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**National technical approval /
General construction technique permit
No. Z-14.1-581 dated 11 August 2020**

Deutsches Institut für Bautechnik DIBt

National technical approval / General construction technique permit

Zulassungsstelle für Bauprodukte und Bauarten
Bautechnisches Prüfamt
Eine vom Bund und den Ländern
gemeinsam getragene Anstalt des öffentlichen Rechts
Mitglied der EOTA. der UEAtc und der WFTAO

Date
11.08.2020

Reference
I 89-1.14.1-58/17

Number:
Z-14.1-581

Validity:
from: **11 August 2020**
until: **1 July 2025**

Applicant:
Kalzip GmbH
August-Horch-Straße 20-22
56070 Koblenz

Object of approval:
Kalzip FC façade system made of aluminium and its products

The above-mentioned object of approval is herewith granted national technical approval and authorised for use in construction.
This notification covers nine pages and seven annexes on 23 pages.
This national technical approval / general construction technique permit replaces the national technical approval / general construction technique permit No. Z-14.1-581 of 2 July 2020. The object was first granted general approval for use in construction on 11 June 2010.

I GENERAL PROVISIONS

1. This notification confirms the suitability and/or applicability of the object of approval for the purposes of the *Landesbauordnungen* (state building regulations).

2. This notification does not replace the statutory permits, approvals and certifications required to carry out construction projects.

3. This notification is issued without prejudice to third-party rights, in particular private property rights.

4. Without prejudice to other regulations under 'Special Provisions', the manufacturer and/or distributor of the object of approval are required to make copies of this notification available to the user or applicator of the object of approval. Furthermore, it should be pointed out to the user or applicator of the object of approval that this notification must be available at the point of application or use. Copies must also be made available to the authorities involved on request.

5. This notification may only be copied in its entirety. Extracts may only be published with the approval of Deutsches Institut für Bautechnik. Texts and drawings of advertising material must not contradict this notification. Translations must include the reference 'Translation of the German original document, not checked by Deutsches Institut für Bautechnik'.

6. The issuing of this notification is revocable. The provisions of the approval may subsequently be amended or changed, especially when necessitated by new technical findings.

7. This notification is based on statements made by the applicant and documents submitted by him. Any change in these basic principles is not covered by this notification and must be disclosed to Deutsches Institut für Bautechnik without delay.

8. The general construction technique permit covered by this notification is at the same time a national technical approval for the construction technique.

II SPECIAL PROVISIONS

1. Object of regulation and field of application or scope

1.1 Object of approval for general technical approval and field of application

The object of approval covers the fixing profiles (modular click rails) and/or fasteners (mono-click brackets) including shaped plastic parts (plastic inlays) of the Kalzip FC façade system for attaching cladding panels to the building sub-construction, see annexes 1.1 and 1.2.

Depending on the design, the modular click rails and the mono-click brackets are made either from blanked or sawn extruded profiles or aluminium strip by cutting to size or blanking and bending or roll forming.

1.2 Object of approval for general construction technique permit and scope

The object of approval is the planning, dimensioning and execution of the Kalzip FC façade system, comprising:

- cladding panels (perforated and non-perforated) in accordance with DIN EN 14782[1], see annexes 2.1 and 2.2
- the above-mentioned fixing profiles (modular click rails), see annexes 3.1 to 3.3
- the above-mentioned fasteners (mono-click brackets), see annex 4
- the above-mentioned shaped plastic parts (plastic inlays), see annexes 3.1 to 3.3 and annex 4.

The cladding panels are made from aluminium strip that is cold formed into profiled panels with a trough-shaped cross-section by roll forming or by bending.

The moulded plastic parts (plastic inlays) are pressed into the apertures of the modular click rails and mono-click brackets provided to fix the cladding panels. The cladding panels are hung into the apertures in such a way that they click into place. The cladding panels can be laid in any direction. Depending on the geometry of the cladding panels, the cladding system is designed with or without shadow joints.

The modular click rails and mono-click brackets are attached to the sub-construction using mechanical fasteners.

2 Provisions for the building products

2.1 Properties and composition

2.1.1 General

Proof of the required material properties of the starting material of the mono-click brackets and the modular click rails must be provided for each material delivery by means of a type 3.1 inspection certificate according to DIN EN 10204[2].

Proof of the required material properties of the starting material of the plastic inlays must be provided with each material delivery by means of a type 2.1 statement of compliance with the order by the manufacturer as per DIN EN 10204[2].

2.1.2 Modular click rails and mono-click brackets with plastic inlays

The NE, SE and SEL modular click rails and mono-click brackets are manufactured by extrusion of the aluminium alloys EN AW-6061 T6 or EN AW-6063 T66 as specified in DIN EN 755-2[3] or an aluminium alloy with at least the same material properties according to DIN EN 755-2[3]. DIN EN 755-9[4] applies for the dimensional tolerances.

[1] DIN EN 14782:2006-03 Self-supporting metal sheet for roofing, external cladding and internal lining - Product specification and requirements

[2] DIN EN 10204:2005-01 Metallic products - Types of inspection documents

The modular click rails NE and SE and the mono-click brackets are manufactured from aluminium strip by bending alloy EN AW-5754 as specified in DIN EN 573-3[5] or an aluminium alloy with at least the same material properties as specified in DIN EN 573-3[5]. DIN EN 755-9[4] applies for the dimensional tolerances.

The starting material must exhibit at least the mechanical properties shown in table 1.

Table 1: mechanical properties

$R_{p0,2}$ [N/mm²]	R_m [N/mm²]	$A_{50\,mm}$ [%]
190	240	3,0

The requirements given in table 1 must also be fulfilled by the finished component in its ultimate state of use.

Details regarding the material properties of the plastic inlays have been lodged with Deutsches Institut für Bautechnik.

The main dimensions can be found in annexes 3.1 to 3.3 and annex 4. Further details have been lodged with Deutsches Institut für Bautechnik.

2.2 Marking

The packaging or the attachments to the delivery note of the building products mentioned in section 2.1 must be marked by the manufacturer with the compliance mark (Ü-mark) in accordance with the *Übereinstimmungszeichen-Verordnungen der Länder* (compliance mark regulations issued by the German states). Marking may only be carried out if all requirements given in section 2.3 have been met fully.

A label giving details of the production plant, year of manufacture, designation, sheet thickness, and material of the components must additionally be attached to each packaging unit of the mono-click brackets and modular click rails with plastic inlays.

2.3 Confirmation of conformity

2.3.1 General

Confirmation of the conformity of the building products referred to in section 2.1 with the provisions of this notification has to be provided for each manufacturing plant by a declaration of conformity issued by the manufacturer based on an initial inspection by the manufacturer and an in-house production control. The declaration of conformity must be made by the manufacturer by marking the building products with the mark of conformity (Ü symbol) with reference to the intended use.

[3] DIN EN 755-2:2016-10 Aluminium and aluminium alloys - Extruded rod/bar, tube and profiles - Part 2: Mechanical properties

[4] DIN EN 755-9:2016-10 Aluminium and aluminium alloys - Extruded rod/bar, tube and profiles - Part 9: Profiles, tolerances on dimensions and form

[5] DIN EN 573-3:2019-10 Aluminium and aluminium alloys - Chemical composition and form of wrought products - Part 3: Chemical composition and form of products

2.3.2 In-house production control

In-house production control must be established and carried out in each production plant. In-house production control means continuous monitoring of the production that is to be undertaken by the manufacturer to ensure that the building products the producer manufactures conform to the provisions of the national technical approval covered by this notification.

The in-house production control for the mono-click brackets, the modular click rails and the plastic inlays should include at least the following measures:

- The dimensions and tolerances as well as the geometry specified in section 2.1 must be checked by regular measurements.
- The conformity of the information in the acceptance test certificate (mono-click brackets and modular click rails) or in the manufacturer's certificate of compliance (plastic inlays) with the specifications in section 2.1 must be checked.

The results of the in-house production control must be recorded and evaluated. The records must include at least the following details:

- description of the building product or the starting material and the constituents
- type of inspection or test
- date of manufacture and testing of the building product or the starting material or the constituents
- result of the inspections and testing and where applicable comparison with the specifications
- signature of the person responsible for the in-house production control.

The records must be stored for at least five years. They must be presented to Deutsches Institut für Bautechnik and the responsible supreme building inspection authority on request.

If the result of the test is not satisfactory, the manufacturer must immediately implement the measures necessary to eliminate the fault. Building products that do not comply with the requirements must be treated in such a way that they cannot be mistaken for products that do comply with the requirements. Once the fault has been eliminated, the corresponding test must be repeated immediately – as far as it is technically possible and necessary as verification that the fault has been eliminated.

3 Provisions for planning, dimensioning and execution

3.1 Planning

3.1.1 General

Unless otherwise specified below, the *Technische Baubestimmungen* (technical building regulations) apply to the planning of the Kalzip FC façade system.

The construction technique comprises the following building products.

- cladding panels from Kalzip GmbH in accordance with DIN EN 14782[1].

  The dimensions of the cladding panels must comply with the specifications in annex 2.1 or 2.2.

  The cladding panels with nominal sheet thicknesses *t* as specified in annexes 5.1 to 5.8 must be made of the aluminium alloys EN AW-3004, EN AW-3005 or EN AW-6025 as per DIN EN 573-3[5] or an aluminium alloy with at least the same material properties as per DIN EN 573-3[5]. DIN EN 12020-2 applies for the dimensional tolerances. For cladding panels with a nominal sheet thickness of t = 1,50 mm, a starting material of $t \geq 1{,}47$ mm may be used.

If the aluminium strip is produced in clad form, the layer thickness on each side must be at least 4% of the nominal thickness *t*. Aluminium alloy EN AW-7072 in accordance with DIN EN 573-3[5] must be used as the cladding material.

For all sheet thicknesses, the starting material must exhibit at least the material properties given in table 2 (strength properties and elongation at fracture determined in accordance with DIN EN 10002-1[6] on flat samples *t* x 12,5 mm x 50 mm).

Table 2: mechanical properties

$R_{p0,2}$ [N/mm²]	R_m [N/mm²]	Sheet thickness *t* [mm]	$A_{50\,mm}$ [%]
185	220	0,8	3,5
		0,9	3,8
		≥ 1,0	4,0
Alternatively, aluminium alloys with the following properties may be used: $R_{p0,2} \geq 160$ N/mm² and $R_m \geq 175$ N/mm² or $R_{p0,2} \geq 140$ N/mm² and $R_m \geq 165$ N/mm²			

The requirements specified in table 2 must also be met by the finished component in its final state of use.

The starting material of the cladding panels must have sufficient formability. The cladding panels must not show any signs of cracking.

The cladding panels must comply with the relevant provisions of DIN EN 1090-5[7].

- fixing profiles (modular click rails) according to this notification
- fasteners (mono-click brackets) according to this notification
- plastic moulded parts (plastic inlays) according to this notification.

