Deutsches Institut für Bautechnik

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Approval body for construction products and types of construction

Bautechnisches Prüfamt

An institution established by the Federal and Laender Governments

Designated according to Article 29 of Regulation (EU) No 305/2011 and member of EOTA (European Organisation for Technical Assessment)

European Technical Assessment

ETA-21/0722 of 20 April 2023

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	Heavy Load Corbels "SLK-ALU-TR", "SLK-ALU-TQ", "SLK-ALU-TTR", "SLK-ALU-TTQ"
Product family to which the construction product belongs	Heavy Load Corbels "SLK-ALU-TR", "SLK-ALU-TQ", "SLK-ALU-TTR", "SLK-ALU-TTQ" for the low thermal bridging fixation of attachment parts in external thermal insulation composite systems (ETICS) and other facade systems.
Manufacturer	Dosteba GmbH Aspenhaustraße 6 72770 Reutlingen DEUTSCHLAND
Manufacturing plant	Plant 1
This European Technical Assessment contains	33 pages including 28 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	EAD 040868-00-0404

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Specific Part

1 Technical description of the product

The Heavy Load Corbels "SLK-ALU-TR", "SLK-ALU-TQ", "SLK-ALU-TTR" and "SLK-ALU-TTQ" correspond to product family a) of EAD 040868-00-0404[1].

The Heavy Load Corbels "SLK-ALU-TR" and "SLK-ALU-TQ" consits of

- a pressure distribution plate made of HPL
- alluminum extrusion profile for fixation oft the attachment parts
- four polyamide tension bars for the force transmission
- two inner and two outer steel brackets with four steel retaining washers
- four polyamide injection feets for mounting on the substrate

The Heavy Load Corbels "SLK-ALU-TTR" and "SLK-ALU-TTQ" consits of

- a pressure distribution plate made of HPL
- alluminum extrusion profile for fixation oft the attachment parts
- four polyamide tension bars for the force transmission
- two inner and two outer steel brackets
- a square steel tube
- four polyamide injection feets for pressure transfer to the outer wall
- two polyamide injection feets for mounting on the substrate

The components are joined at the factory and foamed to a box element using black rigid polyurethane foam. The Heavy Load Corbels have a thickness (cantilever distance) of 100 mm to 300 mm in increments of 20 mm. The dimensions are documented in Annexes A 3 - A 6.

Detailed information and data for all the components are provided in the annexes to this ETA and in the associated test reports and control plan. The components and the system setup of the product are provided in Annexes A 1 and A 2.

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

The heavy-load corbels "SLK-ALU-TR", "SLK-ALU-TQ", "SLK-ALU-TTR" and "SLK-ALU-TTQ" are intended for use as a low thermal bridging fixation of primarily static loads from attachment parts such as awnings, canopies, stairways, railings, balconies, load bearing brackets and sun protection corbels on external walls with external thermal insulation composite systems (ETICS) or other facade systems.

The heavy-load corbels are fixed with their entire surface to the level, solid, load-bearing external wall (substrate) using two ("SLK-ALU-TTR" and "SLK-ALU-TTQ") or four ("SLK-ALU-TR" and "SLK-ALU-TQ") anchor corbels.

The performances given in Section 3 are only valid if the heavy load corbels are used in compliance with the specifications and conditions given in Annexes B.

[1] EAD 0040868-00-0404, edition June 2019 - RIGID POLYURETHANE FOAM (PUR) CORBELS FOR FASTENING ATTACHMENT PARTS IN EXTERNAL THERMAL INSULATION COMPOSITE SYSTEMS

The verifications and assessment methods on which this ETA is based lead to the assumption of a working life of heavy-load corbels of at least 25 years. The indications given on the working life cannot be interpreted as a guarantee given by the manufacturer, 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 Safety in case of fire (BWR 2)

Essential characteristic	Performance
Reaction to fire	E in accordance with DIN EN 13501

3.2 Safety and accessibility in use (BWR 4)

Essential characteristic		Performance
Swelling in thickness after immersion in water		No performance assessed
Apparent density of PU foam		See Annex C 2 – C 18
Mechanical resistance	Tensile strength	See Annex C 2 – C 18
	Compressive strength	See Annex C 2 – C 18
	Shear strength	See Annex C 2 – C 18
	Lateral tensile strength	No performance assessed
	Flexural strength	No performance assessed
	Pull-through resistance of anchor corbels	No performance assessed
	Embedment strength (local bearing strength) of the anchorage area	No performance assessed
Influencing factors		See Annex C 1

3.3 Energy economy and heat retention (BWR 6)

Essential characteristic	Performance
Thermal conductivity	$\lambda < 0.0651$ W/(mK)[1] with EN 12677
Thermal resistance	No performance assessed
Thermal transmittance	No performance assessed
[1] As a measured value which was not exceeded.	

4 Assessment and verification of constancy of performance system applied, with reference to its legal basis

In accordance with European Assessment Document (EAD) no. 040868-00-0404, the following legal basis shall apply: 2003/640/EC.

The following system for the assessment and verification of constancy of performance (AVCP) shall be used for the heavy-load corbels: 2+ for all intended uses except for uses subject to reaction-to-fire requirements.

For intended uses subject to reaction-to-fire requirements, AVCP system 1, 3 or 4 shall be used for the reaction to fire, depending on the boundary conditions listed in the above-mentioned Decision.

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

The technical details necessary for the implementation of the AVCP system are laid down in the control plan deposited with DIBt.

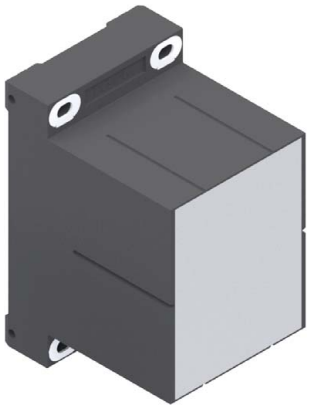
Issued in Berlin on 20 April 2023 by Deutsches Institut für Bautechnik

Renée Kamanzi-Fechner
Head of Section

beglaubigt:
Beckmann

Deutsches Institut für Bautechnik DIBt

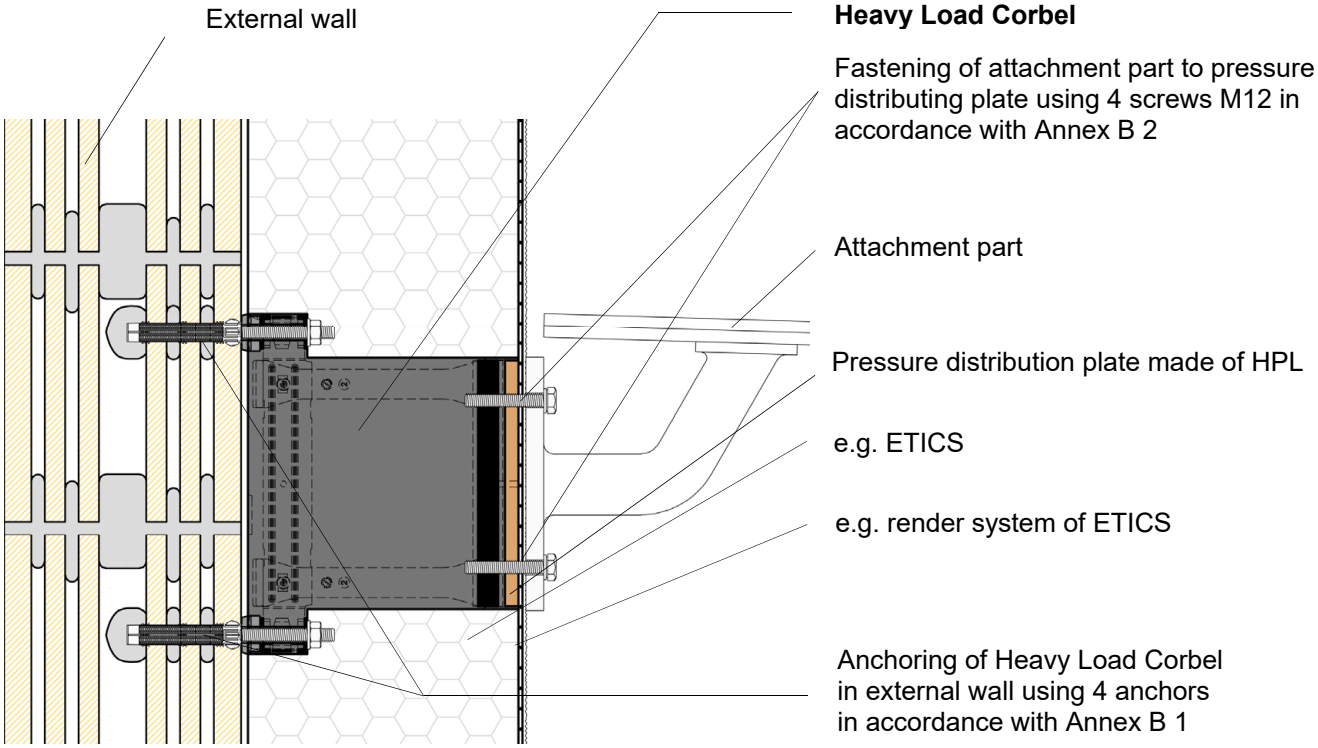
Heavy Load Corbels SLK-ALU-TR and SLK-ALU-TQ



Heavy Load Corbel vertically installed
(Example SLK-ALU-TR)

Heavy Load Corbel horizontally installed
(Example SLK-ALU-TQ)

Installation situation using the example of a canopy



Heavy Load Corbels "SLK-ALU-TR", "SLK-ALU-TQ", "SLK-ALU-TTR", "SLK-ALU-TTQ"	Annex A 1
Product description Product and installed condition of SLK-ALU-TR and SLK-ALU-TQ	

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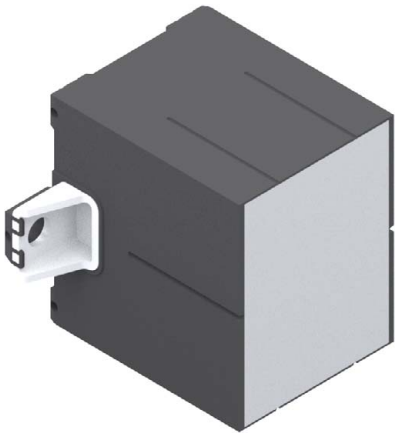
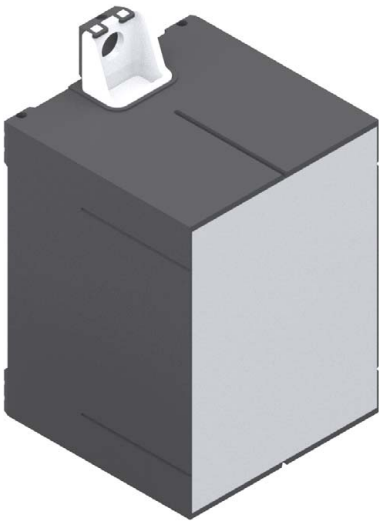
Heavy Load Corbels SLK-ALU-TTR and SLK-ALU-TTQ

