



VERROTEC

Testing, inspection and certification
body (RPF14)

General appraisal certificate (AbP)

Certificate no.: VT 17-073.1P_eng

Applicant: Bohle AG
Dieselstraße 10
D - 42781 Haan

Date of issue: 29.03.2022

Valid until: 29.03.2027

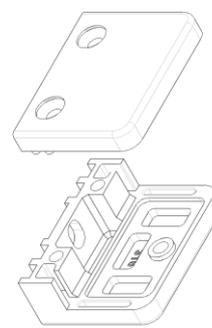
Object: Glazing guardrail system with edge camps acc. to DIN 18008-4 for which the resistance under dynamic impact load is to be verified

acc. to

no. C 4.12

Administrative provision technical building rule (VV TB NRW) of Nordrhein-Westfalen from 15th June 2021

Amendment: This test certificate replaces and amends the general appraisal certificate VT 17-073P_eng dated 29.03.2017.



Source: Bohle AG

Mainz,

29th March 2022

Dr.-Ing. Mascha Baitinger
(Head of testing, inspection and certification body)



This general appraisal certificate contains 20 pages (incl. Annexes).

This document is a translation of the German original. In case of divergence from the German version, the German version shall prevail.



Modification/Amendment

This general appraisal certificate replaces and amends the general appraisal certificate VT 17-073P_eng datet 29.03.2017.

The general appraisal certificate for this construction kit was first issued on 29.03.2017.

The following modifications/amendments were executed on 29.03.2022:

- Transcription to the VV TB NRW
- Editorial changes



Inhalt:

A	General regulations	4
B	Special regulations	5
1	Object of the general appraisal certificate and intended use	5
1.1	Dimensions	5
1.2	Glazing	6
1.3	Substructure	7
1.4	Handrail/ protection of the glass edge	7
2	Regulations for the construction kit	8
2.1	Properties and composition	8
2.1.1	Properties of the construction kit	8
2.1.2	Applied test method.....	8
3	Verification of conformity	8
3.1	General	8
3.2	Quality control	8
4	Regulations for design and verification.....	9
5	Regulations for execution.....	9
6	Regulations for use, maintenance and repair	9
7	Legal remedies	9
Annex A	Installation Situation A, B and C	10
Annex B	Clamp models	13
B.1	Clamp model B10 und B12	13
B.2	Clamp model B20, B22 und B24	14
B.3	Clamp model B30, B32 und B34	15
B.4	Clamp model B40 und B42	16
B.5	Clamp model B50 und B52	17
B.6	Clamp model B55 und B57	18
Annex C	Sample certificate of compliance	19



A General regulations

The fitness for use of the construction kit in the sense of the German state building code is verified with this general appraisal certificate.

The general appraisal certificate does not replace the statutory permits, approvals and certificates. The general appraisal certificate is valid in all federal states of Germany.

The general appraisal certificate is granted without prejudice to third party rights, in particular private copyrights. The general appraisal certificate has to respect all requirements of public law to be fulfilled for the intended use.

Notwithstanding any further provisions listen in "Special regulations", the manufacturer and distributor of the construction kit shall provide copies of this general appraisal certificate to the end user and inform him, that the general appraisal certificate shall be available at the site of application of the construction kit. On request, copies of the general appraisal certificate shall be provided for the authorities.

This general appraisal certificate contains 20 pages (incl. annexe) and may be duplicated in unabridged versions only. Any partial publication requires the permission of Verrotec GmbH. Texts and drawings in advertising and product description shall not contradict the general appraisal certificate. Translations of the general appraisal certificate, not published by Verrotec GmbH, shall contain the note "Translation of the original German version without verification by the approved body Verrotec GmbH".

The issue of this general appraisal certificate is revocable. The regulations of the general appraisal certificate can be altered or amended subsequently, especially when technical knowledge requires it.