Depending on the geometry of the cladding panels, the façade system can be designed with perforated cladding panels according to annex 2.2 and without shadow gaps or with non-perforated cladding panels according to annex 2.1 and with or without shadow gaps.

Fire protection certificates and verifications of the building physics must be provided separately if necessary.

3.1.2 Fire protection

The cladding panels, mono-click brackets und modular click rails are non-combustible if uncoated or when a metallic coating is applied (Building Material Class DIN 4102-A1 as specified in DIN 4102-4[8]). If they are coated with organic substances, they must at least fulfil the requirements for normally inflammable building materials (DIN 4102-B2 as specified in DIN 4102-1[9]).

The plastic inlays must fulfil the requirements for normally inflammable building materials (DIN 4102-B2 as specified in DIN 4102-1[9]).

[6] DIN EN 10002-1:2001-12 Metallic materials - Tensile testing - Part 1: Method of testing at ambient temperature

[7] DIN EN 1090-5:2017-07 Execution of steel structures and aluminium structures - Part 5: Technical requirements for cold-formed structural aluminium elements and cold-formed structures for roof, ceiling, floor and wall applications

[8] DIN 4102-4:2016-05 Fire behaviour of building materials and building components - Part 4: Synopsis and application of classified building materials, components and special components

[9] DIN 4102-1:1998-05 Fire behaviour of building materials and building components - Part 1: Building materials; concepts, requirements and tests

3.2 Dimensioning

Unless otherwise specified below, the *Technische Baubestimmungen* (technical building regulations) apply to the dimensioning of the Kalzip FC façade system.

The verification concept specified in DIN EN 1990[10] in conjunction with the National Annex applies. The theory of elasticity applies.

In each individual case, evidence of the serviceability and the load-bearing safety of the Kalzip FC façade system in accordance with the *Technische Baubestimmungen* (technical building regulations) must be provided using structural analysis.

The general construction technique permit covered by this notification regulates exclusively the use of the Kalzip FC façade system as well as the ultimate limit state analysis of the Kalzip FC façade system.

The ultimate limit state analysis of the connection of the cladding panels with the mono-click brackets and/or with the modular click rails is deemed to be fulfilled by the ultimate limit state analysis of the cladding panels at the end and intermediate supports for gravity loading. For uplift loading, the ultimate limit state analysis must also be carried out with regard to the cladding panels being pulled out from the mono-click brackets or the modular click rails.

The bending moment capacity of the modular click rails must be verified in each individual case using structural analysis. The verification can be omitted if the modular click rails are joined mechanically to the sub-construction at every point where they are connected to the cladding panels.

modular click rails NE as per annex 3.1 must be joined mechanically to the sub-construction at every point where they are connected to the cladding panels, so verification of the bending moment capacity is not required.

The mono-click brackets must be fastened to the sub-construction with two fasteners in each case.

When the cladding panels are not laid horizontally, the load must be verified as being derived from the cladding's dead weight.

In the wall areas of Zone A the verification of the cladding panels may be carried out using the wind loads for Zone B specified in DIN EN 1991-1-4[11], figure 7. The verification of the attachment of the cladding panels and the fasteners must continue to be carried out using the values for Zone A.

It must be verified that the design value of an effect E_d is not greater than the design value of the associated resistance R_d.

The following verifications must be carried out separately:

- serviceability
- the ultimate limit state of the mechanical connections of the mono-click brackets or modular click rails with the sub-construction
- the ultimate limit state of the sub-construction
- positional stability
- the introduction and transmission of the forces verified in section 3.3 into the main support system (e.g. building envelope, supporting structure).

[10] DIN EN 1990:2010-12 Eurocode - Basis of structural design

[11] DIN EN 1991-1-4:2010-12 Eurocode 1: Actions on structures - Part 1-4: General actions - Wind actions in conjunction with DIN EN 1991-1-4/NA:2010-12

3.3 Verifications

3.3.1 Characteristic values of the resistance parameters of the cladding panels and their attachment

The ultimate limit state analyses of the Kalzip FC façade system must be carried out in accordance with the following specifications. For the cladding panels and their fixings, the characteristic values of the resistance given in annexes 5.1 to 6.6 shall be applied, taking into account annex 7 and the associated partial factors γ_M. The designation of the characteristic values in annexes 5.1 to 6.6 is in accordance with DIN EN 1999-1-4[12].

The characteristic values of the resistance for the pull-out force of the cladding panels from the mono-click brackets or from the modular click rails under uplifting load, as well as the corresponding partial factors γ_M, are specified in annexes 3.1 to 3.3 and annex 4, while taking annex 7 into account.

For cladding panels with overall widths *BB* > 500 mm attention must also be paid to the following

- If the ratio of the span *L* to the overall width *BB* of the cladding panels is *L/BB* ≥ 1,0, the intermediate support force F may be calculated using *F*=1,1 * *q* * *L* for cladding panels designed as two-span beams and subjected to an area load *q*.
- For *L/BB* < 1,0, the calculated effect of the stress relief due to the projection of the cladding panels on the first intermediate support can be ignored.
- For *L/BB* < 0,5, the support forces for the calculated span L_{calc} = 0,5 * *BB* must be determined.

The first and last supports of each cladding panel are to be regarded as end supports.

For cladding panels with overall widths as given in annexes 5.1 to 6.6, the characteristic values of the resistance may be determined by interpolation using the following equation:

$$S(BB)= S(BB_1)+\frac{S(BB_1)-S(BB_2)}{\frac{1}{BB_1}-\frac{1}{BB_2}}\cdot\left(\frac{1}{BB}-\frac{1}{BB_1}\right)$$

where

BB	is the overall width to be interpolated
S(BB)	is the resistance parameter for the width *BB*
BB_1	is the first overall width with known resistance parameter $S(BB_1)$
BB_2	is the second overall width with known resistance parameter $S(BB_2)$.

Alternatively, the characteristic values of the resistance parameters of the cladding panels with the next higher overall width can be used for the interpolation.

Cladding panels with an overall width *BB* < 250 mm should be dimensioned using the resistance values of the FC 30/250 cladding panel.

3.3.2 Characteristic values of the bending moment capacity of the modular click rails

The characteristic values of the bending moment capacity ($M_{R,k}$) of the modular click rails SE and SEL as well as the corresponding partial safety coefficient γ_M for determining the resistances are shown in annexes 3.2 and 3.3.

3.4 Execution

Unless otherwise specified below, the *Technische Baubestimmungen* (technical building regulations) apply to the installation of the Kalzip FC façade system.

The structural details of the Kalzip FC façade system can be found in the appendices.

[12] DIN EN 1999-1-4:2010-05 Eurocode 9 - Design of aluminium structures - Part 1-4: Cold-formed structural sheeting in conjunction with DIN EN 1999-1-4/NA:2011-11 and DIN EN 1999-1-4/NA:2017-10

The cladding panels are hung into the mono-click brackets or modular click rails with plastic inlays in such a way that they click into place correctly. The cladding panels can be laid in a vertical direction from above or below.

At transverse joints of the cladding panels, a separate mono-click bracket or a separate modular click rail must be positioned on each side of a joint.

The cladding panels must project at least 40 mm to guarantee the load-bearing capacity at the end supports.

The manufacturer must prepare instructions for installing the elements of the Kalzip FC façade system and hand them over to the company carrying out the work. Cladding panels, mono-click brackets and/or modular click rails with plastic inlays that are damaged, including plastic deformation, must not be installed.

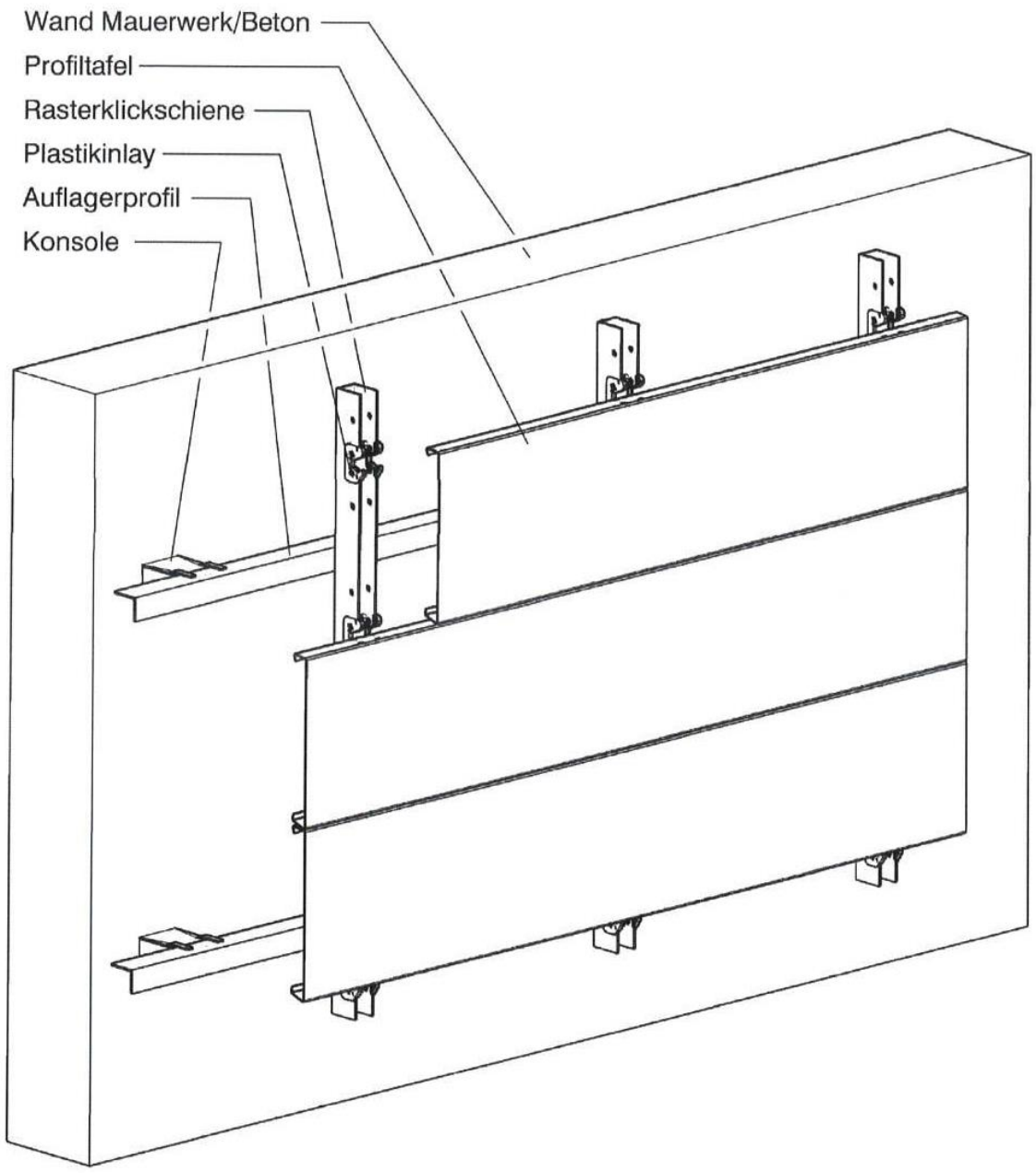
The Kalzip FC façade system may only be produced by companies with the necessary experience, unless the installation personnel are instructed by specialists from companies with experience in this field.

