ETA-Danmark A/S
Göteborg Plads 1
DK-2150 Nordhavn
Tel. +45 72 24 59 00
Fax +45 72 24 59 04
Internet www.etadanmark.dk

Authorised and notified according to Article 29 of the Regulation (EU) No 305/2011 of the European Parliament and of the Council of 9 March 2011

European Technical Assessment ETA-10/0396 of 10/12/2015

I General Part

Technical Assessment Body issuing the ETA and designated according to Article 29 of the Regulation (EU) No 305/2011: ETA-Danmark A/S

Trade name of the construction product:	BB roof brackets type E17 and E18
Product family to which the above construction product belongs:	Three-dimensional nailing plate (roof brackets is the fixing of photovoltaic systems on wooden roof constructions)
Manufacturer:	BB Stanz- und Umformtechnik GmbH Nordhäuser Str. 42 D-06536 Berga Tel. +49 34651 2988 0 Fax +49 34651 2988 20 Internet www.bb-berga.de
Manufacturing plant:	BB Stanz- und Umformtechnik GmbH Nordhäuser Str. 42 D-06536 Berga
This European Technical Assessment contains:	11 pages including 2 annexes which form an integral part of the document
This European Technical Assessment is issued in accordance with Regulation (EU) No 305/2011, on the basis of:	Guideline for European Technical Approval (ETAG) No. 015 Three Dimensional Nailing Plates, April 2013, used as European Assessment Document (EAD).
This version replaces:	The previous ETA with the same number issued on 2010-12-10 and expiry on 2015-12-10

Translations of this European Technical Assessment in other languages shall fully correspond to the original issued document and should be identified as such.

Communication of this European Technical Assessment, including transmission by electronic means, shall be in full (excepted the confidential Annex(es) referred to above). However, partial reproduction may be made, with the written consent of the issuing Technical Assessment Body. Any partial reproduction has to be identified as such.

II SPECIFIC PART OF THE EUROPEAN TECHNICAL ASSESSMENT

1 Technical description of product and intended use

Technical description of the product
BB roof brackets are two-piece non-welded connectors used to fix photovoltaic systems on wooden roof constructions. The roof brackets are produced from steel grade 1.4301 according to EN 10088-3:2005-09 with a minimum characteristic yield strength of $R_{p0,2}$ = 300 N/mm² and a minimum characteristic tensile strength of R_m = 600 N/mm².

For the connection of the base plate with the purlin wood screws 6,0 x 80 mm or 8,0 x 100 mm according to EN 14592 with minimum characteristic tensile strength of R_m = 500 N/mm² are used.

Dimensions are shown in Annex A and B.

2 Specification of the intended use in accordance with the applicable EAD

The roof brackets are intended for use in is the fixing of photovoltaic systems on wooden roof constructions, where requirements for mechanical resistance and stability and safety in use in the sense of the Basic Works Requirements 1 and 4 of Regulation (EU) 305/2011 shall be fulfilled.

The static behaviour of the timber members or the supports shall be as described in Annex B.

Annex B states the load-carrying capacities of the roof brackets for the load-cases compression, tension and shear relative to the roof plane. The design of the connections shall be in accordance with Eurocode 3 and Eurocode 5 or a similar national code.

The roof brackets are for use in timber structures subject to the service classes 1, 2 and 3 of Eurocode 5 and for connections subject to static or quasi-static loading. The corrosion protection is given by stainless steel. The metal fasteners must also be of stainless steel or have a zinc coating for the intended use in service class 3 of EN 1995-1-1 (zinc coating Fe/Zn 25c according to EN ISO 2081).

The scope of the brackets regarding resistance to corrosion shall be defined according to national provisions that apply at the installation site considering environmental conditions.

The provisions made in this European Technical Assessment are based on an assumed intended working life of the connectors of 50 years.

The indications given on the working life cannot be interpreted as a guarantee given by the producer or Assessment Body, but are to be regarded only as a means for choosing the right products in relation to the expected economically reasonable working life of the works.

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

Characteristic	Assessment of characteristic
3.1 Mechanical resistance and stability*) (BWR1)	
Characteristic load-carrying capacity	See Annex B
Stiffness	No performance determined
Ductility in cyclic testing	No performance determined
3.2 Safety in case of fire (BWR2)	
Reaction to fire	The roof brackets are made from steel classified as Euroclass A1 in accordance with EN 13501-1 and EC decision 96/603/EC, amended by EC Decision 2000/605/EC
3.3 Hygiene, health and the environment (BWR3)	
Influence on air quality	The product does not contain/release dangerous substances specified in TR 034, dated March 2012 0**)
3.7 Sustainable use of natural resources (BWR7)	No Performance Determined
3.8 General aspects related to the performance of the product	The roof brackets have been assessed as having satisfactory durability and serviceability when used in timber structures using the timber species described in Eurocode 5 and subject to the conditions defined by service class 1 and 2

*) See additional information in section 3.8 – 3.9.

