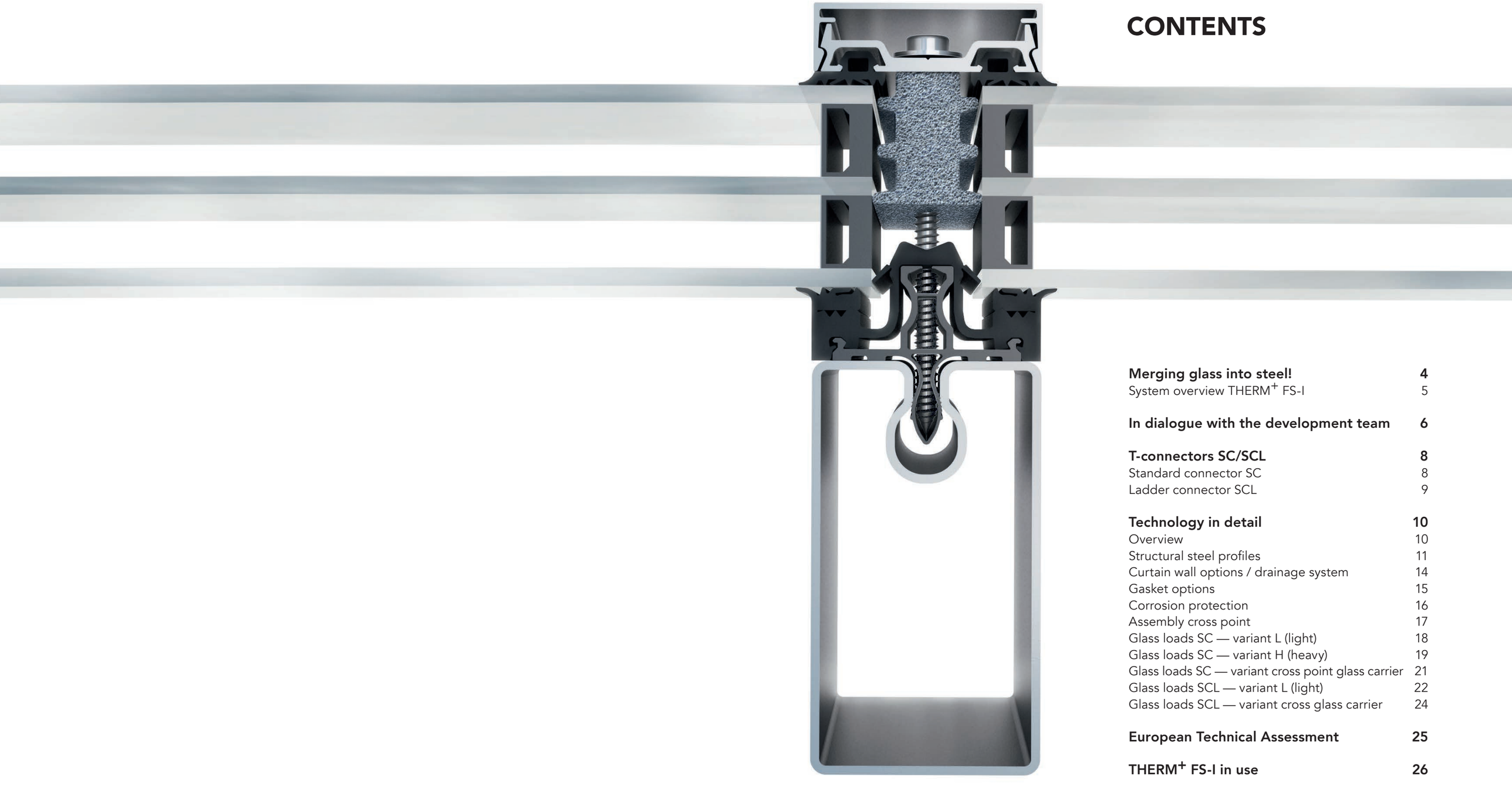
RAICO

STEEL | FAÇADE | FS-I

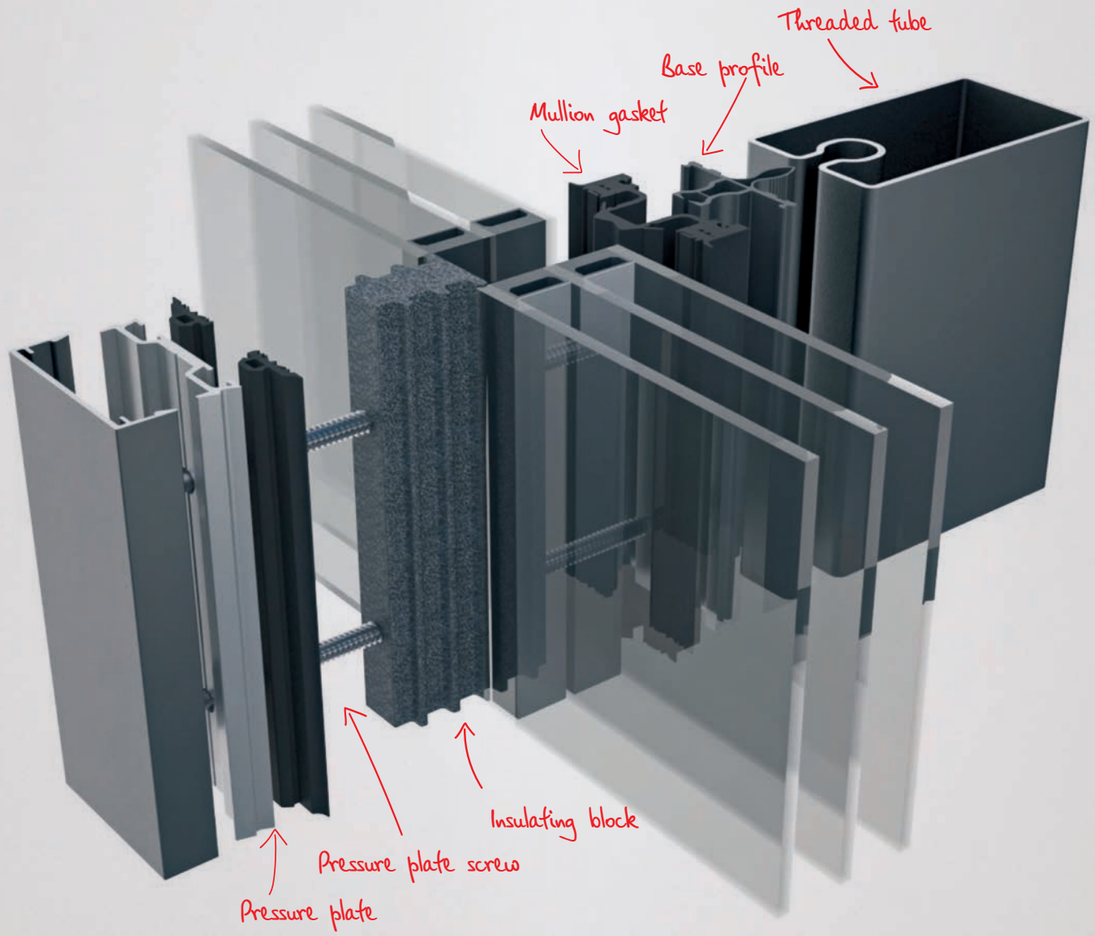
THERM+ FS-I — Merging glass into steel!



