Deutsches Institut für Bautechnik

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Approval body for construction products and types of construction

Bautechnisches Prüfamt

An institution established by the Federal and Laender Governments

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

European Technical Assessment ETA-17/1069 of 24 May 2019

English translation prepared by DIBt - Original version in German language

General Part

Technical Assessment Body issuing the European Technical Assessment:	Deutsches Institut für Bautechnik
Trade name of the construction product	RIB-ROOF Evolution sliding standing seam roofing aluminium
Product family to which the construction product belongs	Roof and wall systems with hidden fastenings
Manufacturer	Zambelli RIB-ROOF GmbH & Co. KG Hans-Sachs-Straße 3+ 5 94569 Stephansposching DEUTSCHLAND
Manufacturing plant	A
This European Technical Assessment contains	26 pages including 22 annexes which form an integral part of this assessment
This European Technical Assessment is issued in accordance with Regulation (EU) No 305/2011, on the basis of	EAD 200035-00-0302
This version replaces	ETA-17/1069 issued on 21 December 2018

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Specific part

1 Technical description of the product

The "RIB-ROOF Evolution sliding standing seam roofing aluminium" consists of prefabricated wall and roof elements (profiled sheeting) and the appropriate hidden fastenings (standard clips and/or directional clips and/or directional profiles or turned directional clips and/or turned directional profiles). The wall and roof elements are made of stucco-embossed, mill finish or plastic-coated aluminium strip which is roll formed into profiled sheets in cold condition with a trough-shaped cross section of constant height. The standard clips, directional and turned directional clips and profiles are made of galvanized steel strip.

The profiled sheeting is connected with each other continuously forming a rainproof standing seam by crimping the lateral edge ribs of adjacent roof elements. The connection to the substructure is made by standard clips and/or directional clips and/or directional profiles or turned directional clips and/or turned directional profiles, not visible from above, crimped between the edge ribs, which are fastened to the substructure by appropriate fastening elements

The components and the system setup of the product are given in annexes A 1 to A 7.

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

The verifications and assessment methods on which this European Technical Assessment is based lead to the assumption of a working life of the kit of at least 50 years. The indications given on the working life cannot be interpreted as a guarantee given by the producer, but are to be regarded only as a means for choosing the right products in relation to the expected economically reasonable working life of the works.

3 Performance of the product and references to the methods used for its assessment

3.1 Mechanical resistance and stability (BWR 1)

Essential characteristic	Performance
Profiled sheeting	see annexes B 1 to B 6
Walk-on stability	see annex B 10
Standard clips, directional clips, turned directional clips, directional profiles and turned directional profiles (hidden fastenings)	see annexes B 7 to B 9

3.2 Safety in case of fire (BWR 2)

Essential characteristic	Performance
Reaction to fire	class A1
External fire performance of the roof covering	B_{ROOF}(t1), B_{ROOF}(t2), B_{ROOF}(t3), B_{ROOF}(t4) Subject to compliance with any national provisions on the design and execution of works.

3.3 Safety and accessibility in use (BWR 4)

Essential characteristic	Performance
Profiled sheeting: - Dead load g - Effective moment of inertia for uplift and for downward load I_{ef}	see annexes B 1 to B 6
Water tightness	No performance assessed
Water permeability	The profiled sheeting is water impermeable.

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

In accordance with EAD No. 200035-00-0302 the applicable European legal act is: Decision 98/214/EC amended by Decision 2001/596/EC.

The system to be applied is: 2+

In addition, with regard to reaction to fire for products outside the scope of Decision 2010/737/EC, 96/603/EC and 2000/605/EC the applicable European legal act is: Decision 98/214/EC

The system to be applied is: 1

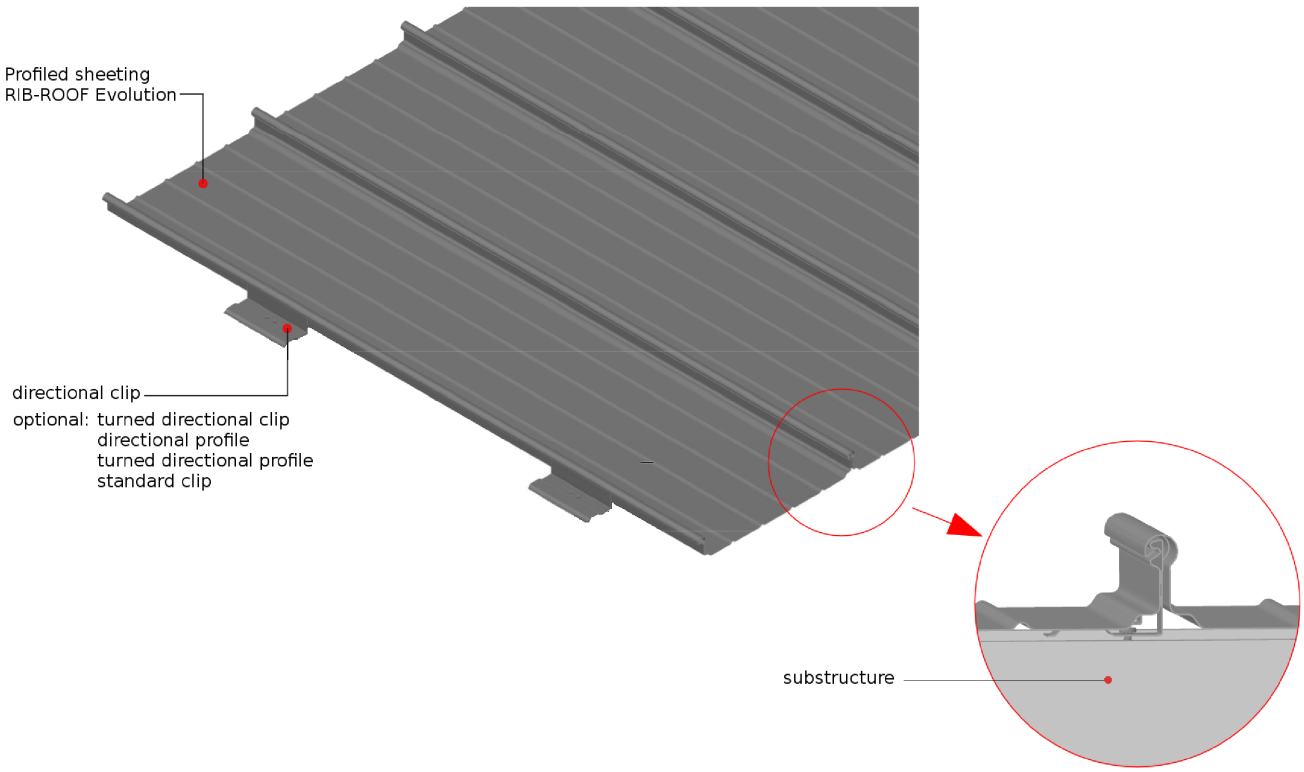
5 Technical details necessary for the implementation of the AVCP system, as provided for in the applicable EAD

Technical details necessary for the implementation of the AVCP system are laid down in the control plan deposited at Deutsches Institut für Bautechnik.

Issued in Berlin on 24 May 2019 by Deutsches Institut für Bautechnik

BD Dipl.-Ing. Andreas Kummerow
Head of Department

beglaubigt:
Ortmann



System components

Designation	Material
Profiled sheeting RIB-ROOF Evolution sliding standing seam	As material for the manufacture of the profiled sheeting with the sheet thickness given in the annexes, the aluminium alloys EN AW-3004, EN AW-3005 or EN AW-3105 are used. The initial aluminium strip material not yet roll formed (mill finish, stucco-embossed or organic coated) has at least the following mechanical properties in the longitudinal direction for all sheet thicknesses (resistances and elongation at break determined in accordance with EN 10 002-1):

Alloy	$R_{p0,2}$ N/mm²	R_m N/mm²	$A_{50\ mm}$ %
EN AW-3004, strength type 1	220	250	4
EN AW-3004, strength type 2	190	215	3
EN AW-3005, EN AW-3105	190	215	3

The profiled sheeting can be fitted with organic coating (PE, PVDF) as deposited at Deutsches Institut für Bautechnik.

