

NATIONAL TECHNICAL EVALUATION ITB-KOT-2018/0434 issue 1

This National Technical Evaluation has been issued according to the ordinance of the Minister of Infrastructure and Construction from 17/11/2016 on national technical evaluations (Journal of Laws from 2016, item 1968) by the Institute of Building Technology in Warsaw, at the request of:

BSP Bracket System Polska Sp. z o.o.
04-219 Warszawa, ul. Pabianicka 26A lok. 3-4

National Technical Evaluation ITB-KOT-2018/0434 issue 1 is a positive evaluation of the performance characteristics of the following construction product for the intended application:

A set of products for making BSP System substructures for fixing façade linings

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21/11/2023

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1. TECHNICAL DESCRIPTION OF THE PRODUCT

This National Technical Evaluation includes sets for performing BSP System substructures for fixing the façade linings, manufactured by BSP Bracket System Polska Sp. z o.o., 04-219 Warsaw, ul. Pabianicka 26A unit 3-4, in a manufacturing plant in Poland.

This National Technical Evaluation includes the types of products determined by the manufacturer and resulting from the performance characteristics provided in point 3 and a combination of products being a part of BSP System sets.

The sets include consoles, consoles with a laminate separator, profiles, taps and complementary accessories.

The description of the sets included in this National Technical Evaluation and the products that are parts of them is provided in tables 1-3 and figures B1-B30.

Table 1

Set designation	Fig.	Products included in the set				
		Consoles	Consoles with a laminate separator	Profiles	Hooks	Complementary accessories
“KW”	A1	BSP KW1	BSP KW1 PAS, BSP KW3 PAS	angular: BSP KWR2, BSP KWR5, BSP KWR7, BSP KWR10, BSP KWR11, BSP KWRG T-shaped: BSP KWR1, BSP KWR8, BSP KWR9, BSP KWR12	-	BSP HDPE washer, BSP KWP1 extension (used only with BSP KW1 console)
“KWRV”	A2	BSP KW1	BSP KW1 PAS, BSP KW3 PAS	BSP KWRV50, BSP KWRV80	BSP KWZ	BSP HDPE washer, BSP KWP1 extension (used only with BSP KW1 console)
“KCS”	A3	BSP KW1	BSP KW1 PAS, BSP KW3 PAS	BSP KCL BSP KCT	BSP KC1, BSP KC2, BSP KC3, BSP KC4, BSP KC5, BSP C0, BSP C1, BSP Z1	BSP HDPE washer, BSP KWP1 extension (used only with BSP KW1 console)
“KWRW and KWRZ”	A4	-	-	BSP KWRW, BSP KWRZ	BSP KWRW, BSP KWRZ	-

Table 1, cont.

Set designation	Fig.	Products included in the set				
		Consoles	Consoles with a laminate separator	Profiles	Hooks	Complementary accessories
“KW connected with KWRW and KWRZ”	A5	BSP KW1	BSP KW1 PAS, BSP KW3 PAS	angular: BSP KWR2, BSP KWR5, BSP KWR7, BSP KWR10, BSP KWR11, BSP KWRG T-shaped: BSP KWR1, BSP KWR8, BSP KWR9, BSP KWR12	BSP KWRW, BSP KWRZ	BSP HDPE washer, BSP KWP1 extension (used only with BSP KW1 console)
“KWP2”	A6	BSP KW1	-	BSP KWR1	-	BSP KWW1 foot BSP KWP2 extension
“FtF”	A7	BSP K1, BSP K2	-	BSP KWR6	-	BSP HDPE washer, BSP KP1 extension
“FtF connected with KWRW and KWRZ”	A8	BSP K1, BSP K2		BSP KWR6 BSP KWRW, BSP KWRZ	BSP KWRW, BSP KWRZ	BSP HDPE washer, BSP KP1 extension

The descriptions of products included in the sets covered with this National Technical Evaluation are provided in Tables 2 and 3 and shown on Figures B1-B29.

Table 2

Item	Product	Material	Figure no.
1	2	3	4
Consoles			
1	BSP KW1	aluminium alloy EN AW 6060 according to PN-EN 573-3:2014, condition T6 or T66 according to PN-EN 515:2017 or aluminium alloy EN AW 6063 according to PN-EN 573-3:2014, condition T6 or T66 according to PN-EN 515:2017, with anodic coating or without, with mechanical properties according to PN-EN 755-2:2016	B1
2	BSP K1		B2
3	BSP K2		B2
Profiles			
4	BSP KWR1	aluminium alloy EN AW 6060 according to PN-EN 573-3:2014, condition T6 or T66 according to PN-EN 515:2017 or aluminium alloy EN AW 6063 according to PN-EN 573-3:2014, condition T6 or T66 according to PN-EN 515:2017, with anodic coating or without, with mechanical properties according to PN-EN 755-2:2016	B3
5	BSP KWR2		B4
6	BSP KWR5		B5
7	BSP KWR6		B6
8	BSP KWR7		B7
9	BSP KWR8		B8
10	BSP KWR9		B9
11	BSP KWR10		B10
12	BSP KWR11		B11
13	BSP KWR12		B12

Table 2, cont.

Item	Product	Material	Figure no.
1	2	3	4
14	BSP KWRV50	aluminium alloy EN AW 6060 according to PN-EN 573-3:2014, condition T6 lubT66 according to PN-EN 515:2017 or aluminium alloy EN AW 6063 according to PN-EN 573-3:2014, condition T6 or T66 according to PN-EN 515:2017, with anodic coating or without, with mechanical properties according to PN-EN 755-2:2016	B13
15	BSP KWRV80		B14
16	BSP KWRW		B15
17	BSP KWRZ		B16
18	BSP KCL		B17
19	BSP KCT		B18
20	BSP KWRG		B19
Complementary accessories			
21	BSP KWW1 foot	aluminium alloy EN AW 6060 according to PN-EN 573-3:2014, condition T66 according to PN-EN 515:2017	B20
22	BSP KWP1 extension	aluminium alloy EN AW 6060 according to PN-EN 573-3:2014, condition T6 lubT66 according to PN-EN 515:2017 or aluminium alloy EN AW 6063 according to PN-EN 573-3:2014, condition T6 or T66 according to PN-EN 515:2017, with anodic coating or without, with mechanical properties according to PN-EN 755-2:2016	B21
23	BSP KP1 extension		B22
24	BSP KWP2 stay	aluminium alloy EN AW 6060 according to PN-EN 573-3:2014, condition T66 according to PN-EN 515:2017	B23
25	BSP HDPE washer	polyethylene (HDPE) with high density (0.94 ÷ 0.97 g/cm ³)	B24
Hooks			
26	BSP KWRW	aluminium alloy EN AW 6060 according to PN-EN 573-3:2014, condition T6 or T66 according to PN-EN 515:2017 or aluminium alloy EN AW 6063 according to PN-EN 573-3:2014, condition T6 or T66 according to PN-EN 515:2017, with anodic coating or without, with mechanical properties according to PN-EN 755-2:2016	B25
27	BSP KWRZ		B26
28	BSP KWZ		B27
29	BSP KC1		B28
30	BSP KC2		
31	BSP KC3		
32	BSP KC4		
33	BSP KC5	corrosion-resistant steel, types: 1.4301, 1.4307, 1.4401 or 1.4407 according to PN-EN 10088-1:2014	B29
34	BSP C0		
35	BSP C1		
36	BSP Z1		

Table 3

Item	Product	Components	Figure no.
1	2	3	4
Consoles with a laminate separator			
1	BSP KW1 PAS	KW1 console, L1 epoxy-glass laminate separator (according to table C1), aluminium tip, Ø 4.8 mm rivets made of A2 or A4 stainless steel according to PN-EN ISO 3506-1:2009, with shear capacity of 5.5 kN and tensile strength of 5 kN according to PN EN ISO 14589:2003	B30
2	BSP KW3 PAS	KW1 console, L1 epoxy-glass laminate separator (according to table C1), aluminium tip with sockets Ø 6.5 mm, Ø 4.8 mm rivets made of A2 or A4 stainless steel according to PN-EN ISO 3506-1:2009, with shear capacity of 5.5 kN and tensile strength of 5 kN according to PN EN ISO 14589:2003	

Permissible deviations of dimensions of aluminium products meet the requirements of the PN-EN 755-9:2016 standard. Permissible deviations in dimensions of steel products are not greater than $\pm 5\%$.

The identification features of the epoxy-glass laminate used in passive consoles are given in the Annex C.

2. INTENDED USES OF THE PRODUCT

The BSP System product sets are intended for the substructure of the BSP System for fixing façade linings in industrial, public and residential buildings. The product sets of the BSP System can also be used to construct the substructure of internal walls linings.

Substructures made of sets covered by this National Technical Evaluation can be attached to external and internal walls, made of reinforced concrete, building elements and other mineral substrates, constituting a stable supporting structure for the lining.

Due to the corrosion-resistance, the sets covered by this National Technical Evaluation, which include products made of aluminium alloy EN AW 6060 according to PN-EN 573-3:2014 standard, condition T6 or T66 according to PN-EN 515:2017 standard or aluminium alloy EN AW 6063 according to PN-EN 573-3:2014 standard, condition T6 or T66 according to PN-EN 515:2017 standard (including consoles with an epoxy-glass laminate separator), or of corrosion-resistant steel, types: 1.4301, 1.4307 according to PN-EN 10088-1:2014 standard, may be used in environments with atmospheric corrosivity C1, C2 and C3 according to PN-EN ISO 9223:2012 standard.

Due to the corrosion-resistance, the sets covered by this National Technical Evaluation, which include products made of aluminium alloy EN AW 6060 according to PN-EN 573-3:2014 standard, condition T6 or T66 according to PN-EN 515:2017 standard, or aluminium alloy EN AW 6063 according to PN-EN 573-3:2014 standard, condition T6 or T66 according to PN-EN 515:2017 standard (including consoles with an epoxy-glass laminate separator), protected against corrosion with an anodic oxide coating with thickness not less than 20 μ according to PN-EN ISO 9223:2012 standard, or of corrosion-resistant steel, types: 1.4401 or 1.4407 according to PN-EN 10088-1:2014 standard, may be used in environments with atmospheric corrosivity C1, C2, C3 and C4, according to PN-EN ISO 9223:2012 standard.

The BSP KW1 BSP KW1 PAS and BSP KW3 PAS consoles should be connected with BSP KWR2, BSP KWR5, BSP KWR7, BSP KWR10, BSP KWR11, BSP KW BSP KCL, BSP KWRG, BSP KWR1, BSP KWR8, BSP KWR9, BSP KWR12, BSP KCT, BSP KWRY50 and BSP KWRY80 profiles via at least 2 \varnothing 4.8 mm screws, made of stainless steel, types A2 or A4 according to PN-EN ISO 3506-1:2009 standard.

K1 and K2 consoles should be connected with BSP KWR6 profiles via at least M8 x 30 mm screw, made of stainless steel, types A2 or A4 according to PN-EN ISO 3506-1:2009 standard.

BSP KWZ hooks should be connected with BSP KWRY50 and BSP KWRY80 profiles via 2 \varnothing 4.8 mm screws, made of stainless steel, types A2 or A4 according to PN-EN ISO 3506-1:2009 standard.

BSP KC1, BSP KC2, BSP KC3 and BSP KC4 hooks should be connected with BSP KCL and BSP KCT profiles via \varnothing 5.5 mm screw or M6 screw, made of stainless steel, types A2 or A4 according to PN-EN ISO 3506-1:2009 standard.

BSP KC5 hook should be connected with BSP KCT profile via \varnothing 5.5 mm screw or M6 screw, made of stainless steel, types A2 or A4 according to PN-EN ISO 3506-1:2009 standard.

BSP C0, BSP C1 and BSP Z1 hooks should be connected with BSP KCL and BSP KCT profiles via M6 screw, made of stainless steel, types A2 or A4 according to PN-EN ISO 3506-1:2009 standard.

The length of mechanical connectors should be chosen according to the thickness of the connected elements.

BSP KWRW and BSP KWRZ profiles connections with BSP KWR2, BSP KWR5, BSP KWR7, BSP KWR10, BSP

KWR11, BSP KWRG angular profiles and BSP KWR1, BSP KWR8, BSP KWR9, BSP KWR12 KWR6 T-shaped profiles should be performed on the basis of static calculations.

The method of attaching the console to the ground, joining the substructure elements and fixing the façade boards to the substructure are not covered by this National Technical Evaluation and should be specified in the technical design of the specific facility, depending on the existing loads and the type and condition of the ground. The corrosion resistance of the mechanical connectors should be adjusted to the corrosivity category of the environment according to the PN-EN ISO 12944-2:2001 and PN-EN ISO 9223:2012 standards.

Due to the strength properties, the BSP System product sets should be used within the range determined on the basis of static calculations, taking into account the mechanical properties specified in item 3 and in the Annex D.

Steel or aluminium products included in the sets are classified in the scope of reaction to fire, without testing, in A1 class according to the PN-EN 13501-1+A1:2010 standard, based on the decision of the European Commission: no. 96/603/EC, no. 2000/605/EC and no. 2003/424/EC and as non-flammable products, pursuant to the ordinance of the Minister of Infrastructure from 12/04/2002 regarding technical conditions, which should be met by buildings and their location (Journal of Laws from 2015, item 1422, as amended).

KW1 PAS and KW3 PAS consoles fixed directly to non-flammable surfaces (at least A2-s3 class, d0 reaction to fire according to the PN-EN 13501-1+A1:2010 standard), were classified in the B-s3 class, d0 reaction to fire according to the PN-EN 13501-1+A1:2010 standard and as non-flammable products, pursuant to the ordinance of the Minister of Infrastructure from 12/04/2002 regarding technical conditions, which should be met by buildings and their location (Journal of Laws from 2015, item 1422, as amended).

KW1 PAS and KW3 PAS consoles were classified according to the PN-B-02867:2013 standard in the extent of the fire spreading through external walls when exposed to fire from the outside, as not spreading fire - NRO.

Product sets covered by this National Technical Evaluation should be used in accordance with the technical design developed for a specific facility including:

- Polish standards and technical and construction regulations, in particular the ordinance of the Minister of Infrastructure from 12/04/2002 regarding technical conditions, which should be met by buildings and their location (Journal of Laws from 2015, item 1422, as amended),
- assembly instructions, developed by the manufacturer and delivered to recipients,
- provisions of this National Technical Evaluation.

3. PERFORMANCE CHARACTERISTICS AND METHODS APPLIED TO THEIR ASSESSMENT

Performance characteristics of sets for performing the BSP System substructure and methods are given in tables 4 and 5.

Table 4

Item	Basic characteristics	Performance characteristics	Assessment methods
1	2	3	4
1	Resistance of connections to horizontal and vertical forces	According to Annex D tables D1 ÷ D6	ETAG 034:2012 EAD 090034-00-0404:2016
2	Durability - corrosion resistance	According to point 2 and table 5	
3	Classification in terms of reaction to fire of products made of steel and aluminium	A1	Decisions of the European Commission: 96/603/EC, 2000/605/EC and 2003/424/EC
4	Fire classification of BSP KW1 PAS and BSP KW3 PAS consoles in terms of reaction	B-s3, d0 ¹⁾	PN-EN 13501-1+A1:2010
5	Fire classification of BSP KW1 PAS and BSP KW3 PAS consoles in terms of fire propagation through external walls when exposed to fire from the outside	not spreading fire (NRO)	PN-B-02867:2013
¹⁾ classification refers to consoles fixed directly to non-flammable surfaces (at least A2-s3 class, d0 reaction to fire according to the PN-EN 13501 -1+A1:2010 standard)			

Table 5

Item	Basic characteristics	Performance characteristics	Assessment methods
1	2	3	4
1	Thickness, pm	≥ 20	PN-EN ISO 2808:2008 method 7D
2	Degree of seal of the coating	admiration value less than 20 μS	PN-EN ISO 2931:2010
3	Weight loss of anodic oxide coating, mg/dm ³	≤ 30	PN-EN ISO 3210:2010 method 2
4	Resistance to acidic salt spray after 1,500 hours, defined by the area of corrosion pits, %	≤ 0.02	PN-EN ISO 8993:2010 temp.+ 35°C
¹⁾ Where anodic oxide coatings on aluminium profiles are made by the manufacturers with the QUALANOD quality label, these coatings should meet the QUALANOD Technical Quality Requirements			

4. PACKAGING, TRANSPORT AND STORAGE, AND THE METHOD OF MARKING THE PRODUCT

The products included in the sets covered by this National Technical Assessment should be delivered in the original packaging of the manufacturer and stored and transported in a way that ensures that their technical properties remain unchanged.

The method of marking products with a construction mark should be in accordance with the ordinance of the Minister of Infrastructure and Construction from 17/11/2016 on the manner of declaring the performance characteristics of construction products and the method of marking them with a construction mark (Journal of Laws from 2016, item 1966, as amended).

The product marking with the construction mark should be accompanied by the following information:

- the last two digits of the year in which the construction mark was placed for the first time on a construction product,
- name and address of the manufacturer's registered office or identification mark allowing to clearly identify the name and address of the registered office of the manufacturer,
- name and type designation of the construction product,
- number and year of issue of the national technical evaluation, according to which the performance has been declared (ITB-KOT-2018/0434 issue 1),
- number of the national declaration of performance characteristics,
- level or class of declared performance characteristics,
- name of the certification body that participated in the assessment and verification of constancy of performance characteristics of the construction product,
- manufacturer's website address if the national declaration of performance is made available on it.

Along with the national declaration of performance characteristics, a safety data sheet and/or information on hazardous substances contained in the construction product, referred to in art. 31 or 33 of the European Parliament and the Council ordinance (EC) no. 1907/2006 on the Registration, Evaluation, Authorisation and Restriction of Chemicals (REACH) and the creation of a European Chemicals Agency.

In addition, the marking of a construction product constituting a hazardous mixture according to the REACH Regulation should comply with the requirements of the European Parliament and the Council ordinance (EC) no. 1272/2008 on classification, labelling and packaging of substances and mixtures (CLP), amending and repealing the directive 67/548/EEC and 1999/45/WE and amending the ordinance (EC) no. 1907/2006.

5. EVALUATION AND VERIFICATION OF STABILITY OF PERFORMANCE CHARACTERISTICS

5.1. National system of assessment and verification of constancy of performance

In accordance with the ordinance of the Minister of Infrastructure and Construction of 17/11/2016 on the manner of declaring the performance of construction products and the method of marking them with a construction mark (Journal of Laws from 2016, item 1966, as amended) the system 2+ is used to assess and verify the constancy of performance.

5.2. Type examination

The performance characteristics, evaluated in item 3, constitute the type examination of the product, until changes of raw materials, ingredients, production line or production plant occur.

5.3. Factory production control

The manufacturer should have implemented a system of factory production control in the production plant. All the elements of the system, requirements and provisions adopted by the manufacturer should be documented in a systematic manner in the form of rules and procedures, including records from conducted research. The factory production control should be adapted to the production technology and ensure the serial production of the declared performance characteristics of the product.

The factory production control includes the specification and checking of raw materials and components, control and testing in the manufacturing process and control tests (according to point 5.4), carried out by the manufacturer in accordance with the established test plan and according to the rules and procedures set out in the factory production control documentation.

The results of production control should be systematically recorded. The records should confirm that the products meet the criteria for assessment and verification of constancy of performance characteristics. Individual products or batches of products and related production details must be fully identifiable and reproducible.

5.4. Control examinations

5.4.1. Examination programme. The examination programme includes:

- a) current tests,
- b) periodic tests.

5.4.2. Current tests. The current tests include checking:

- a) shape and dimension of included in the set,
- b) density of the epoxy-glass laminate.

5.4.3. Periodic tests. The periodic tests include checking:

- a) resistance of consoles connections with a laminate separator with profiles for vertical and horizontal force of a console with a laminate separator with a profile (one connection type),
- b) resistance of hook connections with profiles to vertical and horizontal force (one type of connection),
- c) dimensional stability after 24 hours in temp. -20°C and $+70^{\circ}\text{C}$ – in the case of epoxy-glass laminate,
- d) bending strength - in the case of epoxy-glass laminate,
- e) bending elasticity module - in the case of epoxy-glass laminate,
- f) tensile strength - in the case of epoxy-glass laminate,
- g) tension elasticity module - in the case of epoxy-glass laminate,
- h) Charpy impact strength - in the case of epoxy glass laminate.

5.5. Frequency of examinations

Testing of finished products should be carried out in accordance with the established test plan, but not less frequently than for each batch of products. The size of a batch of products should be specified in the documentation of the factory production control.

Periodic tests should be carried out at least once every 3 years.

6. NOTICE

6.1. National Technical Evaluation ITB-KOT-2018/0434 issue 1 is a positive evaluation of the performance of these essential characteristics of products sets for the substructure of the BSP System, which, according to the intended use, resulting from the provisions of this Evaluation, have an impact on meeting the basic requirements by construction objects in which the product will be used.

6.2. National Technical Evaluation ITB-KOT-2018/0434 issue 1 is not a document authorising the marking of a construction product with a construction mark.

In accordance with the Construction Products Act from 16/04/2004 (Journal of Laws from 2016, item 1570, as amended) the sets concerned by this National Technical Evaluation may be placed on the market or made available on the domestic market if the manufacturer has assessed and verified the constancy of performance characteristics, drew up a national declaration of performance in accordance with the National Technical Evaluation ITB-KOT-2018/0434 issue 1 and labelled products with a construction mark, in accordance with the applicable regulations.