CONTENTS

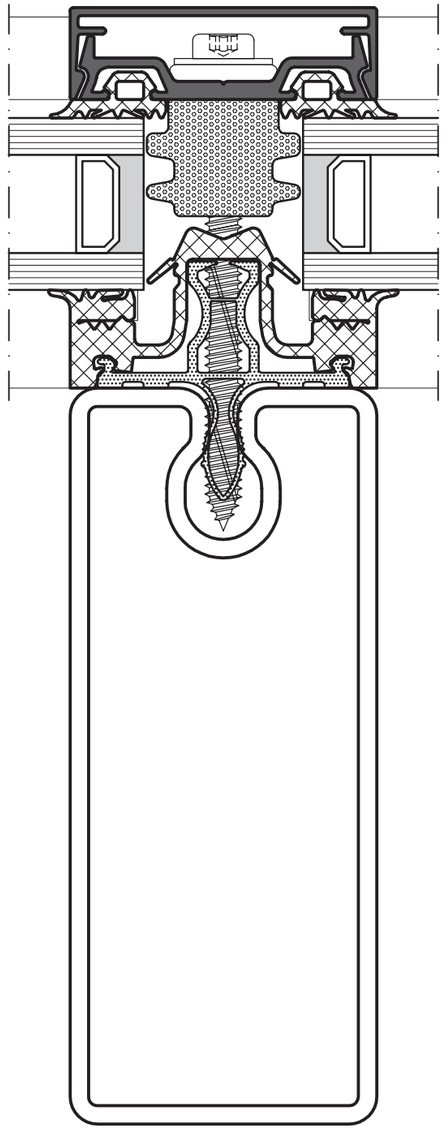
MERGING GLASS INTO STEEL!

This curtain wall system with integrated screw channel is compatible with all other THERM$^+$ systems. Architects can employ it freely with a massive range of dimensions and wall thicknesses, and use its sharp-edged look to create elegant, seamlessly merged glass and curtain wall profiles. Installers no longer need to worry about welding or riveting, as the FS-I system lets them screw the pressure profile and structural system directly to each other. The system also includes two different T-connectors for single-bar and ladder installation.



THERM$^+$ FS-I

Overview of the latest member of the façade system



Excellent product properties

- Sharp edged profiles due to small radii.
- System widths 50 and 56 mm.
- Add-on construction for RAICO threaded tubes (width 50 or 60 mm).
- Infill thickness from 4 to 64 mm.
- Maximum energy saving by variable thermal insulation with insulating block options up to Um,t= 0.75 W/(m²K) including the screw influence.
- Passive house certified in all system widths.
- All profiles can be used as well for mullions as for transoms.

Optimum planning

- Threaded tubes available in many varying dimensions and wall thicknesses for a wide range of static requirements.
- Vertical curtain wall and glass roof up to 2° roof inclination.
- Different steel connectors for single bar or ladder assembly available.
- Special steel connector even for heavy loads.
- Extensive system accessories, e.g. sun protection fixations.

Efficient installation

- Integrated screw channel in tube reduces planning, manufacturing and installation costs.
- No welding needed for the curtain wall construction.
- Direct mounting of the pressure profile into the steel substructure.
- Sendzimir galvanised profiles ensure a broad corrosion protection.
- Special technology for invisible screwed transom connection of the steel tubes.
- Two options for interior gaskets.
- Guidance of gasket with one-part synthetic profile.
- Integrated drainage at the continuous gasket in three levels.
- Separation of screw penetration and water-bearing level by hat gaskets.
- Design variants: burglar-resistance up to RC3, Structural Glazing SG2, fire protection up to EI 30.

Test type/Standard	Classification/Result
Wind resistance (EN 12179)	Permissible load 2.5 kN/m² · Increased load 3.75 kN/m²
Air permeability (EN 12153)	AE (>600)
Water penetration (EN 12155)	RE 1950
Airborne sound insulation (if requested) (EN ISO 140-3)	$R_W(C;C_{tr})$ = 34 (-1;-4) dB until $R_W(C;C_{tr})$ = 47 (-1;-3) dB
Thermal transmittance (U_{CW} value) (DIN EN ISO 12631)	Calculation with data from RAICO $U_{m,t}$-value tables

In dialogue with the development team

With THERM+ FS-I, the RAICO development team for curtain walls has created a valuable addition to the RAICO curtain wall system family. The Head of the Team Curtain Wall, Daniel Filser, and Michael Kaufmann, now the Head of Project Engineering, provide insights into the development process from the basic idea to the European Technical Assessment. Marcel Englert and Beate Schmid, responsible for the implementation of the planning and the processing, are also happy about the result of the joint team performance.

IT'S A QUESTION OF GETTING THE SIZE OF THE GAP IN THE FUNCTIONAL GROOVE JUST RIGHT.

What were the basic considerations as the team planned the THERM+ FS-I?
Daniel Filser: We wanted to create a steel curtain wall system with integrated screw channel, for combining with our THERM+ range. This gives architects greater freedom to design. THERM+ FS-I offers significantly more processing comfort, since the pressure profile can be screwed directly to the structural construction. Welding is no longer necessary.

The heart of the THERM+ FS-I is the functional groove with correspondingly matched screw and clip-on profile. What was important here?
Michael Kaufmann: The key question was how to design the groove into which the screw is anchored in order to fix the pressure profile and structural construction directly into each other. The decisive factor here was to determine the exact dimension of the gap that would allow easy insertion of the screw into the clip opening, while eliminating any play between the elements concerned.

Why did the RAICO team develop a new screw for this purpose?
Beate Schmid: We wanted a screw that has two important properties: It should be hard enough to cut its thread into the steel profile. At the same time it has to be highly resistant to corrosion, as its head may be exposed to the weather.

What is the key point of the innovative T-connection?
Marcel Englert: The standard SC connector for mullion and transom profiles has a variably adjustable fixing element designed to match internal tube-diameter tolerances. It can be transported easily. Since it can be screwed with threaded tubes and standard press-on steel profiles, and also as a screw-on expansion transom, it is also suitable for subsequent transom installation. The SCL ladder connector can also be screwed in to provide contact pressure. Another great advantage is the high glass weight of over 1,000 kg that we can be borne with it. Due to this innovative technology, a solid steel façade can be installed similar to the familiar aluminium façade.

How does the ideal solution for sealing and insulation of FS-I look like?
Michael Kaufmann: A cover seal stops surrounding water penetrating the screw. It is also impervious to temperature changes, as its one-piece synthetic profile conducts considerably less heat than one made of metal. Various insulating blocks based on the existing THERM+ system can be used, depending on the required heat insulation and desired heat transfer coefficients. The FS-I is passive house certified in all systems widths – with maximum thermal insulation of up to $U_{m,t}$=0.77 W/(m²K), with screw factor included.

FUNCTION TESTING WITH THE FIRST PROTOTYPES FROM THE 3D PRINTER.

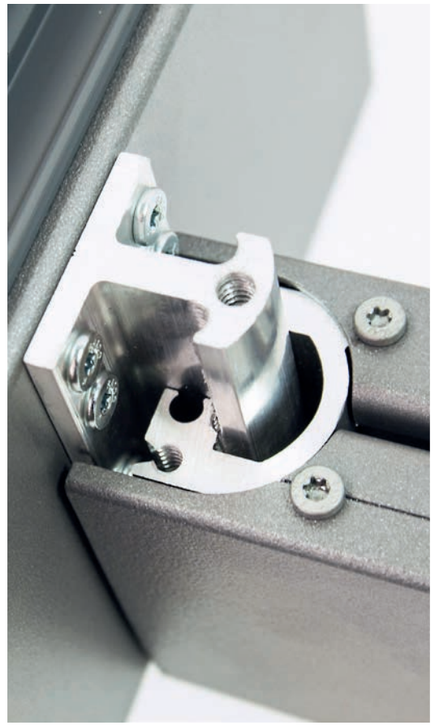
THERM+ FS-I is also a visual highlight …
Beate Schmid: The reduced radii of the profile tubes give the FS-I its sharp-edged appearance. Architects appreciate this characteristic, because it allows them to create seamlessly merged glass façades and curtain wall profiles. In addition, it is especially the high spans that can be realised that make the architects' hearts leap.

