

Approval body for construction products
and types of construction

Bautechnisches Prüfamt

An institution established by the Federal and
Laender Governments



European Technical Assessment

ETA-10/0362
of 16 August 2016

English translation prepared by DIBt - Original version in German language

General Part

Technical Assessment Body issuing the
European Technical Assessment:

Deutsches Institut für Bautechnik

Trade name of the construction product

VARIO

Product family
to which the construction product belongs

Insulated glass unit with structural sealant punctually
anchored

Manufacturer

ECKELT GLAS GmbH
Resthofstraße 18
4403 Steyr
ÖSTERREICH

Manufacturing plant

Manufacturing plants see Annex D

This European Technical Assessment
contains

32 pages including 19 annexes 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

European Assessment Document (EAD)
090035-00-0404

**European Technical Assessment
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Specific part

1 Technical description of the product

This European Technical Assessment (ETA) covers a structural sealant glazing kit consisting of infill elements made of glass called "VARIO", which are fastened punctually to a supporting construction. 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 outer pane. In case of wind suction loads the outer pane is borne via the structural sealant of the insulating glass edge, the inner panes are held mechanically via retaining devices. The U-profile is applied both either with or without an upstand. The upstand serves as emergency mounting bracket to secure the outer pane of the infill element in case of failure of the structural bond (see Annex 1).

The dimensions of the infill elements made of glass amount to at least 400 mm x 800 mm (width x height and height x width respectively) and at most 2500 mm x 5000 mm (width x height and height x width respectively).

The components and the system setup of the product are given in Annexes 1 to 19.

The ETA is based on the European Assessment Document (EAD no 090035-00-0404)

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

This ETA covers the following intended uses and assembled systems as in ETAG 002¹.

Type I: Mechanical transfer of the self-weight of the infill to the sealant-support frame and thence to the structure. The structural seal transfers all other actions. Devices are used to reduce danger in the event of a bond failure.

Type II: Mechanical transfer of the self-weight of the infill to the sealant-support frame and thence to the structure. The structural seal transfers all other actions and no devices are used to reduce danger in the event of a bond failure.

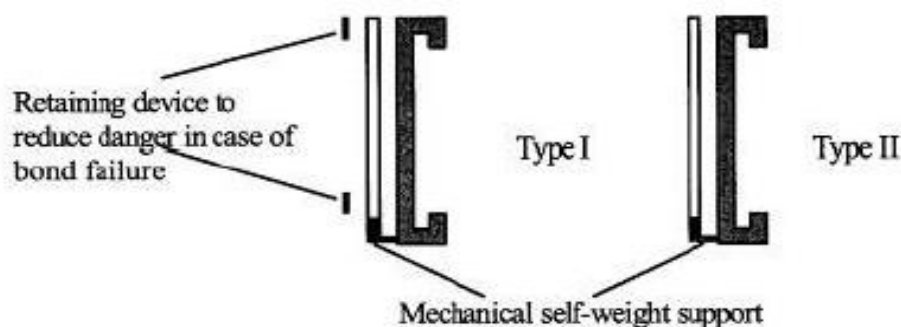


Figure 1 – Schematic example of the Type I and II of Structural Sealant Glazing Kit (SSGK)

¹ ETAG 002, Edition November 1999, 3rd amendment: May 2012: Guideline for European technical approval for Structural Sealant Glazing Kits (SSGK), Part 1: Supported and unsupported systems

Restrictions for the bonding:

- The structural bond of the insulating glass edge compound is to be silicone according to Annex C.
- The structural sealant is to be factory applied.

The "Insulated glass unit with structural sealant punctually anchored" is intended for use in facades and roofs, or parts of them, with glazing at any angle between vertical and 7° above horizontal (see Figure 2). In case of use as overhead glazing laminated safety glass shall be used as lower pane. With an inclination to the outside the structural bond shall not be permanently subject to tension.

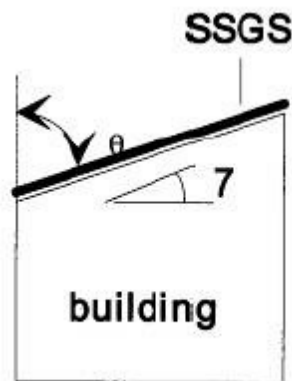


Figure 2 – Permissible inclination of the Structural Sealant Glazing System

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

The system "VARIO" shall not be used in an environment with high chloride content (e. g. indoor pools).

To meet the requirements for the buildings and the design codes which are national provisions the following use scenario are defined:

- 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 14179-1² and 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) of thermally toughened soda lime silicate safety glass according to EN 12150-1³, -2⁴
- 2a Use of laminated safety glass for the exterior or interior pane of the insulated glass unit according to EN 14449⁵ with PVB-interlayer; Compound effects are not respected.

2	EN 14179-1:2005	Glass in building - Heat soaked thermally toughened soda lime silicate safety glass – Part 1: Definition and description
3	EN 12150-1:2005	Glass in building – Thermally toughened soda lime silicate glass – Part 1: Definition and description
4	EN 12150-2:2005	Glass in building .Thermally toughened soda lime silicate safety glass Part 2: Evaluation of conformity/Product standard
5	EN 14449:2005	Glass in building – Laminated glass and laminated safety glass – Evaluation of conformity/Product standard

- 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 $G = 0.4 \text{ N/mm}^2$
- 3a Restricted use due to national regulations concerning reaction to fire
- 3b There is no restriction for use according to national regulations concerning reaction to fire.

The verifications and assessment methods on which this European Technical Assessment is based lead to the assumption of a working life of the point-supported vertical glazing of at least 25 years, provided that the conditions laid down in section 3.8.3 for the use/maintenance are met. 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
Glass products: <ul style="list-style-type: none"> – characteristic bending strength – heat-soaking process – compound effect of laminated glass 	see Annex A
Mechanical self-weight support, retaining devices (toggles), wind protection devices: <ul style="list-style-type: none"> – load-bearing capacities 	see Annex B
Structural bonding: <ul style="list-style-type: none"> – For the structural bonding a silicone shall be used, qualified by an ETA for load-bearing according to ETAG 002. 	see Annex C

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
– Reaction to fire for laminated safety glass with PVB-interlayer panes and compositions according to section 1	C-s1, d2

3.3 Hygiene, health and the environment (BWR 3)

Essential characteristic	Performance
– Contents of dangerous substances	The manufacturer has submitted a written declaration to the Technical Assessment Body (DIBt) that all used materials are in compliance with definitions and restrictions of the Regulation (EC) No 1907/2006 (SVHC < 0.1 wt.%) and the Regulation (EC) No 1272/2008 and in accordance with Regulation (EU) No 305/2011.

3.4 Safety and accessibility (BWR 4)

No performance was assessed.

3.5 Protection against noise (BWR 5)

No performance was assessed.

3.6 Energy economy and heat retention (BWR 6)

No performance was assessed.

3.7 Sustainable use of natural resources (BWR 7)

No performance was assessed.

3.8 General aspects

3.8.1 Requirements concerning design calculation

The verification of durability is part of testing the essential characteristics. Durability is only ensured if the specifications of 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 (see Annex A).

A positive compound effect for shear stress between two panes of the laminated safety glass is subject of national safety requirements and may be considered in the structural design calculation according national regulations.

3.8.2 Requirements concerning the sub-structure

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.

3.8.3 Assumptions under which the fitness of the product for the intended use was favourably assessed

– Manufacturing

This European Technical Assessment is issued for the product on the basis of agreed information, deposited with Deutsches Institut für Bautechnik, which identifies the product that has been assessed and judged. Changes to the product or production process, which could result in this deposited information being incorrect, should be notified to Deutsches Institut für Bautechnik before the changes are introduced. Deutsches Institut für Bautechnik will decide whether or not such changes affect the assessment and consequently the validity of the CE marking on the basis of the assessment, and if so whether further assessment or alterations to the assessment shall be necessary.

The infill elements may only be manufactured in the manufacturing plants as noted in Annex D. 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.

– Installation

The infill elements shall be fixed to the supporting structure according to the processing guidelines of the company "ECKELT GLAS GmbH" such that no restraints may occur in the elements. The installation shall be performed by experts only, which have been trained for these works by the company "ECKELT GLAS GmbH". Alternatively the processing guideline has to be handed over from the manufacturing plant to their customer.

- Packaging, transport and storage

The manufacturer shall take suitable precautions for packaging, transport and storage to ensure that glass elements are protected against damage by, e.g. breakage, scratching, splitting or contamination.

Suitable arrangements have to be made to prevent the application of unacceptable loads to the structural seal, for example the provision of suitable racks, and to prevent exposure to water, solar radiation or significant changes of temperature, by protecting with covers.

- Use, maintenance, repair

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). Damaged glass panes shall be substituted immediately.

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

In accordance with EAD no 15-09-0035-04.04 the applicable European legal act is: 1996/582/EC⁶.

The systems to be applied are:

- System 1 for Type II according to 2.1 Figure 1
- System 2+ for Type I according to 2.1 Figure 1

In addition, with regard to e.g. reaction to fire for products covered by this EAD the applicable European legal act is: 2003/656/EC⁷

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 16 August 2016 by Deutsches Institut für Bautechnik

Uwe Bender
Head of Department

beglaubigt:
Niebur

⁶ Official Journal of the European Communities no L 254/62 of 8.10.1996
⁷ Official Journal of the European Communities no L 231/15 of 17.9.2003

VARIO

Annex A

Insulated glass unit

Glass products

A double or triple glass unit is installed for "VARIO" (Annexes 1-4, 10, 11, 15 and 16). The use categories according to Section 2 depend on national requirements for the location and shall be respected when choosing the suitable glass product. The insulating glass unit consists of an exterior pane of thermally toughened soda lime silicate safety glass, heat-soaked thermally toughened soda lime silicate safety glass or laminated safety glass. The interior pane and the middle pane if applicable consist of thermally toughened soda lime silicate safety glass. The interior pane may also be laminated safety glass.

Laminated safety glass as exterior pane with an upstand (emergency retaining device)

For both panes thermally toughened soda lime silicate safety glass with a interlayer made of polyvinyl butyral (PVB) and a minimum thickness of 0.76 mm is required. Alternatively heat-soaked thermally toughened soda lime silicate safety glass is possible. The outer pane is treated mechanically according to the geometrical data given in Annex 5 and thus prepared for application of the emergency retaining device. The depth of the glass grinding may not exceed 6 mm.

The minimum thickness of the pane with an emergency retaining device has to be 8 mm or 10 mm. The minimum thickness of the pane without an emergency retaining device has to be ≥ 6 mm.

Laminated safety glass as exterior pane without an upstand (emergency retaining device)

For both panes thermally toughened soda lime silicate safety glass, heat-soaked thermally toughened soda lime silicate safety glass, heat-strengthened soda lime silicate glass or annealed soda lime silicate glass are possible. The minimum thickness of the pane without an emergency retaining device has to be ≥ 4 mm. The laminated safety glass used as exterior pane shall be manufactured with a PVB-interlayer and a minimum thickness of 0.76 mm.

When a laminated safety glass is used for the interior pane, it shall be manufactured of double-pane annealed glass (soda lime silicate glass), heat strengthened soda lime silicate glass or thermally toughened soda lime silicate safety glass and a PVB-interlayer with a minimum thickness of 0.76 mm. The thickness of the individual panes of the laminated safety glass shall be at least 4 mm. If thermally toughened soda lime silicate safety glass is used as interior pane, the pane thickness can vary from 6 mm to 15 mm. For the middle pane made of thermally toughened soda lime silicate safety glass a thickness of at least 6 mm is required.

The glass panes entirely or partially enamelled may only be used, if their adhesive behaviour has been verified according to ETAG 002 with the adhesive "Dow Corning 3362 HD" according to ETA-03/0003 or "Dow Corning DC 3363" according to ETA-13/0359 or "Sikasil IG-25 HM Plus" according to ETA-11/0391.

If other enamellings or coatings of the glass panes are foreseen the bonded area shall be left out from this enamelling or coating.

Furthermore it shall be observed that when using the coated glass according to EN 1096-4⁸ as laminated safety glass the coated glass surface may not be oriented towards the PVB-interlayer.

⁸

EN 1096-4:2004

Glass in building - Coated glass - Part 4: Evaluation of conformity/Product standard

Annex A

The glass edges of the exterior pane shall either be ground or polished. In the area of glass grinding damage to the edges is not permitted.

For the glass panes of the insulating glass units glass products according European harmonized standards shall be used. The characteristic bending strength of the glass panes according EN 1288-3⁹ is required for designing to ensure that they will safely transmit the wind load to the structural sealant support frame via the structural sealant.

For the use of heat strengthened glass products according to EN 1863-2¹⁰, the fragmentation test should be passed according to EN 1863-2 with at least two panes of the maximum size and five panes 1000 mm x 1500 mm per thickness of the glass panes.

For laminated safety glass according EN 14449 an interlayer made of polyvinyl butyral (PVB) is required.

The interlayer has to feature the following properties for tear strength $> 20 \text{ N/mm}^2$ and for elongation at rupture $> 250 \%$.

