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and types of construction

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General Part

Technical Assessment Body issuing the
European Technical Assessment:

Deutsches Institut für Bautechnik

Trade name of the construction product

System Schüco FWS 50/60 SG and FWS 50/60 SG.SI;
ERC 50

Product family
to which the construction product belongs

Structural Sealant Glazing Kit - Infill Elements / Facade
Construction

Manufacturer

SCHÜCO International KG
Karolinenstraße 1-15
33609 Bielefeld

Manufacturing plant

siehe Anhang E
see Annex E

This European Technical Assessment
contains

60 pages including 6 annexes (54 pages) which form an
integral part of this assessment.

This European Technical Assessment is
issued in accordance with Regulation (EU)
No 305/2011, on the basis of

EAD 090035-00-0404

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Specific part

1 Definition of the product

This European Technical Assessment applies to the infill elements for glass façades with the trade names "System Schüco FWS 50/60 SG and FWS 50/60 SG.SI" for insulating glass units and in addition the trade name "System ERC 50" for a composition with a single glass pane. The insulating glass units are fastened punctually to a mullion-transom system. For that purpose retaining devices, which are fixed to the supporting construction, grip into a U-profile which is glued into the insulating glass edge. The insulating glass units may consist of two or three glass panes. The U-profile is inserted in the insulating glass edge next to the inner pane. Different types of U-profiles are applicable. The outer panes are borne via the structural sealant of the insulating glass edge, the inner pane is held mechanically via retaining devices (Annexes F 5-10). The "System ERC 50" (Annex F 15) is made of a monolithic glazing which is bonded by a structural sealant to a profile that is fixed to the supporting construction.

For the self-weight of all infill elements mechanical self-weight supports are fixed to the supporting construction and for the case of bond failure there are wind protection devices (emergency retainers) optionally.

The designation "infill elements" includes insulating glass units and monolithic glazing.

The insulating glass units are not larger than 2.60 m x 4.20 m (width x height and height x width). The pane thickness and formats are to be adjusted under consideration of the field of application and the required actions. The monolithic glazing for ventilated façades are not larger than 1.50 m x 2.00 m (width x height and height x width) with a thickness of the glass panes ≤ 12 mm.

The components and the system setup of the product are given in Annexes F 1-16.

2 Specification of the intended use in accordance with the applicable European Assessment Document

The performances given in Section 3 are only valid if the infill elements are used in compliance with the specifications and conditions given in the Annexes A to F.

The infill elements are used in overhead and vertical areas.

The vertical glazing is installed vertically or with a slight inclination. The inclination angle with respect to the vertical is limited to 10° for inward inclination and 5° for inclination with a slope to the outside.

Overhead glazing is installed at inclinations with respect to the horizontal ranging from 5° to 80°.

The area of application of the insulating glass units is limited to the maximum permissible load (serviceability) of 1.33 kN/m² perpendicular to the infill elements.

For the use in structures the following types are differentiated in accordance with ETAG 002-1

Type I: mechanical transfer of the self-weight of the façade element to the support frame and/or structure and then to the substructure. The structural sealant transfers wind suction loads, and wind protection devices (emergency retainers) are used to reduce danger in the case of structural sealant failure.

Type II: mechanical transfer of the self-weight of the façade element to the support frame and/or structure and then to the substructure. The structural sealant transfers wind suction loads, and no emergency retainers are used.

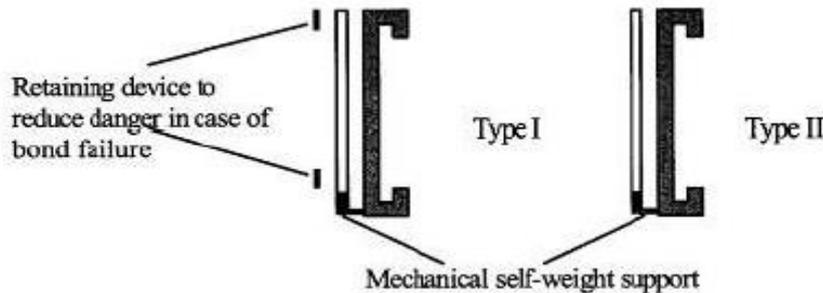


Figure 1 – Schematic example of the type I and II of Structural Sealant Glazing Kit (SSGK)

The verifications and assessment methods on which this European Technical Assessment is based lead to the assumption of a working life of "System Schüco FWS 50/60 SG, FWS 50/60 SG.SI and ERC 50" of at least 25 years. The indications given on the working life cannot be interpreted as a guarantee given by the producer, but are to be regarded only as a means for choosing the right products in relation to the expected economically reasonable working life of the works.

3 Performance of the product and references to the methods used for its assessment

3.1 Mechanical resistance and stability (BWR 1)

Essential characteristic	Performance
Characteristics of the different glass products (characteristic bending strength, coating)	See Annex A
Use scenario for the heat soaking process	Use scenario 1a/1b; see Annex A
Use scenario for the compound effect of laminated safety glass	Use scenario 2a/2b; see Annex A
Structural bonding: Substrates and adhesive	See Annex B
Mechanical glazing support, retaining devices, wind protection devices (emergency retainers) - Load-bearing capacities	See Annex C
Dynamic load resistance (impact) for infill elements used as barrier against falling down	See Annex D

3.2 Safety in case of fire (BWR 2)

Essential characteristic	Performance
Reaction to fire of the glass panes and metal components in accordance with the provisions of EC Decision 1996/582/EC	A 1

3.3 Safety and accessibility (BWR 4)

Essential characteristic	Performance
Air permeability	FWS 50/60 SG / SG.SI: AE as per EN 12152 ¹
Watertightness	FWS 50/60 SG / SG.SI: RE 120 as per EN 12154 ²
Impact	FWS 50/60 SG / SG.SI: I5/E5 as per EN 14019 ³

3.4 Energy economy and heat retention (BWR 6)

The total thermal transmittance factor U_{CW} of the façade construction is to be determined as per EN ISO 12631⁴. The following values determined for infill elements using insulated glass units may be used for dimensioning:

System Schüco FWS 50 SG mullion (with $U_g = 1.5$)

Sealing profile	Stainless steel spacer	Aluminium spacer
U-shaped seal	$U_f = 0.0011 l_f + 2.54$; $\psi = 0.13$	$U_f = 0.0011 l_f + 2.54$; $\psi = 0.15$
Flat seal	$U_f = 1.8$; $\psi = 0.11$ W/mK for 50 mm construction depth	$U_f = 0.0011 l_f + 2.19$
Wet sealing	$U_f = 0.0005 l_f + 1.74$; $\psi = 0.13$	$U_f = 0.0005 l_f + 1.74$; $\psi = 0.16$

System Schüco FWS 50 SG transom (with $U_g = 1.5$)

Sealing profile	Stainless steel spacer	Aluminium spacer
U-shaped seal	$U_f = 0.0015 l_f + 2.17$; $\psi = 0.13$	$U_f = 0.0015 l_f + 2.17$; $\psi = 0.15$
Flat seal	$U_f = 1.8$; $\psi = 0.11$ W/mK for 50 mm construction depth	$U_f = 0.0015 l_f + 1.82$
Wet sealing	$U_f = 0.0007 l_f + 1.61$; $\psi = 0.13$	$U_f = 0.0007 l_f + 1.61$; $\psi = 0.16$

System Schüco FWS 50 SG.SI mullion (with panel)

Sealing profile	Panel 0,035 W/(mK)
Hermetic sealing, wet	$U_f = 0,60 - 0,82$ W/m ² K (without concerning the influence of the screws) $U_f = 0,84 - 1,06$ W/m ² K (screw influence:0,24 W/m ² K)

1 EN 12152:2002 Curtain walling - Air permeability - Performance requirements and classification
2 EN 12154:2000 Curtain walling - Watertightness - Performance requirements and classification
3 EN 14019:2016 Curtain Walling - Impact resistance - Performance requirements
4 EN ISO 12631 Thermal performance of curtain walling - Calculation of thermal transmittance

System Schüco FWS 60 SG.SI mullion (with panel)

Sealing profile	Panel 0,035 W/(mK)
Hermetic sealing, wet	Uf = 0,58 – 0,77 W/m ² K (without concerning the influence of the screws) Uf = 0,82 – 1,01 W/m ² K (screw influence 0,24 W/m ² K)

4 Assessment and verification of constancy of performance (AVCP) system applied, with reference to its legal base

In accordance with EAD 15-09-0035-04.04 the applicable European legal act is: 1996/582/EC⁵.

The systems to be applied are:

- System 1 for Type II according to Figure 2
- System 2+ for Type I according to Figure 2

In addition, with regard to e.g. reaction to fire for products covered by this EAD the applicable European legal act is: 2003/656/EC⁶

The systems to be applied are:

- System 1, 3, 4

5 Technical details necessary for the implementation of the AVCP system, as provided for in the applicable EAD

Technical details necessary for the implementation of the AVCP system are laid down in the control plan deposited with Deutsches Institut für Bautechnik.

Issued in Berlin on 2 February 2018 by Deutsches Institut für Bautechnik

BD Dipl.-Ing. Andreas Kummerow
Head of Department

beglaubigt:
Herr

⁵ Official Journal of the European Communities no L 254/62 of 8.10.1996

⁶ Official Journal of the European Communities no L 231/15 of 17.9.2003

Annex A

Characteristics of the different glass products

A double or triple glass unit is installed for "System Schüco FWS 50/60 SG and FWS 50/60 SG.SI" and a single glazing for "System ERC 50". Depending on the use scenarios given below and the requirements due to the designing results for the existing actions at the place of installation the suitable glass products shall be chosen.

The basic glass type of all glass products is float glass according to EN 572-9¹ made of soda lime silicate glass. Dependent on the appropriate use scenario the following products are suitable: thermally toughened soda lime silicate safety glass according to EN 12150-2², coated glass according to EN 1096-4³, heat soaked thermally toughened soda lime silicate safety glass according to EN 14179-2⁴, heat soaked thermally toughened soda lime silicate safety glass according to EN 14179-2 but with deviating requirements concerning the duration of the holding phase of four hours and the involvement of a notified body for controlling the heat-soaking process, heat strengthened soda lime silicate glass (TVG) according to EN 1863-2⁵ and laminated safety glass (VSG) according to EN 14449 with an interlayer made of polyvinyl butyral (PVB). The PVB-interlayer has to feature the following properties for tear strength > 20 N/mm² and for elongation at rupture > 250 %.

For "System ERC 50" the monolithic glazing is to be produced of heat soaked thermally toughened soda lime silicate safety glass according to EN 14179-2 or heat soaked thermally toughened soda lime silicate safety glass according to EN 14179-2 but with deviating requirements concerning the duration of the holding phase of four hours and involving a notified body for controlling the heat-soaking process with respect to the appropriate use scenario.

The characteristic bending strength of the glass panes according to EN 1288-3⁶ shall be given in the "Declaration of Performance" as basis for the designing respectively to ensure that they will safely transmit the wind load to the support frame via the structural sealant.

The glass panes coated or entirely or partially enamelled may only be used, if their adhesive behaviour has been verified according to ETAG 002-1 with the adhesive "DOWSIL 3362"⁷ according to ETA-03/0003 or "DOWSIL 993" according to ETA-01/0005 or "Sikasil SG 500" according to ETA-03/0038 or "Sikasil IG-25 HM Plus" according to ETA-11/0391 or "KÖDIGLAZE S" according to ETA-08/0286. In the table given below coated glass products are listed which are suitable for bonding with "DOWSIL 993". If other enamellings or coatings of the glass panes are foreseen the bonded area shall be left out from this enamelling or coating. The coating is given in the "Declaration of Performance".

In the case of overhead glazing the lower glass pane of the insulated glass unit is made of laminated safety glass.

Furthermore it shall be observed that when using the coated glass according to EN 1096-4 as laminated safety glass the coated glass surface may not be oriented towards the PVB-interlayer.

The insulated glass units shall comply with the regulations for insulating glass units as per EN 1279-5⁸.

1	EN 572-9	Glass in building – Basic soda lime silicate glass products – Part 9: Evaluation of conformity/Product standard
2	EN 12150-2	Glass in building – Thermally toughened soda lime silicate safety glass – Part 2: Evaluation of conformity/Product standard
3	EN 1096-4	Glass in building - Coated glass - Part 4: Evaluation of conformity/Product standard
4	EN 14179-2	Glass in building - Heat soaked thermally toughened soda lime silicate safety glass - Part 2: Evaluation of conformity/Product standard
5	EN 1863-2	Glass in building – Heat strengthened soda soda lime silicate glass – Part 2: Evaluation of conformity/Product standard
6	EN 1288-3	Glass in building - Determination of the bending strength of glass - Part 3: Test with specimen supported at two points (four point bending)
7	DOWSIL 3362, DOWSIL 993	(new product names) are equivalent to DC 3362, DC 993
8	EN 1279-5:2005-08	Glass in building - Insulating glass units – Part 5: Evaluation of conformity

Use scenarios

- 1a Use of monolithic exterior panes for the insulated glass unit (e.g. in Germany at installation height of more than 4 m): Heat-soaked thermally toughened soda lime silicate safety glass is required according to EN 14179-1⁹ but with duration of the holding phase of four hours and involving a notified body for controlling the heat-soaking process.
- 1b Use of monolithic exterior panes for the insulated glass unit (e.g. in Germany at installation height of less than 4 m): Thermally toughened soda lime silicate safety glass according to EN 12150-1¹⁰, -2 or according to EN 14179-1, -2.
- 2a Use of laminated safety glass for the exterior or interior pane of the insulated glass unit according to EN 14449¹¹ with PVB-interlayer; Compound effects are not respected.
- 2b Use of laminated safety glass for the exterior or interior pane of the insulated glass unit according to EN 14449; Compound effects are respected regarding $G = 0.4 \text{ N/mm}^2$.

Coated glass products, suitable for structural sealant DOWSIL 993 without removing the coating

Manufacturer	Name of the product
Cerdec AG Ceramic Colours, Frankfurt/Main	Emaillierung 14710* Emaillierung 144001* * Verklebung auf Emaille-Seite
Glasfabrik SAS van Gent, Gent (NL)	Cool-Lite-Types: SS 108, SS 114, SS 120, SS 132 SS 208, SS 214, SS 220, SS 232 SS 308, SS 314, SS 320, SS 332 SS 408, SS 414, SS 420, SS 432 SS 508, SS 514, SS 520, SS 532 SS 608, SS 614, SS 620, SS 632
Glas Trösch AG, Schweiz	Sunstop Silber 20
Glasverarbeitungsgesellschaft Bietigheim	Emalit 7016 (anthrazit), Coollite TB 125 RAL 9005 GV-Nr. 93/160
Glaverbel, Belgien	Stopsol Supersilver klar
Luxguard I.S.A., Bescharge (L)	Luxguard CR 20* Luxguard CS 35* * ohne Thermopac
Pilkington Deutschland AG, Gelsenkirchen	Infrastop S 010 Infrastop S 020 Infraclad E 010 Infraclad E 020 K-Glas

⁹ EN 14179-1 Glass in building - Heat soaked thermally toughened soda lime silicate safety glass – Part 1: Definition and description

¹⁰ EN 12150-1 Glass in building – Thermally toughened soda lime silicate glass – Part 1: Definition and description

¹¹ EN 14449 Glass in building – Laminated glass and laminated safety glass – Evaluation of conformity/Product standard

SAS-Glas Saint Roch (Saint-Gobain-Group), (NL)	Coollite TS 120, C00llite TB 140, Coollite SS 108, Coollite SN 150, Antelio-Silber
Schott Glaswerke, Mainz	Calorex AO SG 30* Calorex BO SG 30* Calorex A1 Calorex B1 * Verklebung auf Emaille-Seite
Semco, Neubrandenburg	Glasemail Farbe RAL 7031 (grau), Glasemail Farbe F 79

Annex B

Structural bonding and sealing

Bonding profiles and spacers

U-profiles in combination with spacers are inserted and bonded in the insulating glass edge next to the inner pane. Different types of U-profiles and spacers are applicable. The following products are to be used as U-profiles into which the retaining devices (toggles) are inserted. The metallic U-profiles are inserted continuously and the plastic pocket U-profiles are inserted piece by piece. The U-profiles and the spacers may be used in combination with the given adhesives - see the following tables.

Table 1: U-profiles and spacers for insulating glass units

Product	Art. No.	Surface condition	Adhesives that may be used
One-piece U-profile/ spacer made of EN AW 6060 aluminium as per EN 573-3 ¹² , state T66 as per EN 755-2 ¹³ , profile as per Annex F1	326320	Anodised aluminium: colours E6-C0 to E6-C35, Königsdorf company, Wolfhagen [*] ; colours E6-C0 to E6-C35, HD Wahl company, Jettingen - Scheppach [*] ; colour E6-C05 (1003 bronze), ALCAN company, 89600 Saint Florentin, France	DOWSIL 993 Sikasil SG 500 KÖDIGLAZE S
Two-piece U-profile/ spacer made of stainless steel, material number 1.4301 as per EN 10088-2 ¹⁴ as per Annex F1 Butyl Isocoll 6773 from Isocoll GmbH, Nördlingen, is used for joining the individual parts.	202669, 202670, 202671	2R surface as per EN 10088-2, Table 6	DOWSIL 993 Sikasil SG 500 KÖDIGLAZE S
Spacers made of stainless steel, material number 1.4301, alternatively made of the above mentioned anodised aluminium in combination with plastic pockets as U-profile (see Annex F1)	202671	2R surface as per EN 10088-2, Table 6	DOWSIL 3362 HD Sikasil IG-25 HM Plus
Spacers used for the outer space of a triple glass unit		Glass	DOWSIL 993 Sikasil SG 500 DOWSIL 3362 HD Sikasil IG-25 HM Plus

¹² EN 573-3:2007-11 Aluminium and aluminium alloys - Chemical composition and form of wrought products – Part 3: Chemical composition and form of products

¹³ EN 755-2:2006-12 Aluminium and aluminium alloys - Extruded rod/bar, tube and profiles – Part 2: Mechanical properties

¹⁴ EN 10088-2:2005-09 Stainless steels – Part 2: Technical delivery conditions for sheet/plate and strip of corrosion resisting steels for general purposes

Plastic pockets made of Polyamid PA6 GF 30	268201	The surface of the plastic pocket shall be treated before bonding according to the specification deposited in Deutsches Institut für Bautechnik.	DOWSIL 3362 HD Sikasil IG-25 HM Plus
* The anodising process is to conform to the specifications described in the test reports respectively deposited in Deutsches Institut für Bautechnik.			