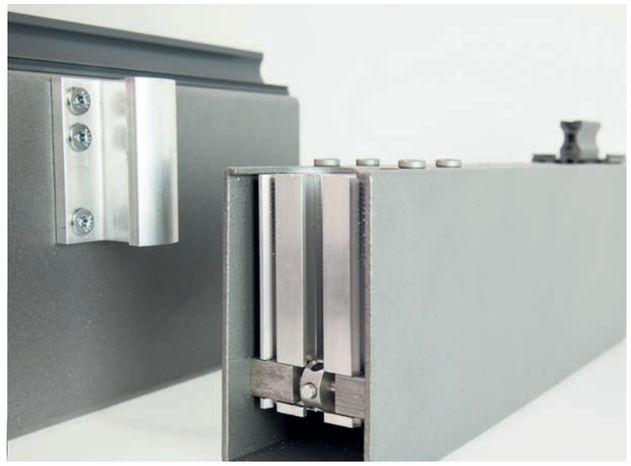
What is the effect of the great interest in THERM+ FS-I shown by processors?
Daniel Filser: Due to the great demand on the European market, we have pushed forward and obtained the European Technical Approval (ETA) for our systems THERM+ S-I and FS-I . This approval has now been granted – another advantage in terms of quality transparency and planning reliability, especially for international projects. □

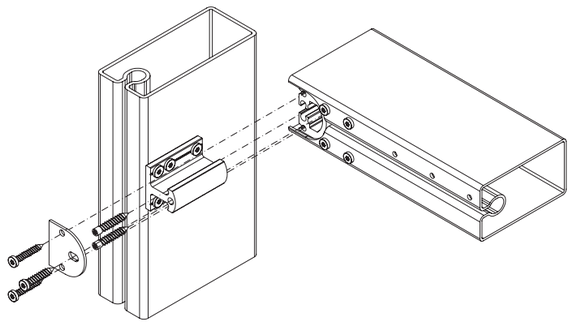
THE RAICO DEVELOPMENT TEAM CURTAIN WALL: MARCEL ENGLERT, MICHAEL KAUFMANN, BEATE SCHMID AND DANIEL FILSER (F.L.T.R.)

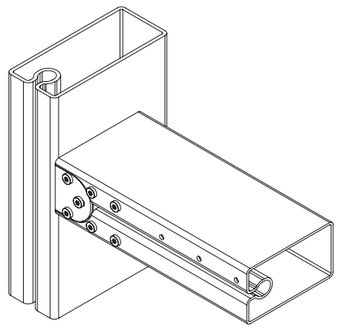
EVEN MORE FREEDOM ...

Standard connector SC





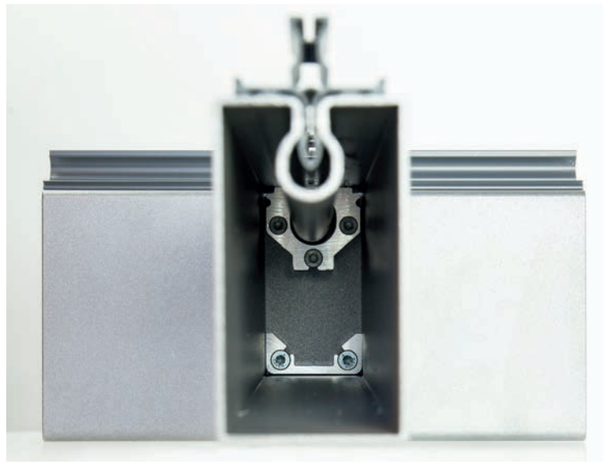


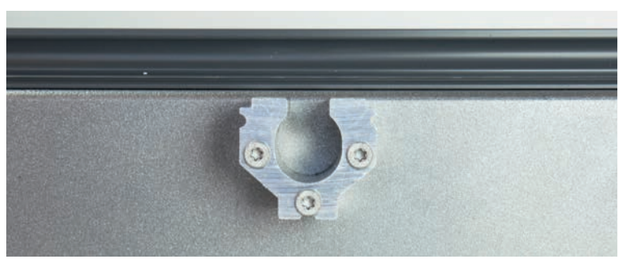


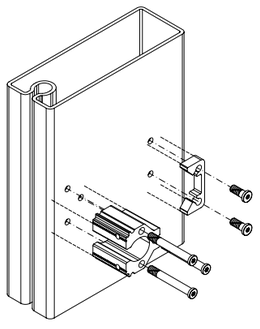
- Transom to mullion connector.
- Adjuster to compensate for internal profile dimension tolerances.
- Smart Connector concept provides tolerance for the facade grid alignment.
- Threaded tube and custom steel profiles have twist lock fixings → to provide joint stability for transportation.
- Transoms fitted internally between mullions.
- Available in vertical facade and sloped glass roof formats.

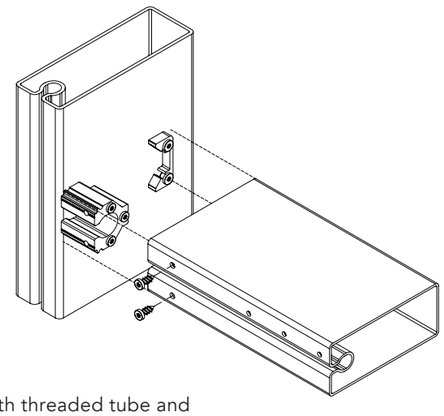
... THANKS TO THE T-CONNECTORS SC AND SCL

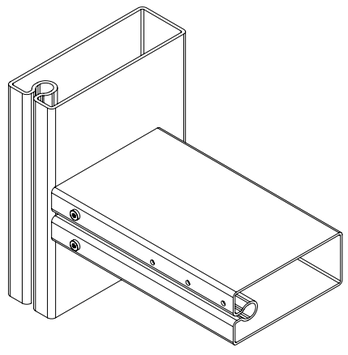
Ladder connector SCL









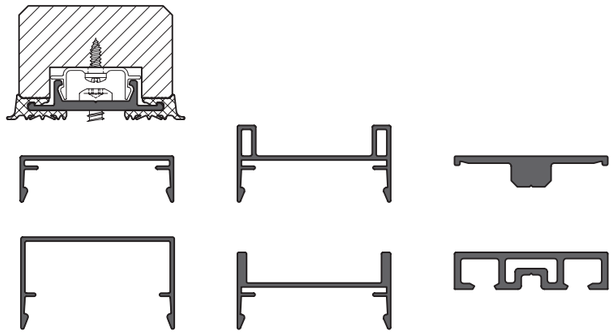


- Connectors available for both threaded tube and custom steel profiles.
- On contact pressure screw fixing.
- Available in vertical facade and sloped glass roof formats.
- Also available as angled or polygon connection.

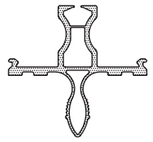
TECHNOLOGY IN DETAIL

THERM+ FS-I under examination

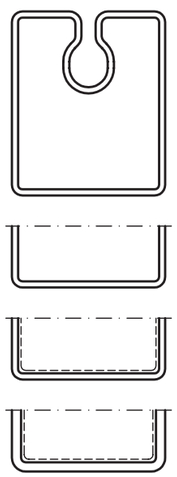
- **Pressure profiles and cover caps for curtain wall and roof light applications**
  - Wide choice of profiles for all system widths.
  - Project specific solutions available with short lead-in times.
  - Aesthetically pleasing flat pressure profiles with only 4 mm offset from glass surface.
  - Optimum cross point sealing system.

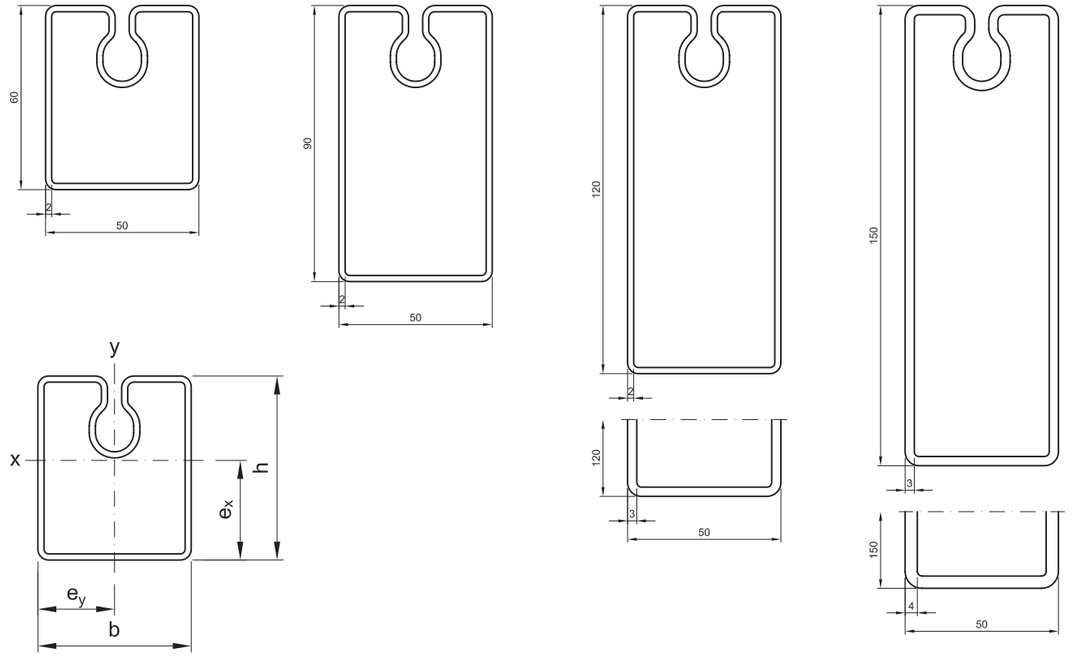


- **Gasket alignment with one-part synthetic base profile**
  - No gasket slippage.
  - Secure pressure plate screw fixing into the steel grid.
  - Slim sight-line glazing without expensive on-site welding.
  - Long term quality assured by established RAICO technology.