The general appraisal certificate is based on the following test report:

VT 16-0631-02

The glazing guardrail kit shall correspond in all details to the information given in VT 16-0631-02. All comments and references given in the test report VT 16-0631-02 shall be respected.

Object of this general appraisal certificate is the assessment of the construction kit under impact loading. Damaged parts have to be removed immediately. The area around and under the damaged pane are to be marked off until the damaged parts are replaced.



B Special regulations

1 Object of the general appraisal certificate and intended use

The construction kit described in this general appraisal certificate is a glazing guardrail kit with fall protection acc. to DIN 18008-4, acc. to Administrative provision technical building rule (VV TB NRW) of Nordrhein-Westfalen from 15th June 2021, no. C 4.12.

The glazing system consists of glass elements and edge clamps.

The construction kit can be used as a fall protection of C acc. to DIN 18008-4, depending on the used glass assembly and type of fixing.

1.1 Dimensions

The system dimensions depend on the installation situation A, B or C according to Annex A.

The minimum glass dimensions are: $W \times H = 500 \times 800$ [mm].

The maximum glass dimensions are: $W \times H = 2000 \times 1000$ [mm].

The dimensions given in Table 1 (chapter 1.2) shall be respected. The included clamps are defined in the Annex B.

The glasses may differ from the rectangular shape in acc. to Annex B.3, DIN 18008-4.

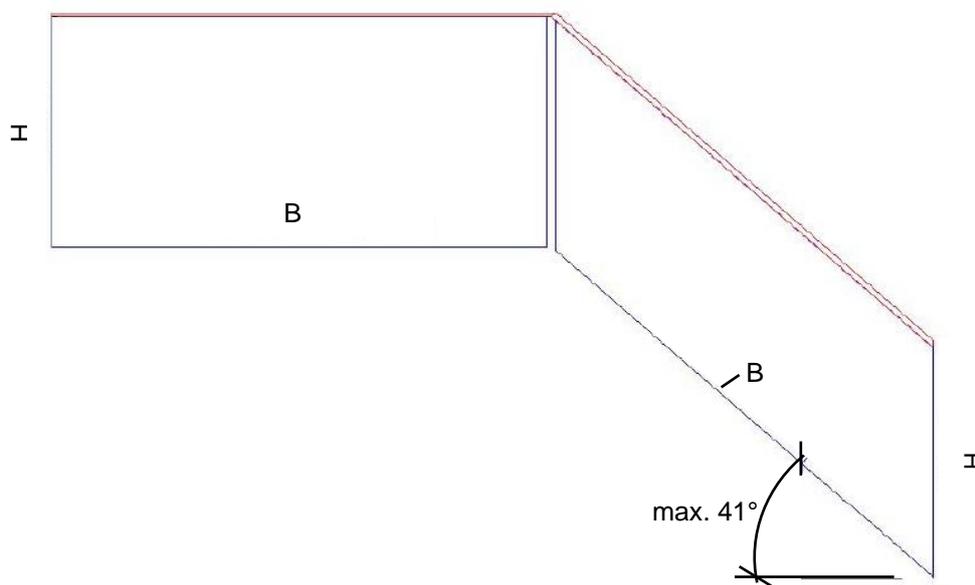


Bild 1 Permitted deviation from the rectangular shape acc. to Annex B.3, DIN 18008-4

1.2 Glazing

The construction kit may be used respecting section 1.1 and 1.3 with the following glass assemblies (acc. to Administrative provision technical building rule (VV TB NRW) of Nordrhein-Westfalen from 15th June 2021 no. C 4.12).

The given glass thickness can be exceeded if all the described boundary conditions are respected.

The clamps to be used need described in Annex B.

Metal/glass contact and glass/glass contact are to be avoided permanently.

The glass edges shall be produced with a minimum edge quality of KGN (ground edges) acc. to DIN 1249 part 11.

