TECHNICAL CATALOGUE

OPENING WINDOW SYSTEM WITH THERMAL BREAK

E1600 E75 E85 E68 EW70 Q72 E75 ES38 E68 EW70 E45 Q60 E8000

ETEM

EW70
WINDOW 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 on 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.

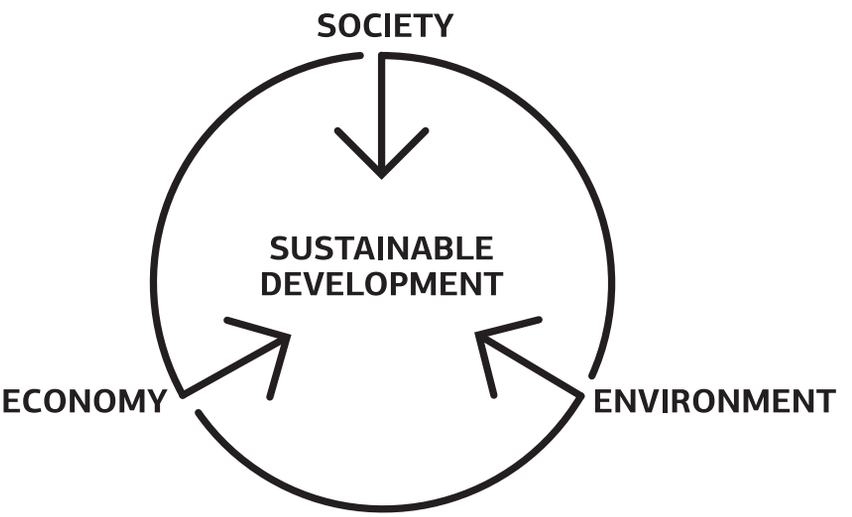
For us meeting this objective translates into the challenge of satisfying market demands at the lowest economic, social and environmental cost possible.

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



* Extract from Brundtland Report, from the United Nations World Commission on Environment and Development WCED

GENERAL INFORMATION

CONCEPT / ADVANTAGES / CERTIFICATES

EW70 CONCEPT

EW70 IS A SYSTEM CORRESPONDING TO THE HIGH REQUIREMENTS FOR THERMAL INSULATION, FUNCTIONALITY AND AESTHETICS

- Elegant straight design
- 70 mm system allowing usage of triple glazing
- Wide polyamide bars
- Excellent thermal insulation
- Effective drainage
- Excellent water-tightness and air-permeability
- EPDM central gasket
- Extruded corners for crimping machine with glue allowing greater connections

COMPLIANCE WITH APPLICABLE REGULATIONS
Production management

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

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 powder coated aluminium profiles and Qualanod for anodized profiles used in architectural applications.

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

PERFORMANCE CHARACTERISTICS OF EW70

Characteristic	**Classification / value**	**Standard**
Air permeability	class 4	EN 1026 / EN 12207
Watertightness	class 9A	EN 1027 / EN 12208
Resistance to wind load	class C4	EN 12211 / EN 12210
Body impact	class 4	EN 13049
Thermal transmittance (Uf)	from 1.4 $W/m^2.K$	EN ISO 10077-2
Operating forces	class 1	EN 13115
Mechanical properties	class 2	EN 13115

*calculation result according to Annex B of EN 14351-1

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 (τv)	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. COMMERCIALLY 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 6060.
Here are the properties of this alloy:

MATERIAL PROPERTIES	
Aluminium alloy	EN AW 6060 T66
Ultimate tensile strength	R_m = 215 N/mm^2
Yield strength	$R_{p0,2}$=160 N/mm^2
Modulus of elasticity	E_{al} = 70 000 N/mm^2
Coefficient of thermal expansion	α = 23.4 x 10^{-6}/°K

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.

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 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.

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 heigh 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	
h	v	$q = \frac{V^2}{16}$		$Wp^* = 1.25 \times cp \times q$ $c_p = 0.8$		$h/b \le 0.25$ $W_s = c_p \times q$ $c_p = 0.5$		$h/b \ge 0.5$ $W_s = c_p \times q$ $c_p = 0.7$		$b/8 \le 2$ m $W_s = c_p \times q$ $c_p = 2.0$	
m	m/s	kg/m2	kg/m2	kg/m2	kg/m2	kg/m2	kg/m2	kg/m2	kg/m2	kg/m2	kg/m2
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/m^2 and kN/m^2
$w_{p/s}$ – wind pressure / suction, kN/m^2
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/m^2 = 0.01 kN/m^2
1 Pa = 1 N/m^2 = 0.1 kg/m^2
1 kPa = 1000 Pa = 1 kN/m^2 =100 kg/m^2
1 MPa = 1000 kPa = 1 000 000 Pa
1 MPa = 1 N/mm^2 = 0.1 kN/cm^2 =100 000 kg/m^2

MULLION SELECTION

*Wind load actions:

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

a) triangle load

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

or

b) trapezoid load

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

Use the same method to calculate I_{yd}

Total of required moment of inertia:
$I_y = I_{yc} + I_{yd},\ cm^4$

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

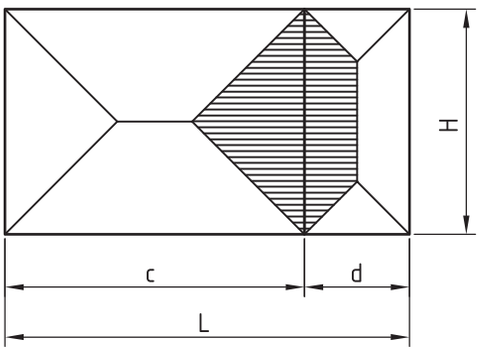
Maximum transom deflection f_{max} by wind load:

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

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 m w = 60 kg/m^2
c = 2,4 m E_{al} = 7.10^9 kg/m^2
d = 0,8 m

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

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

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

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

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

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

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

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

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

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

Use ETEM Catalogue to choose the appropriate mullion with
$I_y \ge 25,74\ cm^4$
We choose mullion E68300 with $I_y = 33,27\ cm^4$
and $I_x = 14,17\ cm^4$

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/m^2/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:
$I_x = I_{x1} + I_{x2}$,cm^4

Where:
a=0,15 – Distance of a glazing supports of the glass pane, m
I_x – Moment of inertia of a transom, cm^4
q – Self weight of a transom per linear meter, kg/m
E_{al} – Modulus of Elasticity of aluminium, kg/m^2
f_{max} – Maximum transom deflection, m
L – Length of a transom, m

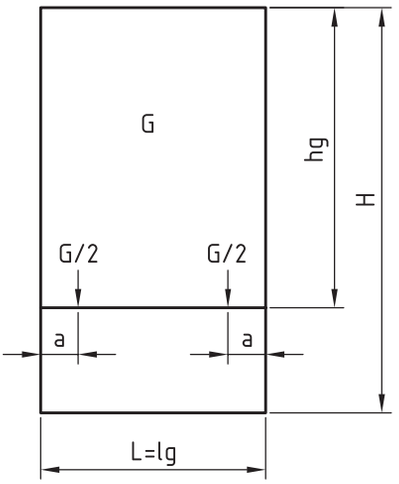
Maximum transom deflection f max by dead load:

$$f = \frac{L}{500} \text{ ,m} \quad \text{or 0.003 m – whichever is less (EN 14351-1)}$$

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 = 10 mm	E_{al} = 7.10^9 kg/m^2
l_g = 1,5 m	ρ_{glass} = 2,5 kg/m^2/mm
h_g = 2,0 m	q = 2 kg/m
a = 0,15 m	

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

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

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

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

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

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

$$I_{x2} \geq \frac{5 \cdot q \cdot L^4 \cdot 10^8}{384 \cdot E_{al} \cdot f_{max}} \text{ ,cm}^4 \quad I_{x2} \geq \frac{5 \cdot 2 \cdot 1{,}5^4 \cdot 10^8}{384 \cdot 7 \cdot 10^9 \cdot 0{,}003} \text{ ,cm}^4 \Longrightarrow I_{x1} \geq 0{,}63 \text{cm}^4$$

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

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

Use ETEM Catalogue to choose the appropriate transom with $I_x \geq 8{,}06$ cm^4
We choose transom E68300 with $I_x = 14{,}17$ cm^4
and $I_y = 33{,}25$ 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

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

or

b) trapezoid load

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

Use the same method to calculate I_{xb}

Total of required moment of inertia:
$I_y = I_{ya} + I_{yb}$, 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

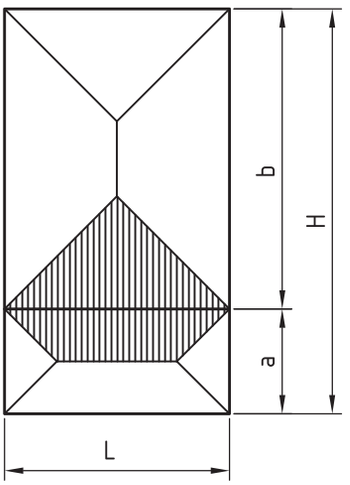
Maximum transom deflection f_{max} by wind load:

$f = \frac{L}{200}$,m or 0.015 m – 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 m w = 60 kg/m^2
a = 0,7 m E_{al} = 7.10 kg/m^2
b = 2,0 m

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

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

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

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

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

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

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

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

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

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

$\Longrightarrow I_y = 2,41 + 3,62 = 6,03$ cm^4

Use ETEM Catalogue to choose the appropriate mullion with $I_y \geq 6,03$ cm^4
We choose mullion E68300 with $I_y = 33,25$ cm^4
and $I_x = 14,17$ cm^4

CALCULATION OF GLASS PANE THICKNESS

*Glazing thickness:

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

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

or

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

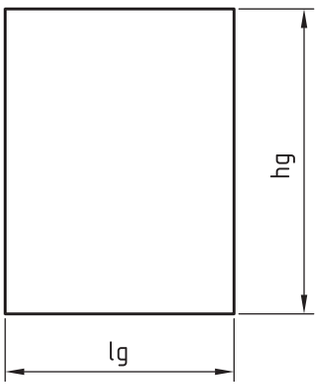
Where:
t – Minimum theoretical glass thickness, mm
w – Wind pressure, kg/m^2
l_g – The smallest dimension of the glass pane, m
h_g – The largest dimension of the glass pane, m

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 m
h_g = 2,0 m
w = 60 kg/m^2

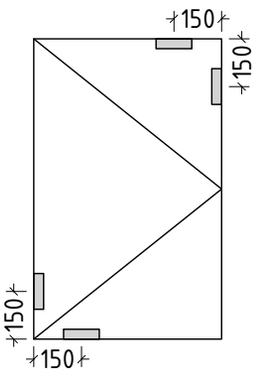
$$\frac{h_g}{l_g} = \frac{2}{1,5} = 1,33 \leq 3$$

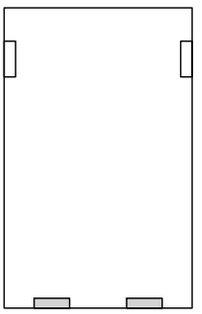
$$t = \sqrt{\frac{10 \cdot l_g \cdot h_g \cdot w}{72}} = \sqrt{\frac{10 \cdot 1,5 \cdot 2 \cdot 60}{72}} = \sqrt{\frac{1800}{72}} = 5 \text{ mm}$$

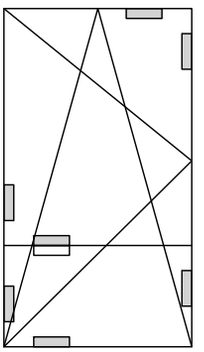
For double glazing t_{req} = 1,5 . 5 = 7,5 mm

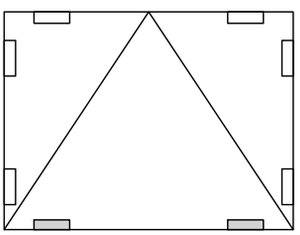
We choose double glazing 5/14/5

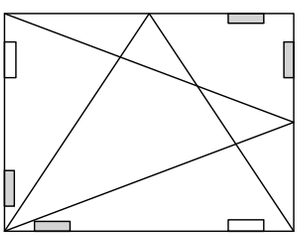
GLAZING SHIMS

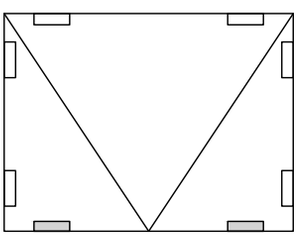












- load bearing shim

- distance shim

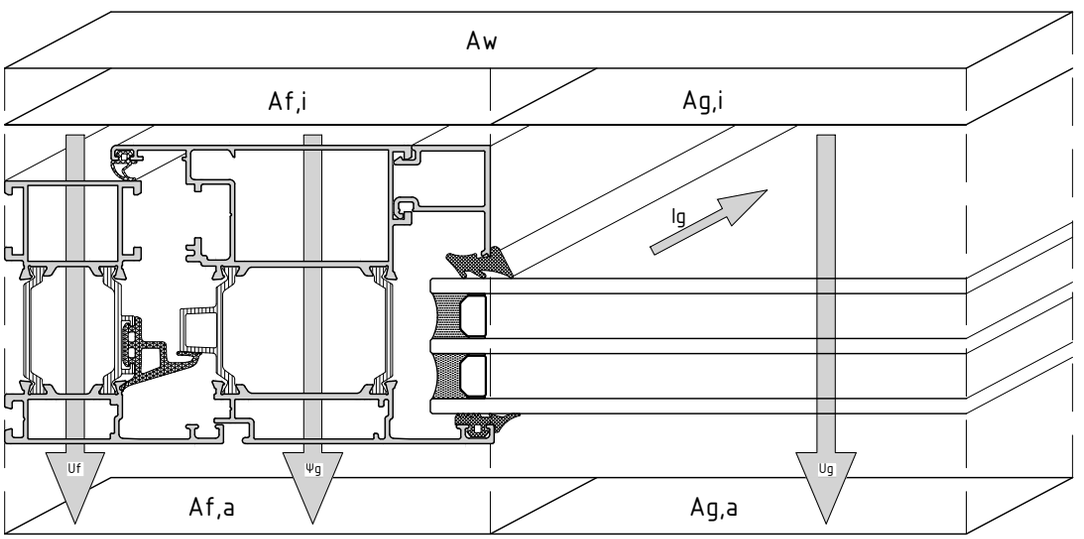
Note:
Load glazing shims should be positioned on 150 mm distance from the glazing edge.
Distance shims do not have exactly defined position.

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

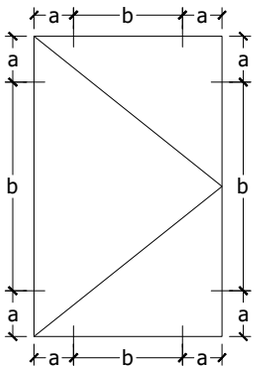
$$U_w = \frac{A_g \times U_g + A_f \times U_f + l_g \times \Psi_g}{A_g + A_f} \qquad (1)$$

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)

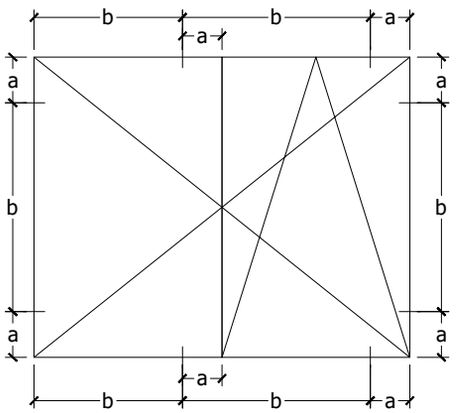
U_w – is calculated by formula (1)
U_g – is given by the glass manufacturer
U_f – is given by the manufacturer of the aluminium profiles

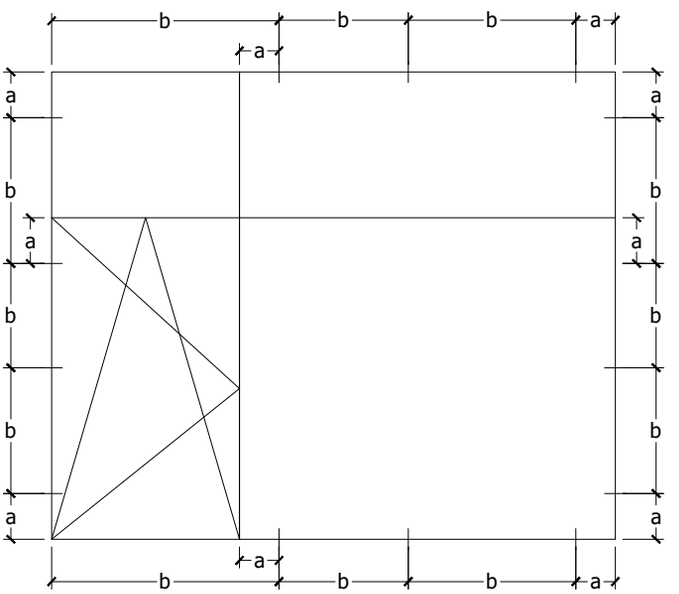


POSITION OF ANCHORS



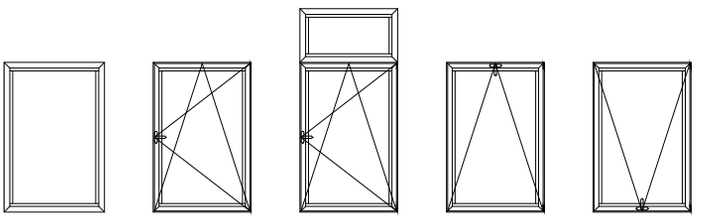
a = 150 ÷ 200 mm
b ≤ 800 mm

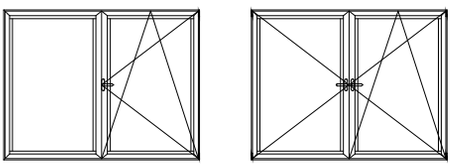


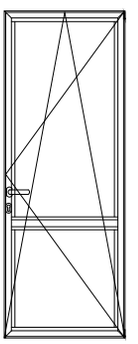


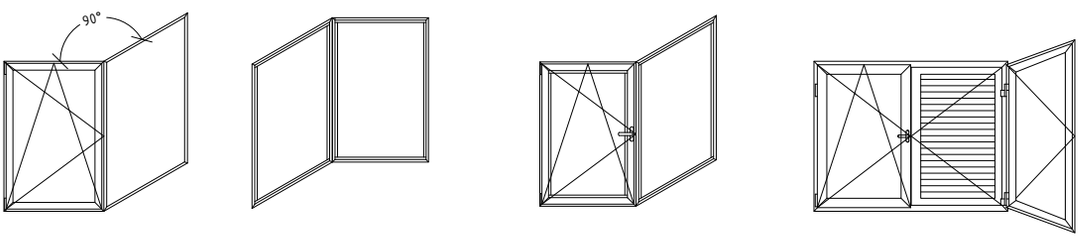
TABLES

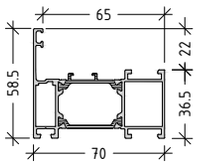
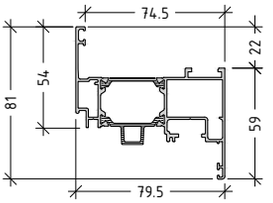
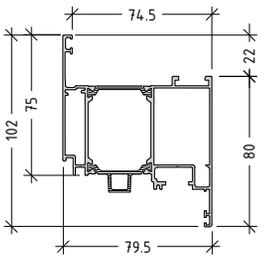
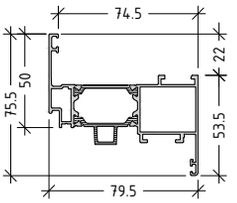
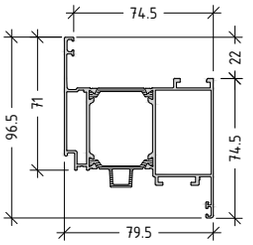
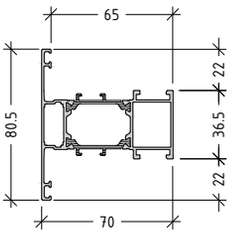
TYPOLOGIES / LIST OF PROFILES / CHARACTERISTICS

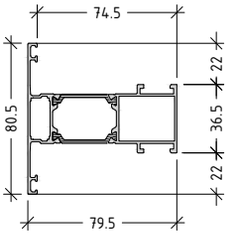
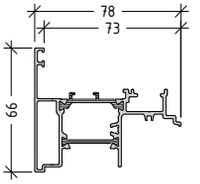
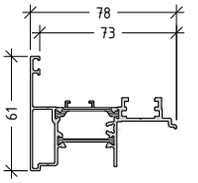
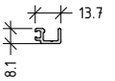
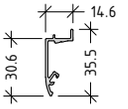
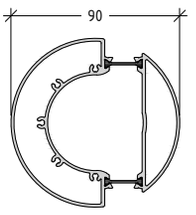




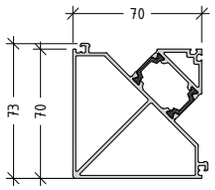
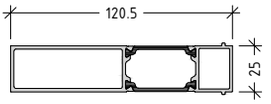
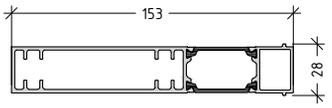
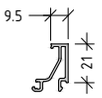
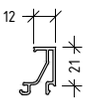


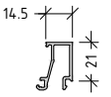
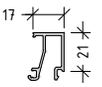
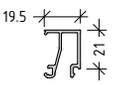
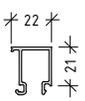
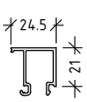
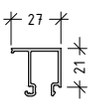

90°

code	profile	weight length moment of inertia
E4270100 frame		1280 g/m L=6.01 m Ix=8.63 cm^4 Iy=27.14 cm^4
E4270220 casement PVC groove		1472 g/m L=6.01 m Ix=12.99 cm^4 Iy=39.77 cm^4
E4270221 casement PVC groove		1806 g/m L=6.01 m Ix=31.77 cm^4 Iy=50.83 cm^4
E4270200 casement EURO groove		1367 g/m L=6.01 m Ix=10.23 cm^4 Iy=36.49 cm^4
E4270201 casement EURO groove		1693 g/m L=6.01 m Ix=26.40 cm^4 Iy=47.1 cm^4
E4270300 T profile for frame		1371 g/m L=6.01 m Ix=12.54 cm^4 Iy=29.97 cm^4

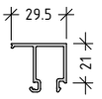
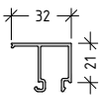
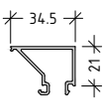
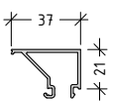
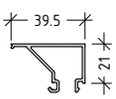
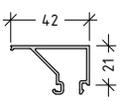
code	profile	weight length moment of inertia
E4270340 T profile for casement		1379 g/m L=6.01 m
E4270540 overhung secondary casement profile PVC groove		1293 g/m L=6.01 m
E4270500 overhung secondary casement profile Euro groove		1214 g/m L=6.01 m
E4275606 alignment profile		120 g/m L=6.01 m
E75602 adapter		216 g/m L=6.01 m
E75603 round column		2232 g/m L=6.01 m Ix=56.34 cm^4 Iy=55.75 cm^4

L68-1

code	profile	weight length moment of inertia
E4268600 90° column		2083 g/m L=6.01 m Ix=43.17 cm^4 Iy=43.17 cm^4
E50690 Intermediate profile		1550 g/m L=6.01 m Ix=5.03 cm^4 Iy=79.15 cm^4
E50691 Intermediate profile		2046 g/m L=6.01 m Ix=7.09 cm^4 Iy=161.25 cm^4
E4060307 glazing bead		267 g/m L=6.01 m
E4060310 glazing bead		277 g/m L=6.01 m
E4060312 glazing bead		287 g/m L=6.01 m

code	profile	weight length moment of inertia
E4060315 glazing bead		287 g/m L=6.01 m
E4060317 glazing bead		297 g/m L=6.01 m
E4060320 glazing bead		305 g/m L=6.01 m
E4060322 glazing bead		314 g/m L=6.01 m
E4060325 glazing bead		324 g/m L=6.01 m
E4060327 glazing bead		335 g/m L=6.01 m

L68-1
(2)

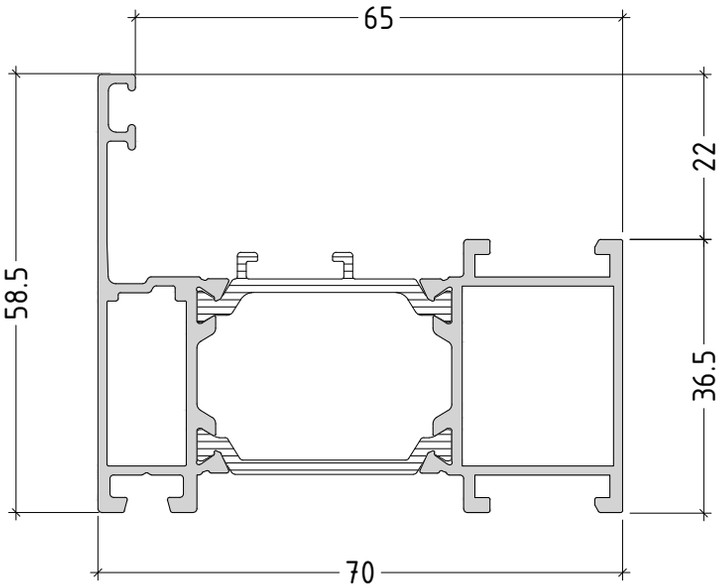
code	profile	weight length moment of inertia	code	profile	weight length moment of inertia
E4060330 glazing bead		345 g/m L=6.01 m			
E4060332 glazing bead		355 g/m L=6.01 m			
E4060335 glazing bead		385 g/m L=6.01 m			
E4060337 glazing bead		395 g/m L=6.01 m			
E4060340 glazing bead		405 g/m L=6.01 m			
E4060342 glazing bead		416 g/m L=6.01 m			

L68-1
(3)