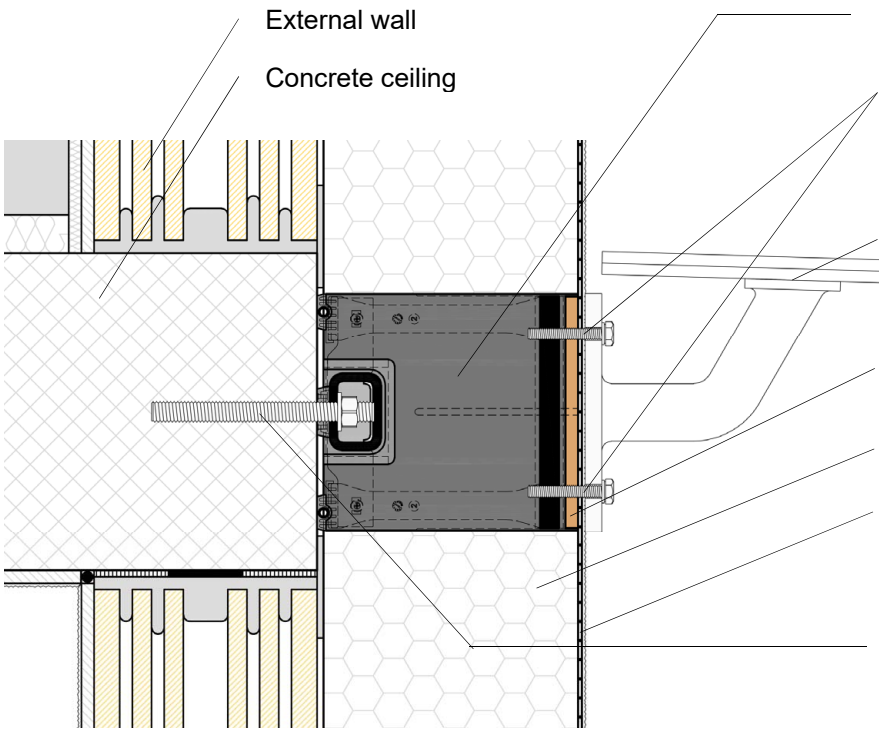


Heavy Load Corbel vertically installed
(Example SLK-ALU-TTR)



Heavy Load Corbel horizontally installed
(Example SLK-ALU-TTQ)

Installation situation using the example of a canopy



Heavy Load Corbel

Fastening of attachment part to pressure distributing plate using 4 screws M12 in accordance with Annex B 2

Attachment part

Pressure distribution plate made of HPL

e.g. ETICS

e.g. render system of ETICS

Anchoring of Heavy Load Corbel in external wall using 2 anchors in accordance with Annex B 1

Heavy Load Corbels "SLK-ALU-TR", "SLK-ALU-TQ", "SLK-ALU-TTR", "SLK-ALU-TTQ"	Annex A 2
Product description Product and installed condition of SLK-ALU-TTR and SLK-ALU-TTQ	

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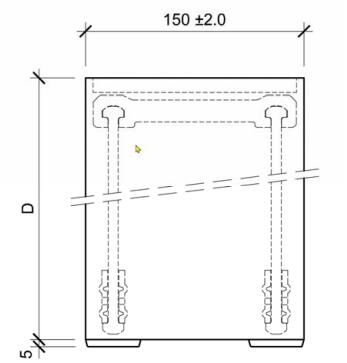
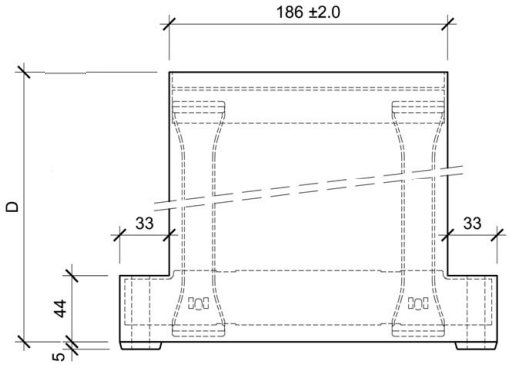
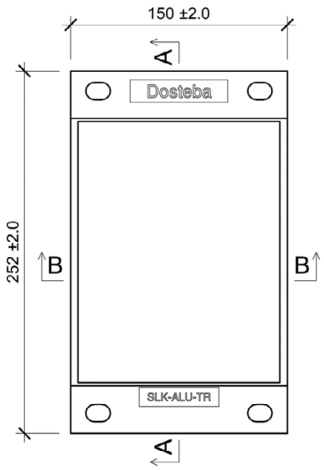
B-B



A-A



Top View



For measurements without specified tolerances, tolerance class "c (coarse)" applies in accordance with ISO 2768

Description	D (mm)	Weight (g)		
		-3%	Nominal value	+ 3%
SLK-ALU-TR 100	100	3599	3710	3821
SLK-ALU-TR 120	120	3802	3920	4038
SLK-ALU-TR 140	140	4007	4131	4255
SLK-ALU-TR 160	160	4212	4342	4472
SLK-ALU-TR 180	180	4415	4552	4689
SLK-ALU-TR 200	200	4620	4763	4906
SLK-ALU-TR 220	220	4825	4974	5123
SLK-ALU-TR 240	240	5029	5185	5341
SLK-ALU-TR 260	260	5233	5395	5557
SLK-ALU-TR 280	280	5438	5606	5774
SLK-ALU-TR 300	300	5642	5817	5992

Heavy Load Corbels "SLK-ALU-TR", "SLK-ALU-TQ", "SLK-ALU-TTR", "SLK-ALU-TTQ"

Annex A 3

Product description
Outside dimensions and weight of SLK-ALU-TR

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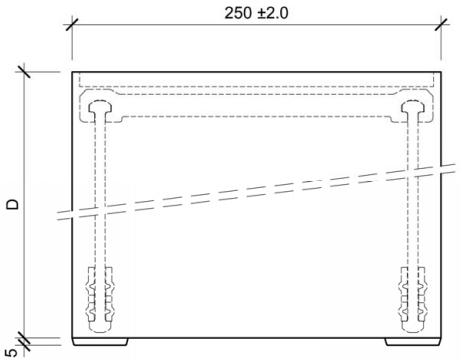
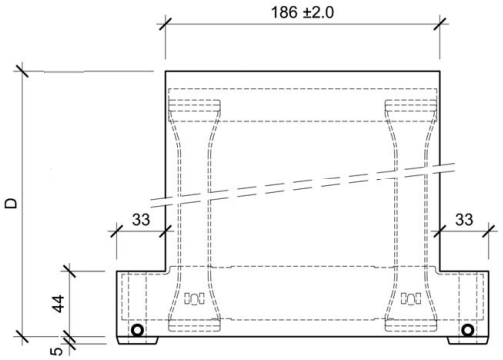
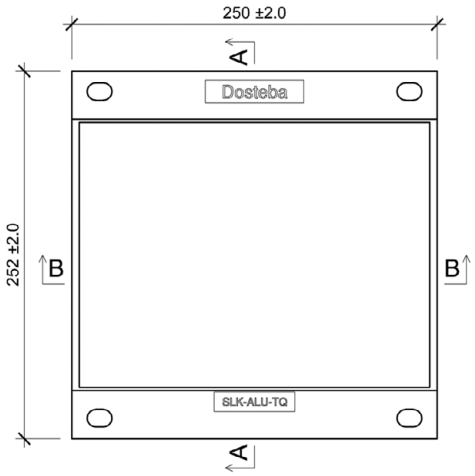
B-B



A-A



Top View



For measurements without specified tolerances, tolerance class "c (coarse)" applies in accordance with ISO 2768

Description	D (mm)	Weight (g)		
		-3%	Nominal value	+ 3%
SLK-ALU-TQ 100	100	5134	5293	5452
SLK-ALU-TQ 120	120	5464	5633	5802
SLK-ALU-TQ 140	140	5795	5974	6153
SLK-ALU-TQ 160	160	6126	6315	6504
SLK-ALU-TQ 180	180	6456	6656	6856
SLK-ALU-TQ 200	200	6787	6997	7207
SLK-ALU-TQ 220	220	7118	7338	7558
SLK-ALU-TQ 240	240	7449	7679	7909
SLK-ALU-TQ 260	260	7779	8020	8261
SLK-ALU-TQ 280	280	8110	8361	8612
SLK-ALU-TQ 300	300	8441	8702	8963

Heavy Load Corbels "SLK-ALU-TR", "SLK-ALU-TQ", "SLK-ALU-TTR", "SLK-ALU-TTQ"

Product description
Outside dimensions and weight of SLK-ALU-TQ

Annex A 4

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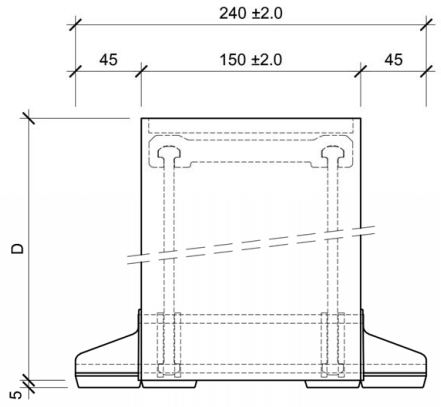
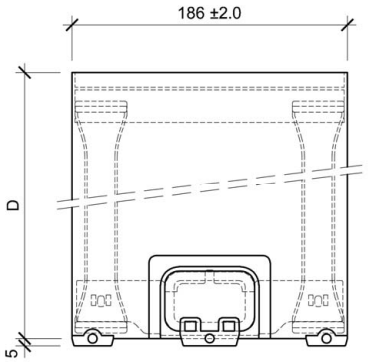
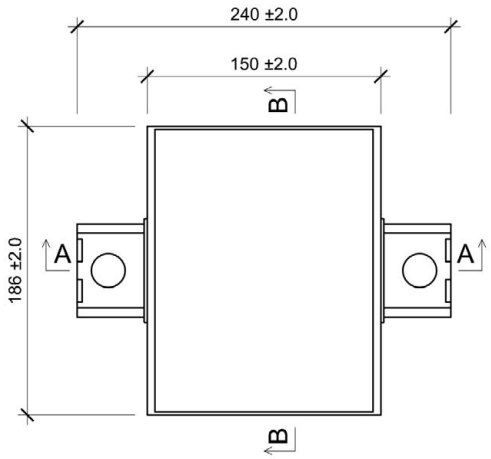
View A-A



