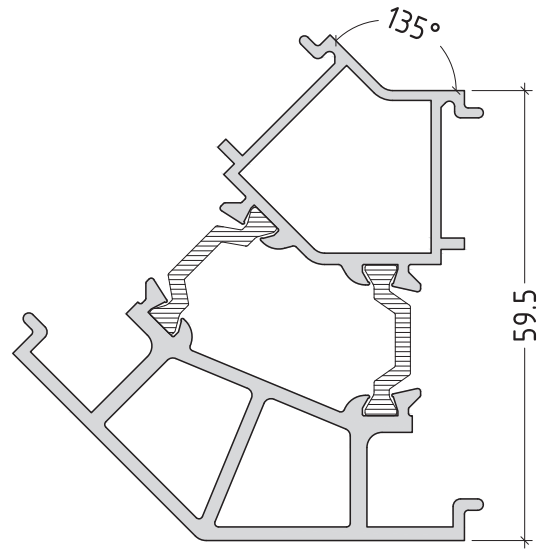
scale : 1:1

P45-16

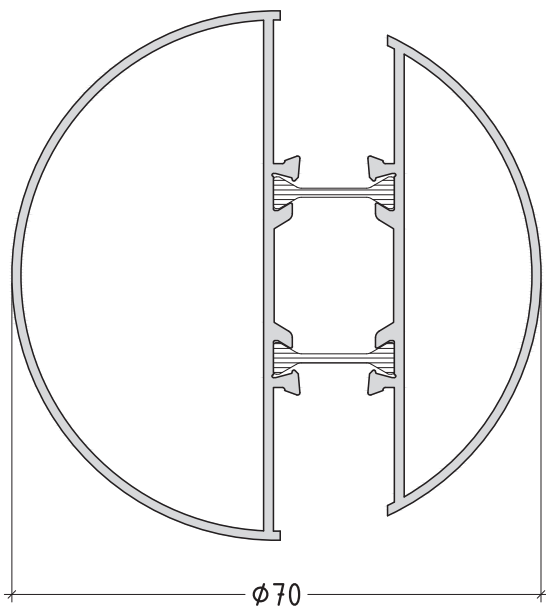
E40600
2038 g/m



E40601
1549 g/m



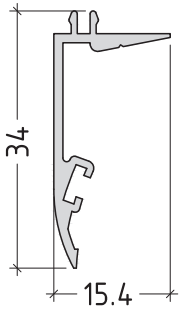
E40603
1276 g/m



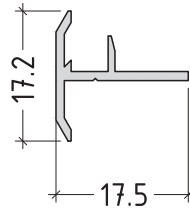
scale : 1:1

P45-17

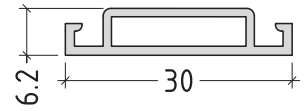
E40602
203 g/m



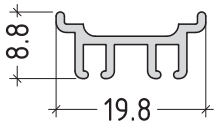
E40604
113 g/m



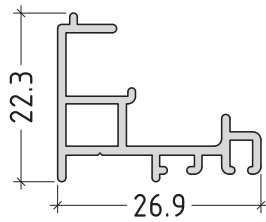
E40651
203 g/m



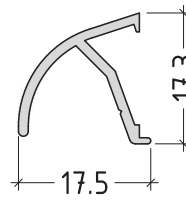
E40812
135 g/m



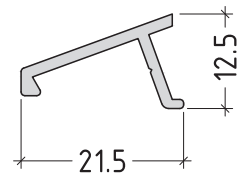
E40813
265 g/m



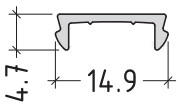
E40820
143 g/m



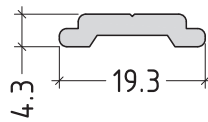
E2357
144 g/m



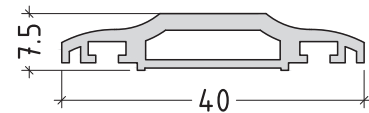
E23600
66.5 g/m



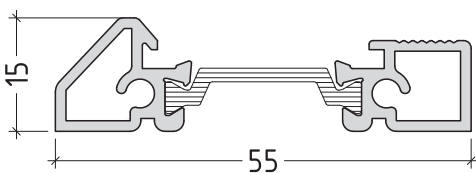
E2308
159 g/m



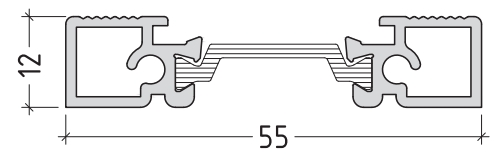
E40650
338 g/m



E45800
566 g/m



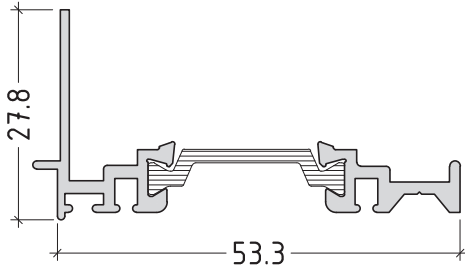
E45801
553 g/m



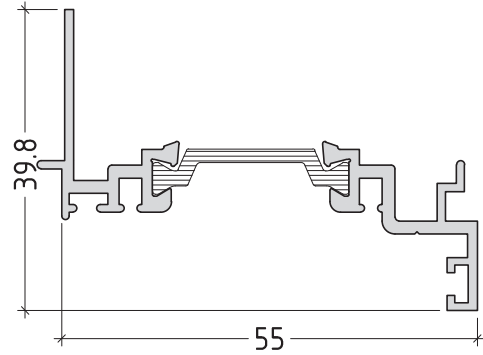
scale : 1:1

P45-18

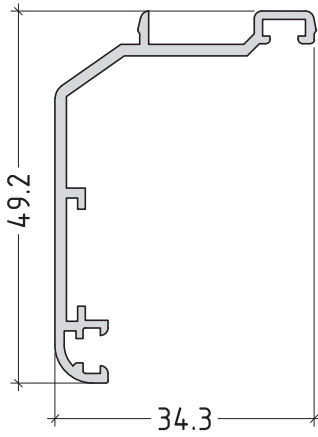
E45810
505 g/m



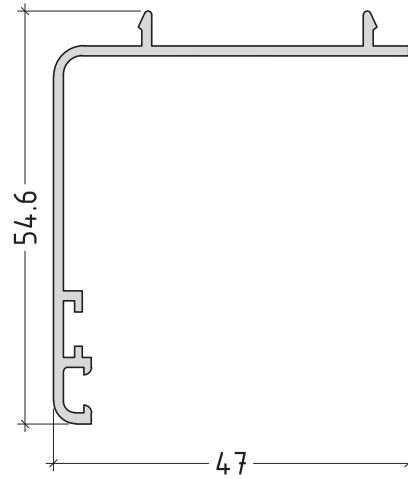
E45811
580 g/m



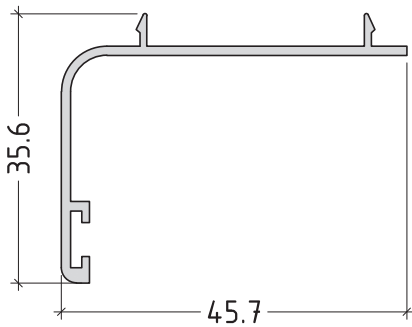
E40605
381 g/m



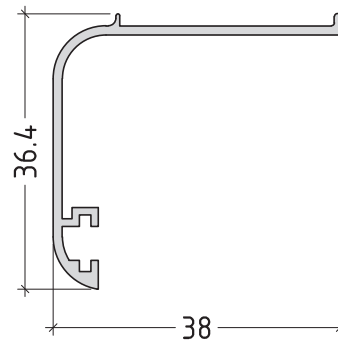
E1115
408 g/m



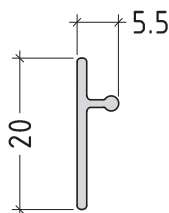
E1127
288 g/m



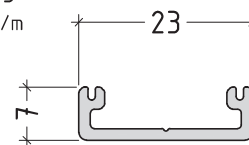
E5366
269 g/m



E62600
84.5 g/m

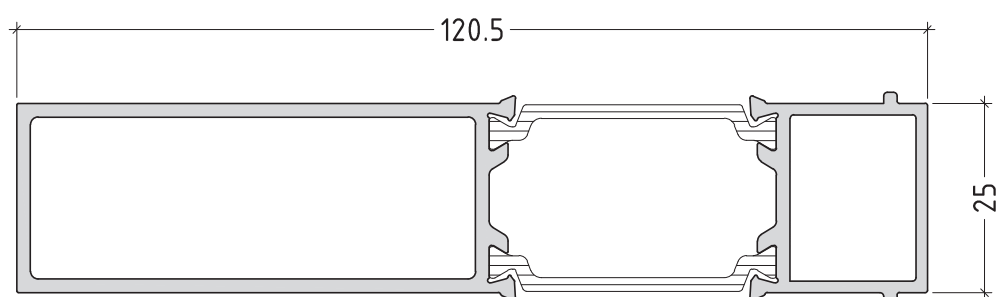


E40995
155.4 g/m



scale : 1:1

E50690
1550 g/m



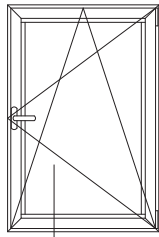
scale : 1:1

P45-20

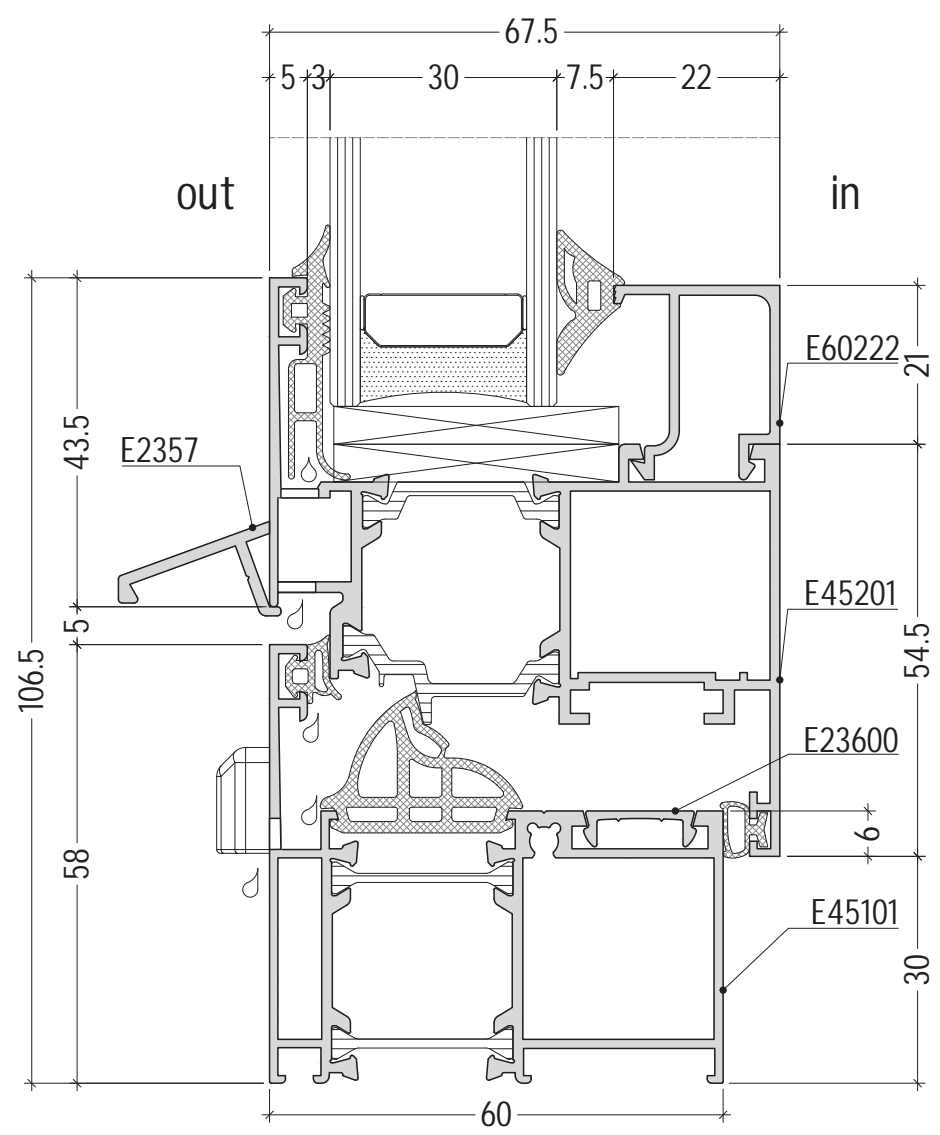
SECTIONS

SECTIONS / DETAILS

inward opening

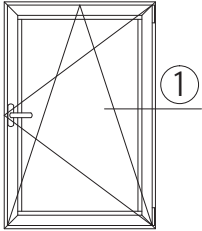


①

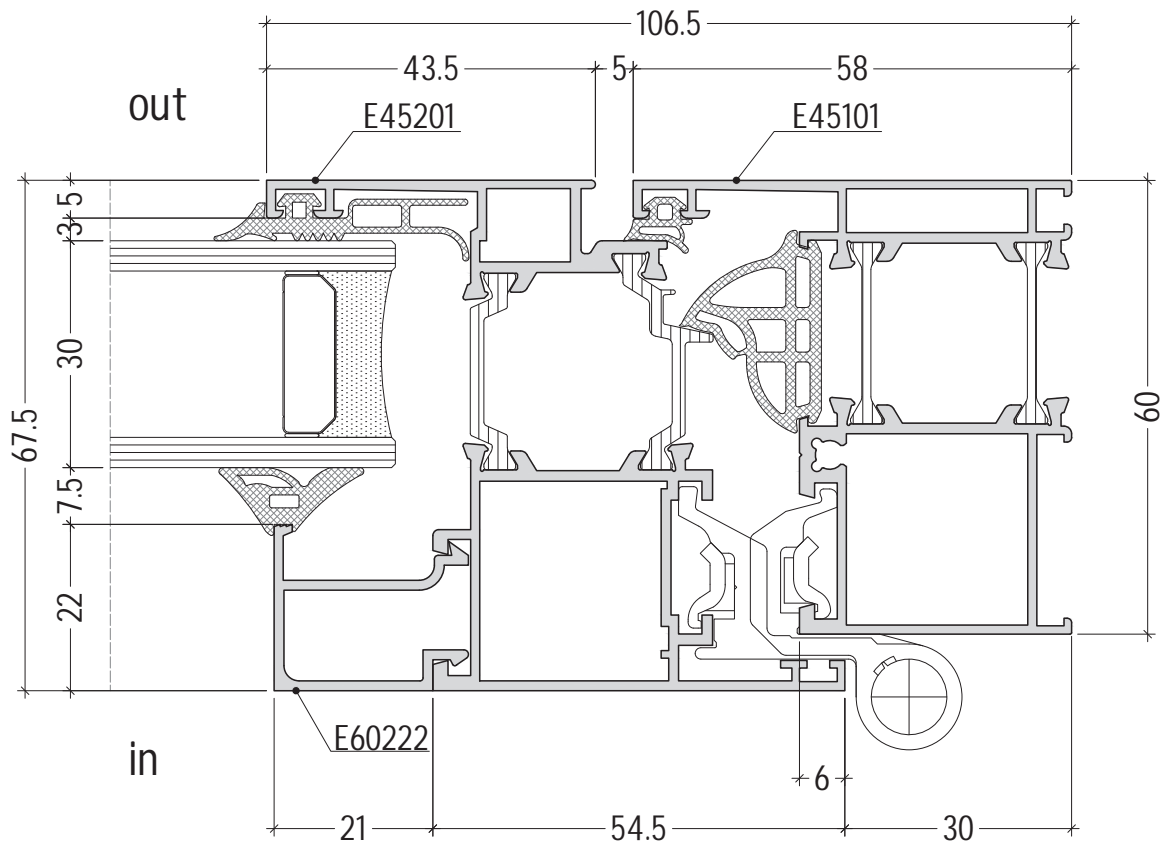


scale : 1:1

inward opening



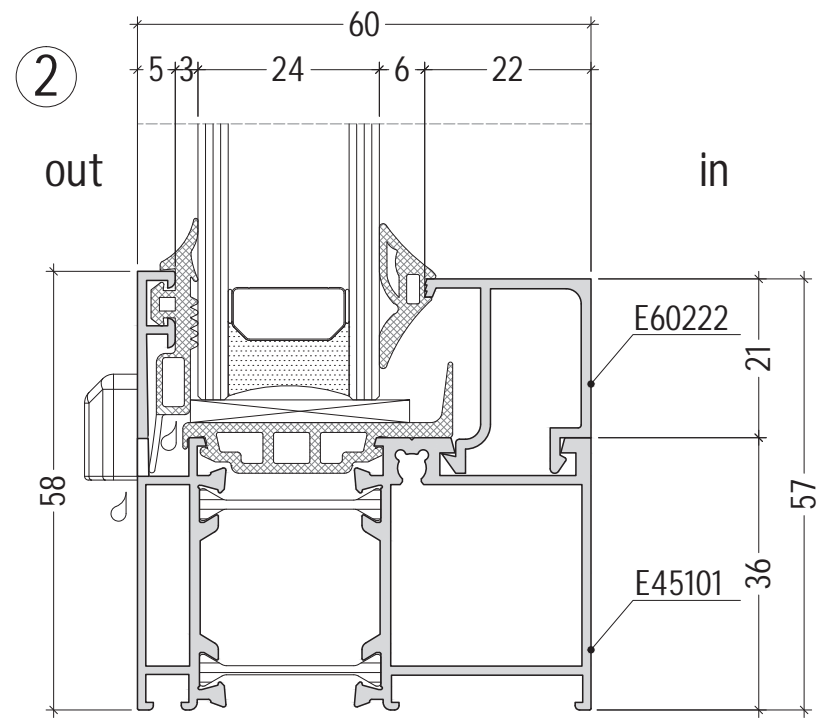
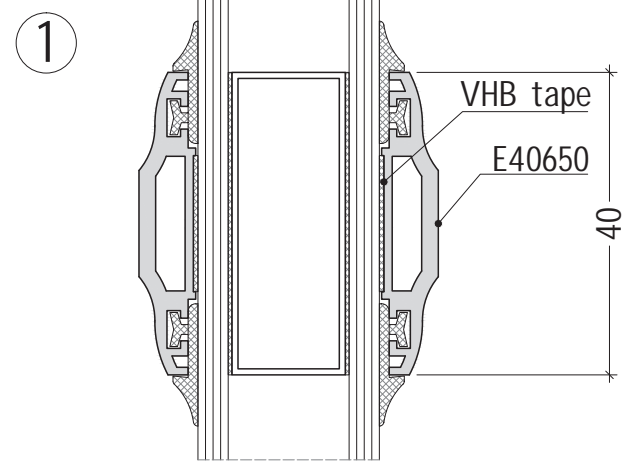
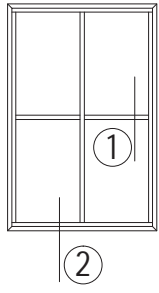
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scale : 1:1

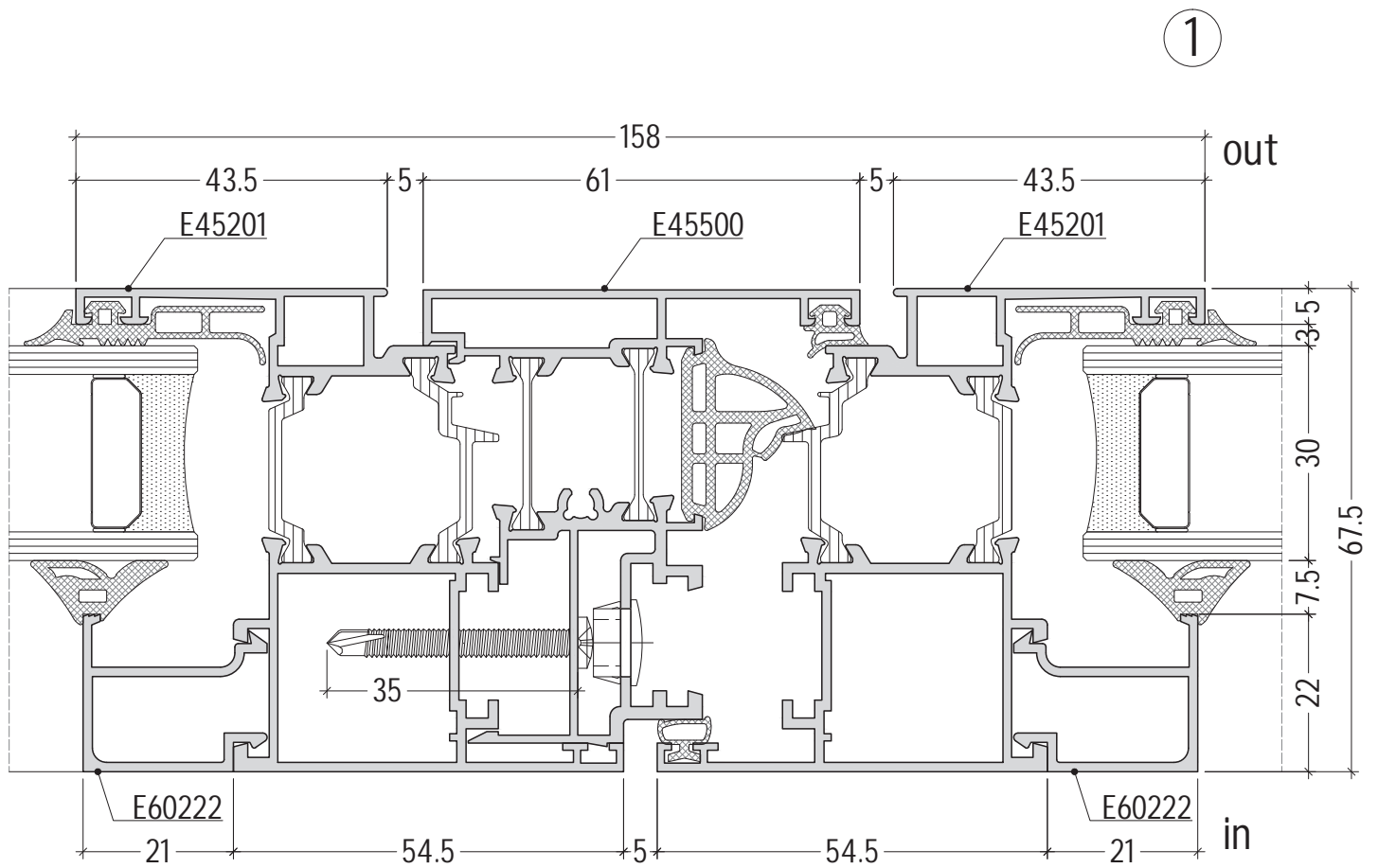
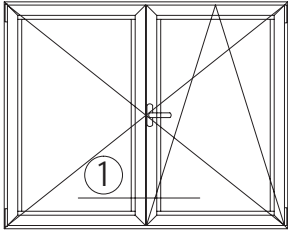
D45-02

fix
position



scale : 1:1

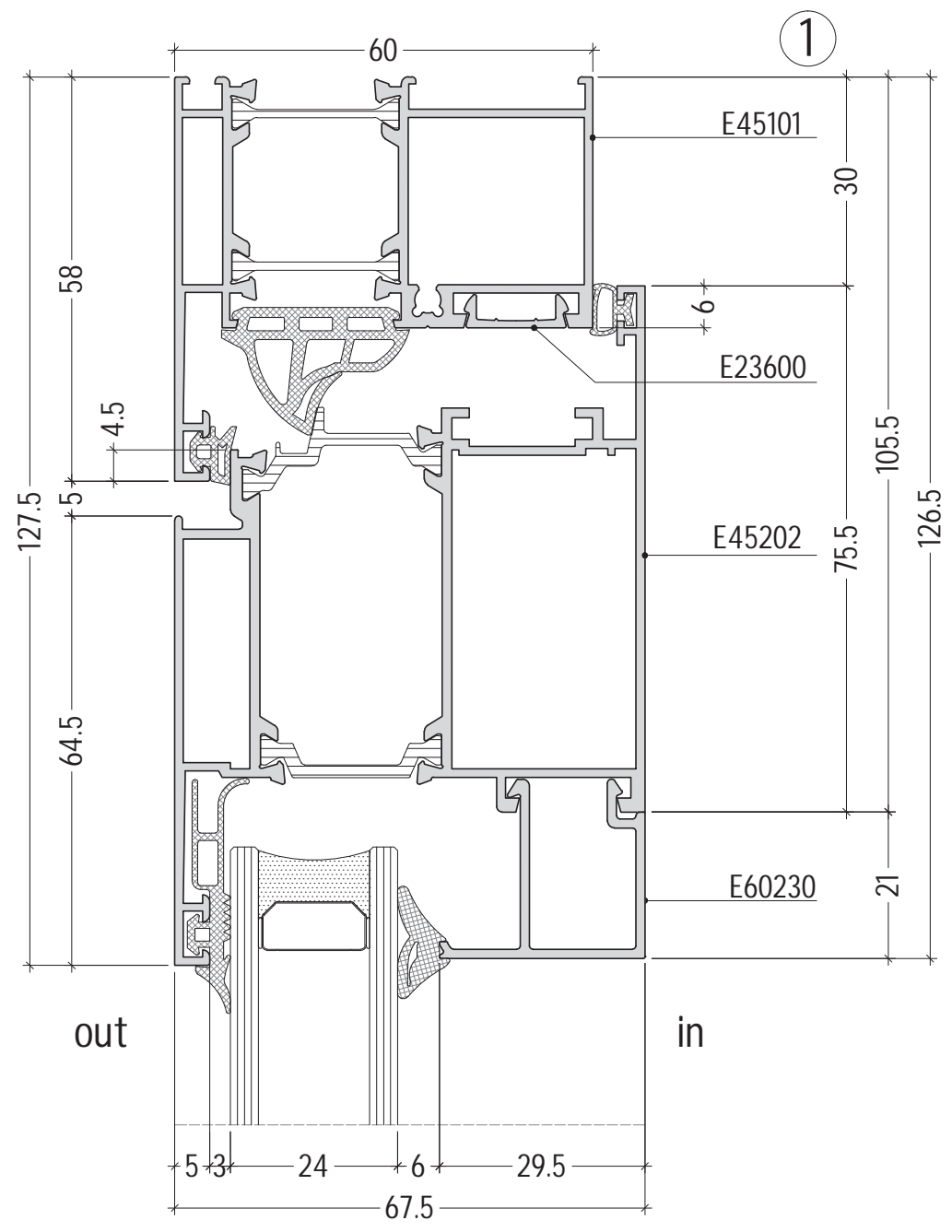
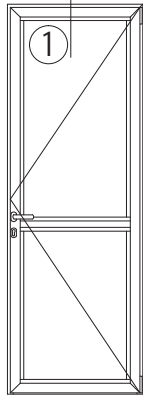
inward opening



scale : 1:1

D45-04

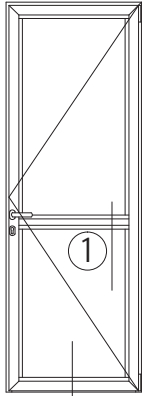
inward opening



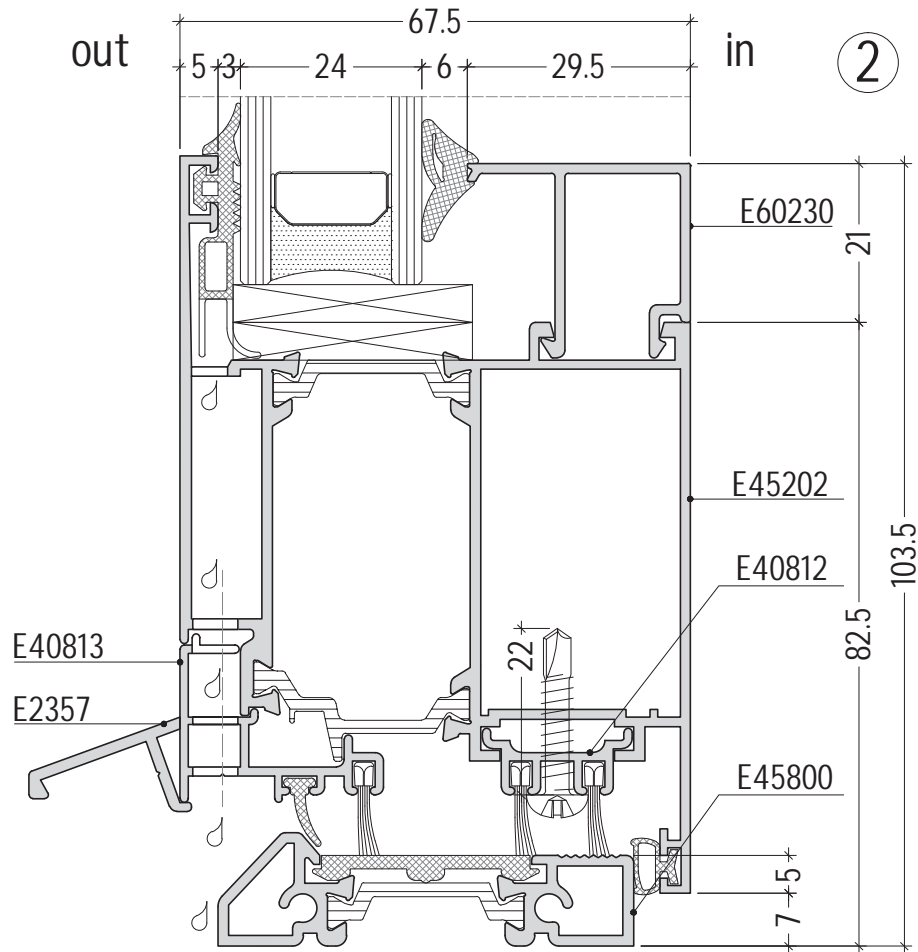
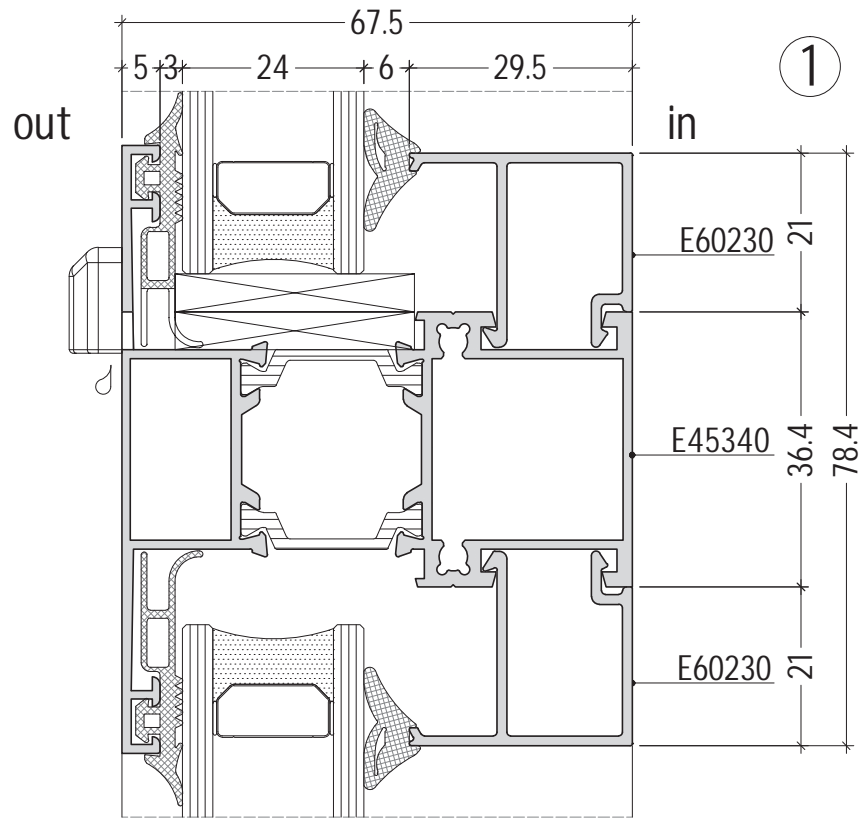
scale : 1:1

D45-05

inward opening



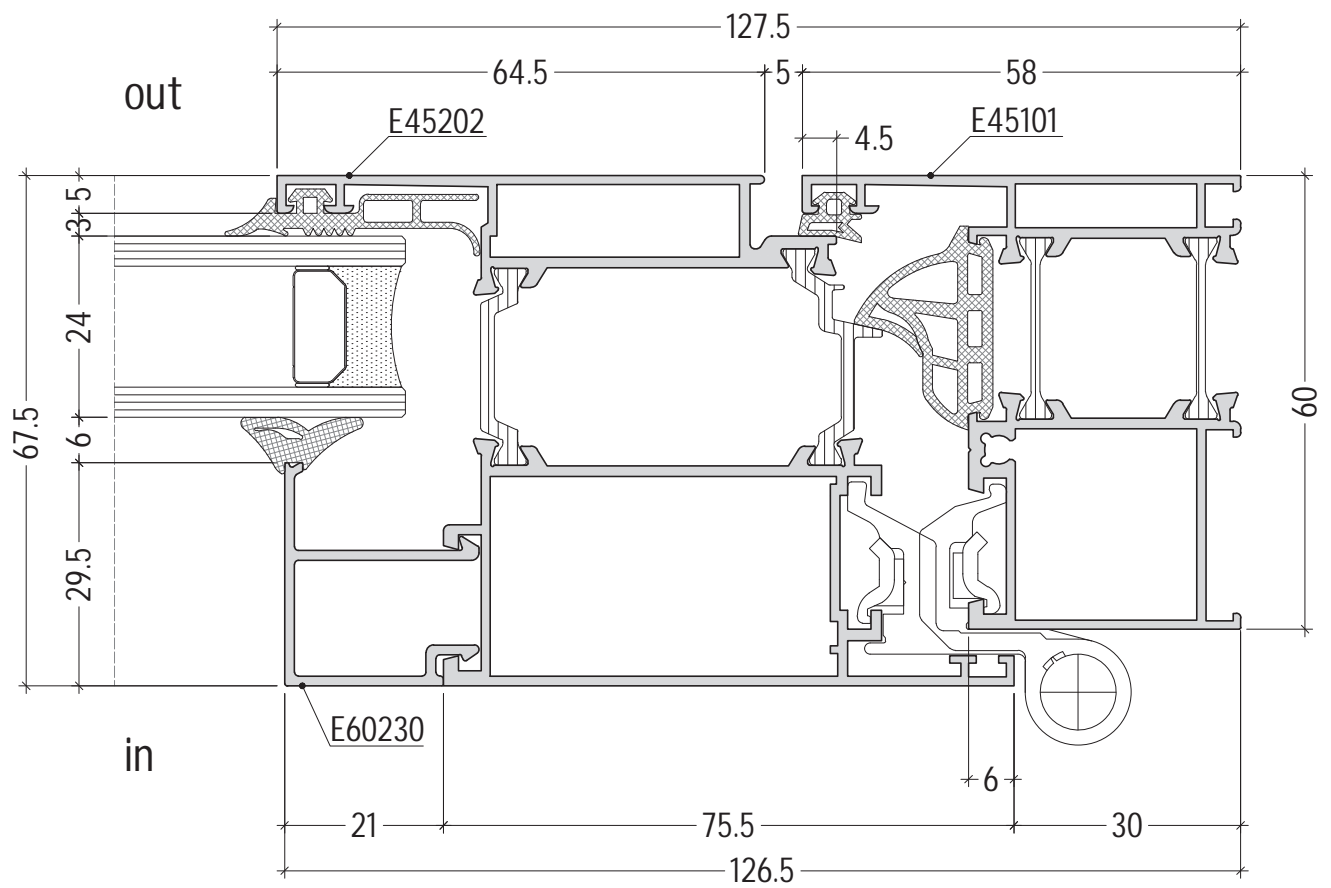
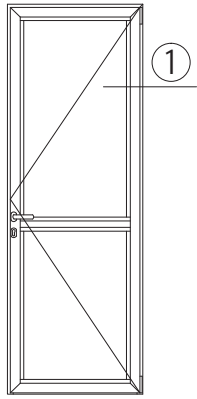
②



scale : 1:1

D45-06

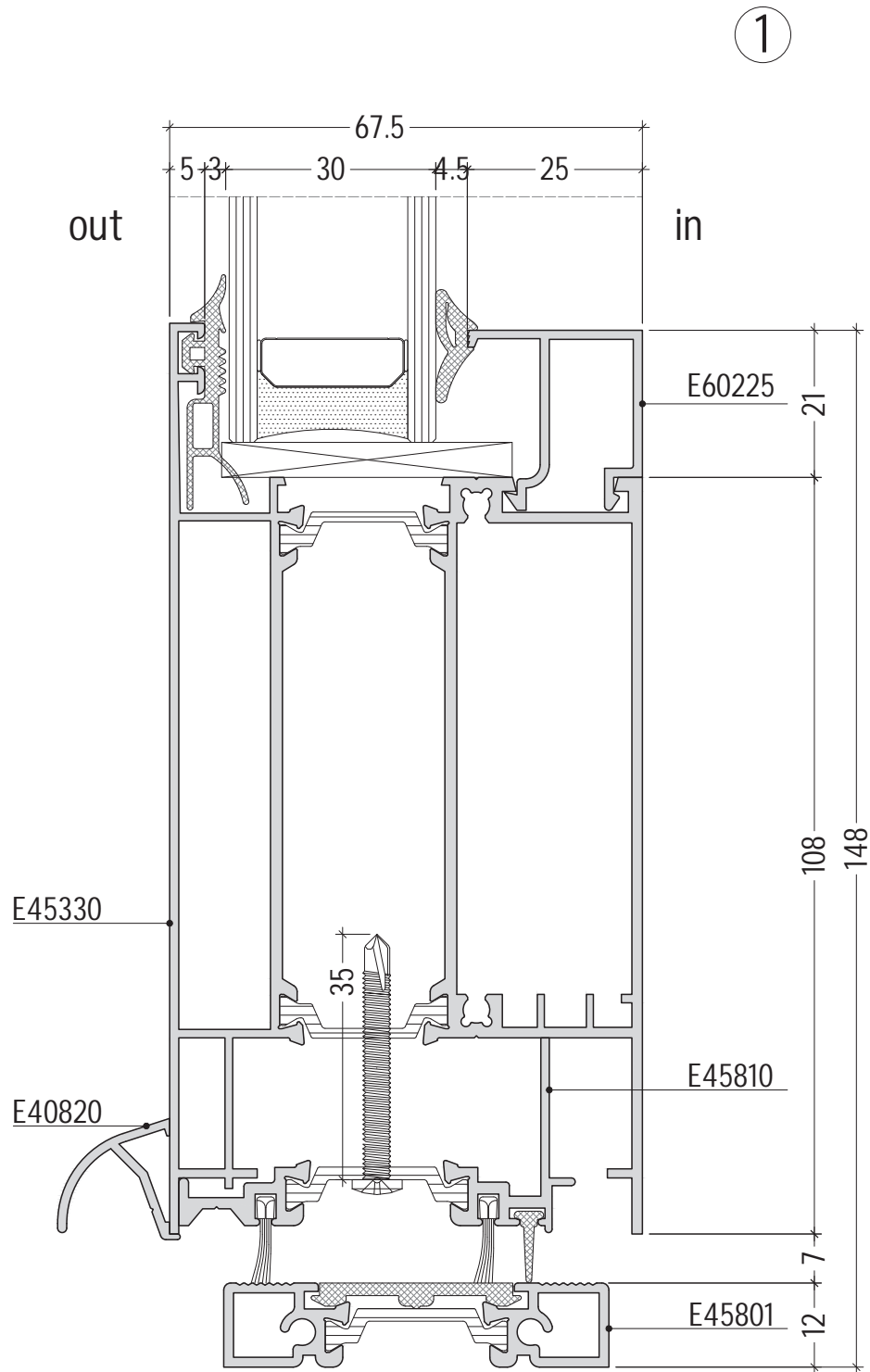
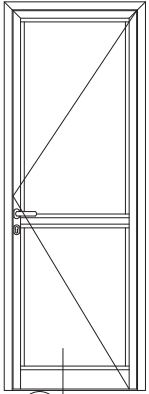
inward opening



scale : 1:1

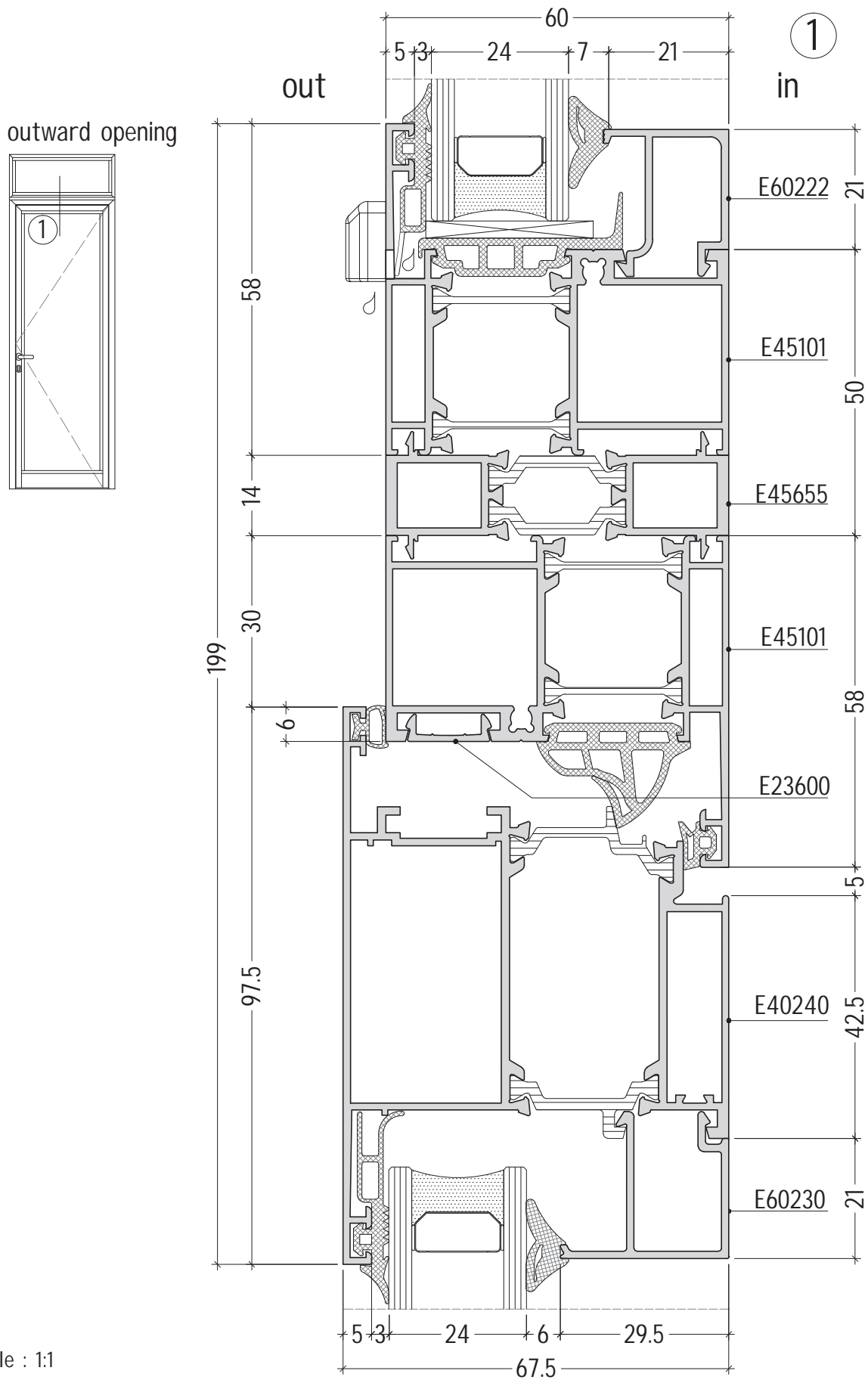
D45-07

inward opening



scale : 1:1

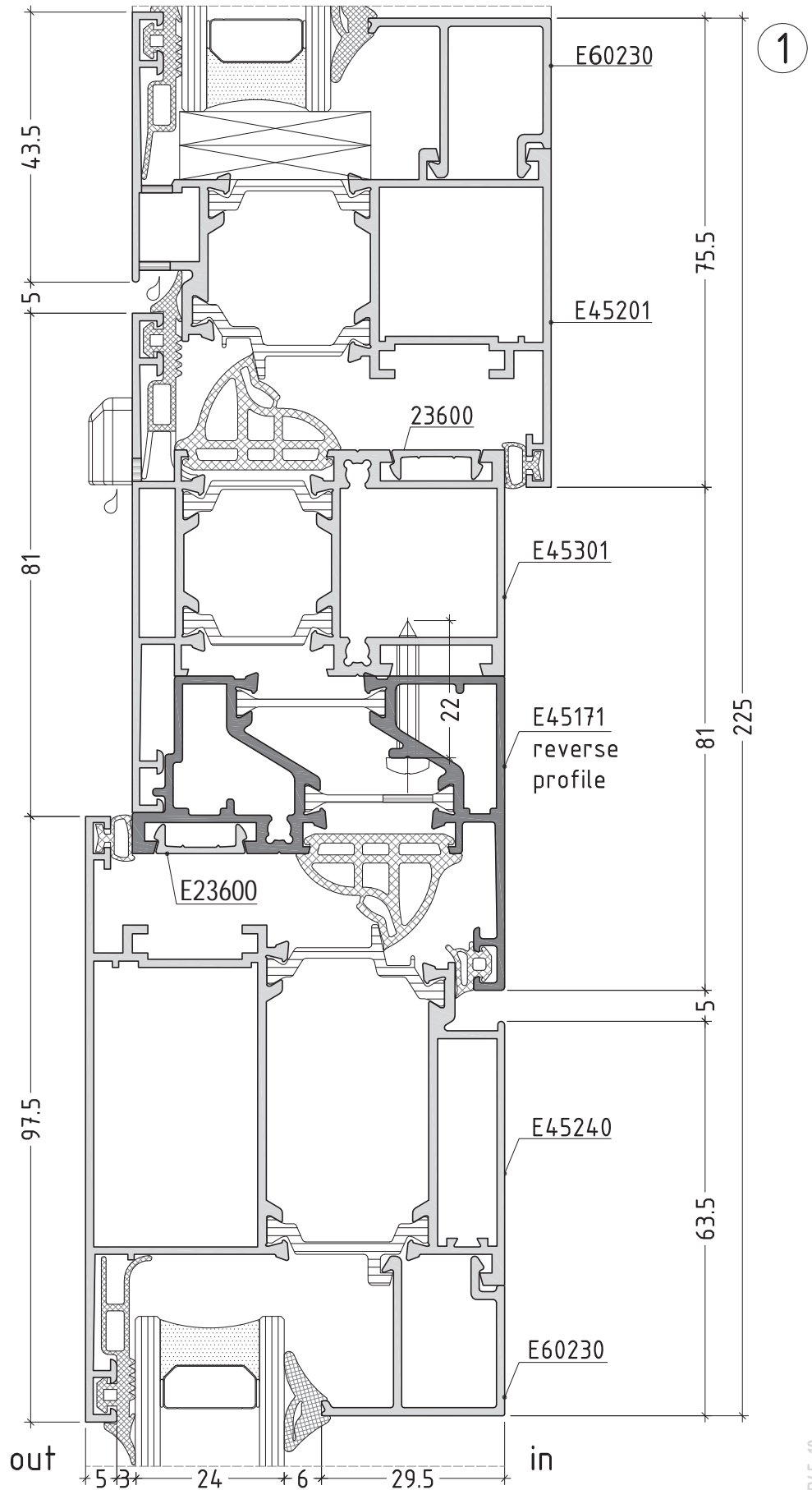
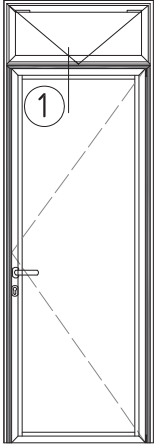
D45-08



scale : 1:1

D45-09

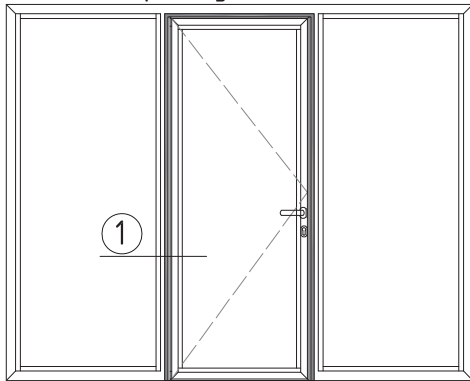
outward opening



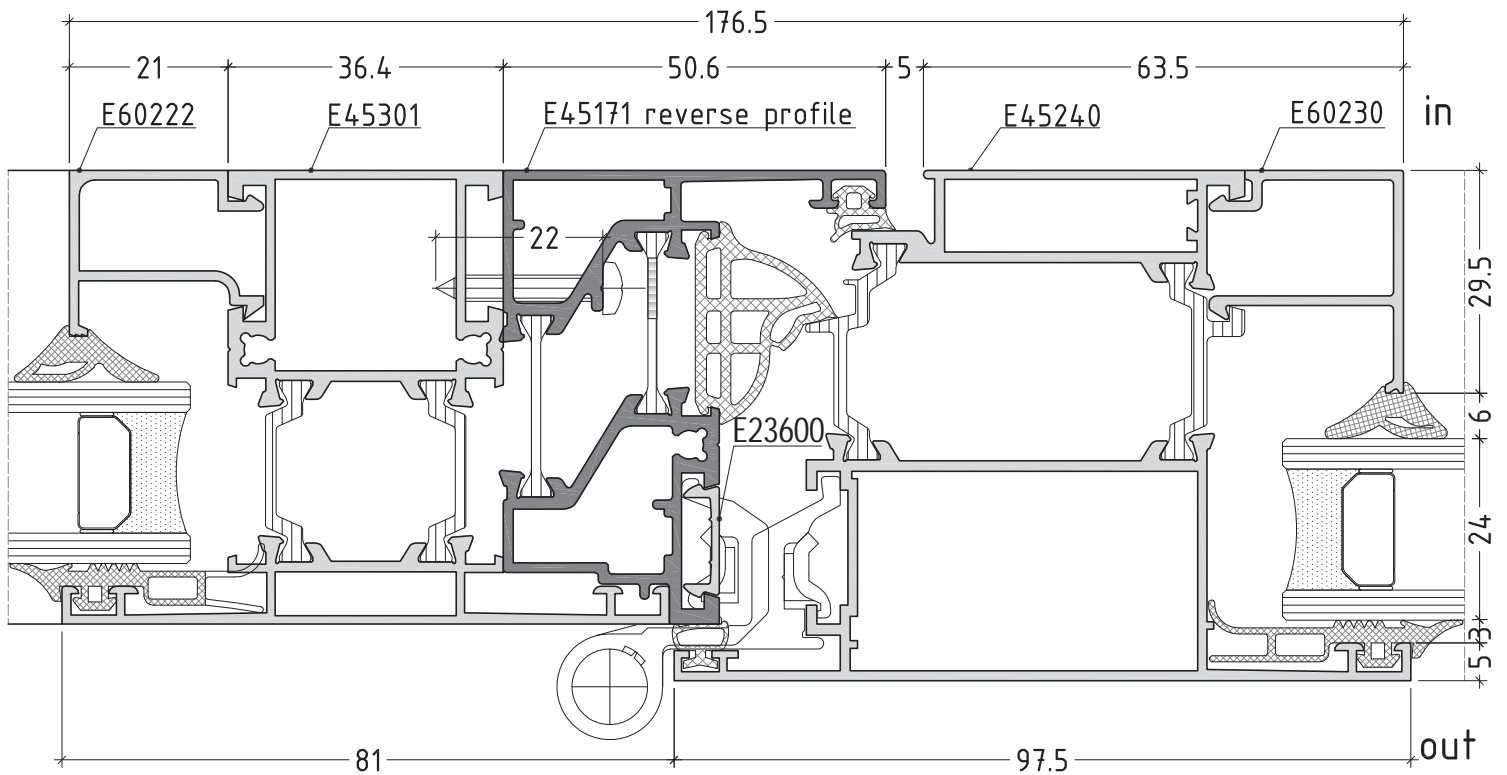
scale : 1:1

D45-10

outward opening



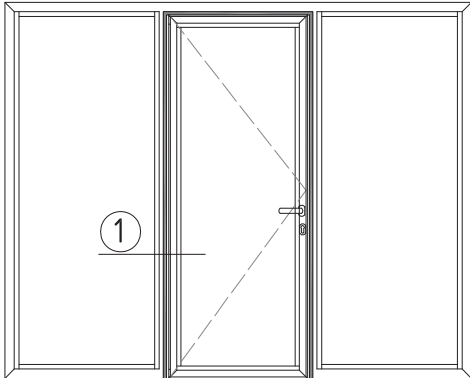
1



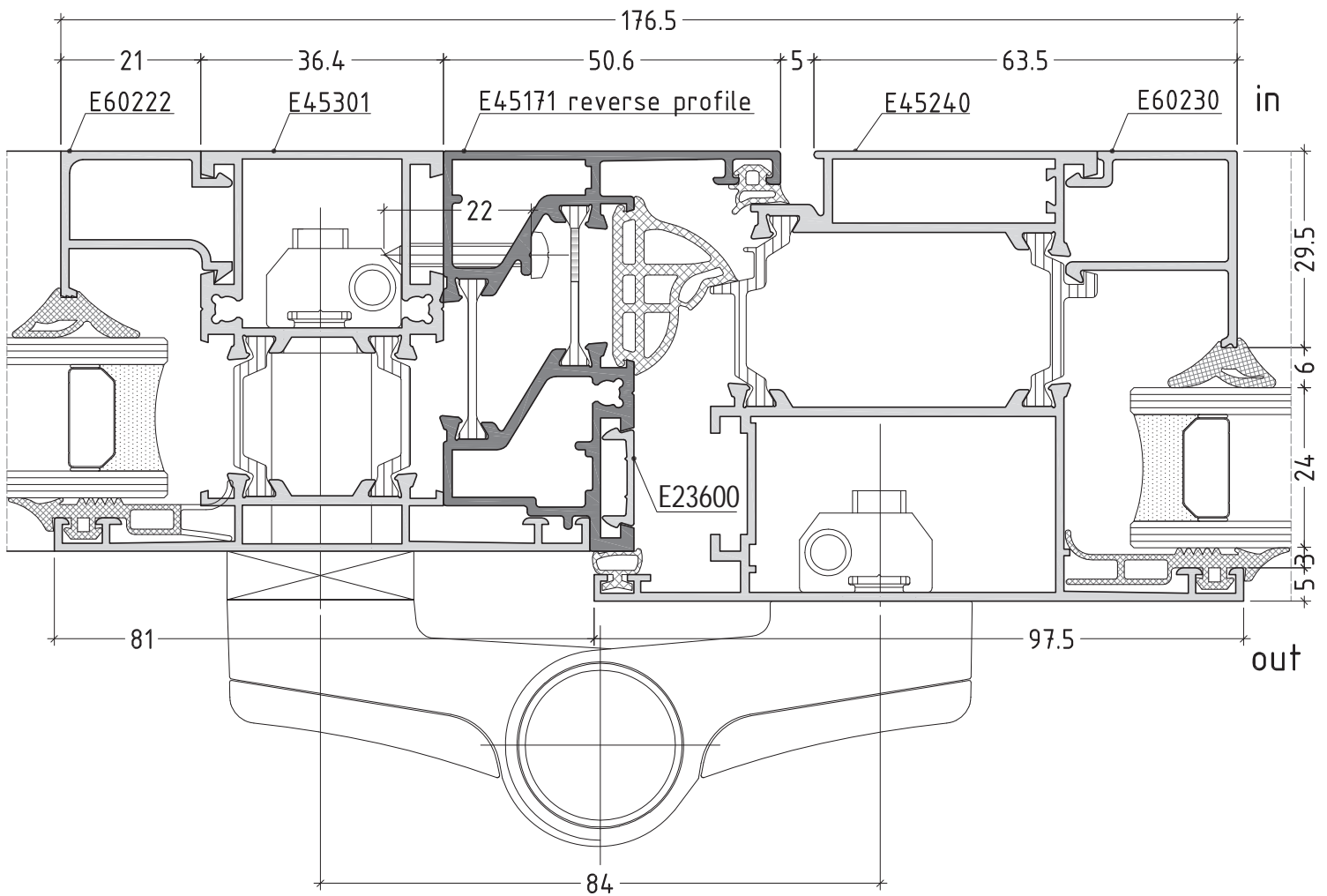
scale : 1:1

D45-11

outward opening



1

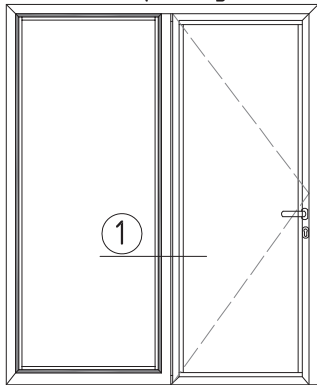


When the hinge and reverse profile are inside the openable part, the distance between axes of hinges has to be 84 mm