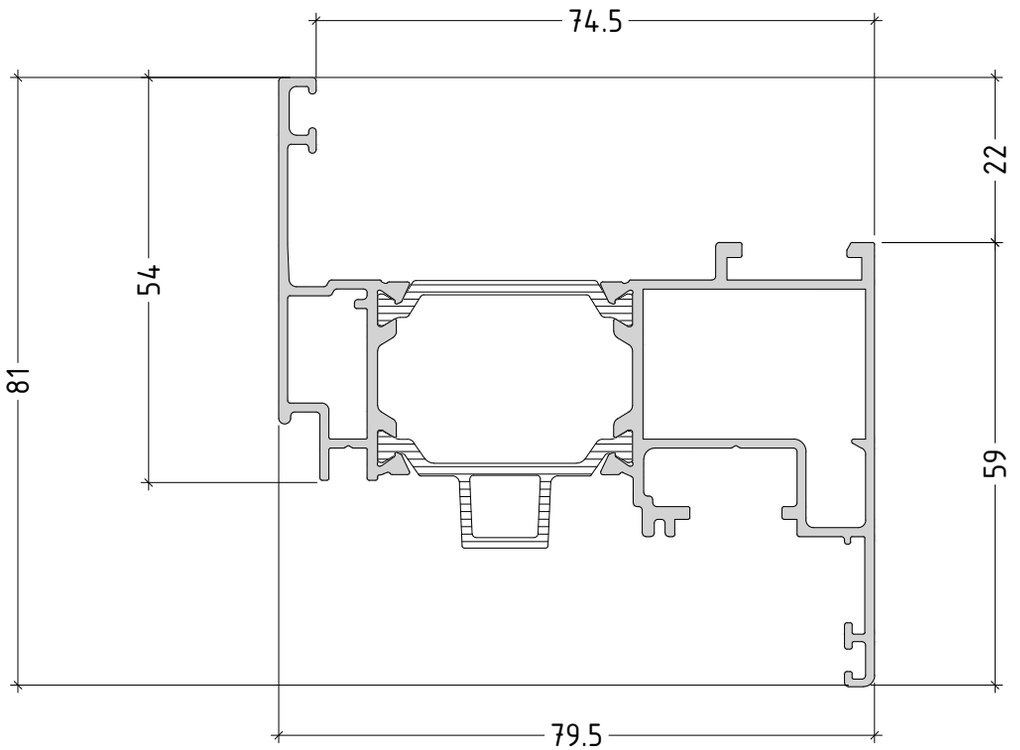
PROFILES

DRAWINGS / SCALE 1:1

E4270100
1280 g/m



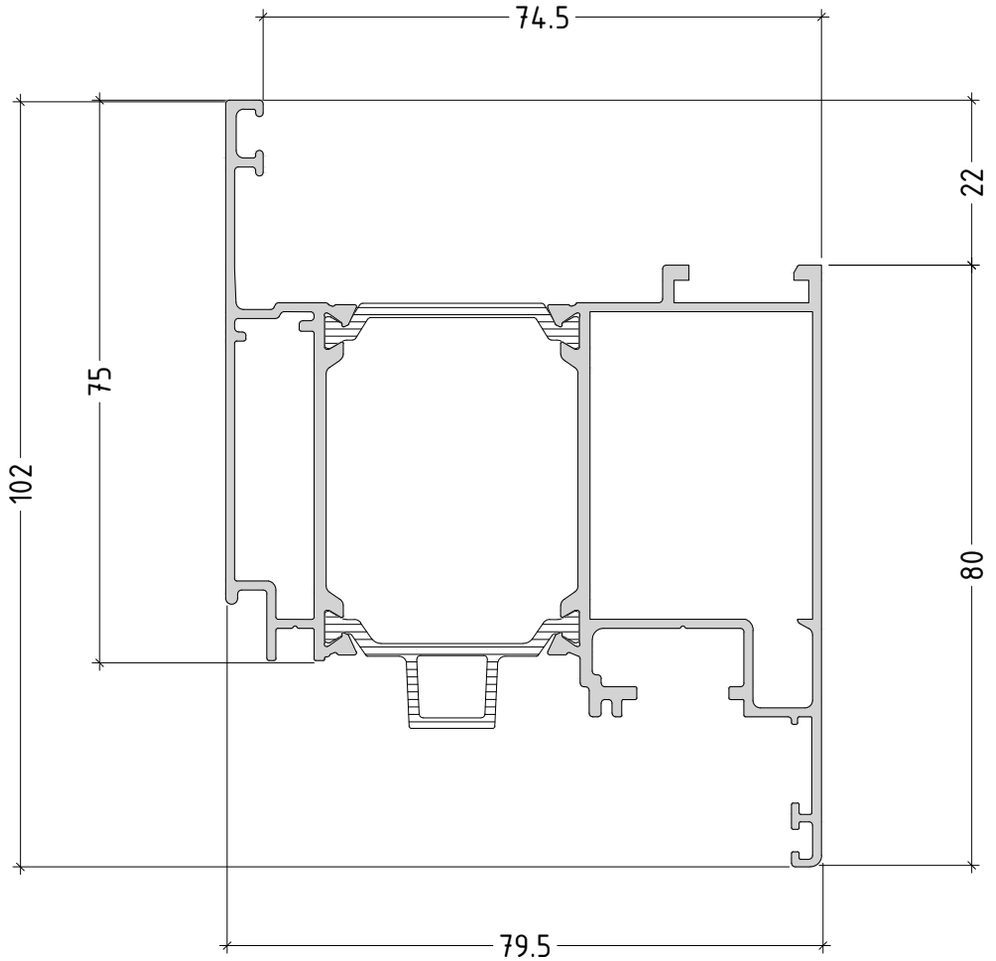
E4270220
1472 g/m



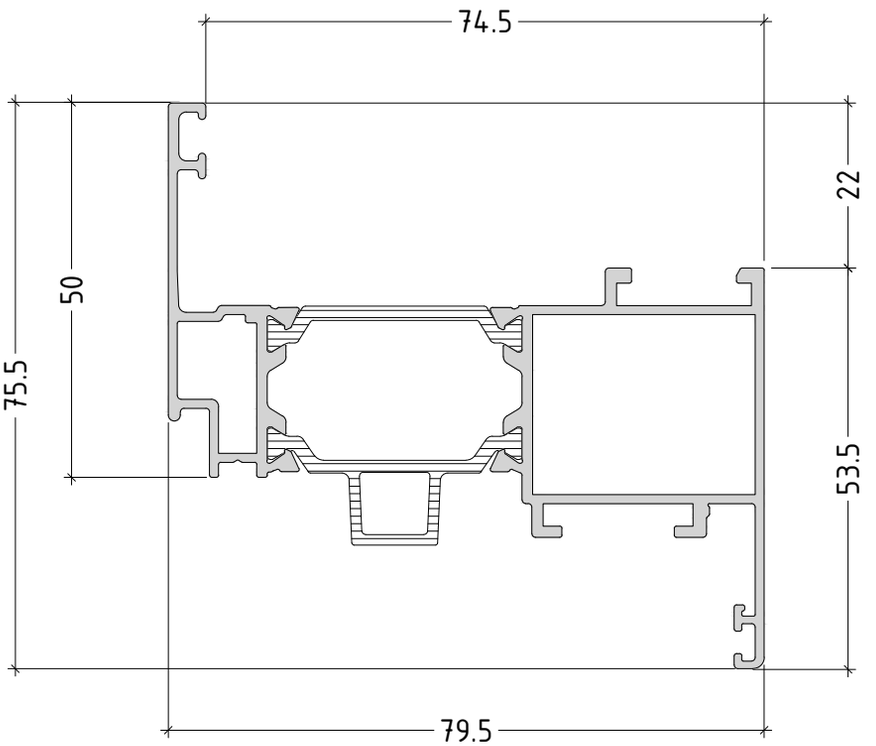
scale : 1:1

EW70-2

E4270221
1806 g/m



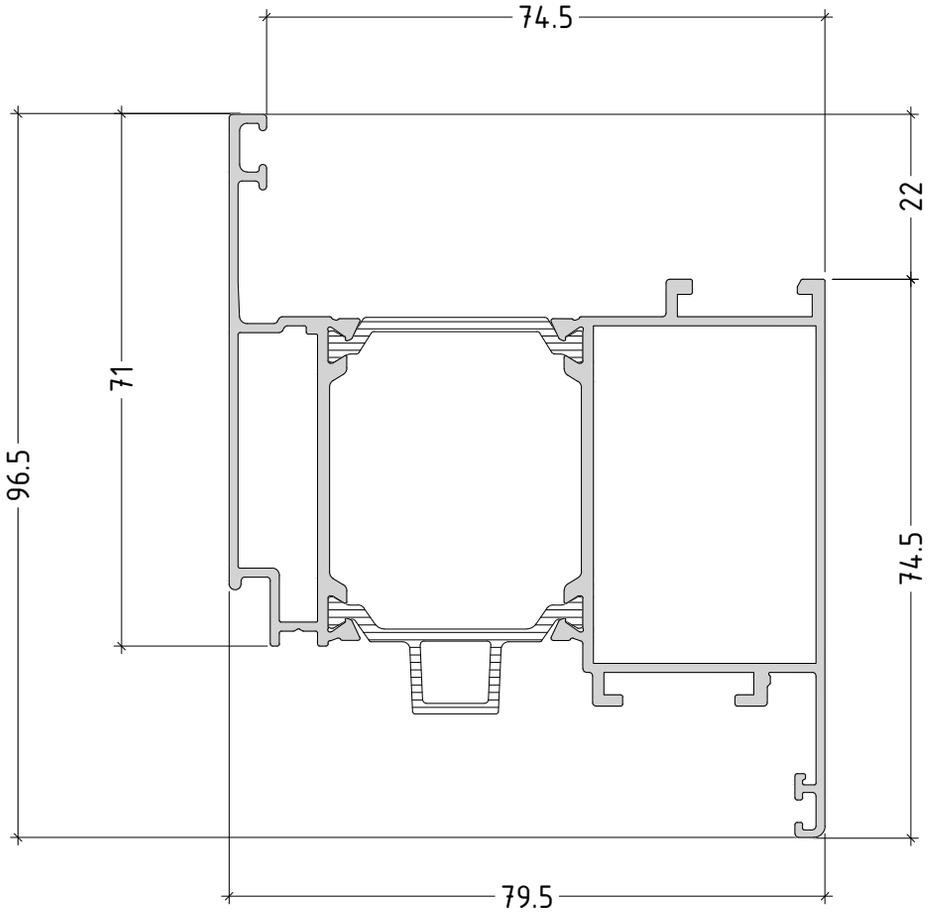
E4270200
1367 g/m



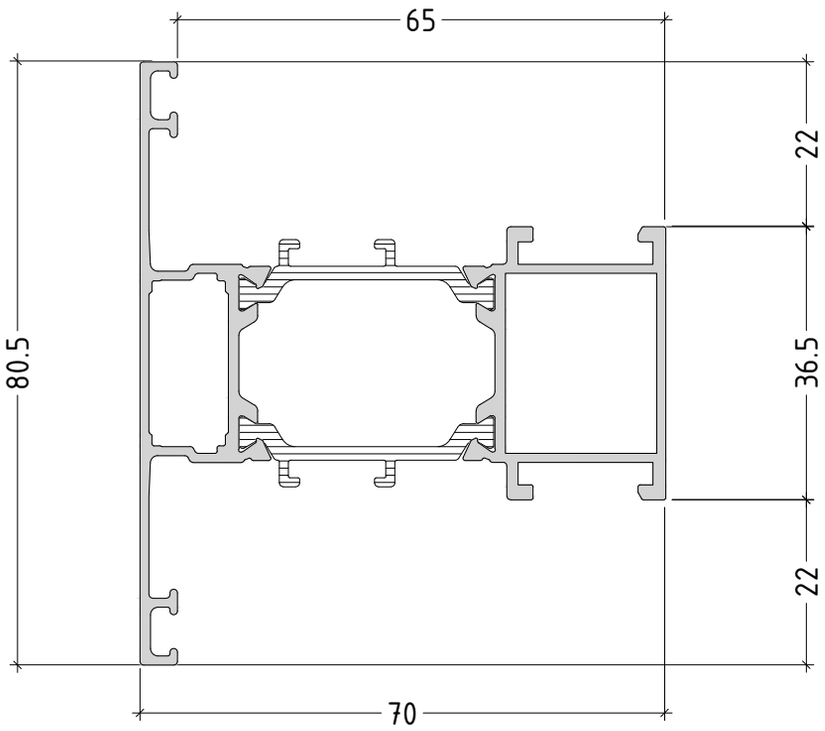
scale : 1:1

EW70-3

E4270201
1693 g/m



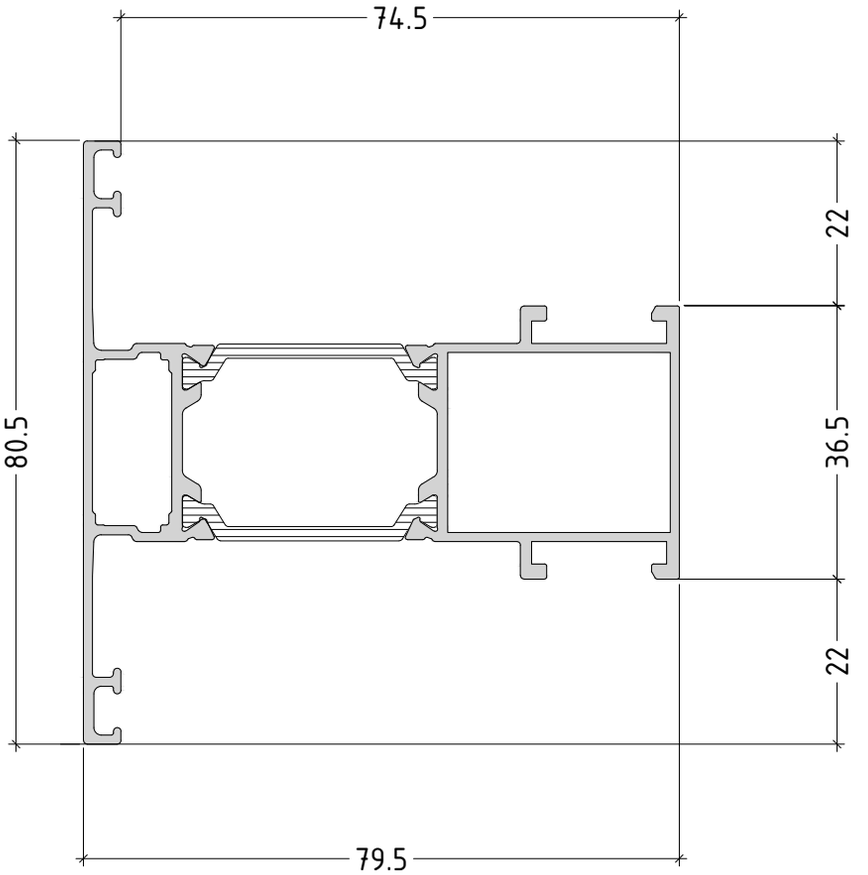
E4270300
1371 g/m



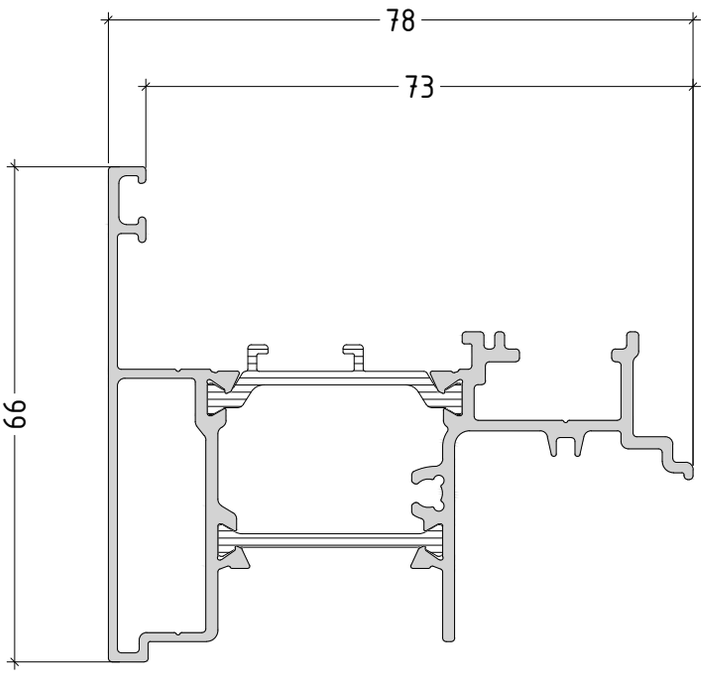
scale : 1:1

EW70-4

E4270340
1379 g/m



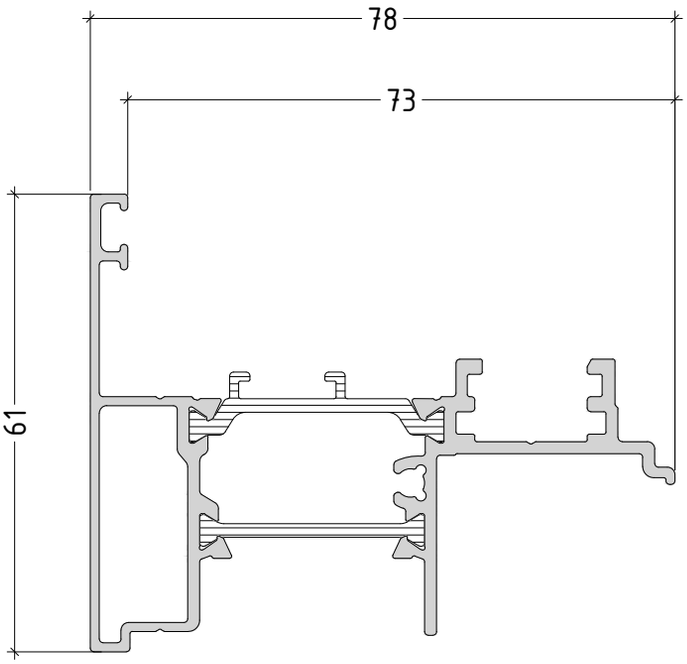
E4270540
1293 g/m



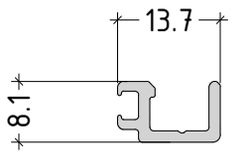
scale : 1:1

EW70-5

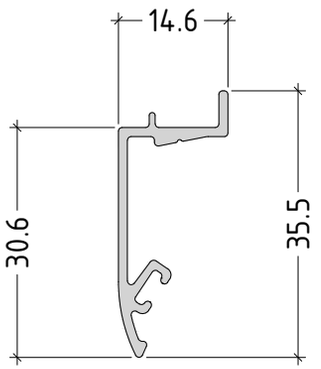
E4270500
1214 g/m



E4275606
120 g/m



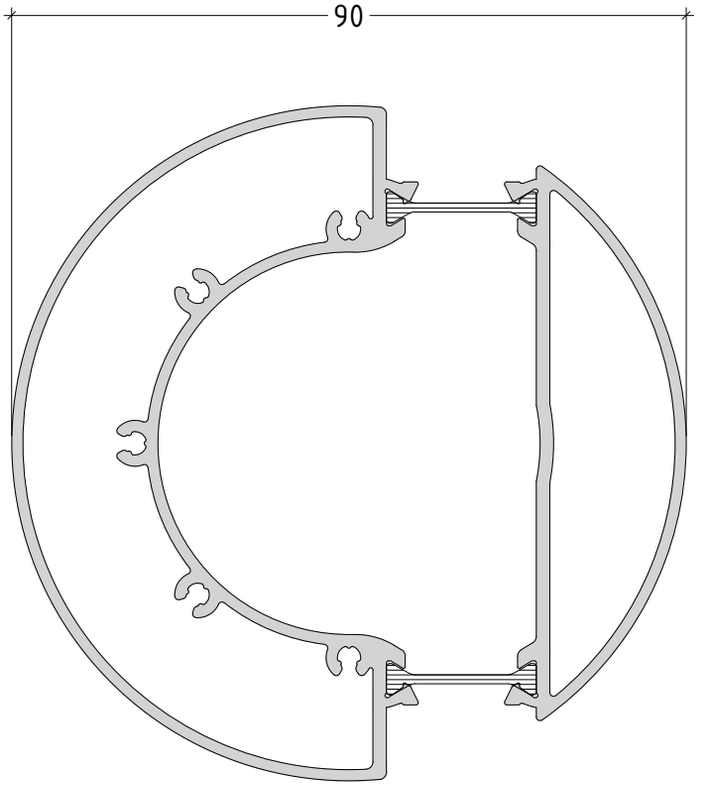
E75602
216 g/m



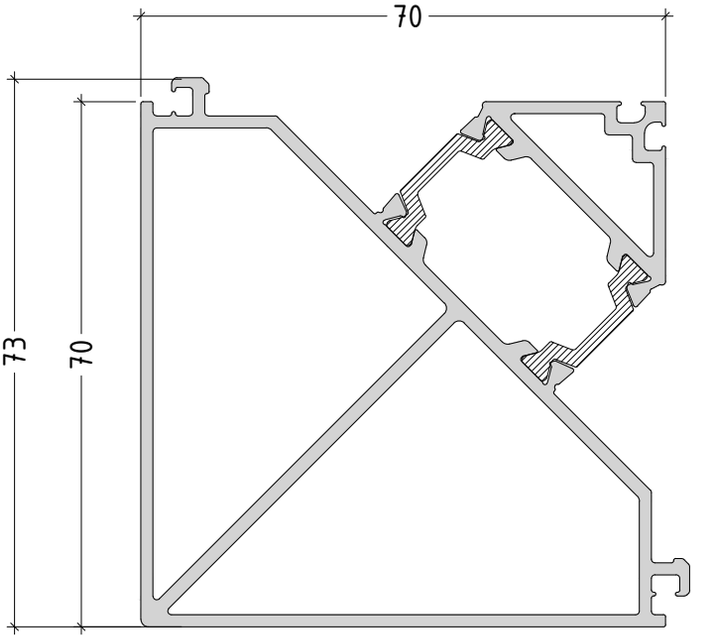
scale : 1:1

EW70-6

E75603
2232 g/m



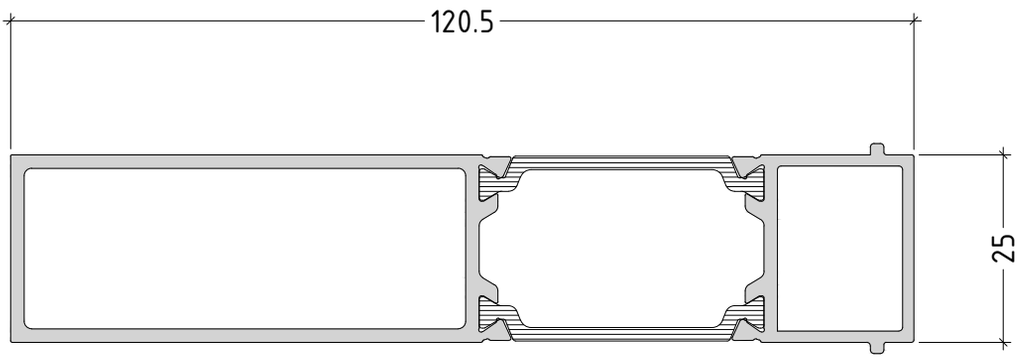
E4268600
2083 g/m



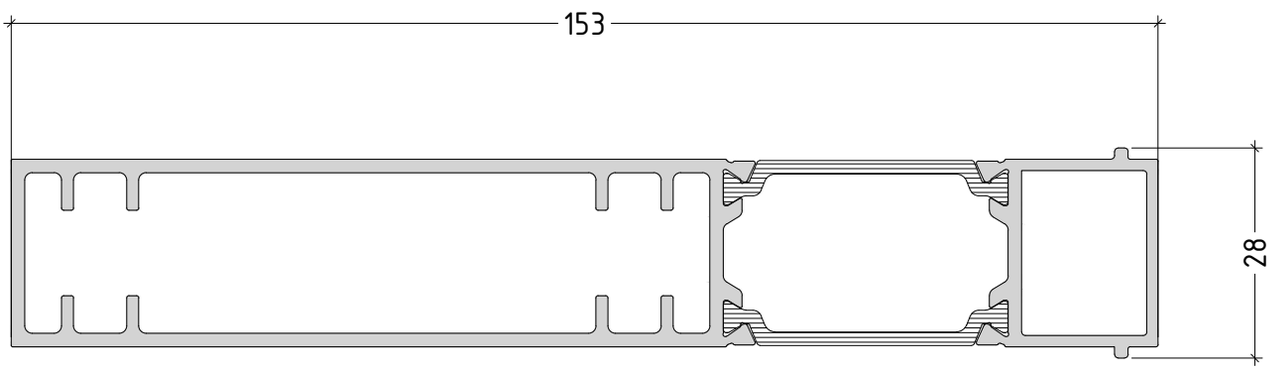
scale : 1:1

EW70-7

E50690
1550 g/m



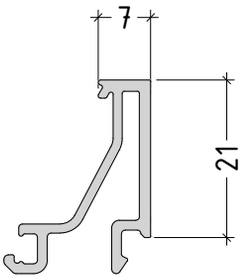
E50691
2046 g/m



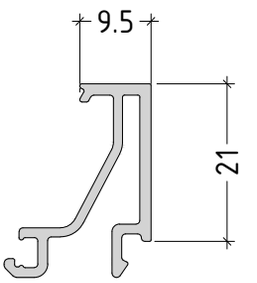
scale : 1:1

EW70-8

E4060307
267 g/m



E4060310
277 g/m



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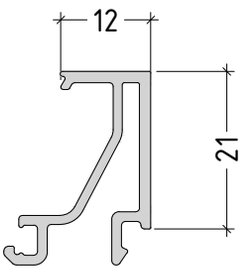
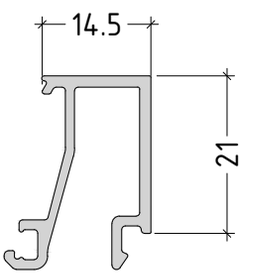
287 g/m



