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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

MEMBER OF EOTA



## European Technical Assessment ETA-10/0153 of 2024/12/20

### 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:**

AKK Stolpebærer type B150, B100, B2-100, B2-200,  
S350, S450, BH-160, UHB2, type U40, U70, U90,  
type L70 and type BH-165

**Product family to which  
the above construction  
product belongs:**

Three-dimensional nailing plate (timber to concrete  
post base)

**Manufacturer:**

AKK Industri  
Industrivej 17  
DK-7490 Aulum  
Internet [www.akk-i.dk](http://www.akk-i.dk)

**Manufacturing plant:**

AKK Industri  
Industrivej Nord 40  
DK-7490 Aulum

**This European Technical  
Assessment contains:**

25 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:**

EAD 130186-00-0603 for Three-dimensional nailing  
plates

**This version replaces:**

The previous ETA with the same number issued on  
2015-06-10

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## **II SPECIFIC PART OF THE EUROPEAN TECHNICAL ASSESSMENT**

### **1 Technical description of product**

AKK Industri Stolpebærer type Fork Anchor type 1; AKK type B150, B100, B2-100, B2-200, S350, S450, BH-160, UHB2, type U40, U70, U90, type L70 and type BH-165 are welded steel connectors (post bases).

The upper part e.g. a plate or a U-shaped plate is fastened to the timber member with nails, screws, bolts or dowels.

The lower part of the post base is either a bar, a threaded rod, a tube or a plate for embedment into the support of concrete or a steel plate to be fastened by anchor bolts to the support of concrete.

The post bases are made from pre-galvanized steel Grade S235JRG2 according to EN 10025 with a corrosion protection of hot dipped galvanized according to EN ISO 1461 with a zinc coating thickness of approximately 55 µm. In addition, the post bases can be delivered with electroplated zinc corrosion protection made from 12µm Fe/Zn 12c.

Steel quality, dimensions of the post bases and hole positions are shown in Annex B.

### **2 Specification of the intended use in accordance with the applicable European Assessment Document (hereinafter EAD)**

The brackets are intended for use as support for timber structures or wood-based structural members to their support, where requirements for mechanical resistance and stability and safety in use in the sense of the Basic Works Requirements 1 of Regulation (EU) 305/2011 shall be fulfilled.

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

The wood members can be of solid timber, glued laminated timber and similar glued members, or wood-based structural members with a characteristic density from 290 kg/m<sup>3</sup> to 420 kg/m<sup>3</sup>. Depending on the fastening in the wood there are different demands for the wood material.

For nailing in the side of the wood members the requirement to the material of the wood members can be fulfilled by using the following materials:

- Solid timber classified to C18-C40 according to EN 338 / EN 14081
- Glued members of timber classified to C18-C40 according to EN 338 / EN 14081 when structural adhesives are used.
- Glued laminated timber classified to GL24c or better according to EN 1194 / EN 14080.

Annex B states the load-carrying capacities of the post base connections for a characteristic density of the timber for at least 350 kg/m<sup>3</sup>.

The load-carrying capacity of the connections for a lower characteristic density should be determined under the assumption that the load-carrying capacity is proportional to the density.

The concrete strength class is assumed to be C15 unless otherwise indicated in Annex B.

The design of the connections shall be in accordance with Eurocode 5 or a similar national Timber code.

The post bases are intended for use for connections subjected to static or quasi static loading.

It is assumed that the force acting on the post base is an upward or downward force F<sub>1</sub> acting in the centre of the post base

The post bases with a electroplated zinc coating 12µm Fe/Zn 12c are intended for use in service class 1 and 2 according to EN 1995 (Eurocode 5).

The post bases which are hot dipped galvanized according to EN ISO 1461 with a zinc coating thickness of approximately 55 µm are intended for use in service class 1, 2 and 3 according to EN 1995 (Eurocode 5).

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
<b>3.1 Mechanical resistance and stability*) (BWR1)</b>	
Joint Strength - Characteristic load-carrying capacity	See Annex B
Joint Stiffness	No performance assessed
Joint ductility	No performance assessed
Resistance to seismic actions	No performance assessed
Resistance to corrosion and deterioration	See section 3.6
<b>3.2 Safety in case of fire (BWR2)</b>	
Reaction to fire	The connectors are made from steel classified as Euroclass A1 in accordance with EN13501-1 and Commission Delegated Regulation 2016/364
Resistance to fire	No performance assessed
<b>3.3 General aspects related to the performance of the product</b>	
Identification	The connectors 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, 2 and 3  See Annex A

\*) See additional information in section 3.4 – 3.7.

### 3.4 Methods of verification

The characteristic load-carrying capacities have been calculated without considering different ratios between the partial factors for timber connections and steel cross sections. Therefore, in the end use calculation based on this ETA, this shall be considered.

The values in annex B have been determined by multiplying the calculated resistance of the connection by  $k_{mod}$  to consider load duration and service classes in accordance with EC 5.

Additionally, the capacities indicated for the upward force  $F_1$  takes into account the national partial safety factor  $\gamma_M$ .

### 3.5 Mechanical resistance and stability

See annex B for characteristic load-carrying capacity in the direction  $F_1 \uparrow$  and  $F_1 \downarrow$ .

The characteristic capacities of the post bases are determined by calculation as described in EAD 130186-00-0603. They should be used for designs in accordance with Eurocode 5 or a similar national Timber Code.

#### *Connector nails in accordance to ETA-09/0273*

The load bearing capacities of the post bases has been determined based on the use of Paslode Connector nails 4,0 x 40 mm in accordance with the ETA-09/0273 for the nails. The fastener can be replaced by fastener mentioned in the ETA-09/0273 with the same or higher performance. The capacity of the connection may not be higher than the load mentioned in this ETA.

The capacity of the nails used in calculations are:

$$F_{V,Rk} = 1,877 \text{ kN}$$

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.

### 3.6 Aspects related to the performance of the product

#### 3.6.1 Corrosion protection in service class 1 and 2.

In accordance with EAD 130186-00-0603 the post bases having a zinc coating  $12 \mu\text{m}$  Fe/Zn 12c fulfill the requirements.

#### 3.6.2 Corrosion protection in service class 3

In accordance with EAD 130186-00-0603 the post bases which are hot dipped galvanized according to EN ISO 1461 with a zinc coating thickness of approximately  $55 \mu\text{m}$  fulfill the requirements.

### 3.7 General aspects related to the fitness for use of the product

AKK Industri connectors 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 stated type of fasteners for each post base has to be applied in applicable holes in the post base.

- The primary structural member – the post member shown in typical installation page 16 or a beam member - to which the post bases are fixed shall be:
  - Restrained against rotation
  - Capable to transfer the force to the post bases as assumed.
  - Free from wane in areas in contact with the post base.
- The secondary structural member – the concrete support - to which the post bases are fixed shall be:
  - Made from concrete of at least strength class C15, unless otherwise is indicated in annex C of this ETA.
- To ensure sufficient capacity the designer has to take into account splitting of the timber.
- The timber member shall be free from wane.
- There shall be no gap between the timber and the horizontal contact area.
- Otherwise the gap between the timber member and the post base may not exceed 3 mm.
- There are no specific requirements relating to preparation of the timber members.

The calculations are based on not pre-drilled holes for nails and screws. However the holes for lag screws, dowels and bolts have to be pre-drilled.