In order to confirm that the Kalzip FC façade system complies with the general construction technique permit covered by this notification, the company carrying out the installation work must submit a declaration of conformity in accordance with Article 16(a)(5) in conjunction with Article 21(2) of the *Musterbauordnung (*MBO, model building regulation).

Certified

Dr.-Ing. Ronald Schwuchow

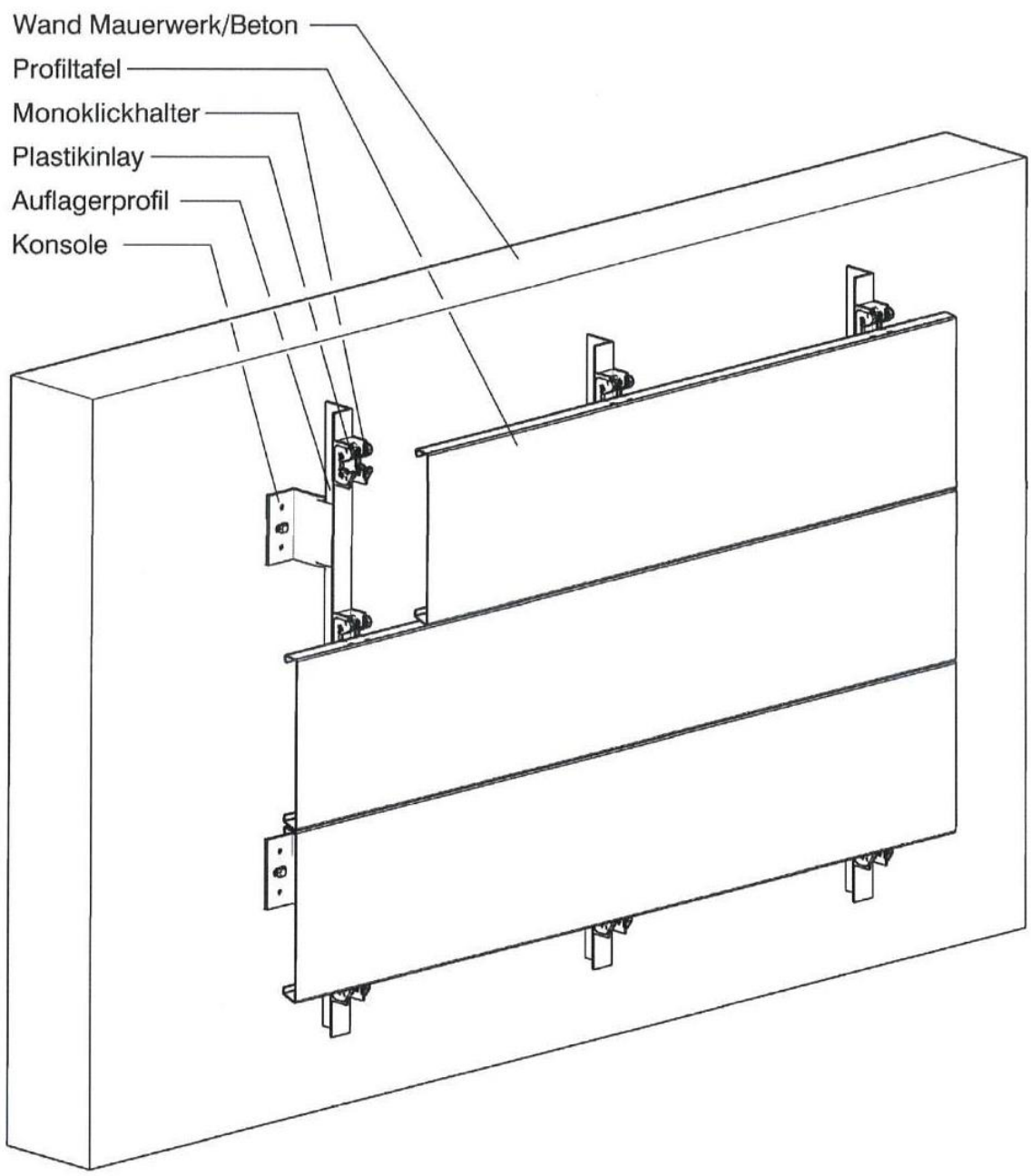
Head of Department



Translator's note:

Wand Mauerwerk/Beton	Wall masonry/concrete
Profiltafel	Profiled sheet
Rasterklickschiene	Modular click rail
Plastikinlay	Plastic inlay
Auflagerprofil	Supporting profile
Konsole	Bracket

Kalzip FC façade system made of aluminium and its products	Annex 1.1
Example of installation using modular click rails, structural liner trays on wall masonry or concrete	

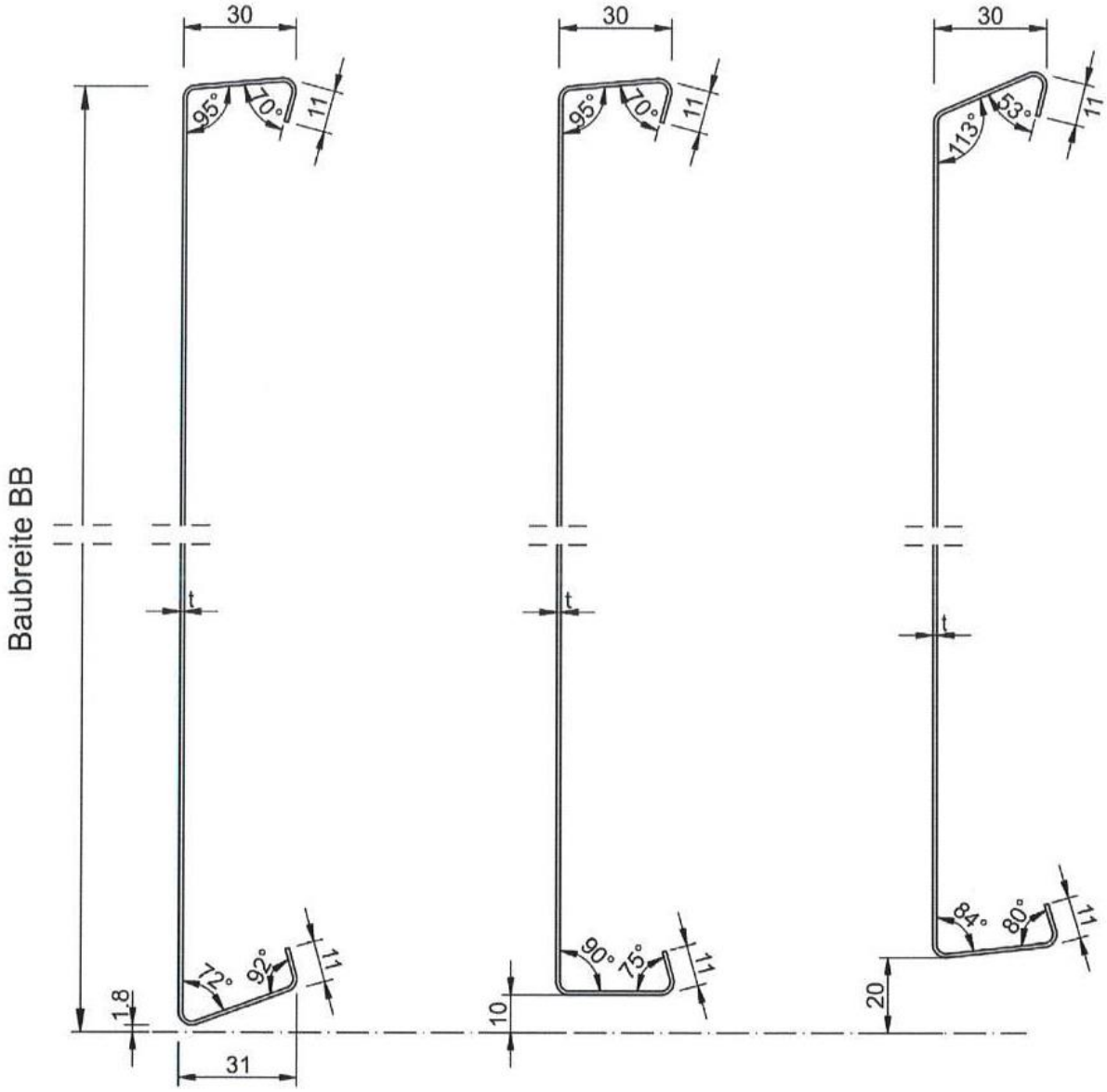


Translator's note:

Wand Mauerwerk/Beton	Wall masonry/concrete
Profiltafel	Profiled sheet
Rasterklickschiene	Modular click rail
Plastikinlay	Plastic inlay
Auflagerprofil	Supporting profile
Konsole	Bracket

Kalzip FC façade system made of aluminium and its products	Annex 1.2
Example of installation using mono-click brackets, structural liner trays on wall masonry or concrete	

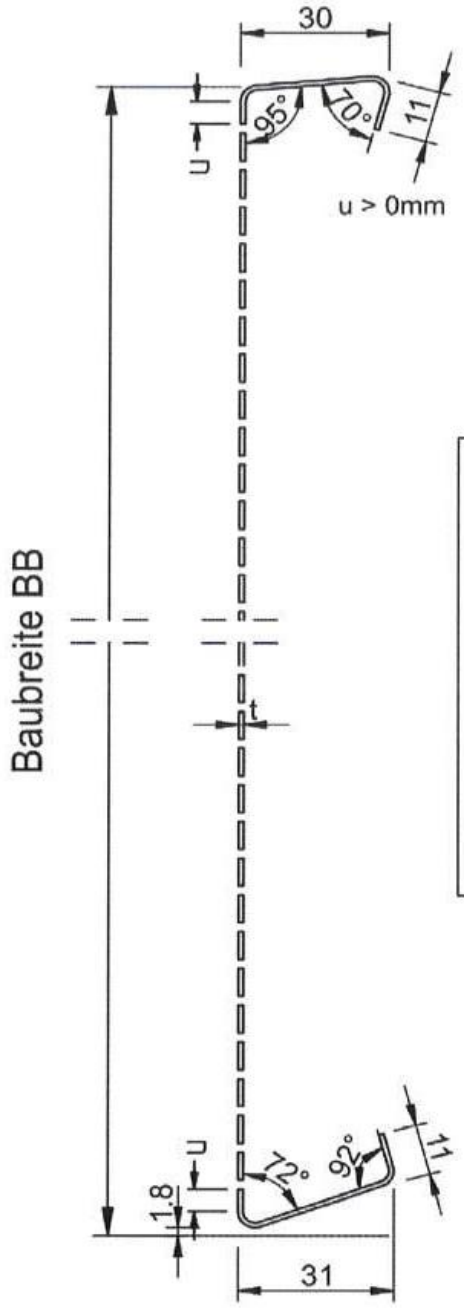
FC 30/BB **FC 30/BB/10 mm joint** **FC 30/BB/20 mm joint**