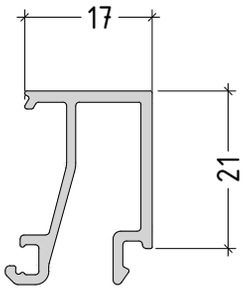
E4060315
287 g/m



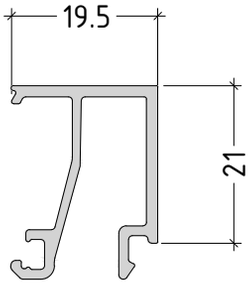
scale : 1:1

EW70-9

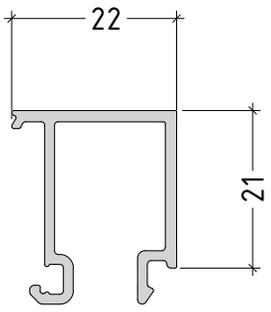
E4060317
297 g/m



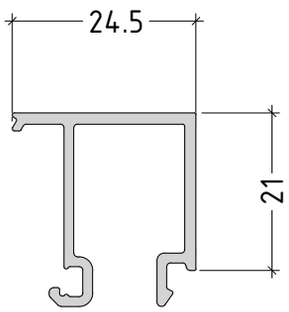
E4060320
305 g/m



E4060322
314 g/m



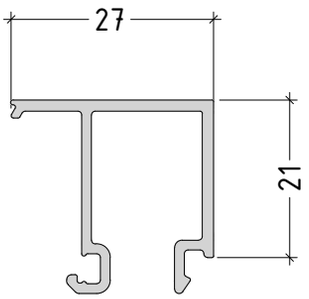
E4060325
324 g/m



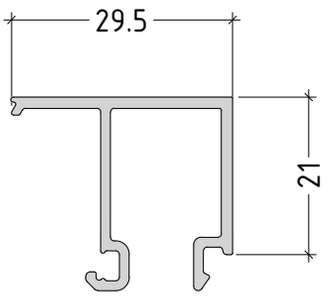
scale : 1:1

EW70–10

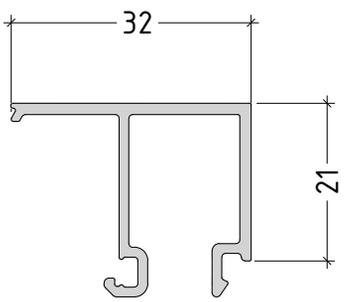
E4060327
335 g/m



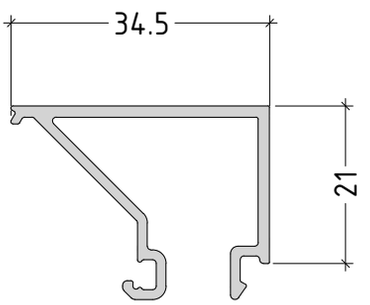
E4060330
345 g/m



E4060332
355 g/m



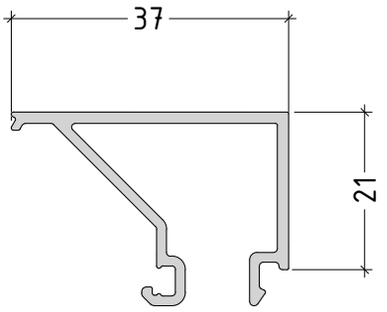
E4060335
385 g/m



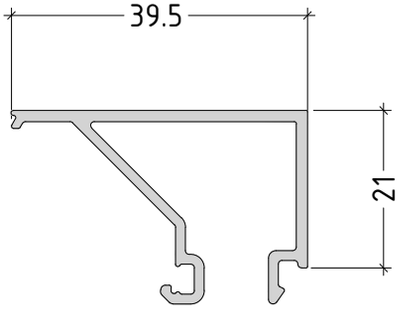
scale : 1:1

EW70-11

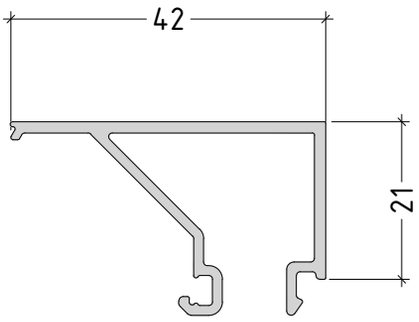
E4060337
395 g/m



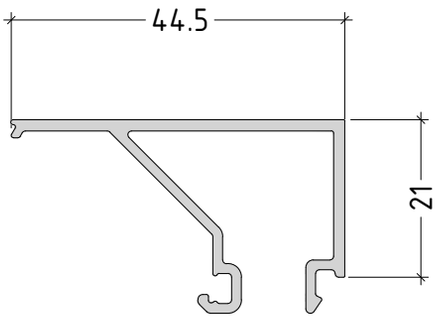
E4060340
405 g/m



E4060342
416 g/m



E4060345
426 g/m

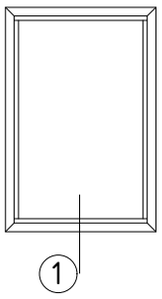


scale : 1:1

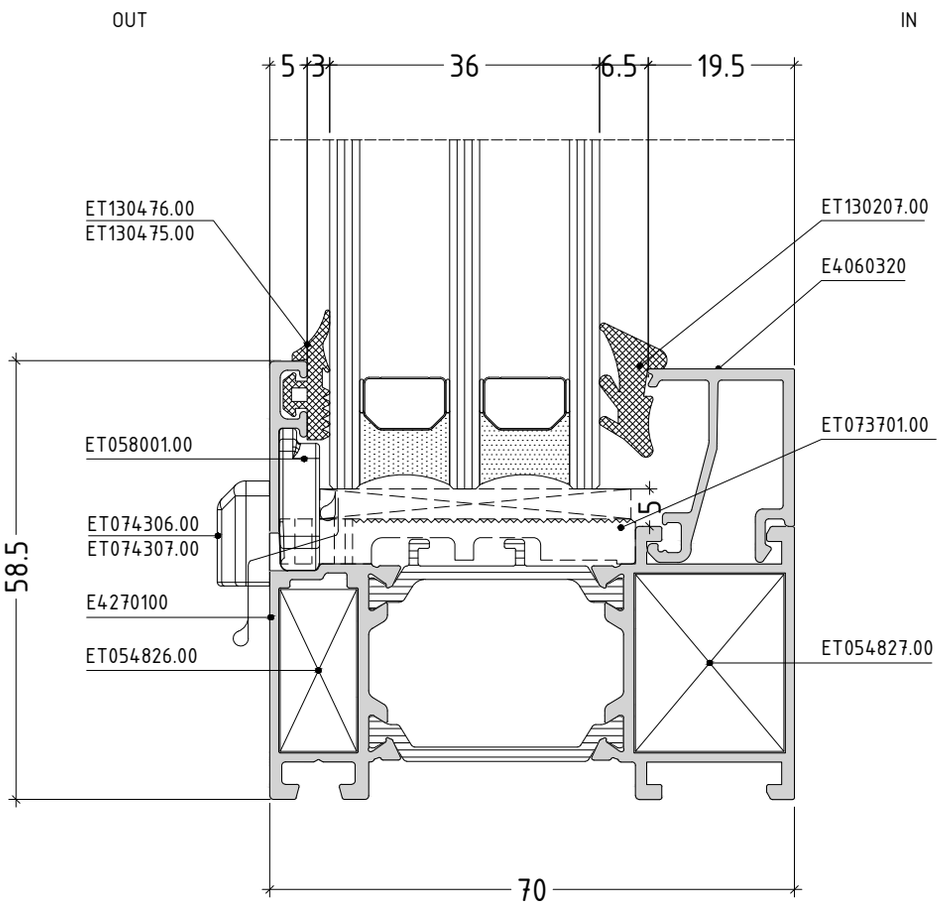
EW70-12

SECTIONS

SECTIONS / DETAILS

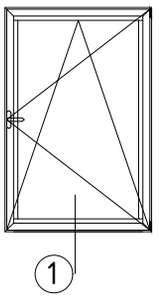


1

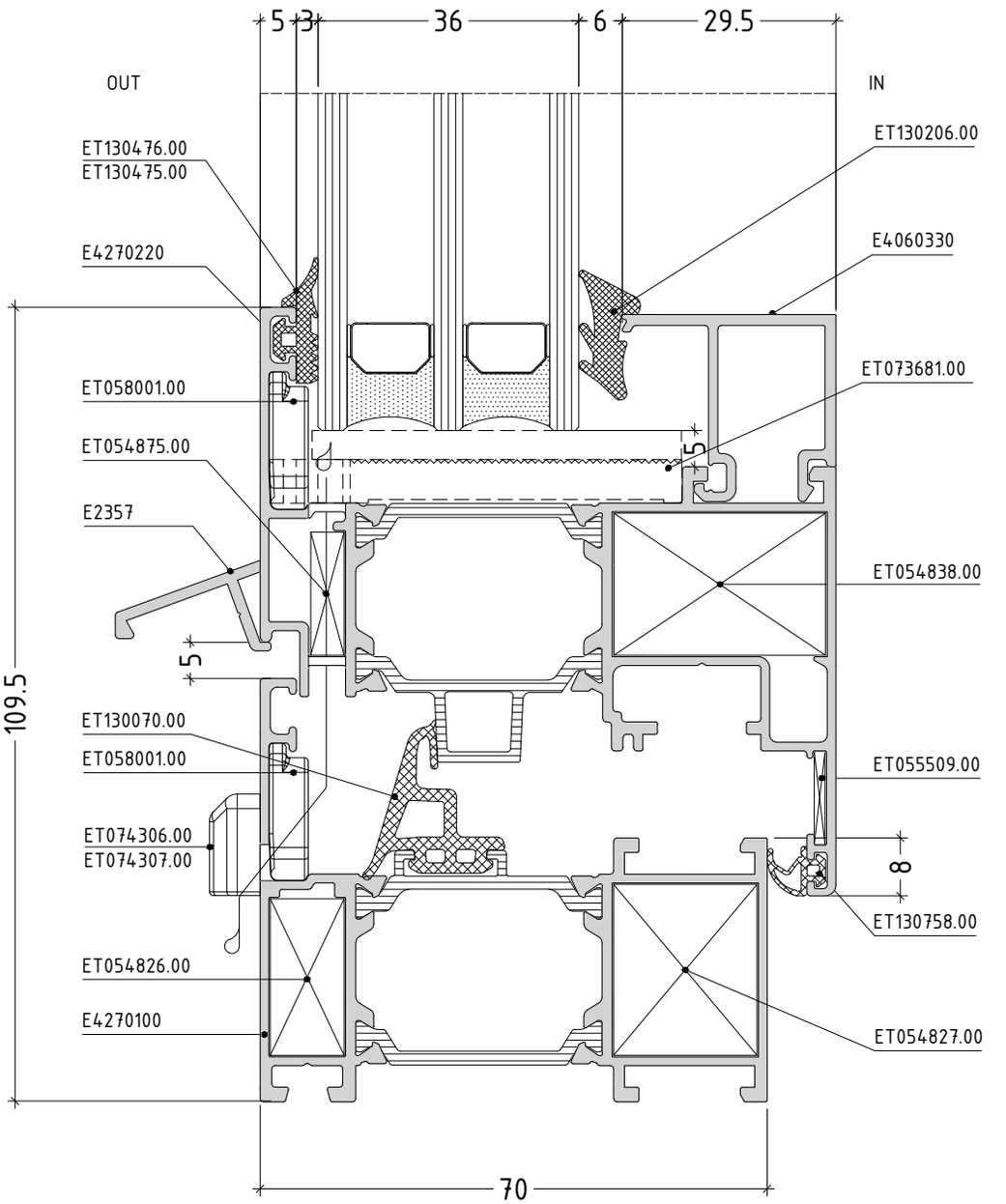


scale : 1:1

EW70-1

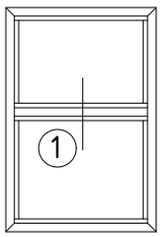


1

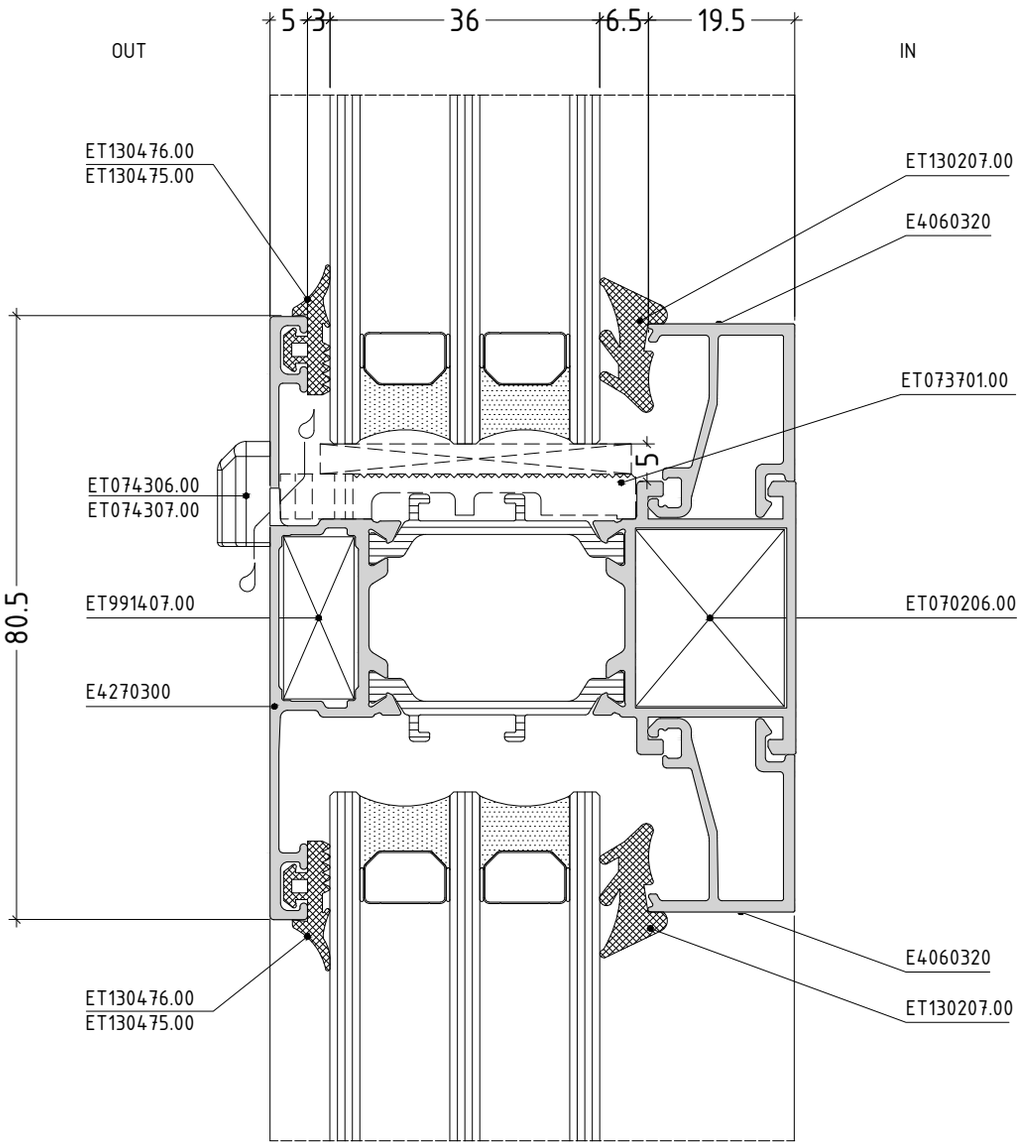


scale : 1:1

EW70-2

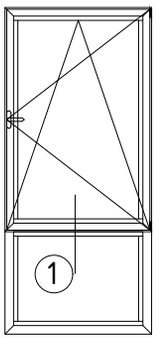


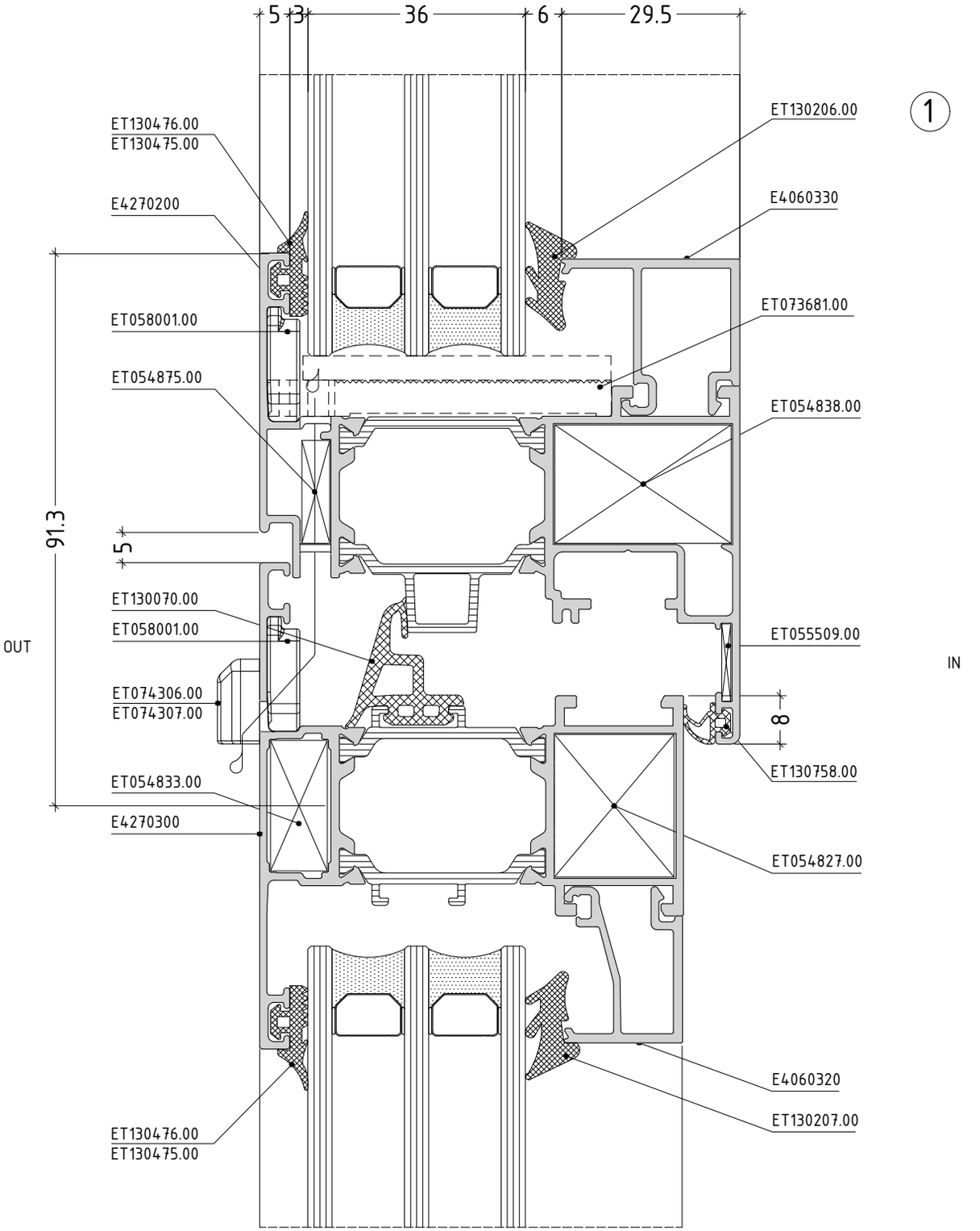
1



scale : 1:1

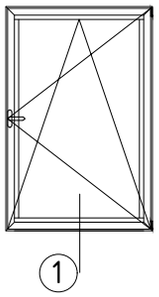
EW70-3





scale : 1:1

EW70-5



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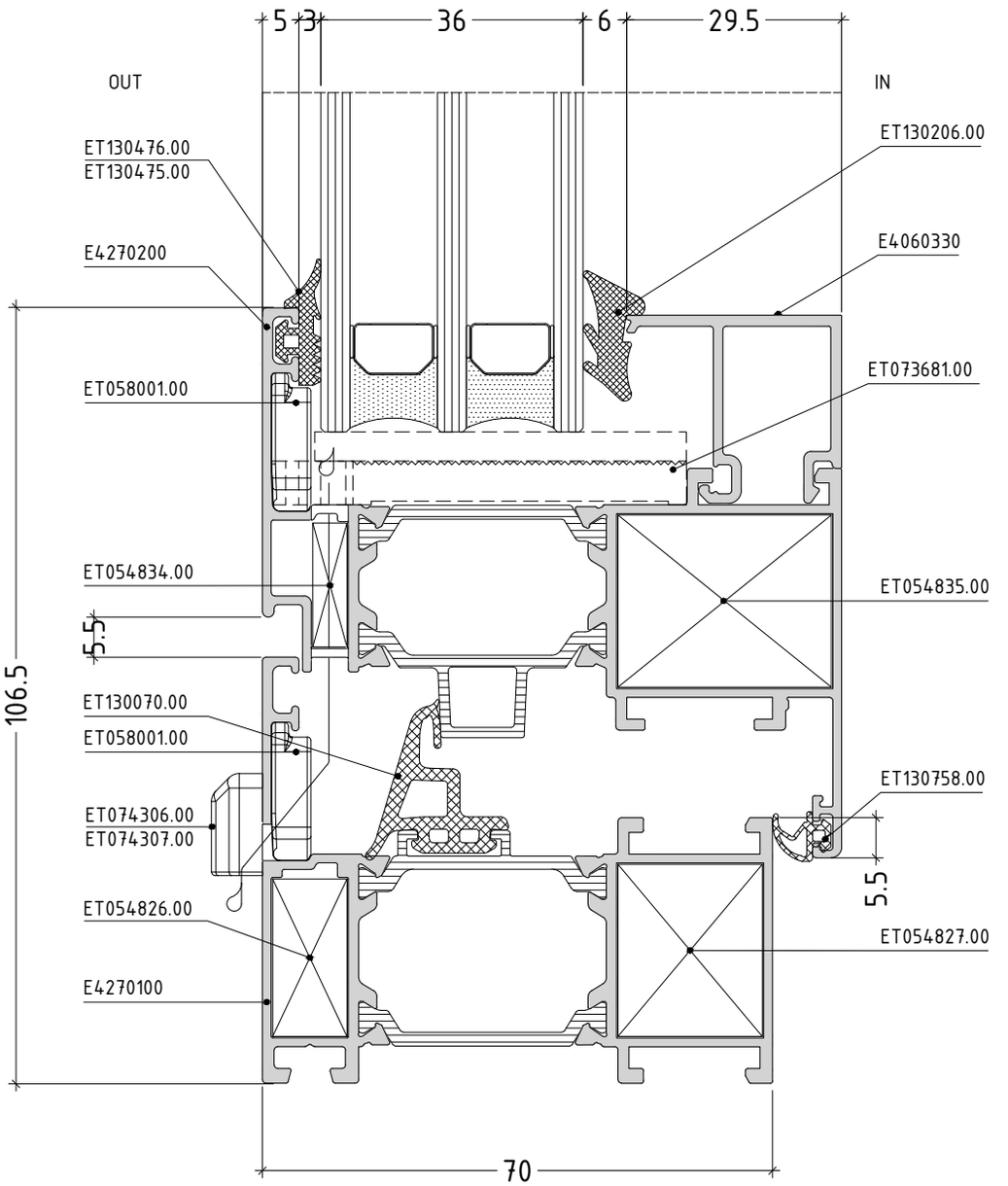
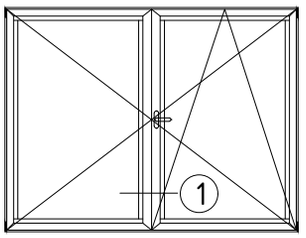
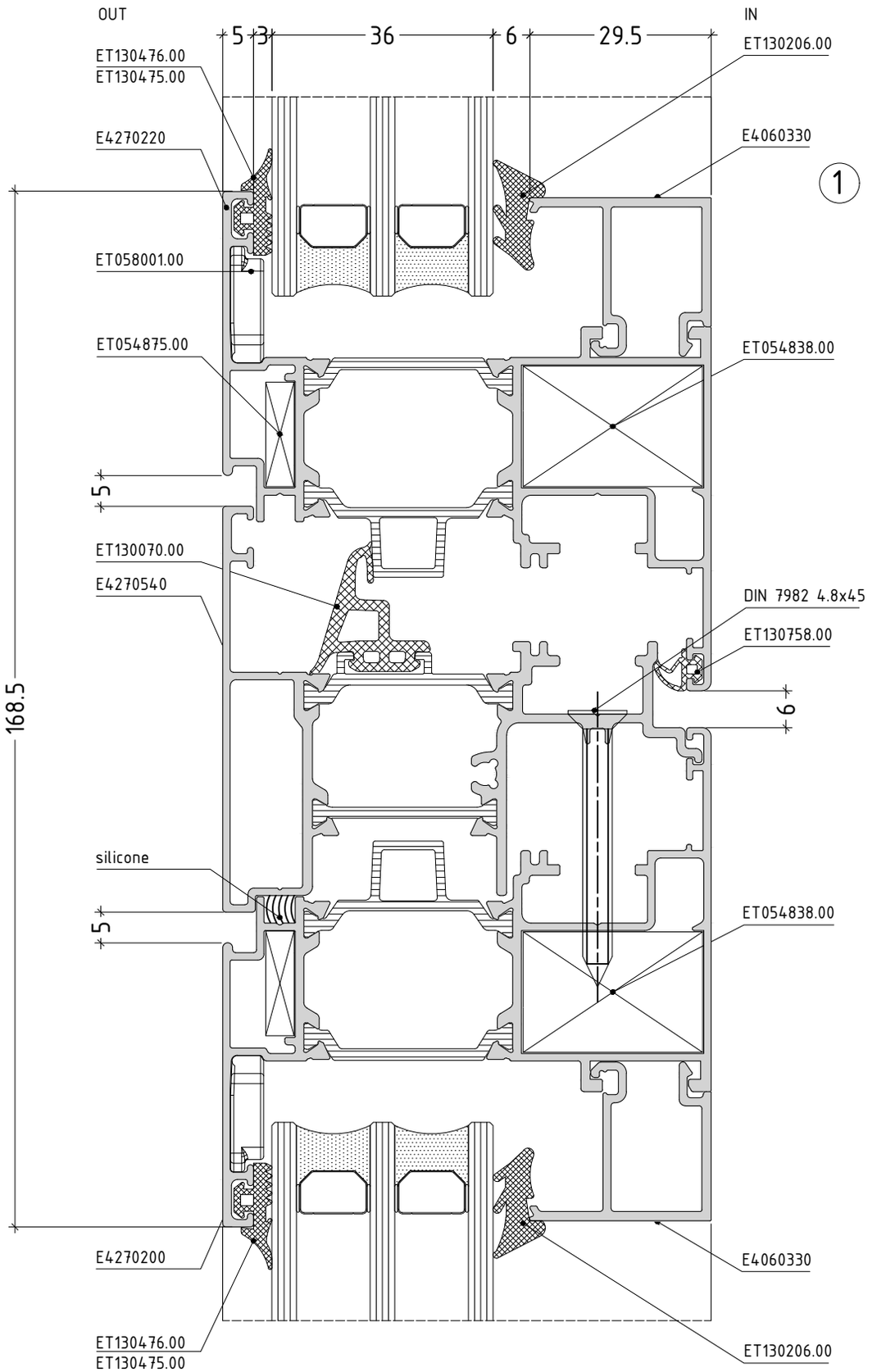