**) In addition to the specific clauses relating to dangerous substances contained in this European technical Assessment, there may be other requirements applicable to the products falling within its scope (e.g. transposed European legislation and national laws, regulations and administrative provisions). In order to meet the provisions of the Construction Products Regulation, these requirements need also to be complied with, when and where they apply.

3.9 Methods of verification

The characteristic load-carrying capacities are based on testing.

As steel failure is decisive, the design value shall be calculated according to EN 1993-1-1 by reducing the characteristic values of the load-carrying capacity with different partial factors.

The design value of the load-carrying capacity is:

$$F_{Rd} = \frac{F_{Rk,S}}{\gamma_{Mi,S}}$$

3.10 Mechanical resistance and stability

See Annex B for the characteristic load-carrying capacity in the different load-cases compression, tension and shear. Using the load-carrying capacities of the roof brackets, the specifications in Annex A must be fulfilled.

The characteristic capacities of the roof brackets are determined by testing according to Eurocode 3 and Eurocode 5. They should be used for designs in accordance with Eurocode 3 and Eurocode 5 or a similar national code.

No performance has been determined in relation to ductility of a joint under cyclic testing. The contribution to the performance of structures in seismic zones, therefore, has not been assessed.

No performance has been determined in relation to the joint's stiffness properties - to be used for the analysis of the serviceability limit state.

3.11 Aspects related to the performance of the product

3.11.1 Corrosion protection in service class 1, 2 and 3.
In accordance with ETAG 015 the roof brackets are produced from steel grade 1.4301 according to EN 10088-3:2005-09 with a minimum characteristic yield strength of $R_{p0,2}$ = 300 N/mm² and a minimum characteristic tensile strength of R_m = 600 N/mm².

3.12 General aspects related to the fitness for use of the product

BB roof brackets are manufactured in accordance with the provisions of this European Technical Assessment using the manufacturing processes as identified in the inspection of the plant by the notified inspection body and laid down in the technical documentation.

The nailing pattern used shall be the maximum as defined in Annex B.

The following provisions concerning installation apply:

The structural members to which the brackets are fixed shall be:

- The timber members
  - shall be strength class C24 according to EN 338:2003-09 or better, see section 3 of this evaluation report
  - shall be free from wane under the connector base plate

- The actual end bearing capacity of the timber member to be used in conjunction with the roof bracket is checked by the designer of the structure to ensure it is not less than the roof bracket capacity and, if necessary, the roof bracket capacity reduced accordingly.

- The fastener spacing, edge and end distances shall be chosen according to Eurocode 5.

- There are no specific requirements relating to preparation of the timber members.

4 Attestation and verification of constancy of performance (AVCP)

4.1 AVCP system

According to the decision 97/638/EC of the European Commission1, as amended, the system(s) of assessment and verification of constancy of performance (see Annex V to Regulation (EU) No 305/2011) is 2+.

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

Technical details necessary for the implementation of the AVCP system are laid down in the control plan deposited at ETA-Danmark prior to CE marking

Issued in Copenhagen on 2015-12-10 by

Thomas Bruun
Managing Director, ETA-Danmark

Annex A
Product details and definitions

Table A.1 Specifications of the roof brackets

Roof Bracket		Identification		Metal Fasteners
Type	Dimension	Art.-Nr.	Drawing-Nr.	Screws according to EN 14592
C-Bracket	31 x 2,5 mm	E17	865 02 0037	3x 6,0x80mm or 2x 8,0x100 mm
Zebra- Bracket	31 x 2,5 mm	E18	856 02 0038	3x 6,0x80mm or 2x 8,0x100 mm

Table A.2 Specifications of the metal fasteners according to EN 14592

Fastener type (1.4301)	Size (mm)			Finish
	Diameter	Length	Thread Length	
wood screw 6,0 x 80 mm	6 mm	80 mm	70 mm	Stainless steel
wood screw 8,0 x 100 mm	8 mm	100 mm	80 mm	Stainless steel

Annex B
Characteristic load-carrying capacities

Table B.1 Characteristic load-carrying capacities for roof brackets “C-Bracket” (E17) and “Zebra-Bracket” (E18) with 3 wood screws 6,0 x 80 mm in kN