6.3. National Technical Evaluation ITB-KOT-2018/0434 issue 1 does not violate the rights resulting from the regulations on the protection of industrial property, in particular the Act of 30/06/2000 - Industrial Property Law (unified text: Journal of Laws from 2017, item 776, as amended). Providing these rights is one of the obligations of the beneficiaries of this National Technical Evaluation of the ITB.

6.4. ITB, issuing the National Technical Evaluation, is not responsible for any infringement of exclusive and acquired rights.

6.5. National Technical Evaluation does not exempt the manufacturer of the products from the responsibility for their correct quality, and the contractors of construction works from the responsibility for their proper application.

6.6. The validity of the National Technical Evaluation may be extended for subsequent periods, not longer than 5 years.

7. LIST OF DOCUMENTS USED IN THE PROCEEDINGS

7.1. Reports, test reports, assessments, classifications

- 1) 02955/16/Z00NZE. Technical Evaluation and testing of a set of products for the aluminium substructure of BSP System for fixing ventilated façade linings for the purposes of issuing the National Technical Evaluation. Department of Building Components Engineering ITB.
- 2) LZE02-02955/16/Z00NZE. Report on testing of a set of products for the aluminium substructure of BSP System for fixing ventilated façade linings for the purposes of issuing the National Technical Evaluation. Department of Building Components Engineering ITB.
- 3) LZM00-02965/16/Z00NZE. Report on testing of BSP L1 thermal separator. Department of Building Components Engineering ITB.
- 4) LZM00-01522/17/Z00NZE. Report on testing the BSP KW PAS console. Department of Building Components Engineering ITB.
- 5) 01522/17/Z00NZE. Technical opinion regarding the corrosion resistance of the BSP KW PAS passive console with epoxy-glass laminate for the performance of ventilated façade linings in environments with corrosivity categories C1, C2 and C3 according to PN-EN ISO 9222:2012 standard. Department of Building Components Engineering ITB.
- 6) 3037.2/16/Z00NZE. Classification report for KW1 PAS, KW2 PAS and KW3 PAS passive consoles. Department of Fire Research ITB.
- 7) 3037.1/16/Z00NZE. Fire classification in the scope of fire propagation through walls in case of fire from the outside of KW1 PAS, KW2 PAS and KW3 PAS passive consoles. Department of Fire Research ITB.
- 8) 3037.3/16/Z00NZE. Evaluation of KW1 PAS, KW2 PAS and KW3 PAS passive consoles in meeting the criteria of the NRO class according to PN-B-02867:2013-06 standard. Department of Fire Research ITB.

7.2. Standards and related documents

PN-EN ISO 62:2008	<i>Plastics. Determination of water absorption</i>
PN EN ISO 178:2011	<i>Plastics. Determination of bending properties</i>
PN-EN ISO 179:2010	<i>Plastics. Determination of Charpy impact strength. Part 1: Non-instrumental impact test</i>
PN-EN ISO 527-1:2012	<i>Plastics. Determination of mechanical properties at static stretching. Part 1: General principles</i>
PN-EN ISO 1172:2002	<i>Plastics reinforced with fibreglass. Pre-impregnates, mouldings and laminates. Determination of fibreglass content and mineral filler. Calcination methods</i>
PN-EN ISO 3506-1:2009	<i>Mechanical properties of corrosion-resistant stainless steel fasteners. Part 1: Bolts and stud bolts</i>
PN-EN ISO 9223:2012	<i>Corrosion of metals and alloys. Corrosiveness of the atmosphere. Classification, determination and evaluation</i>

- PN-EN ISO 1183-1:2013 *Plastics. Methods for determining the density of non-porous plastics. Part 1: Immersion method, liquid pycnometer method and titrimetric method*
- PN-EN ISO 9223:2012 *Corrosion of metals and alloys. Corrosiveness of the atmosphere. Classification, determination and evaluation*
- PN-EN ISO 10211:2008 *Thermal bridges in buildings. Streams of heat and surface temperatures. Detailed calculations*
- PN-EN ISO 12944-2:200 *Paints and varnishes. Corrosion protection of steel structures by means of protective paint systems. Part 2: Classification of environments*
- PN EN ISO 14589:2003 *Blind rivets. Mechanical tests*
- PN-EN 515:2017 *Aluminium and aluminium alloys. Plastically processed products. State markings*
- PN-EN 573-3:2014 *Aluminium and aluminium alloys. Chemical composition and types of plastically processed products. Part 3: Chemical composition and types of products*
- PN-EN 755-2:2016 *Aluminium and aluminium alloys. Rods, pipes and extruded profiles. Part 2: Mechanical properties*
- PN-EN 10088-1:2014 *Steels resistant to corrosion. Part 1: List of corrosion-resistant steels*
- PN-EN 13501-1+A1:2010 *Fire classification of construction products and building elements. Part 1: Classification based on the results of the reaction to fire tests*
- PN-B-02867:2013 *Fire protection of buildings. Method for testing the degree of fire spreading through external walls from the outside and classification principles*
- Guidelines for European Technical Approvals - sets for making external*
- ETAG 034:2012 *wall linings*
- EAD 090034-00-0404:2016 *Set consisting of an auxiliary frame and connectors for attaching elements of wall linings and external façade elements*

ANNEXES

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Annex A.