Verification

The stability of the infill elements and their anchorage to the structure shall be assessed by taking particular account of the following:

- self-weight,
- wind,
- temperature,
- exposure to climatic conditions.

The glass panes shall be dimensioned for the actions given above. The deflection of the glass panes in the center of the pane in case of service load shall not exceed 1/100 of the smallest support expanse of the pane.

For the loading case of bond failure, when the outer pane of the insulating glass unit is held by means of emergency retaining devices exclusively the load-bearing capacity of the emergency retaining devices is 295 N for a glass thickness of 8 mm and 358 N for a glass thickness of 10 mm.

To prevent the outer pane from skidding in this loading case the chord reduction of the outer pane shall be limited to 2 mm.

Deflection

The deflection of the framing profiles supporting the pane edges shall not exceed - in the area of the pane edge - 1/200 of the pane edge length concerned. For pane edges of insulating glasses it shall, however, not exceed 15 mm.

⁹	EN 1288-3:2000	Glass in building – Determination of the bending strength of glass – Part 3: Test with specimen supported at two points (four point bending)
¹⁰	EN 1863-2:2004	Glass in building – Heat strengthened soda soda lime silicate glass – Part 2: Evaluation of conformity/Product standard

VARIO

Annex B

Load-bearing capacities of mechanical self-weight supports, of retaining devices (toggles), and of wind protection devices

Glass support

Supporting devices with a width of 100 mm in accordance with Annexes 6 to 9, 12 to 14, and 17 to 19 bear the self-weight of the glass. The glass supports shall be verified for the self-weight loading of the infill element in every use case.

The measurement of the supporting device depends on the total thickness of the insulating glass unit. It shall be ensured that the outer pane of the insulating glass unit is supported to at least two thirds of the pane thickness. It shall not be padded in the area of U-profiles.

As contact material only silicone or polypropylene setting blocks are allowed for which compatibility with the load-bearing silicone sealant is verified. For instance the standard block GLAS-TEC GL-SV of polypropylene by Roto Frank AG, D-70771 Leinfelden-Echterdingen can be used as contact material.

Screw-retaining devices (toggles)

For fixing the infill elements retaining devices shall be used that are able to carry actions of stress. Retaining devices with proven load-bearing capacities are given in the European technical approvals ETA-05/0114, ETA-09/0335 and ETA-013/0015. Further proven retaining devices are possible.

Their load-bearing capacity is not subject of this ETA. For all applicable retaining devices geometrical specifications shall be observed. The following minimum dimensions shall apply: 9 mm x 14 mm (anchoring depth and support width).

For the positioning of the retaining devices it shall be observed that they are situated 250 mm off the corner in the case of the horizontal pane edge and 150 mm in the case of the vertical pane edge (Annexes 6 to 9, 12 to 14, and 17 to 19).

U-profile with or without an upstand (emergency retaining device)

In the area of the load-bearing insulating glass edge a U-profile of the length of 100 mm is glued at a distance of 300 - 600 mm depending on the static requirement (Annexes 1 to 4, 10, 11, 15 and 16). The U-profile can have an upstand of 40 mm in width which bites into the lateral slot of the external insulating glass pane and thus serves for the external pane as mechanical protection in case of bond failure. Prior to pressing the upstand silicone is injected in the grinding. The U-profile consists of stainless steel material No. 1.4016 and strength class S235. More detailed material information is deposited with Deutsches Institut für Bautechnik.

For the load-bearing capacity of the U-profile a maximum characteristic load of 1000 N in the area of the screw-retaining device may be used. It shall be considered that for U-profiles with upstand the load limitation given in Annex A shall apply in case of bond failure. For the screw-retaining devices see the respective ETA.

To prevent the screw-retaining devices from slipping out of the U-profile the chord reduction of the panes shall be verified.

The spacers are applied for which a system check according to EN 1279-2¹¹ is available. The edge seal of the insulating glass is manufactured with the primary seal Butylver (Fa. Fenzi) or BU-S (Fa. Kömmerling) and a secondary seal (load-bearing insulating glass edge) of silicone adhesive DC 3362 HD, DC 3363 or Sikasil IG-25 HM Plus.

¹¹ EN 1279-2:2003 Glass in building – Insulated glass units – Part 2: Long term test method and requirements for moisture penetration

VARIO

Annex C

Structural bonding

For the load-bearing insulating glass edge seal the structural sealant "DC 3362 HD" according to ETA-03/0003¹² shall be used.

As alternatives for the load-bearing insulating glass edge seal the structural sealant "Dow Corning DC 3363" according to ETA-13/0359¹³ or "Sikasil IG-25 HM Plus" according to ETA-11/0391¹⁴ may be used.

Requirement for the preparation of the adhesion surfaces

The processing requirements of the system's supplier by ECKELT GLAS GmbH and the data of the structural sealant manufacturer regarding the pre-treatment of contact surfaces and the different kinds of structural sealants processing as mentioned above which were deposited with Deutsches Institut für Bautechnik, shall be considered.

Assessment of the structural bond

At this a global safety factor $\gamma = 6$ is considered to be assessed that the structural bond taking particular account under the following actions:

- wind,
- temperature,
- exposure to climatic conditions.

Thereafter, the structural bond with a width of 16 mm can carry a load of:

- DC 3362 HD 0,14 N/mm² x 16 mm = 2,24 kN/m (ETA-03/0003)
- DC 3363 0,21 N/mm² x 16 mm = 3,36 kN/m (ETA-13/0359)
- SIKA IG-25 HM Plus 0,19 N/mm² x 16 mm = 3,04 kN/m (ETA-11/0391)

Due to the point transmission of forces by means of the screw-retaining devices, the structural bond is not uniformly stressed by the wind suction loads, so that the following distinction of cases is to be taken into account:

1. The wind load of the outer pane is completely assigned to the point bearing and an associated effective width of the silicone sealant of $b = 140$ mm. This means:

$$(w \times A) / (n \times b) \leq F$$

- w - wind suction (proportion of the exterior pane)
- A - glazing area
- n - number of point bearings
- b - effective width for the load
- F - load-bearing capacity of the structural bond

The number of retaining devices (point bearings) required can be increased up to the use of the minimum distance of retaining device of 300 mm.

2. The climate load is distributed on the remaining structural bond of silicone between the retaining devices. This means:

$$K \times A / (U - n \times b) \leq F$$

- K - climate load
- U - pane periphery

¹² ETA-03/0003 "DOW CORNING 3362 and 3362 HD Black – Grey - White; Structural Sealant for use in structural and non-structural edge seal of insulated-glass unit for use in structural sealant glazing systems", UBAtc; Validity to 05/04/2017

¹³ ETA-13/0359 "DOW CORNING DC 3363 Structural Sealant for use in structural and non-structural edge seal of insulated-glass unit for use in structural sealant glazing systems", UBAtc; Validity to 05/04/2017

¹⁴ ETA-11/0391 " Sikasil IG-25 HM Plus Structural Sealant for use in structural sealant glazing kit", OIB; Validity to 07/11/2016

Annex C

The design of the structural bond has to be carried out in accordance with the regulations in the Member State, in which the infill elements will be used.

Joint sealing

After assembly, the joints between infill elements are to be sealed using one of the sealants mentioned below:

- DC 791 (Dow Corning) or
- DC 797 (Dow Corning) or
- DC 757 (Dow Corning) or
- Sikasil WS-605 S (Sika) or
- Sikasil WS-680 SC (Sika)

Only compatible materials may be installed adjacent to the structural sealant. Neighbouring materials used in the combinations specified in the following table are assessed:

Permissible combinations of structural sealants and adjacent materials										
Manufacturer	Structural sealant	Inner seal / butyl		Joint sealing					Glazing support / setting block	
		Butylver (Fa. Fenzi)	Butyl BU-S (Fa. Kömmerling)	DC 791	DC 797	DC 757	Sikasil WS-605 S	Sikasil WS-680 SC	GLSV Standardklötze, Fa. Roto Frank AG, Fa. Gluske	G-U, BKS Verglasungsklotze
Dow Corning	DC 3362 HD	X	X	X	X	X			X	X
Dow Corning	DC 3363	X	X	X	X	X			X	X
Sika	Sikasil IG-25 HM Plus	X	X				X	X	X	X

VARIO

Annex D

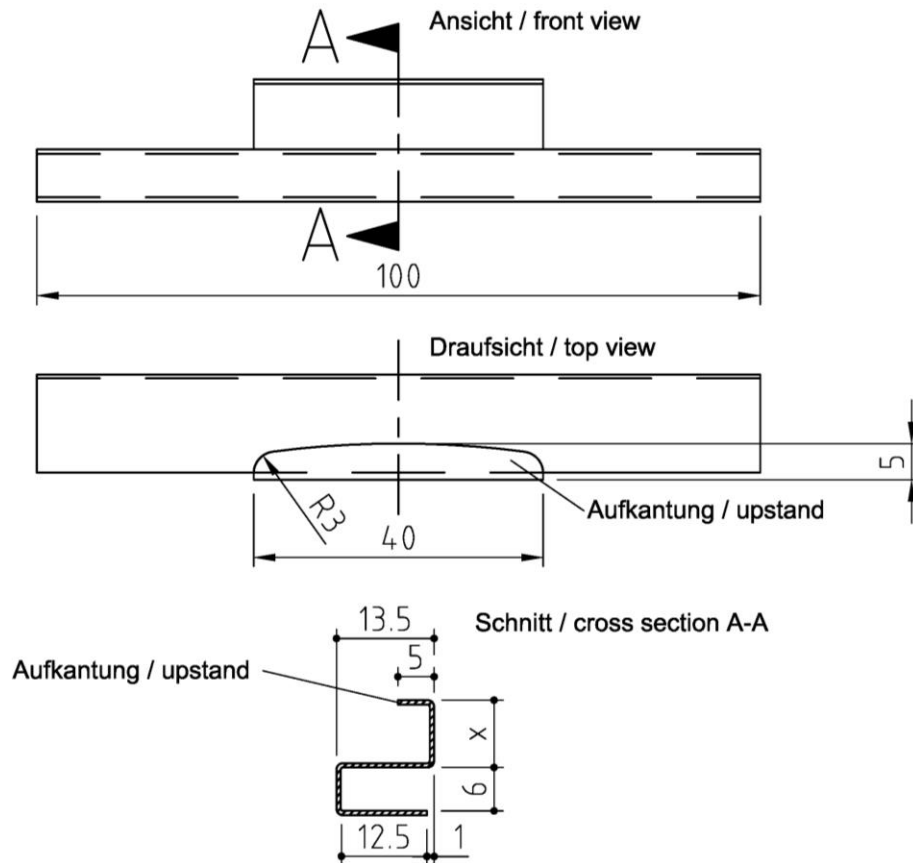
Manufacturing plants for types VARIO DZ / VARIO S-FOR / VARIO II

- 1) GLASSOLUTION AUSTRIA ECKELT GLAS GmbH
Resthofstraße 18
4400 Steyr
AUSTRIA (ÖSTERREICH)
- 2) GLASSOLUTIONS Objekt GmbH
Bahnhofstraße 30
01471 Radeburg
GERMANY (DEUTSCHLAND)

Manufacturing plants for type VARIO II

- 3) ESTLAND GLASSOLUTIONS Baltiklaas
Saint-Gobain Glass Estonia SE / BU Baltiklaas
Ringtee 58b
Tartu 51014
ESTONIA (ESTLAND)
- 4) SPANIEN-GLASSOLUTIONS Lalin
La Veneciana S.A.
Cima Do Alle - Filguera
36500 Lalin – Pontevedra
SPAIN (SPANIEN)
- 5) TSCHECHIEN - GLASSOLUTIONS CZ
Saint-Gobain GLASSOLUTIONS
Zavoud Brno – Sklenarska 643/7
619 00 Brno
CZECH REPUBLIC (TSCHECHIEN)
- 6) FRANCE - GLASSOLUTIONS S.I.V.A.Q
Zone Industrial BP 50
57 Eygreteau Est
33230 Coutras
FRANCE (FRANKREICH)
- 7) SAGE ELECTROCHROMICS Inc.
2 Sage Way
Faribault, MN 55021
USA (VEREINIGTE STAATEN VON AMERIKA)