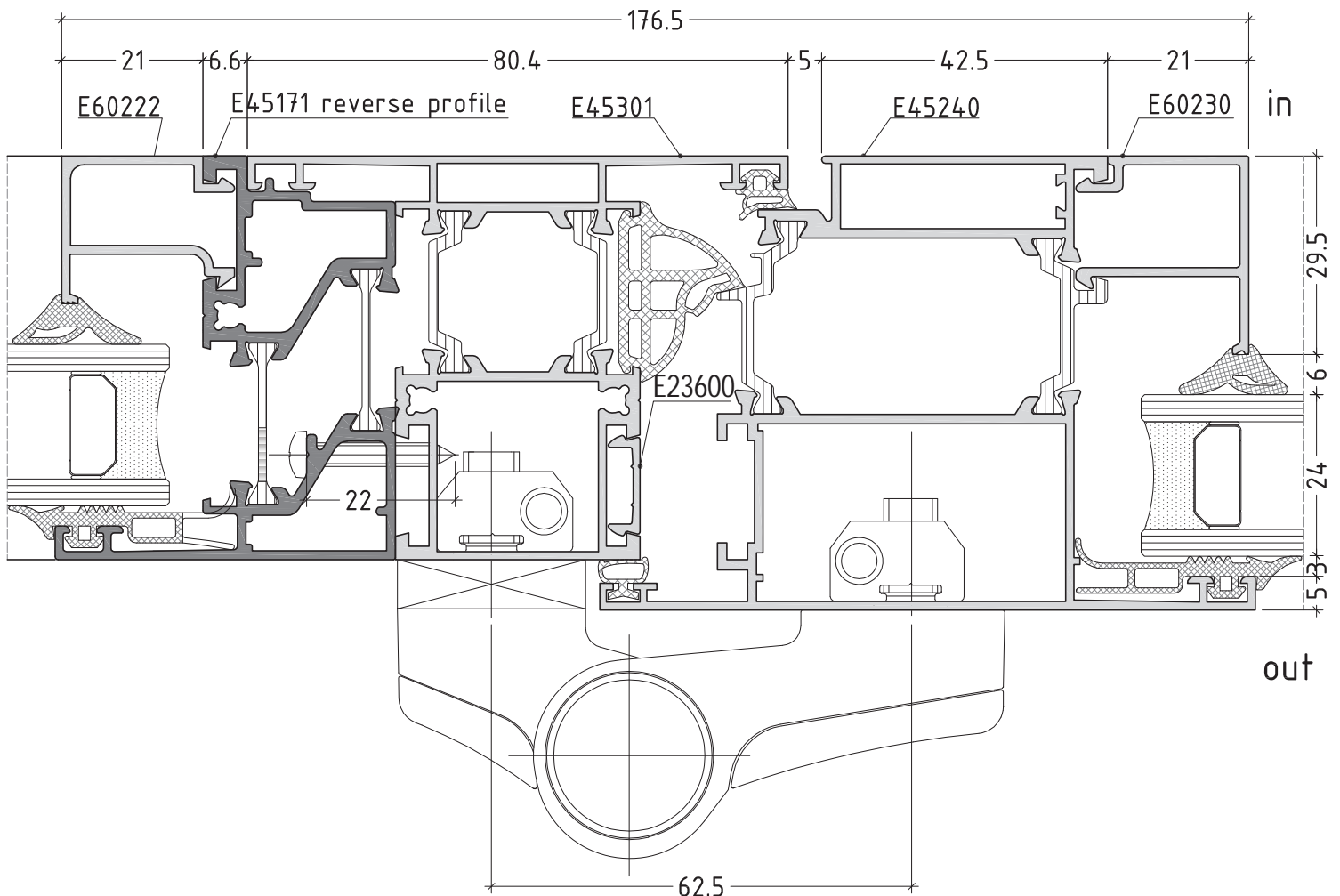
scale : 1:1

D45-12

outward opening



1

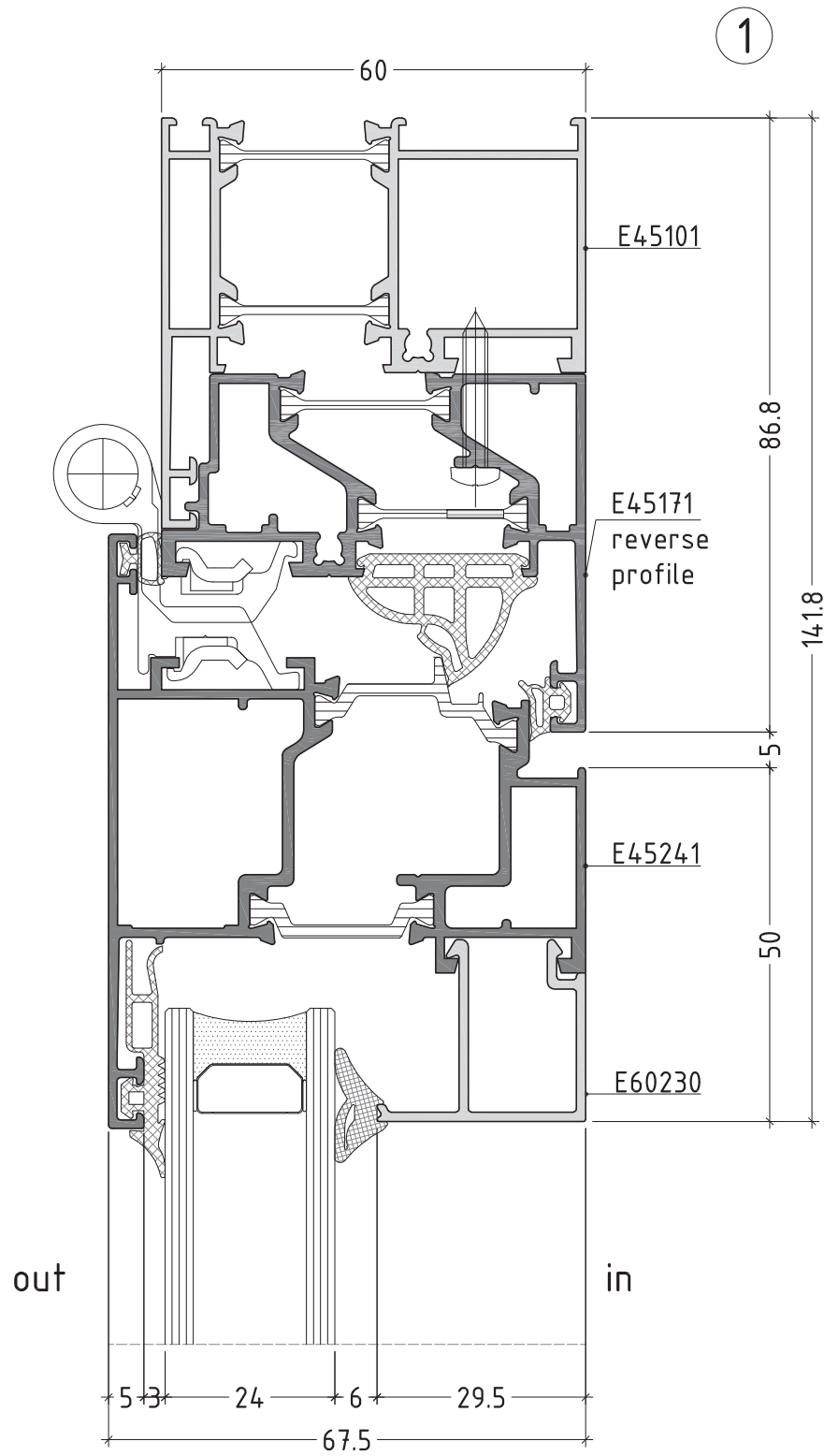
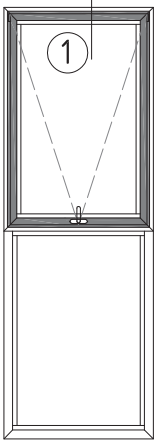


When the hinge and reverse profile are inside the fixed part, the distance between axes of hinges has to be 62,5 mm

scale : 1:1

D45-13

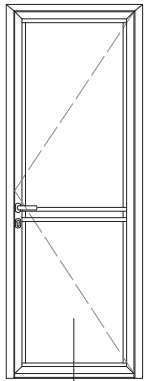
outward opening



scale : 1:1

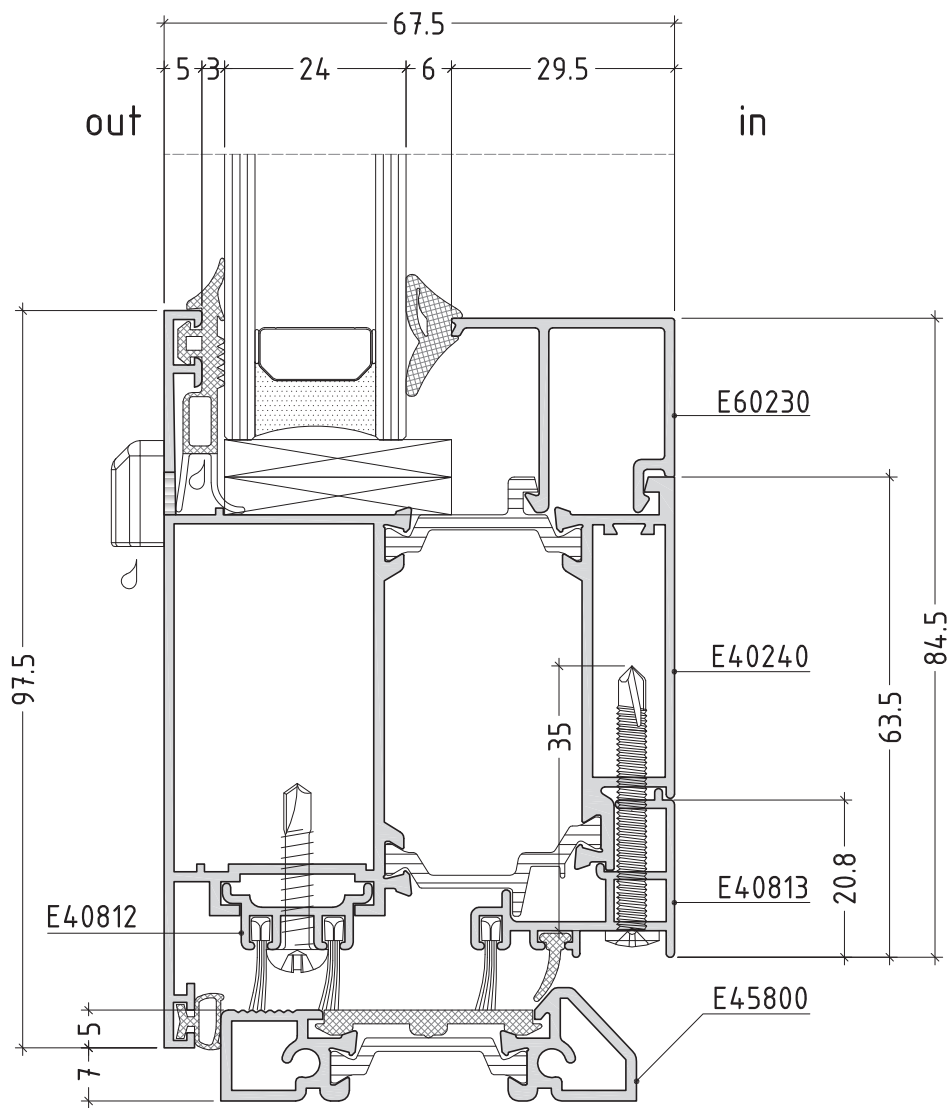
D45-14

outward opening



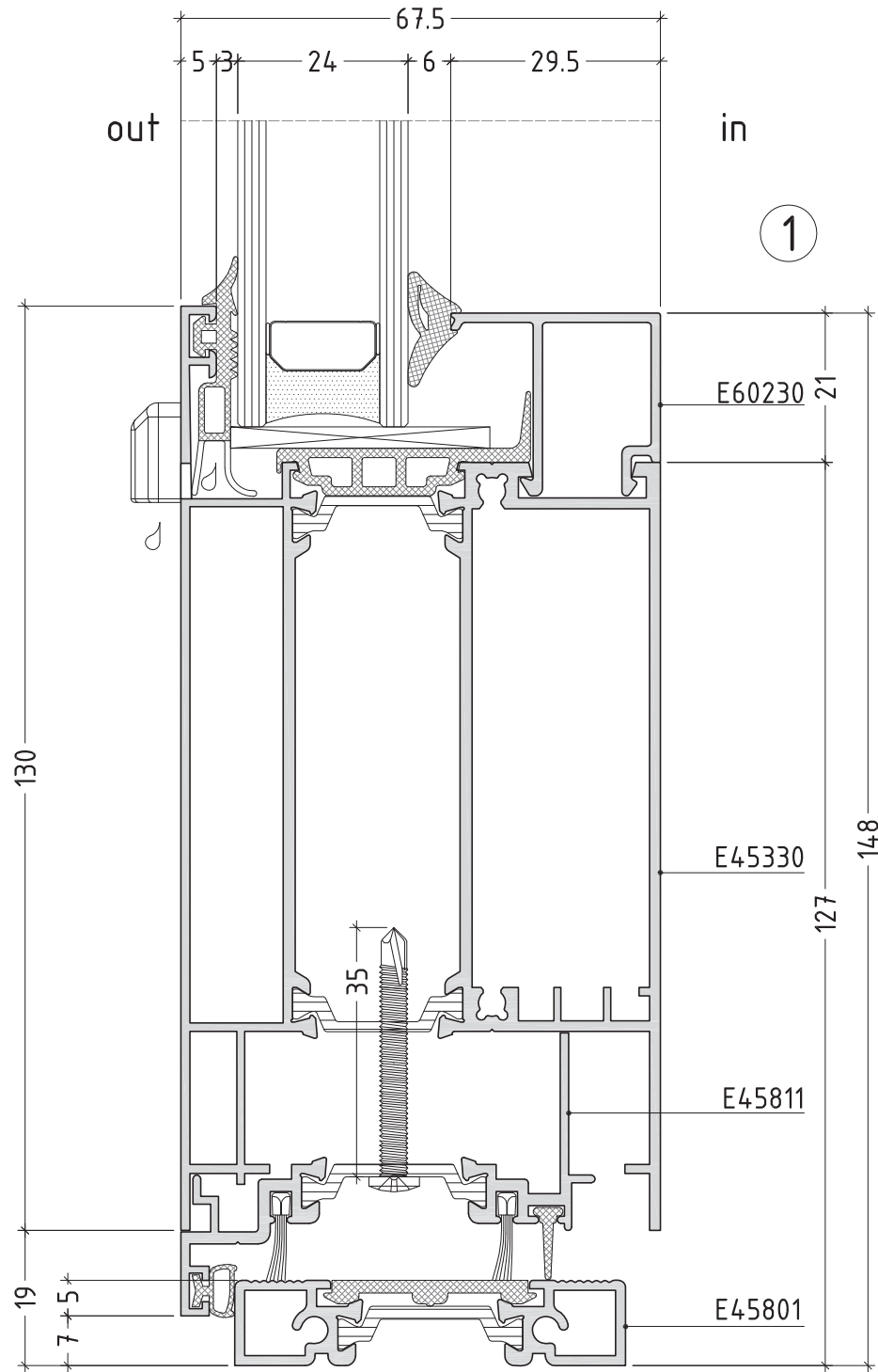
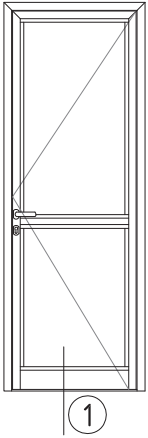
①

①



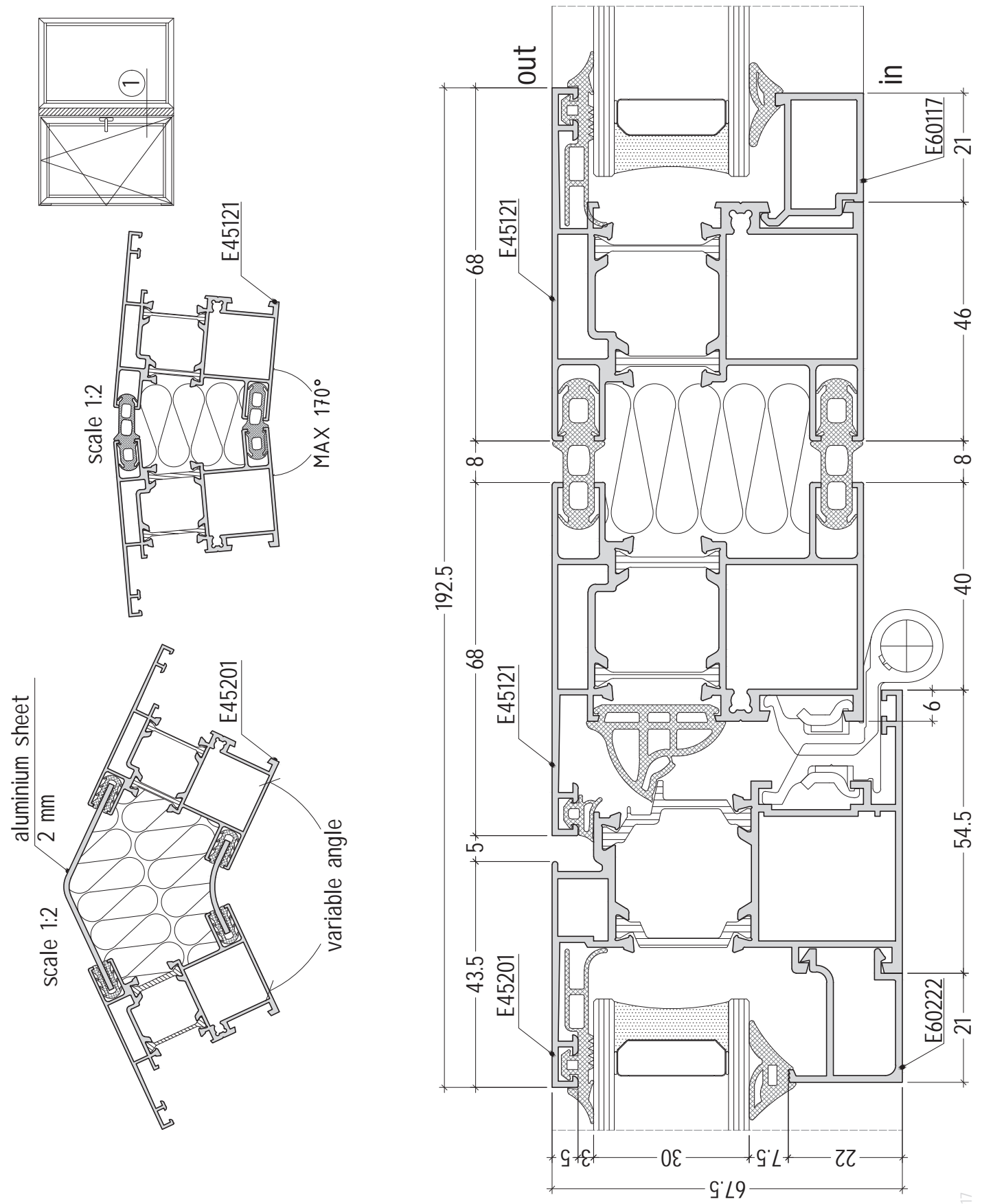
scale : 1:1

outward opening



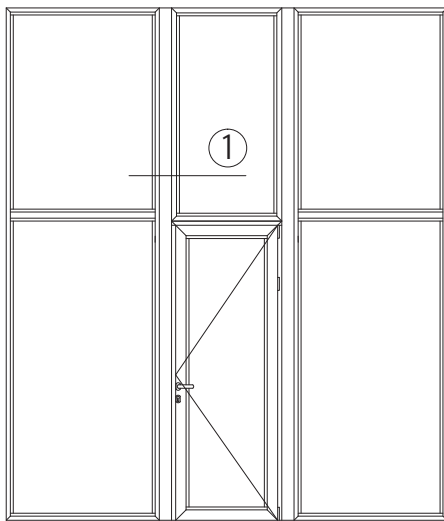
scale : 1:1

D45-16

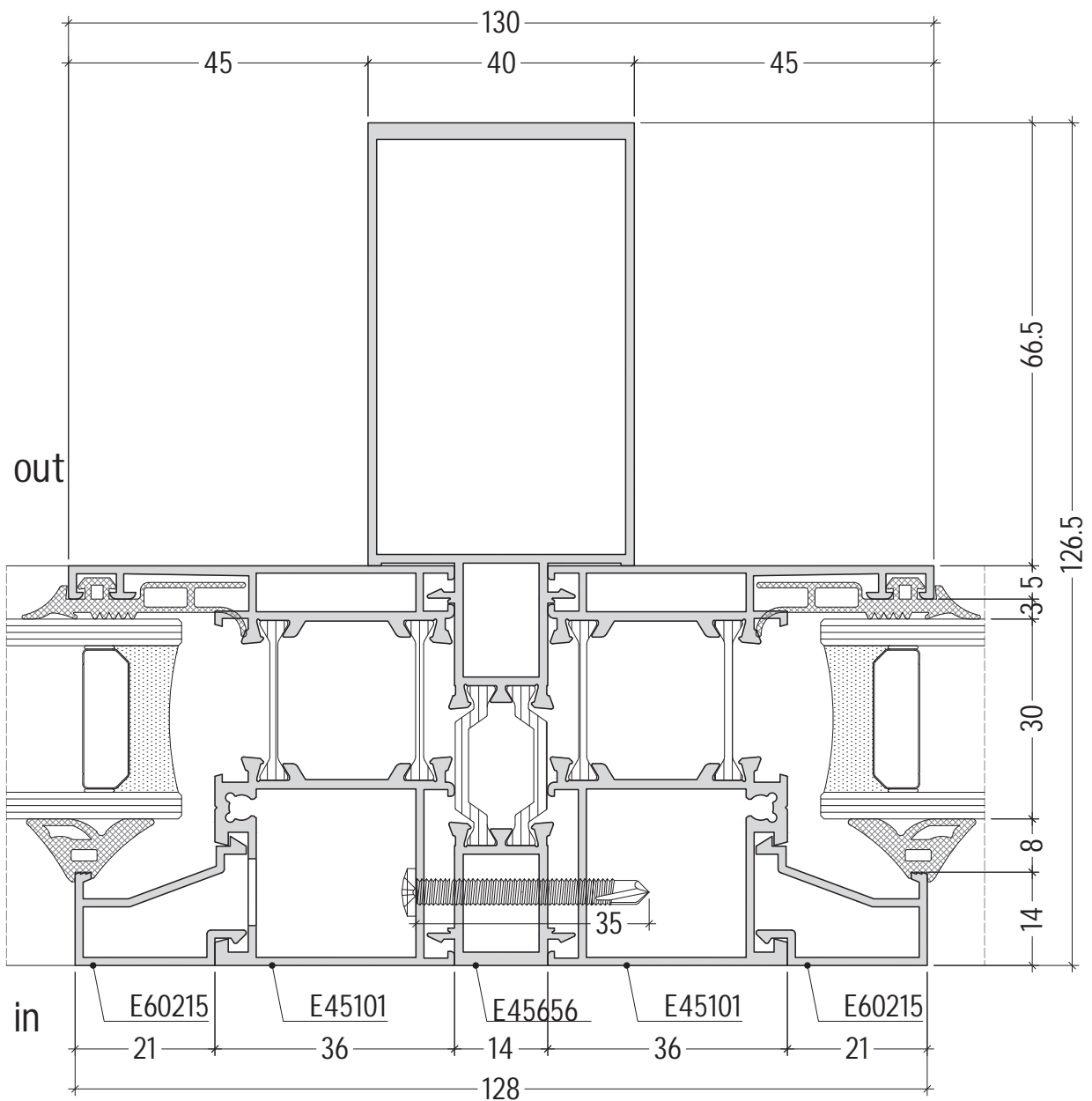


scale : 1:1

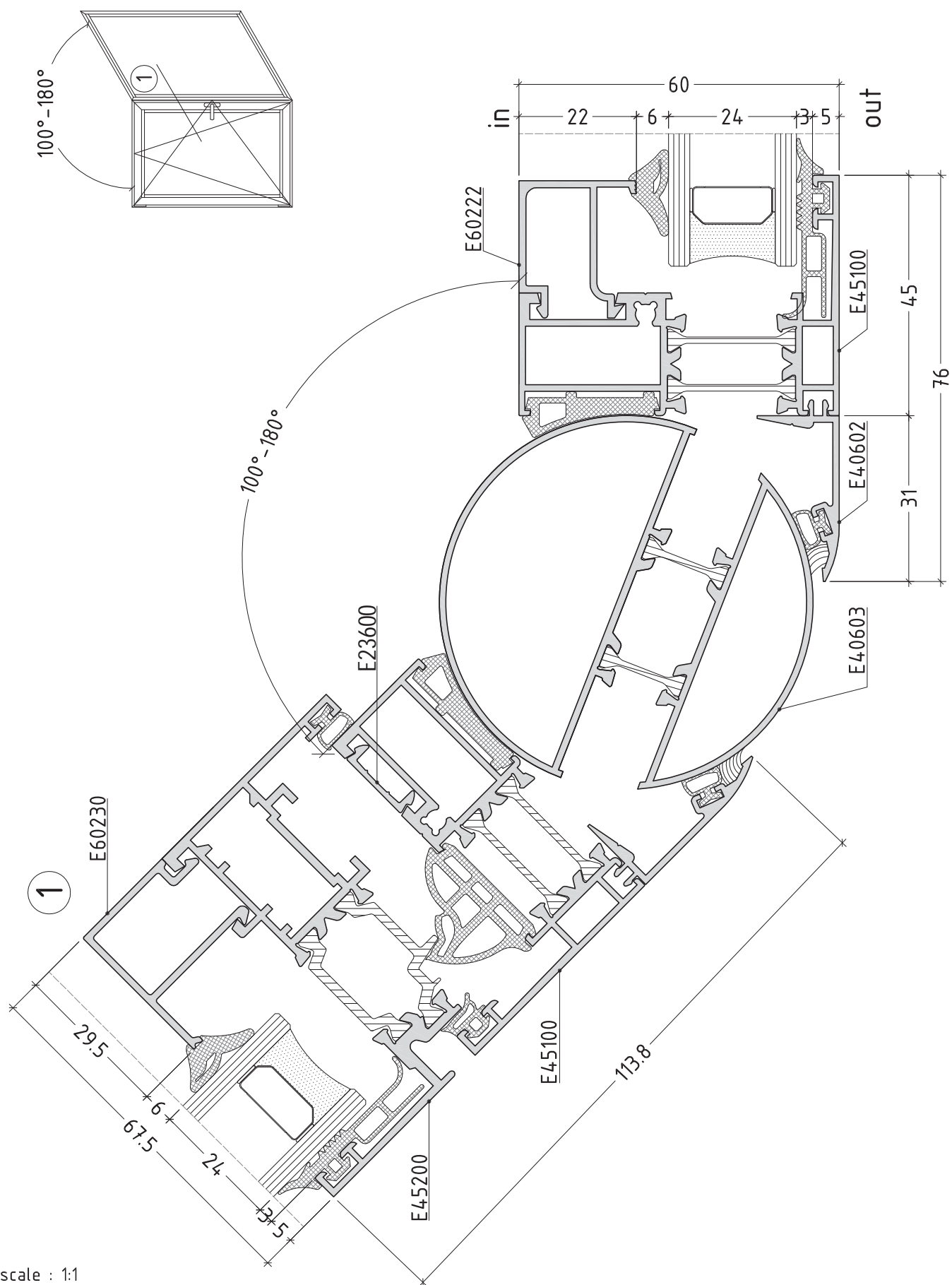
D45-17

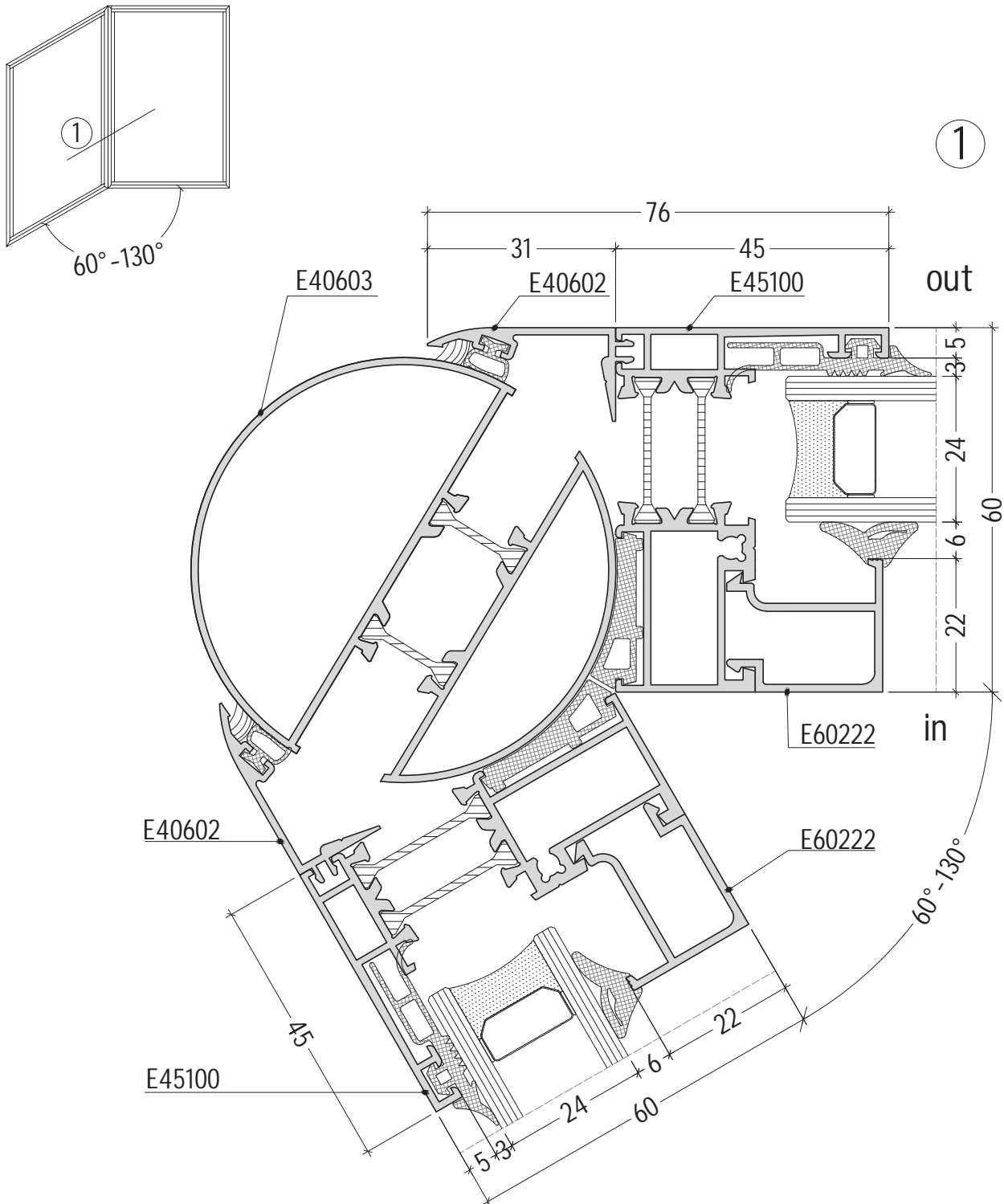


1



D45-14



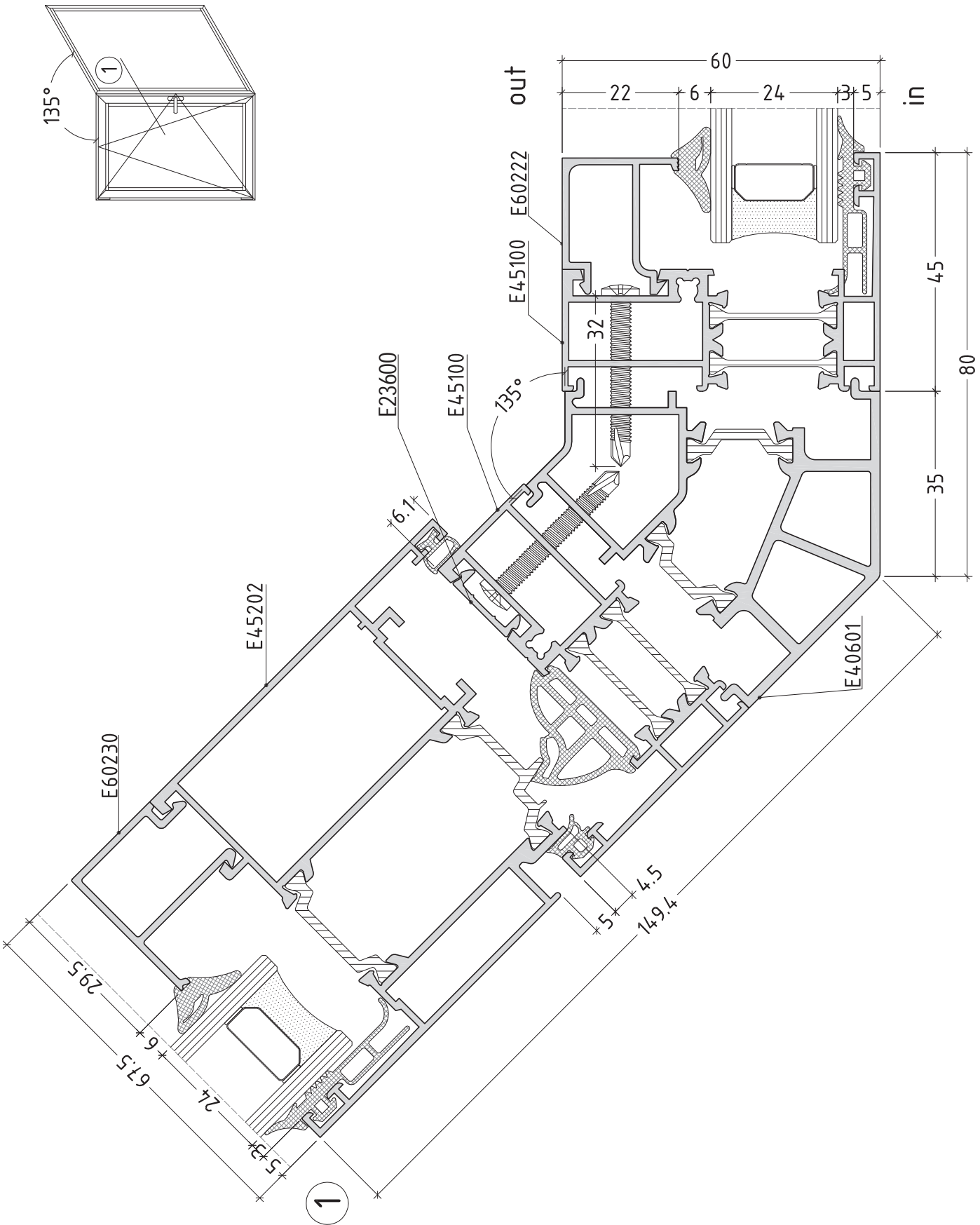


scale : 1:1

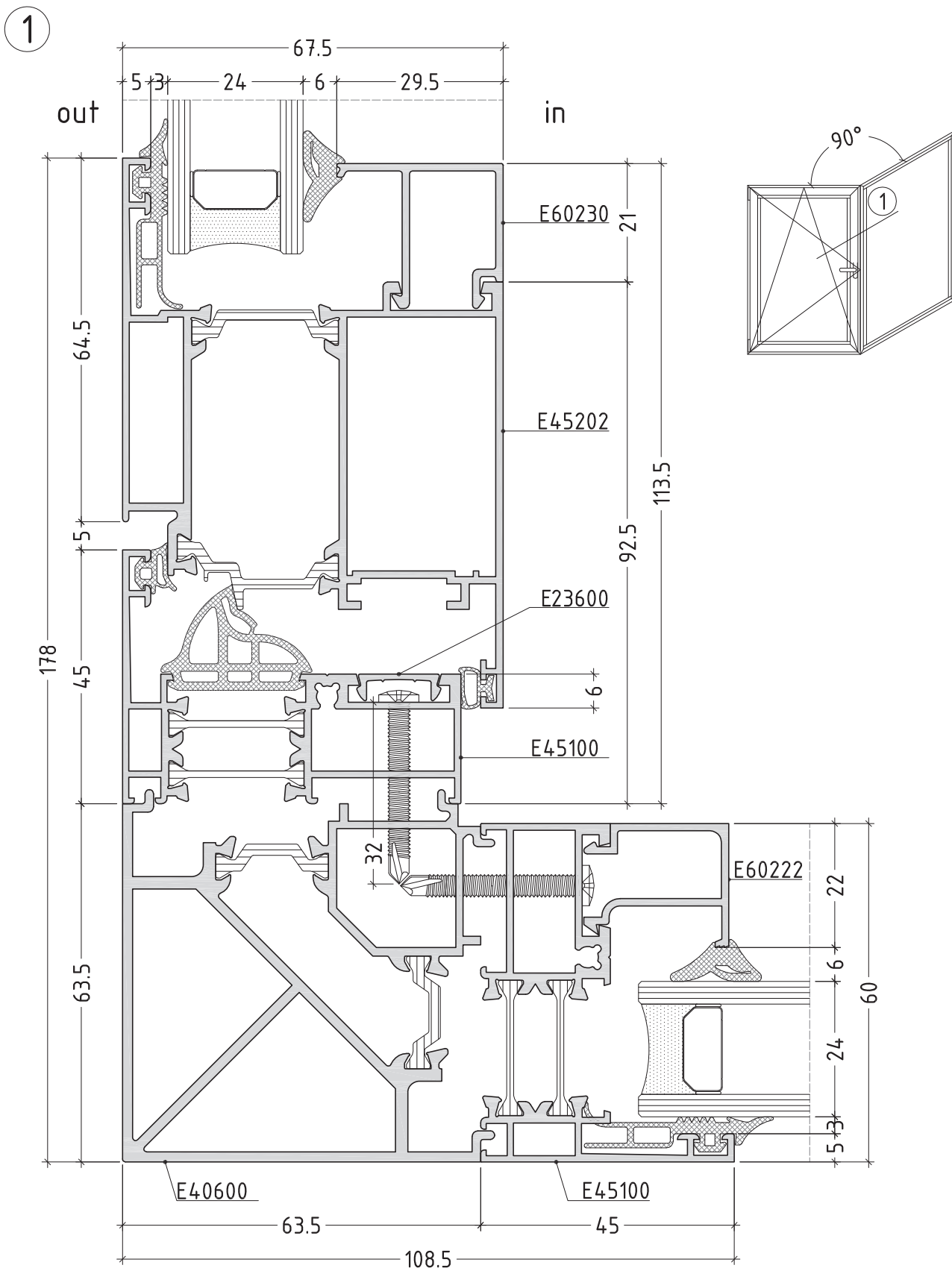
D45-20

opening system with thermal break

E45



scale : 1:1



scale : 1:1

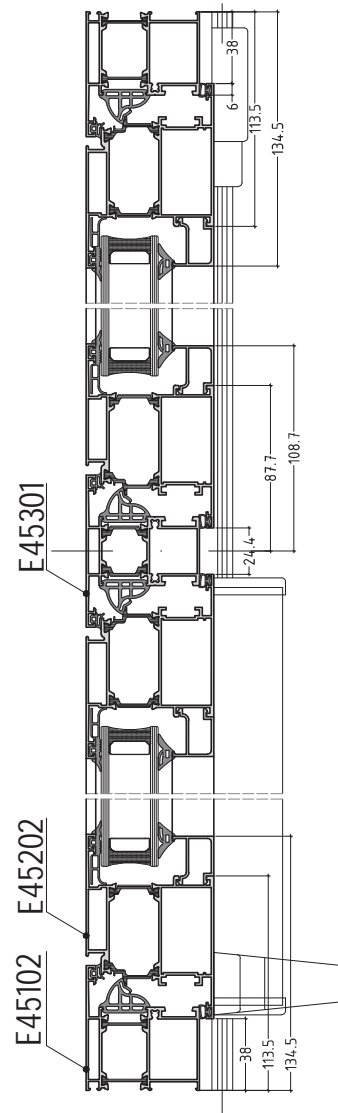
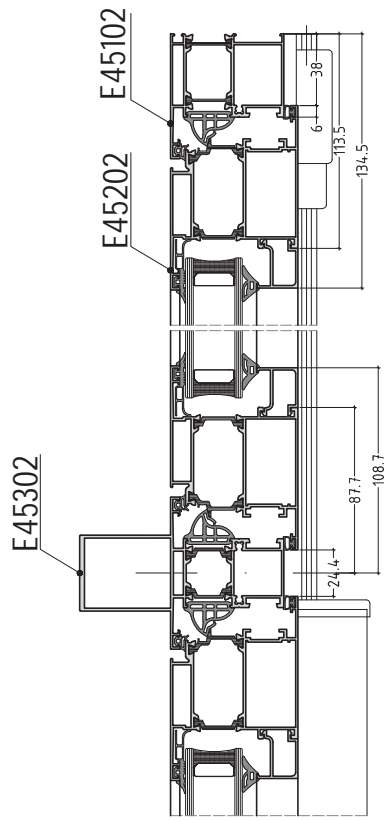
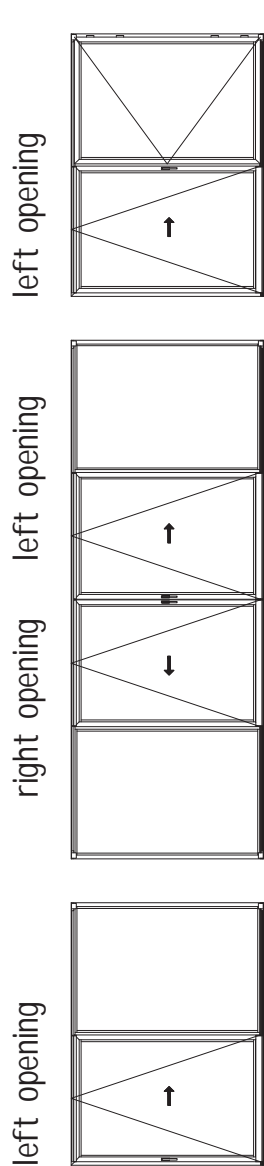
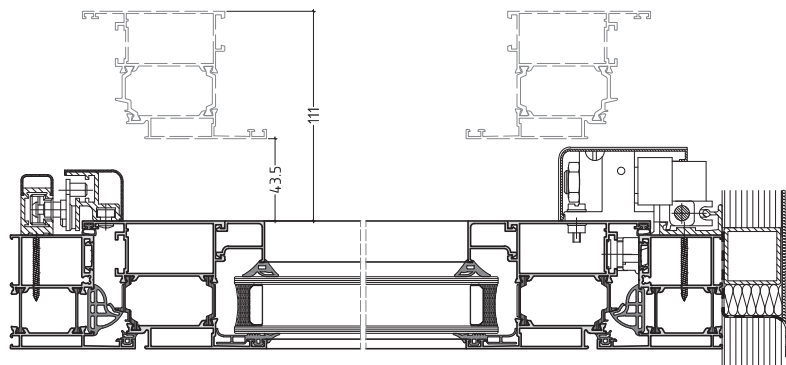
D.45-22

GU mechanism

width of sash	height of sash	maximum weight
740 - 1600 mm	895 - 2400 mm	150 kg

parallel sliding and tilting door

scale :



Note:

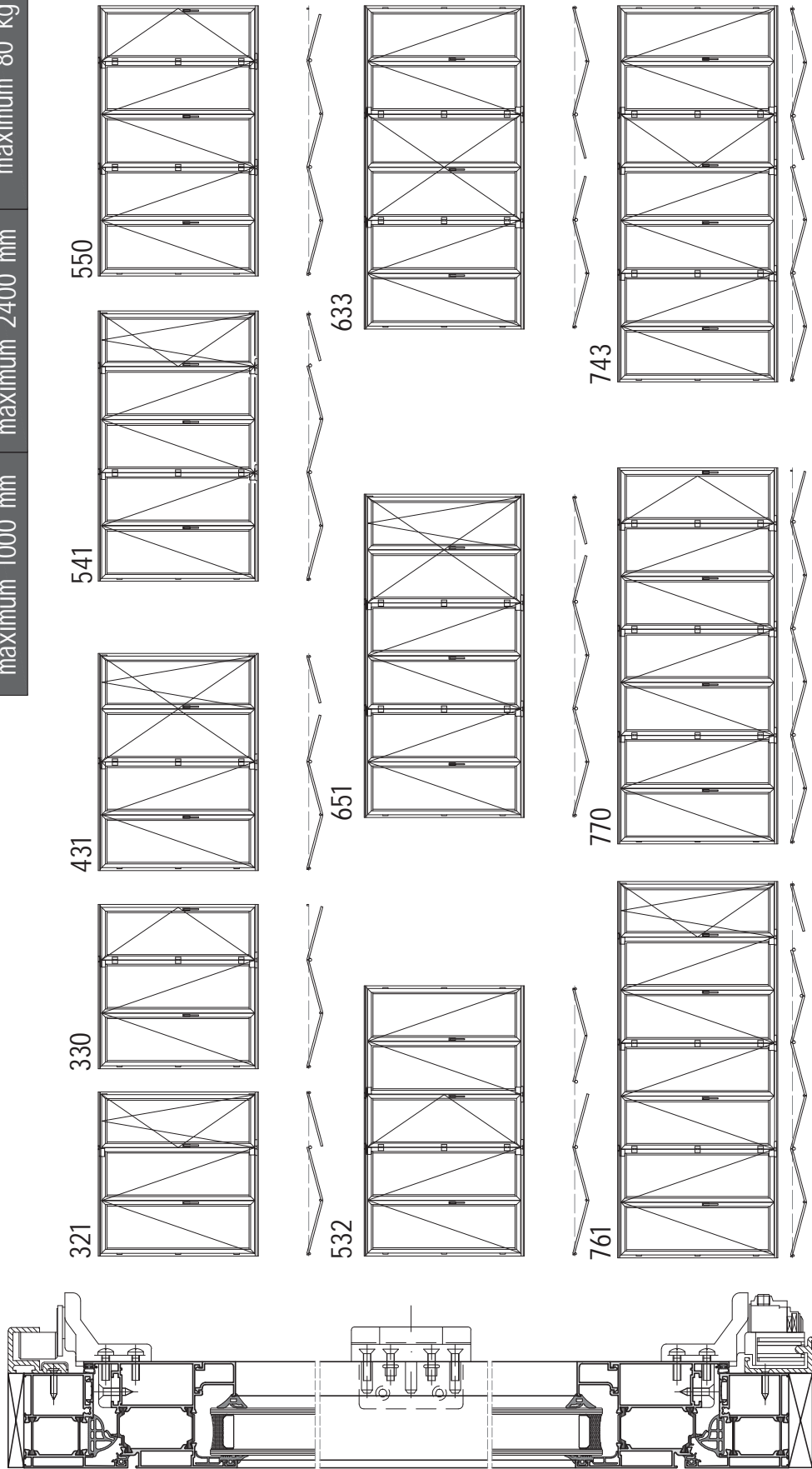
Dimensions and cutting list of the accessories depend on the specifications given by the hardware producer. Please contact the hardware producer for this specification!

GU mechanism

width of sash	height of sash	maximum weight
maximum 1000 mm	maximum 2400 mm	maximum 80 kg

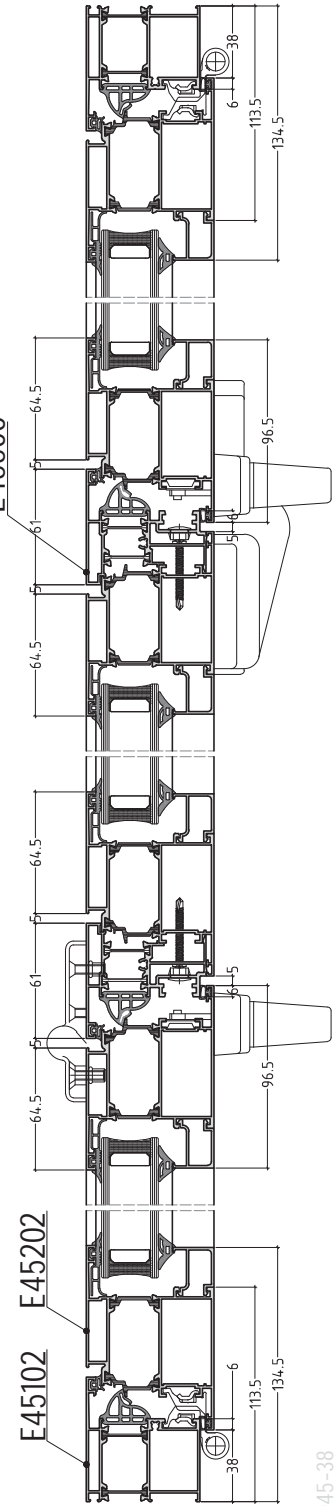
sliding - folding door

scale :



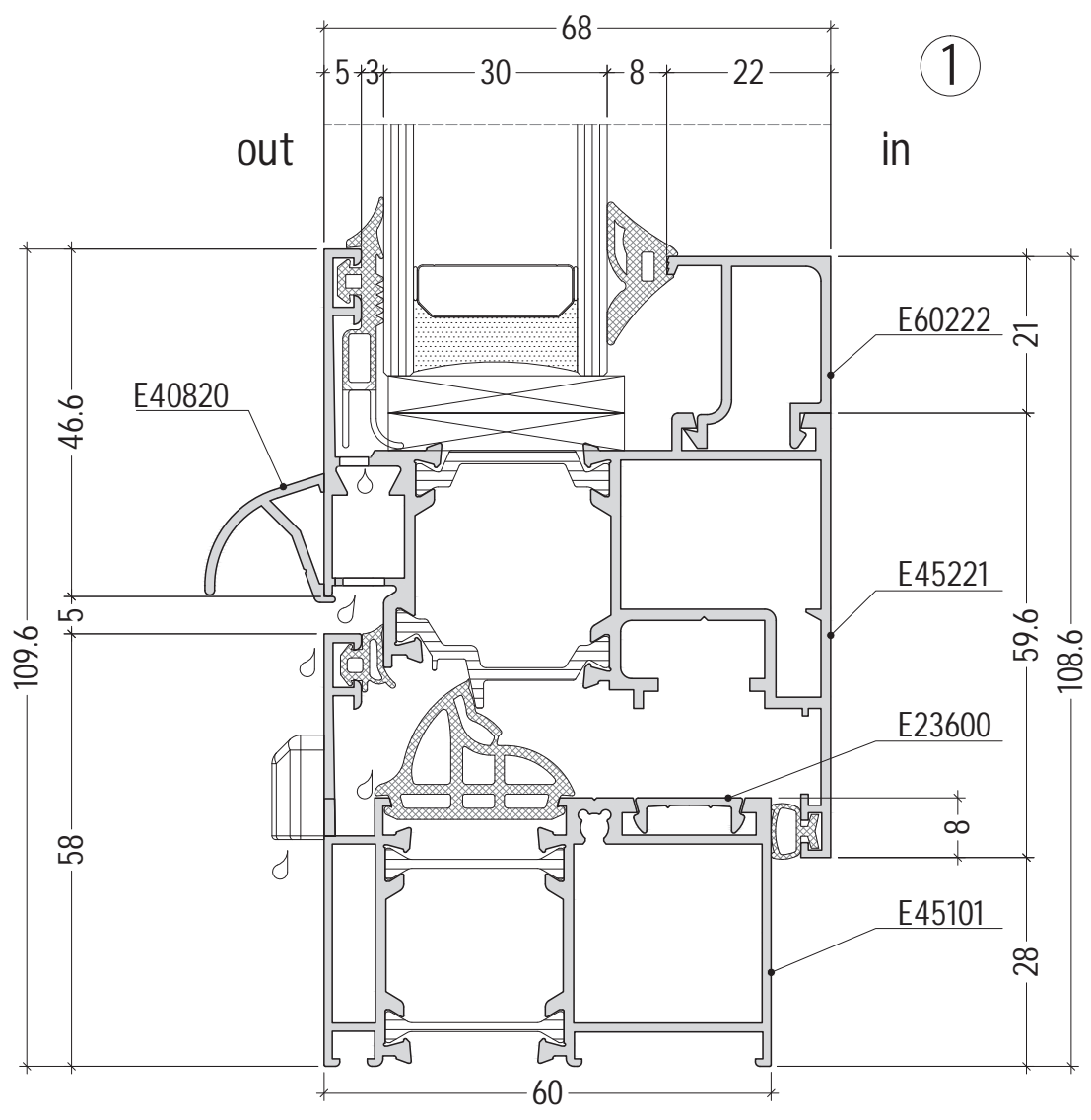
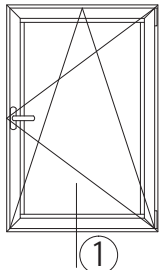
Note:

Dimensions and cutting list of the accessories depend on the specifications given by the hardware producer. Please contact the hardware producer for this specification!



