



CONTEMPORARY ARCHITECTURE

Foreword

Ever since its founding, KELLER AG have specialised in the construction of home conservatories and given high priority to the new and further development of individual components and complete systems. In combination with the thermally insulated aluminium profiles from the market leader, SCHÜCO INTERNATIONAL, high-quality profile systems for home conservatory construction have been manufactured.

The innovative developments of KELLER AG include i.a. the creation and technical implementation of complete new product series such as the "Orangerie Elegance" and the "Orangerie Garden Pavilions".

These developments have set standards in home conservatory construction and are all the product of the interplay between high technical know-how, many years of craft experience, competent employees and partners, the quality of the materials employed and the feeling for design and aesthetics.

This approach to innovation has also led to the development of **"minimal windows"**, a holistic concept based on sophisticated running rail and locking technology that permits efficient implementation during the installation. The **"minimal windows"** undergo a further development in the field of profiles and running rails. The components **"roller carriage"**, **"locking systems"** and **"leaf brake"** represent an **absolute new development**. In the present documents, these new aspects are highlighted in a red basic colour.



minimal **windows** | the perfect outlook

Extremely slender profiles
that don't obstruct the view

The innovative “minimal windows” system permits a low construction depth with maximum stability. The window frame is only 38mm wide. The frame can completely be integrated in the masonry resulting in a fully frameless transparency. The profile width of the intermediate profiles only amounts to 20mm.



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On a whisper into the great outdoors

The integrated running rails of the “**minimal windows**” system permit effortless, smooth-running and noiseless opening and closing of the transparent panels.

Modules with stainless steel rollers are inserted into the glazing surround at the required positions during installation.

Thanks to this design, the running components are effectively protected from the weather and soiling to ensure smooth opening and closing for many years to come.

The modular structure of the whole system also results in an extremely easy-to-install overall concept that also underlines the economic benefits of the innovation.



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Panorama

Transparent surfaces are integral parts of each building object. They also form a major part of the appearance of old and new buildings. Thanks to the high degree of flexibility, practically no design compromises have to be accepted.

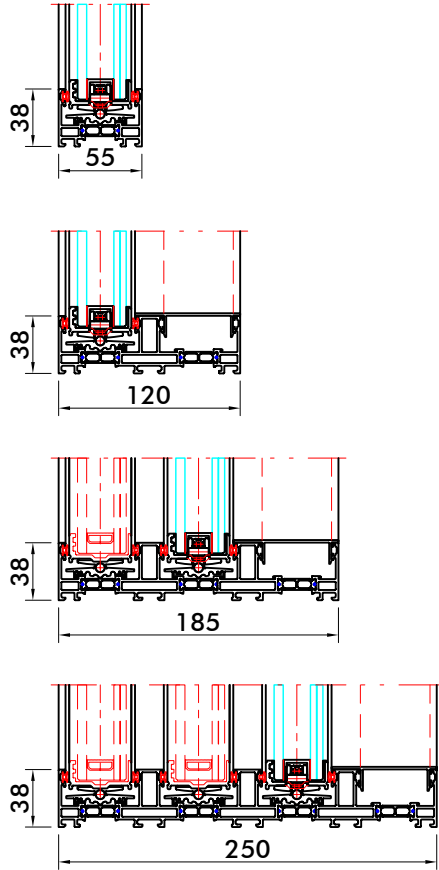
In view of its slender and modular conception, the system is equally suitable for new buildings and modernisation projects, for large and small spans, for façades or interiors. Particularly when installed in existing objects, the KELLER “**minimal windows**” sliding system allows the original building character to be maintained or – if desired – highlights and even contrasts to be created.

The whole concept is structured in such a way that the roller carriage cassette into which the precision running stainless steel rollers are later inserted as a module is integrated during the production of the insulated glass. A large number of very large sliding elements can thus be used that are either matched to one another or disappear soundlessly into an intermediate wall.

Even when the unit is closed, the view from the light flooded room out into nature is unhindered.

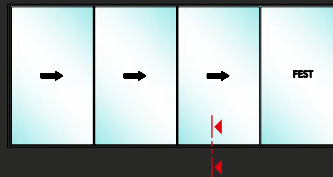
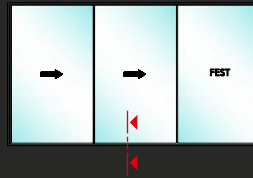
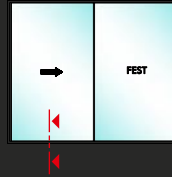
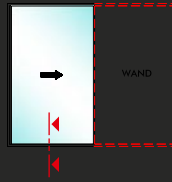
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Scale 1:5

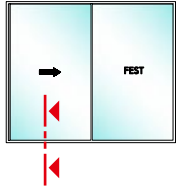
mw | frame element



- Extruded aluminium profiles with thermal insulation using polyamide insulating bars
- Frame height 38 mm, installation even in confined spaces, maximum light yield
- Modular construction, multi-track possible without additional frame profiles
- The installation depth varies, depending on the number of running rails selected (1-track = 55 mm, 2-track = 120 mm, etc.)
- Frame corner connection with screwed and bonded corner bracket



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The insulated glass panes are fitted very precisely (± 0.5 mm in the diagonal) into the frames at the factory using bonded aluminium U-rails.

The use of different models of glass mounting profiles (U-rails) permits filler thicknesses from 30 to 34 mm.

The traditional brush seals are replaced by ultramodern sliding seals with an extremely low frictional resistance while guaranteeing the best possible sealing.

The frame U-values lie in the order of $U_f = 2.1 \text{ W}/(\text{m}^2\text{K})$. On the basis of the above U_f -value and considering a U_g -value of the insulated glass pane of $1.0 \text{ W}/(\text{m}^2\text{K})$, we obtain for a double-leaf component of $B=3000$ mm $\times$ $H=2600$ mm a U_w -value of roughly $1.2 \text{ W}/\text{m}^2\text{K}$.