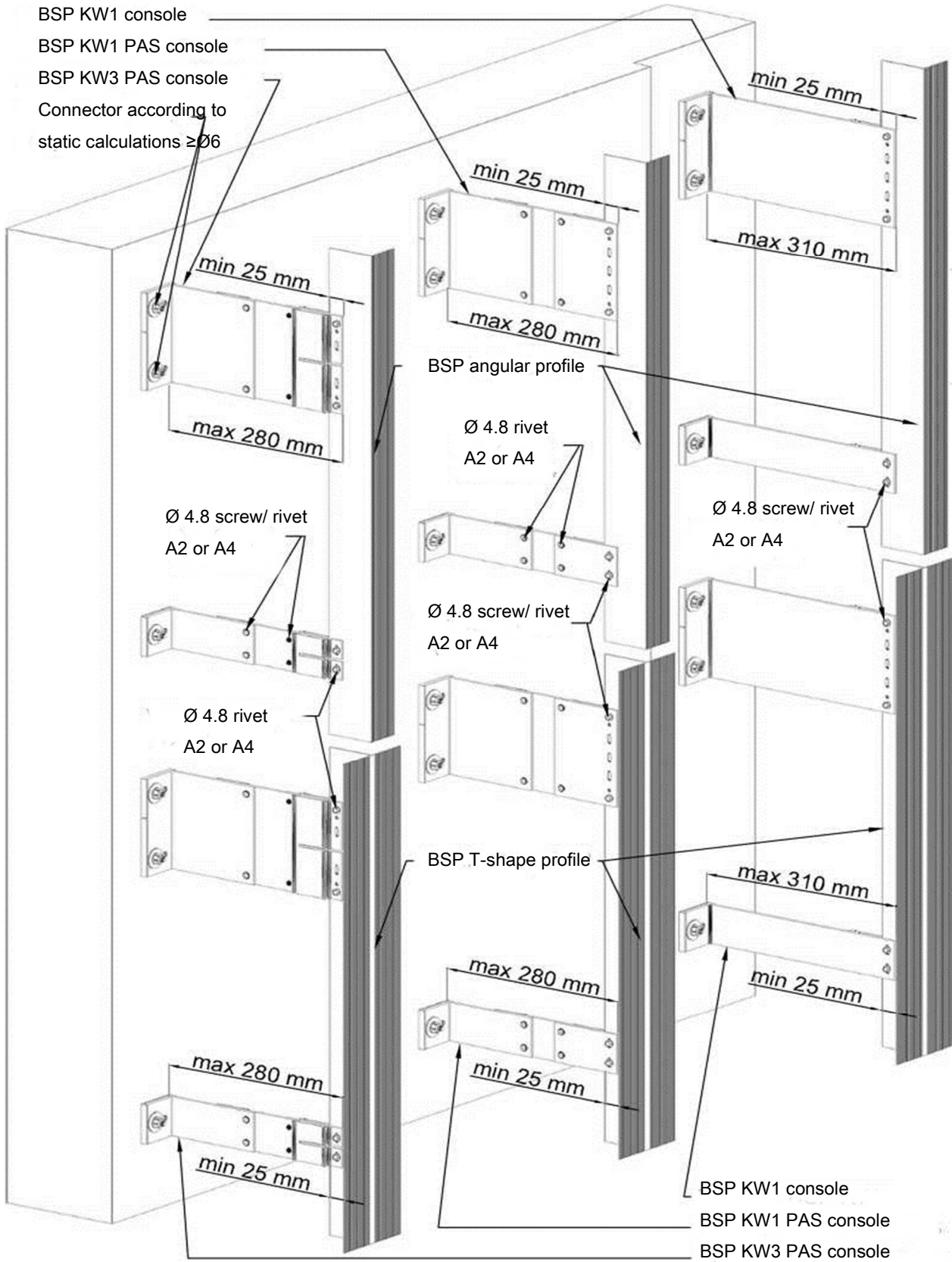


Fig. A1. "KW" set

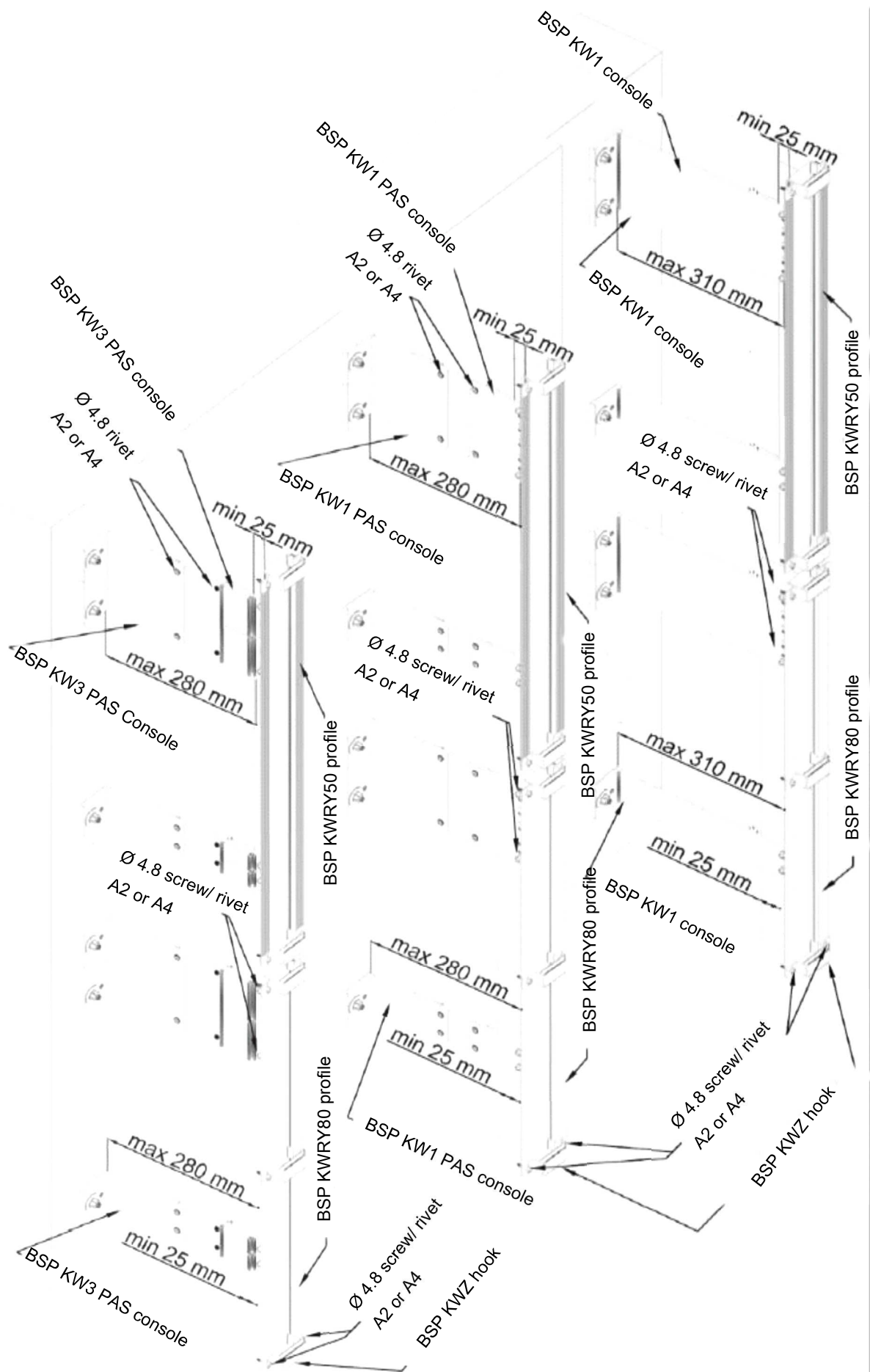


Fig. A2. "KWRV" set

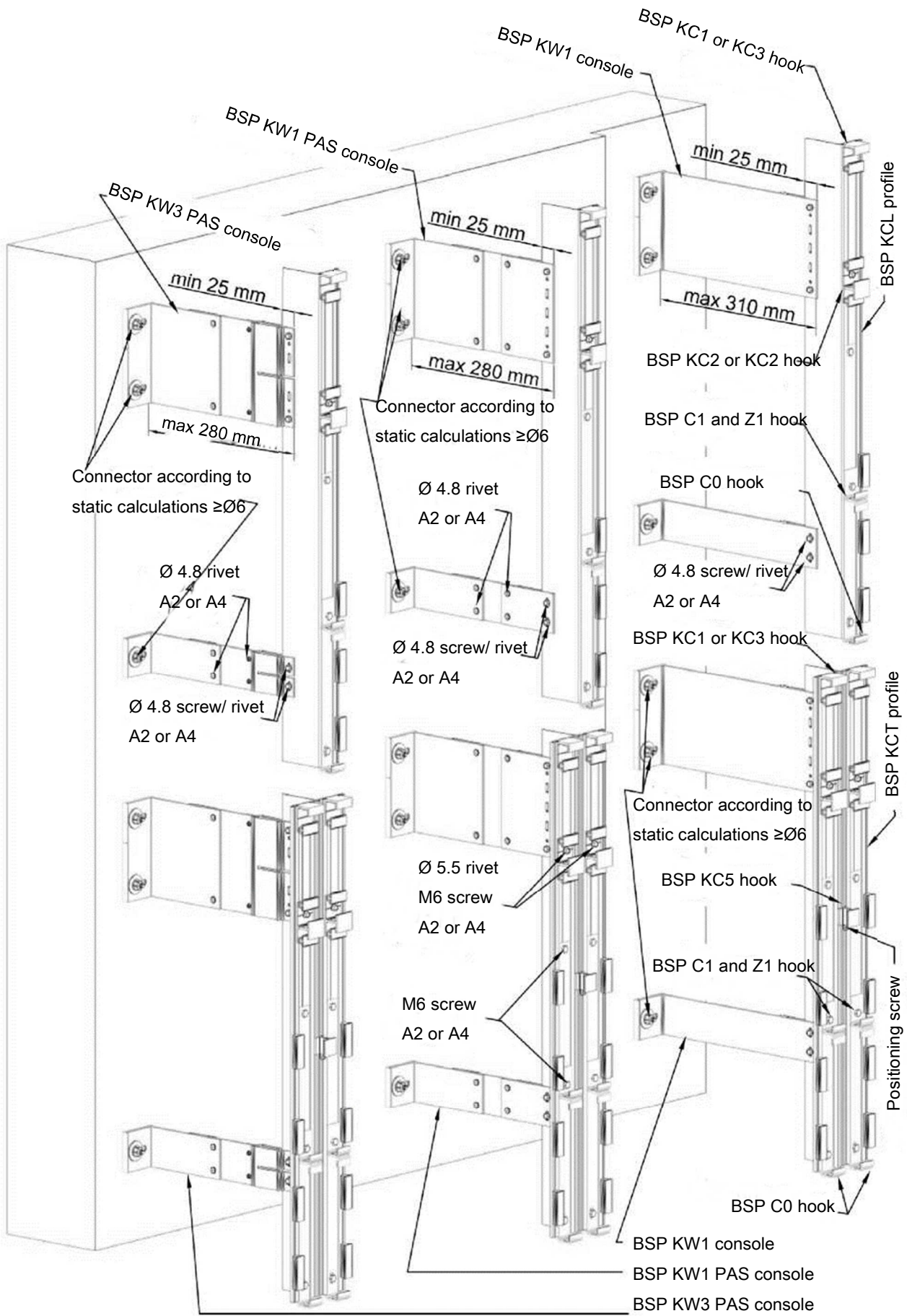


Fig. A3. "KCS" set

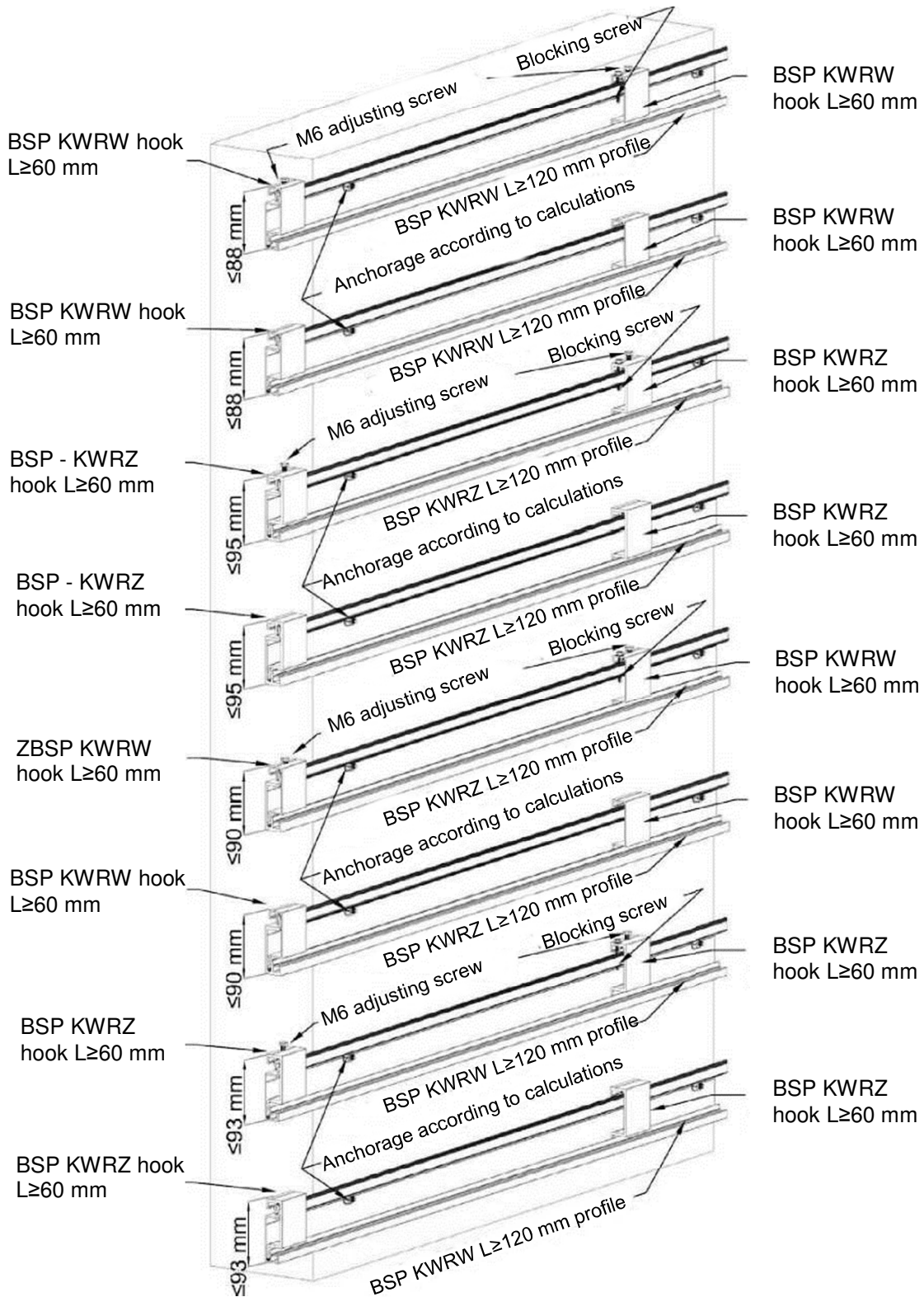


Fig. A4. "KWRW and KWRZ" set

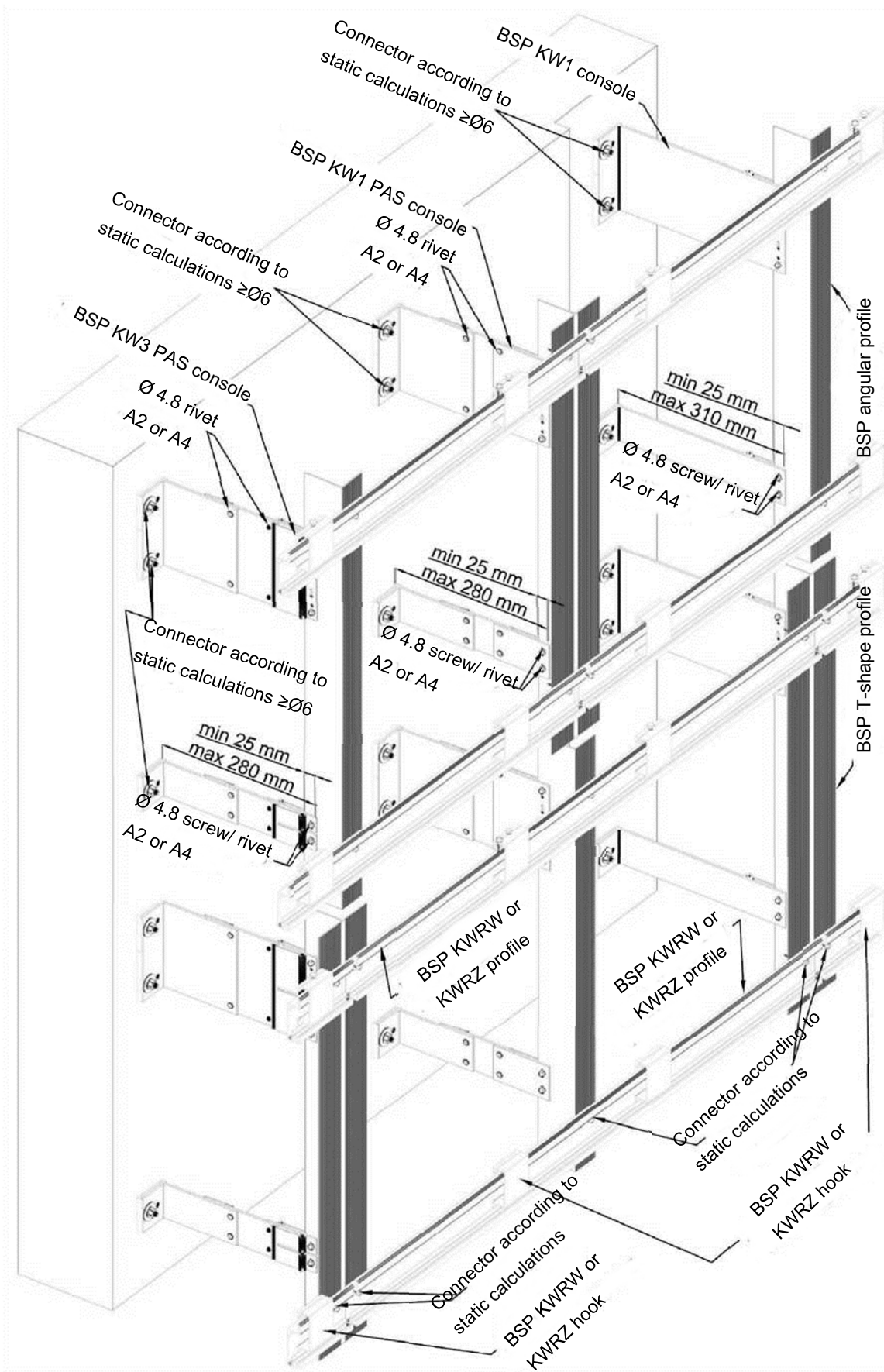


Fig. A5. „KW connected with KWRW and KWRZ” set

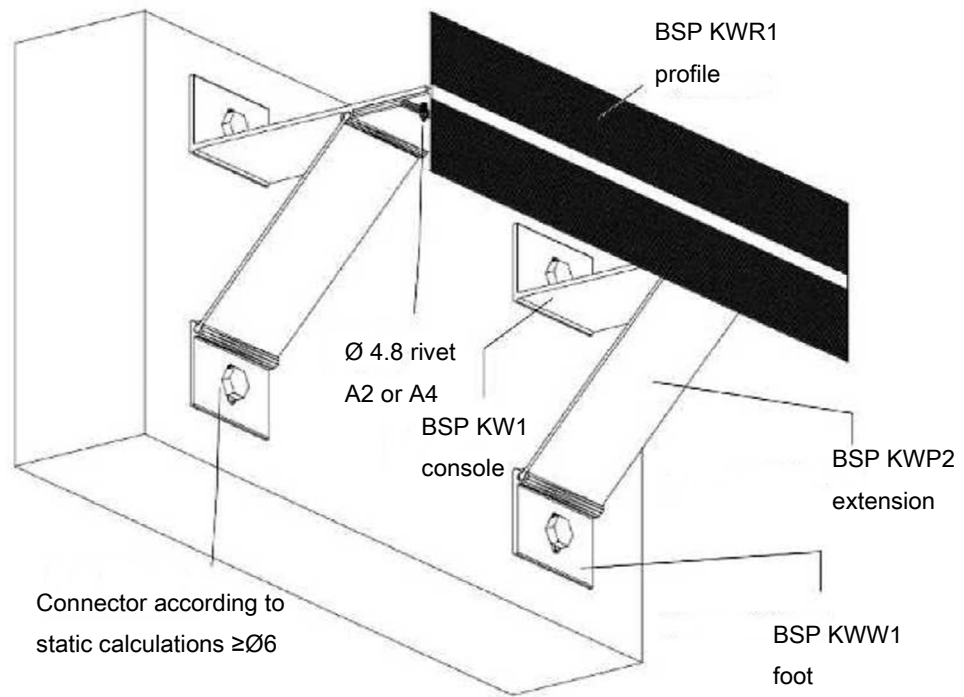


Fig. A6. "KWP2" set

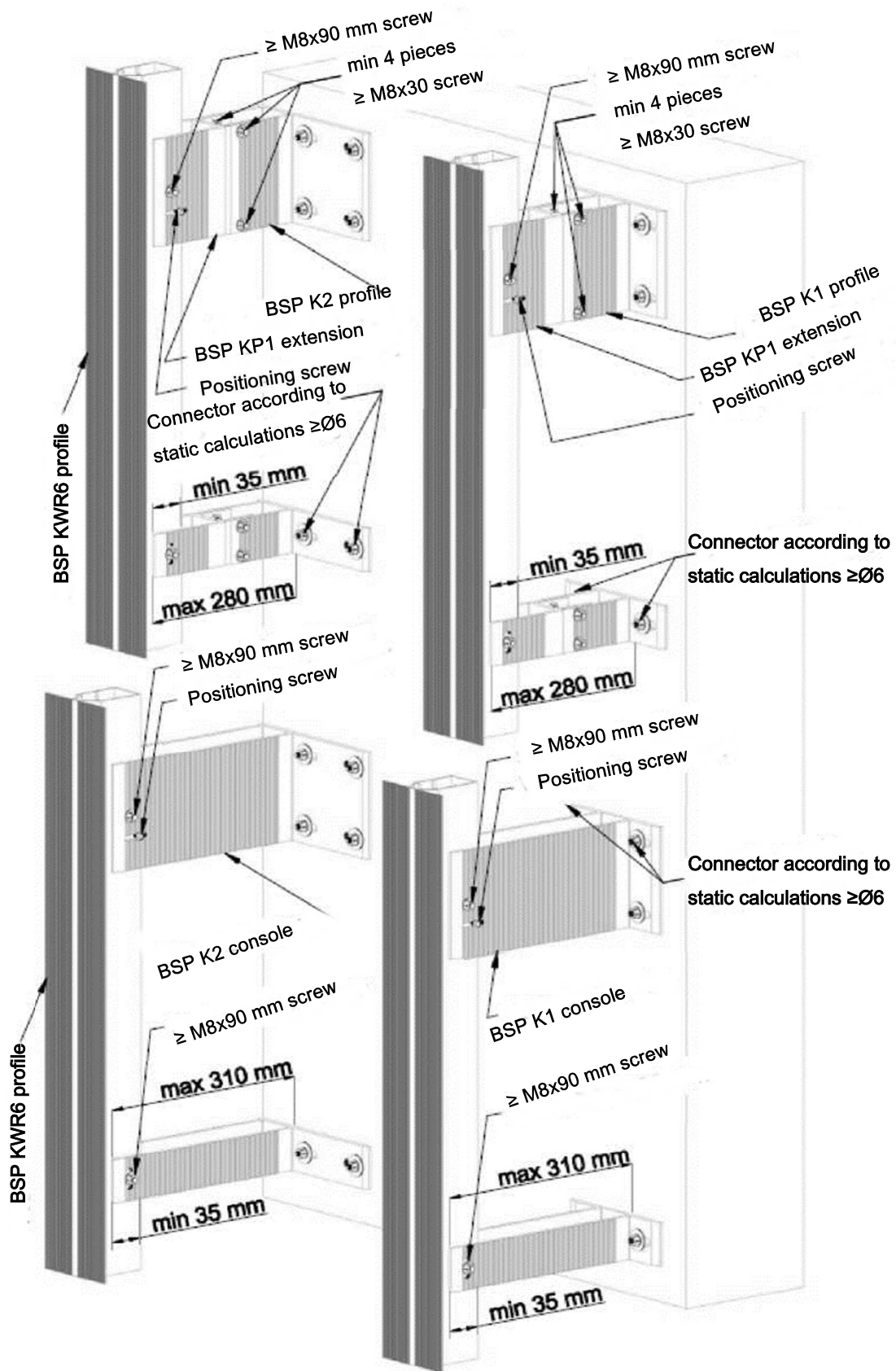


Fig. A7. "FtF" set

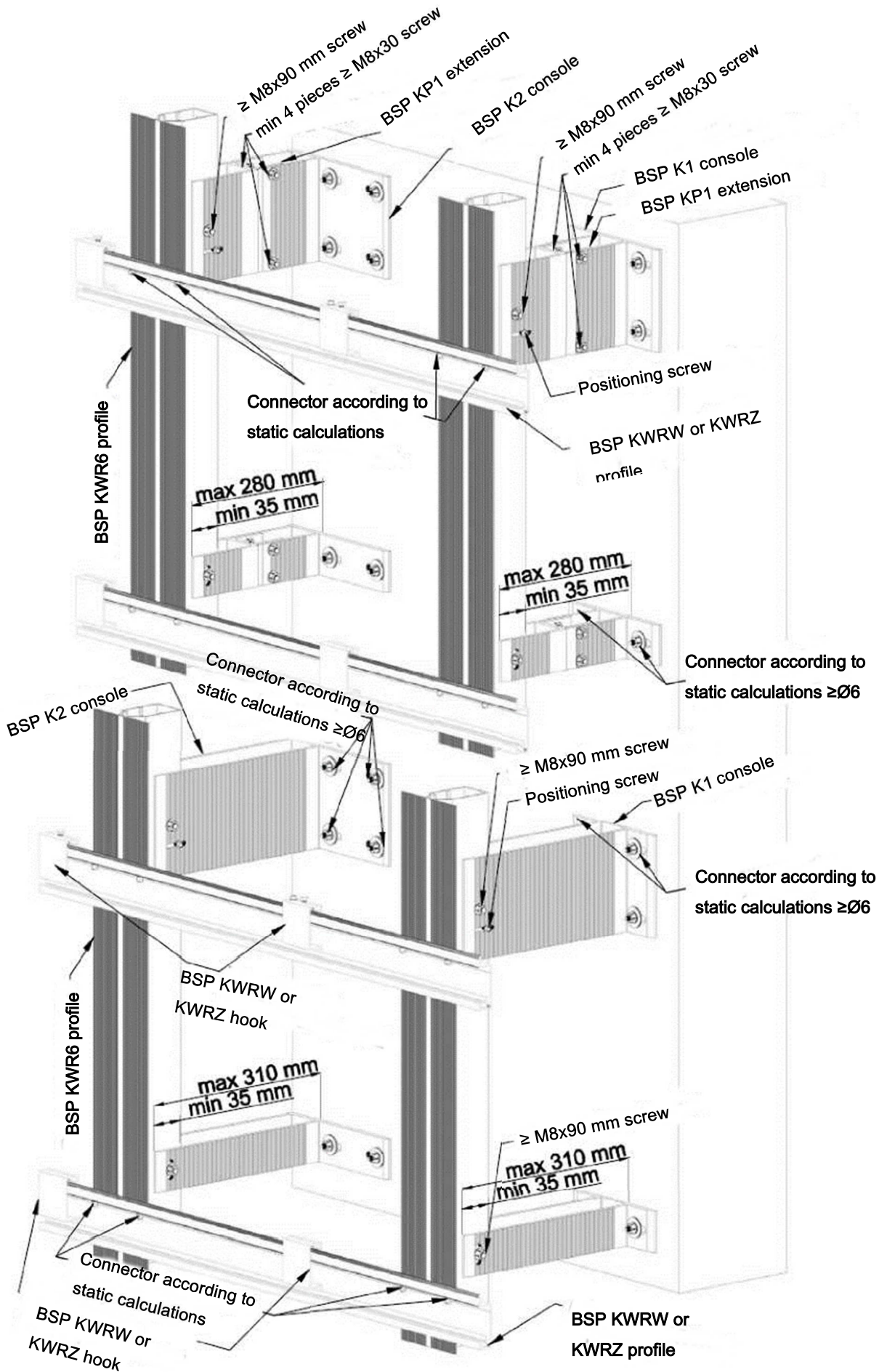
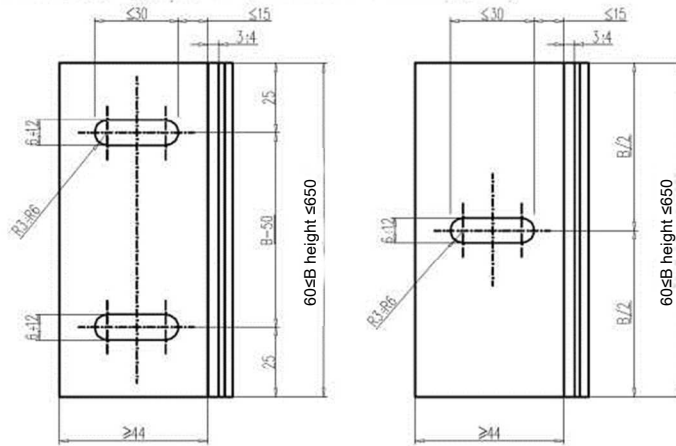
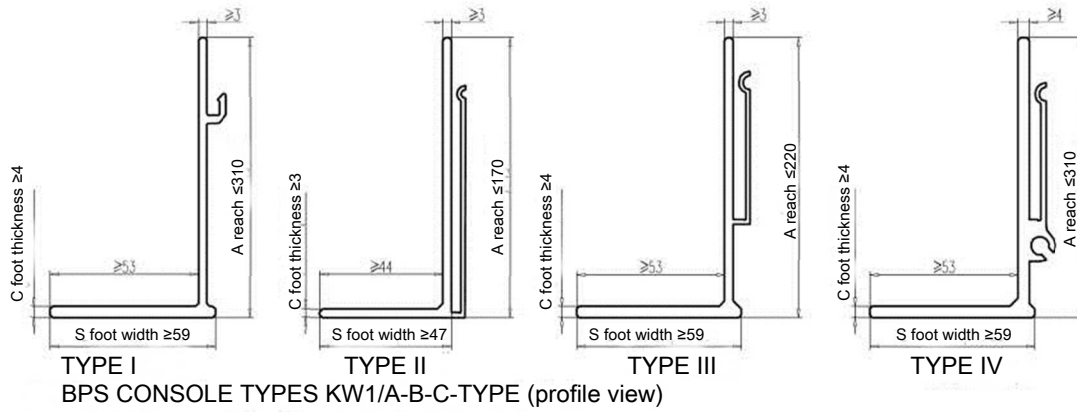
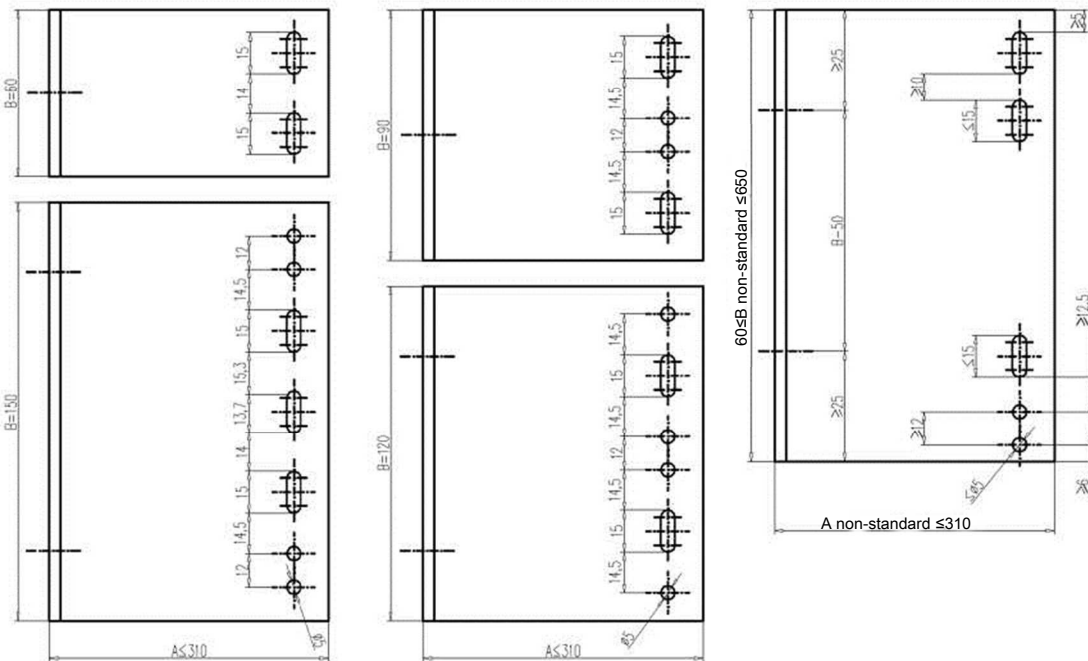


Fig. A8. "FtF connected with KWRW and KWRZ" set

Annex B.



BPS CONSOLE KW1/A-B-C-TYPE (foot view)



BPS CONSOLE KW1/A-B-C-TYPE ("reach" arm view)

Figure B1. BPS KW1 console (dimensions in mm)

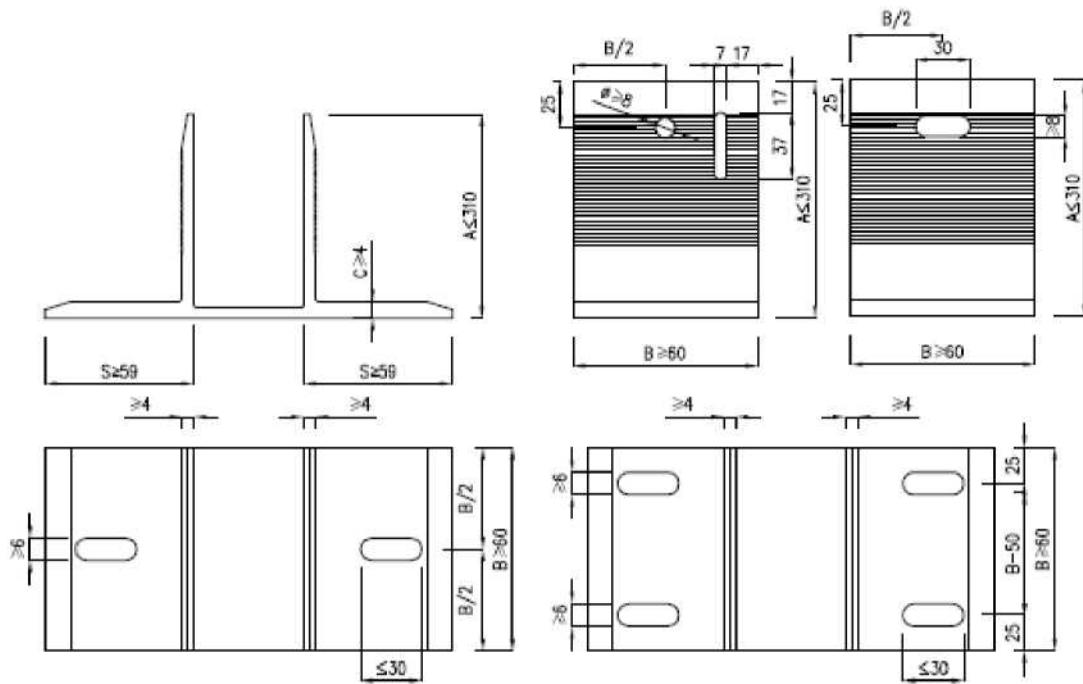
Table B1. Assortment of standard BSP KW1 consoles*

Console	Reach A, mm	Height B, mm	Foot thickness C, mm	Foot width S, mm
KW1 170-150	170	150	3	47
KW1 170-120		120	3	47
KW1 170-90		90	3	47
KW1 170-60		60	3	47
KW1 220-150	220	150	4	59
KW1 220-120		120	4	59
KW1 220-90		90	4	59
KW1 220-60		60	4	59
KW1 260-150	260	150	4	59
KW1 260-120		120	4	59
KW1 260-90		90	4	59
KW1 260-60		60	4	59
KW1 280-150	280	150	4	59
KW1 280-120		120	4	59
KW1 280-90		90	4	59
KW1 280-60		60	4	59
KW1 310-150	310	150	4	59
KW1 310-120		120	4	59
KW1 310-90		90	4	59
KW1 310-60		60	4	59

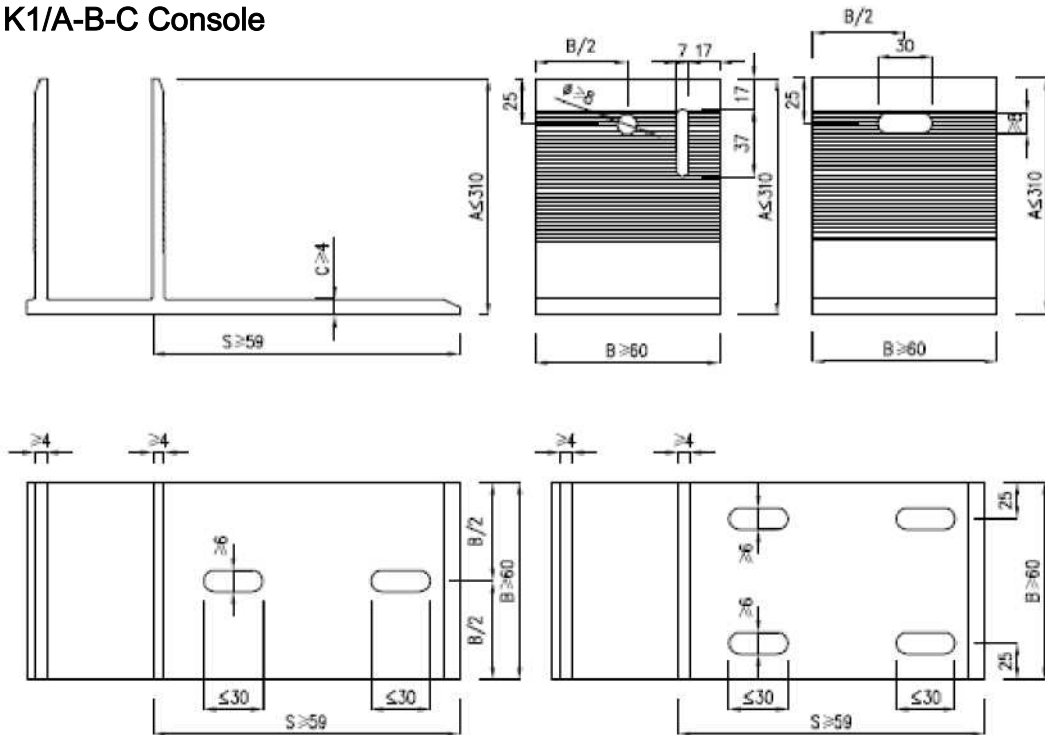
*) BSP KW1 consoles with other dimensions may also be manufactured, after agreement between the producer and the recipient, in accordance with Table B2 and meeting the required geometric parameters specified in tables D1 and D2.

