

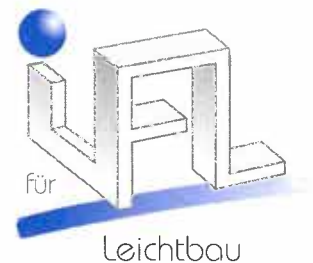
**CE MARKING  
ACCORDING TO  
EN 14782**

**RIB-ROOF 465  
Sliding Seam Roofing**



**Steel  
Aluminium**

**zambelli**  
SIMPLY COVERING FUNCTIONS



## **Gutachten Nr. 1551/20-2**

### **Anmerkungen zur Verwendbarkeit des Zambelli RIB-ROOF-465- Profildaches aus Stahl**

Im Auftrag der Firma

**Zambelli RIB-ROOF GmbH**

**Hans-Sachs-Straße 3+5**

**94568 Stephansposching**

Dieses Gutachten enthält 2 Seiten und einen Anhang.

## **1 Vorbemerkung**

Das Stahl- Klemmrippenprofil RIB-ROOF 465 der Firma Zambelli RIB-ROOF GmbH & Co. KG war bisher mit der ABZ Z-14.1-345 [2] allgemein bauaufsichtlich zugelassen. Zukünftig soll es als selbsttragendes Dachdeckungselement nach DIN EN 14782 [1] eingesetzt werden.

## **2 Literatur / Grundlagen**

- [1] DIN EN 14782: Selbsttragende Dachdeckungs- und Wandbekleidungselemente für die Innen- und Außenanwendung aus Metallblech – Produktspezifikation und Anforderungen; Deutschen Fassung EN 14782:2006
- [2] DIBt (Hrsg.): Allgemeine bauaufsichtliche Zulassung Nr. Z-14.1-345 „RIB-ROOF-Gleit-Falz-Profildach aus Stahl“, Stand 1. Februar 2016 (abgedruckt im Anhang)

## **3 Voraussetzungen für die Verwendung**

### **3.1 Allgemeines**

Für die Verwendung eines Bauproduktes nach der harmonisierten Norm DIN EN 14782 ist vom Hersteller eine Leistungserklärung bereitzustellen. In der Leistungserklärung sind die für den vorgesehenen Anwendungsbereich relevanten Leistungen (entsprechend den wesentlichen Merkmalen gemäß der Bauproduktenverordnung) zu deklarieren.

### **3.2 Mechanische Festigkeit**

#### **3.2.1 Allgemeines**

Für die Festlegung des Merkmales „mechanischen Festigkeit“ gibt DIN EN 14782 (Abschnitt 4.3.1) lediglich die zu beachtenden Aspekte an, z.B. bestimmungsgemäße Anwendung (z.B. Dach, Wand), Werkstoffeigenschaften, Geometrie und Toleranzen etc.

#### **3.2.2 Statischer Nachweis**

Ein statischer Nachweis gemäß der ABZ Z-14.1-345 [2] erfüllt die wesentlichen Anforderungen der DIN EN 14782 bzgl. der mechanischen Festigkeit. Die RIB-ROOF 465- Profile wurden 1978 erstmals bauaufsichtlich zugelassen. Damit steht die Zulassung, die seither stets verlängert und aktualisiert wurde, für eine über 40- jährige kontinuierliche Bewährung des Pro-

duktes und der Erfahrung der Fa. Zambelli. Obwohl die Zulassung formal am 1. Februar 2021 ausläuft, kann sie im Hinblick auf die darin genannten Anforderung bzgl. Herstellung und Verwendung der RIB-ROOF 465- Profile weiterhin als Quelle für die Produkteigenschaften, wie z.B. charakteristische Querschnitts- und Tragfähigkeitswerte herangezogen werden.

### 3.3 Überwachung

DIN EN 14782 fordert für die CE- Kennzeichnung eine Überwachung (Konformitätsbewertung) nach System 4 bzw. 3. Die Fa. Zambelli wird die RIB-ROOF 465- Profile gemäß einer Selbstverpflichtung nach dem umfassenderen System 2+ entsprechend der ABZ Z-14.1-345 bewerten.

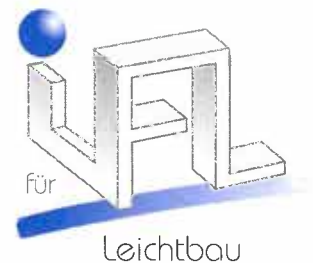
## 4 Zusammenfassung und Empfehlung

Die Fa. Zambelli RIB-ROOF GmbH & Co, KG will nach dem formellen Auslaufen der allgemeine bauaufsichtliche Zulassung Nr. Z-14.1-3465 die RIB-ROOF 465- Profile nach DIN EN 14782 kennzeichnen. Ich empfehle, für den normkonformen statischen Nachweis die genannte Zulassung gemäß Anlage weiterhin heranzuziehen. Die Anforderungen der Zulassung bzgl. Herstellung und Verwendung der RIB-ROOF 465- Profile müssen eingehalten werden.

Karlsruhe, den 16. Dezember 2020



Dr.- Ing. Gerhard Huck  
Ing.- Büro für Leichtbau, Dipl.- Ing. R. Holz  
Rehbuckel 7  
76228 Karlsruhe



## **Gutachten Nr. 1551/20-2**

### **Anmerkungen zur Verwendbarkeit des Zambelli RIB-ROOF-465- Profildaches aus Stahl**

## **Anhang**

### **Allgemeine bauaufsichtliche Zulassung Z-14.1-345**

Im Auftrag der Firma

**Zambelli RIB-ROOF GmbH**

**Hans-Sachs-Straße 3+5**

**94568 Stephansposching**

Dieser Anhang enthält 16 Blätter.

General System Authorisation  
by the Construction Authorities  
RIB-ROOF 465 sliding standing seam roofing

**Steel: no. Z-14.1-345**



# Allgemeine bauaufsichtliche Zulassung

**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

Datum:

01.02.2016

Geschäftszeichen:

I 31-1.14.1-5/16

**Zulassungsnummer:**

**Z-14.1-345**

**Antragsteller:**

**Zambelli RIB-ROOF GmbH & Co. KG**

Hans-Sachs-Straße 3+ 5

94569 Stephansposching

**Geltungsdauer**

vom: **1. Februar 2016**

bis: **1. Februar 2021**

**Zulassungsgegenstand:**

**RIB-ROOF-Gleit-Falz-Profildach aus Stahl**

Der oben genannte Zulassungsgegenstand wird hiermit allgemein bauaufsichtlich zugelassen.

Diese allgemeine bauaufsichtliche Zulassung umfasst neun Seiten und sieben Anlagen.

Der Gegenstand ist erstmals am 18. Dezember 1978 allgemein bauaufsichtlich zugelassen worden.

# General System Authorisation by the Construction Authorities

**German Institute for Building Technology**  
INCORPORATED PUBLIC-LAW INSTITUTE

**Construction Approvals Body for Construction  
Products and Construction Systems**

Member of the European Organisation for Technical  
Approvals EOTA and the European Union of Agrément  
UEAtc

Date: 2nd February 2016

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Trans. Ref. : I 35.1-1.14.1-16/10

**Authorisation number:** Z-14.1-345

**Applicant:** Zambelli RIB-ROOF GmbH & Co. KG Hans-Sachs-Straße 3+5, 94569 Stephansposching, Germany

**Object:** RIB-ROOF 465 sliding standing seam roofing, steel

**Valid until:** 1st February 2021

**Object of approval:** RIB-ROOF 465 sliding standing seam roofing made of steel sheet

The above-mentioned object of authorisation has been approved by the General Construction Authorities. This General System Authorisation by the Construction Authorities includes nine pages and seven enclosures.

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## I. GENERAL REGULATIONS

- 1 Through the General System Authorisation by the Construction Authorities the utilisation and/or applicability of the object approved has been established in accordance with the Building regulations of the land.
- 2 Provided that the requirements for manufacturing of building products and types are met regarding the expertise and experience of the entrusted individuals in the general construction approvals body according to § 17 paragraph 5 Model Building Regulations and according to state regulations, attention should be given to the fact that this expertise and experience can also be documented by comparable proof from other member states of the European Union. This is valid, where applicable, also for documentation given within the framework of agreements covering the European Economic Area (EWR) or other bilateral agreements.
- 3 The General System Authorisation by the Construction Authorities does not replace the approvals, consents and certificates, which are regulated by law for the execution of building projects.
- 4 The General System Authorisation by the Construction Authorities is granted without impairing the rights of third parties, especially private property rights.
- 5 Producers and marketing organisations of the object approved are obliged to provide the user and applier of the approved object copies of the General System Authorisation by the Construction Authorities, independent of advanced regulations according to the "Special Regulations", and to advise them that the General System Authorisation by the Construction Authorities has to be available at the application site. On request, the General System Authorisation by the Construction Authorities has to be made available to authorities involved.
- 6 It is only allowed to copy the General System Authorisation in its entirety. The publication in extracts requires the approval of the German Institute for Construction Technology. Texts and drawings of advertising materials must not contradict the General System Authorisation. Translations of the General System Authorisation by the Construction Authorities have to include the following note "This translation from the German original is uncertified by the German Institute for Construction Technology".
- 7 The General System Authorisation by the Construction Authorities is subject to revocation. The regulations of the General System Authorisation by the Construction Authorities can be supplemented and altered subsequently, especially if new developments in technology require this.

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## II. SPECIAL REGULATIONS

### 1 Object of approval and area of application

The object of approval is a type of construction composed of several building products consisting of load-bearing, room-closing roof elements (profiled sheets) as well as associated fixing elements (fixation clips). The profiled sheets are manufactured from a corrosion protected steel coil, which is warped in a cold state by roll-bending to profiled sheets with a trough-shaped cross-section and parallel ribs in the support direction (see enclosure 1). The fixation clips are manufactured from corrosion-protected sheet steel or stainless steel.

The profiled sheets are connected one to each other by interlocking the sideways ribs of adjacent roof elements roof remains rain proof. The connection with the substructure is effected by fixation clips, which are clamped between the ribs, cannot be seen from above and which are mounted on the substructure.

The General System Authorisation by the Construction Authorities regulates the manufacture of the building products and the usage of the type of construction.

### 2 Regulations for the building products

#### 2.1 Properties and composition

##### 2.1.1 Dimensions

The dimensions of the profiled sheets and fixation clips have to correspond to the specifications in enclosures 1 and 2.

For the limiting dimensions of the nominal sheet thicknesses, the tolerances according to DIN EN 10143:2006-09 (normal limiting dimensions) apply; however, for the lower limiting dimensions only the half values apply.

##### 2.1.2 Material

###### 2.1.2.1 Profiled sheets

As material for the manufacture of the profiled sheets a corrosion-protected steel sheet, suitable for cold bending, has to be used.

The base material which has not been profiled yet, must have at least the mechanical characteristic of steel of the type S320GD+Z or S350GD+Z according to DIN EN 10346:2015-10 for all sheet thicknesses.

These standards must also be fulfilled by the finished component in its final state of application.