Table 1 Glass assemblies to be used, pane dimensions and installation situation

Pane dimensions [mm]		Glass assembly [mm]	installation situation
Width min W / max W	Height min H / max H		
500 / 750	800 / 1000	VSG made of 44.4 TVG	A, C
		VSG made of 44.4 ESG	
VSG made of 44.2 TVG			
VSG made of 44.2 ESG			
750 / 1500		VSG made of 55.2 TVG	A,B , C
		VSG made of 55.2 ESG	
500 / 2000		VSG made of 66.2 TVG	A, C
		VSG made of 66.2 ESG	

With:

LSG Laminated safety glass with PVB film according to EN 14449 considering the defined characteristics described in Annex A 1.2.7./2 of Administrative provision technical building rule (VV TB NRW) of Nordrhein-Westfalen from 15th June 2021:

- The laminated safety glass shall be at least classified as 2(B)2 according to DIN EN 12600.
- The interlayer shall consist of Polyvinyl-Butyral (PVB film) with the following properties:
 - Tensile strength: > 20 N/mm
 - Elongation at fracture: > 250 %

(tests according to DIN EN ISO 527-3; test velocity: 50 mm/min, test temperature: 23 °C)

or alternatively:

Laminated safety glass with PVB film according to DIN EN 14449 considering the defined characteristics described in Annex B.2 of DIN 18008-1:



- The interlayer shall consist of Polyvinyl-Butyral (PVB film) for which a test specimen with a glass structure of 4 mm float glass / 0,76 mm PVB film / 4 mm float glass rated classification of 1(B)1 according to DIN EN 12600 and P1A according to DIN EN 356 after completion of tests.

HSG: Heat strengthened soda lime silicate glass according to EN 1863-2 for use according to DIN 18008 with all its parts. The glass products with a component size of 1.000 mm x 1.500 mm or larger shall have a fracture pattern in which the area of non-critical fragments is more than four fifths of the total area. The test of the fracture pattern shall be carried out in accordance with DIN EN 1863-1 section 8. All fragments in which a circle with a diameter of 120 mm can be inscribed may be considered as fragments of non-critical size.

TTG: Thermally toughened soda lime safety glass according to EN 12150-2 for use according to DIN 18008 and all its parts.

Instead of TTG, heat-soaked thermally toughened soda lime safety glass according to EN 14179-2 may be used.

1.3 Substructure

The glass panes are fixed at the lateral vertical edges by four clamps, two at each side. The clamp is made out of stainless steel (Material no. 1.4401 or 1.4403) acc. to approval Z-30.3-6 (Erzeugnisse, Bauteile und Verbindungsmittel aus nichtrostenden Stählen, 05th March 2018). According to the thickness of the EPDM-Interlayer it is suitable for different thicknesses of the glass. The EPDM Interlayer has to be chosen acc. to the glass thickness. A firm clamping has to be ensured. Possible tolerances in the glass thickness has to be considered. The design appraised in this certificate includes the clamp models in Annex B (plane connection for rectangular tube, round connection for round tubes).

The screws are made out of Material no. 1.4404 or 1.4403 acc. to DIN EN 10088 Part 1. The screws have to be made acc. to DIN EN ISO 10642 in the strength class 70.

For the fastening with blind rivet nuts including the screw (M8x20, ISO 4762, Material no. 1.4301 or 1.4404), the blind rivet nuts have to be from the producer Goebel GmbH. The specification is "blind rivet nuts M8 with a little countersunk head" made out of stainless steel (Material no. 1.0211). The walls of the used mullions have to have at least a thickness of 2 mm.

Alternatively, the clamps can be fastened in an equivalent flowdrill-hole.

All indication in test report VT 16-0631-02 shall be respected.

1.4 Handrail/ protection of the glass edge

The design is about a filling glass element. There has to be load bearing handrail, which has to be fastened in the height acc. to the building regulation.

All free glass edges with a distance more than 30 mm to the next protective component has to be protected acc. to DIN 18008-4.