scale : 1:1

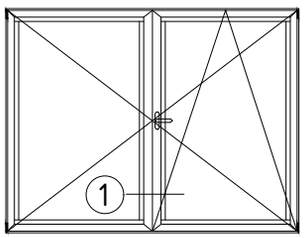
EW70-6

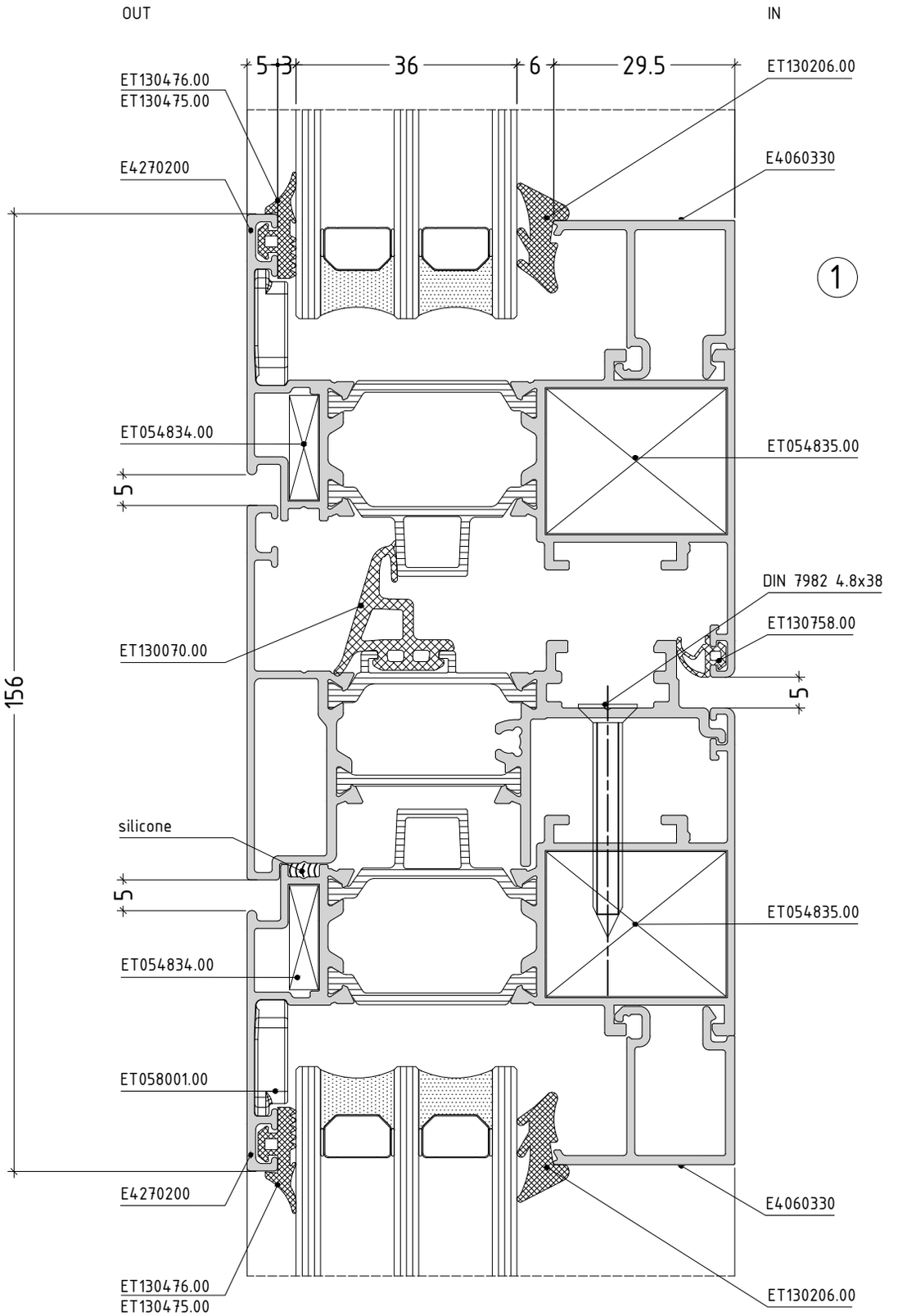




scale : 1:1

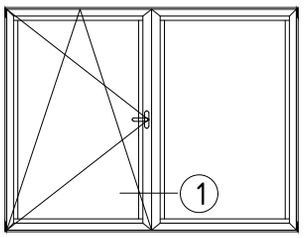
EW70-8

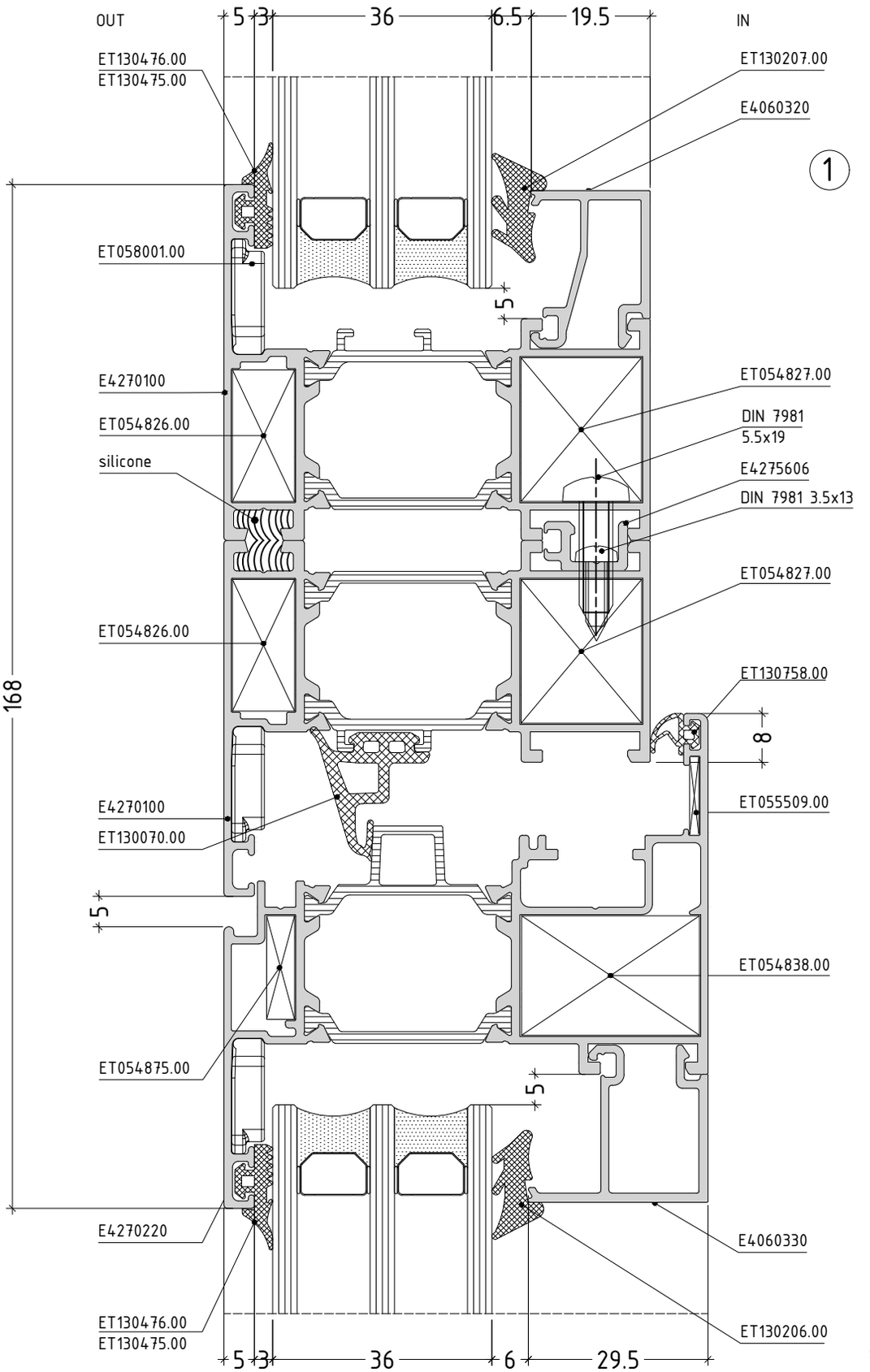




scale : 1:1

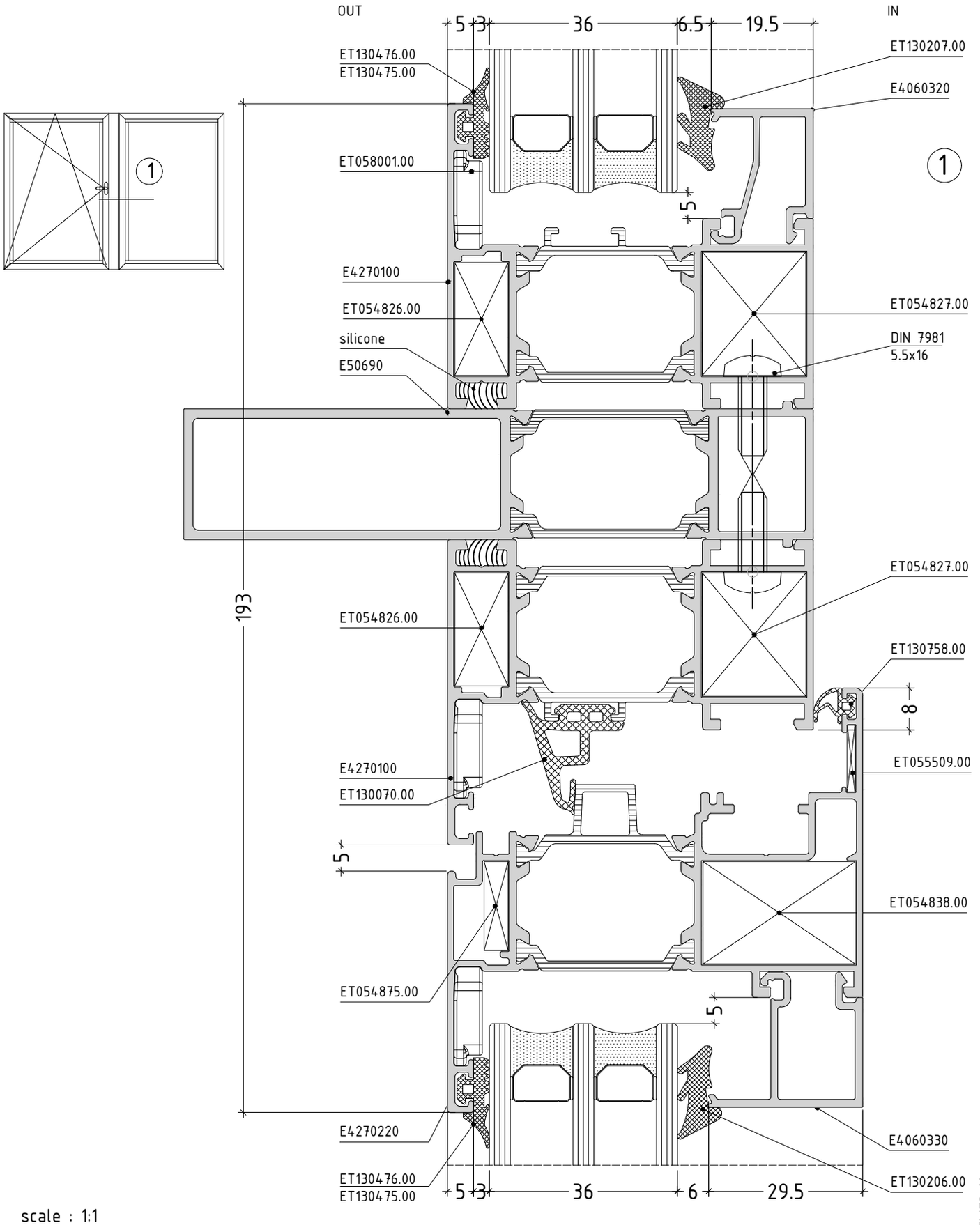
EW70-9





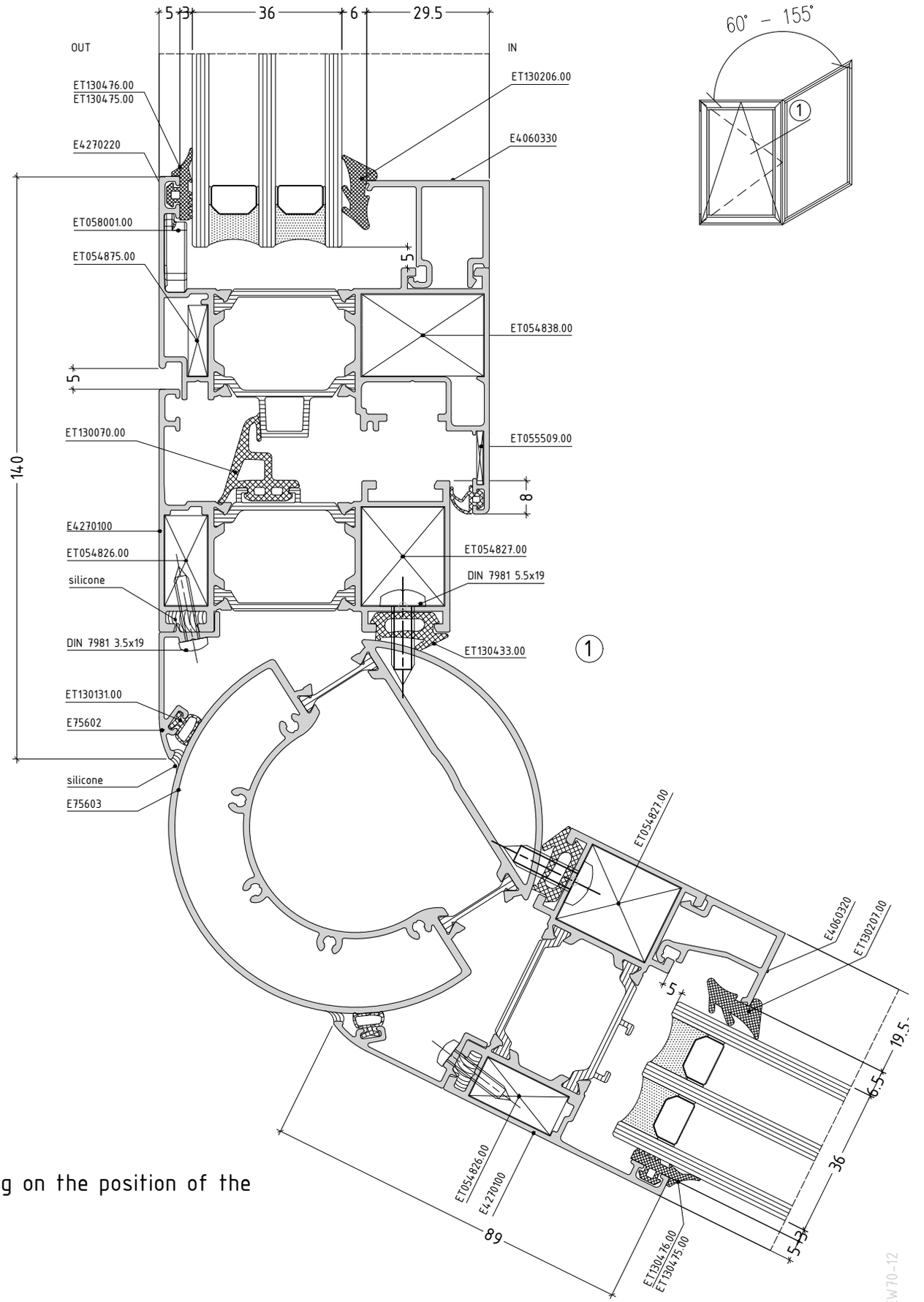
scale : 1:1

EW70-10



scale : 1:1

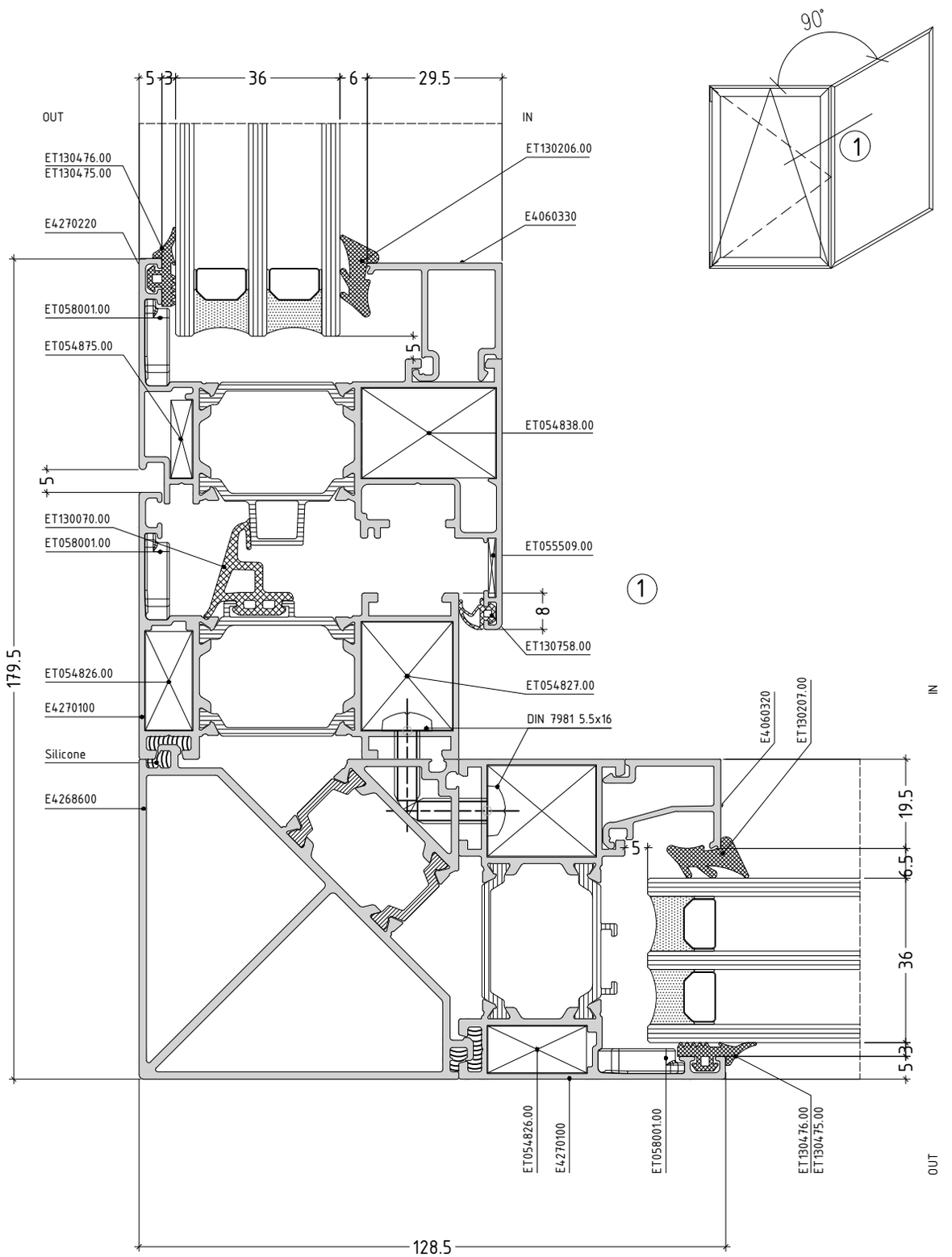
EW70-11



NOTE:
depending on the position of the column.

scale : 1:1

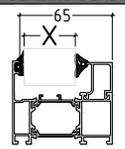
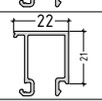
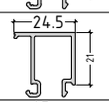
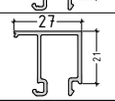
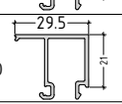
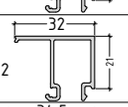
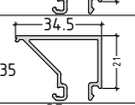
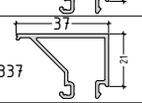
EW70-12

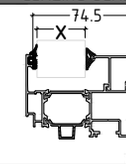
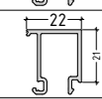
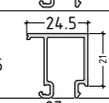
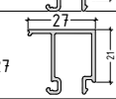
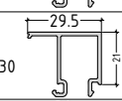
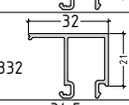
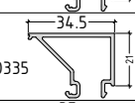
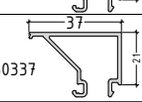
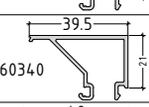
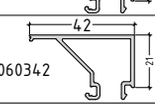
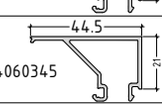


scale : 1:1

EW70-13

GLAZING OPTIONS

GLAZING OPTIONS FOR FRAME					
external gaskets	INTERNAL GASKETS				GLAZING BEADS
3 mm 130475	5 - 6 mm 130176		7 - 8 mm 130177		
3 mm 130476	5 mm 130205	6 mm 130206	7 mm 130207	8 mm 130208	
	X mm				E40603xx
130475 130476	50	49	48	47	E4060307 
130475 130476	47	46	45	44	E4060310 
130475 130476	45	44	43	42	E4060312 
130475 130476	42	41	40	39	E4060315 
130475 130476	40	39	38	37	E4060317 
130475 130476	37	36	35	34	E4060320 
130475 130476	35	34	33	32	E4060322 
130475 130476	32	31	30	29	E4060325 
130475 130476	30	29	28	27	E4060327 
130475 130476	27	26	25	24	E4060330 
130475 130476	25	24	23	22	E4060332 
130475 130476	22	21	20	19	E4060335 
130475 130476	20	19	18	17	E4060337 

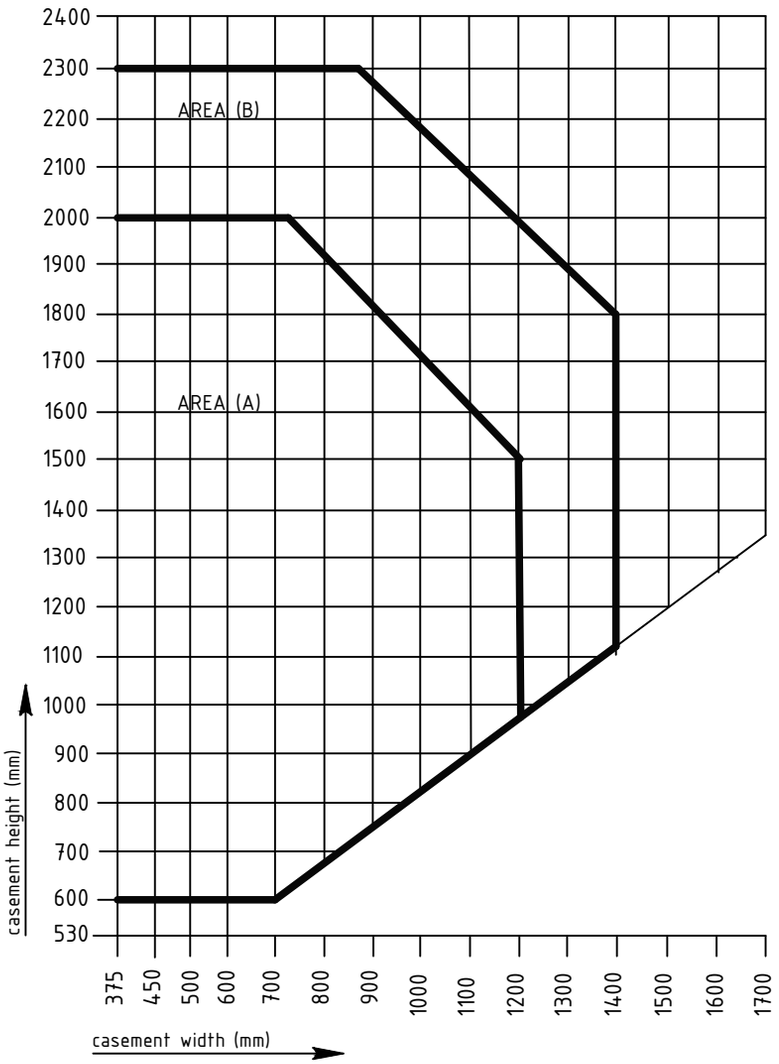
GLAZING OPTIONS FOR VENT					
external gaskets	INTERNAL GASKETS				GLAZING BEADS
3 mm 130475	5 - 6 mm 130176		7 - 8 mm 130177		
3 mm 130476	5 mm 130205	6 mm 130206	7 mm 130207	8 mm 130208	
	X mm				E40603xx
130475 130476	52	51	50	49	E4060315 
130475 130476	49	48	47	46	E4060317 
130475 130476	47	46	45	44	E4060320 
130475 130476	44	43	42	41	E4060322 
130475 130476	42	41	39	38	E4060325 
130475 130476	39	38	37	36	E4060327 
130475 130476	37	36	35	34	E4060330 
130475 130476	34	33	32	31	E4060332 
130475 130476	32	31	30	29	E4060335 
130475 130476	29	28	27	26	E4060337 
130475 130476	27	26	25	24	E4060340 
130475 130476	24	23	22	21	E4060342 
130475 130476	22	21	20	19	E4060345 

EW70-13

CUTTING LISTS

application diagram for overall casement dimensions

selection of the appropriate casement profile and the dimensions of the casement



AREA (A)
E4270200
E4270220

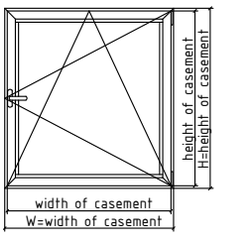
AREA (B)
E4270201
E4270221

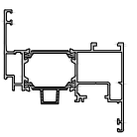
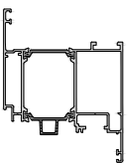
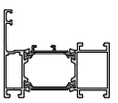
ATTENTION
The diagram is valid for windows which are constructed using corner crimping machine & epoxy resin

EW70-17

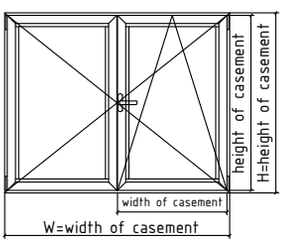
Cutting for PVC groove

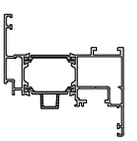
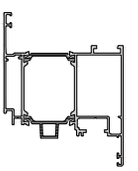
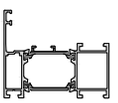
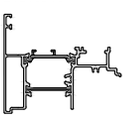
calculation of cutting length for one leaf window



frame profile selection \ casement profile selection		E4270220 	E4270221 
E4270100 	width of casement	W - 57	W - 57
	height of casement	H - 57	H - 57

calculation of cutting length for two leaf window

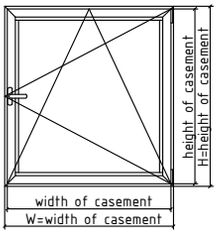


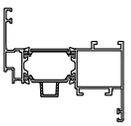
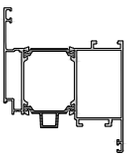
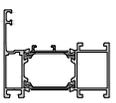
frame profile selection \ casement profile selection		E4270220 	E4270221 
E4270100 	width of casement	$\frac{W - 62}{2}$	$\frac{W - 62}{2}$
	height of casement	H - 57	H - 57
E4270540 	height of secondary casement profile	H - 133	H - 133

EW70-16

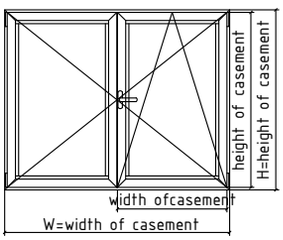
Cutting for EURO groove

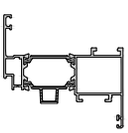
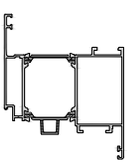
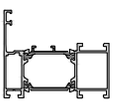
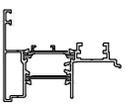
calculation of cutting length for one leaf window



frame profile selection		casement profile selection: E4270200 	casement profile selection: E4270201 
E4270100 	width of casement	W - 62	W - 62
	height of casement	H - 62	H - 62

calculation of cutting length for two leaf window



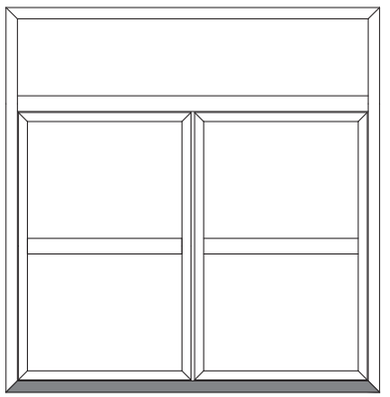
frame profile selection		casement profile selection: E4270200 	casement profile selection: E4270201 
E4270100  E4270500 	width of casement	$\frac{W - 68}{2}$	$\frac{W - 68}{2}$
	height of casement	H - 62	H - 62
	height of secondary casement profile	H - 133	H - 133

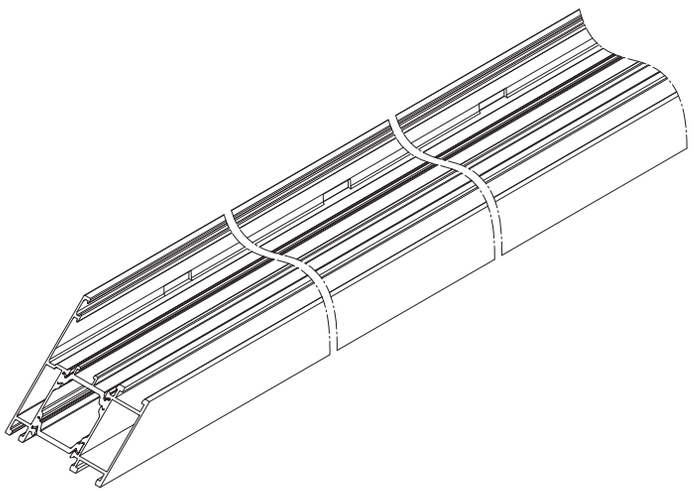
EW70-15

MACHINING

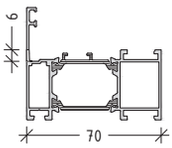
Additional treatment of profiles after cutting
Frame E4270100 – machining for drainage

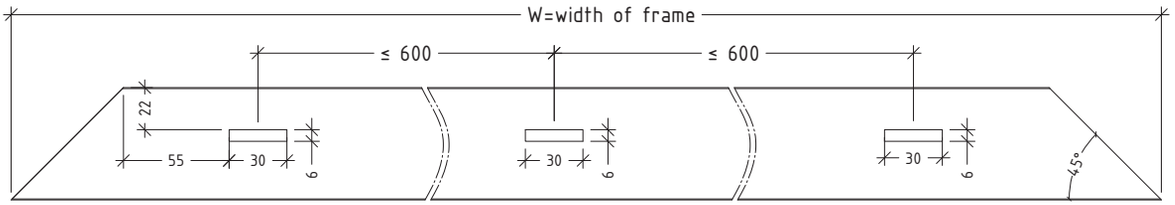
exterior view

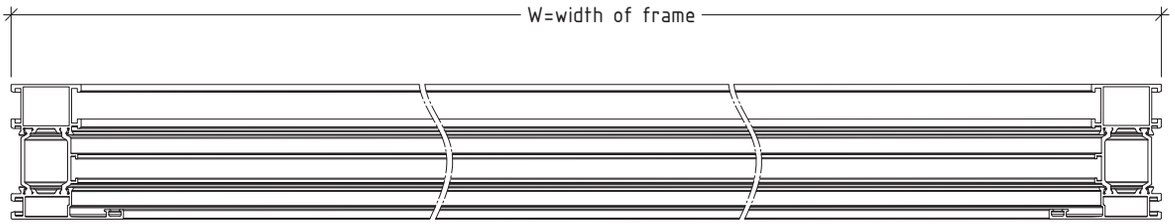




E4270100

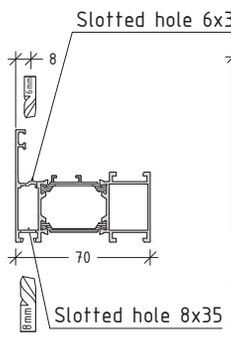


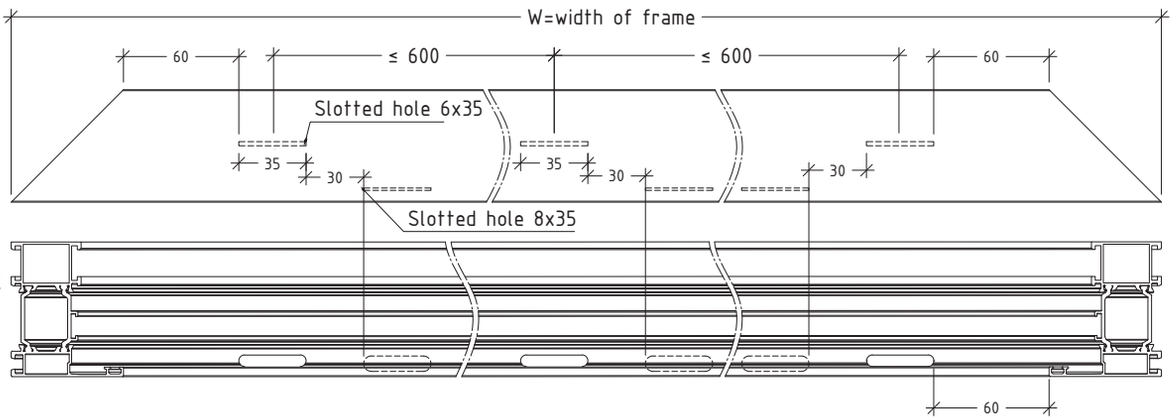




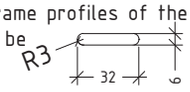
E4270100

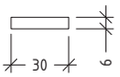
Optional
machining for hidden drainage





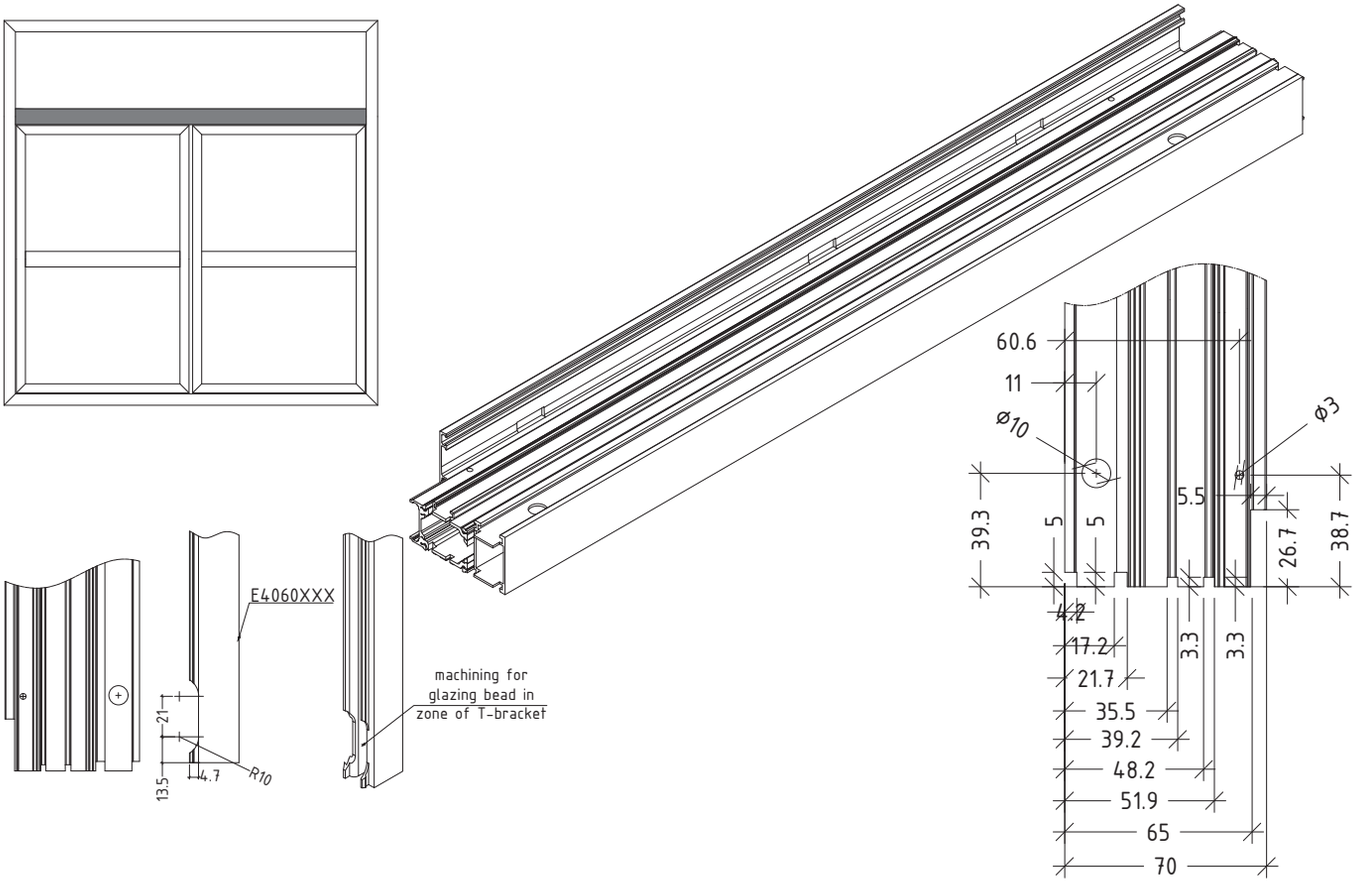
Note:
This machining is valid for all the frame profiles of the system
For CNC machine drainage hole must be R3 for punching machine is