View B-B



Top view



For measurements without specified tolerances, tolerance class "c (coarse)" applies in accordance with ISO 2768

Description	D (mm)	Weight (g)		
		-3%	Nominal value	+ 3%
SLK-ALU-TTR 100	100	4189	4319	4449
SLK-ALU-TTR 120	120	4393	4529	4665
SLK-ALU-TTR 140	140	4598	4740	4882
SLK-ALU-TTR 160	160	4802	4951	5100
SLK-ALU-TTR 180	180	5006	5161	5316
SLK-ALU-TTR 200	200	5211	5372	5533
SLK-ALU-TTR 220	220	5416	5583	5750
SLK-ALU-TTR 240	240	5620	5794	5968
SLK-ALU-TTR 260	260	5824	6004	6184
SLK-ALU-TTR 280	280	5059	5215	5371
SLK-ALU-TTR 300	300	6233	6426	6619

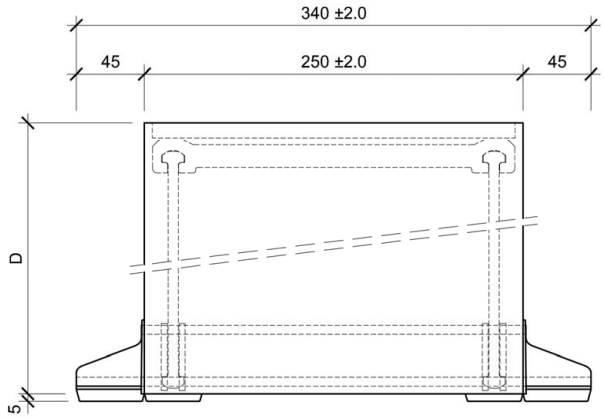
Heavy Load Corbels "SLK-ALU-TR", "SLK-ALU-TQ", "SLK-ALU-TTR", "SLK-ALU-TTQ"

Product description
Outside dimensions and weight of SLK-ALU-TTR

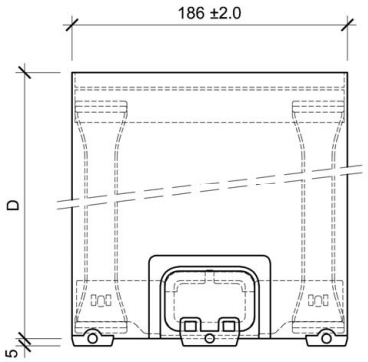
Annex A 5

Deutsches Institut für Bautechnik DIBt

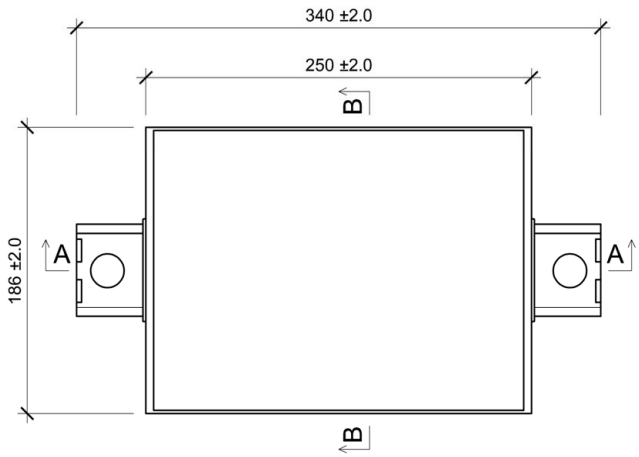
View A-A



View B-B



Top view



For measurements without specified tolerances, tolerance class "c (coarse)" applies in accordance with ISO 2768

Description	D (mm)	Weight (g)		
		-3%	Nominal value	+ 3%
SLK-ALU-TTQ 100	100	6300	6495	6690
SLK-ALU-TTQ 120	120	6631	6836	7041
SLK-ALU-TTQ 140	140	6962	7177	7392
SLK-ALU-TTQ 160	160	7291	7517	7743
SLK-ALU-TTQ 180	180	7622	7858	8094
SLK-ALU-TTQ 200	200	7953	8199	8445
SLK-ALU-TTQ 220	220	8284	8540	8796
SLK-ALU-TTQ 240	240	8615	8881	9147
SLK-ALU-TTQ 260	260	8945	9222	9499
SLK-ALU-TTQ 280	280	9276	9563	9850
SLK-ALU-TTQ 300	300	9607	9904	10201

Heavy Load Corbels "SLK-ALU-TR", "SLK-ALU-TQ", "SLK-ALU-TTR", "SLK-ALU-TTQ"

Product description
Outside dimensions and weight of SLK-ALU-TTQ

Annex A 6

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Field of application

Product family a) heavy-load corbels in accordance with EAD 090868-00-0404

Loading of the Heavy Load Corbel

Static and quasi-static loads (primarily static loads) from attachment parts

Structural analysis

The verification of the Heavy Load Corbel as well as the anchoring and fastening shall consider all loads which occur. For each application case, a structural analysis shall be carried out for the ultimate limit state (ULS) and for the serviceability limit state (SLS). Relevant national regulations shall be observed.

For table C1 in Annex C 1:

The following loading durations shall be used:
- Self-weight (attachment parts, may also have to be considered here): permanent
- Imposed loads (traffic loads):
  The actions of Clauses 6.3.1, 6.3.4 and 6.4 of EN 1991-1-1:2010-12 shall be considered as imposed loads. The actions listed in Clauses 6.3.2 and 6.3.3 of the standard shall be excluded.
  Unless other values exist, the following loading durations shall be assumed:
  - Loads in accordance with Clause 6.3.1: 25 % permanent; 75 % short
  - Loads in accordance with Clause 6.3.4: short
  - Loads in accordance with Clauses 6.4 (1) and 6.4 (2): medium
  - Loads in accordance with Clauses 6.4 (NA.3)* to 6.4 (NA.6): permanent
- Wind loads: very short
- Snow loads: medium
- Extraordinary snow loads: short

The actions E_k shall be increased through multiplication by the influencing factors depending on the load scenario.
* acc. DIN EN 1991-1/NA:2010-12

Installation

The Heavy Load Corbels are fixed with their entire surface to the level, solid, load-bearing external wall (substrate) using anchor corbels as follows:
- SLK-ALU-TR, SLK-ALU-TQ: 4 anchor corbels diameter 10 mm
- SLK-ALU-TTR, SLK-ALU-TTQ: 2 anchor corbels diameter 16 mm

The anchoring corbels must be fit to use and have a strength class of at least 8.8 according to DIN EN ISO 898-1. The anchor corbels shall be inserted so they are perpendicular to the surface of the building. The load-bearing capacity of the anchoring corbels in the substrate must be verified for each individual case.
The attachment parts to the Heavy Load Corbel is always carried out symmetrically over the mounting surface (attachment surface of the add-on part) by means of four M12 screws according to Annex B 3 and B 4. The screws are connected to the pressure distribution plate and the aluminium extrusion profile.

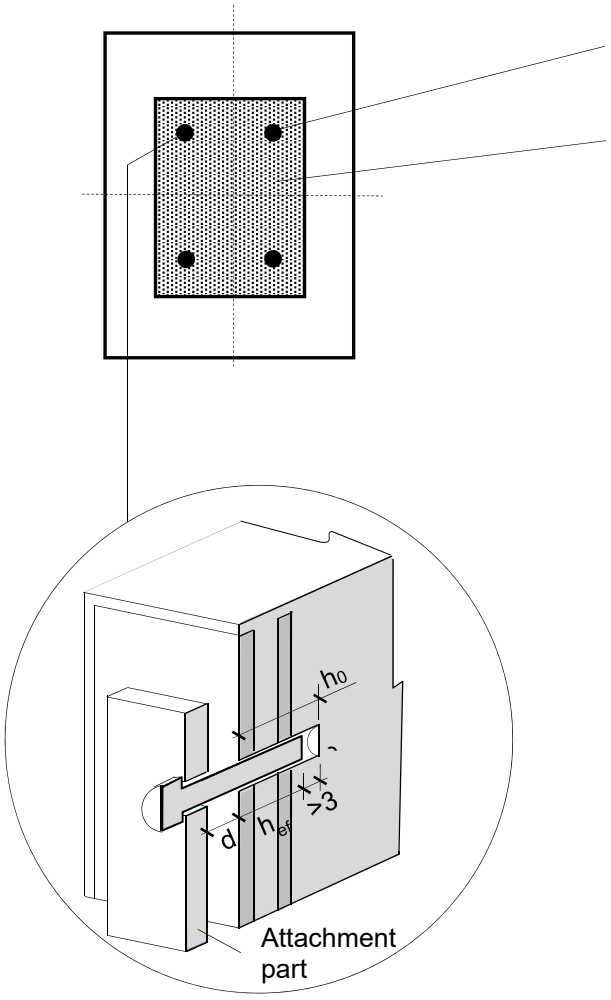
Heavy Load Corbels "SLK-ALU-TR", "SLK-ALU-TQ", "SLK-ALU-TTR", "SLK-ALU-TTQ"	Annex B 1
Intended use Technical data – application and installation	

Deutsches Institut für Bautechnik DIBt

A blind hole connection with an embedment depth of at least 35 mm from the top edge of the pressure distribution plate is provided for this purpose. To fasten the attachment part to the Heavy Load Corbel M12 screws with a minimum strength class of 8.8 in accordance with EN ISO 898-1 shall be used.
The attachment parts are mounted directly on the pressure distribution plate or can be attached to the Heavy Load Corbel with a distance of maximum 20 mm between the attachment part and the pressure distribution plate. The specifications given in Annex B 2 regarding the fixation of the attachment parts shall be adhered to. Impact drivers shall not be used.

The following shall be observed when fastening the attachment parts:
- The attachment part shall be fastened at the pressure distribution plate according below pictured.
- Four M12 screws in accordance with Annex B 3 and B 4 shall be used for fastening.
- The installation depth from the upper edge of the pressure distribution plate shall be at least 35 mm.
- The blind hole shall be positioned perpendicular to the pressure distribution plate and can be created on-site or at the factory.
- The screw shall not be loosened.

Fastening of attachment part



Attachment mounting part (adapter plate) 4 x M12, strength class of 8.8

Mounting surface of the load transfer of the attachment part

Dimensions of the mounting surface and arrangement of the screws according to Annex B 3 and B 4.