Table B2. Assortment of BSP KW1 consoles - dimensions

Assortment of BSP KW1 consoles				
Reach A, mm	Height B, mm	Foot thickness C, mm	Foot width S, mm	Console type
$A \leq 310$	$60 \leq B \leq 650$	$C \geq 4$	$S \geq 59$	I
$A \leq 170$	$60 \leq B \leq 650$	$C \geq 3$	$S \geq 47$	II
$A \leq 220$	$60 \leq B \leq 650$	$C \geq 4$	$S \geq 59$	III
$A \leq 310$	$60 \leq B \leq 650$	$C \geq 4$	$S \geq 59$	IV



K1/A-B-C Console



K2/A-B-C Console

Figure B2. BSP K1 and BSP K2 consoles
(dimensions in mm)

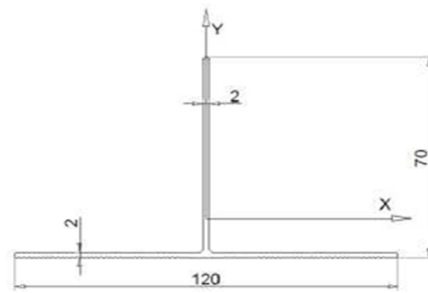
Table B3. Assortment of standard BSP K1 and BSP K2 consoles

Console	Reach A, mm	Height B, mm	Foot thickness, mm	Foot width, mm
K1 170-150 K2 170-150	170	150	3	47
K1 170-120 K2 170-120		120	3	47
K1 170-90 K2 170-90		90	3	47
K1 170-60 K2 170-60		60	3	47
K1 220-150 K2 220-150	220	150	4	59
K1 220-120 K2 220-120		120	4	59
K1 220-90 K2 220-90		90	4	59
K1 220-60 K2 220-60		60	4	59
K1 260-150 K2 260-150	260	150	4	59
K1 260-120 K2 260-120		120	4	59
K1 260-90 K2 260-90		90	4	59
K1 260-60 K2 260-60		60	4	59
K1 280-150 K2 280-150	280	150	4	59
K1 280-120 K2 280-120		120	4	59
K1 280-90 K2 280-90		90	4	59
K1 280-60 K2 280-60		60	4	59
K1 310-150 K2 310-150	310	150	4	59
K1 310-120 K2 310-120		120	4	59
K1 310-90 K2 310-90		90	4	59
K1 310-60 K2 310-60		60	4	59

*) BSP K1 and BSP K2 consoles with other dimensions may also be manufactured, after agreement between the producer and the recipient, in accordance with Table B4 and meeting the required geometric parameters specified in tables D1 and D2.

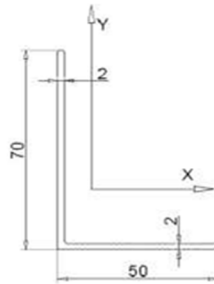
Table B4. Assortment of BSP K1 and BSP K2 consoles - dimensions

Reach A, mm	Height B, mm	Foot thickness C, mm	Foot width S, mm	Console type
$A \leq 310$	$60 \leq B$	$C \geq 4$	$S \geq 59$	K1
$A \leq 310$	$60 \leq B$	$C \geq 4$	$S \geq 59$	K2



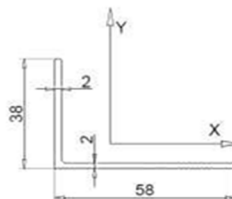
KWR1 PROFILE					
J_x	15,581	cm ⁴	J_y	27,096	cm ⁴
W_x	2,785	cm ³	W_y	4,516	cm ³
A	3,642	cm ²	Mass	0,983	kg/m

Figure B3. KWR1 PROFILE
(dimensions in mm)



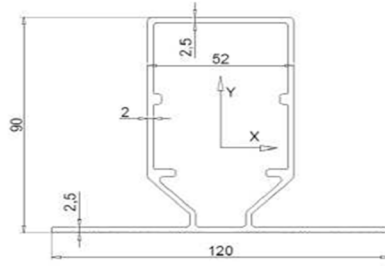
KWR2 PROFILE					
J_x	12,001	cm ⁴	J_y	5,154	cm ⁴
W_x	2,480	cm ³	W_y	1,315	cm ³
A	2,305	cm ²	Mass	0,622	kg/m

Figure B4. KWR2 PROFILE
(dimensions in mm)



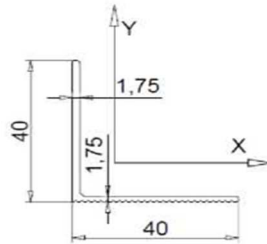
KWR5 PROFILE					
J_x	2,305	cm ⁴	J_y	6,466	cm ⁴
W_x	0,785	cm ³	W_y	1,610	cm ³
A	1,794	cm ²	Mass	0,484	kg/m

Figure B5. KWR5 PROFILE
(dimensions in mm)



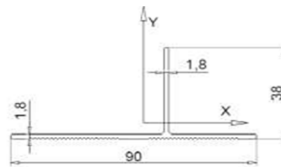
KWR6 PROFILE					
J_x	95,865	cm ⁴	J_y	58,829	cm ⁴
W_x	17,541	cm ³	W_y	9,805	cm ³
A	8,536	cm ²	Mass	2,305	kg/m

Figure B6. KWR6 PROFILE
(dimensions in mm)



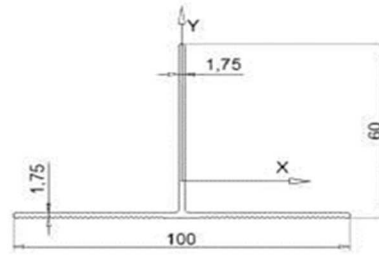
KWR7 PROFILE					
J_x	2,091	cm ⁴	J_y	2,027	cm ⁴
W_x	0,724	cm ³	W_y	0,679	cm ³
A	1,303	cm ²	Mass	0,352	kg/m

Figure B7. KWR7 PROFILE
(dimensions in mm)



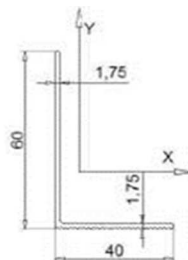
KWR8 PROFILE					
J_x	2,325	cm ⁴	J_y	10,871	cm ⁴
W_x	0,741	cm ³	W_y	2,234	cm ³
A	2,163	cm ²	Mass	0,584	kg/m

Figure B8. KWR8 PROFILE
(dimensions in mm)



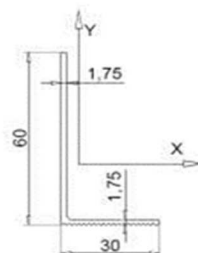
KWR9 PROFILE					
J_x	8,419	cm ⁴	J_y	13,166	cm ⁴
W_x	1,773	cm ³	W_y	2,633	cm ³
A	2,626	cm ²	Mass	0,709	kg/m

Figure B9. KWR9 PROFILE
(dimensions in mm)



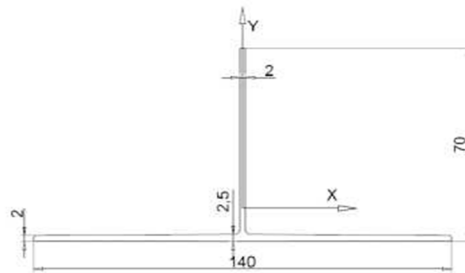
KWR10 PROFILE					
J_x	6,349	cm ⁴	J_y	2,264	cm ⁴
W_x	1,560	cm ³	W_y	0,711	cm ³
A	1,653	cm ²	Mass	0,446	kg/m

Figure B10. KWR10 PROFILE
(dimensions in mm)



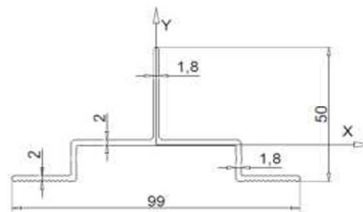
KWR11 PROFILE					
J_x	5,763	cm ⁴	J_y	1,002	cm ⁴
W_x	1,487	cm ³	W_y	0,406	cm ³
A	1,496	cm ²	Mass	0,404	kg/m

Figure B11. KWR11 PROFILE
(dimensions in mm)



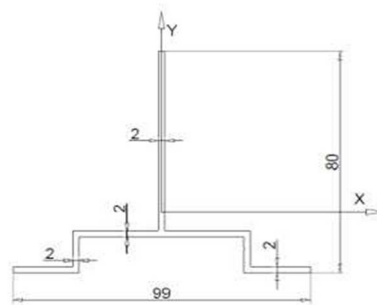
KWR12 PROFILE					
J_x	16,554	cm ⁴	J_y	45,957	cm ⁴
W_x	2,851	cm ³	W_y	6,565	cm ³
A	4,390	cm ²	Mass	1,185	kg/m

Figure B12. KWR12 PROFILE
(dimensions in mm)



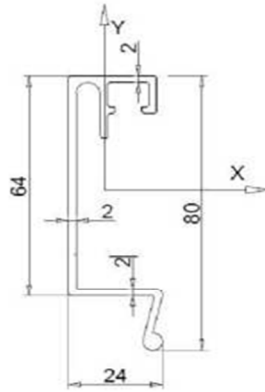
KWR50 PROFILE					
J_x	4,340	cm ⁴	J_y	18,967	cm ⁴
W_x	1,195	cm ³	W_y	3,832	cm ³
A	3,021	cm ²	Mass	0,816	kg/m

Figure B13. KWR50 PROFILE
(dimensions in mm)



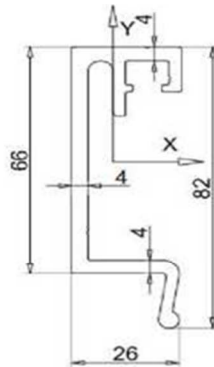
KWR80 PROFILE					
J_x	18,639	cm ⁴	J_y	20,392	cm ⁴
W_x	3,197	cm ³	W_y	4,120	cm ³
A	3,800	cm ²	Mass	1,026	kg/m

Figure B14. KWR80 PROFILE
(dimensions in mm)



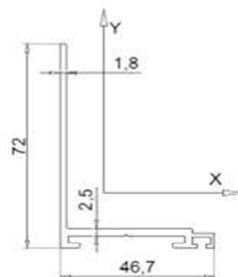
KWRW PROFILE					
J_x	23,223	cm ⁴	J_y	2,251	cm ⁴
W_x	4,971	cm ³	W_y	1,521	cm ³
A	3,154	cm ²	Mass	0,851	kg/m

Figure B15. KWRW PROFILE
(dimensions in mm)



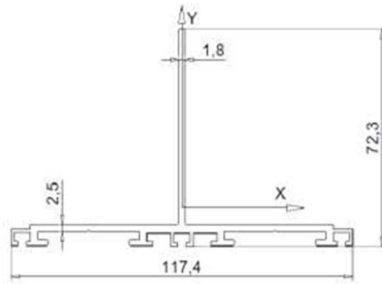
KWRZ PROFILE					
J_x	40,281	cm ⁴	J_y	4,538	cm ⁴
W_x	8,269	cm ³	W_y	2,752	cm ³
A	5,778	cm ²	Mass	1,560	kg/m

Figure B16. KWRZ PROFILE
(dimensions in mm)



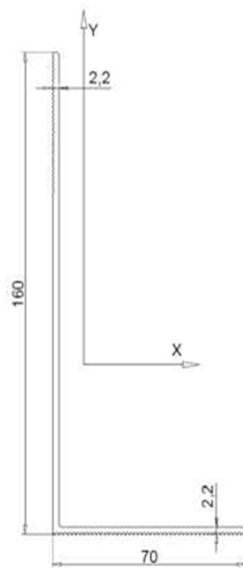
KCL PROFILE					
J_x	12,278	cm ⁴	J_y	6,465	cm ⁴
W_x	2,347	cm ³	W_y	1,929	cm ³
A	2,697	cm ²	Mass	0,728	kg/m

Figure B17. KCL PROFILE
(dimensions in mm)



KCT PROFILE					
J_x	15,309	cm ⁴	J_y	43,667	cm ⁴
W_x	2,573	cm ³	W_y	7,439	cm ³
A	5,134	cm ²	Mass	1,386	kg/m

Figure B18. KCT PROFILE
(dimensions in mm)



KWRG PROFILE					
J_x	131,387	cm ⁴	J_y	17,280	cm ⁴
W_x	12,695	cm ³	W_y	2,934	cm ³
A	4,819	cm ²	Mass	1,301	kg/m

Figure B19. KWRG PROFILE
(dimensions in mm)

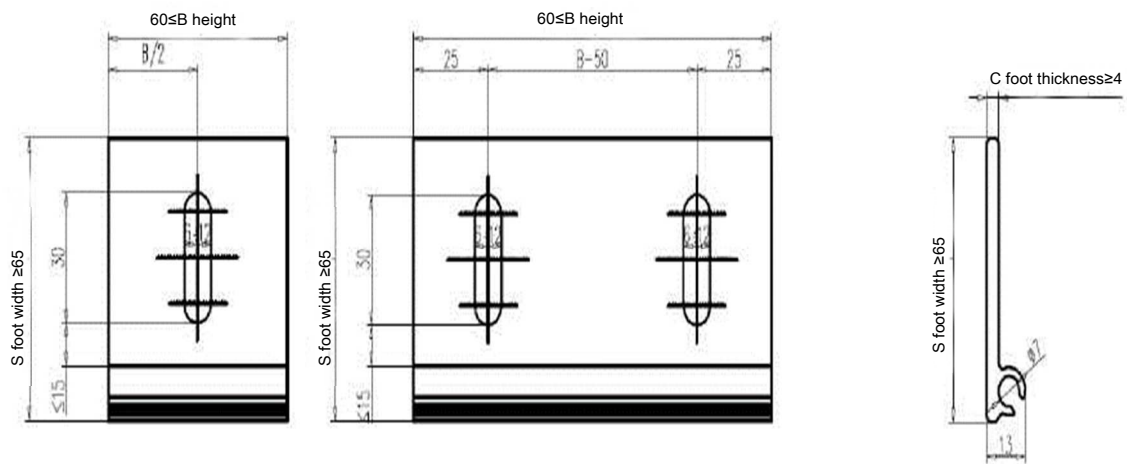


Figure B20. BSP KWW1 foot
(dimensions in mm)

Table B5. Assortment of standard BSP KWW1* feet

Designation	Foot width S, mm	Height B, mm
KWW1/135-60	65	60
KWW1/135-90	65	90
KWW1/135-120	65	120
KWW1/135-150	65	150
*) BSP KWW1 feet with other dimensions can also be produced, after an agreement between the manufacturers and the recipient, in accordance with Table B6.		

Table B6. Assortment of BSP KWW1 feet - dimensions

Height B, mm	Foot thickness C, mm	Foot width S, mm	Socket diameter, mm
$60 \leq B$	$C \geq 4$	$S \geq 65$	7

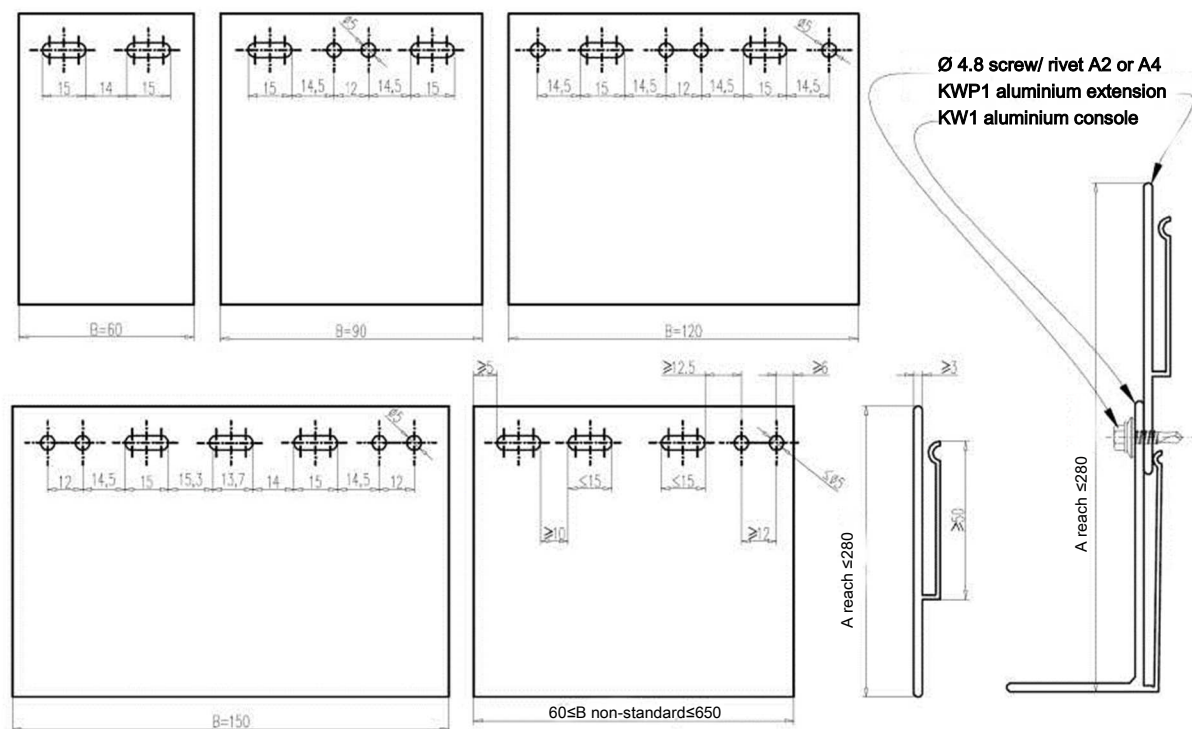


Figure B21. BSP KWP1 extension (dimensions in mm)

Table B7. Assortment of standard BSP KWP1 extensions^{*)}

Designation	Dimension A, mm	Dimension B, mm
KWP1/135-60	135	60
KWP1/135-90	135	90
KWP1/135-120	135	120
KWP1/135-150	135	150

* BSP KWP1 extensions of other dimensions may also be produced, after an agreement between the manufacturer and the recipient, in accordance with Table B8 and meeting the requirements regarding the geometrical parameters specified in tables D1 and D2.

Table B8. Assortment of BSP KWP1 extensions

Reach A, mm	Height B, mm	Thickness G, mm
A ≤ 280	60 ≤ B	G ≥ 3

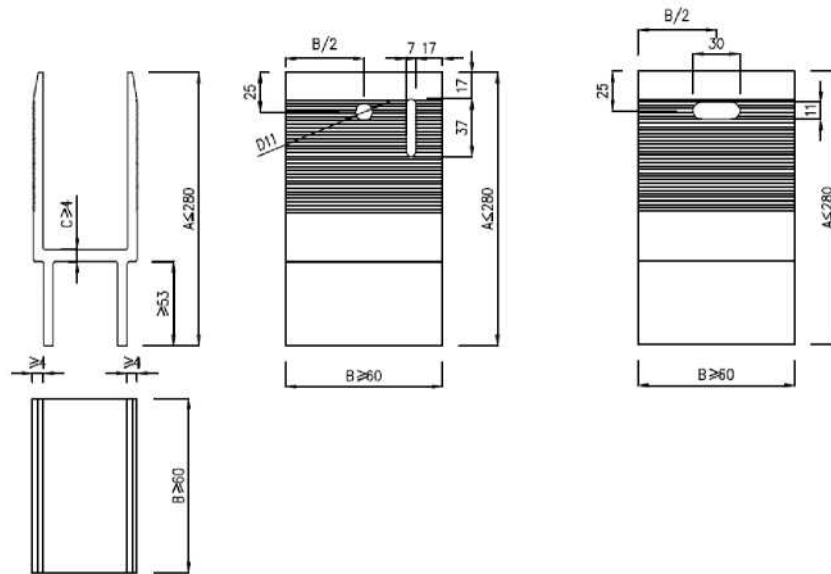


Figure B22. BSP KP1 extension
(dimensions in mm)

Table B9. Assortment of standard BSP KP1* extensions

Designation	Dimension A, mm	Dimension B, mm
KP1/135-60	135	60
KP1/135-90	135	90
KP1/135-120	135	120
KP1/135-150	135	150

*) BSP KWP1 extensions of other dimensions may also be produced, after an agreement between the manufacturer and the recipient, in accordance with Table B10 and meeting the requirements regarding the geometrical parameters specified in tables D1 and D2.

