ETA-Danmark A/S
Kollegievej 6
DK-2920 Charlottenlund
Tel. +45 72 24 59 00
Fax +45 72 24 59 04
Internet ww.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-14/0137 of 13/06/2014

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:	BRISTA Post bases
Product family to which the above construction product belongs:	Three-dimensional nailing plate (Post bases for the support of timber columns and posts as load-bearing elements)
Manufacturer:	Franz Brinkmann GmbH Oesterweg 16 DE 59469 Ense-Höingen Tel. +49 (0) 29 38 / 97 70 - 0 Fax +49 (0) 29 38 / 97 70 - 77 Internet www.brista.de
Manufacturing plant:	Franz Brinkmann GmbH Oesterweg 16 DE 59469 Ense-Höingen
This European Technical Assessment contains:	21 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:	-

Translations of this European Technical Assessment in other languages shall fully correspond to the original issued document and should 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

The post bases are made from 4,0 mm to 8,0 mm thick steel plates in combination with reinforcing bars. The post bases are produced from steel grade S235JR according to EN 10025-2:2004 with minimum characteristic yield strength of R_e = 235 N/mm² and minimum characteristic tensile strength of R_m = 360 N/mm² and from stainless steel according to EN 10088-2:2005 with minimum characteristic yield strength of $R_{p0,2}$ = 220 N/mm² and minimum characteristic tensile strength of R_m = 520 N/mm². The reinforcing bars are produced from steel grade B 500 A according to EN 10080:2005 with minimum characteristic yield strength of R_{eH} = 500 N/mm².

For the connections with metal fasteners bolts ø10,0 and ø12,0 mm (S235) and screws ø10,0 (S235) according to EN 14592:2012 (DIN 571 and thread according to DIN 7998) are used.

Dimensions are shown in Annex A and B.

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

The intended use of the post bases is the support of timber columns and posts as load-bearing elements, 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 and kinematical behaviour of the timber members or the supports shall be as described in Annex B.

The timber posts may be of solid timber of strength class C24 or better according to EN 338:2009. Minimum dimensions for the post have to be considered (Annex A).

The post base shall be installed as pictured in the drawings. The cross-section of the timber column shall be positioned centrically and with the end grain plane on the base plate. Some post bases may have a clearance between the end grain of the timber post and the base plate of the post base due to constructive wood preservation (distance e given in Annex A).

The maximum distance between the foundation and the base plate of the post base is given in Annex A, table A.1.

Annex B states the load-carrying capacities of the post bases for solid timber of strength class C24 according to EN 338:2009. The design of the connections shall be in accordance with Eurocode 3 and Eurocode 5 or a similar national code. The anchorage of the post base in the foundation and imperfections exceeding the assumptions in Eurocode 5, 5.4.4 are not part of this ETA.

The post bases 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 hot-dip zinc coating with a minimum thickness of 70 µm according to EN 1461:2009 or stainless steel. The metal fasteners must also 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 2081:2008).

The scope of the post bases regarding resistance to corrosion shall be defined according to national provisions that apply at the installation site considering environmental conditions and in conjunction with the admissible service conditions according to EN 1995-1-1 and the admissible corrosivity category as described and defined in EN ISO 12944-2

The provisions made in this European Technical Assessment are based on an assumed intended working life of the post bases brackets 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 post bases 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	No dangerous materials
3.7 Sustainable use of natural resources (BWR7)	No performance determined
3.8 General aspects related to the performance of the product	The post bases 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
Identification	See Annex A

*) See additional information in section 3.9 – 3.12.

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

Safety principles and partial factors

The characteristic load-carrying capacities are based on the characteristic values of the connections with metal fasteners, the steel components and the timber post.

In the case of timber failure or failure of the metal fasteners, the design values shall be calculated according to EN 1995-1-1 by dividing the characteristic values of the load-carrying capacities by different partial factors for the strength properties, and in addition multiplied with the coefficient k_{mod}.

In the case of steel failure, 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 the smaller value of all load-carrying capacities:

$$F_{Rd} = \min\left\{\frac{k_{mod} \cdot F_{Rk,T}}{\gamma_{M,T}}; \frac{F_{Rk,S}}{\gamma_{Mi,S}}\right\}$$

Therefore, for timber failure or failure of the metal fasteners the load duration class and the service class are included. The different partial factors γ_M for steel or timber failure, respectively, are also correctly taken into account.

3.10 Mechanical resistance and stability

See Annex B for the characteristic load-carrying capacity in the different directions F_1 to F_5 for solid timber of strength class C24 according to EN 338:2009. Using the load-carrying capacities of the post bases, the specifications in Annex A must be fulfilled. The end grain of the timber post must in general be plane on the base plate of the post base. Some post bases may have a clearance between the end grain of the timber post and the base plate of the post base due to constructive wood preservation (distance e given in Annex A).

The characteristic capacities of the post bases are determined by calculation 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.

No performance has been determined in relation to the anchorage of the post bases in the foundation. It must be checked by the designer of the structure to ensure it is not less than the post base capacity and, if necessary, the post base capacity reduced accordingly. Therefore the specifications for the lever arms $e_{F2/F3}$ (for load case F_2 / F_3) and $e_{F4/F5}$ (for load case F_4 / F_5) in annex A have to be considered. The lever arm is the distance between the top edge of the foundation and the load.

3.11 Aspects related to the performance of the product

3.11.1 Corrosion protection in service class 1 and 2.

In accordance with ETAG 015 the angle brackets are produced from steel grade S235JR according to EN 10025-2:2004 with minimum characteristic yield strength of R_e = 235 N/mm² and minimum characteristic tensile strength of R_m = 360 N/mm² and from stainless steel according to EN 10088-2:2005 with minimum characteristic yield strength of $R_{p0,2}$ = 220 N/mm² and minimum characteristic tensile strength of R_m = 520 N/mm². The reinforcing bars are produced from steel grade B 500 A according to EN 10080:2005 with minimum characteristic yield strength of R_{eH} = 500 N/mm².

The post bases are coated with hot-dip zinc coating with a minimum thickness of 70 µm or made from stainless steel.

3.12 General aspects related to the use of the product

The angle 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 either the maximum or the minimum pattern as defined in Annex A.

