Deutsches Institut für Bautechnik

Public-law institution jointly founded by the federal states and the Federation

European Technical Assessment Body for construction products

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European Technical Assessment ETA-18/0543 of 12 February 2025

English translation prepared by DIBt - Original version in German language

General Part

Technical Assessment Body issuing the European Technical Assessment:	Deutsches Institut für Bautechnik
Trade name of the construction product	STF-Post bases
Product family to which the construction product belongs	Three-Dimensional Nailing Plates
Manufacturer	Arndt Bohrenkämper Holzverbindung GmbH Pestalozzistraße 16 32257 Bünde DEUTSCHLAND
Manufacturing plant	HSW1 HSW2
This European Technical Assessment contains	20 pages including 16 annexes which form an integral part of this assessment
This European Technical Assessment is issued in accordance with Regulation (EU) No 305/2011, on the basis of	EAD 130186-00-0603
This version replaces	ETA-18/0543 issued on 28 November 2019

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Specific Part

1 Technical description of the product

STF-Post bases are single- or multi-component timber fasteners made from S235 galvanised steel sheet in accordance with EN 10346[1] with steel cast head plates from ZG230-450 comparable with GE 240 of material number 1.0446 according to EN 10293[2], which are fastened to timber members (see Annex 2) with screws and to concrete members with anchor bolts or by embedding.

Connection to concrete members is achieved for post bases STF B500 and STF M600 through embedding in concrete and for the height-adjustable post bases STF 140+50, STF 190+100 and STF 300+150 post bases using anchor bolts. Galvanized HECO full-thread screws according to ETA-11/0284 are used for the connection to the wooden component.

Dimensions, hole pattern and steel grades are given in Annex 1.

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

The performances given in Section 3 are only valid if the STF-Post bases are used in compliance with the specifications and conditions given in Annex 1 up to 3.

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

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

3.1 Mechanical resistance and stability (BWR 1)

Essential characteristic	Performance
Joint strength	See Annex 3
Joint stiffness	No performance assessed
Joint ductility	No performance assessed
Resistance to seismic actions	No performance assessed
Resistance to corrosion and deterioration	See Annex 2

3.2 Safety in case of fire (BWR 2)

Essential characteristic	Performance
Reaction to fire	Class A1
Resistance to fire	No performance assessed

[1] EN 10346:2015 Continuously hot-dip coated steel flat products – Technical delivery conditions
[2] EN 10293:2015 Steel castings - Steel castings for general engineering uses

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

In accordance with EAD Nr. 130186-00-0603 the applicable European legal act is: [97/638/EC].
The system to be applied is: 2+

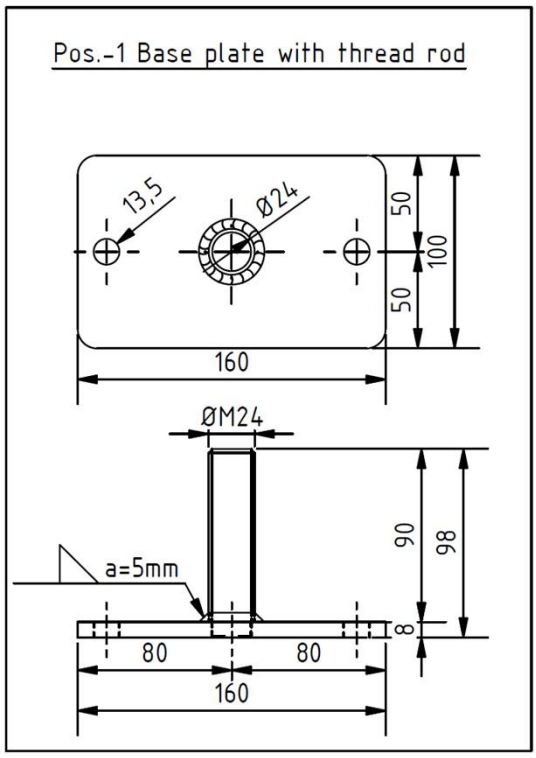
5 Technical details necessary for the implementation of the AVCP system, as provided for in the applicable EAD

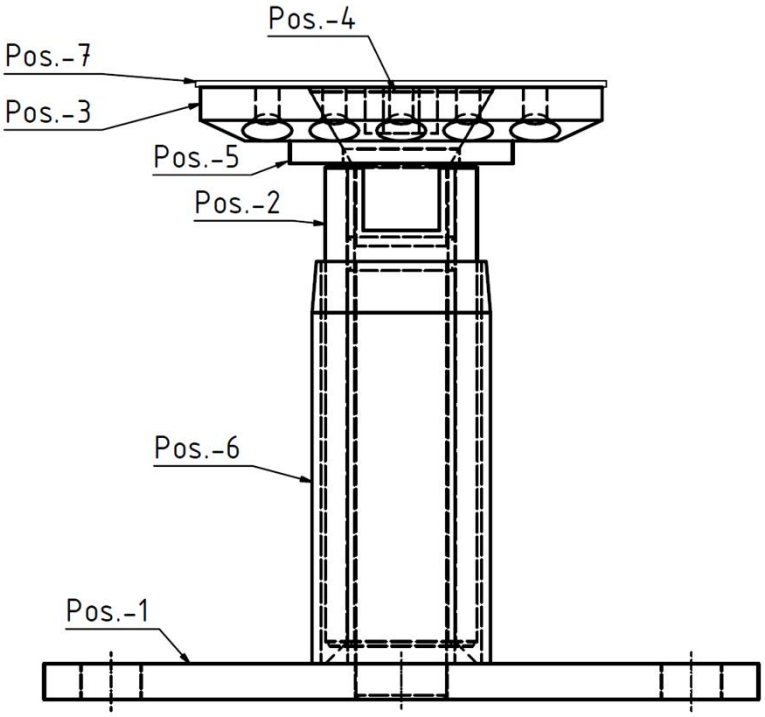
Technical details necessary for the implementation of the AVCP system are laid down in the control plan deposited with Deutsches Institut für Bautechnik.