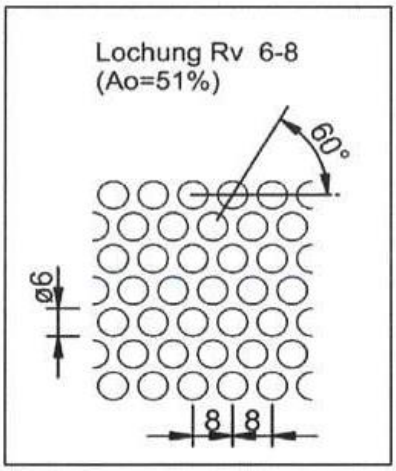


All inner radii
R = 2,5 mm

Translator's note:
Baubreite Overall width

Kalzip FC façade system made of aluminium and its products	Annex 2.1
Kalzip FC 30/BB, FC 30/BB/10 mm joint and FC 30/BB/20 mm joint, profile dimensions	





All inner radii
R = 2,5 mm

Translator's note:

Baubreite	Overall width
Lochung	Perforation

Kalzip FC façade system made of aluminium and its products	Annex 2.2
Kalzip FC 30 perforated, profile dimensions	

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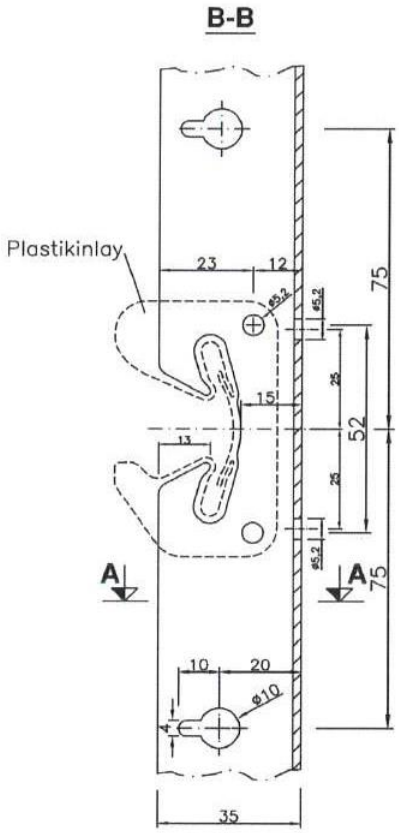
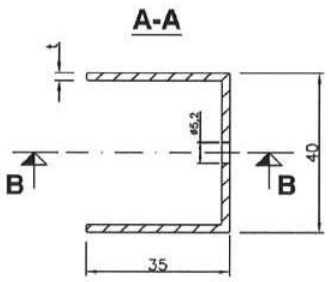
MODULAR CLICK RAIL NE
h = 35 mm
not designed for absorbing bending moments (see section 3.1)





Charakteristische Auszugskraft $t_{Schiene}$ = 2 mm	
t_N mm	$F_{R,k}$ kN/Einhängepunkt
0,8	0,90
0,9	1,13
1,0	1,36
1,2	1,63
1,5	1,63
1,6	1,63
γ_M = 1,33	

Translator's note:

Plastikinlay	Plastic inlay
Charakteristische Auszugskraft	Characteristic pull-out force
$t_{Schiene}$	t_{rail}
Einhängepunkt	Attachment point

Kalzip FC aluminium façade system and its products	Annex 3.1
Modular click rail NE Geometry and dimensions, characteristic values of resistances	

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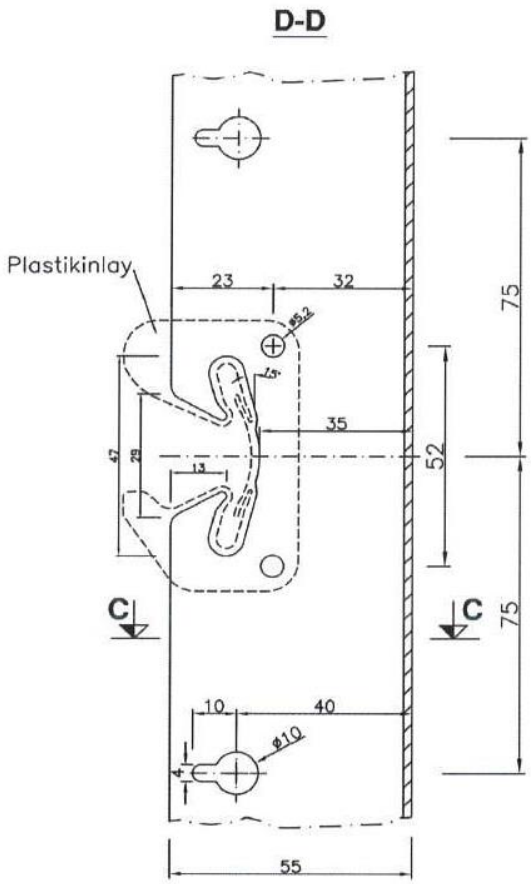
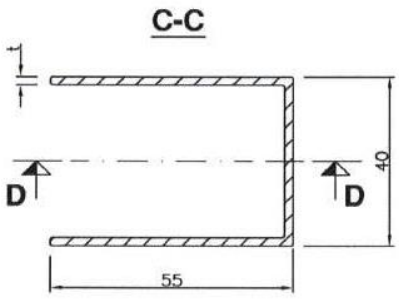
MODULAR CLICK RAIL SE
h = 55 mm





Charakteristisches Biegemoment $M_{R,k}$ $t_{Schiene}$ = 2 mm
29,7 kNcm
γ_M = 1,1

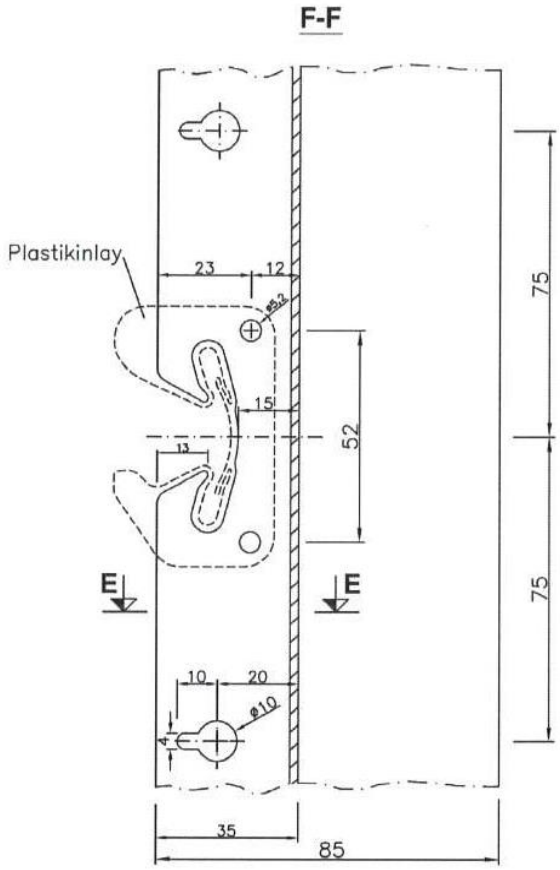
Charakteristische Auszugskraft $t_{Schiene}$ = 2 mm	
t_N mm	$F_{R,k}$ kN/Einhängepunkt
0,8 0,9 1,0 1,2 1,5 1,6	0,90 1,13 1,36 1,63 1,63 1,63
γ_M = 1,33	

Translator's note:

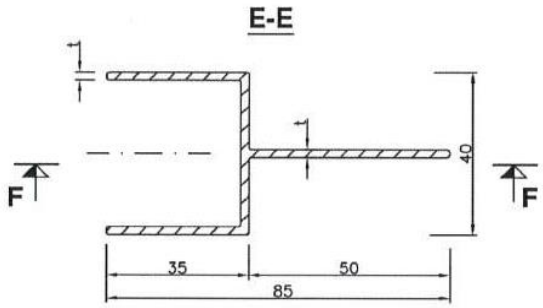
Plastikinlay	Plastic inlay
Charakteristische s Biegemoment	Characteristic bending moment
$t_{Schiene}$	t_{rail}
Charakteristische Auszugskraft	Characteristic pull-out force
Einhängepunkt	Attachment point

Kalzip FC façade system made of aluminium and its products	Annex 3.2
Modular click rail SE Geometry and dimensions, characteristic values of resistances	

MODULAR CLICK RAIL SEL
h = 85 mm



Charakteristisches Biegemoment $M_{R,k}$ $t_{Schiene}$ = 2 mm
29,7 kNcm
γ_M = 1,1



Charakteristische Auszugskraft $t_{Schiene}$ = 2 mm	
t_N mm	$F_{R,k}$ kN/Einhängepunkt
0,8	0,90
0,9	1,13
1,0	1,36
1,2	1,63
1,5	1,63
1,6	1,63
γ_M = 1,33	

Translator's note:

Plastikinlay	Plastic inlay
Charakteristische s Biegemoment	Characteristic bending moment
$t_{Schiene}$	t_{rail}
Charakteristische Auszugskraft	Characteristic pull-out force
Einhängepunkt	Attachment point

Kalzip FC façade system made of aluminium and its products	Annex 3.3
Modular click rail SEL Geometry and dimensions, characteristic values of resistances	

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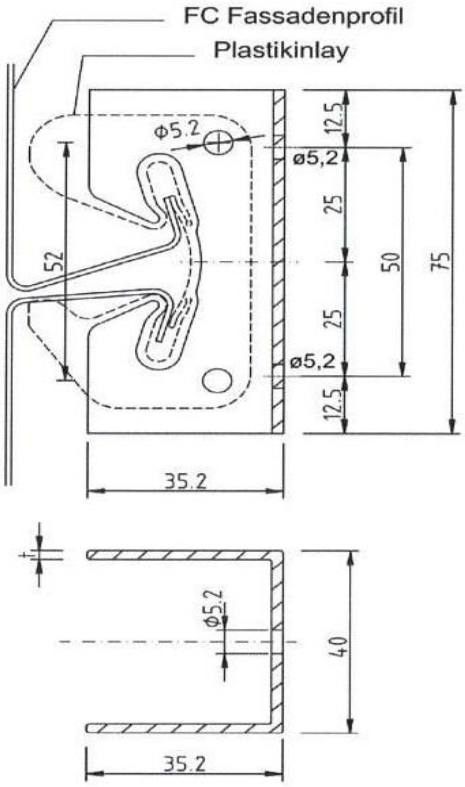
MONO-CLICK BRACKET



Charakteristische Auszugskraft t_{Halter} = 2 mm	
t_N mm	$F_{R,k}$ kN/Halter
0,8	0,90
0,9	1,13
1,0	1,36
1,2	1,63
1,5	1,63
1,6	1,63
γ_M = 1,33	