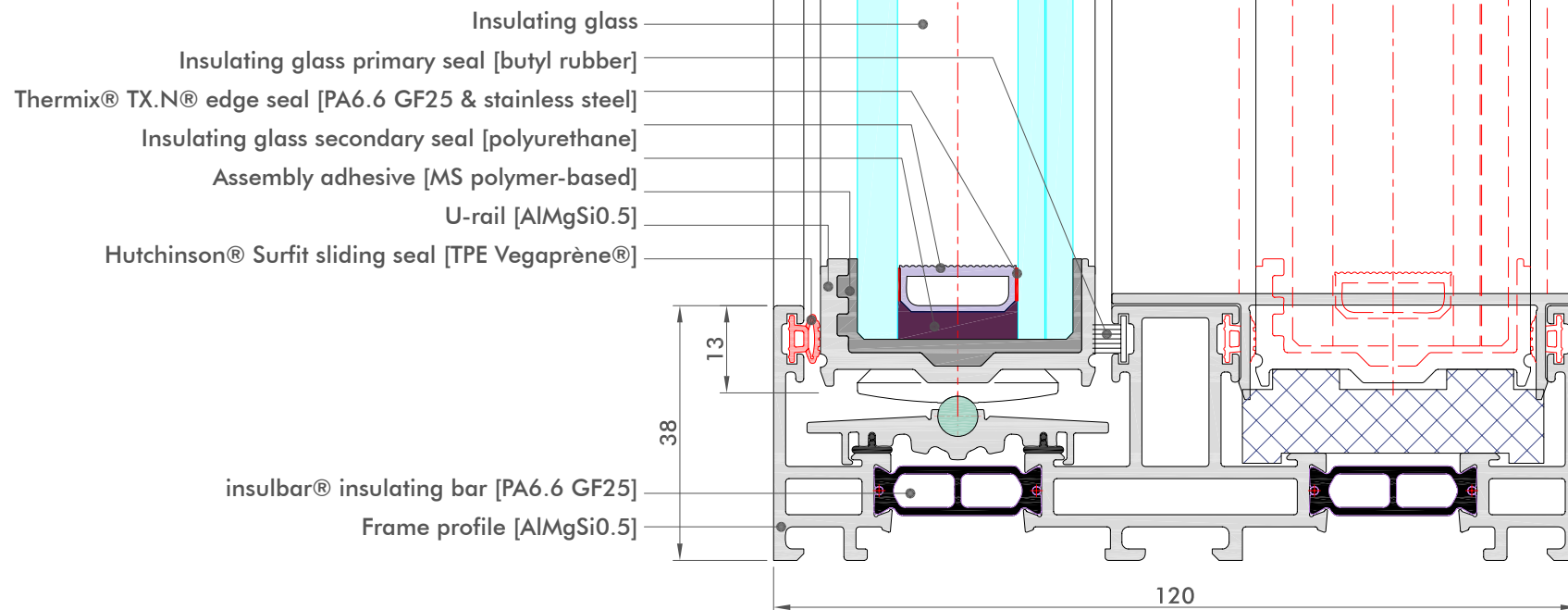
In view of the low area ratio of the "minimal windows" frame in relation to the area of the insulated glass, the influence of the U_g -value of the insulated glass pane on the U_w -value of the whole component is naturally much higher.

Glass proportion depending on execution:

95-99%

100%
Well-being

mw | frame cross-section bottom

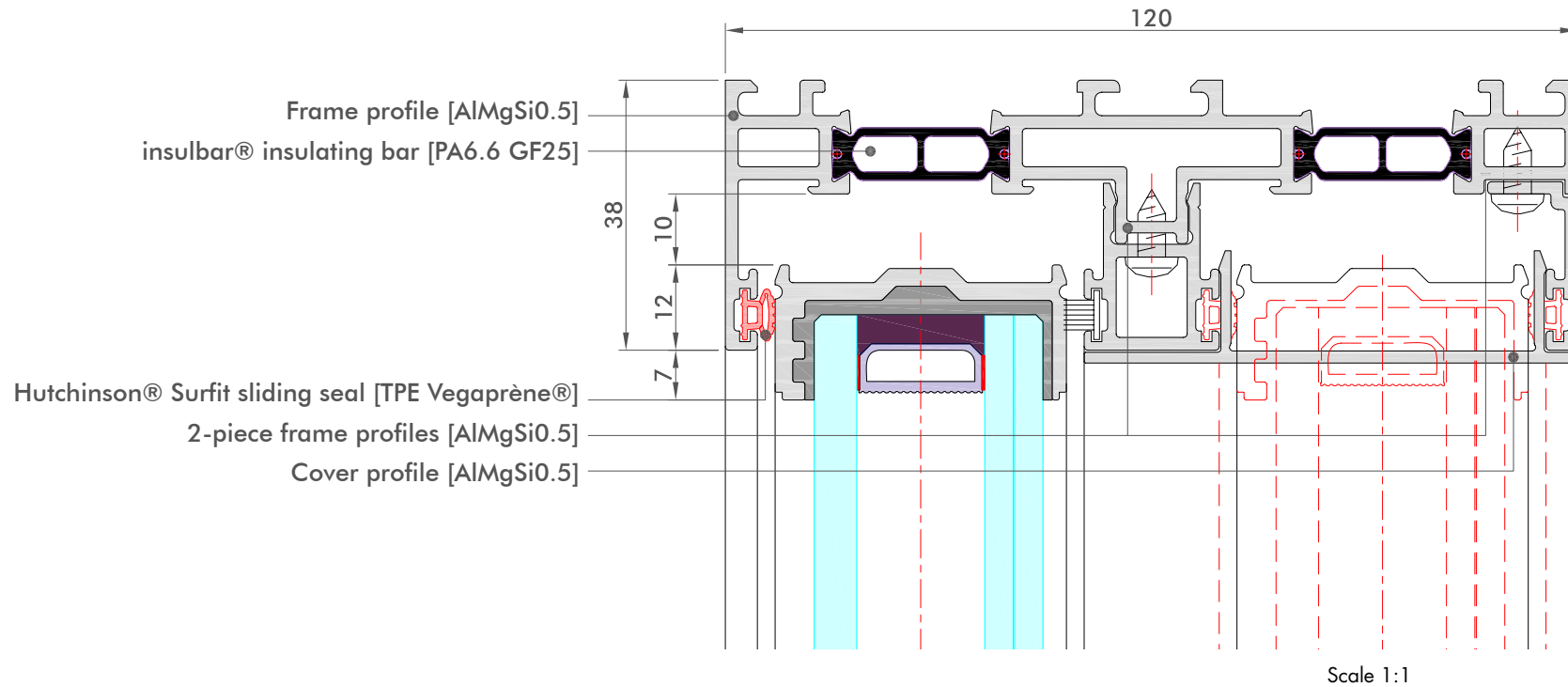
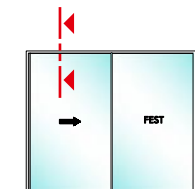