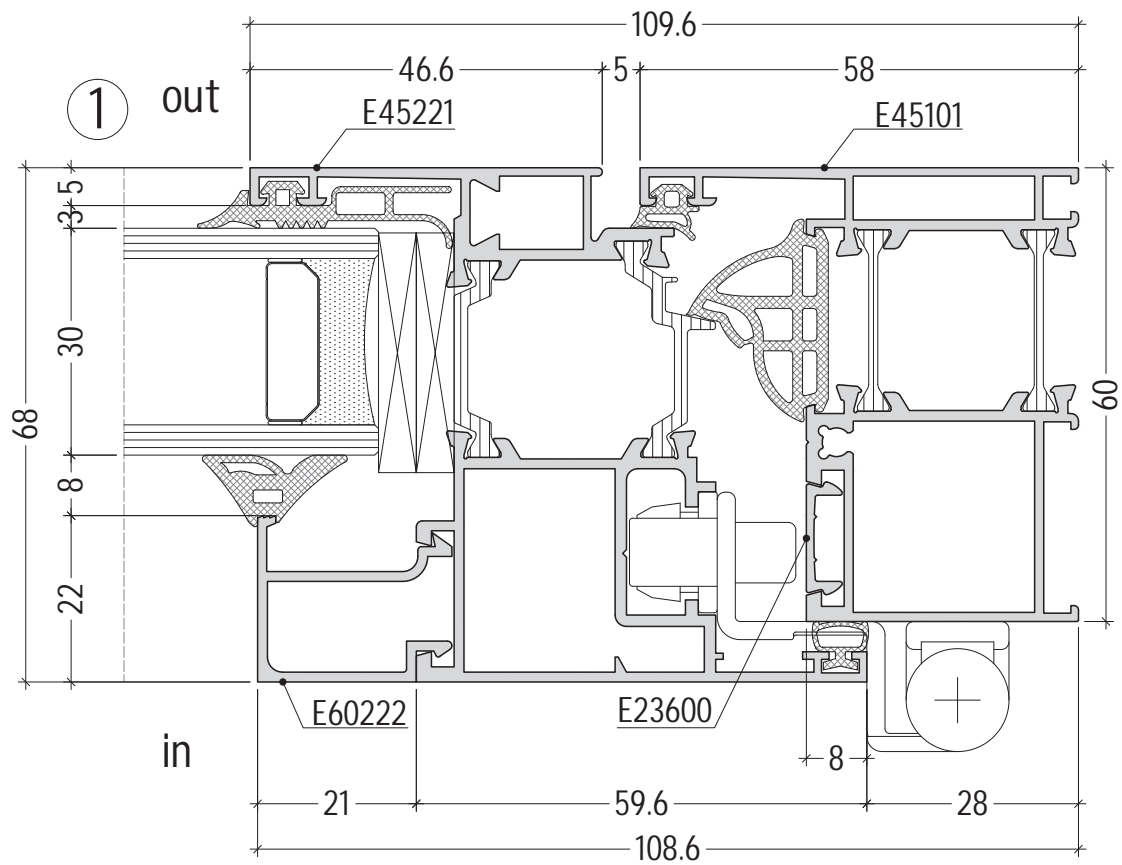
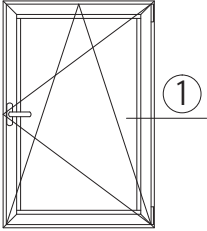
D45-38

inward opening
PVC groove



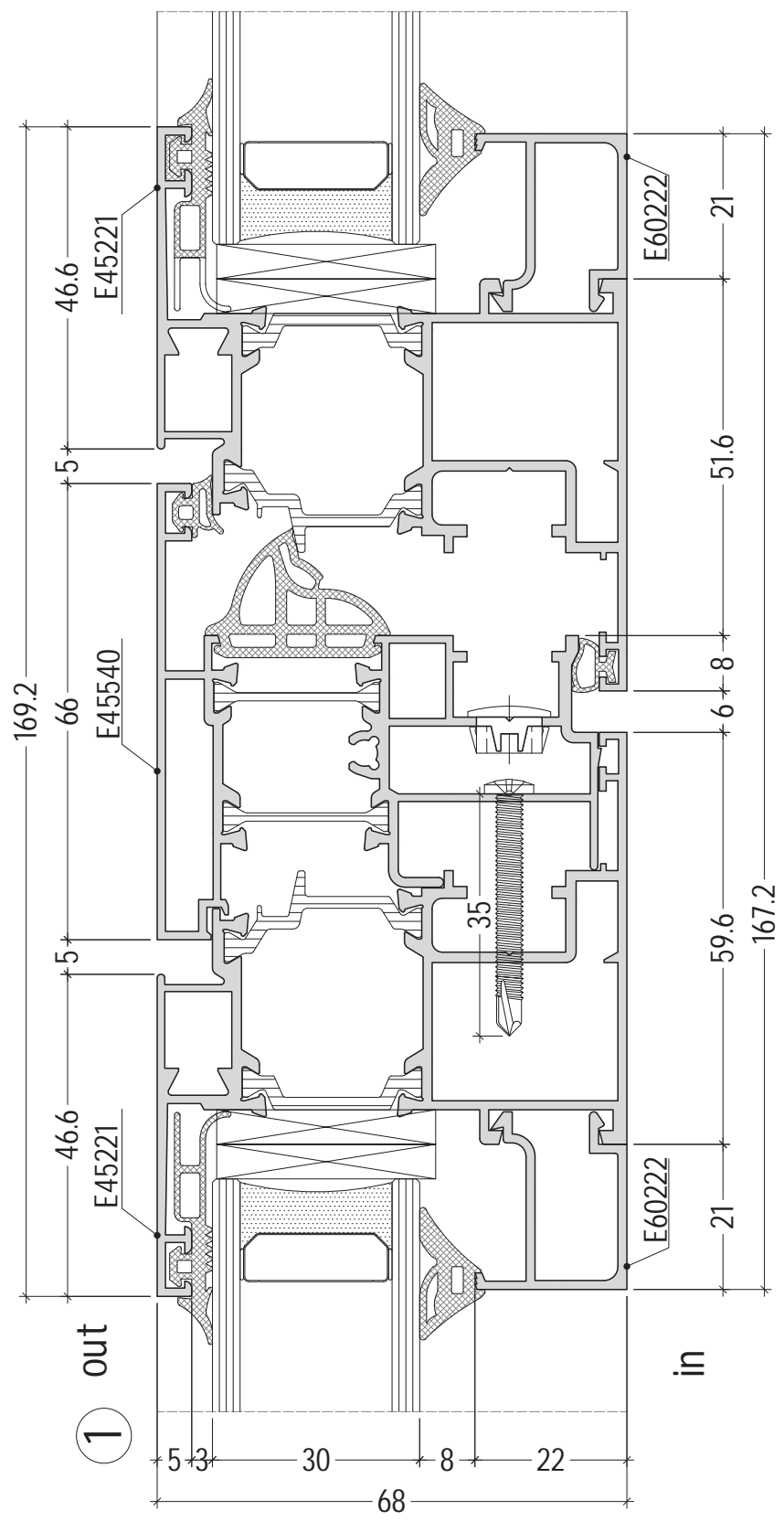
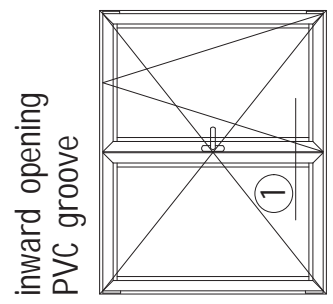
scale : 1:1

inward opening
PVC groove



scale : 1:1

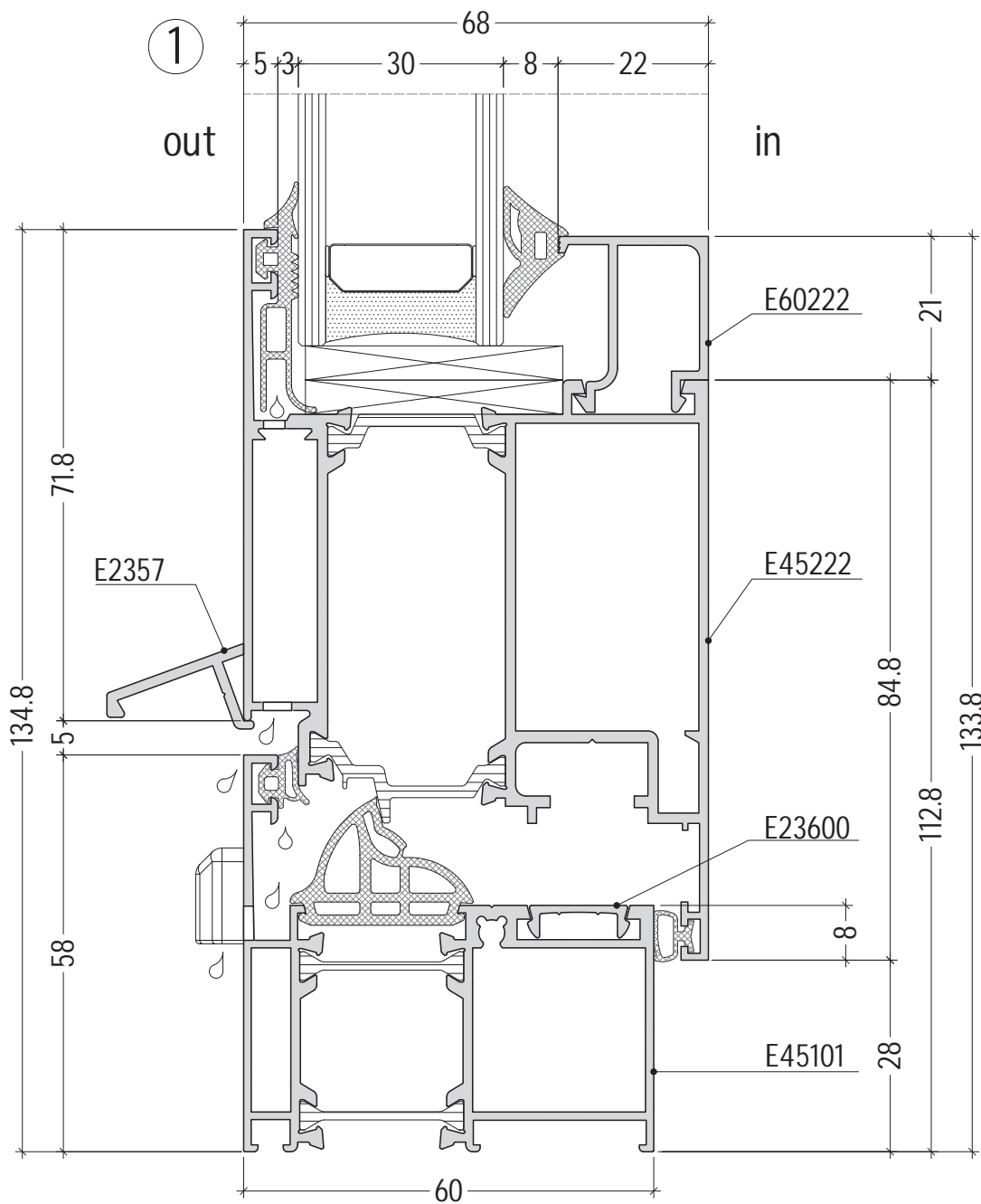
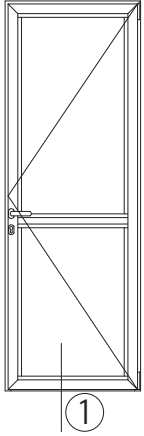
D45-19



scale : 1:1

D45-20

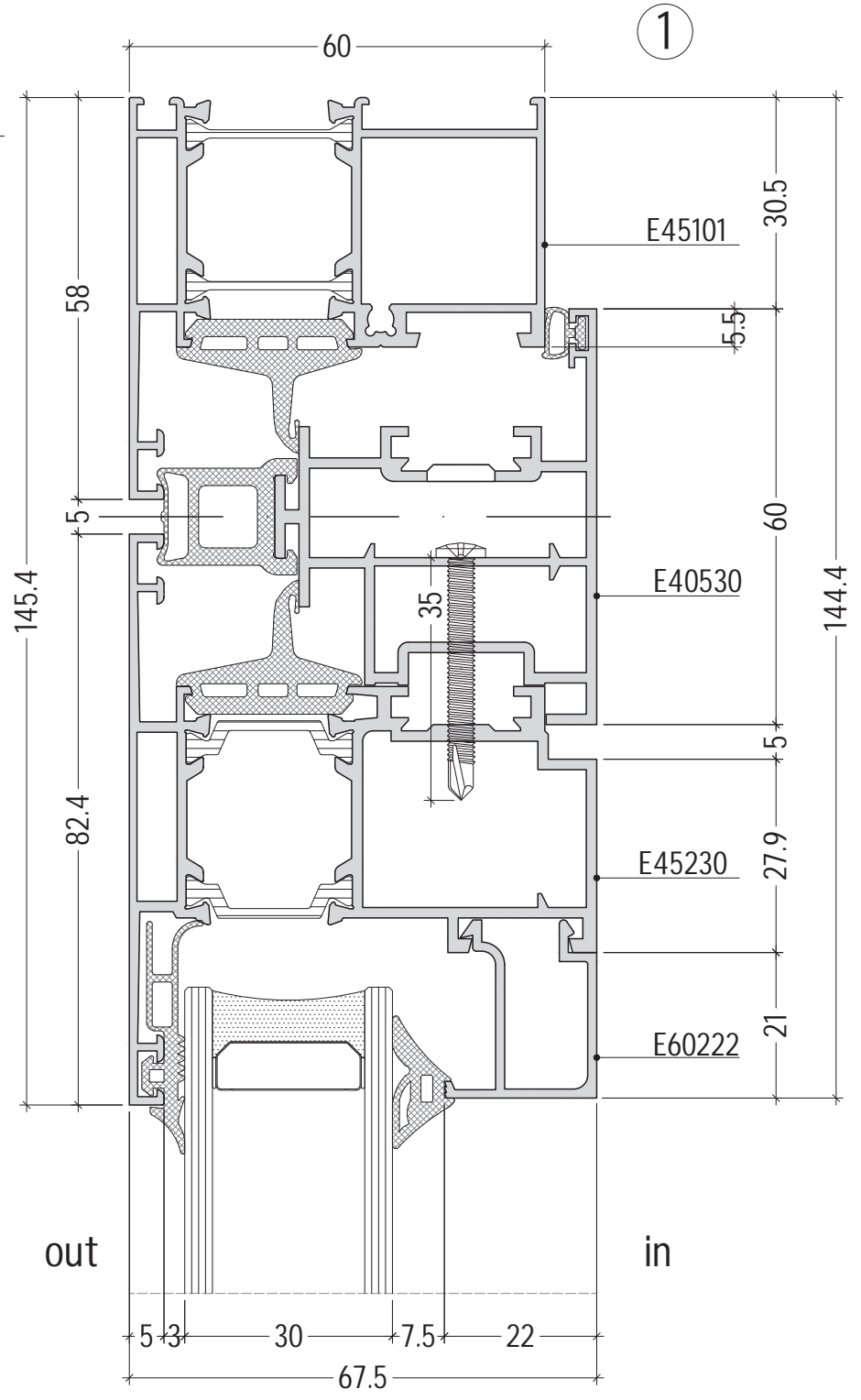
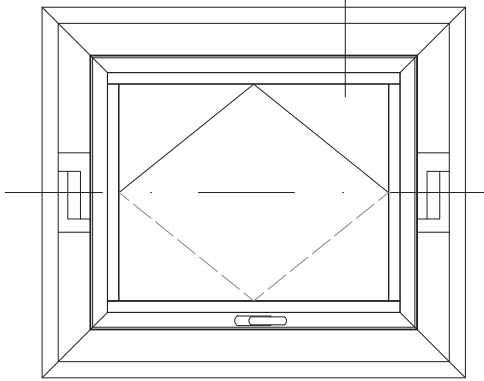
inward opening
PVC groove



scale : 1:1

D45-21

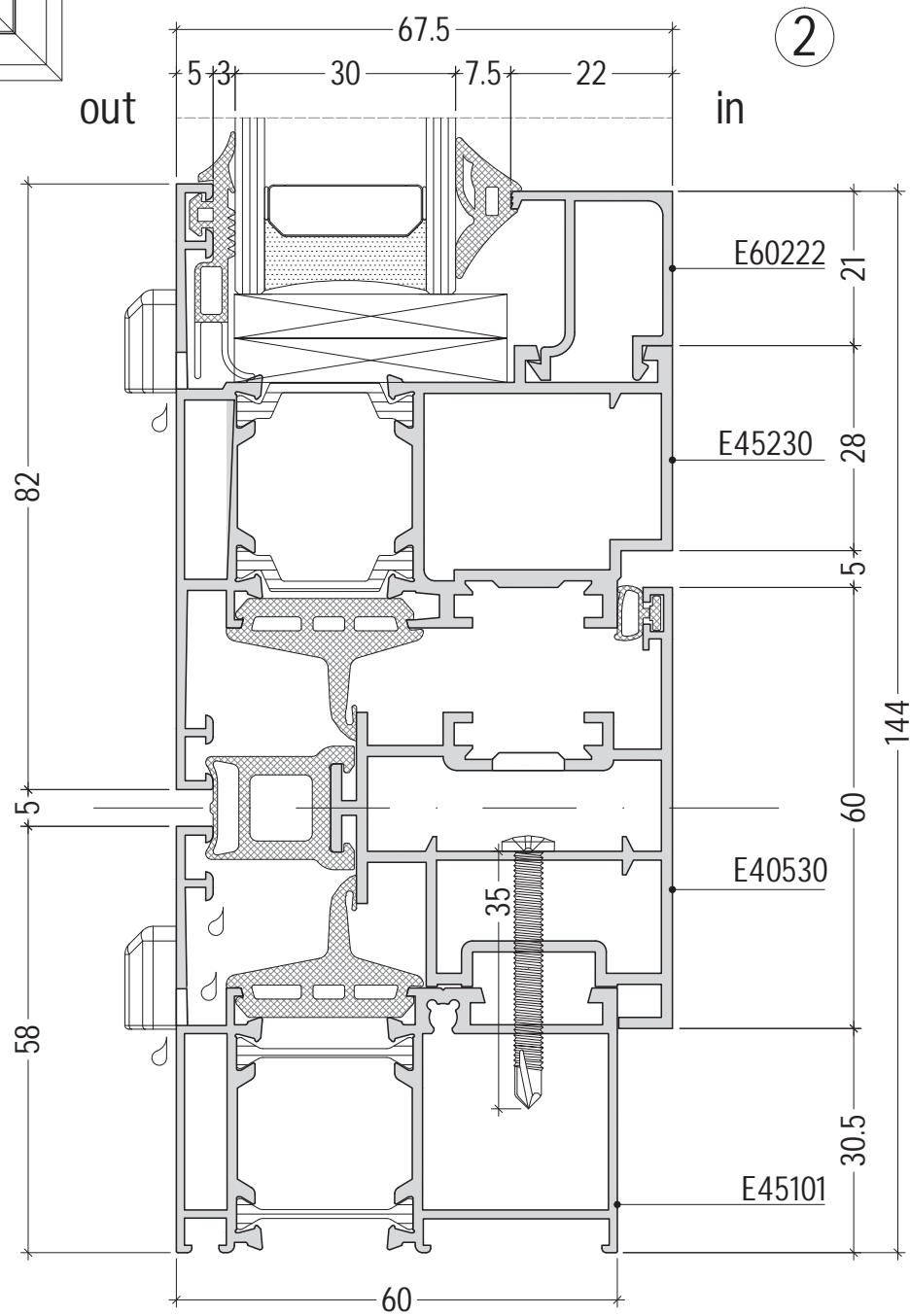
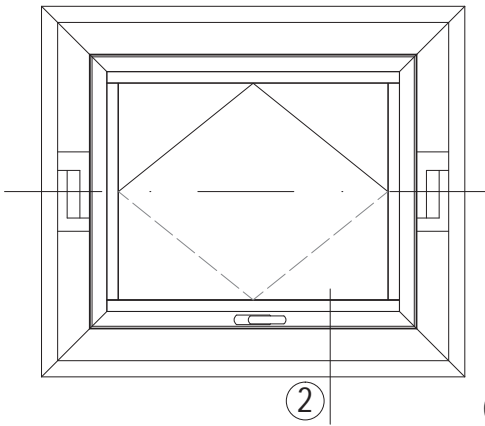
Pivot mechanism ①



scale : 1:1

D45-22

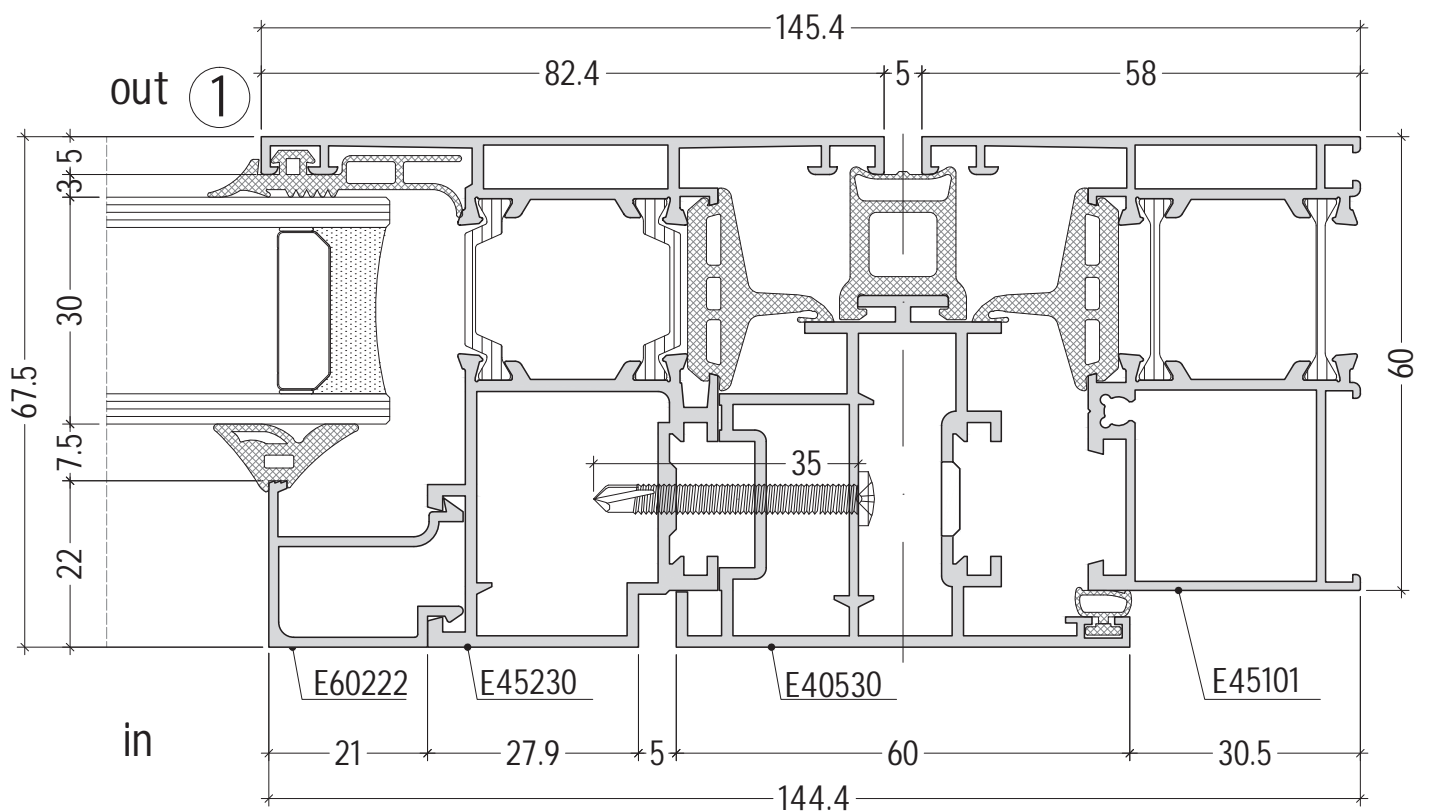
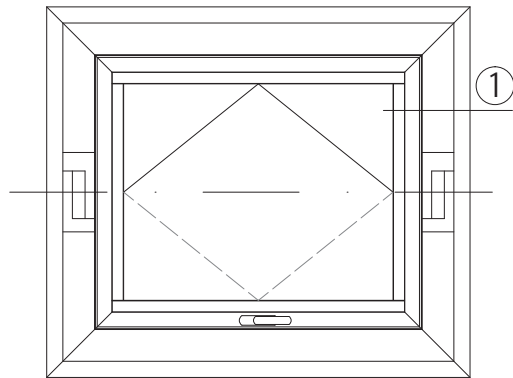
Pivot mechanism



scale : 1:1

D45-23

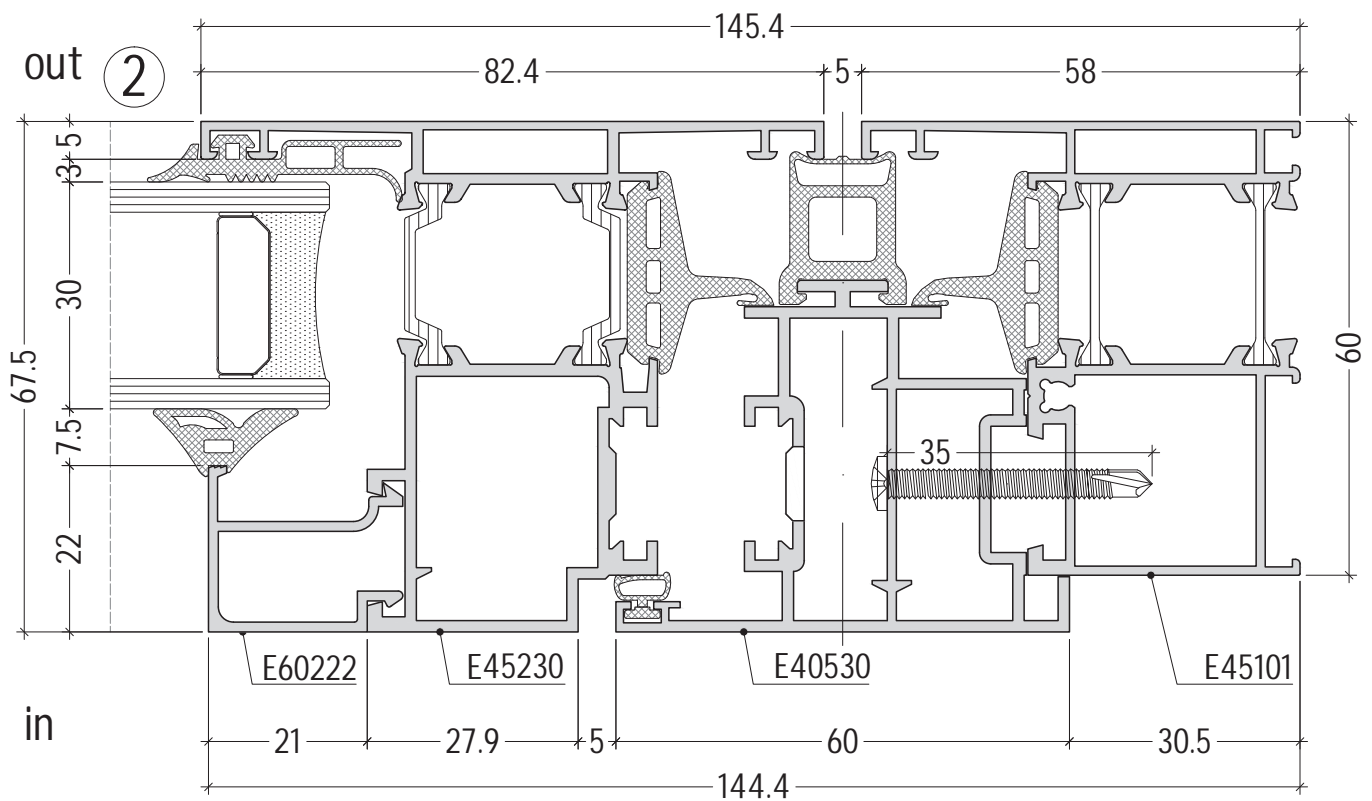
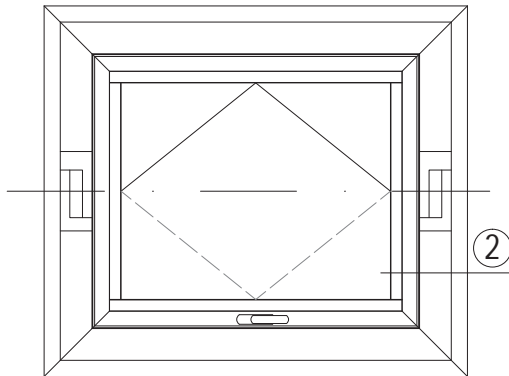
Pivot mechanism



scale : 1:1

D45-24

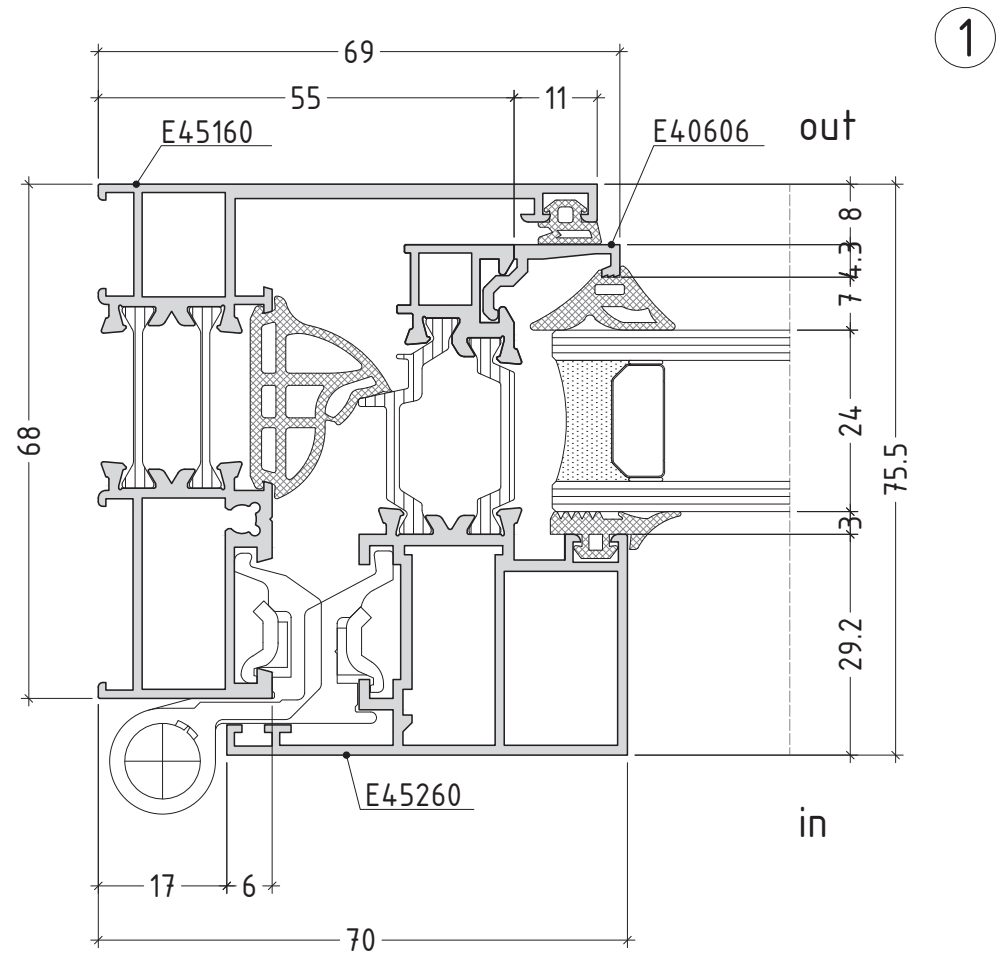
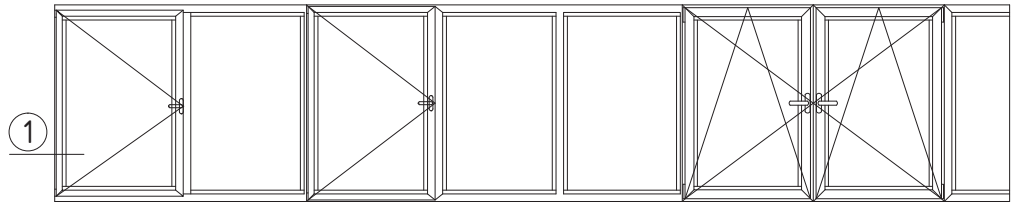
Pivot mechanism



scale : 1:1

D45-25

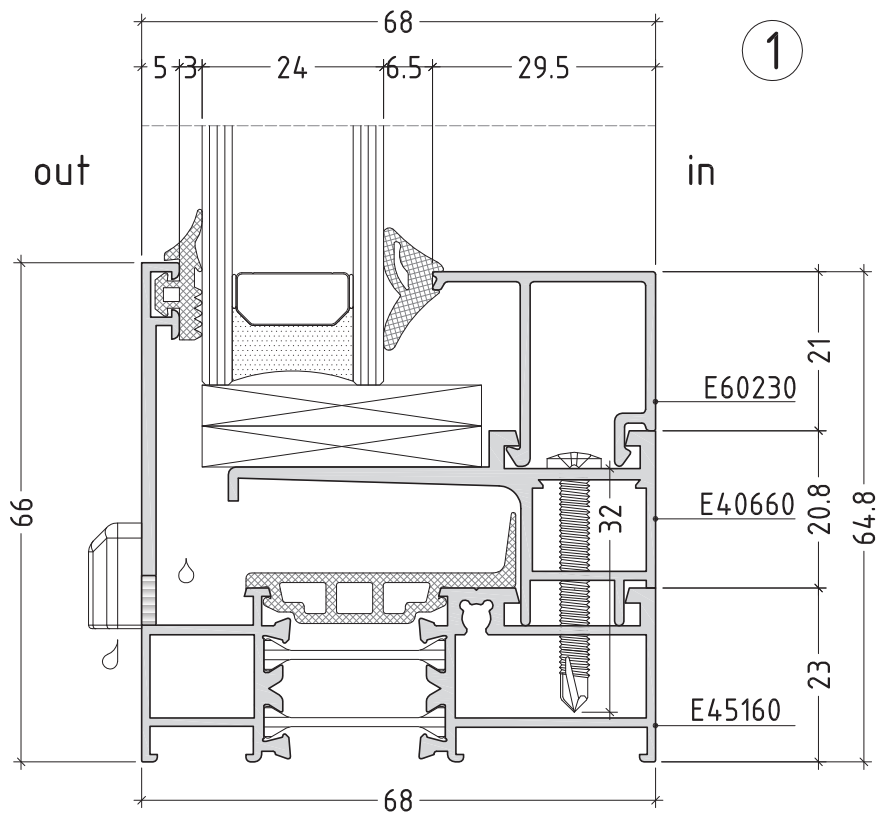
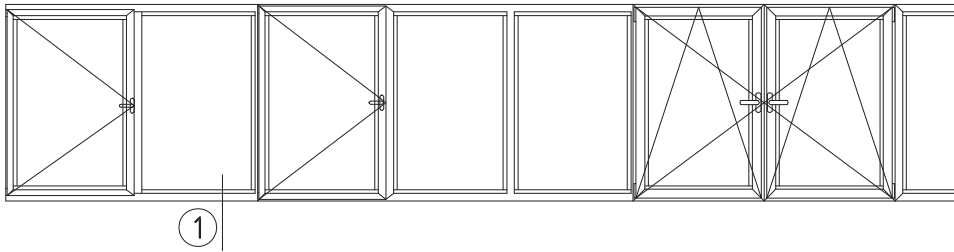
Hidden vent



scale : 1:1

D45-26

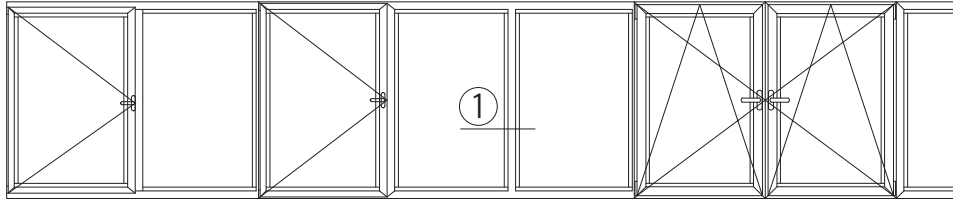
Hidden vent



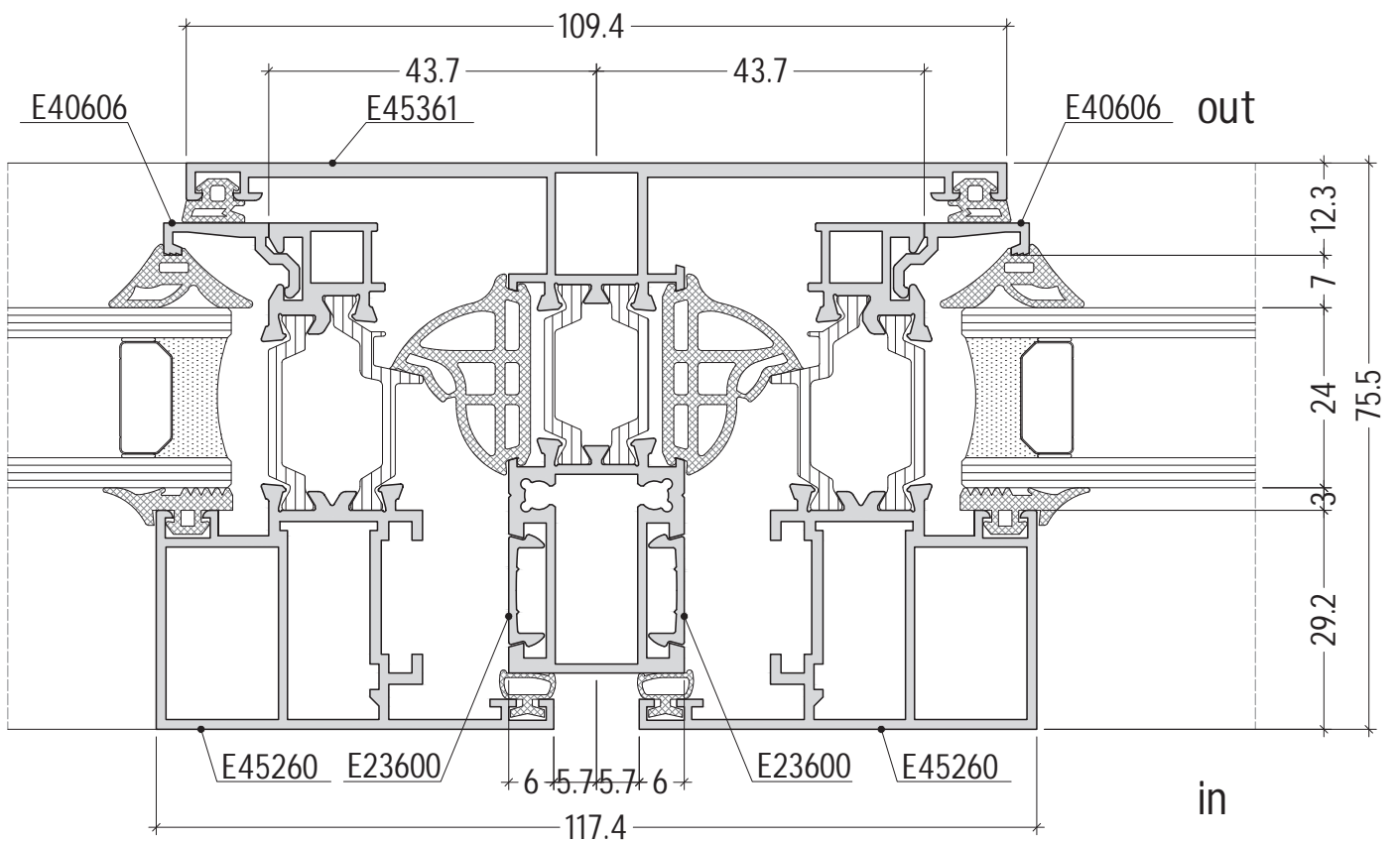
scale : 1:1

D45-32

Hidden vent



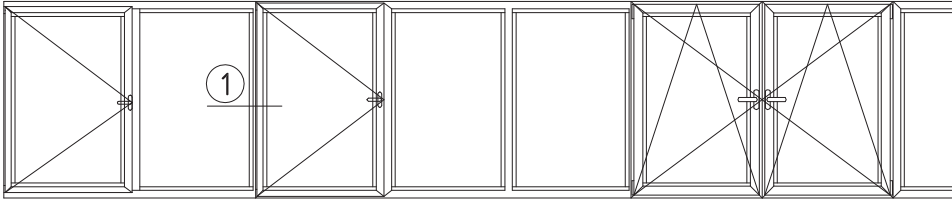
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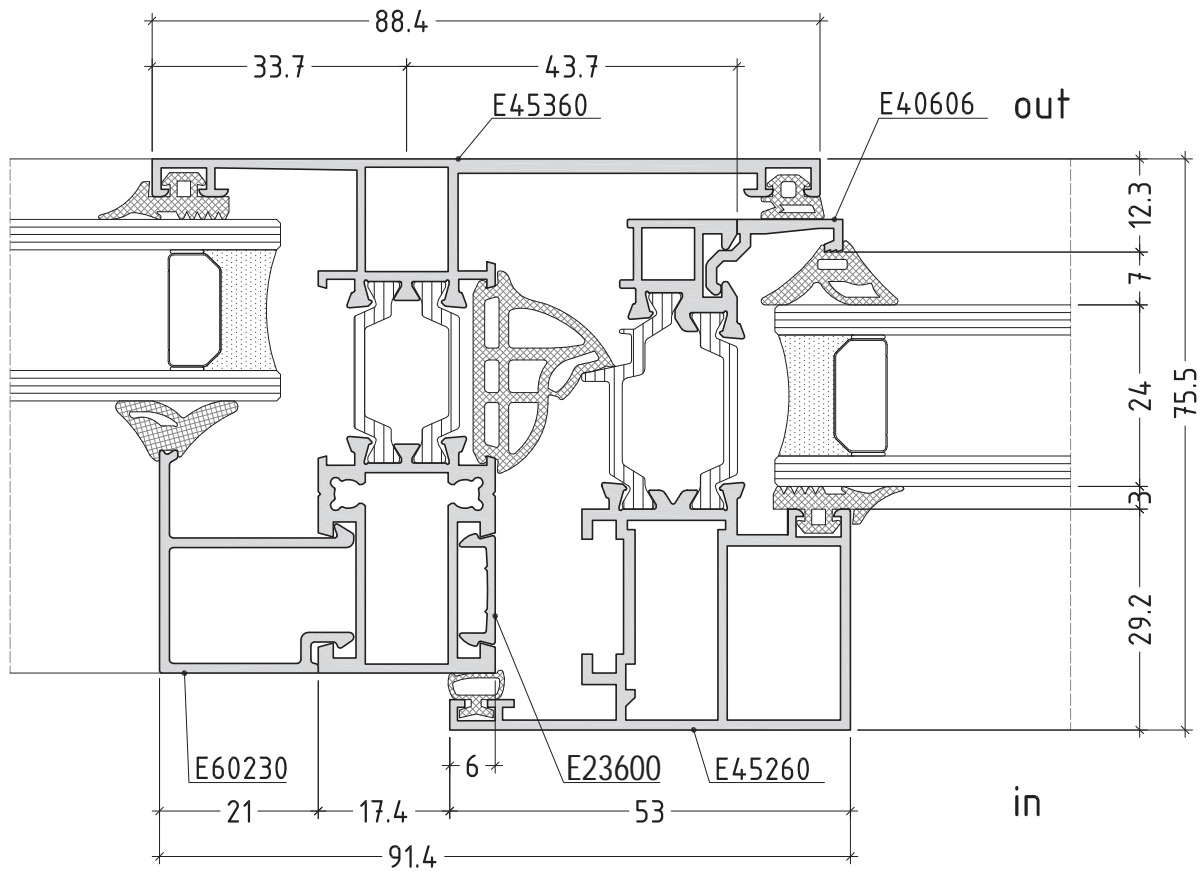
scale : 1:1

D45-28

Hidden vent

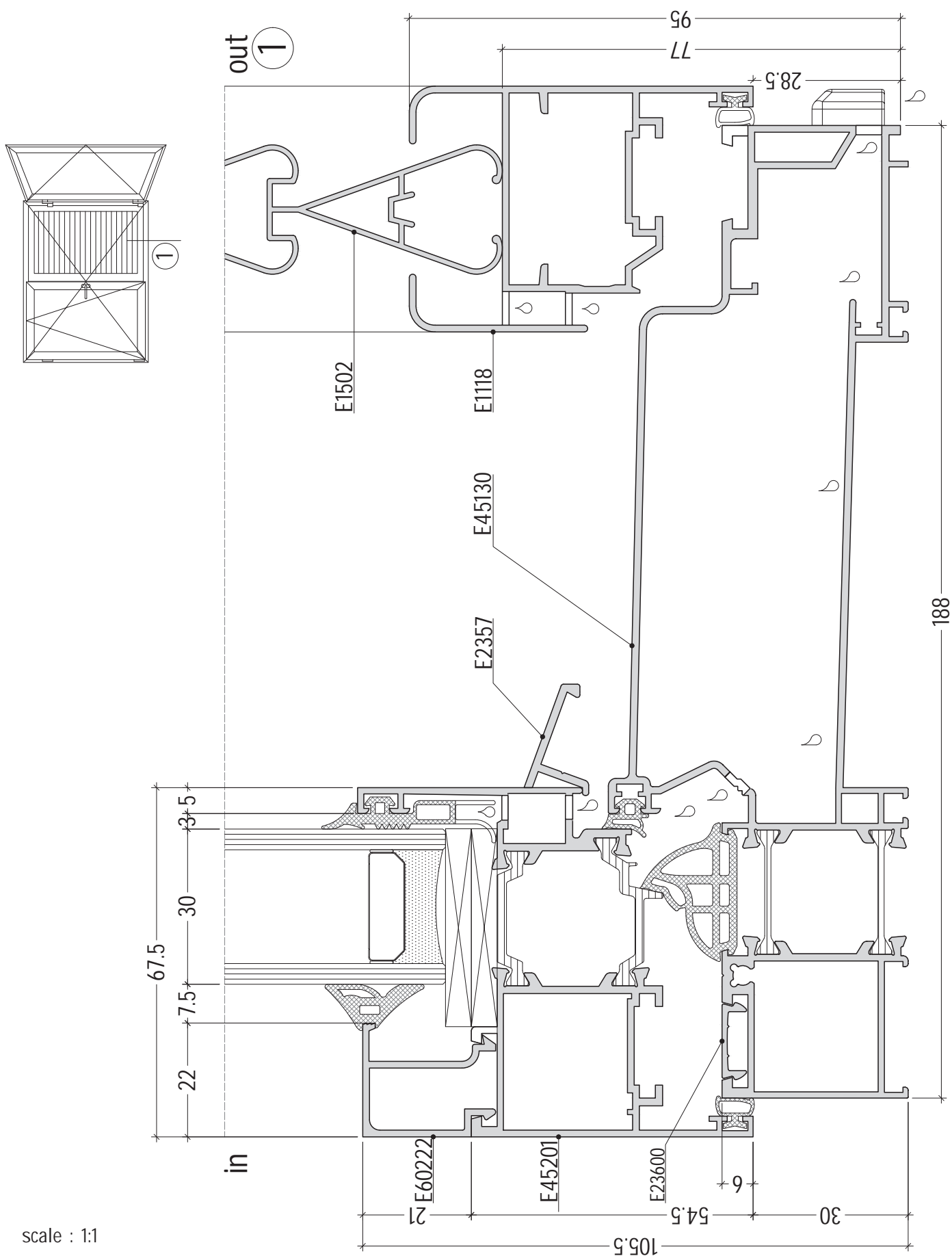


1



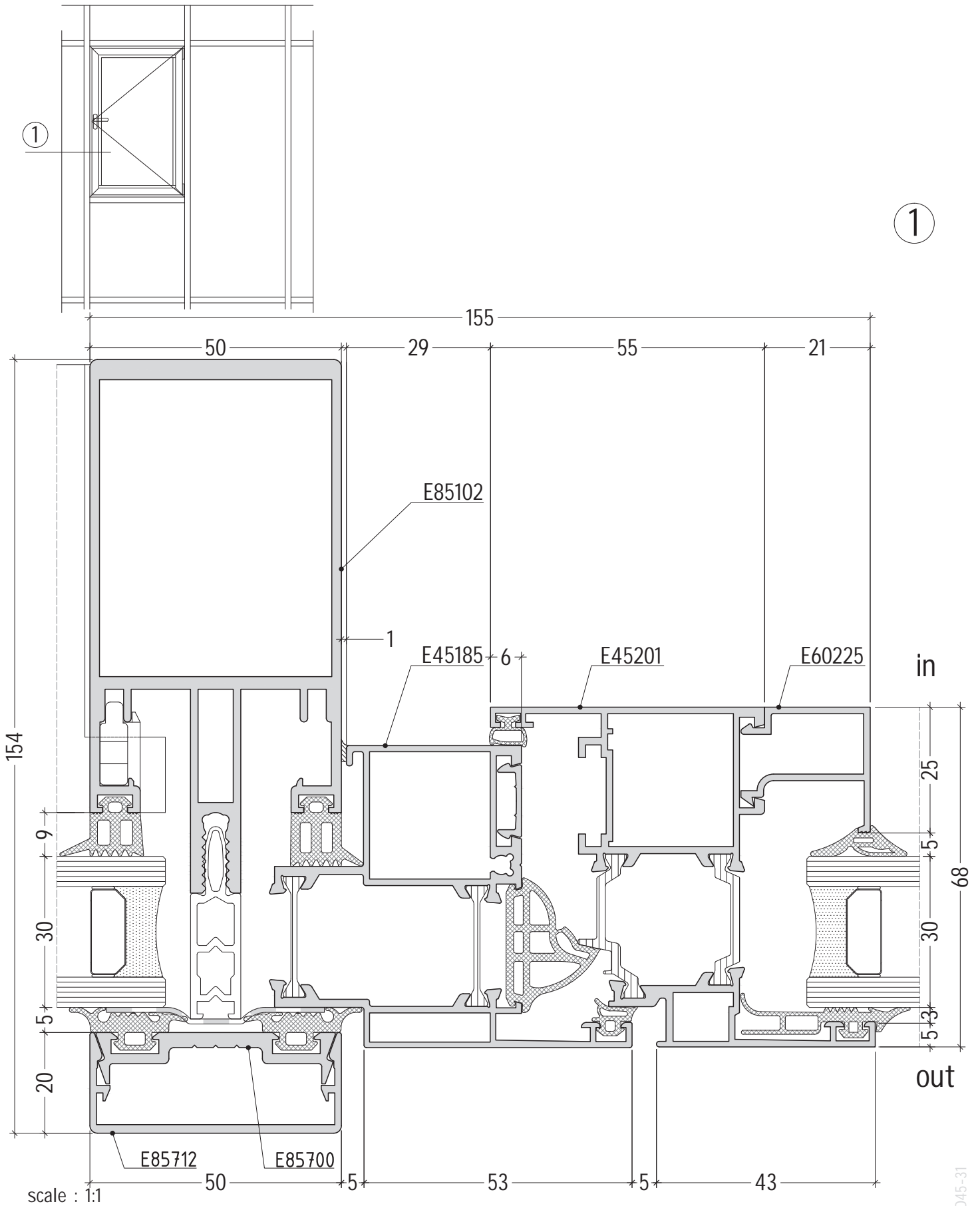
scale : 1:1

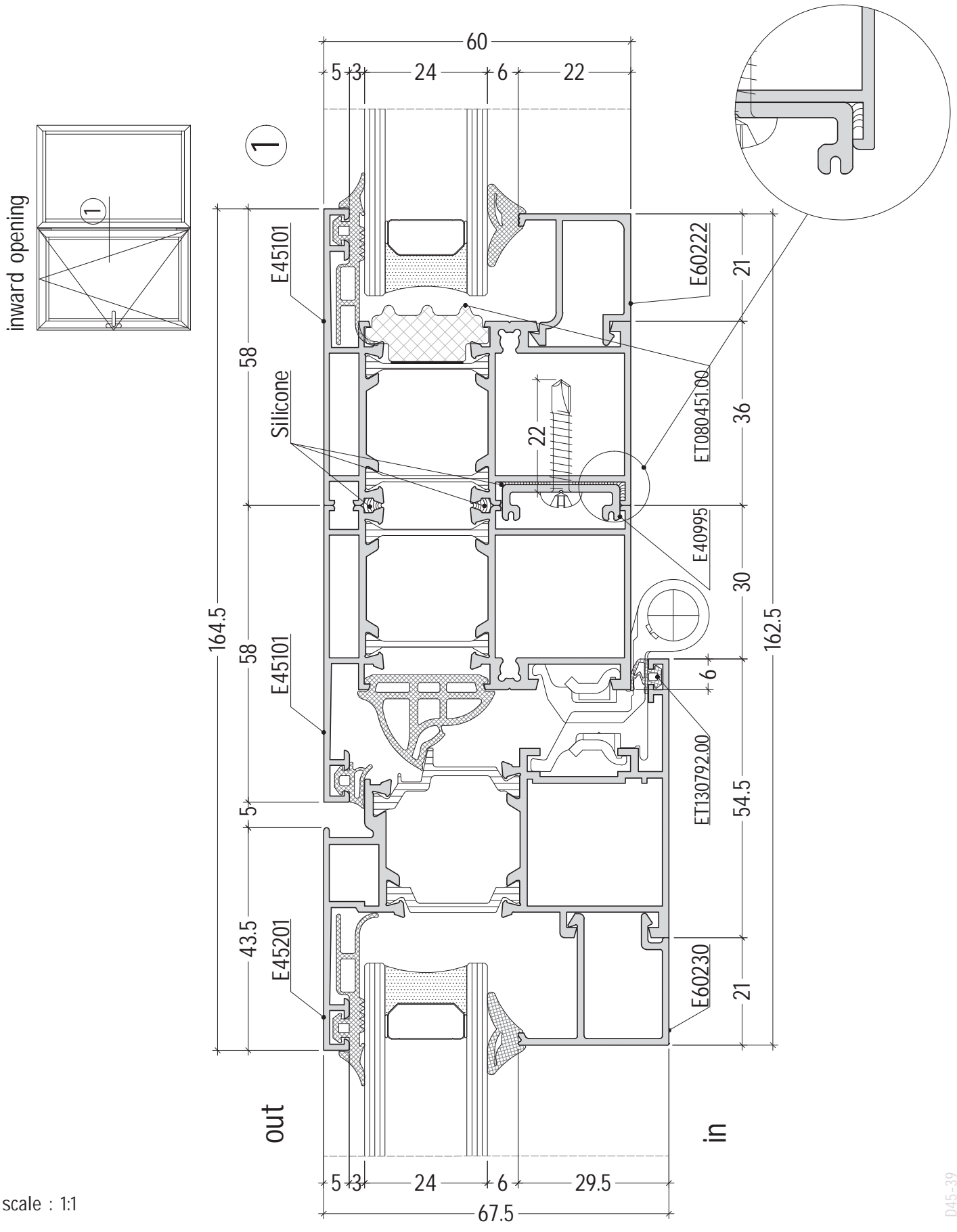
D45-34

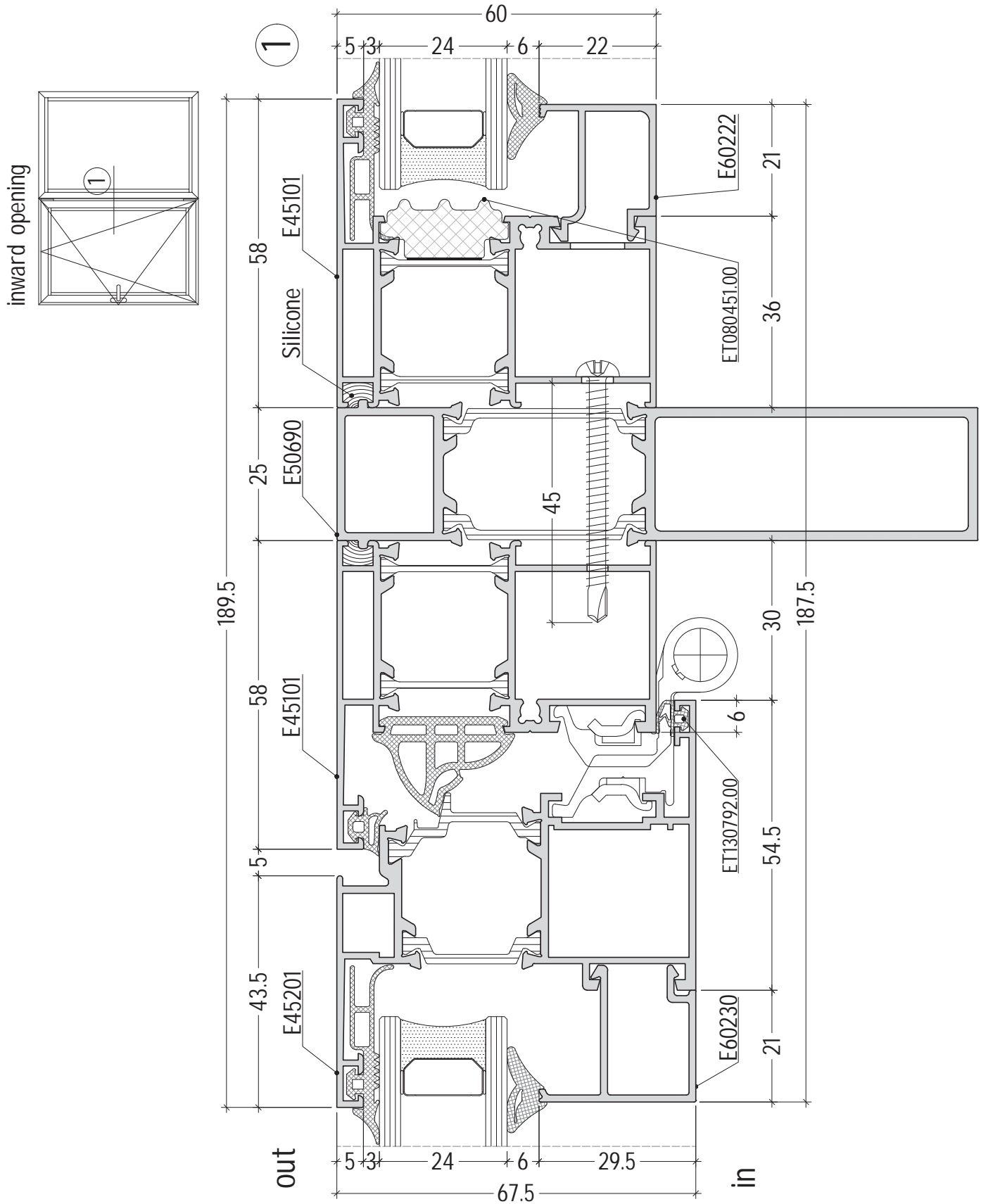


scale : 1:1

D45-30



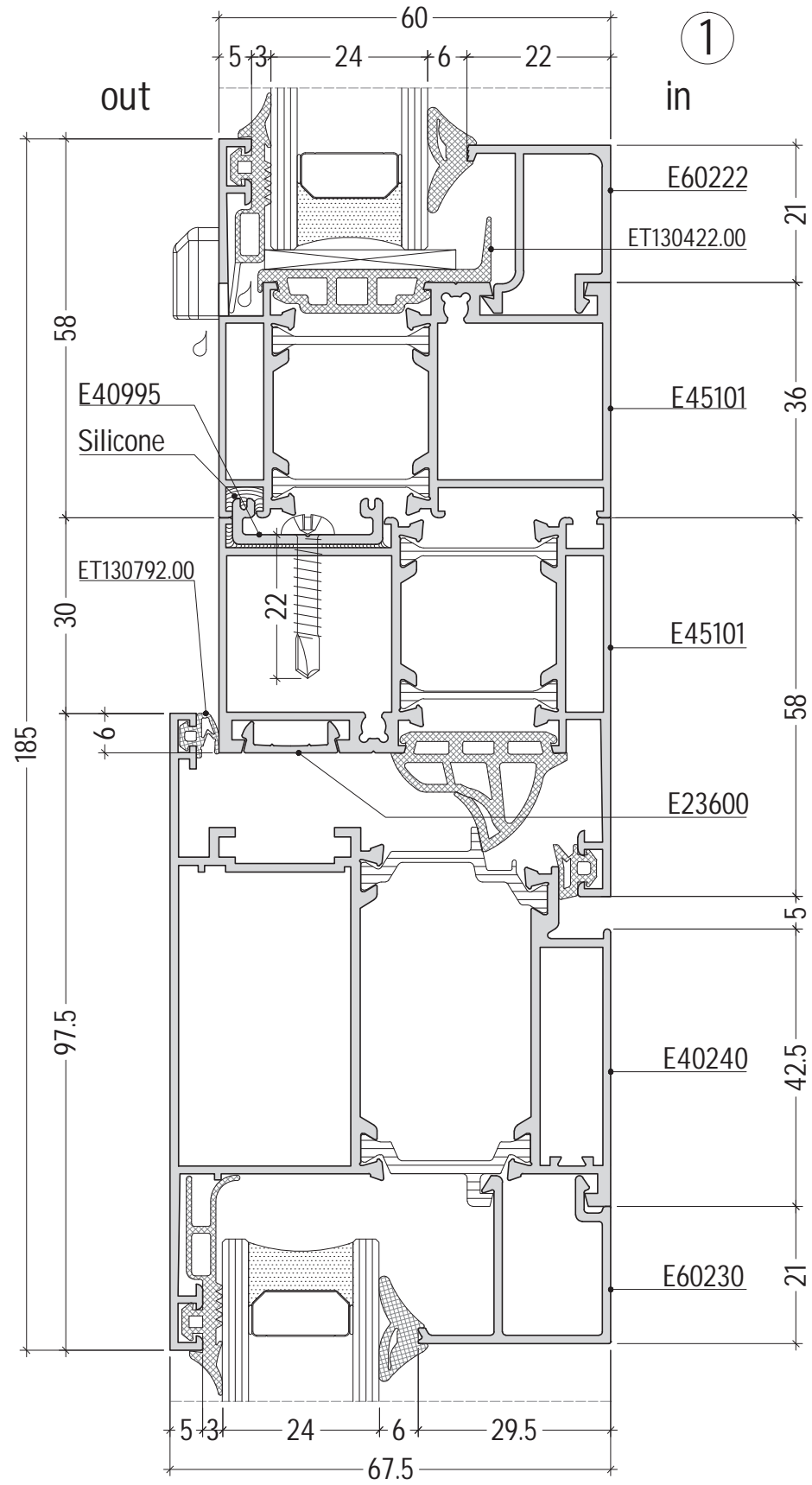
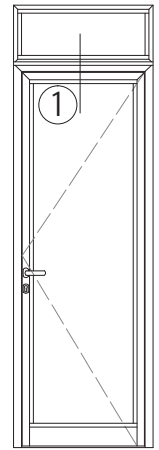




scale : 1:1

D45-40

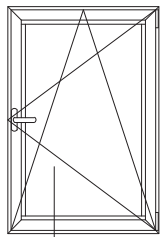
outward opening



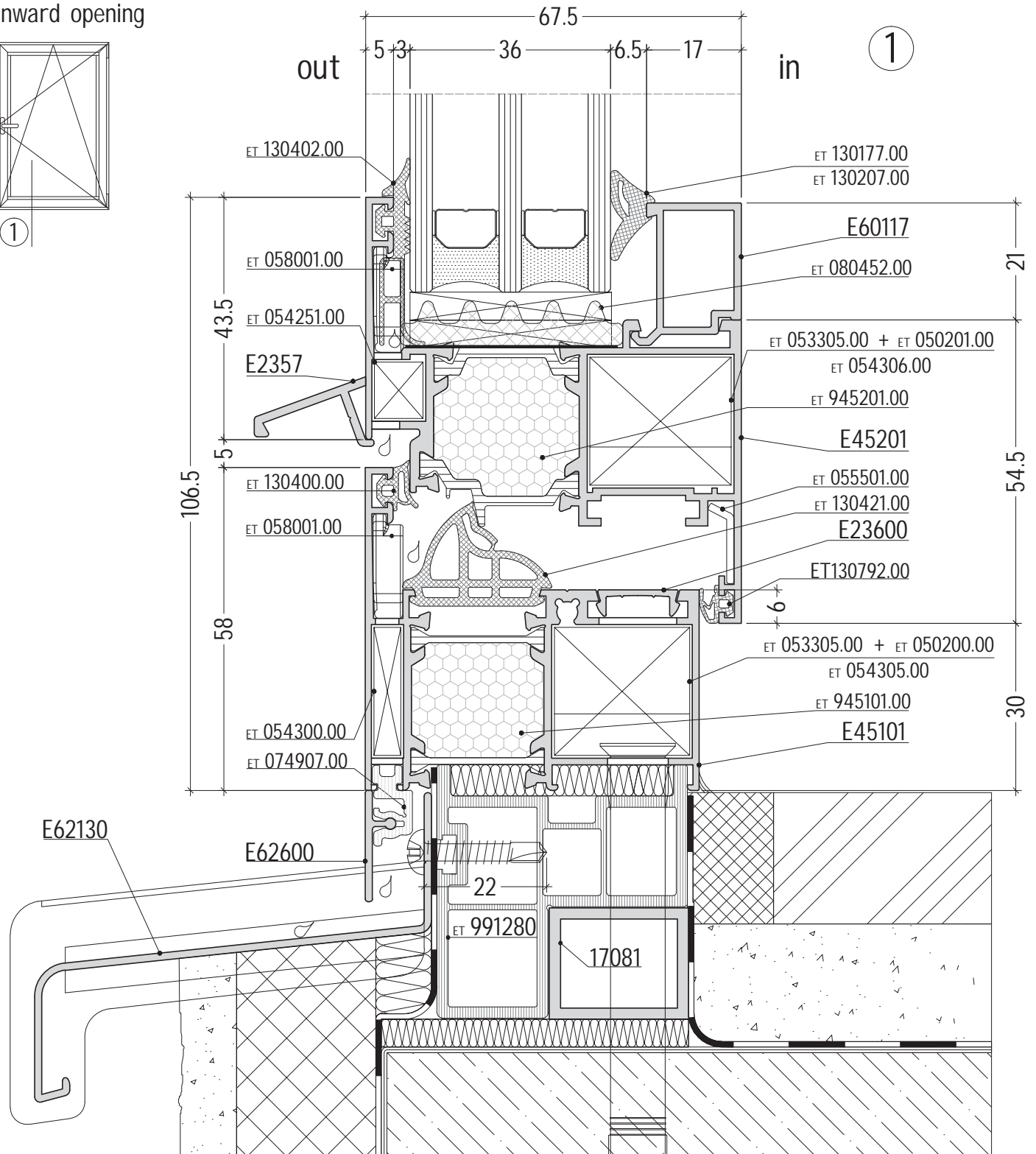
scale : 1:1

D45-41

inward opening



①



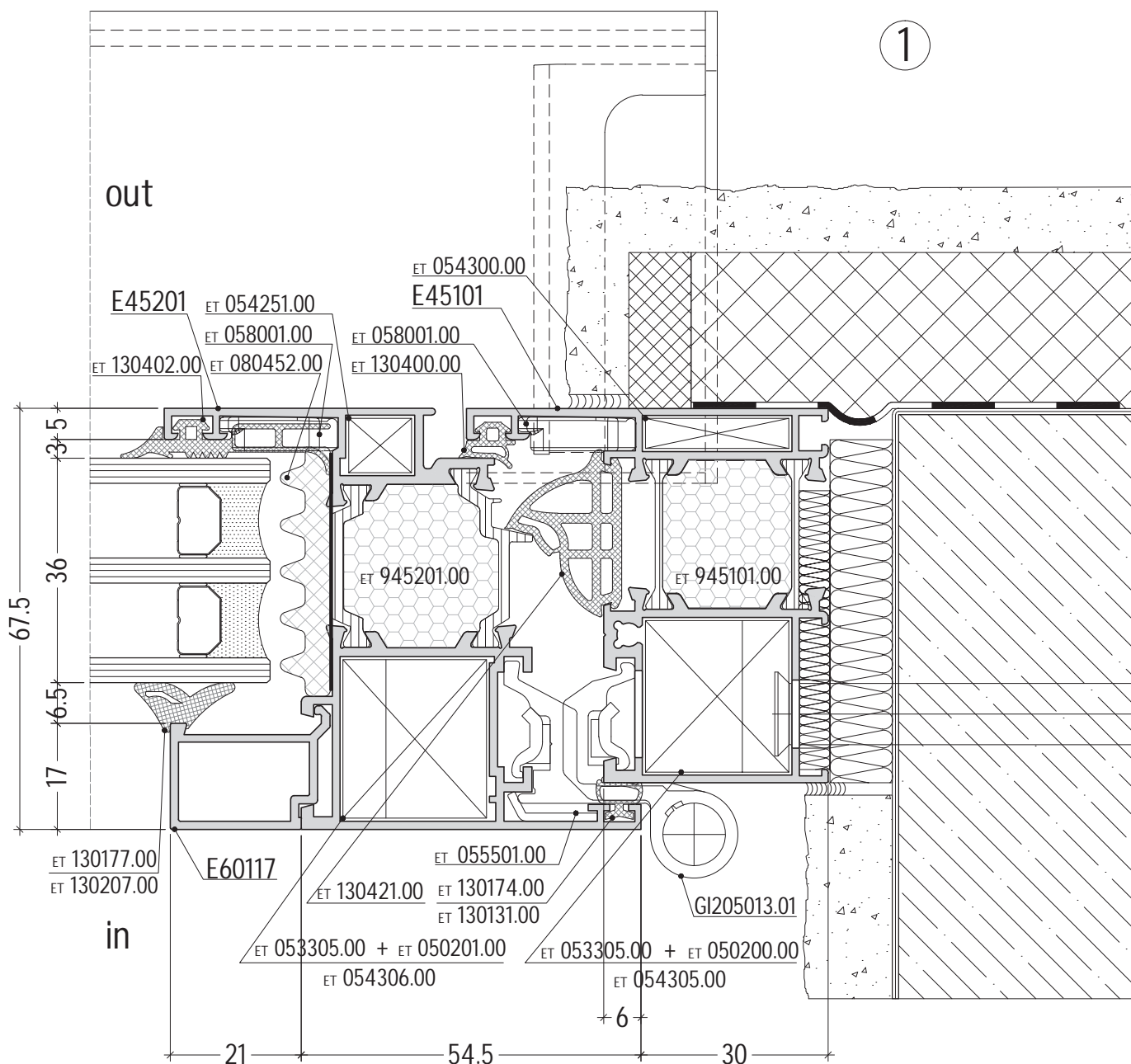
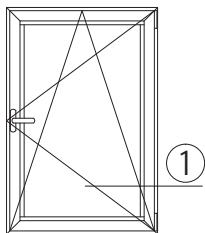
Interface shown on the drawing is an example ONLY!