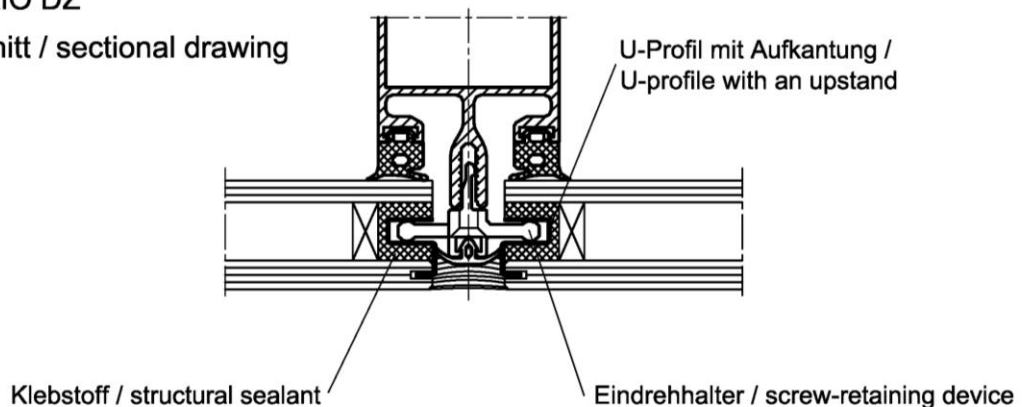
U-Profil mit Aufkantung (Nothalter) / U-profile with an upstand (safety device)



x = glasdickenabhängig / depending on thickness of glass

VARIO DZ

Schnitt / sectional drawing

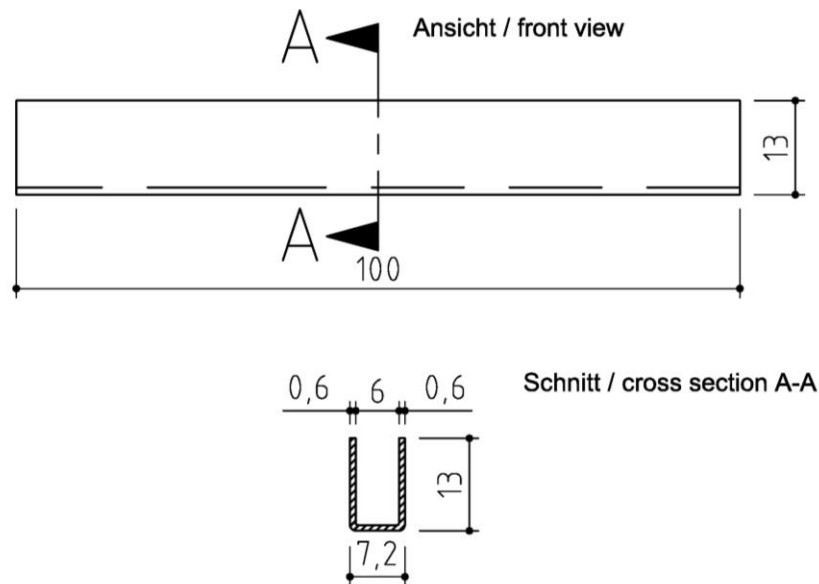


GLASSOLUTIONS
Eckelt Glas GmbH • Resthofstraße 18 • 4400 Steyr
Austria • FBG Steyr • FN 118661b
Tel. + 43 7252 894 0 • Fax + 43 7252 894 24
www.eckelt.at

VARIO DZ
mech. Sicherung
safety device
Zweifach Isolierglas
double insulation glass

Anlage 1 / Annex 1

U-Profil ohne Aufkantung / U-profile without an upstand

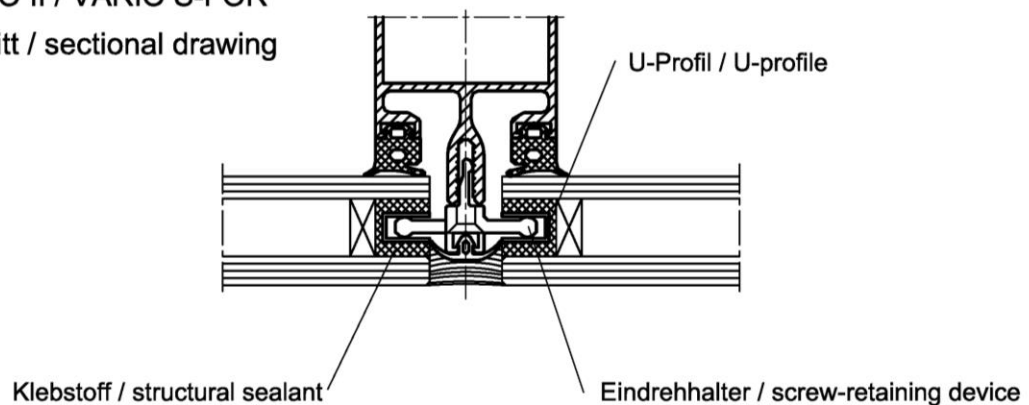


VARIO II: gänzlich ohne Nothalterung (mech. Sicherung der Außenscheibe)
VARIO II: completely without emergency bracket

VARIO S-FOR: Anordnung der Nothalterungen gemäß Anlage 7
VARIO S-FOR: position of the emergency brackets in accordance with Annex 7

VARIO II / VARIO S-FOR

Schnitt / sectional drawing



VARIO II / VARIO S-FOR in Deutschland nur bis zu einer Einbauhöhe von 8 m
VARIO II / VARIO S-FOR in Germany only up to 8 m height

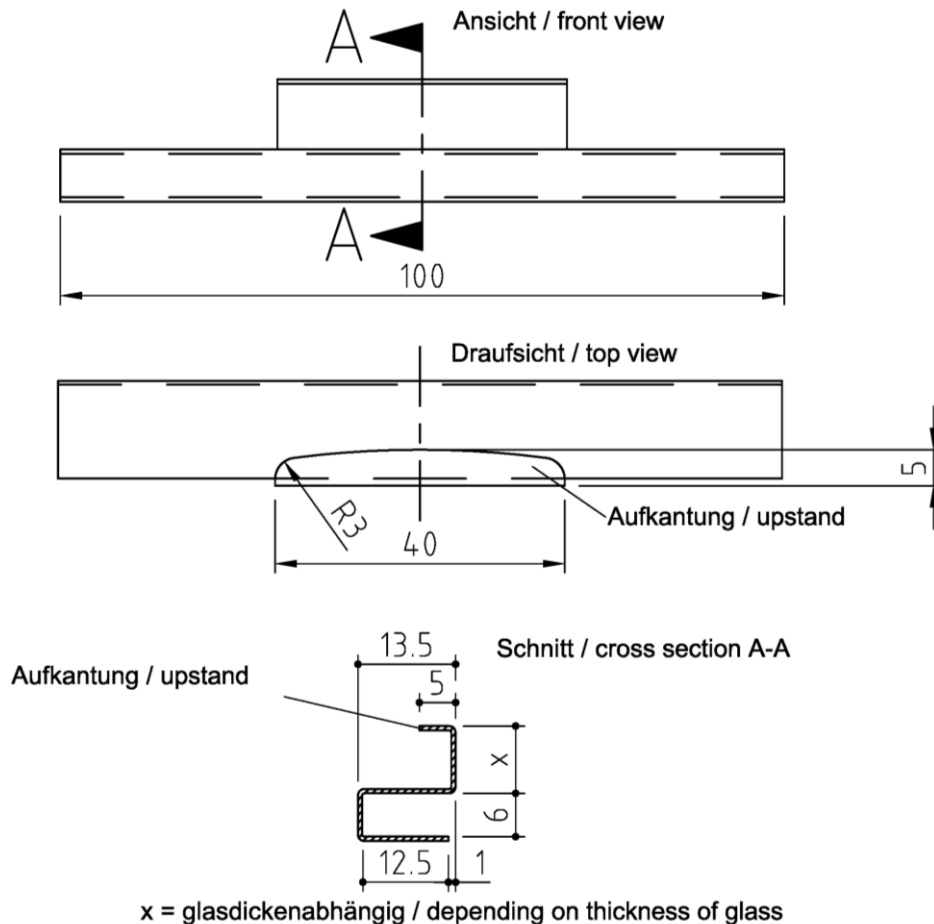


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Eckelt Glas GmbH • Resthofstraße 18 • 4400 Steyr
Austria • FBG Steyr • FN 118661b
Tel. + 43 7252 894 0 • Fax + 43 7252 894 24
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VARIO II
VARIO S-FOR
Zweifach Isolierglas
double insulation glass

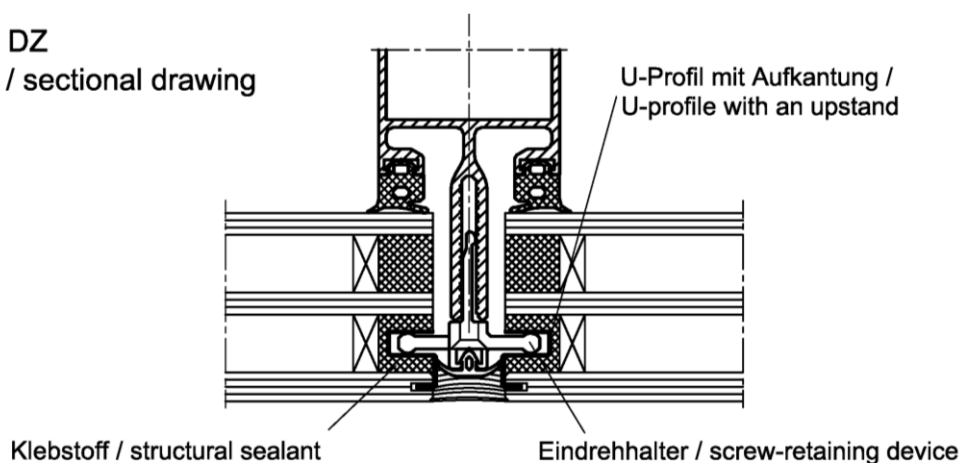
Anlage 2 / Annex 2

U-Profil mit Aufkantung (Nothalter) / U-profile with an upstand (safety device)



VARIO DZ

Schnitt / sectional drawing

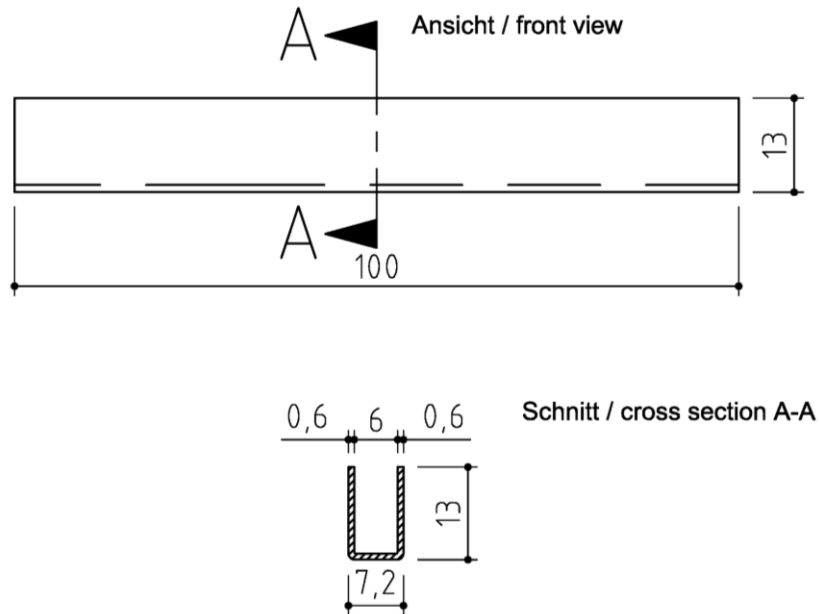


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Austria • FBG Steyr • FN 118661b
Tel. + 43 7252 894 0 • Fax + 43 7252 894 24
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VARIO DZ
mech. Sicherung
safety device
Dreifach Isolierglas
triple insulation glass

Anlage 3 / Annex 3

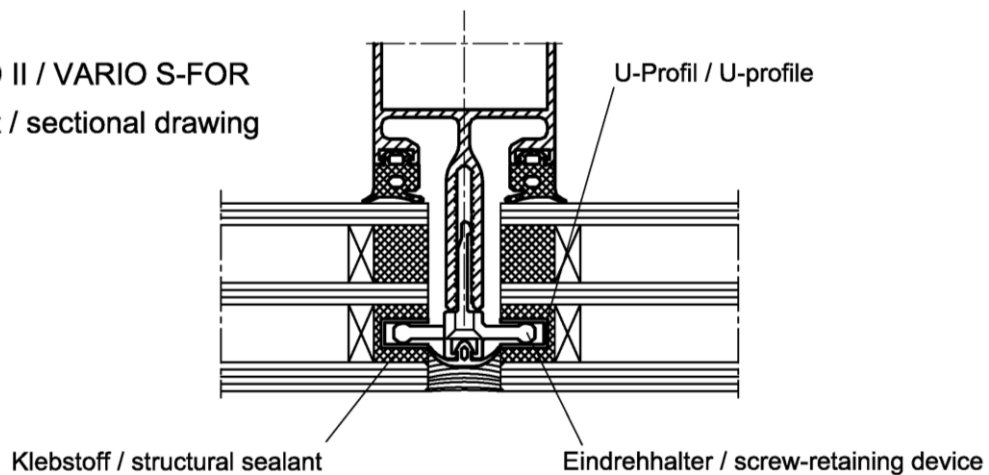
U-Profil ohne Aufkantung / U-profile without an upstand



VARIO II: gänzlich ohne Nothalterung (mech. Sicherung der Außenscheibe)
VARIO II: completely without emergency bracket

VARIO S-FOR: Anordnung der Nothalterungen gemäß Anlage 9
VARIO S-FOR: position of the emergency brackets in accordance with Annex 9

VARIO II / VARIO S-FOR Schnitt / sectional drawing



VARIO II / VARIO S-FOR in Deutschland nur bis zu einer Einbauhöhe von 8 m
VARIO II / VARIO S-FOR in Germany only up to 8 m height