Scale 1:1

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possible applications



mw | frame cross-section top

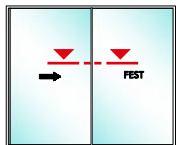
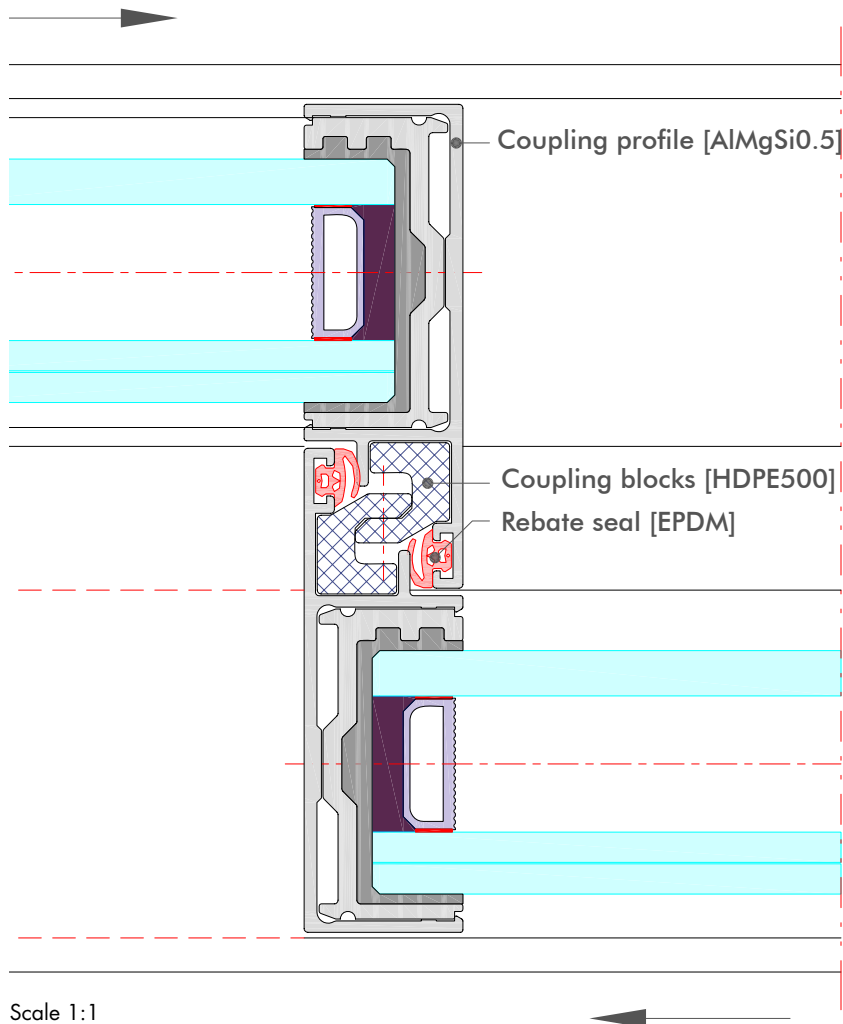
The use of separable special profiles (screwed) for the upper frame profiles permits consecutive glazing. The surrounded insulated glass pane is inserted at an angle into the frame and then pressed upwards against the frame. The first separating rail is now screwed in. The next pane can then be inserted, and so on.

The possible lifting height of the insulated glass pane in the upper frame area of max. 9 mm is smaller than the frame insertion depth (12 mm). That significantly increases the burglar protection, so that simple "jemmying out" of the pane is no longer possible.

By reversing the frame situation, glazing is possible either from the inside or the outside.



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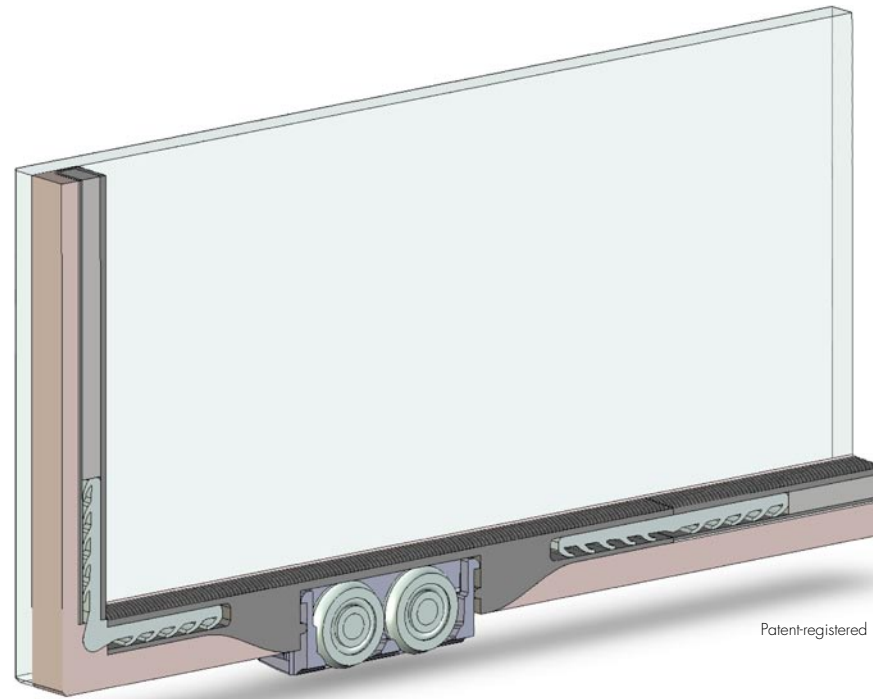
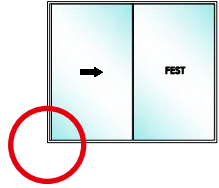
mw | coupling cross-section middle

In the coupling area too, attention was paid to the use of optimum sealing systems. Here again, the traditional brush seals were replaced with EPDM rebate seals to achieve the best possible wind and draught tightness.

For positive coupling of the aluminium profiles there are HDPE coupling blocks arranged as mirror images in the space between the panes that serve at the same time as stop blocks and leaf carriers. The area between the coupling blocks is filled with adequate foamed material.



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INNOVATION!

mw | roller carriage

The roller carriage system integrated into the edge seal of the insulated glass pane comprises polyamide injection mouldings (insert cassette and bearing housing), stainless steel ball bearings and hubs.