2 Regulations for the construction kit

2.1 Properties and composition

2.1.1 Properties of the construction kit

The resistance of the construction kit described in this general appraisal certificate under impact loading was verified by tests.

Regarding the construction materials to be used section 4 of DIN 18008-4 shall be respected.

2.1.2 Applied test method

The resistance under impact loading was verified according to annexe A of DIN 18008-4.

The test procedure and results shall be taken from test report VT 16-0631-02. The verification was executed with an impact loading oriented from the inside to the outside (see section 1).

3 Verification of conformity

3.1 General

The construction kit described in this general appraisal certificate needs a verification of conformity acc. to Administrative provision technical building rule (VV TB NRW) of Nordrhein-Westfalen from 15th June 2021 through a declaration of conformity issued by the user of the construction kit (ÜH). A sample declaration of conformity can be found in Annex A.

The user of the construction kit has to declare, that the construction kit was executed corresponding to the general appraisal certificate and that the used construction products correspond to the regulations of this general appraisal certificate. The user declares to the contracting authority, that the construction kit corresponds in all details to this general appraisal certificate. The declaration of conformity shall be filed with the documents of the contracting authority. The user has to ensure, that the used construction products are usable in the sense of § 18ff. BauO NRW.

3.2 Quality control

A quality control shall be established and carried out at each place of application of the construction kit. Quality control is understood to mean the continuous monitoring of assembly to be carried out by the contractor to ensure that the construction kit manufactured by him complies with the provisions of this general appraisal test certificate.



4 Regulations for design and verification

For design and verification of the guardrail glazing the DIN 18008 is to be respected. Glas/metal or glass/glass contact are to be avoided at any time under load and temperature impact. The supports are to be executed in a way that no restraints appear due to temperature loads.

The structural analysis of the substructure, the handrail and the connection to the main structure shall be executed. All connections and construction components are to be verified according to the relevant technical regulations.

The supporting structure is to be executed according to the general technical construction rules, whereas the maximum admissible deformation and stresses are to be met.

5 Regulations for execution

For execution of the guardrail glazing DIN 18008 is to be respected. The execution has to comply in all details with the provisions of the test report VT 16-0631-02.

The construction materials and components for the support of the glazing have to provide sufficient resistance and long-term functionality and durability. They shall comply with those materials given in the test report VT 16-0631-02. Any risk of corrosion is to be avoided by suitable means.

Installation works shall be executed by competent and trained staff under supervision of a skilled site manager.

6 Regulations for use, maintenance and repair

The construction kit shall be cleaned and maintained in regular intervals in order to preserve its function. The state of the construction kit is to be checked in regular intervals. Damaged parts are to be replaced immediately. For the replacement only those parts shall be used, which comply with this general appraisal certificate.