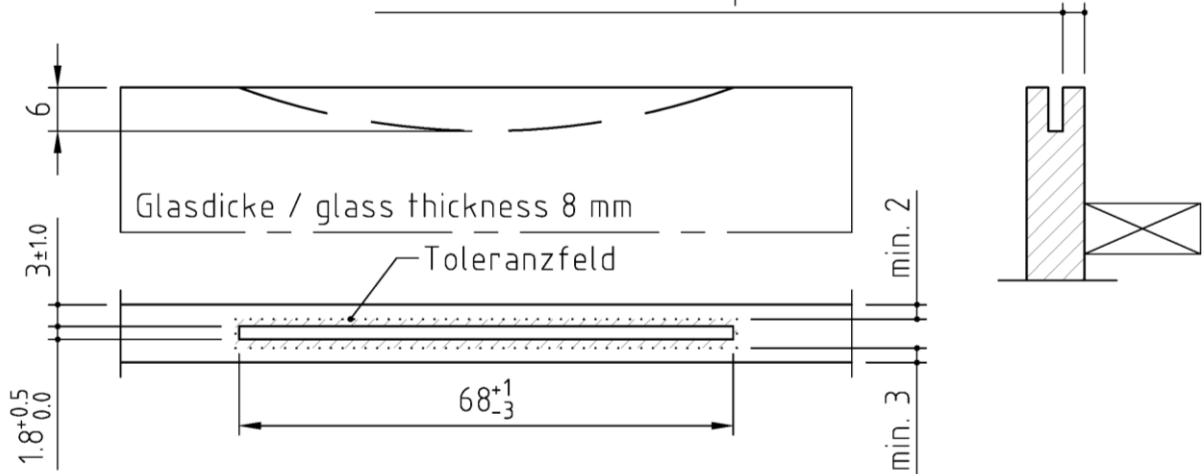
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VARIO II
VARIO S-FOR
Dreifach Isolierglas
triple insulation glass

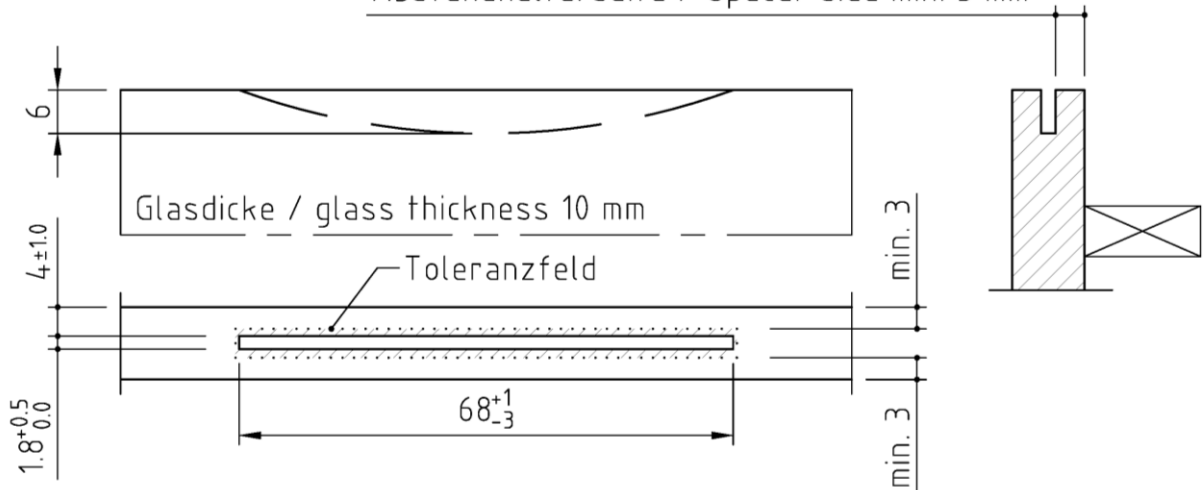
Anlage 4 / Annex 4

Abmessungen des Glaseinschliffs / Dimensions of the glass grinding

Abstandhalterseite / spacer side min. 3 mm



Abstandhalterseite / Spacer side min. 3 mm



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VARIO DZ

**Glaseinschliff / glass cut in
für Glas / for glazing
8, 10 mm ESG-H**

Anlage 5 / Annex 5

Eigengewichtsabtragung / Klotzung

Es muss sichergestellt werden,
dass das Eigengewicht der
Isolierglasscheibe durch die
Klotzung abgetragen wird.

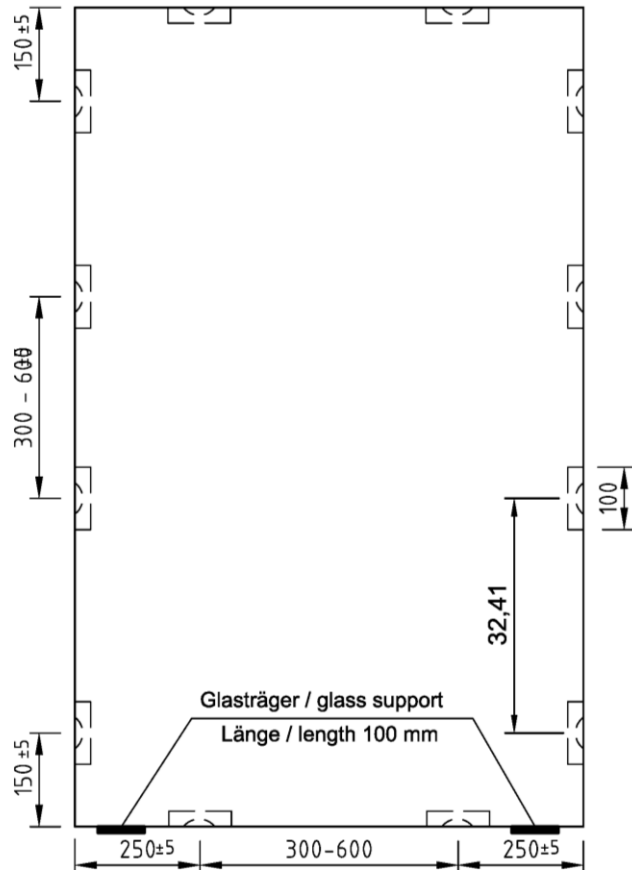
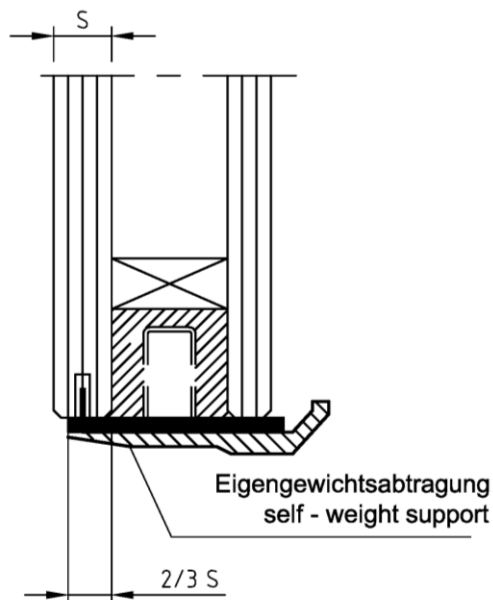
Im Bereich vom Glaseinschnitt
darf nicht geklotzt werden.

Die Klotzung ist bis 2/3
der Außenscheibe
durchzuführen.

Self - weight support / setting block:

The dead weight of the insulating
glass pane has to be carried by the
setting blocks. Do not place setting
blocks at the cut in area.

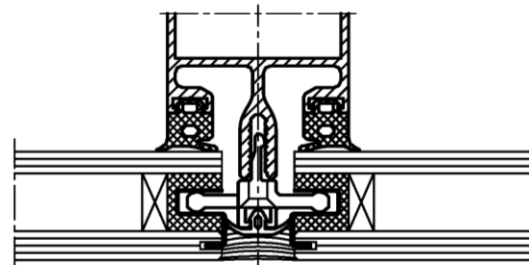
The setting block must be positioned
2/3 of the thickness of the outside
pane.



Bei Scheibenbreiten von 500 mm bis 700 mm,
nur einen Halteteil einsetzen.

For pane width 500 mm to 700 mm insert one mechanical clip only.

Über 700 mm zwei oder mehr Halteteile einsetzen,
wobei der Abstand der Halteteile 300 bis 600 mm betragen soll.
Pane widths of over 700 mm insert two or more mechanical clips.
The distance of the clips should be 300 to 600 mm.



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VARIO DZ
Eigengewichtsabtragung
self - weight support
Zweifach Isolierglas
double insulation glass

Anlage 6 / Annex 6

Eigengewichtsabtragung / Klotzung

Es muss sichergestellt werden,
dass das Eigengewicht der
Isolierglasscheibe durch die
Klotzung abgetragen wird.

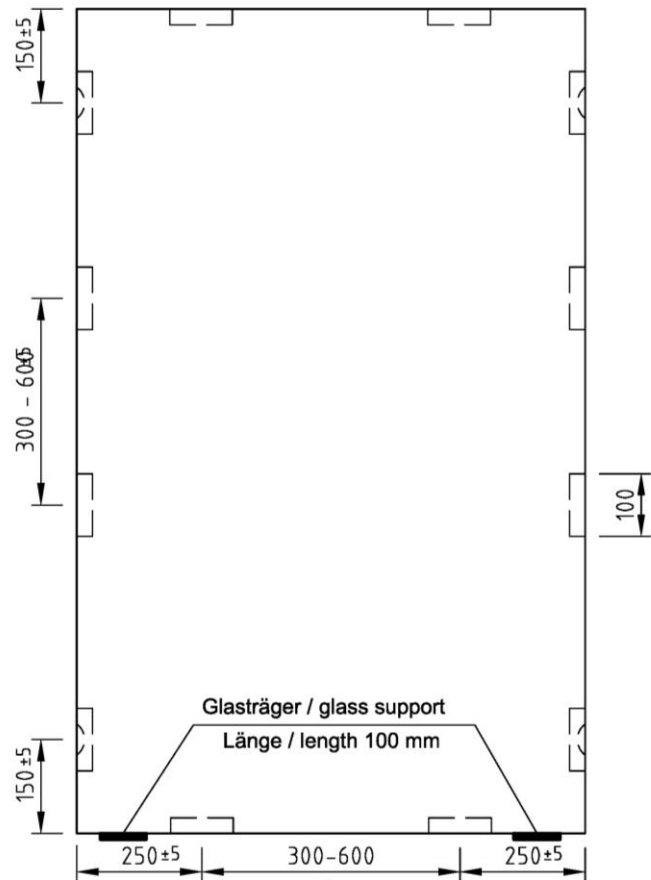
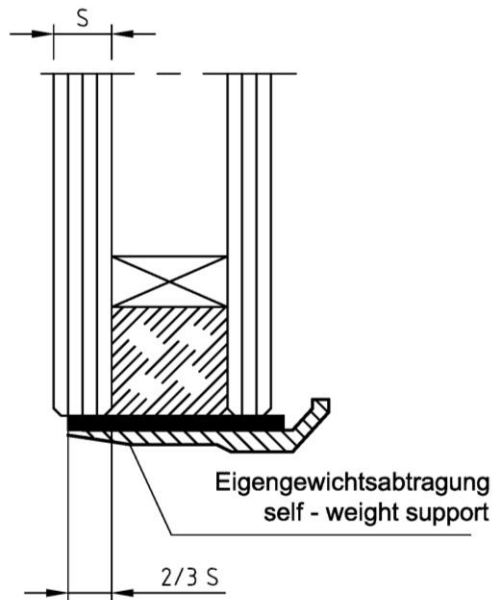
Im Bereich vom Glaseinschnitt
darf nicht geklotzt werden.

Die Klotzung ist bis 2/3
der Außenscheibe
durchzuführen.

Self - weight support / setting block:

The dead weight of the insulating
glass pane has to be carried by the
setting blocks. Do not place setting
blocks at the cut in area.

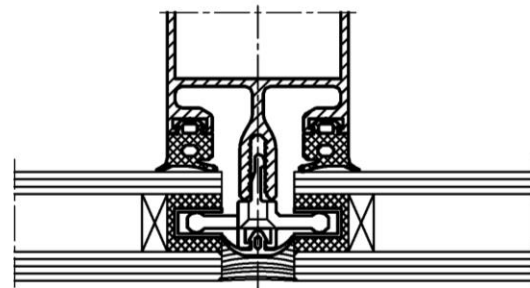
The setting block must be positioned
2/3 of the thickness of the outside
pane.



Bei Scheibenbreiten von 500 mm bis 700 mm,
nur einen Halteteil einsetzen.

For pane width 500 mm to 700 mm insert one mechanical clip only.

Über 700 mm zwei oder mehr Halteteile einsetzen,
wobei der Abstand der Halteteile 300 bis 600 mm betragen soll.
Pane widths of over 700 mm insert two or more mechanical clips.
The distance of the clips should be 300 to 600 mm.



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VARIO S-FOR
Eigengewichtsabtragung
self - weight support
Zweifach Isolierglas
double insulation glass

Anlage 7 / Annex 7

Eigengewichtsabtragung / Klotzung

Es muss sichergestellt werden,
dass das Eigengewicht der
Isolierglasscheibe durch die
Klotzung abgetragen wird.