Table B10. Assortment of BSP KP1 extensions

Reach A, mm	Height B, mm	Thickness G, mm
$A \leq 280$	$60 \leq B$	$G \geq 4$

KWP2/A-B STAY

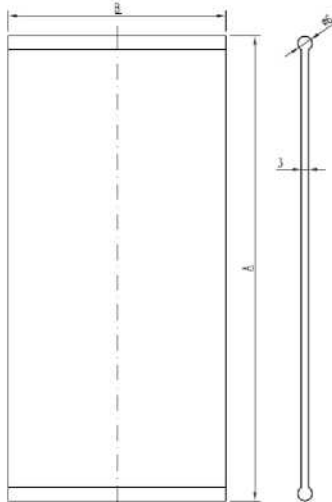


Table B9. Assortment of standard BSP KWP2* stays

Designation	Reach A	Hight B
KWP2/193-60	193	60
KWP2/193-90	193	90
KWP2/193-120	193	120
KWP2/193-150	193	150

*) BSP KWP2 stays with other dimensions can also be produced, after an agreement between the manufacturers and the recipient, in accordance with Table B10.

Table B10. Assortment of BSP KWP2 stays

Reach A, mm	Height B, mm	Thickness G, mm
$A \leq 193$	$60 \leq B$	$G \geq 3$

Figure B23. BSP KWP2 stay
(dimensions in mm)

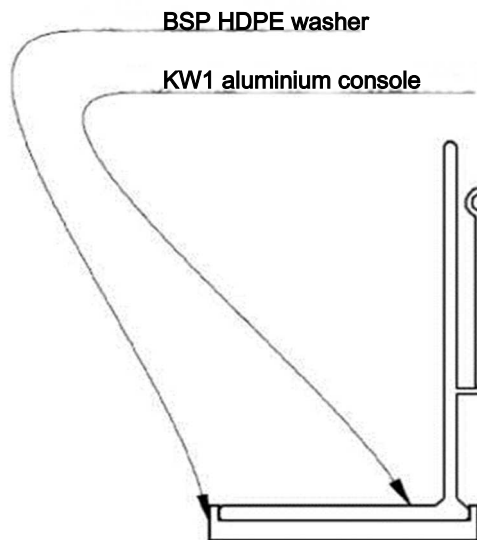
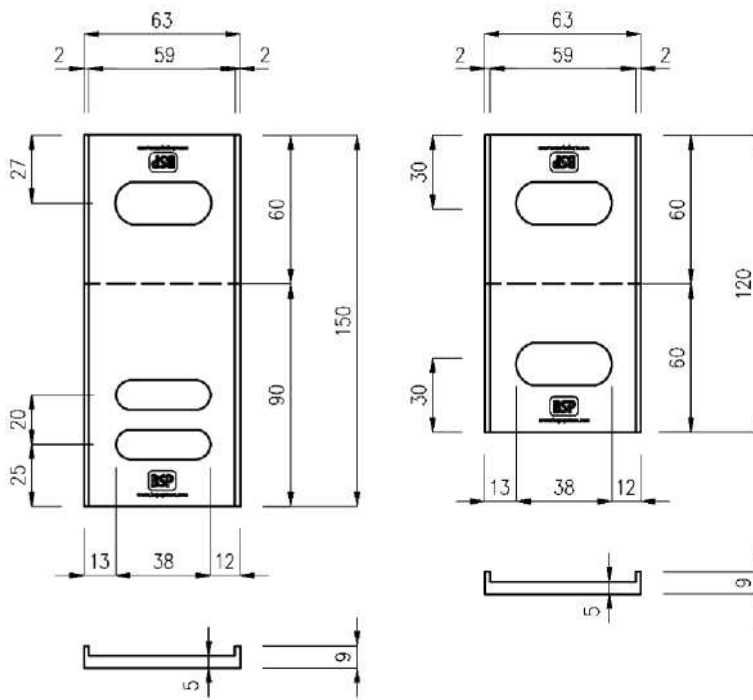


Figure B24. BSP HDPE washer
(dimensions in mm)

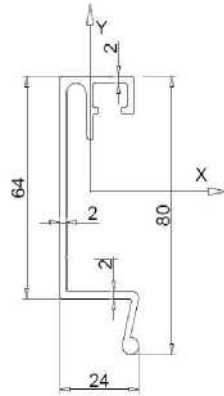


Figure B25. BSP KWRW hook
(dimensions in mm)

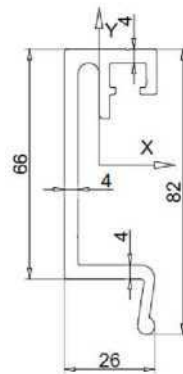
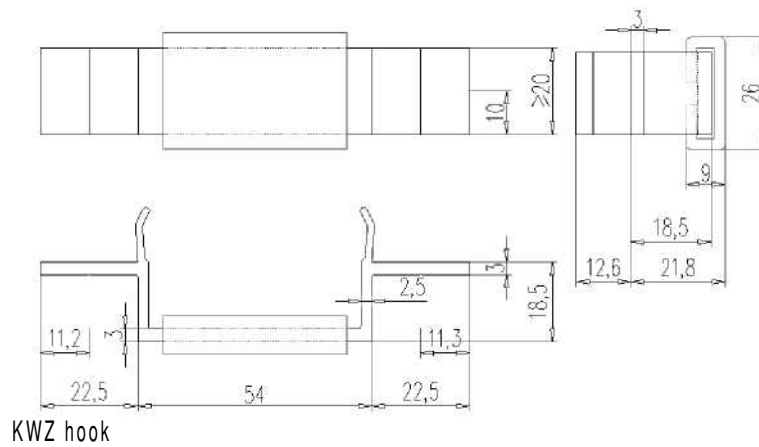
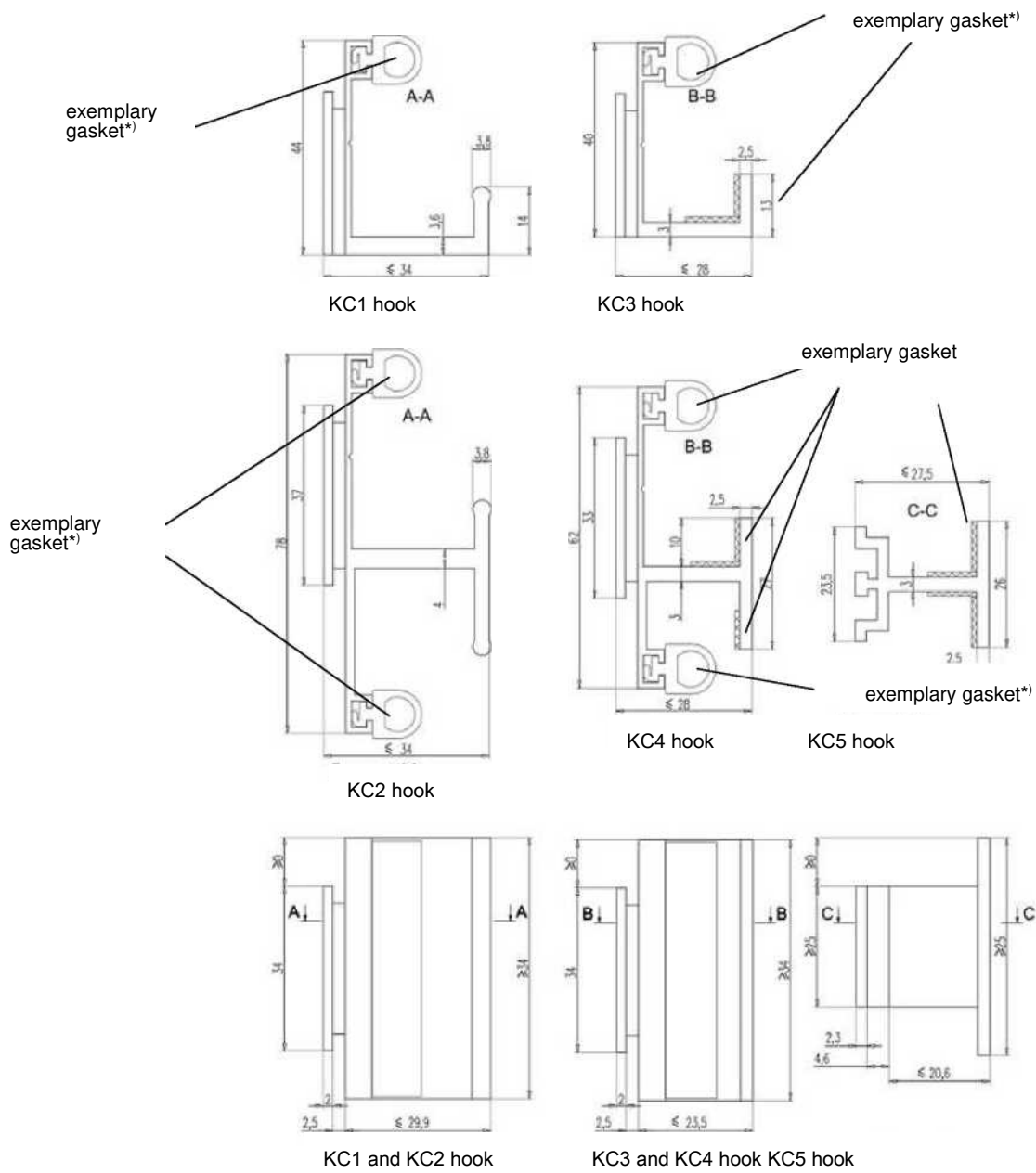


Figure B26. BSP KWRZ hook
(dimensions in mm)



KWZ hook

Figure B27. BSP KWZ hook
(dimensions in mm)



*) Evaluation of gaskets and their influence on the load-bearing capacity of the substructure (resistance to force and horizontal fixings of substructure elements) and fire safety - outside the scope of the National Technical Evaluation

Figure B28. BSP KC1, BSP KC2, BSP KC3, BSP KC4 and BSP KC5 hooks (dimensions in mm)

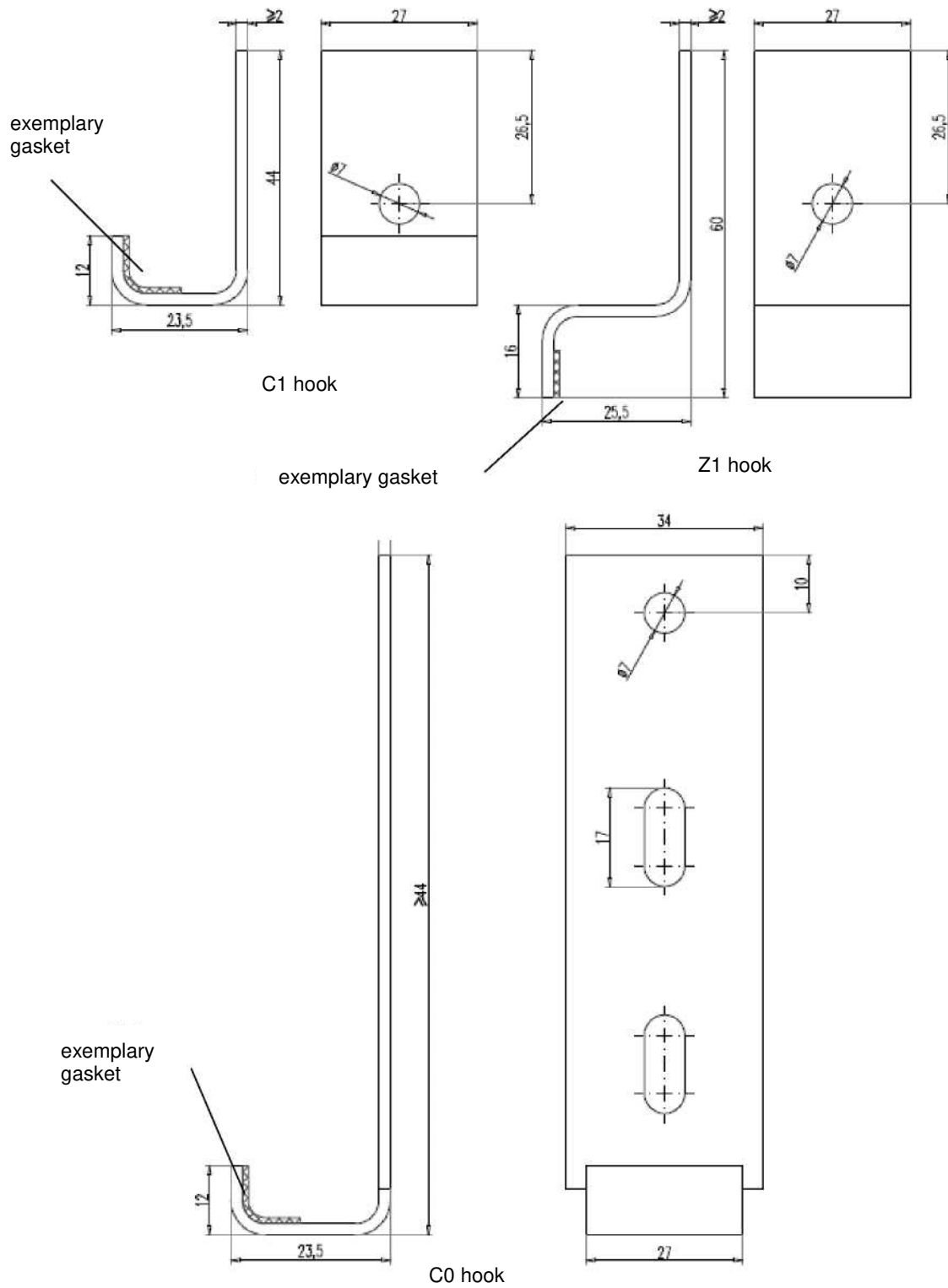


Figure B29. BSP C0, BSP C1 and BSP Z1 hooks
(dimensions in mm)

BSP KW PAS CONSOLES

Console type: KW1 PAS

Console type: KW3 PAS

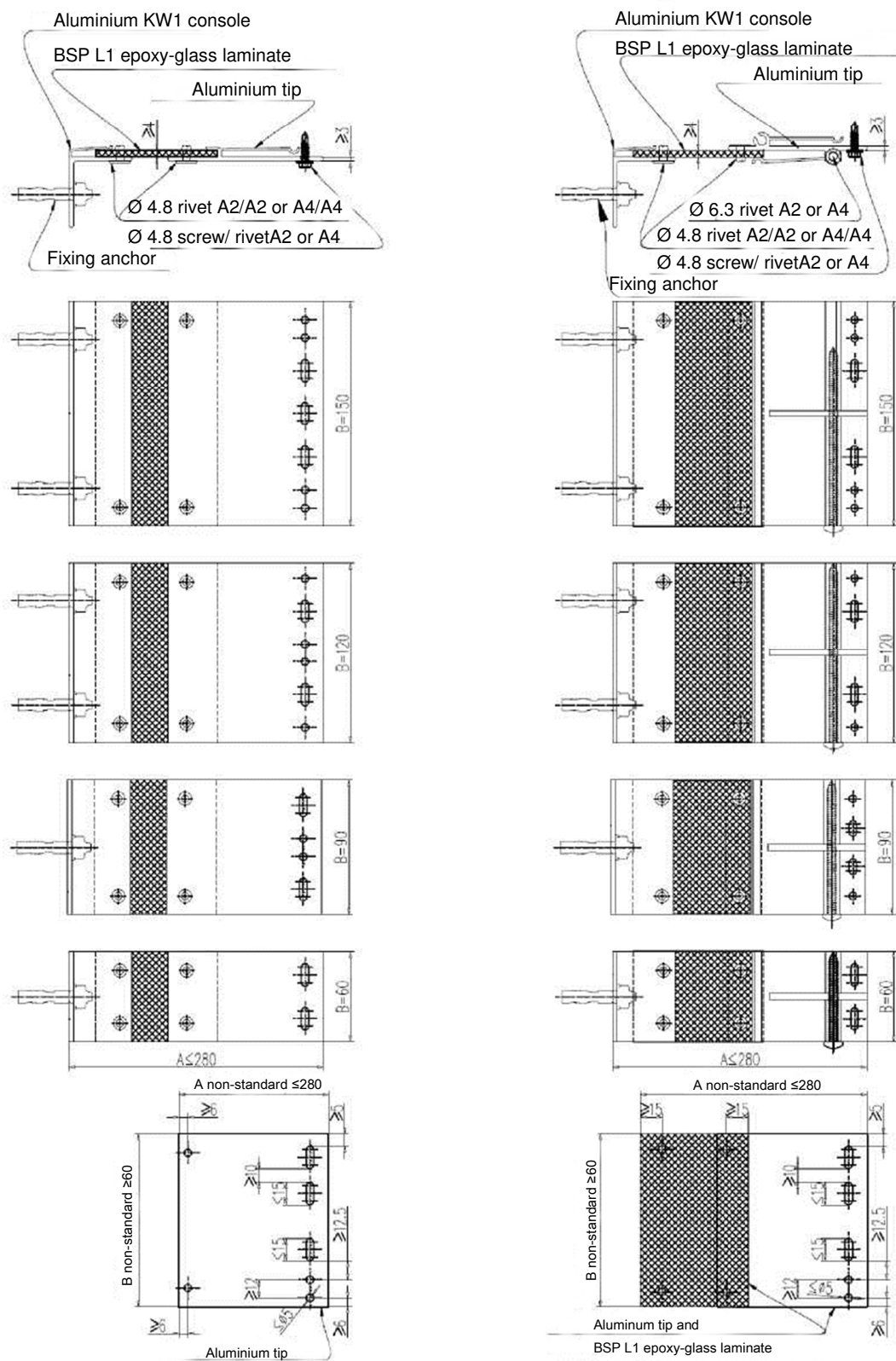


Figure B30. BSP KW1 PAS and BSP KW3 PAS consoles (dimensions in mm)

Table B11. Assortment of standard BSP KW1 PAS and BSP KW3 PAS consoles

Console	Reach A, mm	Height B, mm	Foot thickness, mm	Foot width, mm
KW1 PAS/ 170-150 KW3 PAS/ 170-150	170	150	3	47
KW1 PAS/ 170-120 KW3 PAS/ 170-120		120	3	47
KW1 PAS/ 170-90 KW3 PAS/ 170-90		90	3	47
KW1 PAS/ 170-60 KW3 PAS/ 170-60		60	3	47
KW1 PAS/ 220-150 KW3 PAS/ 220-150	220	150	4	59
KW1 PAS/ 220-120 KW3 PAS/ 220-120		120	4	59
KW1 PAS/ 220-90 KW3 PAS/ 220-90		90	4	59
KW1 PAS/ 220-60 KW3 PAS/ 220-60		60	4	59
KW1 PAS 260-150 KW3 PAS/ 260-150	260	150	4	59
KW1 PAS 260-120 KW3 PAS/ 260-120		120	4	59
KW1 PAS/ 260-90 KW3 PAS/ 260-120		90	4	59
KW1 PAS/ 260-60 KW3 PAS/ 260-60		60	4	59
KW1 PAS/ 260-60 KW3 PAS/ 260-60	280	150	4	59
KW1 PAS/ 280-120 KW3 PAS/ 280-120		120	4	59
KW1 PAS/ 280-90 KW3 PAS/ 280-90		90	4	59
KW1 PAS/ 280-60 KW3 PAS/ 280-60		60	4	59

*) BSP KW1 PAS and BSP KW3 PAS consoles with other dimensions may also be manufactured, after an agreement between the producer and the recipient, in accordance with Table B12 and meeting the required geometric parameters specified in tables D1 and D2.

Table B12. Assortment of BSP KW1 PAS and BSP KW3 PAS consoles

Overall reach of the console with a laminate separator and/ or aluminum tip A, mm	Height B, mm	Foot thickness C, mm	Foot width S, mm	Console type
$A \leq 280$	$60 \leq B \leq 650$	$C \geq 4$	$S \geq 59$	I
$A \leq 170$	$60 \leq B \leq 650$	$C \geq 3$	$S \geq 47$	II
$A \leq 280$	$60 \leq B \leq 650$	$C \geq 4$	$S \geq 59$	III
$A \leq 280$	$60 \leq B \leq 650$	$C \geq 4$	$S \geq 59$	IV

Annex C.