Table 2: Bonding profiles for monolithic glazing

Product	Art. No.	Surface condition	Adhesives that may be used
Bonding profile for monolithic glazing made of EN AW 6060 aluminium as per EN 573-3 state T66 as per EN 755-2. For stainless steel profiles the details according to Table 1 apply.	433460, 440050, 352550, 354540, 336690 (see Annex F1)	Anodised aluminium: colours E6-C0 to E6-C35, Königsdorf company, Wolfhagen; colours E6-C0 to E6-C35, HD Wahl company, Jettingen - Scheppach; colour E6-C05 (1003 bronze), ALCAN company, 89600 Saint Florentin, France*	DOWSIL 993 Sikasil SG 500 KÖDIGLAZE S
* The anodising process is to conform to the specifications described in the test reports respectively deposited in Deutsches Institut für Bautechnik.			

Adhesives

Two-component silicone adhesive is to be used for the structural bonding considering the following detailed specifications. For all parts of load transmission by bonding – glass to glass, spacer to glass and glass to the frame – the adhesives and surfaces according to the respective ETA of the silicone, Annex A and Table 3 are required.

Table 3: Structural sealants

Structural sealant	Manufacturer	Associated ETA	Surfaces in addition to those assessed according to the associated ETA	Additional requirements
DOWSIL 993	DOW Europe GmbH	ETA-01/0005	Coated glass as per Annex A; Anodised aluminium see Table 1 and 2	For the manufacture of "System ERC 50" the adhesion surface may be coated – before the actual sealing – with a (1.5 ± 0.5) mm thick sealant layer according to the method deposited with Deutsches Institut für Bautechnik. Only one of the following combinations (glass face – aluminium face) may be used thereby: DOWSIL 993 – DOWSIL 993 DOWSIL 3793 – DOWSIL 993 DOWSIL 3362 – DOWSIL 993
Sikasil SG 500	SIKA SERVICES AG	ETA-03/0038	Anodised aluminium see Table 1 and 2	For the manufacture of "System ERC 50" the adhesion surface may be coated – before the actual sealing – with a (1.5 ± 0.5) mm thick sealant layer according to the method deposited with Deutsches Institut für Bautechnik. Only one of the following combinations (glass face – aluminium face) may be used thereby: SIKASIL SG 500 – SIKASIL SG 500 SIKASIL IG 25 – SIKASIL SG 500
KÖDIGLAZE S	Kömmerling	ETA-08/0286	Anodised aluminium and stainless steel, see Table 1 and 2	

DOWSIL 3362 HD	DOW Europe GmbH	ETA-03/0003	Plastic pockets, see Table 1	The surface of the plastic pocket is to be preprocessed with the purifier DOWSIL R41 from DOW Europe GmbH according to their specifications.
Sikasil IG-25 HM Plus	SIKA SERVICES AG	ETA-11/0391	Plastic pockets, see Table 1	The surface of the plastic pocket is to be preprocessed with the Sika Primer 210 from SIKA SERVICES AG according to their specifications..

Only compatible materials may be installed adjacent to the structural sealant, and this compatibility is to be proven in the assessment procedure. Neighbouring materials may be used in the combinations specified in Table 4.

Table 4: Effects of materials in contact

Permissible combinations of structural sealants and adjacent materials																
Manufacturer	Structural sealant	Inner seal / butyl					Spacer tape Cover profile Sealing profile				Glazing support/ setting block			SI Isolator	Plastic Pocket	Frame profiles
		BU-S, Kömmerling	Climafill standard, NMC _{sa}	GD 115 Kömmerling	Terostat 969, H.B. Fuller	Sika Glaze IG-5, SIKA SERVICES	Norton V 2100	Norton V 3100	Vito Glazing mount 400	Silicone EN 7863 Type B, BIW Isolierstoffe	EPDM EN 7863, Type C	Silicone, Sico	GLSV, Gluske	polypropylene, Repsol	Nomaflex PP-Foam	PA6 GF30
DOW Europe GmbH	DOWSIL 993	X	X	X			X	X			X	X	X	X		X
	DOWSIL 3362	X	X		X						X	X				
	DOWSIL 3362 HD													X	X	X
Sika AG	Sikasil SG 500	X				X	X	X		X	X		X	X	X	X
	Sikasil IG25 HM Plus	X												X	X	X
Kömmerling	KÖDIGLAZE S			X			X	X								

Details for the bonding process

The structural sealant is to be factory applied. The infill elements may only be manufactured in the manufacturing plants as noted in Annex E.

The structural bond of the insulating glass edge compound is to be silicone according to Table 3.

The surfaces to be sealed may only be prepared in conformity with the manufacturing directives given by the sealant manufacturer. Bubbles, holes or inclusions in the structural sealant are not permissible.

For the use as horizontal respectively overhead glazing the structural sealant of the infill elements shall be positioned in such a way that it is not constantly subjected to tensile forces.

Inner sealing of insulating glass units

For the inner sealing of infill elements designed as insulating glass units, a polyisobutylene layer is to be applied between the glass panes and spacers. Details on the butylene to be used are deposited with Deutsches Institut für Bautechnik.

Sealing of the façade systems "Schüco FWS 50/60 SG and FWS 50/60 SG.SI"

The seams between two infill elements are closed by

- silicone sealant (wet sealing),
- a U-shaped silicone seal or silicone-compatible EPDM gasket as per EN 7863¹⁵, shore hardness type C (70 IRHD), and
- a seal across the outer pane, of silicone or silicone-compatible EPDM gasket as per EN 7863, type B.

Annex C

Characteristics and load-bearing capacities of the glazing supports, retaining devices (toggles), wind protection devices (emergency retainers)

Glazing supports

Glazing supports with a width of 100 mm in accordance with Annex F 2 support the self-weight of the glass panes. The extruded profiles as per EN 15088¹⁶ are produced of EN AW-6060 T66 as per EN 755-2 according to EN 573-3. The material properties are deposited with Deutsches Institut für Bautechnik.

The setting blocks are of plastic with a Shore A hardness of approx. 70 ± 5 as per ISO 7619-1¹⁷ and ISO 7619-2¹⁸. Detailed information on the plastics to be used is deposited with Deutsches Institut für Bautechnik.

Table 5: Types of glazing supports for insulating glass units of two glass panes and for monolithic panes

Support	Art. No.	Type of fixing	Glass support material	Setting block material
System FWS 50 SG				
Both panes, "standard load"	266674, 266675, 266677, 266676	hung in the frame transom profile	EN AW 6005A* aluminium as per EN 573-3	Silicone
Inner pane, "standard load"	266673			
Both panes, "increased load"	242297, 242299, 242358, 242359, 242379	two ST5.5 x 23.5 screws (Art.-No. 205963) in the screw channel of the frame transom profile	EN AW 6005A aluminium as per EN 573-3, strength "F27" as per manufacturer designation**	Polypropylene – moulding compound
Inner pane, "increased load"	242298, 242300			
Outer pane	242301	two ST5.5 x 38 screws in the screw channel of the frame transom profile	EN AW 6005A aluminium as per EN 573-3	The outer pane lies on the seal, may only be used with dry seal joint
	237525		aluminium EN AW 6060*	

¹⁶ EN 15088 Aluminium and aluminium alloys - Structural products for construction works - Technical conditions for inspection and delivery

¹⁷ ISO 7619-1 Rubber, vulcanized or thermoplastic - Determination of indentation hardness - Part 1: Durometer method (Shore hardness)

¹⁸ ISO 7619-2 Rubber, vulcanized or thermoplastic - Determination of indentation hardness - Part 2: IRHD pocket meter method

System FWS 60 SG				
Both panes, "standard load"	266679, 266680, 266682, 266681	hung in the frame transom profile	EN AW 6005A* aluminium	Silicone
Inner pane, "standard load"	266678			
Both panes, "increased load"	242188, 242302, 242360, 242361, 242380	two ST5.5 x 23.5 screws (Art.-No. 205963) in the screw channel of the frame transom profile	EN AW 6005A aluminium as per EN 573-3, strength "F27" as per manufacturer designation**	Polypropylene – moulding compound
Inner pane, "increased load"	242189, 242303			
Outer pane	242301	two ST5.5 x 38 screws in the screw channel of the frame transom profile	EN AW 6005A aluminium as per EN 573-3	The outer pane lies on the seal, may only be used with dry seal joint
	237525		aluminium EN AW 6060*	
System ERC 50				
Glass panes ≤ 1.50 m x 2.00 m d ≤ 12 mm	433600	two ST3.9 x 16 screws in the bonding profile	EN AW 6060 T66 aluminium as per EN 573-3	Silicone
Glass panes ≤ 1.50 m x 2.00 m d ≤ 12 mm	433610, 433620	ST3.9 x 16 screws in the bonding profile, a ≤ 250 mm	EN AW 6060 T66 aluminium as per EN 573-3	Silicone
* Extruded profiles as per EN 15088 of EN AW 6060 aluminium as per EN 573-3, state T66 as per EN 755-2				
** The material properties are deposited with Deutsches Institut für Bautechnik.				

Table 6: Types of glazing supports for insulating glass units of three glass panes

Support	Art. No.	Type of fixing	Glass support material	Setting block material
System FWS 50 SG.SI				
Three panes, "increased load"	268053, 268054, 268056, 268057, 268059, 268064, 268066	two ST5.5 x 23.5 screws (Art.-No. 205963) in the screw channel of the frame transom profile	EN AW 6005A aluminium as per EN 573-3, strength "F27" as per manufacturer designation**	Silicone

System FWS 60 SG.SI				
Three panes, "increased load"	268067, 268068, 268070, 268071, 268073, 268078 268080	two ST5.5 x 23.5 screws (Art.-No. 205963) in the screw channel of the frame transom profile	EN AW 6005A aluminium as per EN 573-3, strength "F27" as per manufacturer designation**	Silicone

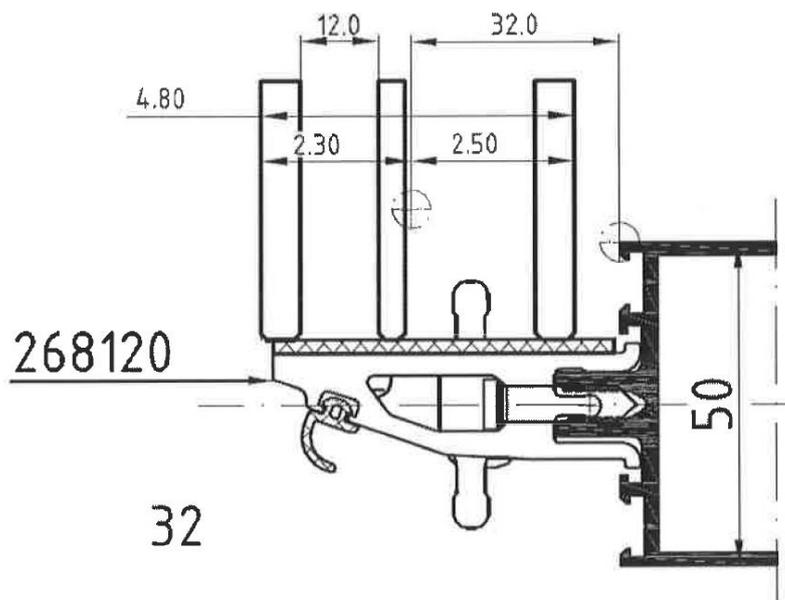
Table 7: Load-bearing capacities of the glazing supports

Art.-No.		Permissible loads (5%-fractile / 75% confidence level; $\gamma_{glob} = \gamma_M \cdot \gamma_F = 1.7$)
One-piece supports		
266674, 266675, 266677, 266676, 266673, 266679, 266680, 266682, 266681, 266678		1.53 kN
242188, 242189, 242297, 242298, 242299, 242300, 242302, 242303, 242358, 242359, 242360, 242361, 242379, 242380		2.71 kN
242301, 237525		0.53 kN
242566 bis 242569, 242721 bis 242730		0.24 kN
Assembled supports		
front	rear	
237525, 242301	238470, 242185, 242189	1.95 kN
	242298, 242300, 242303	1.53 kN
Monolithic glazing		
266674, 266675, 266677, 266676, 266679, 266680, 266682, 266681		1.53 kN
433600 only for glass panes ≤ 1.50 m x 2.00 m and a thickness of the panes ≤ 12 mm		0.45 kN
433610, 433620 only for glass panes ≤ 1.50 m x 2.00 m and a thickness of the panes ≤ 12 mm		0.6 N/m

Table 8: Deflection under load

Art.-No.	$F_{u,Rd}$	$F_{0.5\text{ mm}}$	$F_{1\text{ mm}}$	$F_{1.5\text{ mm}}$
268053	4.52	1.04	1.89	2.65
268059	3.48	0.70	1.47	2.10
268066	2.48	0.44	0.75	1.04
268067	3.77	1.02	2.18	2.97
268073	3.14	0.78	1.57	2.10
268080	2.22	0.51	1.05	1.43

For choosing the appropriate support usually the serviceability state is decisive. For this reason the correlation between load and deflection is given in Table 8. The given values apply to a single support. Every pane is placed on two supports. The deflection is measured between the edge of the transom profile and the axis of gravity of the glass unit – e.g. for the distance 32, see the following figure.



Retaining devices (toggles)

The horizontal wind suction loads to the insulating glass units are transferred to the substructure by a composite system. The interior pane of the insulating glass unit is mechanically fastened and the exterior pane is retained by structural sealant. Retaining devices (toggles) are inserted into the U-profiles of the insulating glass units (Annex F 5 to 12), next to the inner pane. There are two different kinds of retaining devices, a die-cast zinc retaining device or an extruded aluminium retaining device.

These retaining devices (toggles) are to be used as two-sided retaining devices and as single-sided retaining devices (Annex F 3). The Art.-No. of the two-sided retaining devices are 237855 and 242363 and 266003, 266537, 266539 and 266005. The Art.-No. of the single-sided retaining devices are 237854 and 242362 and 266002, 266536, 266538 and 266004.

The above named retaining devices are made of die-cast zinc of G-ZnAl 4 Cu 3 (ZP 0430) as per EN 12844¹⁹. They are to be fixed to the screw channel of the load-bearing structure using self-tapping screws of type ST 5.5 x 23.5 (Art.-Nr. 205963) or ST 5.5 x 27.5 (Art.-Nr. 225082) as per EN ISO 1478²⁰.

The extruded retaining devices are profiles as per EN 15088 and EN 1090 and are consist of aluminium EN AW-6060 T66 as per EN 755-2 according to EN 573-3. They are 60 mm long and are to be fixed in the screw channel of the transom-mullion profiles using two self-tapping screws for each support as per EN ISO 1478.

In System FWS 50 SG und FWS 50 SG.SI the extruded retaining devices Art.-No. 237856, 237857, 242425, 242426, 242429 and 242430 are used. In System FWS 60 SG und FWS 60 SG.SI instead of Art.-No. 242425 and 242426 Art.-No. 242427 and 242428 are used respectively.

Table 9: Load-bearing capacities of the retaining devices

Art. No.	Permissible loads (5%-fractile / 75% confidence level; $\gamma_{glob} = 3.0$)	Note
242363, 237855	1.18 kN	centrically loaded
242362, 237854	0.47 kN	eccentrically loaded (screw channel stressed by bending)
237856, 242429	0.50 kN	eccentrically loaded
237857, 242425, 242426, 242427, 242428, 242430	0.44 kN	eccentrically loaded

The retaining devices of an infill element may have a maximum distance of 150 mm to the element corners and 400 mm between each other. The single-sided retainers of adjacent infill elements are to be arranged alternately at a maximum distance of 200 mm.

The contact depth of the retaining devices in the U-profile is to be at least 7.5 mm (including tolerances).

Wind protection devices (emergency retainers)

For the loading case when the sealant fails, the horizontal wind suction loads are absorbed and passed on by emergency retainers. They were fixed in screw channels of the frame profiles. The load bearing capacity of those screw channels are not assessed in this ETA. The necessity to use such emergency retainers is regulated by the respective Member States.

- Aluminium emergency retainers

The aluminium emergency retainers - Art. No. 266166, 266167 and 266168 - are positioned at specific points depending on the loading and have a base area of approx. 52 mm x 60 mm. The emergency retainers are extruded precision profiles as per EN 15088 and they are made of aluminium EN AW-6060 T66 as per EN 755-2 according to EN 573-3 with silicone setting blocks having a Shore A hardness of approx. 50 as per ISO 7619-1,-2. They are fixed to the transom-mullion profiles using two screws.

19
20

EN 12844:1999-01
EN ISO 1478:1999-12

Zinc and zinc alloys – Castings - Specifications
Tapping screw thread

- Aluminium emergency retainers for monolithic glazing
The emergency retainers - Art. No. 433610 and 433620 - are used for securing monolithic glazing for façades. Their application is limited to glass panes $\leq 1.50 \text{ m} \times 2.00 \text{ m}$ and a thickness of the panes $\leq 12 \text{ mm}$. The emergency retainers are extruded precision profiles as per EN 15088 and they are made of aluminium EN AW-6060 T66 as per EN 755-2 according to EN 573-3 with silicone setting blocks having a Shore A hardness of approx. 50 as per ISO 7619-1,-2. They are fixed to the bonding profiles with screws at a distance of 250 mm.
- Stainless steel emergency retainers inserted into the U-profile
The emergency retainers - Art. No. 266002 to 266005 and 266536 to 266539 respectively - are used for securing insulated glass units that consist of two panes. For the use in areas with different floor levels, where a risk of fall to a lower level is given see Annex D.
In addition to the emergency retainers special retaining devices with tailored thickness belong to the whole system. The emergency retainers are made of stainless steel, material No 1.4301 as per EN 10151²¹ and are used together with the stainless steel two-piece U-profile/spacer as per Table 1. The emergency retainers are inserted into the U-profile of the spacer and are fixed during the sealing process by being pressed into the two adhesive layers adjacent to the profile, and encompass the outer pane. The stainless steel emergency retainer system is designed for a maximum outer pane thickness of 12 mm.

Verification of the glass panes and the wind protection devices (emergency retainers)

For the load case relating to the failure of the structural bond, verification is to be provided that the outer glass panes are held by the emergency retainers. A permissible principal tensile stress for the heat soaked soda lime silicate safety glass of $\sigma_{zul} = 105 \text{ N/mm}^2$ may be assumed for this case.

The emergency retainers are also to be dimensioned for the above mentioned load case. When designing the emergency retainers, the permissible loads listed in the following sections may be assumed ($\gamma_{glob} = 1.1$).

Aluminium emergency retainers Art. No. 266166, 266167, 266168

The permissible centric load is: $F_{zul} = 3.86 \text{ kN}$

If the load only occurs through an adjacent pane (eccentric load) then the load is to be doubled and then treated as a centric load.