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

##### **4.1 AVCP system**

According to the decision 97/638/EC of the European Commission<sup>1</sup>, 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 provided for in the applicable EAD**

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

Issued in Copenhagen on 2024-12-20 by



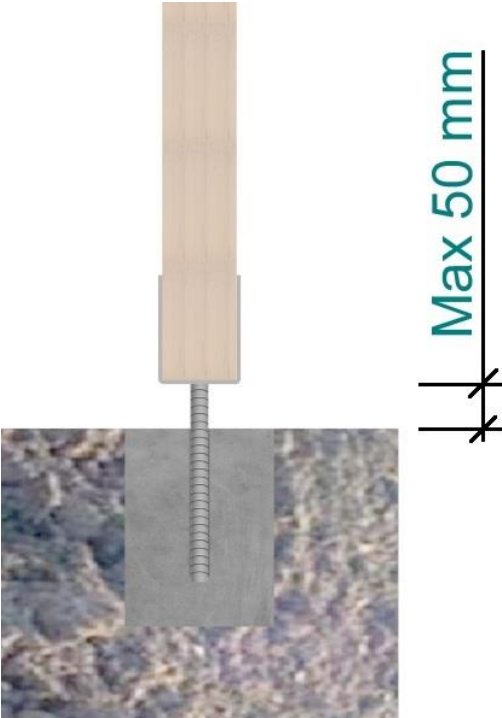
Thomas Bruun  
Managing Director, ETA-Danmark

**Annex A**  
**Product details and definitions**

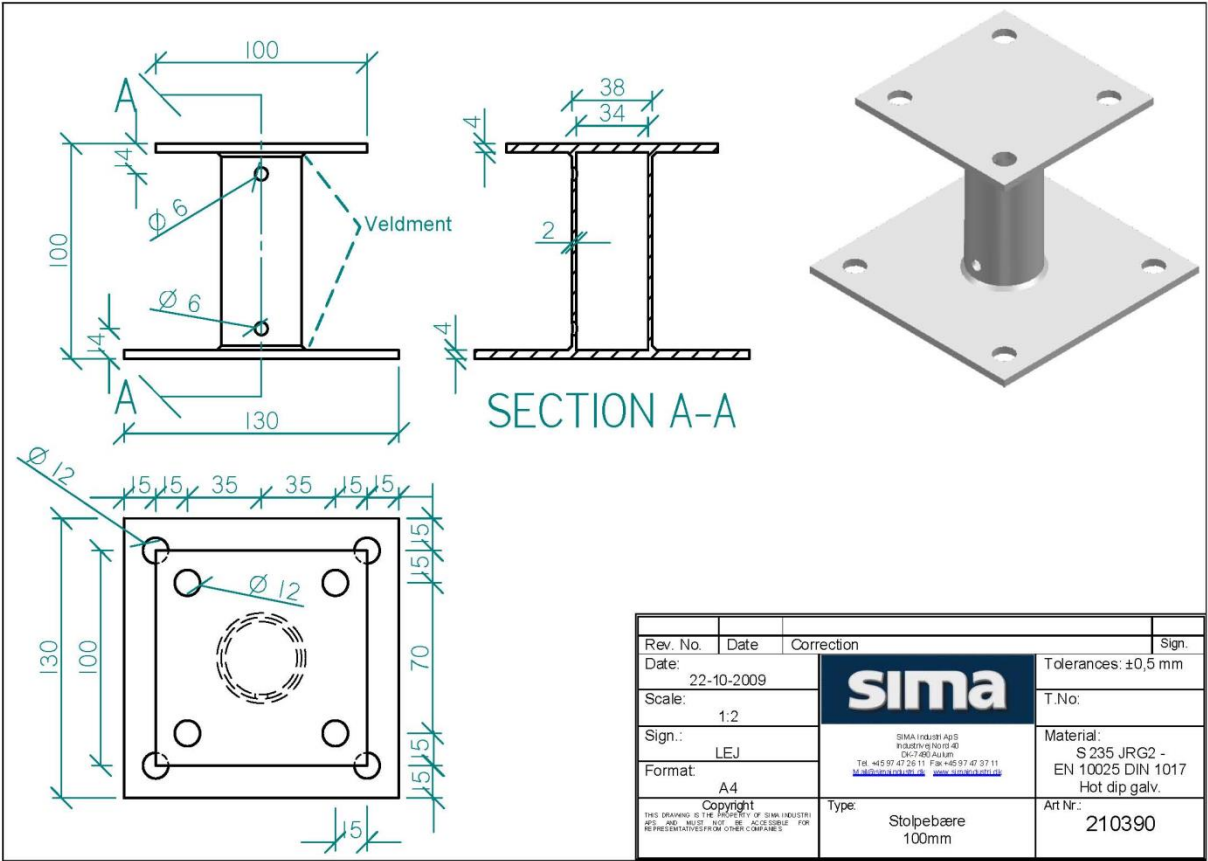
Table B1 Fastener specification

Nail, screw and bolt type	Nail and bolt size (mm)		Finish	ETA
	Diameter	Length		
Paslode Connector nail	4,0	40	Electroplated zinc	09/0273
Bolt M8	8		See the assumed characteristic capacities of the bolt connection and compare with the specification of the manufacturer	
Bolt M10	10			
Bolt M12	12			

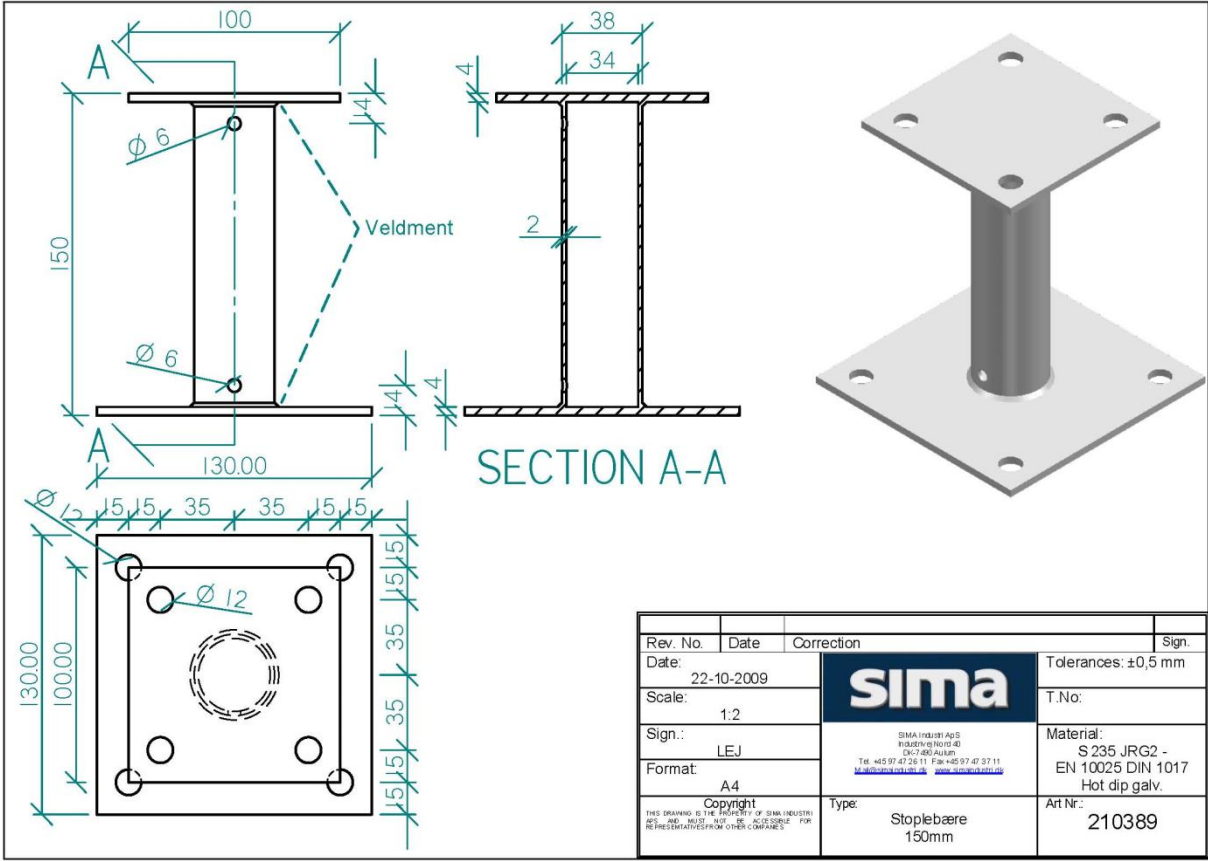
Stanchion holders type U40, U70, U90 and L70 can be made with longer shafts and/or split at the end.  
Values for stanchion holders type U40, U70, U90 and L70 are based on a maximum 50 mm gap between concrete surface and bottom of the steel plate