Standard clips, directional clips, turned directional clips, directional profiles, turned directional profiles	Corrosion protected steel sheet, grade S350GD+AZ according to EN 10346:2015-10. For the corrosion protection DIN 55634:2010-02 applies. As corrosion protection at least coating mass AZ150 according to EN 10346:2015 has to be applied. The Zinc-Magnesium-coating mass shall meet the application-oriented demands of DIN 55634.

RIB-ROOF Evolution sliding standing seam system aluminium

System overview

Annex A 1

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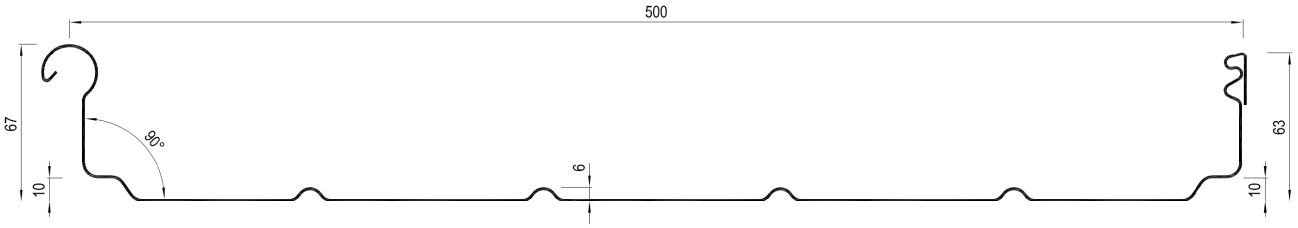
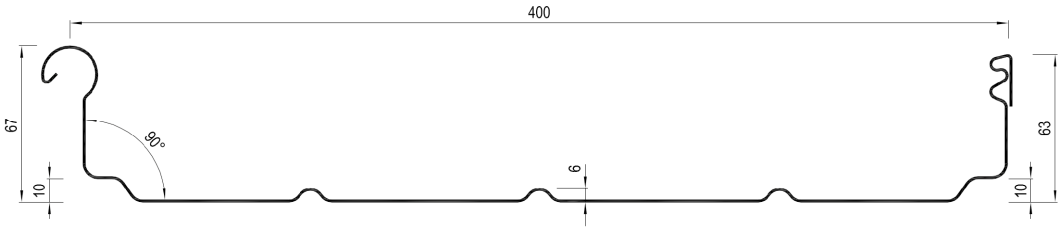


RIB-ROOF Evolution
cover width = 500 mm



RIB-ROOF Evolution
cover width = 400 mm

RIB-ROOF Evolution
cover width = 333 mm

RIB-ROOF Evolution sliding standing seam system aluminium	Annex A 2
Profile dimensions	

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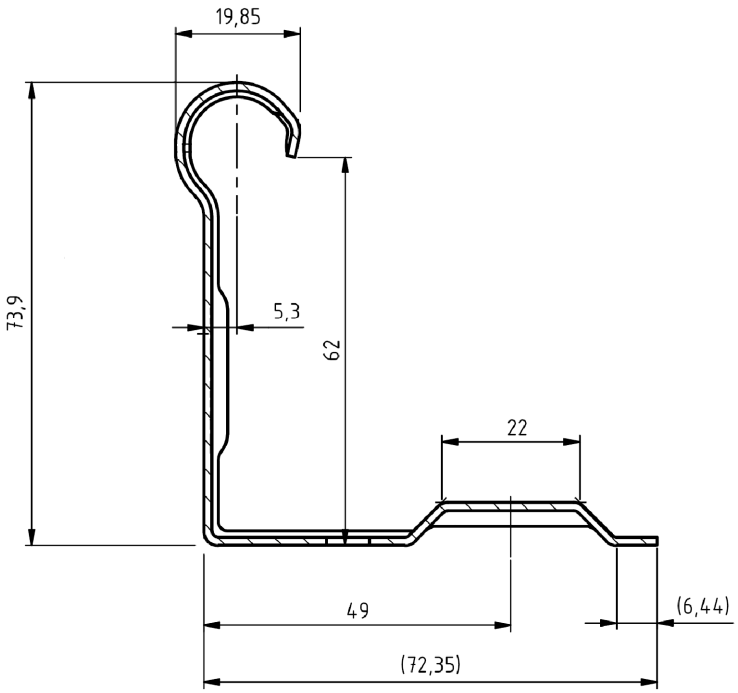
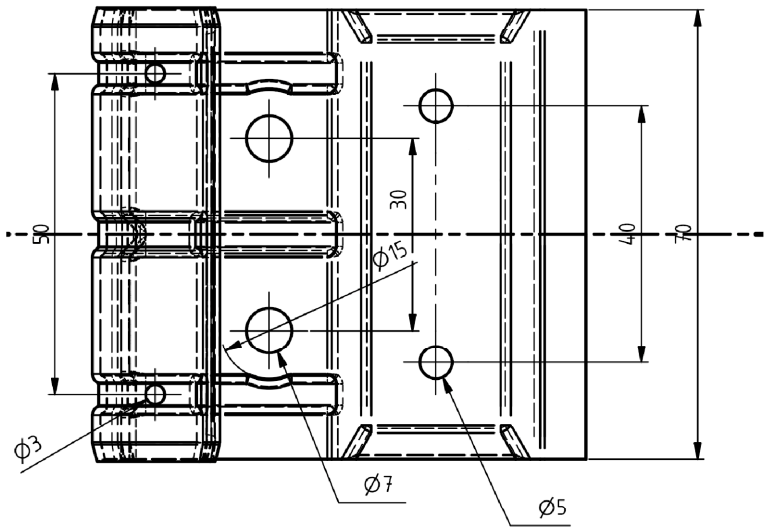