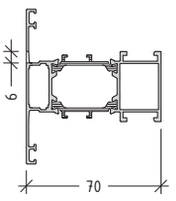


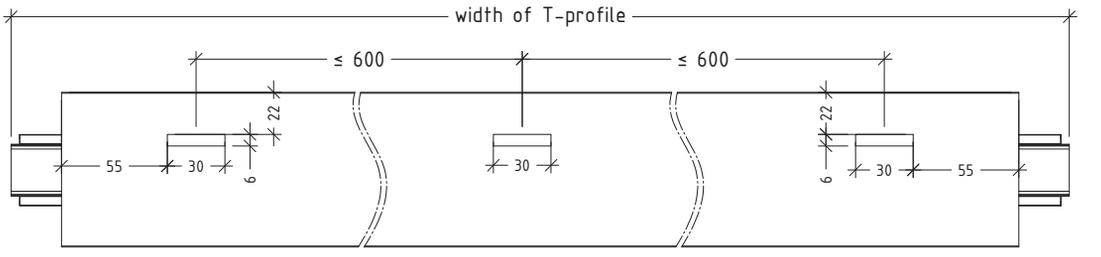
EW70-17

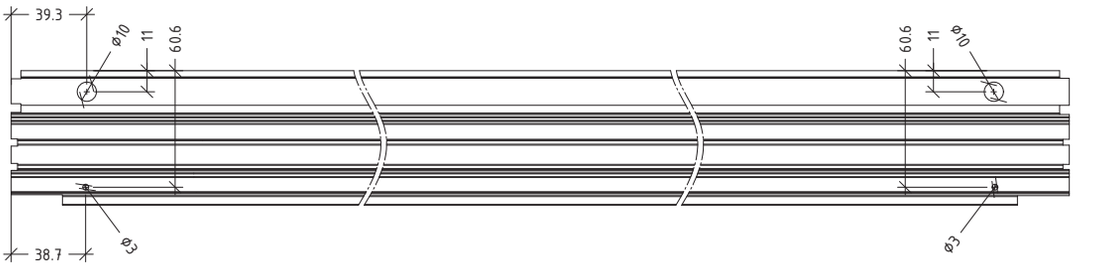
Additional treatment of profiles after cutting
T profile E4270300 – machining for visible drainage and connecting to the frame



E4270300
T profile

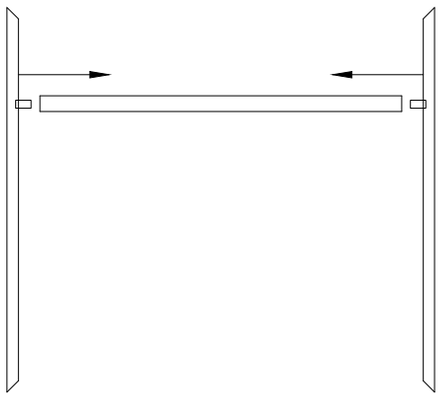


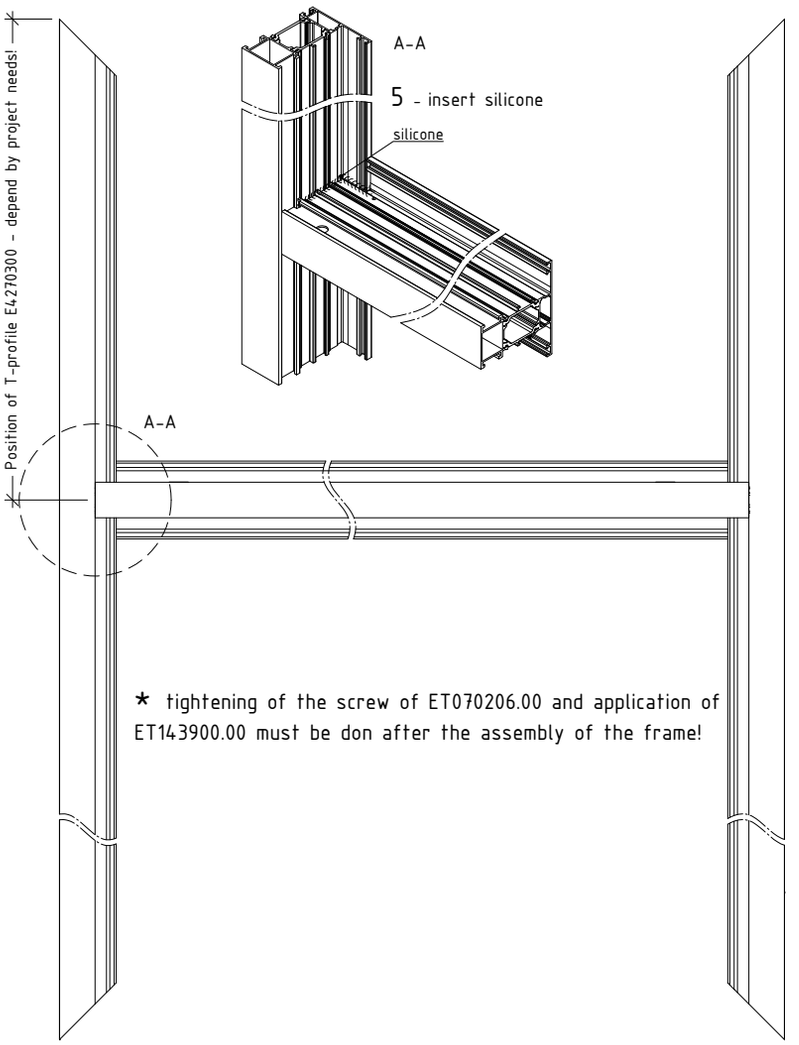


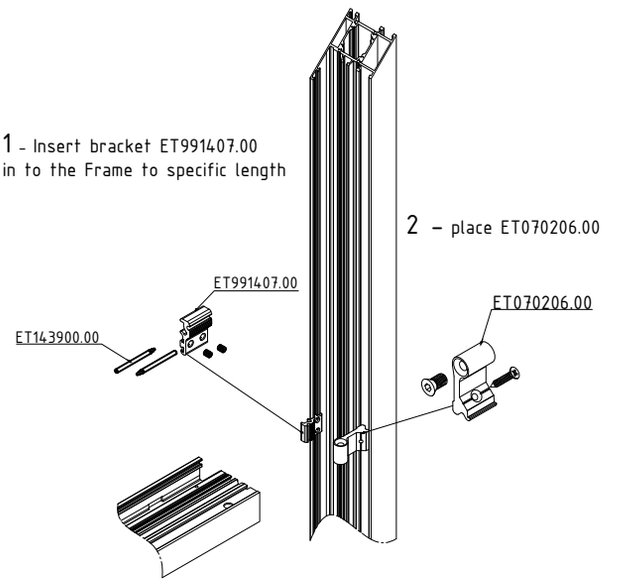


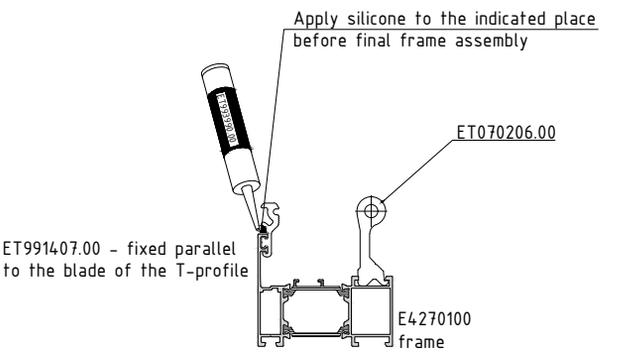
EW70-18

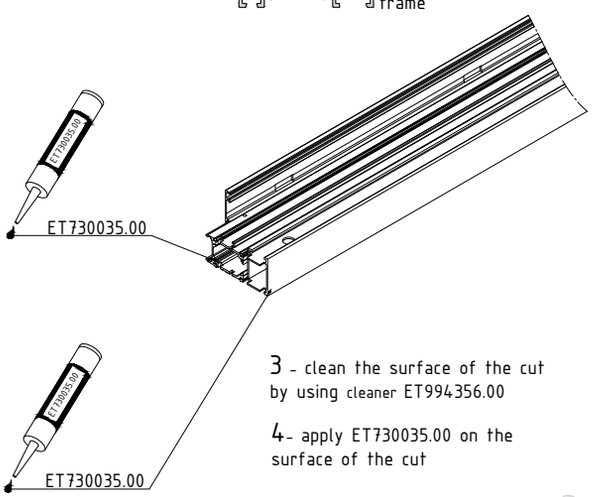
Sequence for mounting of T-profile E4270300 to the frame E4270100









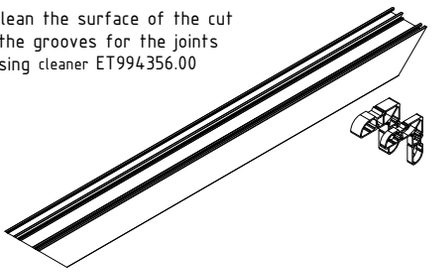


Note:
This mounting sequence is valid for all the frames in the system

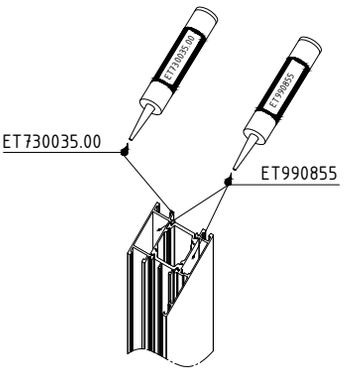
EW70-19

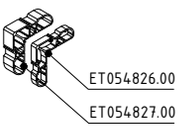
Assembly sequence for frame E4270100

1 - clean the surface of the cut and the grooves for the joints by using cleaner ET994356.00



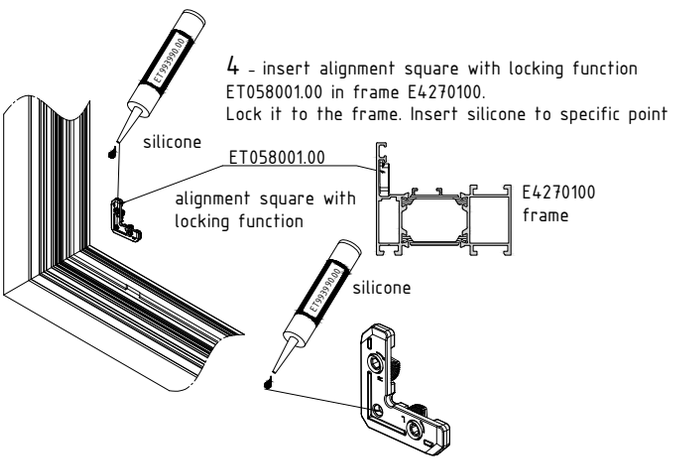
2 - apply ET730035.00 on the surface of the cut and ET990855 in the grooves for the joints

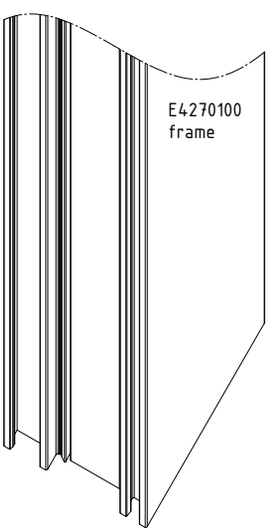




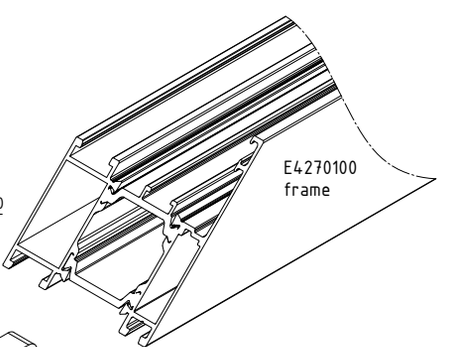
3 - put the joints in the chambers of frame E4270100

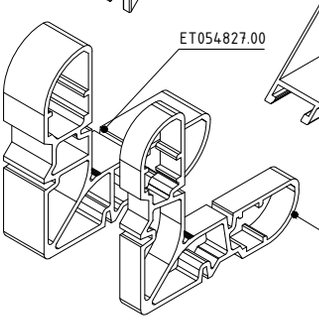
4 - insert alignment square with locking function ET058001.00 in frame E4270100.
Lock it to the frame. Insert silicone to specific point





A-A
scale 1.5

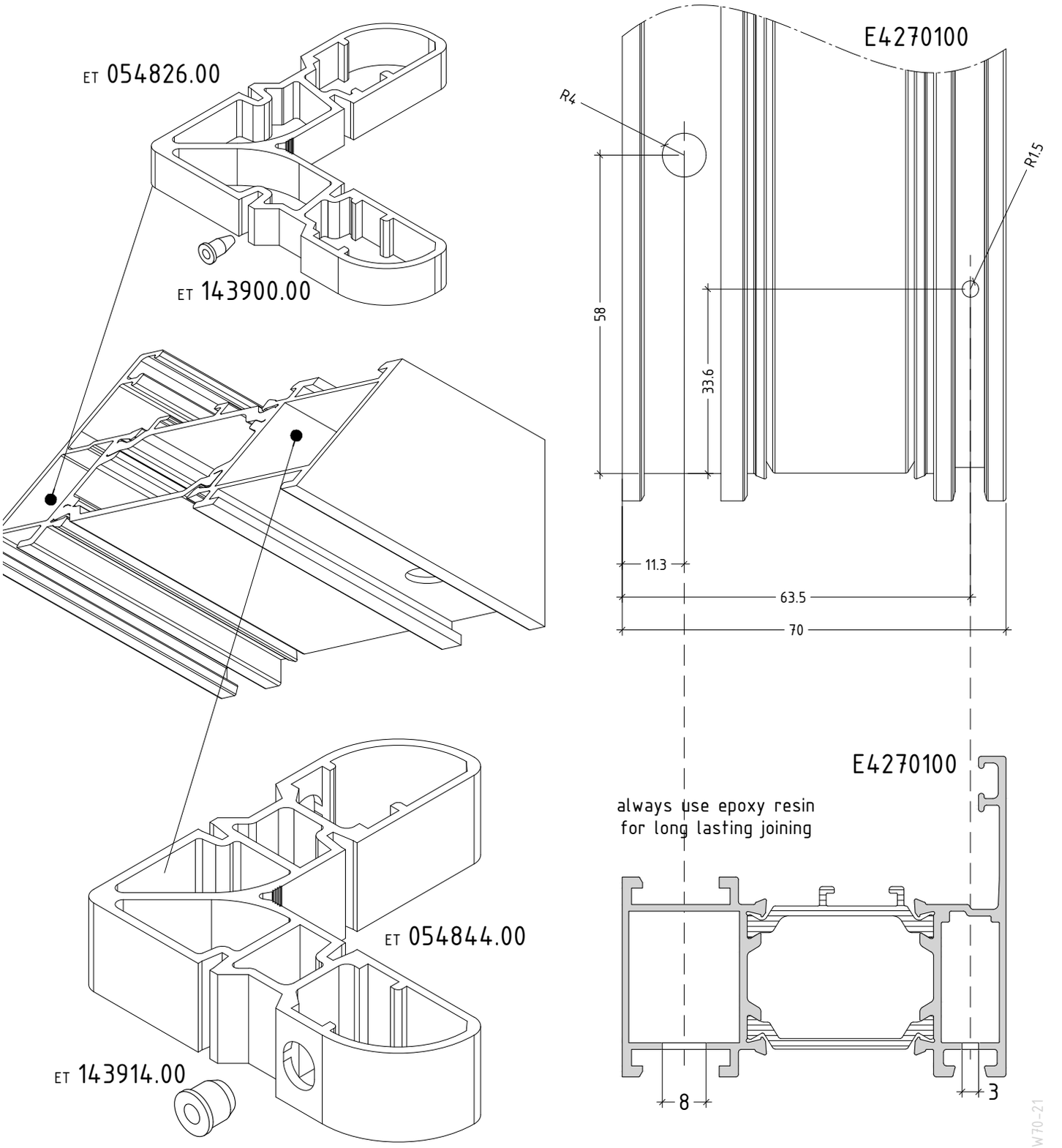




A-A

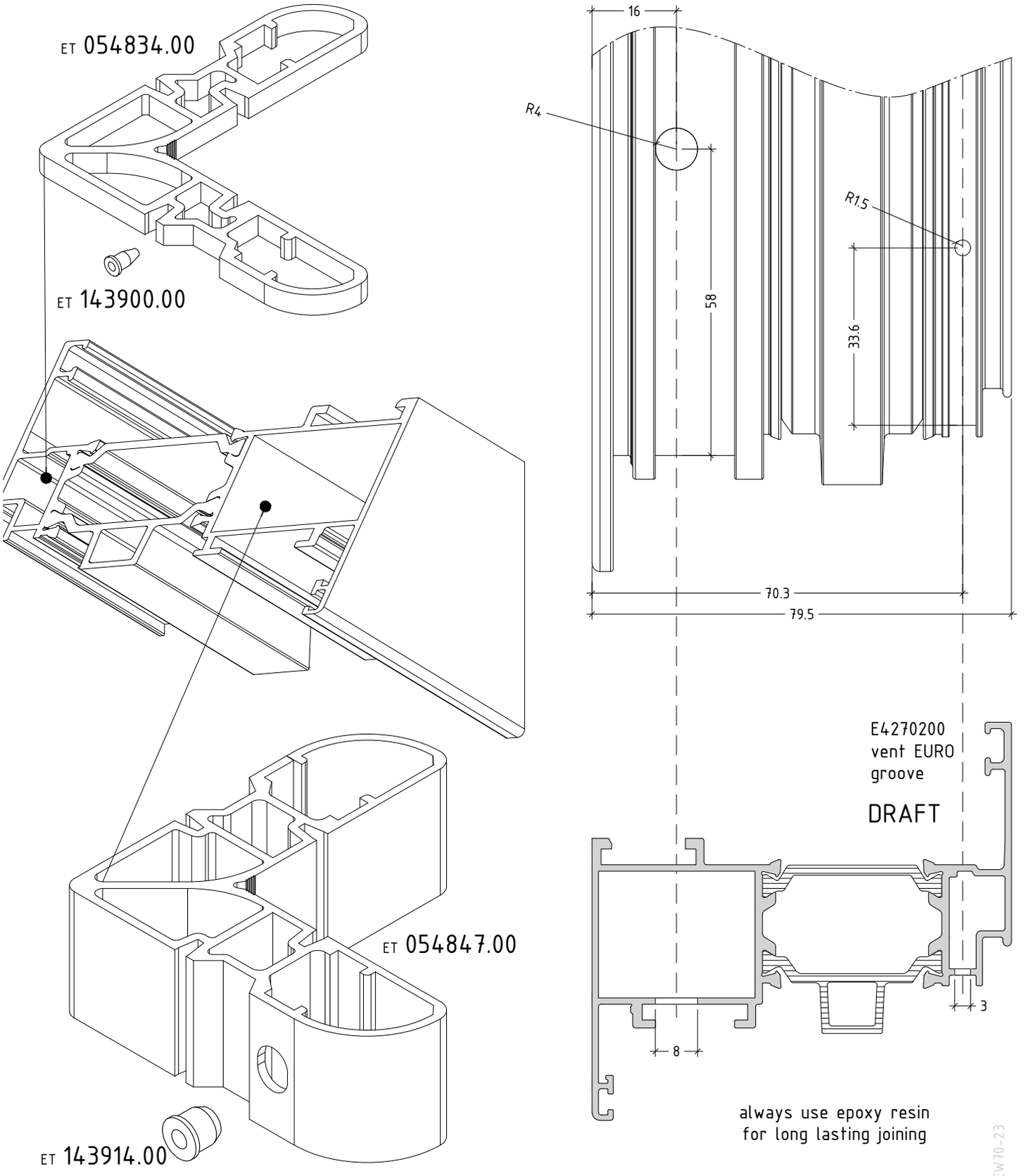
EW70-20

Machining if use roll pins extruded aluminum joint corner brackets

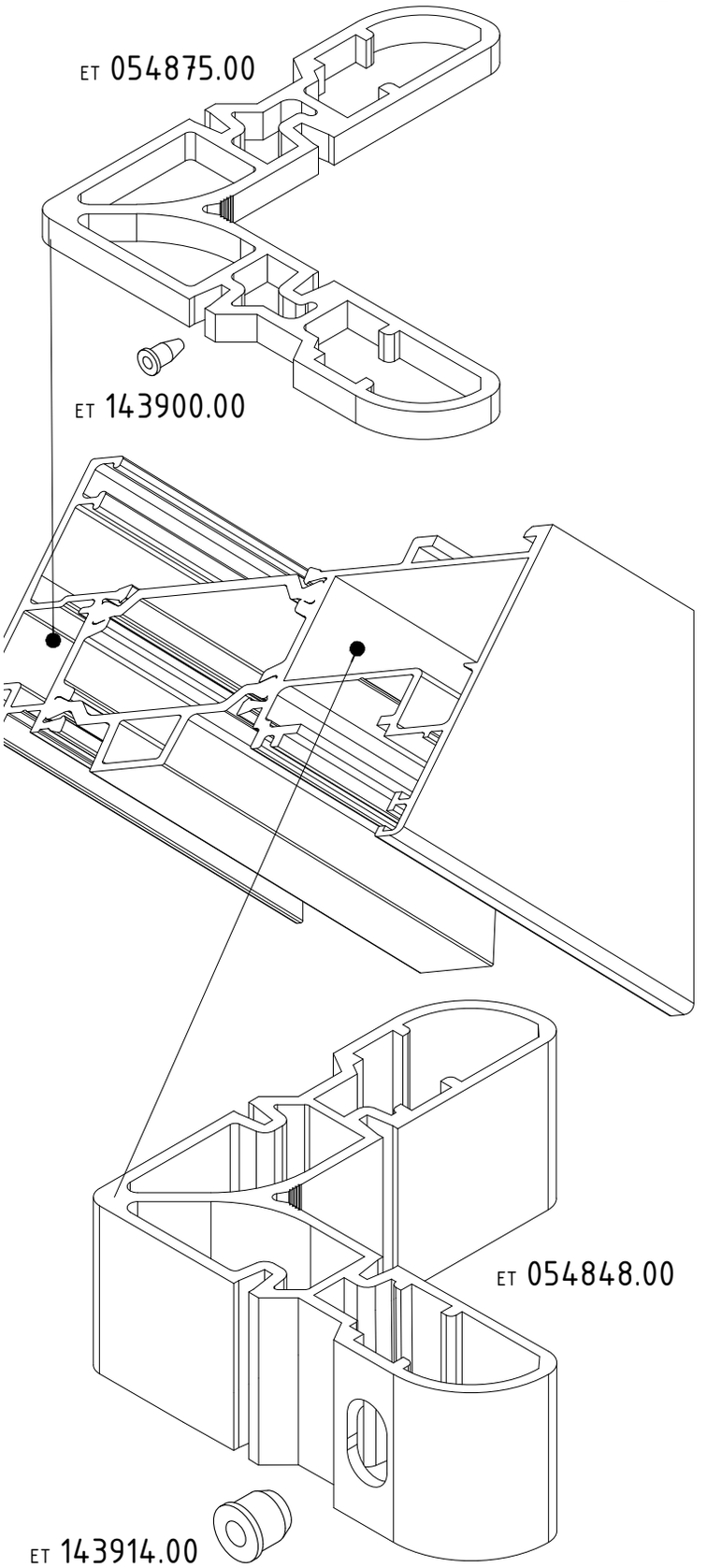


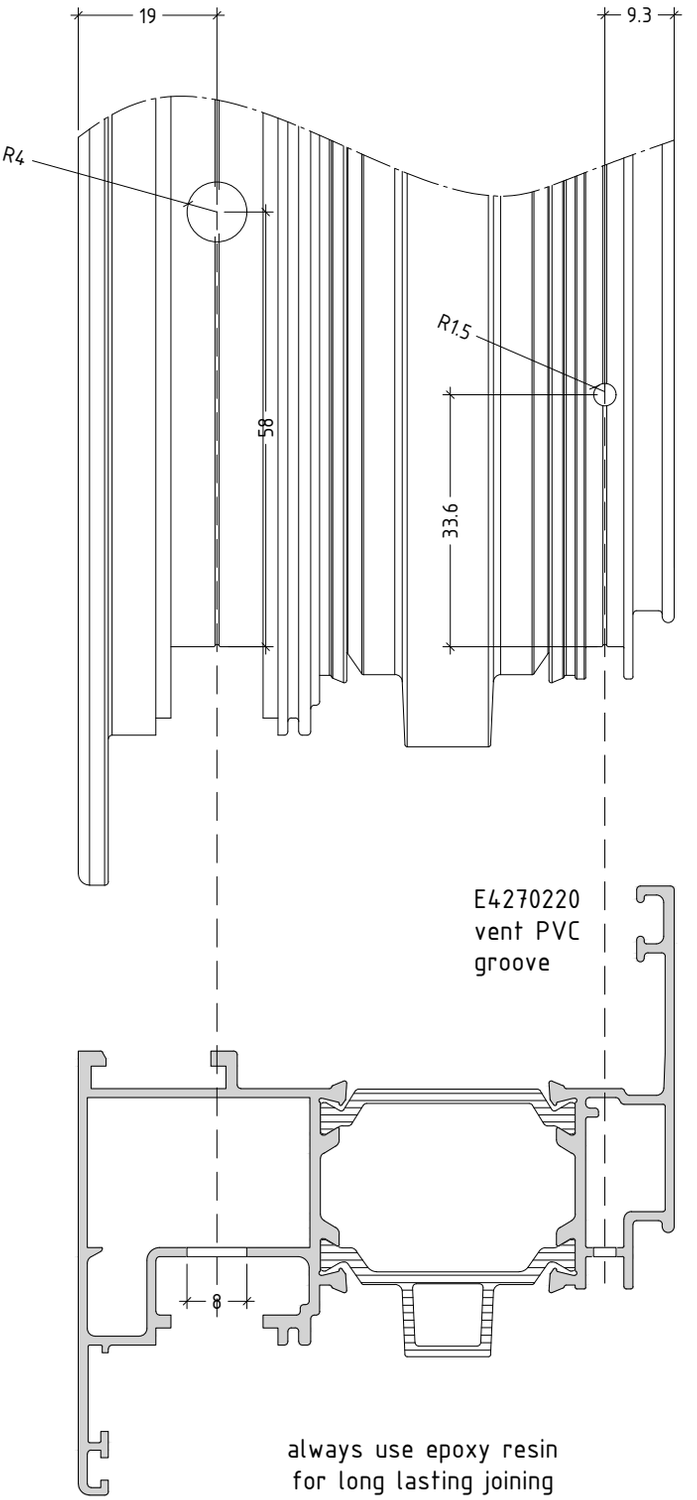
EW70-21

Machining if use roll pins extruded aluminum joint corner brackets E4270200



Machining if use roll pins extruded aluminum joint corner brackets
E4270220

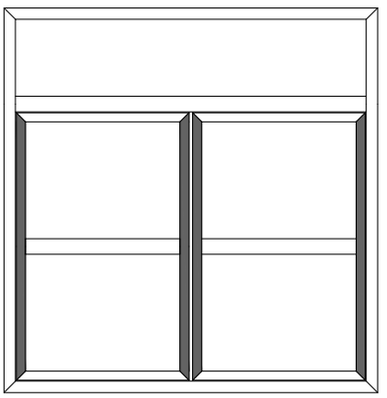


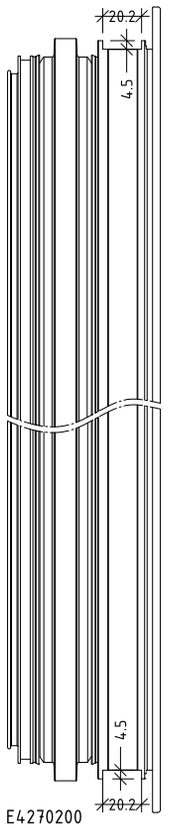


EW70-25

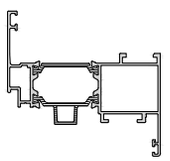
Additional treatment of profiles after cutting
casement E4270200 - machining for connecting rod E2308