###### 2.1.2.2 Fixation clips

A corrosion-protected steel sheet suitable for cold bending or a steel sheet out of stainless steel with the material number 1. 4301 according to DIN EN 10088-4:2010-01 is to be used as material for the production of the fixation clips.

The fixation clips out of corrosion-protected sheet steel must at least have the mechanical characteristics of steel of the type S 350GD+Z according to DIN EN 10346:2015-10.

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For the fixation clips out of stainless steel with the material number 1. 4301, the value of the elongation limit (0.2% elongation limit) of the base material must be at least  $R_{p0.2} = 290 \text{ N/mm}^2$ .

#### 2.1.2.3 Fastening elements

The General Authorisation Approval (e. g. Authorisation. no. Z-14.1-4) or European Technical Approvals or European Technical Evaluations for connecting elements or Standards (e. g. DIN 14592:2012-07 in connection with DIN 20000-6:2015-02).

### 2.1.3 Corrosion protection

#### 2.1.3.1 Profiled sheets

The regulations in DIN 55634-8:2010-04 apply.

As corrosion protection at least a coating thickness of Z275, ZA255 or AZ150 according to DIN EN 10346:2015-10 has to be applied.

As corrosion protection also a duplex system with zinc-magnesium alloy according to the General System Authorisation may be used, provided that this is dedicated to at least a corrosion protection class III according to DIN 55634:2010-04.

#### 2.1.3.2 Fixation clips

Paragraph 2.1.3.1 applies in the general sense for fixation clips which are not out of stainless steel.

#### 2.1.3.3 Fastening elements

The regulations of the General System Authorisation (e. g. Authorisation no. Z-14. 1-4) or the details in corresponding European Technical Authorisations or European Technical Evaluations.

### 2.1.4 Fire protection

Steel sheet with exclusive metallic coating is a material in class A1 according to DIN 4102-4:1994:03, section 2.2.1h. Steel profiled sheets are resistant against striking fire and radiant heat resting roofings according to DIN 4102-4:1994-03 section 8.7.2. During the implementation the regulations MTLB, enclosure 3.1/2 as well as DIN 4102-4/A1:2004-11 must be remembered. Deviating implementations need a separate verification of applicability.

## 2.2 Labelling

### 2.2.1 Profiled sheets

The packaging of the profiled sheets must be designated by the manufacturer with the conformity symbol (Ü-symbol) according to the conformity symbol ordinances of the Federal German States. Labelling may only take place when the pre-conditions of section 2.3 have been fulfilled.

Each package of profiled sheets must also bear a sign containing information on the production company, year of manufacture, type of profile, sheet thickness and minimum yield.

### 2.2.2 Fixation clips

The packaging of the fixation clips must be designated by the manufacturer with the conformity symbol (Ü-symbol) according to the conformity symbol ordinances of the Federal German States. Labelling may only take place when the pre-conditions of section 2.3 have been fulfilled.

Each package of fixation clips must also bear a sign containing information on the production company, year of manufacture, type of fixation clip and material.

## 2.3 Evidence of conformity

### 2.3.1 General

The confirmation of the conformity of the building product with the regulations of this General System Authorisation by the Construction Authorities has to be carried out for every factory with a conformity

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certificate on the basis of the company's own factory production control and a regular external control including an initial inspection of the building products according to the following regulations. For the purpose of issuing the conformity certificate and the external control including the accompanying product tests, which have to be carried out, the producer of the building product has to employ an authorized certification office as well as an authorized regulatory agency. A copy of the conformity certificate issued by the certification office has to be given to the German approval body.

### 2.3.2 In-house production control

An in-house production control has to be set up and implemented in every production facility. In-house production control means that the continuous production control to be carried out by the producer, with which the producer is able to ensure that the building products produced correspond to the regulations of this General System Authorisation by the Construction Authorities.

The in-house production control should include at least the following measures:

- Profiled sheets:  
At the production company the geometry and dimensions (particularly the sheet thicknesses) have to be proved by regular measurements.  
For each material delivery, the material characteristics have to be proved as required in section 2.1. and if necessary the factory-set corrosion protection. Evidence of the material characteristics of the base material has to be supplied with an inspection certificate "3.1" according to DIN EN 10204. The conformity of the specifications in the inspection certificate "3.1" with the specifications in section 2.1 has to be proved.
- Fixation Clips:  
The regulations for the profiled sheets apply correspondingly.

The results of the in-house production control have to be recorded and evaluated. The records must contain at least the following information:

- Description of the building product or the base material as well as the components
- Type of control or test
- Date of production and the test of the building product or rather the base material as well as the components
- Result of the controls and tests and comparison with the requirements
- Signature of the person responsible for in-house production control

The records have to be kept for at least five years and presented to the regulatory agency responsible for the external control. On request, they have to be presented to the German Institute for Construction Technology and the responsible superior Building Authority.

Should testing results prove inadequate, the producer has immediately to take the necessary measures to eliminate the defect. Building products which do not conform to the requirements are to be handled that way, that they can not be mixed up with products, which conform. After elimination of the defect, the corresponding test has to be repeated immediately if it is technically possible and necessary for evidence of the elimination of the defect.

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### 2.3.3 External control

In every production company the in-house production control has to be proved by an external control on a regular basis, but at least twice a year. As part of the external control an initial check of the building products has to be carried out:

- Profiled sheets

Random checks of the thicknesses, the profile geometry and the material characteristics have to be made. The external control has to prove that the requirements of section 2.1 are fulfilled.

- Fixation clips

The instructions for the profiled sheets apply in the general sense.

The sampling and testing have to be carried out through the specified office. The results of the certification and the external control have to be kept for at least five years. On request, they have to be presented to the German Institute for Building Technology and to the responsible superior Building Authority through the certification office or the regulatory agency.

## 3 Regulation for planning and measurements

### 3.1 General

Serviceability and load-bearing safety have to be proofed by means of a static calculation in every single case of use. The regulations of the current Technical Building Regulations apply if the following does not determine any other facts.

### 3.2 Loading assumptions (impacts)

#### 3.2.1 Single load of the profiled sheets

See enclosure 4.1 until 4.2 for the permanent weight of the profiled sheets.

#### 3.2.2 Single load

The proof of the load bearing capacity for the profiled sheets under a single load of 1.0 kN according to DIN 1991-1-1:2010-12 in connection with DIN EN 1991-1-1/NA:2010-12 table 6.10DE is considered to be established with the compliance of these regulations under this authorisation (see also section 5).

#### 3.2.3 Waterskin

The regulations according to DIN 18 807-3:1987-06, section 3.1.3 apply correspondingly.

### 3.3 Static systems

The profiled sheets can be laid over one field or continuously over several fields.

Continuous beams with a distance between supports of less than 1.0 m have to have verification of a calculated distance between supports of at least 1.0 m.

### 3.4 Proof of load bearing capabilities acting perpendicularly to the laying surface

#### 3.4.1 Calculation of loads section

All loads must in principle be calculated according to the theory of elasticity.

The proof of serviceability (for deflection see DIN 18800-1:2008-11, section 7.2.3) has to be conducted with the same combination coefficients as for the proof of load-bearing safety and

$$\gamma_M = 1.0.$$

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### 3.4.2 Calculation of the load-bearing capacities from the characteristic values of resistivity

DIN EN 1993-1-3:2010-12 in connection with DIN EN 1993-1-3/NA:2010-12 and the specifications in the enclosures 4.1 to 4.2. Deviating from DIN EN 1993-1-3:2010-12, equation (6.28c) is valid for interaction conditions for the in enclosure 4.1 to 4.2 mentioned equation.

The characteristic values of the retaining forces between the profiled sheets and the fixing clips can be taken from enclosure 4.3.

The characteristic values for the maximal bearing loads of the connections to the fixation clips with the substructure may be taken from the relevant General Construction Authorisation Approvals (e. g. Authorisation no. Z-14. 1-4), European Technical Approvals and Standards (e. g. DIN EN 14592:2012-07) in connection with DIN 20000-6:2015-02

To determine the strength out of the characteristic values, the part-safety coefficient  $\gamma_M = 1,33$  has to be used.

At connections with wooden constructions the modification factor  $k_{mod}$  has to be considered according to DIN EN 1995-1-1:2010-12 in connection with the National annex.

### 3.5 Calculation of changes in shape

See enclosures 4.1 to 4.2 for the characteristic value for the bending torque of inertia.

### 3.6 Roof shear

A continuation of shear and normal forces acting at the roof level due to a roof slope by the profiled sheets may not be taken into consideration for the purposes of calculation without special design requirements-e. g. forming of fixed points (see also section 4.1). The forces from fixed points are to be further pursued in the substructure.

### 3.7 Sheet action

The sheet action of the profiled sheets for the purposes of fixed points of stiffening the overall building must not be taken into consideration for calculation purposes.

## 4 Regulations for execution

### 4.1 Profiled sheets

The profiled sheets have to be connected to the substructure by fixation clip at every rib. Fixed points are to be provided to fix the profiled sheets in the case of heat movements and to transfer the roof shear in the case of inclined roofs (see enclosure 3). Transverse joints are only permissible if a correct water drain is still possible even under full load. Transverse joints have to be effected directly over a support if the joint is carried out at a fixed point.

Otherwise the profiled sheets have to be jointed slightly above a support. In the case of roof pitches of up to 17° (30%) the opposite overlap of the profiled sheets has to be at least 20 cm and at least 15 cm in case of bigger roof pitches.

If the profiled sheets are used as a water-bearing outer shell of roofs, the following minimum roof pitches are to be adhered to:

Minimum roof pitch of 1.5° (2.6%) for roofs without transverse joints. The required minimum roof inclination increases to 2.9° (5%) for roofs with transverse joints and/or roof penetrations (e. g. dome lights).

The increase in the minimum roof pitch required in the case of roof penetrations – e. g. for dome lights - is not necessary, if the following preconditions are met at the same time:

1. Completely welded roof bearing frames are used.
2. The roof bearing frames are welded to the roof upper shell of the profiled sheets in a way that an absolute tightness is achieved.
3. Weldings are pretreated and given a follow-up treatment regarding the corrosion protection.

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The requirement of a minimum roof pitch does not apply (locally limited) for the ridge area, if the roof elements in areas with roof pitch  $\leq 2.9^\circ$  (5%) are arranged un-jointed running continuously over the ridge.

The sheets formed by the profiled sheets have to run in direction of the roof pitch.

#### 4.2 Fixation clips

To connect the profiled sheets to the substructure, fixation clips as per enclosure 2 are to be used, where the upper end of each is to be seized to the profiled sheets. The fixation clips are to be fixed directly to the substructure out of steel or wood.

Fixation Clips are fixed to the substructure by suitable screws, indicated in the General System Authorisations by the Construction Authorities (e. g. Authorisation no. Z-14. 1-4) and in the European Technical Authorisations, European Technical Evaluations and Standards (e.g. DIN EN 14592:2012-07 in connection with DIN 20000-6:2015-02).

To connect the profiled sheets to concrete substructures, sufficiently anchored, continuous steel components (e. g. HTU tracks or 8 mm thick flat steel) or wooden laths (minimum thickness 40 mm) with a width of at least 60 mm are to be interposed.