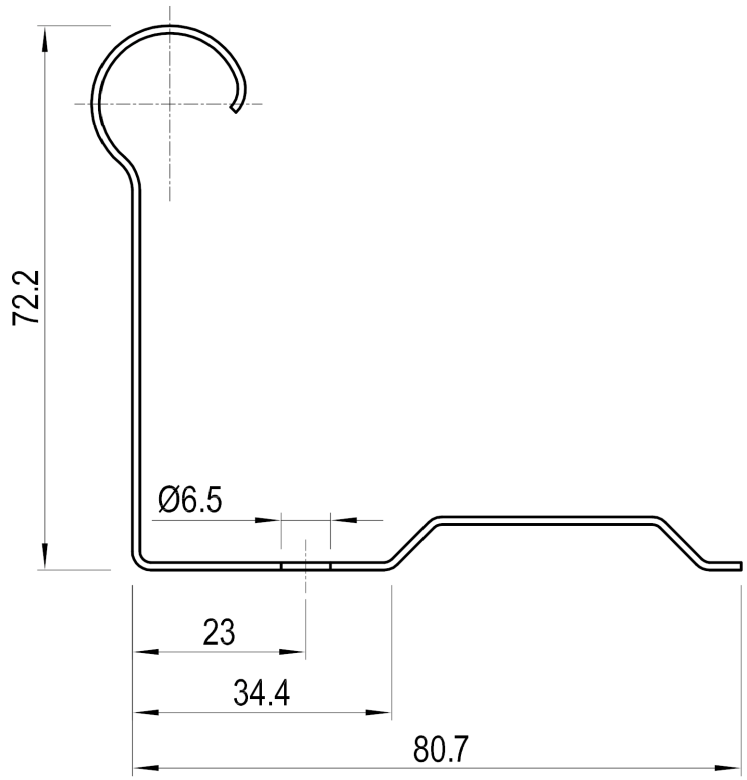
t_{nom} = 1,3 mm

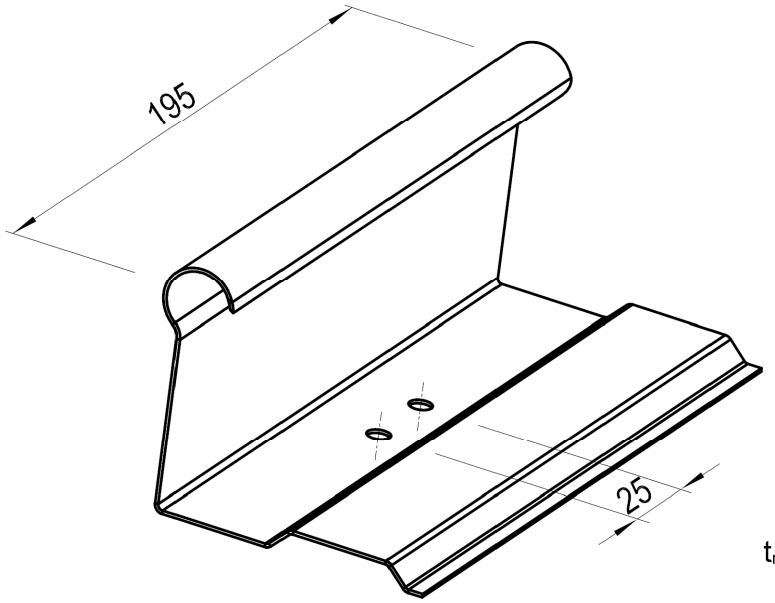
RIB-ROOF Evolution sliding standing seam system aluminium