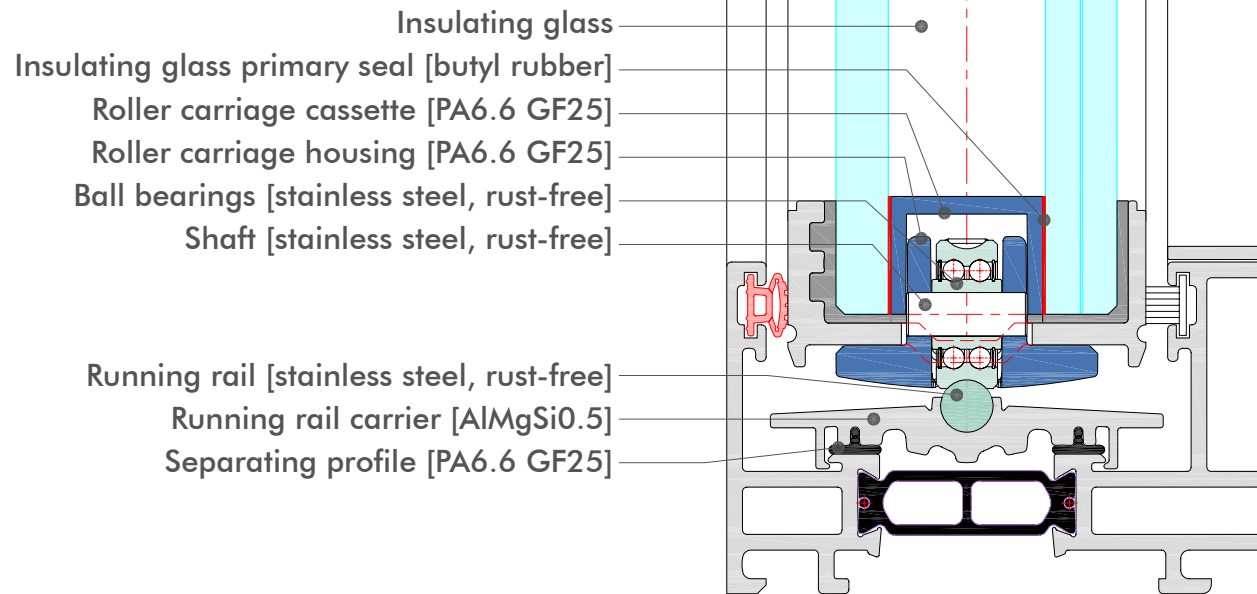
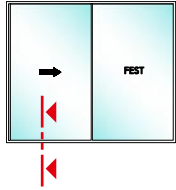
The lateral spaces in the insert cassette have exactly the same hollow geometry as the Thermix® edge seal profiles, so that they can be precisely joined with butt joint or corner cleats.

The black colour and the surface structure of the side of the insert cassette facing the space between the panes emulate the properties of the Thermix® edge seal making the insert cassette practically invisible.

Overall a moving structure is created between an insulated glass pane and a running rail in an absolute minimum of installation space.



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Patent-registered

Scale 1:1

INNOVATION!**mw | roller carriage cross-section**

The primary seal (butyl rubber) and secondary seal of the insulated glass pane are continuous and cover the butt joint of the roller carriage cassette and the edge seal of the insulated glass. This ensures the complete wind and draught tightness.

The bearings of the roller carriage in the cassette are not rigid and can tilt slightly in running direction. This ensures optimum contact between the two ball bearings of each roller block and the stainless steel running rail at all times.

In order to avoid tribocorrosion, a wiper seal is being developed that is installed at each end of the sliding leaf that cleans the stainless steel running rail and coats it with a thin film of lubricant on each sliding movement.

The running rail is a high-precision stainless steel rod embedded in an extruded aluminium profile such as that used for linear guides in machine engineering. Polyamide separating profiles serves as thermal insulation to the frame profile. They are fixed in the lower frame area by means of a clip system.



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Project: 39.08
Minimal Window

Customer: **astec**
epu
eppler engineering
created 13.03.2008
R. Eppler

Calculation of bearing load of the roller blocks

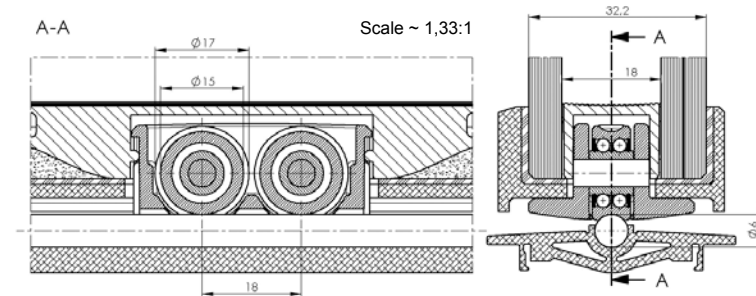


Illustration of roller block left, completely installed -> in total min. 2 roller blocks per door

Door size m	2,5 x 3 = 7,5 m ²	Time for door opening	t	10 sec
Door weight with 30kg/m2	m 225 kg	Distance for door opening	s	2,5 m
Vertical weight force	G 2207 N	Speed of door	v	0,25 m/sec
No. of rollers per door	x 4 Stck	Speed of door	v	15 m/min
Vertical load per roller	G 552 N	Effective diameter of roller	D	15 mm
Vertical load	Fr 0,55 kN	Circumference of roller	U	0,0471 m
Assumed axial load	Fa 0,20 kN	Max. speed of roller	n	318 1/min
Bearing supports radial static	Cor 0,84 kN	Distance for 1 cycle	sz	5 m
>Safety factor radial, static	Sr 1,5 times	Life cycle for 100 km	N	20.000 Zyklen
Bearing supports axial static	Coa 0,35 kN	Maximum door weight with		
>Safety factor axial, static Sa	1,8 times			
		2 roller blocks / door:	225 kg	

mw | roller carriage in figures

2 ball bearings are installed per roller carriage. If 2 roller carriages are used per sliding leaf, a maximum leaf weight of 225 kg is permissible.