The following provisions apply:

- The timber post
  - shall be restrained against rotation, and supported at the lower and upper end
  - shall be strength class C24 according to EN 338:2009 or better, see section 3 of this evaluation report
  - shall be free from wane in the post base
  - must fulfil the requirements regarding minimum dimensions (see Annex A)
  - end grain must in general be plane on the base plate of the post base; some post bases may have a distance between the end grain of the

timber post and the base plate of the post base due to constructive wood preservation (distance e, see Annex A)

- The post base shall be installed centrically in the cross-section of the timber column.
- The actual end bearing capacity of the timber member to be used in conjunction with the post base is checked by the designer of the structure to ensure it is not less than the post base capacity and, if necessary, the post base capacity reduced accordingly.
- There are no specific requirements relating to preparation of the timber members.
- The anchorage of the post base in the foundation is not part of this ETA. It must be checked by the designer of the structure to ensure it is not less than the post base capacity and, if necessary, the post base capacity reduced accordingly. Therefore, the specifications for the lever arms $e_{F2/F3}$ (for load case F_2 / F_3) and $e_{F4/F5}$ (for load case F_4 / F_5) in Annex A have to be considered. The lever arm is the distance between the top edge of the foundation and the load.

The execution of the connection shall be in accordance with the assessment holder's technical literature.

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

Issued in Charlottenlund on 2014-06-13 by

Thomas Bruun
Manager, ETA-Danmark

Annex A
Product details and definitions

Table A.1 Specifications of the post bases

Post base					Post		Distances			
Type	Article No.	Size	Fastener		min b	min h	max e	max a	$e_{F2/F3}$	$e_{F4/F5}$
		[mm]	Bolt	Screw	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]
H-Shape 600-60-6	001155	71	2 x Ø12,0	-	71	96	10	50	195	72
	001157	91	2 x Ø12,0	-	91	96	10	50	195	72
	001159	101	2 x Ø12,0	-	101	96	10	50	195	72
	001160	111	2 x Ø12,0	-	111	96	10	50	195	72
	001162	121	2 x Ø12,0	-	121	96	10	50	195	72
	001163	141	2 x Ø12,0	-	141	96	10	50	195	72
H-Shape 800-60-6	001164	91	2 x Ø12,0	-	91	96	10	100	240	87
	001127	121	2 x Ø12,0	-	121	96	10	100	240	87
H-Shape 800-80-8	001150	121	2 x Ø12,0	-	121	96	10	100	240	98
	001151	141	2 x Ø12,0	-	141	96	10	100	240	98
	003515	161	2 x Ø12,0	-	161	96	10	100	240	98
H-Shape 1000-80-8	001129	115	2 x Ø12,0	-	115	96	10	150	290	120
H-Shape 600-60-5 V2A	001152	91	2 x Ø12,0	-	91	96	10	50	195	63
L-Shape	001131	75	-	2 x Ø10,0	75	80	-	50	-	-
	002529	75	-	2 x Ø10,0	75	80	-	100	-	-
U-Shape h = 250 mm	001144	71	-	4 x Ø10,0	71	115	-	50	140	63
	001145	81	-	4 x Ø10,0	81	115	-	50	140	63
	001146	91	-	4 x Ø10,0	91	115	-	50	140	63
	001147	101	-	4 x Ø10,0	101	115	-	50	140	63
	002504	121	-	4 x Ø10,0	121	115	-	50	140	63
	001148	141	-	4 x Ø10,0	141	115	-	50	140	63
U-Shape h = 400 mm	001139	71	-	4 x Ø10,0	71	115	-	100	140	63
	001140	81	-	4 x Ø10,0	81	115	-	100	140	63
	002527	91	-	4 x Ø10,0	91	115	-	100	140	63
	002528	101	-	4 x Ø10,0	101	115	-	100	140	63
	001141	121	-	4 x Ø10,0	121	115	-	100	140	63
	001142	141	-	4 x Ø10,0	141	115	-	100	140	63
post base to bolt down	001171	71	2 x Ø10,0	-	71	80	10	-	185	39
	001172	81	2 x Ø10,0	-	81	80	10	-	185	39
	001173	91	2 x Ø10,0	-	91	80	10	-	185	39
	001174	101	2 x Ø10,0	-	101	80	10	-	185	39
	001176	121	2 x Ø10,0	-	121	80	10	-	185	39

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

Fastener type	Size			Material	Finish
	Diameter	Length	Threaded length		
Screws	10,0 mm	min 60 mm	min 40 mm	$f_{u,k} \geq 360$ N/mm^2	Galvanic zinc coating
Bolts	10,0 mm			$f_{u,k} \geq 360$ N/mm^2	Galvanic zinc coating
The load-carrying-capacities of the metal fasteners were calculated according to Eurocode 5 for lateral loads. The contribution to the load-carrying capacity due to the rope effect was considered according to Eurocode 5.					

Annex B
Characteristic load-carrying capacities

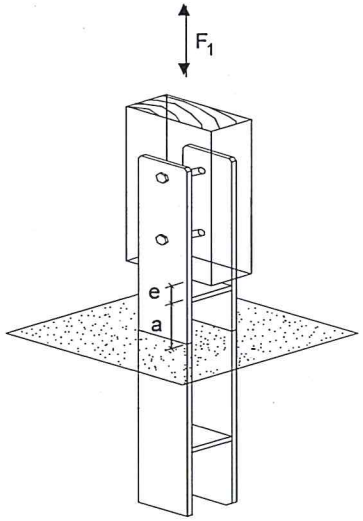
Table B.1 Characteristic load-carrying capacities for post bases $F_{i,Rk}$ [kN]