Im Rahmen der statischen Berechnung ist zu prüfen, dass unter den vorhandenen Lasten die Verformung der Glastafel nicht zum Herausrutschen aus den Nothaltern führen kann. Der Glaseinstand sollte 5 mm nicht unterschreiten. Hierzu ist die Sehnenverkürzung auf maximal 9,5 mm zu beschränken. Sie darf vereinfachend mit der Kreisgleichung ermittelt werden:

$$s = \sqrt{l^2 - \frac{16}{3} f^2}$$

f Stichhöhe

l Initial length of the glass in a non-deformed state

Aluminium emergency retainers Art. No. 433610, 433620

The emergency retainers are only for System ERC 50 with glass panes $\leq 1.5 \text{ m} \times 2.0 \text{ m}$ and a thickness of the panes $\leq 12 \text{ mm}$.

The permissible wind suction load is: $F_{zul} = 1.5 \text{ kN/m}^2$

- Stainless steel emergency retainers Art. No. 266002 to 266005 or 266536 to 266539

The permissible load of a stainless steel emergency retainer is $F_{zul} = 0.36 \text{ kN}$

The clearance between the stainless steel emergency retainers inserted into the U-profile may not exceed 400 mm.

Within the scope of static loading calculations verification is to be provided that deformation of the glass unit under the existing loads cannot lead to the panes slipping out of the emergency retainers. The chord reduction is to be limited to a maximum of 9.5 mm.

Annex D

Details for structural design calculation and installation

General aspects

The verification of durability is part of testing the essential characteristics. Durability is only ensured if the specifications for the intended use according to the following requirements and provisions are taken into account.

For the structural design calculation the design codes of the Member State, in which the infill elements will be used, shall be respected. To this the use scenarios according to Annex A shall be part of the "Declaration of Performance".

For choosing the appropriate glass panes and for all mechanical devices see Annexes A to D.

For using the glass units as barrier against falling down see the specifications below of the clauses "Insulating glass unit used as barrier against falling down" and "Tested compositions of glazing units (dynamic load from height 900 mm)".

The self-weight of the glazing and the wind loads shall be carried by the sub-structure. This shall be verified by calculation.

The widths of the joints shall be determined in such a way to avoid glass to glass or glass to metal contact.

Details for installation, transport, maintenance

The infill elements shall be fixed to the supporting structure according to the processing guidelines of the company SCHÜCO International KG such that no restraints may occur in the elements. The bonding and installation shall be performed by experts only, which have been trained for these works by the company SCHÜCO International KG.

The manufacturer shall take suitable precautions for packaging, transport and storage to prevent the application of unacceptable loads to the structural bonding, for example by providing suitable racks, and to prevent from exposure to water, solar radiation or significant changes of temperature, by protecting with covers.

The cleaning of the façade may only be performed by using water with the addition of not more than 1 % surface-active agents without any other chemical additives and/or any aggressive cleaning methods (e.g. blast-cleaning with steam pressure).

The use of the infill elements for the stiffening of other building elements is not covered by this ETA.

Insulating glass unit used as barrier against falling down

The characteristic values of the actions on glazings used as barrier against falling down (e.g. wind, horizontal load at cross beam level or briefly cross beam load) shall be taken from the regulation of the respective Member State. For insulating glazings it is further necessary to take account of pressure differences between the enclosed glass volume and the ambient air resulting from temperature variations and atmospheric pressure variations as well as of changes of levels between place of manufacture and place of installation.

For the verification of the insulating glass unit under simultaneous action of wind (w) and cross beam load (h) it is permitted to neglect additional stresses resulting from pressure differences (d). It is further permitted, in such a case, to base the design of the glazing construction, instead on the full superposition, on that one of the load case combinations which is the more unfavourable.

- w "+" $h/2$
- h "+" $w/2$.

Additionally both cross beam load and wind load shall each be fully superposed by the load resulting from pressure differences:

- h "+" d
- w "+" d

Besides the static actions according to the regulations of the respective Member State it is further necessary to verify sufficient loadbearing capacity of the glazing construction in the case of impact by persons. Those actions are also named "dynamic load or impact load" (see the following test results and Annex B of EAD 090035-00-0404). For the verification of the impact resistance it is not necessary to superpose loads according to the specifications above.

Tested compositions of glazing units (dynamic load from height 900 mm)

For the following compositions of insulating glass units with structural bonding the impact tests are passed in the context of issuing this ETA. The verification of static actions is to be done in addition as mentioned above. As precondition U-profiles of anodized aluminium or stainless steel according to Annex B, Table 1 are required.

Insulating glass units with two panes and without emergency retainers

- extruded aluminium retaining device
- die-cast zinc retaining device
- with the following glass composition:
 - Inner pane: laminated safety glass with a thickness of at least 5 mm annealed glass / 0,76 mm PVB-interlayer / 5 mm annealed glass;
 - Space between two panes: 20 mm
 - Outer pane: 8 mm heat soaked soda lime silicate safety glass
 - Dimensions (width x height): minimum: 500 mm x 1000 mm
maximum: 2100 mm x 4200 mm

Up to the width of the panes of about 720 mm the maximum clearance between two toggles amounts to 350 mm. For larger width the maximum clearance amounts to 400 mm.

In the area of cross beam load (h) at least two toggles are required on each side according to Annex F 22-23.

Insulating glass units with two panes and with emergency retainers made of aluminium

- extruded aluminium retaining device
- die-cast zinc retaining device
- emergency retainers Art.-No. 266166, 266167 or 266168 according to Annex F 3
- with the following glass composition:
 - Inner pane: laminated safety glass with a thickness of at least 5 mm annealed glass / 0,76 mm PVB-interlayer / 5 mm annealed glass;
 - Space between two panes: 20 mm
 - Outer pane: 8 mm heat soaked soda lime silicate safety glass
 - Dimensions (width x height): minimum: 500 mm x 1000 mm
maximum: 2100 mm x 4200 mm

Up to the width of the panes of about 720 mm the maximum clearance between two toggles amounts to 350 mm. For larger width the maximum clearance amounts to 400 mm.

In the area of cross beam load (h) at least two toggles are required on each side according to Annex F 22-23.

Insulating glass units with two panes and with emergency retainers made of stainless steel

- extruded aluminium retaining device
- die-cast zinc retaining device
- emergency retainers Art.-No. 266002 to 266005 and 266536 to 266539 according to Annex F 3
- with the following glass composition:
 - Inner pane: laminated safety glass with a thickness of at least 5 mm annealed glass / 0,76 mm PVB-interlayer / 5 mm annealed glass;
 - Space between two panes: 20 mm
 - Outer pane: 8 mm heat soaked soda lime silicate safety glass
 - Dimensions (width x height): minimum: 500 mm x 1000 mm
maximum: 2100 mm x 4200 mm

Up to the width of the panes of about 720 mm the maximum clearance between two toggles amounts to 350 mm. For larger width the maximum clearance amounts to 400 mm.

In the area of cross beam load (h) at least two toggles are required on each side according to Annex F 24-25.

Insulating glass units with three panes and without emergency retainers

- extruded aluminium retaining device
- die-cast zinc retaining device
- with the following glass composition:
 - Inner pane: laminated safety glass with a thickness of at least 5 mm annealed glass / 0,76 mm PVB-interlayer / 5 mm annealed glass;
 - Inner space between two panes: 20 mm
 - Intermediate pane: at least 4 mm annealed glass
 - Outer space between two panes: 12 or 16 mm
 - Outer pane: 8 mm heat soaked soda lime silicate safety glass
 - Dimensions (width x height): minimum: 720 mm x 720 mm
maximum: 2600 mm x 4200 mm

In the area of cross beam load (h) at least two toggles are required on each side according to Annex F 26-27.

Insulating glass units with three panes and with emergency retainers made of aluminium

- extruded aluminium retaining device
- die-cast zinc retaining device
- emergency retainers Art.-No. 266166, 266167 or 266168 according to Annex F 3
- with the following glass composition:
 - Inner pane: laminated safety glass with a thickness of at least 5 mm annealed glass / 0,76 mm PVB-interlayer / 5 mm annealed glass;
 - Inner space between two panes: 20 mm
 - Intermediate pane: at least 4 mm annealed glass
 - Outer space between two panes: 12 or 16 mm
 - Outer pane: 8 mm heat soaked soda lime silicate safety glass
 - Dimensions (width x height): minimum: 720 mm x 720 mm
maximum: 2600 mm x 4200 mm

In the area of cross beam load (h) at least two toggles are required on each side according to Annex F 26-27.

current status mar. 2018

Name	Street	Zip	Place
BGT Bischoff Glastechnik AG *	Alexanderstraße 2	7501	Bretten
Flachglas Radeburg Glassolutions Saint Gobain FLACHGLAS WERNBERG GMBH *	Bahnhofstraße 30 Nürnberger Str. 140	0147 9253	Radeburg Wernberg-Köblitz
Fugen- und Verklebetechnik *	Karlstraße 8	7114	Steinenbronn
Glasbau Kraft	Ustersbacher Str. 11	8642	Dinkelscherben
GLAS-DREISBUSCH GmbH & Co. KG *	Österreicher Str. 12	6377	Goldbach
GLASZENTRUM G.F. Schweikert GmbH	Salzstr. 191	7407	Heilbronn
Gebr. Schneider Fensterfabrik GmbH & Co.KG	Rechenberger Str. 7-9	7459	Stimpfach
Heidersberger GmbH Fassadenbau	Hansaring 23	4826	Greven
Hoffmannnglas GmbH & Co. Glasgroßhandlung KG	Gewerbefoh Nr. 3	0618	Peissen/Halle
Hunsrückler Glasveredelung Wagner GmbH & Co.	Dr.Fritz-Ries-Str. 1	5548	Kirchberg
HVF mobile structural glazing *	Rossbergweg 8	7323	Weilheim
INTERPANE Glasgesellschaft mbH Lauenförde	Sohnreystr. 21	3769	Lauenförde
Judenhofer Glas GmbH	Alter Rennweg 163	8403	Landshut
Kemper GmbH	Hünegräben 3 u. 12	5739	Schmallenberg
Linther Glas Kölling Glas GmbH & Co. KG *	Linther Str. 3	1482	Linthe
Oder-Glas GmbH	Gewerbeparkring 1	1529	Müllrose
OKALUX GMBH *	Am Jöspershecklein 1	9782	Marktheidenfeld
OPTITHERM - Glas Sander GmbH	Bachstr. 20	3317	Borchen
ROSCHMANN GLAS GmbH & Co. KG *	Dieselstr. 37	8636	Gersthofen
Rupert App GmbH & Co.	Memminger Str. 77	8829	Leutkirch
Philippi Metallbau	Kloppenheimer Weg 1	6519	Wiesbaden
RUF Fassadentechnik	Industrieweg 3	6392	Kleinheubach
Schollglas Sachsen GmbH	Vorwerkstr. 3	0168	Nossen
SEMCOGLAS GmbH *	Langebrügger Str. 10	2665	Westerstede
Teutemacher Glas GmbH	Südstr. 1-5	4823	Warendorf
Amberger Glas GmbH & Co.KG	Fuggerstr. 34	9222	Amberg

System Schüco FWS 50 SG, FWS 60 SG; FWS 50 SG.SI, FWS 60 SG.SI; ERC 50

**Global certified companies (Germany) for
structural glazing**

Annex E
Page 1

current status mar. 2018

Name	Street	Zip code	Place	country
SABU 2 L.i.A. Sasinowscy Sp.j.	ul. Spokojna 1B	05-250	Slupno	Polen
Alu-Plus Sp. Z o.o.	Lezno 59 A	80-298	Gdansk	Polen
Reconal Sp. Z o.o	ul. Krakowska 150	35-506	Rzeszow	Polen
Elkam	ul. Olszynska 27	11-040	Dobre Miasto	Polen
P.P.U.H. WiK Zawadka Sp.j.	ul. Jesionowa	05-816	Michalowice-Osiedle	Polen
PEMALUX SP. Z O.O.	uL.DALEKA 110A	82-200	MALBORK	Polen
KER +3MR Technika Aluminiowo-	Miedziana	55-003	Czernica	Polen
Argo Spolka z Organiczona	ul. Tokarska 21	20-210	Lublin	Polen
ALREM - JERZY BYRDZIAK	ul. Zywiecka 384	43-310	Bielsko-Biala	Polen
ALUANT-Projekt	ul. Lukowska 5 m.M. 185	04-113	Warszawa	Polen
Stalbud Marcin Paluch	ul. Krasickiego 17/19	26-640	Skaryszew	Polen
VITROPLAST DYSTRYBUCJA	ul. Ruczaj 89	02-997	WARSZAWA	Polen
Opal Spolka Z Ograniczona	ul. Kakolewska 13	62-065	Grodzisk Wielkopolski	Polen
Gabit	ul. Jeziorna 41	77-100	Bytow	Polen
Alprof Sp. Z o.o.	ul. Wallenroda 17/8	80-438	Gdansk	Polen
AWILUX Polska Spolka z	ul. Wiasenna 17	64-100	Leszno	Polen
Alures Sp z o.o.	ul. Techniczna 2A	36-040	Boguchwala	Polen
Lindhorst Aluminium Spolka z	ul. Boznicza 11e	61-752	Poznan	Polen
Defor S.A.	ul. Rolna 5	63-100	Srem	Polen
BUDTRANS SYSTEMY	Stobno 9	72-002	Doluje	Polen
7 NT Hitech Sp. Z o.o.	Przemyslowa 47	28-300	Jedrzejow	Polen
Press Glass SA	ul. Kopalniana 9	42-262	Poczesna	Polen
Q4Glass, ABJ Investors sp.z.o.o.	ul. Bojownikow o Wolnosc i	75-209	Koszalin	Polen
Vetrex Sp.z.o.o.	ul.Skarszewska 13	83-110	Tczew Rokitki	Polen
FBR Spolka	Obodowie 5	89-412	Sosno	Polen

System Schüco FWS 50 SG, FWS 60 SG; FWS 50 SG.SI, FWS 60 SG.SI; ERC 50

Global certified companies (structural glazing)

Annex E
Page 2

current status mar. 2018

Name	Street	Zip code	Place	country
AGC Tremcom s.r.o.	Suvoz 12	911 01	Trencin	Slowakei
Nitrasklo, a.s.	Levicka 3	95015	Nitra	Slowakei
Gunn Lennon Fabrications Limited	Dublin 9		Santry	Irland
Williaam Cox Ireland Ltd	Robin Hood Industrial		Clondalkin	Irland
Norbridæ Developments Ltd T/A	Le Brocauv Avem Park		Dublin 12	Irland
Carey Glass Ltd	Limerick Road		Nenagh	Irland
Friva AS	Knapstadveien 1	1820	Spydeberg	Norwegen
Idex aluqaar ehf	Smiöiuvegi 3	200	Kopavogur	Island
Ariston Glass Yalourgikes	Epano Karpounari	20300	Loutraki	Griechenland
Yalodomi-Mavropoulos A.E.B.E	Komotinis 14	15344	Gerakas	Griechenland
Kademiladis Athanassios S.A.	St. Stefanoustr. 3	56429	N.Efkarpia/Thessaloni	Griechenland
Sifakis Em. Nikolaos	Roido Str. 15	12131	Peristeri	Griechenland
Athanasios Alafropatis	E co lp	35100	Vipe	Griechenland
Vasileiou Krystalla EPE	28th Octovriou	34002	Vasiliko Chalkida	Griechenland
Patsis Glass S.A.	Kleisthenous 400	15344	Gerakas - Athens	Griechenland
Rakla Tampere Oy	Vehmaistenkatu 5	33730	Tampere	Finnland
Lasiluoto Oy	Littoistentie 168	21500	Piikkiö	Finnland
Seloy oy	Loimijoentie 215	32700	Huittinen	Finnland
Lasiliiri Oy AG	Lepistöntie 3	11310	Riihimäki	Finnland
Avieli Aluminium Industrial Area Kiryat Arye	Boltimor St. 9	49510	Petach Tiqva	Israel
WMA Glass s.r.o.	Skolni 70	46331	Chrastava	Tschechien

System Schüco FWS 50 SG, FWS 60 SG; FWS 50 SG.SI, FWS 60 SG.SI; ERC 50

Global certified companies (structural glazing)

Annex E
Page 4

current status mar. 2018

Name	Street	Zip code	Place	country
Petra Aluminium Company	P.O Box 2230	11181	Jordan	Jordanien
Anodite S.A.	Ureta Coxx 1035		Santiago de Chile	Chile
Tycotech Aluminium Sdn Bhd	Taman Perindustrian Balakong	43300	Selangor Darul Ehsan	Malaysia
Georgios Neofytou & Sons Ltd	A. Koursoumba Str. 4	1028	Kaimakl	Zypern
Metalco Glazing Ltd	Polyphimou Str. 1, P.O. Box 1307	1506	Nicosia	Zypern
Porfyrios Chap Glass Ltd	PO Box 28343	2093	Nicosia	Zypern
Staticus UAB	Metalo Str. 13	02190	Vilnius	Litauen
Skonto Plan Ltd SIA	Rūpniecības iela 6	LV 3101	Tukums	Lettland
Alumax Group SIA	Jaunpils iela 1	LV-1002	Rīga	Lettland
Aile Grupa SIA	Pulvera iela 28	LV 3405	Liepāja	Lettland
DG Constructions SIA Garkalnes Now	Meznoru iela 5	LV-2137	Garkalnes nov.	Lettland
Glas Troesch Artemovsk LLC	Pervomajsky Str. 152	84500	Artemovsk	Ukraine
SK Intek	Plozhad Geroev Majdana	49000	Dnepropetrowsk	Ukraine
LLC Eclipse Aluminium	Street Mandrikovsay 47-107	49094	Dnipro	Ukraine
LLC Evroviknobud	Ul. Matrosova 31	01103	Kiew	Ukraine
Alutrade	South B 11 Industrial Areas, PO		Accra	Ghana
Legend Aluminium Co. Ltd.	East Legon, Adjiringano		Accra	Ghana
Polypane Glasindustrie NV	T.T.S. Industriezone C	B-9140	Temse	Belgien
Sprimoglass S.A	Zone Industrielle de Damre	4140	Sprimont	Belgien

System Schüco FWS 50 SG, FWS 60 SG; FWS 50 SG.SI, FWS 60 SG.SI; ERC 50

Global certified companies (structural glazing)