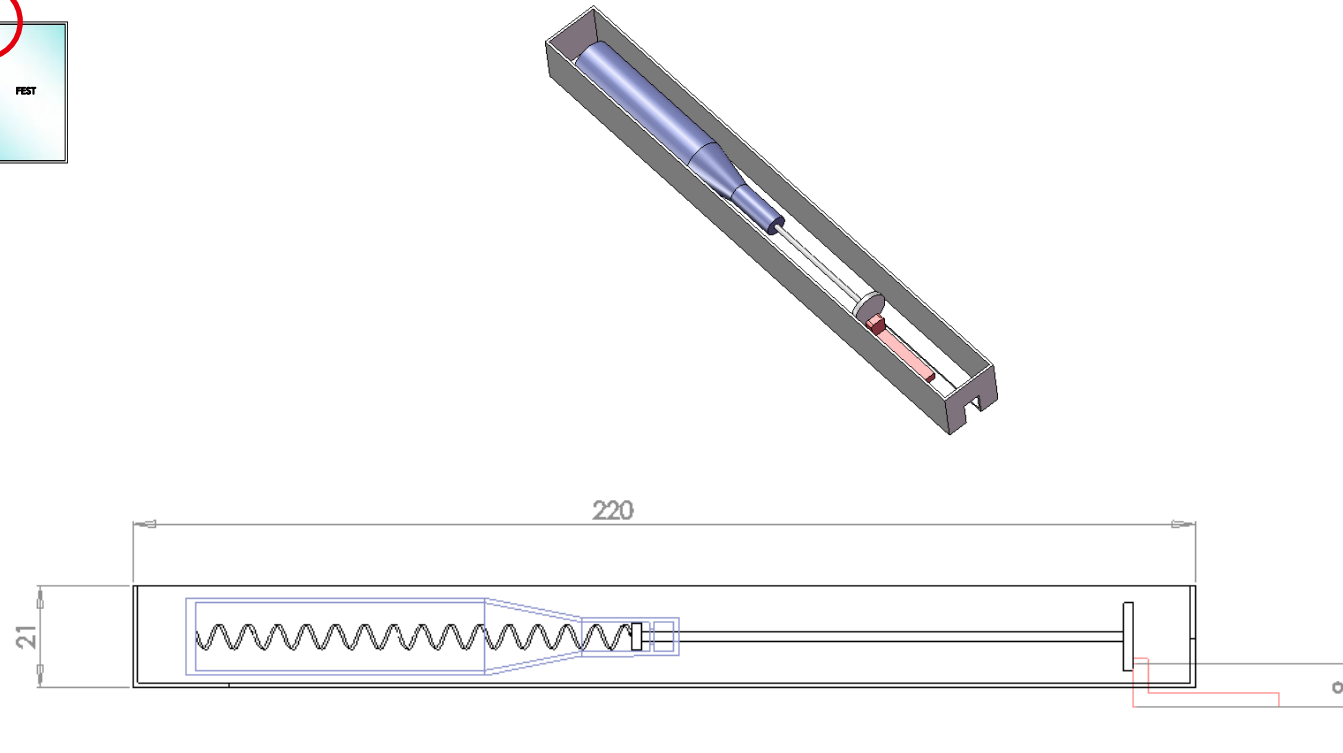
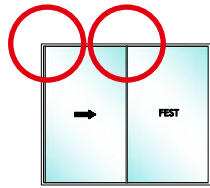
The use of more than two roller blocks allows correspondingly higher leaf weights.

The life cycle is designed for 20,000 opening cycles.

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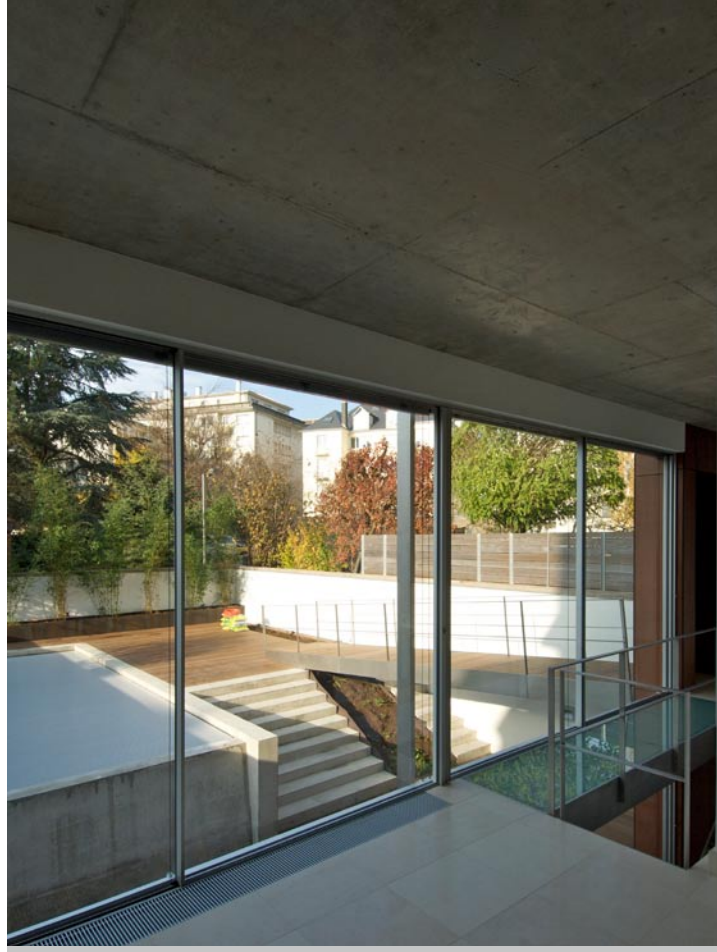
INNOVATION!

With leaf weights that in some cases can be as high as several hundred kilograms and simultaneous extreme free running of the moving system, a brake system has been designed to control the sliding leaf as it moves into its end position and then “releases” it at a low speed so that it travels gently into its closing position.

The diagram shows the spring and hydraulic element that creates the necessary degressive effect by means of a variable damping element cross-section and bypass line. The bypass cross-section can be regulated by means of valves. The leaf brake can thus be adjusted to the respective leaf weight.

The leaf brake can naturally be employed in both closing and opening direction of the sliding leaf.

mw | leaf brake



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Basis configuration of the sliding leaf locking system

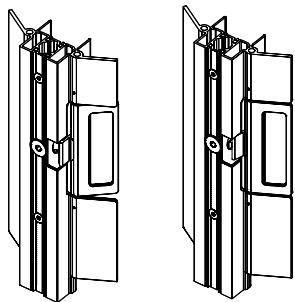
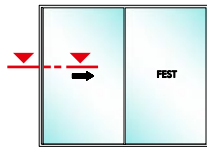
On the closing side of the sliding leaf is a thermally insulated handle that is clipped and screwed to the glass enclosing U-rail.

The aluminium handle on the inside aligned with the handle bar of the sliding leaf is pivotably mounted on plain bearings. During opening, the stainless steel hook integrated into the handle compresses the stainless steel spring that returns the handle to its starting position. Spring pressure and handle position can be adjusted at the stainless steel adjusting screw.

Locking on the frame side is effected by the stainless steel frame hook.