Post base			F_1 (Compression)			F_1 (Tension)		F_2/F_3			F_4/F_5	
Type	Article No.	Size [mm]	Timber	Steel		Timber	Steel	Timber	Steel		Timber	Steel
H-Shape 600-60-6	001155	71	31,2	112	154	31,2	154	7,90	-	12,1	4,68	3,75
	001157	91	31,2	112	154	31,2	154	10,1	-	12,1	4,68	3,75
	001159	101	31,2	112	154	31,2	154	11,2	-	12,1	4,68	3,75
	001160	111	31,2	112	154	31,2	154	12,4	-	12,1	4,68	3,75
	001162	121	31,2	112	154	31,2	154	13,5	-	12,1	4,68	3,75
	001163	141	31,2	112	154	31,2	154	15,7	-	12,1	4,68	3,75
			$\gamma_{M,C}$	$\gamma_{M,1}$	$\gamma_{M,2}$	$\gamma_{M,C}$	$\gamma_{M,2}$	$\gamma_{M,T}$	-	$\gamma_{M,1}$	$\gamma_{M,T}$	$\gamma_{M,0}$
H-Shape 800-60-6	001164	91	31,2	71,0	-	31,2	154	10,1	-	9,1	3,42	2,76
	001127	121	31,2	71,0	-	31,2	154	13,5	-	9,1	3,20	2,76
			$\gamma_{M,C}$	$\gamma_{M,1}$	-	$\gamma_{M,C}$	$\gamma_{M,2}$	$\gamma_{M,T}$	-	$\gamma_{M,1}$	$\gamma_{M,T}$	$\gamma_{M,0}$
H-Shape 800-80-8	001150	121	34,9	176	247	34,9	247	13,5	-	22,1	7,96	5,91
	001151	141	34,9	176	247	34,9	247	15,7	-	22,1	7,96	5,91
	003515	161	34,9	176	247	34,9	247	17,9	-	22,1	7,96	5,91
			$\gamma_{M,C}$	$\gamma_{M,1}$	$\gamma_{M,2}$	$\gamma_{M,C}$	$\gamma_{M,2}$	$\gamma_{M,T}$	-	$\gamma_{M,1}$	$\gamma_{M,T}$	$\gamma_{M,0}$
H-Shape 1000-80-8	001129	115	34,9	107	-	34,9	247	12,8	-	17,7	6,32	4,77
			$\gamma_{M,C}$	$\gamma_{M,1}$	-	$\gamma_{M,C}$	$\gamma_{M,2}$	$\gamma_{M,T}$	-	$\gamma_{M,1}$	$\gamma_{M,T}$	$\gamma_{M,0}$
H-Shape 600-60-5 V2A	001152	91	31,2	76,9	-	31,2	132	10,1	-	9,28	3,55	2,68
			$\gamma_{M,C}$	$\gamma_{M,1}$	-	$\gamma_{M,C}$	$\gamma_{M,2}$	$\gamma_{M,T}$	-	$\gamma_{M,1}$	$\gamma_{M,T}$	$\gamma_{M,0}$
L-Shape	001131	75	52,1	43,7	-	0,95	4,67	-	-	-	-	-
	002529	75	52,1	43,7	-	0,95	4,67	-	-	-	-	-
			$\gamma_{M,T}$	$\gamma_{M,0}$	-	$\gamma_{M,C}$	$\gamma_{M,0}$	-	-	-	-	-
U-Shape h = 250 mm	001144	71	63,5	56,6	-	8,91	7,37	5,94	1,51	-	5,34	5,09
	001145	81	70,3	56,6	-	8,91	5,90	5,94	1,21	-	5,34	5,09
	001146	91	77,1	56,6	-	8,91	4,92	5,94	1,07	-	5,34	5,09
	001147	101	84,0	56,6	-	8,91	4,22	5,94	1,07	-	5,34	5,09
	002504	121	97,6	56,6	-	8,91	3,28	5,94	1,07	-	5,34	5,09
	001148	141	111	56,6	-	8,91	2,68	5,94	1,07	-	5,34	5,09
			$\gamma_{M,T}$	$\gamma_{M,0}$	-	$\gamma_{M,C}$	$\gamma_{M,0}$	$\gamma_{M,C}$	$\gamma_{M,0}$	-	$\gamma_{M,T}$	$\gamma_{M,0}$
U-Shape h = 400 mm	001139	71	63,5	56,6	-	8,91	7,37	5,94	1,51	-	5,30	2,33
	001140	81	70,3	56,6	-	8,91	5,90	5,94	1,21	-	5,30	2,33
	002527	91	77,1	56,6	-	8,91	4,92	5,94	1,07	-	5,30	2,33
	002528	101	84,0	56,6	-	8,91	4,22	5,94	1,07	-	5,30	2,33
	001141	121	97,6	56,6	-	8,91	3,28	5,94	1,07	-	5,30	2,33
	001142	141	111	56,6	-	8,91	2,68	5,94	1,07	-	5,30	2,33
			$\gamma_{M,T}$	$\gamma_{M,0}$	-	$\gamma_{M,C}$	$\gamma_{M,0}$	$\gamma_{M,C}$	$\gamma_{M,0}$	-	$\gamma_{M,T}$	$\gamma_{M,0}$
post base to bolt down	001171	71	23,8	49,7	-	12,7	8,41	10,7	1,27	-	7,54	1,37
	001172	81	23,8	49,7	-	12,7	9,55	10,7	1,27	-	7,54	1,37
	001173	91	23,8	49,7	-	12,7	11,0	10,7	1,27	-	7,54	1,37
	001174	101	23,8	49,7	-	12,7	13,1	10,7	1,27	-	7,54	1,37
	001176	121	23,8	49,7	-	12,7	20,5	10,7	1,69	-	7,54	1,37
			$\gamma_{M,C}$	$\gamma_{M,1}$	-	$\gamma_{M,C}$	$\gamma_{M,0}$	$\gamma_{M,C}$	$\gamma_{M,0}$	-	$\gamma_{M,T}$	$\gamma_{M,0}$

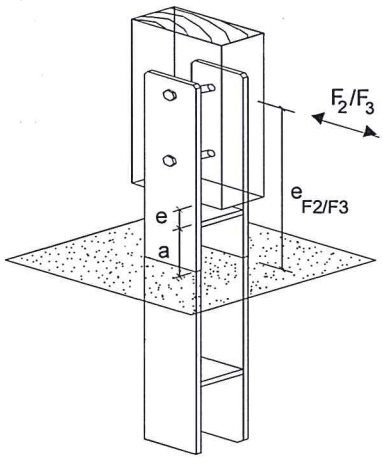
$\gamma_{M,T}$ = partial factor for solid timber according to EN 1995-1-1 and national annex
$\gamma_{M,C}$ = partial factor for connections according to EN 1995-1-1 and national annex
$\gamma_{M,0}; \gamma_{M,1}; \gamma_{M,2}$ = partial factor according to EN 1993-1-1 and national annex