7 Legal remedies

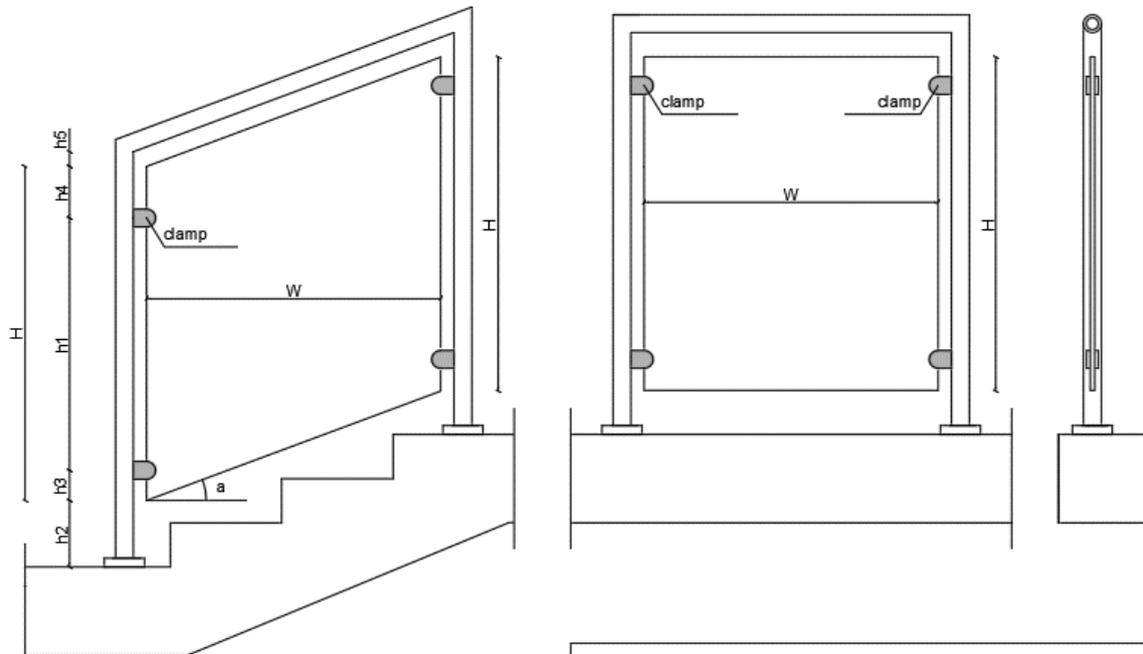
The granting of this general appraisal certificate is an administrative act against which objections can be raised. Any objections shall be made, either in writing or for recording, at VERROTEC GmbH, Im Niedergarten 12a, D-55124 Mainz within one month from receipt of this notification. The relevant date of the objection shall be the date of reception of the written objection document at VERROTEC GmbH.

The objection cannot be made by means of electronic communication.

The relevant date of the objection is the date of reception of the written objection document at VERROTEC GmbH. The missing of the deadline by the fault of an authorised person acting on behalf of the opposing party, lies in the responsibility of the opposing party.



Annex A Installation Situation A, B and C



		dimensions	
name	meaning	min.	max.
h5	distance handrail - upper glass edge	10 - 30	h4 + h5 = 200
h4	upper glass edge - central axis upper clamp		
h3	central axis upper clamp - lower glass edge	100	250
h2	lower glass edge - top edge of the floor	10	120
h1	distance between the clamps	500	700
a	horizontal glass angle	0°	41°
H	glass height	800 1000	
B	glass width	500 2000	

Definition of the installation situation A:

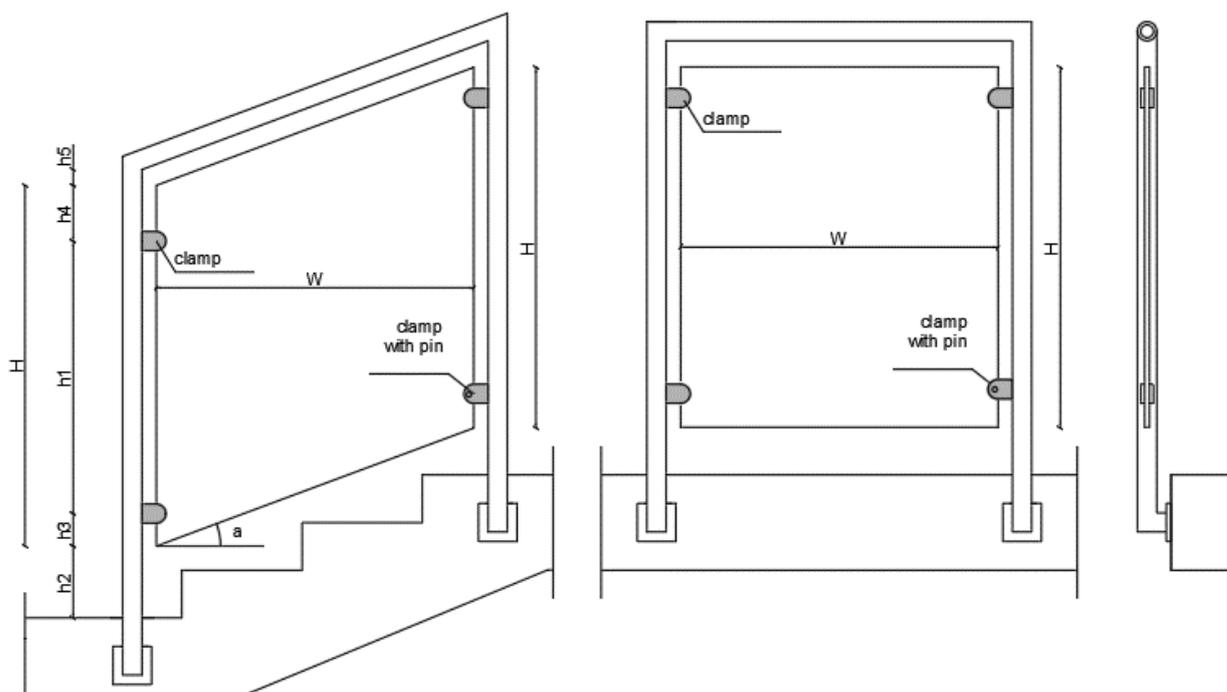
The system has to be mounted above the floor with clamps without securing pin or securing plate.