Table C1. Identification features of the epoxy-glass laminate

Item	Identification features	Requirements	Testing methods
1	2	3	4
1	Density, g/cm ³	1.9 ± 10%	PN-EN ISO 1183-1:2013 (met. A.)
2	Water absorption after 24 h, %	≤ 1	PN-EN ISO 62:2008 (met. 1)
3	Content of fibreglass, %	56 ÷ 62	PN-EN ISO 1172:2002
4	Dimensional stability after 24 h in temp. -20°C, %	≤ 0.5	p. C.1
5	Dimensional stability after 24 h in temp. +70°C, %	≤ 0.5	
6	bending strength, MPa	≥ 400	PN EN ISO 178:2011 (met. A, v = 2 mm/min)
7	Modulus of elasticity for bending, MPa	≥ 20000	
8	Tensile strength, MPa	≥ 400	PN-EN ISO 527-1:2012 (B-type sample, v = 50 mm/min)
9	Modulus of elasticity for stretching, MPa	≥ 12000	PN-EN ISO 527-1:2012 (B-type sample, v = 1 mm/min)
10	Charpy impact, kJ/m ²	≥ 35	PN-EN ISO 179:2010 (met. ISO 179-1/1-eA)

C.1. Checking the dimensional stability. The test is carried out on samples which are subjected to a temperature of +70°C for 24 h and a temperature of -20°C for 24 h. The samples are then aged for 2 hours under laboratory conditions. The change of linear dimensions is calculated according to the formula:

$$\frac{l_1 - l_0}{l_0} \times 100\%$$

where:

l_1 - the average value of the final dimension +70°C and -20°C,

l_0 - the average value of the initial dimension, mm

Table D1. Resistance of console connections with profiles to vertical and horizontal forces - average values

Connection type of the profile with console		BSP profile: KCL, KCT, KWR50, KWR80, KWR1, KWR2, KWR5, KWR6, KWR7, KWR8, KWR9, KWR10, KWR11, KWR12, KWRG, KWRW, KWRZ																				
		BSP console: KW1 PAS, KW3 PAS, KW1, K1, K2 or BSP console with extension: KW1+ KWP1, K1+ KP1, K2+ KP1																BSP console: KW1, K1, K2				
Geometrical parameters - dimensions of the console	L _x (console reach - A ¹⁾ , in the case of consoles with extensions - total reach of the console - A ¹⁾ and extension), mm	≤ 170				≤ 220				≤ 260				≤ 280				≤ 310				
	B ¹⁾ (console height), mm	≥ 150	≥ 120	≥ 90	≥ 60	≥ 150	≥ 120	≥ 90	≥ 60	≥ 150	≥ 120	≥ 90	≥ 60	≥ 150	≥ 120	≥ 90	≥ 60	≥ 150	≥ 120	≥ 90	≥ 60	
	C ²⁾ (foot thickness), mm	≥ 3				≥ 4				≥ 4				≥ 4				≥ 4				
	foot width, mm	≥ 47				≥ 59				≥ 59				≥ 59				≥ 59				
Average value of force F _m , N	Resistance to vertical force	load value with displacement of 0.2%-L _x	198	198	86	86	165	181	87	49	165	135	60	49	165	135	60	52	144	115	67	49
		F _v - load value with constant displacement 0.2%-L _x	666	666	161	161	949	738	179	89	949	555	130	89	949	555	130	80	780	477	129	103
		F _{1d} - load value with displacement of 1 mm	496	496	177	177	277	377	166	80	277	228	101	80	277	228	101	77	217	178	100	72
		F _{3d} - load value with displacement of 3 mm	1155	1155	304	304	744	885	381	173	744	578	238	173	744	578	238	153	602	470	189	150
	F _e - load value at damage	4509	4509	1458	1458	3956	3963	1934	914	3956	3007	1398	914	3956	3007	1398	801	3246	2461	1202	642	
	Resistance to horizontal force	load value with displacement of 1 mm	932	932	724	724	1478	1310	955	800	1478	1310	790	758	1268	1268	790	659	1663	1447	1112	994
		F _m - load value with constant displacement of 1 mm	2831	2831	2093	2093	4458	4262	2613	2330	4458	4262	2798	2367	3797	3797	2798	2003	5027	5031	2932	2601
F _t - load value at damage		9394	9394	4476	4476	11357	9757	6512	4986	11357	9757	9053	7915	10704	10704	9053	5416	11975	11283	9547	7018	

¹⁾ Designations A, B according to fig. B1, B2 and B30

²⁾ Designation C according to fig. B1, B2 and B30

Table D2. Resistance of console connections with profiles to vertical and horizontal forces - characteristic values

Connection type of the profile with console		BSP profile: KCL, KCT, KWR50, KWR80, KWR1, KWR2, KWR5, KWR6, KWR7, KWR8, KWR9, KWR10, KWR11, KWR12, KWRG, KWRW, KWRZ																				
		BSP console: KW1 PAS, KW3 PAS, KW1, K1, K2 or BSP console with extension: KW1+ KWP1, K1+ KP1, K2+ KP1																BSP console: KW1, K1, K2				
Geometrical parameters -	L _x (console reach - A ¹⁾ , in the case of consoles with extensions - total reach of the console - A ¹⁾ and extension), mm	≤ 170				≤ 220				≤ 260				≤ 280				≤ 310				
	B ¹⁾ (console height, mm)	≥ 150	≥ 120	≥ 90	≥ 60	≥ 150	≥ 120	≥ 90	≥ 60	≥ 150	≥ 120	≥ 90	≥ 60	≥ 150	≥ 120	≥ 90	≥ 60	≥ 150	≥ 120	≥ 90	≥ 60	
	C ²⁾ (console foot thickness), mm	≥ 3				≥ 4				≥ 4				≥ 4				≥ 4				
	foot width, mm	≥ 47				≥ 59				≥ 59				≥ 59				≥ 59				
Characteristic value of force F _{0,5;N} ³⁾	Resistance to vertical force	load value with a displacement of 0.2%-L _x	165	165	76	76	133	163	76	40	133	94	53	40	133	94	53	32	135	110	56	40
		R _{cr} - load value with a constant displacement of 0.2%-L _x	626	626	81	81	857	542	115	54	857	515	110	54	857	515	110	7	719	359	106	95
		R _{cd1} - wa load value with a displacement of 1 mm	443	443	138	138	217	343	147	67	217	152	94	67	217	152	94	46	192	162	83	63
		R _{cd2} - load value with a displacement of 3 mm	1035	1035	236	236	606	772	319	137	606	460	212	137	606	460	212	86	540	412	144	135
		R _s - load value at damage	4362	4362	1377	1377	3672	3535	1819	848	3672	2794	1164	848	3672	2794	1164	730	3034	2374	1043	603
	Resistance to horizontal force	load value with a displacement of 1 mm	786	786	545	545	1149	1110	864	734	1149	1110	586	674	832	832	586	432	1471	1327	985	953
		R _c - load value with constant displacement of 1 mm	2241	2241	1902	1902	4153	3806	2403	2185	4153	3806	2212	2155	3552	3552	2212	1713	4554	3835	2627	2527
		R _t - load value at damage	7243	7243	3726	3726	10692	8936	6028	4901	10692	8936	8275	7014	9749	9749	8275	4790	11916	9975	9301	5833

¹⁾ Designations A, B according to fig. B1, B2 and B30

²⁾ Designation C according to fig. B1, B2 and B30

³⁾ Characteristic value of force F_m giving 75% certainty that 95% of the test results will be greater than this value

Table D3. Resistance of hook connections with profiles to horizontal force - average values

F_m - resistance to horizontal force, N - average value		
Connection type	F_I - load value with constant displacement of 1 mm	F_{IU} - load value at damage
KWZ hook of length ≥ 20 mm with KWRV 50 or KWRV 80 profile	1209	2181
KC1 hook of length ≥ 34 mm with KCL or KCT profile	2862	3767
KC2 hook of length ≥ 34 mm with KCL or KCT profile	1370	1612
KC3 hook of length ≥ 34 mm with KCL or KCT profile	1685	1911
KC4 hook of length ≥ 34 mm with KCL or KCT profile	2306	2710
KC5 hook of length ≥ 25 mm with KCL or KCT profile	2319	2572
C1 hook used with Z1 hook of width ≥ 27 mm with KCL or KCT profile	815	844
C0 hook of width ≥ 34 mm with KCL or KCT profile	815	844
KWRW hook of length ≥ 60 mm with KWRW or KWRZ profile: case of maximum profile extension by means of an M6 screw ¹⁾	957	3025
KWRZ hook of length ≥ 60 mm with KWRW profile: case of maximum profile extension by means of an M6 screw ¹⁾	957	3025
KWRW hook of length ≥ 60 mm: with KWRW or KWRZ profile: case of minimal profile extension ¹⁾	755	3919
KWRZ hook of length ≥ 60 mm with KWRW profile: case of minimal profile extension ¹⁾	755	3919
KWRZ hook of length ≥ 60 mm, with KWRZ profile: case of maximum profile extension by means of an M6 screw ¹⁾	3681	10966
KWRZ hook of length ≥ 60 mm with KWRZ profile: case of minimal profile extension ¹⁾	3054	14576

¹⁾ according to fig. D8

Table D4. Resistance of hook connections with profiles to vertical force - average values

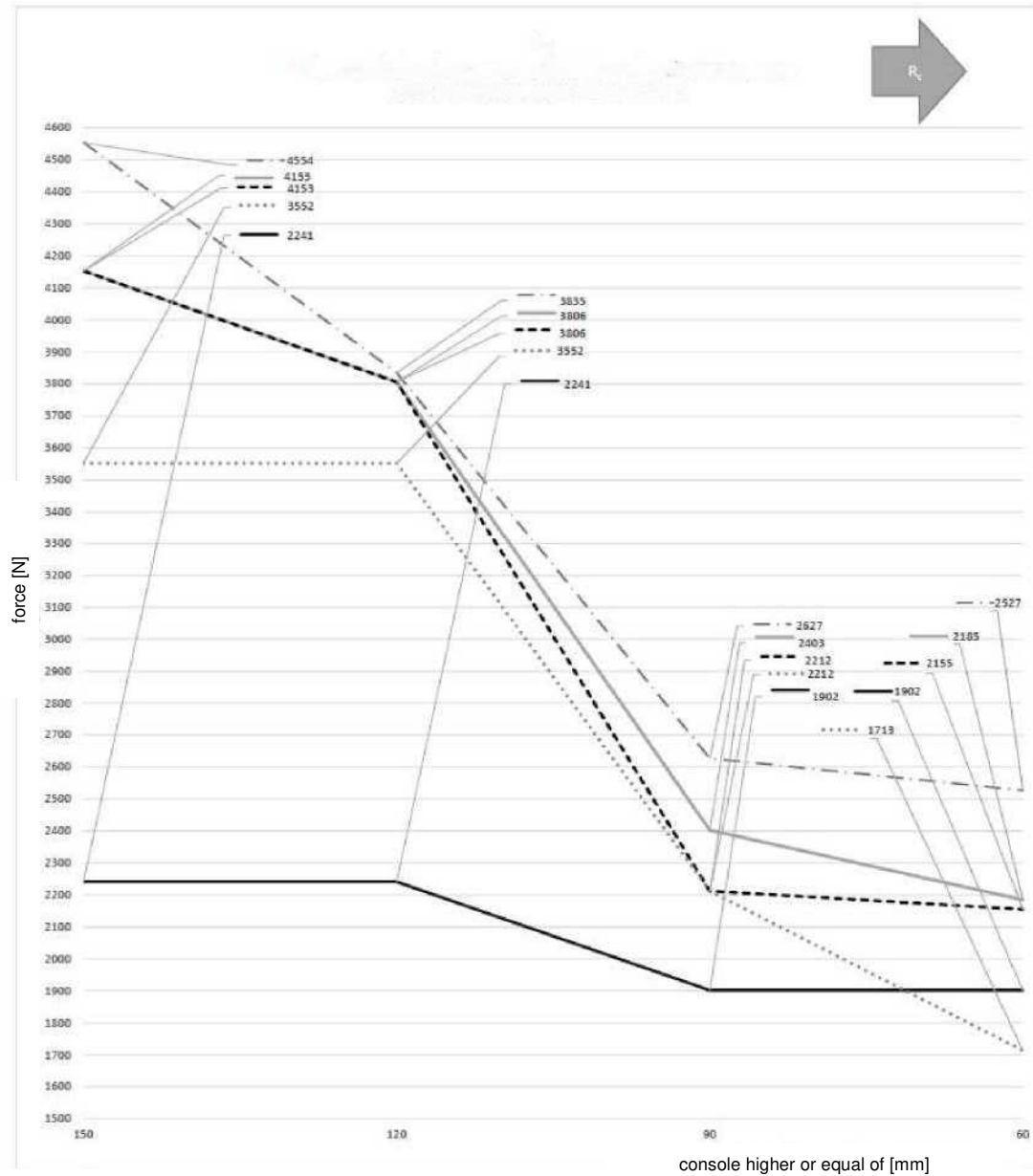
F_m - resistance to vertical force, N - average value		
Connection type	F₁ - load value with constant displacement of 1 mm	F₁₀ - load value at destruction
KWZ hook of length ≥ 20 mm with KWRV 50 or KWRV 80 profile	1440	1864
KC1 hook of length ≥ 34 mm with KCL or KCT profile	2052	2400
KC2 hook of length ≥ 34 mm with KCL or KCT profile	1882	3425
KC3 hook of length ≥ 34 mm with KCL or KCT profile	1662	1962
KC4 hook of length ≥ 34 mm with KCL or KCT profile	1731	1924
KC5 hook of length ≥ 25 mm with KCL or KCT profile	1460	1599
C1+Z1 hook of width ≥ 27 mm with KCL or KCT profile,	1536	2340
C0 hook of width ≥ 34 mm with KCL or KCT profile	1536	2340
2 KWRW hooks of length ≥ 60 mm with KWRW or KWRZ profile: case of maximum profile extension by means of an M6 screw ¹⁾	2443	6545
2 KWRZ hooks of length ≥ 60 mm with KWRW profile: case of maximum profile extension by means of an M6 screw ¹⁾	2443	6545
2 KWRZ hooks of length ≥ 60 mm with KWRZ profile: case of maximum profile extension by means of an M6 screw ¹⁾	6574	14998
¹⁾ according to fig. D8		

Table D5. Resistance of hook connections with profiles to horizontal force - characteristic values

F_c - resistance to horizontal force, N - characteristic value		
Connection type	F_I - load value with constant displacement of 1 mm	F_{IU} - load value at damage
KWZ hook of length ≥ 20 mm with KWRV 50 or KWRV 80 profile	1106	2045
KC1 hook of length ≥ 34 mm with KCL or KCT profile	1521	2822
KC2 hook of length ≥ 34 mm with KCL or KCT profile	1039	1017
KC3 hook of length ≥ 34 mm with KCL or KCT profile	1508	1741
KC4 hook of length ≥ 34 mm with KCL or KCT profile	2161	2436
KC5 hook of length ≥ 25 mm with KCL or KCT profile	1820	1986
C1 hook used with Z1 hook of width ≥ 27 mm with KCL or KCT profile	779	801
C0 hook of width ≥ 34 mm with KCL or KCT profile	779	801
KWRW hook of length ≥ 60 mm with KWRW or KWRZ profile: case of maximum profile extension by means of an M6 screw ¹⁾	823	2824
KWRZ hook of length ≥ 60 mm with KWRW profile: case of maximum profile extension by means of an M6 screw ¹⁾	823	2824
KWRW hook of length ≥ 60 mm: with KWRW or KWRZ profile: case of minimal profile extension ¹⁾	720	3165
KWRZ hook of length ≥ 60 mm with KWRW profile: case of minimal profile extension ¹⁾	720	3165
KWRZ hook of length ≥ 60 mm, with KWRZ profile: case of maximum profile extension by means of an M6 screw ¹⁾	3525	9625
KWRZ hook of length ≥ 60 mm with KWRZ profile: case of minimal profile extension ¹⁾	2879	13992
¹⁾ according to fig. D8		

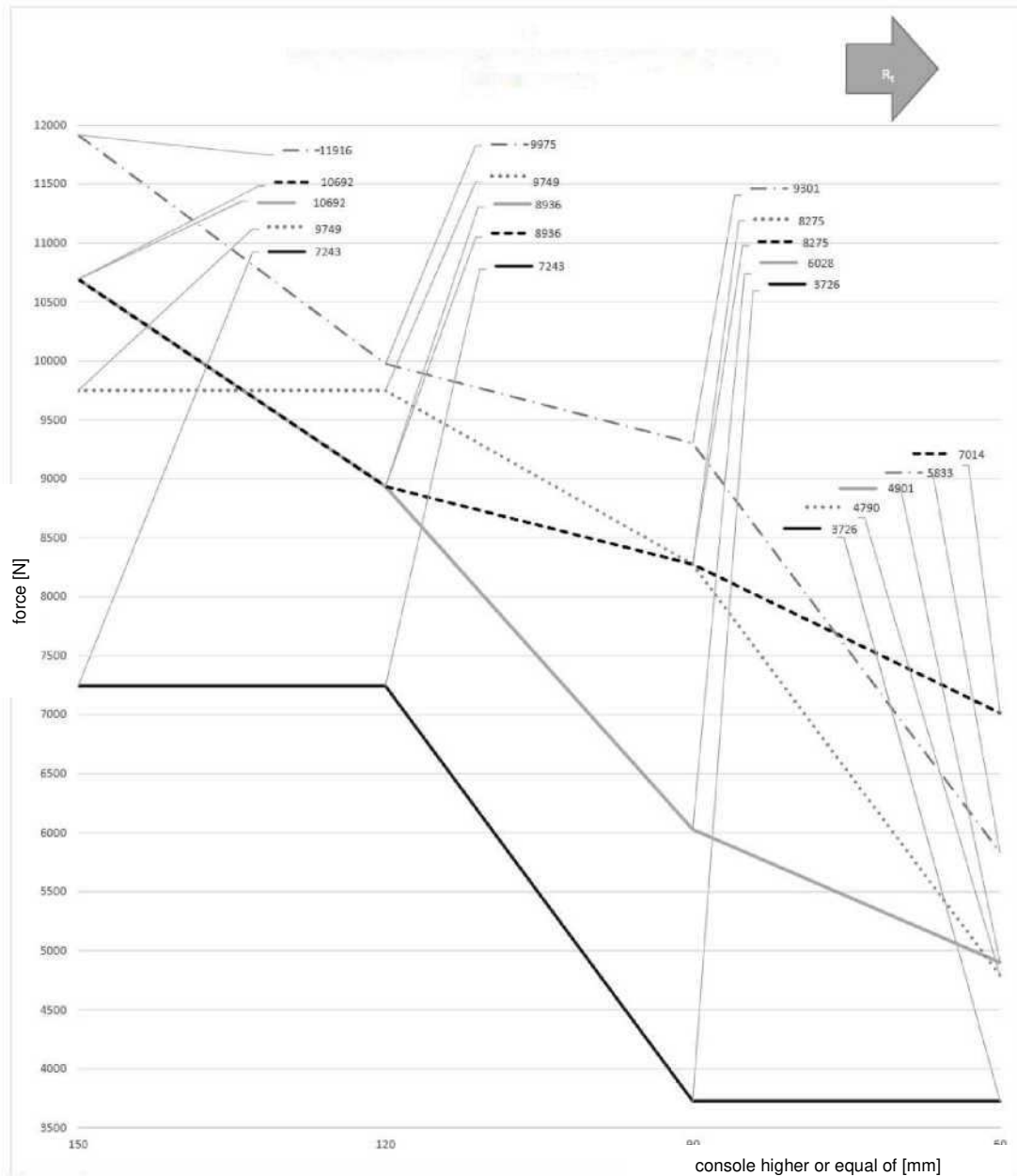
Table D6. Resistance of hook connections with profiles to vertical force - characteristic values