Annex E
Page 6

current status mar. 2018

Name	Street	Zip code	Place	country
Chau A Industry Joint Stock Company	Lot CN4-2.1, Thach That Industrial Zone		Hanoi City	Vietnam
Phuc Hung Holdings Construction JSC.	3rd Floor, HH2 Building, Duong Dinh Nghe Street		Ha Noi	Vietnam
Quan Dat Trading and Prod. Co. Ltd	Tan Thoi Hiep IDZ, Dist. 12		Ho Chi Minh City	Vietnam
TID Joint Stock Company	4 Lieu Giai Street		Ha Noi City	Vietnam
Eurowindow Joint Stock Company	Me Linh		Ha Noi City	Vietnam
North Phi Kha Trading – Services	TS7,Tien Son Industrial Park		Bac Ninh Province	Vietnam
Phi Kha Trading-	428 Nguyen van Nghi St,		Ward 7, Go Vap District	Vietnam
Viet Tin International Trading	106/14/18 Hoang Quoc Viet St		Ha Noi	Vietnam
Tin An JSC	Block B1, D3 Street		Binh Duong Procince	Vietnam
CERVI GLAS, S.L.	CTR.TURIS-SILLA,KM. 2	46389	TURIS (VALENCIA)	Spanien
COMAYCO VIDRIO LA PLANA S.L.	AVDA. VALENCIA, 157	12005	CASTELLON	Spanien
ARIÁ'O DUGLASS, S.A.	Pi royales bajos s/n	50171	Puebla de alfinden	Spanien
UNION VIDRIERA ARAGONESA, S.L.	C/ O, 233 P.IND LA PAZ	44195	TERUEL	Spanien
CONTROL GLASS ACUSTICO Y SOLAR	C/ OPORTO, 4 P.IND LA PAZ	44195	TERUEL	Spanien
ASTIGLASS, S.L.	P. LA LAGUNILLA 5	41400	ECIJA	Spanien
LA VENECIANA IBERIAGLASS, S.L.	LUGAR CIMA DO AZZE-FILGUEIRA	36500	LALIN-PONTEVEDRA	Spanien
VIDROGAL S.A.	P.I.VILAPOUCA-SOTELO DE MONTES	36560	FORCAREY-PONTEVEDRA	Spanien
TEC DEL VIDRIO TRANSFORMADO S.L.	P.I. EL BAYO, PARC. I, 19	24492	CUBILLOS DEL SIL	Spanien
Cristec Vipla S.L.	P.I.Cam Llong C/Marinda, 10-12	25600	Balaguer	Spanien
VITRO CRISTALGLASS SL	C/ NARAYA S/N	28947	FUENLABRADA	Spanien
X-VIDRESIF, S.A.	C/TREBALL, 7	17846	MATA-PORQUERES (GIRONA)	Spanien
LA VENECIANA, S.A.	Apartado de correos 1020	28905	GETAFE	Spanien
CRISTALERIA RAMOS SA	C/ Palier, 20-22	28914	Leganes (Madrid)	Spanien

System Schüco FWS 50 SG, FWS 60 SG; FWS 50 SG.SI, FWS 60 SG.SI; ERC 50

Global certified companies (structural glazing)

Annex E
Page 7

current status mar. 2018

Name	Street	Zip code	Place	country
CRIST. SOLER HERMANOS S.A.	CARRETERA DEL LEVANTE KM 53	03400	VILLENA (ALICANTE)	Spanien
MURALCRIS, SL	POLIGONO INDUSTRIAL II	31592	CINTRUENIGO (NAVARRA)	Spanien
CRISTALERIA	P.I.OESTE PARCELA 26/7	30169	SAN GINES-MURCIA	Spanien
JOSE VIOLA RIBA S.L.	POLIGONO INDUSTRIAL ERAL, S/N	25617	LA SENTIU DE SIO	Spanien
Eurovidrio	P.I. Agustinos	31013	Pamplona	Spanien
VIDRIOS COBO S.A.	Bº LOS CALDERONES,2	39110	SOTO DE LA MARINA	Spanien
VIDRESIF, S.L.	C/TREBALL, 7	17846	MATA-PORQUERES (GIRONA)	Spanien
CRISTALES CURVADOS S.A.	Cami de Can Ferran s/n	08403	Granollers	Spanien
COVIPOR- COMP VIDREIRA	LUGAR DA REBOREDA	4784-909	SANTO TIRSO	Portugal
VISA OESTE - COMÁRCIO DE PRODUTOS D	ESTRADA NACIONAL 8, 4	2510-713	GAEIRAS	Portugal
A SMEFA SOC.METALURGICA DE	R.DO CASAL NOVO,9-	2710-023	SINTRA	Portugal
FACAL- ENGENHARIA DE	Z.I. DE FONTISCOS	4784-909	SANTO TIRSO	Portugal
PROFIAL PROFISSIONAIS	ESTRADA DE FATIMA	2490-053	ATOUGUIA - OUREM	Portugal
Vidraria Central de	Rua do Vale 750	4446-908	Alfena	Portugal
COVIPOR- COMP VIDREIRA	LUGAR DA REBOREDA	4784-909	SANTO TIRSO	Portugal
VISA OESTE - COMÁ%RCIO DE PRODUTOS D	ESTRADA NACIONAL 8, 4	2510-713	GAEIRAS	Portugal
A SMEFA SOC.METALURGICA DE	R.DO CASAL NOVO,9- ABRUNHEIRA	2710-023	SINTRA	Portugal
FACAL- ENGENHARIA DE	Z.I. DE FONTISCOS	4784-909	SANTO TIRSO	Portugal
PROFIAL PROFISSIONAIS	ESTRADA DE FATIMA	2490-053	ATOUGUIA -OUREM	Portugal
VITRO CHAVES INDUSTRIA DE VIDRO S.A	E.N.2 Zona Industrial de Bobêda	5400-757	São Pedro de Agostém - Chaves	Portugal
Vidromax – Vidros	Z. Ind. Viadores, lotes 40 e 41	3050-481	Mealhada	Portugal
OeM - Alum. e Serralharia, Lda.	Qta. Figueira Arz. 35/37 Aprt. 181	2615-907	Sobralinho-Alverca	Portugal
Spitex II LDA	Estr Municipal Zona Ind Dos	9560-304	Cabouco	Portugal

System Schüco FWS 50 SG, FWS 60 SG; FWS 50 SG.SI, FWS 60 SG.SI; ERC 50

Global certified companies (structural glazing)

Annex E
Page 8

current status mar. 2018

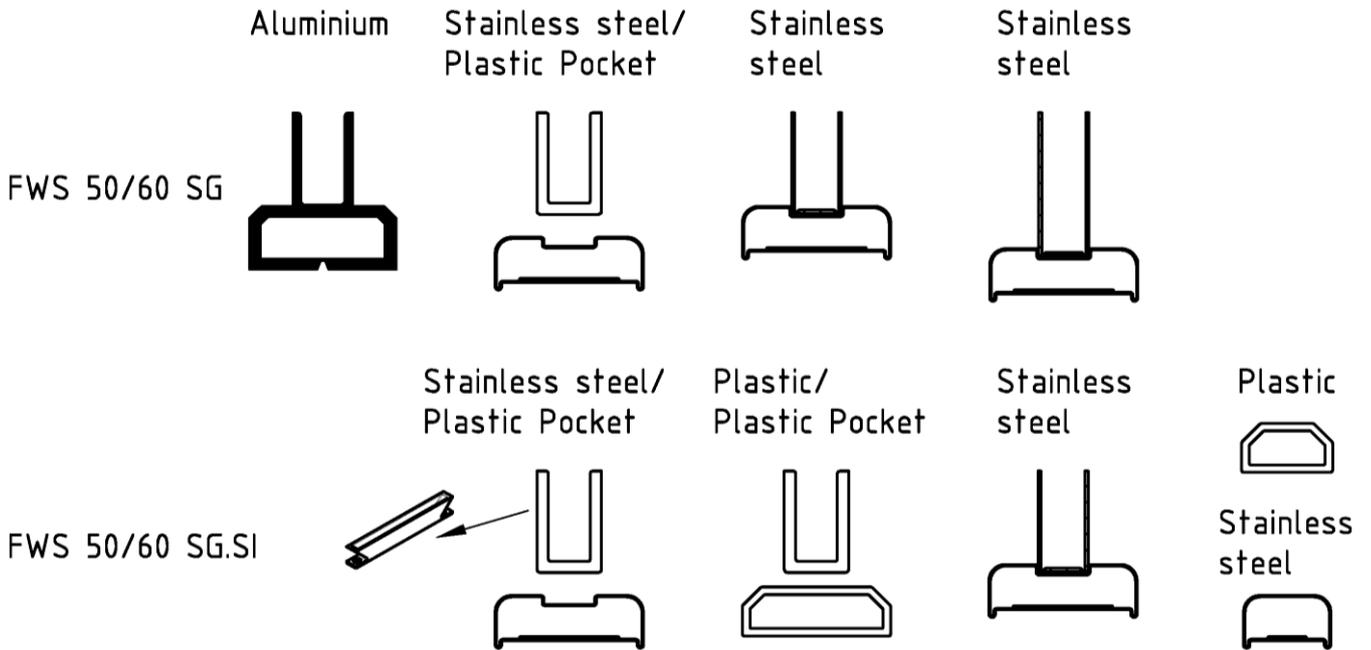
Name	Street	Zip code	Place	country
Aluminium & Licht Industries Co. (Alico) Ltd.	P.O. Box 6011		Sharjah	United Arab Emirates
Alu Glass	7,Aflaton St.of el Oruba Heliopolis	11341	Cairo	Ägypten
Egybel International	5 Baghdad Str. Korba	11341	Cairo	Ägypten
Iðex gluggar ehf	Smiojuvegi 3	200	Kopavogur	Island
Osby Glas AB	Box 130	SE-283 23	Osby	Schweden
Scheuten Glas Hoorn BV	De Marowijne 4	1689	AL Zwaag	Niederlande
Pilkington Benelux B.V.	De Hoevler 25	7547	SB Enschede	Niederlande

System Schüco FWS 50 SG, FWS 60 SG; FWS 50 SG.SI, FWS 60 SG.SI; ERC 50

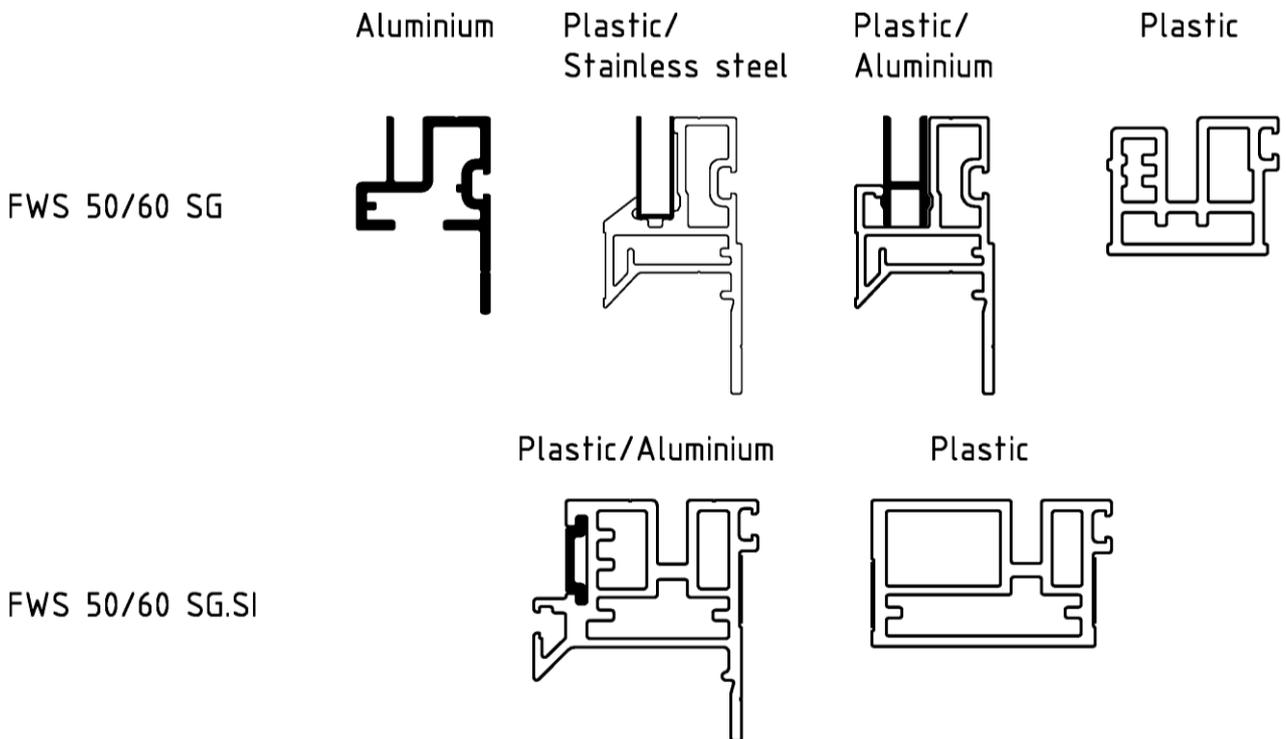
Global certified companies (structural glazing)

Annex E
Page 9

Spacers for insulating glass



Spandrel panel profiles



electronic copy of the eta by dibt: eta-05/0114

System Schüco FWS 50/60 SG and FWS 50/60 SG.SI; ERC 50

Overview spacers, spandrel panel profiles

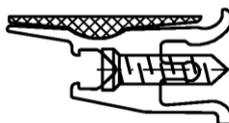
Annex F
Page 1

Glazing supports
Aluminium/Silicone

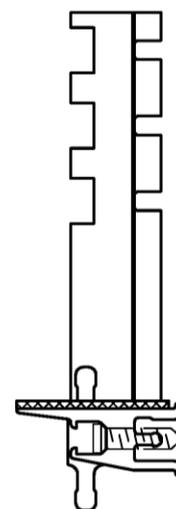
Standard glazing support



large glass loads



Cruciform glazing support

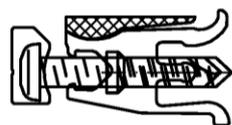


FWS 50/60 SG

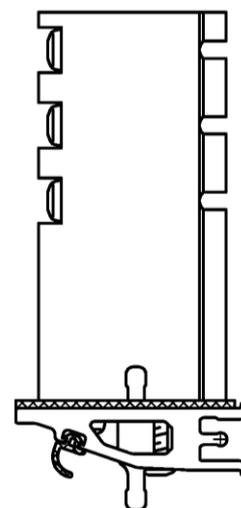
Standard glazing support



large glass loads



Cruciform glazing support



FWS 50/60 SG.SI

large glass loads



electronic copy of the eta by dibt: eta-05/0114

System Schüco FWS 50/60 SG and FWS 50/60 SG.SI; ERC 50

Overview glazing supports

Annex F
Page 2

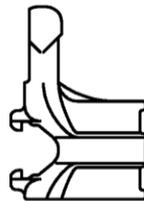
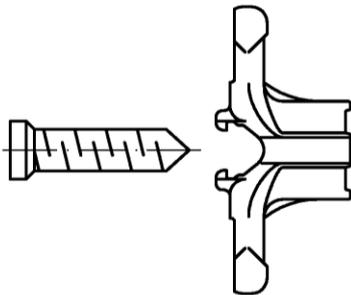
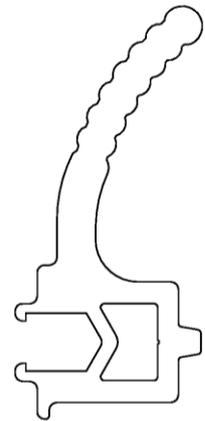
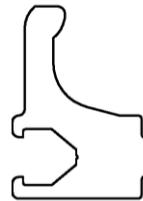
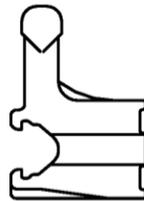
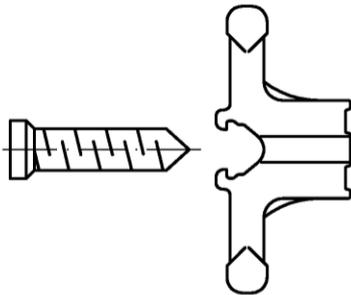
Retaining devices

Die-cast zinc

Die-cast zinc

Aluminium

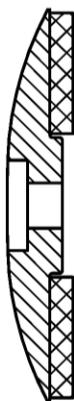
Aluminium



Emergency retainers

Aluminium/Silicone

Stainless steel



electronic copy of the eta by dibt: eta-05/0114

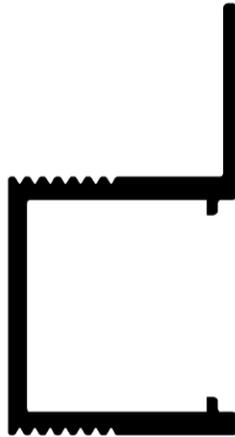
System Schüco FWS 50/60 SG and FWS 50/60 SG.SI; ERC 50

Overview, retaining devices, emergency retainers

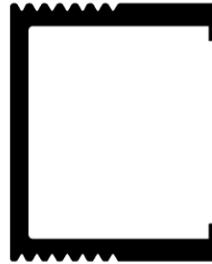
Annex F
Page 3

Frame profiles

Aluminium



Aluminium



Glazing support profile

Aluminium

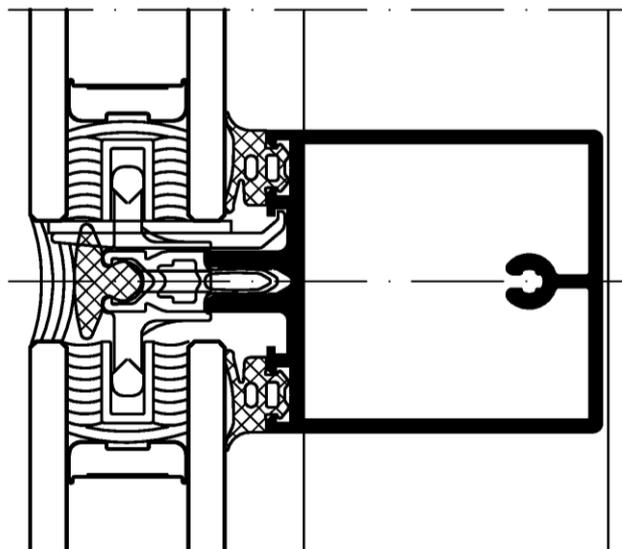
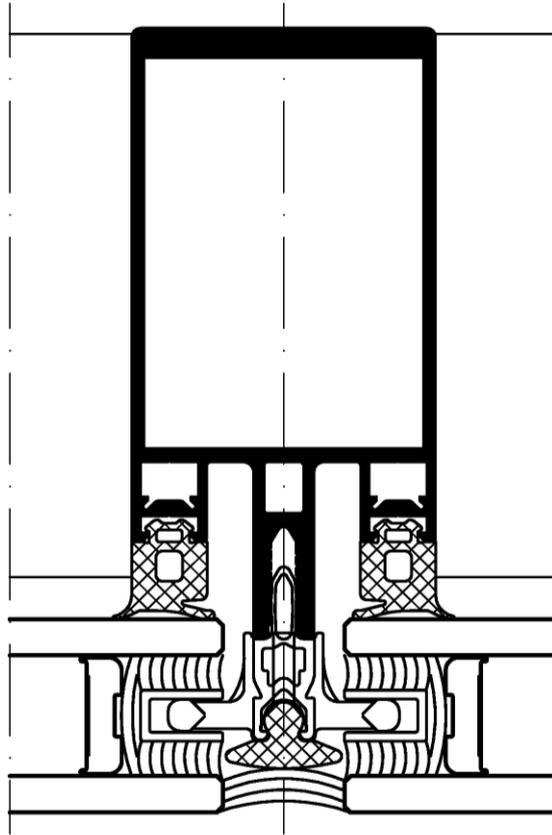