Connection between backing wall and frame is specific for each single project. It is obligatory to observe different projects' features. All final decisions about materials used, interface finishing, etc. should be approved by the structural / façade engineer responsible for the specific project.

scale : 1:1

D45-42

inward opening

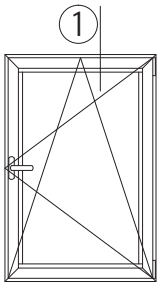


Interface shown on the drawing is an example ONLY!
 Connection between backing wall and frame is specific for each single project. It is obligatory to observe different projects' features. All final decisions about materials used, interface finishing, etc. should be approved by the structural / façade engineer responsible for the specific project.

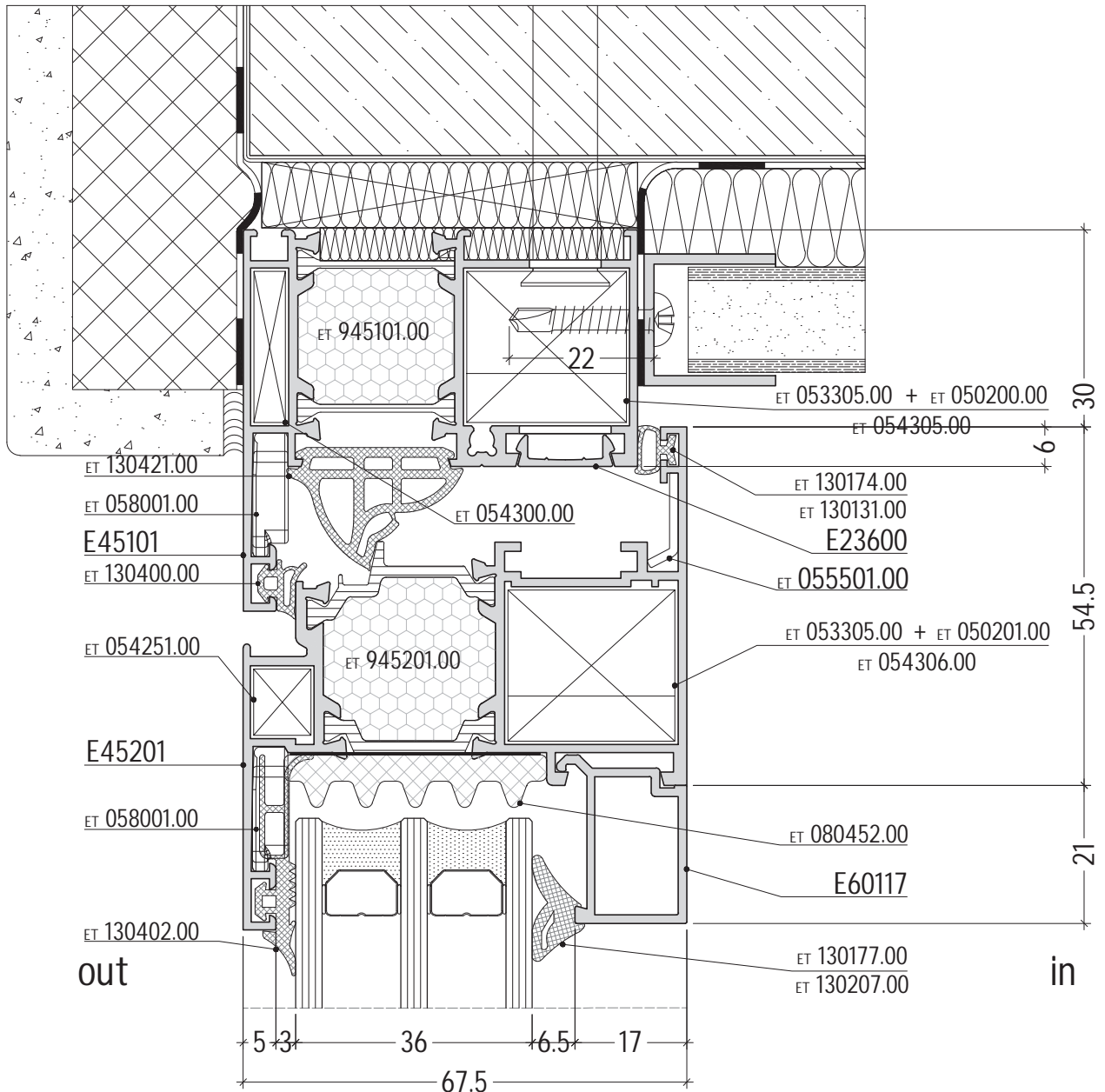
scale : 1:1

D45-43

inward opening



1

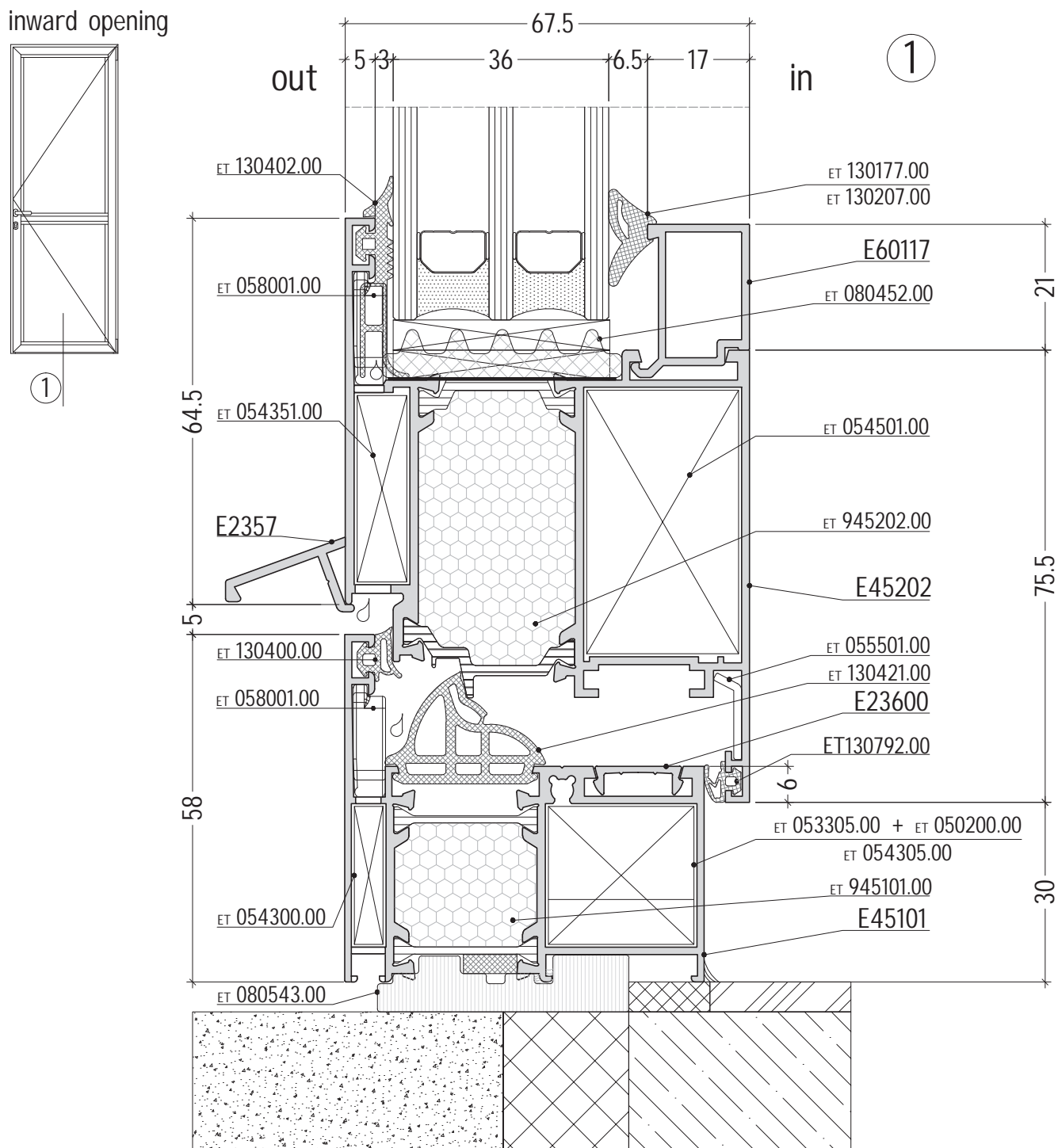


Interface shown on the drawing is an example ONLY!

Connection between backing wall and frame is specific for each single project. It is obligatory to observe different projects' features. All final decisions about materials used, interface finishing, etc. should be approved by the structural / façade engineer responsible for the specific project.

scale : 1:1

D45-44



Interface shown on the drawing is an example ONLY!

Connection between backing wall and frame is specific for each single project. It is obligatory to observe different projects' features. All final decisions about materials used, interface finishing, etc. should be approved by the structural / façade engineer responsible for the specific project.

scale : 1:1

D45-45

GLAZING OPTIONS

external gaskets	INTERNAL GASKETS					GLAZING OPTIONS				
	5 - 6 mm 130176		7 - 8 mm 130177			GLAZING BEADS				
3 mm 1304.11 4 mm 130153	5 mm 130205	6 mm 130206	7 mm 130207	8 mm 130208	10 mm 130210					
	X mm					E601xx	E602xx	E604xx	E605xx	E607xx
130411 130402	40	39	38	37	35	E60107 old code E1114	E60207 old code E1144			
130153	39	38	37	36	34					
130411 130402	37	36	35	34	32	E60110		E60410 old code E1160	E60510 old code E1130	
130153	36	35	34	33	31					
130411 130402	35	34	33	32	30	E60112 old code E5317	E60212			E60712
130153	34	33	32	31	29					
130411 130402	33	32	31	30	28	E60215				
130153	32	31	30	29	27					
130411 130402	30	29	28	27	25	E60117 old code E5311				
130153	29	28	27	26	24					
130411 130402	28	27	26	25	23	E60119 old code E5314	E60219 old code E5304	E60419 old code E5394		
130153	27	26	25	24	22					
130411 130402	25	24	23	22	20	E60122 old code E5312	E60222 old code E1113	E60422		E60722
130153	24	23	22	21	19					
130411 130402	22	21	20	19	17	E60225 old code E5307	E60425 old code E5308			E60725 old code E5348
130153	21	20	19	18	16					
130411 130402	20	19	18	17	15	E60127 old code E5325	E60227			
130153	19	18	17	16	14					
130411 130402	17	16	15	14	12	E60230	E60430			
130153	16	15	14	13	11					
130411 130402	15	14	13	12	10	E60132				
130153	14	13	12	11	9					
130411 130402	12	11	10	9	7	E60235	E60435			
130153	11	10	9	8	6					

Note:
Tolerance in dimension chain ± 0.5 mm

T45-01

external gaskets	INTERNAL GASKETS					GLAZING OPTIONS				
	5 - 6 mm 130176		7 - 8 mm 130177			GLAZING BEADS				
3 mm 130411 5 mm 130205 6 mm 130206 7 mm 130207 8 mm 130208 10 mm 130210 4 mm 130153						Straight sashes E45230 pivot mechanism				
			X mm			E601xx	E602xx	E604xx	E605xx	E607xx
130411 130402	47	46	45	44	42					
130153	46	45	44	43	41	E60107 old code E1114	E60207 old code E1144			
130411 130402	44	43	42	41	39					
130153	43	42	41	40	38	E60110		E60410 old code E1160	E60510 old code E1130	
130411 130402	42	41	40	39	37					
130153	41	40	39	38	36	E60112 old code ES317	E60212			E60712
130411 130402	40	39	38	37	35					
130153	39	38	37	36	34		E60215			
130411 130402	37	36	35	34	32					
130153	36	35	34	33	31	E60117 old code ES311				
130411 130402	36	35	34	33	31					
130153	35	34	33	32	30	E60119 old code ES314	E60219 old code ES304	E60419 old code ES394		
130411 130402	32	31	30	29	27					
130153	31	30	29	28	26	E60122 old code ES312	E60222 old code E1113	E60422		E60722
130411 130402	29	28	27	26	24					
130153	28	27	26	25	23		E60225 old code ES307	E60425 old code ES308		E60725 old code ES348
130411 130402	27	26	25	24	22					
130153	26	25	24	23	21	E60127 old code ES325	E60227			
130411 130402	25	24	23	22	20					
130153	24	23	22	21	19		E60230	E60430		
130411 130402	22	21	20	19	17					
130153	21	20	19	18	16	E60132				
130411 130402	20	19	18	17	15					
130153	19	18	17	16	14		E60235	E60435		
130411 130402	17	16	15	14	12					
130153	16	15	14	13	11	E60137	E60237			

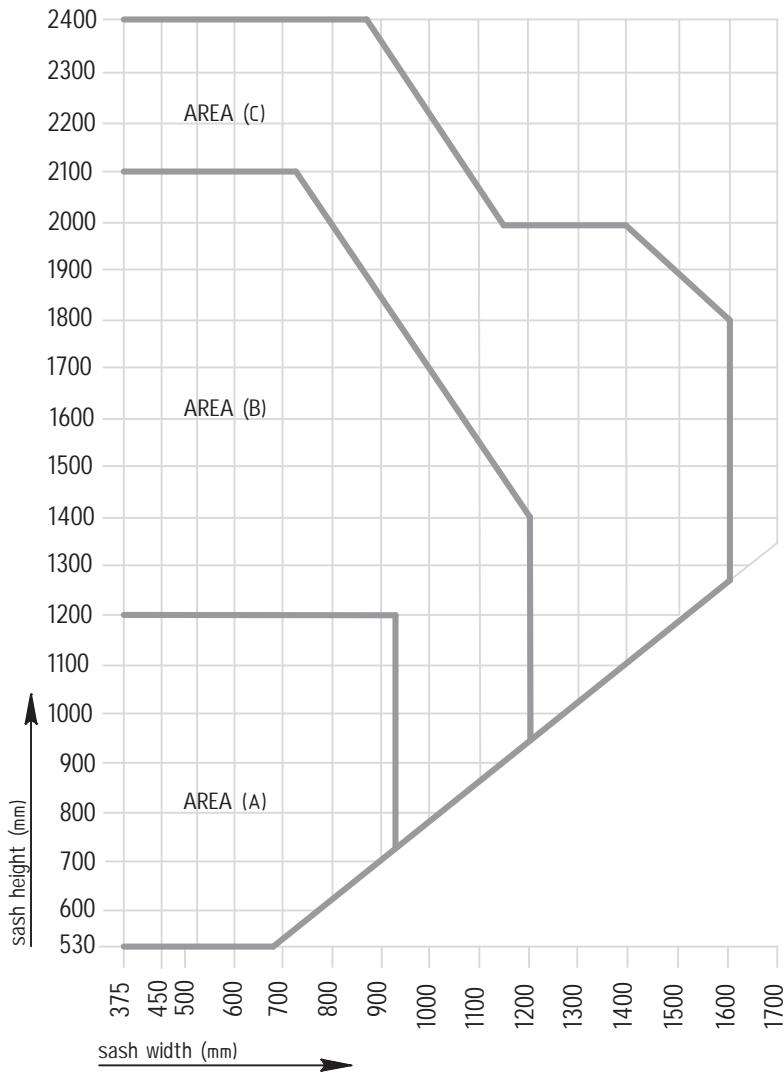
Note:
Tolerance in dimension chain $\pm 0.5\text{mm}$

T45-02

CUTTING LISTS

application diagram for sash size

selection of the appropriate sash profile according to the glazing thickness and the dimensions of the window/door



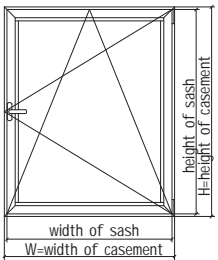
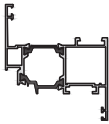
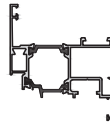
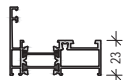
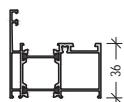
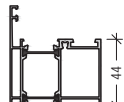
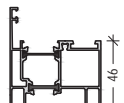
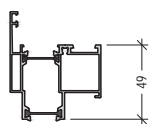
AREA (C)
E45202
E45252
E45240
E45290
E45222
E45245
E45272
E45295

AREA (B)
E45201
E45241
E45251
E45281
E45221
E45271
E45275

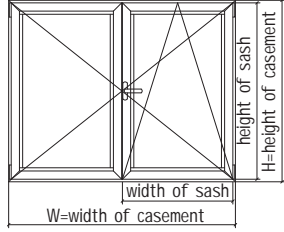
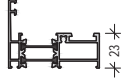
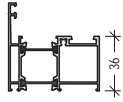
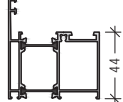
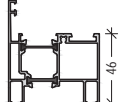
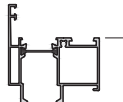
AREA (A)
E45200
E45250

ATTENTION
The diagram is valid for doors/windows which are constructed using corner crimping machine & epoxy resin

calculation of cutting length for one leaf window

		sash profile selection	PVC groove		
frame profile selection		E45200 E45201 E45202 E45240 E45250 E45251 E45252 E45290 E45281 E45241		E45221 E45222 E45245 E45271 E45272 E45275 E45295	
E45100 E45150 E45180		width of sash	W - 34		
		height of sash	H - 34		
E45101 E45190 E45130 E45151 E45154 E45153 E45111 E45161		width of sash	W - 60	W - 56	
		height of sash	H - 60	H - 56	
E45102 E45152		width of sash	W - 76		
		height of sash	H - 76		
E45121		width of sash	W - 80	W - 76	
		height of sash	H - 80	H - 76	
E45185		width of sash	W - 86	W - 82	
		height of sash	H - 86	H - 82	

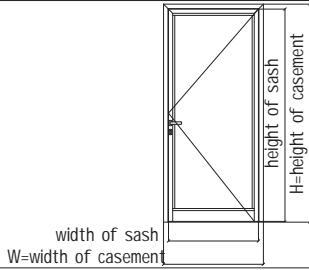
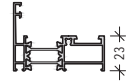
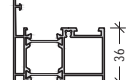
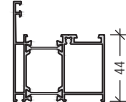
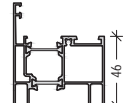
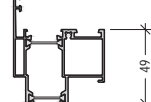

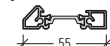
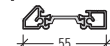
calculation of cutting length for two leaf window

		sash profile selection	PVC groove
frame profile selection		E45200 E45201 E45202 E45240 E45250 E45251 E45252 E45290 E45281 E45241	E45221 E45222 E45245 E45271 E45272 E45275 E45295
E45100 E45150 E45180 	width of sash	$\frac{W - 39}{2}$	
	height of sash	H - 34	
	height of secondary sash profile	H - 106	
E45101 E45190 E45130 E45151 E45154 E45153 E45111 E45161 	width of sash	$\frac{W - 65}{2}$	$\frac{W - 61}{2}$
	height of sash	H - 60	H - 56
	height of secondary sash profile	H - 132	H - 132
E45102 E45152 	width of sash	$\frac{W - 81}{2}$	
	height of sash	H - 76	
	height of secondary sash profile	H - 148	
E45121 	width of sash	$\frac{W - 85}{2}$	$\frac{W - 81}{2}$
	height of sash	H - 80	H - 76
	height of secondary sash profile	H - 152	H - 152
E45185 	width of sash	$\frac{W - 91}{2}$	$\frac{W - 87}{2}$
	height of sash	H - 86	H - 82
	height of secondary sash profile	H - 158	H - 158

calculation of cutting length for one leaf door with door threshold profile

		sash profile selection	PVC groove		
frame profile selection		E45200 E45201 E45202 E45240 E45250 E45251 E45252 E45290 E45281 E45241		E45221 E45222 E45245 E45271 E45272 E45275 E45295	
E45100 E45150 E45180		width of sash	W - 34		
		height of sash	H - 24		
E45101 E45190 E45130 E45151 E45154 E45153 E45111 E45161		width of sash	W - 60	W - 56	
		height of sash	H - 37	H - 35	
E45102 E45152		width of sash	W - 76		
		height of sash	H - 45		
E45121		width of sash	W - 80	W - 76	
		height of sash	H - 47	H - 45	
E45185		width of sash	W - 86	W - 82	
		height of sash	H - 50	H - 48	
four side sash with door threshold profile		E45800	E45800		
		E45801	E45801		

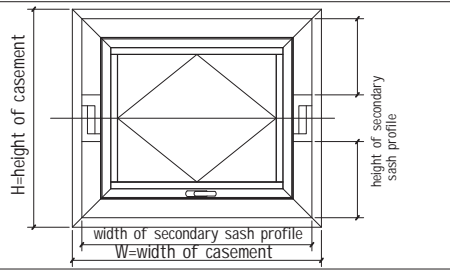
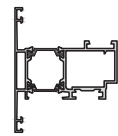
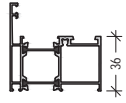
calculation of cutting length for one leaf door with bottom rail and threshold profile

		sash profile selection	PVC groove
frame profile selection		E45200 E45201 E45202 E45240 E45250 E45251 E45252 E45290 E45281 E45241	E45221 E45222 E45245 E45271 E45272 E45275 E45295
E45100 E45150 E45180		width of sash	W - 34
		height of sash	H - 36
E45101 E45190 E45130 E45151 E45154 E45153 E45111 E45161		width of sash	W - 60
		height of sash	H - 49
E45102 E45152		width of sash	W - 76
		height of sash	H - 57
E45121		width of sash	W - 80
		height of sash	H - 59
E45185		width of sash	W - 86
		height of sash	H - 62
three side sash with door bottom rail and threshold profile		E45330 door bottom rail for straight sash profile E45331 door bottom rail E45800 E45801	  

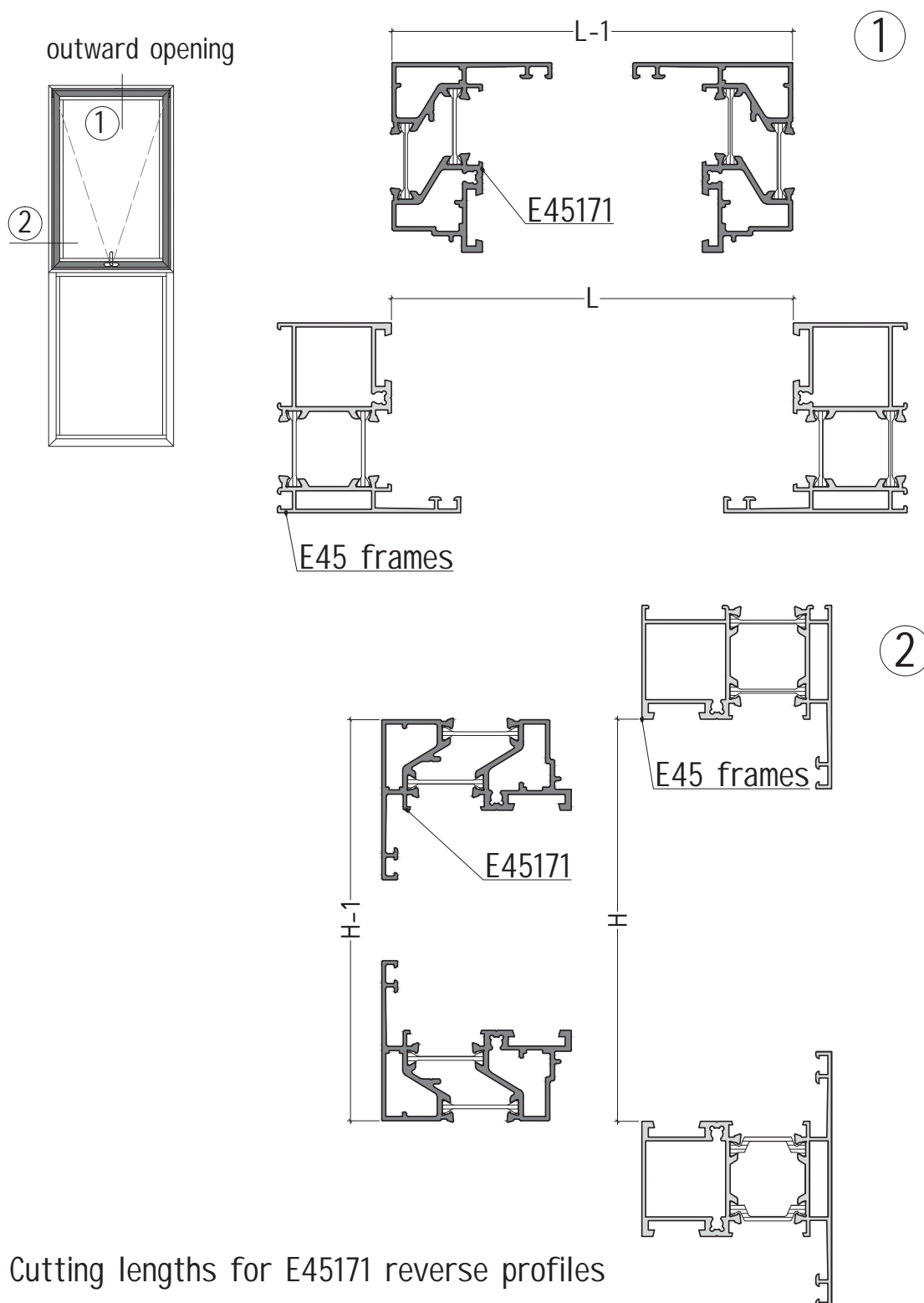
calculation of cutting length for two leaf door with bottom rail and threshold profile

		sash profile selection	PVC groove
frame profile selection		E45200 E45201 E45202 E45240 E45250 E45251 E45252 E45290 E45281 E45241	E45221 E45222 E45245 E45271 E45272 E45275 E45295
E45100 E45150 E45180		width of sash	$\frac{W - 39}{2}$
		height of sash	H - 36
		height of secondary sash profile	H - 72
E45101 E45190 E45130 E45151 E45154 E45153 E45111 E45161		width of sash	$\frac{W - 65}{2}$
		height of sash	H - 49
		height of secondary sash profile	H - 85
E45102 E45152		width of sash	$\frac{W - 81}{2}$
		height of sash	H - 57
		height of secondary sash profile	H - 93
E45121		width of sash	$\frac{W - 85}{2}$
		height of sash	H - 59
		height of secondary sash profile	H - 95
E45185		width of sash	$\frac{W - 91}{2}$
		height of sash	H - 62
		height of secondary sash profile	H - 98
three side sash with door bottom rail and threshold profile		E45330 door bottom rail for straight sash profile E45331 door bottom rail E45800 E45801	E45330 door bottom rail for straight sash profile E45331 door bottom rail E45800 E45801

calculation of cutting length for pivot mechanism

		sash profile selection E45230 pivot mechanism 
frame profile selection		
E45101 	width of sash	W - 126
	height of sash	H - 126
	width of secondary sash profile	H - 61
	height of secondary sash profile	$\frac{H - 211}{2}$

cutting list for profiles E45171



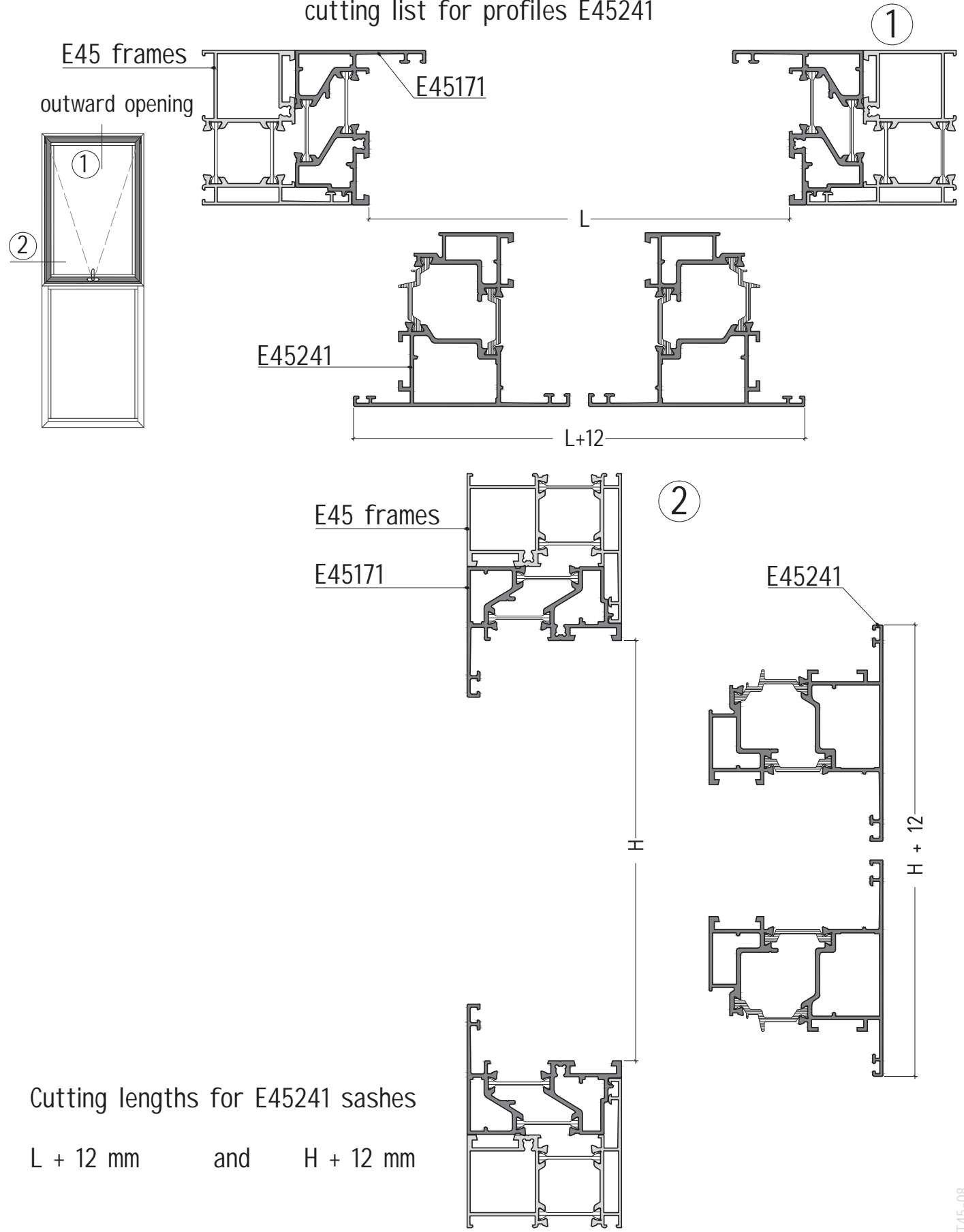
Cutting lengths for E45171 reverse profiles

L - 1 mm

and

H - 1 mm

cutting list for profiles E45241

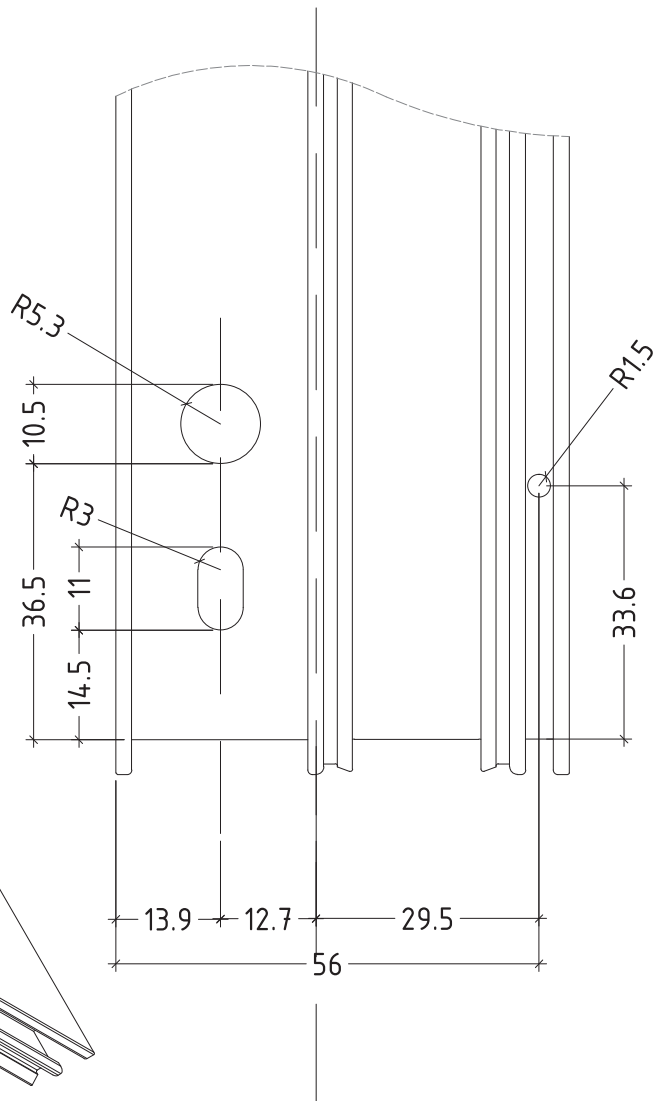
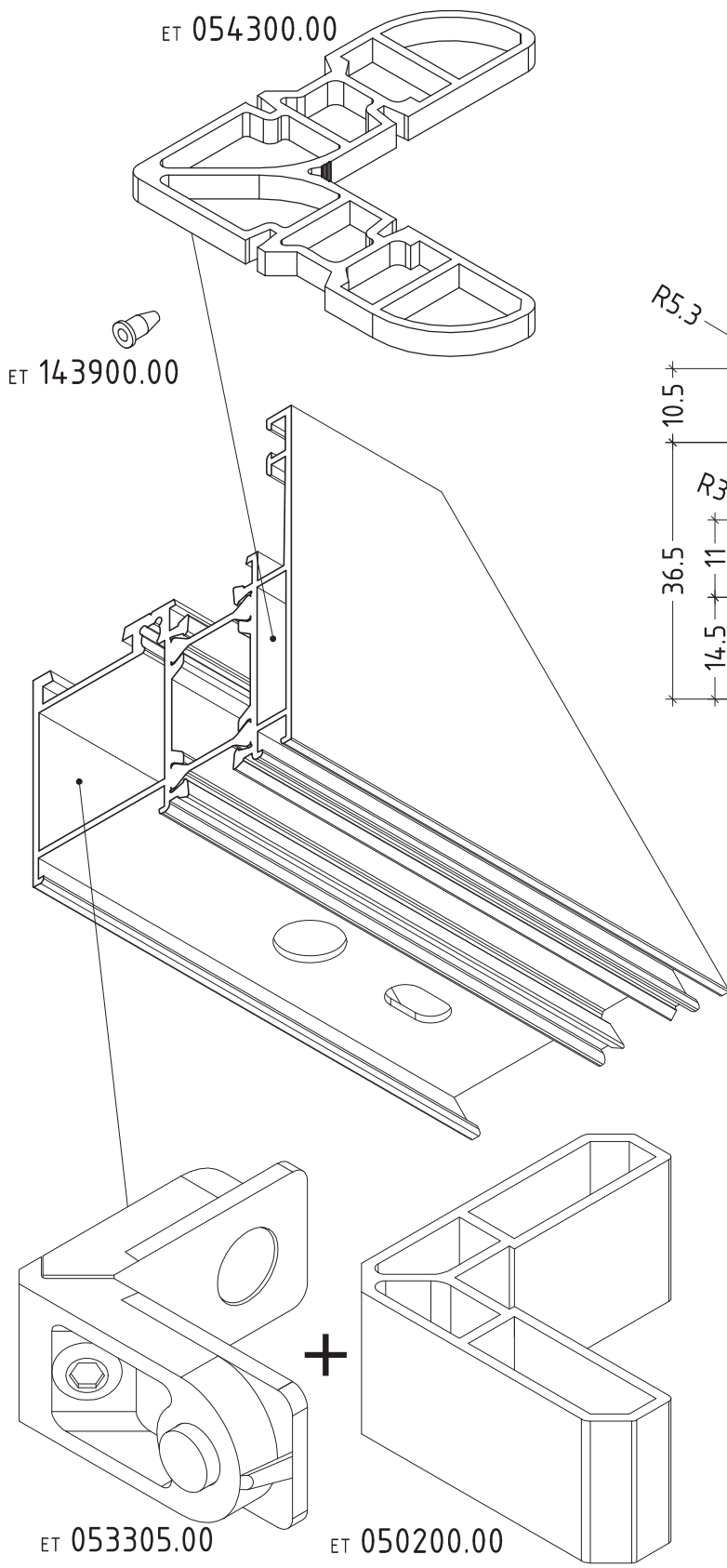


Cutting lengths for E45241 sashes

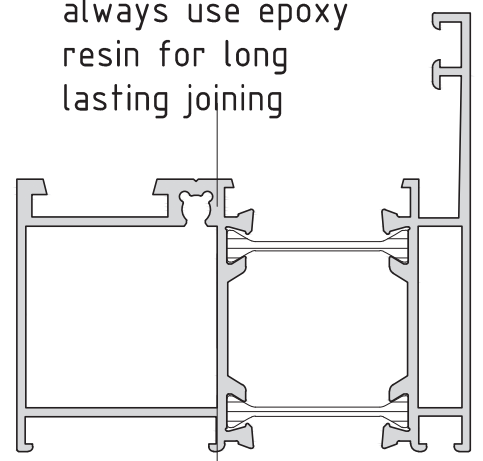
$L + 12 \text{ mm}$ and $H + 12 \text{ mm}$

MACHINING

machining to use die cast joints and al. joint corner bracket



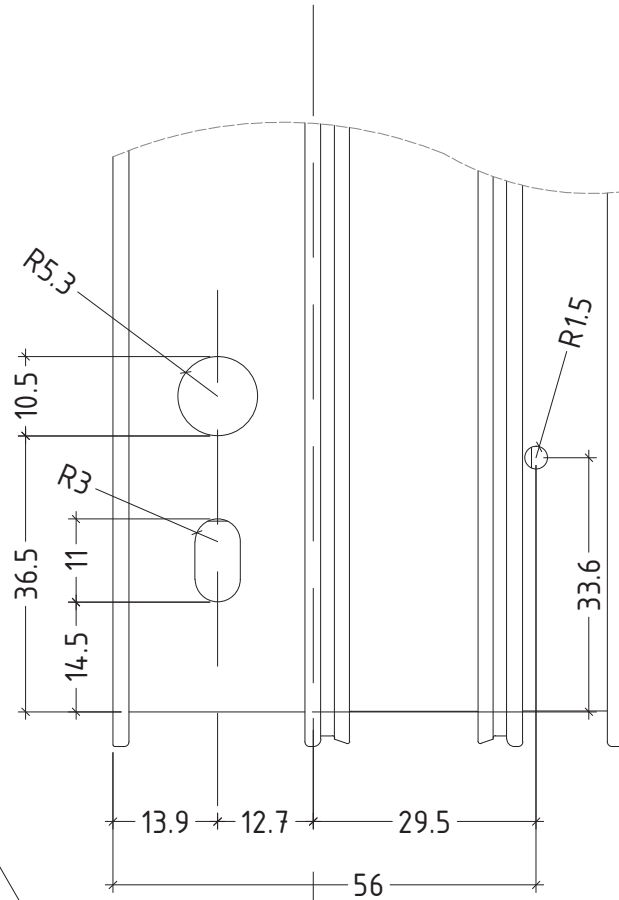
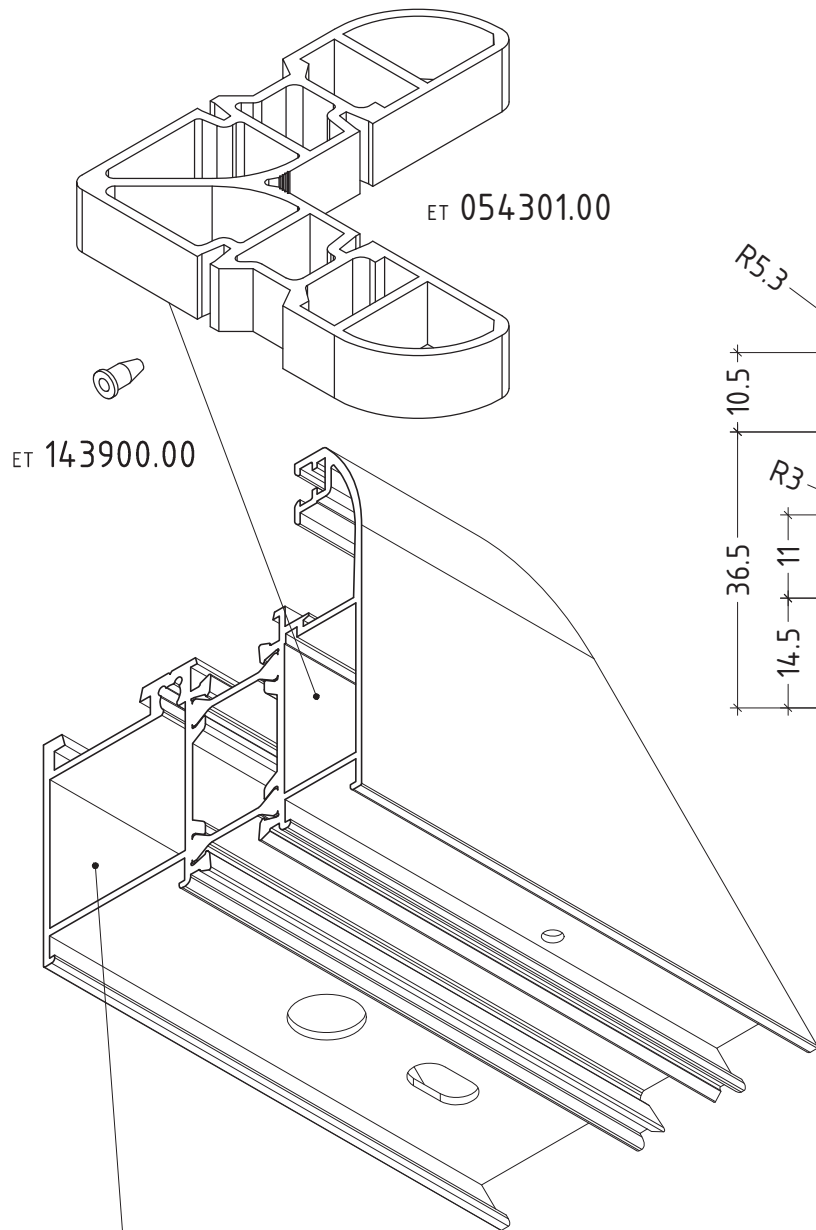
always use epoxy resin for long lasting joining



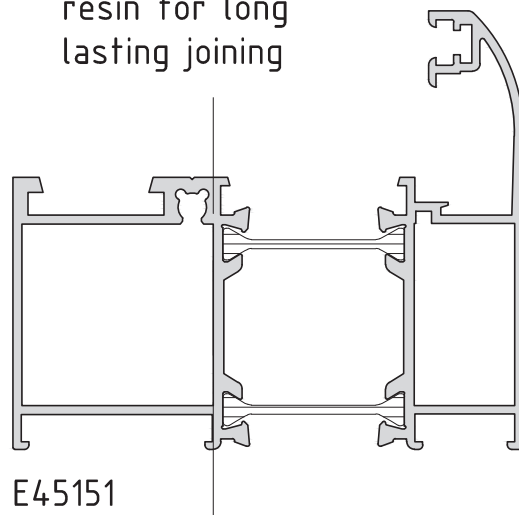
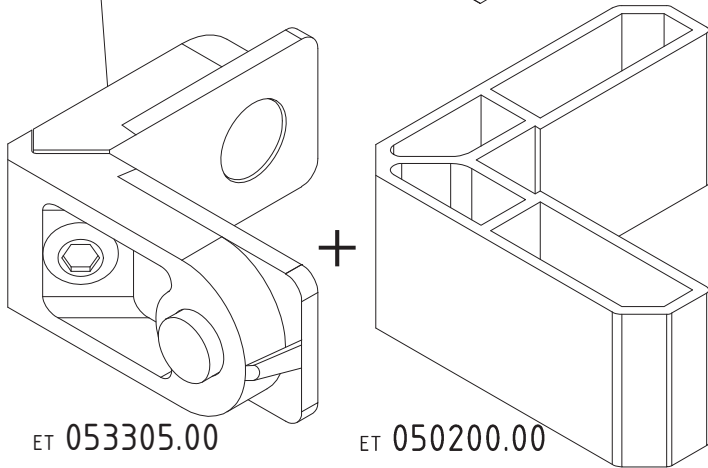
scale : 1:1

D45-01

machining to use die cast joints and al. joint corner bracket



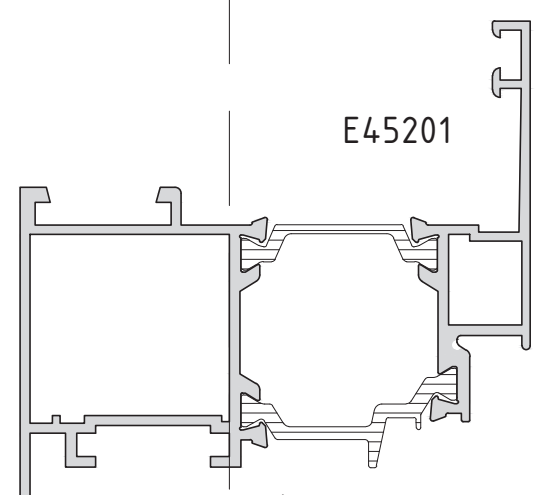
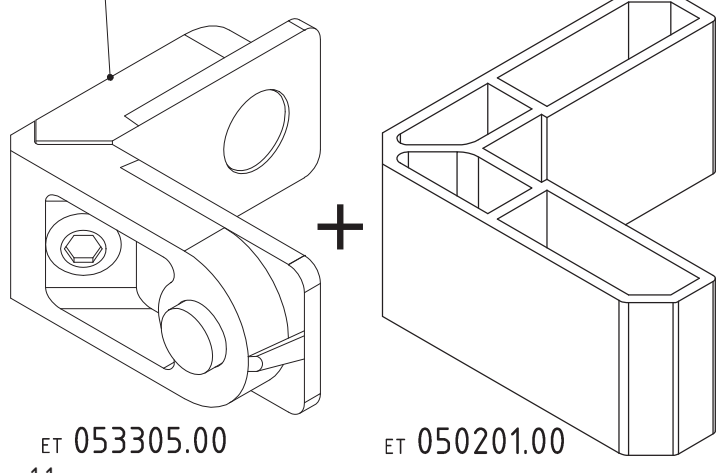
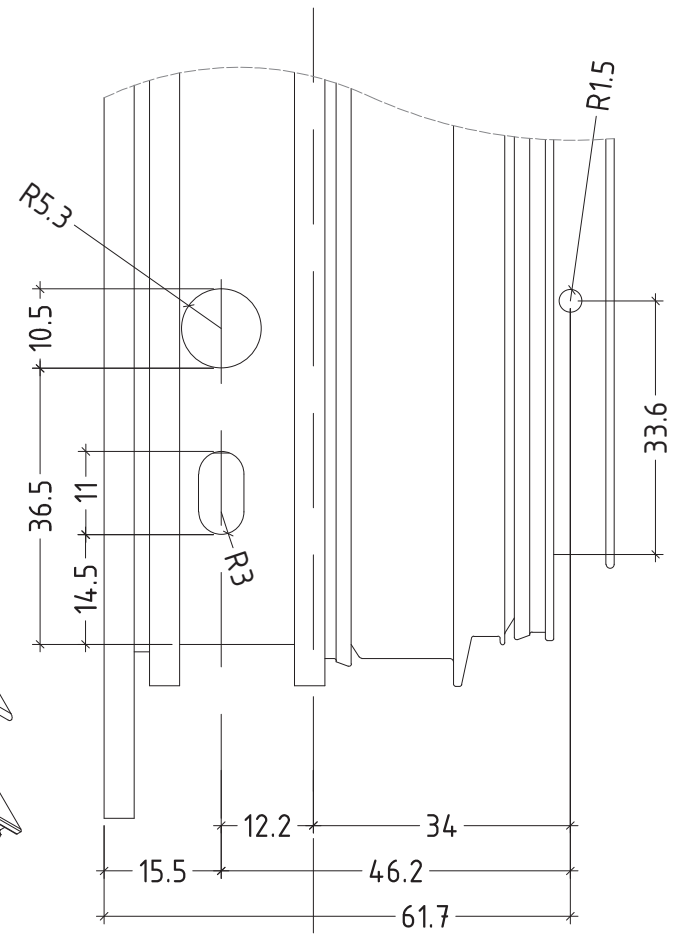
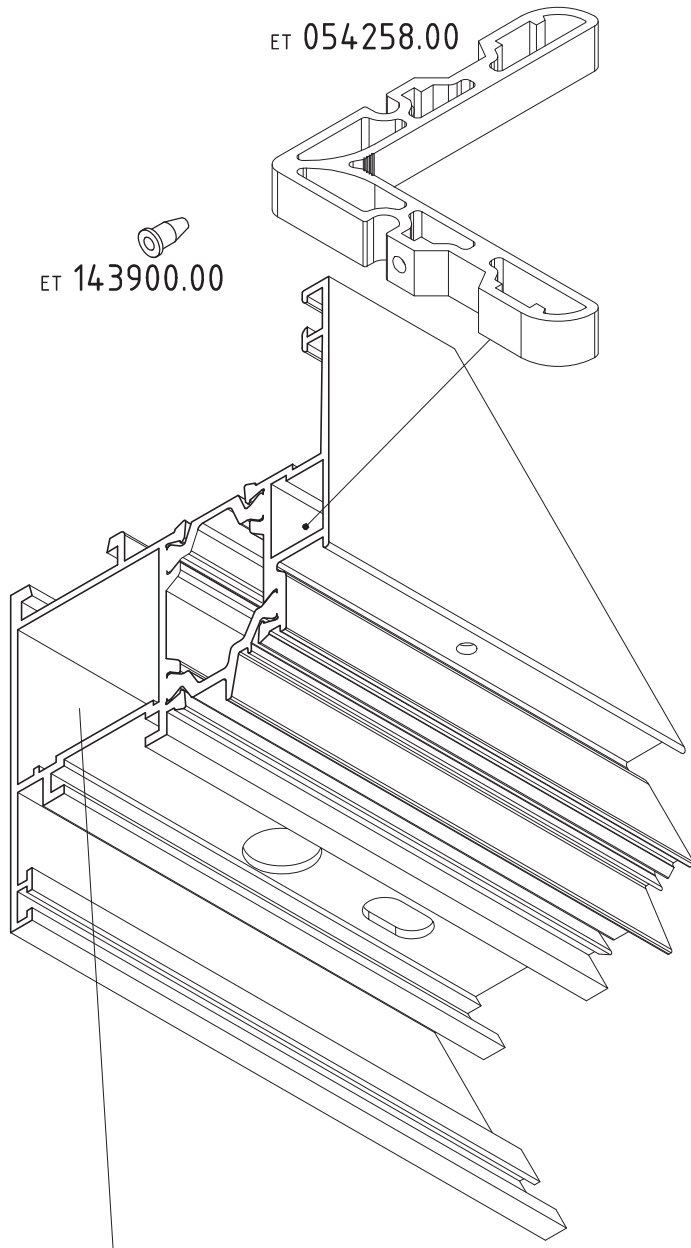
always use epoxy resin for long lasting joining



scale : 1:1

D45-02

machining to use die cast joints and al. joint corner bracket



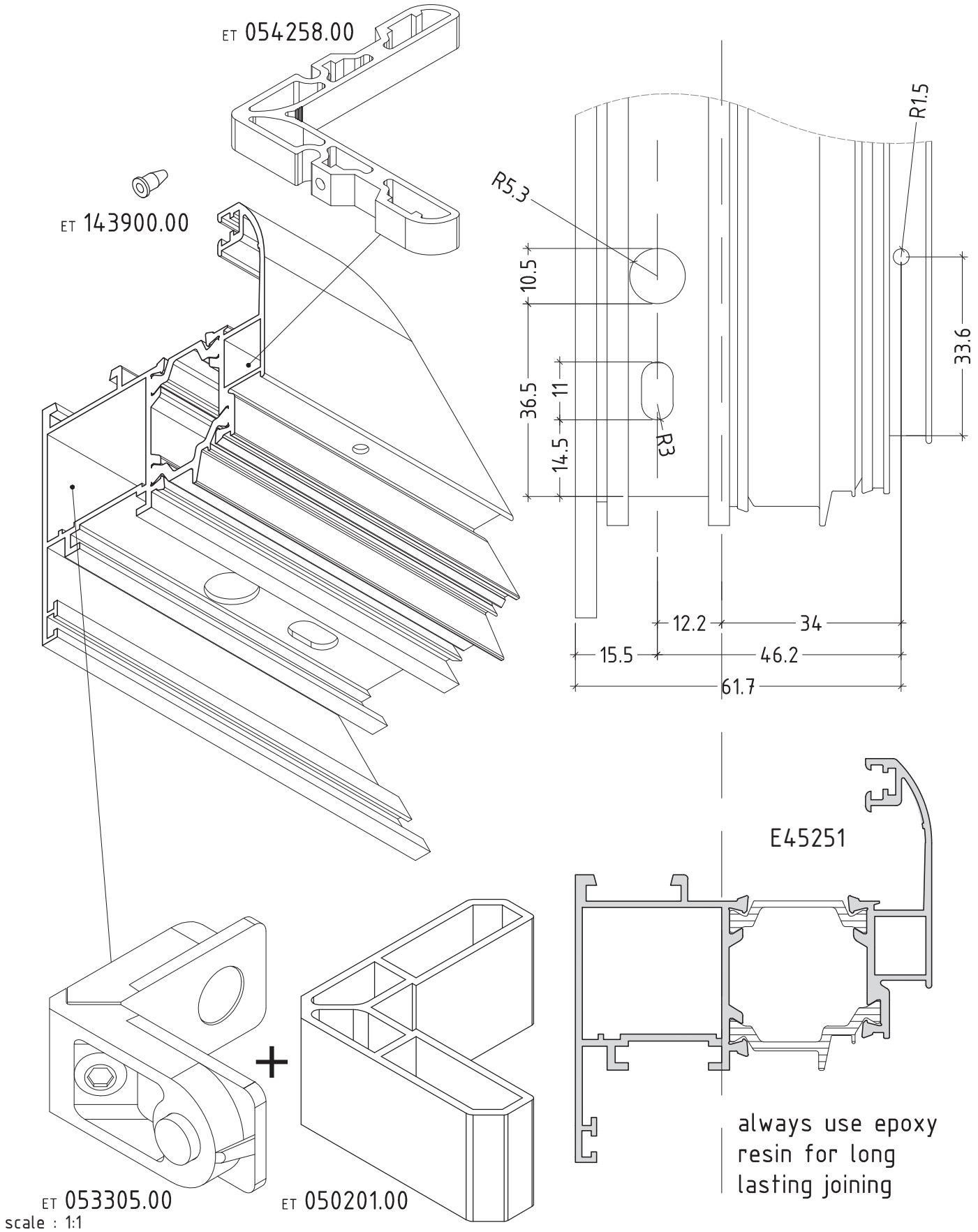
always use epoxy resin for long lasting joining