#### 4.3 Support thickness

The stringer width may not be lower than 50 mm for end and intermediate supports. To guarantee the load bearing capacity at the end supports an overlap of profiled sheets of at least 60 mm is required.

#### 4.4 Verge

The free edges in clamping direction of the profiled sheets are to be braced by suitable edge stiffening (verge profiles).

#### 4.5 Installation of profiled sheets

It is only permitted to qualified persons of the production company or to authorised companies with the corresponding instruction from the producer to install the profiled sheets. The producer or installer of the profiled sheets has to hand out executions instructions for the installation of the elements to the assemblers.

Profiled sheets with damages including plastic deformations must not be installed.

When using profiled sheets with different metal thicknesses on one roof, they have to be marked according to the thicknesses in order to prevent confusions.

The individual elements have to be combined immediately after the installation by attaching the edge ribs. Here, it is important to attend to a proper connection with the fixation clips. If the installation of the profiled sheets is interrupted, the last fixed profiled sheet has to be secured against lifting.

An additional protection against lifting is moreover necessary, if the construction is exposed to bigger stresses due to wind loads during construction than after completion of the project.

During installation it is not allowed to walk on the profiled sheets without load-distributing measures (see section 5). After completion, the roof is to be cleared of objects. The conformity of the style of construction with the regulations in this General System Authorisation by the Construction Authorities has to be certified by the executing company.

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## 5 Regulations for use, maintenance and service

After completion of the roof, it is permissible to walk on the profiled sheets for cleaning and maintenance work without load-distribution measures up to spans as per enclosure 5.

Load-distributing measures (e. g. wooden planks of sorting class S10 according to DIN 4074-1:2003-06 or Property Class C24 according to DIN EN 14081-1:2011-05 in connection with DIN 20000-5:2012-03 with a cross-section of 4 x 24 cm and a length of > 3,0 m are to be used if the distance between supports is more than the above-mentioned maximal values. The planks may be laid in the direction of stress of the profiled sheets or transverse to the direction of stress on the ribs.

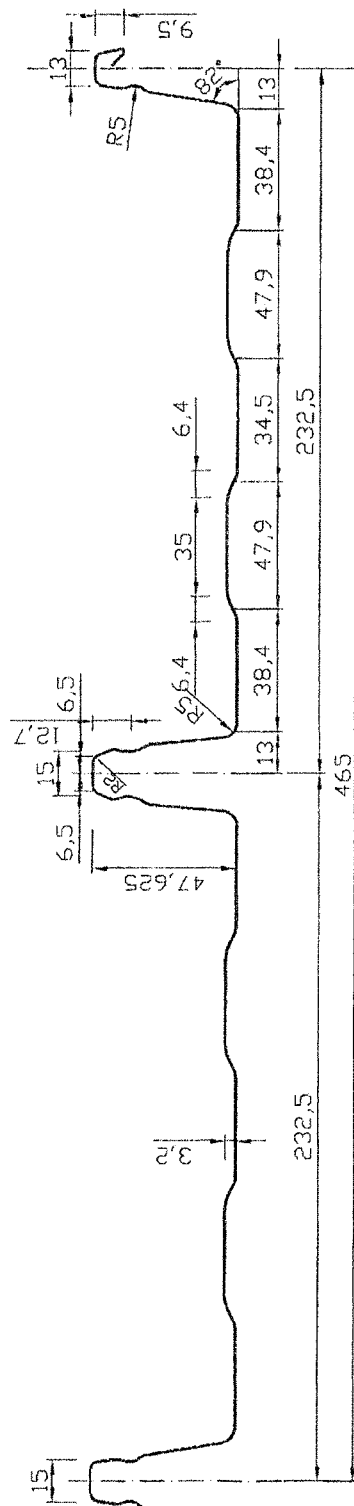
Andreas Schult  
Head of Unit

(German version certified by the German Institute for Building Technology)

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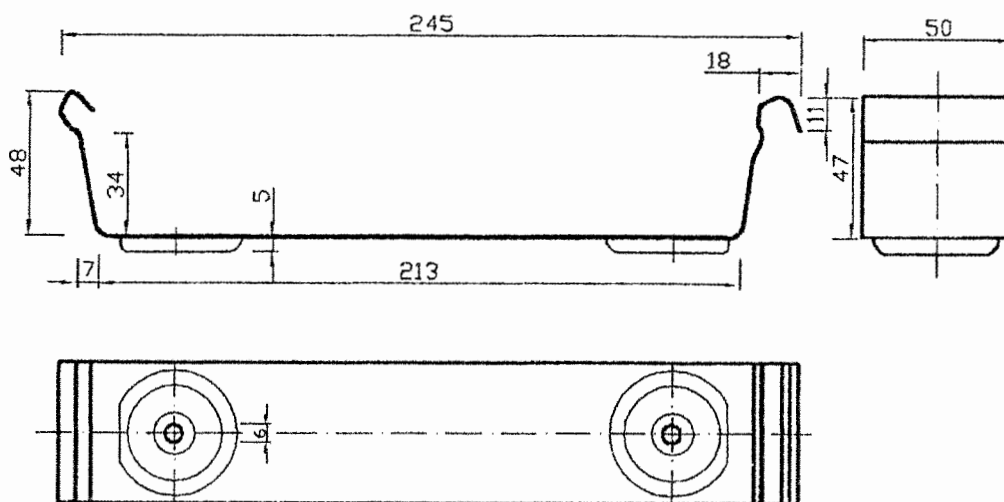


**RIB-ROOF sliding standing seam roofing out of steel**

**Enclosure 1**

cross section geometry of the profiled sheets

Fixation clips (sliding clip) type 465  
out of stainless steel  $t_N = 1.20$  mm and  
out of sheet steel  $t_N = 1.25$  mm

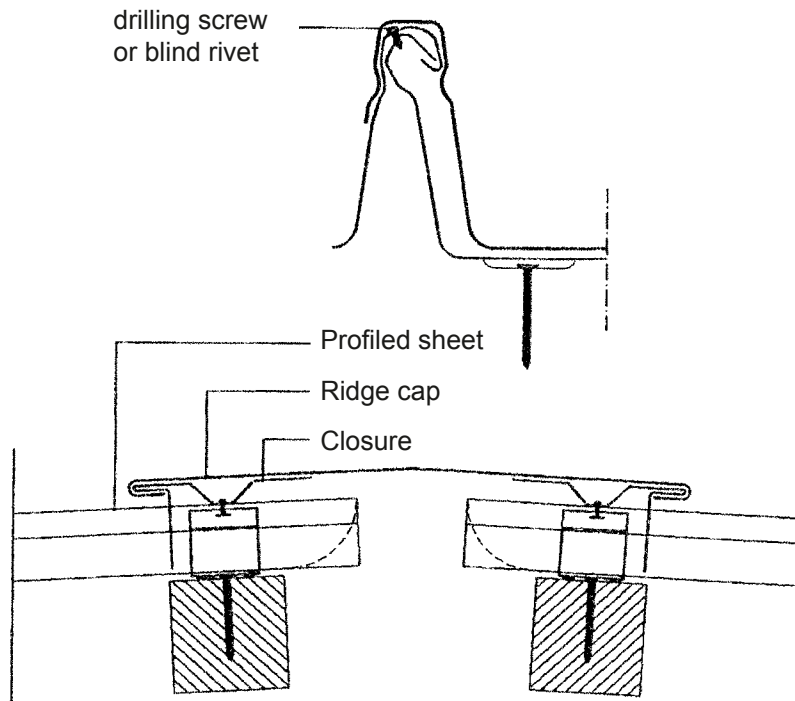


RIB-ROOF sliding standing seam roofing out of steel

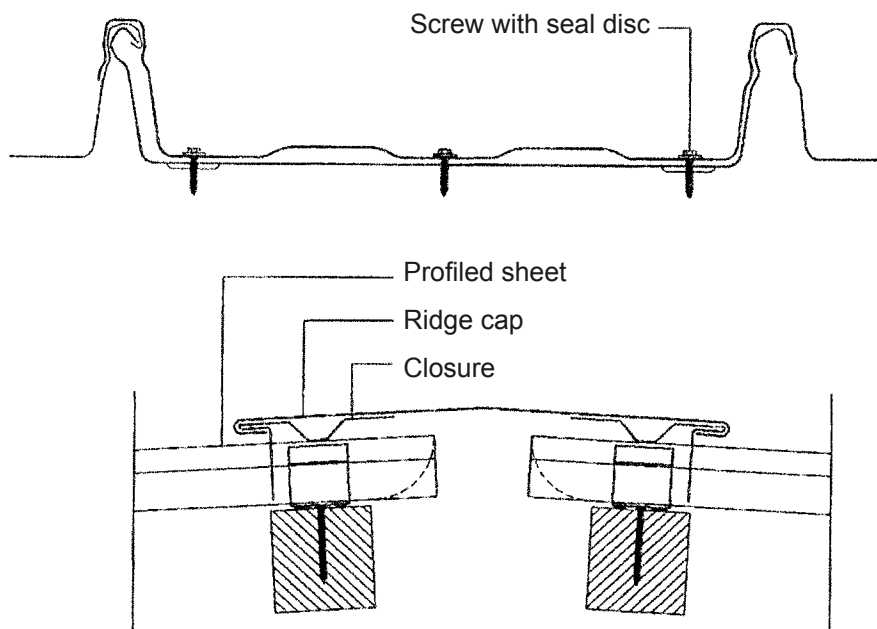
Enclosure 2

form and dimensions of the fixation clips

## Fixed point, version 1



## Fixed point, version 2



RIB-ROOF sliding standing seam roofing out of steel

Enclosure 3

designs of fixed points

**steel S350GD+Z**

| <b>RIB-ROOF 465</b>                                       |                          |                                  |                    |                       |                                                                                      |                           |                        |                       |
|-----------------------------------------------------------|--------------------------|----------------------------------|--------------------|-----------------------|--------------------------------------------------------------------------------------|---------------------------|------------------------|-----------------------|
| characteristic values for superimposed load <sup>1)</sup> |                          |                                  |                    |                       |                                                                                      |                           |                        |                       |
| metal thickness                                           | permanent load           | torque of inertia                | torque of field    | end-support strengths | cut sizes at intermediate supports<br>$M/M_{B,k}^{\circ} + R/R_{B,k}^{\circ} \leq 1$ |                           |                        |                       |
| $t_N$<br>mm                                               | $g$<br>kN/m <sup>2</sup> | $J_{ef,k}$<br>cm <sup>4</sup> /m | $M_{F,k}$<br>kNm/m | $R_{A,k}$<br>kN/m     | $M_{B,k}^{\circ}$<br>kNm/m                                                           | $R_{B,k}^{\circ}$<br>kN/m | max $M_{B,k}$<br>kNm/m | max $R_{B,k}$<br>kN/m |
| 0,63                                                      | 0,072                    | 17,7                             | 2,17               | 15,8                  | 2,27                                                                                 | 30,0                      | 1,86                   | 16,7                  |
| 0,75                                                      | 0,083                    | 21,3                             | 2,83               | 23,5                  | 3,10                                                                                 | 46,5                      | 2,63                   | 24,5                  |
| 0,88                                                      | 0,097                    | 25,2                             | 3,34               | 27,9                  | 3,66                                                                                 | 54,9                      | 3,11                   | 29,0                  |
| 1,00                                                      | 0,110                    | 28,8                             | 3,82               | 31,8                  | 4,19                                                                                 | 62,9                      | 3,56                   | 33,1                  |
|                                                           |                          | $\gamma_M = 1,0$                 |                    | $\gamma_M = 1,1$      |                                                                                      |                           |                        |                       |