System Schüco FWS 50/60 SG and FWS 50/60 SG.SI; ERC 50

Overview frame profiles, glazing support profile

Annex F
Page 4

Stainless steel spacer with plastic pocket and wet sealing



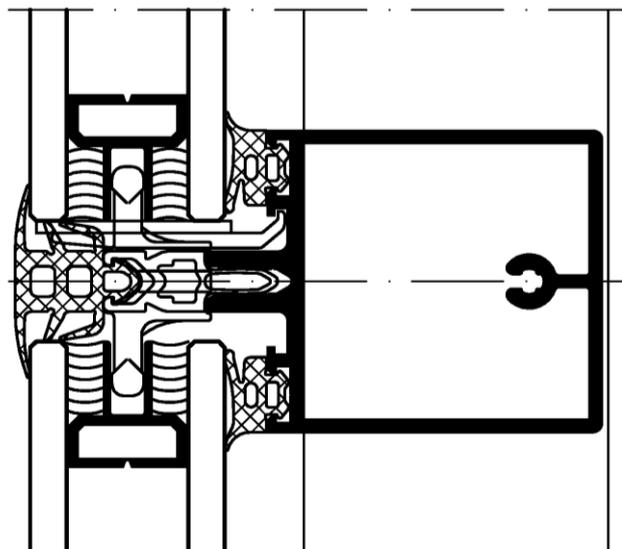
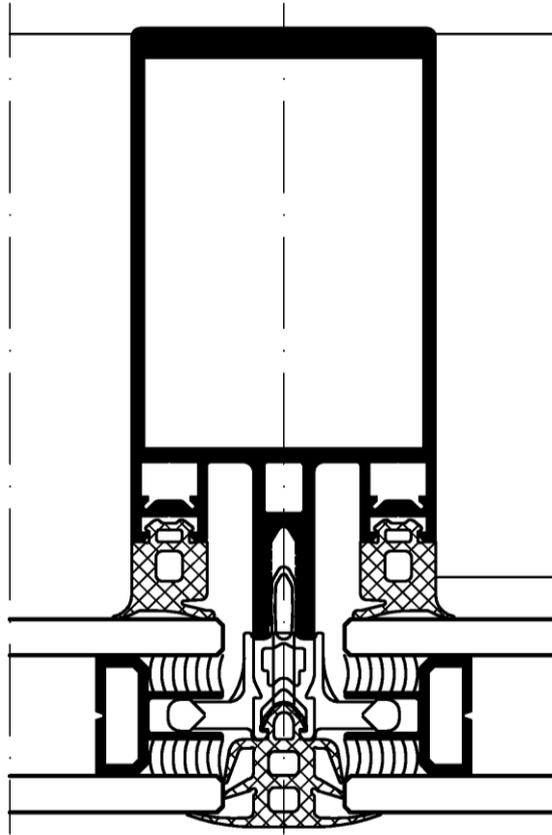
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System Schüco FWS 50/60 SG and FWS 50/60 SG.SI; ERC 50

Intersection points example

Annex F
Page 5

Aluminium spacer with flush dry glazing



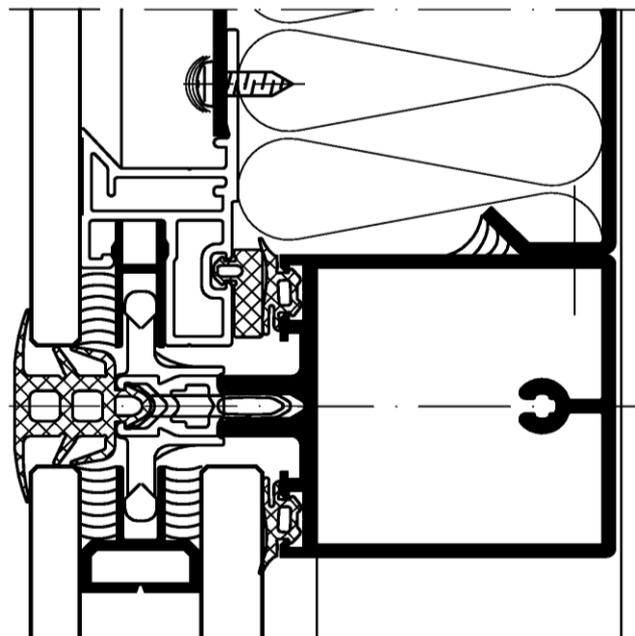
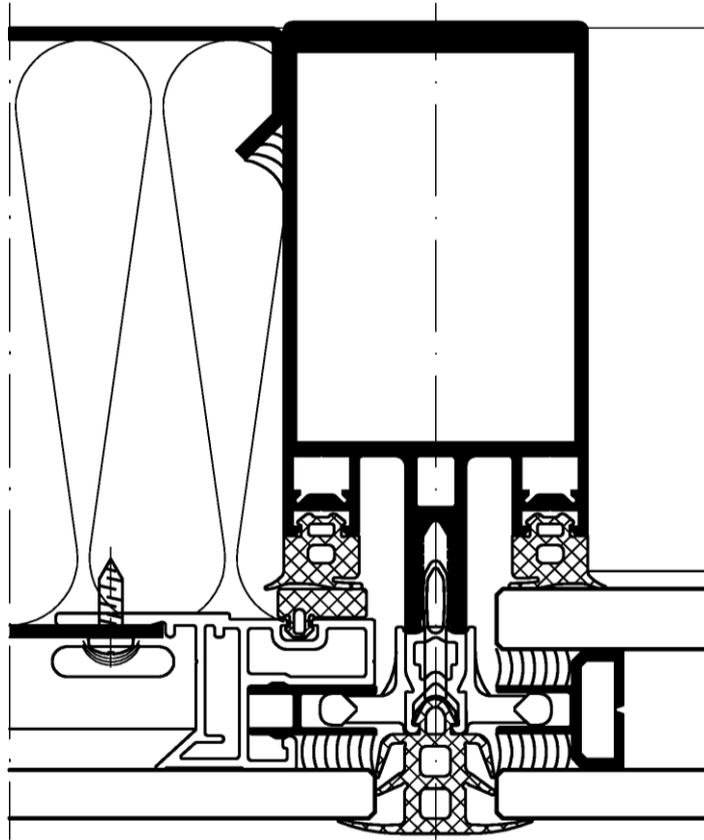
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System Schüco FWS 50/60 SG and FWS 50/60 SG.SI; ERC 50

Intersection points example

Annex F
Page 6

Aluminium spacer with flush dry glazing

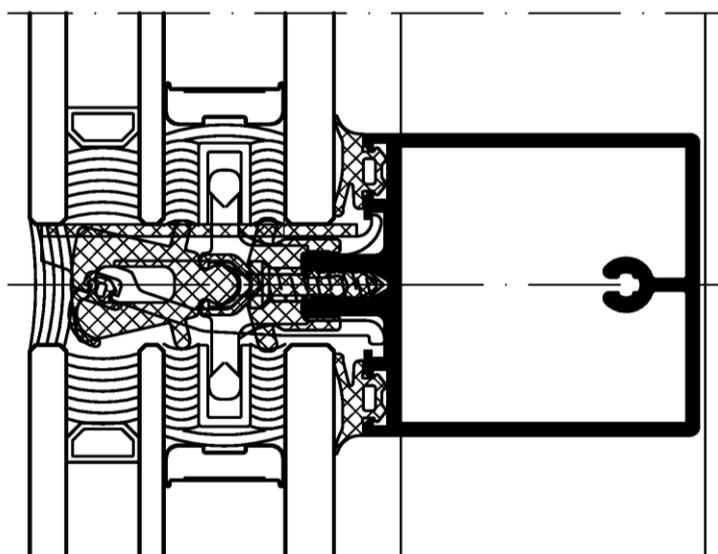
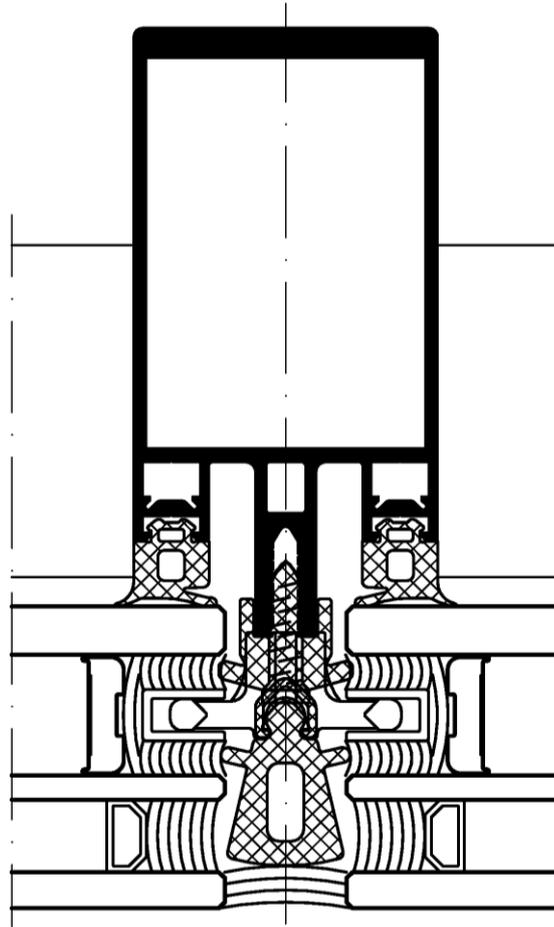


System Schüco FWS 50/60 SG and FWS 50/60 SG.SI; ERC 50

Intersection points example

Annex F
Page 7

Stainless steel spacer with plastic pocket / plastic spacer and wet sealing



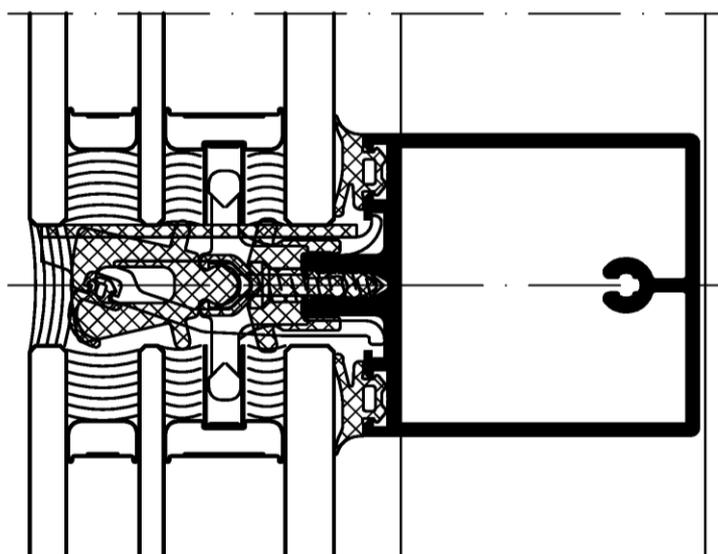
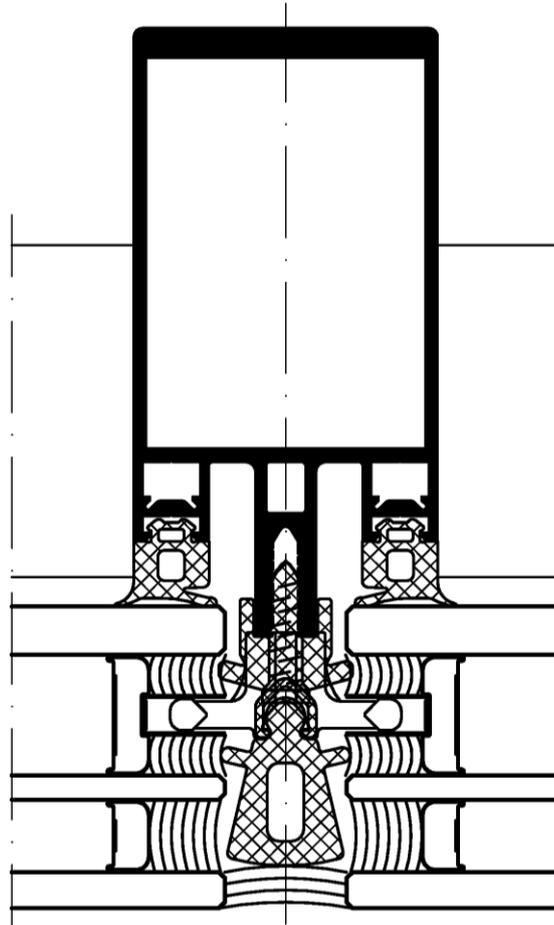
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System Schüco FWS 50/60 SG and FWS 50/60 SG.SI; ERC 50

Intersection points example

Annex F
Page 8

Stainless steel spacer / Stainless steel spacer and wet sealing



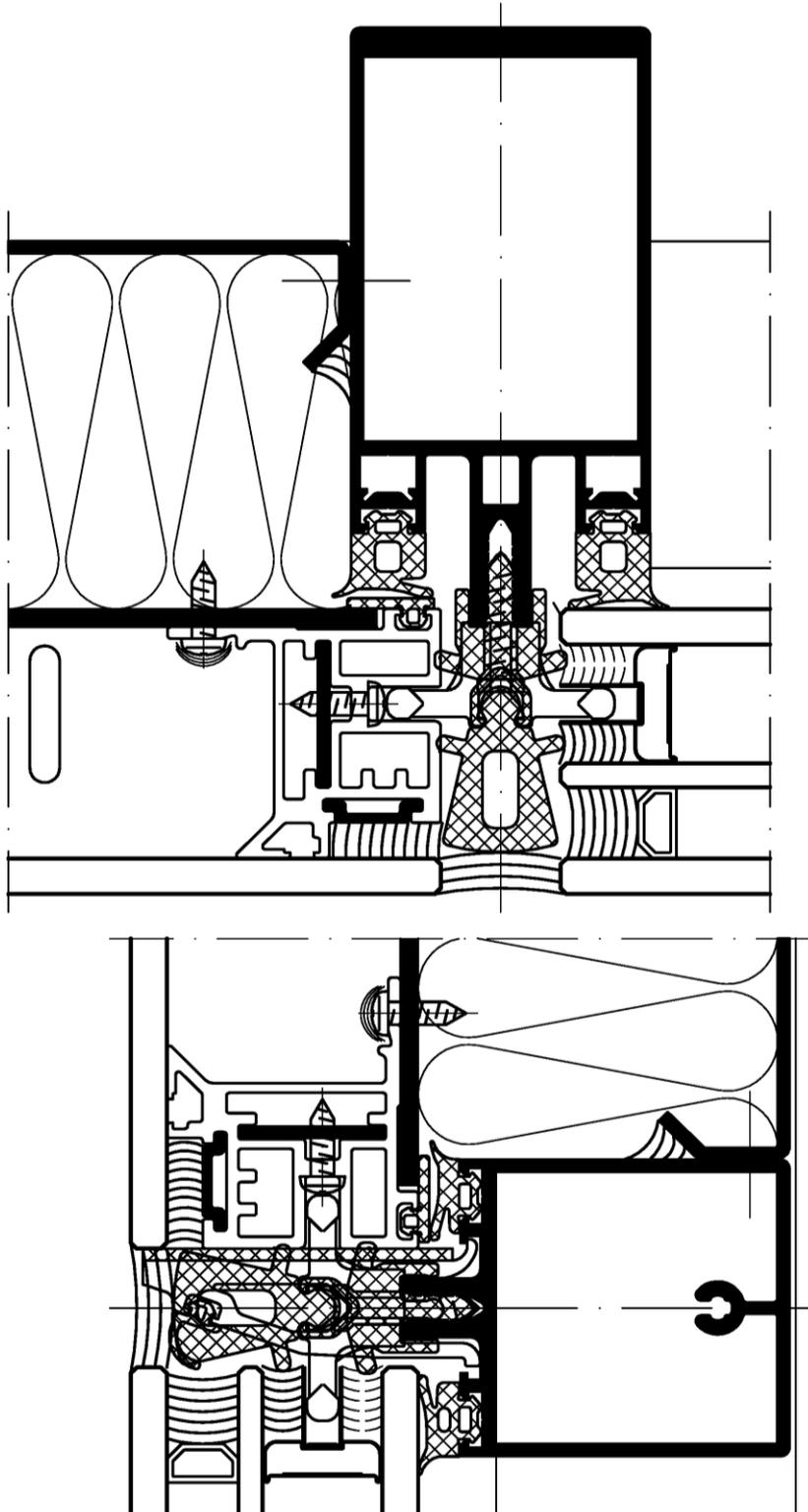
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System Schüco FWS 50/60 SG and FWS 50/60 SG.SI; ERC 50

Intersection points example

Annex F
Page 9

Stainless steel spacer / plastic spacer and wet sealing



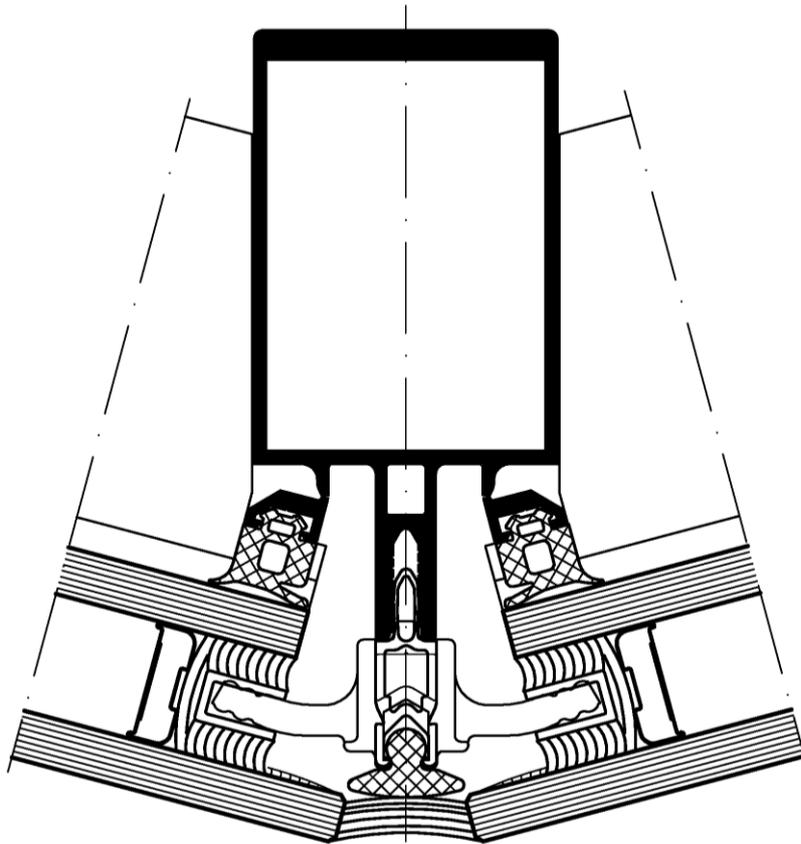
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System Schüco FWS 50/60 SG and FWS 50/60 SG.SI; ERC 50