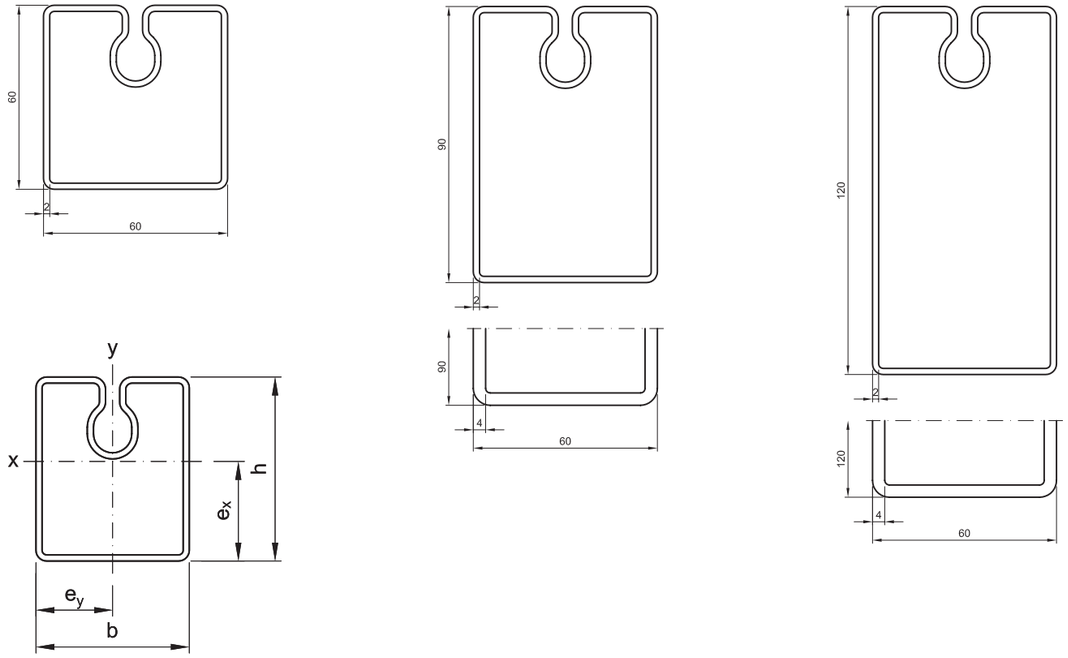
- **A range of threaded tubes to meet project requirements**
  - System widths of 50 and 56 mm (internally 50 or 60 mm).
  - Threaded tubes available in a variety of sizes and wall thicknesses.
  - Covers a wide range of static requirements.
  - Integrated screw channel within profile.
  - Small radii corners provide almost sharp edges.





Article	Width mm	Height mm	Weight kg/m	Wall thickness mm	Surface area m	No.	I_x cm⁴	I_y cm⁴	e_x cm	e_y cm	W_x cm³	W_y cm³
Threaded tube 50/60/2	50	60	4,07	2	0,265	**445010**	23,51	16,87	3,25	2,50	7,24	6,75
Threaded tube 50/90/2	50	90	5,01	2	0,325	**445015**	65,03	23,79	4,94	2,50	13,16	9,52
Threaded tube 50/120/2	50	120	5,95	2	0,385	**445020**	134,9	30,7	6,57	2,50	20,52	12,28
Threaded tube 50/120/3	50	120	8,79	3	0,382	**445025**	194,11	43,73	6,56	2,50	29,60	17,94
Threaded tube 50/150/3	50	150	10,21	3	0,442	**445030**	345,64	53,68	8,15	2,50	42,39	21,47
Threaded tube 50/150/4	50	150	13,43	4	0,440	**445035**	444,75	68,09	8,14	2,50	54,66	27,24

- **Technical information**
  - Possible for assembly as mullion or transom profile.
  - Profile width: 50 mm.
  - Material:
    Steel S280GD + Z275MAO
  - Surface: sendzimir galvanised.
  - Execution class EXC2.
  - PU: 7 m.



Article	Width mm	Height mm	Weight kg/m	Wall thickness mm	Surface area m	No.	I_x cm⁴	I_y cm⁴	e_x cm	e_y cm	W_x cm³	W_y cm³
Threaded tube 60/60/2	60	60	4,38	2	0,285	**445060**	26,9	25,61	3,23	3,00	8,33	8,54
Threaded tube 60/90/2	60	90	5,32	2	0,345	**445065**	72,85	35,7	4,91	3,00	14,82	11,90
Threaded tube 60/90/4	60	90	10,28	4	0,340	**445070**	132,08	64,79	4,88	3,00	27,05	21,60
Threaded tube 60/120/2	60	120	6,27	2	0,405	**445075**	148,95	45,8	6,54	3,00	22,76	15,27
Threaded tube 60/120/4	60	120	12,17	4	0,400	**445080**	275,26	83,64	6,51	3,00	42,26	27,88

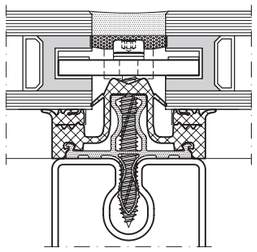
- **Technical information**
  - Possible for assembly as mullion or transom profile.
  - Profile width: 60 mm.
  - Material:
    Steel S280GD + Z275MAO
  - Surface: sendzimir galvanised.
  - Execution class EXC2.
  - PU: 7 m.

Article	Width mm	Height mm	Weight kg/m	Wall thickness mm	Surface area m	No.	I_x cm⁴	I_y cm⁴	e_x cm	e_y cm	W_x cm³	W_y cm³
Threaded tube 60/150/3	60	150	10,68	3	0,462	**445085**	378,31	80,28	8,12	3,00	46,57	26,76
Threaded tube 60/150/4	60	150	14,05	4	0,460	**445090**	487,71	102,48	8,11	3,00	60,14	34,16
Threaded tube 60/180/3	60	180	12,10	3	0,522	**445095**	602,72	94,92	9,70	3,00	62,15	31,64
Threaded tube 60/180/5	60	180	19,70	5	0,517	**445100**	946,86	145,38	9,67	3,00	97,96	48,46
Threaded tube 60/180/5	60	180	19,70	5	0,517	**445100.F10000**	946,86	145,38	9,67	3,00	97,96	48,46
Threaded tube 60/200/5	60	200	21,27	5	0,557	**445105**	1247,02	160,55	10,71	3,00	116,48	53,52
Threaded tube 60/200/5	60	200	21,27	5	0,557	**445105.F10000**	1247,02	160,55	10,71	3,00	116,48	53,52

- **Technical information**
  - Possible for assembly as mullion or transom profile.
  - Profile width: 60 mm.
  - Material:
    Steel S280GD + Z275MAO
  - Surface: sendzimir galvanised.
  - Execution class EXC2.
  - PU: 7 m.
  - PU: 10 m for no. 445100.F10000 and 445105.F10000.