Roof Bracket		Compression	Shear	Tension
Type	Position			
E17	low	1,47	1,11	0,78
	elevated	1,23	0,91	0,67
E18	low	0,94	0,99	0,50
	elevated	0,76	0,71	0,51

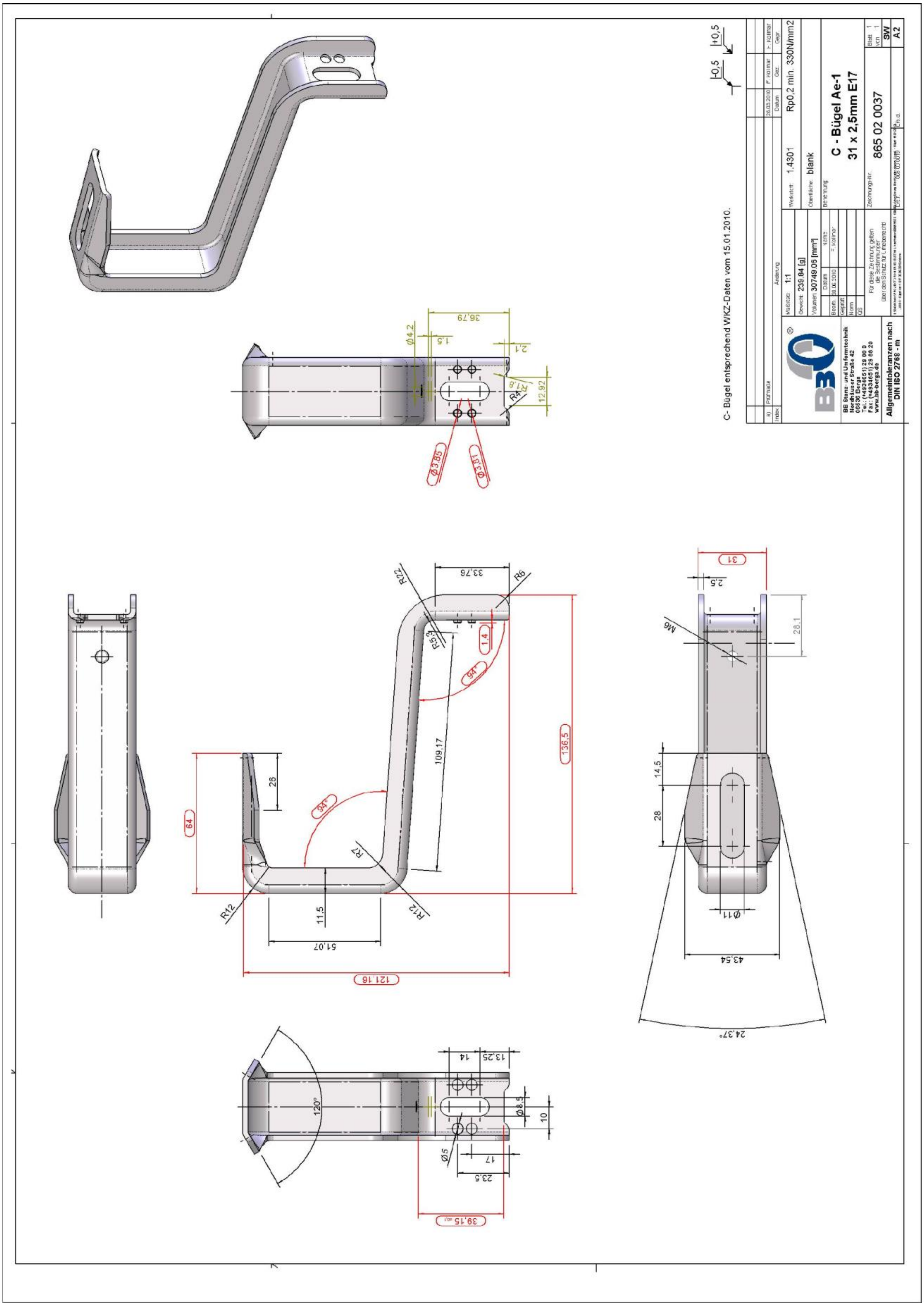
Table B.2 Characteristic load-carrying capacities for roof brackets “C-Bracket” (E17) and “Zebra-Bracket” (E18) with 2 wood screws 8,0 x 100 mm in kN