Intersection points example

Annex F
Page 10

Stainless steel spacer with plastic pocket and wet sealing



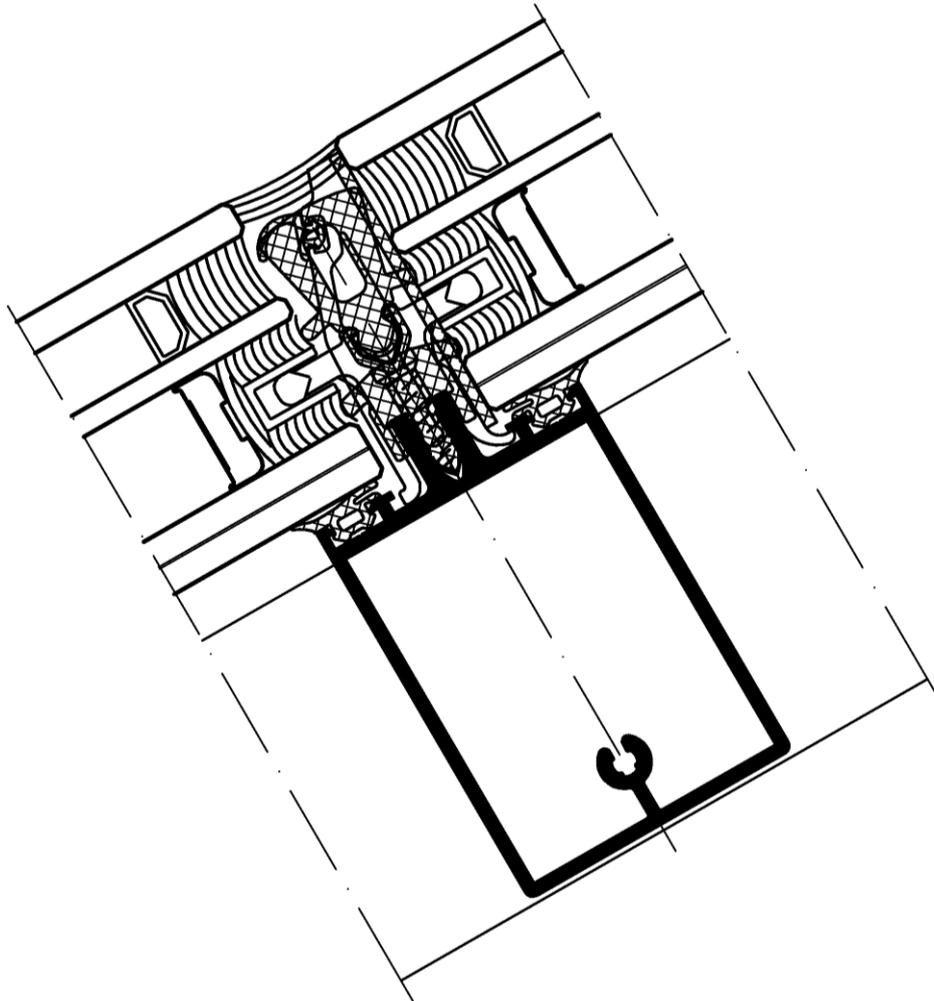
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System Schüco FWS 50/60 SG and FWS 50/60 SG.SI; ERC 50

Intersection points example

Annex F
Page 11

Stainless steel spacer with plastic pocket / plastic spacer and wet sealing



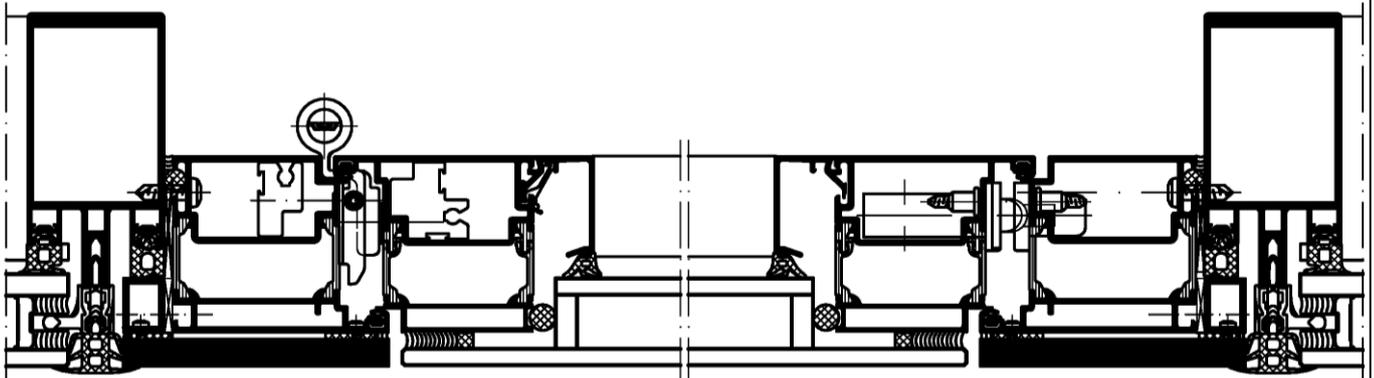
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System Schüco FWS 50/60 SG and FWS 50/60 SG.SI; ERC 50

Intersection points example

Annex F
Page 12

SG Tür mit Stufenglas



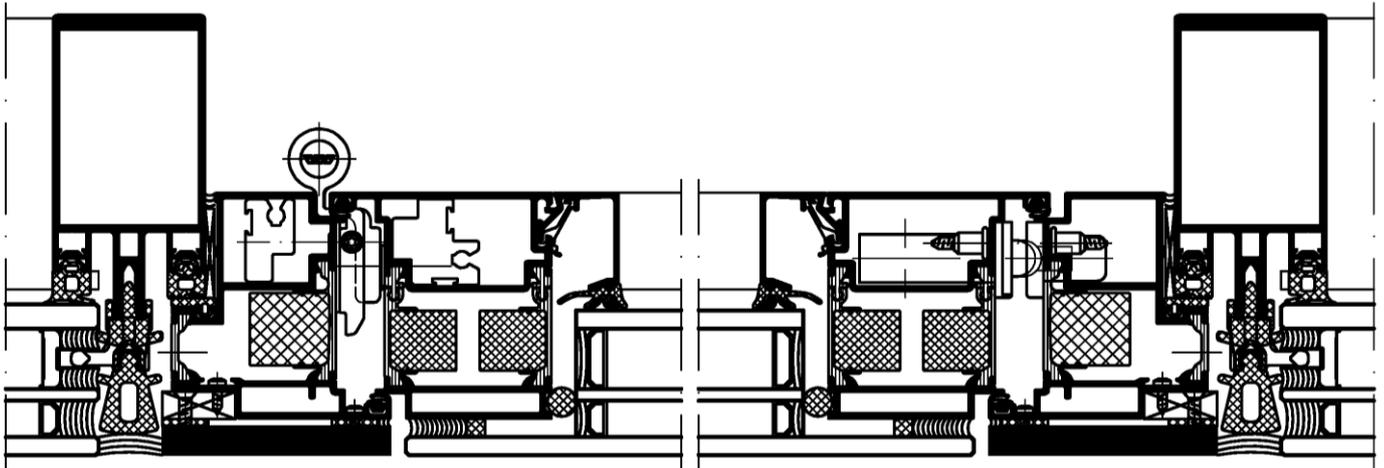
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System Schüco FWS 50/60 SG and FWS 50/60 SG.SI; ERC 50

Intersection points example

Annex F
Page 13

SG Tür mit Stufenglas



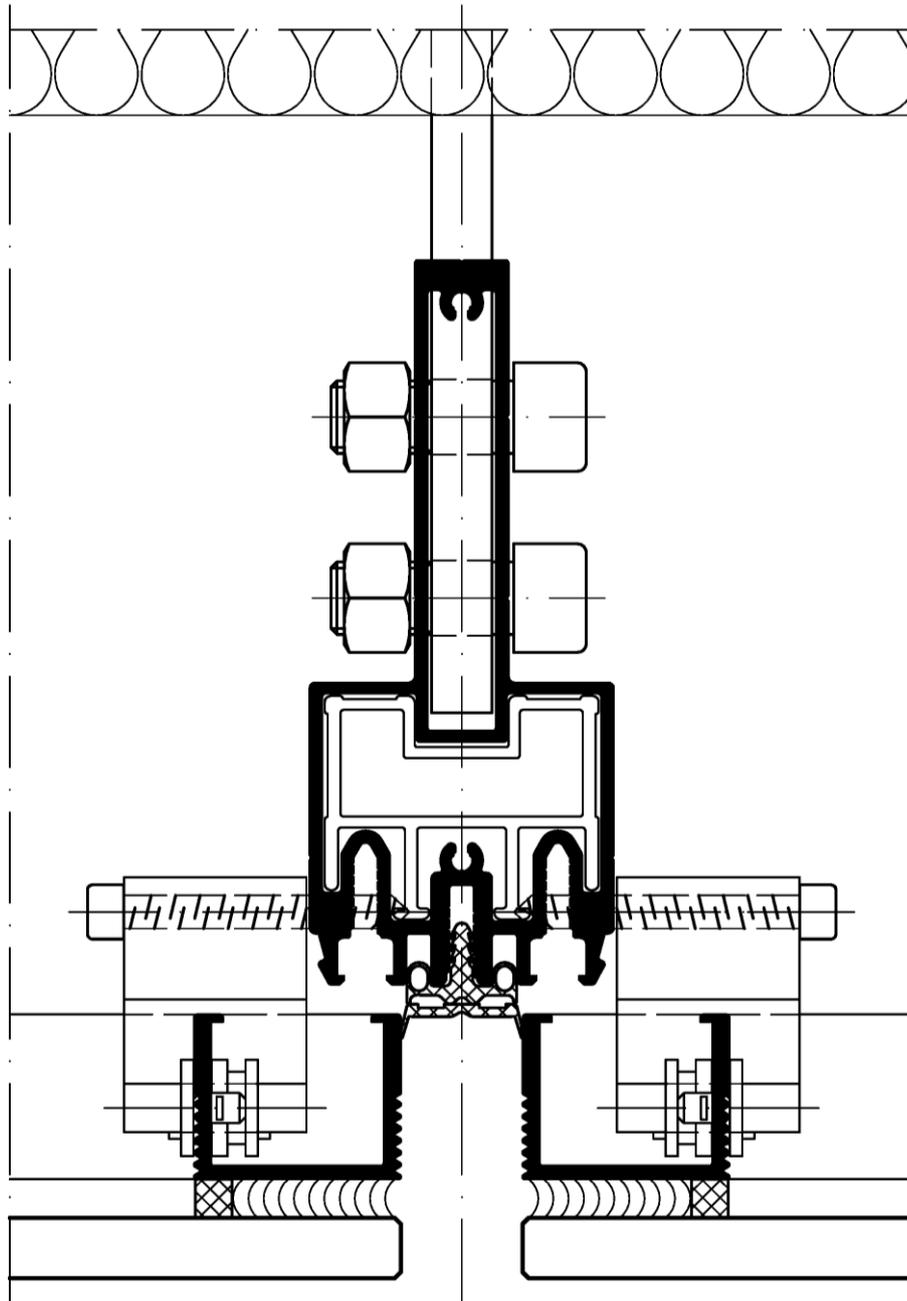
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System Schüco FWS 50/60 SG and FWS 50/60 SG.SI; ERC 50

Intersection points example

Annex F
Page 14

Aluminium frame profile



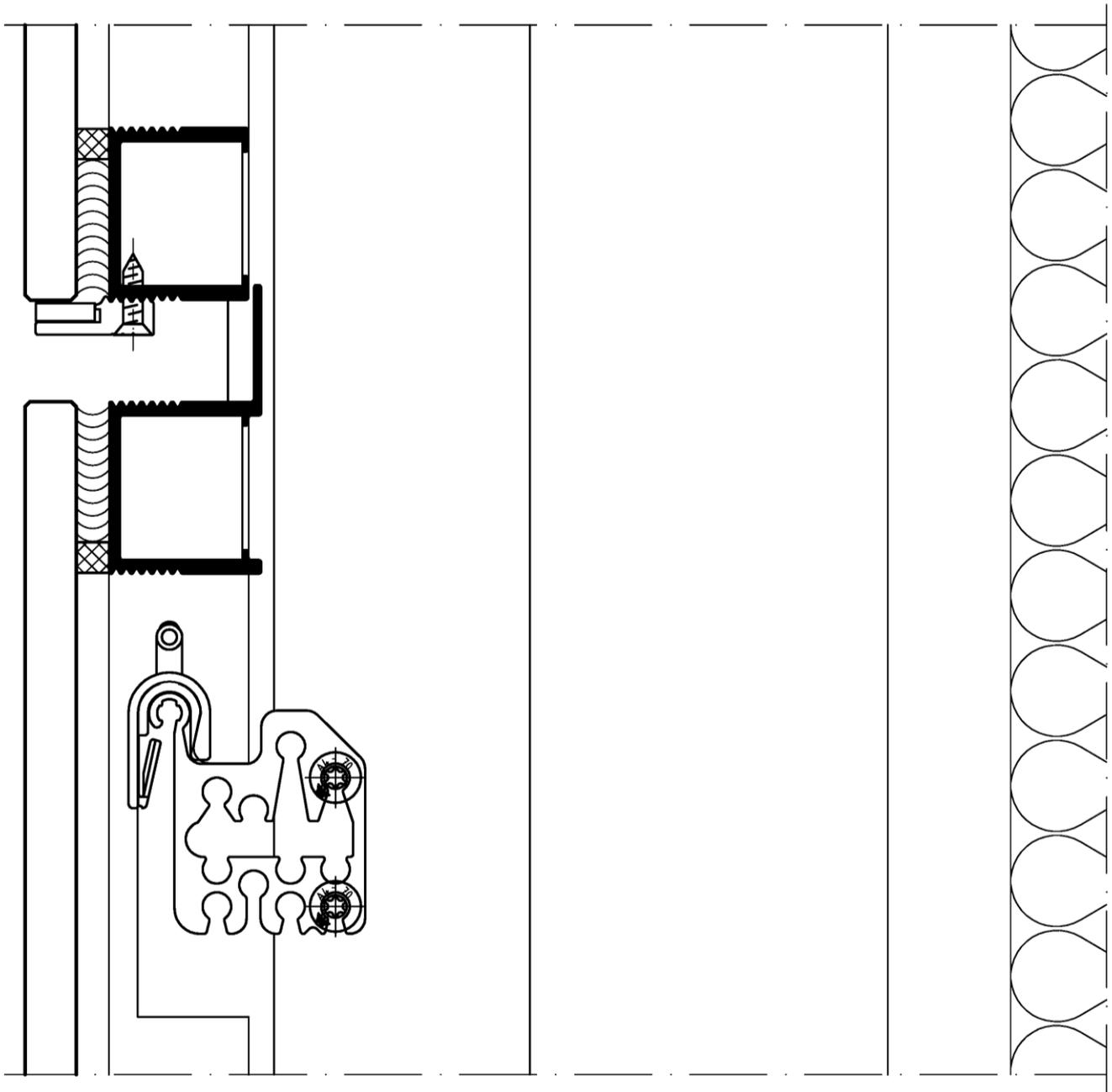
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System Schüco FWS 50/60 SG and FWS 50/60 SG.SI; ERC 50

Intersection points example

Annex F
Page 15

Aluminium frame with glazing support



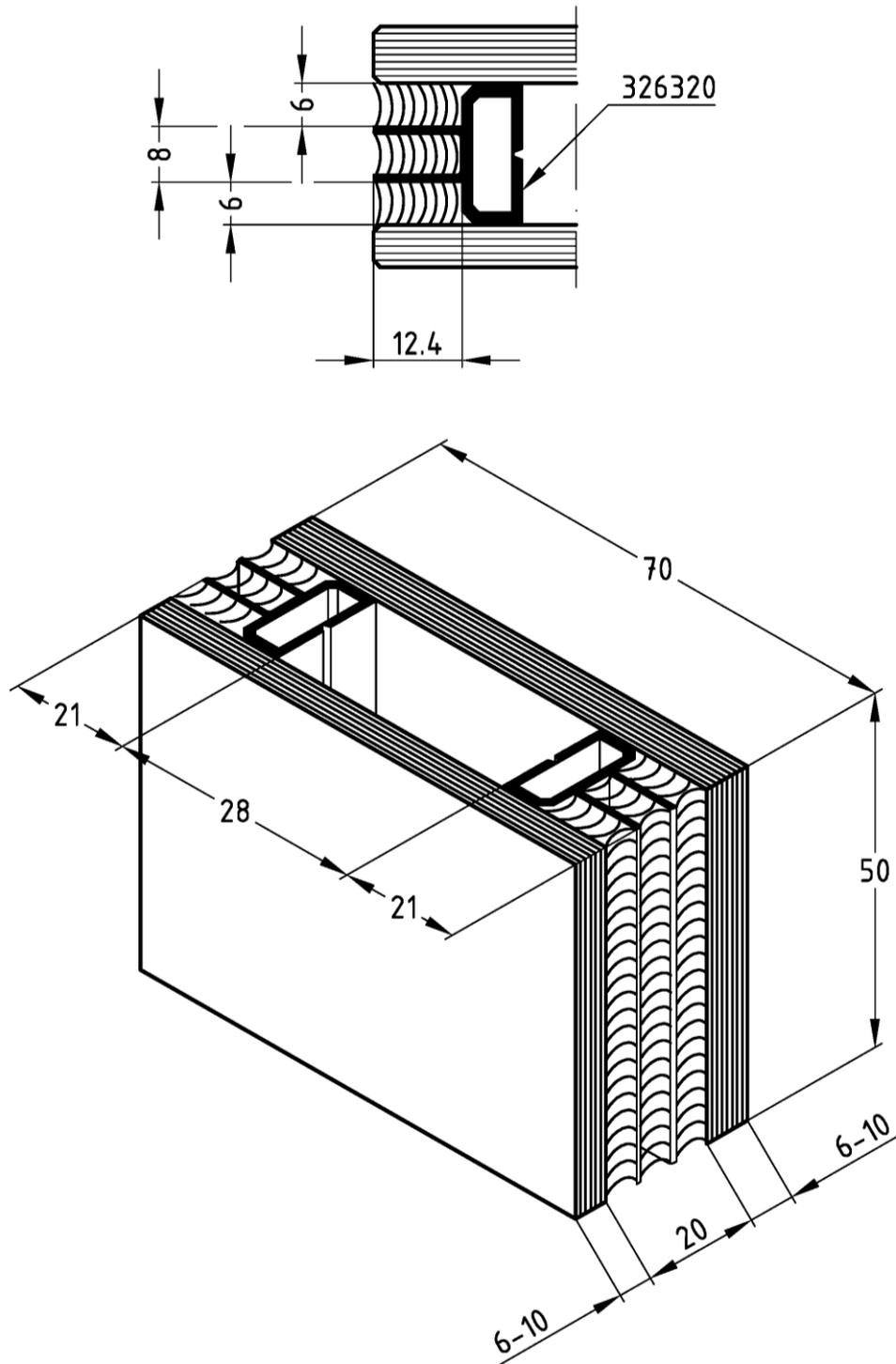
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System Schüco FWS 50/60 SG and FWS 50/60 SG.SI; ERC 50