Definitions of forces, their directions and eccentricity

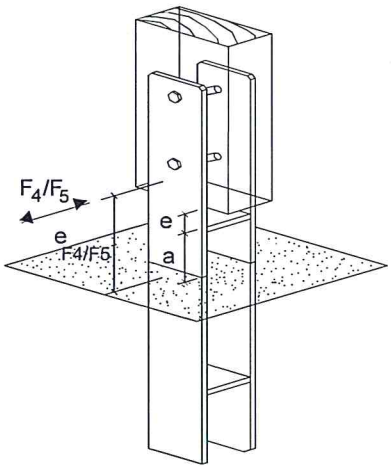
- Force F_1: tensile or compression load



- Force F_2 / F_3: horizontal load parallel to the side plates of the post base and perpendicular to the fasteners



- Force F_4 / F_5: horizontal load perpendicular to the side plates of the post base and parallel to the fasteners



Acting forces

F_1	axial force (tension or compression) acting along the central axis of the joint
F_2 and F_3	horizontal force parallel to the side plates of the post base acting with the lever arm $e_{F2/F3}$ above the foundation
F_4 and F_5	horizontal force perpendicular to the side plates of the post base acting with the lever arm $e_{F4/F5}$ above the foundation

Combined forces

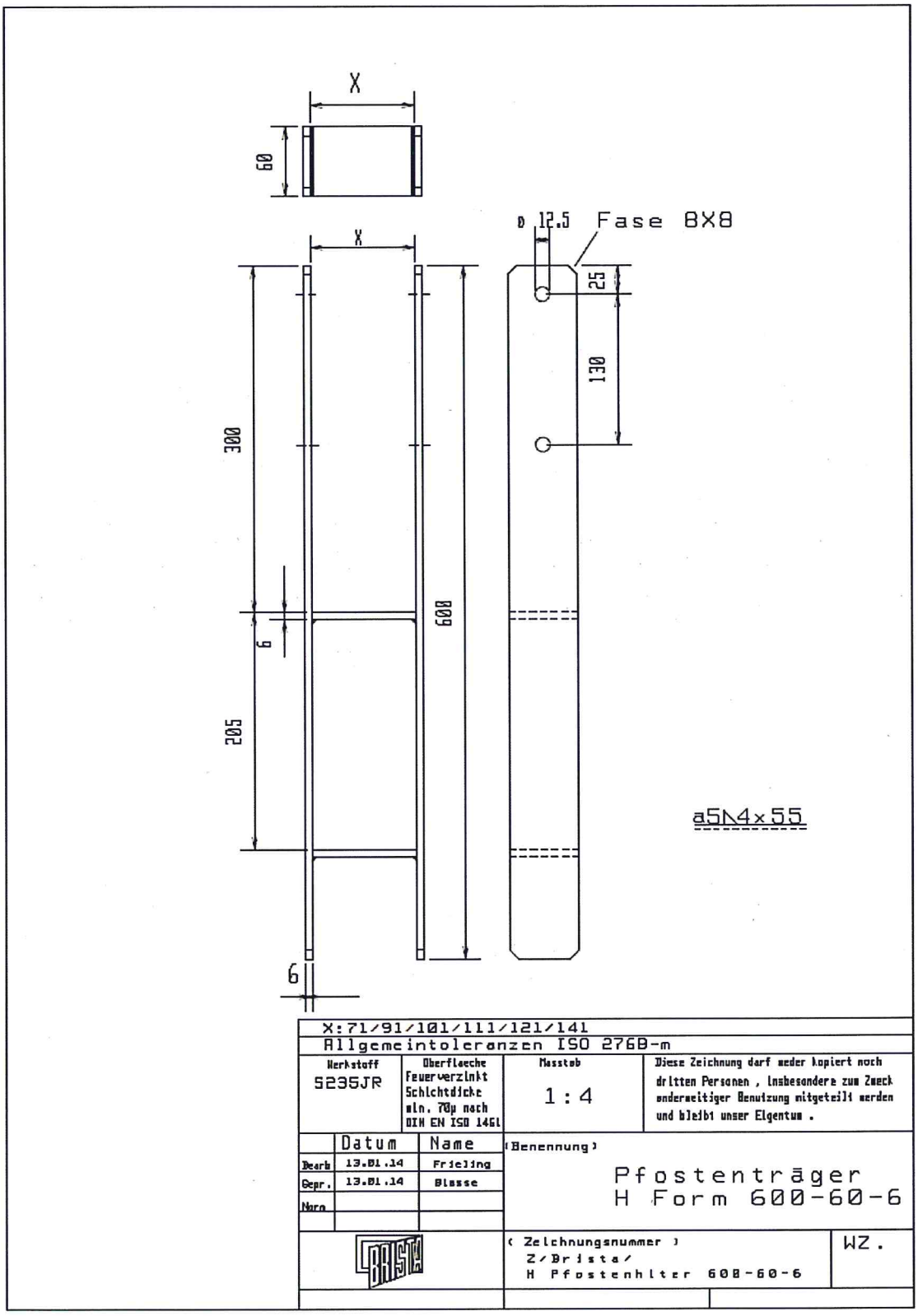
If the forces F_1 and F_2/F_3 or F_4/F_5 act at the same time, the following inequality shall be fulfilled:

$$\sum \frac{F_{i,Ed}}{F_{i,Rd}} \leq 1$$

The forces F_2 and F_3 or F_4 and F_5 are forces with opposite direction. Therefore only one force F_2 or F_3, and F_4 or F_5, respectively, is able to act simultaneously with F_1.