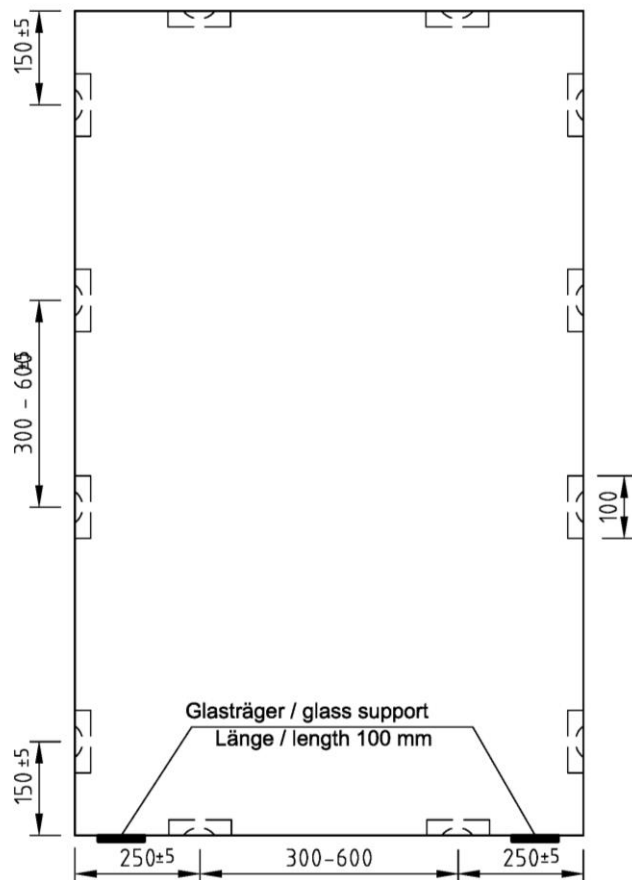
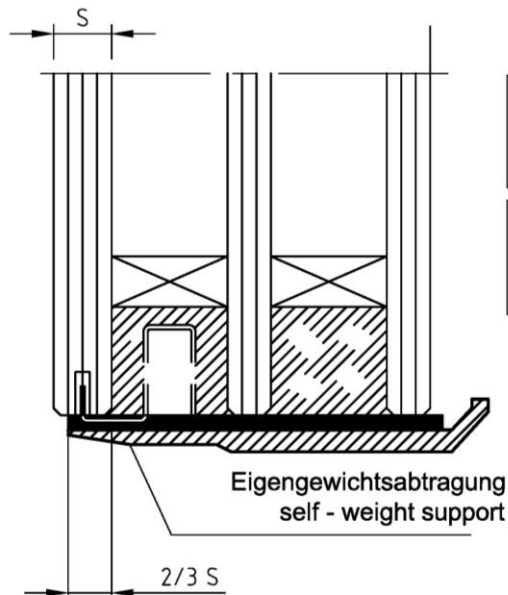
Im Bereich vom Glaseinschnitt
darf nicht geklotzt werden.

Die Klotzung ist bis 2/3
der Außenscheibe
durchzuführen.

Self - weight support / setting block:

The dead weight of the insulating
glass pane has to be carried by the
setting blocks. Do not place setting
blocks at the cut in area.

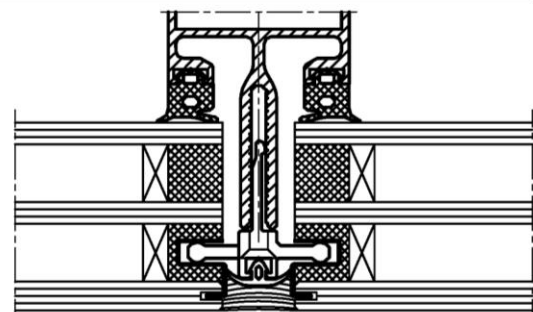
The setting block must be positioned
2/3 of the thickness of the outside
pane.



Bei Scheibenbreiten von 500 mm bis 700 mm,
nur einen Halteteil einsetzen.

For pane width 500 mm to 700 mm insert one mechanical clip only.

Über 700 mm zwei oder mehr Halteteile einsetzen,
wobei der Abstand der Halteteile 300 bis 600 mm betragen soll.
Pane widths of over 700 mm insert two or more mechanical clips.
The distance of the clips should be 300 to 600 mm.



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VARIO DZ
Eigengewichtsabtragung
self - weight support
Dreifach Isolierglas
triple insulation glass

Anlage 8 / Annex 8

Eigengewichtsabtragung / Klotzung

Es muss sichergestellt werden,
dass das Eigengewicht der
Isolierglasscheibe durch die
Klotzung abgetragen wird.

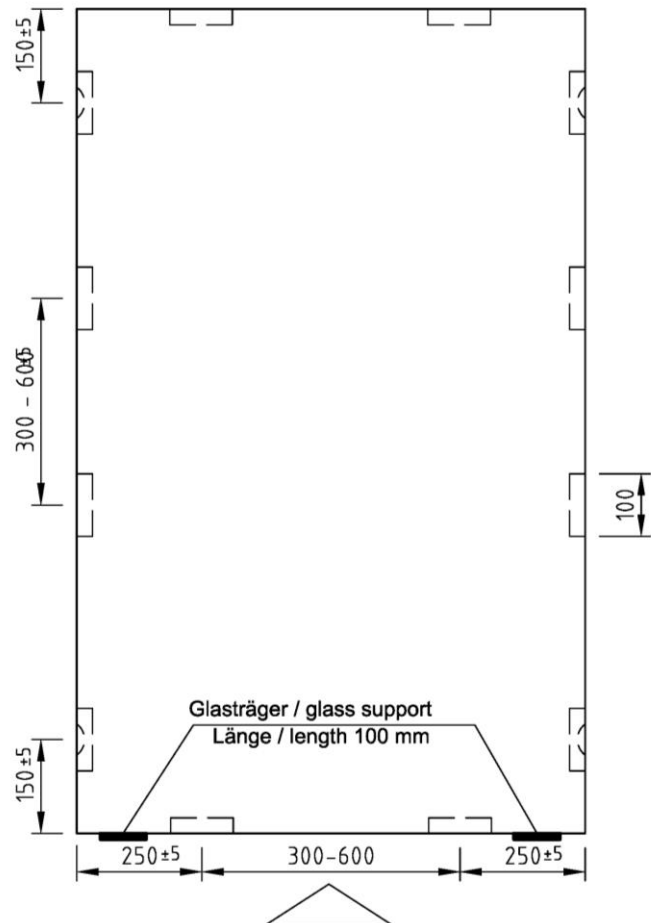
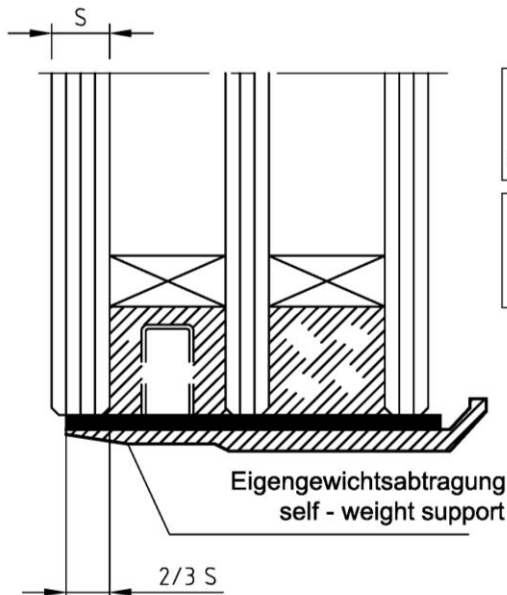
Im Bereich vom Glaseinschnitt
darf nicht geklotzt werden.

Die Klotzung ist bis bis 2/3
der Außenscheibe
durchzuführen.

Self - weight support / setting block:

The dead weight of the insulating
glass pane has to be carried by the
setting blocks. Do not place setting
blocks at the cut in area.

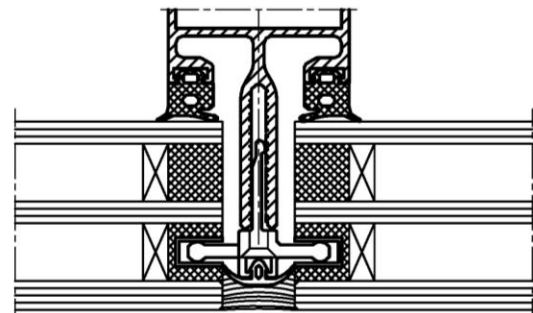
The setting block must be positioned
2/3 of the thickness of the outside
pane.



Bei Scheibenbreiten von 500 mm bis 700 mm,
nur einen Halteteil einsetzen.

For pane width 500 mm to 700 mm insert one mechanical clip only.

Über 700 mm zwei oder mehr Halteteile einsetzen,
wobei der Abstand der Halteteile 300 bis 600 mm betragen soll.
Pane widths of over 700 mm insert two or more mechanical clips.
The distance of the clips should be 300 to 600 mm.

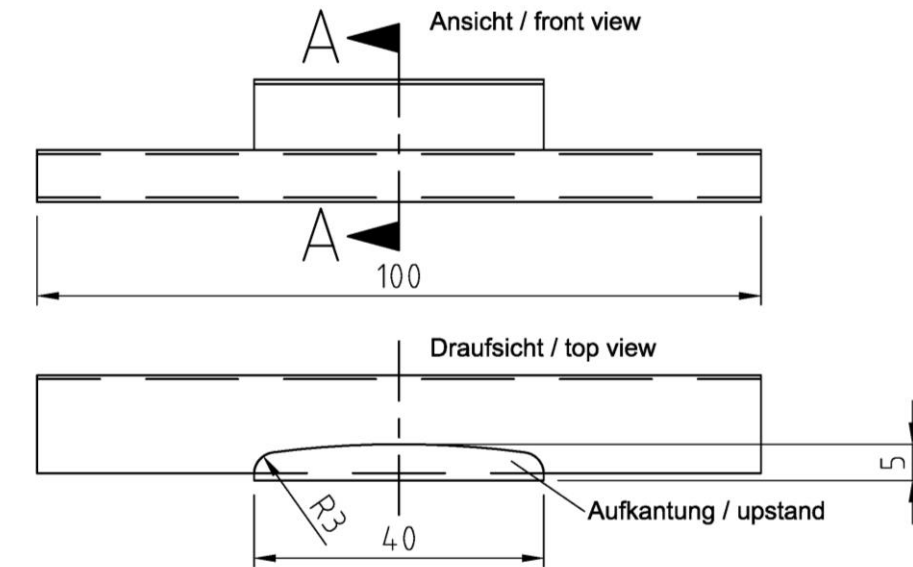


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VARIO S-FOR
Eigengewichtsabtragung
self - weight support
Dreifach Isolierglas
triple insulation glass

Anlage 9 / Annex 9

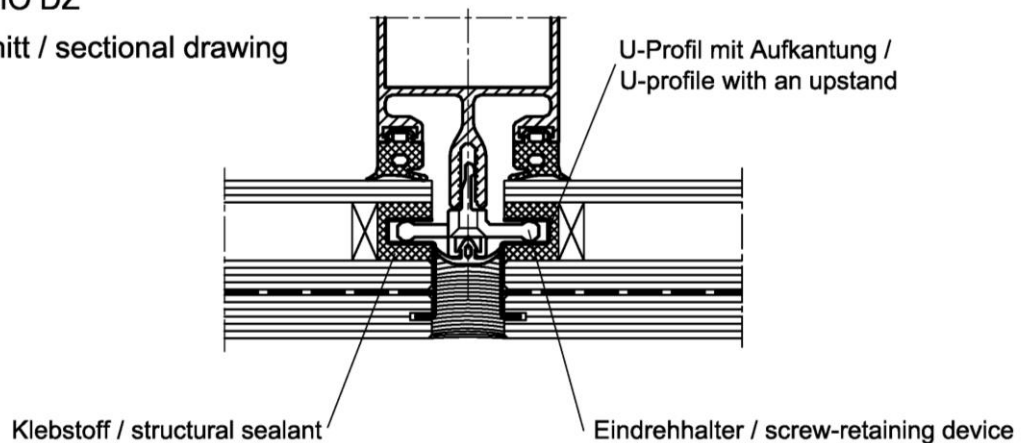
U-Profil mit Aufkantung (Nothalter) / U-profile with an upstand (safety device)



x = glasdickenabhängig / depending on thickness of glass

VARIO DZ

Schnitt / sectional drawing

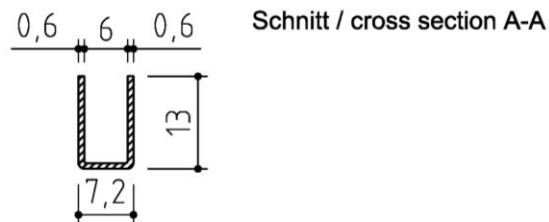
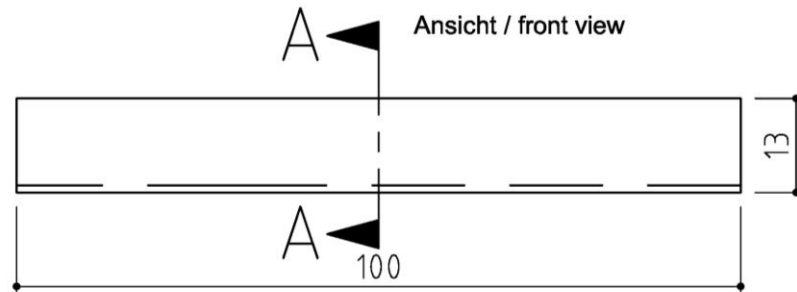