Annex A 3

Standard clip, dimensions

Deutsches Institut für Bautechnik DIBt





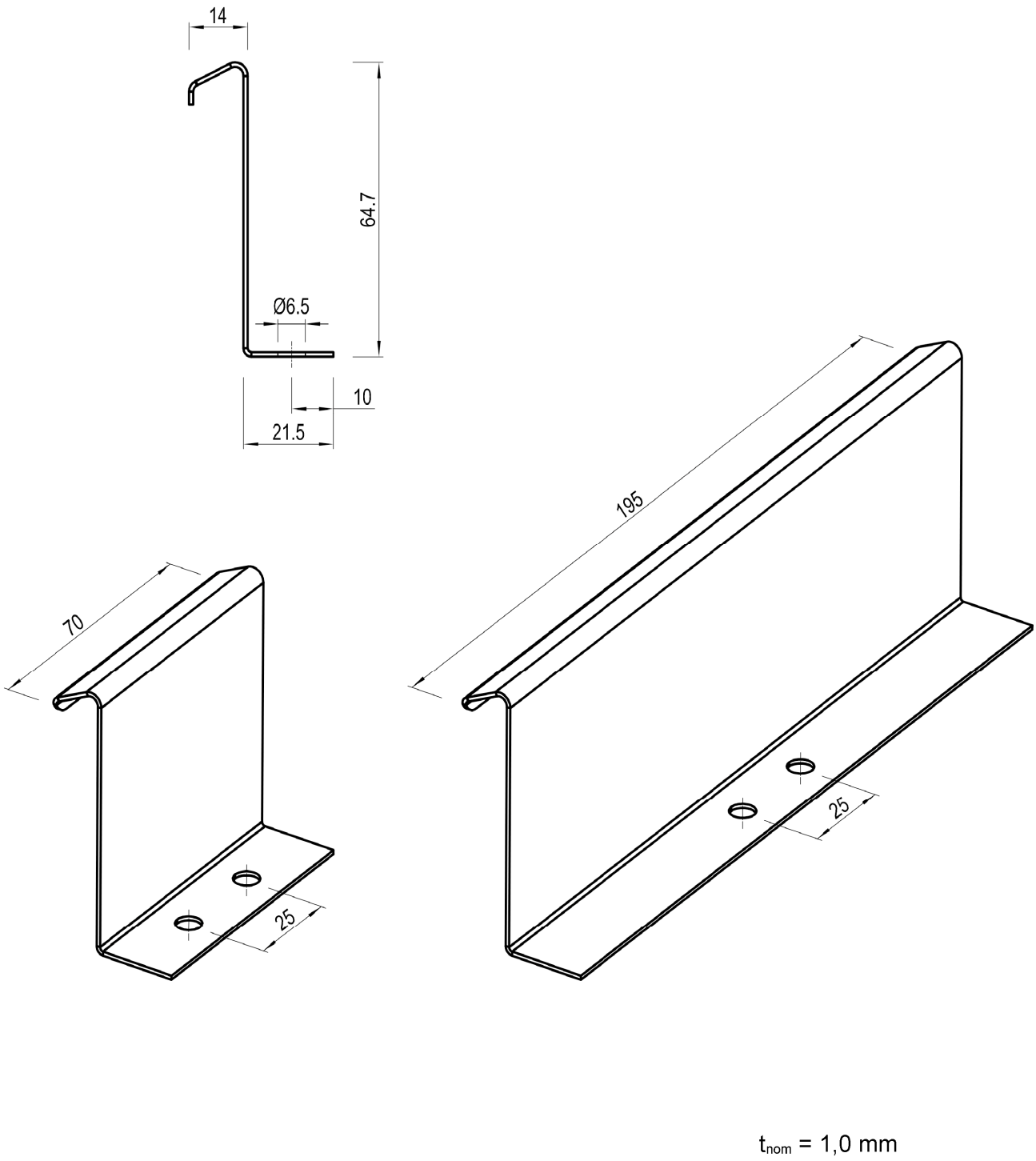
t_{nom} = 1,0 mm

RIB-ROOF Evolution sliding standing seam system aluminium

Directional clip 200, dimensions

Annex A 4

Deutsches Institut für Bautechnik DIBt



t_{nom} = 1,0 mm

RIB-ROOF Evolution sliding standing seam system aluminium

Turned directional clips 70 and 200, dimensions

Annex A 5

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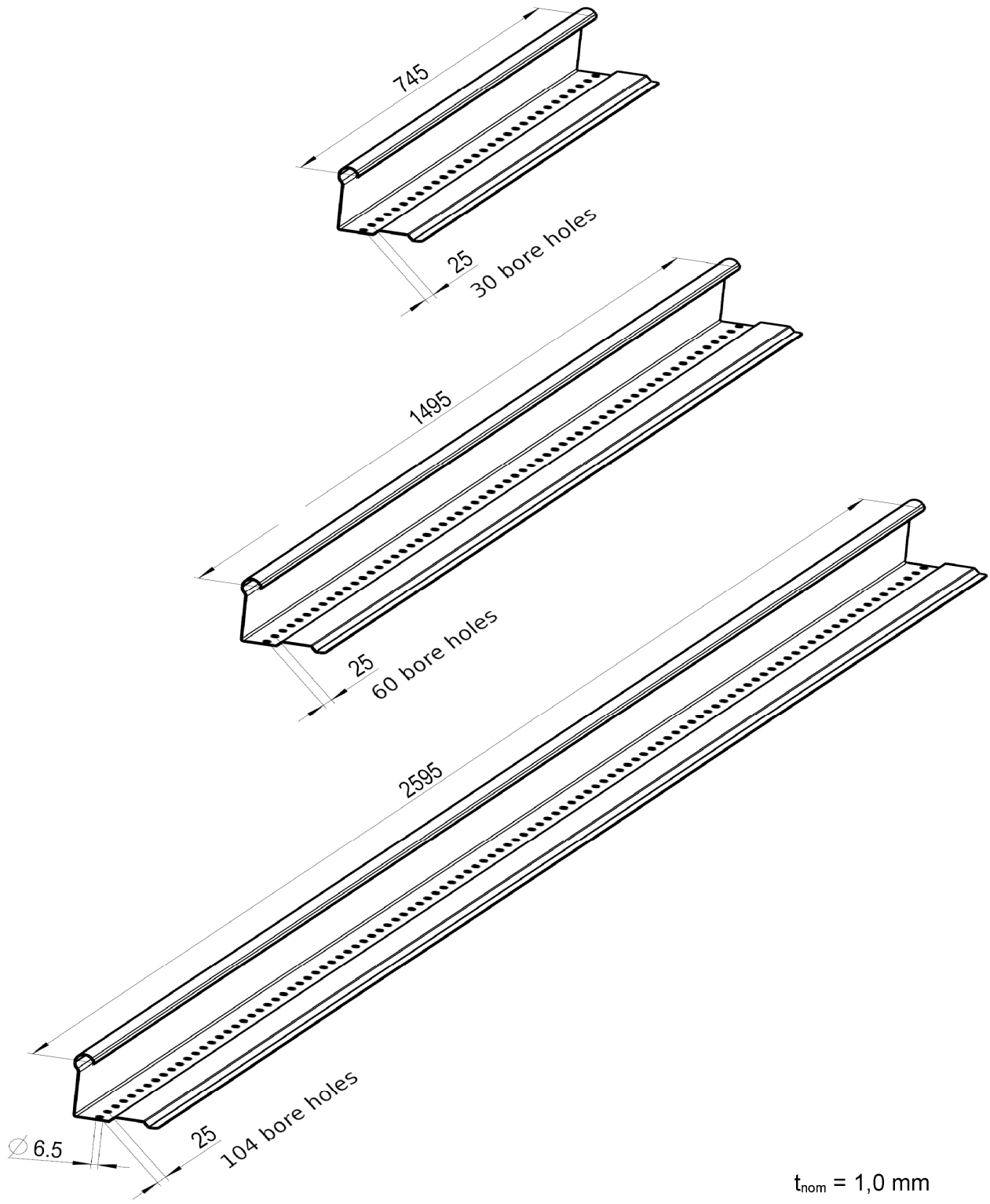

RIB-ROOF Evolution sliding standing seam system aluminium

Annex A 6

Directional profiles 760, 1500 and 2600, dimensions

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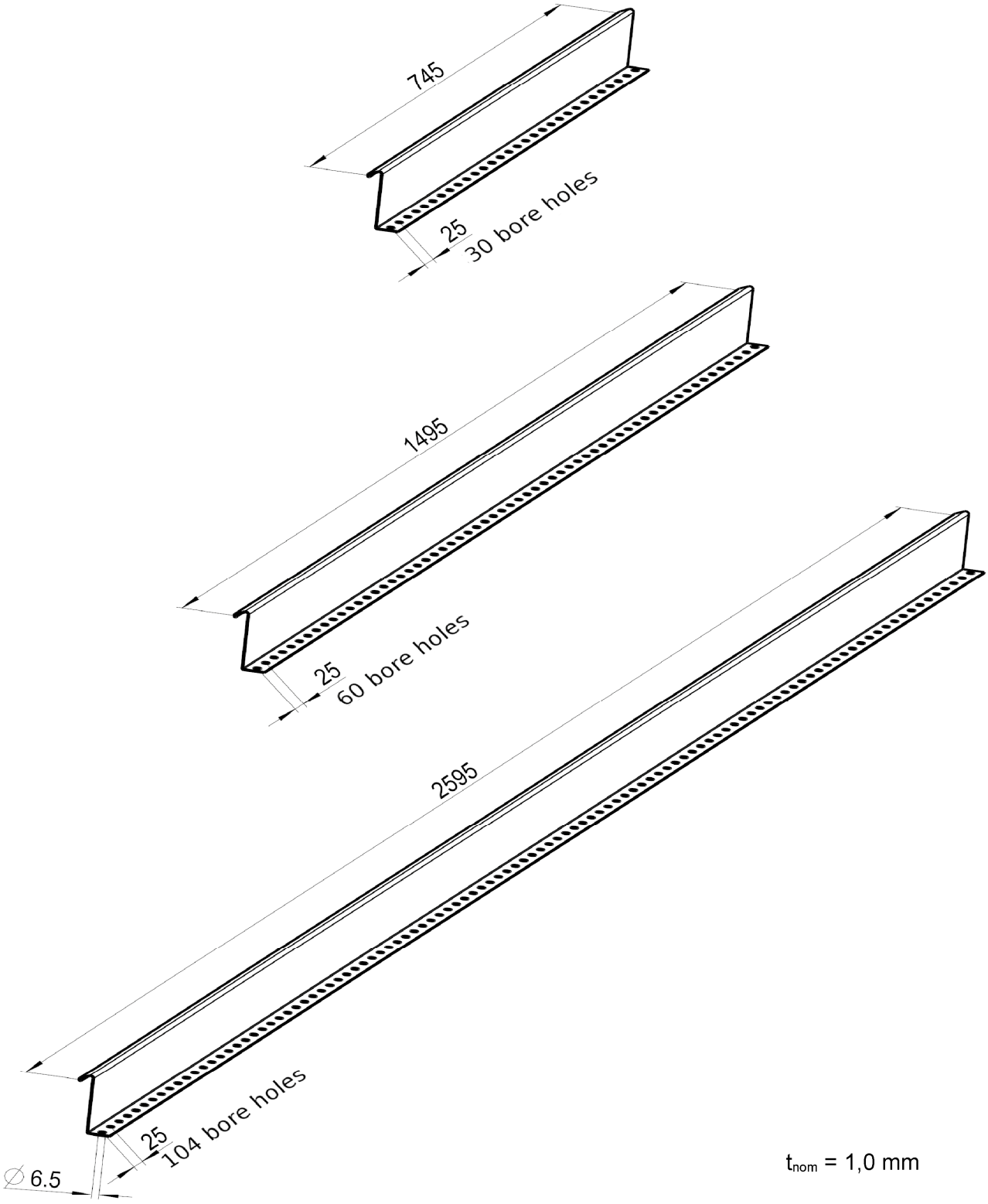

RIB-ROOF Evolution sliding standing seam system aluminium

Turned directional profiles 760, 1500 and 2600, dimensions

Annex A 7

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RIB-ROOF Evolution, b= 500

Characteristic values for downward load

Sheet thick-ness	Dead load	Moment of inertia	Field moment	End support reaction	Moment and reaction at intermediate supports $M_{Ed}/(M^0_{Rk,B}/\gamma_M)+F_{Ed}/(R^0_{Rk,B}/\gamma_M)\le 1$			
t	g	I_{ef}	$M_{c,Rk,F}$	$R_{w,RK,A}$	$M^0_{Rk,B}$	$R^0_{Rk,B}$	$M_{c,Rk,B}$	$R_{w,Rk,B}$
mm	kN/m²	cm⁴/m	kNm/m	kN/m	kNm/m	kN/m	kNm/m	kN/m
0,70	0,0252	34,2	0,820	2,27	0,791	15,82	0,660	4,53
0,80	0,0288	39,1	1,071	2,96	1,033	20,66	0,861	5,92
0,90	0,0324	44,0	1,205	3,33	1,162	23,25	0,969	6,66
1,00	0,0360	48,9	1,339	3,70	1,291	25,83	1,077	7,40
		$\gamma_{M,ser}$ *)	γ_M *)					

RIB-ROOF Evolution, b= 500

Characteristic values for uplift load,
applicable with standard clips according to annex A 3