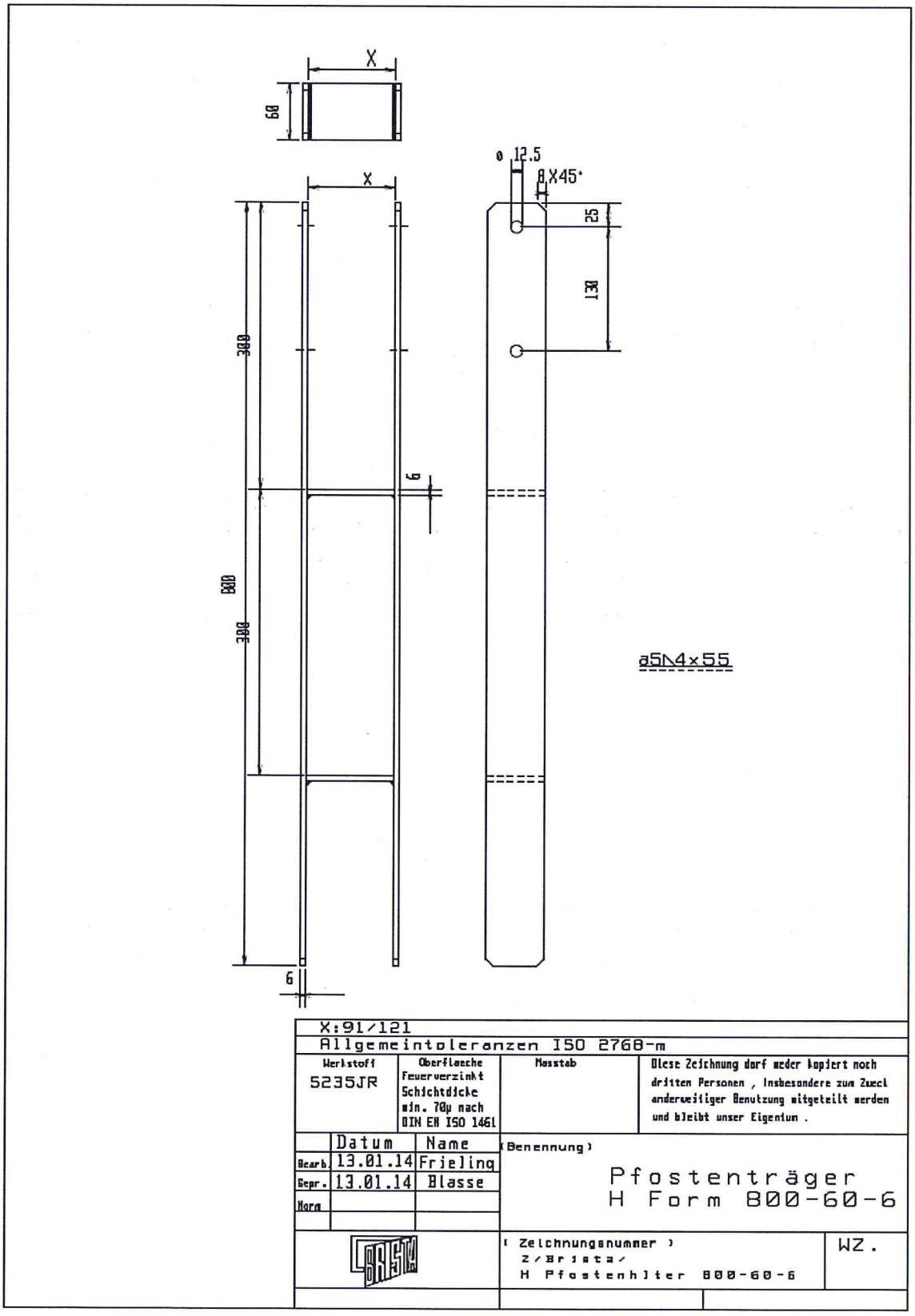
B.1 H-Shape 600-60-6

Art.-Nr. 001155, 001157, 001159, 001160, 001162, 001163



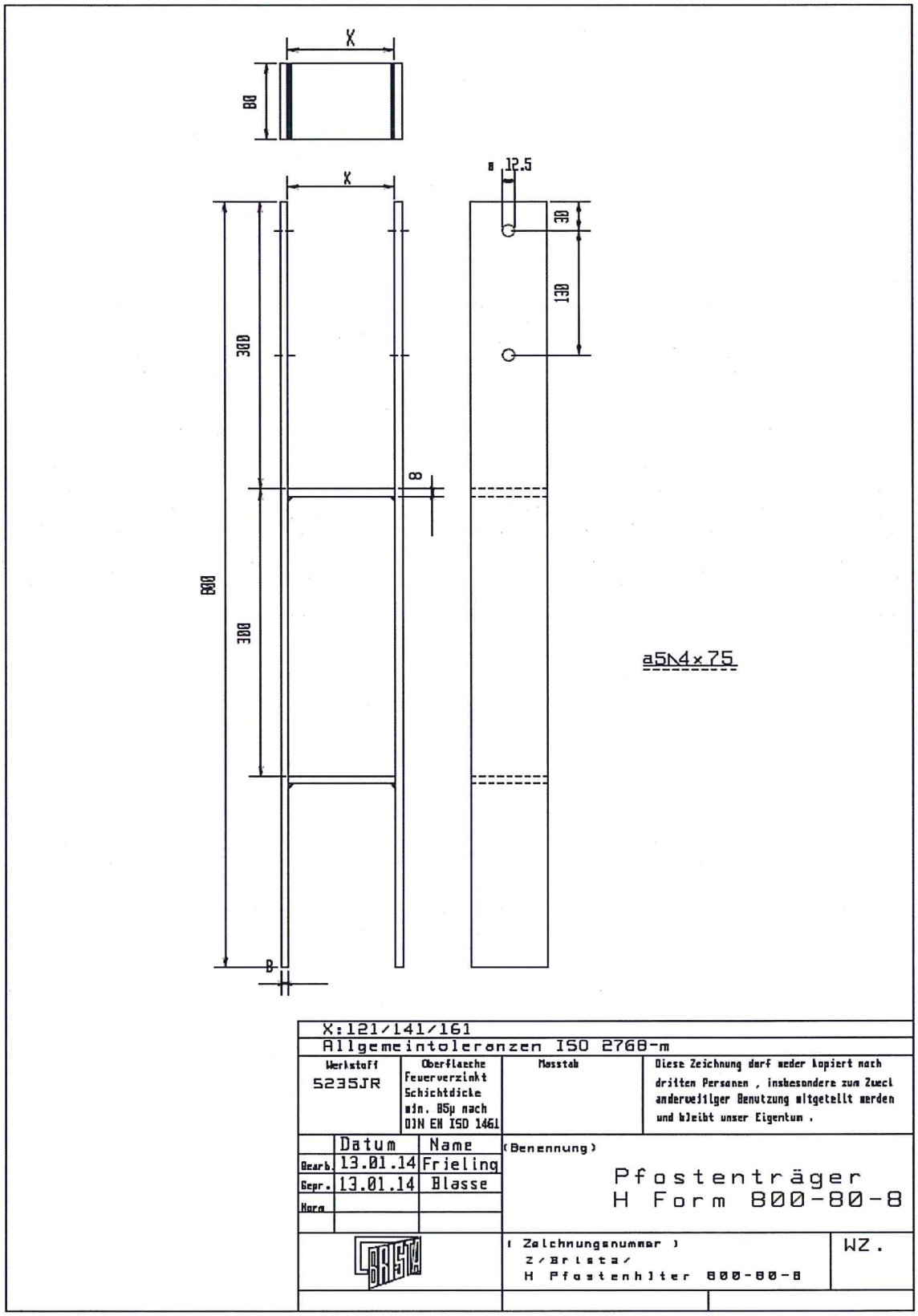
B.2 H-Shape 800-60-6

Art.-Nr. 001164, 001127



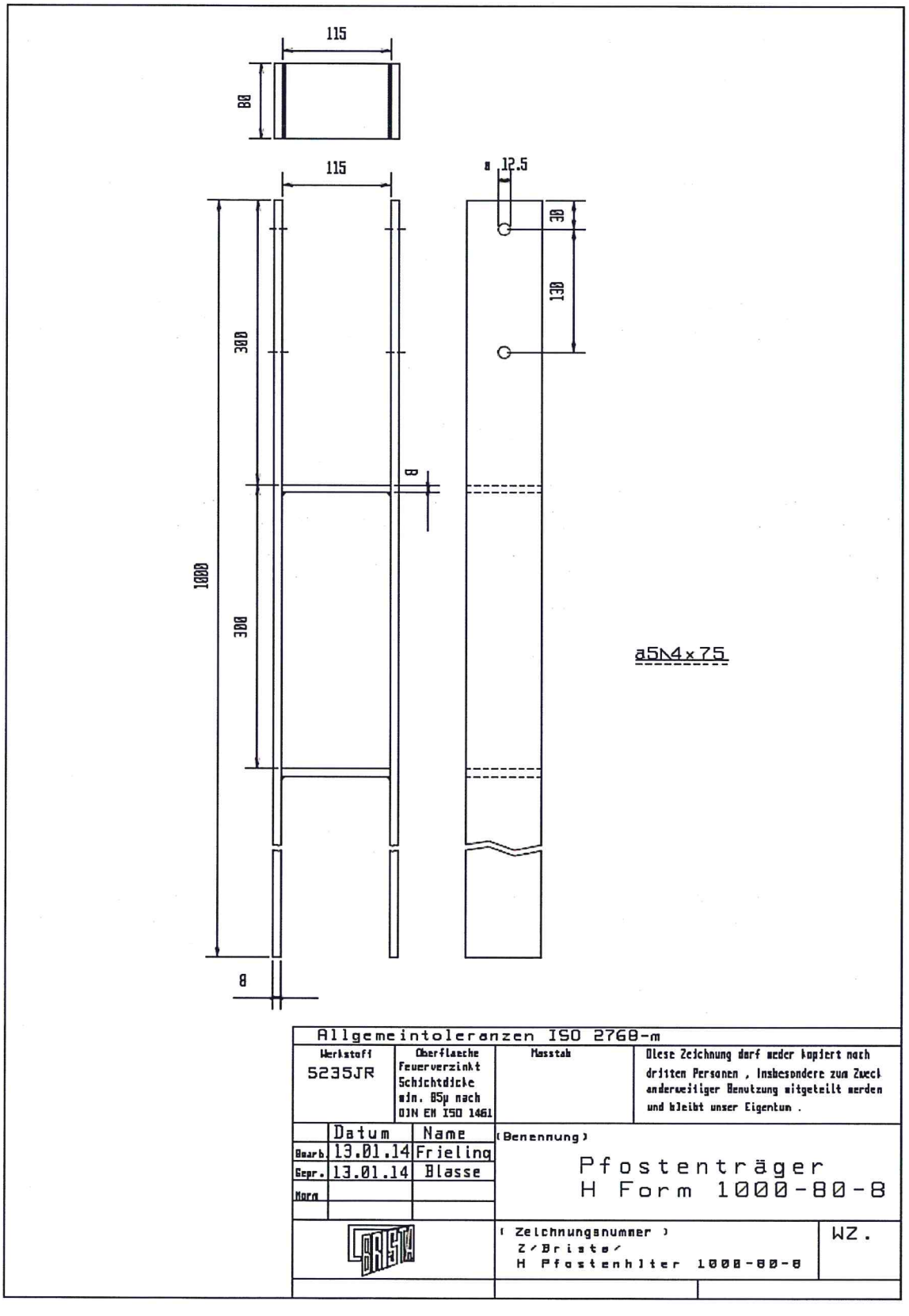
B.3 H-Shape 800-80-8

Art.-Nr. 001150, 001151, 003515



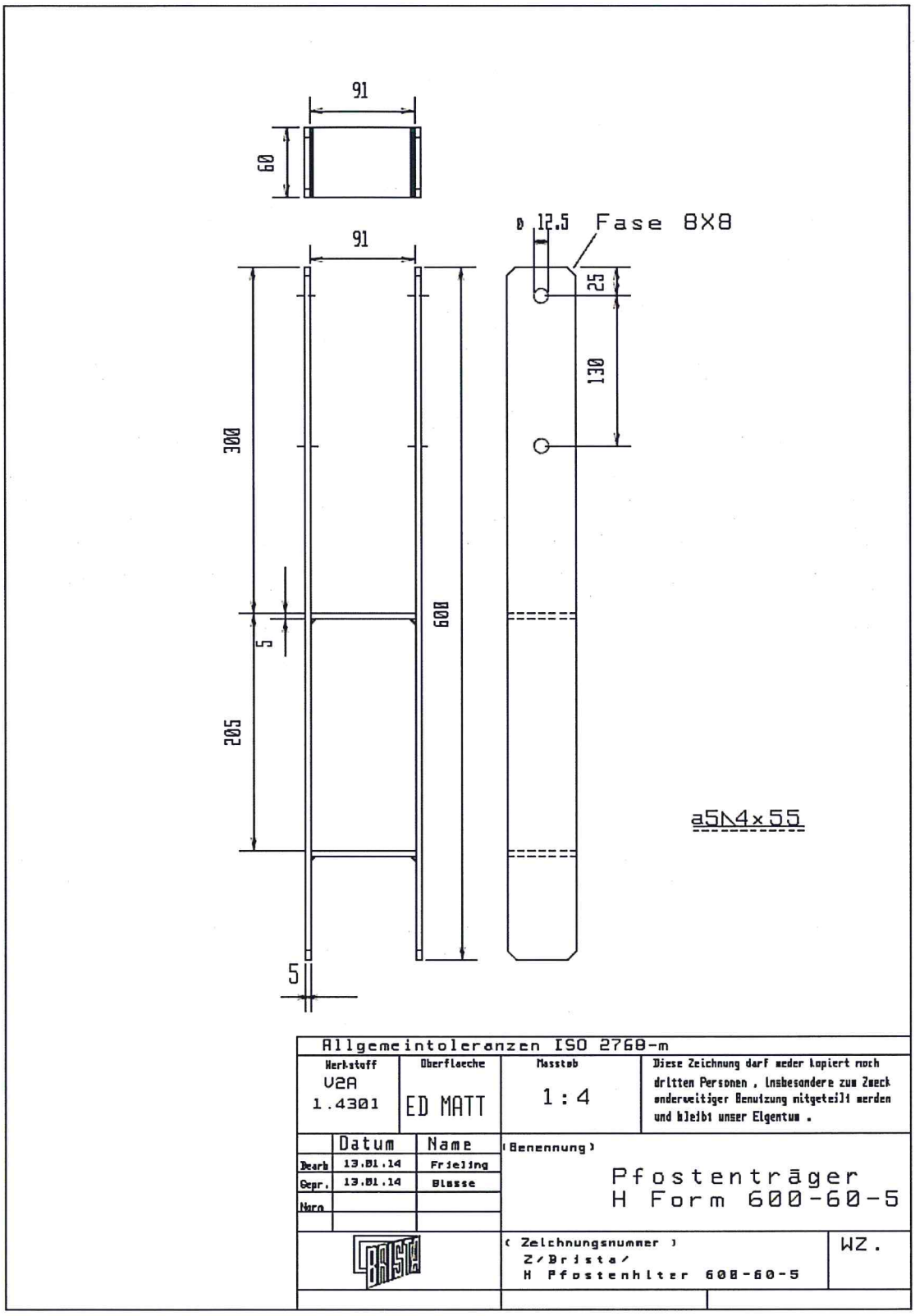