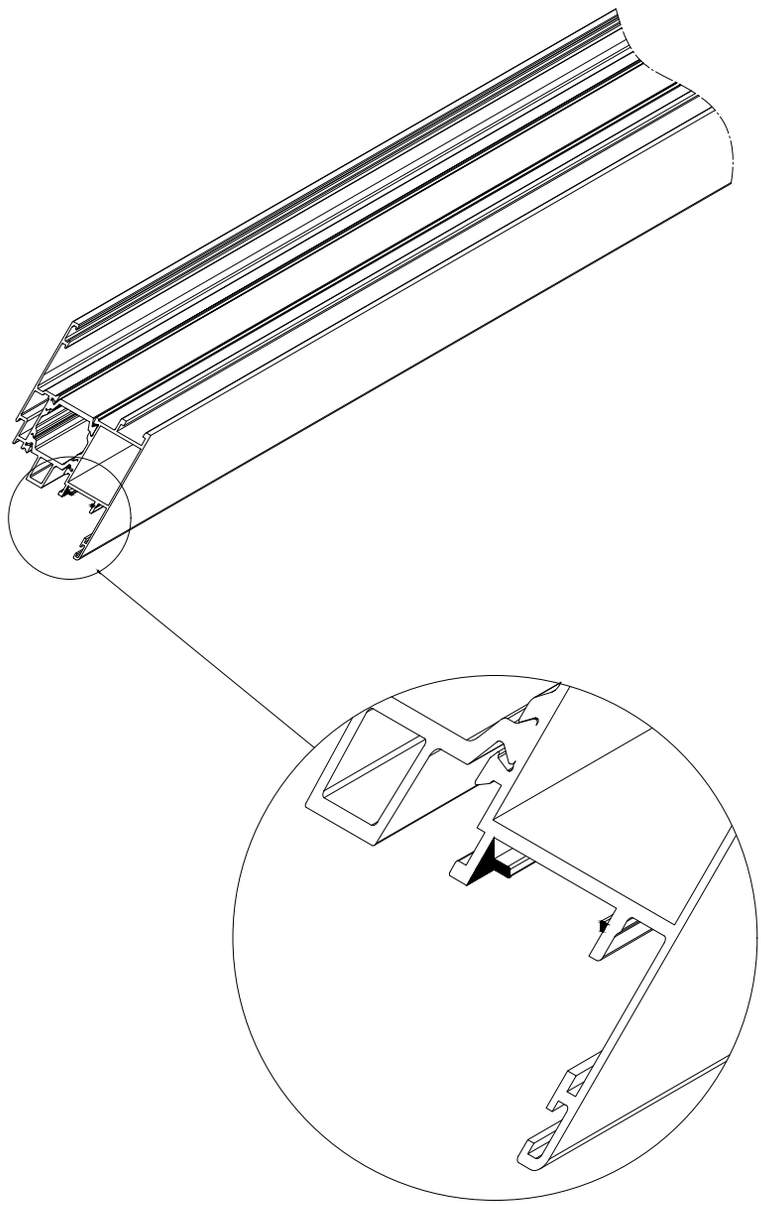
exterior view





E4270200

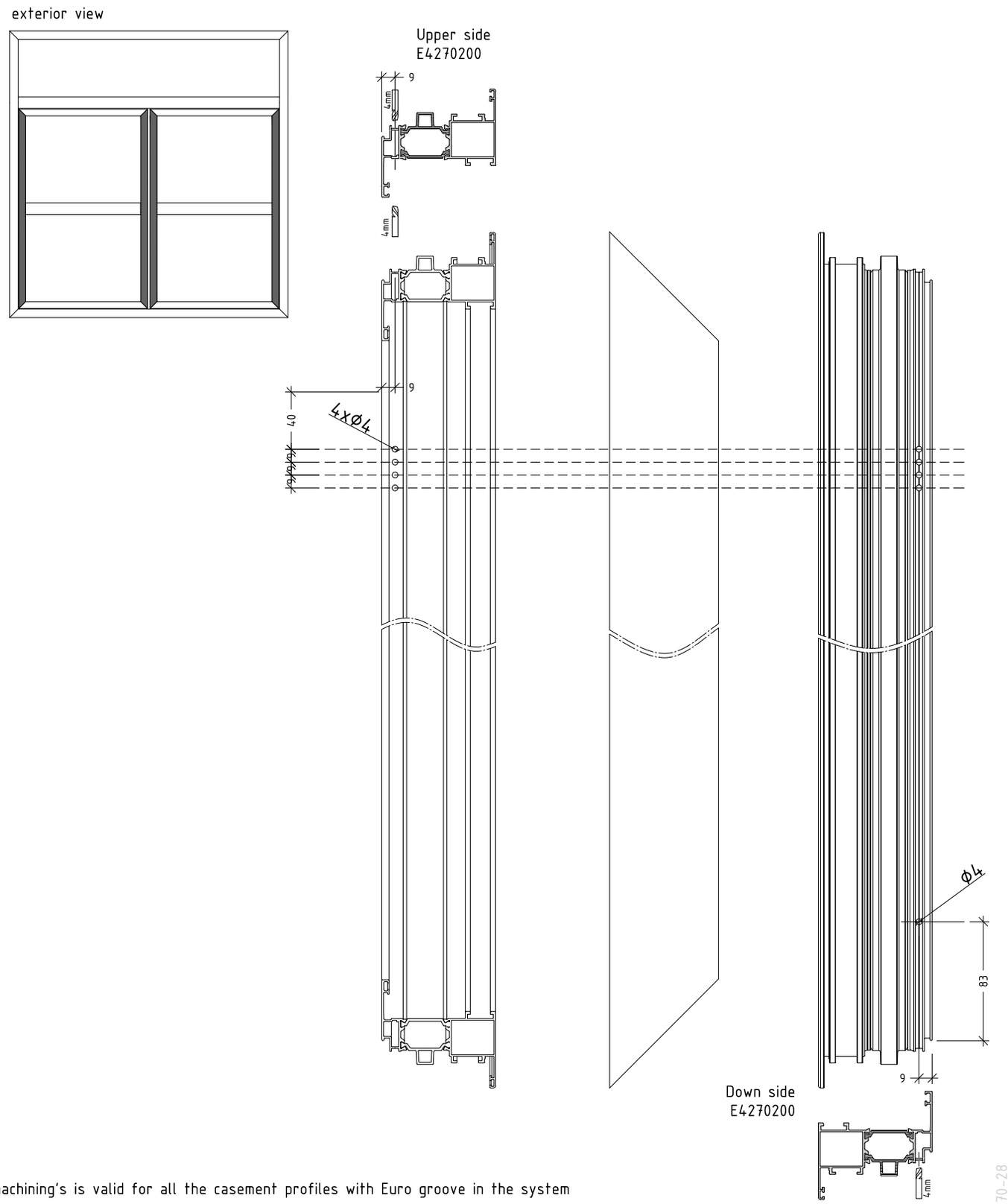




Note:
This machining's is valid for all the vent profiles with Euro groove in the system

EW70-27

Additional treatment of profiles after cutting casement E4270200 - machining for ventilation

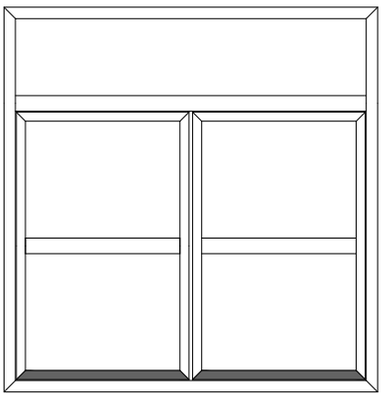


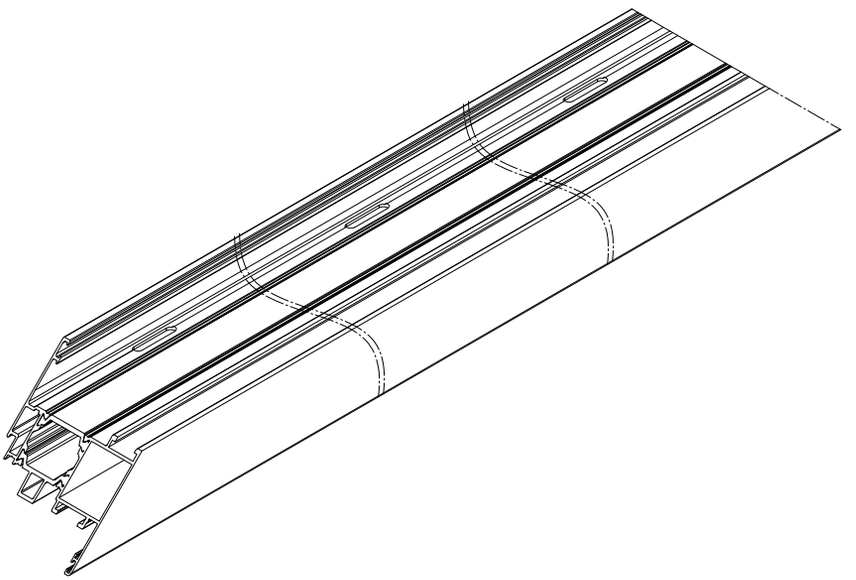
Note:
This machining's is valid for all the casement profiles with Euro groove in the system

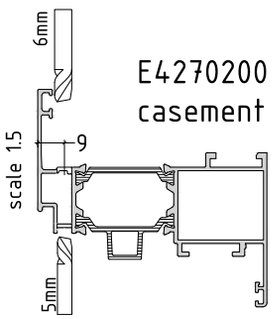
EW70-28

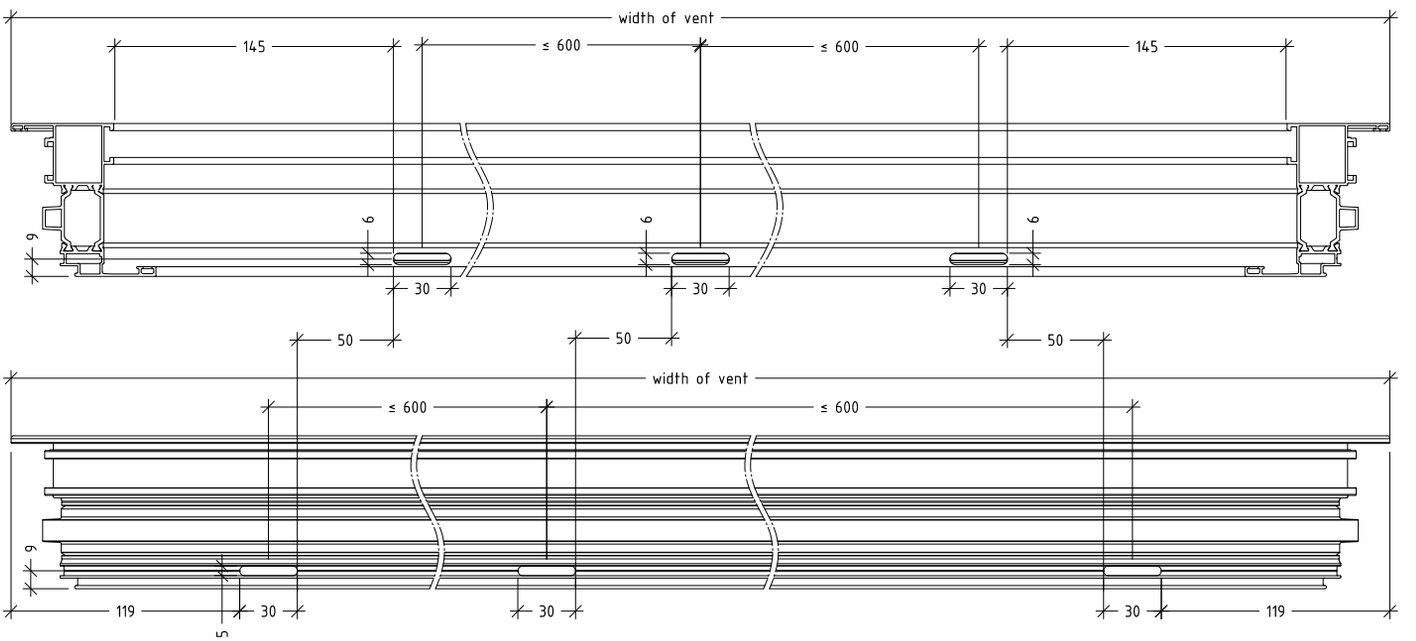
Additional treatment of profiles after cutting
casement E4270200 - machining for drainage

exterior view







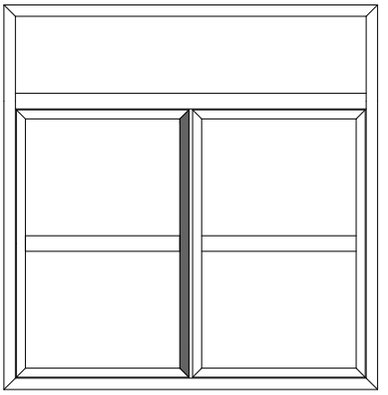


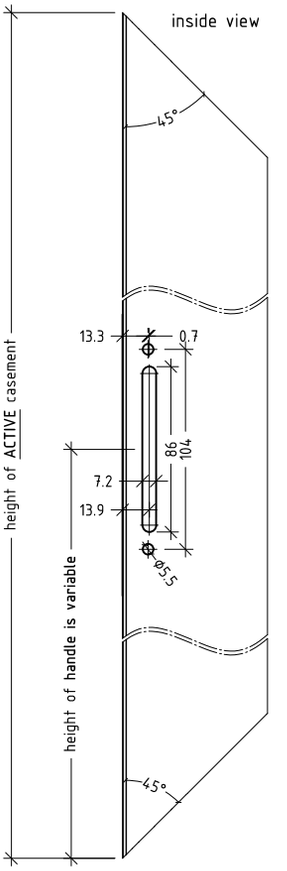
Note:
This machining is valid for all the casement profiles in the system

EW70-29

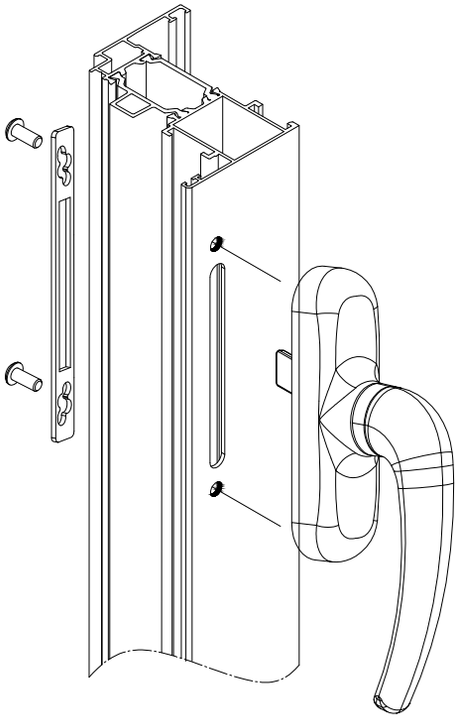
Additional treatment of profiles after cutting
casement E4270200 – machining for handle on active vent

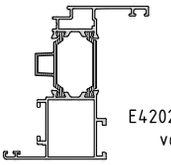
exterior view





machining for window handle





NOTE:

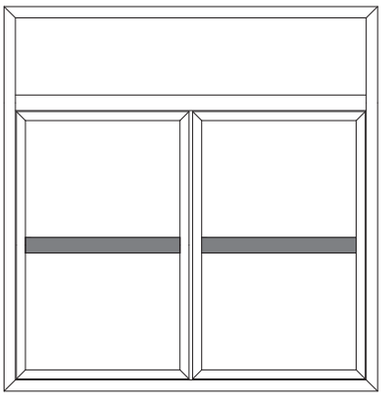
- For different cases active and passive casement positions varied!
- For different hardware the machining for handle may not fit!
(use mounting scheme for hardware supplier!!)

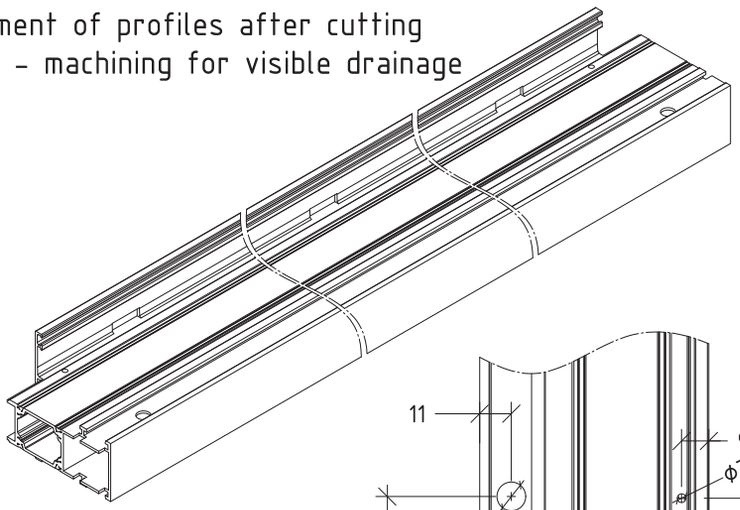
Note:
This machining is valid for all the casement profiles with Euro groove in the system

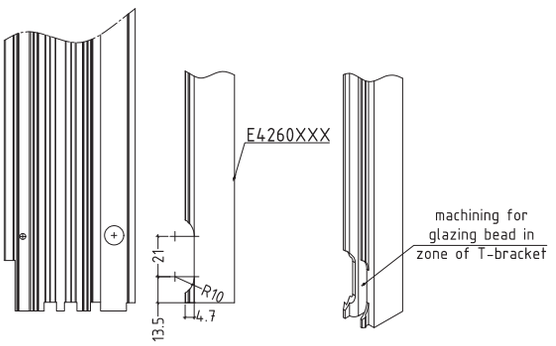
EW70-30

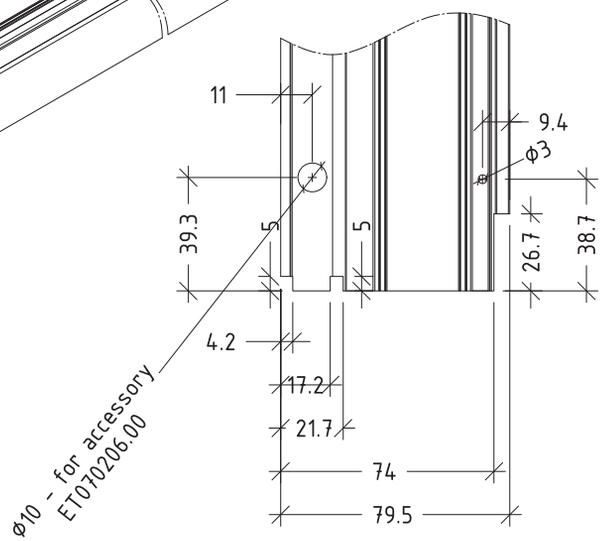
Additional treatment of profiles after cutting
T-profile E4270340 - machining for visible drainage

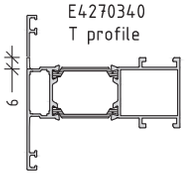
exterior view

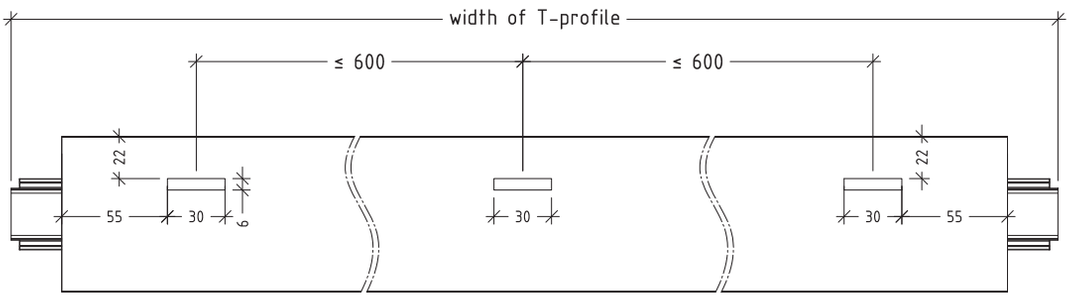


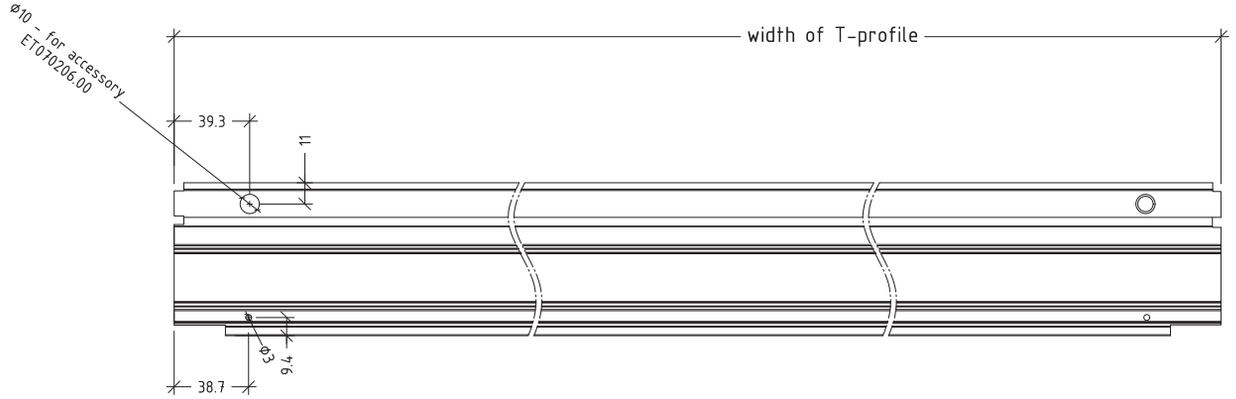






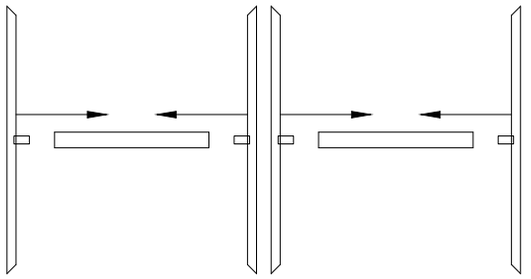


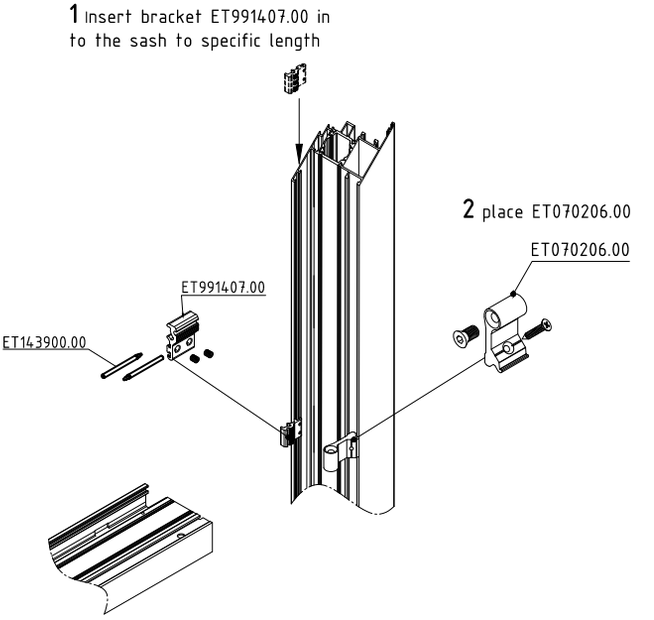


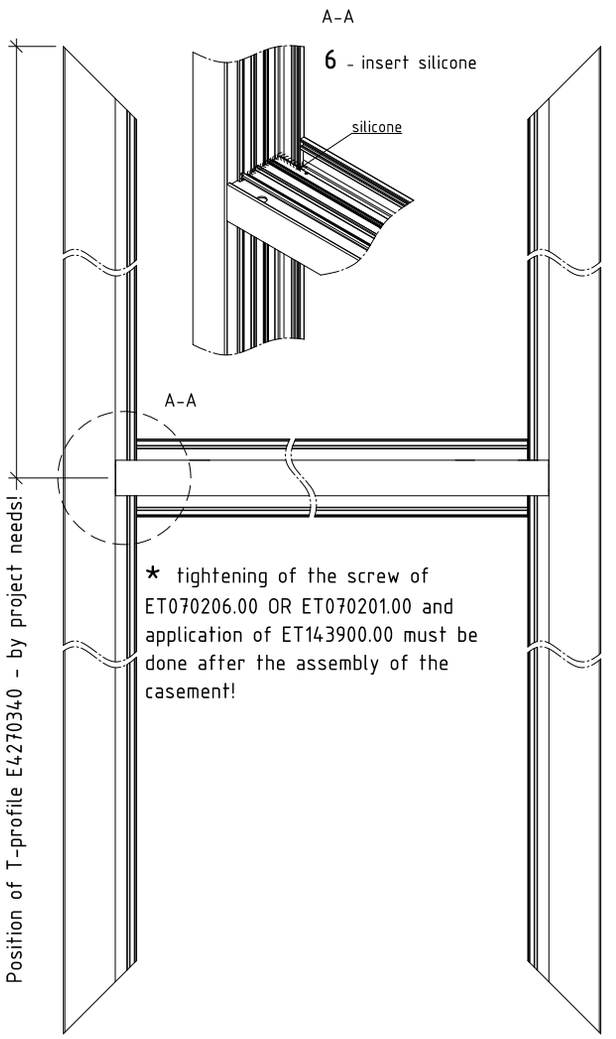


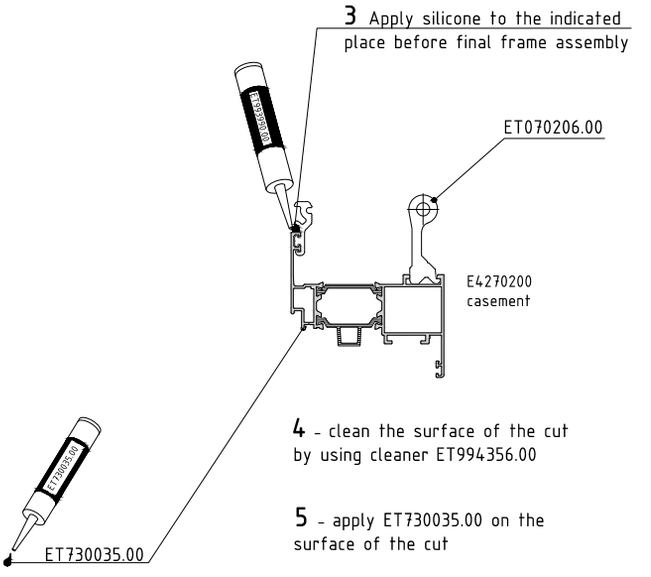
EW70-31

Sequence for mounting of T-profile E4270340 to the casement E4270200





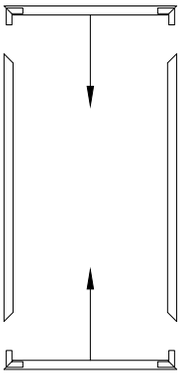


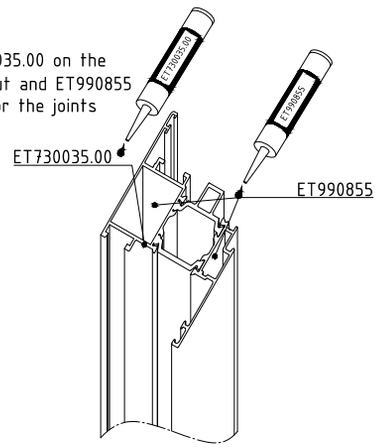


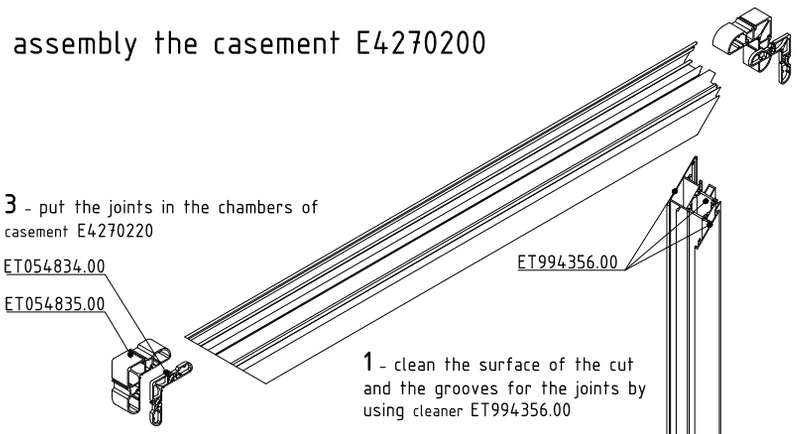
Note:
* This mounting sequence is valid for all casement profile with Euro groove in the system