Sheet thickness	Field moment	End support reaction	Moment and reaction at intermediate supports $M_{Ed}/(M^0_{Rk,B}/\gamma_M)+F_{Ed}/(R^0_{Rk,B}/\gamma_M)\le 1$			
t	$M_{c,Rk,F}$	$R_{w,RK,A}$	$M^0_{Rk,B}$	$R^0_{Rk,B}$	$M_{c,Rk,B}$	$R_{w,Rk,B}$
mm	kNm/m	kN/m	kNm/m	kN/m	kNm/m	kN/m
0,70	0,699	1,569	1,322	4,451	0,605	3,137
0,80	0,913	2,049	1,727	5,813	0,791	4,098
0,90	1,027	2,293	2,516	6,042	0,997	4,585
1,00	1,141	2,537	3,305	6,270	1,203	5,073
	γ_M *)					

*) Recommended: $\gamma_{M,ser}$ = 1,0

γ_M = 1,1

RIB-ROOF Evolution sliding standing seam system aluminium	Annex B 1
Cross section properties, characteristic resistance values and partial safety factor γ_M RIB-ROOF Evolution, b= 500, standard clip	

Deutsches Institut für Bautechnik DIBt

RIB-ROOF Evolution, b= 400

Characteristic values for downward load

Sheet thick-ness	Dead load	Moment of inertia	Field moment	End support reaction	Moment and reaction at intermediate supports $M_{Ed}/(M^0_{Rk,B}/\gamma_M)+F_{Ed}/(R^0_{Rk,B}/\gamma_M)\leq 1$			
t	g	I_{ef}	$M_{c,Rk,F}$	$R_{w,RK,A}$	$M^0_{Rk,B}$	$R^0_{Rk,B}$	$M_{c,Rk,B}$	$R_{w,Rk,B}$
mm	kN/m²	cm⁴/m	kNm/m	kN/m	kNm/m	kN/m	kNm/m	kN/m
0,70	0,0268	40,6	1,041	2,83	0,989	19,78	0,824	5,67
0,80	0,0306	46,4	1,360	3,70	1,291	25,83	1,077	7,40
0,90	0,0344	52,2	1,530	4,16	1,453	29,06	1,211	8,32
1,00	0,0383	58,0	1,700	4,62	1,614	32,29	1,346	9,25
		$\gamma_{M,ser}$ *)	γ_M *)					

RIB-ROOF Evolution, b= 400

Characteristic values for uplift load,
applicable with standard clips according to annex A 3

Sheet thickness	Field moment	End support reaction	Moment and reaction at intermediate supports $M_{Ed}/(M^0_{Rk,B}/\gamma_M)+F_{Ed}/(R^0_{Rk,B}/\gamma_M)\leq 1$			
t	$M_{c,Rk,F}$	$R_{w,RK,A}$	$M^0_{Rk,B}$	$R^0_{Rk,B}$	$M_{c,Rk,B}$	$R_{w,Rk,B}$
mm	kNm/m	kN/m	kNm/m	kN/m	kNm/m	kN/m
0,70	0,911	2,032	1,573	6,009	0,767	4,063
0,80	1,190	2,653	2,054	7,848	1,002	5,307
0,90	1,339	2,933	2,657	8,273	1,212	5,866
1,00	1,488	3,212	3,261	8,698	1,422	6,425
	γ_M *)					

*) Recommended: $\gamma_{M,ser}$ = 1,0

γ_M = 1,1

RIB-ROOF Evolution sliding standing seam system aluminium	Annex B 2
Cross section properties, characteristic resistance values and partial safety factor γ_M RIB-ROOF Evolution, b= 400, standard clip	

Deutsches Institut für Bautechnik DIBt

RIB-ROOF Evolution, b= 333

Characteristic values for downward load

Sheet thick-ness	Dead load	Moment of inertia	Field moment	End support reaction	Moment and reaction at intermediate supports $M_{Ed}/(M^0_{Rk,B}/\gamma_M)+F_{Ed}/(R^0_{Rk,B}/\gamma_M)\leq 1$			
t	g	I_{ef}	$M_{c,Rk,F}$	$R_{w,RK,A}$	$M^0_{Rk,B}$	$R^0_{Rk,B}$	$M_{c,Rk,B}$	$R_{w,Rk,B}$
mm	kN/m²	cm⁴/m	kNm/m	kN/m	kNm/m	kN/m	kNm/m	kN/m
0,70	0,0284	46,5	1,263	3,40	1,188	23,76	0,990	6,81
0,80	0,0324	53,1	1,650	4,44	1,551	31,03	1,293	8,89
0,90	0,0365	59,8	1,856	5,00	1,745	34,91	1,455	10,00
1,00	0,0405	66,4	2,063	5,56	1,939	38,79	1,617	11,11
		$\gamma_{M,ser}$ *)	γ_M *)					

RIB-ROOF Evolution, b= 333

Characteristic values for uplift load,
applicable with standard clips according to annex A 3

Sheet thickness	Field moment	End support reaction	Moment and reaction at intermediate supports $M_{Ed}/(M^0_{Rk,B}/\gamma_M)+F_{Ed}/(R^0_{Rk,B}/\gamma_M)\leq 1$			
t	$M_{c,Rk,F}$	$R_{w,RK,A}$	$M^0_{Rk,B}$	$R^0_{Rk,B}$	$M_{c,Rk,B}$	$R_{w,Rk,B}$
mm	kNm/m	kN/m	kNm/m	kN/m	kNm/m	kN/m
0,70	1,125	2,497	1,825	7,577	0,931	4,994
0,80	1,469	3,262	2,384	9,896	1,215	6,523
0,90	1,653	3,577	2,800	10,519	1,429	7,154
1,00	1,837	3,892	3,216	11,141	1,642	7,784
	γ_M *)					

*) Recommended: $\gamma_{M,ser}$ = 1,0

γ_M = 1,1

RIB-ROOF Evolution sliding standing seam system aluminium	
Cross section properties, characteristic resistance values and partial safety factor γ_M RIB-ROOF Evolution, b= 333, standard clip	Annex B 3

Deutsches Institut für Bautechnik DIBt

RIB-ROOF Evolution, b= 500

Characteristic values for downward load

Sheet thick-ness	Dead load	Moment of inertia	Field moment	End support reaction	Moment and reaction at intermediate supports $M_{Ed}/\left(M^0_{Rk,B}/\gamma_M\right)+F_{Ed}/\left(R^0_{Rk,B}/\gamma_M\right)\le 1$			
t mm	g kN/m²	I_{ef} cm⁴/m	$M_{c,Rk,F}$ kNm/m	$R_{w,RK,A}$ kN/m	$M^0_{Rk,B}$ kNm/m	$R^0_{Rk,B}$ kN/m	$M_{c,Rk,B}$ kNm/m	$R_{w,Rk,B}$ kN/m
0,70	0,0252	34,2	0,820	2,27	0,791	15,82	0,660	4,53
0,80	0,0288	39,1	1,071	2,96	1,033	20,66	0,861	5,92
0,90	0,0324	44,0	1,205	3,33	1,162	23,25	0,969	6,66
1,00	0,0360	48,9	1,339	3,70	1,291	25,83	1,077	7,40
		$\gamma_{M,ser}$ *)	γ_M *)					

RIB-ROOF Evolution, b= 500

Characteristic values for uplift load,
applicable with clips according to annexes A 4 to A 7

Sheet thickness	Field moment	End support reaction	Moment and reaction at intermediate supports $M_{Ed}/\left(M^0_{Rk,B}/\gamma_M\right)+F_{Ed}/\left(R^0_{Rk,B}/\gamma_M\right)\le 1$			
t mm	$M_{c,Rk,F}$ kNm/m	$R_{w,RK,A}$ kN/m	$M^0_{Rk,B}$ kNm/m	$R^0_{Rk,B}$ kN/m	$M_{c,Rk,B}$ kNm/m	$R_{w,Rk,B}$ kN/m
0,70	0,699	2,69	0,743	55,44	0,705	5,38
0,80	0,913	3,51	0,970	72,41	0,921	7,03
0,90	1,027	3,57	1,390	43,43	1,100	7,14
1,00	1,141	3,62	1,811	14,45	1,279	7,25
	γ_M *)					

