Deutsches Institut für Bautechnik

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Approval body for construction products and types of construction

Bautechnisches Prüfamt

An institution established by the Federal and Laender Governments

Designated according to Article 29 of Regulation (EU) No 305/2011 and member of EOTA (European Organisation for Technical Assessment)

European Technical Assessment ETA-09/0228 of 21 June 2018

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	Cantilever step stair system Treppenmeister
Product family to which the construction product belongs	Prefabricated stair with steps made of solid wood and steel for use as an indoor stair in buildings
Manufacturer	Treppenmeister GmbH Emminger Straße 38 71131 Jettingen DEUTSCHLAND
Manufacturing plant	Treppenmeister, plant 1 to plant 85
This European Technical Assessment contains	12 pages including 3 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 340006-00-0506

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Specific Part

1 Technical description of the product

The Cantilever step stair system Treppenmeister is a prefabricated stair system, which consists of steps, steel section and fasteners.

The steps are made of solid wood (only hardwood) and they are connected with steel section, which is fixed on the wall side.

The product description is given in Annex A. The material values, dimensions and tolerances of the components of the stair not indicated in the annexes shall correspond to the values laid down in the technical documentation[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 stair is used in compliance with the specifications and conditions given in Annex B.

The verification and assessment methods on which this European Technical Assessment is based lead to the assumption of a working life of the stair 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.

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[1] The technical documentation comprises all information of the holder of this ETA necessary for the production, installation and maintenance of the stair; these are in particular the structural analysis, design drawings and the manufacturer's installation instructions. The part to be treated confidentially is deposited with Deutsches Institut für Bautechnik and, as far as this is relevant to the tasks of the approved bodies involved in the procedure of the AVCP system, shall be handed over to the approved body.

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
Load-bearing capacity of stair	See Annex C2
Load-bearing capacity of fixings	See technical documentation of this European Technical Assessment
Load/displacement behaviour	See Annex C2
Vibration behaviour	Walking on the stair does not result in vibration of the entire construction Deflection under a single load F = 1 kN: $w \leq 5$ mm
Prevention of progressive collapse	Failure of individual components of the stair does not lead to a progressive collapse of the complete stair
Residual load-bearing capacity	Local material failure does not lead to an abrupt total loss of load-bearing capacity of the stair
Long-term behaviour	Load-bearing capacity are ensured under an appropriate use and maintenance over the indicated working life
Resistance to earthquakes	No performance assessed
Durability against physical, chemical and biological agents	Adequate durability for the intended use under an appropriate use and maintenance

3.2 Safety in case of fire (BWR 2)

Essential characteristic	Performance
Reaction to fire	See Annex A3
Fire resistance	No performance assessed

3.3 Hygiene, health and the environment (BWR 3)

Essential characteristic	Performance
Release of formaldehyde	Wood adhesive does not contain formaldehyde
Release of pentachlorophenol	No pentachlorophenol treated materials are used
Radioactive emission	Not relevant

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3.4 Safety in use (BWR 4)

Essential characteristic	Performance
Geometry	See Annex C1
Slipperiness	No performance assessed
Equipment of the stair for a safe use	No performance assessed
Safe breakage of components	No brittle failure of individual components
Impact resistance	No performance assessed

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

In accordance with the European Assessment Document EAD No. 340006-00-0506 the applicable European legal act is: 1999/89/EC

The System to be applied is: 2+

In addition, with regard to reaction to fire for products covered by the European Assessment Document EAD No. 340006-00-0506 the applicable European legal act is: 2001/596/EC

The System to be applied is: 4

5 Technical details necessary for the implementation of the AVCP system, as provided for in the applicable European Assessment Document