B100

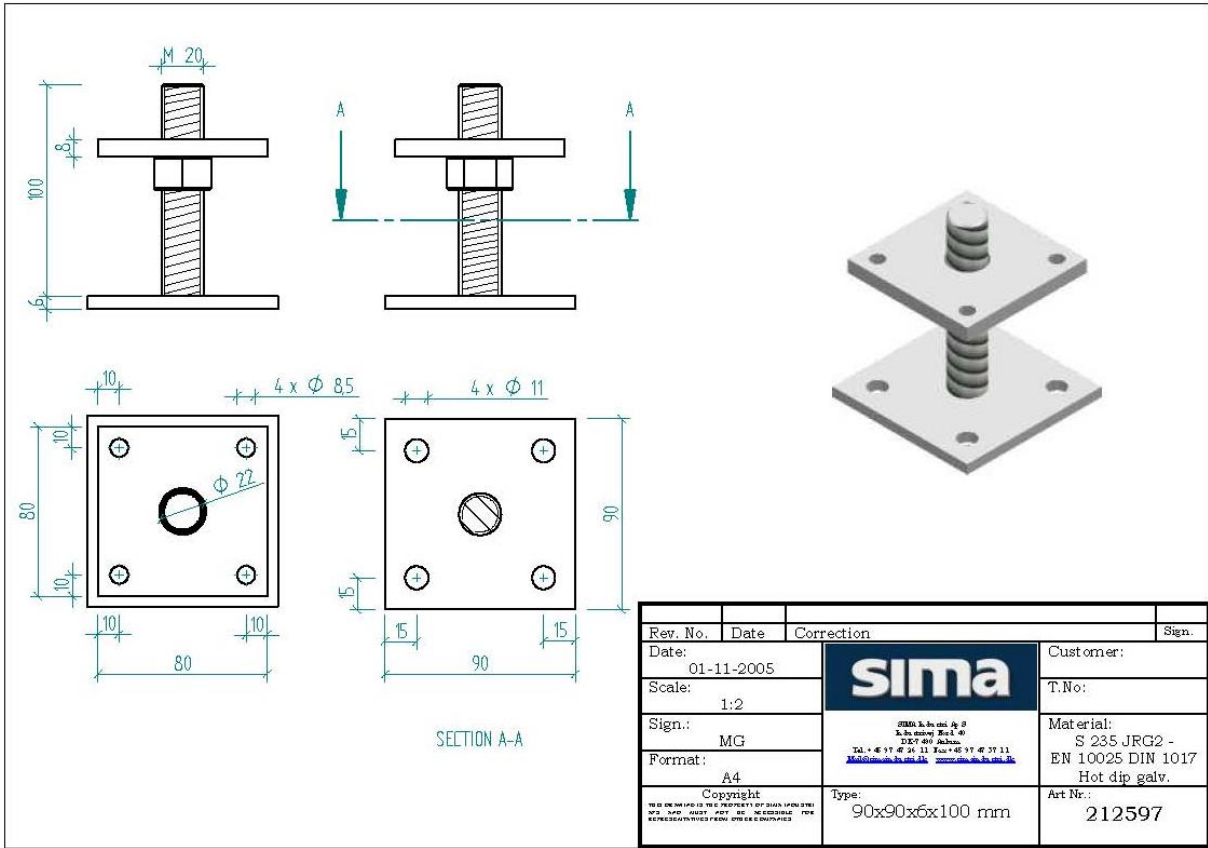


B150

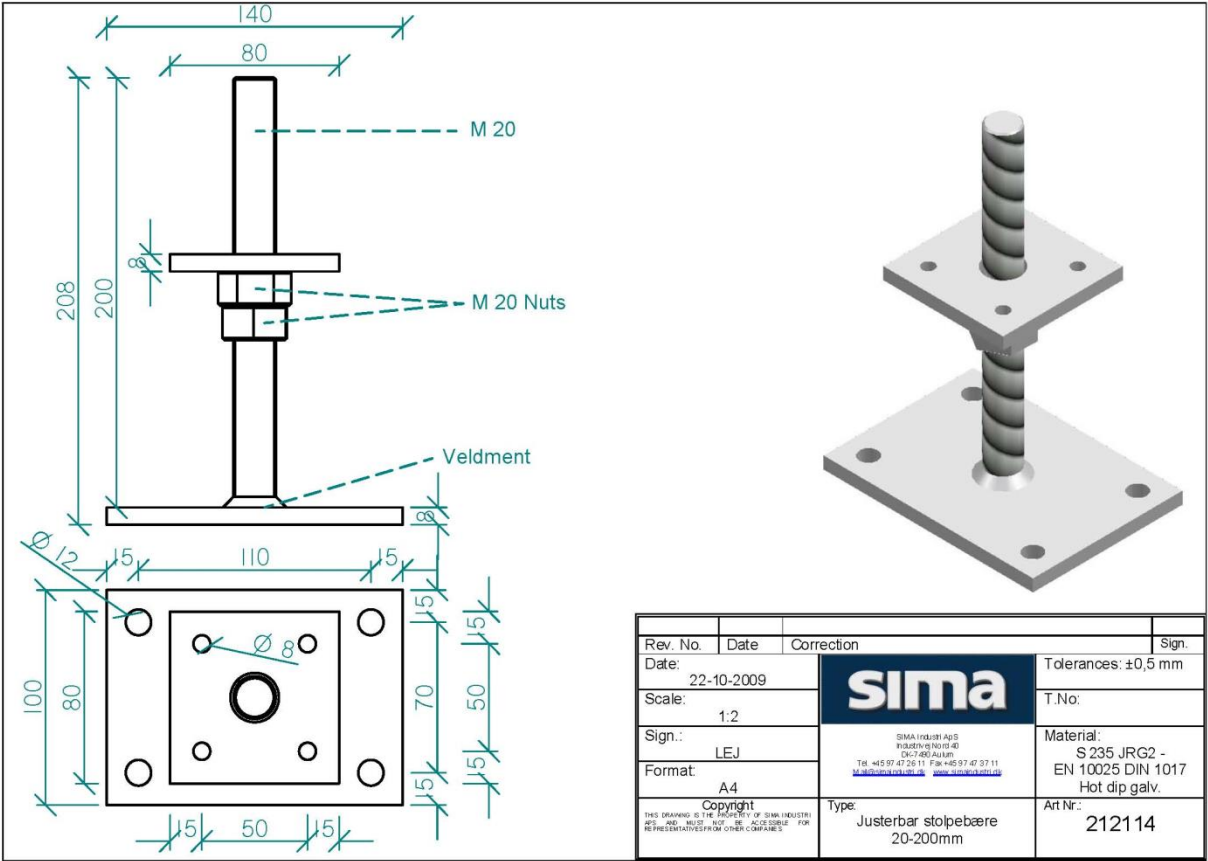




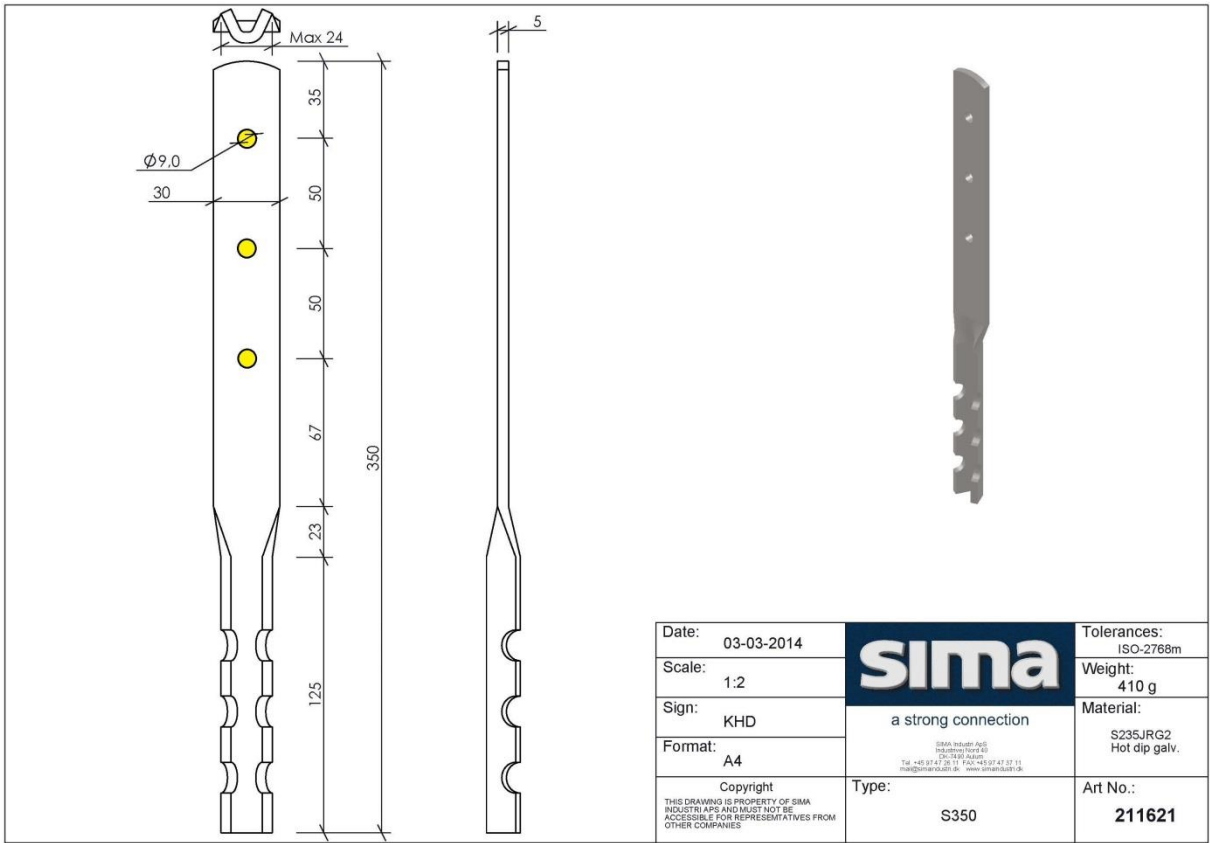
B2-100



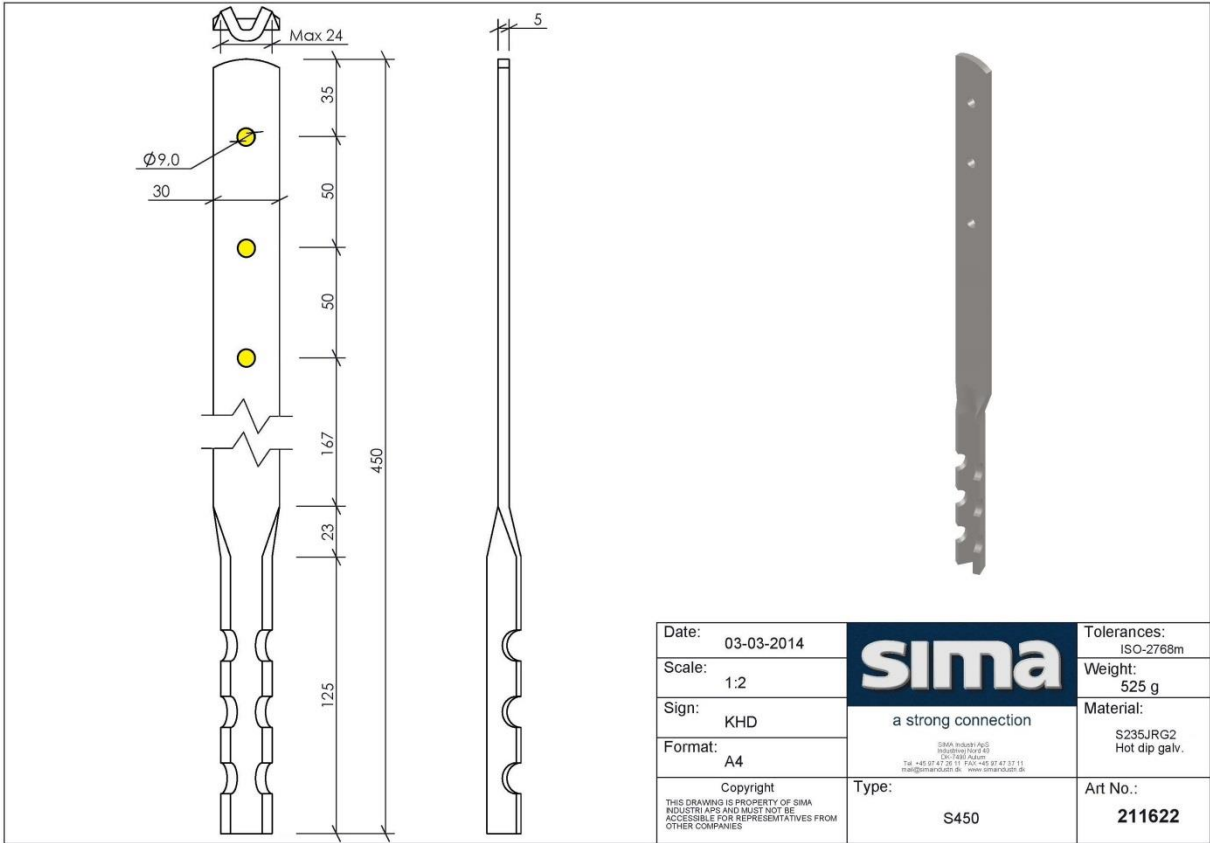
B2-200



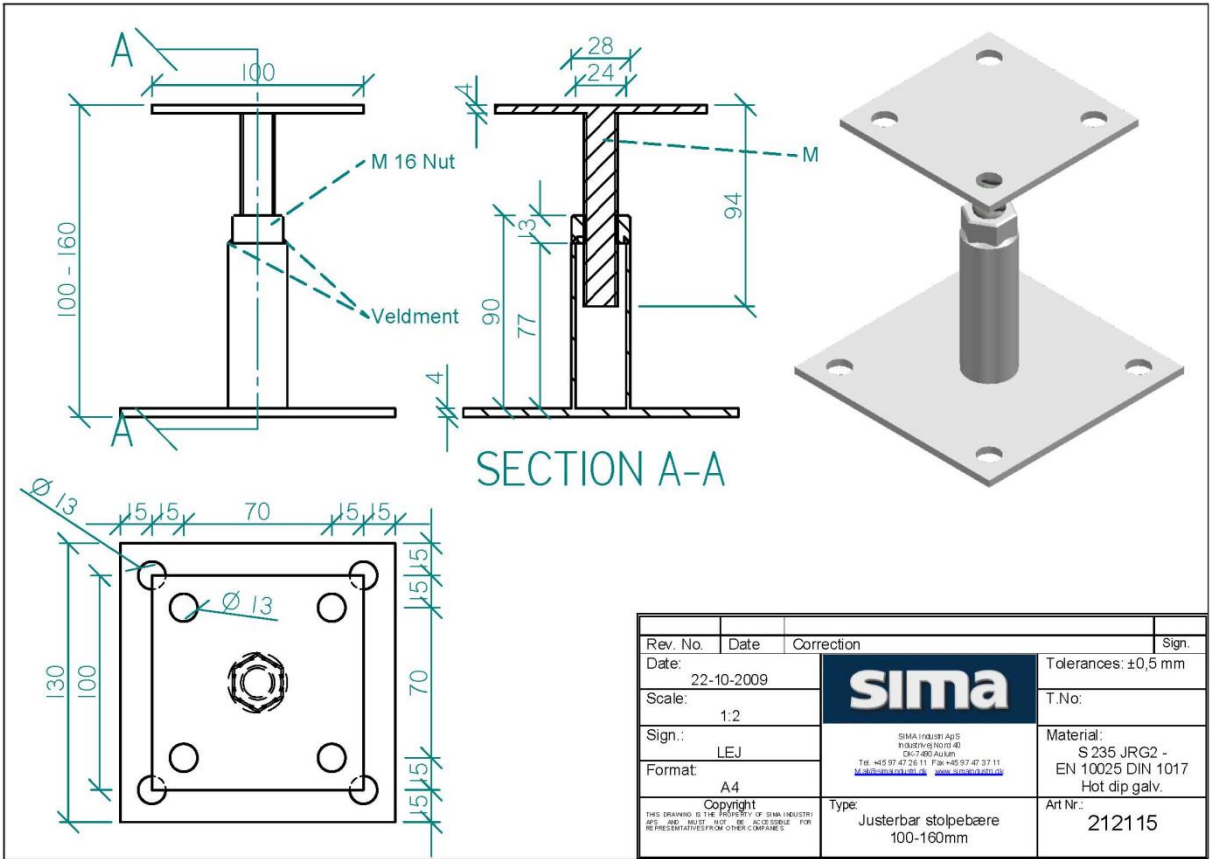
S350



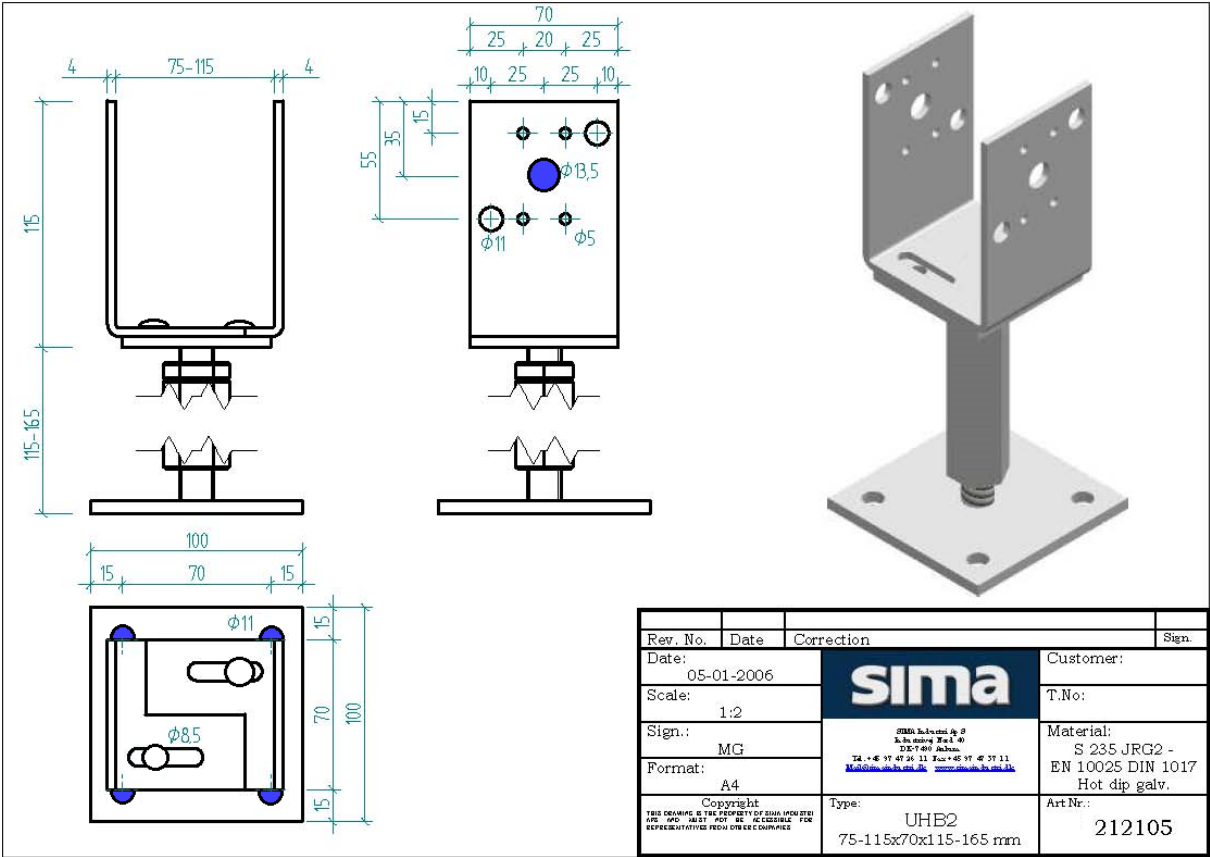
S450



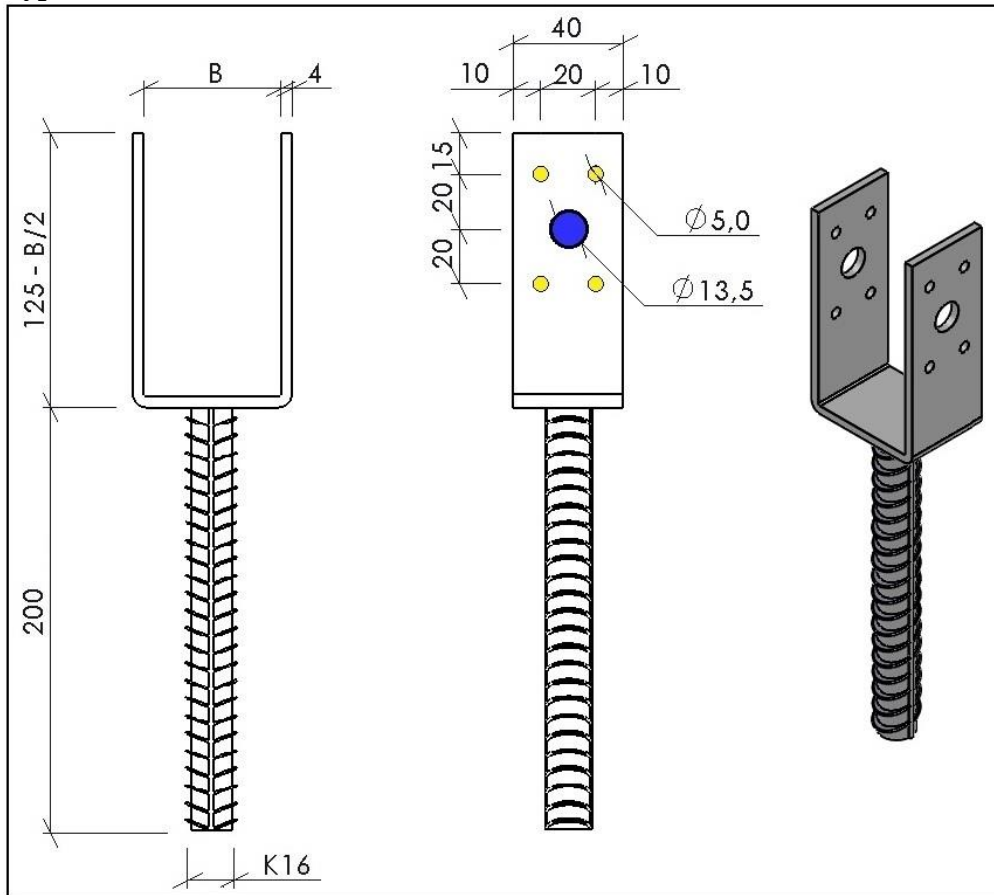
**BH-160**



**UHB2**

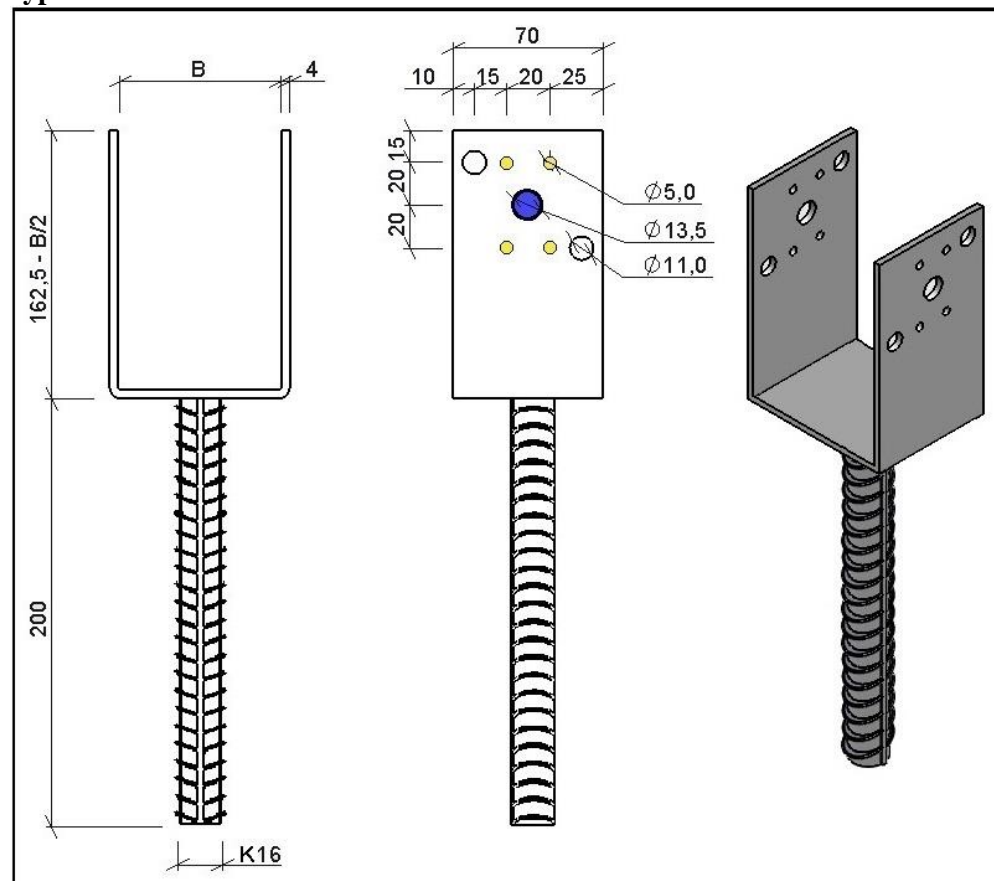


### Type U40



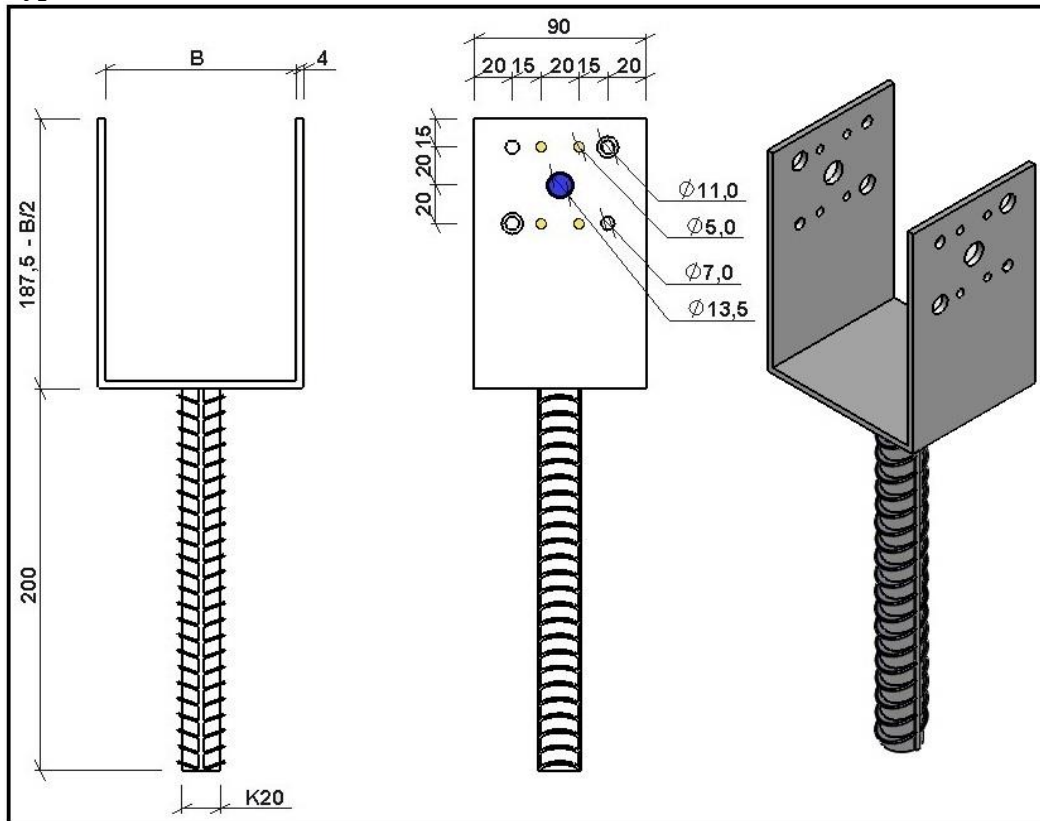
Maximum width (B) of U40 is 75 mm

### Type U70



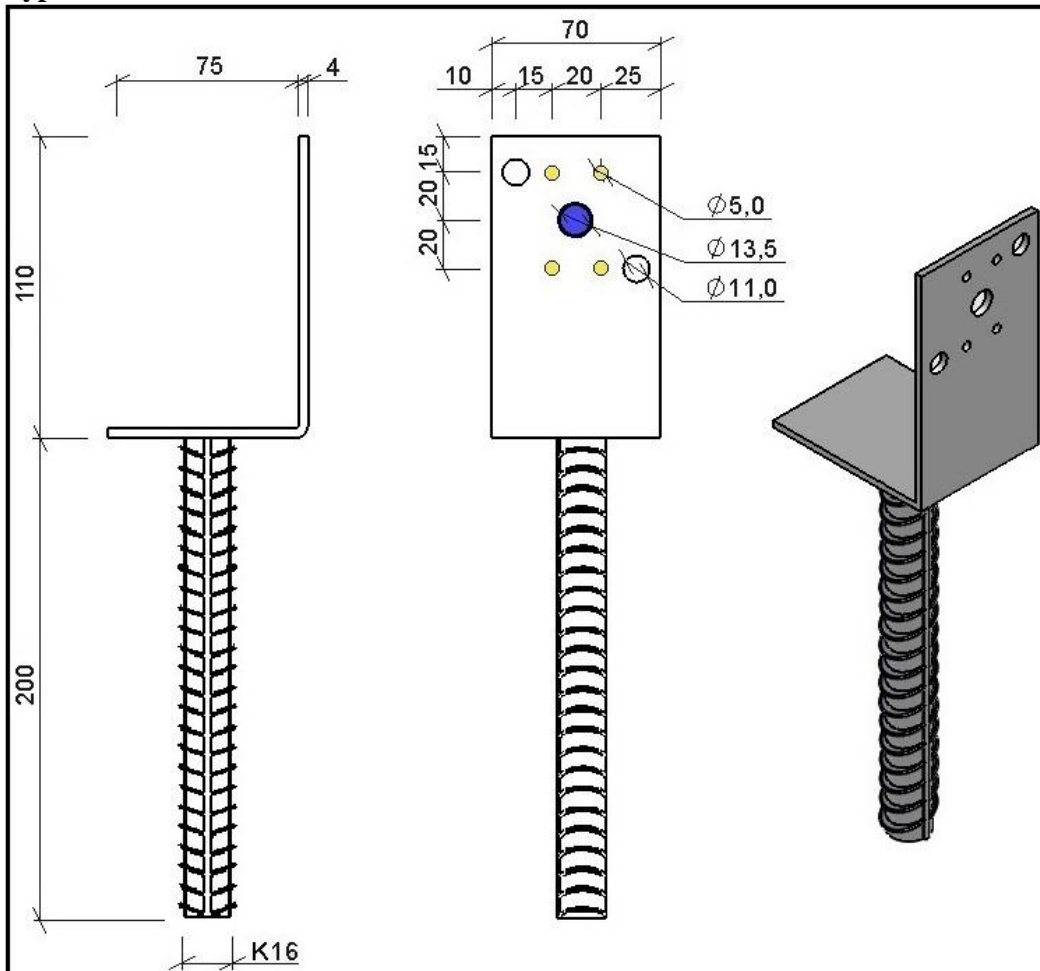
Maximum width (B) of U70 is 100 mm

### Type U90

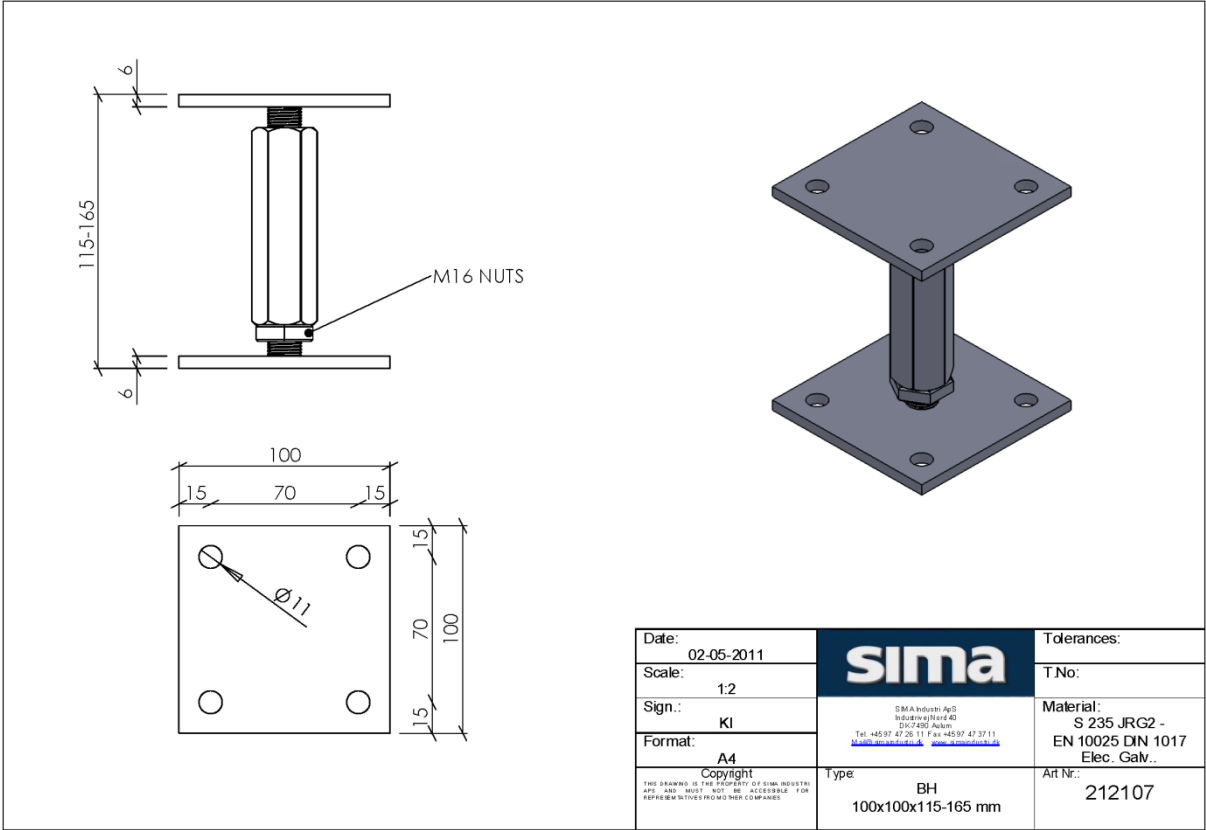


Maximum width (B) of U90 is 150 mm

### Type L70



**BH-100**



## **Annex B**

### **Characteristic load-carrying capacity**

#### **Design Basis - general**

The design values  $F_d$  are calculated from the modified characteristic capacities  $F_{R,k}$  for service class 1, 2 and 3 and the indicated load duration classes as:

$$F_d = \frac{F_{R,k}}{\gamma_M}$$

with the material partial coefficient  $\gamma_M$  for wood. The characteristic load-carrying capacities have been modified by the factor  $k_{mod}$  as given in Table C1.

Table C1 Factor  $k_{mod}$

Load duration class	P	L	M	S	I
	Permanent	Long	Medium	Short	Instantaneous
SC 1+2	0,6	0,7	0,8	0,9	1,1
SC 3	0,5	0,55	0,65	0,7	0,9

#### **The modified characteristic capacities stated in this Annex C**

The capacities are valid for service class 1, 2 and 3.

#### **Density**

The load-carrying capacities of the post base connections are stated for a timber strength class C24 with a characteristic density of 350 kg/m<sup>3</sup>.

The load-carrying capacity of the connections for a lower characteristic density should be determined under the assumption that the load-carrying capacity is proportional to the density.

The load-carrying capacity for a larger characteristic density shall unless a special investigation is made be taken as that of this document.

#### **Concrete**

The load-carrying capacities of the fixation is not taken into account and must calculated separately.

#### **Wane**

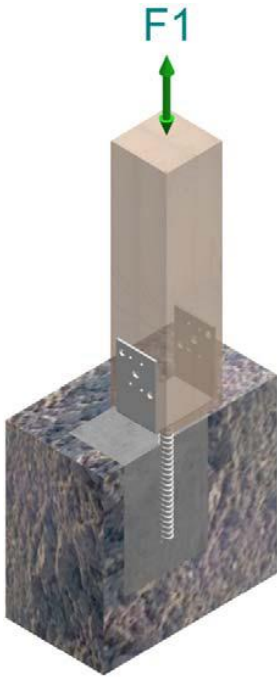
Where force is carried by contact compression no wane may occur.

#### **Fastening**

Unless otherwise indicated the calculations the holes in the post bases have to be fully applied with the applicable fasteners. The fastener types for which the calculations have been made are stated at each post base.

#### **Assumed characteristic capacities of anchor bolts**

The characteristic capacities that have been assumed for the bolt connection to the support are stated at each post base. For smaller capacity than stated of the bolt connection the capacity of the post base is reduced proportionally.