Issued in Berlin on 12 February 2025 by Deutsches Institut für Bautechnik

Anja Dewitt
Head of Section

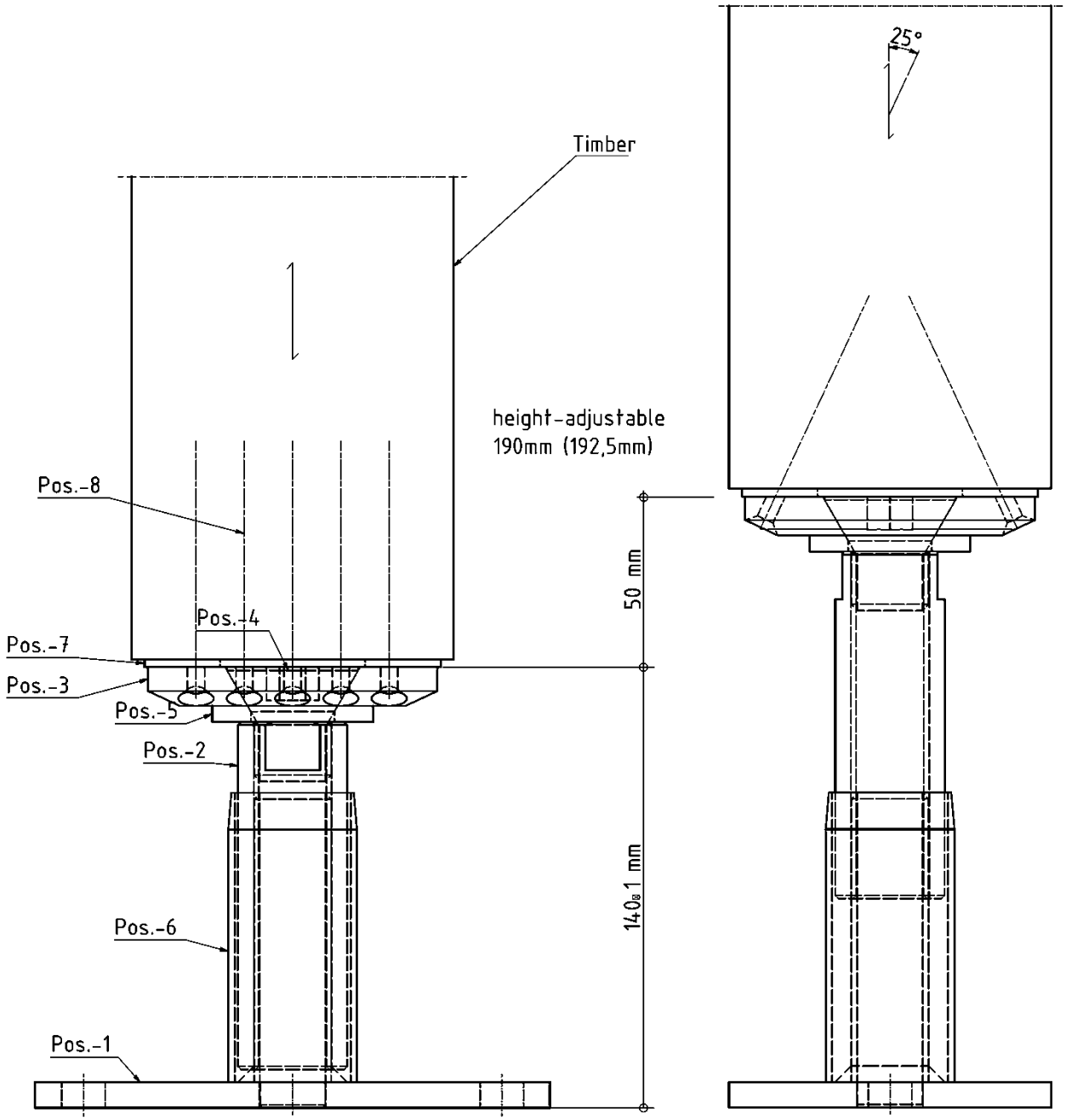
beglaubigt:
Stützer



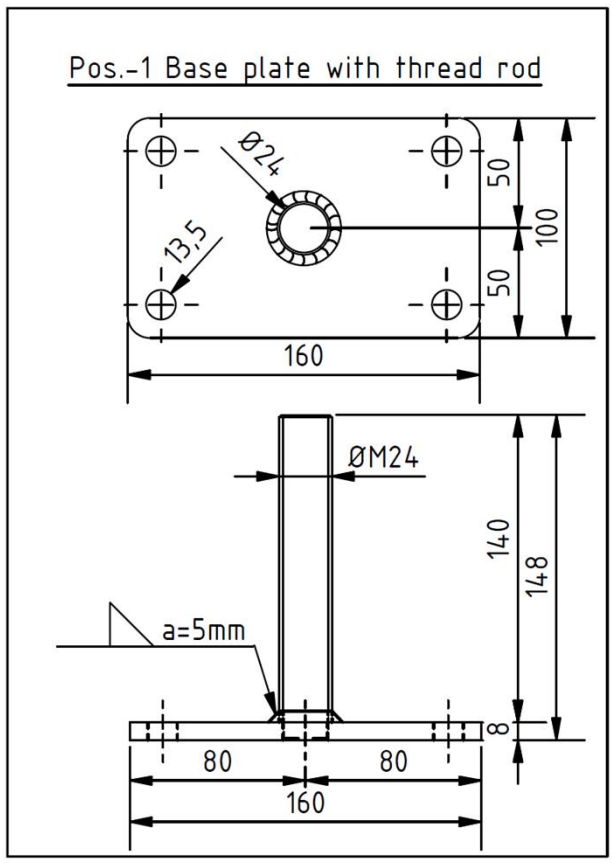


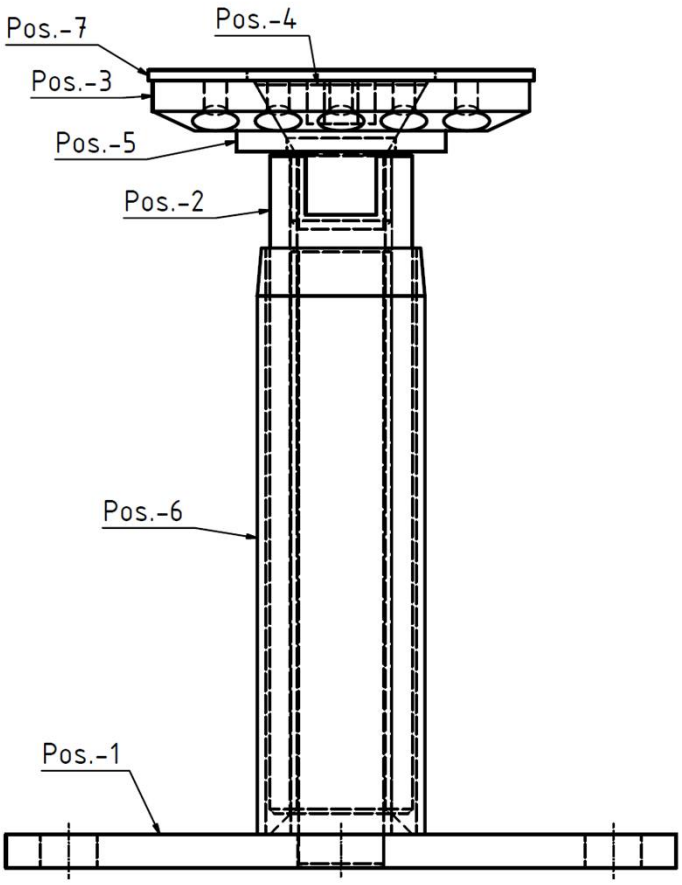
Post base STF 140+50, hot-dip galvanized or zinc-nickel coating	
Pos.-No.	Designation
1	Base plate 160 x 100 x 8 mm³, S235; and threaded bolt M24, H = 90 mm, 5.6
2	Threaded sleeve d = 34 mm, inner thread M24, H = 108 mm, wrench size 30, S235
3	Head plate 90 x 90 x 12 mm³, ZG230-450 comparable with GE-240 1.0446
4	Countersunk head screw M24x35, S235
5	Washer $d_{outside}$ = 50 mm, d_{hole} = 26 mm, T = 5 mm, S235
6	Protection sleeve d = 40 mm, T = 2 mm, H = 90 mm, S235
7	EPDM seal
8	HECO TOPIX fully threaded screw 5.0 mm x 80 mm carbon steel- special coating- / stainless steel A2-special coating

STF-Post bases	Annex 1.1
Hight-adjustable post base for embedding in concrete STF 140+50	