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

Issued in Berlin on 21 June 2018 by Deutsches Institut für Bautechnik

Dr.-Ing. Lars Eckfeldt
p. p. Head of Department

beglaubigt:
Stiller

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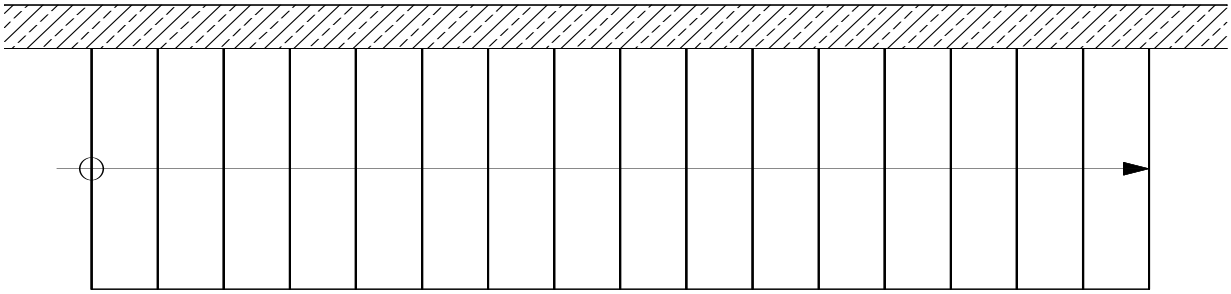
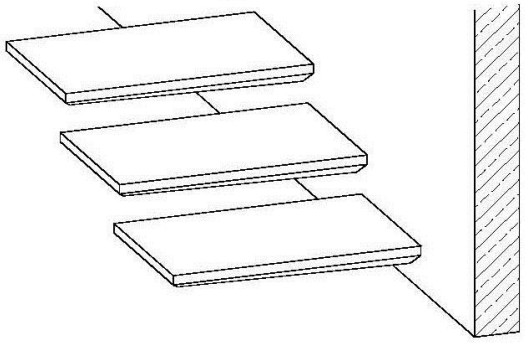
Type of plan

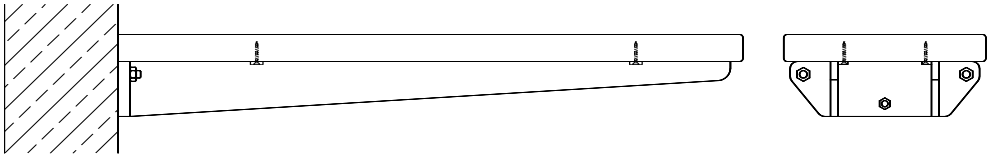
walking line is exemplified, position may be chosen freely within the walking zone,
walking zone is 20 % of the clear width of the stair in the middle of the stair



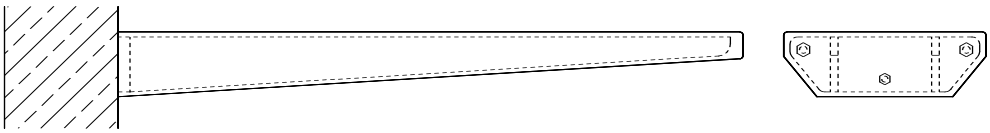
Construction



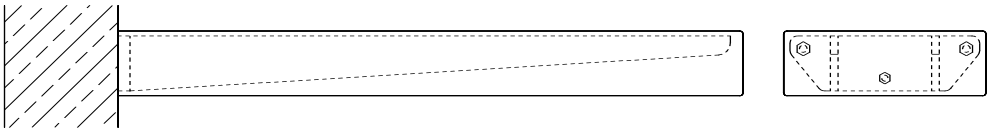
Types of construction



Saddle step



Tapered step



Solid cross section

Cantilever step stair system Treppenmeister	Annex A1
Product	

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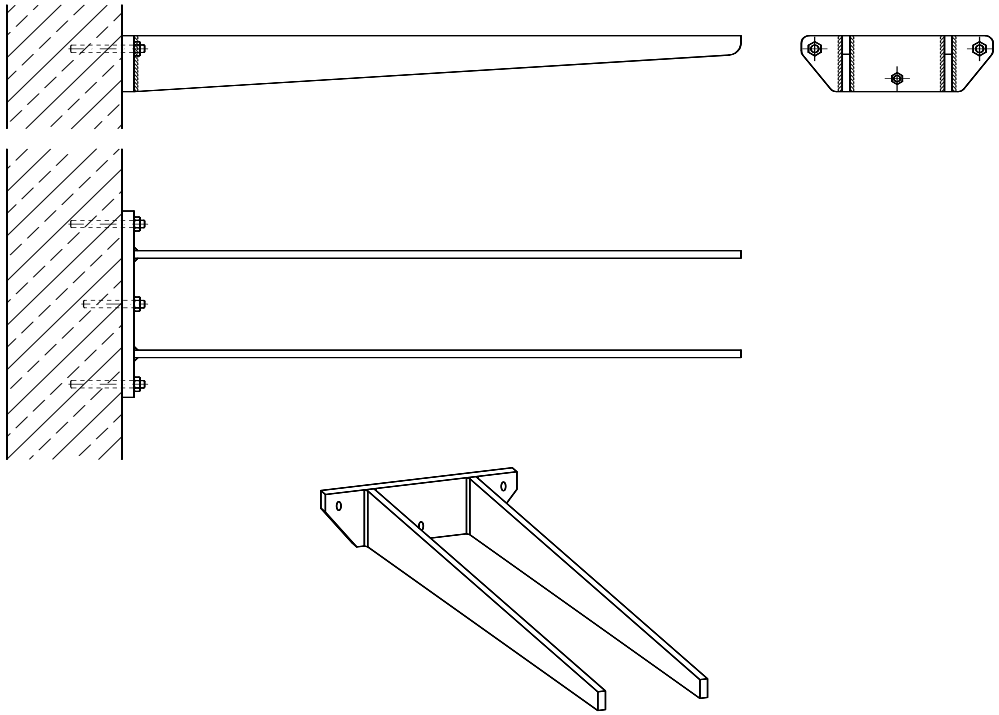
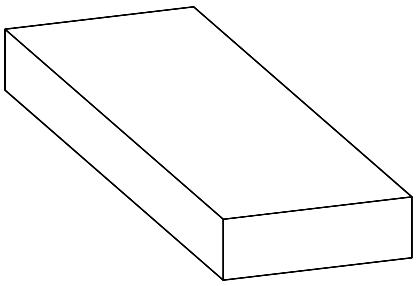
Steel construction [1)]