Intersection points example

Annex F
Page 16

Aluminium spacer



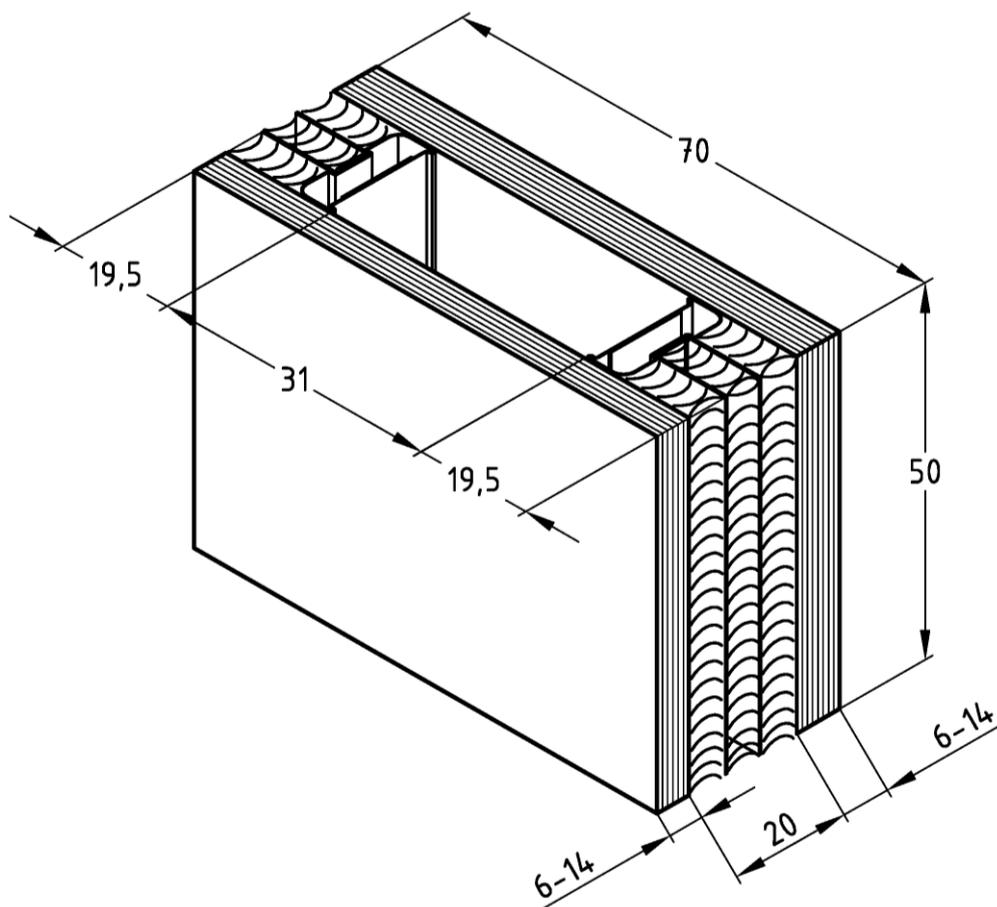
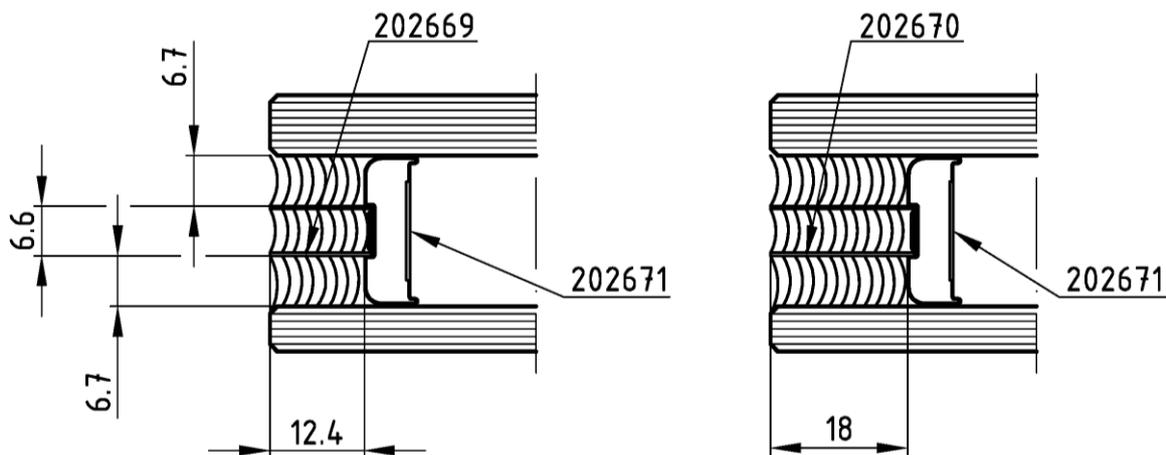
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System Schüco FWS 50/60 SG and FWS 50/60 SG.SI; ERC 50

Test specimen for control

Annex F
Page 17

Stainless steel spacer



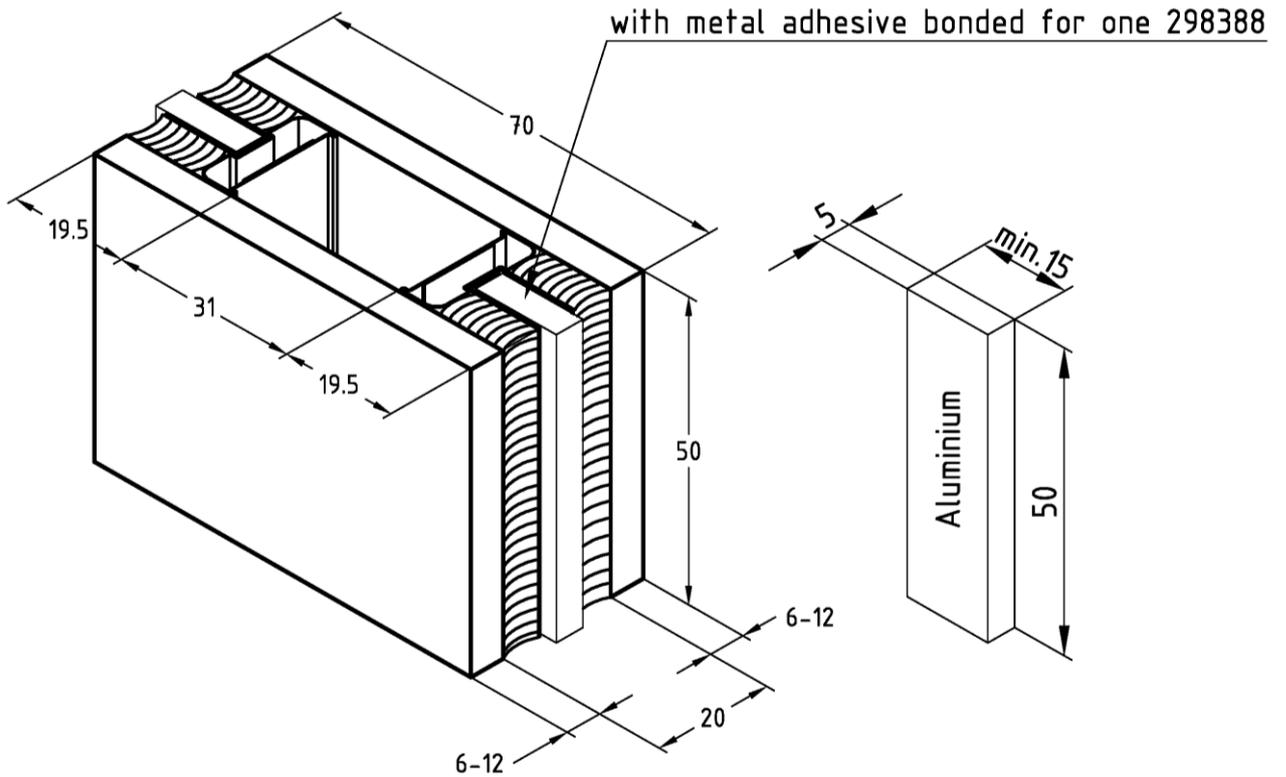
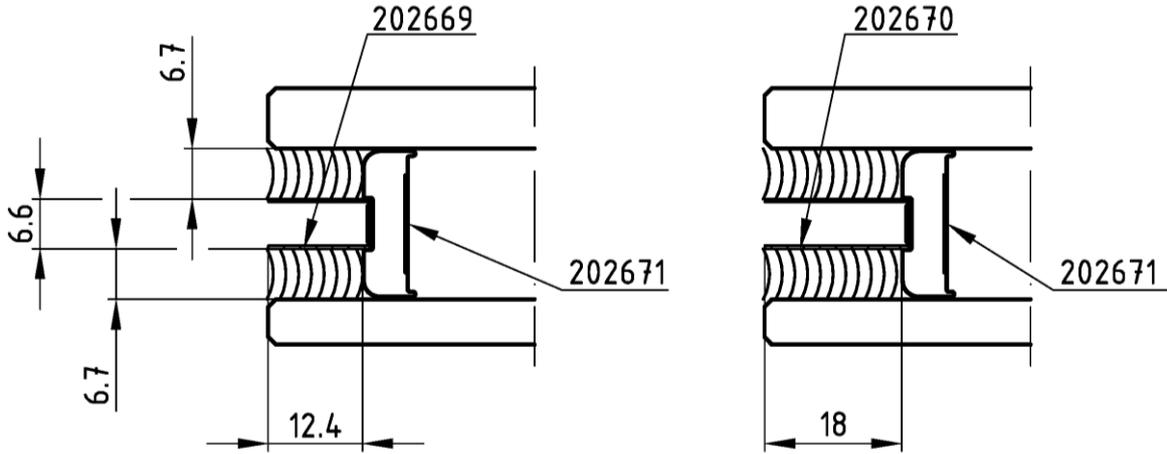
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System Schüco FWS 50/60 SG and FWS 50/60 SG.SI; ERC 50

Test specimen for control

Annex F
Page 18

Stainless steel spacer

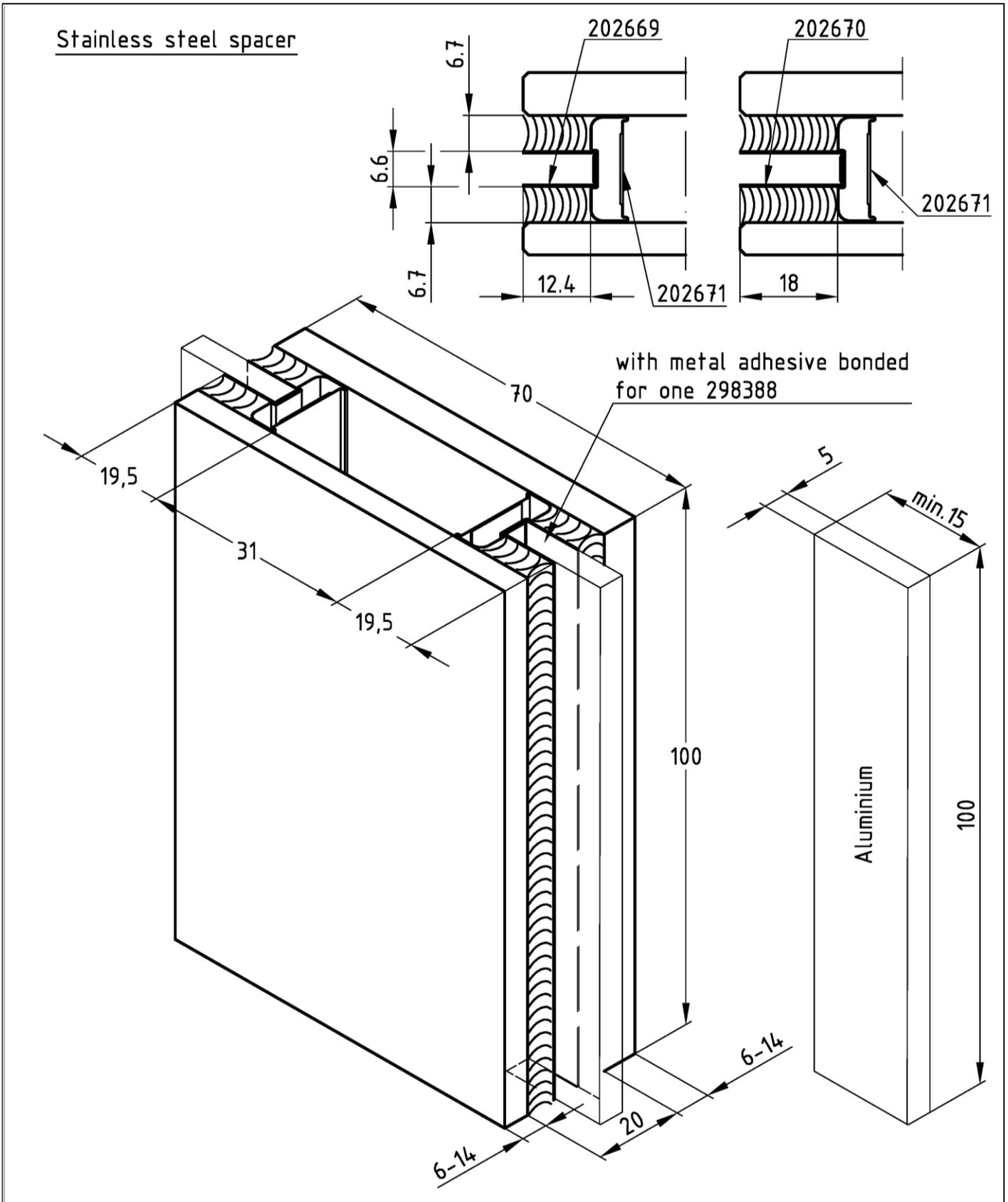


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System Schüco FWS 50/60 SG and FWS 50/60 SG.SI; ERC 50

Test specimen for control

Annex F
 Page 19



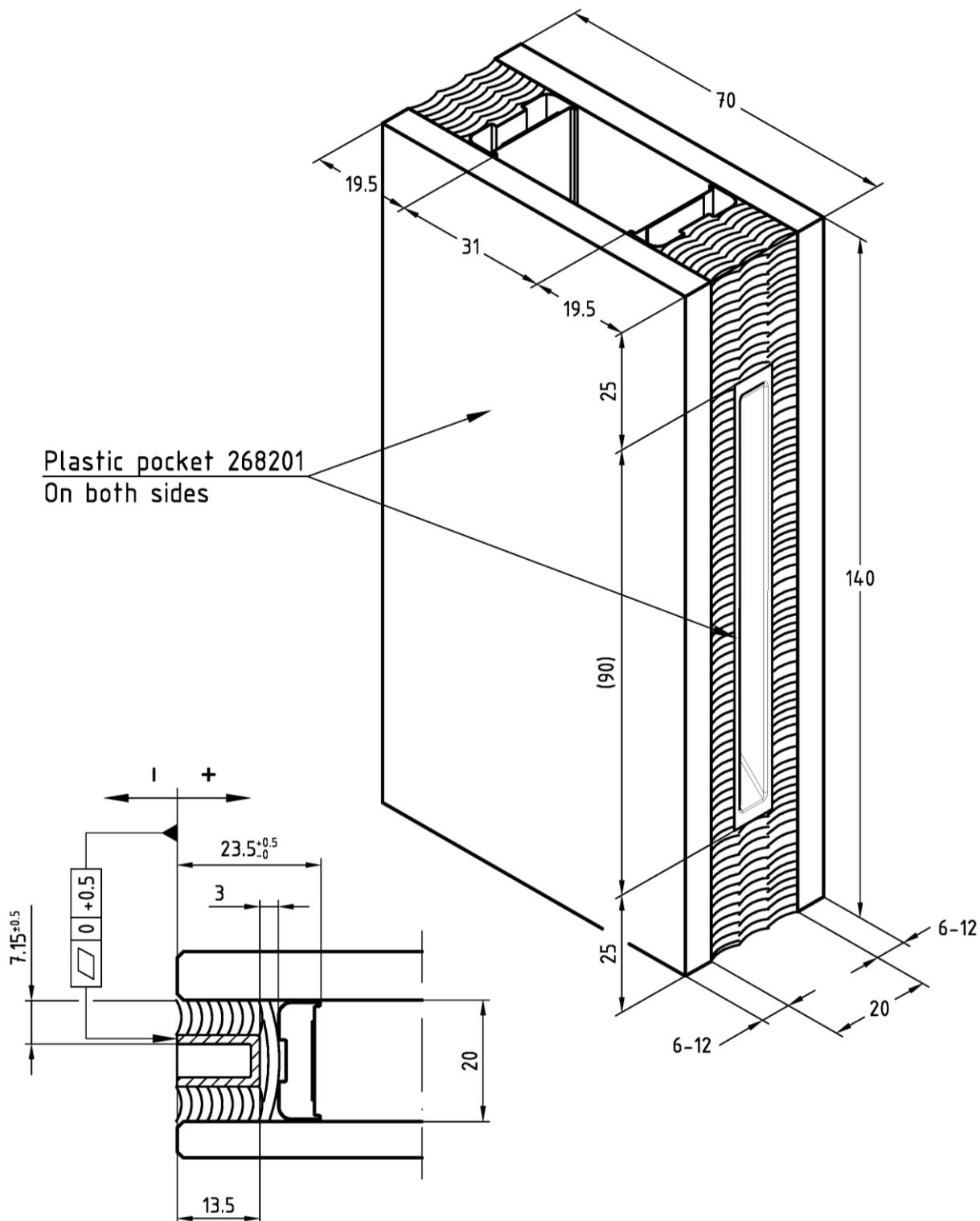
System Schüco FWS 50/60 SG and FWS 50/60 SG.SI; ERC 50