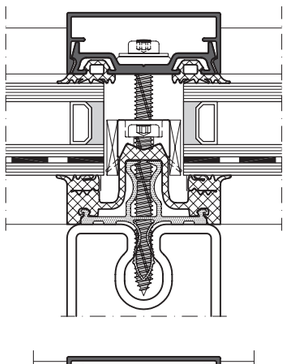
SG2 Structural Glazing

– System widths of 50 and 56 mm
– Glazing system provides all glass appearance
– High thermal performance using SG insulation blocks
– Simple and economic fabrication
– Non visible glass retention on screens up to 8 m (subject to local building standards)



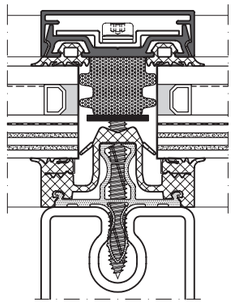
Burglar proof curtain wall RC2/RC3

– System widths 50, and 56 mm.
– Resistance class RC2 and RC3 permitted.
– Simple processing.
– Identical technology to the basic system.
– Optimized design variant.



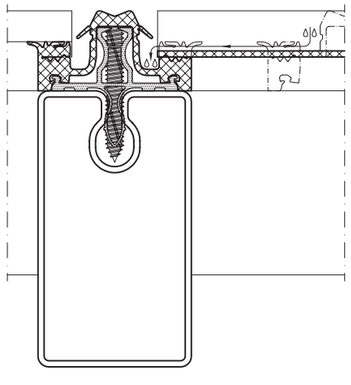
Fire protection

– Tested up to E30/EW30/EI30.
– Mullion-transom connection with steel connector SCL.
– Only a few additional components required.



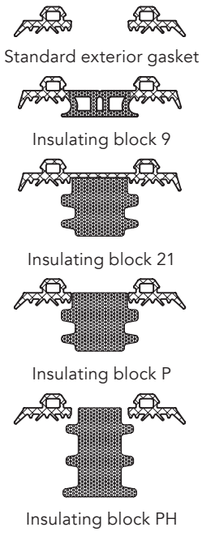
Drainage system

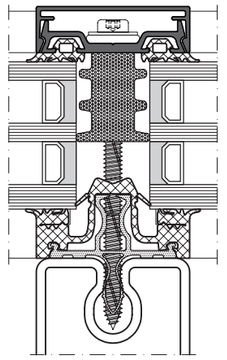
– The drainage groove of the mullion and transom gasket is arranged on various levels.
– In all THERM^{+} systems the ventilation and drainage principle is so designed that a controlled condensate removal from transom to the mullion rebate is secured via interior gaskets.
– Separation of screw penetration and water-bearing level.



Exterior gasket

– Various exterior gaskets and insulating block options available.
– Gradual adaptation of the insulation value.
– Maximum thermal insulation up to $U_{m,t}$ = 0.75 W/(m²K) including screw influence.
– Certified passive house curtain wall.
– Economic solution.



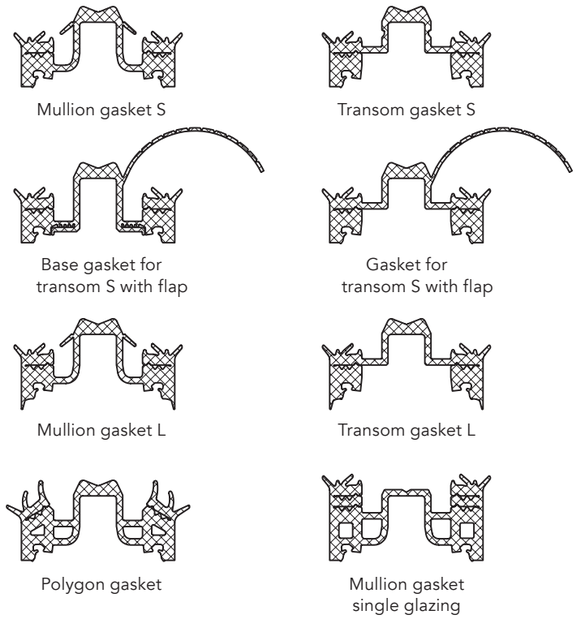


Transom and mullion gaskets

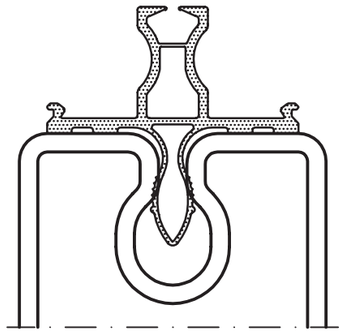
– Optimised shape for maximum thermal insulation and efficient fabrication.
– Complete covering and sealing of the base profile.
– Available in two materials: EPDM or silicone.
– Perfect and easy fitting on the structural profile (without silicone).
– Two options of gaskets with flaps for transom and base drainage as well as draining within the continuous gasket at the structural connections.
– Reliable drainage in two or three levels by simply notching.
– Tested with a roof inclination of up to 2°
– Special accessories for all applications, e. g. transom and mullion sealing elements.

Interior gasket options

– Type „S“ for assembly with lateral guidance and fixation by a synthetic base profile.
– Type „L“ with lateral lips for visual optimization using big radiuses of structural profiles lateral guidance like type „S“.