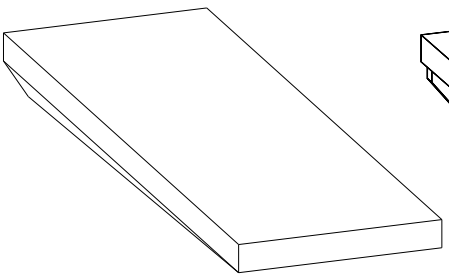


Steps (possible types) [1)]

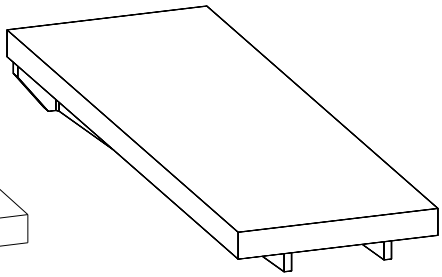
Solid cross section



Tapered step



Saddle step



[1)] more details (fasteners, geometry, welded joint, glued joint etc.) according to technical documentation

Cantilever step stair system Treppenmeister	**Annex A2**
Steel construction and steps	

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Table 1: Minimum dimensions of relevant stair components and reaction to fire

Component	Material[1)]	Dimension		Value	Reaction to fire
Step – steel section	Steel	- [3)]		- [3)]	A1
Step – solid cross section	Solid wood [2)]	Thickness	[mm]	106	D-s2, d0
Tapered step	Solid wood [2)]	Thickness	[mm]	48 … 106	D-s2, d0
Saddle step	Solid wood [2)]	Thickness	[mm]	44	D-s2, d0
Fastener	Steel	Diameter	[mm]	12	A1

1) Characteristic values of material according to technical documentation

2) Only hardwood of the following species:
Group 1: Amazakoué, Bangkirai, Bongossi, Beech, Oak, Ash, Iroko/Kambala, Merbau, Wengé, Zebrano
Group 2: Maple, Afzelia/Doussié, Acacia/Robinia, Birch, Bubinga, Cherry tree, Nut tree, Elm, Sapelli, Teak, Dibetou, Hevea

3) Geometry according to technical documentation

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Cantilever step stair system Treppenmeister

Mindestmaße wesentlicher Treppenteile und Brandverhalten Geometrie der Treppe

Annex A3

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Specification of intended use (Part 1)

Intended use:

- European Technical Assessment applies for a construction system.
- For the specific case of use the corresponding type of stair is manufactured within the context of the values defined in this European Technical Assessment.
- Values of this ETA applies to all types of stairs, the real dimensions follow in accordance with the relevant case of use.

Stair subject to:

- Static and quasi static loads

Use conditions:

- Indoor stair
- Air temperatures between +5 °C and +30 °C
- Relative air humidity between 30% and 70%
- To the individual requirements handrail and barrier can be attached to the stair optionally. Conditions for possible handrail/barrier:

  Dead load ≤ 0.15 kN/m

  Height ≤ 0.90 m

  Distance of baluster ≤ 1.00 m

Design:

- Design of the stair according to the annexes and the technical documentation of this European Technical Assessment.
- Fastening of the stair to the construction works according to the annexes and the technical documentation of this Technical European Assessment.
- Verification of the transmission of loads to the construction works by the civil engineer responsible for the construction works.
- Load bearing capacity at ultimate limit state:

  $q_k \cdot \gamma_Q \leq q_{Rk} / \gamma_M$

  $Q_k \cdot \gamma_Q \leq Q_{Rk} / \gamma_M$

  $h_k \cdot \gamma_Q \cdot \psi_0 \leq h_{Rk} / \gamma_M$

  with

  q_{Rk}, Q_{Rk}, $h_{Rk:}$ characteristic values of resistance; see Table 3

  γ_M: recommended material partial safety factor; see Table 3

  q_k, Q_k, h_k: characteristic values of imposed loads according to EN 1991-1-1:2002 + AC:2009