ET 053305.00
scale : 1:1

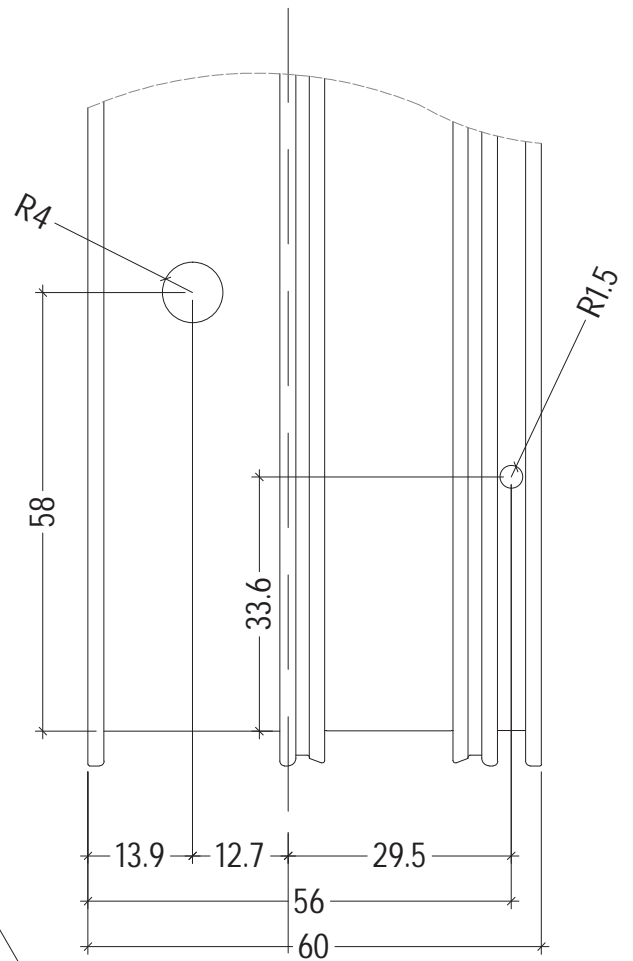
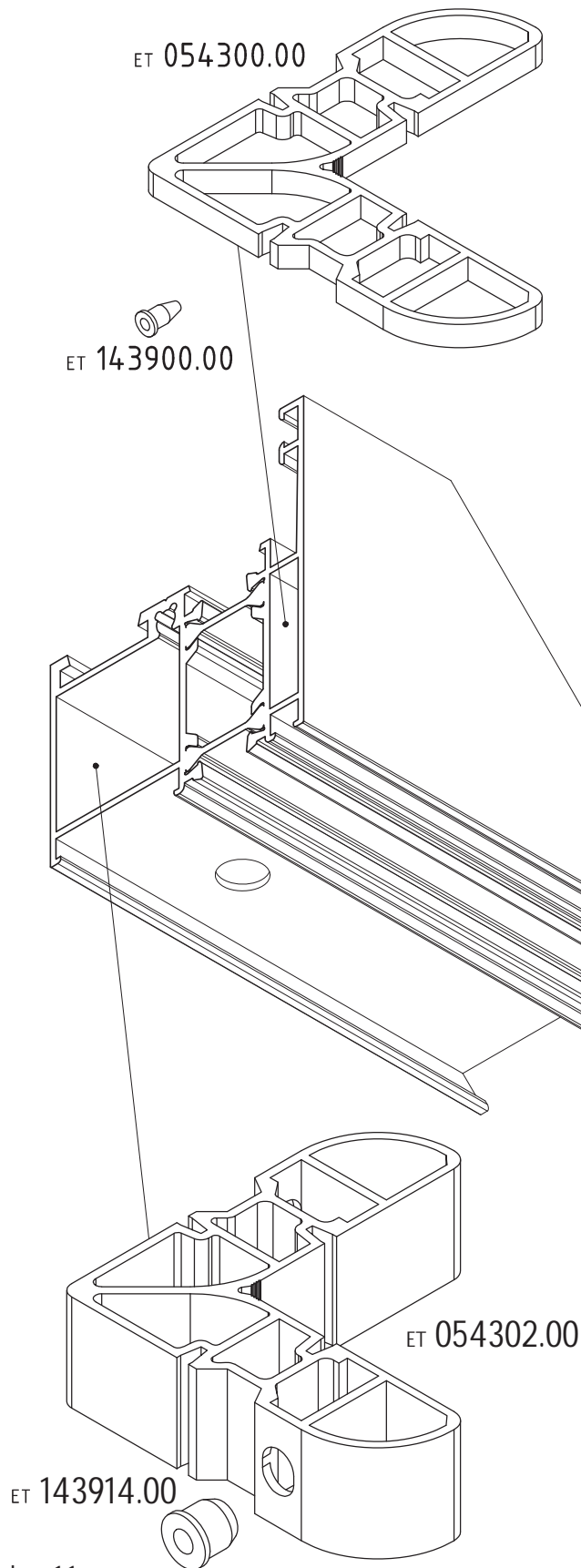
ET 050201.00

D45-03

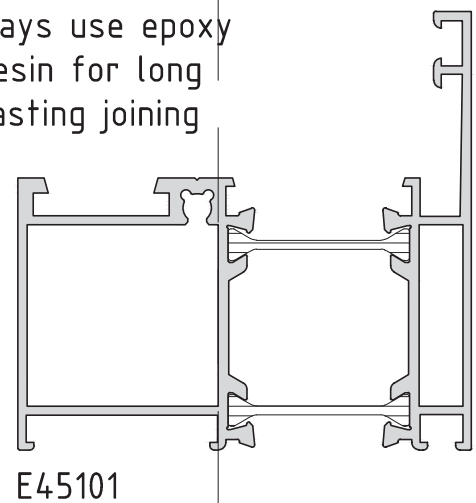
machining to use die cast joints and al. joint corner bracket



machining to use roll pins extruded aluminium joint corner brackets



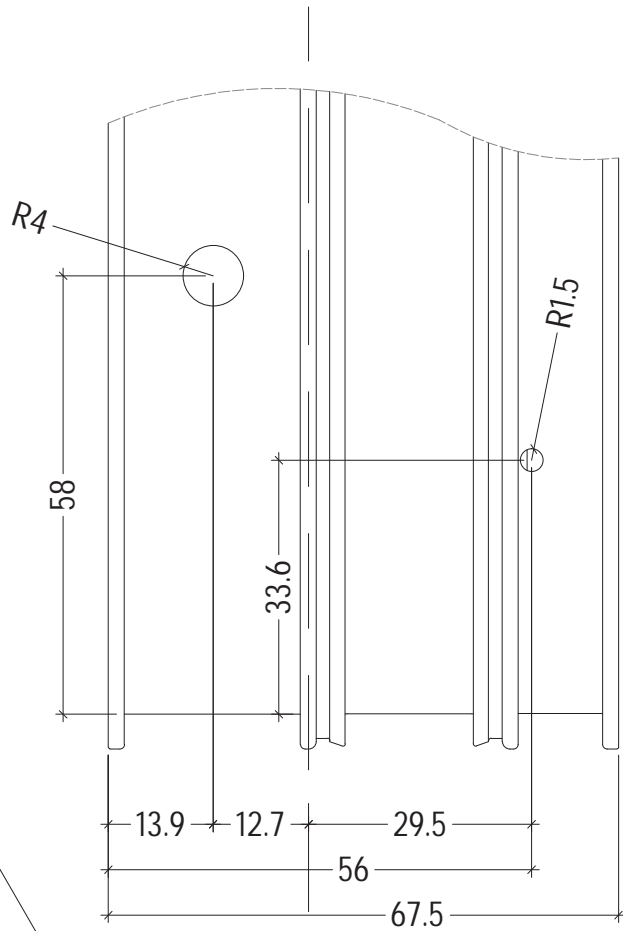
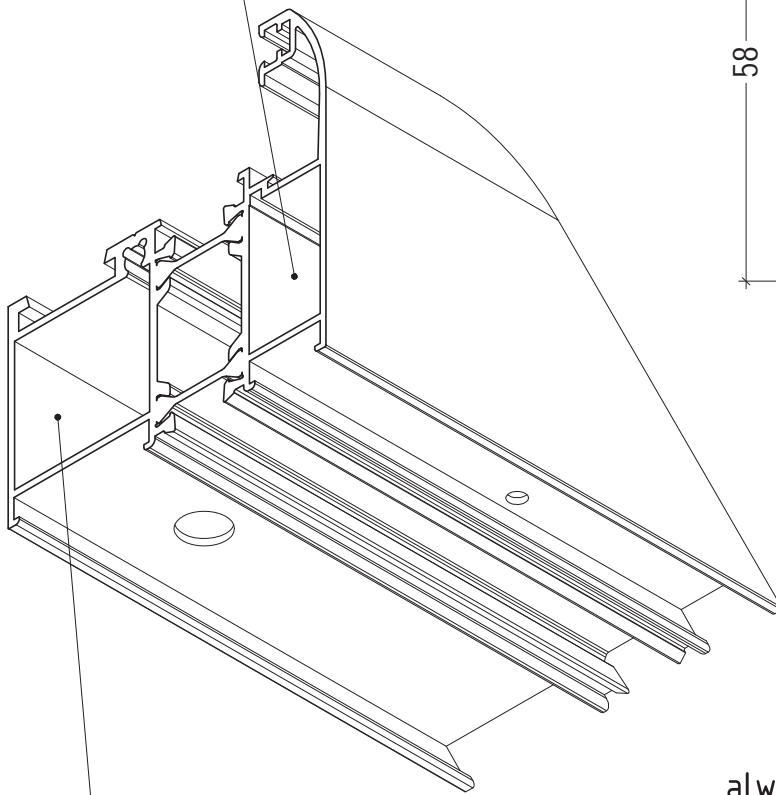
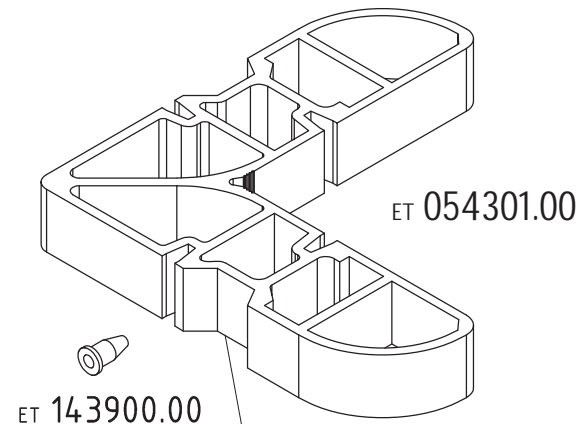
always use epoxy resin for long lasting joining



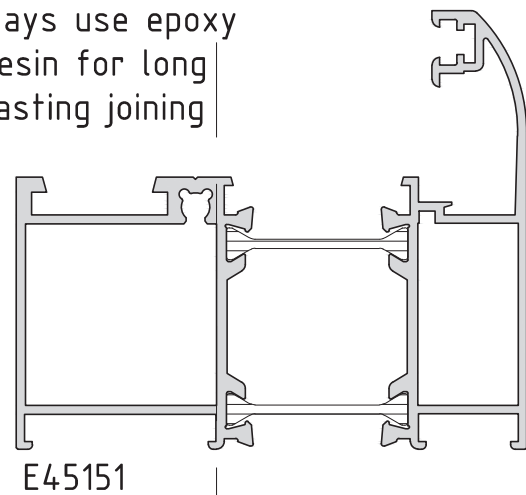
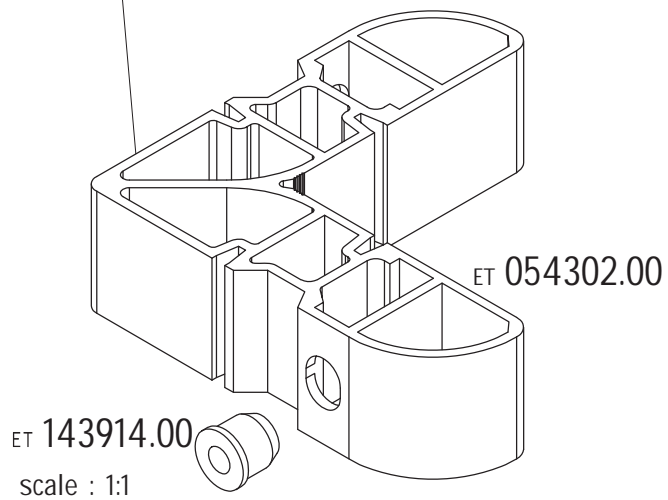
scale : 1:1

D45-05

machining to use roll pins extruded aluminium joint corner brackets

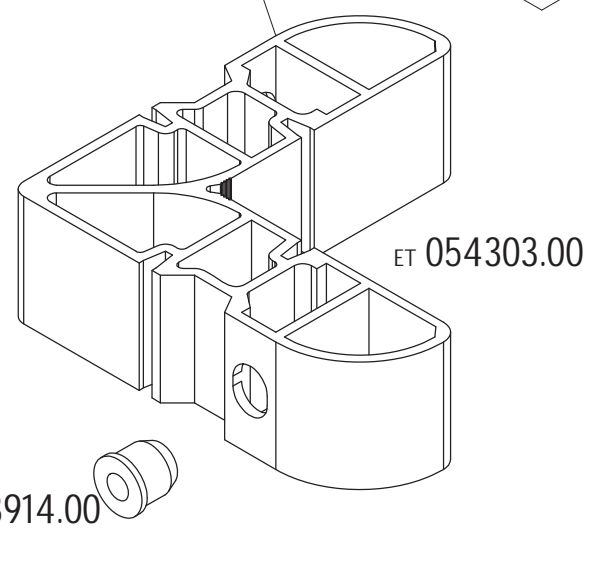
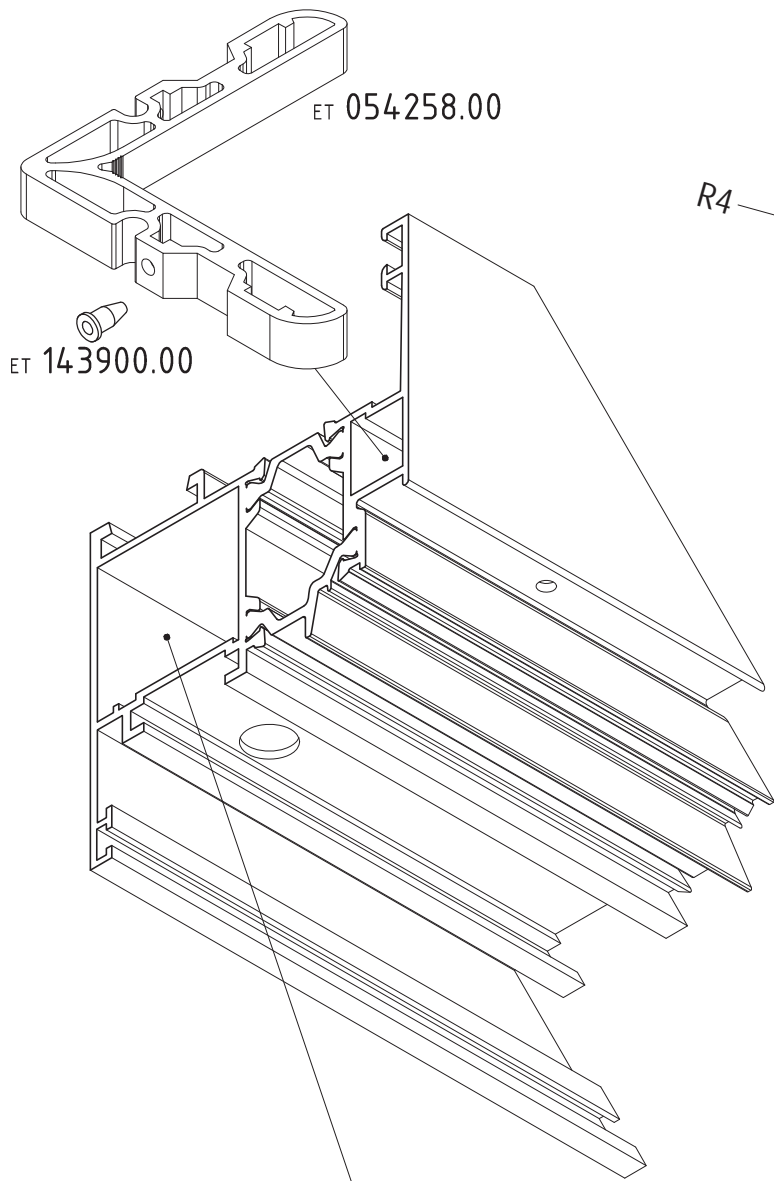


always use epoxy resin for long lasting joining

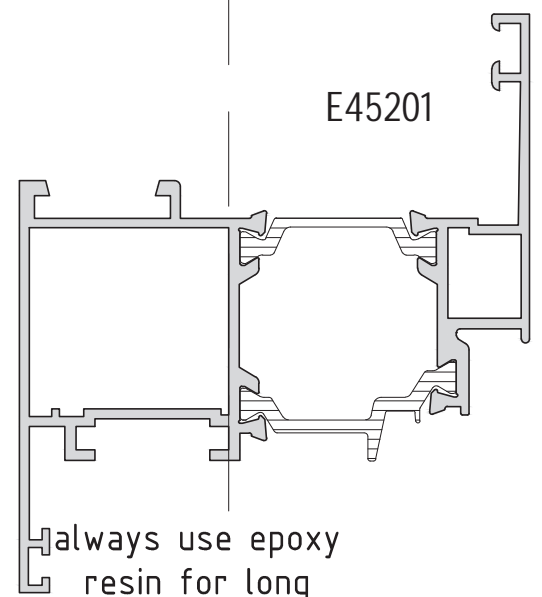
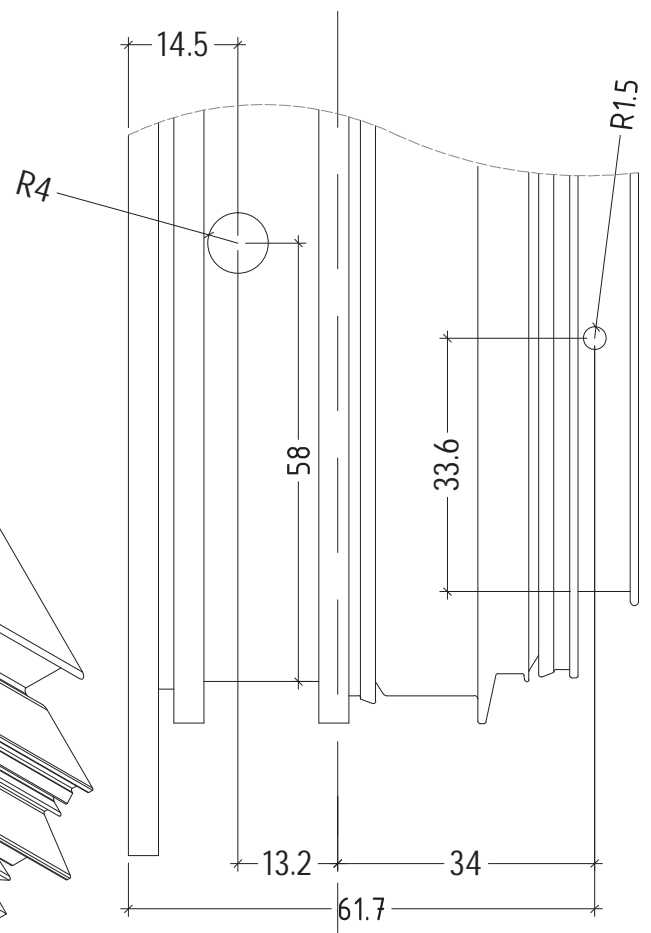


D45-06

machining to use roll pins extruded aluminium joint corner brackets



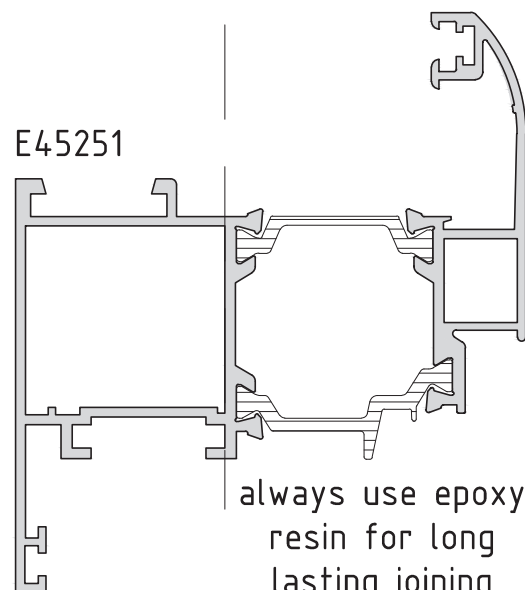
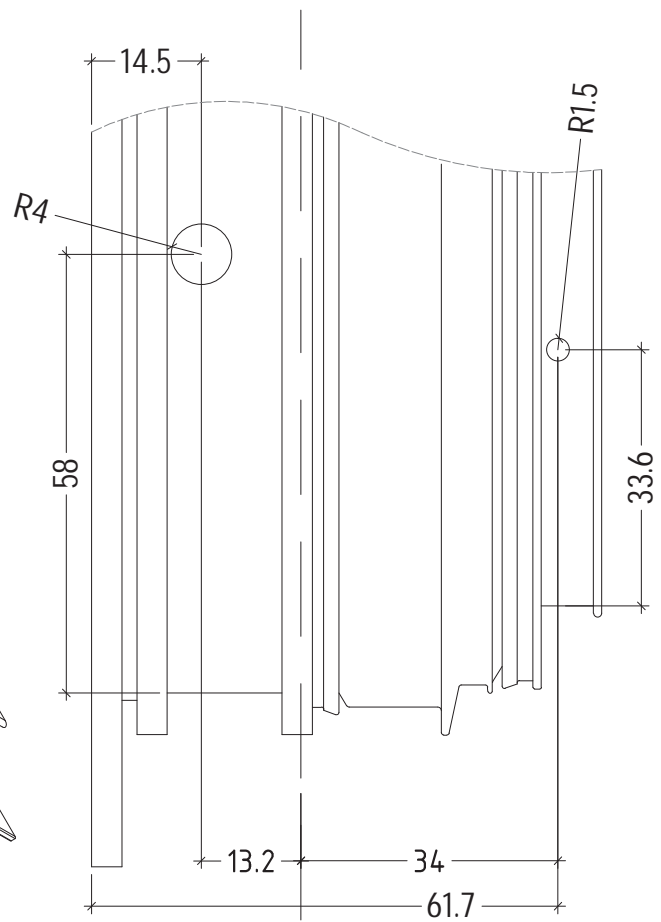
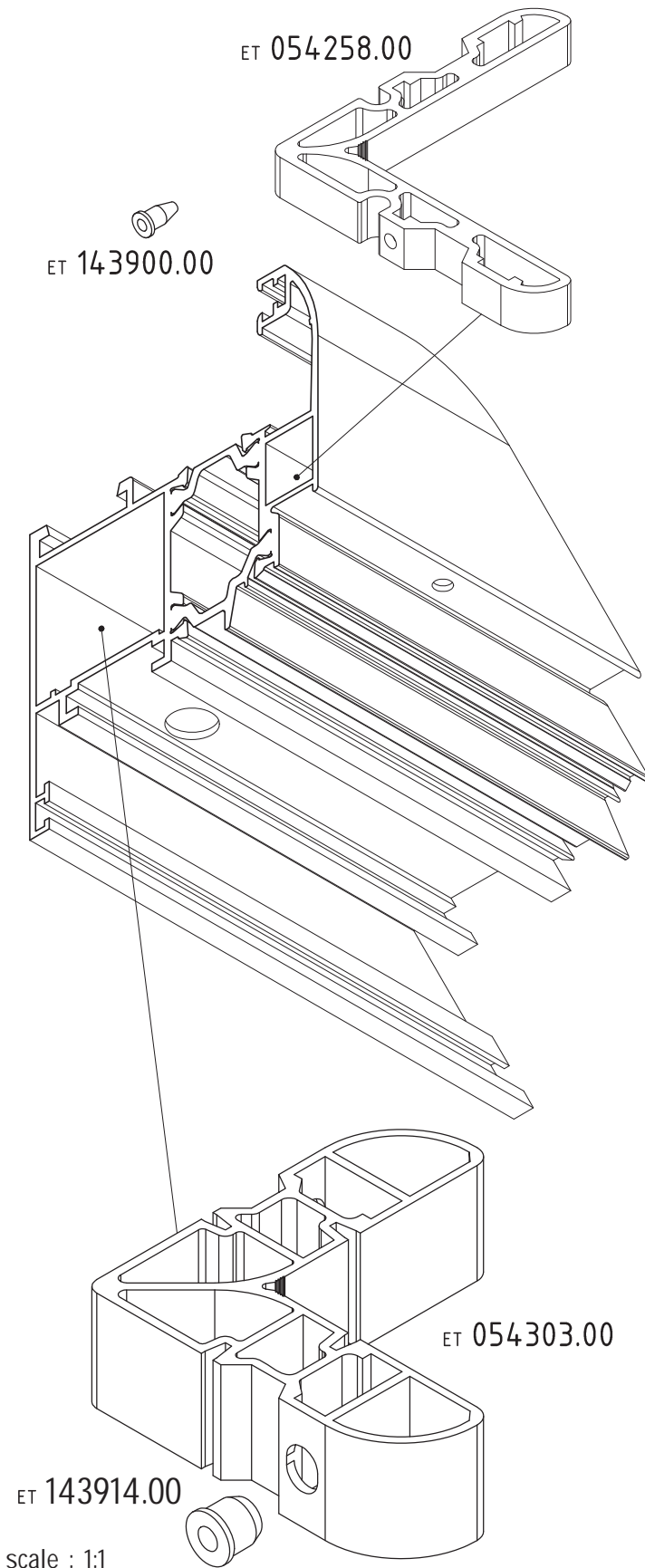
ET 143914.00
scale : 1:1



always use epoxy resin for long lasting joining

D45-07

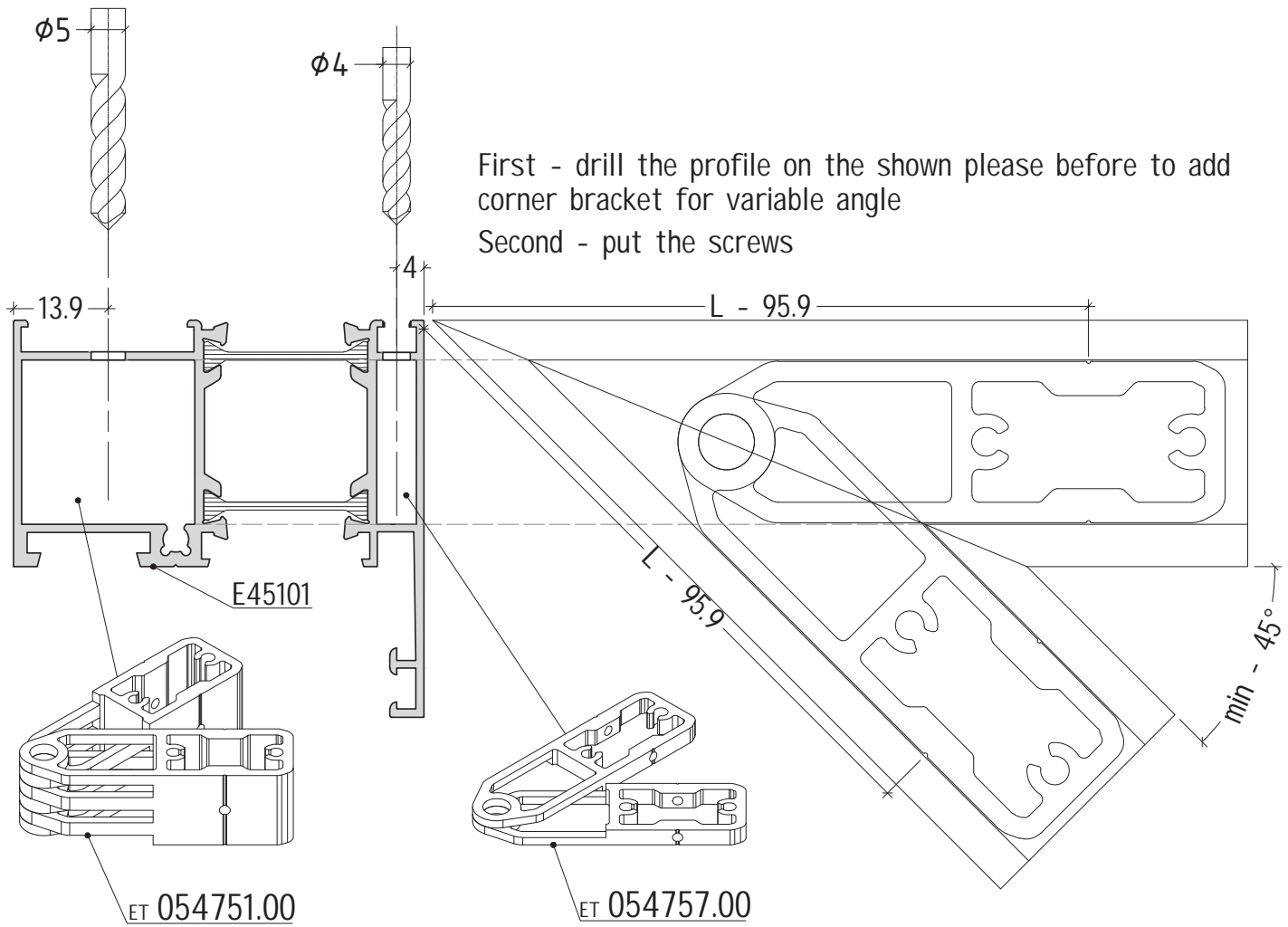
machining to use roll pins extruded aluminium joint corner brackets



always use epoxy resin for long lasting joining

D45-08

corner bracket for variable angle for frame E45101



for profile: E 45101									
α (°)	L (mm)	α (°)	L (mm)	α (°)	L (mm)	α (°)	L (mm)	α (°)	L (mm)
45	95.9	74	76.5	103	67.1	132	60.8	161	55.9
46	94.8	75	76.1	104	66.8	133	60.6	162	55.7
47	93.8	76	75.7	105	66.6	134	60.5	163	55.6
48	92.9	77	75.3	106	66.3	135	60.3	164	55.4
49	92.0	78	74.9	107	66.1	136	60.1	165	55.2
50	91.1	79	74.5	108	65.8	137	59.9	166	55.1
51	90.2	80	74.1	109	65.6	138	59.7	167	54.9
52	89.4	81	73.7	110	65.4	139	59.6	168	54.8
53	88.6	82	73.4	111	65.1	140	59.4	169	54.6
54	87.8	83	73.0	112	64.9	141	59.2	170	54.5
55	87.1	84	72.7	113	64.7	142	59.0	171	54.3
56	86.4	85	72.3	114	64.5	143	58.9	172	54.1
57	85.7	86	72.0	115	64.2	144	58.7	173	54.0
58	85.0	87	71.7	116	64.0	145	58.5	174	53.8
59	84.4	88	71.3	117	63.8	146	58.3	175	53.7
60	83.7	89	71.0	118	63.6	147	58.2	176	53.5
61	83.1	90	70.7	119	63.4	148	58.0	177	53.4
62	82.5	91	70.4	120	63.2	149	57.8	178	53.2
63	81.9	92	70.1	121	63.0	150	57.7	179	53.1
64	81.4	93	69.8	122	62.8	151	57.5	180	52.9
65	80.8	94	69.5	123	62.6	152	57.3		
66	80.3	95	69.2	124	62.4	153	57.2		
67	79.8	96	68.9	125	62.2	154	57.0		
68	79.3	97	68.6	126	62.0	155	56.8		
69	78.8	98	68.4	127	61.8	156	56.7		
70	78.3	99	68.1	128	61.6	157	56.5		
71	77.9	100	67.8	129	61.4	158	56.4		
72	77.4	101	67.6	130	61.2	159	56.2		
73	77.0	102	67.3	131	61.0	160	56.0		

attention
always use epoxy
resin for long
lasting joining

Note:

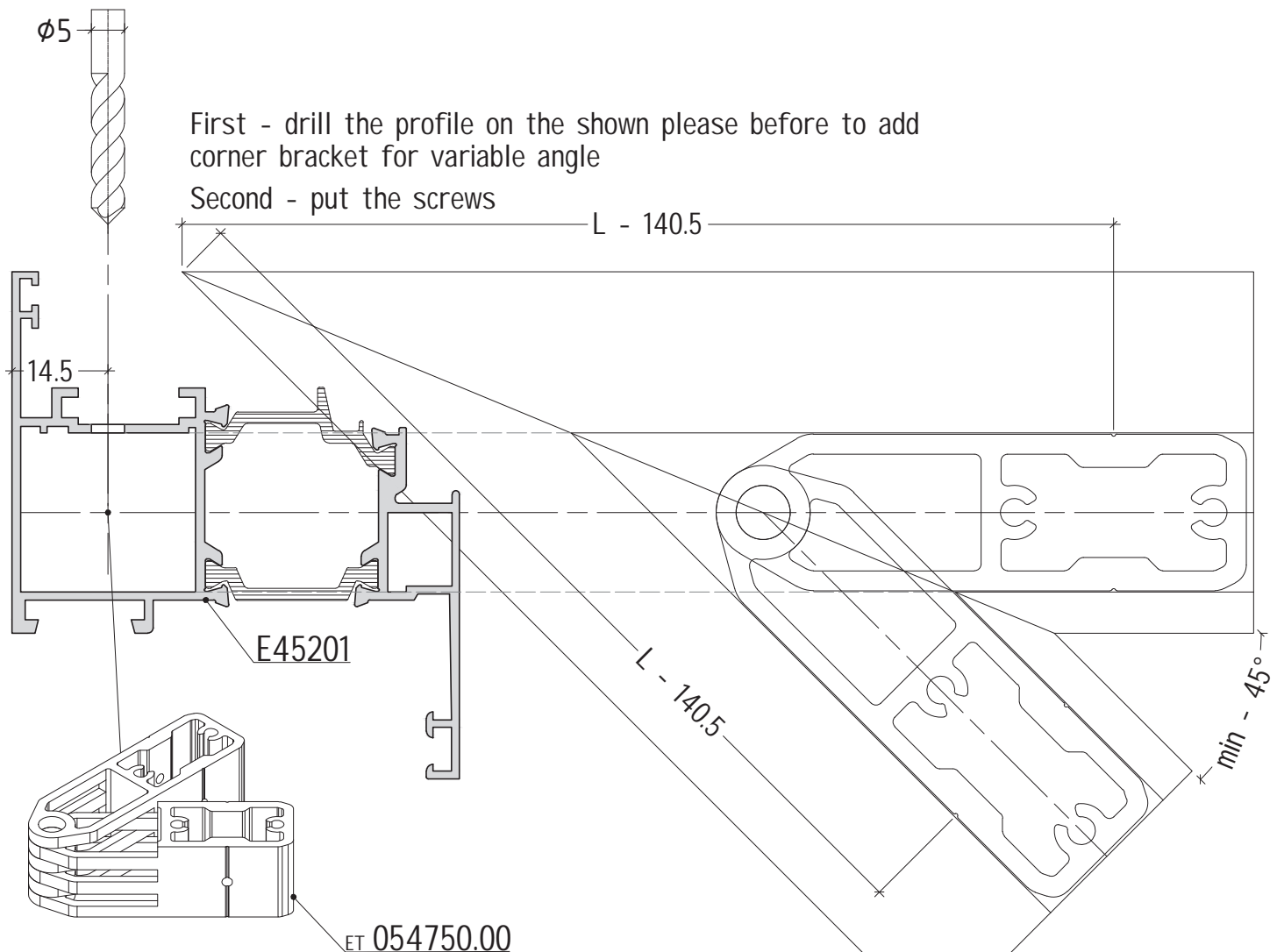
The tables concern only the profiles shown here.

For other profiles the tables are different.

In case you are using other corner bracket for variable angle for other profiles, please contact ETEM R&D department for additional information.

D45-09

corner bracket for variable angle for sash E45201



attention
always use epoxy
resin for long
lasting joining

Note:

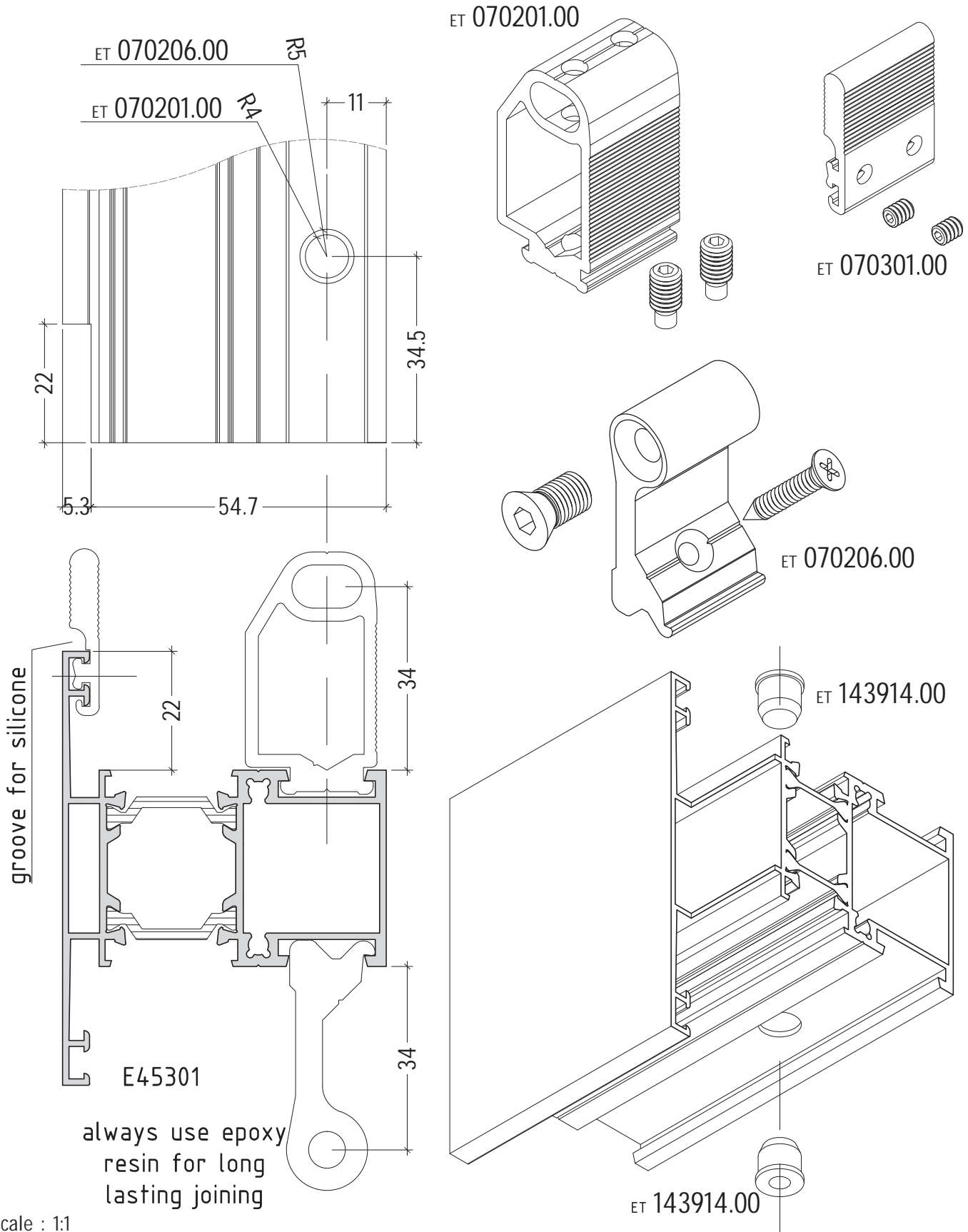
The tables concern only the profiles shown here.

For other profiles the tables are different.

In case you are using other corner bracket for variable angle for other profiles, please contact ETEM R&D department for additional information.

for profile: E 45201									
α (°)	L (mm)	α (°)	L (mm)	α (°)	L (mm)	α (°)	L (mm)	α (°)	L (mm)
45	140.5	74	101.1	103	81.8	132	69.1	161	59.0
46	138.4	75	100.2	104	81.3	133	68.7	162	58.6
47	136.4	76	99.4	105	80.8	134	68.3	163	58.3
48	134.4	77	98.5	106	80.3	135	67.9	164	58.0
49	132.6	78	97.7	107	79.8	136	67.6	165	57.7
50	130.7	79	96.9	108	79.3	137	67.2	166	57.4
51	129.0	80	96.2	109	78.8	138	66.8	167	57.0
52	127.3	81	95.4	110	78.3	139	66.5	168	56.7
53	125.7	82	94.7	111	77.8	140	66.1	169	56.4
54	124.1	83	93.9	112	77.4	141	65.8	170	56.1
55	122.6	84	93.2	113	76.9	142	65.4	171	55.8
56	121.2	85	92.5	114	76.5	143	65.0	172	55.4
57	119.8	86	91.8	115	76.0	144	64.7	173	55.1
58	118.4	87	91.2	116	75.6	145	64.3	174	54.8
59	117.1	88	90.5	117	75.1	146	64.0	175	54.5
60	115.8	89	89.8	118	74.7	147	63.7	176	54.2
61	114.5	90	89.2	119	74.3	148	63.3	177	53.9
62	113.3	91	88.6	120	73.9	149	63.0	178	53.5
63	112.1	92	88.0	121	73.4	150	62.6	179	53.2
64	111.0	93	87.3	122	73.0	151	62.3	180	52.9
65	109.9	94	86.8	123	72.6	152	62.0		
66	108.8	95	86.2	124	72.2	153	61.6		
67	107.7	96	85.6	125	71.8	154	61.3		
68	106.7	97	85.0	126	71.4	155	60.9		
69	105.7	98	84.5	127	71.0	156	60.6		
70	104.7	99	83.9	128	70.6	157	60.3		
71	103.8	100	83.4	129	70.2	158	60.0		
72	102.9	101	82.8	130	69.8	159	59.6		
73	102.0	102	82.3	131	69.4	160	59.3		

machining to use T-bracket - T-bracket for mullions/transoms

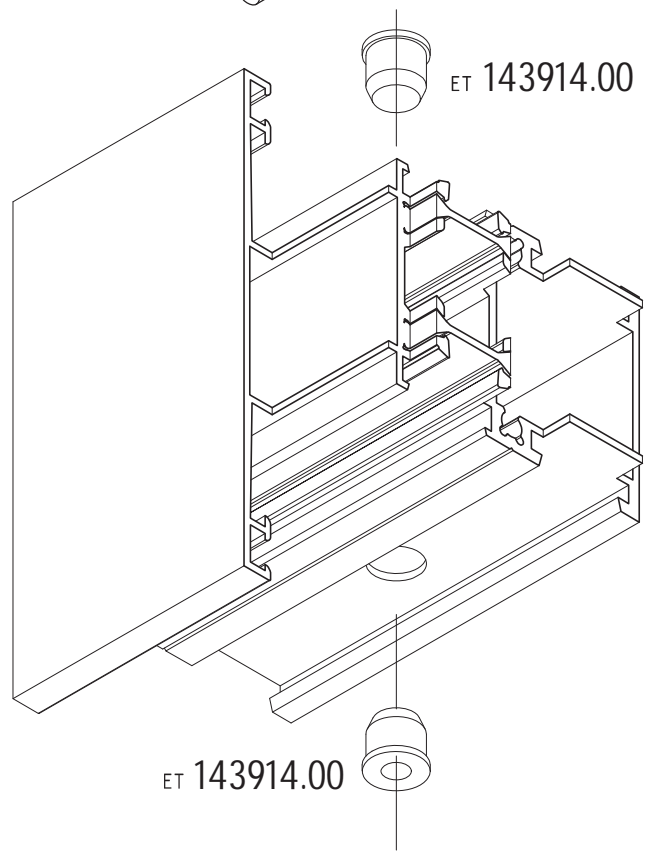
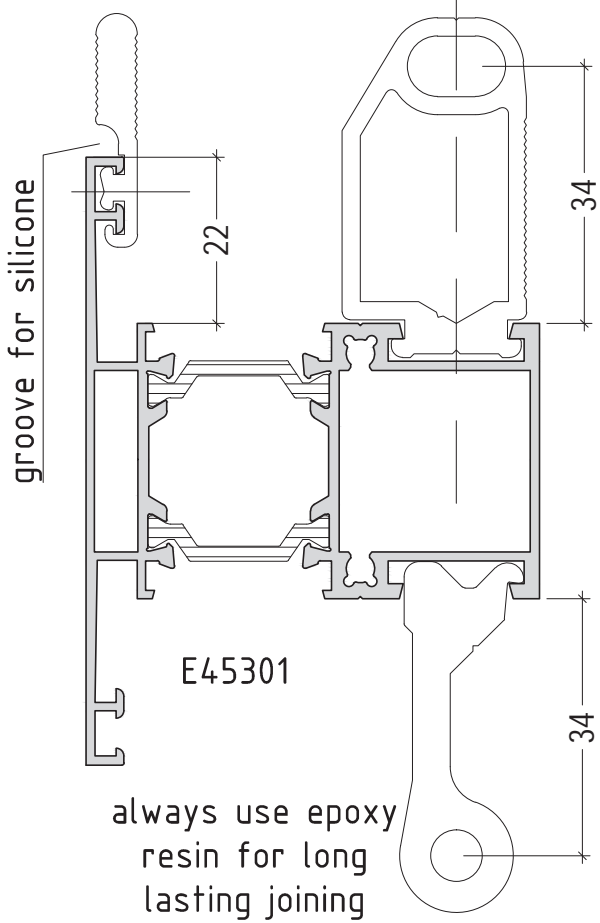
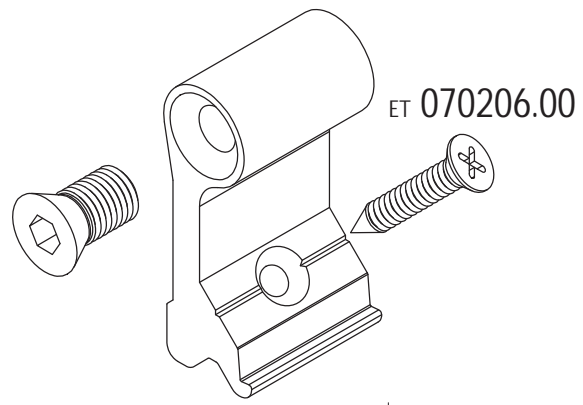
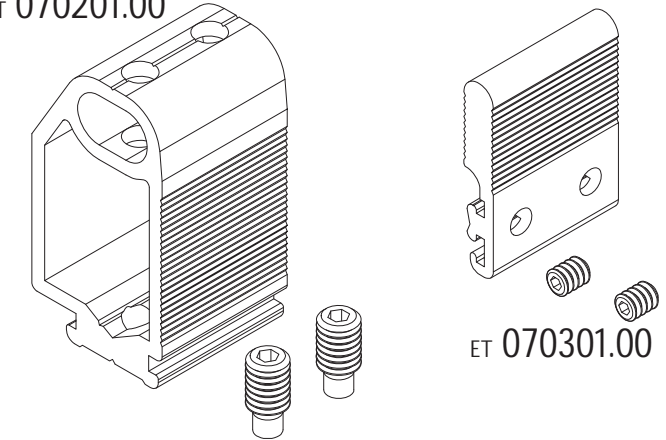
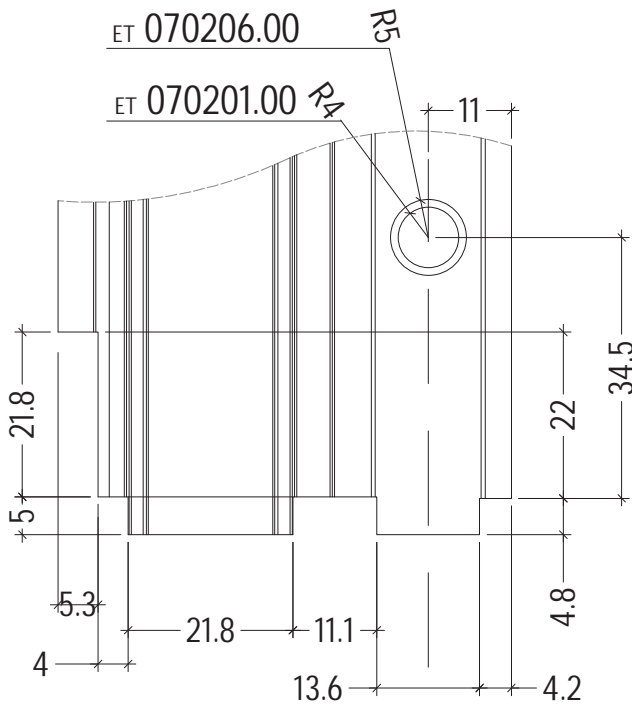


machining to use T-bracket - T-bracket for mullions/transoms

ET 070201.00

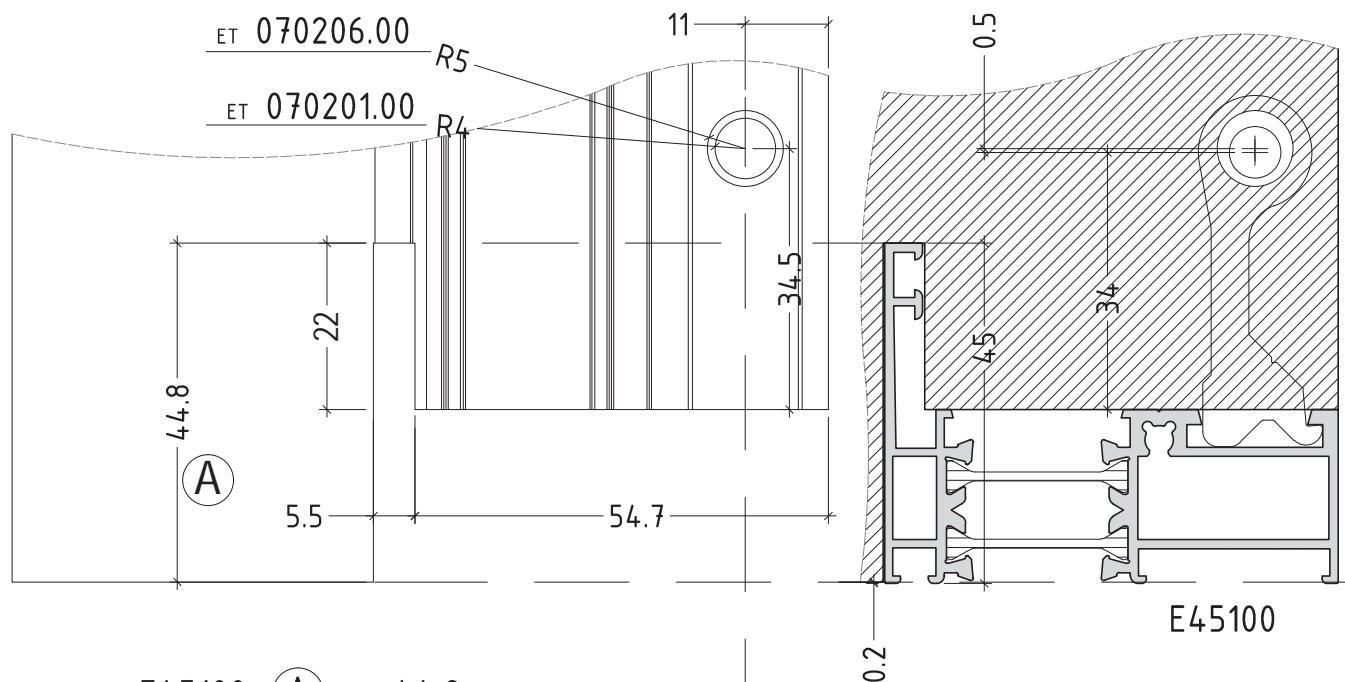
ET 070206.00

ET 070201.00

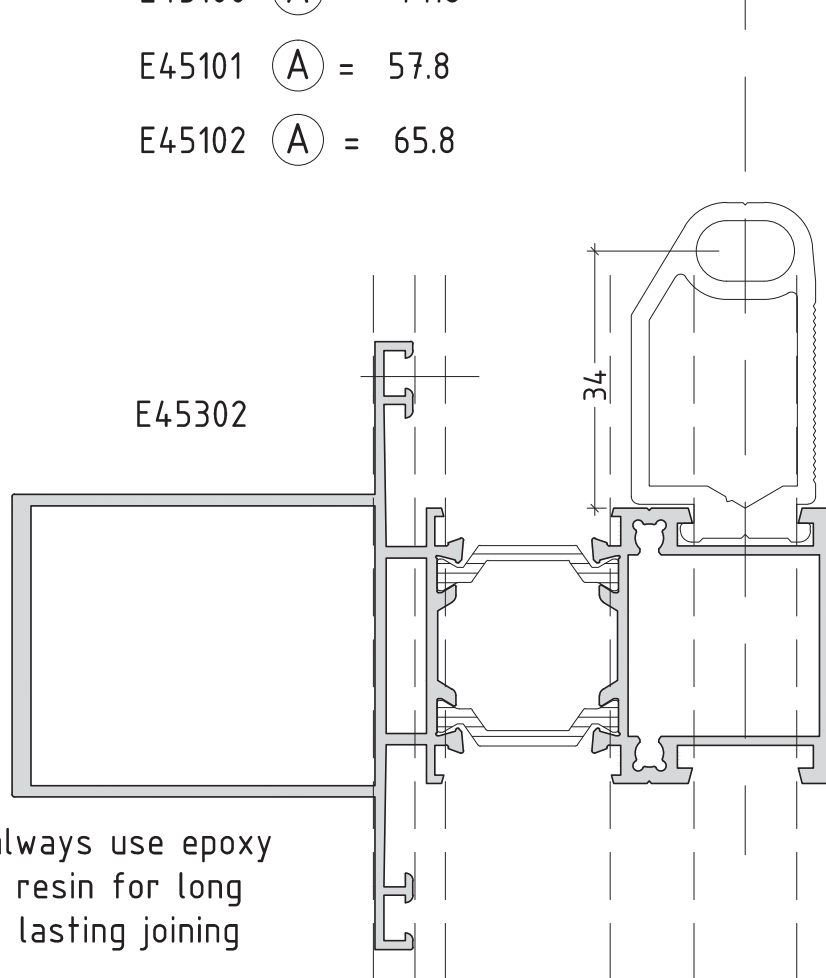


scale : 1:1

machining to use E45302 with E45100,1,2 - Option I

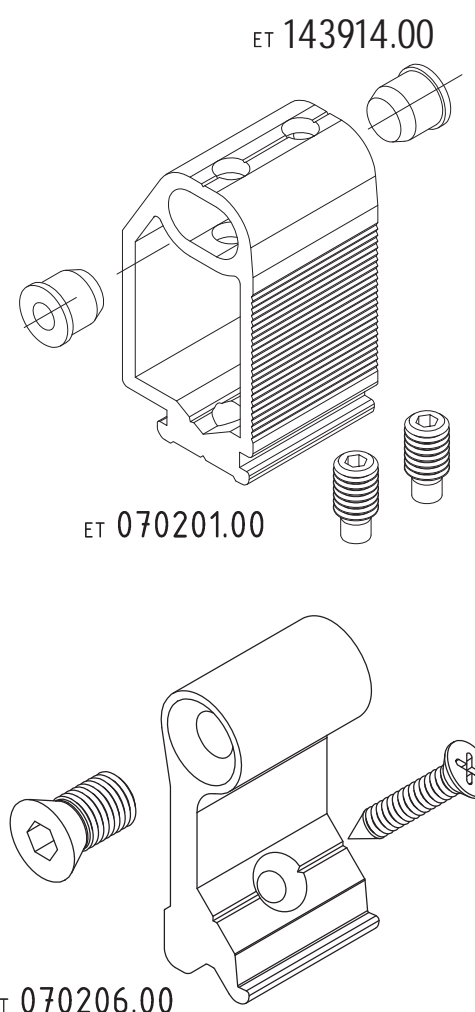


- E45100 (A) = 44.8
- E45101 (A) = 57.8
- E45102 (A) = 65.8

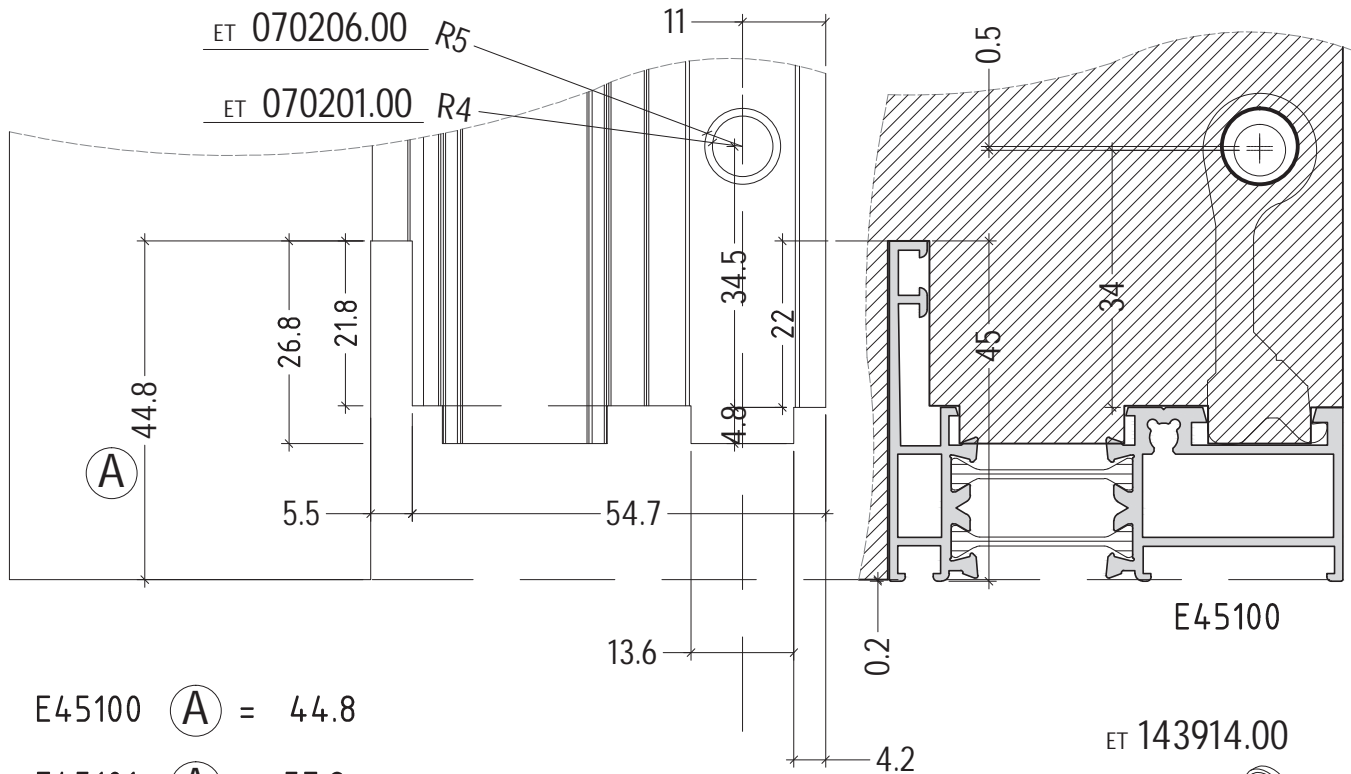


always use epoxy resin for long lasting joining

scale : 1:1



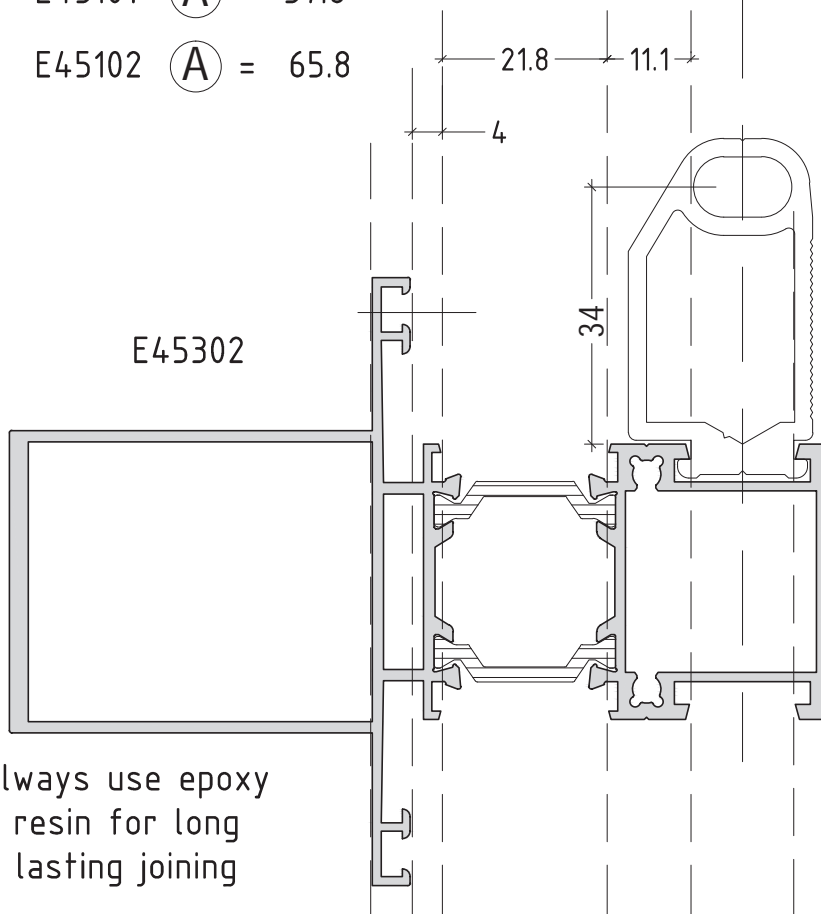
machining to use E45302 with E45100,1,2 - Option II