Translator's note:

FC Fassadenprofil	FC façade profile
Plastikinlay	Plastic inlay
Charakteristische Auszugskraft	Characteristic pull-out force
t_{Halter}	$t_{bracket}$

Kalzip FC façade system made of aluminium and its products	Annex 4
Mono-click bracket Geometry and dimensions, characteristic values of resistances	

Kalzip FC 30/250

Charakteristische Werte für andrückende Belastung

Blech-dicke	Eigen-last	Trägheits-moment	Feld-moment	Endauf-lagerkraft	Schnittgrößen an Zwischenauflagern $M_{Ed}/(M^0_{Rk,B}/\gamma_M)+F_{Ed}/(R^0_{Rk,B}/\gamma_M)\leq 1$			
t	g	I_{eff}	$M_{c,Rk,F}$	$R_{w,Rk,A}$	$M^0_{Rk,B}$	$R^0_{Rk,B}$	$M_{c,Rk,B}$	$R_{w,Rk,B}$
mm	kN/m²	cm⁴/m	kNm/m	kN/m	kNm/m	kN/m	kNm/m	kN/m
0,8	0,0282	3,96	0,613	1,63	-	-	0,300	3,26
0,9	0,0317	4,77	0,728	2,07	-	-	0,397	4,15
1,0	0,0352	5,59	0,849	2,54	-	-	0,498	5,09
1,2	0,0422	7,21	1,107	4,05	1,017	38,65	0,898	8,09
1,5	0,0528	8,83	1,356	4,96	1,245	47,35	1,101	9,91
1,6	0,0563	9,61	1,476	5,40	1,355	51,54	1,198	10,79
		γ_M= 1,0	γ_M= 1,1					

Kalzip FC 30/250

Charakteristische Werte für abhebende Belastung

Blech-dicke	Trägheits-moment	Feld-moment	Endauf-lagerkraft	Schnittgrößen an Zwischenauflagern $M_{Ed}/(M^0_{Rk,B}/\gamma_M)+F_{Ed}/(R^0_{Rk,B}/\gamma_M)\leq 1$			
t	I_{eff}	$M_{c,Rk,F}$	$R_{w,Rk,A}$	$M^0_{Rk,B}$	$R^0_{Rk,B}$	$M_{c,Rk,B}$	$R_{w,Rk,B}$
mm	cm⁴/m	kNm/m	kN/m	kNm/m	kN/m	kNm/m	kN/m
0,8	8,01	0,462	1,50	0,647	41,73	0,615	3,00
0,9	9,02	0,565	1,80	0,777	50,13	0,739	3,60
1,0	10,02	0,671	2,10	0,907	58,53	0,863	4,21
1,2	11,49	0,890	2,71	1,167	75,33	1,110	5,41
1,5	14,08	1,090	2,71	1,430	92,28	1,360	5,41
1,6	15,32	1,186	2,71	1,556	100,4	1,480	5,41
	γ_M= 1,0	γ_M= 1,1					

If no values are given for $M^o_{Rk,B}$ or $R^o_{Rk,B}$ interaction verification is not necessary.

Translator's note:

Charakteristische Werte für andrückende Belastung	**Characteristic values for gravity loading**
Blechdicke	Sheet thickness
Eigenlast	Dead weight
Trägheitsmoment	Moment of inertia
Feldmoment	Field moment
Endauflagerkraft	End-support force
Schnittgrößen an Zwischenlagern	Stress resultants at intermediate supports
Charakteristische Werte für abhebende Belastung	**Characteristic values for uplift loading**

Kalzip FC façade system made of aluminium and its products	Annex 5.1
Section properties, characteristic values of resistances and partial factors γ_M for Kalzip FC 30/250	

Kalzip FC 30/300

Charakteristische Werte für andrückende Belastung

Blech-dicke	Eigen-last	Trägheits-moment	Feld-moment	Endauf-lagerkraft	Schnittgrößen an Zwischenauflagern $M_{Ed}/(M^0_{Rk,B}/\gamma_M)+F_{Ed}/(R^0_{Rk,B}/\gamma_M)\leq 1$			
t	g	I_{eff}	$M_{c,Rk,F}$	$R_{w,Rk,A}$	$M^0_{Rk,B}$	$R^0_{Rk,B}$	$M_{c,Rk,B}$	$R_{w,Rk,B}$
mm	kN/m²	cm⁴/m	kNm/m	kN/m	kNm/m	kN/m	kNm/m	kN/m
0,8	0,0271	3,26	0,527	1,39	-	-	0,256	2,78
0,9	0,0305	3,88	0,621	1,76	-	-	0,336	3,52
1,0	0,0338	4,51	0,719	2,14	-	-	0,420	4,29
1,2	0,0406	5,76	0,927	3,30	0,798	36,15	0,718	6,58
1,5	0,0508	7,06	1,136	4,03	0,977	44,28	0,880	8,06
1,6	0,0541	7,68	1,236	4,38	1,063	48,20	0,958	8,77
		γ_M= 1,0	γ_M= 1,1					

Kalzip FC 30/300

Charakteristische Werte für abhebende Belastung

Blech-dicke	Trägheits-moment	Feld-moment	Endauf-lagerkraft	Schnittgrößen an Zwischenauflagern $M_{Ed}/(M^0_{Rk,B}/\gamma_M)+F_{Ed}/(R^0_{Rk,B}/\gamma_M)\leq 1$			
t	I_{eff}	$M_{c,Rk,F}$	$R_{w,Rk,A}$	$M^0_{Rk,B}$	$R^0_{Rk,B}$	$M_{c,Rk,B}$	$R_{w,Rk,B}$
mm	cm⁴/m	kNm/m	kN/m	kNm/m	kN/m	kNm/m	kN/m
0,8	6,89	0,393	1,64	1,13	6,19	0,656	3,29
0,9	7,75	0,481	1,85	1,23	7,72	0,772	3,69
1,0	8,61	0,570	2,05	1,34	9,41	0,889	4,10
1,2	10,33	0,751	2,45	1,56	13,20	1,122	4,91
1,5	12,65	0,921	2,45	1,91	16,17	1,374	4,91
1,6	13,77	1,002	2,45	2,08	17,60	1,496	4,91
	γ_M= 1,0	γ_M= 1,1					

If no values are given for $M^o_{Rk,B}$ or $R^o_{Rk,B}$ interaction verification is not necessary.

Translator's note:

Charakteristische Werte für andrückende Belastung	**Characteristic values for gravity loading**
Blechdicke	Sheet thickness
Eigenlast	Dead weight
Trägheitsmoment	Moment of inertia
Feldmoment	Field moment
Endauflagerkraft	End-support force
Schnittgrößen an Zwischenlagern	Stress resultants at intermediate supports
Charakteristische Werte für abhebende Belastung	**Characteristic values for uplift loading**

Kalzip FC façade system made of aluminium and its products	Annex 5.2
Section properties, characteristic values of resistances and partial factors γ_M for Kalzip FC 30/300	

Kalzip FC 30/350

Charakteristische Werte für andrückende Belastung

Blech-dicke	Eigen-last	Trägheits-moment	Feld-moment	Endauf-lagerkraft	Schnittgrößen an Zwischenauflagern $M_{Ed}/(M^0_{Rk,B}/\gamma_M)+F_{Ed}/(R^0_{Rk,B}/\gamma_M)\leq 1$			
t	g	I_{eff}	$M_{c,Rk,F}$	$R_{w,Rk,A}$	$M^0_{Rk,B}$	$R^0_{Rk,B}$	$M_{c,Rk,B}$	$R_{w,Rk,B}$
mm	kN/m²	cm⁴/m	kNm/m	kN/m	kNm/m	kN/m	kNm/m	kN/m
0,8	0,0263	2,76	0,465	1,22	-	-	0,224	2,43
0,9	0,0269	3,25	0,545	1,53	-	-	0,293	3,06
1,0	0,0329	3,74	0,627	1,86	-	-	0,364	3,71
1,2	0,0394	4,72	0,799	2,75	0,642	36,12	0,590	5,50
1,5	0,0493	5,78	0,978	3,37	0,787	44,24	0,722	6,73
1,6	0,0526	6,29	1,065	3,66	0,856	48,16	0,786	7,33
		γ_M= 1,0	γ_M= 1,1					

Kalzip FC 30/350

Charakteristische Werte für abhebende Belastung

Blech-dicke	Trägheits-moment	Feld-moment	Endauf-lagerkraft	Schnittgrößen an Zwischenauflagern $M_{Ed}/(M^0_{Rk,B}/\gamma_M)+F_{Ed}/(R^0_{Rk,B}/\gamma_M)\leq 1$			
t	I_{eff}	$M_{c,Rk,F}$	$R_{w,Rk,A}$	$M^0_{Rk,B}$	$R^0_{Rk,B}$	$M_{c,Rk,B}$	$R_{w,Rk,B}$
mm	cm⁴/m	kNm/m	kN/m	kNm/m	kN/m	kNm/m	kN/m
0,8	6,04	0,345	1,74	1,89	4,67	0,685	3,49
0,9	6,80	0,420	1,88	1,94	5,37	0,796	3,76
1,0	7,55	0,497	2,00	2,01	6,13	0,908	4,02
1,2	9,06	0,653	2,27	2,18	7,81	1,131	4,54
1,5	11,10	0,800	2,27	2,67	9,57	1,385	4,54
1,6	12,08	0,870	2,27	2,91	10,41	1,508	4,54
	γ_M= 1,0	γ_M= 1,1					

If no values are given for $M^o_{Rk,B}$ or $R^o_{Rk,B}$ interaction verification is not necessary.