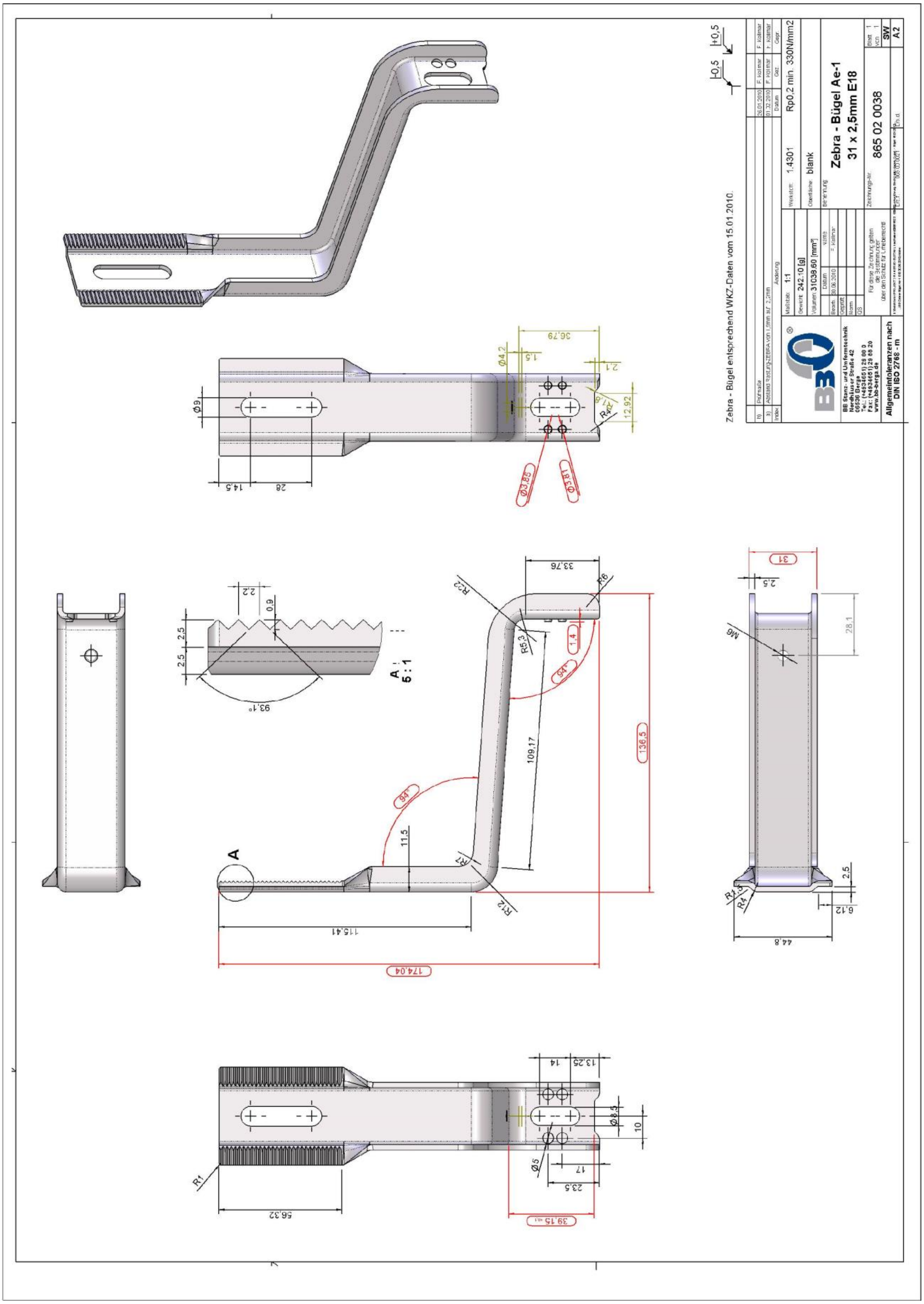
Roof Bracket		Compression	Shear	Tension
Type	Position			
E17	low	1,14	0,86	0,74
	elevated	0,95	0,70	0,64
E18	low	0,73	0,77	0,48
	elevated	0,59	0,55	0,48