B.4 H-Shape 1000-80-8

Art.-Nr. 001129



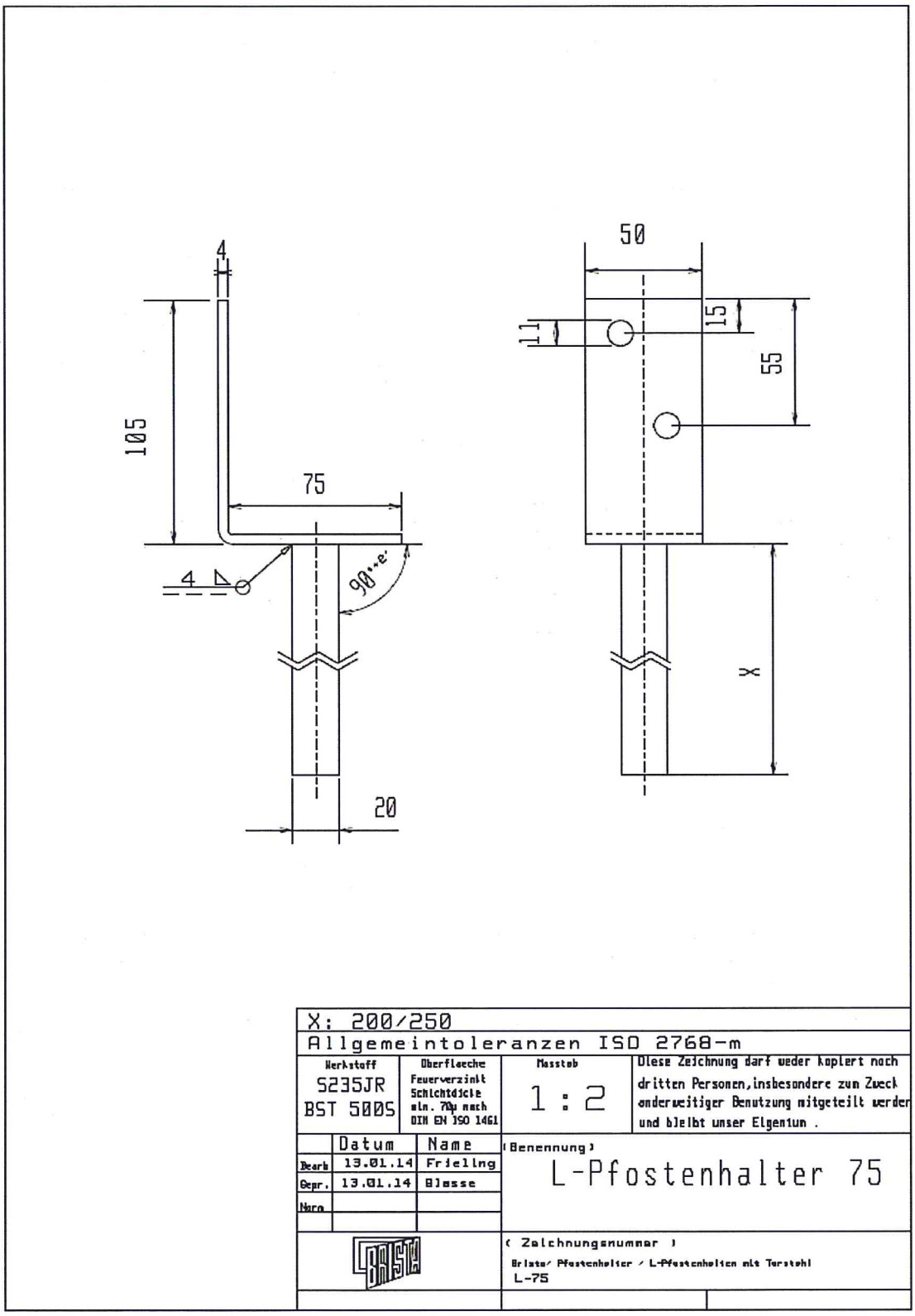
B.5 H-Shape 600-60-5 V2A

Art.-Nr. 001152



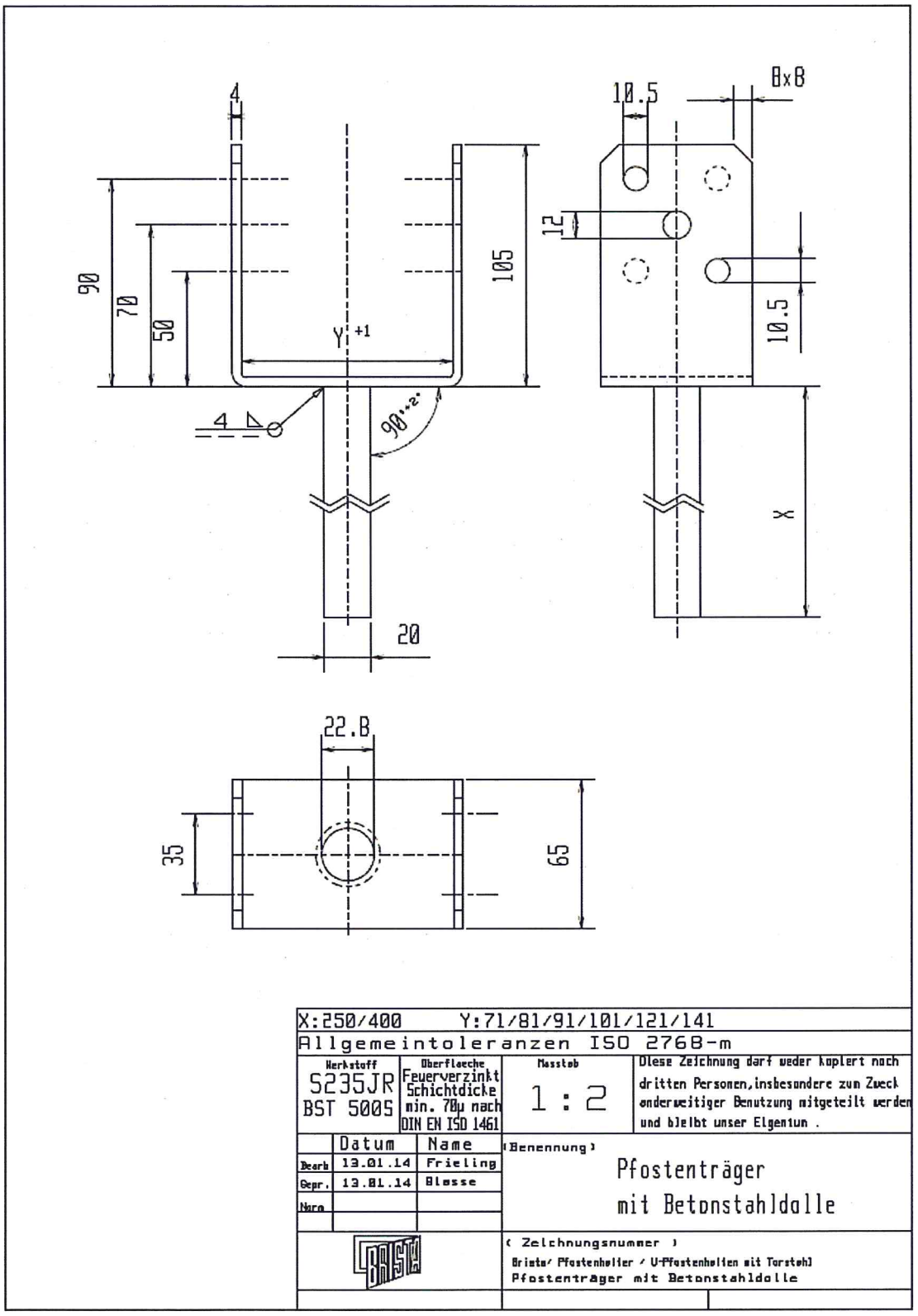
B.6 L-Shape

Art.-Nr. 001131, 002529



B.7 U-Shape h = 250 mm, h=400 mm

Art.-Nr. 001144, 001145, 001146, 001147, 002504, 001148, 001139, 001140, 002527, 0002528, 001141, 001142



X:250/400 Y:71/81/91/101/121/141			
Allgemeintoleranzen ISO 2768-m			
Werkstoff S235JR BST 500S	Oberflaeche Feuerverzinkt Schichtdicke min. 70µ nach DIN EN ISO 1461	Masstab 1 : 2	Diese Zeichnung darf weder kopiert noch dritten Personen, insbesondere zum Zweck anderweitiger Benutzung mitgeteilt werden und bleibt unser Eigentum .
	Datum	Name	(Benennung)
Bearb	13.01.14	Frieling	Pfostenträger mit Betonstahldolle
Gepr.	13.01.14	Blesse	
Norm			
BASTA			(Zeichnungsnummer) Briste/ Pfostenhalter / U-Pfostenhalter mit Torstahl Pfostenträger mit Betonstahldolle

B.8 post base to bolt down

Art.-Nr. 001171, 001172, 001173, 001174, 001176