Translator's note:

Charakteristische Werte für andrückende Belastung	**Characteristic values for gravity loading**
Blechdicke	Sheet thickness
Eigenlast	Dead weight
Trägheitsmoment	Moment of inertia
Feldmoment	Field moment
Endauflagerkraft	End-support force
Schnittgrößen an Zwischenlagern	Stress resultants at intermediate supports
Charakteristische Werte für abhebende Belastung	**Characteristic values for uplift loading**

Kalzip FC façade system made of aluminium and its products	Annex 5.3
Section properties, characteristic values of resistances and partial factors γ_M for Kalzip FC 30/350	

Kalzip FC 30/400

Charakteristische Werte für andrückende Belastung

Blech-dicke	Eigen-last	Trägheits-moment	Feld-moment	Endauf-lagerkraft	Schnittgrößen an Zwischenauflagern $M_{Ed}/(M^0_{Rk,B}/\gamma_M)+F_{Ed}/(R^0_{Rk,B}/\gamma_M)\leq 1$			
t	g	I_{eff}	$M_{c,Rk,F}$	$R_{w,Rk,A}$	$M^0_{Rk,B}$	$R^0_{Rk,B}$	$M_{c,Rk,B}$	$R_{w,Rk,B}$
mm	kN/m²	cm⁴/m	kNm/m	kN/m	kNm/m	kN/m	kNm/m	kN/m
0,8	0,0257	2,38	0,419	1,09	-	-	0,201	2,18
0,9	0,0289	2,77	0,488	1,36	-	-	0,260	2,72
1,0	0,0321	3,16	0,558	1,64	-	-	0,322	3,28
1,2	0,0386	3,93	0,702	2,34	0,526	39,15	0,493	4,68
1,5	0,0482	4,81	0,860	2,87	0,645	47,96	0,604	5,73
1,6	0,0514	5,24	0,937	3,13	0,702	52,21	0,657	6,25
		γ_M= 1,0	γ_M= 1,1					

Kalzip FC 30/400

Charakteristische Werte für abhebende Belastung

Blech-dicke	Trägheits-moment	Feld-moment	Endauf-lagerkraft	Schnittgrößen an Zwischenauflagern $M_{Ed}/(M^0_{Rk,B}/\gamma_M)+F_{Ed}/(R^0_{Rk,B}/\gamma_M)\leq 1$			
t	I_{eff}	$M_{c,Rk,F}$	$R_{w,Rk,A}$	$M^0_{Rk,B}$	$R^0_{Rk,B}$	$M_{c,Rk,B}$	$R_{w,Rk,B}$
mm	cm⁴/m	kNm/m	kN/m	kNm/m	kN/m	kNm/m	kN/m
0,8	5,38	0,308	1,82	3,04	4,26	0,706	3,64
0,9	6,05	0,375	1,90	3,08	4,62	0,814	3,80
1,0	6,73	0,443	1,98	3,13	4,99	0,922	3,96
1,2	8,07	0,579	2,14	3,26	5,79	1,137	4,27
1,5	9,89	0,709	2,14	3,99	7,09	1,393	4,27
1,6	10,76	0,772	2,14	4,35	7,72	1,516	4,27
	γ_M= 1,0	γ_M= 1,1					

If no values are given for $M^o_{Rk,B}$ or $R^o_{Rk,B}$ interaction verification is not necessary.

Translator's note:

Charakteristische Werte für andrückende Belastung	**Characteristic values for gravity loading**
Blechdicke	Sheet thickness
Eigenlast	Dead weight
Trägheitsmoment	Moment of inertia
Feldmoment	Field moment
Endauflagerkraft	End-support force
Schnittgrößen an Zwischenlagern	Stress resultants at intermediate supports
Charakteristische Werte für abhebende Belastung	**Characteristic values for uplift loading**

Kalzip FC façade system made of aluminium and its products	Annex 5.4
Section properties, characteristic values of resistances and partial factors γ_M for Kalzip FC 30/400	

Kalzip FC 30/450

Charakteristische Werte für andrückende Belastung

Blech-dicke	Eigen-last	Trägheits-moment	Feld-moment	Endauf-lagerkraft	Schnittgrößen an Zwischenauflagern $M_{Ed}/(M^0_{Rk,B}/\gamma_M)+F_{Ed}/(R^0_{Rk,B}/\gamma_M)\leq 1$			
t	g	I_{eff}	$M_{c,Rk,F}$	$R_{w,Rk,A}$	$M^0_{Rk,B}$	$R^0_{Rk,B}$	$M_{c,Rk,B}$	$R_{w,Rk,B}$
mm	kN/m²	cm⁴/m	kNm/m	kN/m	kNm/m	kN/m	kNm/m	kN/m
0,8	0,0252	2,09	0,383	0,99	-	-	0,182	1,98
0,9	0,0284	2,40	0,443	1,23	-	-	0,235	2,46
1,0	0,0316	2,71	0,504	1,47	-	-	0,289	2,95
1,2	0,0379	3,33	0,627	2,03	0,437	48,27	0,418	4,05
1,5	0,0473	4,08	0,769	2,48	0,535	59,13	0,512	4,96
1,6	0,0505	4,44	0,837	2,70	0,583	64,35	0,557	5,40
		γ_M= 1,0	γ_M= 1,1					

Kalzip FC 30/450

Charakteristische Werte für abhebende Belastung

Blech-dicke	Trägheits-moment	Feld-moment	Endauf-lagerkraft	Schnittgrößen an Zwischenauflagern $M_{Ed}/(M^0_{Rk,B}/\gamma_M)+F_{Ed}/(R^0_{Rk,B}/\gamma_M)\leq 1$			
t	I_{eff}	$M_{c,Rk,F}$	$R_{w,Rk,A}$	$M^0_{Rk,B}$	$R^0_{Rk,B}$	$M_{c,Rk,B}$	$R_{w,Rk,B}$
mm	cm⁴/m	kNm/m	kN/m	kNm/m	kN/m	kNm/m	kN/m
0,8	4,85	0,280	1,88	4,84	4,11	0,723	3,77
0,9	5,46	0,340	1,92	5,06	4,27	0,828	3,84
1,0	6,06	0,400	1,96	5,28	4,42	0,933	3,91
1,2	7,28	0,521	2,03	5,72	4,73	1,142	4,06
1,5	8,92	0,638	2,03	7,00	5,79	1,399	4,06
1,6	9,71	0,695	2,03	7,63	6,31	1,523	4,06
	γ_M= 1,0	γ_M= 1,1					

If no values are given for $M^o_{Rk,B}$ or $R^o_{Rk,B}$ interaction verification is not necessary.

Translator's note:

Charakteristische Werte für andrückende Belastung	**Characteristic values for gravity loading**
Blechdicke	Sheet thickness
Eigenlast	Dead weight
Trägheitsmoment	Moment of inertia
Feldmoment	Field moment
Endauflagerkraft	End-support force
Schnittgrößen an Zwischenlagern	Stress resultants at intermediate supports
Charakteristische Werte für abhebende Belastung	**Characteristic values for uplift loading**

Kalzip FC façade system made of aluminium and its products	Annex 5.5
Section properties, characteristic values of resistances and partial factors γ_M for Kalzip FC 30/450	

Kalzip FC 30/500

Charakteristische Werte für andrückende Belastung

Blech-dicke	Eigen-last	Trägheits-moment	Feld-moment	Endauf-lagerkraft	Schnittgrößen an Zwischenauflagern $M_{Ed}/(M^0_{Rk,B}/\gamma_M)+F_{Ed}/(R^0_{Rk,B}/\gamma_M)\leq 1$			
t	g	I_{eff}	$M_{c,Rk,F}$	$R_{w,Rk,A}$	$M^0_{Rk,B}$	$R^0_{Rk,B}$	$M_{c,Rk,B}$	$R_{w,Rk,B}$
mm	kN/m²	cm⁴/m	kNm/m	kN/m	kNm/m	kN/m	kNm/m	kN/m
0,8	0,0249	1,86	0,354	0,91	-	-	0,167	1,82
0,9	0,0280	2,11	0,407	1,12	-	-	0,215	2,25
1,0	0,0311	2,35	0,461	1,34	-	-	0,263	2,68
1,2	0,0373	2,84	0,567	1,77	0,366	79,38	0,358	3,55
1,5	0,0467	3,48	0,695	2,17	0,449	97,24	0,438	4,35
1,6	0,0498	3,79	0,757	2,37	0,488	105,85	0,477	4,73
		γ_M= 1,0	γ_M= 1,1					

Kalzip FC 30/500

Charakteristische Werte für abhebende Belastung

Blechd icke	Trägheits moment	Feld-moment	Endauflag erkraft	Schnittgrößen an Zwischenauflagern $M_{Ed}/(M^0_{Rk,B}/\gamma_M)+F_{Ed}/(R^0_{Rk,B}/\gamma_M)\leq 1$			
t	I_{eff}	$M_{c,Rk,F}$	$R_{w,Rk,A}$	$M^0_{Rk,B}$	$R^0_{Rk,B}$	$M_{c,Rk,B}$	$R_{w,Rk,B}$
mm	cm⁴/m	kNm/m	kN/m	kNm/m	kN/m	kNm/m	kN/m
0,8	4,42	0,257	1,93	7,88	4,06	0,737	3,86
0,9	4,97	0,312	1,94	9,17	4,08	0,839	3,87
1,0	5,52	0,366	1,94	10,86	4,10	0,941	3,88
1,2	6,63	0,475	1,95	16,71	4,08	1,146	3,89
1,5	8,12	0,582	1,95	20,47	5,00	1,404	3,89
1,6	8,84	0,634	1,95	22,28	5,44	1,528	3,89
	γ_M= 1,0	γ_M= 1,1					

If no values are given for $M^o_{Rk,B}$ or $R^o_{Rk,B}$ interaction verification is not necessary.

Translator's note:

Charakteristische Werte für andrückende Belastung	**Characteristic values for gravity loading**
Blechdicke	Sheet thickness
Eigenlast	Dead weight
Trägheitsmoment	Moment of inertia
Feldmoment	Field moment
Endauflagerkraft	End-support force
Schnittgrößen an Zwischenlagern	Stress resultants at intermediate supports
Charakteristische Werte für abhebende Belastung	**Characteristic values for uplift loading**

Kalzip FC façade system made of aluminium and its products	Annex 5.6
Section properties, characteristic values of resistances and partial factors γ_M for Kalzip FC 30/500	

Kalzip FC 30/600

Charakteristische Werte für andrückende Belastung

Blech-dicke	Eigen-last	Trägheits-moment	Feld-moment	Endauf-lagerkraft	Schnittgrößen an Zwischenauflagern $M_{Ed}/(M^0_{Rk,B}/\gamma_M)+F_{Ed}/(R^0_{Rk,B}/\gamma_M)\leq 1$			
t	g	I_{eff}	$M_{c,Rk,F}$	$R_{w,Rk,A}$	$M^0_{Rk,B}$	$R^0_{Rk,B}$	$M_{c,Rk,B}$	$R_{w,Rk,B}$
mm	kN/m²	cm⁴/m	kNm/m	kN/m	kNm/m	kN/m	kNm/m	kN/m
1,2	0,0365	2,37	0,473	1,48	0,305	66,15	0,298	2,96
1,5	0,0456	2,90	0,579	1,81	0,374	81,04	0,365	3,62
1,6	0,0487	3,16	0,630	1,97	0,407	88,20	0,398	3,94
		γ_M= 1,0	γ_M= 1,1					

Kalzip FC 30/600

Charakteristische Werte für abhebende Belastung

Blech-dicke	Trägheits-moment	Feld-moment	Endaufla-gerkraft	Schnittgrößen an Zwischenauflagern $M_{Ed}/(M^0_{Rk,B}/\gamma_M)+F_{Ed}/(R^0_{Rk,B}/\gamma_M)\leq 1$			
t	I_{eff}	$M_{c,Rk,F}$	$R_{w,Rk,A}$	$M^0_{Rk,B}$	$R^0_{Rk,B}$	$M_{c,Rk,B}$	$R_{w,Rk,B}$
mm	cm⁴/m	kNm/m	kN/m	kNm/m	kN/m	kNm/m	kN/m
1,2	5,53	0,396	1,62	13,92	3,40	0,955	3,24
1,5	6,77	0,485	1,62	17,06	4,16	1,170	3,24
1,6	7,37	0,528	1,62	18,57	4,53	1,273	3,24
	γ_M= 1,0	γ_M= 1,1					