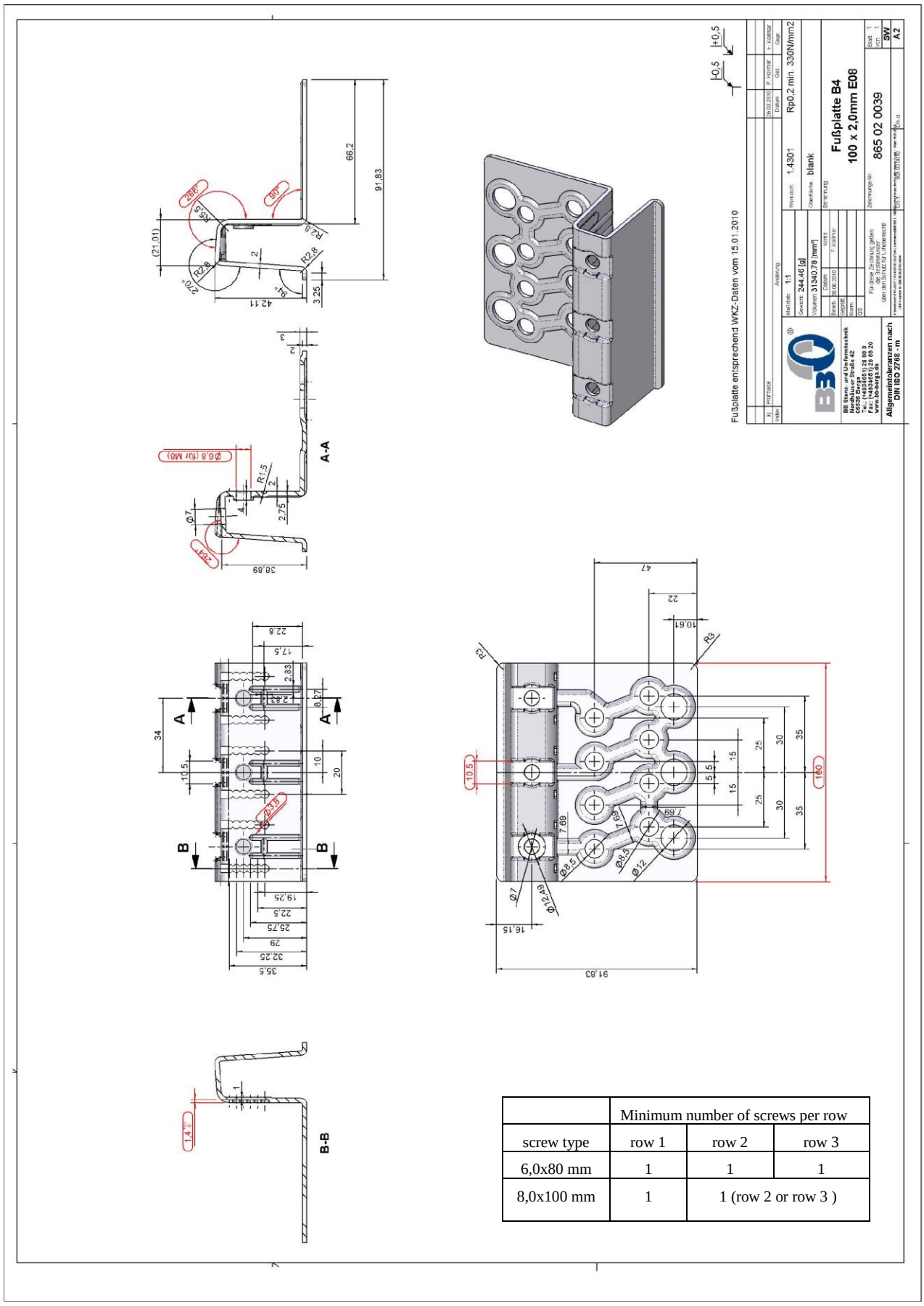
Combined forces

If the compression/tension and shear force act at the same time, the following inequality shall be fulfilled:

$$\sum \frac{F_{i,d}}{R_{i,d}} \leq 1$$


C- Bügel entsprechend WKZ-Daten vom 15.01.2010.
Werkstoff: 1.4301
Rp0.2 min. 330N/mm2
Oberfläche: blank
C - Bügel Ae-1
31 x 2,5mm E17
865 02 0037
Allgemeintoleranzen nach DIN ISO 2768 - m


Zebra - Bügel entsprechend WKZ-Daten vom 15.01.2010.
Werkstoff: 1.4301
Rp0,2 min. 330N/mm2
Oberfläche: blank
Zebra - Bügel Ae-1
31 x 2,5mm E18
865 02 0038
Maßstab: 1:1
Gewicht: 242,10 [g]
Allgemeintoleranzen nach DIN ISO 2768 - m
A 5 : 1



	Minimum number of screws per row		
screw type	row 1	row 2	row 3
6,0x80 mm	1	1	1
8,0x100 mm	1	1 (row 2 or row 3)	