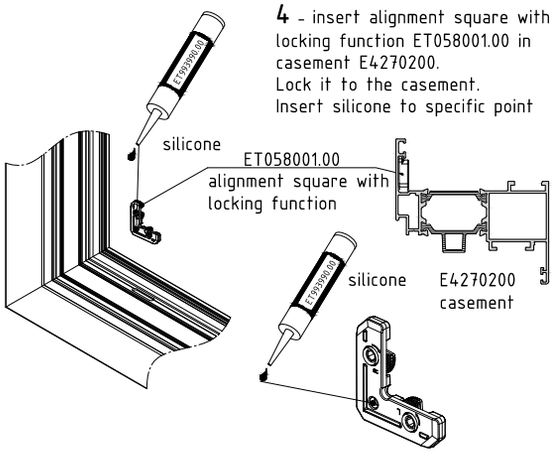
EW70-32

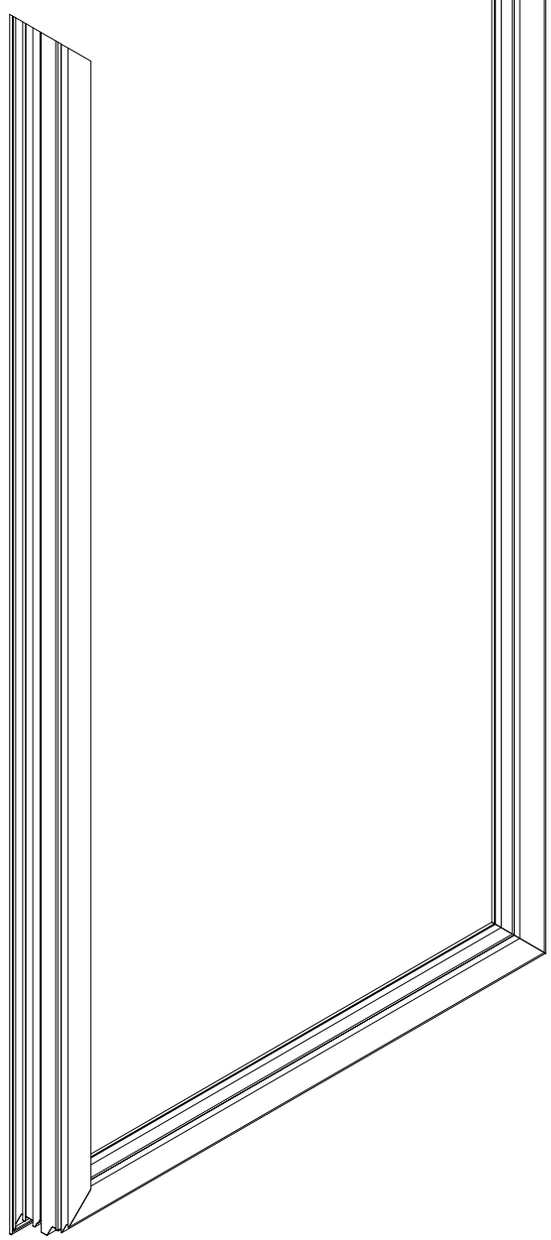
Sequence for assembly the casement E4270200







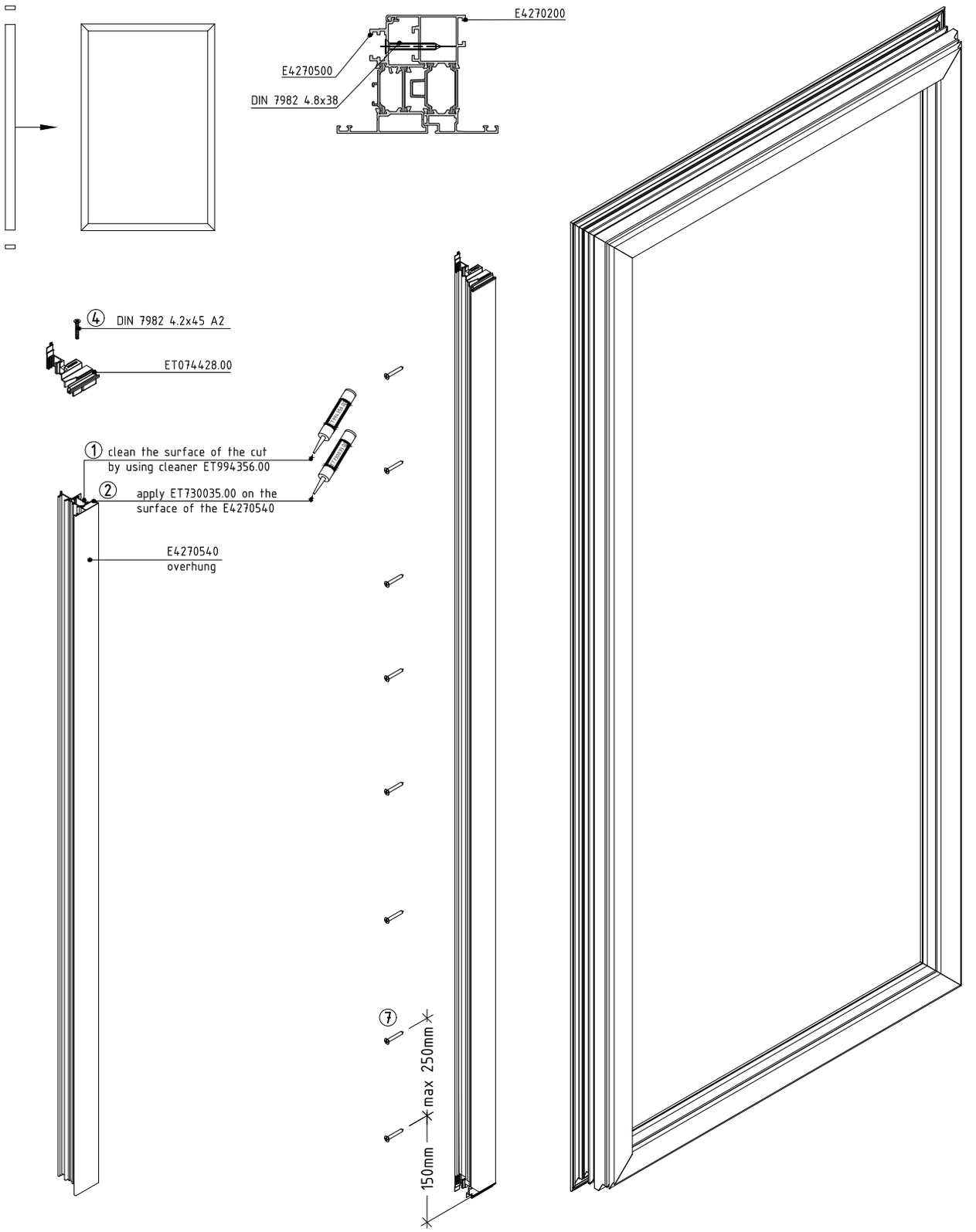




Note:
* This mounting sequence is valid **for** all the casement profiles in the system by using corresponding joint corners and insulators
* Clean the joints before application

EW70-33

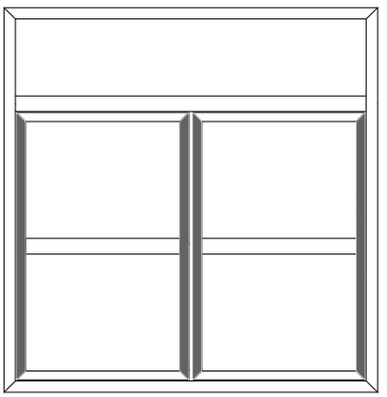
Sequence for assembly the E4270500 overhung and mounting to the casement E4270200

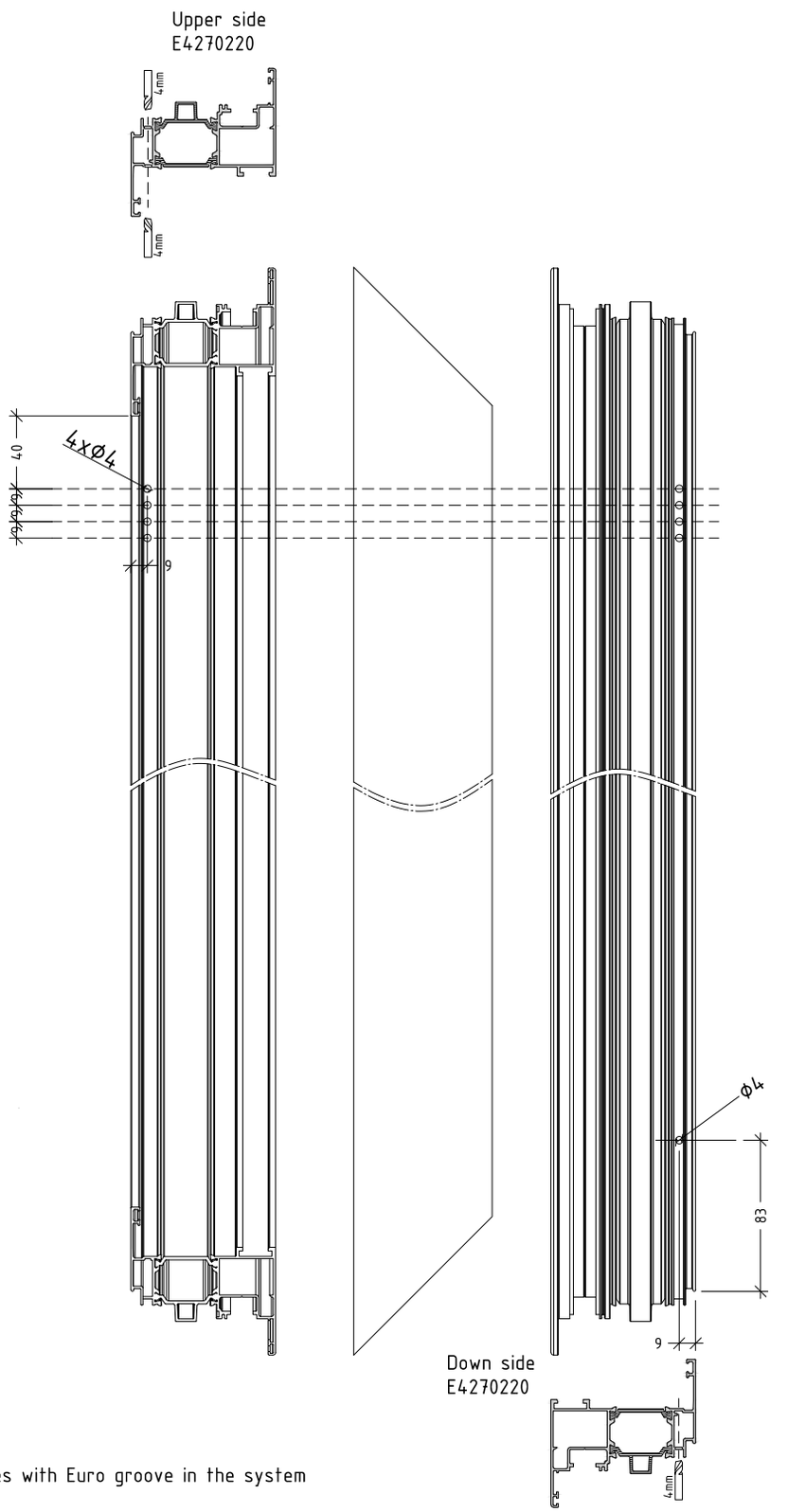


EW70-34

Additional treatment of profiles after cutting casement E4270220 – machining for ventilation

exterior view



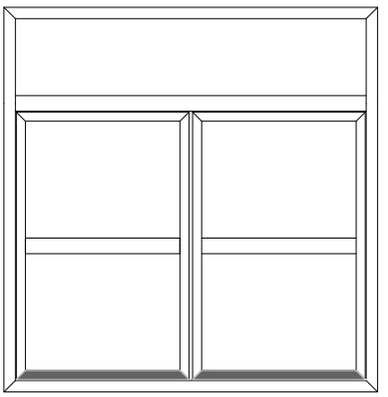


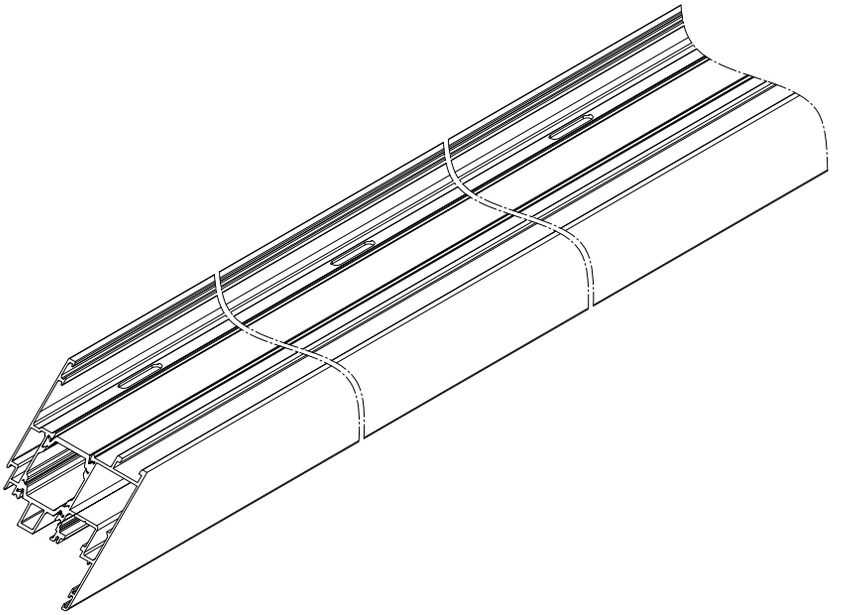
Note:
This machining's is valid for all the casement profiles with Euro groove in the system

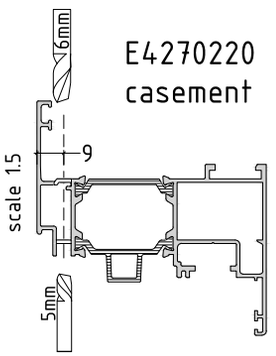
EW70-35

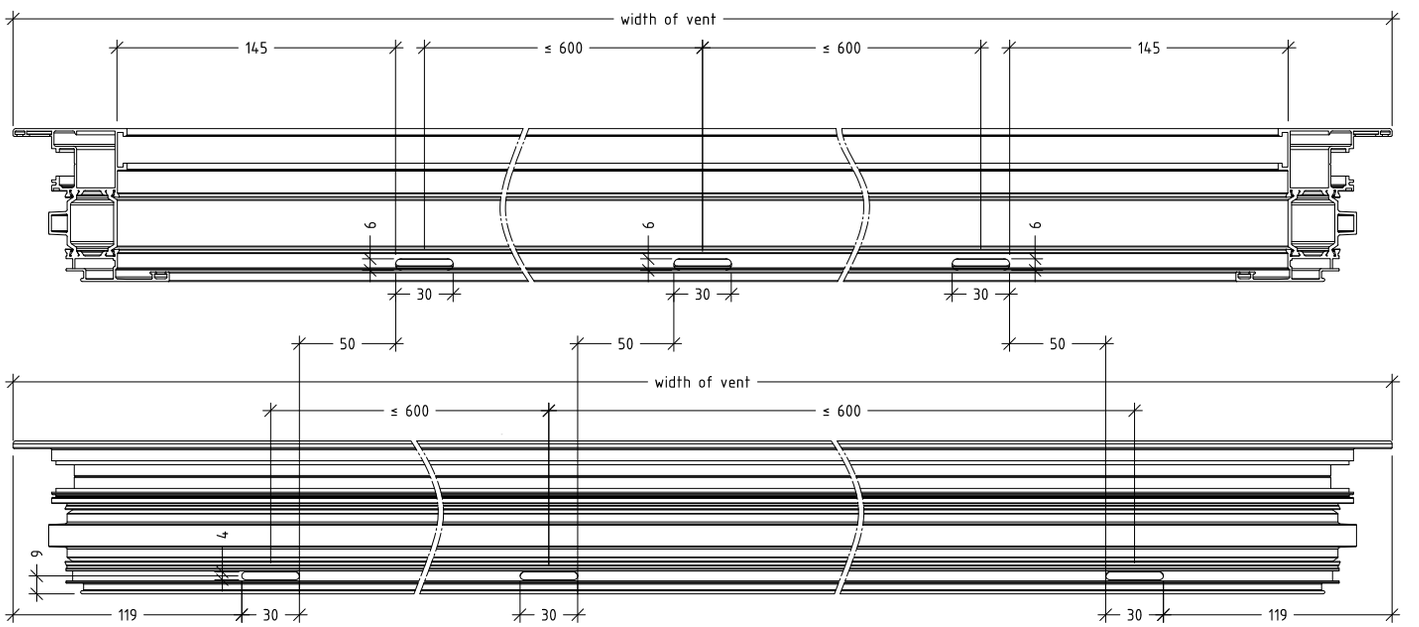
Additional treatment of profiles after cutting casement E4270220 - machining for drainage

exterior view







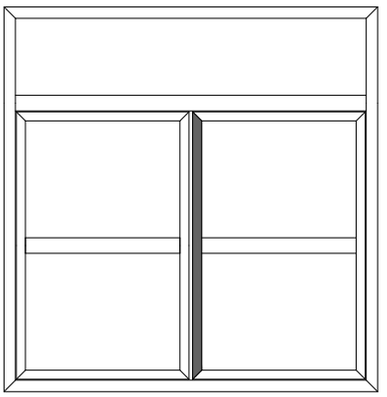


Note:
This machining is valid for all the casement profiles in the system

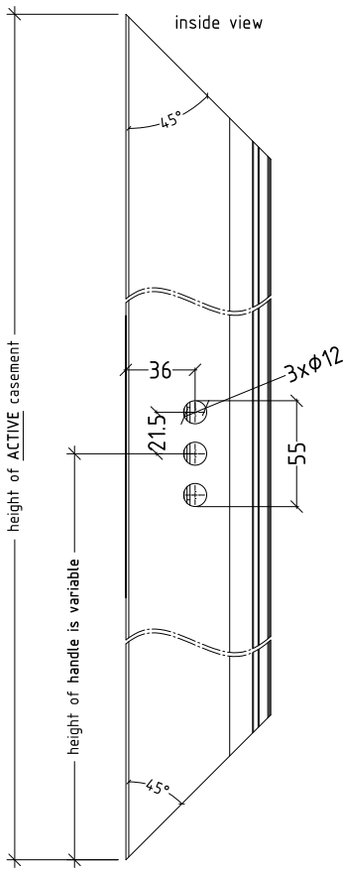
EW70-36

Additional treatment of profiles after cutting
casement E4270220 - machining for handle on active vent

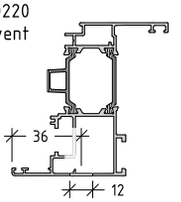
exterior view



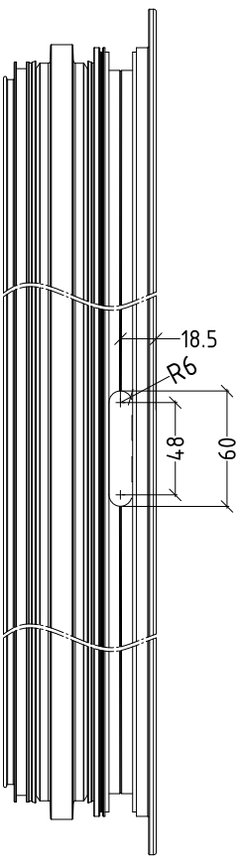
inside view

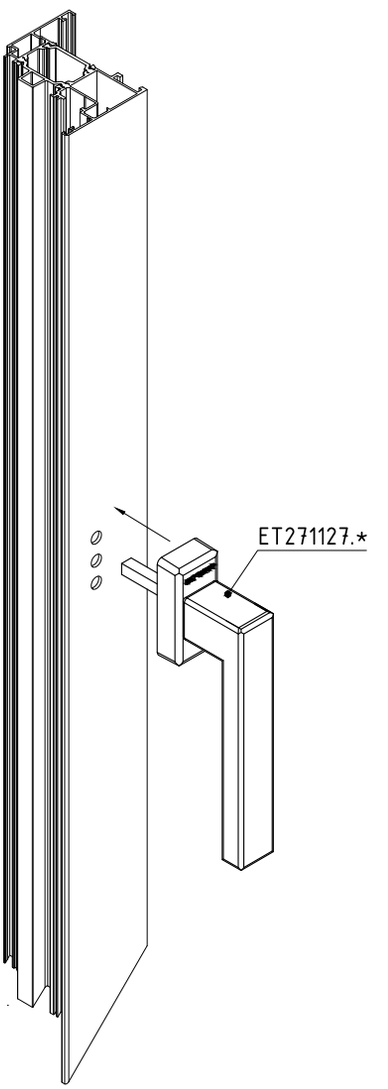


E4270220
vent



machining's to fix T/T handle



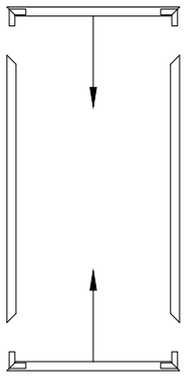


NOTE:

- For different cases active and passive casement positions varied!
- For different hardware the machining for handle may not fit!
(use mounting scheme for hardware supplier!!)

EW70-37

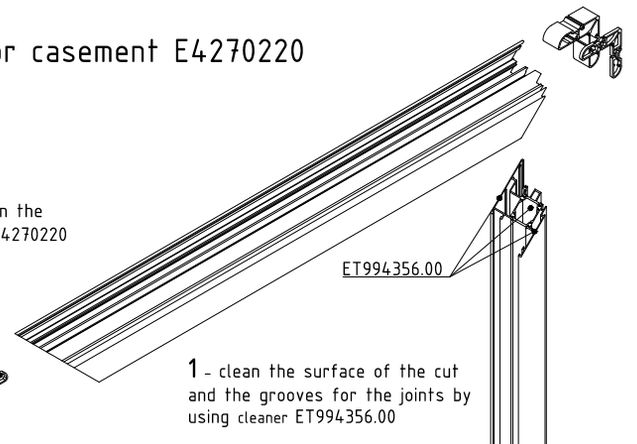
Assembly sequence for casement E4270220



3 - put the joints in the chambers of vent E4270220

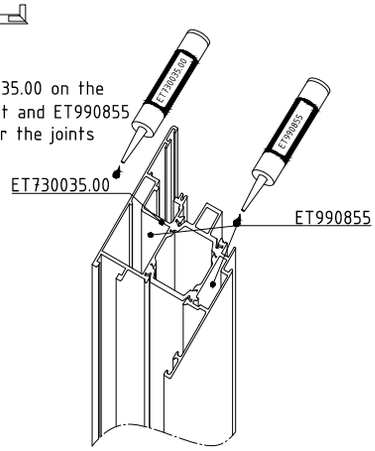
ET054875.00

ET054838.00

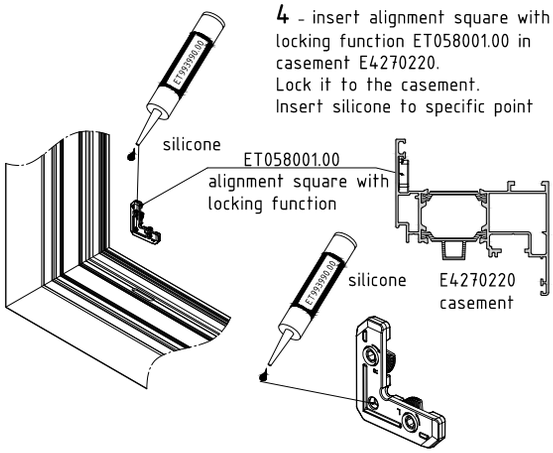


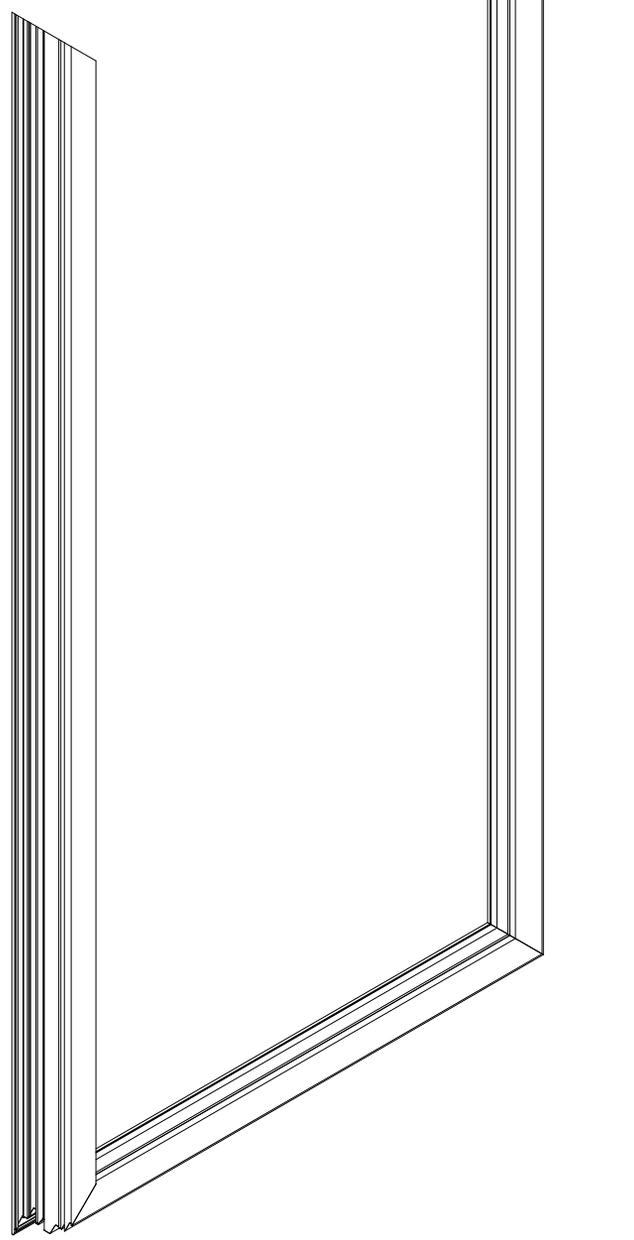
1 - clean the surface of the cut and the grooves for the joints by using cleaner ET994356.00