E45100 (A) = 44.8

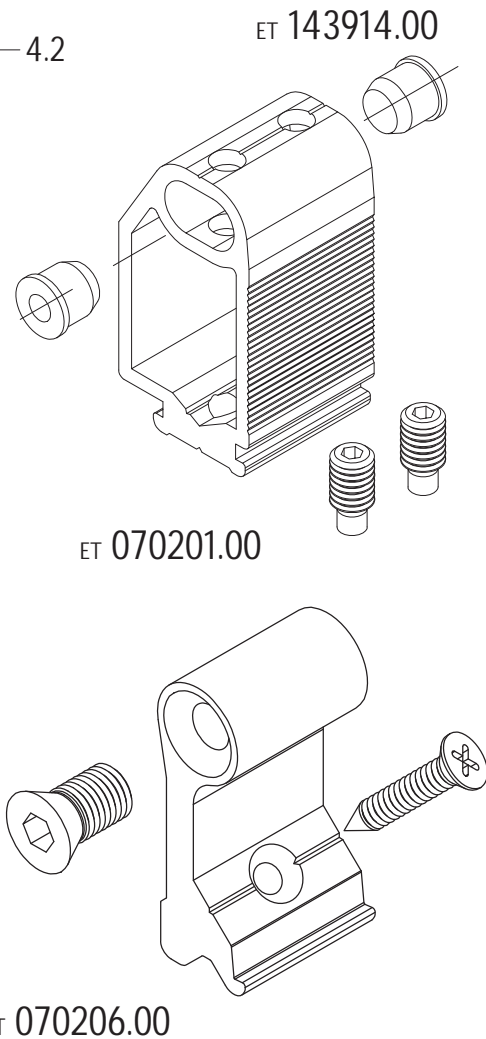
E45101 (A) = 57.8

E45102 (A) = 65.8



always use epoxy resin for long lasting joining

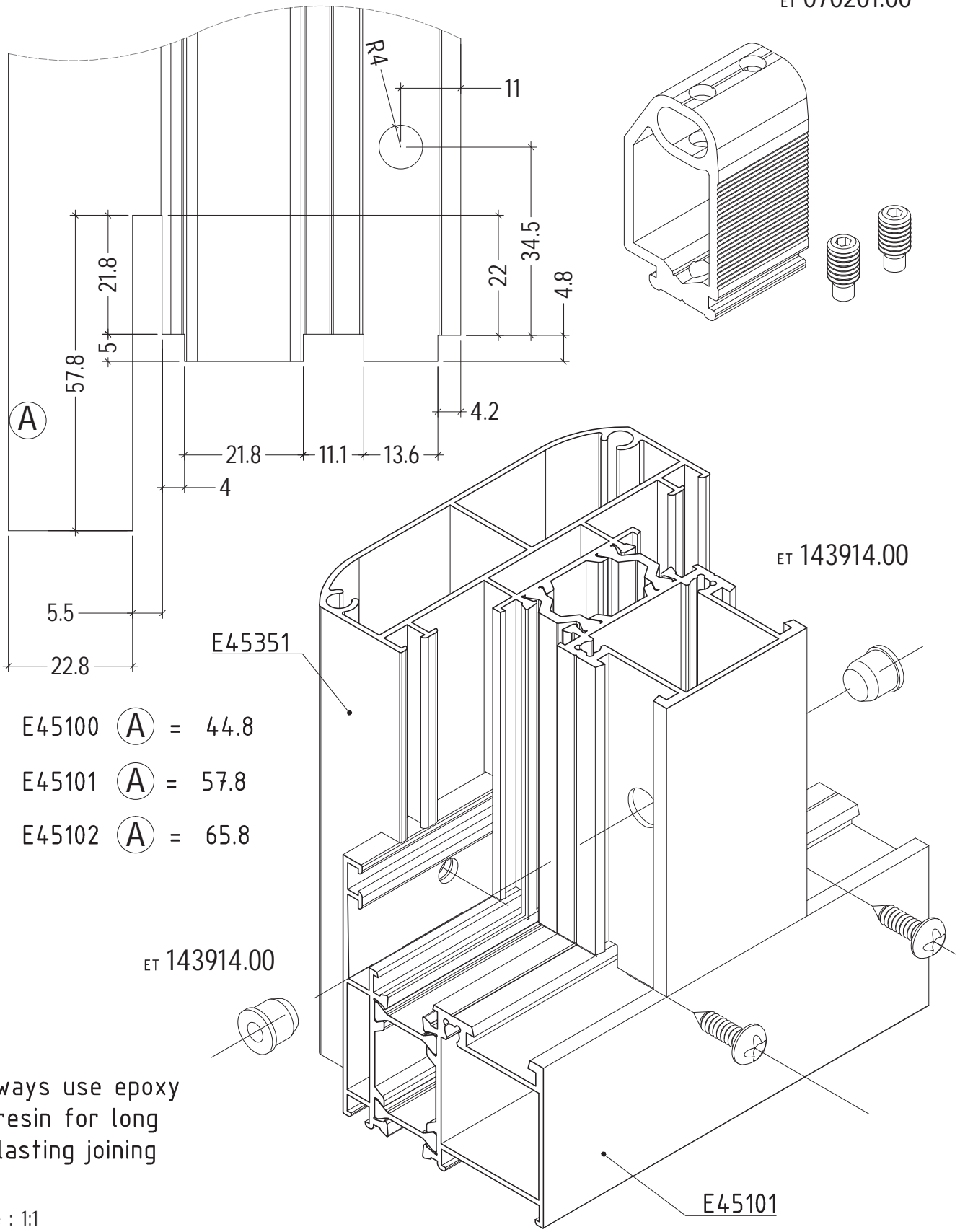
scale : 1:1



D45-14

machining to use T-bracket for mullions/transoms

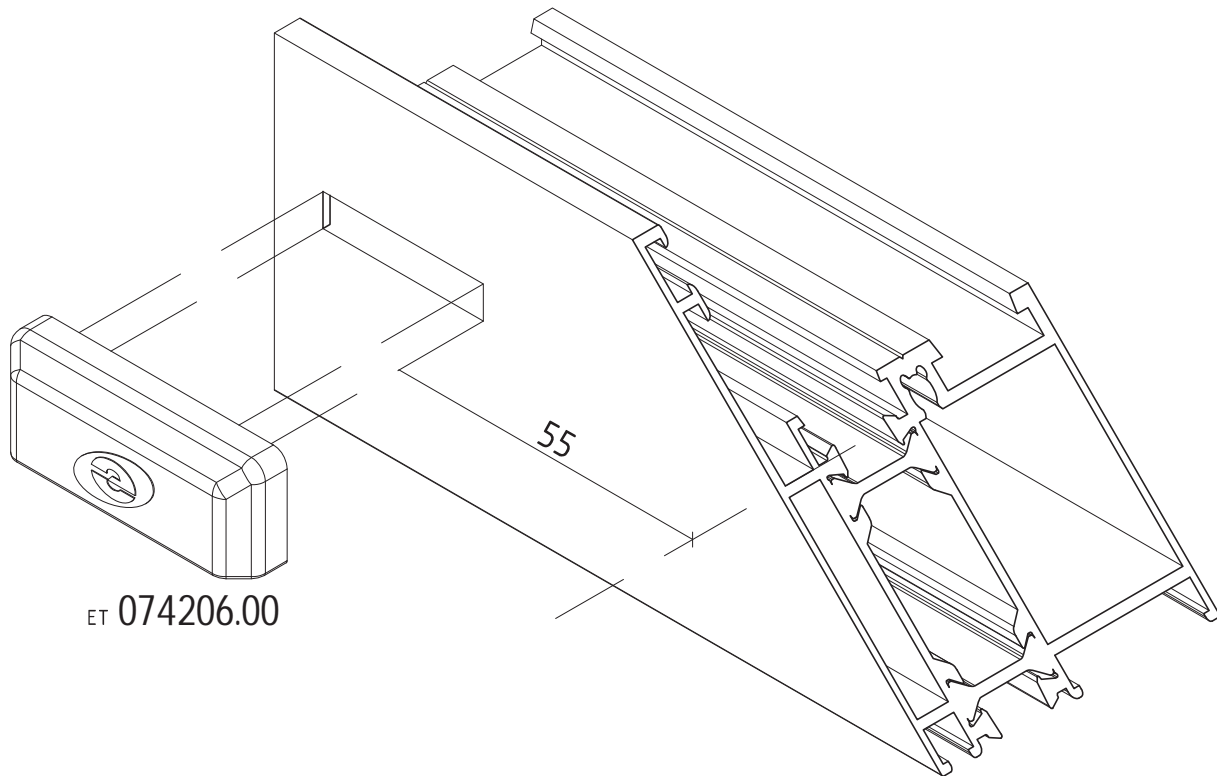
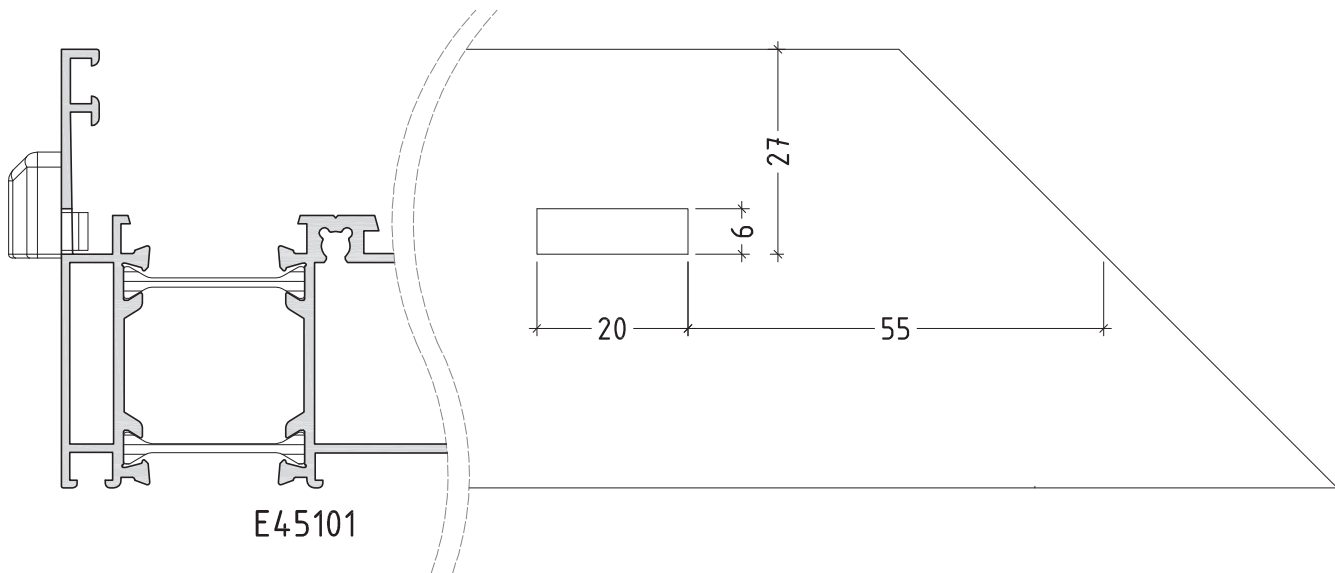
ET 070201.00



always use epoxy resin for long lasting joining

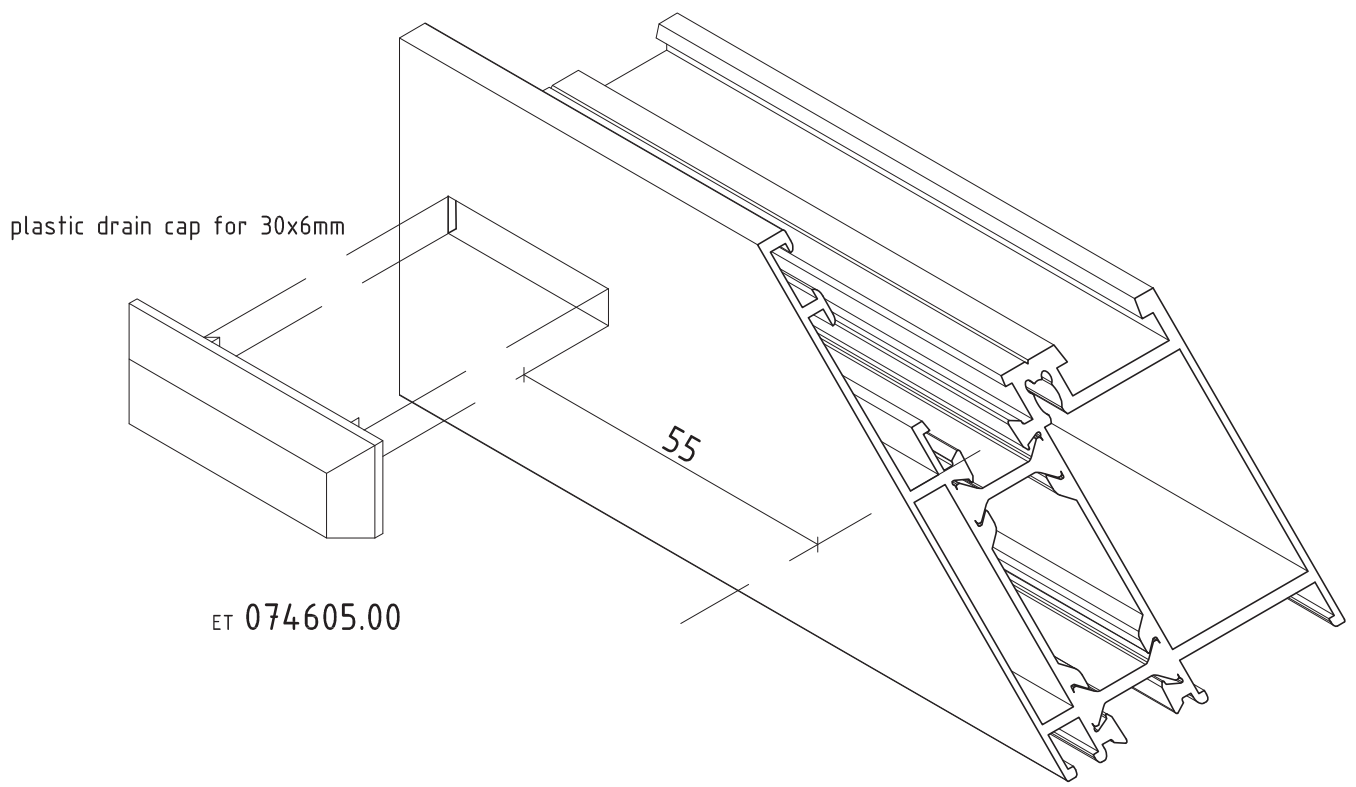
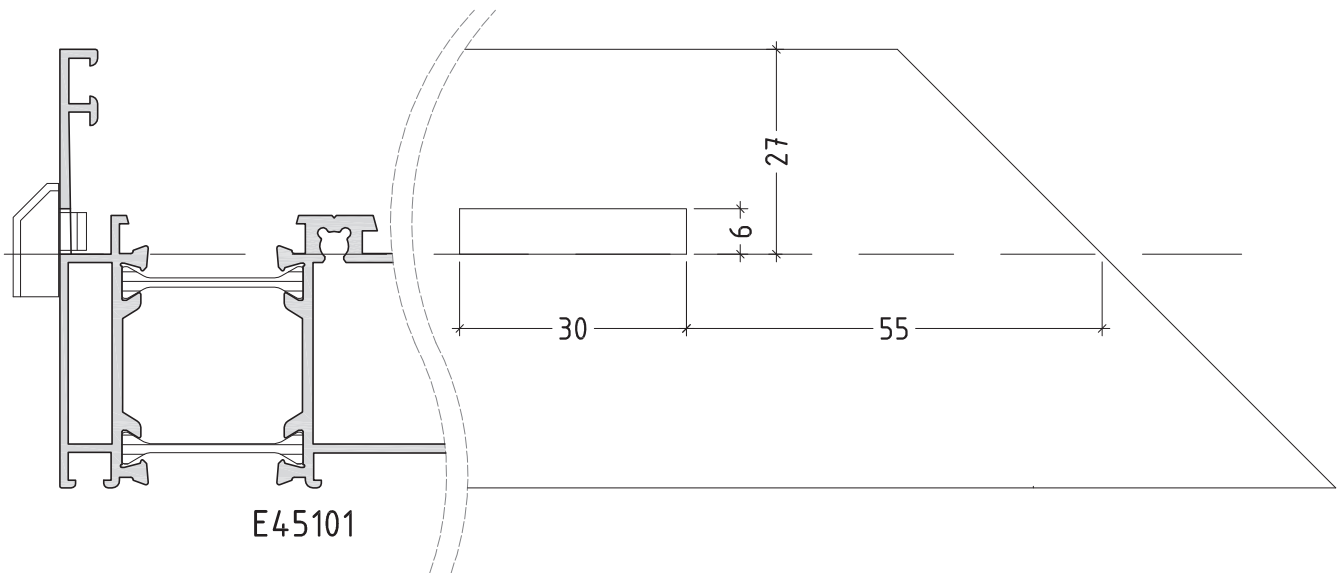
scale : 1:1

machining for drainage and plastic cap



scale : 1:1

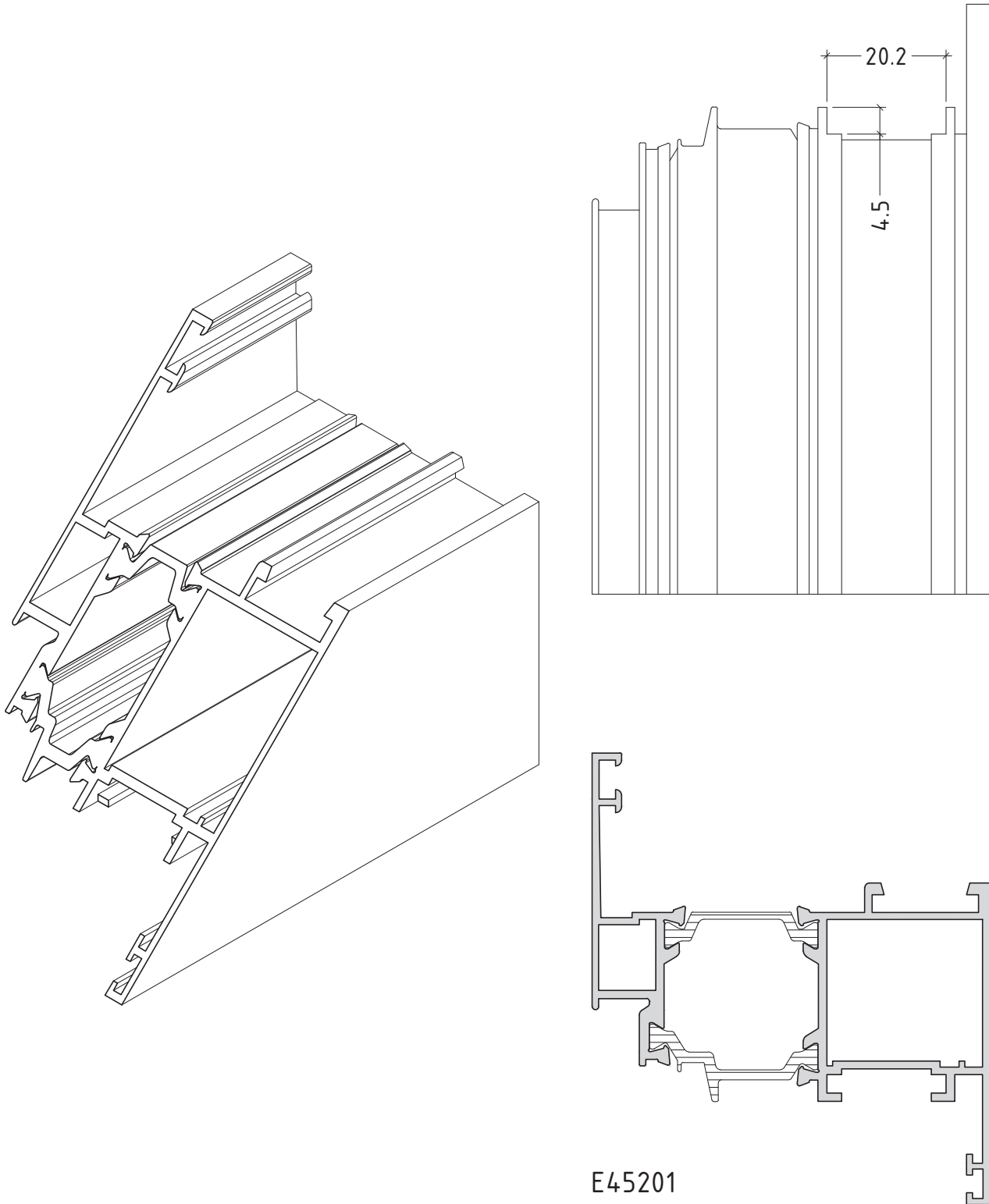
machining for drainage and plastic cap - ET 074605.00



scale : 1:1

D45-16.1

machining for connecting rod

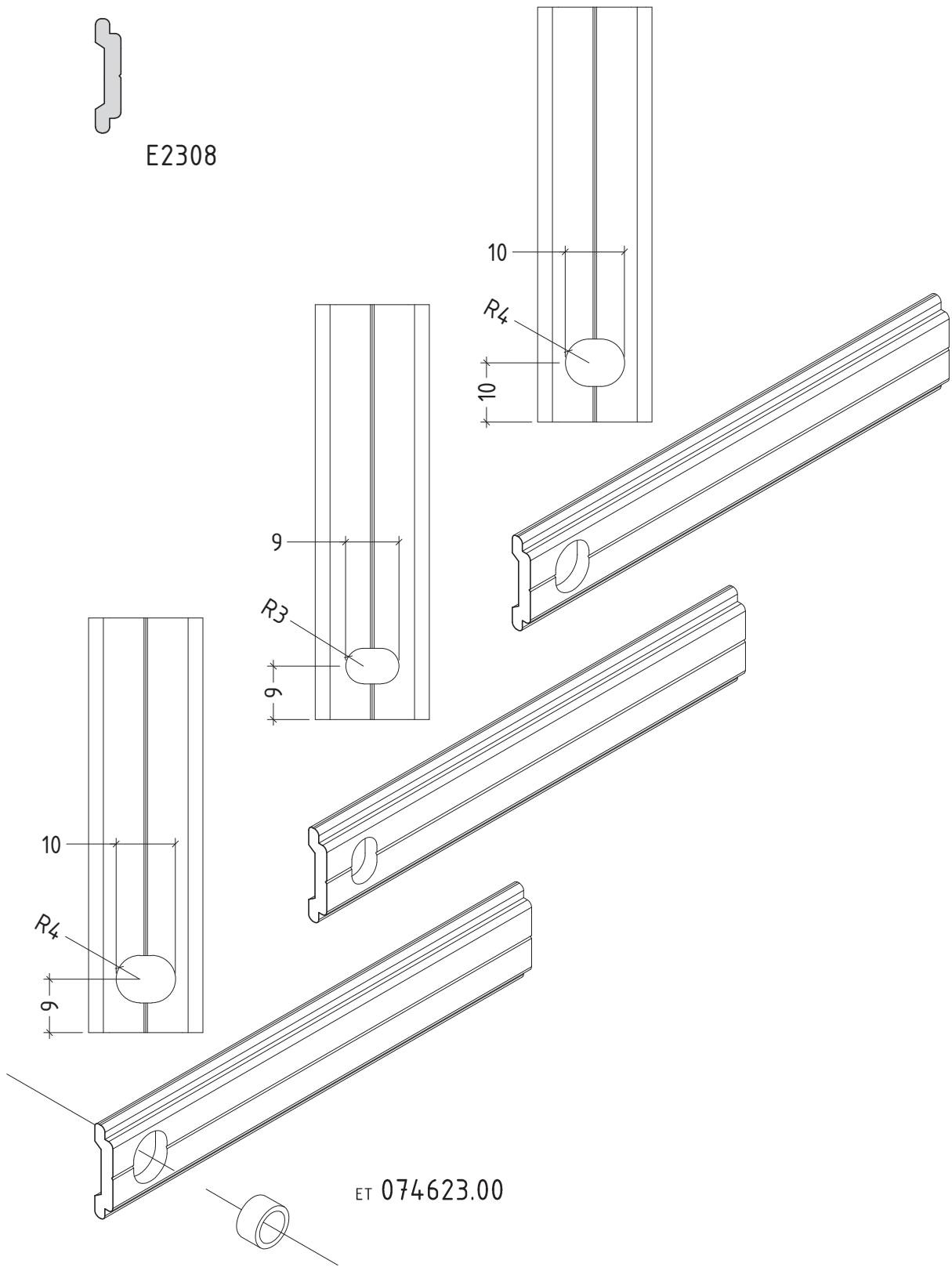


E45201

scale : 1:1

D45-17

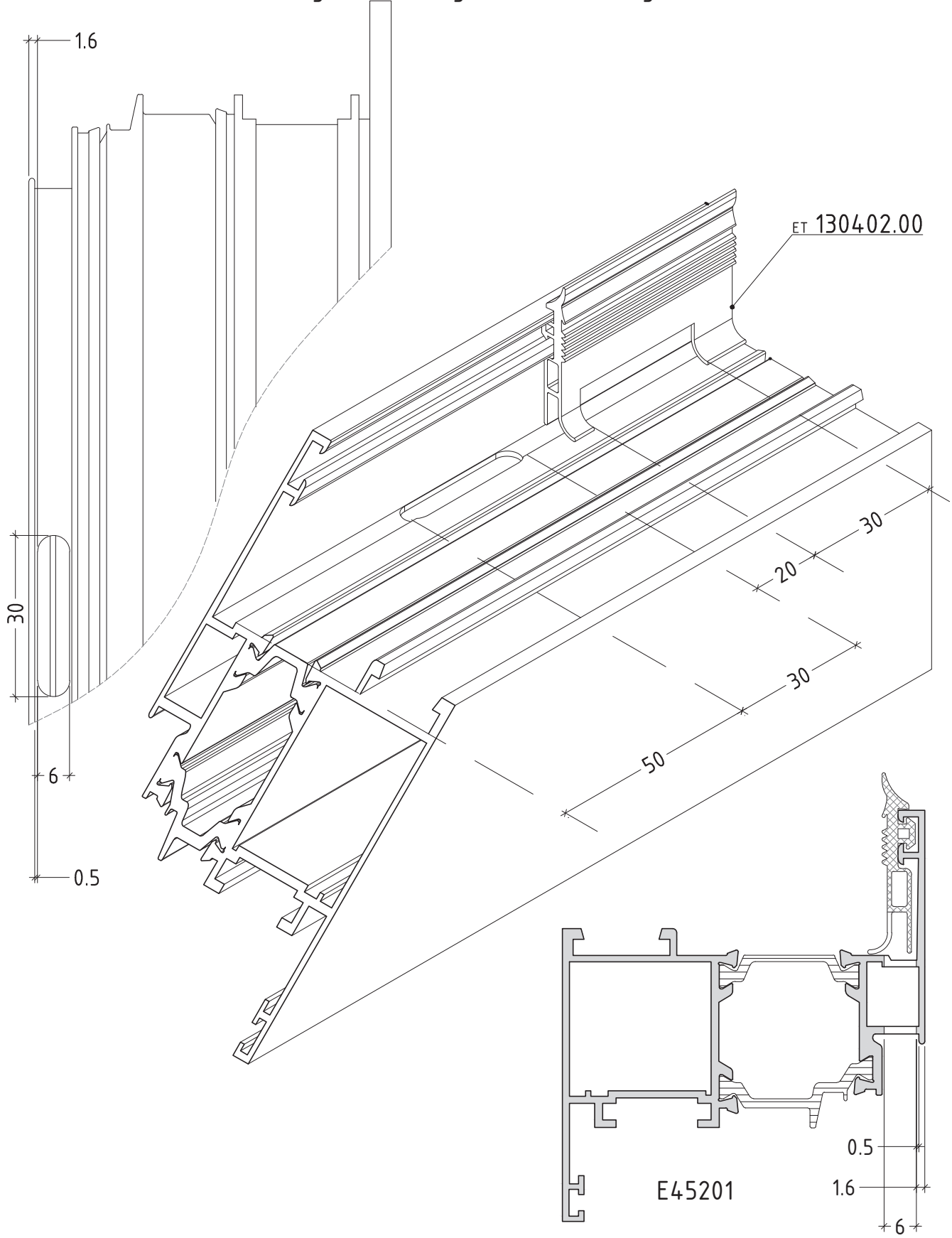
machining for connecting rod



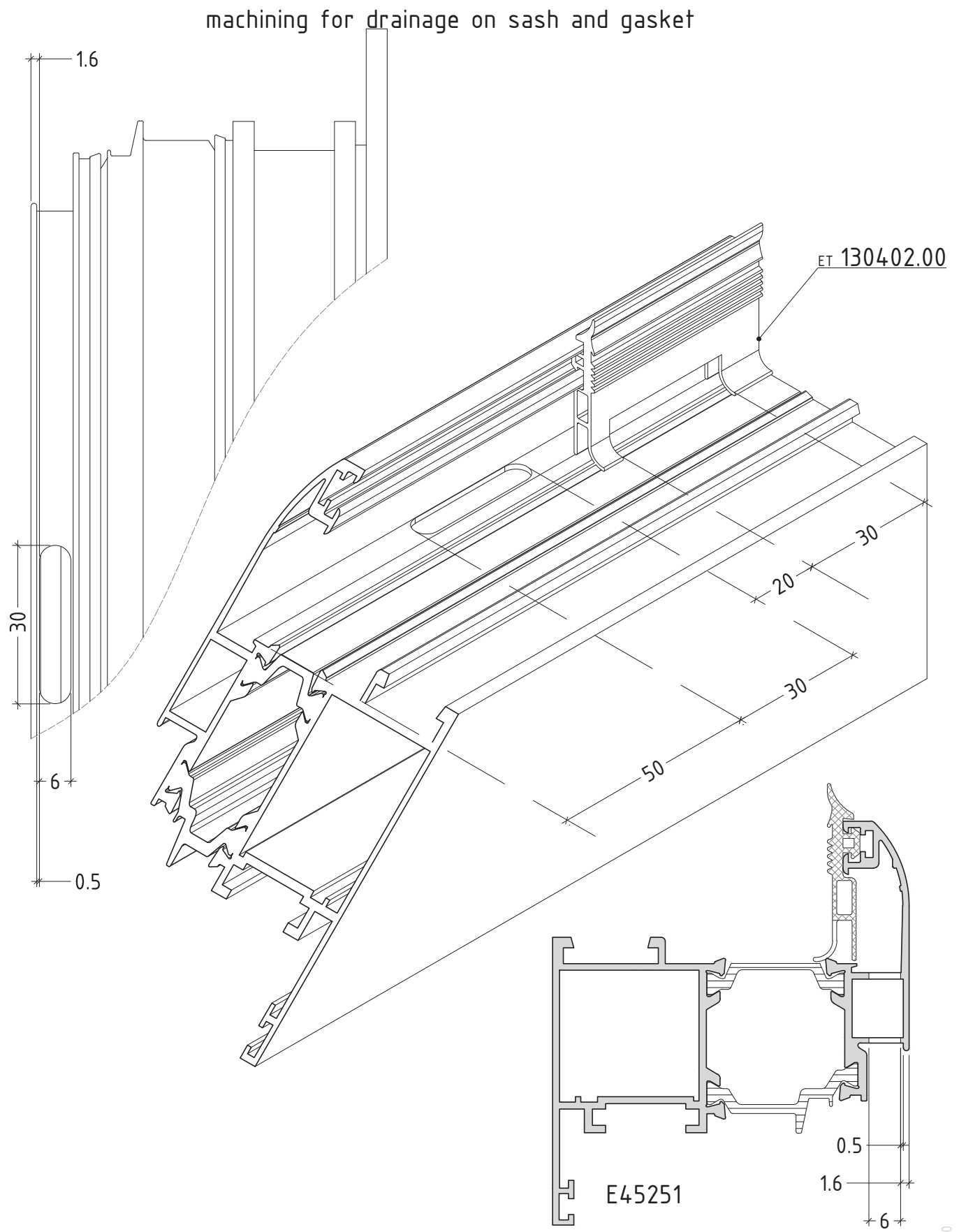
scale : 1:1

D45-18

machining for drainage on sash and gasket

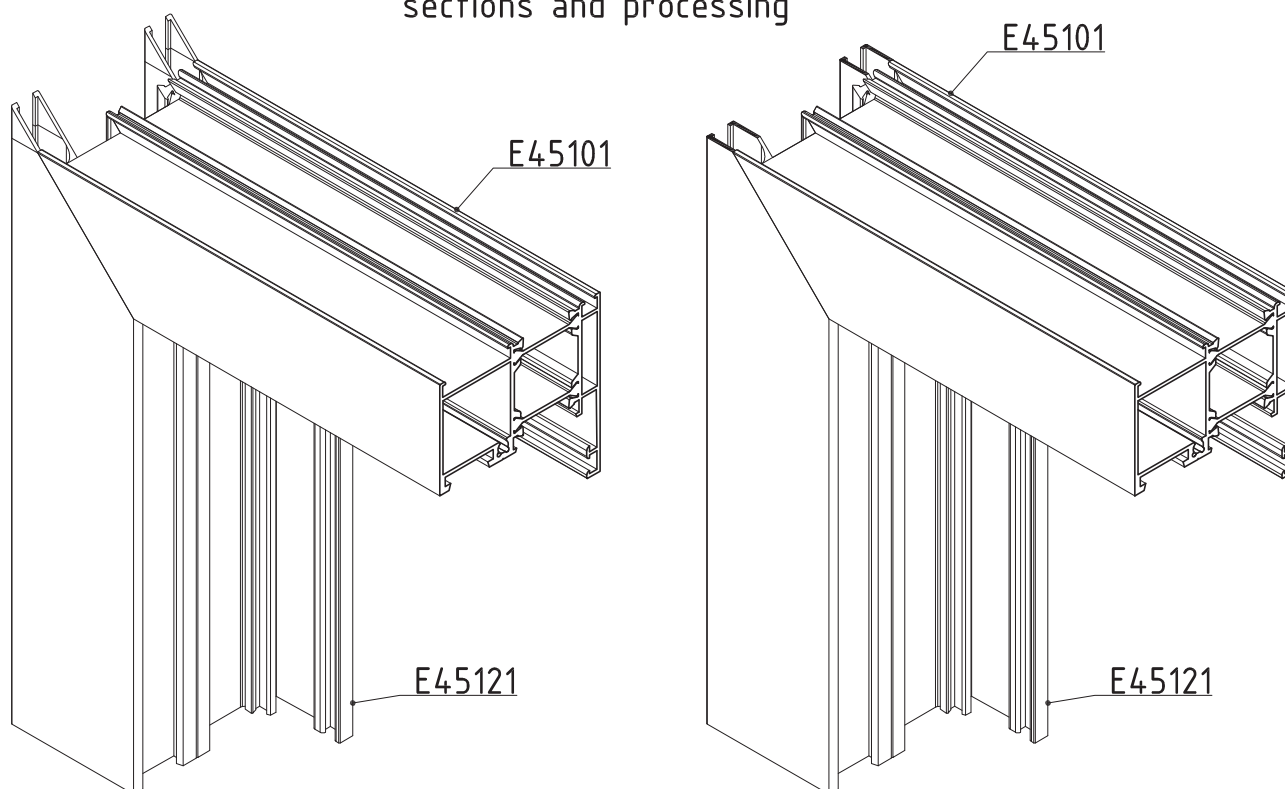


scale : 1:1



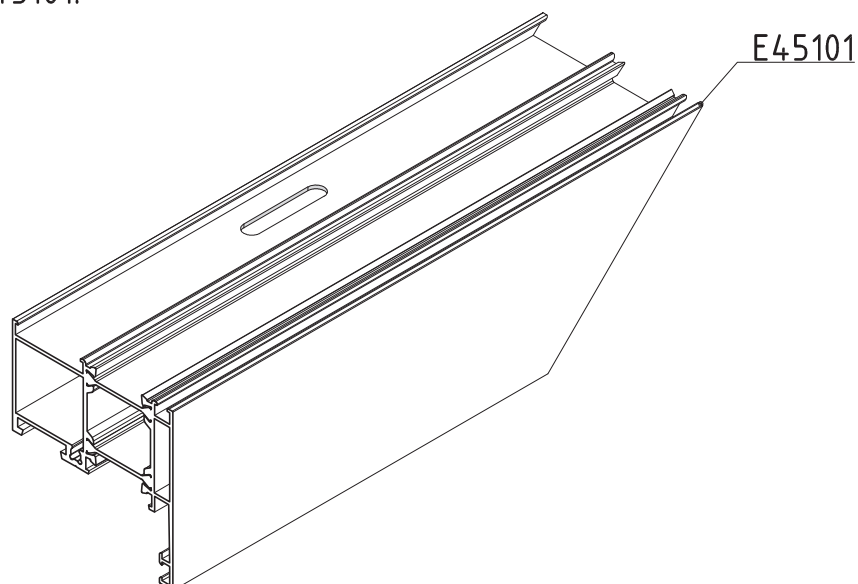
D45-20

sections and processing



The frame for dilatation gap E45121 is joined with E45101 accordingly, using crimping machine ONLY!

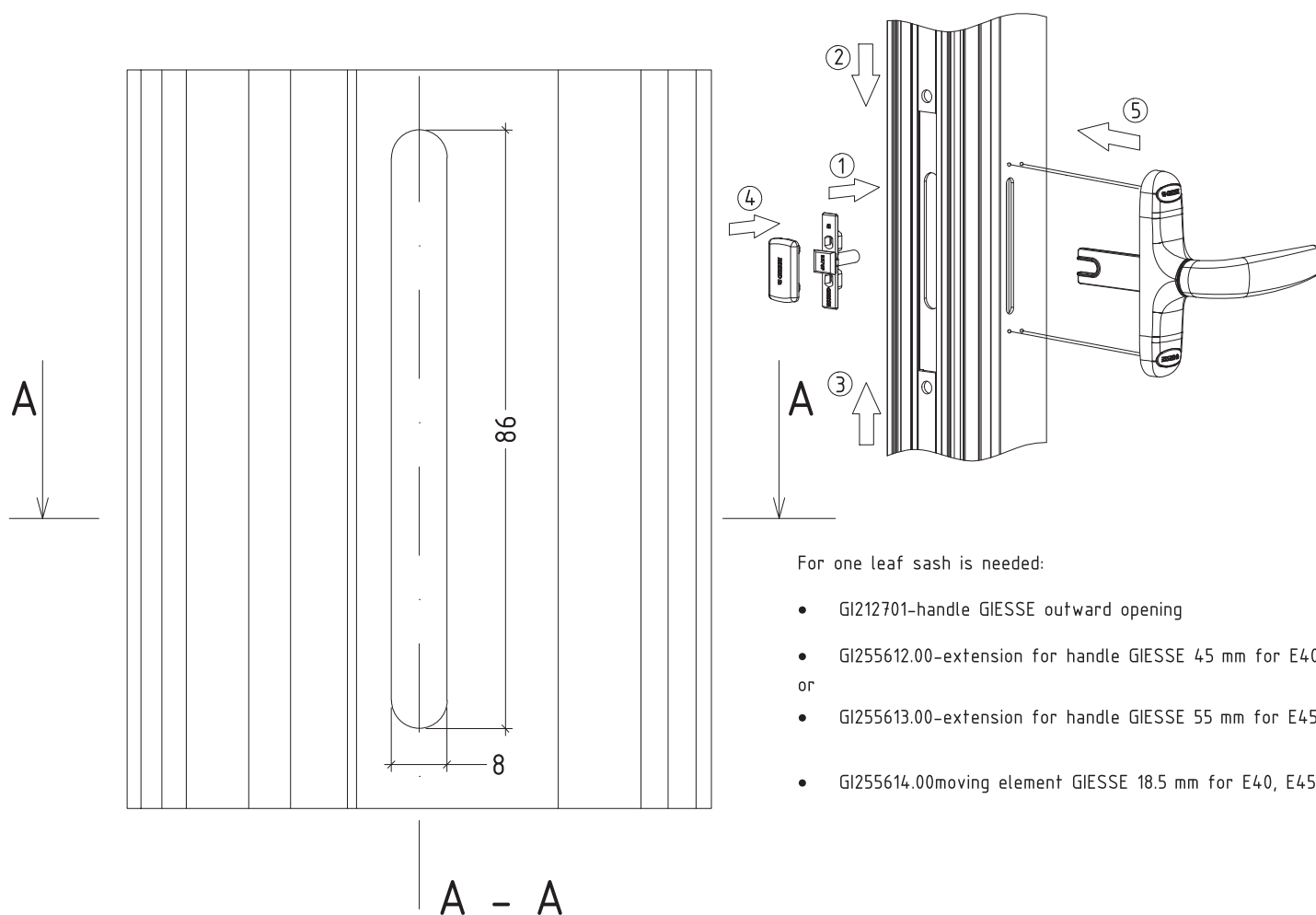
After final assembly, the profile for dilatation gap E45121 is cut in the same plane of the standard frame E45101.



Oval shape of mounting openings are a must and have to be cut in the standard frame E45101, in order to take-in effectively the temperature expansion of the profiles in case of striped windows.

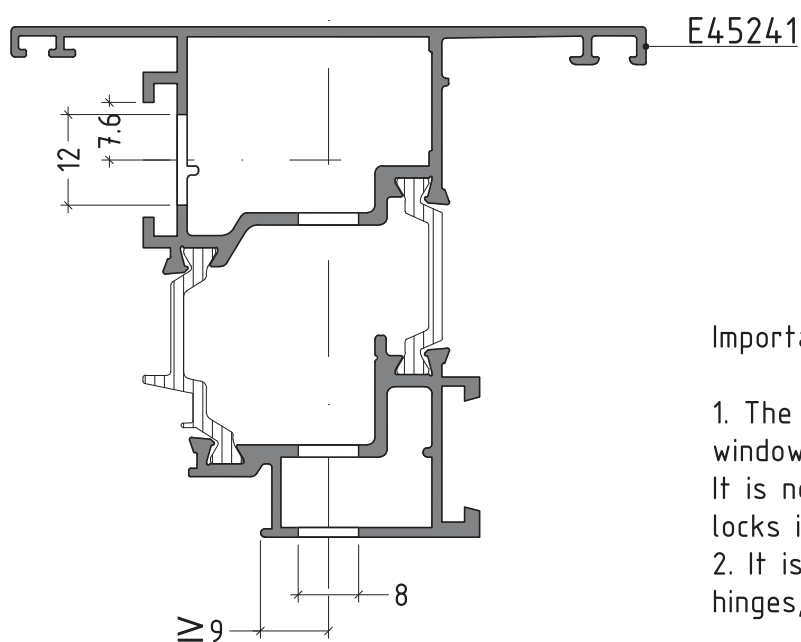
D45-21

machining for handle GI212701.01 - GI212701.02



For one leaf sash is needed:

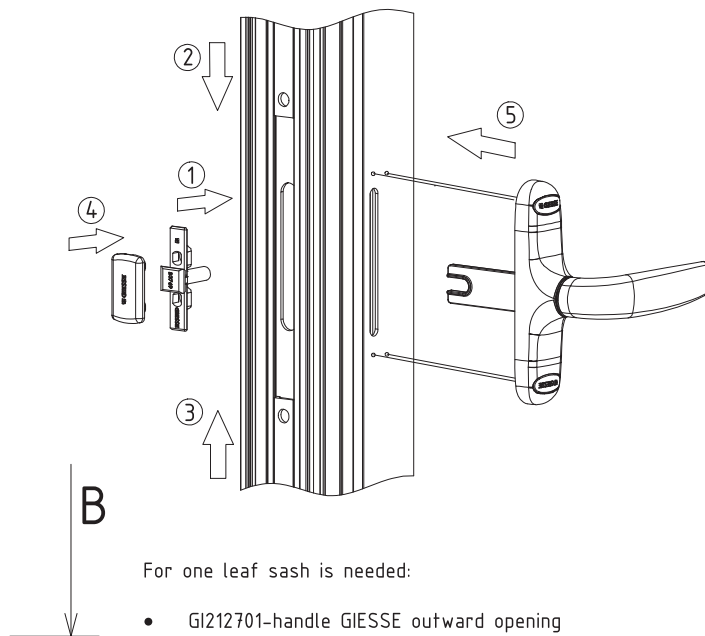
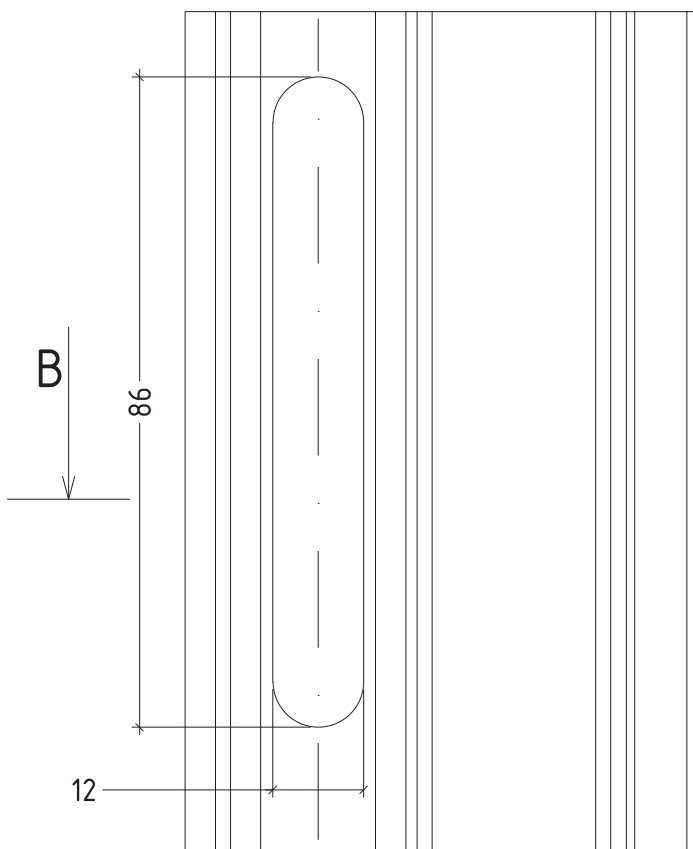
- GI212701-handle GIESSE outward opening
- GI255612.00-extension for handle GIESSE 45 mm for E40 or
- GI255613.00-extension for handle GIESSE 55 mm for E45
- GI255614.00moving element GIESSE 18.5 mm for E40, E45



Important information:

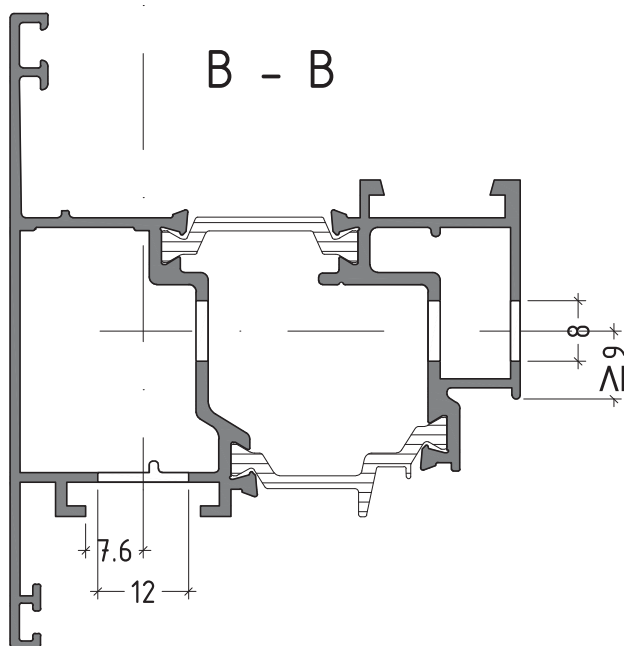
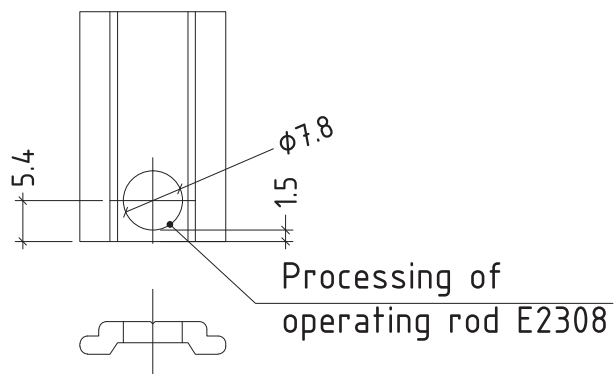
1. The new sash allows execution of windows and door-height windows only. It is not possible to incorporate door locks in sash E45241
2. It is possible to use every kind of hinges, which are suitable for Euro-groove.

machining for handle GI212701.01 - GI212701.02



For one leaf sash is needed:

- GI212701-handle GIESSE outward opening
- GI255612.00-extension for handle GIESSE 45 mm for E40 or
- GI255613.00-extension for handle GIESSE 55 mm for E45
- GI255614.00moving element GIESSE 18.5 mm for E40, E45



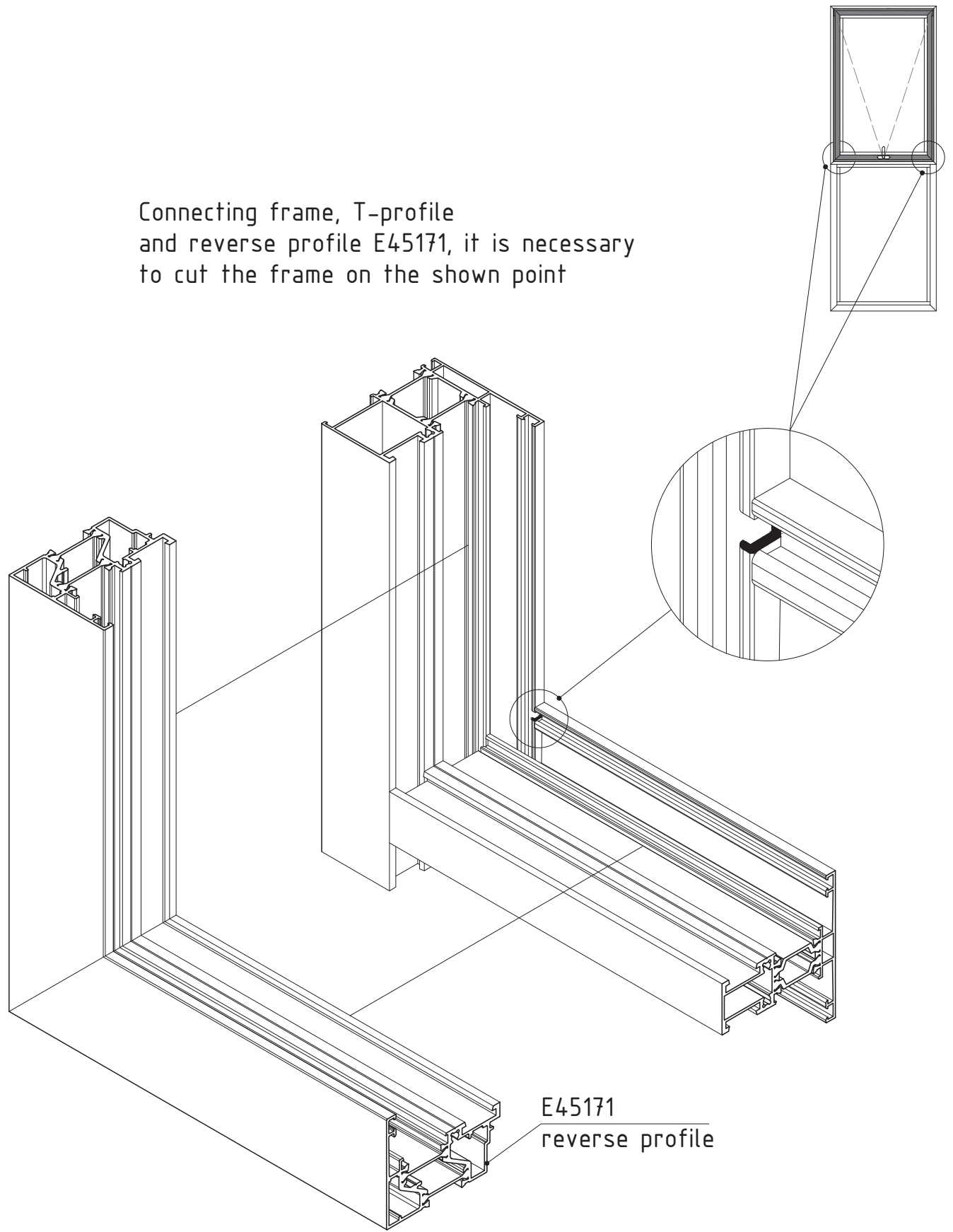
Important information:

1. The new sash allows execution of windows and door-height windows only. It is not possible to incorporate door locks in sash E45241
2. It is possible to use every kind of hinges, which are suitable for Euro-groove.