<sup>1)</sup> For single loads, only 75% of the specified values may be applied.

| <b>RIB-ROOF 465</b>                    |                    |                       |                                                                                      |                           |                        |                       |
|----------------------------------------|--------------------|-----------------------|--------------------------------------------------------------------------------------|---------------------------|------------------------|-----------------------|
| characteristic values for lifting load |                    |                       |                                                                                      |                           |                        |                       |
| metal thickness                        | field moment       | end support strengths | cut sizes at intermediate supports<br>$M/M_{B,k}^{\circ} + R/R_{B,k}^{\circ} \leq 1$ |                           |                        |                       |
| $t_N$<br>mm                            | $M_{F,k}$<br>kNm/m | $R_{A,k}$<br>kN/m     | $M_{B,k}^{\circ}$<br>kNm/m                                                           | $R_{B,k}^{\circ}$<br>kN/m | max $M_{B,k}$<br>kNm/m | max $R_{B,k}$<br>kN/m |
| 0,63                                   | 1,88               | 3,17                  | 17,2                                                                                 | 4,88                      | 1,57                   | 4,76                  |
| 0,75                                   | 2,61               | 5,55                  | 5,35                                                                                 | 7,60                      | 1,78                   | 6,63                  |
| 0,88                                   | 3,09               | 6,57                  | 6,33                                                                                 | 8,99                      | 2,11                   | 7,85                  |
| 1,00                                   | 3,53               | 7,50                  | 7,23                                                                                 | 10,27                     | 2,41                   | 8,97                  |
| $\gamma_M = 1,1$                       |                    |                       |                                                                                      |                           |                        |                       |

**RIB-ROOF sliding standing seam roofing out of steel**

**Enclosure 4.1**

cross section values, characteristic values of the resistivity and partsecurity coefficients  $\gamma_M$  for steel S350 GD+Z

**steel S320GD+Z**

**RIB-ROOF 465**

characteristic values for superimposed load<sup>1)</sup>

| metal thickness | permanent load           | torque of inertia                | torque of field    | end-support strengths | cut sizes at intermediate supports<br>$M/M_{B,k}^{\circ} + R/R_{B,k}^{\circ} \leq 1$ |                           |                        |                       |
|-----------------|--------------------------|----------------------------------|--------------------|-----------------------|--------------------------------------------------------------------------------------|---------------------------|------------------------|-----------------------|
| $t_N$<br>mm     | $g$<br>kN/m <sup>2</sup> | $J_{ef,k}$<br>cm <sup>4</sup> /m | $M_{F,k}$<br>kNm/m | $R_{A,k}$<br>kN/m     | $M_{B,k}^{\circ}$<br>kNm/m                                                           | $R_{B,k}^{\circ}$<br>kN/m | max $M_{B,k}$<br>kNm/m | max $R_{B,k}$<br>kN/m |
| 0,63            | 0,072                    | 17,7                             | 2,07               | 15,1                  | 2,17                                                                                 | 28,7                      | 1,78                   | 16,0                  |
| 0,75            | 0,083                    | 21,3                             | 2,71               | 22,5                  | 2,96                                                                                 | 44,5                      | 2,51                   | 23,4                  |
| 0,88            | 0,097                    | 25,2                             | 3,19               | 26,7                  | 3,50                                                                                 | 52,5                      | 2,97                   | 27,7                  |
| 1,00            | 0,110                    | 28,8                             | 3,65               | 30,4                  | 4,01                                                                                 | 60,1                      | 3,40                   | 31,6                  |
|                 |                          | $\gamma_M = 1,0$                 |                    | $\gamma_M = 1,1$      |                                                                                      |                           |                        |                       |

<sup>1)</sup> For single loads, only 75% of the specified values may be applied.

**RIB-ROOF 465**

characteristic values for lifting load

| metal thickness  | field moment       | end support strengths | cut sizes at intermediate supports<br>$M/ M_{B,k}^{\circ} + R/R_{B,k}^{\circ} \leq 1$ |                           |                        |                       |
|------------------|--------------------|-----------------------|---------------------------------------------------------------------------------------|---------------------------|------------------------|-----------------------|
| $t_N$<br>mm      | $M_{F,k}$<br>kNm/m | $R_{A,k}$<br>kN/m     | $M_{B,k}^{\circ}$<br>kNm/m                                                            | $R_{B,k}^{\circ}$<br>kN/m | max $M_{B,k}$<br>kNm/m | max $R_{B,k}$<br>kN/m |
| 0,63             | 1,80               | 3,03                  | 16,4                                                                                  | 4,67                      | 1,50                   | 4,55                  |
| 0,75             | 2,50               | 5,31                  | 5,12                                                                                  | 7,27                      | 1,70                   | 6,34                  |
| 0,88             | 2,95               | 6,28                  | 6,05                                                                                  | 8,60                      | 2,02                   | 7,51                  |
| 1,00             | 3,38               | 7,17                  | 6,91                                                                                  | 9,82                      | 2,30                   | 8,58                  |
| $\gamma_M = 1,1$ |                    |                       |                                                                                       |                           |                        |                       |

**RIB-ROOF sliding standing seam roofing out of steel**

**Enclosure 4.2**

cross section values, characteristic values of the resistivity and partsecurity coefficients  $\gamma_M$  for steel S320 GD+Z

**Characteristic holding forces between the profiled sheets and the fixation clips**

| <b>RIB-ROOF 465, steel S350GD+Z</b> |                                  |                                  |
|-------------------------------------|----------------------------------|----------------------------------|
| metal<br>thickness                  | intermediate<br>supports         | end-support <sup>1)</sup>        |
| $t_N$<br>mm                         | $F_{B,k}$<br>kN/m <sup>*</sup> ) | $F_{A,k}$<br>kN/m <sup>*</sup> ) |
| 0,63                                | 4,45                             | 3,17                             |
| 0,75                                | 5,05                             | 5,55                             |
| 0,88                                | 5,05                             | 5,55                             |
| 1,00                                | 5,05                             | 5,55                             |
| $\gamma_M = 1,33$                   |                                  |                                  |

| <b>RIB-ROOF 465, steel S350GD+Z</b> |                                  |                                  |
|-------------------------------------|----------------------------------|----------------------------------|
| metal<br>thickness                  | intermediate<br>supports         | end-support <sup>1)</sup>        |
| $t_N$<br>mm                         | $F_{B,k}$<br>kN/m <sup>*</sup> ) | $F_{A,k}$<br>kN/m <sup>*</sup> ) |
| 0,63                                | 4,07                             | 2,90                             |
| 0,75                                | 4,62                             | 5,07                             |
| 0,88                                | 4,62                             | 5,07                             |
| 1,00                                | 4,62                             | 5,07                             |
| $\gamma_M = 1,33$                   |                                  |                                  |

<sup>1)</sup> Profile overlap  $\ddot{u} \geq 6$  cm in excess of the end of the fixation clip.

<sup>\*</sup>) Adjustment by Zambelli confirmed by DIBt

**RIB-ROOF sliding standing seam roofing out of steel**

**Enclosure 4.3**

cross section values, characteristic values of the resistivity and partsecurity  
coefficients  $\gamma_M$

### Span limit of walkability $L_{gr}$

#### a) Site inspection of the lower belt

The profiled sheets are walkable up to the named span without load-distributing coverings. The values apply for the event that the profiled sheets are inspected in the lower belt.

| metal<br>thickness<br>$t_N$<br>mm | RIB-ROOF 465 - S350GD+Z                |                                          |                                        |                                          |
|-----------------------------------|----------------------------------------|------------------------------------------|----------------------------------------|------------------------------------------|
|                                   | During installation                    |                                          | After installation                     |                                          |
|                                   | single-span<br>girder<br>$L_{gr}$<br>m | multiple-span<br>girder<br>$L_{gr}$<br>m | single-span<br>girder<br>$L_{gr}$<br>m | multiple-span<br>girder<br>$L_{gr}$<br>m |
| 0,63                              | 2,42                                   | 3,03                                     | 2,42                                   | 3,03                                     |
| 0,75                              | 3,67                                   | 4,59                                     | 3,62                                   | 4,53                                     |
| 0,88                              | 4,34                                   | 5,43                                     | 4,28                                   | 5,35                                     |
| 1,00                              | 4,96                                   | 6,20                                     | 4,89                                   | 6,11                                     |

| metal<br>thickness<br>$t_N$<br>mm | RIB-ROOF 465 - S320GD+Z                |                                          |                                        |                                          |
|-----------------------------------|----------------------------------------|------------------------------------------|----------------------------------------|------------------------------------------|
|                                   | During installation                    |                                          | After installation                     |                                          |
|                                   | single-span<br>girder<br>$L_{gr}$<br>m | multiple-span<br>girder<br>$L_{gr}$<br>m | single-span<br>girder<br>$L_{gr}$<br>m | multiple-span<br>girder<br>$L_{gr}$<br>m |
| 0,63                              | 2,31                                   | 2,90                                     | 2,31                                   | 2,90                                     |
| 0,75                              | 3,51                                   | 4,39                                     | 3,46                                   | 4,33                                     |
| 0,88                              | 4,15                                   | 5,19                                     | 4,09                                   | 5,12                                     |
| 1,00                              | 4,74                                   | 5,93                                     | 4,68                                   | 5,84                                     |

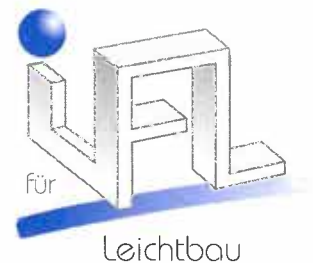
#### b) Walkability of the upper flange

"During the installation" it is absolutely not allowed to walk across the upper flanges of the latest laid sheet without load-distributing measures.

Entirely fixed profiled sheets are also walkable on the upper flange up to the named span. The necessary safety against falling is guaranteed. However, to minimize the risk of permanent deformations (dents), a reduction of these spans by 30% is recommended.

**Notice:** Apart from static permissible spans resulting from the calculation and from the span limits of walkability, it is recommended to pay attention to maximum spans required by installation; referring to documents of the manufacturer.

| RIB-ROOF sliding standing seam roofing out of steel | Enclosure 5 |
|-----------------------------------------------------|-------------|
| span limit of walkability                           |             |



## **Gutachten Nr. 1551/20-1**

### **Anmerkungen zur Verwendbarkeit des Zambelli RIB-ROOF-465- Profildaches aus Aluminium**

Im Auftrag der Firma

**Zambelli RIB-ROOF GmbH**  
**Hans-Sachs-Straße 3+5**  
**94568 Stephansposching**

Dieses Gutachten enthält 2 Seiten und einen Anhang.