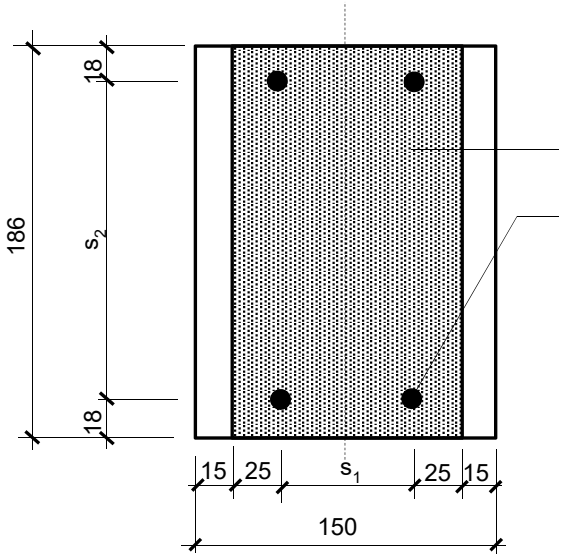
Blind hole:
Drill hole: ∅ 10.2 mm
Drill hole depth h_0: min. 38 mm
Screw: M12, strength class of 8.8
Setting depth h_{ef}: min. 35 mm
Internal thread M12 on whole borehole
Distance to attachment part: d ≤ 20 mm

The verification of serviceability for non-load-bearing layer (plaster etc.) is not part of this approval

Heavy Load Corbels "SLK-ALU-TR", "SLK-ALU-TQ", "SLK-ALU-TTR", "SLK-ALU-TTQ"	Annex B 2
Intended use Technical data – application and installation	

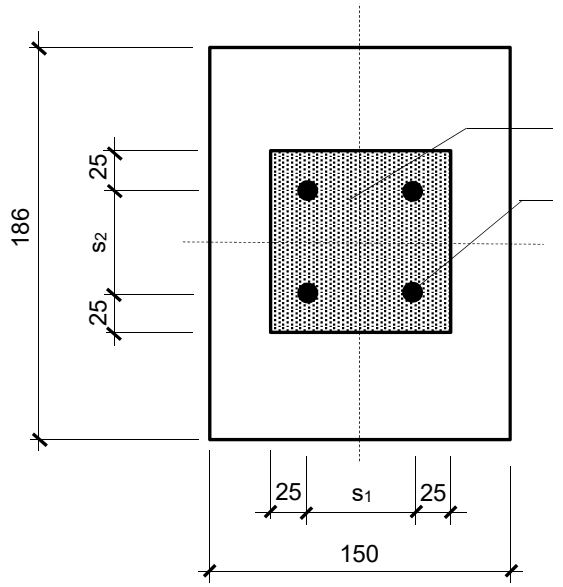
Deutsches Institut für Bautechnik DIBt

Fastening of the attachment part to the Heavy Load Corbel SLK-ALU-TR and SLK-ALU-TTR



Fastening option 1

Mounting area:	120 x 186 mm
Arrangement of the screws:	s_1 = 70 mm s_2 = 150 mm



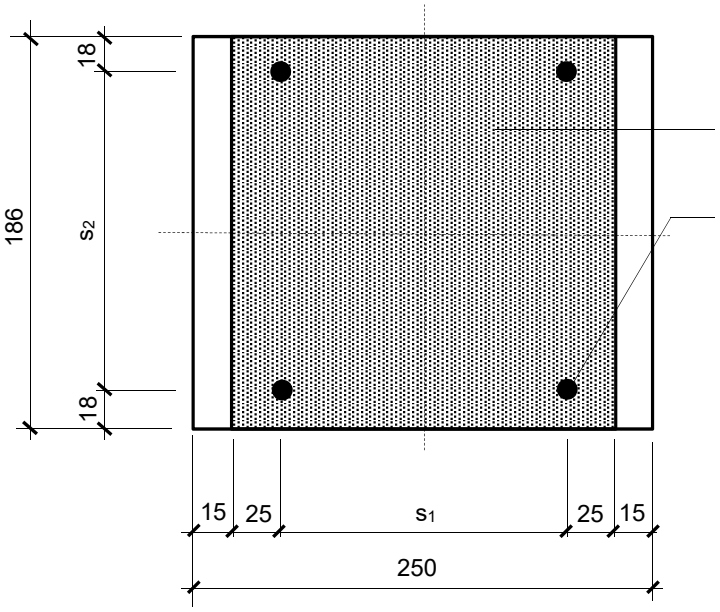
Fastening option 2

Mounting area:	s_1 + 50 mm x s_2 + 50 mm
Arrangement of the screws:	50 mm ≤ s_1 ≤ 70 mm 50 mm ≤ s_2 ≤ 136 mm

Heavy Load Corbels "SLK-ALU-TR", "SLK-ALU-TQ", "SLK-ALU-TTR", "SLK-ALU-TTQ"	Annex B 3
Intended use Technical data – Fastening options of attachment part for SLK-ALU-TR and SLK-ALU-TTR	

Deutsches Institut für Bautechnik DIBt

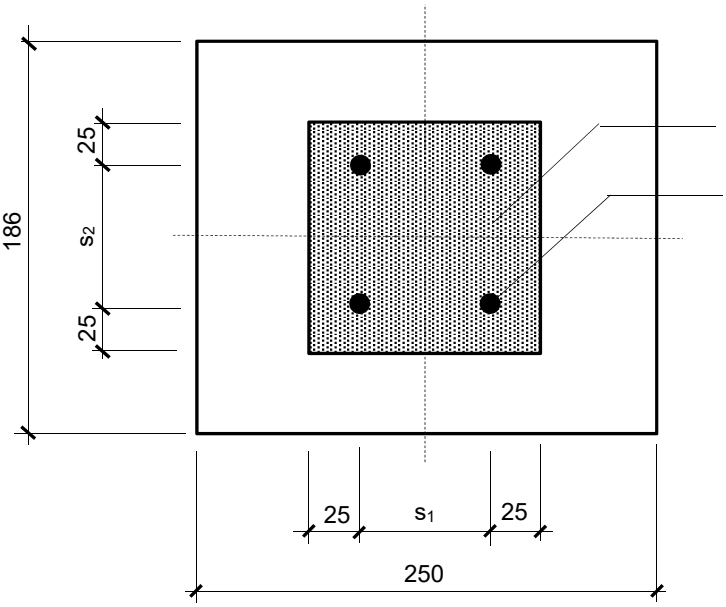
Fastening of the attachment part to the Heavy Load Corbel SLK-ALU-TQ and SLK-ALU-TTQ



Fastening option 1

Mounting area: 220 x 186 mm

Arrangement of the screws: s_1 = 170 mm
s_2 = 150 mm



Fastening option 2

Mounting area: s_1 + 50 mm x s_2 + 50 mm

Arrangement of the screws: 70 mm ≤ s_1 ≤ 170 mm
70 mm ≤ s_2 ≤ 136 mm

Heavy Load Corbels "SLK-ALU-TR", "SLK-ALU-TQ", "SLK-ALU-TTR", "SLK-ALU-TTQ"	Annex B 4
Intended use Technical data – Fastening options of attachment part for SLK-ALU-TQ and SLK-ALU-TTQ	

Tab. C1: Influencing factors A_1 of duration of action

	SLK-ALU-TR SLK-ALU-TQ		SLK-ALU-TTR SLK-ALU-TTQ	
Duration of load action	A_1^f	A_1^E	A_1^f	A_1^E
very short	1,00		1,00	
short up to one week	1,35		1,23	1,30
medium up to three months	1,45		1,29	1,60
Long to permanent	1,65		1,41	2,90

A_1^f : Influencing factor for the ultimate limit state (ULS)

A_1^E : Influencing factor for the serviceability limit state (SLS)

Tab. C2: Influencing factors for media, temperature and cyclic loading for SLK-ALU-TR and SLK-ALU-TQ

	ULS Breakage	SLS Deflection
Influencing factor for media effects A_2	1,40	1,10
Influencing factor for temperature effects A_3 for F_x (tension), F_y und M		
- in summer, 80°	1,20	1,10
- in winter, -20°	1,20	1,20
Influencing factor for temperature effects A_3 für F_x (pressure)		
- in summer, 80°	2,10	1,10
- in winter, -20°	1,20	1,20
Influencing factor for cyclic loading A_4	1,10	1,60

Tab. C3: Influencing factors for media, temperature and cyclic loading for SLK-ALU-TTR and SLK-ALU-TTQ

	ULS Breakage	SLS Deflection
Influencing factor for media effects A_2	1,30	1,10
Influencing factor for temperature effects A_3 for F_x (tension), F_y and M		
- in summer, 80°	1,20	1,10
- in winter, -20°	1,20	1,20
Influencing factor for temperature effects A_3 for F_x (pressure)		
- in summer, 80°	2,10	1,10
- in winter, -20°	1,20	1,20
Influencing factor for cyclic loading A_4	1,10	1,50

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Fig. C1: Stress results for structural resistances F_x, F_y, F_z, M_y and M_z at the pressure distribution plate of the Heavy Load Corbel SLK-ALU-TR and SLK-ALU-TQ

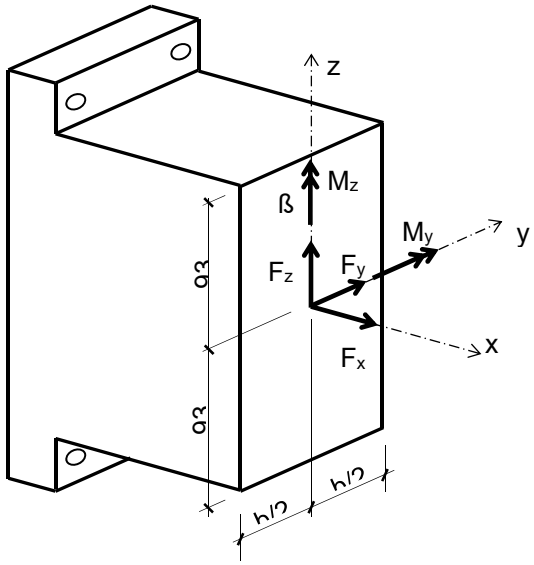
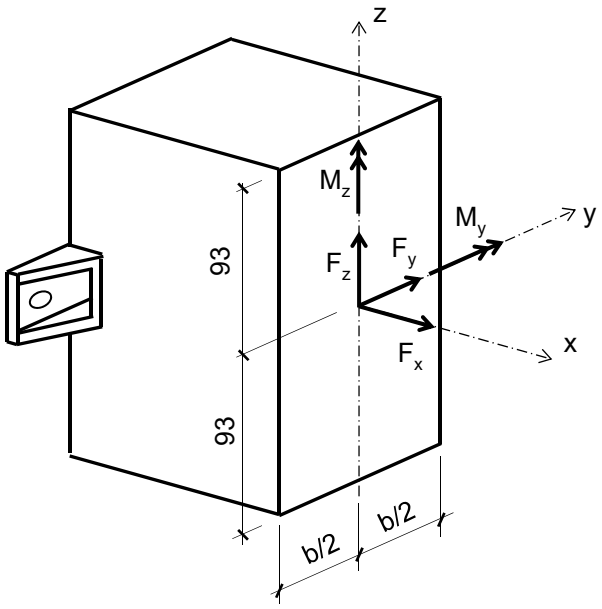