2 - apply ET730035.00 on the surface of the cut and ET990855 in the grooves for the joints



4 - insert alignment square with locking function ET058001.00 in casement E4270220.
Lock it to the casement.
Insert silicone to specific point

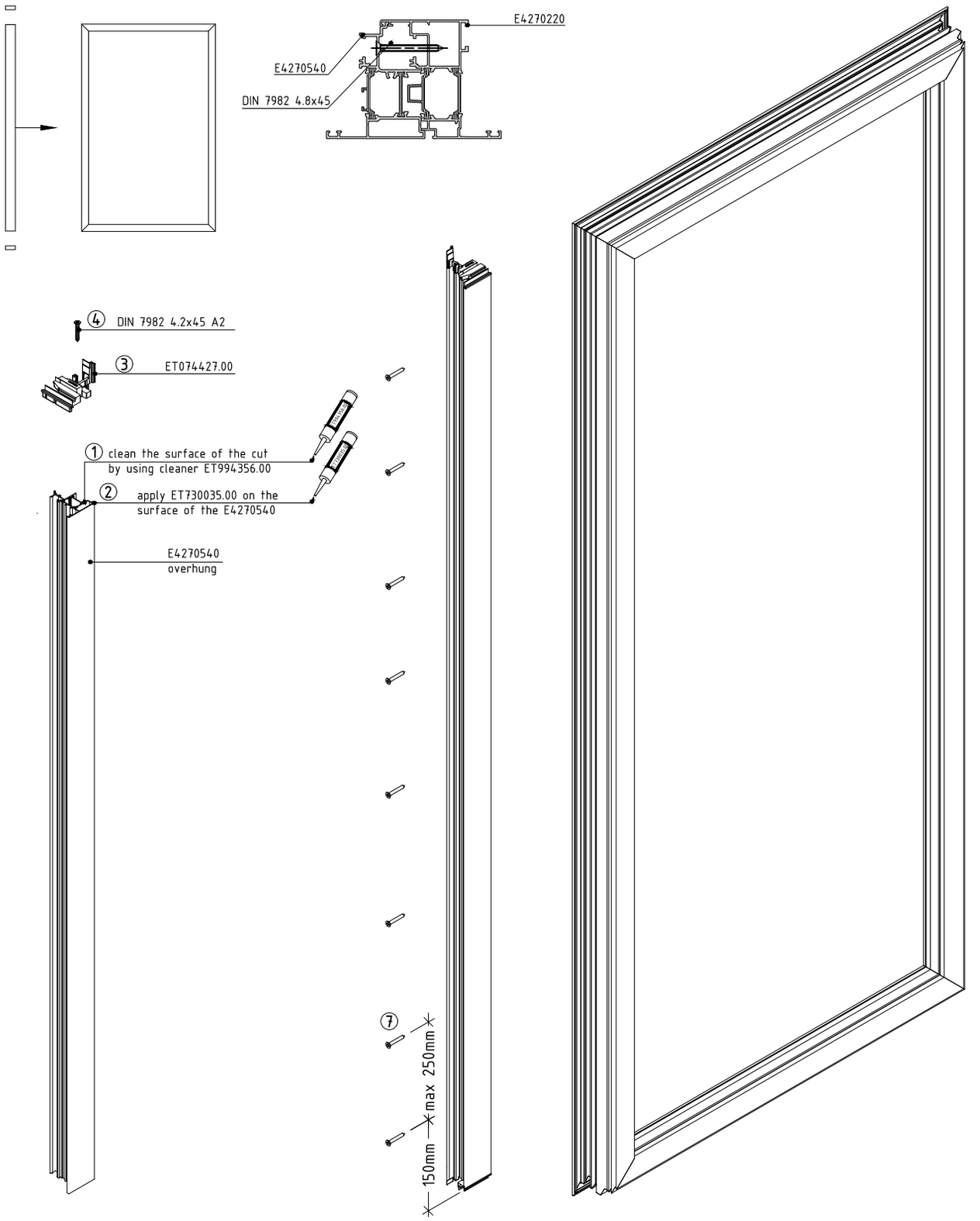




Note:
* This mounting sequence is valid **for** all the casement profiles in the system by using corresponding joint corners and insulators
* Clean the joints before application

EW70-38

Assembly sequence for E4270220 casement and mounting E4270500 overhung



EW70-39

ACCESSORIES

code/description	package/pcs	colour
ET **130475.00**	125	●

glazing EPDM gasket (3mm)

ET **130476.00**	75	●

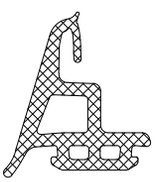
glazing EPDM gasket (3mm)

ET **130758.00**	150	●

interior EPDM gasket
TOPLINE

ET **130070.00**	40	●

central EPDM gasket for
EW70 premium

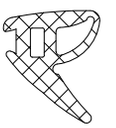


code/description	package/pcs	colour
ET **130176.00**	80	●

glazing EPDM gasket
press-in 5-6 mm

ET **130177.00**	60	●

glazing EPDM gasket
press-in 7-8 mm



ET **130205.00**	75	●

glazing EPDM gasket
press-in 5 mm

ET **130206.00**	75	●

glazing EPDM gasket
press-in 6 mm

code/description	package/pcs	colour
ET **130207.00**	75	●

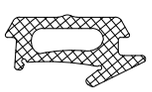
glazing EPDM gasket
press-in 7 mm

ET **130208.00**	40	●

glazing EPDM gasket
press-in 8 mm

ET **130433.00**	40	●

EPDM gasket for 75603
round column



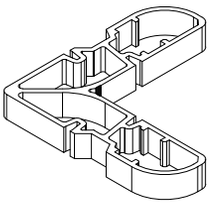
ET **130131.00**	200	●

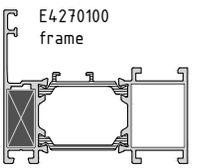
EPDM gasket for 75603
round column

A68-26

code/description	package/pcs	colour
ET **054826.00**	250	●

CORNER 10.2mm(70954) FOR
E4270100

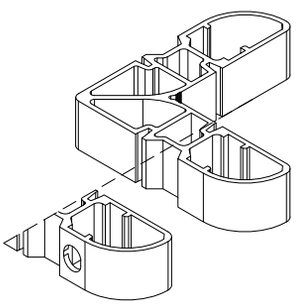


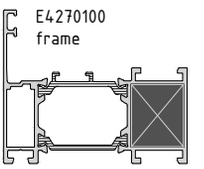


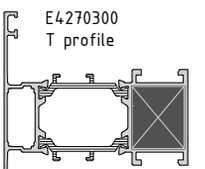
ET **054827.00**	50	●
ET **054844.00**	50	○

CORNER19.8mm(40951)FOR
E4270100;E4270300

CORNER19.8(40951) FOR
E4270100; E4270300 with
hole for pin



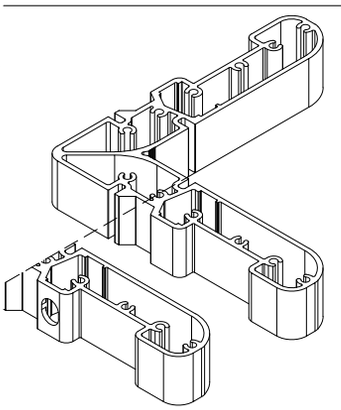


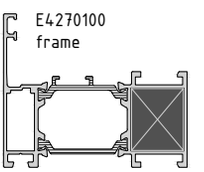


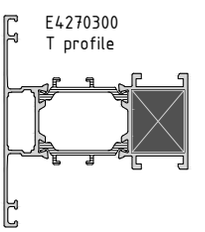
ET **054830.00**	50	●
ET **054845.00**	50	○

CORNER 19.8mm (40984) FOR
E4270100; E4270300 for GU

CORNER 19.8mm (40984)
E4270100; E4270300
with hole for pin GU



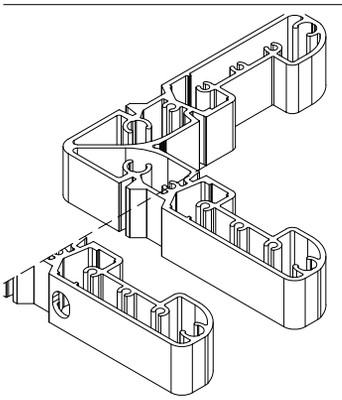


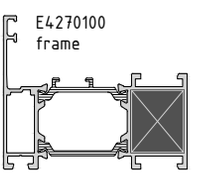


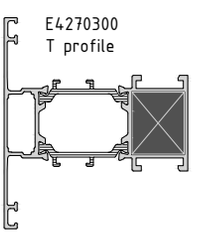
ET **054832.00**	50	●
ET **054846.00**	50	○

CORNER 19.8mm (40983) FOR
E4270100; E4270300
WINKHAUS

CORNER 19.8 mm (40983)
E4270100; E4270300
with hole for pin
WINKHAUS



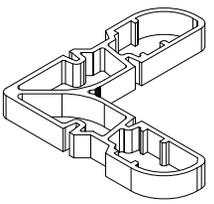




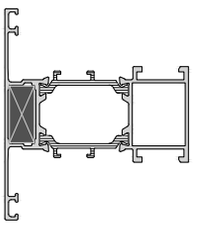
A68-27

code/description	package/pcs	colour
ET **054833.00**	250	●

CORNER 9.4mm(70954)FOR
E4270300

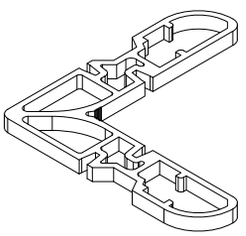


E4270300
T profile

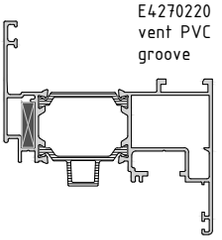


ET **054875.00**	300	●

CORNER 4,6mm(40990) FOR
E4270220

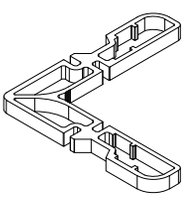


E4270220
vent PVC
groove

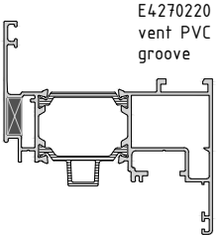


ET **054837.00**	300	●

CORNER 5.4mm(59114) FOR
E4270220



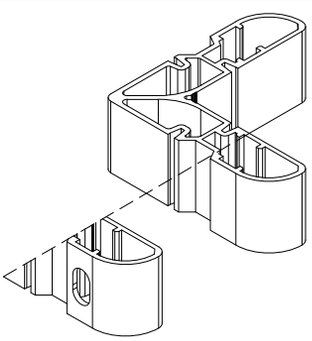
E4270220
vent PVC
groove



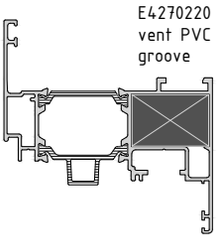
ET **054838.00**	50	●
ET **054848.00**	50	○

CORNER 29.2mm (40954) FOR
E4270220

CORNER 29.2mm (40954) FOR
E4270220 WITH HOLE



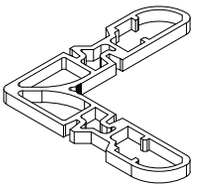
E4270220
vent PVC
groove

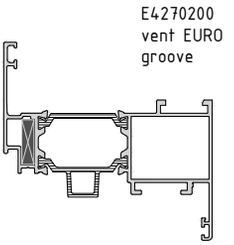


A68-28

code/description	package/pcs	colour
ET **054834.00**	300	●

CORNER 4.7mm(40990) FOR
E4270200

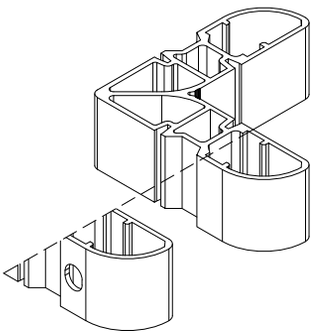


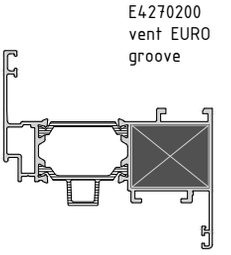


ET **054835.00**	50	●
ET **054847.00**	50	○

CORNER 29.3mm (40951) FOR
E4270200

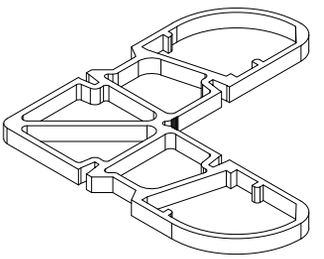
CORNER 29.3mm (40951) FOR
E4270200 with hole

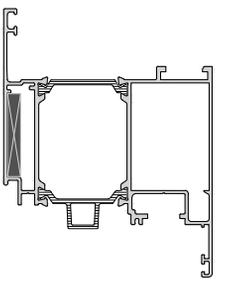




ET **054871.00**	50	●

CORNER 5.1mm(40952) FOR
E4270221

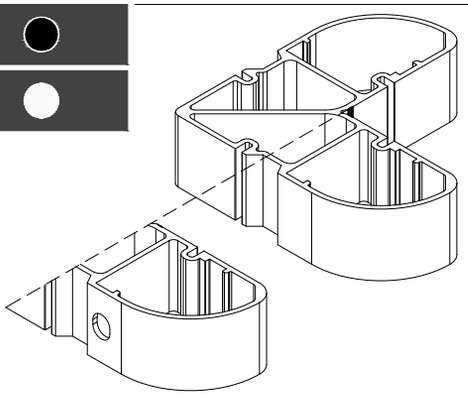


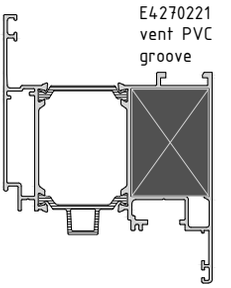


ET **054841.00**	50	●
ET **054849.00**	50	○

CORNER 29.2mm(75952) FOR
E4270221

CORNER 29.2mm (75952)
E4270221 WITH HOLE

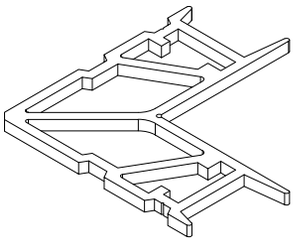


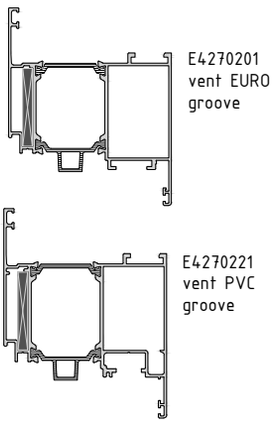


A68-29

code/description	package/pcs	colour
ET **054842.00**	50	●

CORNER 4.7mm(5382) FOR
E4270201

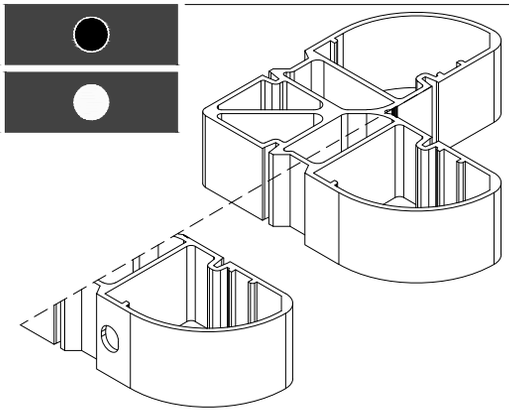


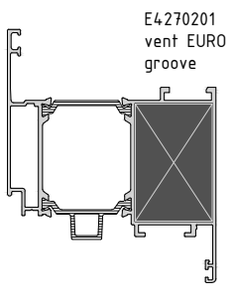


ET **054843.00**	50	●
ET **054850.00**	50	○

CORNER 29.3mm (40953) FOR
E4270201

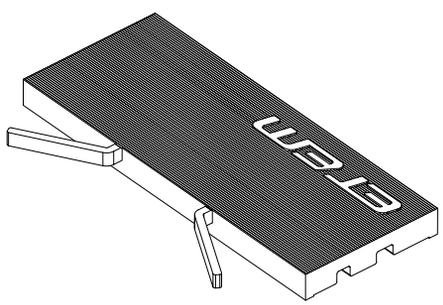
CORNER 29.3mm (40953)
E4270201 WITH HOLE





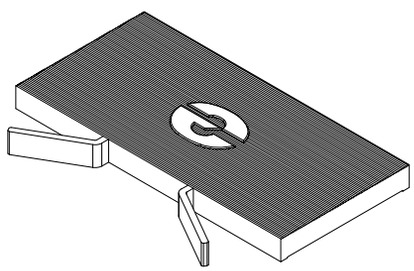
ET **073701.00**	50	●

alignment pad for frame
E4270100



ET **073681.00**	50	●

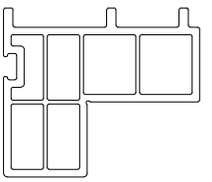
alignment pad for sash



A68-30

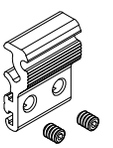
code/description	package/pcs	colour
ET **080068.00**	8pcs x 6m	●

mounting PVC profile



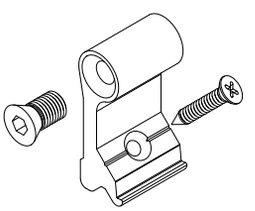
ET **991407.00**	10	MF

T - bracket external side for
E4270300 / E4270340



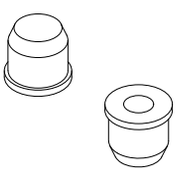
ET **070206.00**	10	MF

T - bracket internal side for
E4270300 / E4270340



ET **143914.00**	100	MF

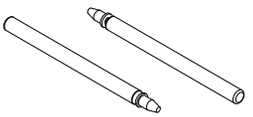
roll pin 4/8 x 6.5 mm - inox



A68-31

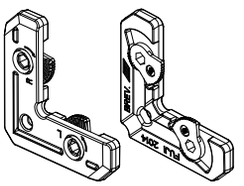
code/description	package/pcs	colour
ET **143900.00**	100	MF

roll pin 3 x 6 mm with handle



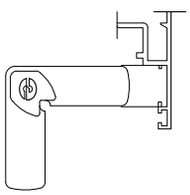
ET **058001.00**	250	MF

alignment square with locking function



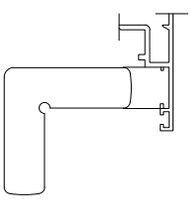
ET **057707.00**	100	MF

alignment square (plastic) for E4270220;E4270221



ET **055509.00**	100	INOX

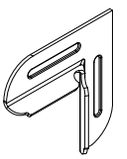
alignment square (INOX) for E4270220;E4270221



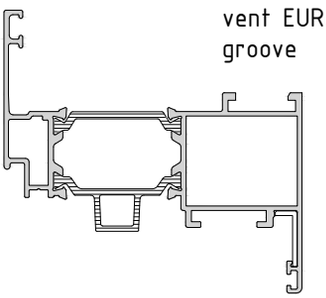
A68-32

code/description	package/pcs	colour
ET **991298.00**	20	●

alignment square for
E4270200 / E4270201

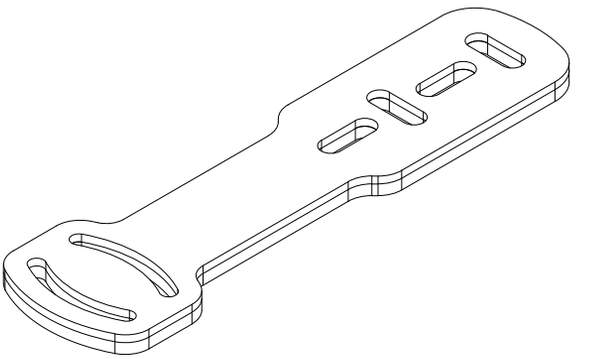


E4270200
vent EURO
groove



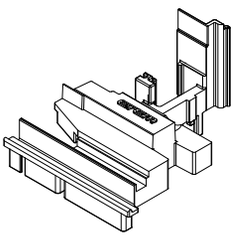
ET **055516.00**	1	–

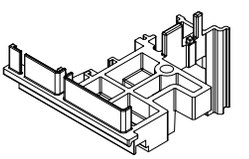
anchor for E75603



ET **074427.00**	5	●

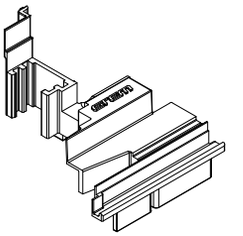
pair PA6 plugs for E4270540

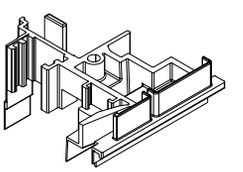




ET **074428.00**	5	●

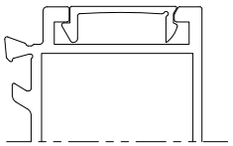
pair PA6 plugs for E4270500





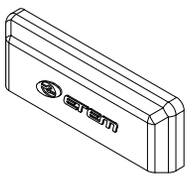
A68-33

code/description	package/pcs	colour
ET **080199.00**	6	●
ET **991308.00**	6	○



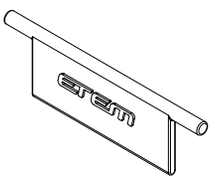
PVC plug for euro groove

ET **074306.00**	200	●



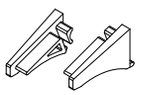
plastic drainage cap 30x6mm

ET **074307.00**	200	●



flap for drainage cap

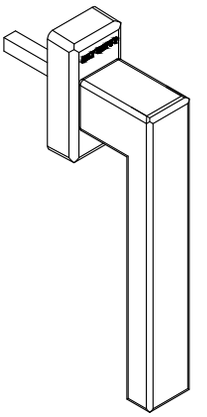
ET **74629.00**	200	●



plastic plug for drip profile
E2357

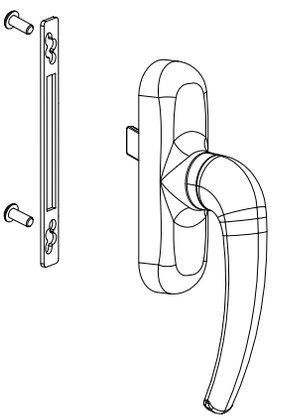
A68-34

code/description	package/pcs	colour
ET **271127.02**	1	●
ET **271127.11**	1	●



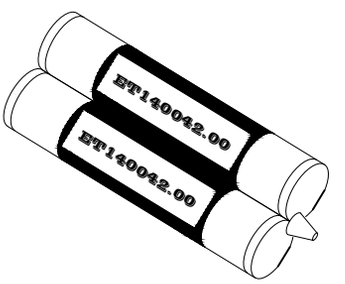
HANDLE HOPPE TOULON
(including screws)

GI **235016.01**	1	●
GI **235016.02**	1	●
GI **235016.06**	1	●



Handle for T/T mechanism
Prima

ET **140042.00**	1	–



adhesive for corner brackets
ETEM 600ml

ET **140044.00**	1	–

pistol

A68-35

code/description	package/pcs	colour
ET **140043.00**	1	–

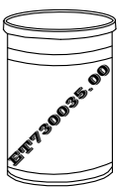
mixer

ET **140045.00**	1	–

primer super bond 30ml

ET **730035.00**	1	–

Vario protect



ET **750016.00**	1	–

cleaner for Vario protect

1l

A68-36

code/description	package/pcs	colour
ET 995760.00	1	–

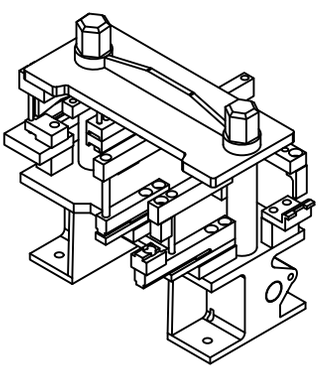
end milling tool for
E4270340

ET 995693.00	1	–

end milling tool for
E4270300

ET 162262.00	1	–

punching machine ETEM



A68-37

CE MARKING

STANDARDS / REQUIREMENTS

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 accessment (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

SAMPLE DECLARATION FOR WINDOWS/DOORS

Declaration of performance
№

1. Unique identification code of the product type:	W-01
2. Intended use / uses:	Window/ External pedestrian doorset intended to be used in domestic and commercial locations
3. Manufacturer:	Name Address Phone Email Website
4. Authorized representative (if applicable)	Name Address Phone Email Website
5. System of assessment and verification of constancy of performance:	3
6. Harmonized standard:	EN 14351-1:2006 + A1:2010
7. Notified body/bodies:	Notified body XXX, Identification number of NB 1234 performed determination of the product-type on the basis of type testing under system 3 and issued test and classification report №123456, issued on 01.02.2015

8. Declared performance:

Essential characteristics	Performance	Harmonized technical specification
Watertightness	8A	EN 14351-1:2006 + A1:2010
Resistance to wind load	C3	
Sound insulation	38 (-1;-2) dB	
Air permeability	4	
Thermal transmittance frame glazing sample	 1,3 W/(m^2.K) 1,3 W/(m^2.K) 1,4 W/(m^2.K)	
Radiation properties solar factor light transmittance	 0,55 0,75	
Dangerous substances	NPD	

9. Specific technical documentation used (if applicable): N/A

The performance of the product identified in point 1 is in conformity with the declared performance in point 8. This declaration of performance is issued under the sole responsibility of the manufacturer identified in point 3.

Signed for and on behalf of the manufacturer by:

.....

(name and function)

Place and date of issue:
Sofia, 01.07.2016

Signature:

.....

STANDARDS

GENERAL

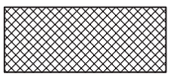
- EN 12020 (1÷2) – ALUMINIUM AND ALUMINIUM ALLOYS – EXTRUDED PRECISION PROFILES IN ALLOYS EN AW-6060 AND EN AW-6063
- EN 755 (1÷9)– ALUMINIUM AND ALUMINIUM ALLOYS – EXTRUDED ROD/BAR, TUBE AND PROFILES
- EN 573 (1÷3) – ALUMINIUM AND ALUMINIUM ALLOYS – CHEMICAL COMPOSITION AND FORM OF WROUGHT PRODUCTS
- 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

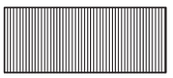
1. EN 14351 – WINDOWS AND DOORS – PRODUCT STANDARD, PERFORMANCE CHARACTERISTICS
2. EN 12519 – WINDOWS AND PEDESTRIAN DOORS – TERMINOLOGY
3. EN 12207 – WINDOWS AND DOORS – AIR PERMEABILITY – CLASSIFICATION
4. EN 1026 – WINDOWS AND DOORS – AIR PERMEABILITY – TEST METHOD
5. EN 12208 – WINDOWS AND DOORS – 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

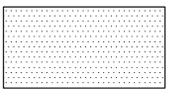
Hatches for different materials



EPDM

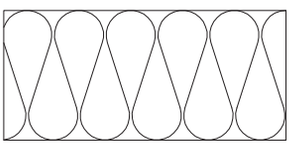


PVC

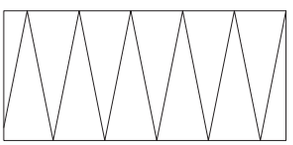


gypsum board

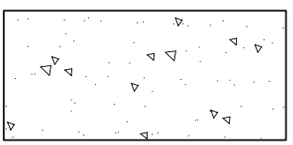
silicone seal



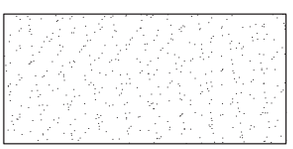
Insulation soft



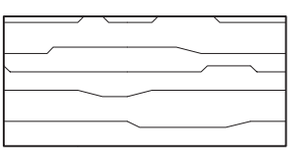
Insulation hard



concrete wall



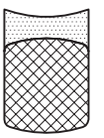
plaster



wood

butyl seal

membrane



silicone seal

backer rod

PVC spacer

etalbond

sheet aluminium

glass

aluminium profile

steel

LIABILITY

The stated data and calculating methods are provided by ETEM as a guideline only.
The information given in this catalogue does not substitute all applicable regulations – Eurocodes, harmonized European standards, national or regional building codes.

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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