## **1 Vorbemerkung**

Das Aluminium- Klemmrippenprofil RIB-ROOF 465 der Firma Zambelli RIB-ROOF GmbH & Co. KG war bisher mit der ABZ Z-14.1-346 [2] allgemein bauaufsichtlich zugelassen. Zukünftig soll es als selbsttragendes Dachdeckungselement nach DIN EN 14782 [1] eingesetzt werden.

## **2 Literatur / Grundlagen**

- [1] DIN EN 14782: Selbsttragende Dachdeckungs- und Wandbekleidungselemente für die Innen- und Außenanwendung aus Metallblech – Produktspezifikation und Anforderungen; Deutschen Fassung EN 14782:2006
- [2] DIBt (Hrsg.): Allgemeine bauaufsichtliche Zulassung Nr. Z-14.1-346 „RIB-ROOF-Gleit-Falz-Profildach aus Aluminium“, Stand 1. Februar 2016 (abgedruckt im Anhang)

## **3 Voraussetzungen für die Verwendung**

### **3.1 Allgemeines**

Für die Verwendung eines Bauproduktes nach der harmonisierten Norm DIN EN 14782 ist vom Hersteller eine Leistungserklärung bereitzustellen. In der Leistungserklärung sind die für den vorgesehenen Anwendungsbereich relevanten Leistungen (entsprechend den wesentlichen Merkmalen gemäß der Bauproduktenverordnung) zu deklarieren.

### **3.2 Mechanische Festigkeit**

#### **3.2.1 Allgemeines**

Für die Festlegung des Merkmales „mechanischen Festigkeit“ gibt DIN EN 14782 (Abschnitt 4.3.1) lediglich die zu beachtenden Aspekte an, z.B. bestimmungsgemäße Anwendung (z.B. Dach, Wand), Werkstoffeigenschaften, Geometrie und Toleranzen etc.

#### **3.2.2 Statischer Nachweis**

Ein statischer Nachweis gemäß der ABZ Z-14.1-346 [2] erfüllt die wesentlichen Anforderungen der DIN EN 14782 bzgl. der mechanischen Festigkeit. Die RIB-ROOF 465- Profile wurden 1978 erstmals bauaufsichtlich zugelassen. Damit steht die Zulassung, die seither stets ver-

längert und aktualisiert wurde, für eine über 40- jährige kontinuierliche Bewährung des Produktes und der Erfahrung der Fa. Zambelli. Obwohl die Zulassung formal am 1. Februar 2021 ausläuft, kann sie im Hinblick auf die darin genannten Anforderung bzgl. Herstellung und Verwendung der RIB-ROOF 465- Profile weiterhin als Quelle für die Produkteigenschaften, wie z.B. charakteristische Querschnitts- und Tragfähigkeitswerte herangezogen werden.

### 3.3 Überwachung

DIN EN 14782 fordert für die CE- Kennzeichnung eine Überwachung (Konformitätsbewertung) nach System 4 bzw. 3. Die Fa. Zambelli wird die RIB-ROOF 465- Profile gemäß einer Selbstverpflichtung nach dem umfassenderen System 2+ entsprechend der ABZ Z-14.1-346 bewerten.

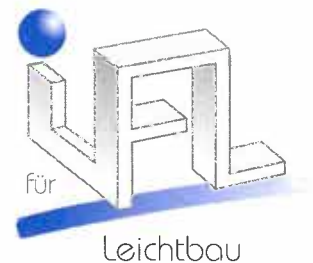
## 4 Zusammenfassung und Empfehlung

Die Fa. Zambelli RIB-ROOF GmbH & Co, KG will nach dem formellen Auslaufen der allgemeine bauaufsichtliche Zulassung Nr. Z-14.1-346 die RIB-ROOF 465- Profile nach DIN EN 14782 kennzeichnen. Ich empfehle, für den normkonformen statischen Nachweis die genannte Zulassung gemäß Anlage weiterhin heranzuziehen. Die Anforderungen der Zulassung bzgl. Herstellung und Verwendung der RIB-ROOF 465- Profile müssen eingehalten werden.

Karlsruhe, den 16. Dezember 2020



Dr.- Ing. Gerhard Huck  
Ing.- Büro für Leichtbau, Dipl.- Ing. R. Holz  
Rehbuckel 7  
76228 Karlsruhe



## **Gutachten Nr. 1551/20-1**

### **Anmerkungen zur Verwendbarkeit des Zambelli RIB-ROOF-465- Profildaches aus Aluminium**

## **Anhang**

### **Allgemeine bauaufsichtliche Zulassung Z-14.1-346**

Im Auftrag der Firma

**Zambelli RIB-ROOF GmbH**  
**Hans-Sachs-Straße 3+5**  
**94568 Stephansposching**

Dieser Anhang enthält 16 Blätter.

General System Authorisation  
by the Construction Authorities  
RIB-ROOF 465 sliding standing seam roofing

Aluminium: no. Z-14.1-346



# Allgemeine bauaufsichtliche Zulassung

**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

Datum:

01.02.2016

Geschäftszeichen:

I 31-1.14.1-4/16

**Zulassungsnummer:**

**Z-14.1-346**

**Antragsteller:**

**Zambelli RIB-ROOF GmbH & Co. KG**

Hans-Sachs-Straße 3+ 5  
94569 Stephansposching

**Geltungsdauer**

vom: **1. Februar 2016**

bis: **1. Februar 2021**

**Zulassungsgegenstand:**

**RIB-ROOF-Gleit-Falz-Profildach aus Aluminium**

Der oben genannte Zulassungsgegenstand wird hiermit allgemein bauaufsichtlich zugelassen.  
Diese allgemeine bauaufsichtliche Zulassung umfasst neun Seiten und sieben Anlagen.  
Der Gegenstand ist erstmals am 18. Dezember 1978 allgemein bauaufsichtlich zugelassen worden.

# General System Authorisation by the Construction Authorities

**German Institute for Building Technology**  
INCORPORATED PUBLIC-LAW INSTITUTE

**Construction Approvals Body for Construction  
Products and Construction Systems**

Incorporated Public-Law Institute supported together by  
the Federal Republic of  
Germany and the federal states  
Member EOTA and the UEAtc

Date: 2nd February 2016  
phone: +49 (0)30 78730-246 fax: +49 (0)30 78730-320  
E-Mail: [dibt@dibt.de](mailto:dibt@dibt.de)  
Trans. Ref. : I 31-1. 14. 1-17/10

**Authorisation number:** Z-14.1-346

**Applicant:** Zambelli RIB-ROOF GmbH & Co. KG Hans-Sachs-Straße 3+5, 94569 Stephansposching, Germany

**Object:** RIB-ROOF 465 sliding standing seam roofing, aluminium

**Valid until:** 1st February 2021

**Object of approval:** RIB-ROOF 465 sliding standing seam roofing made of aluminium sheet

The above-mentioned object of authorisation has been approved by the general construction authorities. This General System Authorisation by the Construction Authorities includes nine pages and five enclosures with seven pages.

This General Construction Authorisation Approval replaces the General Construction Authorisation approval no. Z-14. 1-346 of 31st February 2021, expired by notification dated 26th July 2005. General Construction Authorisation of the object was approved initially on 18th December 1978.

Please note:

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Liability for translation errors is excluded.

## I. GENERAL REGULATIONS

- 1 Through the General System Authorisation by the Construction Authorities the utilisation and/or applicability of the object approved has been established in accordance with the Building regulations of the country.
- 2 Provided that the requirements for manufacturing of building products and types are met regarding the expertise and experience of the entrusted individuals in the general construction approvals body according to § 17 paragraph 5 Model Building Regulations and according to state regulations, attention should be given to the fact that this expertise and experience can also be documented by comparable proof from other member states of the European Union. This is valid, where applicable, also for documentation given within the framework of agreements covering European Economic Area (EWR) or other bilateral agreements.
- 3 The general building authorisation approval does not replace the legal requirements for approvals, consents and certificates, which are regulated by law for the execution of building projects.
- 4 The General System Authorisation by the Construction Authorities is granted without impairing the rights of third parties, especially private property rights.
- 5 Producers and distributors of the object approved are obliged to provide the user and applier of the approved object copies of the General System Authorisation by the Construction Authorities, independent of advanced regulations according to the "Special Regulations", and to advise them that the General System Authorisation by the Construction Authorities has to be available at the application site. On request, the General System Authorisation by the Construction Authorities has to be made available to authorities involved.
- 6 It is only allowed to copy the General System Authorisation in its entirety. The publication in extracts requires the approval of the German Institute for Construction Technology. Texts and drawings of advertising materials must not contradict the General System Authorisation. Translations of the General System Authorisation by the Construction Authorities have to include the following note "This translation from the German original is uncertified by the German Institute for Construction Technology".
- 7 The General System Authorisation by the Construction Authorities is subject to revocation. The regulations of the General System Authorisation by the Construction Authorities can be supplemented and altered subsequently, especially if new developments in technology require this.

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## II. SPECIAL REGULATIONS

### 1 Object of approval and area of application

The object of approval is a type of construction composed of several building products consisting of loadbearing, room-closing roof elements (profiled sheets) as well as associated fixing elements (fixation clips). The profiled sheets are manufactured from smooth or stucco-design aluminium coil, which are warped in a cold state by roll-bending to profiled sheets with a trough-shaped cross-section and parallel ribs in the support direction (see enclosure 1). The fixation clips are manufactured from corrosion-protected sheet steel or stainless steel.

The profiled sheets are connected one to each other by interlocking the sideways ribs of adjacent roof elements to form a waterproof join. The connection with the substructure is effected by fixation clips, which are clamped between the ribs, can not be seen from above and which are mounted on the substructure.

The General System Authorisation by the Construction Authorities regulates the usage of the above-mentioned profiled sheets and fixation clips.

### 2 Regulations for the building products

#### 2.1 Properties and composition

##### 2.1.1 Dimensions

The dimensions of the profiled sheets and fixation clips have to correspond to the specifications in enclosures 1 and 2.

For the limiting dimensions of the nominal sheet thickness of the profiled sheets, the tolerances according to DIN EN 485-4:1994-01 apply; however, for the lower limiting dimensions only the half values apply. For the limiting dimensions of the nominal sheet thickness of the fixation clips, the tolerances according to DIN EN 10143:2006-09 (normal limiting dimensions) apply; however, for the lower limiting dimensions only the half values apply.

##### 2.1.2 Material

##### 2.1.2.1 Profiled sheets

The following aluminium-alloys as material for the manufacture of the profiled sheets having the sheet thicknesses mentioned in the enclosures have to be used:

- EN AW-3004 (Al Mn 1 Mg 1) according to DIN EN 573-3:2009-08 or
- EN AW-3005 (Al Mn 1 Mg 0,5) according to DIN EN 573-3:2009-08

The base material which has not yet been profiled must have at least the following mechanical material characteristics for all sheet thicknesses (values of strength and breaking elongation determined according to DIN EN 10002-1:2001-12):

|                                                | $R_{p0,2}$ [N/mm <sup>2</sup> ] | $R_m$ [N/mm <sup>2</sup> ] | $A_{50\text{ mm}}$ [%] |
|------------------------------------------------|---------------------------------|----------------------------|------------------------|
| EN AW-3004 (Al Mn Mg 1),<br>strength version A | 220                             | 250                        | 4                      |
| EN AW-3004 (Al Mn Mg 1),<br>strength version B | 190                             | 215                        | 3                      |
| EN AW-3005 (Al Mn Mg 0,5)                      | 190                             | 215                        | 3                      |

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These standards must also be fulfilled by the finished component in its final state of application.