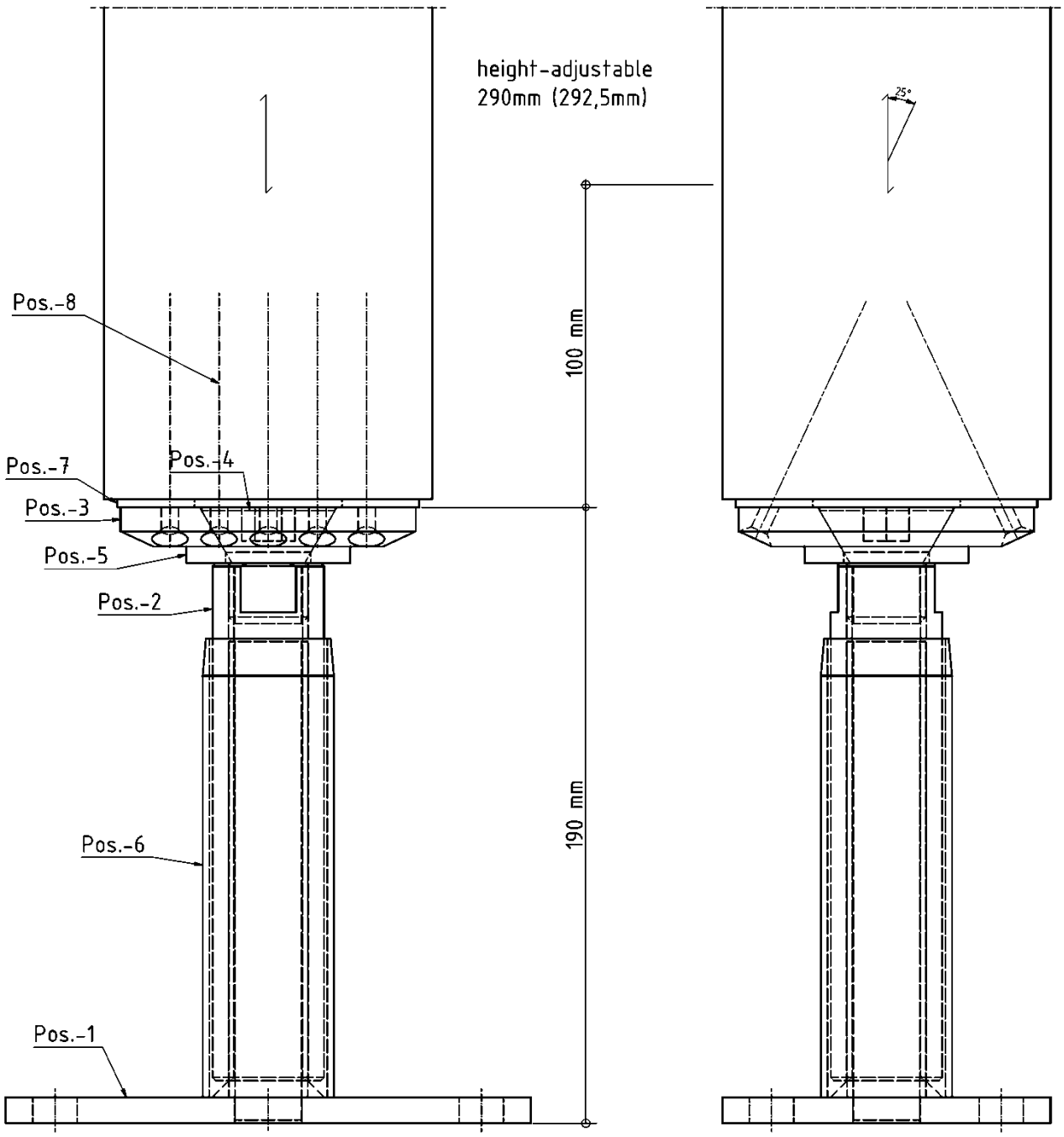
STF-Post bases	Annex 1.2
Hight-adjustable post base for embedding in concrete STF 140+50	



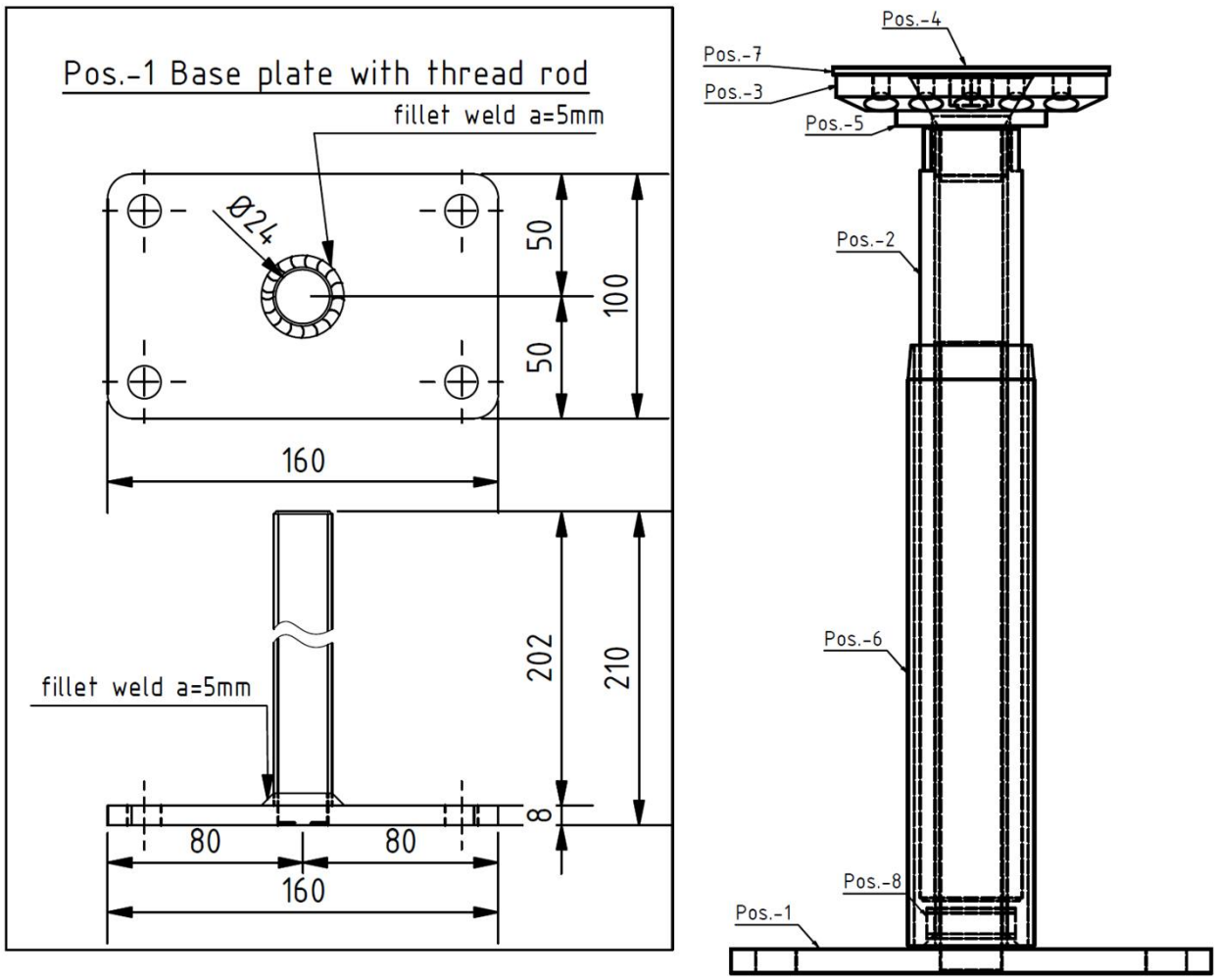


Post base STF 190+100, hot-dip galvanized or zinc-nickel coating	
Pos.-No.	Designation
1	Base plate 160 x 100 x 8 mm³, S235; and threaded bolt M24, H = 140 mm, 5.6
2	Threaded sleeve d = 34 mm, inner thread M24, H = 158mm, wrench size 30, S235
3	Headplate 90 x 90 x 12 mm³, ZG230-450 comparable with GE-240 1.0446
4	Countersunk head screw M24 x 35, S235
5	Washer $d_{outside}$ = 50 mm, d_{hole} = 26mm, T = 5 mm, S235
6	Protection sleeve d = 40 mm, T = 2 mm, H = 140 mm, S235
7	EPDM seal
8	HECO TOPIX fully threaded screw 5.0 mm x 80 mm carbon steel- special coating- / stainless steel A2-special coating

STF-Post bases	Annex 1.3
Hight-adjustable post base for embedding in concrete STF 190+100	