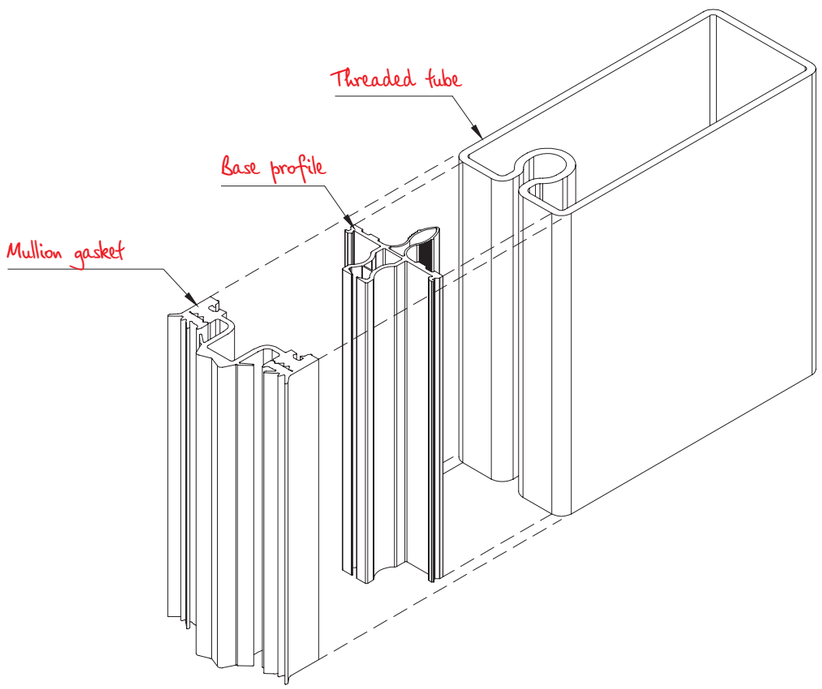


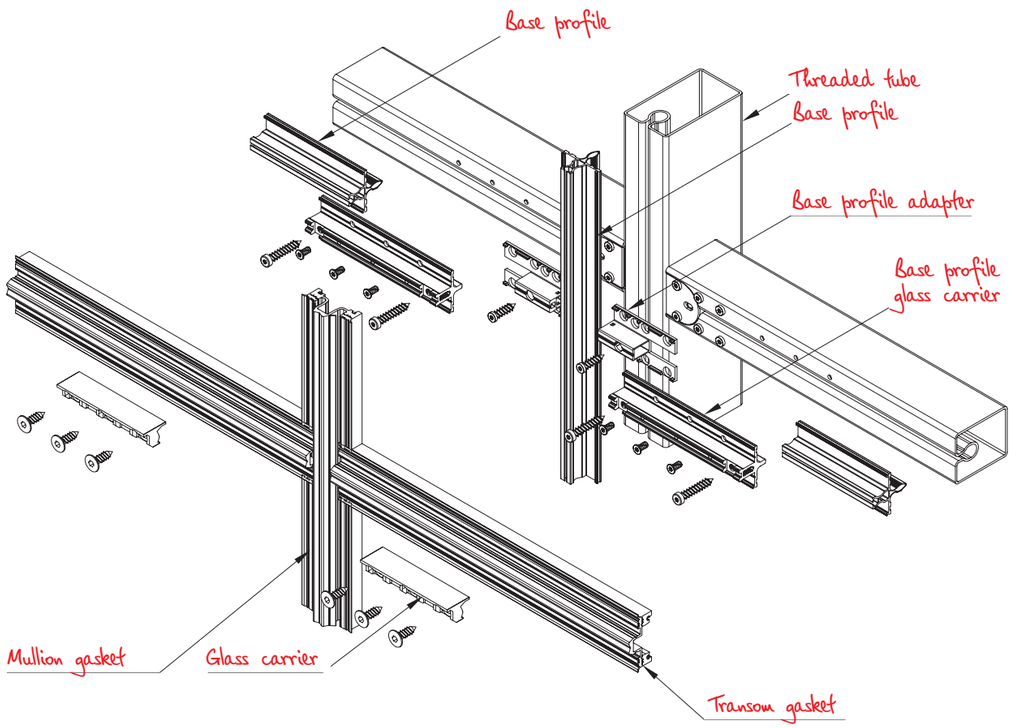
- **Optimal corrosion protection**
  - Proven THERM^{+} sealing technology ensures controlled drainage of condensate and prevents ingress of humidity.
  - Access to all surfaces enables easy and efficient treatment against corrosion.
  - Further corrosion protection with Sendzimir process pre-galvanised coated finish (See also RAICO coating guidelines for top coat finishes).



- **Maximum cross point safety**
  - Choice of glass carriers to suit glass loads.
  - Safe glass load retention with short length aluminium base profile.
  - Base profile adapter for interior gasket alignment.
  - Choice of SC and SCL steel connectors.

- **Synthetic base profile**
  - Push fit or lightly tap in with a mallet.
  - Roll on the internal gaskets in the correct orientation.
  - Plug in technology allows for quick and simple processing with just a few additional components.

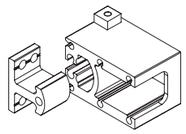


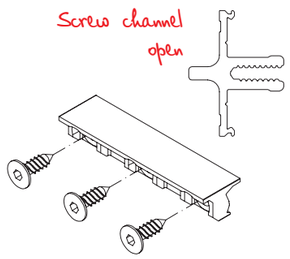


Steel curtain wall 50/56 mm

Admissible glass loads for steel connector SC – variant L (light)

Open screw channel (1 glass carrier per side)





Technical information

- The tests and evaluations for determining the glass loads were carried out according to EN 16758. A max. tipping over of 1 mm is recommended.
- The safety coefficients on the point of application side are extracted from the National Annexes (Germany) of the EUROCODES.
- A combination of glass load and horizontal load is calculated by linear interaction.
- The indicated wind loads refer to the maximum glass weight of 500 kg or 300 kg.
- Deviating constructions available on request.
- For the use of interior gaskets 26 mm please consult the RAICO customer service.
- The glass weights of all variants can be applied similarly to commercial steel tubes for the various fixing options of the base profiles (except the welded screw channel). They refer to one field.
- Intermediate figures can be interpolated.
- *Minimum face width 50 mm.
- ** γ_q = 1.5 considered.

Fitness for use – tipping over 1.0 mm

Wall thickness mullion	Transom*	Eccentricity [mm]							Rated value wind pressure/ suction** F_{zul}
	Depth x wall thickness	28	32	36	40	44	48	52	
		Glass weight [kg]							
≥ 2 mm	≥ 60 x 2	300	300	300	242	196	163	138	8.0 kN
	≥ 90 x 2	500	479	367	290	235	196	166	7.5 kN
	≥ 90 x 4	500	479	367	290	235	196	166	8.5 kN
	≥ 120 x 2	500	479	367	290	235	196	166	8.0 kN
	≥ 120 x 3	500	479	367	290	235	196	166	9.5 kN
	≥ 120 x 4	500	479	367	290	235	196	166	9.0 kN

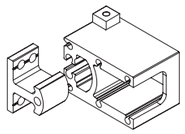
Fitness for use – tipping over 2.0 mm

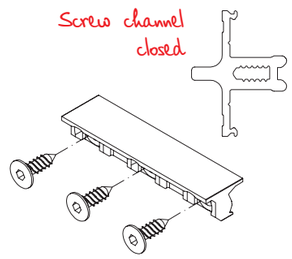
Wall thickness mullion	Transom*	Eccentricity [mm]							Rated value wind pressure/ suction** F_{zul}
	Depth x wall thickness	28	32	36	40	44	48	52	
		Glass weight [kg]							
≥ 2 mm	≥ 60 x 2	300	300	300	300	291	241	203	8.0 kN
	≥ 90 x 2	500	500	500	454	369	306	257	7.5 kN
	≥ 90 x 4	500	500	500	454	369	306	257	8.5 kN
	≥ 120 x 2	500	500	500	454	369	306	257	8.0 kN
	≥ 120 x 3	500	500	500	454	369	306	257	9.5 kN
	≥ 120 x 4	500	500	500	454	369	306	257	9.0 kN

Steel curtain wall 50/56 mm

Admissible glass loads for steel connector SC – variant L (light)

Closed screw channel (1 glass carrier per side)





Technical information

- The tests and evaluations for determining the glass loads were carried out according to EN 16758. A max. tipping over of 1 mm is recommended.
- The safety coefficients on the point of application side are extracted from the National Annexes (Germany) of the EUROCODES.
- A combination of glass load and horizontal load is calculated by linear interaction.
- The indicated wind loads refer to the maximum glass weight of 500 kg or 300 kg.
- Deviating constructions available on request.
- For the use of interior gaskets 26 mm please consult the RAICO customer service.
- The glass weights of all variants can be applied similarly to commercial steel tubes for the various fixing options of the base profiles (except the welded screw channel). They refer to one field.
- Intermediate figures can be interpolated.
- *Minimum face width 50 mm.
- ** γ_q = 1.5 considered.

Fitness for use – tipping over 1.0 mm

Wall thickness mullion	Transom*	Eccentricity [mm]							Rated value wind pressure/ suction** F_{zul}
	Depth x wall thickness	28	32	36	40	44	48	52	
		Glass weight [kg]							
≥ 2 mm	≥ 60 x 2	300	300	300	277	225	187	159	8.0 kN
	≥ 90 x 2	500	500	425	336	273	227	192	7.5 kN
	≥ 90 x 4	500	500	500	403	327	272	231	8.5 kN
	≥ 120 x 2	500	500	500	420	341	283	240	8.0 kN
	≥ 120 x 3	500	500	500	420	341	283	240	9.5 kN
	≥ 120 x 4	500	500	500	420	341	283	240	9.0 kN

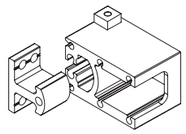
Fitness for use – tipping over 2.0 mm

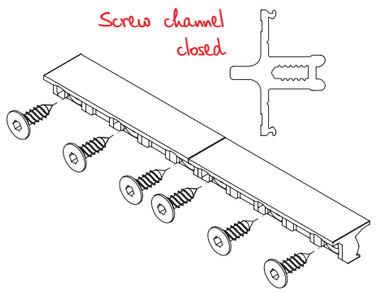
Wall thickness mullion	Transom*	Eccentricity [mm]							Rated value wind pressure/ suction** F_{zul}
	Depth x wall thickness	28	32	36	40	44	48	52	
		Glass weight [kg]							
≥ 2 mm	≥ 60 x 2	300	300	300	300	300	279	235	8.0 kN
	≥ 90 x 2	500	500	500	500	433	359	302	7.5 kN
	≥ 90 x 4	500	500	500	500	495	410	345	8.5 kN
	≥ 120 x 2	500	500	500	500	495	410	345	8.0 kN
	≥ 120 x 3	500	500	500	500	500	421	355	9.5 kN
	≥ 120 x 4	500	500	500	500	500	421	355	9.0 kN

Steel curtain wall 50/56 mm

Admissible glass loads for steel connector SC – variant H (heavy)

Closed screw channel (2 glass carriers per side)





Technical information

- The tests and evaluations for determining the glass loads were carried out according to EN 16758. A max. tipping over of 1 mm is recommended.
- The safety coefficients on the point of application side are extracted from the National Annexes (Germany) of the EUROCODES.
- A combination of glass load and horizontal load is calculated by linear interaction.
- The indicated wind loads refer to the maximum glass weight of 700 kg.
- Deviating constructions available on request.
- The glass weights of all variants can be applied similarly to commercial steel tubes for the various fixing options of the base profiles (except the welded screw channel). They refer to one field.
- Intermediate figures can be interpolated.
- *Minimum face width 50 mm.
- ** γ_q = 1.5 considered.