The capacities in the tables are stated in kN.

#### **Acting forces**

Unless otherwise indicated in the tables with load-carrying capacities, the forces are assumed to act as described below:

F1 Load-carrying capacity for upward or downward load acting along the central axis of the joint. The direction of the force is indicated in the following tables as compression (downward) or tension (upward) where relevant

#### **Combined forces**

In the following tables the load-carrying capacities are given for the individual loads: F1 (↓) for compression and (↑) for tension

For combinations of loads it is – unless otherwise indicated sufficient to verify that the individual loads can be taken.



**1 Stolpebærer B100**

No. of bolts pr connection	Load Duration	F1↓, [kN] SC 1+2	F1↓, [kN] SC 3	F1↓, [kN] Steel
8 All holes are used	P	23,22	19,35	50,55
	L	27,09	21,29	
	M	30,96	25,16	
	S	34,83	29,09	
	I	42,57	34,83	
The characteristic values found by calculation		38,70		
The values have been assessed in accordance with EC 5 Table 3.1- "Values of K <sub>mod</sub> "				

**1 Stolpebærer B150**

No. of bolts pr connection	Load Duration	F1↓, [kN] SC 1+2	F1↓, [kN] SC 3	F1↓, [kN] Steel
8 All holes are used	P	23,22	19,35	49,73
	L	27,09	21,29	
	M	30,96	25,16	
	S	34,83	29,09	
	I	42,57	34,83	
The characteristic values found by calculation		38,70		
The values have been assessed in accordance with EC 5 Table 3.1- "Values of K <sub>mod</sub> "				

**1 Stolpebærer B2-100**

No. of bolts pr connection	Load Duration	F1↓, [kN] SC 1+2	F1↓, [kN] SC 3	F1↓, [kN] Steel
8 All holes are used	P	52,13	43,44	49,48
	L	60,82	47,79	
	M	69,51	56,48	
	S	78,20	60,82	
	I	95,58	78,20	
The characteristic values found by calculation		86,89		
The values have been assessed in accordance with EC 5 Table 3.1- "Values of K <sub>mod</sub> "				