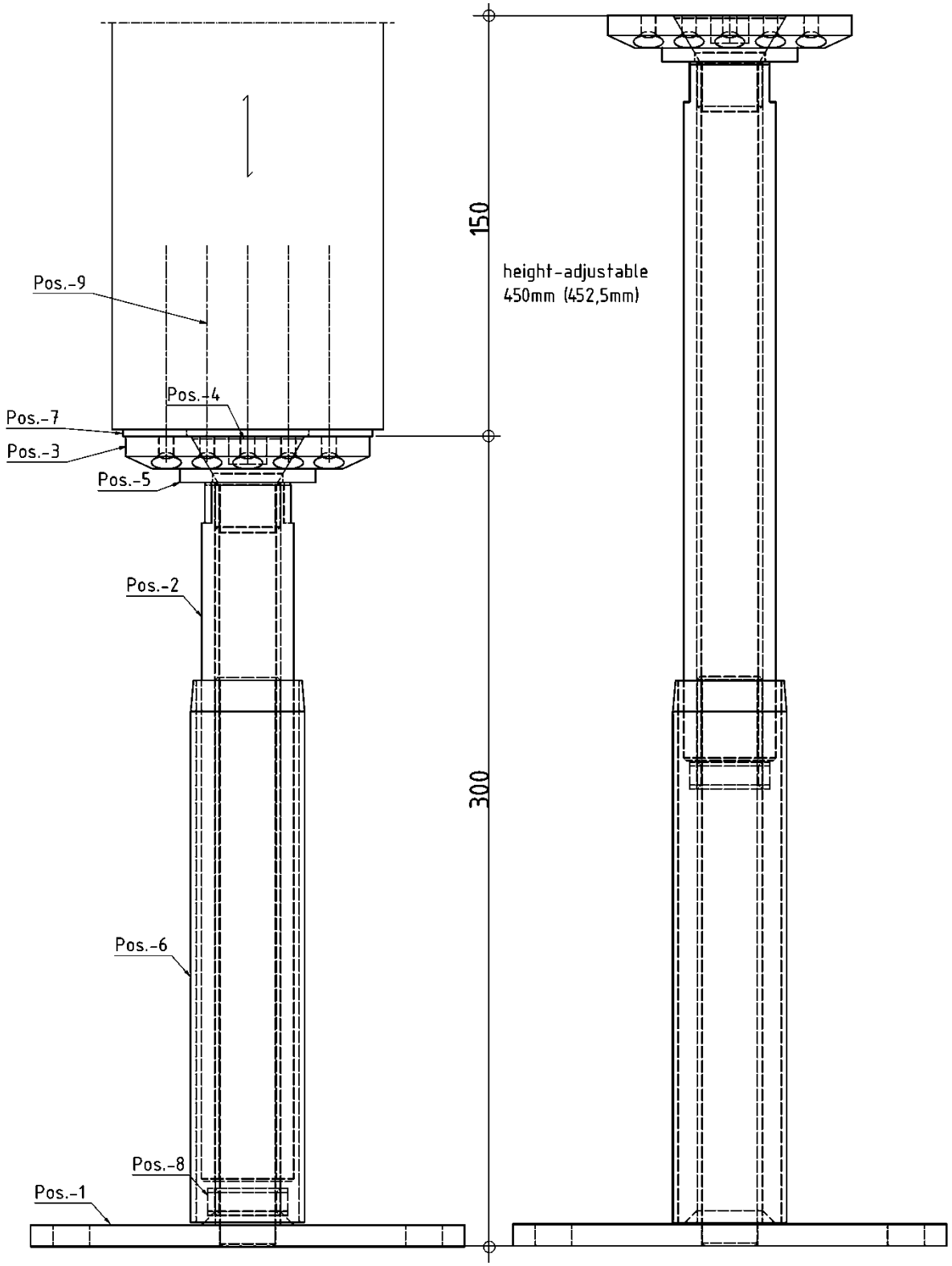


STF-Post bases	Annex 1.4
Hight-adjustable post base for embedding in concrete STF 190+100	

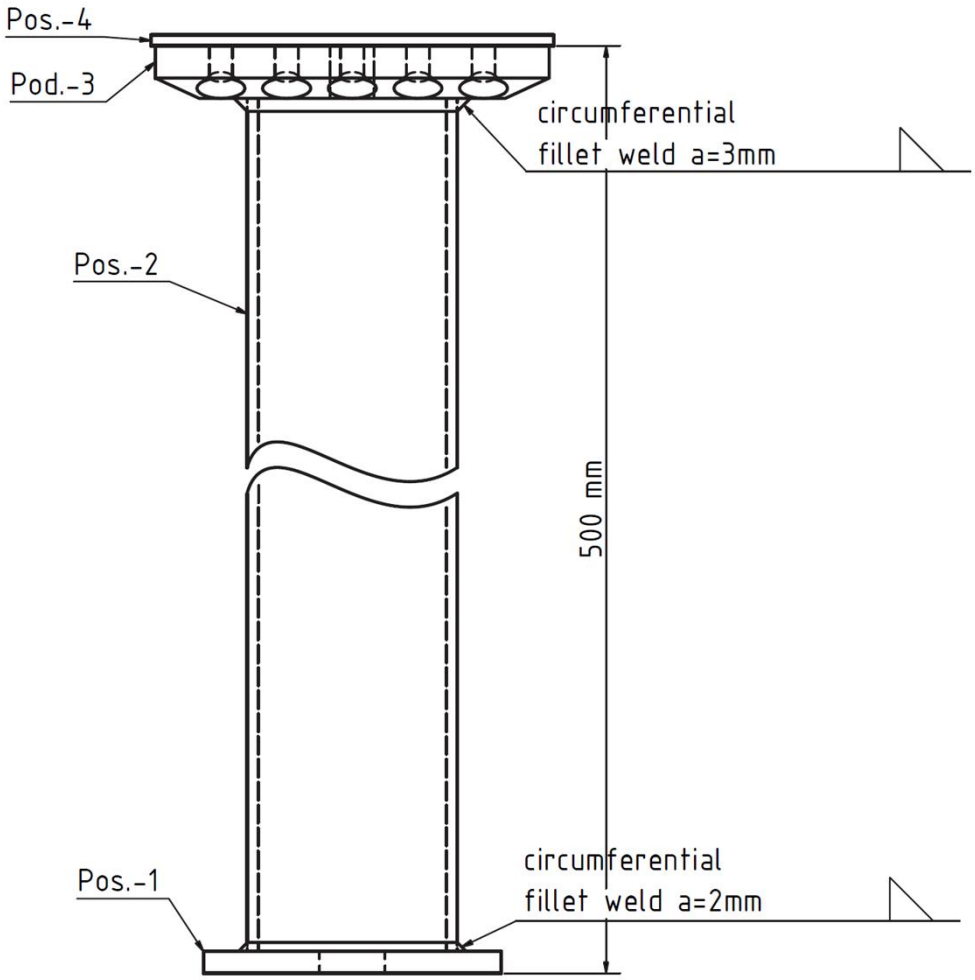


Post base STF 300+150, hot-dip galvanized or zinc-nickel coating	
Pos.-No.	Designation
1	Base plate 160 x 100 x 8 mm³, S235; and threaded bolt M24, H = 202 mm, 5.6
2	Threaded sleeve d = 34 mm, inner thread M24, H = 258 mm, wrench size 30, S235
3	Head plate 90 x 90 x 12 mm³, ZG230-450 comparable with GE-240 1.0446
4	Countersunk head screw M24x35, S235
5	Washer $d_{outside}$ = 50 mm, d_{hole} = 26 mm, T = 5 mm, S235
6	Protection sleeve d = 40 mm, T = 2 mm, H = 200 mm, S235
7	EPDM seal
8	Shaft lock nut M24, d = 10 mm, wrench size 30
9	HECO TOPIX fully threaded screw 5.0 mm x 80 mm carbon steel- special coating- / stainless steel A2-special coating

STF-Post bases	Annex 1.5
Hight-adjustable post base for embedding in concrete STF 300+150	