F_c - resistance to vertical force, N - characteristic value		
Connection type	F_i - load value with constant displacement of 1 mm	F_U - load value at damage
KWZ hook of length ≥ 20 mm with KWRV 50 or KWRV 80 profile	1328	1625
KC1 hook of length ≥ 34 mm with KCL or KCT profile	1914	2353
KC2 hook of length ≥ 34 mm with KCL or KCT profile	1758	2905
KC3 hook of length ≥ 34 mm with KCL or KCT profile	1468	1903
KC4 hook of length ≥ 34 mm with KCL or KCT profile	1598	1789
KC5 hook of length ≥ 25 mm with KCL or KCT profile	1382	1502
C1+Z1 hook of width ≥ 27 mm with KCL or KCT profile	1498	2281
C0 hook of width ≥ 34 mm with KCL or KCT profile	1498	2281
2 KWRW hooks of length ≥ 60 mm with KWRW or KWRZ profile: case of maximum profile extension by means of an M6 screw ¹⁾	2288	6180
2 KWRZ hooks of length ≥ 60 mm with KWRW profile: case of maximum profile extension by means of an M6 screw ¹⁾	2288	6180
2 KWRZ hooks of length ≥ 60 mm with KWRZ profile: case of maximum profile extension by means of an M6 screw ¹⁾	5199	14996
¹⁾ according to fig. D8		



	consoles: KW1 PAS, KW3 PAS, KW1, K1, K2, KW1 consoles with extension KWP1, K1 with extension KP1 or K2 with extension KP1 connected with profiles: KCL, KCT, KWR50, KWR80, KWR1, KWR2, KWR5, KWR6, KWR7, KWR8, KWR9, KWR10, KWR11, KWR12, KWRG, KWRW or KWRZ console reach or – in case of using an extension – total reach of console and extension $L_x \leq 170$ mm, console foot thickness $C \geq 3$ mm, foot width $S \geq 47$ mm
	consoles: KW1 PAS, KW3 PAS, KW1, K1, K2, KW1 consoles with extension KWP1, K1 with extension KP1 or K2 with extension KP1 connected with profiles: KCL, KCT, KWR50, KWR80, KWR1, KWR2, KWR5, KWR6, KWR7, KWR8, KWR9, KWR10, KWR11, KWR12, KWRG, KWRW or KWRZ console reach or – in case of using an extension – total reach of console and extension $L_x \leq 220$ mm, console foot thickness $C \geq 4$ mm, foot width $S \geq 59$ mm
	consoles: KW1 PAS, KW3 PAS, KW1, K1, K2, KW1 consoles with extension KWP1, K1 with extension KP1 or K2 with extension KP1 connected with profiles: KCL, KCT, KWR50, KWR80, KWR1, KWR2, KWR5, KWR6, KWR7, KWR8, KWR9, KWR10, KWR11, KWR12, KWRG, KWRW or KWRZ w console reach or – in case of using an extension – total reach of console and extension $220 \text{ mm} < L_x \leq 260$ mm, console foot thickness $C \geq 4$ mm, foot width $S \geq 59$ mm
	consoles: KW1 PAS, KW3 PAS, KW1, K1, K2, KW1 consoles with extension KWP1, K1 with extension KP1 or K2 with extension KP1 connected with profiles: KCL, KCT, KWR50, KWR80, KWR1, KWR2, KWR5, KWR6, KWR7, KWR8, KWR9, KWR10, KWR11, KWR12, KWRG, KWRW or KWRZ console reach or – in case of using an extension – total reach of console and extension $260 \text{ mm} \leq L_x \leq 280$ mm, console foot thickness $C \geq 4$ mm, foot width $S \geq 59$ mm
	consoles: KW1, K1, K2 connected with profiles: KCL, KCT, KWR50, KWR80, KWR1, KWR2, KWR5, KWR6, KWR7, KWR8, KWR9, KWR10, KWR11, KWR12, KWRG, KWRW, KWRZ console reach $L_x \leq 310$ mm, console foot thickness $C \geq 4$ mm, foot width $S \geq 59$ mm

Figure D1. Resistance of console connections to horizontal force R_c - load value for a constant displacement of 1 mm (according to table D2)








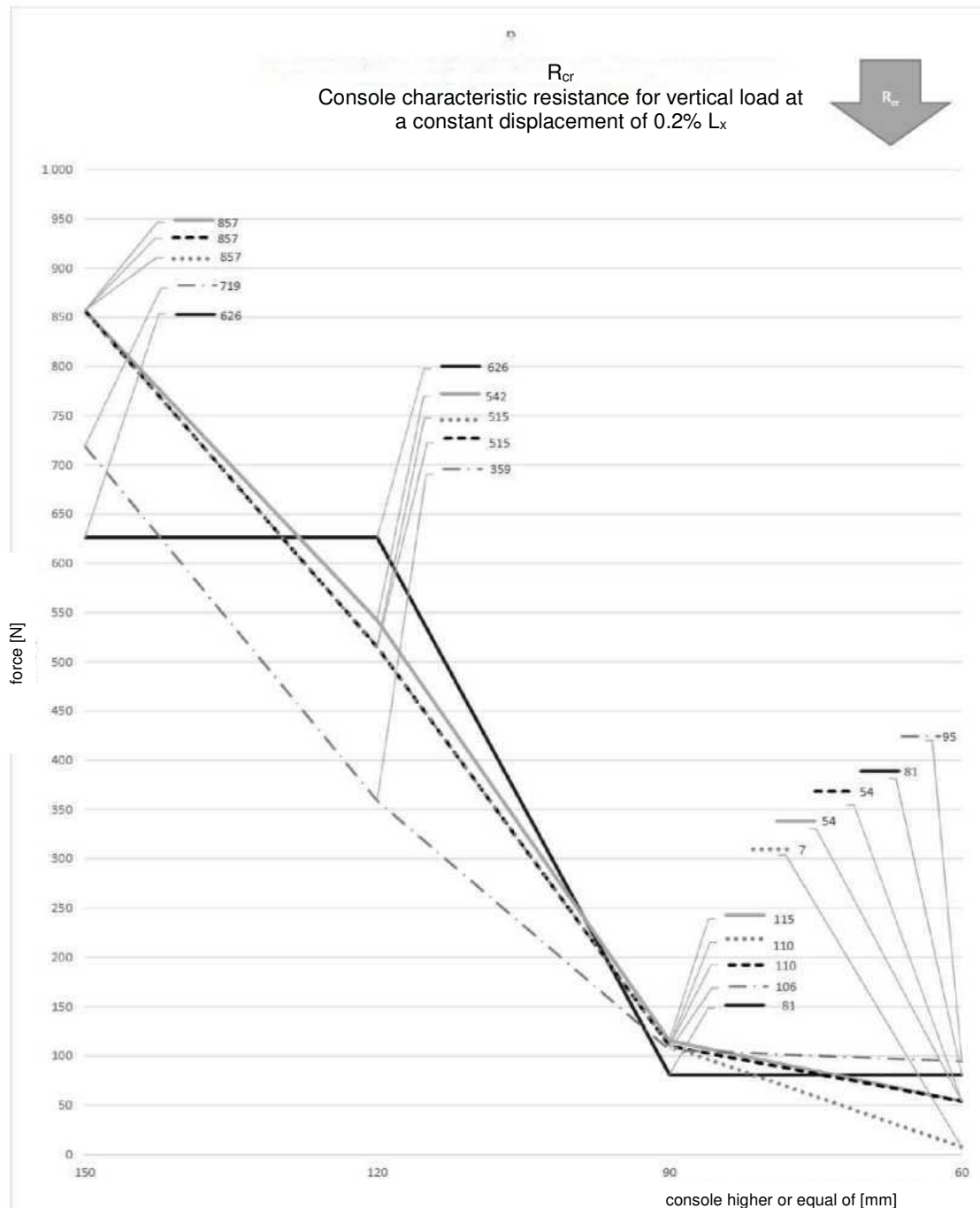
	consoles: KW1 PAS, KW3 PAS, KW1, K1, K2, KW1 consoles with extension KWP1, K1 with extension KP1 or K2 with extension KP1 connected with profiles: KCL, KCT, KWRY50, KWRY80, KWR1, KWR2, KWR5, KWR6, KWR7, KWR8, KWR9, KWR10, KWR11, KWR12, KWRG, KWRW or KWRZ console reach or – in case of using an extension – total reach of console and extension $L_x \leq 170$ mm, console foot thickness $C \geq 3$ mm, foot width $S \geq 47$ mm
	consoles: KW1 PAS, KW3 PAS, KW1, K1, K2, KW1 consoles with extension KWP1, K1 with extension KP1 or K2 with extension KP1 connected with profiles: KCL, KCT, KWRY50, KWRY80, KWR1, KWR2, KWR5, KWR6, KWR7, KWR8, KWR9, KWR10, KWR11, KWR12, KWRG, KWRW or KWRZ console reach or – in case of using an extension – total reach of console and extension $L_x \leq 220$ mm, console foot thickness $C \geq 4$ mm, foot width $S \geq 59$ mm
	consoles: KW1 PAS, KW3 PAS, KW1, K1, K2, KW1 consoles with extension KWP1, K1 with extension KP1 or K2 with extension KP1 connected with profiles: KCL, KCT, KWRY50, KWRY80, KWR1, KWR2, KWR5, KWR6, KWR7, KWR8, KWR9, KWR10, KWR11, KWR12, KWRG, KWRW or KWRZ console reach or – in case of using an extension – total reach of console and extension 220 mm $< L_x \leq 260$ mm, console foot thickness $C \geq 4$ mm, foot width $S \geq 59$ mm
	consoles: KW1 PAS, KW3 PAS, KW1, K1, K2, KW1 consoles with extension KWP1, K1 with extension KP1 or K2 with extension KP1 connected with profiles: KCL, KCT, KWRY50, KWRY80, KWR1, KWR2, KWR5, KWR6, KWR7, KWR8, KWR9, KWR10, KWR11, KWR12, KWRG, KWRW or KWRZ console reach or – in case of using an extension – total reach of console and extension 260 mm $\leq L_x \leq 280$ mm, console foot thickness $C \geq 4$ mm, foot width $S \geq 59$ mm
	consoles: KW1, K1, K2 connected with profiles: KCL, KCT, KWRY50, KWRY80, KWR1, KWR2, KWR5, KWR6, KWR7, KWR8, KWR9, KWR10, KWR11, KWR12, KWRG, KWRW, KWRZ console reach $L_x \leq 310$ mm, console foot thickness $C \geq 4$ mm, foot width $S \geq 59$ mm

Figure D2. Resistance of console connections to horizontal force R_t - load value at damage (according to table D2)



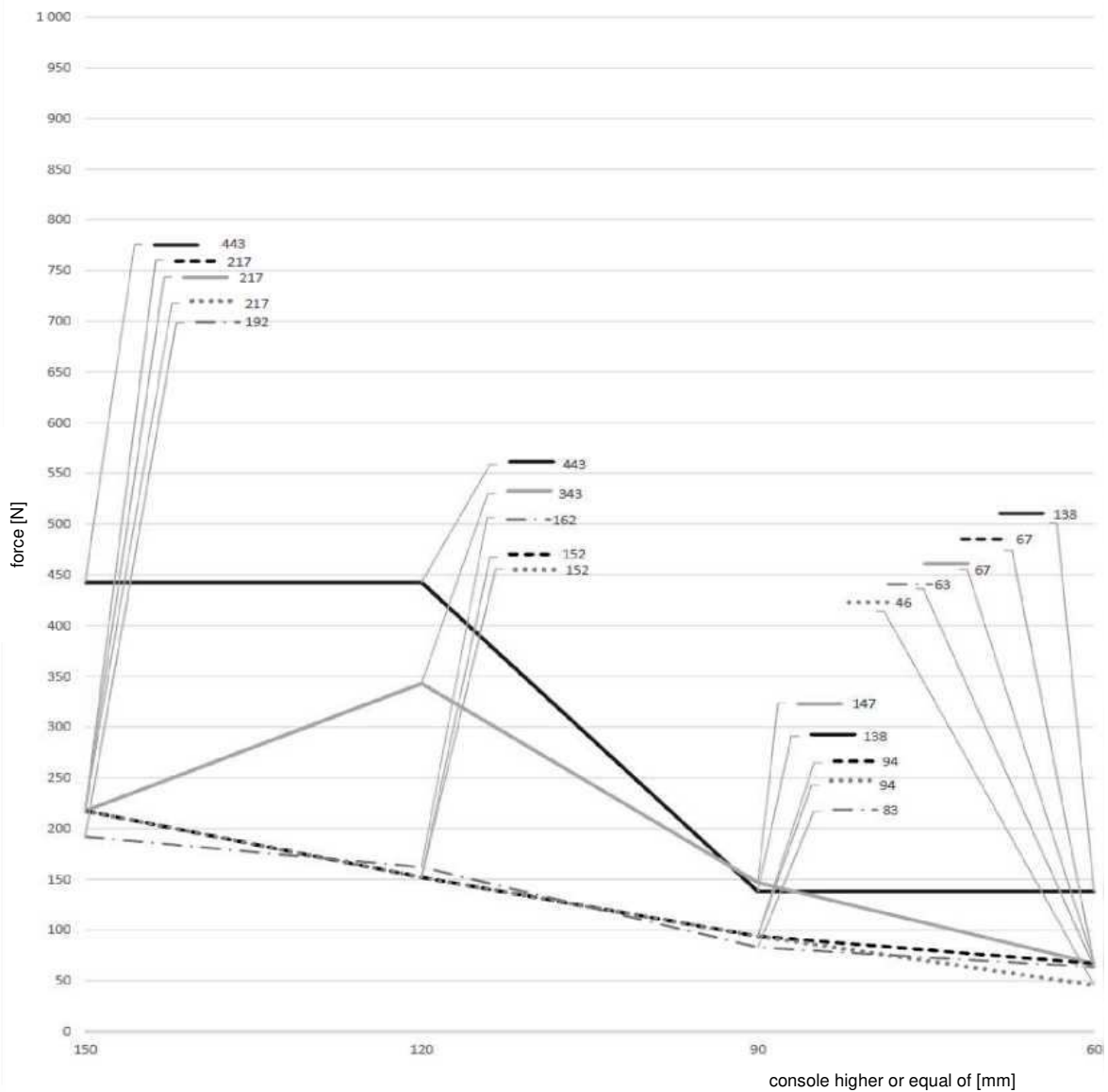
—	consoles: KW1 PAS, KW3 PAS, KW1, K1, K2, KW1 consoles with extension KWP1, K1 with extension KP1 or K2 with extension KP1 connected with profiles: KCL, KCT, KWRY50, KWRY80, KWR1, KWR2, KWR5, KWR6, KWR7, KWR8, KWR9, KWR10, KWR11, KWR12, KWRG, KWRW or KWRZ console reach or – in case of using an extension – total reach of console and extension $L_x \leq 170$ mm, console foot thickness $C \geq 3$ mm, foot width $S \geq 47$ mm
—	consoles: KW1 PAS, KW3 PAS, KW1, K1, K2, KW1 consoles with extension KWP1, K1 with extension KP1 or K2 with extension KP1 connected with profiles: KCL, KCT, KWRY50, KWRY80, KWR1, KWR2, KWR5, KWR6, KWR7, KWR8, KWR9, KWR10, KWR11, KWR12, KWRG, KWRW or KWRZ w console reach or – in case of using an extension – total reach of console and extension $L_x \leq 220$ mm, console foot thickness $C \geq 4$ mm, foot width $S \geq 59$ mm
- - -	consoles: KW1 PAS, KW3 PAS, KW1, K1, K2, KW1 consoles with extension KWP1, K1 with extension KP1 or K2 with extension KP1 connected with profiles: KCL, KCT, KWRY50, KWRY80, KWR1, KWR2, KWR5, KWR6, KWR7, KWR8, KWR9, KWR10, KWR11, KWR12, KWRG, KWRW or KWRZ console reach or – in case of using an extension – total reach of console and extension 220 mm $< L_x \leq 260$ mm, console foot thickness $C \geq 4$ mm, foot width $S \geq 59$ mm
· · · · ·	consoles: KW1 PAS, KW3 PAS, KW1, K1, K2, KW1 consoles with extension KWP1, K1 with extension KP1 or K2 with extension KP1 connected with profiles: KCL, KCT, KWRY50, KWRY80, KWR1, KWR2, KWR5, KWR6, KWR7, KWR8, KWR9, KWR10, KWR11, KWR12, KWRG, KWRW or KWRZ console reach or – in case of using an extension – total reach of console and extension 260 mm $\leq L_x \leq 280$ mm, console foot thickness $C \geq 4$ mm, foot width $S \geq 59$ mm
—	consoles: KW1, K1, K2 connected with profiles: KCL, KCT, KWRY50, KWRY80, KWR1, KWR2, KWR5, KWR6, KWR7, KWR8, KWR9, KWR10, KWR11, KWR12, KWRG, KWRW, KWRZ console reach $L_x \leq 310$ mm, console foot thickness $C \geq 4$ mm, foot width $S \geq 59$ mm

Figure D3. Resistance of console connections to vertical force R_{cr} - load value for a constant displacement of 0.2% L_x (L_x - fixing element reach) (according to table D2)

R_{cd1}
Console characteristic resistance for a vertical load
at a constant displacement of 1 mm

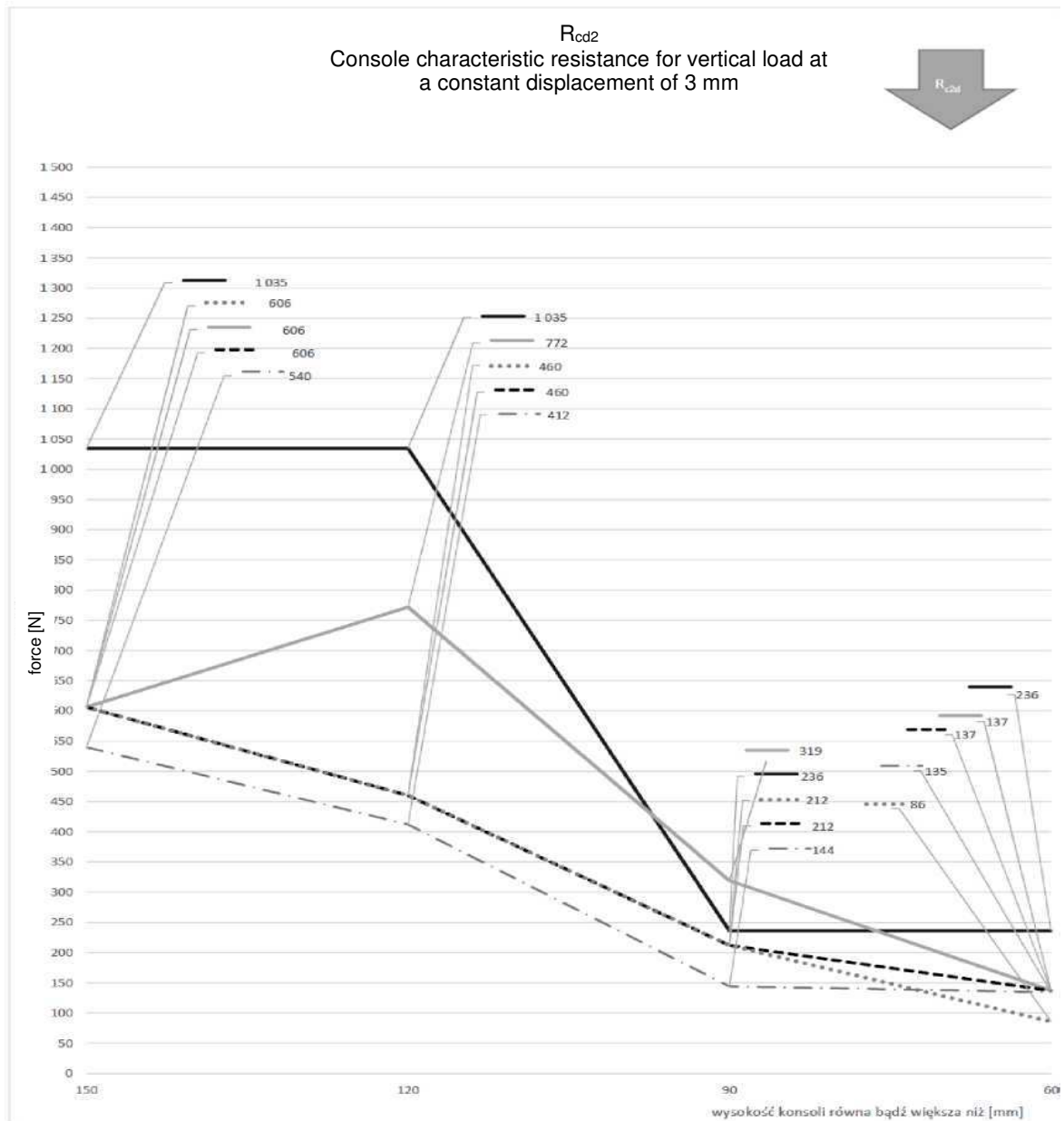


3



	consoles: KW1 PAS, KW3 PAS, KW1, K1, K2, KW1 consoles with extension KWP1, K1 with extension KP1 or K2 with extension KP1 connected with profiles: KCL, KCT, KWRY50, KWRY80, KWR1, KWR2, KWR5, KWR6, KWR7, KWR8, KWR9, KWR10, KWR11, KWR12, KWRG, KWRW or KWRZ console reach or – in case of using an extension – total reach of console and extension $L_x \leq 170$ mm, console foot thickness $C \geq 3$ mm, foot width $S \geq 47$ mm
	consoles: KW1 PAS, KW3 PAS, KW1, K1, K2, KW1 consoles with extension KWP1, K1 with extension KP1 or K2 with extension KP1 connected with profiles: KCL, KCT, KWRY50, KWRY80, KWR1, KWR2, KWR5, KWR6, KWR7, KWR8, KWR9, KWR10, KWR11, KWR12, KWRG, KWRW or KWRZ console reach or – in case of using an extension – total reach of console and extension $L_x \leq 220$ mm, console foot thickness $C \geq 4$ mm, foot width $S \geq 59$ mm
	consoles: KW1 PAS, KW3 PAS, KW1, K1, K2, KW1 consoles with extension KWP1, K1 with extension KP1 or K2 with extension KP1 connected with profiles: KCL, KCT, KWRY50, KWRY80, KWR1, KWR2, KWR5, KWR6, KWR7, KWR8, KWR9, KWR10, KWR11, KWR12, KWRG, KWRW or KWRZ console reach or – in case of using an extension – total reach of console and extension 220 mm $< L_x \leq 260$ mm, console foot thickness $C \geq 4$ mm, foot width $S \geq 59$ mm
	consoles: KW1 PAS, KW3 PAS, KW1, K1, K2, KW1 consoles with extension KWP1, K1 with extension KP1 or K2 with extension KP1 connected with profiles: KCL, KCT, KWRY50, KWRY80, KWR1, KWR2, KWR5, KWR6, KWR7, KWR8, KWR9, KWR10, KWR11, KWR12, KWRG, KWRW or KWRZ console reach or – in case of using an extension – total reach of console and extension 260 mm $\leq L_x \leq 280$ mm, console foot thickness $C \geq 4$ mm, foot width $S \geq 59$ mm
	consoles: KW1, K1, K2 connected with profiles: KCL, KCT, KWRY50, KWRY80, KWR1, KWR2, KWR5, KWR6, KWR7, KWR8, KWR9, KWR10, KWR11, KWR12, KWRG, KWRW or KWRZ console reach $L_x \leq 310$ mm, console foot thickness $C \geq 4$ mm, foot width $S \geq 59$ mm