Test specimen for control

Annex F
 Page 20

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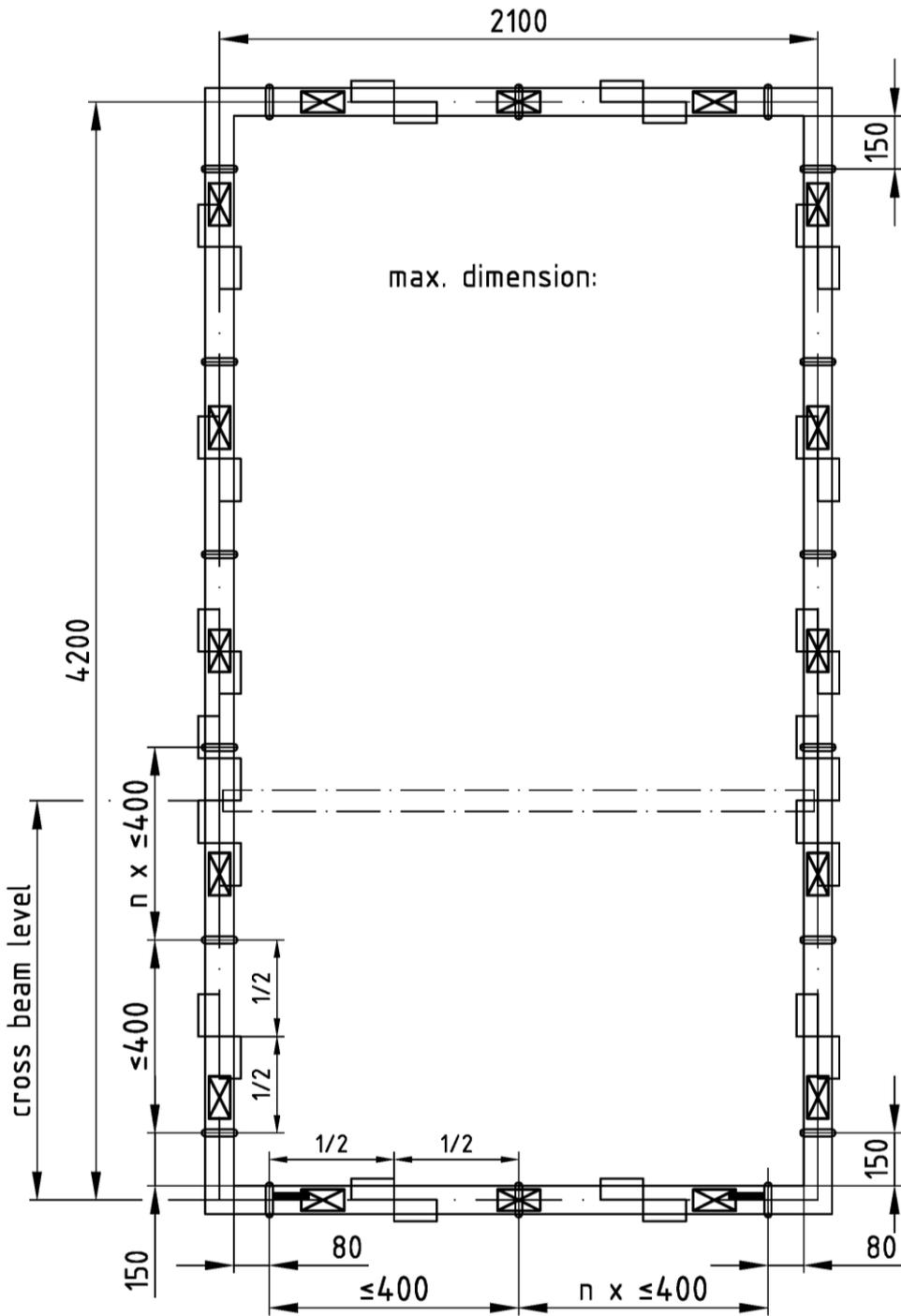
Stainless steel spacer with plastic pocket



System Schüco FWS 50/60 SG and FWS 50/60 SG.SI; ERC 50

Test specimen for control

Annex F
Page 21



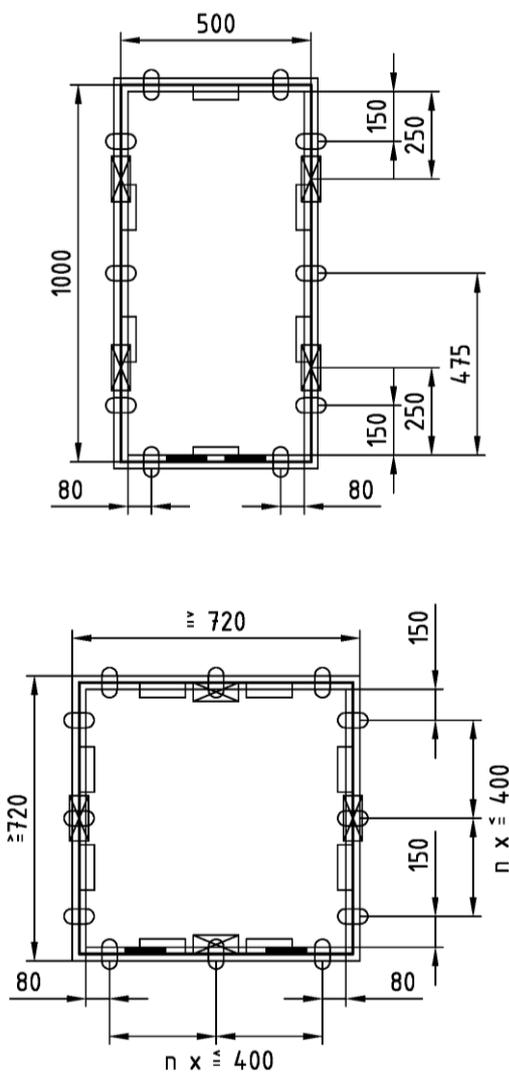
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- Al-Emergency retainers appt. Annex 3
 Retaining devices Die-cast zinc appt. Annex 3
 Retaining devices Al appt. Annex 3
 Glazing supports appt. Annex 2

System Schüco FWS 50/60 SG and FWS 50/60 SG.SI; ERC 50

Fall protection retaining device arrangement with Al-Emergency retainer

Annex F
 Page 22

min. dimension:



☒ Al-Emergency retainers appt. Annex 3

○ Retaining devices Die-cast zinc appt. Annex 3

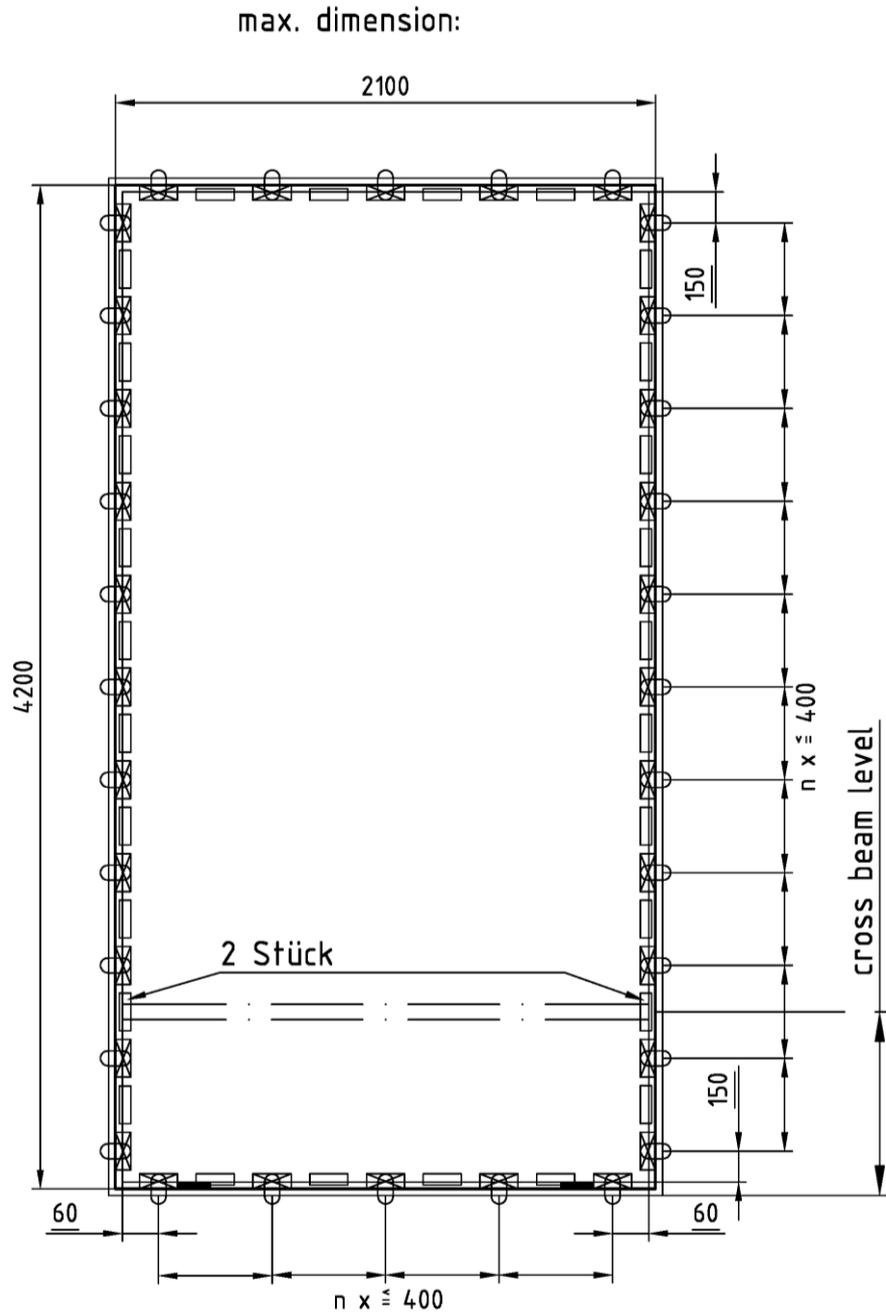
□ Retaining devices Al appt. Annex 3

— Glazing supports appt. Annex 2

System Schüco FWS 50/60 SG and FWS 50/60 SG.SI; ERC 50

Fall protection retaining device arrangement with
Al-Emergency retainer

Annex F
Page 23

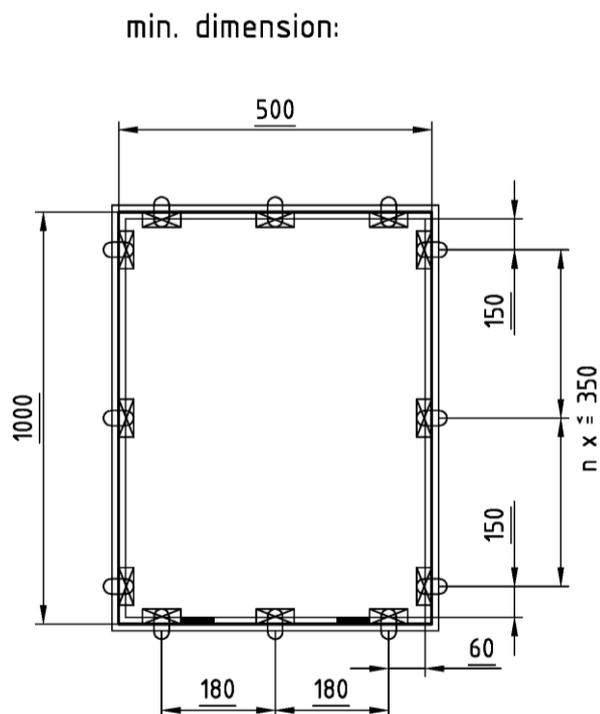


- Retaining devices Al appt. Annex 3
- Retaining devices Die-cast zinc appt. Annex 3
- ⊠ Inox-Emergency retainers appt. Annex 3
- Glazing supports appt. Annex 2

System Schüco FWS 50/60 SG and FWS 50/60 SG.SI; ERC 50

Fall protection retaining device arrangement with
 Inox-Emergency retainer

Annex F
 Page 24



⊠ Inox-Emergency retainers appt. Annex 3

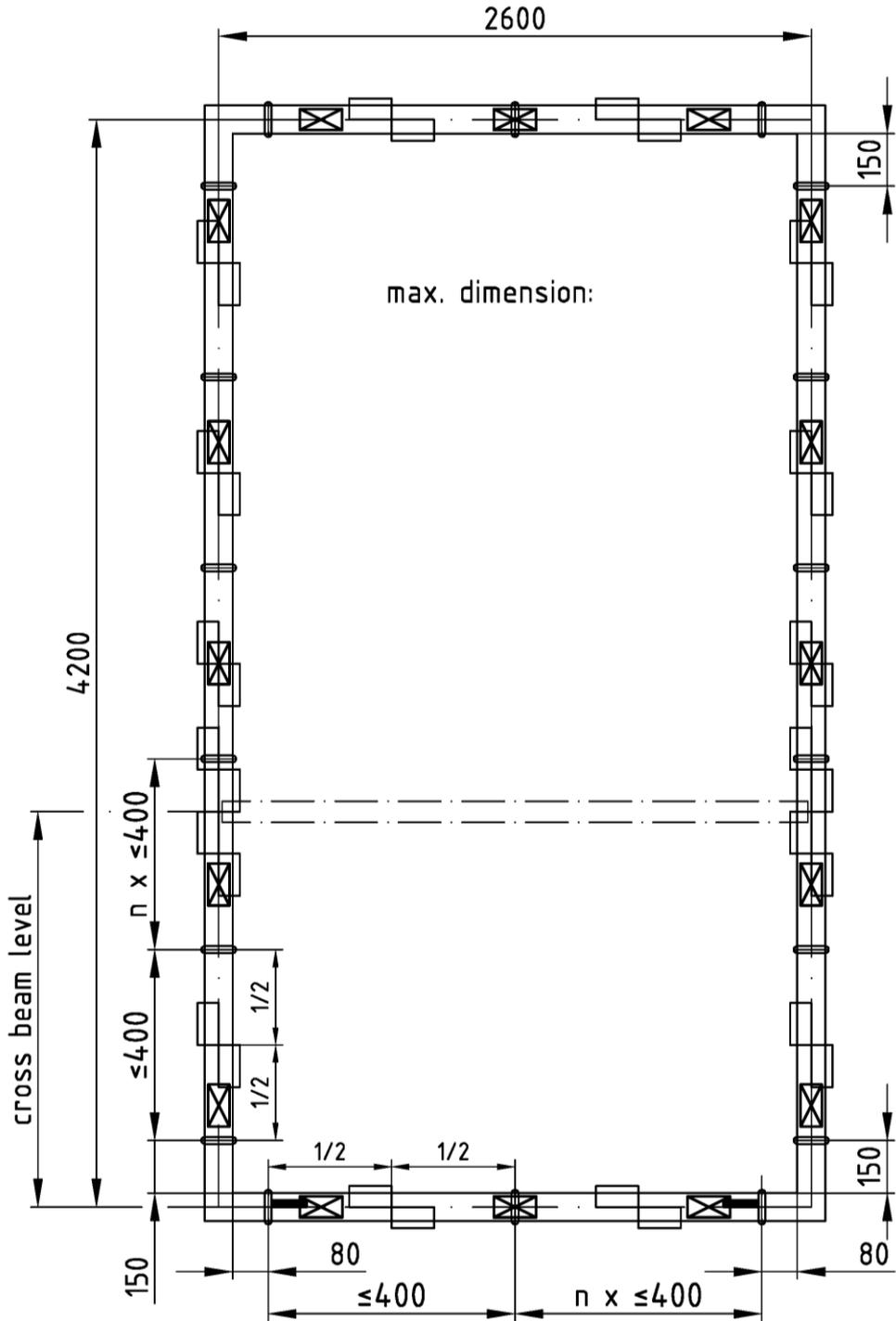
○ Retaining devices Die-cast zinc appt. Annex 3

— Glazing supports appt. Annex 2

System Schüco FWS 50/60 SG and FWS 50/60 SG.SI; ERC 50

Fall protection retaining device arrangement with
Inox-Emergency retainer

Annex F
Page 25



- Retaining devices Die-cast zinc appt. Annex 3
- Retaining devices Al appt. Annex 3
- Inox-Emergency retainers appt. Annex 3
- Glazing supports appt. Annex 2

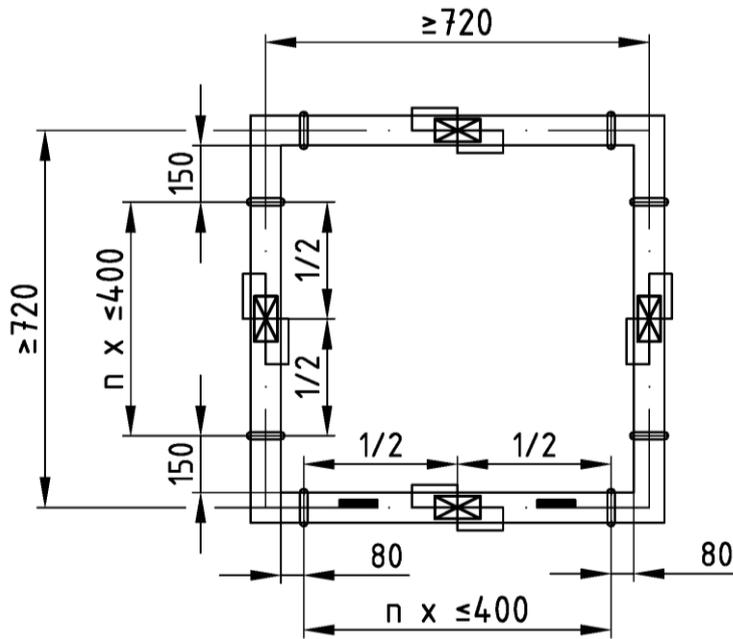
System Schüco FWS 50/60 SG and FWS 50/60 SG.SI; ERC 50

Fall protection retaining device arrangement with Al-Emergency retainer

Annex F
 Page 26

electronic copy of the eta by dibt: eta-05/0114

min. dimension:



Retaining devices Die-cast zinc
 appt. Annex 3

Inox-Emergency retainers appt. Annex 3

Retaining devices Al appt. Annex 3

Glazing supports appt. Annex 2

System Schüco FWS 50/60 SG and FWS 50/60 SG.SI; ERC 50

Fall protection retaining device arrangement with
 Al-Emergency retainer

Annex F
 Page 27