Protection of the glass edge acc. to 1.4 has to be considered.

Glass assemblies VSG made of ESG	Width		
	from 500 mm	from 750 mm	up to 1500 mm
44.2 ESG	/	B3, B4 und B5	
44.4 ESG		B3, B4 und B5	
55.2 ESG	B1, B2, B3, B4 und B5		
66.2 ESG	B3, B4 und B5		

Glass assemblies VSG made of TVG	Width		
	from 500 mm	from 750 mm	up to 1500 mm
44.2 TVG	/	B3, B4 und B5	
44.4 TVG		B3, B4 und B5	
55.2 TVG	B3, B4 und B5		
66.2 TVG	B3, B4 und B5		





name	meaning	dimensions	
		min.	max.
h5	distance handrail - upper glass edge	10 - 30	h4 + h5 = 200
h4	upper glass edge - central axis upper clamp	100	
h3	central axis upper clamp - lower glass edge	100	h2 + h3 = 200
h2	lower glass edge - top edge of the floor	10	
h1	distance between the clamps	500	700
a	horizontal glass angle	0°	41°
H	glass height	800 1000	
B	glass width	500 1500	

Definition of the installation situation B:

The system has to be mounted in front of the floor with clamps with securing pin. It has to be considered, that the position of the sole securing pin is only in one of lower clamps.