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VARIO DZ
mech. Sicherung
safety device
Zweifach Isolierglas
double insulation glass

Anlage 10 / Annex 10

U-Profil ohne Aufkantung / U-profile without an upstand

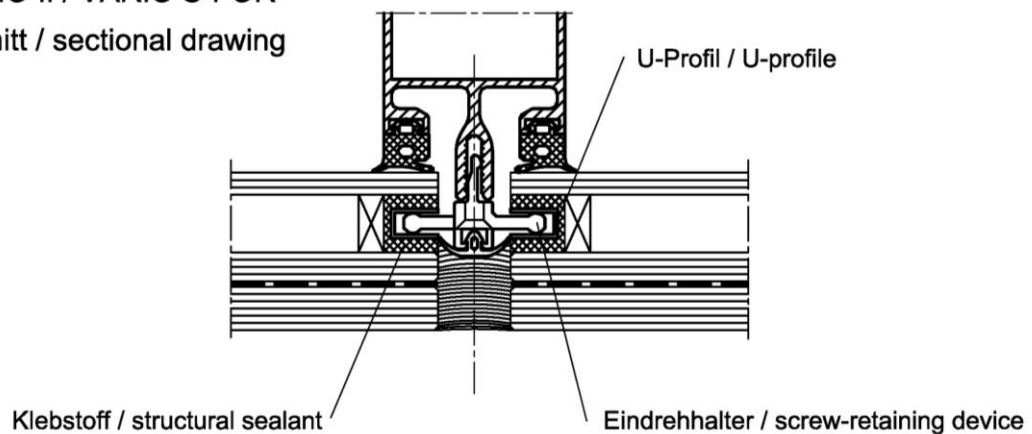


VARIO II: gänzlich ohne Nothalterung (mech. Sicherung der Außenscheibe)
VARIO II: completely without emergency bracket

VARIO S-FOR: Anordnung der Nothalterungen gemäß Anlage 13
VARIO S-FOR: position of the emergency brackets in accordance with Annex 13

VARIO II / VARIO S-FOR

Schnitt / sectional drawing



VARIO II / VARIO S-FOR in Deutschland nur bis zu einer Einbauhöhe von 8 m
VARIO II / VARIO S-FOR in Germany only up to 8 m height



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VARIO II
VARIO S-FOR

Zweifach Isolierglas
double insulation glass

Anlage 11 / Annex 11

Eigengewichtsabtragung / Klotzung

Es muss sichergestellt werden, dass das Eigengewicht der Isolierglasscheibe durch die Klotzung abgetragen wird.

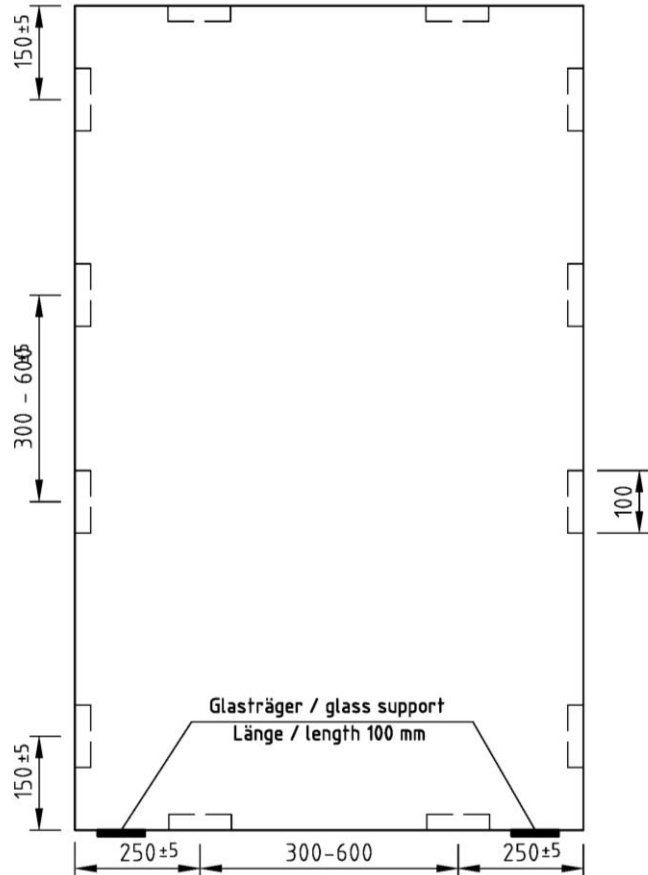
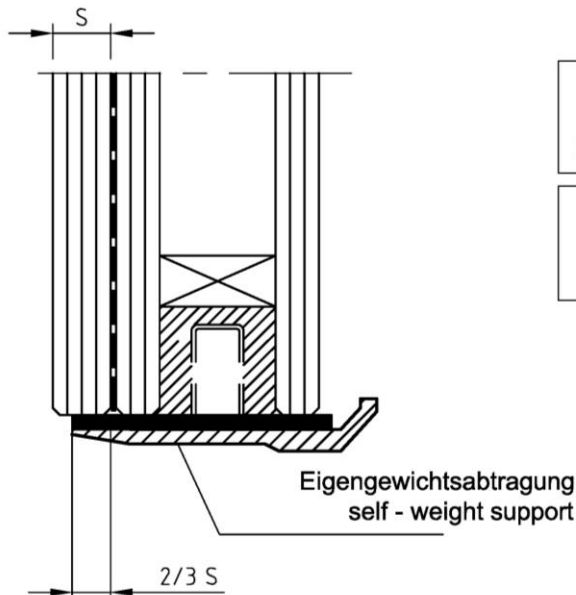
Im Bereich vom Glaseinschnitt darf nicht geklotzt werden.

Die Klotzung ist bis 2/3 der Außenscheibe durchzuführen.

Self - weight support / setting block:

The dead weight of the insulating glass pane has to be carried by the setting blocks. Do not place setting blocks at the cut in area.

The setting block must be positioned 2/3 of the thickness of the outside pane.

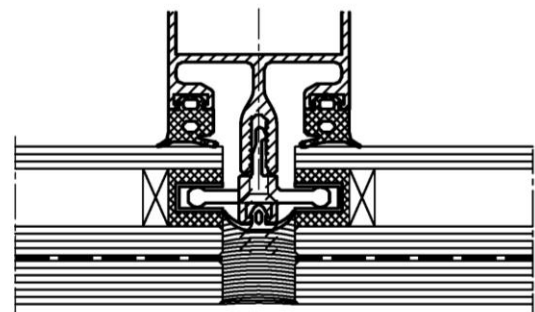


Bei Scheibenbreiten von 500 mm bis 700 mm, nur einen Halteteil einsetzen.

For pane width 500 mm to 700 mm insert one mechanical clip only.

Über 700 mm zwei oder mehr Halteteile einsetzen, wobei der Abstand der Halteteile 300 bis 600 mm betragen soll.

Pane widths of over 700 mm insert two or more mechanical clips. The distance of the clips should be 300 to 600 mm.



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VARIO II
Eigengewichtsabtragung
self - weight support

Zweifach Isolierglas
double insulation glass

Anlage 12 / Annex 12

Eigengewichtsabtragung / Klotzung

Es muss sichergestellt werden,
dass das Eigengewicht der
Isolierglasscheibe durch die
Klotzung abgetragen wird.

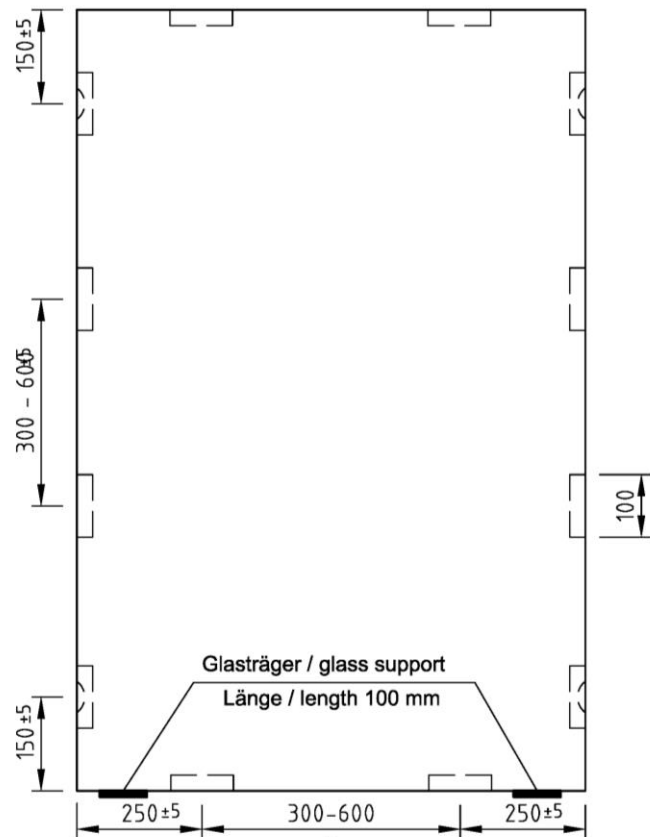
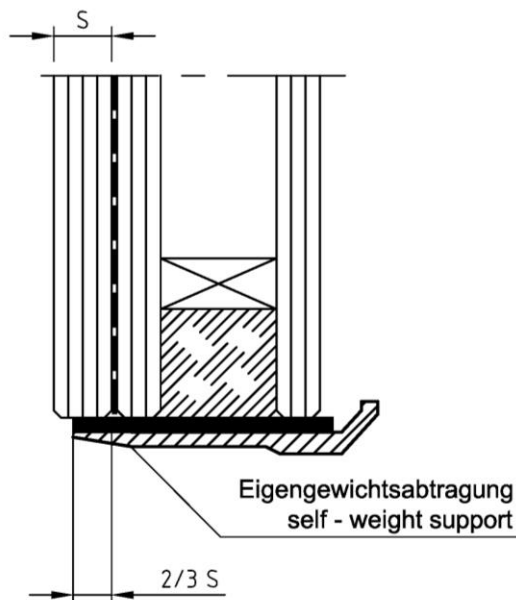
Im Bereich vom Glaseinschnitt
darf nicht geklotzt werden.

Die Klotzung ist bis 2/3
der Außenscheibe
durchzuführen.

Self - weight support / setting block:

The dead weight of the insulating
glass pane has to be carried by the
setting blocks. Do not place setting
blocks at the cut in area.

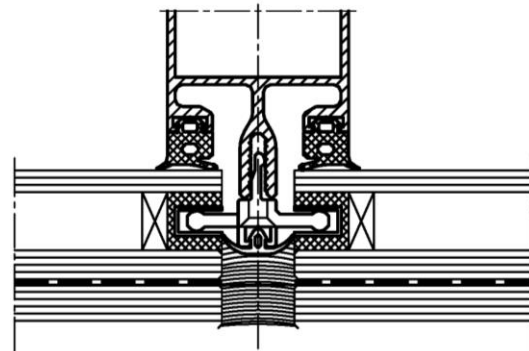
The setting block must be positioned
2/3 of the thickness of the outside
pane.



Bei Scheibenbreiten von 500 mm bis 700 mm,
nur einen Halteteil einsetzen.

For pane width 500 mm to 700 mm insert one mechanical clip only.

Über 700 mm zwei oder mehr Halteteile einsetzen,
wobei der Abstand der Halteteile 300 bis 600 mm betragen soll.
Pane widths of over 700 mm insert two or more mechanical clips.
The distance of the clips should be 300 to 600 mm.



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VARIO S-FOR
Eigengewichtsabtragung
self - weight support
Zweifach Isolierglas
double insulation glass

Anlage 13 / Annex 13

Eigengewichtsabtragung / Klotzung

Es muss sichergestellt werden,
dass das Eigengewicht der
Isolierglasscheibe durch die
Klotzung abgetragen wird.