*) Recommended: $\gamma_{M,ser}$ = 1,0

γ_M = 1,1

RIB-ROOF Evolution sliding standing seam system aluminium

Cross section properties, characteristic resistance values and partial safety factor γ_M

RIB-ROOF Evolution, b= 500

Annex B 4

Deutsches Institut für Bautechnik DIBt

RIB-ROOF Evolution, b= 400

Characteristic values for downward load

Sheet thick-ness	Dead load	Moment of inertia	Field moment	End support reaction	Moment and reaction at intermediate supports $M_{Ed}/(M^0_{Rk,B}/\gamma_M)+F_{Ed}/(R^0_{Rk,B}/\gamma_M)\leq 1$			
t	g	I_{ef}	$M_{c,Rk,F}$	$R_{w,RK,A}$	$M^0_{Rk,B}$	$R^0_{Rk,B}$	$M_{c,Rk,B}$	$R_{w,Rk,B}$
mm	kN/m²	cm⁴/m	kNm/m	kN/m	kNm/m	kN/m	kNm/m	kN/m
0,70	0,0268	40,6	1,041	2,83	0,989	19,78	0,824	5,67
0,80	0,0306	46,4	1,360	3,70	1,291	25,83	1,077	7,40
0,90	0,0344	52,2	1,530	4,16	1,453	29,06	1,211	8,32
1,00	0,0383	58,0	1,700	4,62	1,614	32,29	1,346	9,25
		$\gamma_{M,ser}$ *)	γ_M *)					

RIB-ROOF Evolution, b= 400

Characteristic values for uplift load,
applicable with clips according to annexes A 4 to A 7

Sheet thickness	Field moment	End support reaction	Moment and reaction at intermediate supports $M_{Ed}/(M^0_{Rk,B}/\gamma_M)+F_{Ed}/(R^0_{Rk,B}/\gamma_M)\leq 1$			
t	$M_{c,Rk,F}$	$R_{w,RK,A}$	$M^0_{Rk,B}$	$R^0_{Rk,B}$	$M_{c,Rk,B}$	$R_{w,Rk,B}$
mm	kNm/m	kN/m	kNm/m	kN/m	kNm/m	kN/m
0,70	0,911	3,36	0,928	69,30	0,881	6,73
0,80	1,190	4,39	1,212	90,51	1,151	8,78
0,90	1,339	4,46	1,738	54,29	1,375	8,92
1,00	1,488	4,53	2,264	18,06	1,599	9,06
	γ_M *)					

*) Recommended: $\gamma_{M,ser}$ = 1,0

γ_M = 1,1

RIB-ROOF Evolution sliding standing seam system aluminium	Annex B 5
Cross section properties, characteristic resistance values and partial safety factor γ_M RIB-ROOF Evolution, b= 400	

Deutsches Institut für Bautechnik DIBt

RIB-ROOF Evolution, b= 333

Characteristic values for downward load

Sheet thick-ness	Dead load	Moment of inertia	Field moment	End support reaction	Moment and reaction at intermediate supports $M_{Ed}/(M^0_{Rk,B}/\gamma_M)+F_{Ed}/(R^0_{Rk,B}/\gamma_M)\le 1$			
t	g	I_{ef}	$M_{c,Rk,F}$	$R_{w,RK,A}$	$M^0_{Rk,B}$	$R^0_{Rk,B}$	$M_{c,Rk,B}$	$R_{w,Rk,B}$
mm	kN/m²	cm⁴/m	kNm/m	kN/m	kNm/m	kN/m	kNm/m	kN/m
0,70	0,0284	46,5	1,263	3,40	1,188	23,76	0,990	6,81
0,80	0,0324	53,1	1,650	4,44	1,551	31,03	1,293	8,89
0,90	0,0365	59,8	1,856	5,00	1,745	34,91	1,455	10,00
1,00	0,0405	66,4	2,063	5,56	1,939	38,79	1,617	11,11
		$\gamma_{M,ser}$ *)	γ_M *)					

RIB-ROOF Evolution, b= 333

Characteristic values for uplift load,
applicable with clips according to annexes A 4 to A 7

Sheet thickness	Field moment	End support reaction	Moment and reaction at intermediate supports $M_{Ed}/(M^0_{Rk,B}/\gamma_M)+F_{Ed}/(R^0_{Rk,B}/\gamma_M)\le 1$			
t	$M_{c,Rk,F}$	$R_{w,RK,A}$	$M^0_{Rk,B}$	$R^0_{Rk,B}$	$M_{c,Rk,B}$	$R_{w,Rk,B}$
mm	kNm/m	kN/m	kNm/m	kN/m	kNm/m	kN/m
0,70	1,125	4,04	1,115	83,24	1,058	8,08
0,80	1,469	5,28	1,456	108,72	1,382	10,55
0,90	1,653	5,36	2,088	65,21	1,652	10,72
1,00	1,837	5,44	2,719	21,70	1,921	10,88
	γ_M *)					

*) Recommended: $\gamma_{M,ser}$ = 1,0

γ_M = 1,1

RIB-ROOF Evolution sliding standing seam system aluminium	
Cross section properties, characteristic resistance values and partial safety factor γ_M RIB-ROOF Evolution, b= 333	Annex B 6

Deutsches Institut für Bautechnik DIBt

Characteristic holding forces between profiled sheeting and standard clips

Intermediate support					
Type	Sheet thickness	Per clip	Based on the cover width b for RIB-ROOF Evolution		
			b = 500 mm	**b = 400 mm**	**b = 333 mm**
	t mm	$F_{Rk,B}$ kN	$F_{Rk,B}$ kN/m	$F_{Rk,B}$ kN/m	$F_{Rk,B}$ kN/m
Standard clip	0,70	1,47	2,94	3,67	4,41
	0,80	1,92	3,84	4,80	5,76
	0,90	2,10	4,21	5,26	6,32
	1,00	2,29	4,58	5,73	6,88

End support					
Type	Sheet thickness	Per clip	Based on the cover width b for RIB-ROOF Evolution		
			b = 500 mm	**b = 400 mm**	**b = 333 mm**
	t mm	$F_{Rk,B}$ kN	$F_{Rk,B}$ kN/m	$F_{Rk,B}$ kN/m	$F_{Rk,B}$ kN/m
Standard clip	0,70	0,73	1,47	1,84	2,21
	0,80	0,96	1,92	2,40	2,88
	0,90	1,05	2,10	2,63	3,16
	1,00	1,15	2,29	2,86	3,44

Recommended partial safety factor: γ_M = 1,33

RIB-ROOF Evolution sliding standing seam system aluminium	Annex B 7
Characteristic holding forces between profiled sheeting and standard clips, characteristic resistance values and partial safety factor γ_M	

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Characteristic holding forces between profiled sheeting and directional clips or turned directional clips [1)]

Intermediate support					
Type	Sheet thickness t mm	Per clip $F_{Rk,B}$ kN	Based on the cover width b for RIB-ROOF Evolution		
			b = 500 mm $F_{Rk,B}$ kN/m	**b = 400 mm** $F_{Rk,B}$ kN/m	**b = 333 mm** $F_{Rk,B}$ kN/m
Directional clip 200	0,70	2,60	5,20	6,49	7,80
	0,80	3,39	6,79	8,48	10,19
	0,90	3,39	6,79	8,48	10,19
	1,00	3,39	6,79	8,48	10,19
Turned directional clip 200	0,70	1,83	3,66	4,58	5,50
	0,80	2,39	4,78	5,98	7,18
	0,90	2,94	5,88	7,34	8,82
	1,00	3,48	6,97	8,71	10,46
Turned directional clip 70	0,70	0,97	1,94	2,43	2,92
	0,80	1,27	2,54	3,17	3,81
	0,90	1,94	3,88	4,86	5,83
	1,00	2,62	5,23	6,54	7,86