Besides the support forces, the following limits for γ_M = 1,33 must be observed ($R_{W,Rk,A} = R_{W,Rk,B}/2$)

t = 1,2 mm $L/BB \geq 1{,}0$: $R_{Rk,B}$ = 1,63 kN/m; intermediate values of L/BB may be interpolated linearly
L/BB = 0,5: $R_{Rk,B}$ = 1,14 kN/m;

$t \geq$ 1,2 mm $L/BB \geq 1{,}0$: $R_{Rk,B}$ = 2,95 kN/m; intermediate values of L/BB may be interpolated linearly
L/BB = 0,5: $R_{Rk,B}$ = 2,07 kN/m;

where L = support width
BB = overall width

Translator's note:

Charakteristische Werte für andrückende Belastung	**Characteristic values for gravity loading**
Blechdicke	Sheet thickness
Eigenlast	Dead weight
Trägheitsmoment	Moment of inertia
Feldmoment	Field moment
Endauflagerkraft	End-support force
Schnittgrößen an Zwischenlagern	Stress resultants at intermediate supports
Charakteristische Werte für abhebende Belastung	**Characteristic values for uplift loading**

Kalzip FC façade system made of aluminium and its products	Annex 5.7
Section properties, characteristic values of resistances and partial factors γ_M for Kalzip FC 30/600	

Kalzip FC 30/800

Charakteristische Werte für andrückende Belastung

Blech-dicke	Eigen-last	Trägheits-moment	Feld-moment	Endauf-lagerkraft	Schnittgrößen an Zwischenauflagern $M_{Ed}/(M^0_{Rk,B}/\gamma_M)+F_{Ed}/(R^0_{Rk,B}/\gamma_M)\leq 1$			
t	g	I_{eff}	$M_{c,Rk,F}$	$R_{w,Rk,A}$	$M^0_{Rk,B}$	$R^0_{Rk,B}$	$M_{c,Rk,B}$	$R_{w,Rk,B}$
mm	kN/m²	cm⁴/m	kNm/m	kN/m	kNm/m	kN/m	kNm/m	kN/m
1,2	0,0355	1,78	0,354	1,11	0,229	49,61	0,224	2,22
1,5	0,0443	2,17	0,434	1,36	0,280	60,78	0,274	2,72
1,6	0,0473	2,37	0,473	1,48	0,305	66,15	0,298	2,96
		γ_M= 1,0	γ_M= 1,1					

Kalzip FC 30/800

Charakteristische Werte für abhebende Belastung

Blech-dicke	Trägheits-moment	Feld-moment	Endaufla-gerkraft	Schnittgrößen an Zwischenauflagern $M_{Ed}/(M^0_{Rk,B}/\gamma_M)+F_{Ed}/(R^0_{Rk,B}/\gamma_M)\leq 1$			
t	I_{eff}	$M_{c,Rk,F}$	$R_{w,Rk,A}$	$M^0_{Rk,B}$	$R^0_{Rk,B}$	$M_{c,Rk,B}$	$R_{w,Rk,B}$
mm	cm⁴/m	kNm/m	kN/m	kNm/m	kN/m	kNm/m	kN/m
1,2	4,14	0,297	1,22	10,44	2,55	0,716	2,43
1,5	5,08	0,364	1,22	12,79	3,12	0,878	2,43
1,6	5,53	0,396	1,22	13,92	3,40	0,955	2,43
	γ_M= 1,0	γ_M= 1,1					

Besides the support forces, the following limits for γ_M = 1,33 must be observed ($R_{W,Rk,A} = R_{W,Rk,B}/2$)

t = 1,2 mm *L/BB* ≥ 1,0: $R_{Rk,B}$ = 1,23 kN/m; intermediate values of *L/BB* may be interpolated linearly
L/BB = 0,5: $R_{Rk,B}$ = 0,858 kN/m;
t ≥ 1,2 mm *L/BB* ≥ 1,0: $R_{Rk,B}$ = 2,22 kN/m; intermediate values of *L/BB* may be interpolated linearly
L/BB = 0,5: $R_{Rk,B}$ = 1,55 kN/m;
where *L* = support width
BB = overall width

Translator's note:

Charakteristische Werte für andrückende Belastung	**Characteristic values for gravity loading**
Blechdicke	Sheet thickness
Eigenlast	Dead weight
Trägheitsmoment	Moment of inertia
Feldmoment	Field moment
Endauflagerkraft	End-support force
Schnittgrößen an Zwischenlagern	Stress resultants at intermediate supports
Charakteristische Werte für abhebende Belastung	**Characteristic values for uplift loading**

Kalzip FC façade system made of aluminium and its products	Annex 5.8
Section properties, characteristic values of resistances and partial factors γ_M for Kalzip FC 30/800	

Kalzip FC 30/250 gelocht

Charakteristische Werte für andrückende Belastung

Blech-dicke	Eigen-last	Trägheits-moment	Feld-moment	Endauf-lagerkraft	Schnittgrößen an Zwischenauflagern $M_{Ed}/(M^0_{Rk,B}/\gamma_M)+F_{Ed}/(R^0_{Rk,B}/\gamma_M)\leq 1$			
t	g	I_{eff}	$M_{c,Rk,F}$	$R_{w,Rk,A}$	$M^0_{Rk,B}$	$R^0_{Rk,B}$	$M_{c,Rk,B}$	$R_{w,Rk,B}$
mm	kN/m²	cm⁴/m	kNm/m	kN/m	kNm/m	kN/m	kNm/m	kN/m
1,2	0,0272	3,90	0,644	4,05	0,667	38,65	0,589	8,09
1,5	0,0341	4,74	0,827	5,06	0,853	48,32	0,754	10,12
		γ_M= 1,0	γ_M= 1,1					

Kalzip FC 30/250 gelocht

Charakteristische Werte für abhebende Belastung

Blech-dicke	Trägheits-moment	Feld-moment	Endaufla-gerkraft	Schnittgrößen an Zwischenauflagern $M_{Ed}/(M^0_{Rk,B}/\gamma_M)+F_{Ed}/(R^0_{Rk,B}/\gamma_M)\leq 1$			
t	I_{eff}	$M_{c,Rk,F}$	$R_{w,Rk,A}$	$M^0_{Rk,B}$	$R^0_{Rk,B}$	$M_{c,Rk,B}$	$R_{w,Rk,B}$
mm	cm⁴/m	kNm/m	kN/m	kNm/m	kN/m	kNm/m	kN/m
1,2	7,32	0,584	2,71	0,679	75,33	0,646	5,41
1,5	9,14	0,746	2,71	0,872	94,16	0,829	5,41
	γ_M= 1,0	γ_M= 1,1					

Perforations as per Annex 2.2

Translator's note:

Charakteristische Werte für andrückende Belastung	**Characteristic values for gravity loading**
Blechdicke	Sheet thickness
Eigenlast	Dead weight
Trägheitsmoment	Moment of inertia
Feldmoment	Field moment
Endauflagerkraft	End-support force
Schnittgrößen an Zwischenlagern	Stress resultants at intermediate supports
Charakteristische Werte für abhebende Belastung	**Characteristic values for uplift loading**

Kalzip FC façade system made of aluminium and its products	Annex 6.1
Section properties, characteristic values of resistances and partial factors γ_M for Kalzip FC 30/250 perforated	

Kalzip FC 30/300 gelocht

Charakteristische Werte für andrückende Belastung

Blech-dicke	Eigen-last	Trägheits-moment	Feld-moment	Endauf-lagerkraft	Schnittgrößen an Zwischenauflagern $M_{Ed}/(M^0_{Rk,B}/\gamma_M)+F_{Ed}/(R^0_{Rk,B}/\gamma_M)\leq 1$			
t	g	I_{eff}	$M_{c,Rk,F}$	$R_{w,Rk,A}$	$M^0_{Rk,B}$	$R^0_{Rk,B}$	$M_{c,Rk,B}$	$R_{w,Rk,B}$
mm	kN/m²	cm⁴/m	kNm/m	kN/m	kNm/m	kN/m	kNm/m	kN/m
1,2	0,0253	3,11	0,540	3,30	0,529	36,15	0,476	6,58
1,5	0,0317	3,77	0,693	4,11	0,675	45,19	0,608	8,22
		γ_M= 1,0	γ_M= 1,1					

Kalzip FC 30/300 gelocht

Charakteristische Werte für abhebende Belastung

Blech-dicke	Trägheits-moment	Feld-moment	Endaufla-gerkraft	Schnittgrößen an Zwischenauflagern $M_{Ed}/(M^0_{Rk,B}/\gamma_M)+F_{Ed}/(R^0_{Rk,B}/\gamma_M)\leq 1$			
t	I_{eff}	$M_{c,Rk,F}$	$R_{w,Rk,A}$	$M^0_{Rk,B}$	$R^0_{Rk,B}$	$M_{c,Rk,B}$	$R_{w,Rk,B}$
mm	cm⁴/m	kNm/m	kN/m	kNm/m	kN/m	kNm/m	kN/m
1,2	6,81	0,498	2,45	0,908	13,20	0,653	4,91
1,5	8,52	0,636	2,45	1,166	16,50	0,839	4,91
	γ_M= 1,0	γ_M= 1,1					

Perforations as per Annex 2.2

Translator's note:

Charakteristische Werte für andrückende Belastung	**Characteristic values for gravity loading**
Blechdicke	Sheet thickness
Eigenlast	Dead weight
Trägheitsmoment	Moment of inertia
Feldmoment	Field moment
Endauflagerkraft	End-support force
Schnittgrößen an Zwischenlagern	Stress resultants at intermediate supports
Charakteristische Werte für abhebende Belastung	**Characteristic values for uplift loading**

Kalzip FC façade system made of aluminium and its products	Annex 6.2
Section properties, characteristic values of resistances and partial factors γ_M for Kalzip FC 30/300 perforated	

Kalzip FC 30/350 gelocht

Charakteristische Werte für andrückende Belastung

Blech-dicke	Eigen-last	Trägheits-moment	Feld-moment	Endauf-lagerkraft	Schnittgrößen an Zwischenauflagern $M_{Ed}/(M^0_{Rk,B}/\gamma_M)+F_{Ed}/(R^0_{Rk,B}/\gamma_M)\leq 1$			
t	g	I_{eff}	$M_{c,Rk,F}$	$R_{w,Rk,A}$	$M^0_{Rk,B}$	$R^0_{Rk,B}$	$M_{c,Rk,B}$	$R_{w,Rk,B}$
mm	kN/m²	cm⁴/m	kNm/m	kN/m	kNm/m	kN/m	kNm/m	kN/m
1,2	0,0240	2,54	0,465	2,75	0,427	36,12	0,393	5,50
1,5	0,0300	3,08	0,597	3,44	0,548	45,15	0,503	6,87
		γ_M= 1,0	γ_M= 1,1					