#### 2.1.2.2 Fixation clips

A corrosion-protected sheet steel suitable for cold bending or a sheet steel out of stainless steel with the material number 1. 4301 according to DIN EN 10088-1:2005-09 is to be used as material for the production of the fixation clips.

The fixation clips out of corrosion-protected steel sheet must at least have the mechanical characteristics of steel of the type S 350 GD+Z according to DIN EN 1036:2015-10.

For the fixation clips out of stainless steel with the material number 1. 4301, the value of the elongation limit (0.2% elongation limit) of the base material must be at least  $R_{p0.2}$  290 N/mm<sup>2</sup>.

#### 2.1.2.3 Fastening elements

The General Authorisation Approval (e. g. Authorisation. no. Z-14.1-4) or European Technical Approvals or European Technical Evaluations for connecting elements or Standards (e. g. DIN 14592:2012-07 in connection with DIN 20000-6:2015-02).

### 2.1.3 Corrosion protection

#### 2.1.3.1 Profiled sheets

The regulations in DIN 18807-9:1998-06 apply

#### 2.1.3.2 Fixation clips

The regulations in DIN 55634:2010-04 apply for fixation clips out of stainless steel. Therefore, as corrosion protection at least a coating thickness of Z275, ZA255 or AZ150 according to DIN EN 10346:2015-10 has to be applied. As corrosion protection also a duplex system with zinc-magnesium alloy according to the General System Authorisation may be used, provided that this is dedicated to at least corrosion protection class III according to DIN 55634:2010-04.

#### 2.1.3.3 Fastening elements

The regulations of the General System Authorisation (e. g. Authorisation no. Z-14. 1-4) or the details in corresponding European Technical Authorisations or European Technical Evaluations.

### 2.1.4 Fire protection

Aluminium is a material in class A1 according to DIN 4102-4:1994:03, section 2.2.1h. Aluminium profiled sheets are resistant against striking fire and radiant heat resting roofings according to DIN 4102-4:1994-03 section 8.7.2. During the implementation the regulations MTLB, enclosure 3.1/2 as well as DIN 4102-4/A1:2004-11 must be remembered.

Deviating implementations need a separate verification of applicability.

## 2.2 Identification

### 2.2.1 Profiled sheets

The packaging of the profiled sheets must be designated by the manufacturer with the conformity symbol (Ü-symbol) according to the conformity symbol ordinances of the Federal German States. Labelling may only take place when the pre-conditions of section 2.3 have been fulfilled.

Each package of profiled sheets must also bear a sign containing information on the production facility, year of manufacture, type of profile designation, sheet thickness and minimum yield.

Profiled Sheets of different strengths must be marked distinctively.

### 2.2.2 Fixation clips

The packaging of the fixation clips must be designated by the manufacturer with the conformity symbol (Ü-symbol) according to the conformity symbol ordinances of the Federal German States. Labelling may only take place when the pre-conditions of section 2.3 have been fulfilled.

Each package of fixation clips must also bear a sign containing information on the production company, year of manufacture, type of fixation clip and material.

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## **2.3 Evidence of conformity**

### **2.3.1 General**

The confirmation of the conformity of the building products (profiled sheets and fixation clips) with the regulations of this General System Authorisation by the Construction Authorities has to be carried out for every production company with a conformity certificate on the basis of the company's own factory production control and a regular external control including an initial inspection of the building products according to the following regulations.

For the purpose of issuing the conformity certificate and the external control including the accompanying product tests, which have to be carried out, the producer of the building products has to employ an authorized certification office as well as an authorized regulatory agency. The producer has to make the declaration that a conformity certificate was issued by marking the building products with the conformity symbol (ü symbol) with reference to the intended purpose.

A copy of the conformity certificate issued by the certification office has to be given to the German Institute for Construction Technology.

### **2.3.2 In-house production control**

An in-house production control has to be set up and implemented in every production company. Inhouse production control means, that the continuous production control to be carried out by the producer, with which the producer is able to ensure that the building products he produces correspond to the regulations of this General System Authorisation by the Construction Authorities. The in-house production control should include at least the following measures:

- **Profiled Sheets:**  
At the production company the geometry and dimensions (particularly the sheet thicknesses) have to be proved by regular measurements.  
For each material delivery the material have to be proved as required in section 2.1. Evidence of the material characteristics of the base material has to be supplied with an inspection certificate "3.1" according to DIN EN 10204:2005-01 The conformity of the specifications in the inspection certificate "3.1" with the specifications in section 2.1 has to be proved.  
For each coil, a folding test according to DIN EN ISO 7438:2005-10 has to be carried out to prove the adequate deformability of the base material and the profiled sheets. These tests are not to show any signs of cracking.
- **Fixation clips:**  
At the production company the geometry and dimensions (particularly the sheet thicknesses) have to be proved with regular measurements.  
For each material delivery the material characteristics and the corrosion protection of the base material have to be proved as required in section 2.1. Evidence of the material characteristics of the base material has to be supplied with an inspection certificate "3.1" according to DIN EN 10204:2005-01. The conformity of the specifications in the inspection certificate "3.1" with the specifications in section 2.1 has to be proved.

The results of the house production control have to be recorded and evaluated. The records must at least contain the following information:

- Description of the building product or the base material as well as the components
- Type of control or test
- Date of production and the test of the building product or the base material as well as the components
- Result of the controls and tests and comparison with the requirements
- Signature of the person responsible for in-house production control.

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The records have to be kept for at least five years and presented to the regulatory agency responsible for the external control. On request, they have to be presented to the German Institute for Construction Technology and the responsible superior Building Authority.

Should testing results prove inadequate, the producer has immediately to take the necessary measures to eliminate the defect. Building products which do not conform to the requirements are to be handled that way, that they can not mixed up with products, which conform. After elimination of the defect, the corresponding test has to be repeated immediately - if it is technically possible and necessary for evidence of the elimination of the defect.

### 2.3.3 External control

In every production company the in-house production control has to be proved by an external control on a regular basis, but at least twice a year. As part of the external control an initial check of the building products (profiled sheets and fixation clips) has to be carried out and the following tests have to be carried out in random checks:

- Profiled sheets  
Random checks of the thicknesses, the profile geometry and the material characteristics have to be made. The external control has to prove that the requirements of section 2.1 are fulfilled.
- Fixation clips  
The instructions for the profiled sheets apply in the general sense.

The sampling and testing have to be carried out through the specified office.

The results of the certification and the external control have to be kept for at least five years.

On request, they have to be presented to the German Institute for Building Technology and to the responsible superior Building Authority through the certification office or the regulatory agency.

## 3 Regulation for planning and measurements

### 3.1 General

Serviceability and load-bearing safety have to be proofed by means of a static calculation in every single case of use. The Technical Construction Regulations are valid, unless nothing has been agreed upon.

### 3.2 Loading assumptions (impacts)

#### 3.2.1 Permanent weight of the profiled sheets

See enclosure 4.1 until 4.2 for the permanent weight of the profiled sheets.

#### 3.2.2 Single load

The proof of the load bearing capacity for the profiled sheets under a single load of 1.0 kN according to DIN EN 1991-1-1:2010-12 is considered to be established with the compliance of these regulations under this authorisation (see also section 5).

#### 3.2.3 Waterskin

The regulations according to DIN 18807-3:1987-06, section 3.1.3 apply correspondingly.

### 3.3 Static systems

The profiled sheets can be laid over one field or continuously over several fields.

Evidence of a calculated span of at least 1.0 m must be provided for continuous beams with span of less than 1.0 m.

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### **3.4 Proof of load bearing capabilities acting perpendicularly to the laying surface**

#### **3.4.1 Calculation of loads section**

All loads must in principle be calculated according to the theory of elasticity. The proof of serviceability has to be conducted with the same combination coefficients as for the proof of load-bearing safety and  $\gamma_M = 1.0$ .

#### **3.4.2 Calculation of the load-bearing capacities from the characteristic values of resistivity**

DIN EN 1999-1-4:2010-05 in connection with DIN EN 1999-1-4/NA2010-12 and the specifications in the enclosure 4.1 and 4.2. Deviating of DIN EN 1999-1-4:2010-05, equation (6.22) applies interaction conditions enclosure 4.1 to 4.3 quoted equation. For the characteristic values of the bearing loads between the profiled sheets and the fixation clips see enclosure 4.3.

The characteristic values for the maximal bearing loads of the connections to the fixation clips with the substructure may be taken from the relevant General Construction Authorisation Approvals (e. g. Authorisation no. Z-14. 1-4), European Technical Approvals or European Technical Evaluations and Standards (e.g. DIN EN 14592:2012-07 in connection with DIN 20000-6:2015-02) may be charged multiplied by a factor of 2. To determine the stresses out of the characteristic values, the partsafety coefficient  $\gamma_M = 1,33$  has to be used. At combinations with wooden constructions the modification factor  $k_{mod}$  has to be considered according to DIN EN 1995-1-1:2010-12 in connection with the National annex.

### **3.5 Calculation of changes in shape**

See enclosures 4.1 - 4.2 for the characteristic value for the bending torque of inertia.

### **3.6 Roof shear**

A continuation of shear and normal forces acting at the roof level due to a roof slope by the profiled sheets may not be taken into consideration for the purposes of calculation without special design requirements – e. g. forming of fixed points (see also section 4.1). The forces from fixed points are to be further pursued in the substructure.

### **3.7 Sheet action**

The sheet action of the profiled sheets for the purposes of stiffening the overall building or to stabilise the substructure against lateral torsional buckling must not be taken into consideration for calculation purposes.

## **4 Provisions of implementation**

### **4.1 Profiled sheets**

The profiled sheets have to be connected to the substructure by fixation clips at every rib. Fixed points are to be provided to fix the profiled sheets in the case of heat movements and to transfer the roof shear in the case of inclined roofs (see enclosure 3). Transverse joints are only permissible if a correct water drain is still possible even under full load.

Transverse joints have to be effected directly over a support if the joint is carried out at an fixed point.

Otherwise the profiled sheets have to be jointed slightly above a support. In the case of roof inclines of up to 17° (30%) the opposite overlap of the profiled sheets has to be at least 20 cm and at least 15 cm in the case of bigger roof inclines.

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If the profiled sheets are used as a water-bearing outer shell of roofs, the following minimum roof inclines are to be adhered to:

Minimum roof pitch of 1.5° (2.6%) for roofs without transverse joints. The required minimum roof pitch increases to 2.9° (5%) for roofs with transverse joints and/or roof penetrations (e. g. dome lights).

The increase in the minimum roof incline required in the case of roof penetrations – e. g. for dome lights – is not necessary if the following preconditions are met at the same time:

1 Completely welded roof bearing frames are used.

2 The curbs for sealing out of aluminium are welded to the roof upper shell of the profiled sheets in a way that an absolute tightness is achieved.