End support					
Type	Sheet thickness t mm	Per clip $F_{Rk,B}$ kN	Based on the cover width b for RIB-ROOF Evolution		
			b = 500 mm $F_{Rk,B}$ kN/m	**b = 400 mm** $F_{Rk,B}$ kN/m	**b = 333 mm** $F_{Rk,B}$ kN/m
Directional clip 200	0,70	1,30	2,60	3,25	3,90
	0,80	1,70	3,39	4,24	5,09
	0,90	1,70	3,39	4,24	5,09
	1,00	1,70	3,39	4,24	5,09
Turned directional clip 200	0,70	0,92	1,83	2,29	2,75
	0,80	1,20	2,39	2,99	3,59
	0,90	1,47	2,94	3,67	4,41
	1,00	1,74	3,48	4,36	5,23
Turned directional clip 70	0,70	0,49	0,97	1,21	1,46
	0,80	0,63	1,27	1,59	1,90
	0,90	0,97	1,94	2,43	2,92
	1,00	1,31	2,62	3,27	3,93

[1)] For directional profiles the resistance of one directional clip 200 may be taken into account at every connection point, see Annex B 9.

Recommended partial safety factor: γ_M = 1,33

RIB-ROOF Evolution sliding standing seam system aluminium	Annex B 8
Characteristic holding forces between profiled sheeting and directional clips and turned directional clips characteristic resistance values and partial safety factor γ_M	

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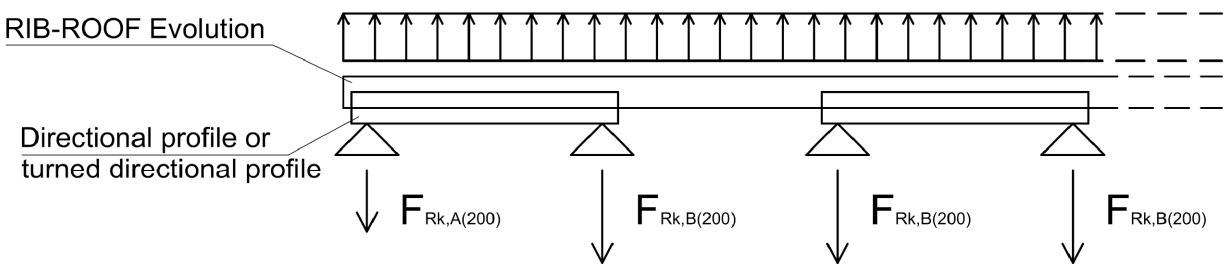
Characteristic holding forces between profiled sheeting and directional profiles or turned directional profiles

For directional profiles and turned directional profiles one may assume the load-bearing capacity of a directional clip 200 or turned directional clip 200 according to annex B 8 for every connecting point of a directional profile (or turned directional profile) with the substructure.

The drawing shows the assignment of the resistance as example for directional profiles and turned directional profiles with two connecting points (supports).



Recommended partial safety factor: γ_M = 1,33

RIB-ROOF Evolution sliding standing seam system aluminium	Annex B 9
Characteristic holding forces between profiled sheeting and directional profiles and turned directional profiles	

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Walk-on stability after Assembly

Fully fixed profiled sheeting may be walked on without any load-dispersal measures up to the following spans:

Sheet thickness	RIB-ROOF Evolution					
	Cover width = 500 mm		**Cover width = 400 mm**		**Cover width = 333 mm**	
	Single-span beam	Multi-span beam	Single-span beam	Multi-span beam	Single-span beam	Multi-span beam
t mm	L_{gr} m	L_{gr} m	L_{gr} m	L_{gr} m	L_{gr} m	L_{gr} m
0,70	2,40	3,00	2,25	2,80	2,10	2,65
0,80	3,15	3,90	2,95	3,70	2,75	3,45
0,90	3,35	4,20	3,15	3,95	2,95	3,70
1,00	3,60	4,50	3,40	4,25	3,20	4,00

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Supplementary information for design, installation, execution and maintenance

The performance and serviceability of the construction product can be provided according the following:

C 1 General

The verification of the load-bearing capacity and serviceability is provided in each individual case according to EN 1990 and EN 1999-1-4 in consideration of the information in this ETA.
In general, it is verified that the design value of the effect of the action E_d does not exceed the design values of the related load-bearing capacity R_d e.g., $E_d \leq R_d$.

The design values of the load-bearing capacities are the result of dividing the characteristic values by the partial safety factor γ_M.

Following verifications shall be provided generally:

- Verification of profiled sheeting
- Verification of clips or profiles respectively
  – Pull out resistance of the clips or profiles in head of seam of profiled sheeting (holding forces)
  – Fastening of the clips or profiles to the substructure
- If required by national regulations verification of walkability (walk-on resistance) after assembly (where required) according to annex B 10 or the manufacturer's recommendations

If there is the possibility of the formation of a water pocket (Generally applies to roof slopes less than 2% and to unfavourable position concerning drainage engineering of the roof outlets.), this load case is verified with the following loads: permanent load and water load as a result of the total deflection of the profiled sheeting from the loads to be applied.

The profiled sheeting are supported in a single span configuration or continuously across several spans. The center-to-center distance of the clips or profiles is assumed as span.

The loads are static or quasi-static.

The verification of the ultimate limit state is performed by a structural engineer experienced in the field of lightweight metal construction.

The aluminium strip is protected against corrosion at normal weathering conditions of sea, country, city or industry surroundings by formation of a natural oxide layer. In cases of an increased corrosion risk, e.g. in the immediate vicinity of plants which emit larger amounts of aggressive substances (e.g. copper smelters), the performance of the profile sheets is given by a suitable plastic coating protection with a nominal thickness of 25 microns minimum. The suitability of the plastic coating shall be attested by evidence of corresponding bodies.

With respect to the corrosion protection the information given in annex A 1 apply.

RIB-ROOF Evolution sliding standing seam system aluminium	Annex C 1
Supplementary information for design, installation, execution and maintenance	

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C 2 Design loads (actions)

C 2.1 General

Unless otherwise stated EN 1990 shall apply.

C 2.2 Dead load of profiled sheeting

The dead loads of profiled sheeting according to annex A 2 are shown in annexes B 1 to B 6.

C 2.3 Point load, walk-on stability

The verification of the ultimate limit state for a point load action of 1 kN on the profiled sheeting shown in annex A 2 can be assumed as proofed if the provisions in this European Technical Assessment have been observed.

C 3 Verifications for action of loads acting normal to the installed profiled sheets

C 3.1 Calculation of stress

Unless otherwise stated EN 1999-1-4 shall apply. Fundamentally, the effects of actions acting normal to the installed profiled sheets will be calculated using the theory of elasticity.

C 3.2 Calculation of load bearing capacity on base of characteristic resistance values

EN 1999-1-4 and annexes B 1 to B 8 shall apply.

The verification of the interaction of moment and support reaction of the profiled sheeting at the intermediate support is given in deviation from equation (6.22), clause 6.1.11 of EN 1999-1-4 according to the interaction equation given in annexes B 1 to B 6.

The characteristic values of profiled sheets shown in annex A 2 can be interpolated linearly in case of construction widths in between.

In terms of pull-out performance (holding force) between clips or profiles and head of seams annexes B 7 and B 8 apply. The design values are the result of dividing the characteristic values by the partial safety factor γ_M.
For directional profiles and turned directional profiles one may assume the load-bearing capacity of a directional clip 200 or turned directional clip 200 according to annex B 8 for every connecting point of a directional profile (or turned directional profile) with the substructure, see annex B 9.