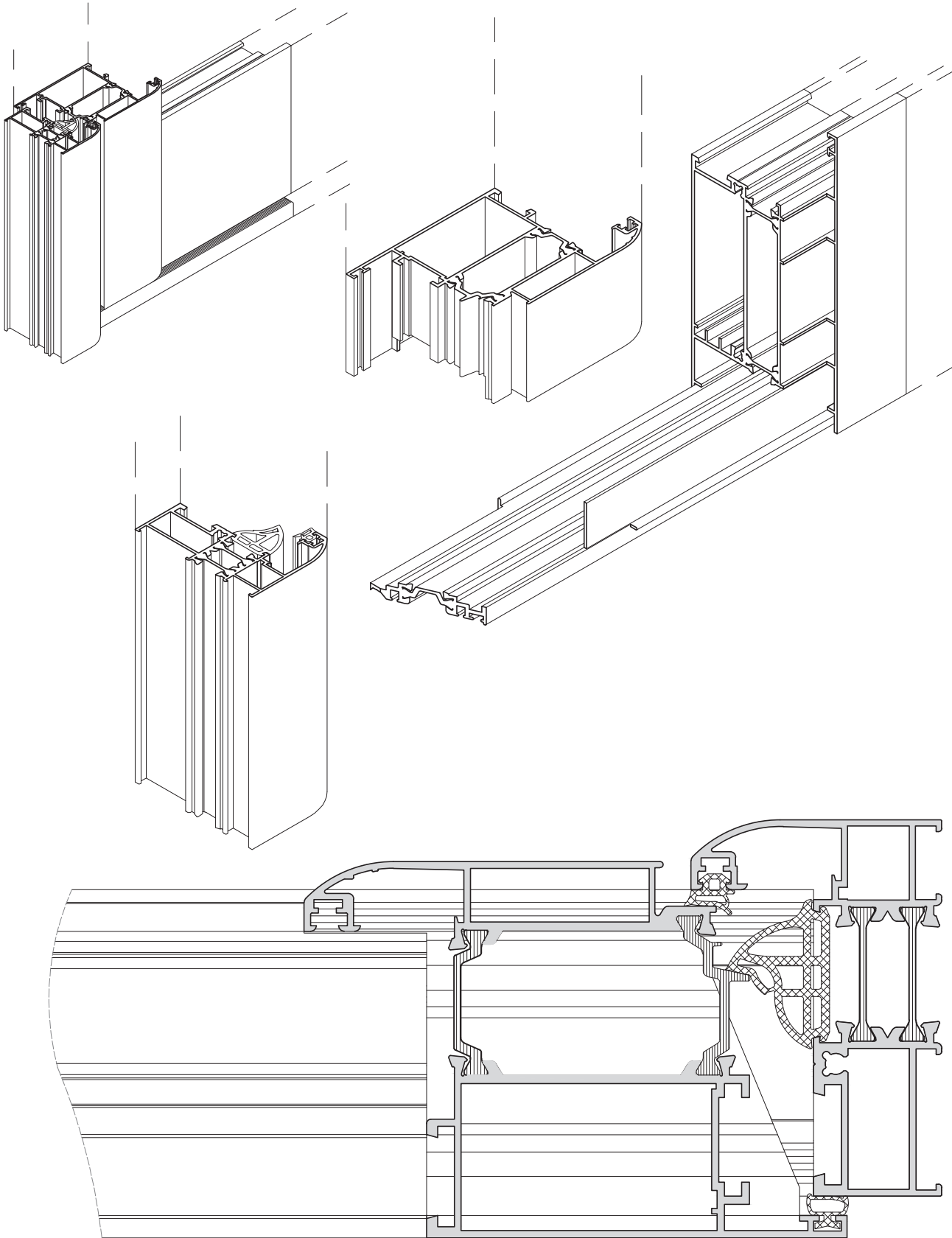
D45-23

outward opening

Connecting frame, T-profile and reverse profile E45171, it is necessary to cut the frame on the shown point

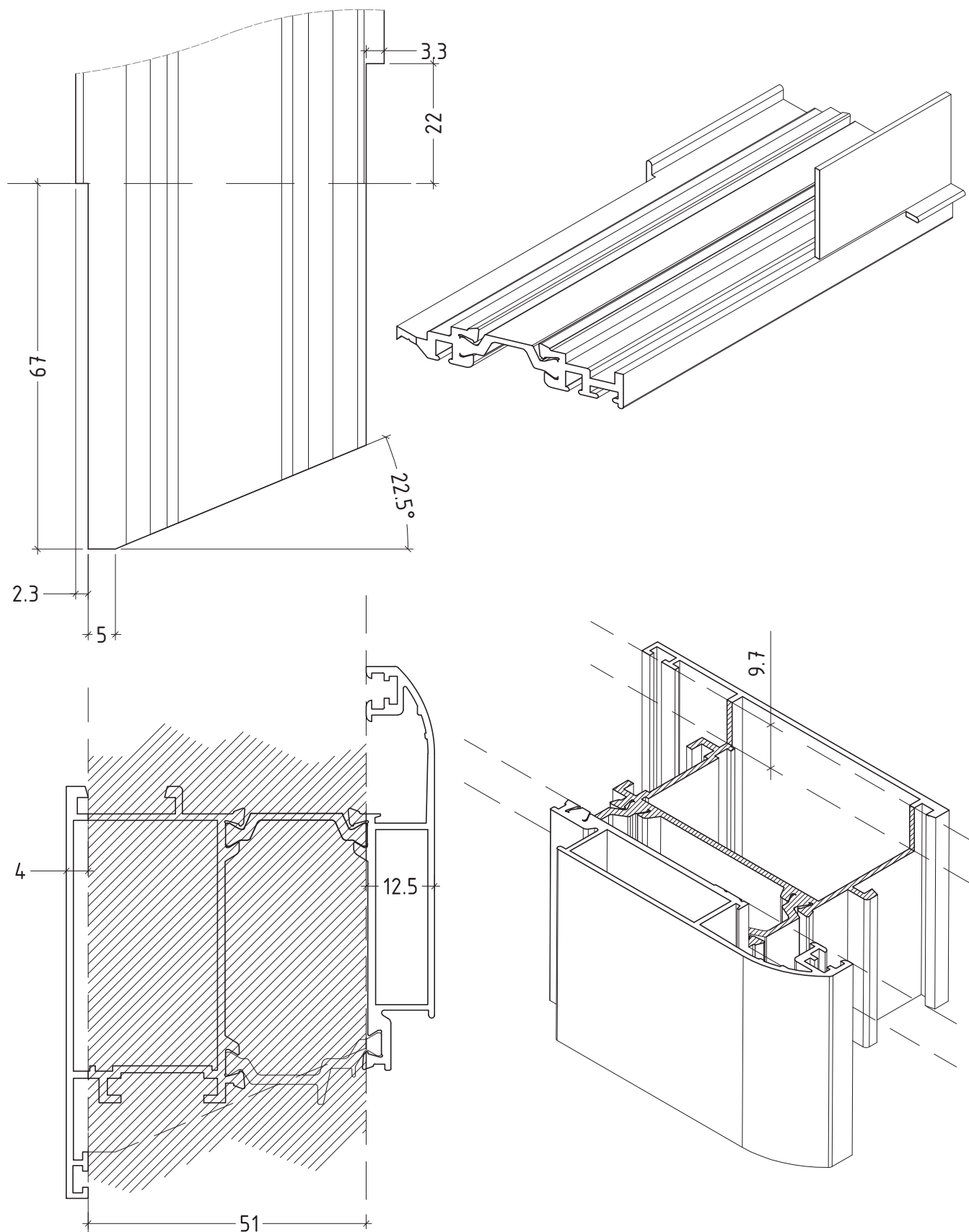


machining to use E45810



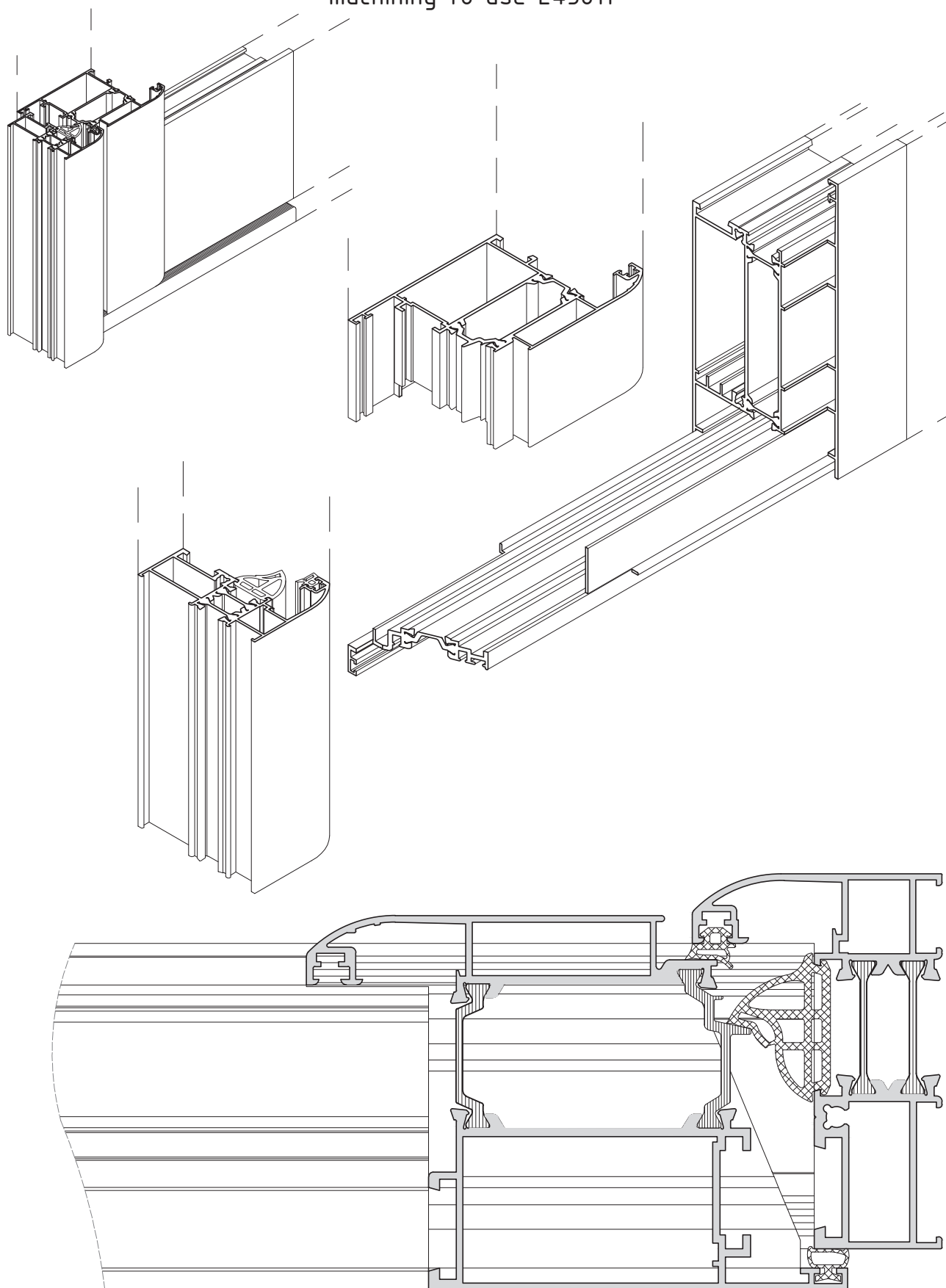
D45-25

machining to use E45810



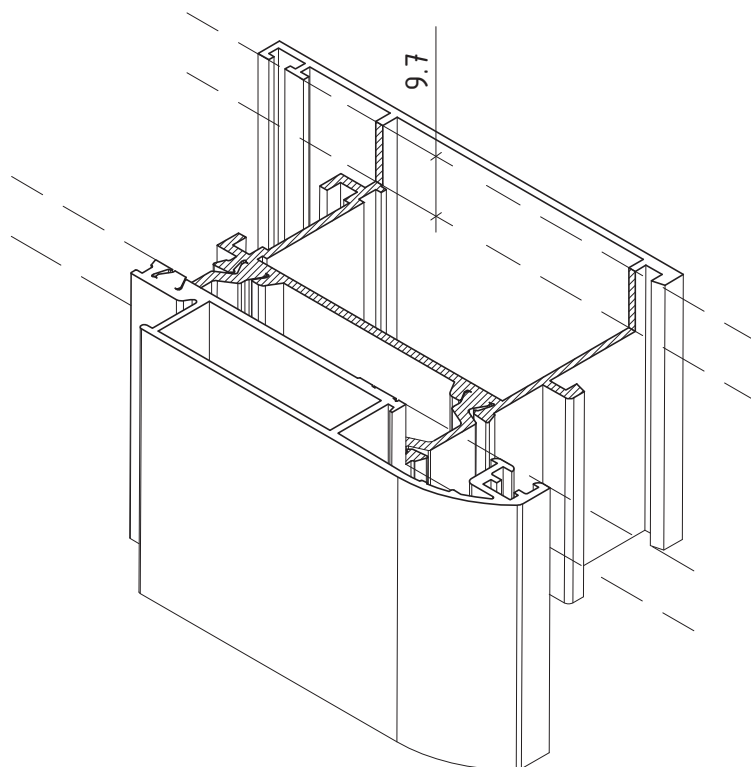
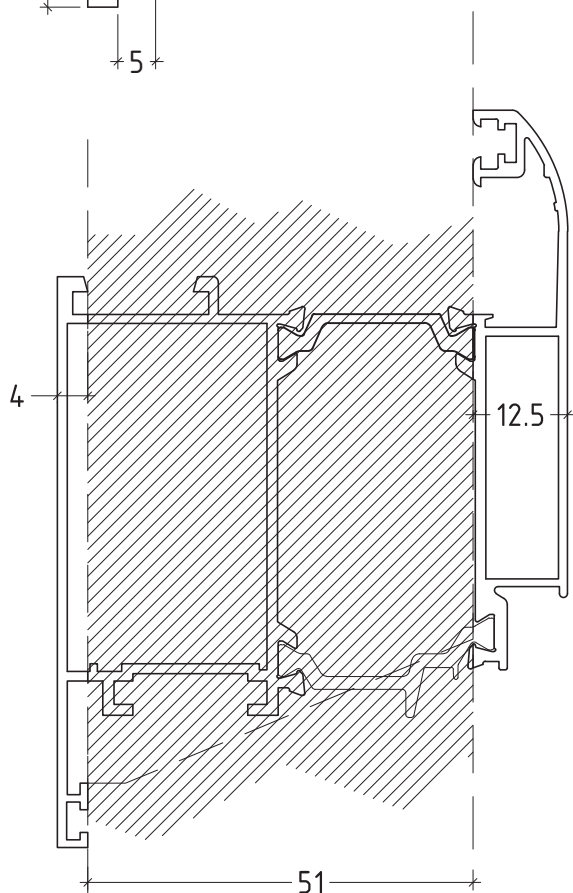
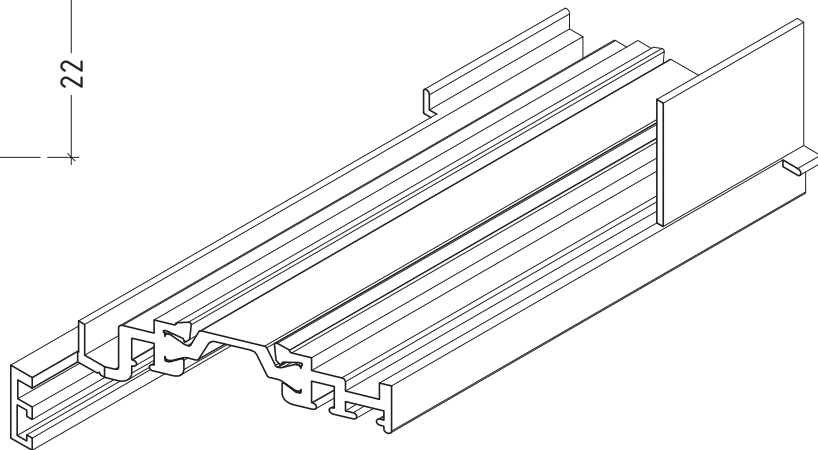
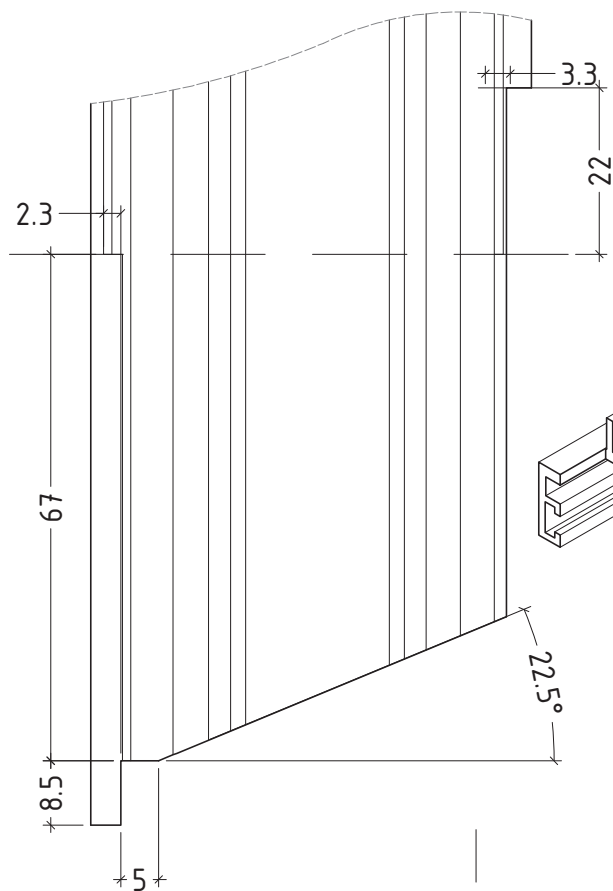
D45-26

machining to use E45811

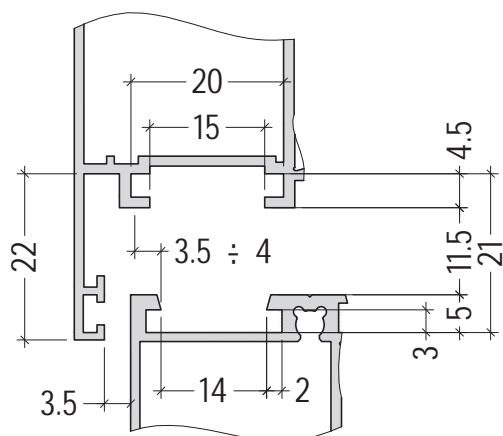


D45-27

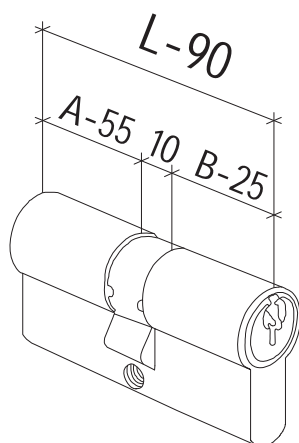
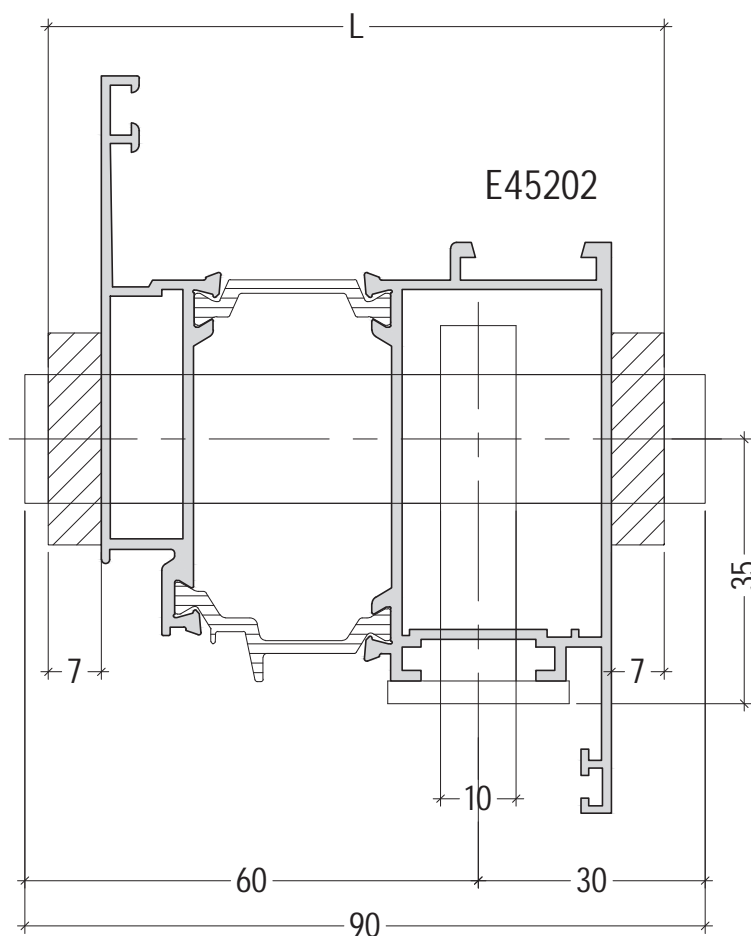
machining to use E45811



D45-28

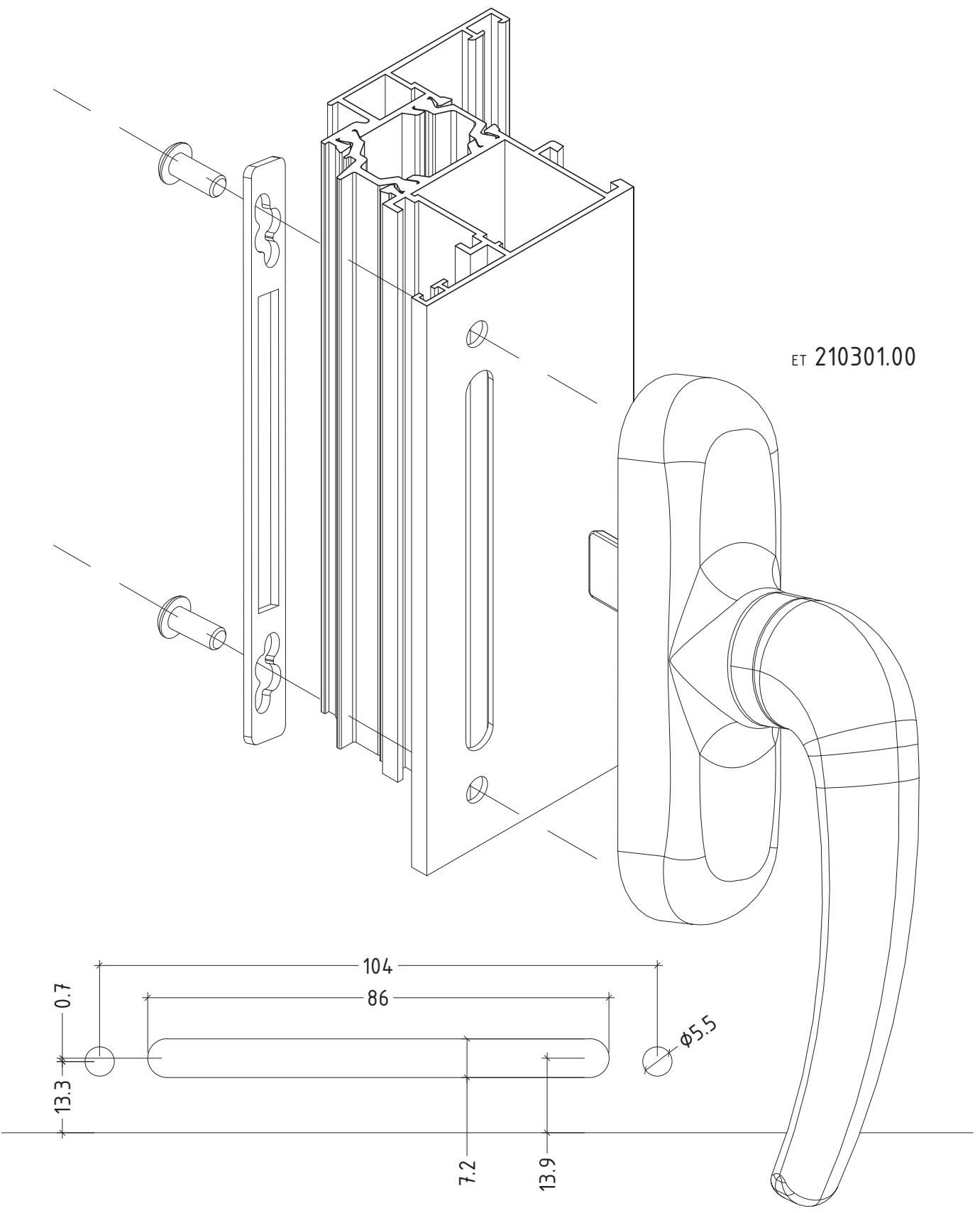


Note:
Hardware used for E45 is intended for Eurogroove with the noted parameters

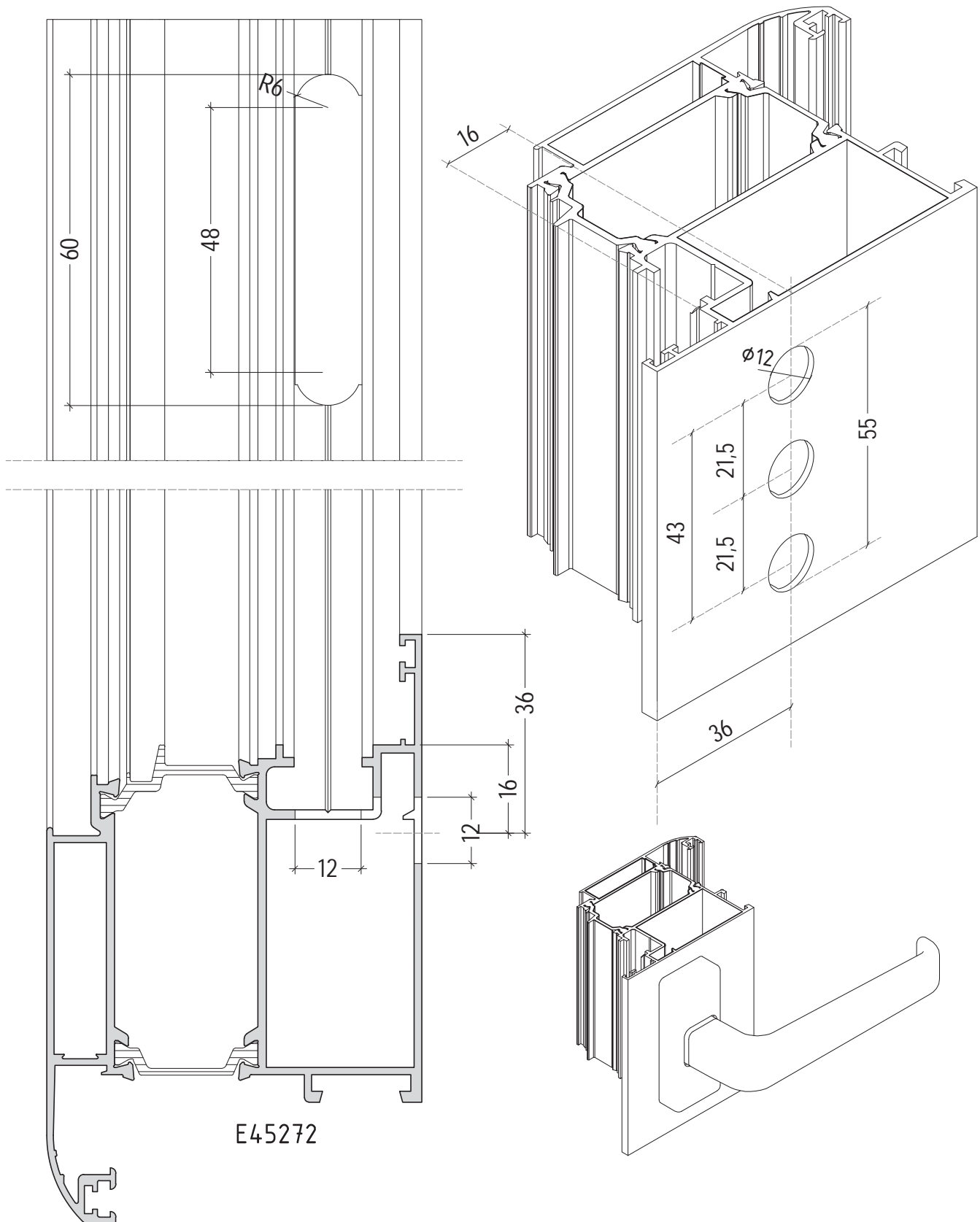


Note:
The length L of the cylinder depends on the chosen type of decorative rosettes

machining for window handle

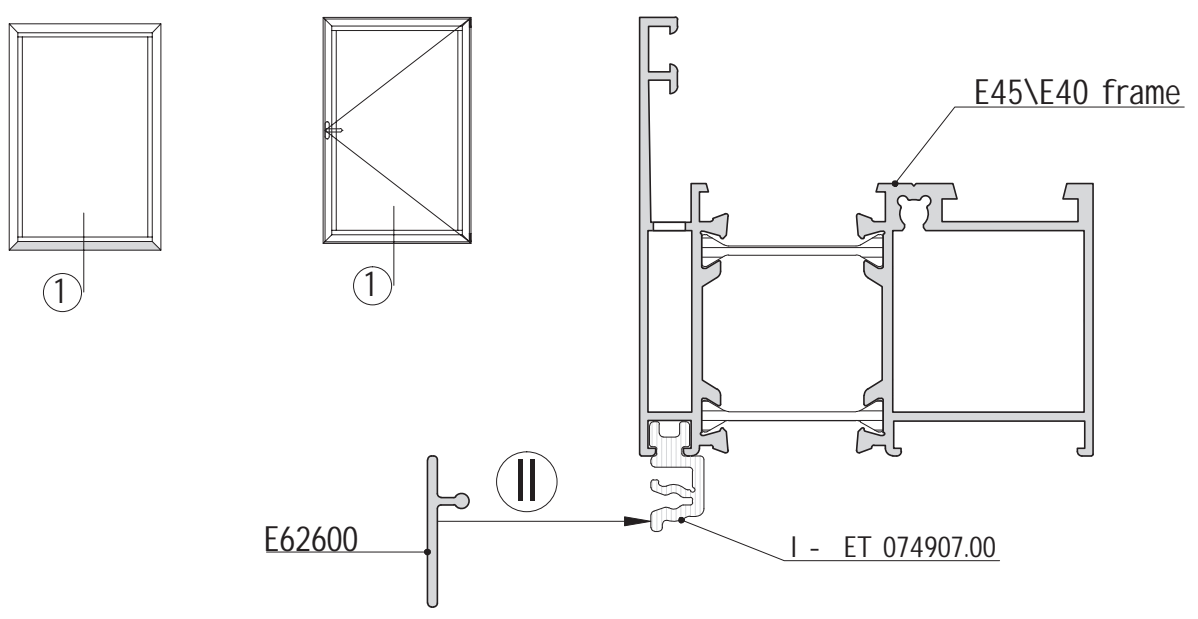
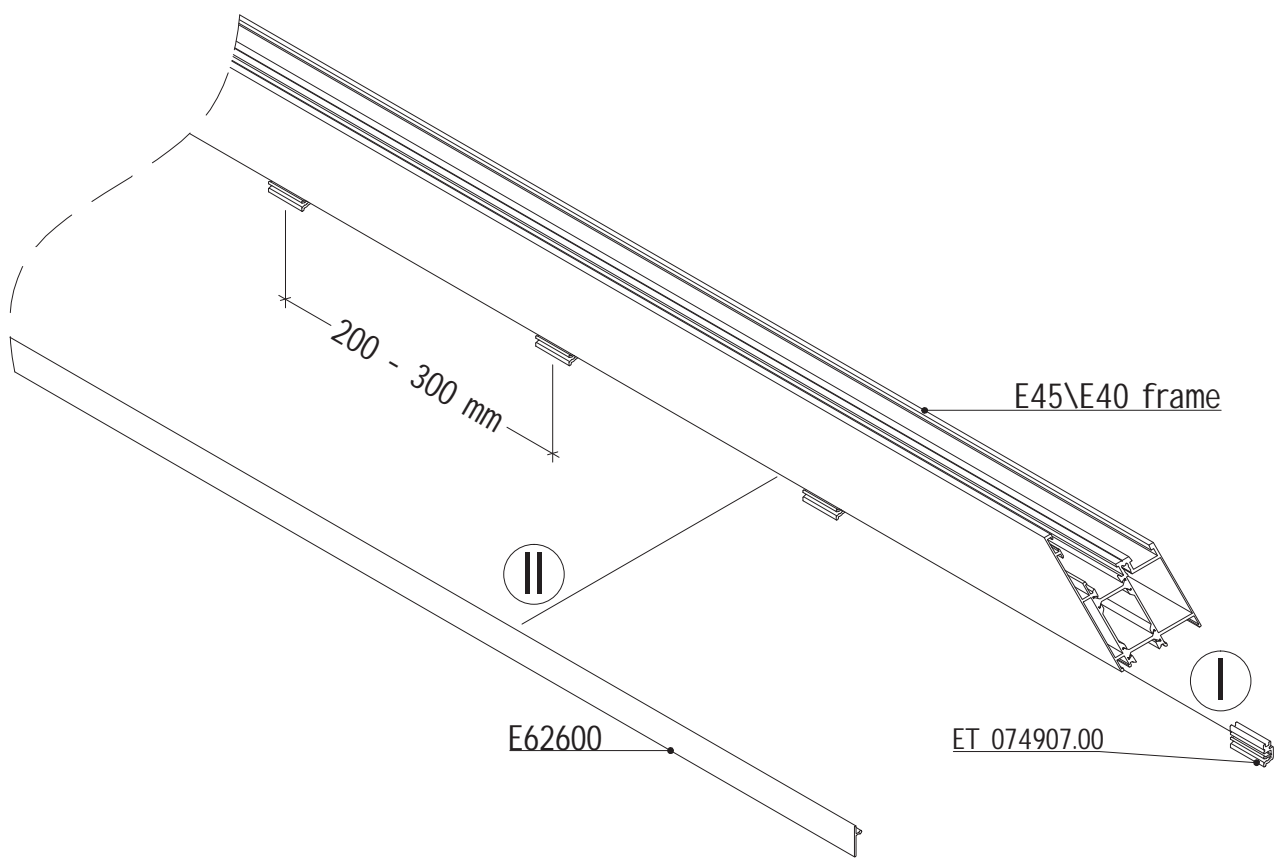


machining for GU mechanism



D45-31

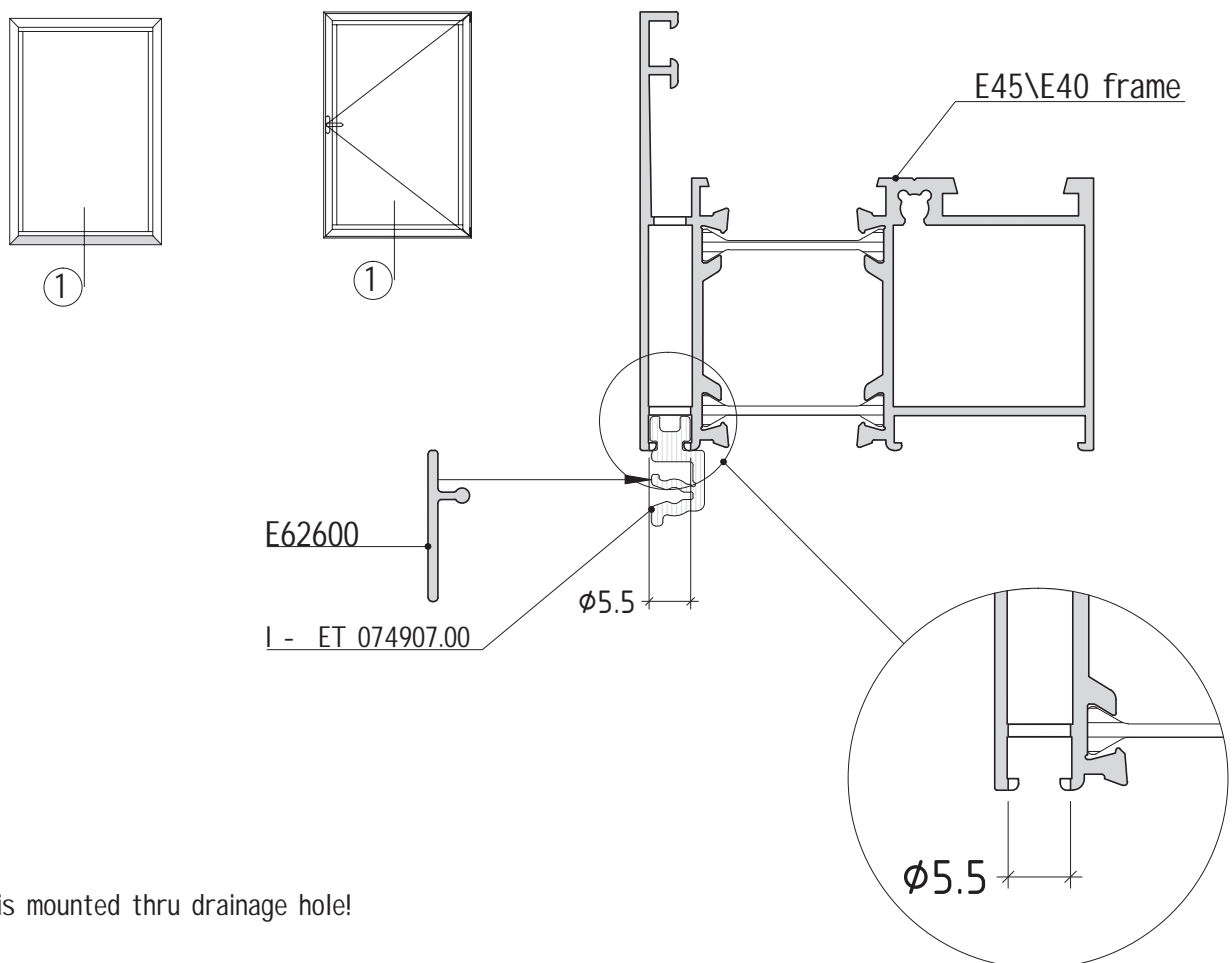
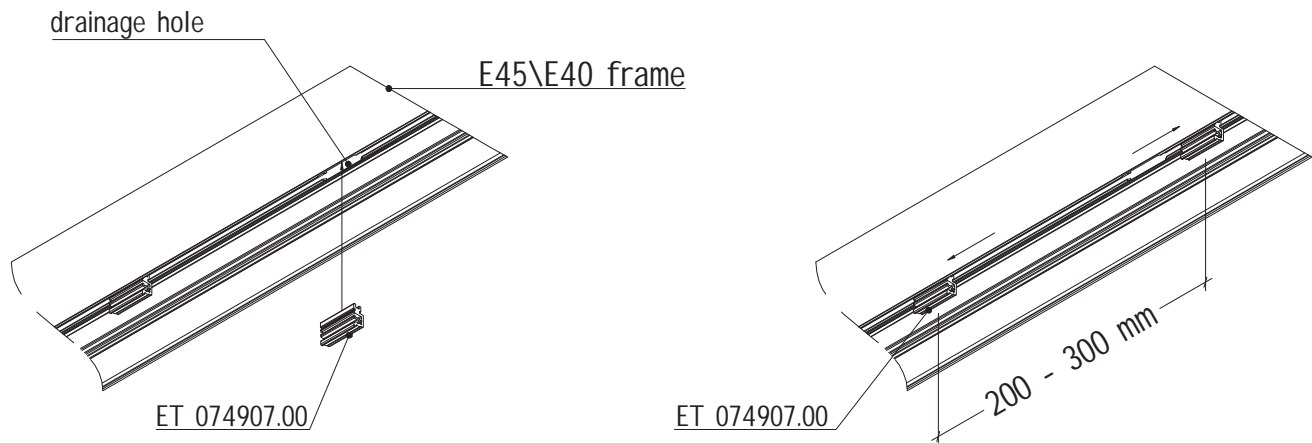
Sequence of assembly of ET 074907.00 and E62600 to frame E45\E40
 Option - 1



Note:
 ET 074907.00 must be mounted before crimping the frame!

D45-32

Sequence of assembly of ET 074907.00 and E62600 to frame E45\E40
 Option - 2



Note:
 ET 074907.00 is mounted thru drainage hole!

D45-33

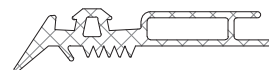
ACCESSORIES

opening system with thermal break

E45

code/description	package/pcs	colour
ET 130402.00	60	●

elongated glazing EPDM gasket E40 - E45 (3 mm)



ET 130411.00	150	●
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glazing EPDM gasket for E1000 E40 E45 (3 mm)



ET 130153.00	150	●
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glazing EPDM gasket 4 mm



ET 130175.00	250	●
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glazing EPDM gasket press-in 3-4 mm



opening system with thermal break

E45

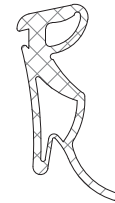
code/description	package/pcs	colour
ET 130176.00	125	●

glazing EPDM gasket
press-in 5-6 mm



ET 130407.00	80	●
--------------	----	---

elongated glazing EPDM
gasket press-in 5-6 mm



ET 130177.00	60	●
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glazing EPDM gasket
press-in 7-8 mm



ET 990619.00	125	●
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ET 130205.00	125	●
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P5 old code

glazing EPDM gasket
press-in 5 mm



A45-2

opening system with thermal break

E45

code/description	package/pcs	colour
ET 990620.00	125	○
ET 130206.00	125	○

P6 old code



glazing EPDM gasket
press-in 6 mm

ET 130207.00	75	○
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P7 old code



glazing EPDM gasket
press-in 7 mm

ET 130208.00	40	○
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P8 old code



glazing EPDM gasket
press-in 8 mm

ET 130210.00	40	○
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P10 old code



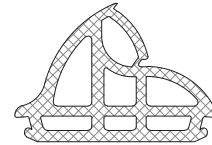
glazing EPDM gasket
press-in 10 mm

opening system with thermal break

E45

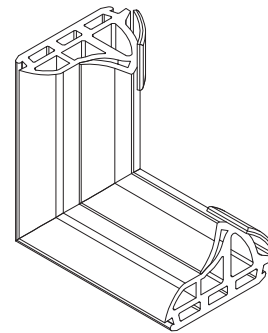
code/description	package/pcs	colour
ET 130421.00	40	●

center seal EPDM gasket
E45



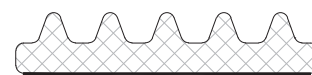
ET 060421.00	40	●
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vulcanised EPDM corner E45
for ET130421.00



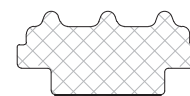
ET 080452.00	2 m	●
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additional insulator with
tape for glass sash E45



ET 080451.00	2 m	●
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additional insulator with
tape for glass frame E45

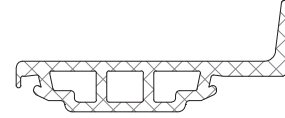


opening system with thermal break

E45

code/description	package/pcs	colour
ET 130422.00	70	●

EPDM gasket for drainage
E45



ET 130792.00	200 m	●
--------------	-------	---

EPDM gasket



ET 130400.00	250	●
--------------	-----	---

internal seal EPDM gasket
E40 - E45



ET 130174.00	160	●
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interior seal EPDM gasket
top line



opening system with thermal break

E45

code/description	package/pcs	colour
ET 130131.00	200	●

interior seal gasket E2300
E1000 E40 E45



ET 130154.00	200	●
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interior seal window EPDM
gasket for
E6300 E2004 E1000 E40
E45 (4 mm)



ATTENTION
use with profile
E45111 & E45161

ET 130420.00	100	●
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EPDM gasket for E45



ET 130412.00	240	●
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door seal EPDM gasket for
E1000 E40 E45



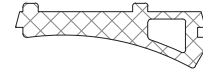
A45-6

opening system with thermal break

E45

code/description	package/pcs	colour
ET 130424.00	90	●

EPDM gasket for frame for variable angles E45



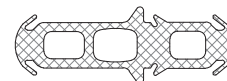
ET 130413.00	200	●
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seal EPDM gasket for decorative lattice bar (E40650)



ET 991275.00	100	●
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EPDM gasket for expansion distance



ET 130184.00	200	●
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EPDM gasket

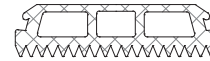


opening system with thermal break

E45

code/description	package/pcs	colour
ET 130403.00	90	●

wall-joining EPDM gasket
(internal)



ET 130404.00	160	●
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wall-joining EPDM gasket
(external) for straight fixed
frame



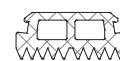
ET 130409.00	240	●
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wall-joining EPDM gasket
perimeter (external) for
straight fixed frame



ET 130405.00	120	●
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wall-joining EPDM gasket
(external) for round fixed
frame



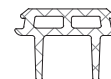
A45-8

opening system with thermal break

E45

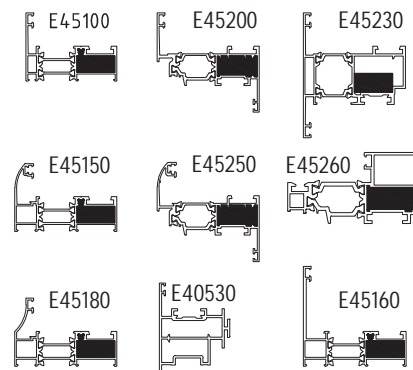
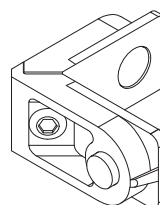
code/description	package/pcs	colour
ET 130410.00	120	●

wall-joining EPDM gasket
perimeter (external) for
round fixed frame



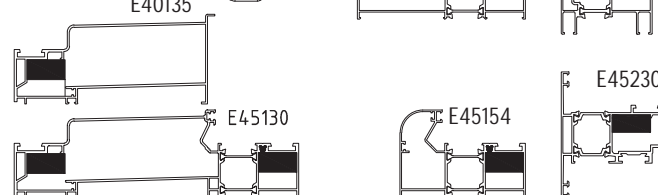
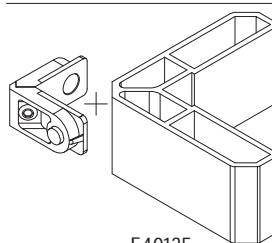
ET 053305.00	250	MF
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die cust al. joint corner bracket



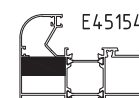
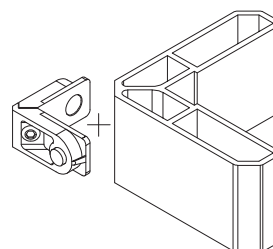
ET 050200.00	300	MF
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extruded al. shimming corner
- 24.7 mm



ET 050202.00	250	MF
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extruded al. shimming corner
- 28.1 mm

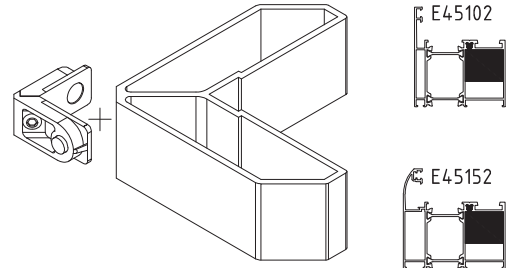


opening system with thermal break

E45

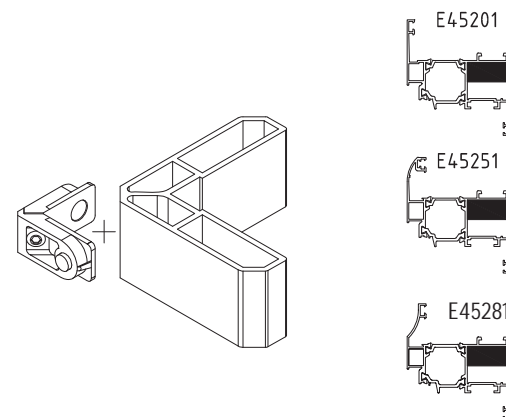
code/description	package/pcs	colour
ET 050300.00	150	MF

extruded al. shimming corner
- 24.7 mm



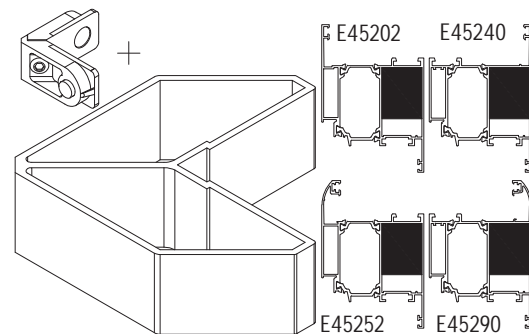
ET 050201.00	300	MF
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extruded al. shimming corner
- 25.8 mm



ET 050400.00	100	MF
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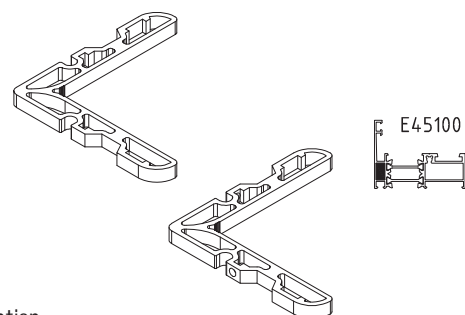
extruded al. shimming corner
- 25.8 mm



ET 054250.00	300	MF
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ET 054257.00	300	MF
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extruded al. joint corner
bracket
- 5.2 mm
without hole/with hole



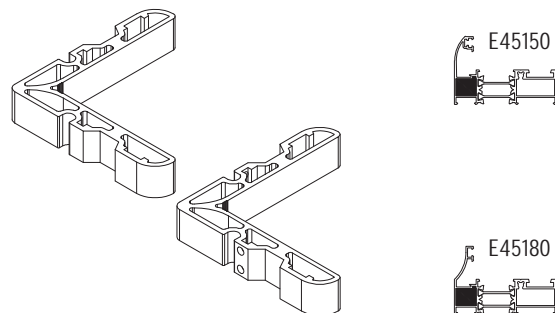
attention
always use epoxy resin
for long lasting joining

opening system with thermal break

E45

code/description	package/pcs	colour
ET 054252.00	250	MF
ET 054259.00	250	MF

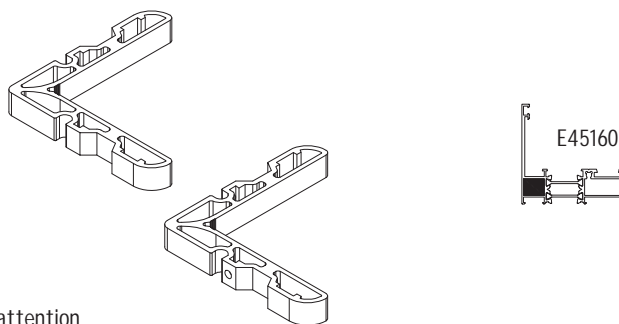
extruded al. joint corner bracket
- 12.6 mm
without hole/with hole



attention
always use epoxy resin
for long lasting joining

ET 054261.00	-	MF
ET 054262.00	-	MF

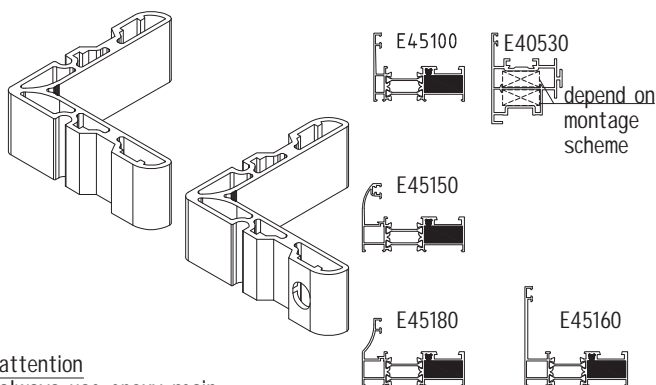
extruded al. joint corner bracket
- 13.3 mm
without hole/with hole



attention
always use epoxy resin
for long lasting joining

ET 054255.00	200	MF
ET 054253.00	200	MF

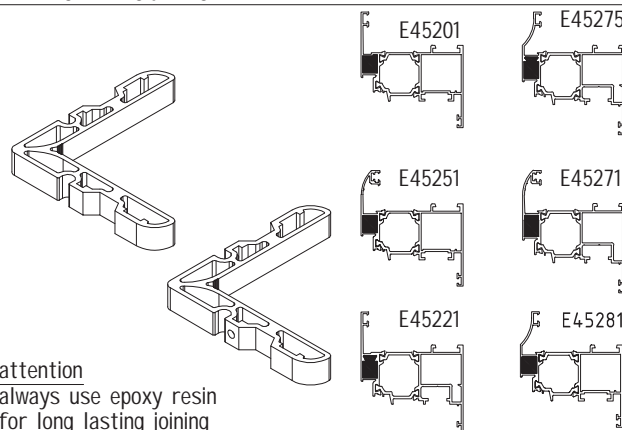
extruded al. joint corner bracket
- 24.7 mm
without hole/with hole



attention
always use epoxy resin
for long lasting joining

ET 054251.00	250	MF
ET 054258.00	250	MF

extruded al. joint corner bracket
- 9.1 mm
without hole/with hole



attention
always use epoxy resin
for long lasting joining

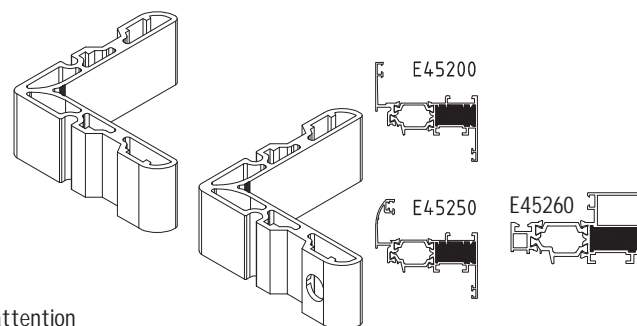
A45-11

opening system with thermal break

E45

code/description	package/pcs	colour
ET 054256.00	200	MF
ET 054254.00	200	MF

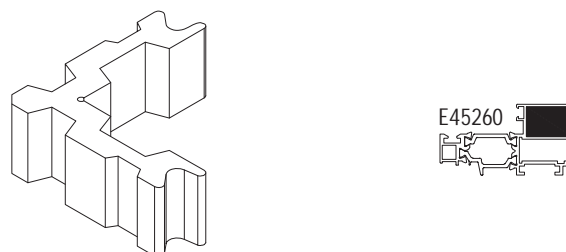
extruded al. joint corner
bracket
- 25.8 mm
without hole/with hole



attention
always use epoxy resin
for long lasting joining

ET 054463.00	-	MF
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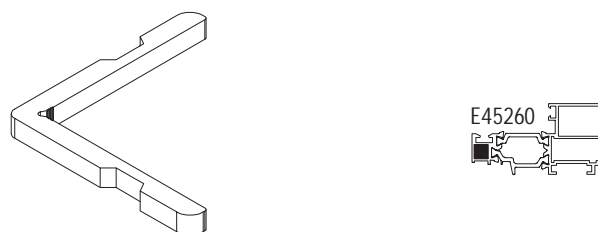
extruded al. joint corner
bracket
- 22.5 mm



attention
always use epoxy resin
for long lasting joining

ET 054651.00	-	MF
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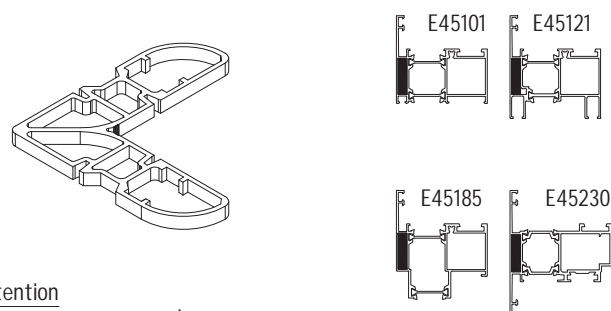
extruded al. joint corner
bracket
- 6.4 mm



attention
always use epoxy resin
for long lasting joining

ET 054300.00	200	MF
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extruded al. joint corner
bracket
- 5.2 mm



attention
always use epoxy resin
for long lasting joining

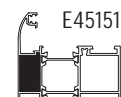
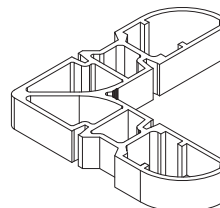
A45-12

opening system with thermal break

E45

code/description	package/pcs	colour
ET 054301.00	150	MF

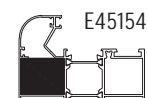
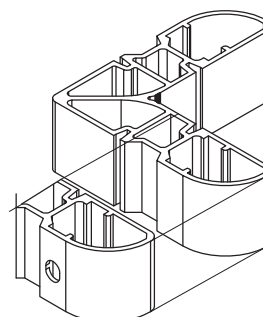
extruded al. joint corner
bracket
- 12.6 mm



attention
always use epoxy resin
for long lasting joining

ET 054308.00	100	MF
ET 054451.00	100	MF

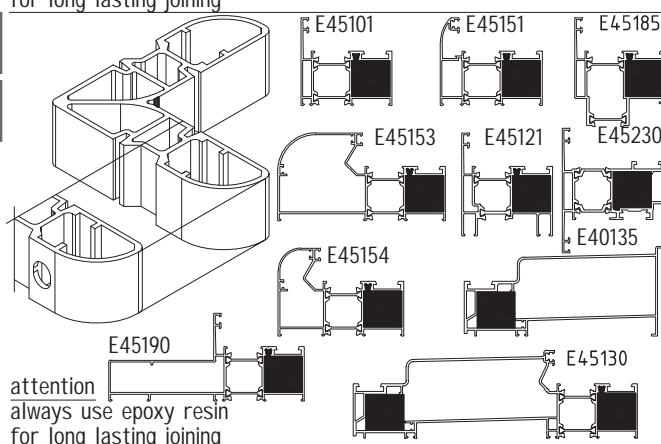
extruded al. joint corner
bracket
- 28.1 mm
without hole/with hole



attention
always use epoxy resin
for long lasting joining

ET 054305.00	100	MF
ET 054302.00	100	MF

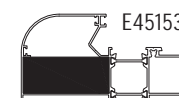
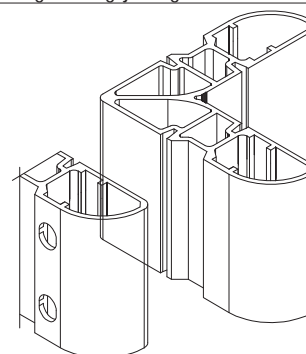
extruded al. joint corner
bracket
- 24.7 mm
without hole/with hole



attention
always use epoxy resin
for long lasting joining

ET 054307.00	70	MF
ET 054304.00	70	MF

extruded al. joint corner
bracket
- 56 mm
without hole/with hole



attention
always use epoxy resin
for long lasting joining

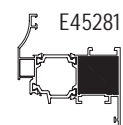
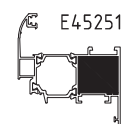
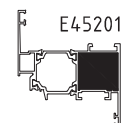
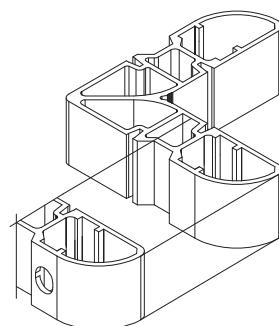
A45-13

opening system with thermal break

E45

code/description	package/pcs	colour
ET 054306.00	100	MF
ET 054303.00	100	MF

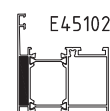
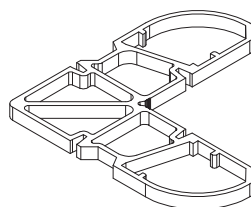
extruded al. joint corner
bracket
- 25.8 mm
without hole/with hole



attention
always use epoxy resin
for long lasting joining

ET 054350.00	150	MF
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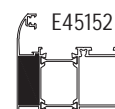
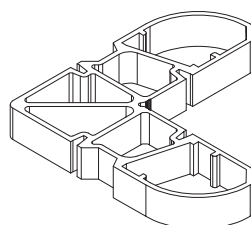
extruded al. joint corner
bracket
- 5.2 mm



attention
always use epoxy resin
for long lasting joining

ET 054352.00	100	MF
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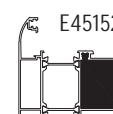
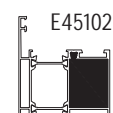
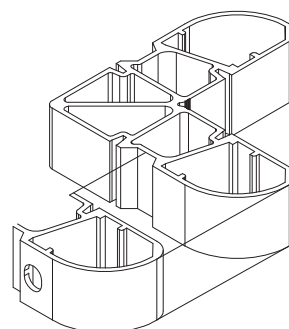
extruded al. joint corner
bracket
- 12.6 mm



attention
always use epoxy resin
for long lasting joining

ET 054354.00	70	MF
ET 054353.00	70	MF

extruded al. joint corner
bracket
- 24.7 mm
without hole/with hole



attention
always use epoxy resin
for long lasting joining

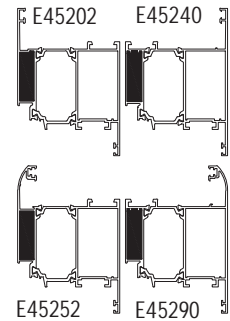
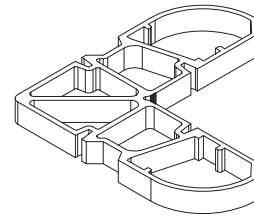
A45-14

opening system with thermal break

E45

code/description	package/pcs	colour
ET 054351.00	150	MF

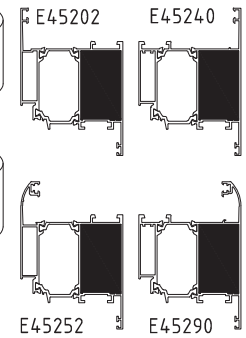
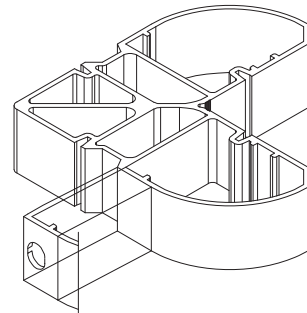
extruded al. joint corner
bracket
- 9 mm



attention
always use epoxy resin
for long lasting joining

ET 054501.00	50	MF
ET 054500.00	50	MF

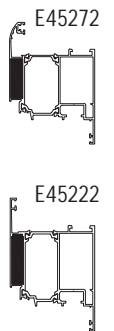
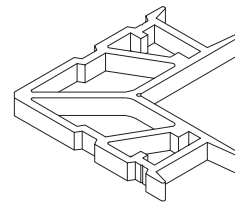
extruded al. joint corner
bracket
-25.8 mm
without hole/with hole



attention
always use epoxy resin
for long lasting joining

ET 054452.00	100	MF
ET 054454.00	100	MF

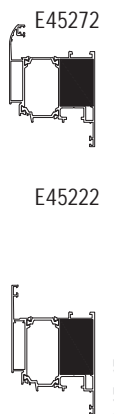
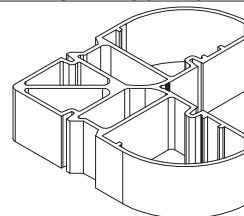
extruded al. joint corner
bracket
- 9 mm
without hole/with hole