The requirement of a minimum roof incline does not apply (locally limited) for the ridge area if the roof elements in areas with roof inclines  $\leq 2.9^\circ$  (5%) are arranged un-jointed running continuously over the ridge.

The sheets formed by the profiled sheets have to run in direction of the roof incline.

#### 4. 2 Fixing elements

To connect the profiled sheets to the substructure, fixing elements as per enclosure 2.1 – 2.5 are to be used. The upper end of each fixing element is to be jammed with the profiled sheets. The fixing elements directly have to be fastened on substructures out of steel or wood (please refer to enclosure 3). Prior mentioned fixing elements are fastened to the substructure by means of suitable connecting elements, indicated in the General System Authorisation approved by building authorities (e.g. Authorisation no. Z-14.1-4), the European Technical Approvals, the European Technical Assessments and Standards (e.g. DIN EN 14592:2012-07 in connection with DIN 20000-6:2015-02). To connect of the profiled sheets to concrete substructures, sufficiently anchored, continuous steel components (e. g. HTU tracks or 8 mm thick flat steel) or wooden laths (minimum thickness 40 mm) with a minimum width of 60 mm should be used.

#### 4. 3 Support thickness

The stringer width must not be lower than 50 mm for end and intermediate supports. To guarantee the load bearing capacity at the end supports an overlap of profiled sheets of at least 60 mm is required.

#### 4. 4 Verge

The free edges in clamping direction of the profiled sheets are to be braced by suitable edge stiffening (verge profiles).

#### 4. 5 Installation of profiled sheets

It is only permitted to qualified persons of the production company or to authorised companies with the corresponding instruction from the producer to install the profiled sheets. The producer or installer of the profiled sheets has to hand out execution instructions for the installation of the elements to the assemblers.

Profiled sheets with damage including plastic deformations must not to be installed. When using profiled sheets with different metal thicknesses on one roof, they have to be marked according to the thicknesses in order to prevent confusions.

The individual elements have to be combined immediately after the installation by attaching the edge ribs. Here, it is important to attend to a proper connection with the fixation clips. If the installation of the profiled sheets is interrupted, the last fixed profiled sheet has to be secured against lifting.

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Moreover, an additional protection against lifting is necessary if the construction is exposed to bigger stresses due to wind loads during construction than after completion of the project.

During installation it is not allowed to walk on the profiled sheets without load-distributing measures (see section 5). After completion, the roof is to be cleared of objects. The conformity of the style of construction with the regulations in this General System Authorisation by the Construction Authorities has to be certified by the executing company.

## **5. Regulations for use, maintenance and service**

After completion of the roof, it is permissible to walk on the profiled sheets for cleaning and maintenance work without load-distribution measures up to spans as per enclosure 5.

Load-distributing measures (e. g. wooden planks of sorting class S10 according to DIN 4074-1:2003:06 with a cross section of 4 x 24 cm and a length of > 3.0 m) have to be used, if the spans exceeds the above mentioned maximum values.

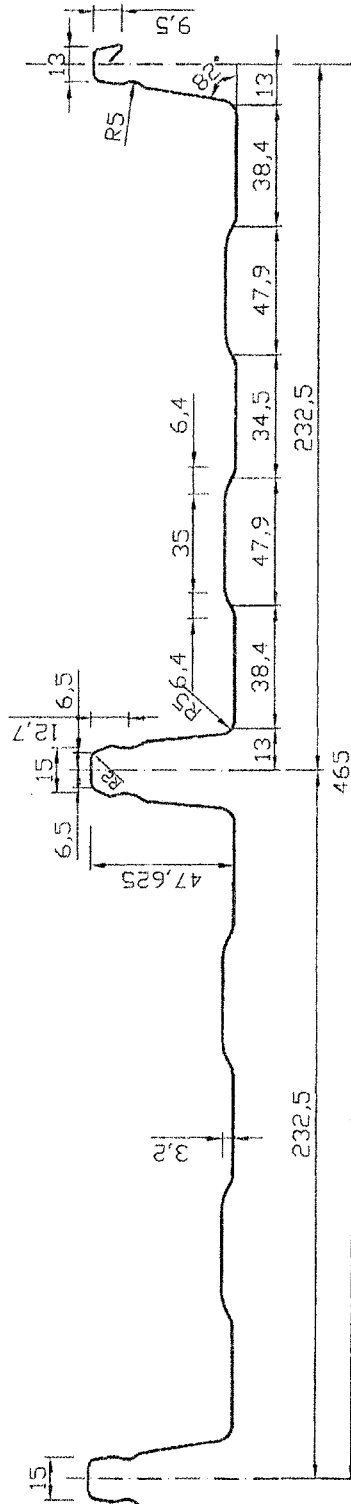
The planks may be laid in the direction of stress of the profiled sheets or transverse to the direction of stress on the ribs.

Andreas Schult  
Head of Unit

(German version certified by the German Institute for Building Technology)

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RIB-ROOF sliding standing seam roofing out of aluminium

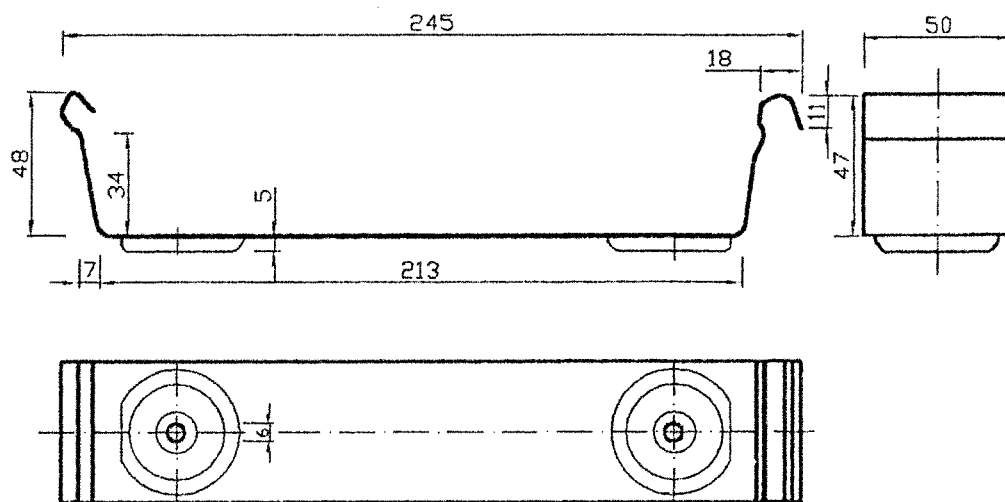
Enclosure 1

cross section geometry of the profiled sheets

Fixation clips (sliding clip) type RIB-ROOF 465

out of sheet steel  $t_N = 1.25 \text{ mm}$

or out of stainless steel  $t_N = 1.20 \text{ mm}$



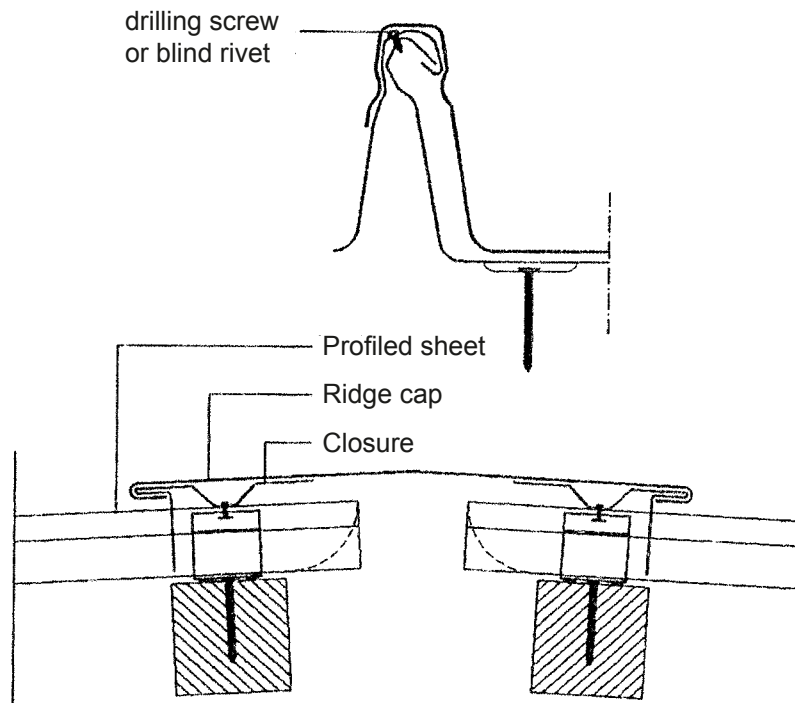
**RIB-ROOF sliding standing seam roofing out of aluminium**

**Enclosure 2**

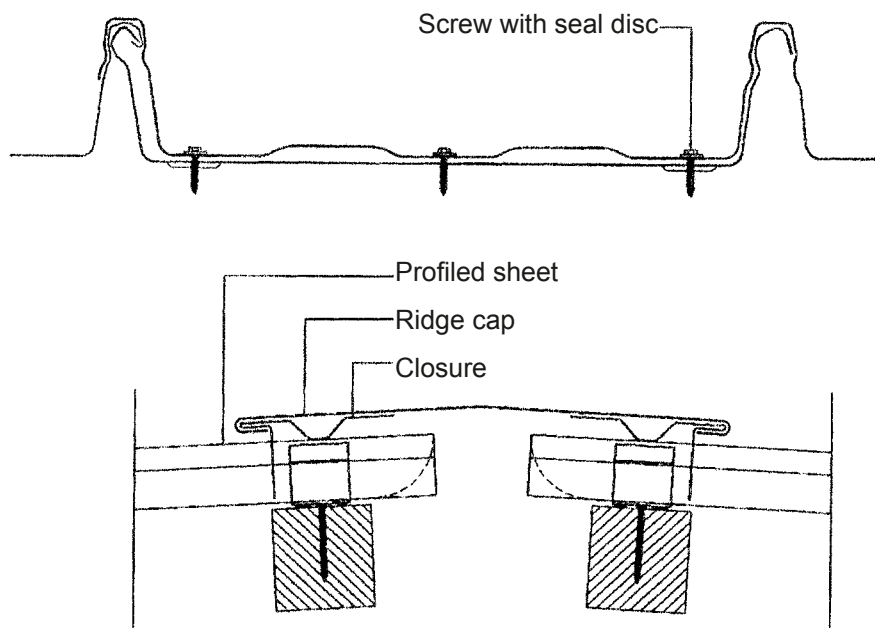
form and dimensions of the fixation clips