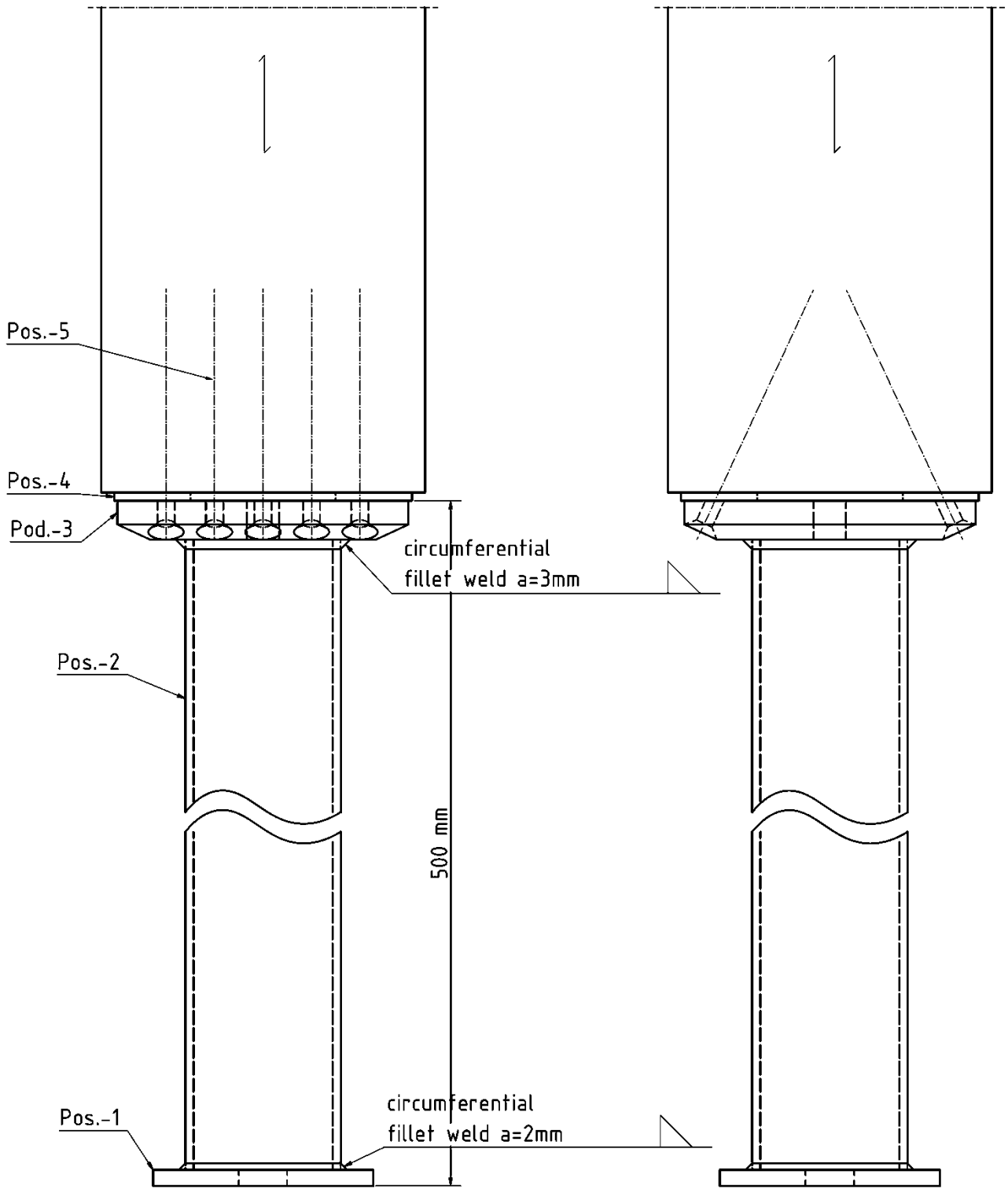


STF-Post bases	Annex 1.6
Hight-adjustable post base for embedding in concrete STF 300+150	

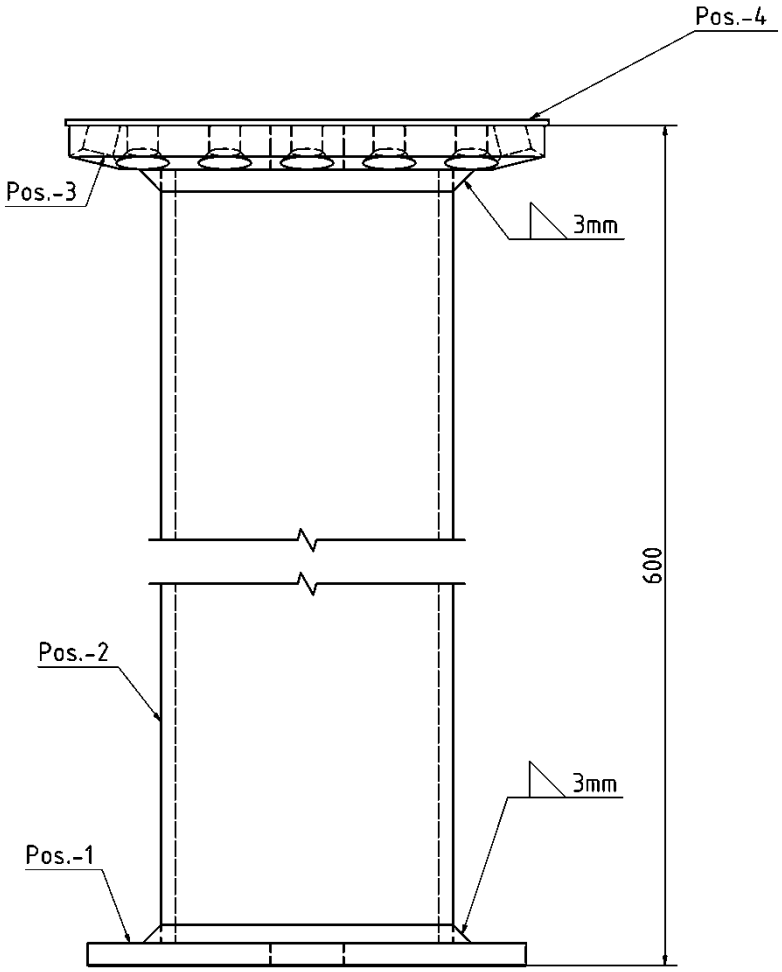


Post base STF B500, hot-dop galvanized or zinc-nickel coating	
Pos.-No.	Designation
1	Steel plate d = 68 x 15 x 5 mm³, S235
2	Steel tube d = 48, T = 2.5 mm, H = 483 mm, S235
3	Head plate 90 x 90 x 12 mm³, ZG230-450 comparable with GE-240 1.0446
4	EPDM seal
5	HECO TOPIX fully threaded screw 5.0 mm x 80 mm carbon steel- special coating- / stainless steel A2-special coating