The characteristic values of the resistances of connections between clips or profiles and substructure can be gathered from the corresponding ETAs or standards (e. g. EN 1995-1-1). The design values are the result of dividing the characteristic values by the partial safety factor γ_M.

C 3.3 Verification of deflections (serviceability limit state)

The characteristic values of moment of inertia of profiled sheeting according to annex A 2 are shown in annexes B 1 to B 6.

C 3.4 Forces acting in plane of the roof

A transmission of shear and direct forces acting in the plane of the roof due to a roof pitch by the profiled sheeting must not be considered by way of calculation without special requirements concerning the execution – e.g. formation of fixed points according to annex C 5. The forces from fixed points shall be further followed up in the substructure.

RIB-ROOF Evolution sliding standing seam system aluminium	Annex C 2
Supplementary information for design, installation, execution and maintenance	

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C 3.5 Diaphragm action

A diaphragm action of the profiled sheeting for stiffening the total works or a shear or torsional stiffness for stabilizing the substructure against lateral torsional buckling will not be taken into account by way of calculation.

C 4 Information for execution

C 4.1 General

The profiled sheeting is connected with each other continuously forming a rainproof standing seam by clamping the lateral edge ribs of adjacent roof elements. The connection to the substructure is made by clips or profiles, not visible from above, clamped between the edge ribs, which are fastened to the substructure.

The profiled sheeting may only be installed by specialists of the manufacturing plant or by companies having received appropriate training and authorization by the manufacturer. The manufacturer or the person laying the profiled sheeting shall prepare implementation instructions for the laying of the elements to be handed over to the assemblers.

Damaged profiled sheeting including plastic deformations must not be installed.

After completion of a roof installation, all foreign objects shall be cleaned from the roof.

When using profiled sheeting of different sheet thicknesses in a roof, these shall be marked according to sheet thicknesses, in order to avoid mix-ups.

C 4.2 Profiled sheeting

Connecting

The profiled sheeting is connected to the substructure at each edge rib by clips or profiles. For fixing the profiled sheeting during thermal movement and for transmitting the in plane forces in case of sloped roofs or wall coverings, fixed points are provided according to annex C 5.

The individual elements are connected immediately after laying by clamping the lateral edge ribs. In doing so, attention shall be paid to a faultless connection to the clips or profiles. If the laying of the profiled sheeting is interrupted before completion of the full roof or wall extents, then the last laid profiled sheeting shall always be secured to provide adequate restraint against detachment from the clips due to wind loads.

An additional securing against sheet detachment from the clips or profiles is also required if the construction, during installation, is exposed to larger wind loads than at the final state.

Minimal roof slope

When using the profiled sheeting as the weathering outer skin of roofs, the minimum roof pitch for roofs without transverse joints or with welded transverse joints is 1.5° (2.6 %). The required minimum roof pitch increases to 2.9° (5 %) for roofs with sealed transverse joints and/or openings (e.g. domed roof-lights).

The required increase of the minimum roof slope for roof penetrations – e.g. for domed roof lights – may not be required, if completely welded flashings are used and the aluminium flashings are welded with the upper shell of the roof such that a completely watertight joint is achieved.

The requirement of the minimum roof slope does not apply to the ridge area, if the roof elements in the area with pitches ≤ 2.9° (5 %) are arranged continuously over the ridge.

RIB-ROOF Evolution sliding standing seam system aluminium	Annex C 3
Supplementary information for design, installation, execution and maintenance	

Transverse joints

Transverse joints are permitted only if even under full load complete water run-off is still possible.

Transverse joints may only be installed directly over a support if the joint is at a fixed point. Otherwise the profiled sheeting is overlapped just above a support. For roof pitches of up to 17° (30 %) the mutual overlap of the profiled sheeting amounts to at least 20 cm, for larger roof pitches at least 15 cm.

Walkability (walk-on resistance)

During the installation, profiled sheeting shown in annex A 2 may only be walked on by placing planks using load-distributing measures.

After completion of the roof the profiled sheeting may be walked on for cleaning and maintenance work without load-distributing measures up to spans according to annex B 10.

Load-distributing measures, e. g. wooden planks of strength class C24 according to EN 14081-1 with a cross section of 4 x 24 cm and a length of > 3.0 m shall be applied if the effective span exceeds the aforementioned maximum values. The planks may be laid on the ribs in the direction of the span of the profiled sheeting or transverse to the direction of the span.

C 4.3 Clips and profiles

For the connection of the profiled sheeting to the substructure clips or profiles according to annexes A 3 to A 7 are used. The clips or profiles are attached directly to substructures made of steel, aluminium or timber.

Attachment of the clips to the substructure is carried out with the appropriate screws or rivets according to the ETAs or standards (e. g. EN 1995-1-1).

For connections of the profiled sheeting with a concrete substructure, sufficiently anchored continuous steel parts (e.g. HTU rails or 8 mm thick flat steels) or timber battens (minimum thickness 40 mm) with a width of at least the width of 60 mm are interposed.

C 4.4 End and intermediate support width

A minimum purlin width of 60 mm is required at end and intermediate supports. To ensure the load-bearing capacity at the end supports a profiled sheeting overhang of at least 60 mm is required.

C 4.5 Verge

Exposed edges in the direction of span of the profiled sheeting are stiffened by suitable edge stiffening (verge profile).

C 4.6 Indications to the person installing the profiled sheeting

– Packaging, transport and storage
The manufacturer's instructions of Zambelli RIB-ROOF relating to Packaging, transport and storage shall be followed. In particular in order to avoid damage to the product a suitable weather protection shall be ensured.

– Use and maintenance
Each delivery of Zambelli RIB-ROOF Evolution sliding standing seam system an installation instruction is enclosed.

The components of the system must comply with the regulations and must be audited and maintained. After completion of the roof the profiled sheeting may be walked on for cleaning and maintenance work without load-distributing measures up to spans according to annex B 10. In case of other spans load-distributing measures are necessary (see clause C 4.2).

RIB-ROOF Evolution sliding standing seam system aluminium	Annex C 4
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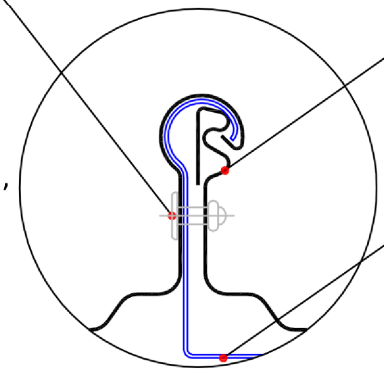
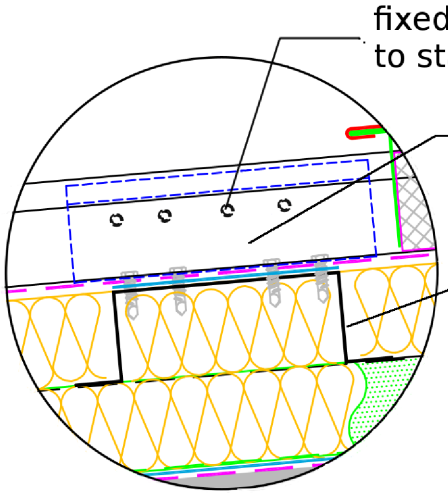
fixed point

cup blind rivet 4,8x12,5mm
(sleeve: aluminium,
mandrel: stainless steel A2)
for side riveting of fixed point with
flat round head 9,5 mm
(alternatively: bolt M6, stainless steel,
on both sides washer with vulcanised
sealing)

Attention: Drilling chips on profiled sheets have to be removed!



Fixed point



RIB-ROOF Evolution sliding standing seam system aluminium	Annex C 5
Supplementary information for design, installation, execution and maintenance Fixed point formation (exemplary for steel substructure)	