Kalzip FC 30/350 gelocht

Charakteristische Werte für abhebende Belastung

Blech-dicke	Trägheits-moment	Feld-moment	Endaufla-gerkraft	Schnittgrößen an Zwischenauflagern $M_{Ed}/(M^0_{Rk,B}/\gamma_M)+F_{Ed}/(R^0_{Rk,B}/\gamma_M)\leq 1$			
t	I_{eff}	$M_{c,Rk,F}$	$R_{w,Rk,A}$	$M^0_{Rk,B}$	$R^0_{Rk,B}$	$M_{c,Rk,B}$	$R_{w,Rk,B}$
mm	cm⁴/m	kNm/m	kN/m	kNm/m	kN/m	kNm/m	kN/m
1,2	6,16	0,435	2,27	1,27	7,81	0,658	4,54
1,5	7,70	0,557	2,27	1,63	9,76	0,845	4,54
	γ_M= 1,0	γ_M= 1,1					

Perforations as per Annex 2.2

Translator's note:

Charakteristische Werte für andrückende Belastung	**Characteristic values for gravity loading**
Blechdicke	Sheet thickness
Eigenlast	Dead weight
Trägheitsmoment	Moment of inertia
Feldmoment	Field moment
Endauflagerkraft	End-support force
Schnittgrößen an Zwischenlagern	Stress resultants at intermediate supports
Charakteristische Werte für abhebende Belastung	**Characteristic values for uplift loading**

Kalzip FC façade system made of aluminium and its products	Annex 6.3
Section properties, characteristic values of resistances and partial factors γ_M for Kalzip FC 30/350 perforated	

Kalzip FC 30/400 gelocht

Charakteristische Werte für andrückende Belastung

Blech-dicke	Eigen-last	Trägheits-moment	Feld-moment	Endauf-lagerkraft	Schnittgrößen an Zwischenauflagern $M_{Ed}/(M^0_{Rk,B}/\gamma_M)+F_{Ed}/(R^0_{Rk,B}/\gamma_M)\leq 1$			
t	g	I_{eff}	$M_{c,Rk,F}$	$R_{w,Rk,A}$	$M^0_{Rk,B}$	$R^0_{Rk,B}$	$M_{c,Rk,B}$	$R_{w,Rk,B}$
mm	kN/m²	cm⁴/m	kNm/m	kN/m	kNm/m	kN/m	kNm/m	kN/m
1,2	0,0230	2,12	0,409	2,34	0,350	39,15	0,328	4,68
1,5	0,0287	2,57	0,525	2,93	0,450	48,94	0,422	5,86
		γ_M= 1,0	γ_M= 1,1					

Kalzip FC 30/400 gelocht

Charakteristische Werte für abhebende Belastung

Blech-dicke	Trägheits-moment	Feld-moment	Endaufla-gerkraft	Schnittgrößen an Zwischenauflagern $M_{Ed}/(M^0_{Rk,B}/\gamma_M)+F_{Ed}/(R^0_{Rk,B}/\gamma_M)\leq 1$			
t	I_{eff}	$M_{c,Rk,F}$	$R_{w,Rk,A}$	$M^0_{Rk,B}$	$R^0_{Rk,B}$	$M_{c,Rk,B}$	$R_{w,Rk,B}$
mm	cm⁴/m	kNm/m	kN/m	kNm/m	kN/m	kNm/m	kN/m
1,2	5,64	0,385	2,14	1,90	5,79	0,662	4,27
1,5	7,05	0,496	2,14	2,44	7,23	0,850	4,27
	γ_M= 1,0	γ_M= 1,1					

Perforations as per Annex 2.2

Translator's note:

Charakteristische Werte für andrückende Belastung	**Characteristic values for gravity loading**
Blechdicke	Sheet thickness
Eigenlast	Dead weight
Trägheitsmoment	Moment of inertia
Feldmoment	Field moment
Endauflagerkraft	End-support force
Schnittgrößen an Zwischenlagern	Stress resultants at intermediate supports
Charakteristische Werte für abhebende Belastung	**Characteristic values for uplift loading**

Kalzip FC façade system made of aluminium and its products	Annex 6.4
Section properties, characteristic values of resistances and partial factors γ_M for Kalzip FC 30/400 perforated	

Kalzip FC 30/450 gelocht

Charakteristische Werte für andrückende Belastung

Blech-dicke	Eigen-last	Trägheits-moment	Feld-moment	Endauf-lagerkraft	Schnittgrößen an Zwischenauflagern $M_{Ed}/(M^0_{Rk,B}/\gamma_M)+F_{Ed}/(R^0_{Rk,B}/\gamma_M)\leq 1$			
t	g	I_{eff}	$M_{c,Rk,F}$	$R_{w,Rk,A}$	$M^0_{Rk,B}$	$R^0_{Rk,B}$	$M_{c,Rk,B}$	$R_{w,Rk,B}$
mm	kN/m²	cm⁴/m	kNm/m	kN/m	kNm/m	kN/m	kNm/m	kN/m
1,2	0,0222	1,79	0,365	2,03	0,291	48,27	0,278	4,05
1,5	0,0277	2,17	0,469	2,53	0,374	60,33	0,357	5,07
		γ_M= 1,0	γ_M= 1,1					

Kalzip FC 30/450 gelocht

Charakteristische Werte für abhebende Belastung

Blech-dicke	Trägheits-moment	Feld-moment	Endaufla-gerkraft	Schnittgrößen an Zwischenauflagern $M_{Ed}/(M^0_{Rk,B}/\gamma_M)+F_{Ed}/(R^0_{Rk,B}/\gamma_M)\leq 1$			
t	I_{eff}	$M_{c,Rk,F}$	$R_{w,Rk,A}$	$M^0_{Rk,B}$	$R^0_{Rk,B}$	$M_{c,Rk,B}$	$R_{w,Rk,B}$
mm	cm⁴/m	kNm/m	kN/m	kNm/m	kN/m	kNm/m	kN/m
1,2	5,21	0,347	2,03	3,33	4,73	0,665	4,06
1,5	6,51	0,446	2,03	4,28	5,91	0,854	4,06
	γ_M= 1,0	γ_M= 1,1					

Perforations as per Annex 2.2

Translator's note:

Charakteristische Werte für andrückende Belastung	**Characteristic values for gravity loading**
Blechdicke	Sheet thickness
Eigenlast	Dead weight
Trägheitsmoment	Moment of inertia
Feldmoment	Field moment
Endauflagerkraft	End-support force
Schnittgrößen an Zwischenlagern	Stress resultants at intermediate supports
Charakteristische Werte für abhebende Belastung	**Characteristic values for uplift loading**

Kalzip FC façade system made of aluminium and its products	Annex 6.5
Section properties, characteristic values of resistances and partial factors γ_M for Kalzip FC 30/450 perforated	

Kalzip FC 30/500 gelocht

Charakteristische Werte für andrückende Belastung

Blech-dicke	Eigen-last	Trägheits-moment	Feld-moment	Endauf-lagerkraft	Schnittgrößen an Zwischenauflagern $M_{Ed}/(M^0_{Rk,B}/\gamma_M)+F_{Ed}/(R^0_{Rk,B}/\gamma_M)\leq 1$			
t	g	I_{eff}	$M_{c,Rk,F}$	$R_{w,Rk,A}$	$M^0_{Rk,B}$	$R^0_{Rk,B}$	$M_{c,Rk,B}$	$R_{w,Rk,B}$
mm	kN/m²	cm⁴/m	kNm/m	kN/m	kNm/m	kN/m	kNm/m	kN/m
1,2	0,0216	1,53	0,330	1,77	0,243	79,38	0,238	3,55
1,5	0,0269	1,85	0,424	2,22	0,313	99,23	0,306	4,43
		γ_M= 1,0	γ_M= 1,1					

Kalzip FC 30/500 gelocht

Charakteristische Werte für abhebende Belastung

Blech-dicke	Trägheits-moment	Feld-moment	Endaufla-gerkraft	Schnittgrößen an Zwischenauflagern $M_{Ed}/(M^0_{Rk,B}/\gamma_M)+F_{Ed}/(R^0_{Rk,B}/\gamma_M)\leq 1$			
t	I_{eff}	$M_{c,Rk,F}$	$R_{w,Rk,A}$	$M^0_{Rk,B}$	$R^0_{Rk,B}$	$M_{c,Rk,B}$	$R_{w,Rk,B}$
mm	cm⁴/m	kNm/m	kN/m	kNm/m	kN/m	kNm/m	kN/m
1,2	4,84	0,316	1,95	9,73	4,08	0,667	3,89
1,5	6,05	0,406	1,95	12,50	5,10	0,857	3,89
	γ_M= 1,0	γ_M= 1,1					

Perforations as per Annex 2.2

Translator's note:

Charakteristische Werte für andrückende Belastung	**Characteristic values for gravity loading**
Blechdicke	Sheet thickness
Eigenlast	Dead weight
Trägheitsmoment	Moment of inertia
Feldmoment	Field moment
Endauflagerkraft	End-support force
Schnittgrößen an Zwischenlagern	Stress resultants at intermediate supports
Charakteristische Werte für abhebende Belastung	= **Characteristic values for uplift loading**

Kalzip FC façade system made of aluminium and its products	Annex 6.6
Section properties, characteristic values of resistances and partial factors γ_M for Kalzip FC 30/500 perforated	

When using alloys with yield strengths $R_{p0,2}$ and tensile strengths R_m as given in the following table, the characteristic values of the resistance parameters in the Annexes 3.1 to 6.6 must be reduced using the respective reduction factor:

Reduction factors					
Resistance parameter			$R_{p0,2} \geq 160$ N/mm² $R_m \geq 175$ N/mm²	$R_{p0,2} \geq 140$ N/mm² $R_m \geq 165$ N/mm²	Reference
Field moment		$M_{c,Rk,F}$	93%	87%	Annexes 5.1-6.6
End support reaction		$R_{W,Rk,A}$	93%	87%	Annexes 5.1-6.6
Axis intercept		$M°_{Rk,B}$	93%	87%	Annexes 5.1-6.6
Axis intercept		$R°_{Rk,B}$	93%	87%	Annexes 5.1-6.6
Hogging moment		$M_{c,Rk,B}$	93%	87%	Annexes 5.1-6.6
Reaction force		$R_{W,Rk,B}$	93%	87%	Annexes 5.1-6.6
Moment of inertia		I_{eff}	100%	100%	Annexes 5.1-6.6
Securing force in clip / rail		$R_{R,k}$	86%	75%	Annexes 3.1-4
Additional limits of reaction force	$t < 1{,}5$ mm	$R_{R,k,B}$	86%	75%	Annexes 5.7-5.8
	$t \geq 1{,}5$ mm		98%	86%	

Kalzip FC façade system made of aluminium and its products	Annex 7
Material-dependent reduction factors	