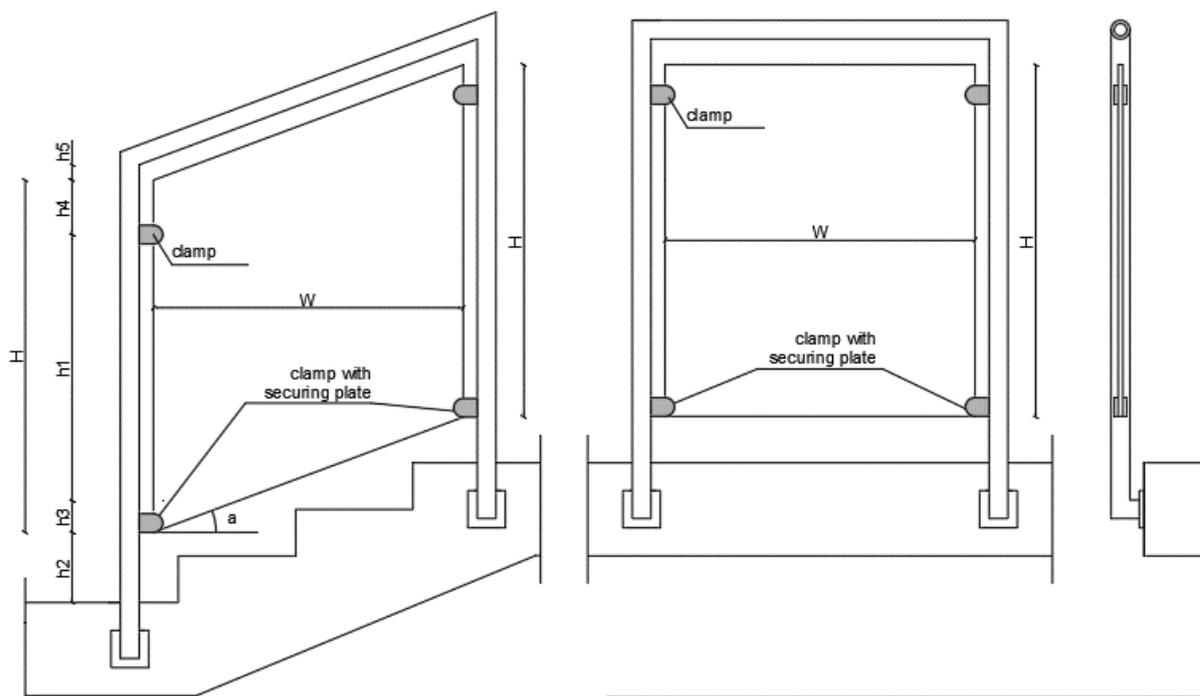
Protection of the glass edge acc. to 1.4 has to be considered.

Glass assemblies VSG made of ESG	Width			
	from 500 mm up to 750	from 750 mm	up to 1500 mm	up to 2000 mm
55.2 ESG	B1*, B3, B4	B3, B4 und B5		
66.2 ESG	und B5			

Glass assemblies VSG made of TVG	Width			
	from 500 mm up to 750	from 750 mm	up to 1500 mm	up to 2000 mm
55.2 TVG	B1*, B3, B4	B3, B4 und B5		
66.2 TVG	und B5			

*clamp model B1 not possible for glass assembly 2x6 mm





name	meaning	dimensions	
		min.	max.
h5	distance handrail - upper glass edge	10 - 30	h4 + h5 = 200
h4	upper glass edge - central axis upper clamp	100	
h3	central axis upper clamp - lower glass edge	0	0
h2	lower glass edge - top edge of the floor	10	120
h1	distance between the clamps	500	700
a	horizontal glass angle	0°	41°
H	glass height	800	1000
B	glass width	500	2000

Definition of the installation situation C:

The system can be mounted in front of the floor (*it is also possible to mount it above the floor) with clamps with securing plate (without securing pin).

Protection of the glass edge acc. to 1.4 has to be considered.

Glass assemblies VSG made of ESG	Width			
	from 500 mm	from 750 mm	up to 1500 mm	up to 2000 mm
44.2 ESG	B4 und B5			
44.4 ESG	B4 und B5			
55.2 ESG	B2, B4 und B5			
66.2 ESG	B4 und B5			

Glass assemblies VSG made of TVG	Width			
	from 500 mm	from 750 mm	up to 1500 mm	up to 2000 mm
44.2 TVG	B4 und B5			
44.4 TVG	B4 und B5			
55.2 TVG	B4 und B5			
66.2 TVG	B4 und B5			