STF-Post bases	Annex 1.7
Post base for embedding in concrete STF B500	

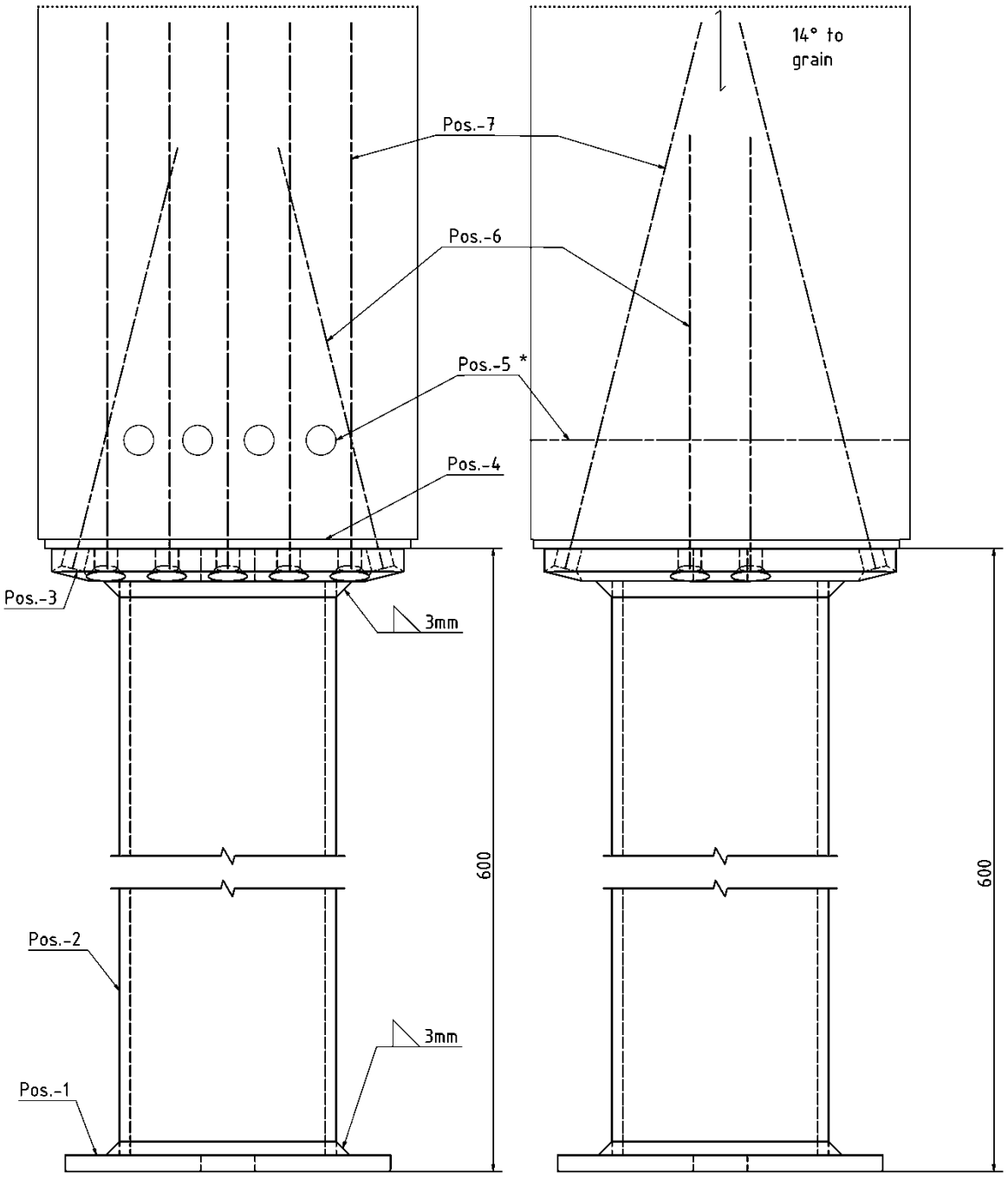


STF-Post bases	Annex 1.8
Post base for embedding in concrete STF B500	



Post base STF M600, hot-dip galvanized or zinc-nickel coating	
Pos.-No.	Designation
1	Base plate 120 x 120 x 6 mm³, S235
2	Steel tube 80 x 80 x 4 mm³, H=582 mm, S235
3	Head plate 130 x 130 x 12 mm³, ZG230-450 comparable with GE-240 1.0446
4	EPDM seal
5	HECO-TOPIX-CC fully thread screw 6.5 x 120 mm carbon steel- special coating- / stainless steel A2-special coating
6	HECO-TOPIX fully thread screw 8.0 x 160 mm carbon steel- special coating- / stainless steel A2-special coating
7	HECO-TOPIX fully thread screw 8.0 x 200 mm carbon steel- special coated- / stainless steel A2-special coating

STF-Post bases	Annex 1.9
Post base for embedding in concrete STF M600	



- Distance of screws Pos 5 to the end grain ≥ 5d

STF-Post bases	Annex 1.10
Post base for embedding in concrete STF M600	

Annex 2 Specifications of intended use

A.2.1 Intended use

The STF-Post bases are intended to be used for load-bearing timber-concrete connections in timber constructions.

The structural behaviour of the construction elements and the support conditions correspond to the indications given in Annex 3. The post bases may be used in service classes 1, 2 and 3 in accordance with EN 1995-1-1[1]. All post bases are designed to withstand loads due to vertical actions and the types of post bases embedded in concrete are also designed to withstand loads due to horizontal actions perpendicular to the axis of the post bases.

A.2.2 Loading:

Non-fatigue-relevant static and quasi-static actions.

A.2.3 Connection materials

A.2.3.1 Timber:

The timber members are made from solid timber, glued laminated timber or comparable glued wood-based members. The following softwood materials are suitable for connections with STF-Post bases:

- solid timber (softwood) in accordance with EN 14081-1[2] of strength class ≥ C24 given in EN 338[3]
- glued laminated timber in accordance with EN 14080[4] as well as
- similarly glued wood-based members with the following minimum dimensions:
  b x h = 10 cm x 10 cm for post base STF 140+50, STF 190+100, STF 300+150 und STF B500 und
  b x h = 14 cm x 14 cm for post base STF M600.

Characteristic values of load-carrying capacities for connections with post bases (see Annex 3) have been determined for a characteristic density of timber components of 350 kg/m³. For load-carrying capacities the density higher than 350 kg/m³ must not be taken into account when determining the load capacities.

A.2.3.2 Concrete:

Strength class ≥ C20/25.

A.2.4 Use conditions (environmental conditions)

A.2.4.1 Durability against corrosion

The steel components of the post base and their connections are either hot-dip galvanised with a minimum total coating mass of 25 µm according to Z350 of EN 10346[5] or with a zinc-nickel coating.

The allowable ambient atmospheric conditions in accordance with EN ISO 12944-2[6] are observed.

Coated fully threaded screws made from carbon steel are used for connecting the top plate to the timber member in service classes 1 and 2. Corrosion protection through use of a metallic coating exists.

Fully threaded screws made from stainless steel 1.4567 or 1.4578 are used for service class 3. The allowable ambient atmospheric conditions in accordance with EN ISO 12944-2 have been considered.

1	EN 1995-1-1: 2004+A1:2008+A2:2014	Eurocode 5: Design of timber structures – Part 1-1: Common rules and rules for buildings
2	EN 14081-1: 2005+A1:2011	Timber structures - Strength graded structural timber with rectangular cross section – Part 1: General requirements
3	EN 338:2016	Structural timber - Strength classes
4	EN 14080:2013	Timber structures - Glued laminated timber - Requirements
5	EN 10346:2015	Continuously hot-dip coated steel flat products for cold forming – Technical delivery conditions
6	EN ISO 12944:2018	Paint and varnishes – Corrosion protection of steel structures by protective paint systems - Part 2: Classification of environments

STF-Post bases	Annex 2.1
Specification of intended use Intended use, loading, connection materials, use conditions	

A.2.4.2 Wood preservative

It is assumed that a possible wood preservative treatment is taken into account and that effects of wood preservative on corrosion resistance are taken into consideration.

A.2.5 Installation

General

The connection of timber and concrete members using post bases is carried out as follows:

- Screws:
  Fully threaded screws "HECO-TOPIX" and "HECO-TOPIX-CC" according to ETA-11/0284 are used as follows:
  d = 5 mm / L = 80 mm for STF 140+50, STF 190+100, STF 300+150 and STF B500
  d = 8 mm / L = 200 mm or L = 160 mm as well as transverse reinforcement d = 6,5 mm / L ≥ 120 mm for STF M600
  see Annex 1 also
- Screw arrangement:
  All holes of the head plate of the post base marked according to Annex 1 are provided with screws.
- Orientation of Post base STF M600:
  The shear resistance according to Table 3.3 applies only to a horizontal load which is perpendicular to the rows of bolts.

Corresponding to the shear resistance the experimentally determined bending capacity for post base STF M600 applies under the condition that the horizontal force acts perpendicularly to the two screw rows of the connection, resulting in bending about the major axis of the connection such that 5 screws are subjected to tensile stress in the axial direction.

Horizontal loading of the post bases parallel to the screw rows is not allowed.