Fitness for use – tipping over 1.0 mm

Wall thickness mullion	Transom*	Eccentricity [mm]							Rated value wind pressure/ suction** F_{zul}
	Depth x wall thickness	28	32	36	40	44	48	52	
		Glass weight [kg]							
≥ 2 mm	≥ 90 x 4	700	700	676	550	457	387	333	7.0 kN
	≥ 120 x 3	700	700	700	597	497	420	362	8.5 kN
	≥ 120 x 4	700	700	700	637	530	449	386	7.5 kN

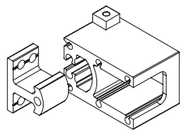
Fitness for use – tipping over 2.0 mm

Wall thickness mullion	Transom*	Eccentricity [mm]							Rated value wind pressure/ suction** F_{zul}
	Depth x wall thickness	28	32	36	40	44	48	52	
		Glass weight [kg]							
≥ 2 mm	≥ 90 x 4	700	700	700	700	700	599	516	7.0 kN
	≥ 120 x 3	700	700	700	700	700	683	588	8.5 kN
	≥ 120 x 4	700	700	700	700	700	683	588	7.5 kN

Steel curtain wall 50/56 mm

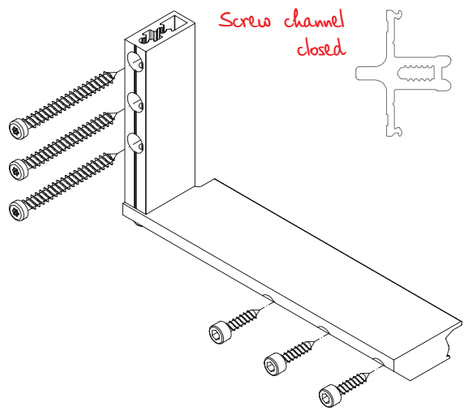
Admissible glass loads for steel connector SC – variant cross point glass carrier

Closed screw channel (1 glass carrier per side)



Technical information

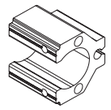
- The tests and evaluations for determining the glass loads were carried out according to EN 16758. A max. tipping over of 1 mm is recommended.
- The safety coefficients on the point of application side are extracted from the National Annexes (Germany) of the EUROCODES.
- A combination of glass load and horizontal load is calculated by linear interaction.
- The indicated wind loads refer to the maximum glass weight of 750 kg or 1000 kg.
- Deviating constructions available on request.
- In case of an additional load please consult the RAICO customer service.
- The glass weights refer to one field. All variants can be applied similarly to commercial steel tubes for the various fixing options of the base profiles (except the welded screw channel). In case of the demand for a cross glass carrier with two fields, please consult the RAICO customer service.
- Intermediate figures can be interpolated.
- *Minimum face width 50 mm.
- ** γ_q = 1.5 considered.

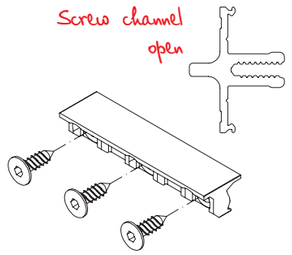


Fitness for use – tipping over 1.0 mm

Wall thickness mullion	Transom*	Eccentricity [mm]							Rated value wind pressure/ suction** F_{zul}
	Depth x wall thickness	28	32	36	40	44	48	52	
		Glass weight [kg]							
≥ 2mm	≥ 90 x 2	750	750	750	750	750	750	750	14.0 kN
	≥ 90 x 4	1.000	1.000	1.000	1.000	1.000	1.000	1.000	13.0 kN
	≥ 120 x 2	750	750	750	750	750	750	750	14.0 kN
	≥ 120 x 3	1.000	1.000	1.000	1.000	1.000	1.000	1.000	13.0 kN
	≥ 120 x 4	1.000	1.000	1.000	1.000	1.000	1.000	1.000	13.0 kN

Steel curtain wall 50/56 mm
Admissible glass loads for steel connector SCL – variant L (light)
Open screw channel (1 glass carrier per side)





Technical information

- The tests and evaluations for determining the glass loads were carried out according to EN 16758. A max. tipping over of 1 mm is recommended.
- The safety coefficients on the point of application side are extracted from the National Annexes (Germany) of the EUROCODES.
- A combination of glass load and horizontal load is calculated by linear interaction.
- The indicated wind loads refer to the maximum glass weight of 500 kg or 300 kg.
- Deviating constructions available on request.
- For the use of interior gaskets 26 mm please consult the RAICO customer service.
- The glass weights of all variants can be applied similarly to commercial steel tubes for the various fixing options of the base profiles (except the welded screw channel). They refer to one field.
- Intermediate figures can be interpolated.
- *Minimum face width 50 mm.
- ** γ_q = 1.5 considered.

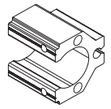
Fitness for use – tipping over 1.0 mm

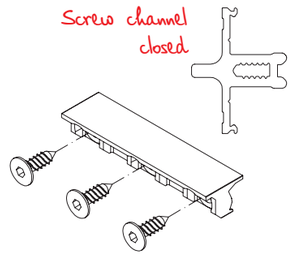
Wall thickness mullion	Transom* Depth x wall thickness	Eccentricity [mm] 28	32	36	40	44	48	52	Rated value wind pressure/ suction** F_{zul}
		Glass weight [kg]							
≥ 2 mm	≥ 60 x 2	300	300	300	284	231	192	163	23.5 kN
	≥ 90 x 2	500	471	360	284	231	192	163	19.5 kN
	≥ 90 x 4	500	471	360	284	231	192	163	21.5 kN
	≥ 120 x 2	500	471	360	284	231	192	163	20.5 kN
	≥ 120 x 3	500	471	360	284	231	192	163	23.5 kN
	≥ 120 x 4	500	471	360	284	231	192	163	23.5 kN

Fitness for use – tipping over 2.0 mm

Wall thickness mullion	Transom* Depth x wall thickness	Eccentricity [mm] 28	32	36	40	44	48	52	Rated value wind pressure/ suction** F_{zul}
		Glass weight [kg]							
≥ 2 mm	≥ 60 x 2	300	300	300	300	300	294	248	23.5 kN
	≥ 90 x 2	500	500	500	437	355	294	248	19.5 kN
	≥ 90 x 4	500	500	500	437	355	294	248	21.5 kN
	≥ 120 x 2	500	500	500	437	355	294	248	20.5 kN
	≥ 120 x 3	500	500	500	437	355	294	248	23.5 kN
	≥ 120 x 4	500	500	500	437	355	294	248	23.5 kN

Steel curtain wall 50/56 mm
Admissible glass loads for steel connector SCL – variant L (light)
Closed screw channel (1 glass carrier per side)





Technical information

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- Intermediate figures can be interpolated.
- *Minimum face width 50 mm.
- ** γ_q = 1.5 considered.