## Fixed points, version 1



## Fixed points, version 2



**RIB-ROOF sliding standing seam roofing out of aluminium**

**Enclosure 3**

designs of fixed points

Rated value of the stress  
at the 0.2% yield point  
 $R_{p0,2} = 220 \text{ N/mm}^2$

| <b>RIB-ROOF 465</b>                                       |                        |                                  |                    |                              |                                                                                          |                           |                        |                       |
|-----------------------------------------------------------|------------------------|----------------------------------|--------------------|------------------------------|------------------------------------------------------------------------------------------|---------------------------|------------------------|-----------------------|
| characteristic values for superimposed load <sup>1)</sup> |                        |                                  |                    |                              |                                                                                          |                           |                        |                       |
| metal<br>thickness                                        | permanent<br>load      | torque<br>of inertia             | torque<br>of field | end-<br>support<br>strengths | cut sizes at intermediate supports<br>$M/M_{B,k}^{\circ} + (R/R_{B,k}^{\circ})^2 \leq 1$ |                           |                        |                       |
| $t_N$<br>mm                                               | g<br>kN/m <sup>2</sup> | $J_{ef,k}$<br>cm <sup>4</sup> /m | $M_{F,k}$<br>kNm/m | $R_{A,k}$<br>kN/m            | $M_{B,k}^{\circ}$<br>kNm/m                                                               | $R_{B,k}^{\circ}$<br>kN/m | max $M_{B,k}$<br>kNm/m | max $R_{B,k}$<br>kN/m |
| 0,7                                                       | 0,027                  | 21,0                             | 1,32               | 12,7                         | 1,32                                                                                     | 20,9                      | 1,28                   | 13,2                  |
| 0,8                                                       | 0,031                  | 24,0                             | 1,66               | 15,9                         | 1,60                                                                                     | 25,9                      | 1,56                   | 16,2                  |
| 0,9                                                       | 0,035                  | 27,0                             | 1,87               | 17,9                         | 1,80                                                                                     | 29,1                      | 1,75                   | 18,2                  |
| 1,0                                                       | 0,039                  | 30,0                             | 2,08               | 19,9                         | 2,00                                                                                     | 32,4                      | 1,95                   | 20,3                  |
|                                                           |                        | $\gamma_M = 1,0$                 |                    | $\gamma_M = 1,1$             |                                                                                          |                           |                        |                       |

<sup>1)</sup> For single loads, only 75% of the specified values may be applied.

| <b>RIB-ROOF 465</b>                    |                    |                             |                                                                                      |                           |                        |                       |
|----------------------------------------|--------------------|-----------------------------|--------------------------------------------------------------------------------------|---------------------------|------------------------|-----------------------|
| characteristic values for lifting load |                    |                             |                                                                                      |                           |                        |                       |
| metal<br>thickness                     | torque<br>of field | end<br>support<br>strengths | cut sizes at intermediate supports<br>$M/M_{B,k}^{\circ} + R/R_{B,k}^{\circ} \leq 1$ |                           |                        |                       |
| $t_N$<br>mm                            | $M_{F,k}$<br>kNm/m | $R_{A,k}$<br>kN/m           | $M_{B,k}^{\circ}$<br>kNm/m                                                           | $R_{B,k}^{\circ}$<br>kN/m | max $M_{B,k}$<br>kNm/m | max $R_{B,k}$<br>kN/m |
| 0,7                                    | 1,16               | 3,21                        | 2,46                                                                                 | 2,76                      | 0,694                  | 2,48                  |
| 0,8                                    | 1,52               | 3,84                        | 12,1                                                                                 | 3,10                      | 1,00                   | 3,02                  |
| 0,9                                    | 1,71               | 4,32                        | 13,6                                                                                 | 3,48                      | 1,13                   | 3,40                  |
| 1,0                                    | 1,90               | 4,80                        | 15,1                                                                                 | 3,87                      | 1,25                   | 3,77                  |
|                                        |                    | $\gamma_M = 1,1$            |                                                                                      |                           |                        |                       |

#### RIB-ROOF sliding standing seam roofing out of aluminium

Enclosure 4.1

cross section values, characteristic  
values of the resistivity and partsecurity coefficients  $\gamma_M$  for  $R_{p0,2} = 220 \text{ N/mm}^2$

Rated value of the stress  
at the 0.2% yield point  
 $R_{p0,2} = 190 \text{ N/mm}^2$

| <b>RIB-ROOF 465</b>                                       |                          |                                  |                    |                       |                                                                              |                     |                        |                       |
|-----------------------------------------------------------|--------------------------|----------------------------------|--------------------|-----------------------|------------------------------------------------------------------------------|---------------------|------------------------|-----------------------|
| characteristic values for superimposed load <sup>1)</sup> |                          |                                  |                    |                       |                                                                              |                     |                        |                       |
| metal thickness                                           | permanent load           | torque of inertia                | torque of field    | end-support strengths | cut sizes at intermediate supports<br>$M/M_{B,k}^* + (R/R_{B,k}^*)^2 \leq 1$ |                     |                        |                       |
| $t_N$<br>mm                                               | $g$<br>kN/m <sup>2</sup> | $J_{ef,k}$<br>cm <sup>4</sup> /m | $M_{F,k}$<br>kNm/m | $R_{A,k}$<br>kN/m     | $M_{B,k}^*$<br>kNm/m                                                         | $R_{B,k}^*$<br>kN/m | max $M_{B,k}$<br>kNm/m | max $R_{B,k}$<br>kN/m |
| 0,7                                                       | 0,027                    | 21,0                             | 1,23               | 11,8                  | 1,23                                                                         | 19,4                | 1,19                   | 12,3                  |
| 0,8                                                       | 0,031                    | 24,0                             | 1,54               | 14,8                  | 1,49                                                                         | 24,2                | 1,45                   | 15,1                  |
| 0,9                                                       | 0,035                    | 27,0                             | 1,74               | 16,6                  | 1,67                                                                         | 27,0                | 1,63                   | 16,9                  |
| 1,0                                                       | 0,039                    | 30,0                             | 1,93               | 18,5                  | 1,86                                                                         | 30,1                | 1,81                   | 18,9                  |
| $\gamma_M = 1,0$                                          |                          |                                  | $\gamma_M = 1,1$   |                       |                                                                              |                     |                        |                       |

<sup>1)</sup> For single loads, only 75% of the specified values may be applied.

| <b>RIB-ROOF 465</b>                    |                    |                       |                                                                          |                     |                        |                       |
|----------------------------------------|--------------------|-----------------------|--------------------------------------------------------------------------|---------------------|------------------------|-----------------------|
| characteristic values for lifting load |                    |                       |                                                                          |                     |                        |                       |
| metal thickness                        | field moment       | end support strengths | cut sizes at intermediate supports<br>$M/M_{B,k}^* + R/R_{B,k}^* \leq 1$ |                     |                        |                       |
| $t_N$<br>mm                            | $M_{F,k}$<br>kNm/m | $R_{A,k}$<br>kN/m     | $M_{B,k}^*$<br>kNm/m                                                     | $R_{B,k}^*$<br>kN/m | max $M_{B,k}$<br>kNm/m | max $R_{B,k}$<br>kN/m |
| 0,7                                    | 1,08               | 2,98                  | 2,29                                                                     | 2,56                | 0,645                  | 2,30                  |
| 0,8                                    | 1,41               | 3,57                  | 11,2                                                                     | 2,87                | 0,929                  | 2,81                  |
| 0,9                                    | 1,59               | 4,01                  | 12,6                                                                     | 3,23                | 1,05                   | 3,16                  |
| 1,0                                    | 1,77               | 4,46                  | 14,0                                                                     | 3,58                | 1,16                   | 3,50                  |
| $\gamma_M = 1,1$                       |                    |                       |                                                                          |                     |                        |                       |

#### RIB-ROOF sliding standing seam roofing out of aluminium

Enclosure 4.2

cross section values, characteristic values of the resistivity and partsecurity coefficients  $\gamma_M$  for  $R_{p0,2} = 190 \text{ N/mm}^2$

**Characteristic holding forces between the profiled sheets and the fixation clips**

| <b>RIB-ROOF 465, <math>R_{p0.2} = 220 \text{ N/mm}^2</math></b> |                          |                           |
|-----------------------------------------------------------------|--------------------------|---------------------------|
| metal<br>thickness                                              | intermediate<br>supports | end-support <sup>1)</sup> |
| $t_N$<br>mm                                                     | $F_{B,k}$<br>kN/m        | $F_{A,k}$<br>kN/m         |
| 0,7                                                             | 2,09                     | 3,19                      |
| 0,8                                                             | 2,73                     | 3,86                      |
| 0,9                                                             | 3,07                     | 4,35                      |
| 1,0                                                             | 3,41                     | 4,83                      |
| $\gamma_M = 1,33$                                               |                          |                           |

| <b>RIB-ROOF 465, <math>R_{p0.2} = 190 \text{ N/mm}^2</math></b> |                          |                           |
|-----------------------------------------------------------------|--------------------------|---------------------------|
| metal<br>thickness                                              | intermediate<br>supports | end-support <sup>1)</sup> |
| $t_N$<br>mm                                                     | $F_{B,k}$<br>kN/m        | $F_{A,k}$<br>kN/m         |
| 0,7                                                             | 1,81                     | 2,76                      |
| 0,8                                                             | 2,38                     | 3,33                      |
| 0,9                                                             | 2,65                     | 3,76                      |
| 1,0                                                             | 2,95                     | 4,17                      |
| $\gamma_M = 1,33$                                               |                          |                           |

\*) Adjustment by Zambelli confirmed by DIBt

<sup>1)</sup> Profile overlap  $\ddot{u} \geq 6 \text{ cm}$  in excess of the end of the fixation clip.

**RIB-ROOF sliding standing seam roofing out of aluminium**

**Enclosure 4.3**

characteristic values of the fixed points between the profiled sheets and the fixation clips and part-security coefficients  $\gamma_M$

## Span limit of Walkability $L_{gr}$

### a) Site inspection of the lower belt

The profiled sheets are walkable up to the named span without load-distributing coverings. The values apply for the event that the profiled sheets are inspected in the lower belt.

| metal<br>thickness<br>$t_N$<br>mm | RIB-ROOF 465 - S320GD+Z                |                                          |                                        |                                          |
|-----------------------------------|----------------------------------------|------------------------------------------|----------------------------------------|------------------------------------------|
|                                   | During installation                    |                                          | After installation                     |                                          |
|                                   | single-span<br>girder<br>$L_{gr}$<br>m | multiple-span<br>girder<br>$L_{gr}$<br>m | single-span<br>girder<br>$L_{gr}$<br>m | multiple-span<br>girder<br>$L_{gr}$<br>m |
| 0,7                               | 1,76                                   | 2,20                                     | 2,17                                   | 2,71                                     |
| 0,8                               | 2,01                                   | 2,51                                     | 2,69                                   | 3,36                                     |
| 0,9                               | 2,27                                   | 2,83                                     | 2,98                                   | 3,73                                     |
| 1,0                               | 2,52                                   | 3,15                                     | 3,35                                   | 4,19                                     |

### b) Walkability of the upper flange

“During the installation” it is absolutely not allowed to walk across the upper flanges of the latest laid sheet without load-distributing measures.

Entirely fixed profiled sheets are also walkable on the upper flange up to the named span. The necessary safety against falling is guaranteed. However, to minimize the risk of permanent deformations (dents), a reduction of these spans by 30% is recommended.

**Notice:** Apart from static permissible spans resulting from the calculation and from the span limits of walkability, it is recommended to pay attention to maximum spans required by installation; referring to documents of the manufacturer.

RIB-ROOF sliding standing seam roofing out of aluminium

Enclosure 5

marginal span of walkability



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2/2021