Wane

A wane is not intended; the timber post's end grain fully contacts the top plate of the post base.

Storage conditions

The construction elements connected by post bases are secured against rotation.

Base plates

The base plates are connected to the supporting substructure by means of anchor bolts or through embedding. The connection is not subject of this European technical assessment.

The members have a thickness exceeding the penetration depth of the screws into the member.

STF-Post bases	Annex 2.2
Specification of intended use Intended use, loading, connection materials, use conditions	

Annex 3 – Load-bearing capacity of post bases

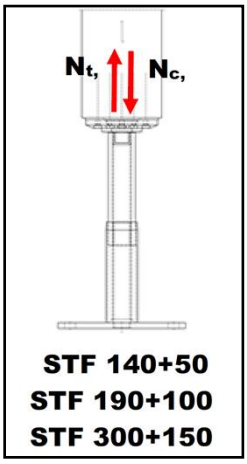


Table 3.1: Characteristic values and partial safety factors (γ) to be considered respectively for post bass STF 140+50, STF 190+100, STF 300+150

Post base	Tension $N_{t,k}$ [kN]	Compression $N_{c,k}$ [kN]
STF 140+50	9,2 (γ_{M0})	50 (γ_{M1})
STF 190+100	9,2 (γ_{M0})	28 (γ_{M1})
STF 300+150	9,2 (γ_{M0})	12 (γ_{M1})

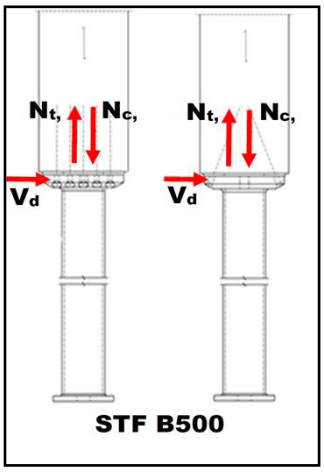


Table 3.2: Characteristic values and partial safety actors (γ) to be considered respectively for post base STF B500

Component / Connection	Tension $N_{t,k}$ [kN]	Compression $N_{c,k}$ [kN]	Lateral Force V_k [kN]
Connection steel-timber	29 (γ_M)	170 (γ_M)	7,0 (γ_M)
Steel tube	84 (γ_{M0})	81 (γ_{M1})	4,5 (γ_{M0})
Connection steel tube-concrete C20/25	36 (γ_C)	68 (γ_C)	-

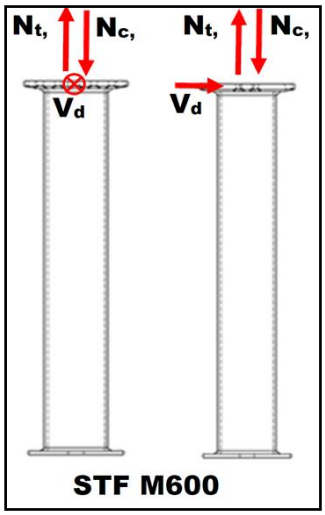


Table 3.3: Characteristic values and partial safety factors (γ) to be considered respectively for post base STF M600

Component / Connection	Tension $N_{t,k}$ [kN]	Compression $N_{c,k}$ [kN]	Lateral Force V_k [kN]
Connection steel-timber	150 (γ_M)	355 (γ_M)	36 (γ_M)
Steel tube	282 (γ_{M0})	282 (γ_{M0})	33 (γ_{M0})
Head plate	150 (γ_{M0})	140 (γ_{M0})	-
Connection Steel tube-concrete C20/25	160 (γ_C)	197 (γ_C)	-

STF-Post bases	Annex 3.1
Characteristic values and corresponding partial safety factors of post bases STF 140+50, STF 190+100, STF 300+150, STF B500 and STF M600	

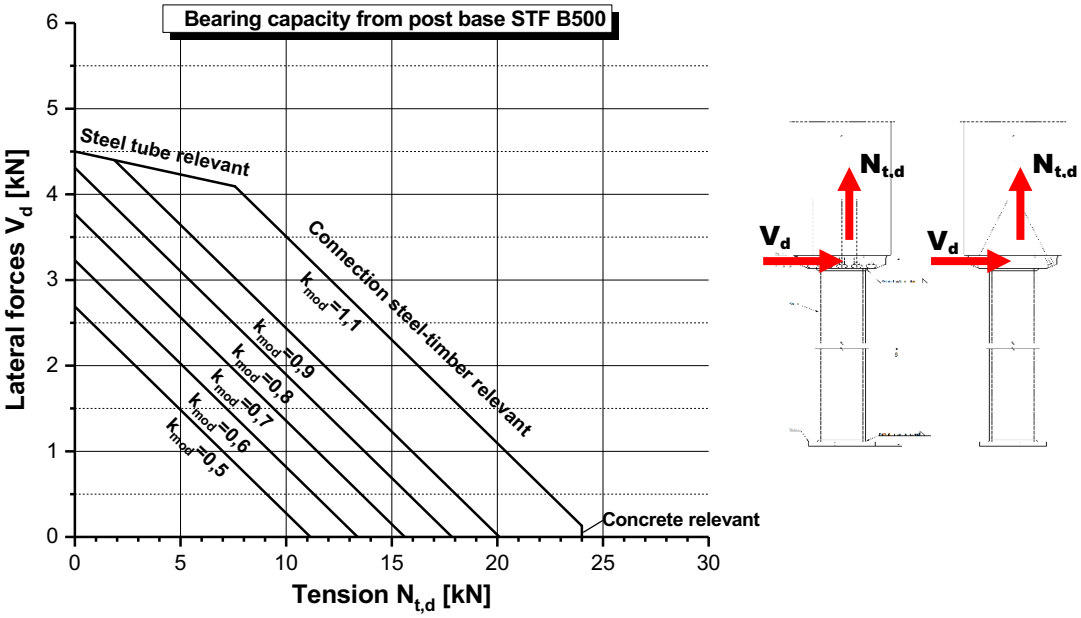


Illustration 3.1: Load-bearing capacity of post base STF B500 in interaction with tension and lateral forces with the adopted partial safety factors γ_M = 1,3 (timber), $\gamma_{M,0}$ = 1,0 (steel), γ_C = 1,5 (concrete)

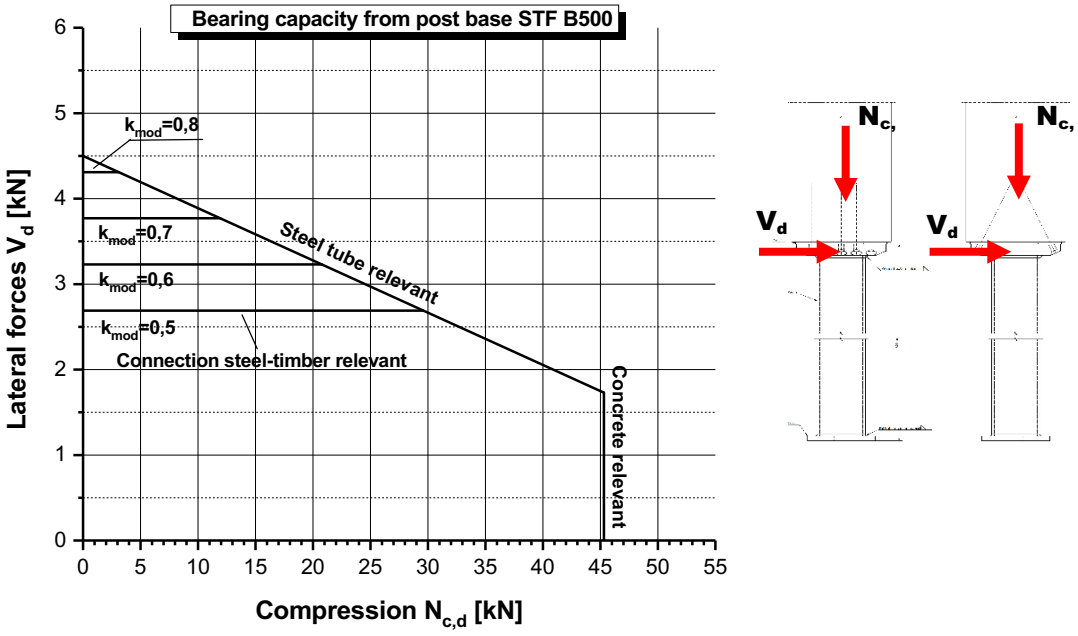


Illustration 3.2: Load-bearing capacity of post base STF B500 in interaction with compression and lateral forces with the adopted partial safety factors γ_M = 1,3 (timber), γ_C = 1,5 (concrete), $\gamma_{M,0}$ = 1,0 und $\gamma_{M,1}$ = 1,1 (steel)