Fig. C2: Stress results for structural resistances F_x, F_y, F_z, M_y and M_z at the pressure distribution plate of the Heavy Load Corbel SLK-ALU-TTR and SLK-ALU-TTQ



Heavy Load Corbels "SLK-ALU-TR", "SLK-ALU-TQ", "SLK-ALU-TTR", "SLK-ALU-TTQ"	Annex C 2
Performance Stress result directions of structural resistances	

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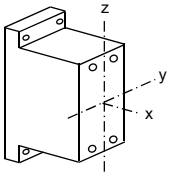
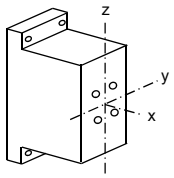
Tab.C4: Characteristic structural resistances **R_k** for the ultimate limit state (ULS) of the SLK-ALU-TR without distance fixing — Fastening option 1 (according Annex B 3)

Characteristic structural resistances R_k for ULS without distance fixing							
	SLK-ALU-TR	$F_{x,R,k}$ [kN]		$F_{y,R,k}$ [kN]	$F_{z,R,k}$ [kN]	$M_{z,R,k}$ [kNm]	$M_{y,R,k}$ [kNm]
		Tension	Pressure				
	**100**	82,0	343	35,5	62,4	5,45	6,00
	120		342	33,7	57,0	5,36	
	140		341	31,9	51,6	5,28	
	160		340	30,0	46,2	5,19	
	180		339	28,2	40,8	5,11	
	200		338	26,4	35,4	5,02	
	220		333	24,5	33,2	4,87	
	240		329	22,6	30,9	4,71	
	260		324	20,6	28,7	4,56	
	280		320	18,7	26,4	4,40	
	300		315	16,8	24,2	4,25	

Tab. C5: Characteristic structural resistances **R_k** for the ultimate limit state (ULS) of the SLK-ALU-TR without distance fixing — Fastening option 2 (according Annex B 3)

Characteristic structural resistances R_k for ULS without distance fixing							
	SLK-ALU-TR	$F_{x,R,k}$ [kN]		$F_{y,R,k}$ [kN]	$F_{z,R,k}$ [kN]	$M_{z,R,k}$ [kNm]	$M_{y,R.k}$ [kNm]
		Tension	Pressure				
	**100**	72,3	0,0 Compressive stress only on mounting area 186 mm x 150 mm	30,7	52,7	4,70	5,63
	120			29,1	48,1	4,63	
	140			27,5	43,6	4,55	
	160			26,0	39,0	4,48	
	180			24,4	34,5	4,40	
	200			22,8	29,9	4,33	
	220			21,1	28,0	4,20	
	240			19,5	26,1	4,07	
	260			17,8	24,2	3,93	
	280			16,2	22,3	3,80	
	300			14,5	20,4	3,67	

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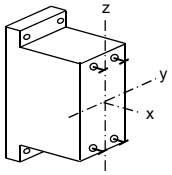
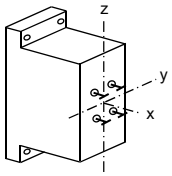
Tab. C6: Characteristic structural resistances **R_k** for the ultimate limit state (ULS) of the SLK-ALU-TR with distance fixing — Fastening option 1 (according Annex B 3)

Characteristic structural resistances R_k for ULS with distance fixing							
	SLK-ALU-TR	$F_{x,R,k}$ [kN]		$F_{y,R,k}$ [kN]	$F_{z,R,k}$ [kN]	$M_{z,R,k}$ [kNm]	$M_{y,R,k}$ [kNm]
		Tension	Pressure				
	**100**	82,0	343	31,5	55,4	5,45	5,74
	120		342	29,9	50,6	5,36	
	140		341	28,3	45,8	5,28	
	160		340	26,6	41,0	5,19	
	180		339	25,0	36,2	5,11	
	200		338	23,4	33,5	5,02	
	220		333	22,1	29,5	4,87	
	240		329	20,7	27,4	4,71	
	260		324	19,4	25,5	4,56	
	280		320	18,0	23,4	4,40	
	300		315	16,7	21,5	4,25	

Tab. C7: Characteristic structural resistances **R_k** for he ultimate limit state (ULS) of the SLK-ALU-TR with distance fixing — Fastening option 2 (according Annex B 3)

Characteristic structural resistances R_k for ULS with distance fixing							
	SLK-ALU-TR	$F_{x,R,k}$ [kN]		$F_{y,R,k}$ [kN]	$F_{z,R,k}$ [kN]	$M_{z,R,k}$ [kNm]	$M_{y,R,k}$ [kNm]
		Tension	Pressure				
	**100**	72,3	0,0 Compressive stress only on mounting area 186 mm x 150 mm	30,7	52,7	4,70	5,63
	120			29,1	48,1	4,63	
	140			27,5	43,6	4,55	
	160			26,0	39,0	4,48	
	180			24,4	34,5	4,40	
	200			22,8	29,9	4,33	
	220			21,1	28,0	4,20	
	240			19,5	26,1	4,07	
	260			17,8	24,2	3,93	
	280			16,2	22,3	3,80	
	300			14,5	20,4	3,67	

Heavy Load Corbels "SLK-ALU-TR", "SLK-ALU-TQ", "SLK-ALU-TTR", "SLK-ALU-TTQ"

Annex C 4

Performance
Characteristic structural resistances R_k for the ultimate limit state (ULS) of SLK-ALU-TR with distance fixing

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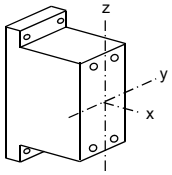
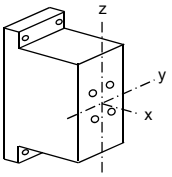
Tab. C8: Characteristic structural resistances $\mathbf{C_k}$ for the serviceability limit state (SLS) of the SLK-ALU-TR without distance fixing — Fastening option 1 (according Annex B 3)

Characteristic structural resistances C_k for SLS without distance fixing							
	SLK-ALU-TR	$F_{x,C,k}$ [kN]		$F_{y,C,k}$ [kN]	$F_{z,C,k}$ [kN]	$M_{z,C,k}$ [kNm]	$M_{y,C,k}$ [kNm]
		Tension	Pressure				
	**100**	41,0	172	12,0	22,5	2,50	3,70
	120		162	11,3	20,6		
	140		151	10,5	18,6		
	160		141	9,78	16,7		
	180		131	9,04	14,7		
	200		120	8,30	12,8		
	220		116	7,36	11,5	2,28	3,46
	240		113	6,42	10,2	2,05	3,22
	260		109	5,48	8,94	1,83	2,98
	280		105	4,54	7,65	1,60	2,74
	300		102	3,60	6,36	1,38	2,50

Tab. C9: Characteristic structural resistances $\mathbf{C_k}$ for the serviceability limit state (SLS) of the SLK-ALU-TR without distance fixing — Fastening option 2 (according Annex B 3)

Characteristic structural resistances C_k for SLS without distance fixing							
	SLK-ALU-TR	$F_{x,C,k}$ [kN]		$F_{y,C,k}$ [kN]	$F_{z,C,k}$ [kN]	$M_{z,C,k}$ [kNm]	$M_{y,C,k}$ [kNm]
		Tension	Pressure				
	**100**	39,6	0,0 Compressive stress only on mounting area 186 mm x 150 mm	10,3	21,4	2,22	2,62
	120			9,66	19,6		
	140			9,02	17,7		
	160			8,38	15,9		
	180			7,74	14,0		
	200			7,10	12,2		
	220			6,30	11,0	2,02	2,45
	240			5,49	9,74	1,82	2,28
	260			4,69	8,52	1,63	2,11
	280			3,88	7,29	1,43	1,94
	300			3,08	6,06	1,23	1,77

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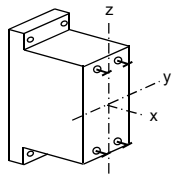
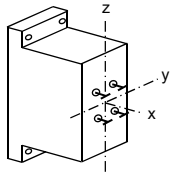
Tab. C10: Characteristic structural resistances **C_k** for the serviceability limit state (SLS) of the SLK-ALU-TR with distance fixing — Fastening option 1 (according Annex B 3)

Characteristic structural resistances C_k for SLS with distance fixing							
	SLK-ALU-TR	$F_{x,C,k}$ [kN]		$F_{y,C,k}$ [kN]	$F_{z,C,k}$ [kN]	$M_{z,C,k}$ [kNm]	$M_{y,C,k}$ [kNm]
		Tension	Pressure				
	**100**	41,0	172	12,0	22,5	2,50	3,70
	120		162	11,3	20,6		
	140		151	10,5	18,6		
	160		141	9,78	16,7		
	180		131	9,04	14,7		
	200		120	8,30	12,8		
	220		116	7,36	11,5	2,28	3,46
	240		113	6,42	10,2	2,05	3,22
	260		109	5,48	8,94	1,83	2,98
	280		105	4,54	7,65	1,60	2,74
	300		102	3,60	6,36	1,38	2,50

Tab. C11: Characteristic structural resistances **C_k** for the serviceability limit state (SLS) of the SLK-ALU-TR with distance fixing — Fastening option 2 (according Annex B 3)

Characteristic structural resistances C_k for SLS with distance fixing							
	SLK-ALU-TR	$F_{x,C,k}$ [kN]		$F_{y,C,k}$ [kN]	$F_{z,C,k}$ [kN]	$M_{z,C,k}$ [kNm]	$M_{y,C,k}$ [kNm]
		Tension	Pressure				
	**100**	39,0	0,0 Compressive stress only on mounting area 186 mm x 150 mm	10,3	21,0	2,22	2,42
	120			9,66	19,3		
	140			9,02	17,4		
	160			8,38	15,6		
	180			7,74	13,8		
	200			7,10	12,0		
	220			6,30	10,8	2,02	2,26
	240			5,49	9,57	1,82	2,11
	260			4,69	8,37	1,63	1,95
	280			3,88	7,16	1,43	1,79
	300			3,08	5,95	1,23	1,63