**1 Stolpebærer B2-200**

No. of bolts pr connection	Load Duration	F1↓, [kN] SC 1+2	F1↓, [kN] SC 3	F1↓, [kN] Steel
8 All holes are used	P	52,13	43,44	14,91
	L	60,82	47,79	
	M	69,51	56,48	
	S	78,20	60,82	
	I	95,58	78,20	
The characteristic values found by calculation		86,89		
The values have been assessed in accordance with EC 5 Table 3.1- "Values of K <sub>mod</sub> "				



## 1 Stolpebærer BH-160

No. of bolts pr connection	Load Duration	F1↓, [kN] SC 1+2	F1↓, [kN] SC 3	F1↓, [kN] Steel
8 All holes are used	P	7,61	6,35	9,67
	L	8,88	6,98	
	M	10,15	8,25	
	S	11,42	8,88	
	I	13,96	11,42	
The characteristic values found by calculation		12,69		
The values have been assessed in accordance with EC 5 Table 3.1- "Values of $K_{mod}$ "				

## 1 Stolpebærer UHB2

No. of bolts pr connection	Load Duration	F1↓, [kN] SC 1+2	F1↓, [kN] SC 3	F1↓, [kN] Steel	F1↑, [kN] SC 1+2	F1↑, [kN] SC 3	F1↑, [kN] Steel
6 Holes marked blue	P	11,77	9,81	59,01	11,77	9,81	1,65
	L	13,73	10,79		13,73	10,79	
	M	15,69	12,75		15,69	12,75	
	S	17,65	13,73		17,65	13,73	
	I	21,57	17,65		21,57	17,65	
The characteristic values found by calculation		19,61			19,61		
The values have been assessed in accordance with EC 5 Table 3.1- "Values of $K_{mod}$ "							

## 1 Stolpebærere type U40

No. of bolts pr connection	Load Duration	F1↓, [kN] SC 1+2	F1↓, [kN] SC 3	F1↓, [kN] Steel	F1↑, [kN] SC 1+2	F1↑, [kN] SC 3	F1↑, [kN] Steel
2 Holes marked blue	P	7,75	6,46	40,00	7,75	6,46	4,27
	L	9,04	7,10		9,04	7,10	
	M	10,33	8,39		10,33	8,39	
	S	11,62	9,04		11,62	9,04	
	I	14,20	11,62		14,20	11,62	
The characteristic values found by calculation		12,91			12,91		
The values have been assessed in accordance with EC 5 Table 3.1- "Values of $K_{mod}$ "							

## 1 Stolpebærer type U40

Paslode connector nails 4,0x40 mm	Load Duration	F1↓, [kN] SC 1+2	F1↓, [kN] SC 3	F1↓, [kN] Steel	F1↑, [kN] SC 1+2	F1↑, [kN] SC 3	F1↑, [kN] Steel
8 Holes marked yellow	P	4,79	3,99	40,00	4,79	3,99	4,27
	L	5,59	4,39		5,59	4,39	
	M	6,38	5,19		6,38	5,19	
	S	7,18	5,59		7,18	5,59	
	I	8,78	7,18		8,78	7,18	
The characteristic values found by calculation		7,98			7,98		
The values have been assessed in accordance with EC 5 Table 3.1- "Values of $K_{mod}$ "							

## 1 Stolpebærer type U70

No. of bolts pr connection	Load Duration	F1↓, [kN] SC 1+2	F1↓, [kN] SC 3	F1↓, [kN] Steel	F1↑, [kN] SC 1+2	F1↑, [kN] SC 3	F1↑, [kN] Steel
2 Holes marked blue	P	8,57	7,14	60,00	8,57	7,14	7,47
	L	10,00	7,85		10,00	7,85	
	M	11,42	9,28		11,42	9,28	
	S	12,85	10,00		12,85	10,00	
	I	15,71	12,85		15,71	12,85	
The characteristic values found by calculation		14,28			14,28		
The values have been assessed in accordance with EC 5 Table 3.1- "Values of $K_{mod}$ "							

## 1 Stolpebærer type U70

Paslode connector nails 4,0x40 mm	Load Duration	F1↓, [kN] SC 1+2	F1↓, [kN] SC 3	F1↓, [kN] Steel	F1↑, [kN] SC 1+2	F1↑, [kN] SC 3	F1↑, [kN] Steel
8 Holes marked yellow	P	4,79	3,99	60,00	4,79	3,99	7,47
	L	5,59	4,39		5,59	4,39	
	M	6,38	5,19		6,38	5,19	
	S	7,18	5,59		7,18	5,59	
	I	8,78	7,18		8,78	7,18	
The characteristic values found by calculation		7,98			7,98		
The values have been assessed in accordance with EC 5 Table 3.1- "Values of $K_{mod}$ "							

## 1 Stolpebærer type U90

No. of bolts pr connection	Load Duration	F1↓, [kN] SC 1+2	F1↓, [kN] SC 3	F1↓, [kN] Steel	F1↑, [kN] SC 1+2	F1↑, [kN] SC 3	F1↑, [kN] Steel
2 Holes marked blue	P	8,57	7,14	60,00	8,57	7,14	4,80
	L	10,00	7,85		10,00	7,85	
	M	11,42	9,28		11,42	9,28	
	S	12,85	10,00		12,85	10,00	
	I	15,71	12,85		15,71	12,85	
The characteristic values found by calculation		14,28			14,28		
The values have been assessed in accordance with EC 5 Table 3.1- "Values of K <sub>mod</sub> "							

## 1 Stolpebærer type U90

Paslode connector nails 4,0x40 mm	Load Duration	F1↓, [kN] SC 1+2	F1↓, [kN] SC 3	F1↓, [kN] Steel	F1↑, [kN] SC 1+2	F1↑, [kN] SC 3	F1↑, [kN] Steel
8 Holes marked yellow	P	4,79	3,99	60,00	4,79	3,99	4,80
	L	5,59	4,39		5,59	4,39	
	M	6,38	5,19		6,38	5,19	
	S	7,18	5,59		7,18	5,59	
	I	8,78	7,18		8,78	7,18	
The characteristic values found by calculation		7,98			7,98		
The values have been assessed in accordance with EC 5 Table 3.1- "Values of $K_{mod}$ "							

## 1 Stolpebærer type L70

No. of bolts pr connection	Load Duration	F1↓, [kN] SC 1+2	F1↓, [kN] SC 3	F1↓, [kN] Steel	F1↑, [kN] SC 1+2	F1↑, [kN] SC 3	F1↑, [kN] Steel
1 Hole marked blue	P	4,65	3,88	26,40	4,65	3,88	4,18
	L	5,43	4,26		5,43	4,26	
	M	6,20	5,04		6,20	5,04	
	S	6,98	5,43		6,98	5,43	
	I	8,53	6,98		8,53	6,98	
The characteristic values found by calculation		7,75			7,75		
The values have been assessed in accordance with EC 5 Table 3.1- "Values of $K_{mod}$ "							

## 1 Stolpebærer type L70

Paslode connector nails 4,0x40 mm	Load Duration	F1↓, [kN] SC 1+2	F1↓, [kN] SC 3	F1↓, [kN] Steel	F1↑, [kN] SC 1+2	F1↑, [kN] SC 3	F1↑, [kN] Steel
4 Holes marked yellow	P	4,51	3,76	26,40	2,25	1,88	4,18
	L	5,26	4,13		2,63	2,06	
	M	6,01	4,88		3,00	2,44	
	S	6,76	5,26		3,38	2,63	
	I	8,26	6,76		4,13	3,38	
The characteristic values found by calculation		7,51			3,75		
The values have been assessed in accordance with EC 5 Table 3.1- "Values of K <sub>mod</sub> "							



# **1 Stolpebærer BH-100**

No. of bolts pr connection	Load Duration	F1↓, [kN] SC 1+2	F1↓, [kN] SC 3	F1↓, [kN] Steel
8 All holes are used	P	10,88	9,07	26,85
	L	12,70	9,98	
	M	14,51	11,79	
	S	16,33	12,70	
	I	19,95	16,33	
The characteristic values found by calculation		18,14		
The values have been assessed in accordance with EC 5 Table 3.1- "Values of K <sub>mod</sub> "				