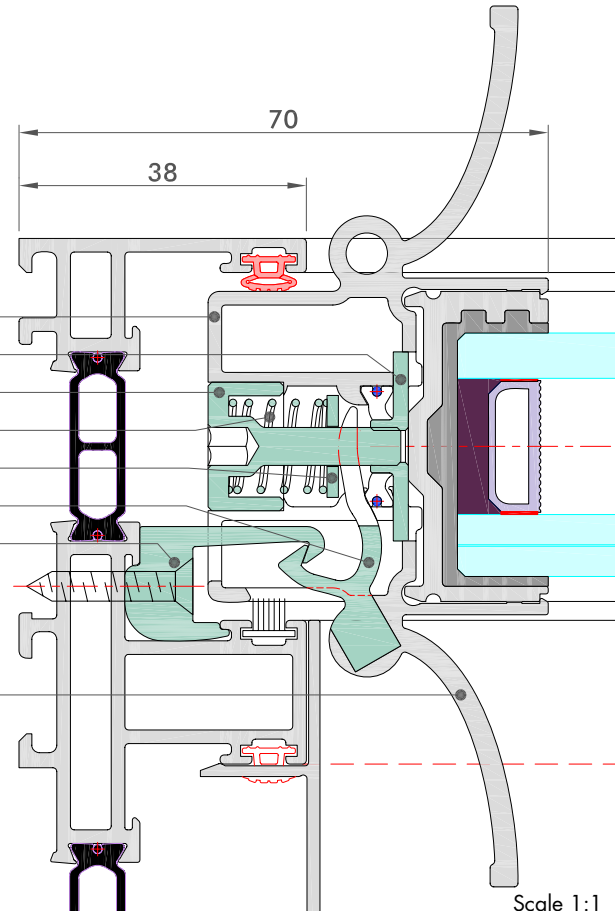
This concept of the locking technology as a basic security element is harmoniously integrated into the handle design.

mw | manual locking



- Leaf profile [AlMgSi0.5]
- Square threaded plate [stainless steel, rust-free]
- Adjusting screw [stainless steel, rust-free]
- Back-pressure spring [stainless steel, rust-free]
- Circular plate [stainless steel, rust-free]
- Handle hook [stainless steel, rust-free]
- Frame hook [stainless steel, rust-free]

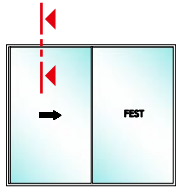
Handle [AlMgSi0.5]



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Optional sliding leaf locking

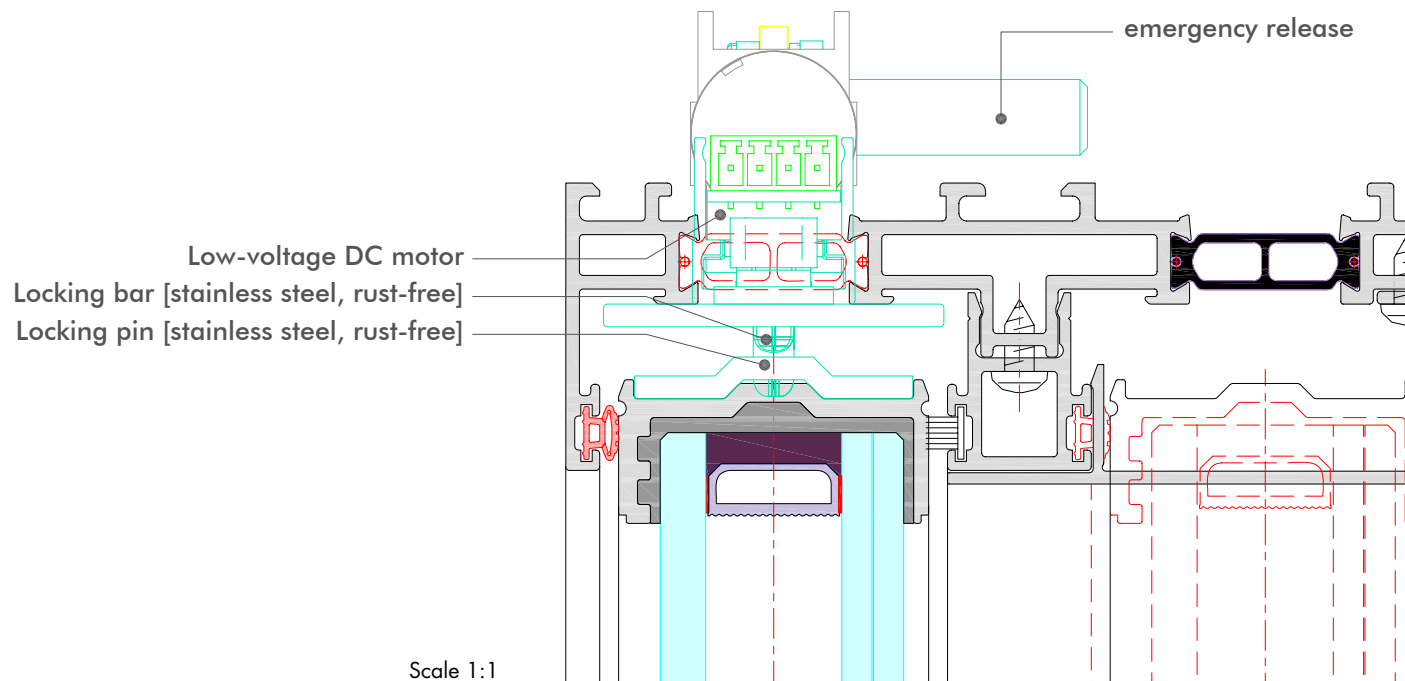
The electric lock integrated into the upper frame profile is based on a DC motor that moves a locking bar system in linear direction. This engages with locking pins on the upper glass enclosing U-rail, thus permitting multi-point locking in the upper leaf area and hence a higher security class.

Operation is either by electronic control system via push-buttons or by radio remote control.