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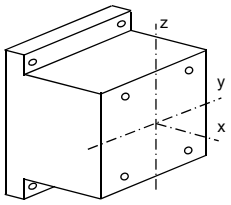
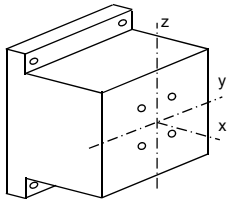
Tab. C12: Characteristic structural resistances **R_k** for the ultimate limit state (ULS) of the SLK-ALU-TQ without distance fixing — Fastening option 1 (according Annex B 4)

Characteristic structural resistances R_k for ULS without distance fixing							
	SLK-ALU-TQ	$F_{x,R,k}$ [kN]		$F_{y,R,k}$ [kN]	$F_{z,R,k}$ [kN]	$M_{z,R,k}$ [kNm]	$M_{y,R,k}$ [kNm]
		Tension	Pressure				
	**100**	82,0	523	48,1	61,6	10,5	8,40
	120		515	47,8	56,0	9,90	8,05
	140		507	47,0	50,7	9,30	7,75
	160		499	45,9	45,7	8,80	7,45
	180		491	44,5	41,1	8,35	7,15
	200		483	42,7	36,8	7,98	6,89
	220		477	40,7	33,0	7,65	6,55
	240		471	38,3	29,4	7,40	6,40
	260		464	35,5	26,2	7,20	6,15
	280		458	32,4	23,4	7,05	5,95
	300		452	29,0	20,9	6,97	5,74

Tab. C13: Characteristic structural resistances **R_k** for the ultimate limit state (ULS) of the SLK-ALU-TQ without distance fixing — Fastening option 2 (according Annex B 4)

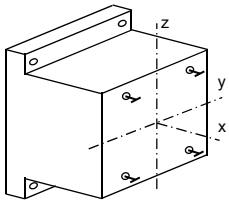
Characteristic structural resistances R_k for ULS without distance fixing							
	SLK-ALU-TQ	$F_{x,R,k}$ [kN]		$F_{y,R,k}$ [kN]	$F_{z,R,k}$ [kN]	$M_{z,R,k}$ [kNm]	$M_{y,R,k}$ [kNm]
		Tension	Pressure				
	**100**	82,0	0,0 Compressive stress only on mounting area 186 mm x 220 mm	46,0	58,6	10,3	7,84
	120			45,8	53,2	9,72	7,51
	140			45,0	48,2	9,14	7,23
	160			43,9	43,4	8,65	6,95
	180			42,6	39,0	8,20	6,67
	200			40,9	35,0	7,84	6,43
	220			39,0	31,4	7,52	6,11
	240			36,7	28,0	7,27	5,97
	260			34,0	24,9	7,07	5,74
	280			31,0	22,2	6,93	5,55
	300			27,8	19,9	6,85	5,36

Heavy Load Corbels "SLK-ALU-TR", "SLK-ALU-TQ", "SLK-ALU-TTR", "SLK-ALU-TTQ"

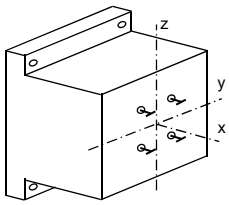
Annex C 7

Performance
Characteristic structural resistances R_k for the ultimate limit state (ULS) of SLK-ALU-TQ without distance fixing

Tab. C14: Characteristic structural resistances **R_k** for the ultimate limit state (ULS) of the SLK-ALU-TQ with distance fixing — Fastening option 1 (according Annex B 4)

Characteristic structural resistances R_k for ULS with distance fixing							
	SLK-ALU-TQ	$F_{x,R,k}$ [kN]		$F_{y,R,k}$ [kN]	$F_{z,R,k}$ [kN]	$M_{z,R,k}$ [kNm]	$M_{y,R,k}$ [kNm]
		Tension	Pressure				
	**100**	82,0	523	47,1	61,6	10,5	8,08
	120		515	46,8	56,0	9,90	7,73
	140		507	46,1	50,7	9,30	7,44
	160		499	45,0	45,7	8,80	7,15
	180		491	43,6	41,1	8,35	6,86
	200		483	41,8	36,8	7,98	6,73
	220		477	39,9	33,0	7,65	6,29
	240		471	37,5	29,4	7,40	6,14
	260		464	34,8	26,2	7,20	5,90
	280		458	31,8	23,4	7,05	5,71
	300		452	28,5	20,9	6,97	5,51

Tab. C15: Characteristic structural resistances **R_k** for the ultimate limit state (ULS) of the SLK-ALU-TQ with distance fixing — Fastening option 2 (according Annex B 4)

Characteristic structural resistances R_k for ULS with distance fixing							
	SLK-ALU-TQ	$F_{x,R,k}$ [kN]		$F_{y,R,k}$ [kN]	$F_{z,R,k}$ [kN]	$M_{z,R,k}$ [kNm]	$M_{y,R,k}$ [kNm]
		Tension	Pressure				
	**100**	82,0	0,0 Compressive stress only on mounting area 186 mm x 220 mm	46,0	58,6	10,3	7,76
	120			45,8	53,2	9,72	7,43
	140			45,0	48,2	9,14	7,16
	160			43,9	43,4	8,65	6,88
	180			42,6	39,0	8,20	6,60
	200			40,9	35,0	7,84	6,37
	220			39,0	31,4	7,52	6,05
	240			36,7	28,0	7,27	5,91
	260			34,0	24,9	7,07	5,68
	280			31,0	22,2	6,93	5,49
	300			27,8	19,9	6,85	5,31

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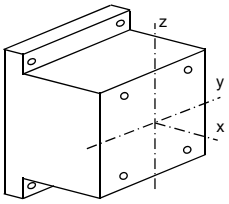
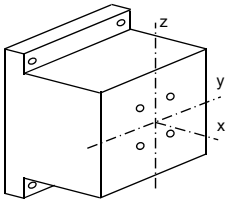
Tab. C16: Characteristic structural resistances $\mathbf{C_k}$ for the serviceability limit state (SLS) of the SLK-ALU-TQ without distance fixing — Fastening option 1 (according Annex B 4)

Characteristic structural resistances C_k for SLS without distance fixing							
	SLK-ALU-TQ	$F_{x,C,k}$ [kN]		$F_{y,C,k}$ [kN]	$F_{z,C,k}$ [kN]	$M_{z,C,k}$ [kNm]	$M_{y,C,k}$ [kNm]
		Tension	Pressure				
	**100**	41,0	127	29,9	39,4	6,74	4,59
	120			29,1	35,7	6,70	
	140			28,2	32,3	6,70	
	160			27,4	29,2	6,65	
	180			26,5	26,5	6,55	
	200			25,6	24,1	6,45	
	220		126	24,8	22,1	6,30	4,45
	240			23,9	20,4	6,20	4,30
	260			23,0	19,1	6,00	4,10
	280			22,1	18,1	5,85	3,85
	300			21,2	17,4	5,63	3,57

Tab. C17: Characteristic structural resistances $\mathbf{C_k}$ for the serviceability limit state (SLS) of the SLK-ALU-TQ without distance fixing — Fastening option 2 (according Annex B 4)

Characteristic structural resistances C_k for SLS without distance fixing							
	SLK-ALU-TQ	$F_{x,C,k}$ [kN]		$F_{y,C,k}$ [kN]	$F_{z,C,k}$ [kN]	$M_{z,C,k}$ [kNm]	$M_{y,C,k}$ [kNm]
		Tension	Pressure				
	**100**	41,0	0,0 Compressive stress only on mounting area 186 mm x 220 mm	26,5	35,6	6,07	4,48
	120			25,8	32,3	6,04	
	140			25,0	29,2	6,03	
	160			24,3	26,4	5,99	
	180			23,5	23,9	5,90	
	200			22,7	21,8	5,81	
	220			22,0	20,0	5,67	4,34
	240			21,1	18,4	5,58	4,20
	260			20,4	17,3	5,40	4,00
	280			19,6	16,4	5,27	3,76
	300			18,9	15,7	5,07	3,48

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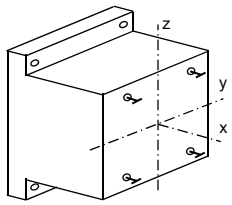
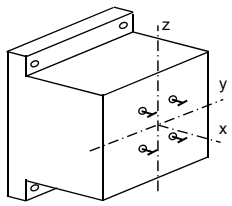
Tab. C18: Characteristic structural resistances $\mathbf{C_k}$ for the serviceability limit state (SLS) of the SLK-ALU-TQ with distance fixing — Fastening option 1 (according Annex B 4)

Characteristic structural resistances C_k for SLS with distance fixing							
	SLK-ALU-TQ	$F_{x,C,k}$ [kN]		$F_{y,C,k}$ [kN]	$F_{z,C,k}$ [kN]	$M_{z,C,k}$ [kNm]	$M_{y,C,k}$ [kNm]
		Tension	Pressure				
	**100**	41,0	127	28,2	38,2	6,65	4,59
	120			27,2	34,6	6,61	
	140			26,1	31,3	6,57	
	160			25,1	28,3	6,53	
	180			24,0	25,7	6,49	
	200			23,0	24,1	6,45	
	220		126	22,6	21,4	6,24	4,45
	240			22,1	19,8	6,03	4,30
	260			21,7	18,5	5,81	4,10
	280			21,2	17,5	5,60	3,85
	300			20,8	17,1	5,39	3,57

Tab. C19: Characteristic structural resistances $\mathbf{C_k}$ for the serviceability limit state (SLS) of the SLK-ALU-TQ with distance fixing — Fastening option 2 (according Annex B 4)

Characteristic structural resistances C_k for SLS with distance fixing							
	SLK-ALU-TQ	$F_{x,C,k}$ [kN]		$F_{y,C,k}$ [kN]	$F_{z,C,k}$ [kN]	$M_{z,C,k}$ [kNm]	$M_{y,C,k}$ [kNm]
		Tension	Pressure				
	**100**	41,0	0,0 Compressive stress only on mounting area 186 mm x 220 mm	24,5	35,6	6,07	4,48
	120			23,9	32,3	6,04	
	140			23,1	29,2	6,03	
	160			22,5	26,4	5,99	
	180			21,7	23,9	5,90	
	200			21,0	21,8	5,81	
	220			20,4	20,0	5,67	4,34
	240			19,5	18,4	5,58	4,20
	260			18,9	17,3	5,40	4,00
	280			18,1	16,4	5,27	3,76
	300			17,5	15,7	5,07	3,48

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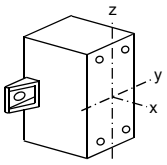
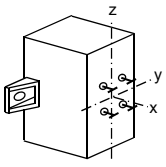
Tab. C20: Characteristic structural resistances **R_k** for the ultimate limit state (ULS) of the SLK-ALU-TTR without distance fixing — Fastening option 1 (according Annex B 3)