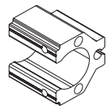
Fitness for use – tipping over 1.0 mm

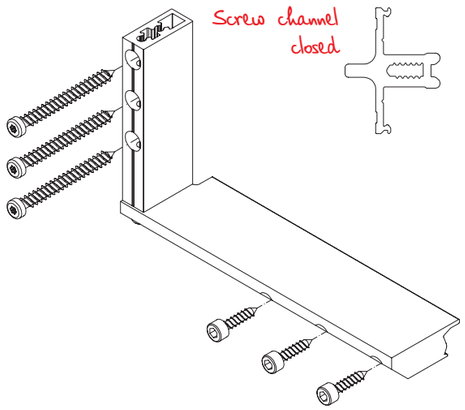
Wall thickness mullion	Transom* Depth x wall thickness	Eccentricity [mm] 28	32	36	40	44	48	52	Rated value wind pressure/ suction** F_{zul}
		Glass weight [kg]							
≥ 2 mm	≥ 60 x 2	300	300	300	300	273	227	192	23.5 kN
	≥ 90 x 2	500	500	425	336	273	227	192	19.5 kN
	≥ 90 x 4	500	500	478	378	307	255	216	21.5 kN
	≥ 120 x 2	500	500	425	336	273	227	192	20.5 kN
	≥ 120 x 3	500	500	478	378	307	255	216	23.5 kN
	≥ 120 x 4	500	500	478	378	307	255	216	23.5 kN

Fitness for use – tipping over 2.0 mm

Wall thickness mullion	Transom* Depth x wall thickness	Eccentricity [mm] 28	32	36	40	44	48	52	Rated value wind pressure/ suction** F_{zul}
		Glass weight [kg]							
≥ 2 mm	≥ 60 x 2	300	300	300	300	300	300	288	23.5 kN
	≥ 90 x 2	500	500	500	500	412	342	288	19.5 kN
	≥ 90 x 4	500	500	500	500	474	393	331	21.5 kN
	≥ 120 x 2	500	500	500	500	426	353	297	20.5 kN
	≥ 120 x 3	500	500	500	500	474	393	331	23.5 kN
	≥ 120 x 4	500	500	500	500	474	393	331	23.5 kN

Steel curtain wall 50/56 mm
Admissible glass loads for steel connector SCL – variant cross glass carrier
Closed screw channel (1 glass carrier per side)





Technical information

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– The indicated wind loads refer to the maximum glass weight of 750 kg or 1000 kg.
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– The glass weights refer to one field. All variants can be applied similarly to commercial steel tubes for the various fixing options of the base profiles (except the welded screw channel). In case of the demand for a cross glass carrier with two fields, please consult the RAICO customer service.
– Intermediate figures can be interpolated.
– *Minimum face width 50 mm.
– ** V_q = 1.5 considered.

Fitness for use – tipping over 1.0 mm

Wall thickness mullion	Transom*	Eccentricity [mm]							Rated value wind pressure/ suction** F_{zul}
	Depth x wall thickness	28	32	36	40	44	48	52	
		Glass weight [kg]							
≥ 2mm	≥ 90 x 2	750	750	750	750	750	750	750	23.5 kN
	≥ 90 x 4	1.000	1.000	1.000	1.000	1.000	1.000	1.000	21.0 kN
	≥ 120 x 2	750	750	750	750	750	750	750	23.5 kN
	≥ 120 x 3	1.000	1.000	1.000	1.000	1.000	1.000	1.000	21.5 kN
	≥ 120 x 4	1.000	1.000	1.000	1.000	1.000	1.000	1.000	21.0 kN

CERTIFIED QUALITY

European Technical Assessment ETA

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Designated according to Article 29 of Regulation (EU) No 305/2011

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European Technical Assessment

ETA-19/0554 of 23.03.2021

General part

Technical Assessment Body issuing the European Technical Assessment	Österreichisches Institut für Bautechnik (OIB) Austrian Institute of Construction Engineering
Trade name of the construction product	THERM+ S-I and THERM+ FS-I
Product family to which the construction product belongs	Loadbearing system for hollow sections and screw tube hollow sections made of steel for façade systems
Manufacturer	RAICO Bautechnik GmbH Gewerbegebiet Nord 2 87772 Pfaffenhausen Germany
Manufacturing plant	RAICO Bautechnik GmbH Gewerbegebiet Nord 2 87772 Pfaffenhausen Germany
This European Technical Assessment contains	60 pages including 3 Annexes
This European Technical Assessment is issued in accordance with Regulation (EU) No 305/2011, on the basis of	European Assessment Document (EAD) 200098-00-0404 “Connection and load transfer system for hollow profiles and bolted tubular profiles made of metal”

THERM+ FS-I IN USE

Please also read ...

... our project report about EXPLORiT in Yverdon-les-Bains!

SOPHISTICATED AND RELIABLE: JUST LIKE A SWISS WATCH

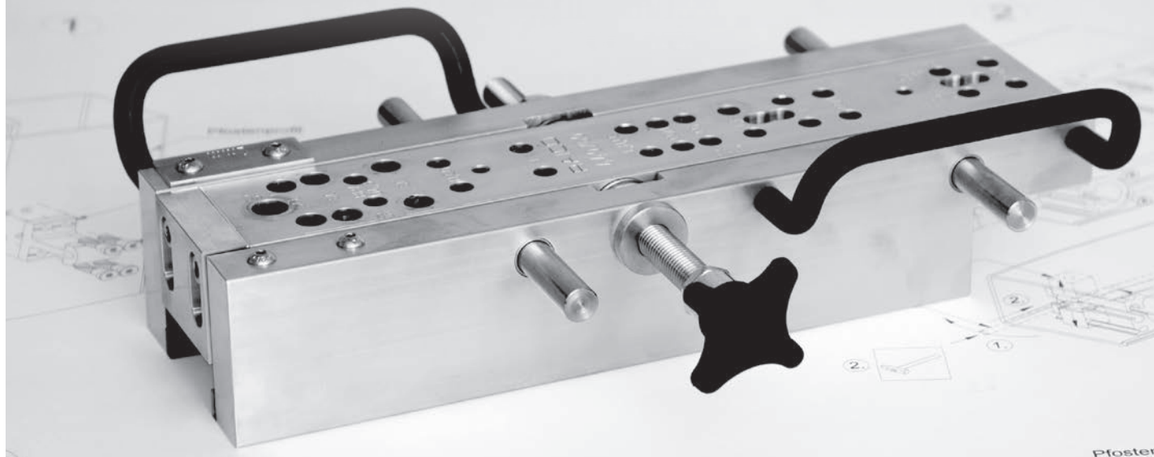
The Swiss canton of Waadt is famed for its art of watchmaking. It perhaps therefore comes as no surprise that the EXPLORiT Edutainment centre in Yverdon-les-Bains will play host to an award-winning RAICO product: The THERM+ FS-I unites glass and steel in an innovative manner with precision, finesse and uncompromising reliability ...

Please ask your RAICO contact person for OBJEKT INSIDE

or read this and further edition online at www.raico.de/en/download/brochures

THE NEXT STEPS?

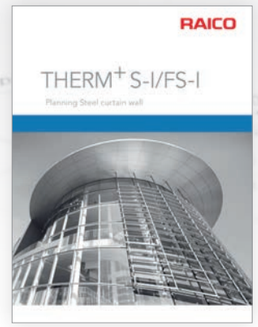
Further information ...

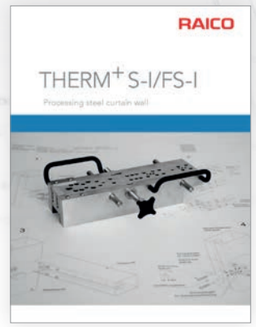


... can be found in our planning and processing manuals!

The planning and processing documents THERM+ S-I/FS-I offer architects, technical planners and processors an ideal starting point to create the most diverse steel façades. Apart from standard sections and numerous connection details the documents contain information showing the design, variations and selection tables to determine the materials required.

You can find quick and convenient access to all data in pdf format in the download area of our website at www.raico.de. For printed versions of the planning or processing manual, please contact your local RAICO consultant.

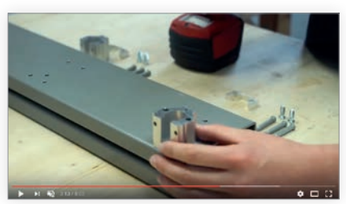




... are also shown online in our YouTube channel!

Subscribe to our RAICO YouTube channel and convince yourself of the easy process of our systems. On our channel you are currently finding two new videos which show the step-by-step processing of the steel connectors SC and SCL.

THERM+ FS-I standard connector SC
youtu.be/i7Lfo2CoSC8



THERM+ FS-I ladder connector SCL
youtu.be/zZBubMXNmag

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No. 002082 – Release 05/2021