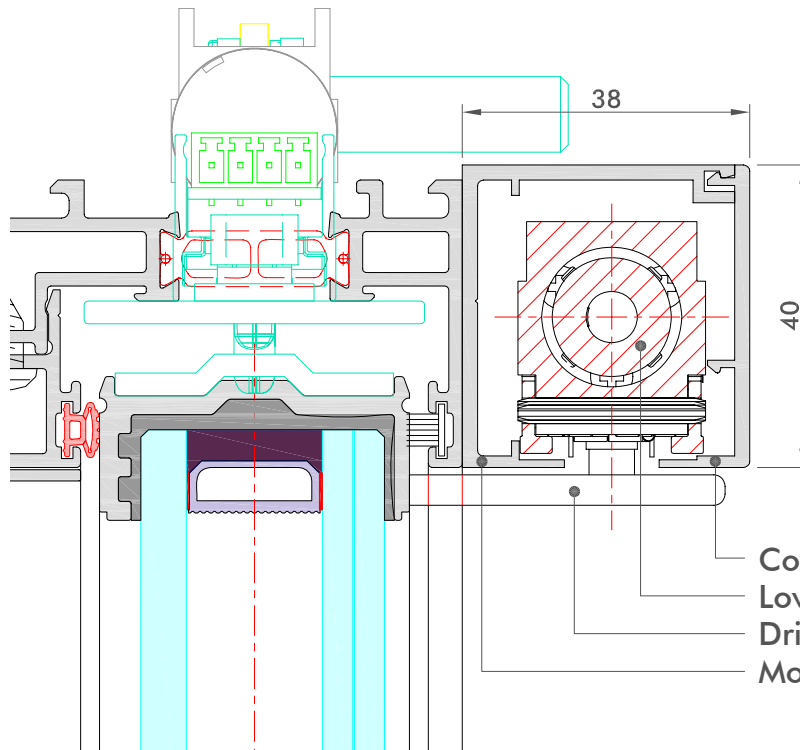
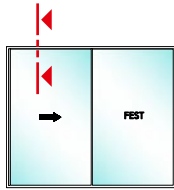
In the event of a power failure, an emergency back-up battery ensures that the locking system can still be used for a short time. Lateral access permits manual emergency unlocking and emergency locking.

mw | electric multipoint locking

INNOVATION!







Cover profile [AlMgSi0.5]
 Low-voltage DC motor
 Driver [stainless steel, rust-free]
 Mounting rail [AlMgSi0,5]

Scale 1:1

Optional sliding leaf equipment

High-end product for ease of operation.

The very compact linear drive is located in the upper inner frame area in an aluminium housing with the same overall height as the frame profile that is installed over the whole system width. The housing thus blends optically into the frame profile.

A stainless steel driver moves the sliding leaf in linear direction at a speed of approx. 100 mm/s.

An overload cut-out device prevents injury caused by pinching or crushing.

Operation is either by electronic control system via push-buttons or by radio remote control.

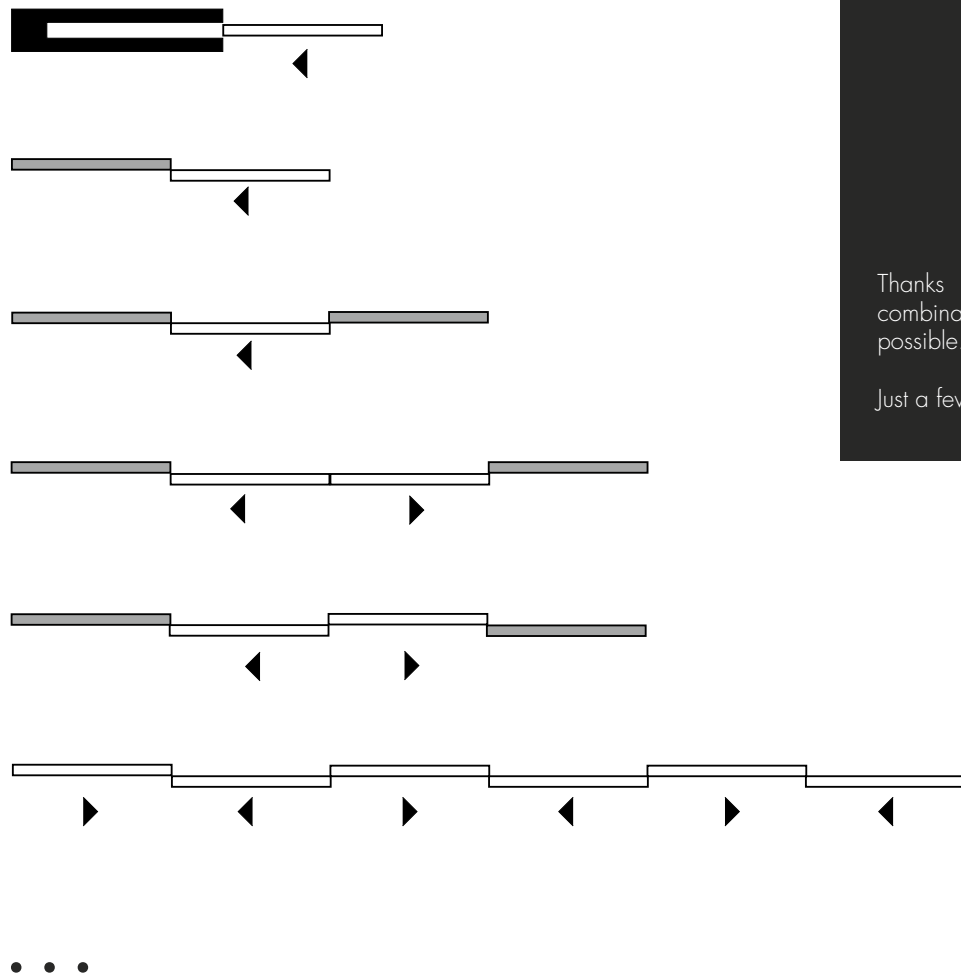
Lateral access permits manual emergency unlocking and emergency locking.

mw | motorised leaf

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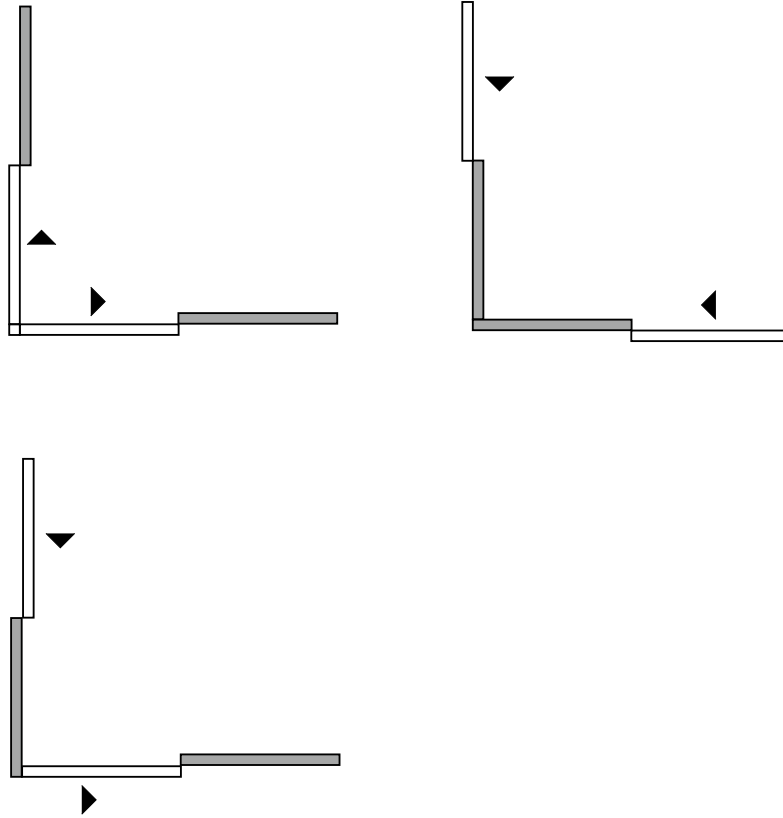
mw | arrangement variants