Characteristic structural resistances R_k for ULS without distance fixing							
	SLK-ALU-TTR	$F_{x,R,k}$ [kN]		$F_{y,R,k}$ [kN]	$F_{z,R,k}$ [kN]	$M_{z,R,k}$ [kNm]	$M_{y,R,k}$ [kNm]
		Tension	Pressure				
	**100**	78,5	204	40,4	33,8	4,73	6,16
	120	79,6	208	37,4	32,1	4,74	6,12
	140	80,7	213	34,5	30,4	4,75	6,08
	160	81,8	217	31,5	28,8	4,75	6,03
	180	82,9	222	28,6	27,1	4,76	5,99
	200	84,0	227	25,6	25,4	4,77	5,95
	220	83,7	222	24,3	24,4	4,67	5,83
	240	83,4	217	23,0	23,3	4,57	5,70
	260	83,1	213	21,7	22,2	4,47	5,58
	280	82,8	208	20,4	21,2	4,37	5,45
	300	82,5	204	19,0	20,1	4,27	5,33

Tab. C21: Characteristic structural resistances **R_k** for the ultimate limit state (ULS) of the SLK-ALU-TTR without distance fixing — Fastening option 2 (according Annex B 3)

Characteristic structural resistances R_k for ULS without distance fixing							
	SLK-ALU-TTR	$F_{x,R,k}$ [kN]		$F_{y,R,k}$ [kN]	$F_{z,R,k}$ [kN]	$M_{z,R,k}$ [kNm]	$M_{y,R,k}$ [kNm]
		Tension	Pressure				
	**100**	70,6	204	36,4	27,0	4,26	5,54
	120	71,6	208	33,7	25,4	4,24	5,46
	140	72,6	213	31,0	23,8	4,22	5,38
	160	73,6	217	28,4	22,2	4,19	5,30
	180	74,6	222	25,7	20,7	4,17	5,22
	200	75,6	227	23,0	19,1	4,15	5,14
	220	75,3	222	21,9	18,5	4,09	5,07
	240	75,1	217	20,7	17,9	4,03	5,00
	260	74,8	213	19,5	17,3	3,96	4,93
	280	74,5	208	18,3	16,7	3,90	4,86
	300	74,2	204	17,1	16,1	3,84	4,79

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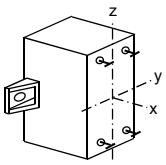
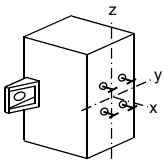
Tab. C22: Characteristic structural resistances **R_k** for the ultimate limit state (ULS) of the SLK-ALU-TTR with distance fixing — Fastening option 1 (according Annex B 3)

Characteristic structural resistances R_k for ULS with distance fixing							
	SLK-ALU-TTR	$F_{x,R,k}$ [kN]		$F_{y,R,k}$ [kN]	$F_{z,R,k}$ [kN]	$M_{z,R,k}$ [kNm]	$M_{y,R,k}$ [kNm]
		Tension	Pressure				
	**100**	78,5	204	34,4	40,8	5,01	6,47
	120	79,6	208	32,3	37,2	4,84	6,37
	140	80,7	213	30,3	33,6	4,67	6,27
	160	81,8	217	28,2	30,1	4,51	6,17
	180	82,9	222	26,1	26,5	4,34	6,07
	200	84,0	227	24,1	22,9	4,17	5,97
	220	83,7	222	22,5	22,0	4,21	5,84
	240	83,4	217	20,8	21,0	4,26	5,72
	260	83,1	213	19,2	20,0	4,30	5,59
	280	82,8	208	17,6	19,1	4,35	5,47
	300	82,5	204	16,0	18,1	4,39	5,34

Tab. C23: Characteristic structural resistances **R_k** for the ultimate limit state (ULS) of the SLK-ALU-TTR with distance fixing — Fastening option 2 (according Annex B 3)

Characteristic structural resistances R_k for ULS with distance fixing							
	SLK-ALU-TTR	$F_{x,R,}$ [kN]		$F_{y,R,k}$ [kN]	$F_{z,R,k}$ [kN]	$M_{z,R,k}$ [kNm]	$M_{y,R,k}$ [kNm]
		Tension	Pressure				
	**100**	70,6	204	30,9	36,7	4,51	5,82
	120	71,6	208	28,9	33,5	4,36	5,73
	140	72,6	213	26,8	30,3	4,21	5,64
	160	73,6	217	24,8	27,0	4,05	5,55
	180	74,6	222	22,7	23,8	3,90	5,46
	200	75,6	227	20,7	20,6	3,75	5,37
	220	75,3	222	19,4	19,8	3,79	5,26
	240	75,1	217	18,1	18,9	3,83	5,15
	260	74,8	213	16,9	18,0	3,87	5,03
	280	74,5	208	15,6	17,2	3,91	4,92
	300	74,2	204	14,4	16,3	3,95	4,81

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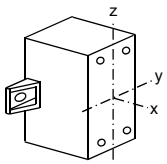
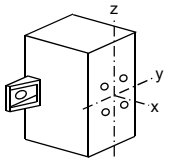
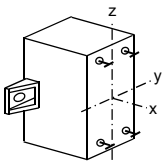
Tab. C24: Characteristic structural resistances **C_k** for the serviceability limit state (SLS) of the SLK-ALU-TTR without distance fixing — Fastening option 1 (according Annex B 3)

Characteristic structural resistances C_k for SLS without distance fixing							
	SLK-ALU-TTR	$F_{x,C,k}$ [kN]		$F_{y,C,k}$ [kN]	$F_{z,C,k}$ [kN]	$M_{z,C,k}$ [kNm]	$M_{y,C,k}$ [kNm]
		Tension	Pressure				
	**100**	39,2	102	20,2	16,9	2,37	3,08
	120	39,8	104	18,7	16,0	2,37	3,06
	140	40,3	106	17,2	15,2	2,38	3,04
	160	40,9	108	15,7	14,4	2,38	3,01
	180	41,4	111	14,3	13,5	2,39	2,99
	200	42,0	113	12,8	12,7	2,39	2,97
	220	41,8	111	12,1	12,2	2,34	2,91
	240	41,7	108	11,5	11,6	2,29	2,85
	260	41,5	106	10,8	11,1	2,24	2,78
	280	41,4	104	10,2	10,6	2,19	2,72
	300	41,2	102	9,55	10,0	2,14	2,66

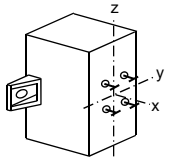
Tab. C25: Characteristic structural resistances **C_k** for the serviceability limit state (SLS) of the SLK-ALU-TTR without distance fixing — Fastening option 2 (according Annex B 3)

Characteristic structural resistances C_k for SLS without distance fixing							
	SLK-ALU-TTR	$F_{x,C,k}$ [kN]		$F_{y,C,k}$ [kN]	$F_{z,C,k}$ [kN]	$M_{z,C,k}$ [kNm]	$M_{y,C,k}$ [kNm]
		Tension	Pressure				
	**100**	35,3	102	18,2	13,5	2,13	2,77
	120	35,8	104	16,8	12,7	2,12	2,73
	140	36,3	106	15,5	11,9	2,11	2,69
	160	36,8	108	14,2	11,1	2,09	2,65
	180	37,3	111	12,8	10,3	2,08	2,61
	200	37,8	113	11,5	9,55	2,07	2,57
	220	37,6	111	10,9	9,25	2,04	2,54
	240	37,5	108	10,3	8,95	2,01	2,50
	260	37,4	106	9,77	8,66	1,98	2,47
	280	37,2	104	9,18	8,36	1,95	2,43
	300	37,1	102	8,59	8,06	1,92	2,40

Tab. C26: Characteristic structural resistances $\mathbf{C_k}$ for the serviceability limit state (SLS) of the SLK-ALU-TTR with distance fixing — Fastening option 1 (according Annex B 3)

Characteristic structural resistances C_k for SLS with distance fixing							
	SLK-ALU-TTR	$F_{x,C,k}$ [kN]		$F_{y,C,k}$ [kN]	$F_{z,C,k}$ [kN]	$M_{z,C,k}$ [kNm]	$M_{y,C,k}$ [kNm]
		Tension	Pressure				
	**100**	39,2	102	17,2	20,4	2,51	3,24
	120	39,8	104	16,1	18,6	2,43	3,19
	140	40,3	106	15,1	16,8	2,34	3,14
	160	40,9	108	14,1	15,0	2,26	3,08
	180	41,4	111	13,0	13,2	2,17	3,03
	200	42,0	113	12,0	11,4	2,09	2,98
	220	41,8	111	11,2	11,0	2,11	2,92
	240	41,7	108	10,4	10,5	2,13	2,86
	260	41,5	106	9,62	10,0	2,15	2,79
	280	41,4	104	8,81	9,56	2,17	2,73
	300	41,2	102	8,00	9,08	2,19	2,67

Tab. C27: Characteristic structural resistances $\mathbf{C_k}$ for the serviceability limit state (SLS) of the SLK-ALU-TTR with distance fixing — Fastening option 2 (according Annex B 3)

Characteristic structural resistances C_k for SLS with distance fixing							
	SLK-ALU-TTR	$F_{x,C,k}$ [kN]		$F_{y,C,k}$ [kN]	$F_{z,C,k}$ [kN]	$M_{z,C,k}$ [kNm]	$M_{y,C,k}$ [kNm]
		Tension	Pressure				
	**100**	35,3	102	15,4	18,3	2,26	2,91
	120	35,8	104	14,4	16,7	2,18	2,87
	140	36,3	106	13,4	15,1	2,11	2,82
	160	36,8	108	12,4	13,5	2,03	2,78
	180	37,3	111	11,3	11,9	1,96	2,73
	200	37,8	113	10,3	10,3	1,88	2,69
	220	37,6	111	9,72	9,91	1,90	2,63
	240	37,5	108	9,09	9,47	1,92	2,57
	260	37,4	106	8,46	9,04	1,93	2,52
	280	37,2	104	7,83	8,60	1,95	2,46
	300	37,1	102	7,20	8,17	1,97	2,40

Heavy Load Corbels "SLK-ALU-TR", "SLK-ALU-TQ", "SLK-ALU-TTR", "SLK-ALU-TTQ"

Performance
Characteristic structural resistances C_k for the serviceability limit state (SLS) of SLK-ALU-TTR with distance fixing

Annex C 14

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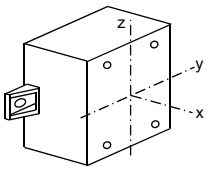
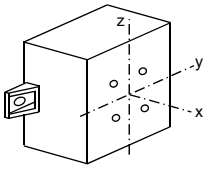
Tab. C28: Characteristic structural resistances $\mathbf{R_k}$ for the ultimate limit state (ULS) of the SLK-ALU-TTQ without distance fixing — Fastening option 1 (according Annex B 4)