  $\gamma_Q = 1.5$: recommended partial safety factor, in absence of other national regulations

  $\psi_0 = 0.7$: recommended combination factor, in absence of other national regulations
- Maximum characteristic values of imposed loads under consideration of the partial factors mentioned above; see Table 5

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Cantilever step stair system Treppenmeister	Annex B1
Specification of intended use (Part 1)	

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Specification of intended use (Part 2)

Installation:

- Installation by personal appropriately trained and authorized by the manufacturer by means of the technical documentation of this European Technical Assessment
- Installation only in the way as specified in the technical documentation of this European Technical Assessment
- Installation of timber components when moisture content of timber components is 8 ± 2 %
- Sufficient support of the stair when assembling
- Installation of stair components without imposed deformations
- Installation of stair components without significant defects and cracks
- Replacing of stair components, which begin tearing when assembling
- Bolted connection are protected such that they will not be loosened by vibrations

Indication of the manufacturer:

- Ensure that all persons involved will be appropriately informed about the specific conditions according to sections 1 and 2 (including the annexes to which reference is being made as well as the not confidential parts of the technical documentation deposited to this European Technical Assessment)
- Packaging of timber components such that the wood moisture is 8 ± 2 % during transport and storage
- Instructions for use should provide information as to use, maintenance and repair of the stair. Including the information of avoidance of moisture penetration of the timber components and the information on the relationship between moisture content of timber components, air temperature and relative air humidity

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Cantilever step stair system Treppenmeister	Annex B2
Specification of intended use (Part 2)	

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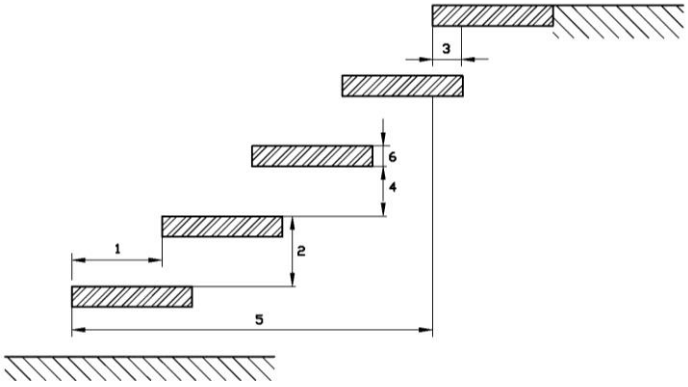
Table 2: Geometry

Designation			Dimension	
			Minimum	Maximum
Going		[mm]	210	370 [2]
Rise of the stairs [1]		[mm]	140 [2]	210
Pitch of the walking line [1]		[°]	21	45
Overlap of the steps		[mm]	30	- [3]
Number of rises		[-]	- [3]	
Openings	between stairs and wall	[mm]	0	0
	between consecutive steps	[mm]	- [3]	166
Clear width of stairs		[mm]	500	1000
Minimum headroom		[mm]	- [3]	
Length of the flight		[mm]	- [3]	4160
Thickness of steps		[mm]	44	- [3]

1) Values are constant within one flight
2) Tolerance between nominal value and actual value = ± 5 mm
3) Not relevant



1 Going
2 Rise
3 Overlap
4 Opening between consecutive steps
5 Length of the flight
6 Thickness of steps

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Cantilever step stair system Treppenmeister	Annex C1
Geometry of the stair	

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Table 3: Load-bearing capacity – Characteristic values of resistance

Type of loading	Characteristic values of resistance			γ_M [1)]
vertical variable uniformly distributed load	$q_{R,k}$	[kN/m²]	5.0	1.1
vertical variable single load	$Q_{R,k}$	[kN]	3.3	
horizontal variable uniformly distributed load on barrier	$h_{R,k}$	[kN/m]	0.6	

[1)] Recommended partial safety factor, in absence of other national regulations

Table 4: Deflections under loading

Deflection of the step under single point load			
single load	Q_k	[kN]	2.0
clear width of the stair	L	[mm]	1000
deflection under load F_S related to the clear width of the stair	w	[-]	≤ L/150

Table 5: Imposed loads

Type of loading	Imposed loads		
vertical variable uniformly distributed load	q	[kN/m²]	3.0
vertical variable single load	Q	[kN]	2.0
horizontal variable uniformly distributed load on barrier	h	[kN/m]	0.5

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Cantilever step stair system Treppenmeister

Load-bearing capacity – Characteristic values of resistance,
Deflections under loading,
Imposed loads

Annex C2