Thanks to the modular design, practically unlimited combinations of sliding and fixed leaf elements are possible.

Just a few possible variants are shown here



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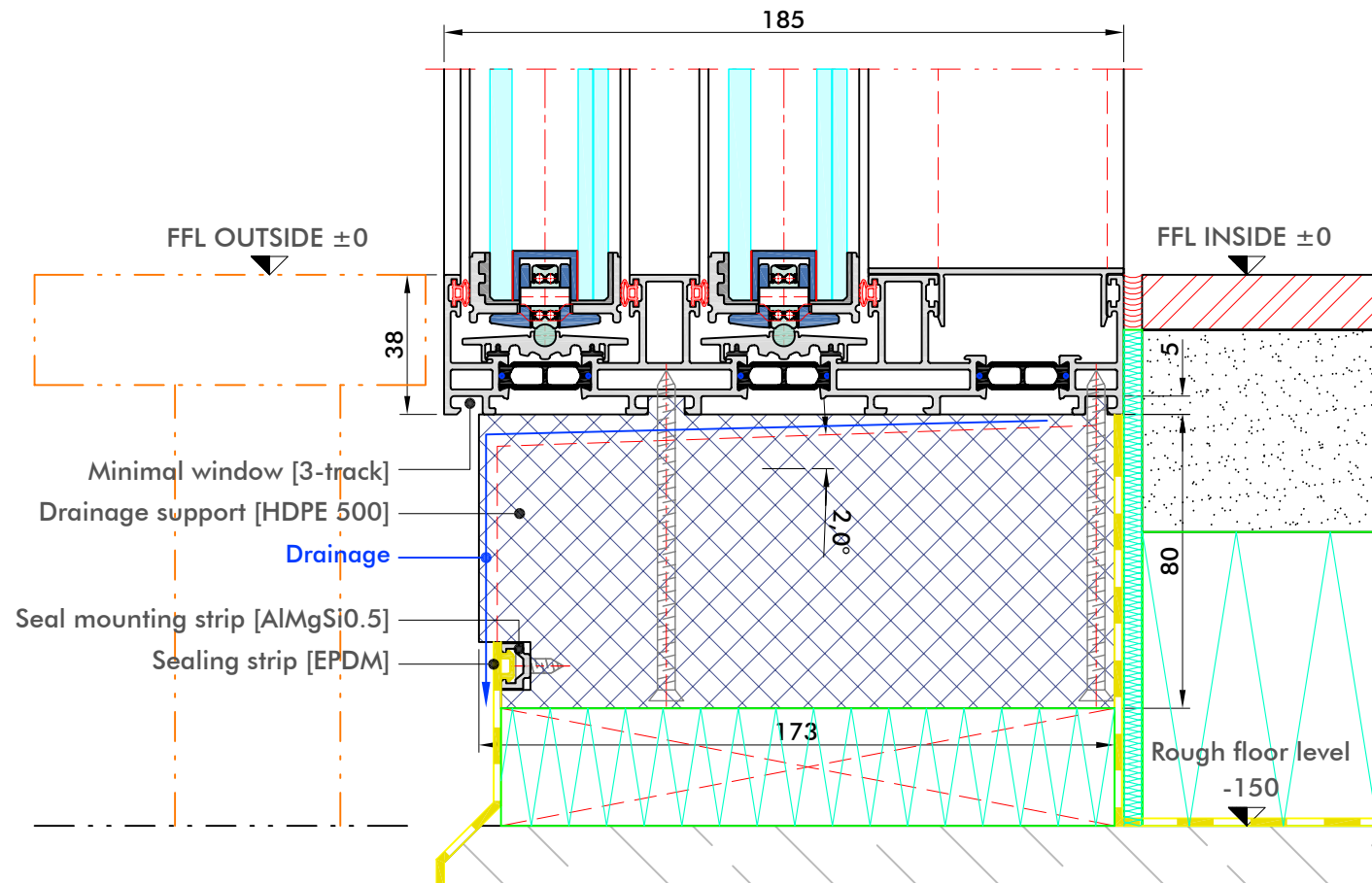
mw | arrangement variants

High flexibility

Not only linear arrangements, but also polygonal constructions (90° corners, closed or opening) are possible.



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mw | connection to the building structure

Solid HDPE500 block elements serve for the connection to the building structure at the bottom. These have milled drainage recesses in longitudinal and transverse direction that guarantee controlled drainage from the profile to the outside. For sealing against the building structure, an EPDM sealing strip with mounting tongue is pressed into a recessed aluminium profile, bonded to the building structure and sealed with permanently elastic sealing compound in the tongue and butt joint areas on completion of the element installation. The mounting profile is preassembled in the HDPE500 block at the factory.

The milled drainage grooves are closed water-tight at the head ends by precision milled HDPE500 head pieces and sealed with permanently elastic sealing compound.

With polygonal constructions, the HDPE500 subframe is used under the whole element, mitre and butt joints sealed with permanently elastic sealing compound ensures reliable and continuous drainage, irrespective of the complexity of the element.

Further advantages:

Modular expansion in height to several hundred mm.

No base construction required on site; the construction is installed on a continuous flat building surface

The use of HDPE ensures that the base has automatic thermal insulation.

Connection elements of any kind can be reliably screwed into the solid HDPE500 block.



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mw | development partners



astec



byform concept



ceysens glas



e-max aluminium profielen bv



ensinger gmbh



epu eppler engineering



hautau gmbh



mechanische werkstätten gmbh



technoform kunststoffprofile gmbh

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