STF-Post bases	Annex 3.2
Load-bearing capacity of post base STF B500 in interaction with tension and lateral forces with as well as compression and lateral forces for adopted partial safety factors for timber, steel and concrete	

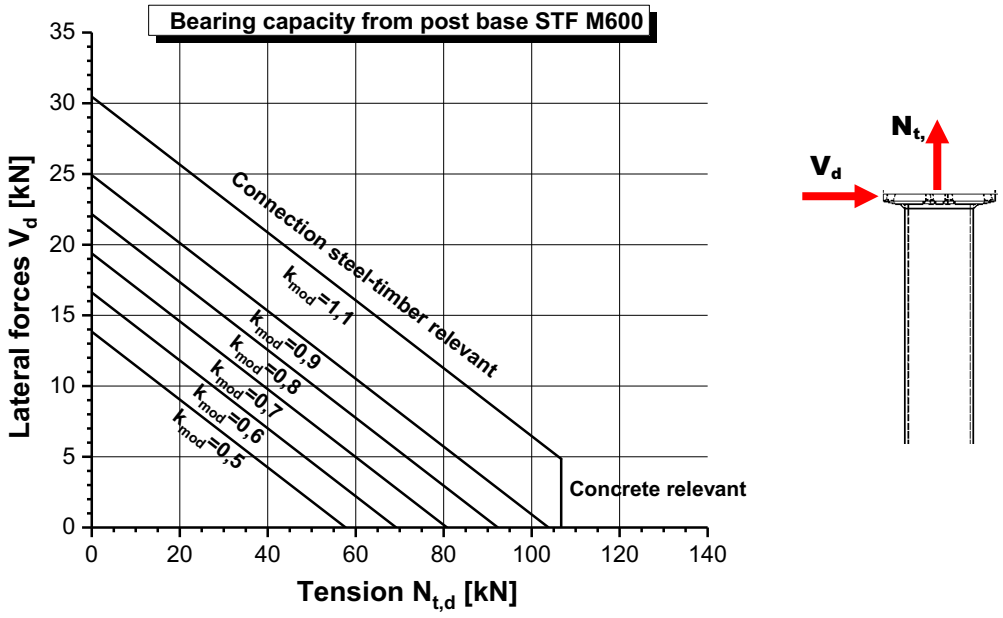


Illustration 3.3: Load-bearing capacity of post base STF M600 in interaction with tension and lateral forces with the adopted partial safety factors γ_M = 1,3 (timber), $\gamma_{M,0}$ = 1,0 (steel), γ_C = 1,5 (concrete)

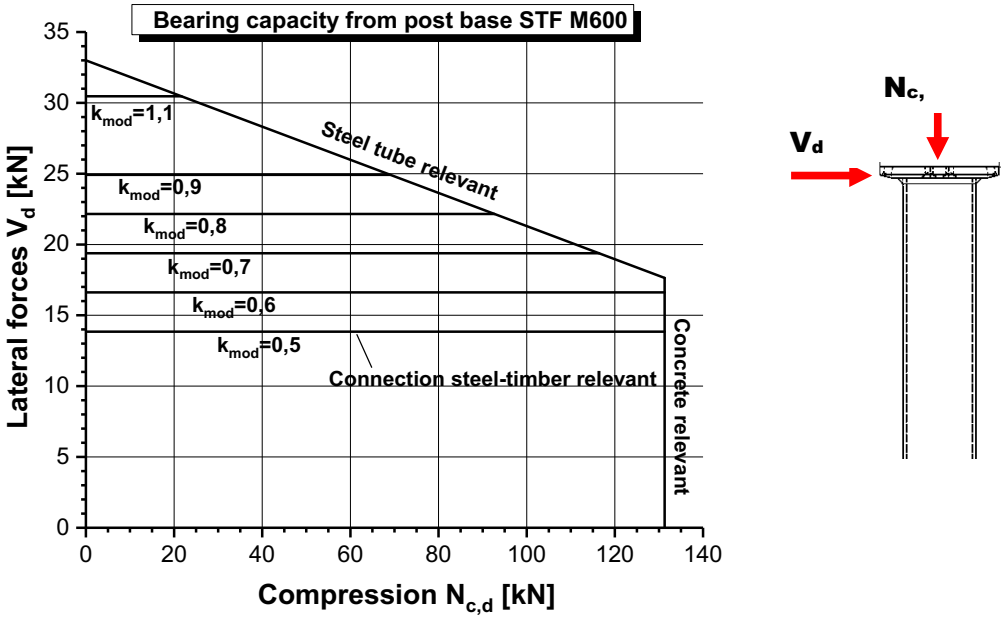


Illustration 3.4: Load-bearing capacity of post base STF M600 in interaction with compression and lateral forces with the adopted partial safety factors γ_M = 1,3 (timber), γ_C = 1,5 (concrete), $\gamma_{M,0}$ = 1,0 und $\gamma_{M,1}$ = 1,1 (steel)

STF-Post bases	Annex 3.3
Load-bearing capacity of post base STF M600 in interaction with tension and lateral forces with as well as compression and lateral forces for adopted partial safety factors for timber, steel and concrete	

Annex 4 – Calculation of the decisive load-bearing capacities of the post bases (informative)

The load bearing capacities for tension, compression and lateral force shall be calculated according to the relevant regulations with the partial safety factors according to equations B1, B2 and B3.

Tensile stress

$$N_{t,d} = min\left\{\frac{k_{mod} \cdot N_{t,k,timber}}{\gamma_M}; \frac{N_{t,k,steel}}{\gamma_{M0}}; \frac{N_{t,k,steel}}{\gamma_{M1}}; \frac{N_{t,k,steel}}{\gamma_{M2}}; \frac{N_{t,k,concret}}{\gamma_C}\right. \quad \text{(B1)}$$

Compressive stress

$$N_{c,d} = min\left\{\frac{k_{mod} \cdot N_{c,k,timber}}{\gamma_M}; \frac{N_{c,k,steel}}{\gamma_{M0}}; \frac{N_{c,k,steel}}{\gamma_{M1}}; \frac{N_{c,k,steel}}{\gamma_{M2}}; \frac{N_{c,k,concret}}{\gamma_C}\right. \quad \text{(B2)}$$

Lateral force stress

$$V_d = min\left\{\frac{k_{mod} \cdot V_{k,timber}}{\gamma_M}; \frac{V_{k,steel}}{\gamma_{M0}}; \frac{V_{k,steel}}{\gamma_{M1}}; \frac{V_{k,steel}}{\gamma_{M2}}\right. \quad \text{(B3)}$$

With simultaneous loading by a vertical load N_d and a horizontal load V_d for the components threaded bolt, steel tube, head and foot plate and the connection shall be proven steel-timber, that

$$\frac{N_d}{N_{Rd}} + \frac{V_d}{V_{Rd}} \leq 1 \quad \text{(B4)}$$

The provisions of EN 1992-1-1, EN 1993-1-1 and EN 1995-1-1 shall be taken into account when calculating design values.

STF-Post bases	Annex 3.1
Characteristic values and corresponding partial safety factors of post bases STF 140+50, STF 190+100, STF 300+150, STF B500 and STF M600	