Characteristic structural resistances R_k for ULS without distance fixing							
	SLK-ALU-TTQ	$F_{x,R,k}$ [kN]		$F_{y,R,k}$ [kN]	$F_{z,R,k}$ [kN]	$M_{z,R,k}$ [kNm]	$M_{y,R,k}$ [kNm]
		Tension	Pressure				
	**100**	88,5	203	67,4	44,1	9,37	6,54
	120	88,4	207	62,9	40,4	9,11	6,39
	140	88,4	212	58,4	36,7	8,85	6,25
	160	88,3	216	54,0	33,0	8,58	6,10
	180	88,2	221	49,5	29,3	8,32	5,96
	200	88,2	226	45,0	25,6	8,06	5,81
	220	86,3	221	42,3	25,3	7,99	5,81
	240	84,5	216	39,6	25,1	7,92	5,81
	260	82,6	212	36,8	24,8	7,85	5,80
	280	80,8	207	34,1	24,5	7,78	5,80
	300	78,9	203	31,4	24,2	7,71	5,80

Tab. C29: Characteristic structural resistances $\mathbf{R_k}$ for the ultimate limit state (ULS) of the SLK-ALU-TTQ without distance fixing — Fastening option 2 (according Annex B 4)

Characteristic structural resistances R_k for ULS without distance fixing							
	SLK-ALU-TTQ	$F_{x,R,k}$ [kN]		$F_{y,R,k}$ [kN]	$F_{z,R,k}$ [kN]	$M_{z,R,k}$ [kNm]	$M_{y,R,k}$ [kNm]
		Tension	Pressure				
	**100**	79,6	203	60,7	39,7	8,44	5,88
	120	79,6	207	56,1	36,2	8,20	5,75
	140	79,5	212	51,5	32,8	7,96	5,62
	160	79,4	216	46,9	29,3	7,73	5,49
	180	79,3	221	42,3	25,9	7,49	5,36
	200	79,3	226	37,7	22,4	7,25	5,23
	220	77,6	221	35,8	22,3	7,19	5,23
	240	76,0	216	33,9	22,2	7,13	5,23
	260	74,3	212	32,0	22,0	7,06	5,22
	280	72,7	207	30,1	21,9	7,00	5,22
	300	71,0	203	28,2	21,8	6,94	5,22

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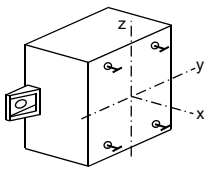
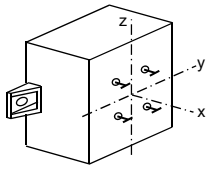
Tab. C30: Characteristic structural resistances $\mathbf{R_k}$ for the ultimate limit state (ULS) of the SLK-ALU-TTQ with distance fixing — Fastening option 1 (according Annex B 4)

Characteristic structural resistances R_k for ULS with distance fixing							
	SLK-ALU-TTQ	$F_{x,R,k}$ [kN]		$F_{y,R,k}$ [kN]	$F_{z,R,k}$ [kN]	$M_{z,R,k}$ [kNm]	$M_{y,R,k}$ [kNm]
		Tension	Pressure				
	**100**	88,5	203	51,8	51,7	9,39	6,92
	120	88,4	207	49,4	46,9	9,05	6,77
	140	88,4	212	46,9	42,1	8,71	6,62
	160	88,3	216	44,5	37,3	8,38	6,47
	180	88,2	221	42,0	32,6	8,04	6,32
	200	88,2	226	39,6	27,8	7,70	6,17
	220	86,3	221	37,5	26,8	7,83	6,01
	240	84,5	216	35,4	25,8	7,96	5,84
	260	82,6	212	33,2	24,8	8,09	5,68
	280	80,8	207	31,1	23,8	8,22	5,51
	300	78,9	203	29,0	22,8	8,35	5,35

Tab. C31: Characteristic structural resistances $\mathbf{R_k}$ for the ultimate limit state (ULS) of the SLK-ALU-TTQ with distance fixing — Fastening option 2 (according Annex B 4)

Characteristic structural resistances R_k for ULS with distance fixing							
	SLK-ALU-TTQ	$F_{x,R,k}$ [kN]		$F_{y,R,k}$ [kN]	$F_{z,R,k}$ [kN]	$M_{z,R,k}$ [kNm]	$M_{y,R,k}$ [kNm]
		Tension	Pressure				
	**100**	79,6	203	46,6	46,5	7,51	6,23
	120	79,6	207	44,4	41,9	7,39	6,09
	140	79,5	212	42,2	37,3	7,28	5,96
	160	79,4	216	40,0	32,7	7,16	5,82
	180	79,3	221	37,8	28,1	7,05	5,69
	200	79,3	226	35,6	23,5	6,93	5,55
	220	77,6	221	33,7	22,9	6,88	5,40
	240	76,0	216	31,8	22,3	6,83	5,25
	260	74,3	212	29,9	21,7	6,78	5,11
	280	72,7	207	28,0	21,1	6,73	4,96
	300	71,0	203	26,1	20,5	6,68	4,81

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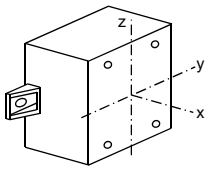
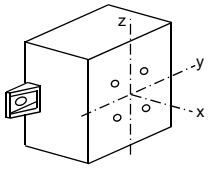
Tab. C32: Characteristic structural resistances $\mathbf{C_k}$ for the serviceability limit state (SLS) of the SLK-ALU-TTQ without distance fixing — Fastening option 1 (according Annex B 4)

Characteristic structural resistances C_k for SLS without distance fixing							
	SLK-ALU-TTQ	$F_{x,C,k}$ [kN]		$F_{y,C,k}$ [kN]	$F_{z,C,k}$ [kN]	$M_{z,C,k}$ [kNm]	$M_{y,C,k}$ [kNm]
		Tension	Pressure				
	**100**	44,2	101	33,7	22,0	4,69	3,27
	120	44,2	103	31,4	20,2	4,56	3,20
	140	44,2	105	29,2	18,3	4,43	3,13
	160	44,1	108	27,0	16,5	4,29	3,05
	180	44,1	110	24,7	14,6	4,16	2,98
	200	44,1	113	22,5	12,8	4,03	2,91
	220	43,1	110	21,1	12,6	3,99	2,91
	240	42,2	108	19,8	12,5	3,96	2,91
	260	41,3	105	18,4	12,4	3,92	2,90
	280	40,4	103	17,0	12,2	3,89	2,90
	300	39,4	101	15,7	12,1	3,85	2,90

Tab. C33: Characteristic structural resistances $\mathbf{C_k}$ for the serviceability limit state (SLS) of the SLK-ALU-TTQ without distance fixing — Fastening option 2 (according Annex B 4)

Characteristic structural resistances C_k for SLS without distance fixing							
	SLK-ALU-TTQ	$F_{x,C,k}$ [kN]		$F_{y,C,k}$ [kN]	$F_{z,C,k}$ [kN]	$M_{z,C,k}$ [kNm]	$M_{y,C,k}$ [kNm]
		Tension	Pressure				
	**100**	39,8	101	30,3	19,8	4,22	2,94
	120	39,8	103	28,0	18,1	4,10	2,87
	140	39,7	105	25,7	16,4	3,98	2,81
	160	39,7	108	23,4	14,7	3,87	2,74
	180	39,6	110	21,1	12,9	3,75	2,68
	200	39,6	113	18,8	11,2	3,63	2,61
	220	38,8	110	17,9	11,1	3,60	2,61
	240	38,0	108	16,9	11,1	3,57	2,61
	260	37,1	105	16,0	11,0	3,53	2,61
	280	36,3	103	15,0	10,9	3,50	2,61
	300	35,5	101	14,1	10,9	3,47	2,61

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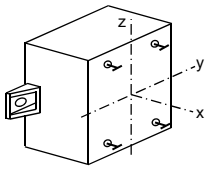
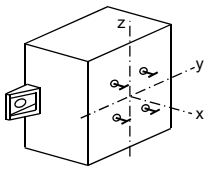
Tab. C34: Characteristic structural resistances $\mathbf{C_k}$ for the serviceability limit state (SLS) of the SLK-ALU-TTQ with distance fixing — Fastening option 1 (according Annex B 4)

Characteristic structural resistances C_k for SLS with distance fixing							
	SLK-ALU-TTQ	$F_{x,C,k}$ [kN]		$F_{y,C,k}$ [kN]	$F_{z,C,k}$ [kN]	$M_{z,C,k}$ [kNm]	$M_{y,C,k}$ [kNm]
		Tension	Pressure				
	**100**	44,2	101	25,9	25,8	4,69	3,46
	120	44,2	103	24,7	23,4	4,52	3,39
	140	44,2	105	23,4	21,0	4,35	3,31
	160	44,1	108	22,2	18,6	4,19	3,24
	180	44,1	110	21,0	16,3	4,02	3,16
	200	44,1	113	19,8	13,9	3,85	3,09
	220	43,1	110	18,7	13,4	3,92	3,01
	240	42,2	108	17,7	12,9	3,98	2,92
	260	41,3	105	16,6	12,4	4,05	2,84
	280	40,4	103	15,5	11,9	4,11	2,75
	300	39,4	101	14,5	11,4	4,18	2,67

Tab. C35: Characteristic structural resistances $\mathbf{C_k}$ for the serviceability limit state (SLS) of the SLK-ALU-TTQ with distance fixing — Fastening option 2 (according Annex B 4)

Characteristic structural resistances C_k for SLS with distance fixing							
	SLK-ALU-TTQ	$F_{x,C,k}$ [kN]		$F_{y,C,k}$ [kN]	$F_{z,C,k}$ [kN]	$M_{z,C,k}$ [kNm]	$M_{y,C,k}$ [kNm]
		Tension	Pressure				
	**100**	39,8	101	23,3	23,2	3,76	3,11
	120	39,8	103	22,2	20,9	3,70	3,04
	140	39,7	105	21,1	18,6	3,64	2,98
	160	39,7	108	20,0	16,3	3,58	2,91
	180	39,6	110	18,9	14,0	3,52	2,85
	200	39,6	113	17,8	11,7	3,46	2,78
	220	38,8	110	16,8	11,4	3,44	2,71
	240	38,0	108	15,9	11,1	3,41	2,63
	260	37,1	105	14,9	10,8	3,39	2,56
	280	36,3	103	14,0	10,5	3,36	2,48
	300	35,5	101	13,0	10,2	3,34	2,41