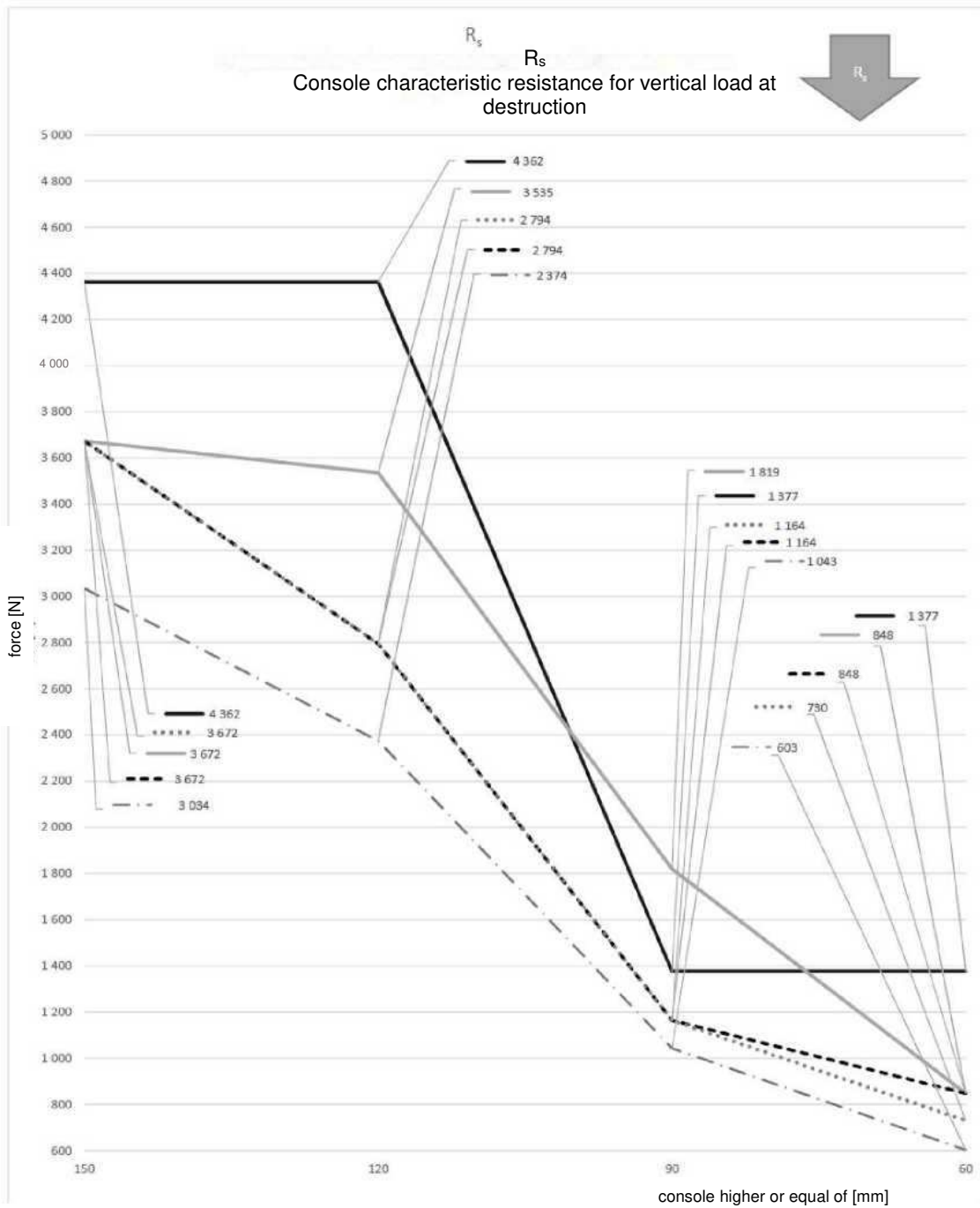
Figure D4. Resistance of console connections to vertical force R_{cd1} - load value for a displacement of 1 mm (according to table D2)



console higher or equal of fmm1

	consoles: KW1 PAS, KW3 PAS, KW1, K1, K2, KW1 consoles with extension KWP1, K1 with extension KP1 or K2 with extension KP1 connected with profiles: KCL, KCT, KWR50, KWR50, KWR1, KWR2, KWR5, KWR6, KWR7, KWR8, KWR9, KWR10, KWR11, KWR12, KWRG, KWRW or KWRZ console reach or – in case of using an extension – total reach of console and extension $L_x \leq 170$ mm, console foot thickness $C \geq 3$ mm, foot width $S \geq 47$ mm
	consoles: KW1 PAS, KW3 PAS, KW1, K1, K2, KW1 consoles with extension KWP1, K1 with extension KP1 or K2 with extension KP1 connected with profile : KCL, KCT, KWR50, KWR50, KWR1, KWR2, KWR5, KWR6, KWR7, KWR8, KWR9, KWR10, KWR11, KWR12, KWRG, KWRW or KWRZ console reach or – in case of using an extension – total reach of console and extension $L_x \leq 220$ mm, console foot thickness $C \geq 4$ mm, foot width $S \geq 59$ mm
	consoles: KW1 PAS, KW3 PAS, KW1, K1, K2, KW1 consoles with extension KWP1, K1 with extension KP1 or K2 with extension KP1 connected with profiles: KCL, KCT, KWR50, KWR50, KWR1, KWR2, KWR5, KWR6, KWR7, KWR8, KWR9, KWR10, KWR11, KWR12, KWRG, KWRW or KWRZ console reach or – in case of using an extension – total reach of console and extension $220 \text{ mm} < L_x \leq 260$ mm, console foot thickness $C \geq 4$ mm, foot width $S \geq 59$ mm
	consoles: KW1 PAS, KW3 PAS, KW1, K1, K2, KW1 consoles with extension KWP1, K1 with extension KP1 or K2 with extension KP1 connected with profiles: KCL, KCT, KWR50, KWR50, KWR1, KWR2, KWR5, KWR6, KWR7, KWR8, KWR9, KWR10, KWR11, KWR12, KWRG, KWRW or KWRZ console reach or – in case of using an extension – total reach of console and extension $260 \text{ mm} \leq L_x \leq 280$ mm, console foot thickness $C \geq 4$ mm, foot width $S \geq 59$ mm
	consoles: KW1, K1, K2 connected with profiles: KCL, KCT, KWR50, KWR50, KWR1, KWR2, KWR5, KWR6, KWR7, KWR8, KWR9, KWR10, KWR11, KWR12, KWRG, KWRW, KWRZ console reach $L_x \leq 310$ mm, console foot thickness $C \geq 4$ mm, foot width $S \geq 59$ mm

Figure D5. Resistance of console connections to vertical force R_{cd2} - load value for a displacement of 3 mm (according to table D2)



	consoles: KW1 PAS, KW3 PAS, KW1, K1, K2, KW1 consoles with extension KWP1, K1 with extension KP1 or K2 with extension KP1 connected with profiles: KCL, KCT, KWRY50, KWRY80, KWR1, KWR2, KWR5, KWR6, KWR7, KWR8, KWR9, KWR10, KWR11, KWR12, KWRG, KWRW or KWRZ console reach or – in case of using an extension – total reach of console and extension $L_x \leq 170$ mm, console foot thickness $C \geq 3$ mm, foot width $S \geq 47$ mm
	consoles: KW1 PAS, KW3 PAS, KW1, K1, K2, KW1 consoles with extension KWP1, K1 with extension KP1 or K2 with extension KP1 connected with profiles: KCL, KCT, KWRY50, KWRY80, KWR1, KWR2, KWR5, KWR6, KWR7, KWR8, KWR9, KWR10, KWR11, KWR12, KWRG, KWRW or KWRZ console reach or – in case of using an extension – total reach of console and extension $L_x \leq 220$ mm, console foot thickness $C \geq 4$ mm, foot width $S \geq 59$ mm
	consoles: KW1 PAS, KW3 PAS, KW1, K1, K2, KW1 consoles with extension KWP1, K1 with extension KP1 or K2 with extension KP1 connected with profiles: KCL, KCT, KWRY50, KWRY80, KWR1, KWR2, KWR5, KWR6, KWR7, KWR8, KWR9, KWR10, KWR11, KWR12, KWRG, KWRW or KWRZ console reach or – in case of using an extension – total reach of console and extension 220 mm $< L_x \leq 260$ mm, console foot thickness $C \geq 4$ mm, foot width $S \geq 59$ mm
	consoles: KW1 PAS, KW3 PAS, KW1, K1, K2, KW1 consoles with extension KWP1, K1 with extension KP1 or K2 with extension KP1 connected with profiles: KCL, KCT, KWRY50, KWRY80, KWR1, KWR2, KWR5, KWR6, KWR7, KWR8, KWR9, KWR10, KWR11, KWR12, KWRG, KWRW or KWRZ console reach or – in case of using an extension – total reach of console and extension 260 mm $\leq L_x \leq 280$ mm, console foot thickness $C \geq 4$ mm, foot width $S \geq 59$ mm
	consoles: KW1, K1, K2 connected with profile: KCL, KCT, KWRY50, KWRY80, KWR1, KWR2, KWR5, KWR6, KWR7, KWR8, KWR9, KWR10, KWR11, KWR12, KWRG, KWRW, KWRZ console reach $L_x \leq 310$ mm, console foot thickness $C \geq 4$ mm, foot width $S \geq 59$ mm

Figure D5. Resistance of console connections to vertical force R_s - load value at damage (according to table D2)

Characteristic resistances for the horizontal force of the attachment of lining elements (hooks) according to EAD 090034-00-0404: 2016

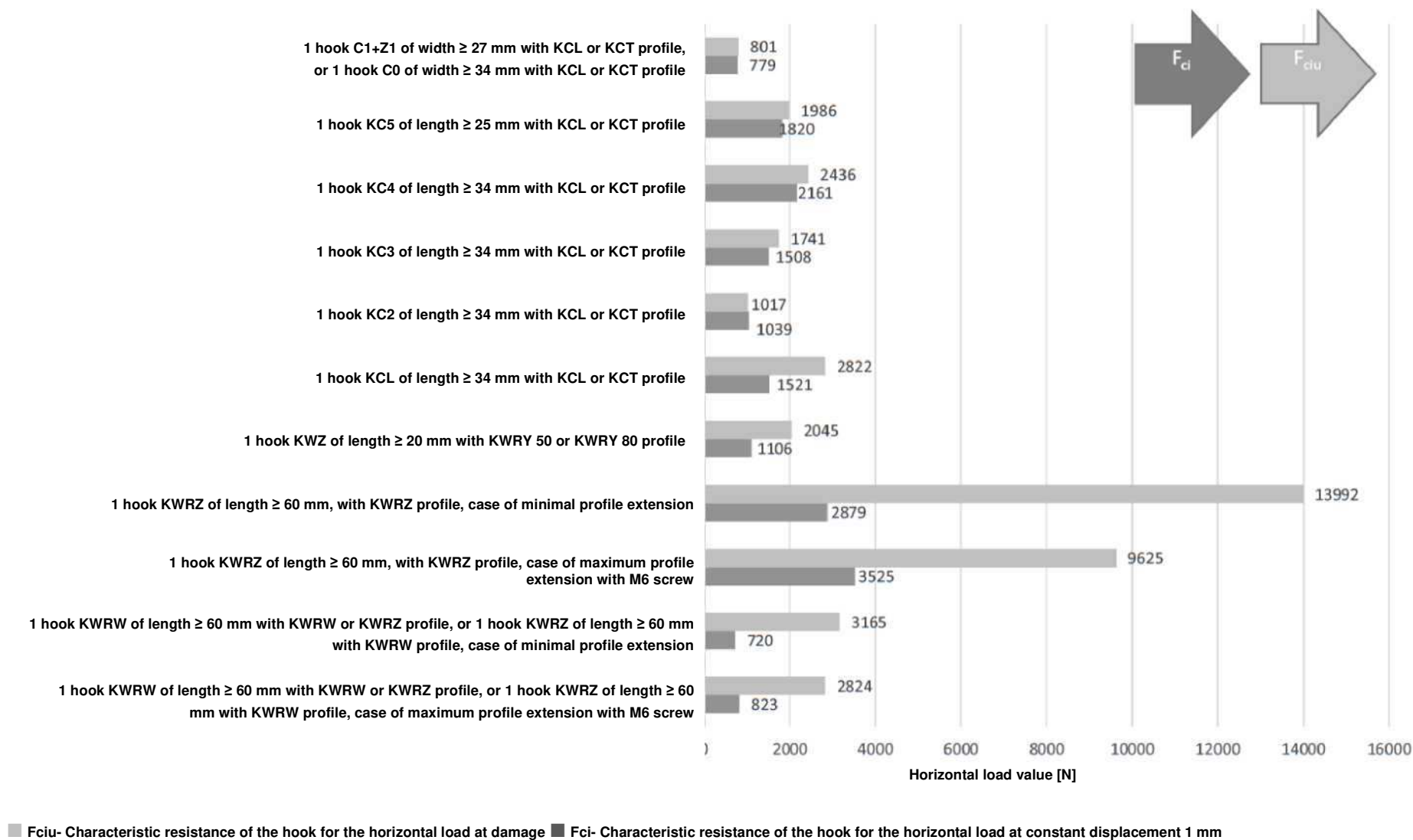


Figure D6. Resistance of connections to horizontal force (according to table D5)

Characteristic resistances for the vertical force of the attachment of lining elements (hooks)
according to EAD 090034-00-0404

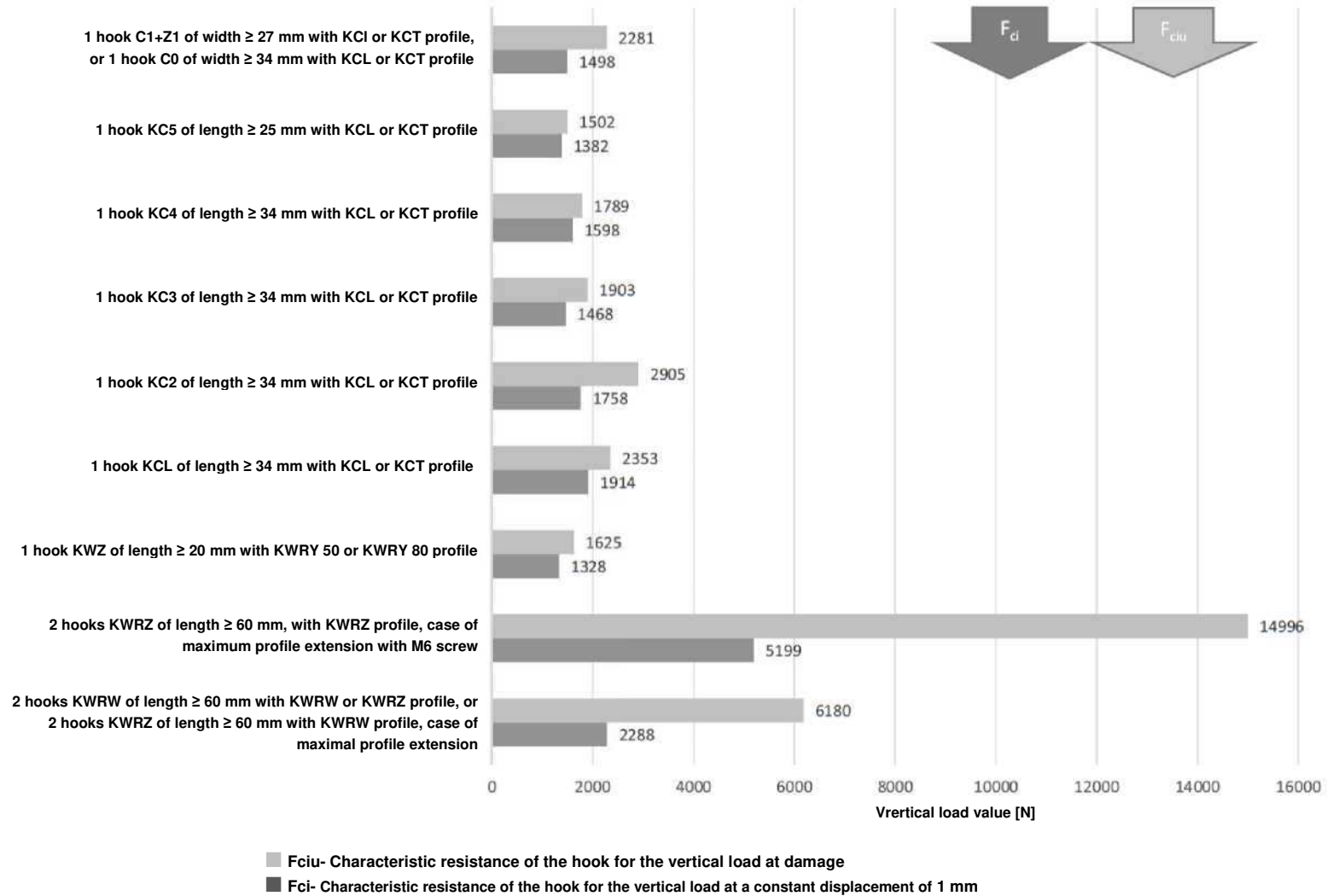


Figure D7. Resistance of connections to vertical force (according to table D6)

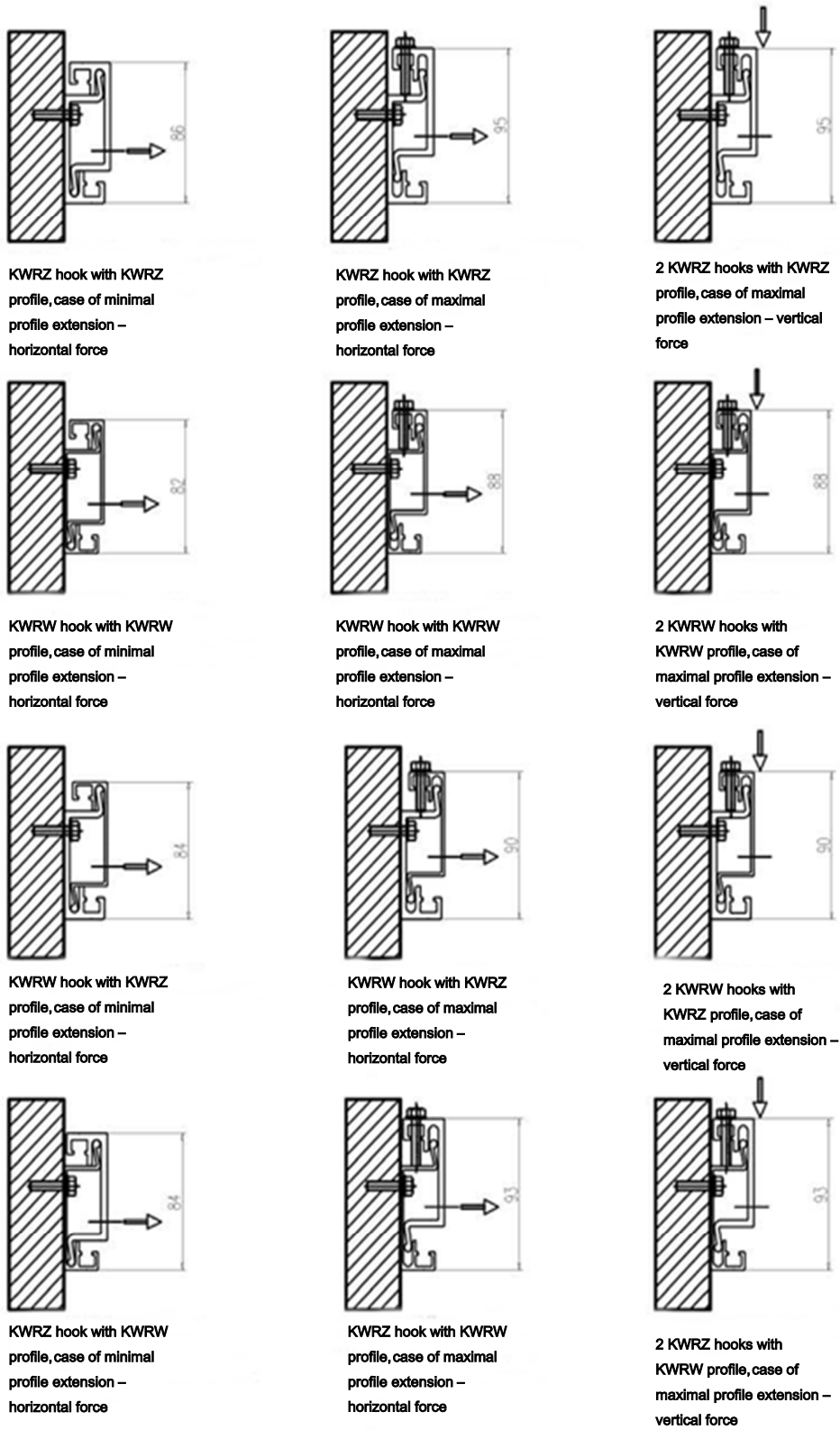


Figure D8. Minimal and maximal BSP KWRW and BSP KWRZ profile extension