Annex B Clamp models

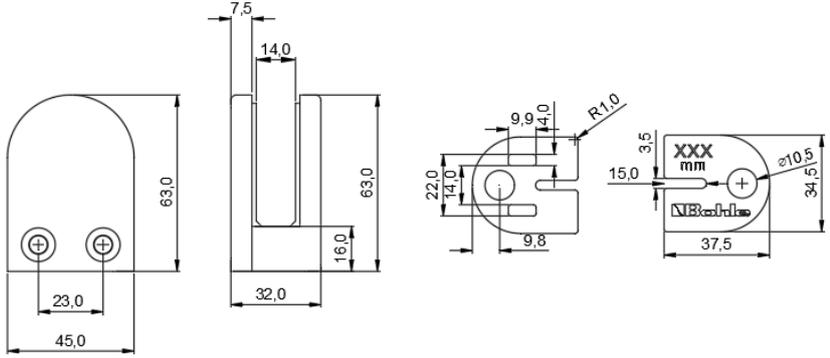
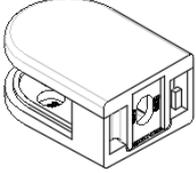
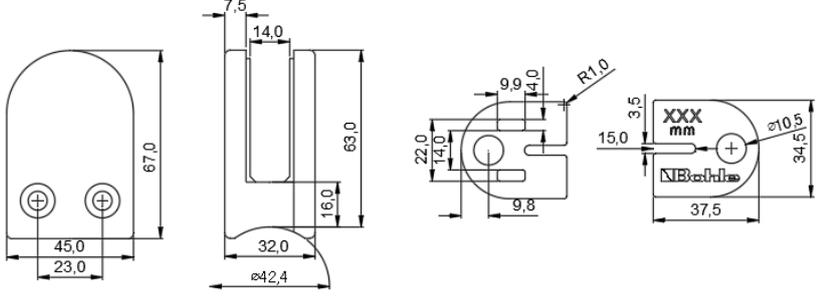
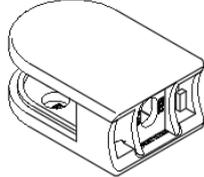
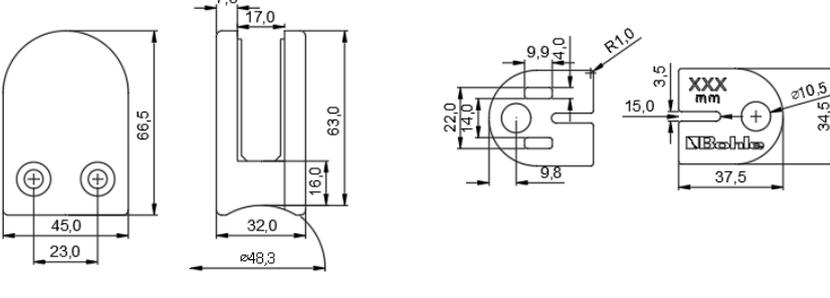
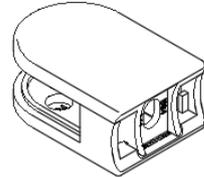
B.1 Clamp model B10 und B12

model 10	
model 12	

B.2 Clamp model B20, B22 und B24

<p>model 20</p>	
<p>model 22</p>	
<p>model 24</p>	

B.3 Clamp model B30, B32 und B34

<p style="text-align: center;">model 30</p>		
<p style="text-align: center;">model 32</p>		
<p style="text-align: center;">model 34</p>		

B.4 Clamp model B40 und B42

model 40	
model 42	

B.5 Clamp model B50 und B52

model 50	
model 52	

B.6 Clamp model B55 und B57

model 55	
model 57	

Annex C Sample certificate of compliance



Sample for a certificate of compliance

User:

Construction kit: Guardrail glazing kit acc. to DIN 18008-4 acc. to
Administrative provision technical building rule (VV TB NRW) of Nordrhein-
Westfalen from 15th June 2021, no. C 4.12

Use:

Site of erection:

Date of production:

The undersigned hereby attests that the above mentioned construction kit was produced and executed properly according to all details and under compliance of all regulations of the general appraisal certificate VT 17-073.1P_eng issued by VERROTEC GmbH on 29th March 2022

Place, date

Seal and signature

This certificate is to be handed over to the building owner for transmission to the responsible building authority.