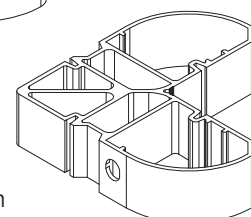
attention
always use epoxy resin
for long lasting joining

ET 054453.00	100	MF
ET 054455.00	100	MF

extruded al. joint corner
bracket
- 26.3 mm
without hole/with hole



attention
always use epoxy resin
for long lasting joining



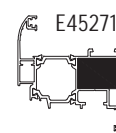
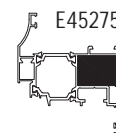
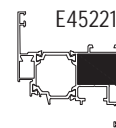
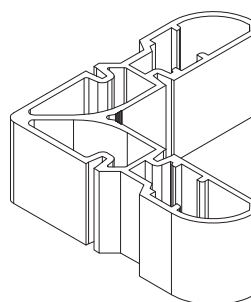
A45-15

opening system with thermal break

E45

code/description	package/pcs	colour
ET 054551.00	100	MF

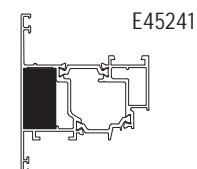
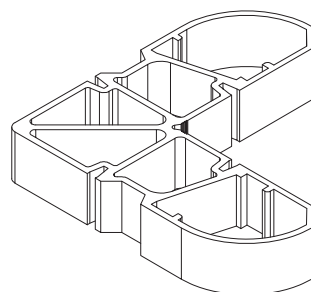
extruded al. joint corner
bracket
- 26.4 mm



attention
always use epoxy resin
for long lasting joining

ET 054470.00	70	MF
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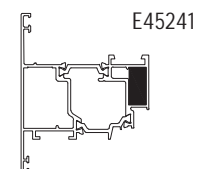
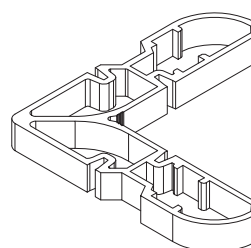
extruded aluminium corner
bracket
- 16.6 mm



attention
always use epoxy resin
for long lasting joining

ET 054471.00	150	MF
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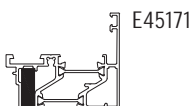
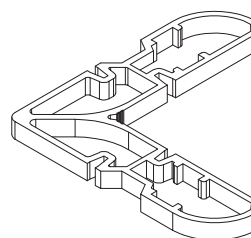
extruded aluminium corner
bracket
- 8.8 mm



attention
always use epoxy resin
for long lasting joining

ET 054472.00	200	MF
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extruded aluminium corner
bracket
- 6.6 mm



attention
always use epoxy resin
for long lasting joining

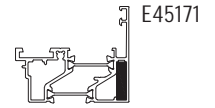
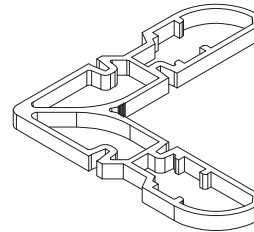
A45-16

opening system with thermal break

E45

code/description	package/pcs	colour
ET 054473.00	200	MF

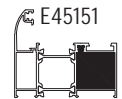
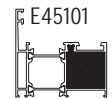
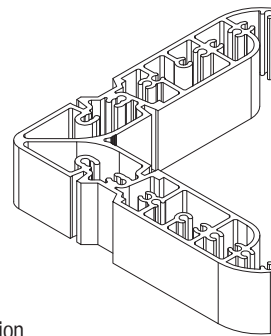
extruded aluminium corner bracket
- 4.8 mm



attention
always use epoxy resin
for long lasting joining

ET 054700.00	70	MF
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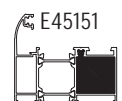
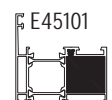
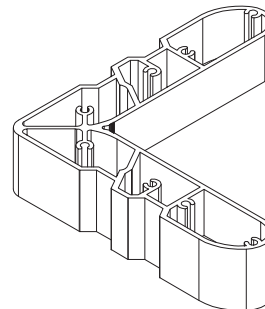
extruded al. joint corner bracket
- 24.6 mm
for GU-SIEGENIA



attention
always use epoxy resin
for long lasting joining

ET 054701.00	70	MF
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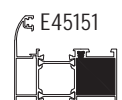
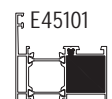
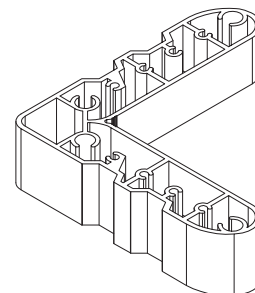
extruded al. joint corner bracket
- 24.6 mm
for ROTO



attention
always use epoxy resin
for long lasting joining

ET 054652.00	70	MF
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extruded al. joint corner bracket
- 24.6 mm
for MACO



attention
always use epoxy resin
for long lasting joining

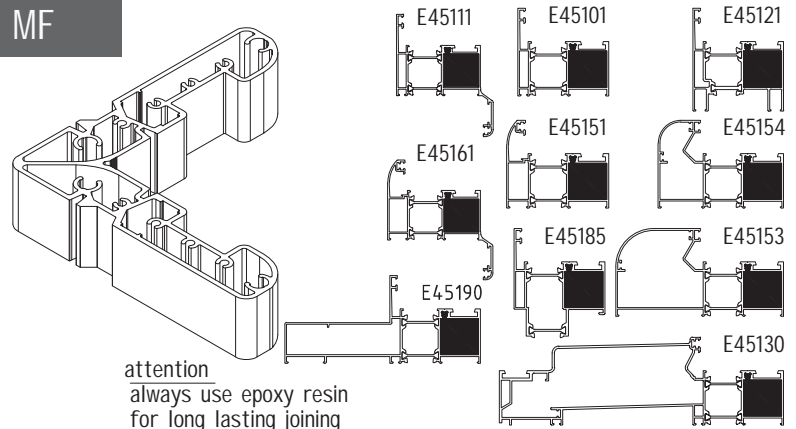
A45-17

opening system with thermal break

E45

code/description	package/pcs	colour
ET 054732.00	70	MF

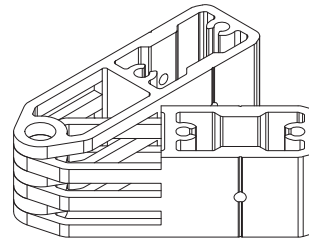
extruded al. joint corner bracket for WINKHAUS



attention
always use epoxy resin
for long lasting joining

ET 054750.00	40	MF
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corner bracket for variable angle
- 25,9mm

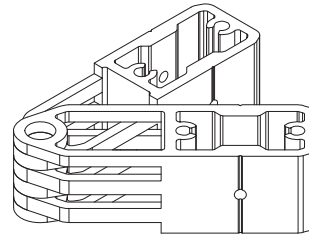


for profiles:
E45201
E45251
E45281

attention
always use epoxy resin
for long lasting joining

ET 054751.00	40	MF
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corner bracket for variable angle
- 24,8 mm

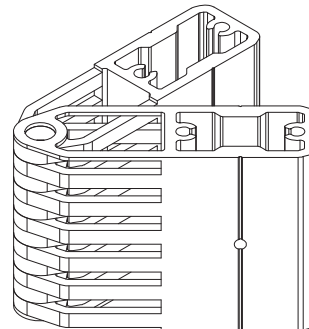


for profiles:
E45101
E45185
E45130
E45151
E45154
E45153
E45301
E45302
E45351
E45340
E45121

attention
always use epoxy resin
for long lasting joining

ET 054753.00	20	MF
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corner bracket for variable angle
- 56.2 mm



for profiles:
E45153

attention
always use epoxy resin
for long lasting joining

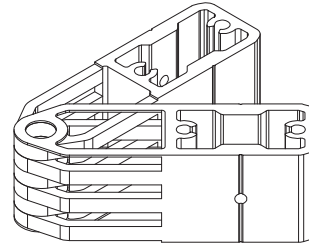
A45-18

opening system with thermal break

E45

code/description	package/pcs	colour
ET 054754.00	30	MF

corner bracket for variable angle
- 28.2 mm

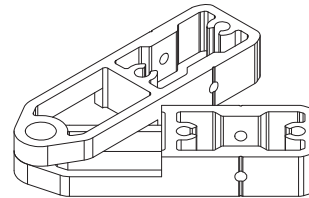


for profiles:
E45154

attention
always use epoxy resin
for long lasting joining

ET 054755.00	60	MF
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corner bracket for variable angle
- 12.8 mm

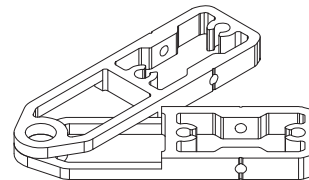


for profiles:
E45340
E45151

attention
always use epoxy resin
for long lasting joining

ET 054756.00	100	MF
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corner bracket for variable angle
- 6.9 mm

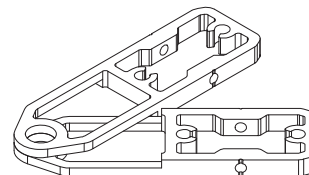


for profiles:
E45351

attention
always use epoxy resin
for long lasting joining

ET 054757.00	100	MF
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corner bracket for variable angle
- 5.3 mm



for profiles:
E45101
E45185
E45301

attention
always use epoxy resin
for long lasting joining

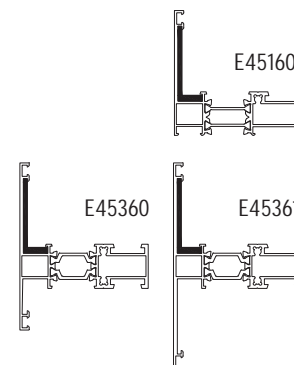
A45-19

opening system with thermal break

E45

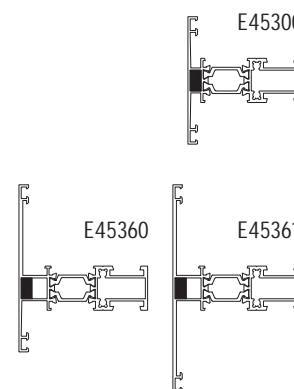
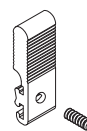
code/description	package/pcs	colour
ET 991309.00	100	-

alignment square



ET 070300.00	100	MF
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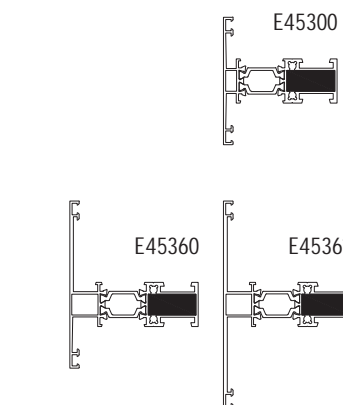
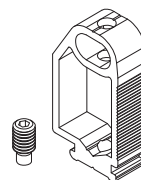
T bracket for mullions/transoms
external side
- 10.5 mm



attention
always use epoxy resin
for long lasting joining

ET 070200.00	100	MF
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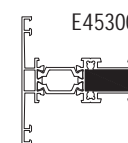
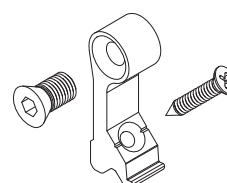
T bracket for
mullions/transoms
- 10.5 mm



attention
always use epoxy resin
for long lasting joining

ET 070205.00	10	MF
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screwing "T" bracket for
mullions/transoms
- 10.5 mm



attention
always use epoxy resin
for long lasting joining

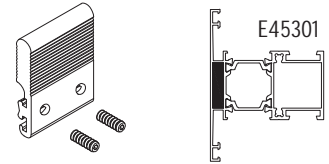
A45-20

opening system with thermal break

E45

code/description	package/pcs	colour
ET 070301.00	100	MF

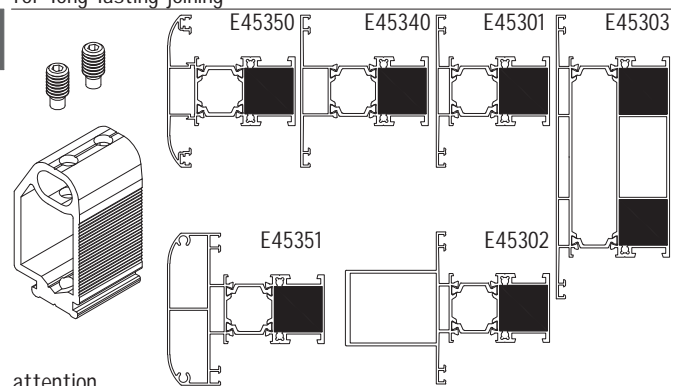
T bracket for mullions/transoms external side - 23.5 mm



attention
always use epoxy resin
for long lasting joining

ET 070201.00	100	MF
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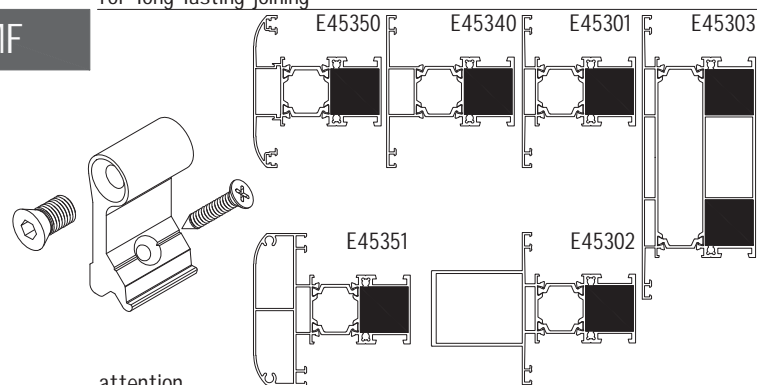
T bracket for mullions/transoms - 23.5 mm



attention
always use epoxy resin
for long lasting joining

ET 070206.00	10	MF
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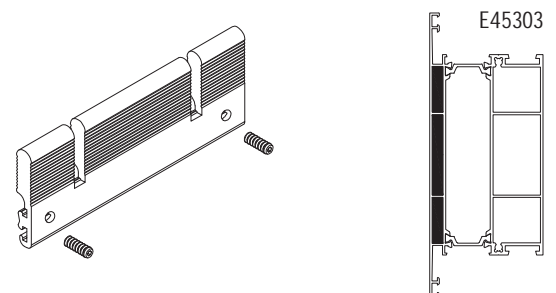
screwing T bracket for mullions/transoms - 23.5 mm



attention
always use epoxy resin
for long lasting joining

ET 070305.00	50	MF
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T bracket for mullions/transoms external side - 93 mm



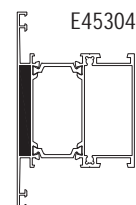
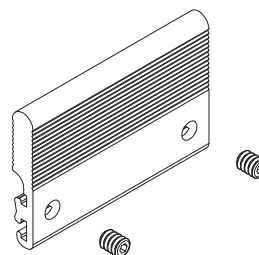
A45-21

opening system with thermal break

E45

code/description	package/pcs	colour
ET 070216.00	10	MF

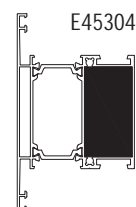
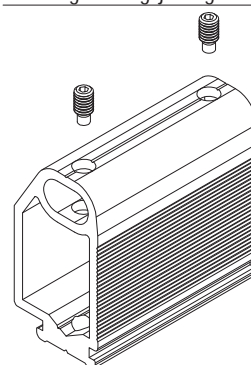
T bracket for mullions/transoms external side - 47 mm



attention
always use epoxy resin
for long lasting joining

ET 070215.00	10	MF
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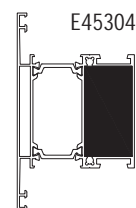
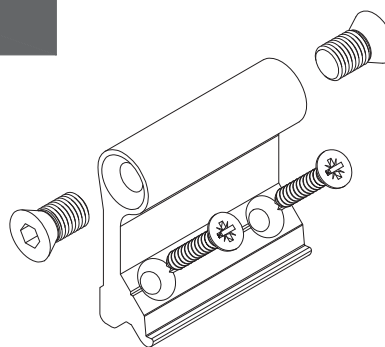
screwing T bracket for mullions/transoms - 47 mm



attention
always use epoxy resin
for long lasting joining

ET 070312.00	10	MF
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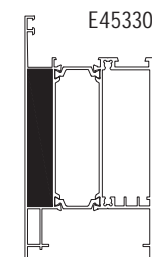
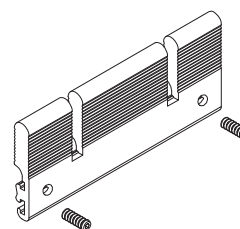
screwing T bracket for mullions/transoms - 47 mm



attention
always use epoxy resin
for long lasting joining

ET 070302.00	50	MF
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T bracket for mullions/transoms external side - 72 mm



attention
always use epoxy resin
for long lasting joining

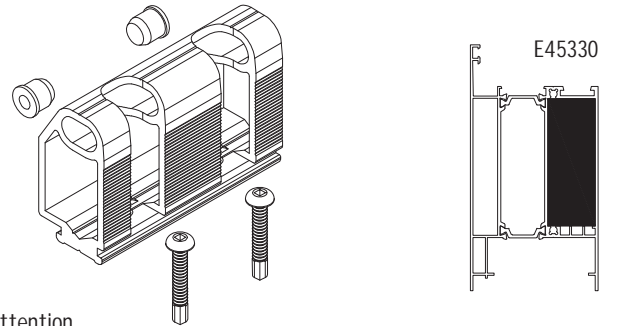
A45-22

opening system with thermal break

E45

code/description	package/pcs	colour
ET 070202.00	50	MF

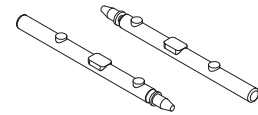
T bracket for
mullions/transoms
- 66.8 mm



attention
always use epoxy resin
for long lasting joining

ET 143900.00	100	MF
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roll pin $\phi 3 \times 6$ mm
with handle



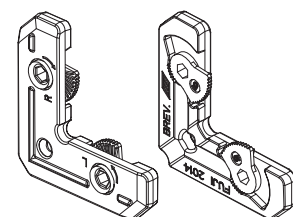
ET 143914.00	100	MF
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roll pin $\phi 4/8 \times 6.5$ mm - inox



ET 058001.00	250	MF
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alignment square with
locking function
for straight sash profiles
and straight frames

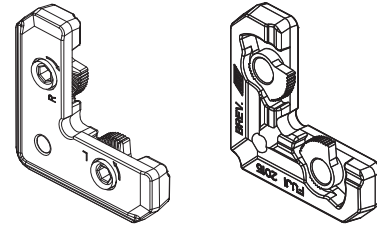


opening system with thermal break

E45

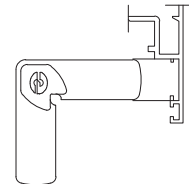
code/description	package/pcs	colour
ET 058002.00	250	MF

alignment square with
locking function
for round sash profiles and
round frames



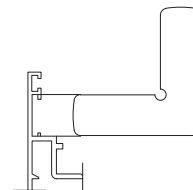
ET 057707.00	100	MF
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alignment square (plastic)
E45271, E45272, E45222,
E45245, E45275, E45295



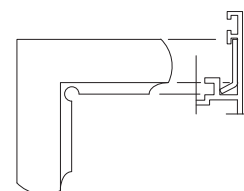
ET 055509.00	100	MF
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alignment square
(galvanized steel) for
E45271, E45272, E45222,
E45245, E45275, E45295



ET 055501.00	100	MF
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alignment square
(galvanized steel)
for
E2004 E1000 E40 E45

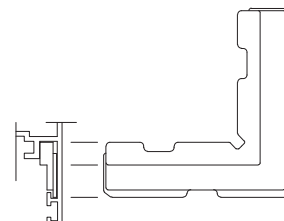


opening system with thermal break

E45

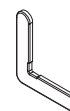
code/description	package/pcs	colour
ET 057704.00	100	MF

alignment square (plastic)
for E1000 E40 E45



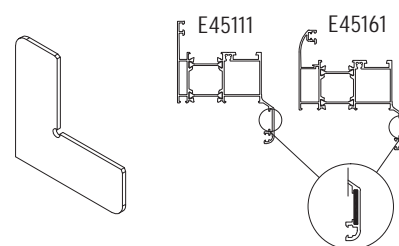
ET 055507.00	200	MF
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alignment square
(galvanized steel)
for E1000 E19 E40 E45
(5x1.25)



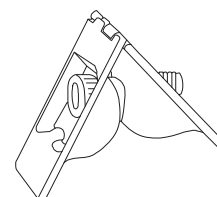
ET 055505.00	100	MF
ET 056605.00	100	INOX

alignment square
for E1000 E2004 E40 E45



ET 051101.00	200	MF
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stainless steel joint corner
(small)

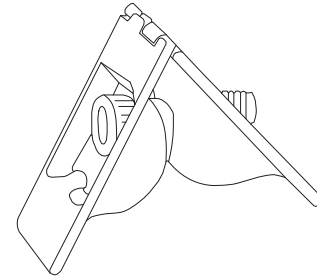


opening system with thermal break

E45

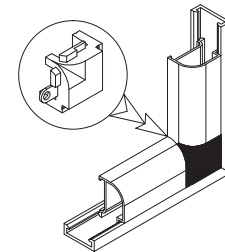
code/description	package/pcs	colour
ET 051102.00	200	MF

stainless steel joint corner
(large)



ET 059902.00	25	MF
ET 059902.02	25	●
ET 059902.01	25	●

corner for round bead



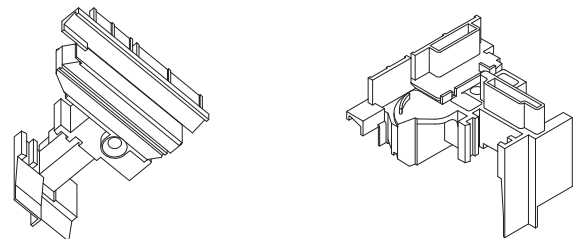
ET 074653.00	5	-
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plastic plug for E40813 E45



ET 074649.00	5	-
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pair of plastic plugs
for straight secondary
sash profile E45500



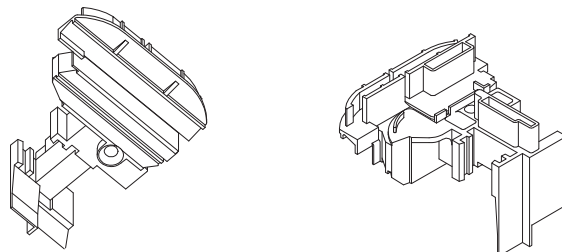
A45-26

opening system with thermal break

E45

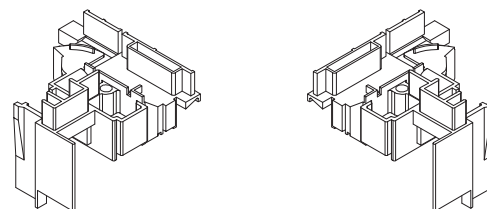
code/description	package/pcs	colour
ET 074650.00	5	-

pair of plastic plugs
for round secondary
sash profile E45550



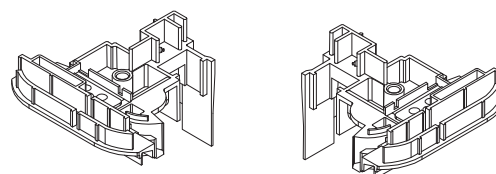
ET 074651.00	5	●
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pair of plastic plugs (flat)
for straight secondary sash
profile E45540
pvc-wood mechanism



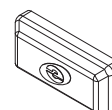
ET 074662.00	5	●
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pair of plastic plugs (curved)
for round secondary sash
profile E45590
pvc-wood mechanism



ET 074206.00	100	●
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plastic drain cap 20x6mm

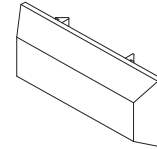


opening system with thermal break

E45

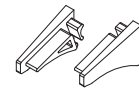
code/description	package/pcs	colour
ET 074605.00	100	●

plastic drain cap 30x6mm



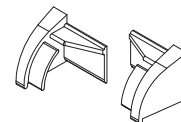
ET 074629.00	200	●
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plastic plug for drip profile
E2357



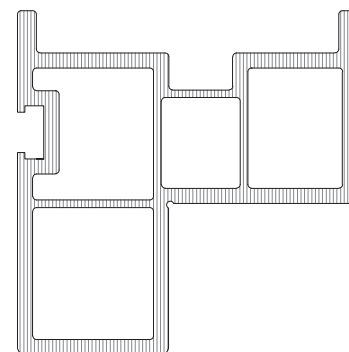
ET 074624.00	200	●
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plastic plug for drip profile
E40820



ET 991280.00	8pcs x 6m	standard
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mounting PVC profile for E45



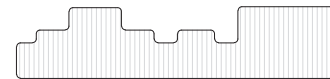
A45-28

opening system with thermal break

E45

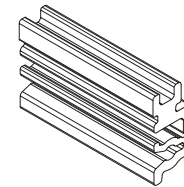
code/description	package/pcs	colour
ET 080543.00	6 m	●

PVC bearing profile for balcony doors



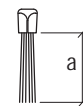
ET 074907.00	100 pcs	●
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PVC accessory "clips"



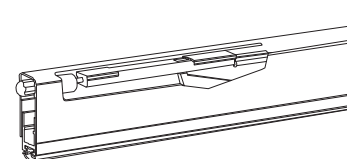
ET 135900.00	200	●
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brush with metallic body
a=12 mm - L=2.2 m



ET 134200.00	1	MF
ET 134201.01	1	MF
ET 134255.00	1	MF

door sealing system internal
 - 13 x 28 (14) 1230 , 1030 mm
 - 13 x 28 (14) 1030 , 830 mm
 - 13 x 28 (14) 830 , 630 mm



opening system with thermal break

E45

code/description	package/pcs	colour
ET 134150.00	1	MF
ET 134151.00	1	MF
ET 134152.00	1	MF
ET 134153.00	1	MF

door sealing system internal
 - 15.6 x 28.3 (13) 730 , 830 mm
 - 15.6 x 28.3 (13) 830 , 930 mm
 - 15.6 x 28.3 (13) 930 , 1030 mm
 - 15.6 x 28.3 (13) 1030 , 1130 mm

ET 074800.00	1	MF
ET 074800.01	1	●

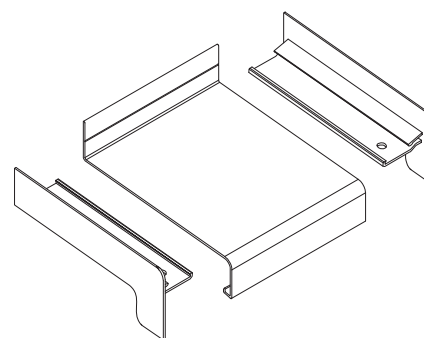
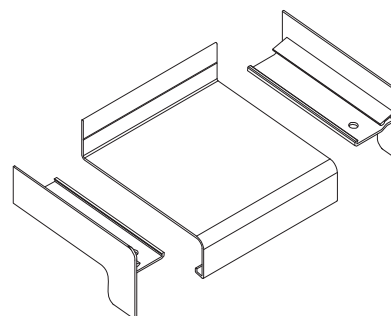
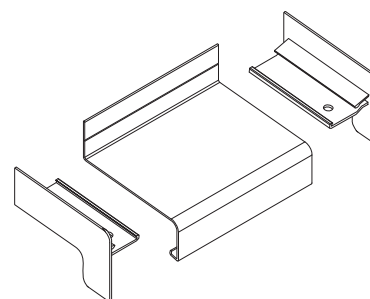
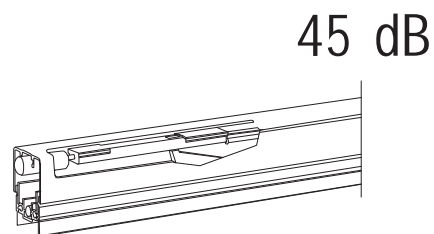
pair of al. plugs for drip sill
 E62130

ET 074801.00	1	MF
ET 074801.01	1	●

pair of al. plugs for drip sill
 E62131

ET 074802.00	1	MF
ET 074802.01	1	●

pair of al. plugs for drip sill
 E62132



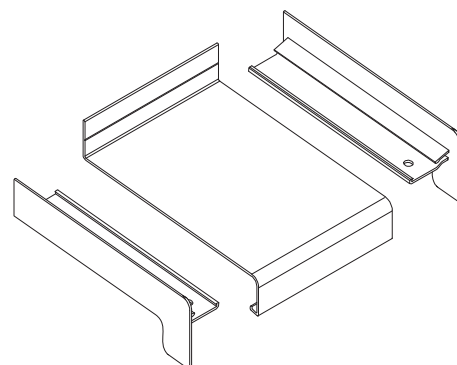
A45-30

opening system with thermal break

E45

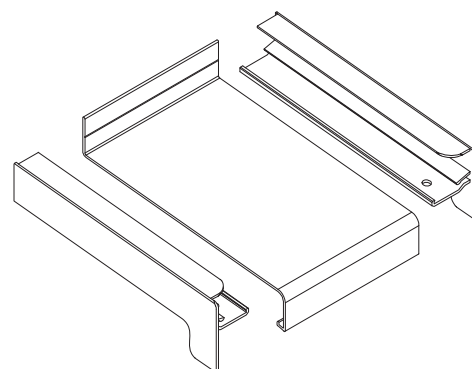
code/description	package/pcs	colour
ET 074803.00	1	MF
ET 074803.01	1	●

pair of al. plugs for drip sill
E62133



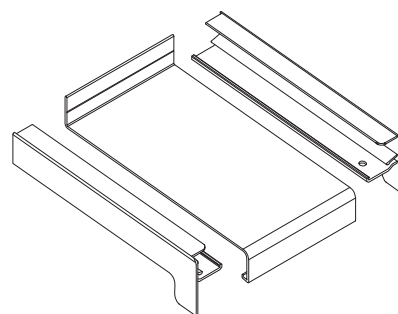
ET 074804.00	1	MF
ET 074804.01	1	●

pair of al. plugs for drip sill
E62134



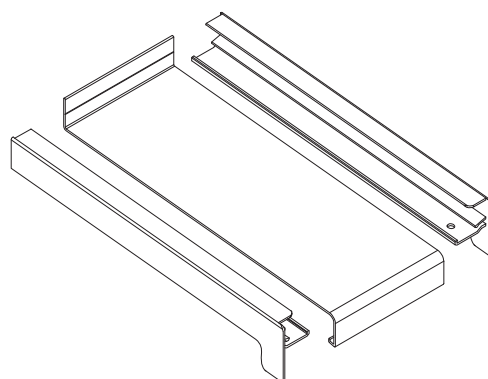
ET 074805.00	1	MF
ET 074805.01	1	●

pair of al. plugs for drip sill
E62135



ET 074807.00	1	MF
ET 074807.01	1	●

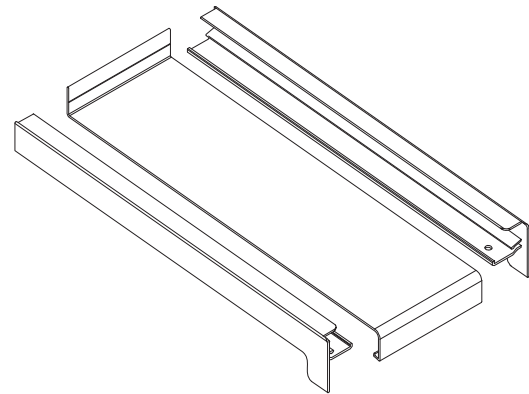
pair of al. plugs for drip sill
E62137



opening system with thermal break

E45

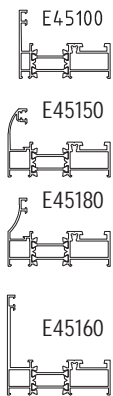
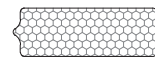
code/description	package/pcs	colour
ET 074808.00	1	MF
ET 074808.01	1	●



pair of al. plugs for drip sill
E62138

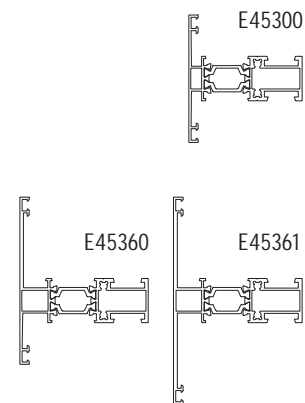
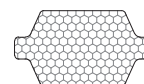
ET 945100.00	9pcs x 700mm	●
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additional insulator
For profiles: E45100
E45150/E45180/
E45160 hidden vent



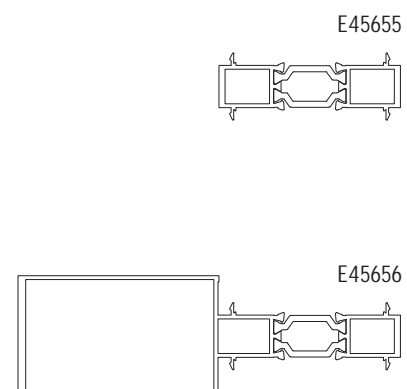
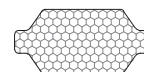
ET 945300.00	9pcs x 700mm	●
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additional insulator
For profiles:
E45300
E45361 hidden vent
E45360 hidden vent



ET 945655.00	9pcs x 700mm	●
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additional insulator
For profiles:
E45655
E45656

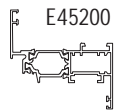


A45-32

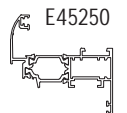
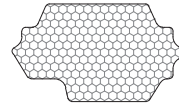
opening system with thermal break

E45

code/description	package/pcs	colour
ET 945200.00	9pcs x 700mm	●

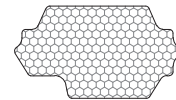


additional insulator
For profiles:
E45200
E45250

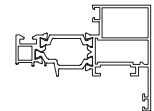


ET 945260.00	9pcs x 700mm	●
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additional insulator
For profiles:
E45260 hidden vent

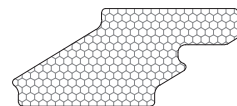


E45260

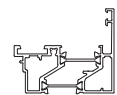


ET 945171.00	9pcs x 700mm	●
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additional insulator
For profiles:
E45171 reverse profile

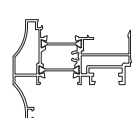
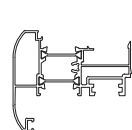
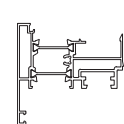
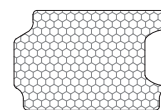


E45171



ET 945500.00	9pcs x 700mm	●
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additional insulator
For profiles:
E45500
E45550
E45580

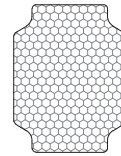


opening system with thermal break

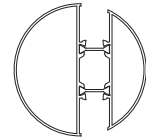
E45

code/description	package/pcs	colour
ET 940603.00	9pcs x 700mm	●

additional insulator
For profiles:
E40603

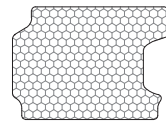


E40603

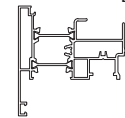


ET 945540.00	9pcs x 700mm	●
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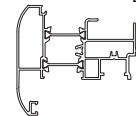
additional insulator
For profiles:
E45540 PVC
E45590 PVC



E45540

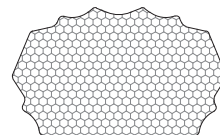


E45590

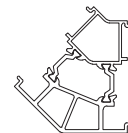


ET 940601.00	9pcs x 700mm	●
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additional insulator
For profiles:
E40601

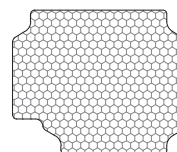


E40601

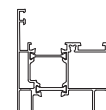


ET 945121.00	9pcs x 700mm	●
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additional insulator
For profiles:
E45121



E45121

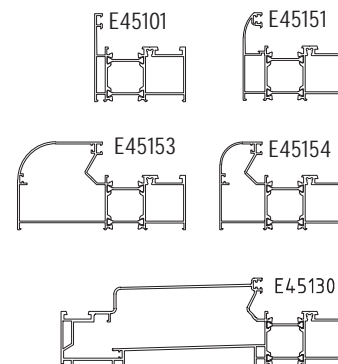
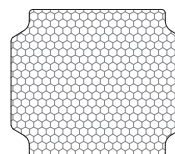


opening system with thermal break

E45

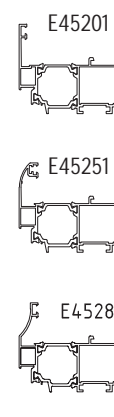
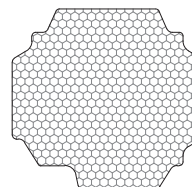
code/description	package/pcs	colour
ET 945101.00	9pcs x 700mm	●

additional insulator
For profiles:
E45101
E45151/E45153
E45130/E45154



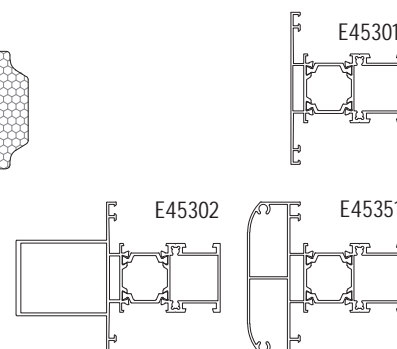
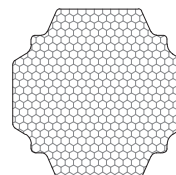
ET 945201.00	9pcs x 700mm	●
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additional insulator
For profiles:
E45201
E45251
E45281



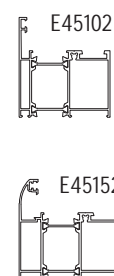
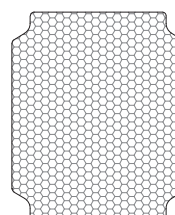
ET 945301.00	9pcs x 700mm	●
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additional insulator
For profiles:
E45301
E45351
E45302



ET 945102.00	9pcs x 700mm	●
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additional insulator
For profiles:
E45102
E45152

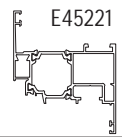
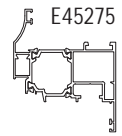
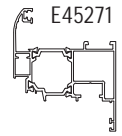
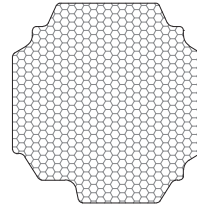


opening system with thermal break

E45

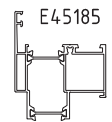
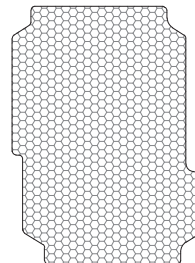
code/description	package/pcs	colour
ET 945271.00	9pcs x 700mm	●

additional insulator
For profiles:
E45271 PVC
E45275 PVC
E45221 PVC



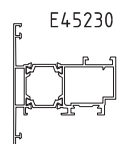
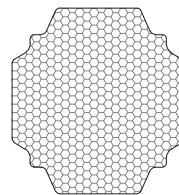
ET 945185.00	9pcs x 700mm	●
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additional insulator
For profiles:
E45185



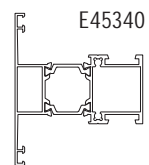
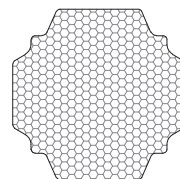
ET 945230.00	9pcs x 700mm	●
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additional insulator
For profiles:
E45230
pivot mechanism



ET 945340.00	9pcs x 700mm	●
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additional insulator
For profiles:
E45340
straight sashes



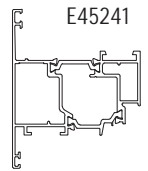
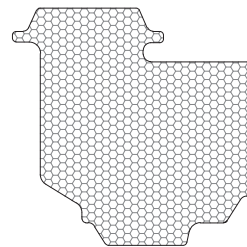
A45-36

opening system with thermal break

E45

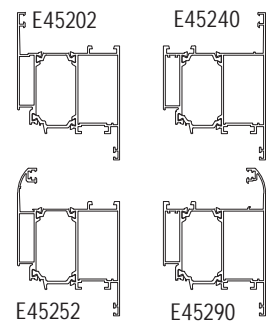
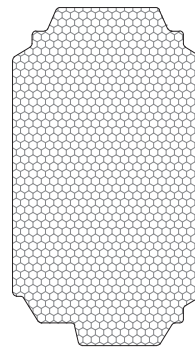
code/description	package/pcs	colour
ET 945241.00	9pcs x 700mm	●

additional insulator
For profiles:
E45241 sash



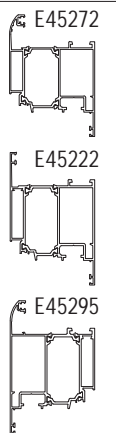
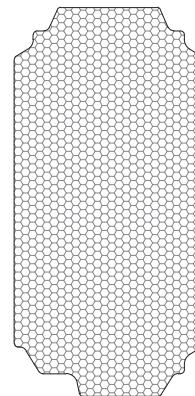
ET 945202.00	9pcs x 700mm	●
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additional insulator
For profiles:
E45202/E45240
E45252/E45290



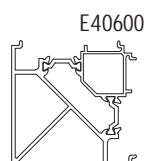
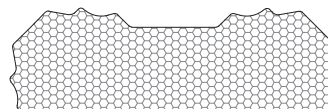
ET 945272.00	9pcs x 700mm	●
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additional insulator
For profiles:
E45272 PVC
E45295 PVC
E45222 PVC



ET 940600.00	9pcs x 700mm	●
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additional insulator
For profiles:
E40600

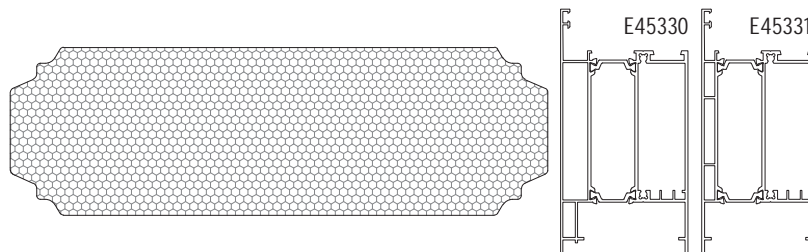


opening system with thermal break

E45

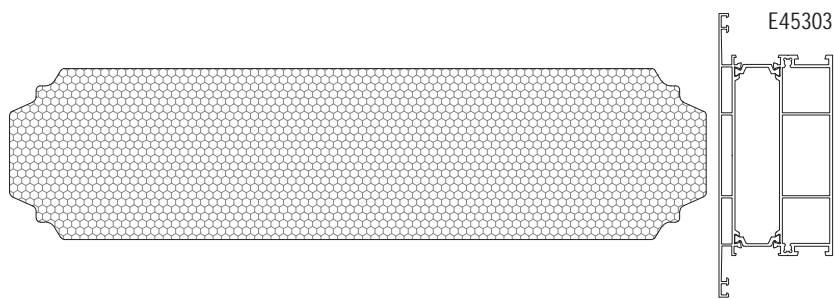
code/description	package/pcs	colour
ET 945330.00	9pcs x 700mm	●

additional insulator
For profiles:
E45330 straight sashes
E45331



ET 945303.00	9pcs x 700mm	●
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additional insulator
For profiles:
E45303



CE MARKING

STANDARDS / PERFORMANCE CHARACTERISTICS

CE MARKING

WHAT DOES THE SIGN CE MEAN?

It is an abbreviation of the French "Conformite Europeene"- i.e. European Conformity. By placing the CE marking the manufacturer declares that the product complies with the general safety requirements set out in the Construction Product Regulation 305/2011.

WHAT IS THE PURPOSE OF CE MARKING?

The CE marking represents "the European passport" of the product, its main objectives are:

CE is a declaration by the manufacturer that the product meets the essential requirements of relevant European legislation relating to health, safety and environmental protection;

CE indicates to officials in relevant ministries and departments that the product can be put on the market lawfully in the country;

CE ensures free movement of goods within the EU and the European Free Trade Association (EFTA);

CE permits the withdrawal of products that do not meet the standards by monitoring and custom authorities;
marking with the CE mark is necessary in cases where the product is distributed within the internal market.

WHAT ARE THE REQUIREMENTS FOR THE CE MARKING?

Doors, windows and gates (except those intended to be used for internal communication only, for fire/smoke compartmentation and on escape routes) are covered by System 3 of assessment and verification of constancy of performance.

According to the Construction Product Regulation 305/2011, this system sets the following duties:

Tasks to be performed by the manufacturer	Tasks to be performed by Notified testing laboratory	Conformity assessment (the basis for CE marking, which is set by the final producer)
factory production control – FPC	Determination of the product type on the basis of type testing, type calculation, tabulated values, etc.	Declaration of performance issued by the manufacturer or his authorized representative based on test results.

LEGAL ACTS

- Construction Products Regulation (305/2011/EU – CPR) – replacing the Construction Products Directive (89/106/EEC – CPD)
- EN 14351-1:2006+A1:2010 – Windows and doors – Product standard, performance characteristics – Part 1: Windows and external pedestrian doorsets without resistance to fire and/or smoke leakage characteristics

MAIN METHODS FOR OBTAINING TEST RESULTS BY THE MANUFACTURER

According to the Construction Product Regulation 305/2011 there are three main options for the manufacturers of windows and doors to obtain test results.

1

THE MANUFACTURER SELECTS A SAMPLE FOR TESTING AND CARRIES OUT FACTORY PRODUCTION CONTROL



NOTIFIED TESTING LABORATORY TESTS THE SAMPLE



THE MANUFACTURER OWNS THE TEST REPORT



MANUFACTURER ISSUES DECLARATION OF PERFORMANCE AND AFFIXES CE MARKING

2

PARTNER (SECOND MANUFACTURER PRODUCING PRODUCT WITH CORRESPONDING PRODUCT-TYPE) SELECTS A SAMPLE FOR TESTING AND CARRIES OUT FACTORY PRODUCTION CONTROL



NOTIFIED TESTING LABORATORY TESTS THE SAMPLE



THE PARTNER OWNS THE TEST REPORT



THE MANUFACTURER CARRIES OUT FACTORY PRODUCTION CONTROL AND IS ALLOWED TO USE THE TEST RESULTS OF HIS PARTNER AFTER OBTAINING PARTNER'S AUTHORIZATION



MANUFACTURER ISSUES DECLARATION OF PERFORMANCE AND AFFIXES CE MARKING

3

THE SYSTEM PROVIDER SELECTS SAMPLES FOR TESTING



NOTIFIED TESTING LABORATORY TESTS THE SAMPLE



THE SYSTEM PROVIDER OWNS THE TEST REPORT



THE MANUFACTURER CARRIES OUT FACTORY PRODUCTION CONTROL AND IS ALLOWED TO USE THE TEST RESULTS OF THE SYSTEM PROVIDER AFTER OBTAINING SYSTEM PROVIDER'S AUTHORIZATION



AGREEMENT BETWEEN THE MANUFACTURER AND THE SYSTEM PROVIDER

- INSTRUCTIONS FOR ASSEMBLING AND INSTALLATION OF THE SYSTEM PROVIDER RELEVANT FOR FPC OF THE MANUFACTURER
- NO REDUCTION OF PERFORMANCE LEVEL OF THE PRODUCT



MANUFACTURER ISSUES DECLARATION OF PERFORMANCE AND AFFIXES CE MARKING

STANDARDS

GENERAL

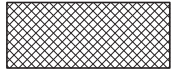
- EN 12020 (1÷2) - ALUMINIUM AND ALUMINIUM ALLOYS - EXTRUDED PRECISION PROFILES IN ALLOYS EN AW-6060 AND EN AW-6063
- EN 755 (1÷9)- ALUMINIUM AND ALUMINIUM ALLOYS - EXTRUDED ROD/BAR, TUBE AND PROFILES
- EN 573 (1÷3) - ALUMINIUM AND ALUMINIUM ALLOYS - CHEMICAL COMPOSITION AND FORM OF WROUGHT PRODUCTS
- EN 1990 EUROCODE - BASIS OF STRUCTURAL DESIGN
- EN 1991 EUROCODE 1 - ACTIONS ON STRUCTURES
- EN 1998 EUROCODE 8 - DESIGN OF STRUCTURES FOR EARTHQUAKE RESISTANCE
- EN 1999 EUROCODE 9 - DESIGN OF ALUMINIUM STRUCTURES

WINDOWS AND DOORS

1. EN 14351 - WINDOWS AND DOORS - PRODUCT STANDARD, PERFORMANCE CHARACTERISTICS
2. EN 12519 - WINDOWS AND PEDESTRIAN DOORS - TERMINOLOGY
3. EN 12207 - WINDOWS AND DOORS - AIR PERMEABILITY - CLASSIFICATION
4. EN 1026 - WINDOWS AND DOORS - AIR PERMEABILITY - TEST METHOD
5. EN 12208 - WINDOWS AND DOORS - WATERTIGHTNESS - CLASSIFICATION
6. EN 1027 - WINDOWS AND DOORS - WATERTIGHTNESS - TEST METHOD
7. EN 12210 - WINDOWS AND DOORS - RESISTANCE TO WIND LOAD - CLASSIFICATION
8. EN 12211 - WINDOWS AND DOORS - RESISTANCE TO WIND LOAD - TEST METHOD
9. EN 1191 - WINDOWS AND DOORS - RESISTANCE TO REPEATED OPENING AND CLOSING - TEST METHOD
10. EN ISO 10077 (1÷2) - THERMAL PERFORMANCE OF WINDOWS, DOORS AND SHUTTERS - CALCULATION OF THERMAL TRANSMITTANCE
11. EN 12412-2 - THERMAL PERFORMANCE OF WINDOWS, DOORS AND SHUTTERS - DETERMINATION OF THERMAL TRANSMITTANCE BY HOT BOX METHOD - PART 2: FRAMES
12. EN 13115 - WINDOWS - CLASSIFICATION OF MECHANICAL PROPERTIES - RACKING, TORSION AND OPERATING FORCES
13. EN 1627 - WINDOWS, DOORS, SHUTTERS - BURGLAR RESISTANCE - REQUIREMENTS AND CLASSIFICATION
14. EN 1628 - WINDOWS, DOORS, SHUTTERS - BURGLAR RESISTANCE - TEST METHOD FOR THE DETERMINATION OF RESISTANCE UNDER STATIC LOADING
15. EN 1629 - WINDOWS, DOORS, SHUTTERS - BURGLAR RESISTANCE - TEST METHOD FOR THE DETERMINATION OF RESISTANCE UNDER DYNAMIC LOADING
16. EN 1630 - WINDOWS, DOORS, SHUTTERS - BURGLAR RESISTANCE - TEST METHOD FOR THE DETERMINATION OF RESISTANCE TO MANUAL BURGLARY ATTEMPTS
17. EN ISO 717-1 - ACOUSTICS - RATING OF SOUND INSULATION IN BUILDINGS AND OF BUILDING ELEMENTS - PART 1: AIRBORNE SOUND INSULATION
18. EN ISO 10140 - ACOUSTICS - LABORATORY MEASUREMENT OF SOUND INSULATION OF BUILDING ELEMENTS

HATCHES

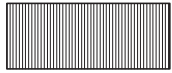
Hatches for different materials



EPDM



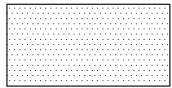
butyl seal



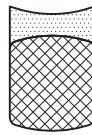
PVC



membrane



gypsum board



silicone seal

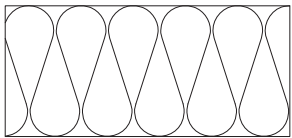
backer rod



silicone seal



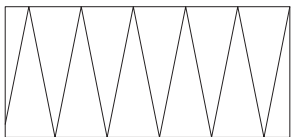
PVC spacer



Insulation soft



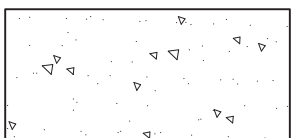
etalbond



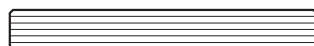
Insulation hard



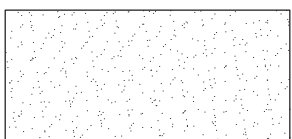
sheet aluminium



concrete wall



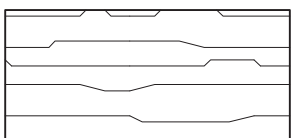
glass



plaster



aluminium profile



wood



steel

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The specific conditions and technical details of every particular project have to be taken into consideration.

The right choice of all elements as well as any special requirements regarding stability of the structure must always be considered by the structural/façade engineer, responsible for the project.

The solutions presented in these pages are indicative and can not cover all possible project cases. Because of that every single project has to be evaluated by the structural/facade engineer in charge taking into consideration the specific features, such as climate conditions, location, orientation, etc.

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