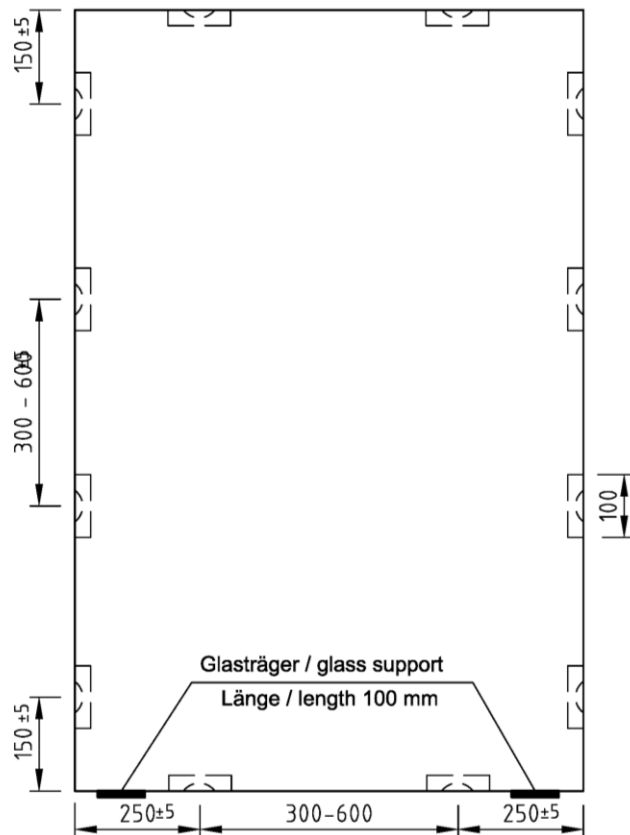
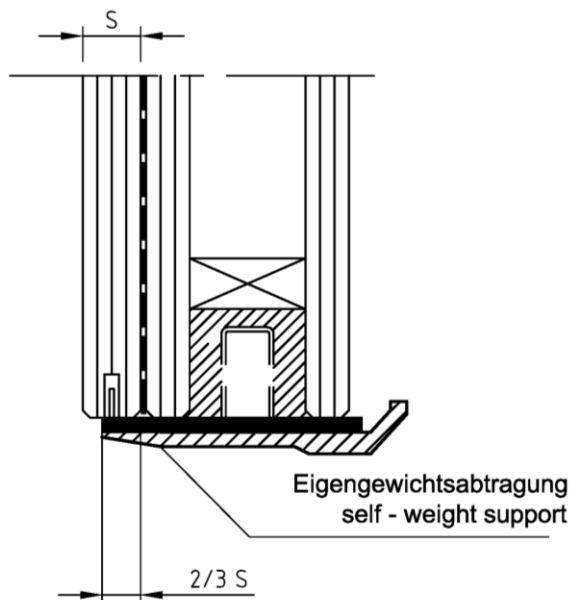
Im Bereich vom Glaseinschnitt
darf nicht geklotzt werden.

Die Klotzung ist bis 2/3
der Außenscheibe
durchzuführen.

Self - weight support / setting block:

The dead weight of the insulating
glass pane has to be carried by the
setting blocks. Do not place setting
blocks at the cut in area.

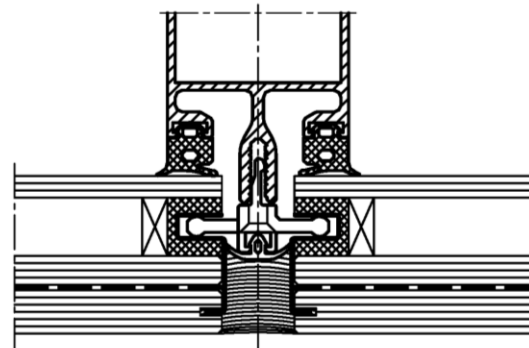
The setting block must be positioned
2/3 of the thickness of the outside
pane.



Bei Scheibenbreiten von 500 mm bis 700 mm,
nur einen Halteteil einsetzen.

For pane width 500 mm to 700 mm insert one mechanical clip only.

Über 700 mm zwei oder mehr Halteteile einsetzen,
wobei der Abstand der Halteteile 300 bis 600 mm betragen soll.
Pane widths of over 700 mm insert two or more mechanical clips.
The distance of the clips should be 300 to 600 mm.

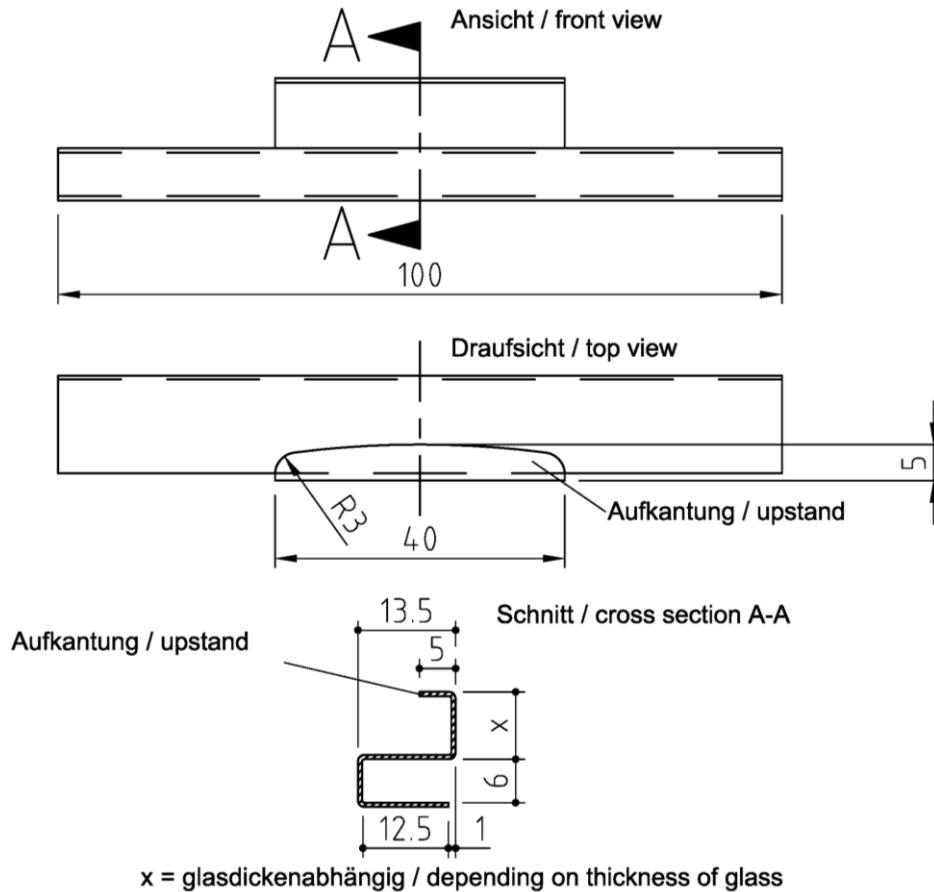


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VARIO DZ
Eigengewichtsabtragung
self - weight support
Zweifach Isolierglas
double insulation glass

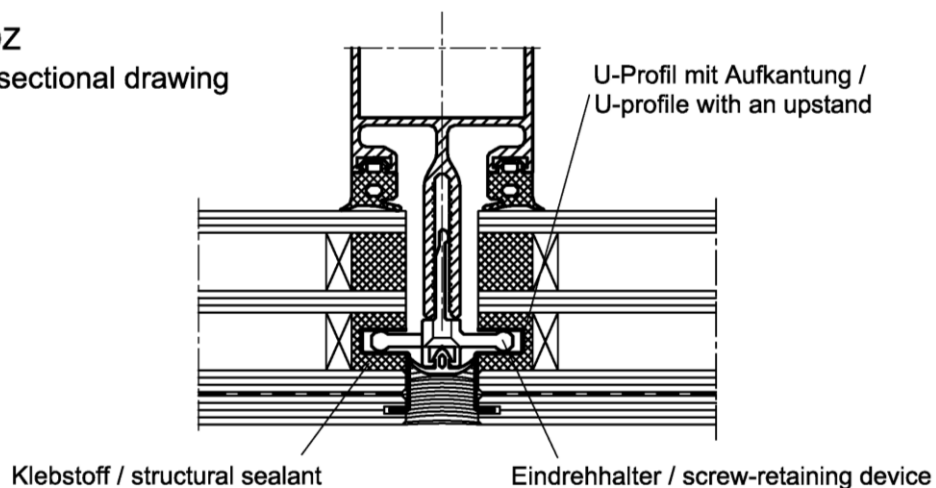
Anlage 14 / Annex 14

U-Profil mit Aufkantung (Nothalter) / U-profile with an upstand (safety device)



VARIO DZ

Schnitt / sectional drawing

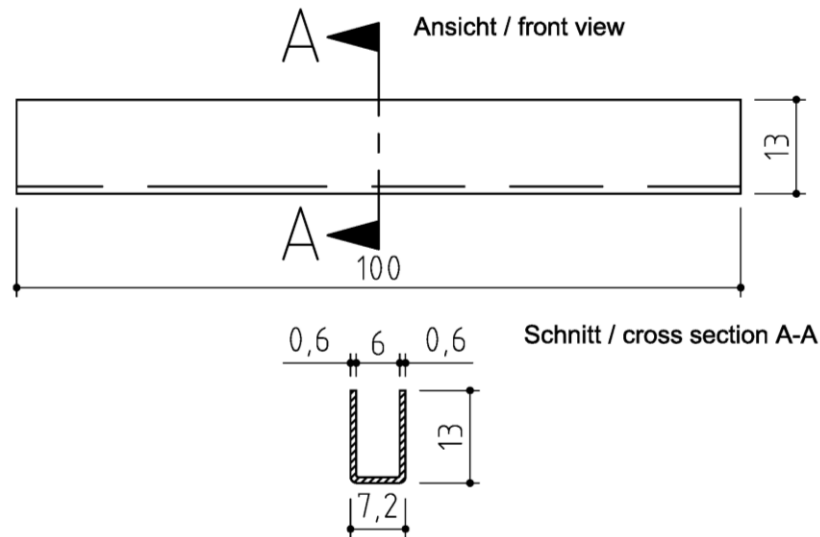


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VARIO DZ
mech. Sicherung
safety device
Dreifach Isolierglas
triple insulation glass

Anlage 15 / Annex 15

U-Profil ohne Aufkantung / U-profile without an upstand



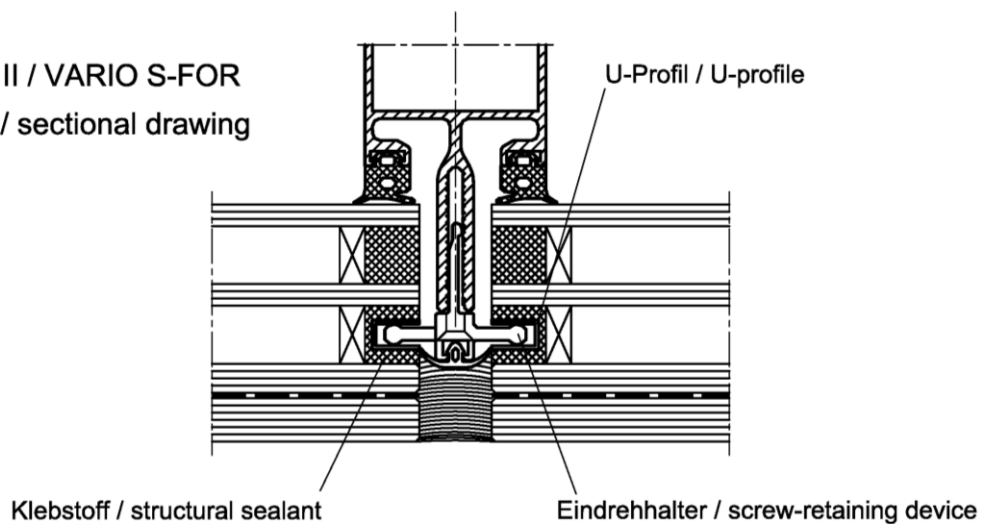
VARIO II: gänzlich ohne Nothalterung (mech. Sicherung der Außenscheibe)

VARIO II: completely without emergency bracket

VARIO S-FOR: Anordnung der Nothalterungen gemäß Anlage 18

VARIO S-FOR: position of the emergency brackets in accordance with Annex 18

VARIO II / VARIO S-FOR Schnitt / sectional drawing



VARIO II / VARIO S-FOR in Deutschland nur bis zu einer Einbauhöhe von 8 m

VARIO II / VARIO S-FOR in Germany only up to 8 m height



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VARIO II
VARIO S-FOR
Dreifach Isolierglas
triple insulation glass

Anlage 16 / Annex 16

Eigengewichtsabtragung / Klotzung

Es muss sichergestellt werden, dass das Eigengewicht der Isolierglasscheibe durch die Klotzung abgetragen wird.

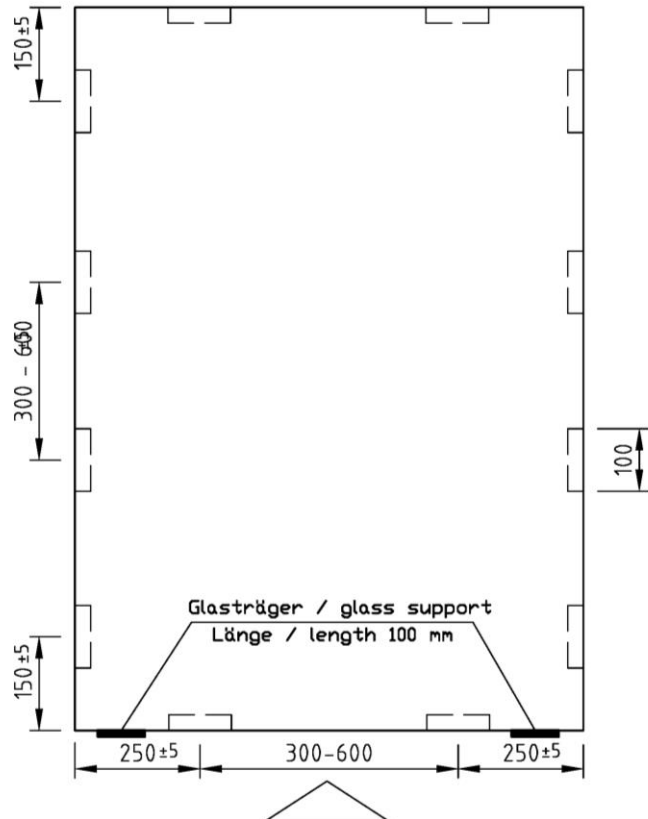
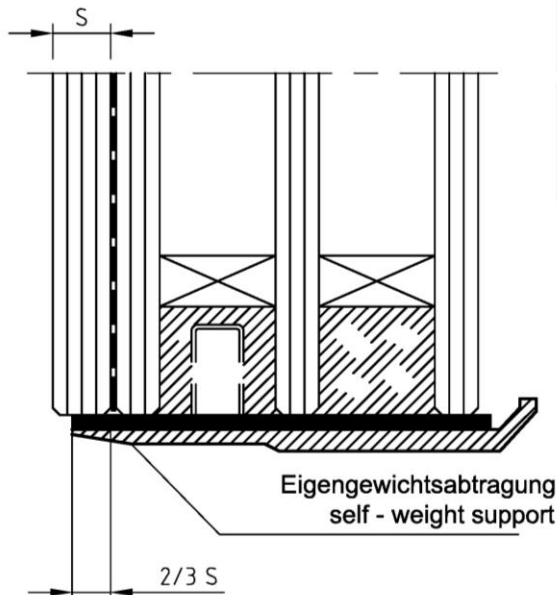
Im Bereich vom Glaseinschnitt darf nicht geklotzt werden.

Die Klotzung ist bis bis $\frac{2}{3}$ der Außenscheibe durchzuführen.

Self - weight support / setting block:

The dead weight of the insulating glass pane has to be carried by the setting blocks. Do not place setting blocks at the cut in area.

The setting block must be positioned $\frac{2}{3}$ of the thickness of the outside pane.

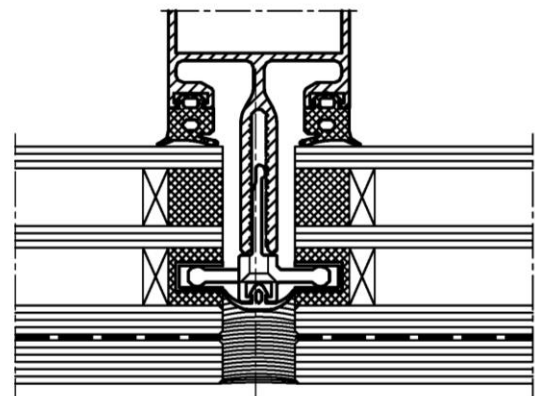


Bei Scheibenbreiten von 500 mm bis 700 mm, nur einen Halteteil einsetzen.

For pane width 500 mm to 700 mm insert one mechanical clip only.

Über 700 mm zwei oder mehr Halteteile einsetzen, wobei der Abstand der Halteteile 300 bis 600 mm betragen soll.

Pane widths of over 700 mm insert two or more mechanical clips. The distance of the clips should be 300 to 600 mm.



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VARIO II
Eigengewichtsabtragung
self - weight support

Dreifach Isolierglas
triple insulation glass

Anlage 17 / Annex 17

Eigengewichtsabtragung / Klotzung

Es muss sichergestellt werden,
dass das Eigengewicht der
Isolierglasscheibe durch die
Klotzung abgetragen wird.

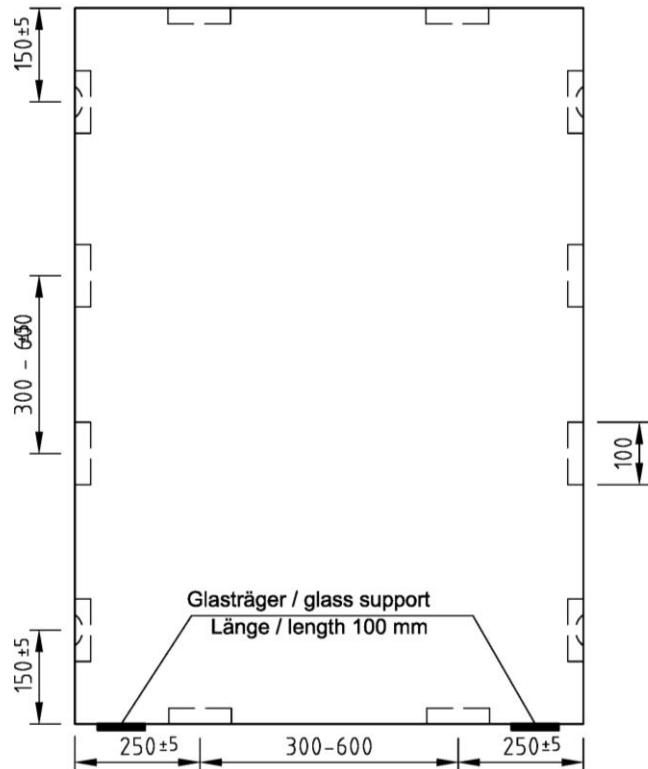
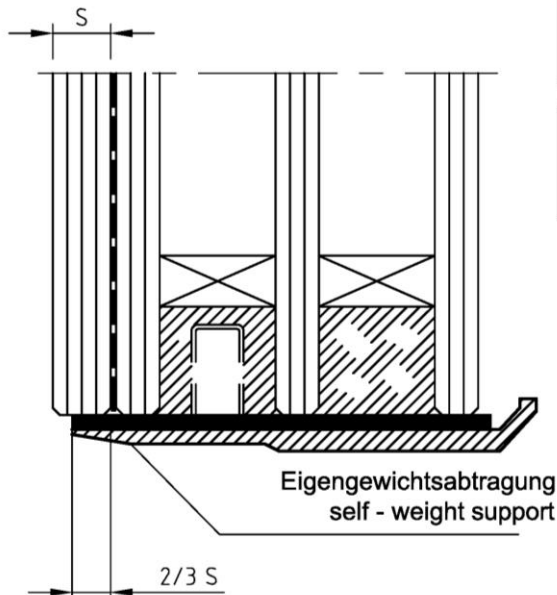
Im Bereich vom Glaseinschnitt
darf nicht geklotzt werden.

Die Klotzung ist bis 2/3
der Außenscheibe
durchzuführen.

Self - weight support / setting block:

The dead weight of the insulating
glass pane has to be carried by the
setting blocks. Do not place setting
blocks at the cut in area.

The setting block must be positioned
2/3 of the thickness of the outside
pane.

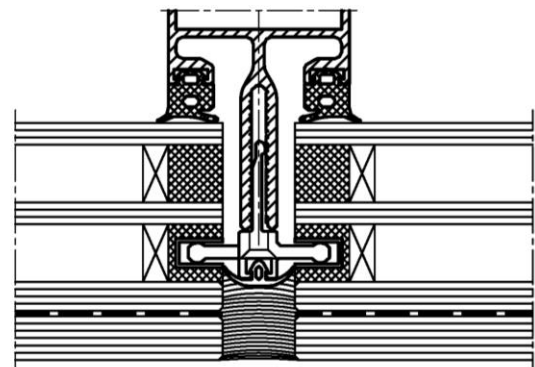


Bei Scheibenbreiten von 500 mm bis 700 mm,
nur einen Halteteil einsetzen.

For pane width 500 mm to 700 mm insert one mechanical clip only.

Über 700 mm zwei oder mehr Halteteile einsetzen,
wobei der Abstand der Halteteile 300 bis 600 mm betragen soll.

Pane widths of over 700 mm insert two or more mechanical clips.
The distance of the clips should be 300 to 600 mm.



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VARIO S-FOR
Eigengewichtsabtragung
self - weight support
Dreifach Isolierglas
triple insulation glass

Anlage 18 / Annex 18

Eigengewichtsabtragung / Klotzung

Es muss sichergestellt werden,
dass das Eigengewicht der
Isolierglasscheibe durch die
Klotzung abgetragen wird.

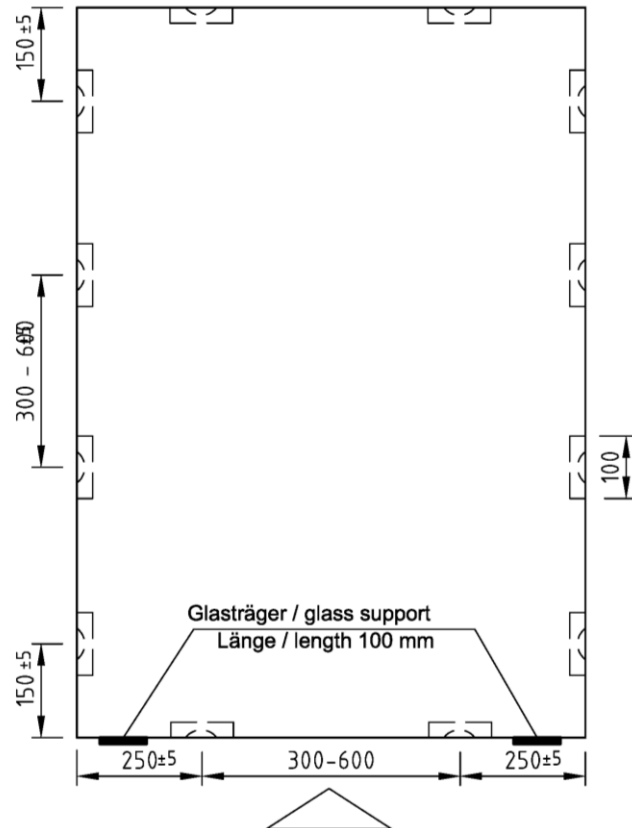
Im Bereich vom Glaseinschnitt
darf nicht geklotzt werden.

Die Klotzung ist bis 2/3
der Außenscheibe
durchzuführen.

Self - weight support / setting block:

The dead weight of the insulating
glass pane has to be carried by the
setting blocks. Do not place setting
blocks at the cut in area.

The setting block must be positioned
2/3 of the thickness of the outside
pane.

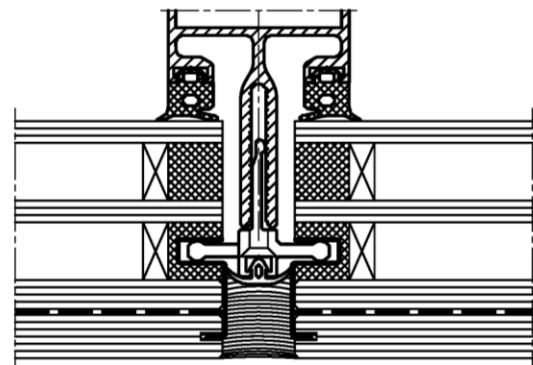
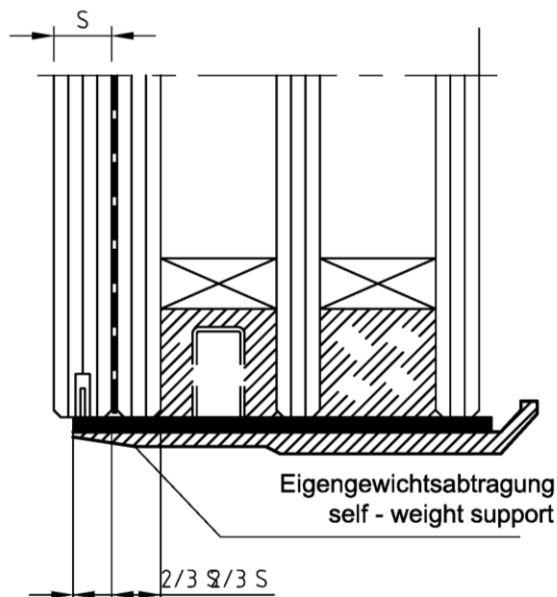


Bei Scheibenbreiten von 500 mm bis 700 mm,
nur einen Halteteil einsetzen.

For pane width 500 mm to 700 mm insert one mechanical clip only.

Über 700 mm zwei oder mehr Halteteile einsetzen,
wobei der Abstand der Halteteile 300 bis 600 mm betragen soll.

Pane widths of over 700 mm insert two or more mechanical clips.
The distance of the clips should be 300 to 600 mm.



GLASSOLUTIONS
Eckelt Glas GmbH • Resthofstraße 18 • 4400 Steyr
Austria • FBG Steyr • FN 118661b
Tel. + 43 7252 894 0 • Fax + 43 7252 894 24
www.eckelt.at

VARIO DZ
Eigengewichtsabtragung
self - weight support
Dreifach Isolierglas
triple insulation glass

Anlage 19 / Annex 19