

Approval body for construction products
and types of construction

Bautechnisches Prüfamt

An institution established by the Federal and
Laender Governments



European Technical Assessment

ETA-09/0195
of 4 March 2024

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

WE1- and WE2-Stair System Hasler

Product family
to which the construction product belongs

Prefabricated stair kits

Manufacturer

Hasler Treppentechnik AG
Ober Au 28
9487 GAMPRIN-BENDERN
FÜRSTENTUM LIECHTENSTEIN

Manufacturing plant

Hasler Treppentechnik Plant 1 - 99

This European Technical Assessment
contains

16 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

This version replaces

ETA-09/0195 issued on 16 February 2016

European Technical Assessment

ETA-09/0195

English translation prepared by DIBt

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Specific Part

1 Technical description of the product

The WE1- and WE2-Stair System Hasler is a prefabricated stair system, which consists of steps, load-bearing bolts and wall ties. The stair can also be formed as a folded plate stair by additional risers.

The steps of the WE1-Stair are connected with each other by a load-bearing bolt on the wall-free side. The steps of the WE2-Stair are connected with each other by a load-bearing bolt on the wall-free side and on the wall side. In case of the folded plate style there are three load-bearing bolts at least inside of the riser. On the wall side each step is equipped with two wall ties, which are anchored in the staircase wall. Alternatively, to the support by wall ties a stringer can be used. In the area of openings in the staircase wall a steel beam (wall-replacement-beam according to Annex A4) can be used.

The steps and risers are made of solid wood, the load-bearing bolts are made of steel and solid wood, the fasteners and wall ties are made of steel.

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 documentation¹.

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.

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 <ul style="list-style-type: none"> - Load-bearing capacity of the stair - Load-bearing capacity of components of the stair - Load-bearing capacity of fixings 	Q_{Rk} , q_{Rk} and h_{Rk} : See Annex C2 H_{Rk} : No performance assessed M_{Rk} , V_{Rk} , N_{Rk} , E , G , f_{mk} and f_{vk} : See technical documentation of this European Technical Assessment See technical documentation of this European Technical Assessment
Load-Displacement behaviour	w_q and w_Q : See Annex C2
Vibration behaviour	First natural frequency: $f_1 \geq 5$ Hz Deflection under a single load $F = 1$ kN: $w_{Q1} \leq 5$ 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, 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 A6
Resistance to fire	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 contained
Radioactive emission	No performance assessed

3.4 Safety in use (BWR 4)

Essential characteristic	Performance
Geometry	See Annex C1
Slipperiness	No performance assessed
Safety equipment	No performance assessed
Safe breakage	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.

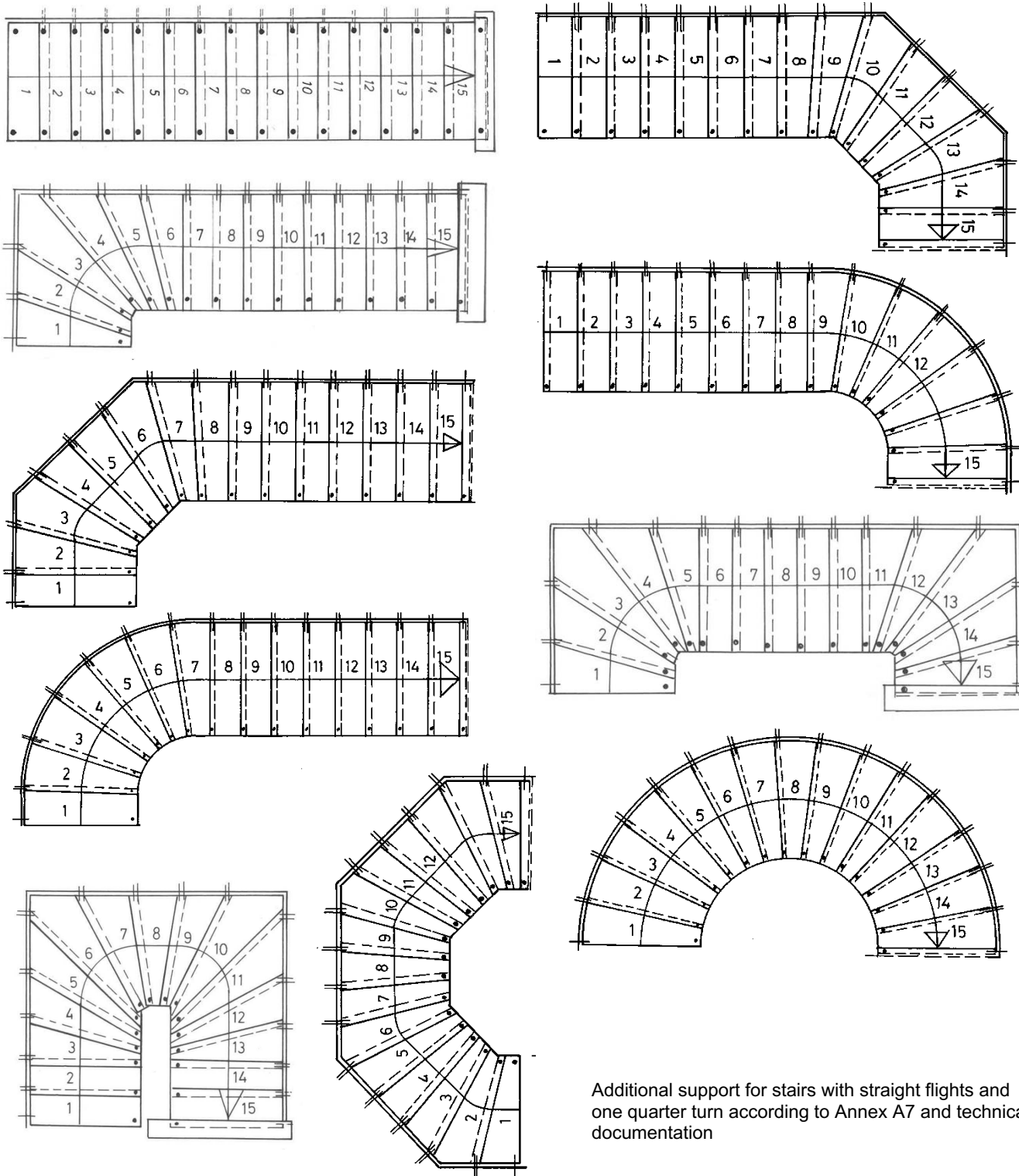
Issued in Berlin on 4 March 2024 by Deutsches Institut für Bautechnik

Dipl.-Ing. Beatrix Wittstock
Head of Section

beglaubigt:
Stiller

Types of plan (Part 1)

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



Additional support for stairs with straight flights and one quarter turn according to Annex A7 and technical documentation

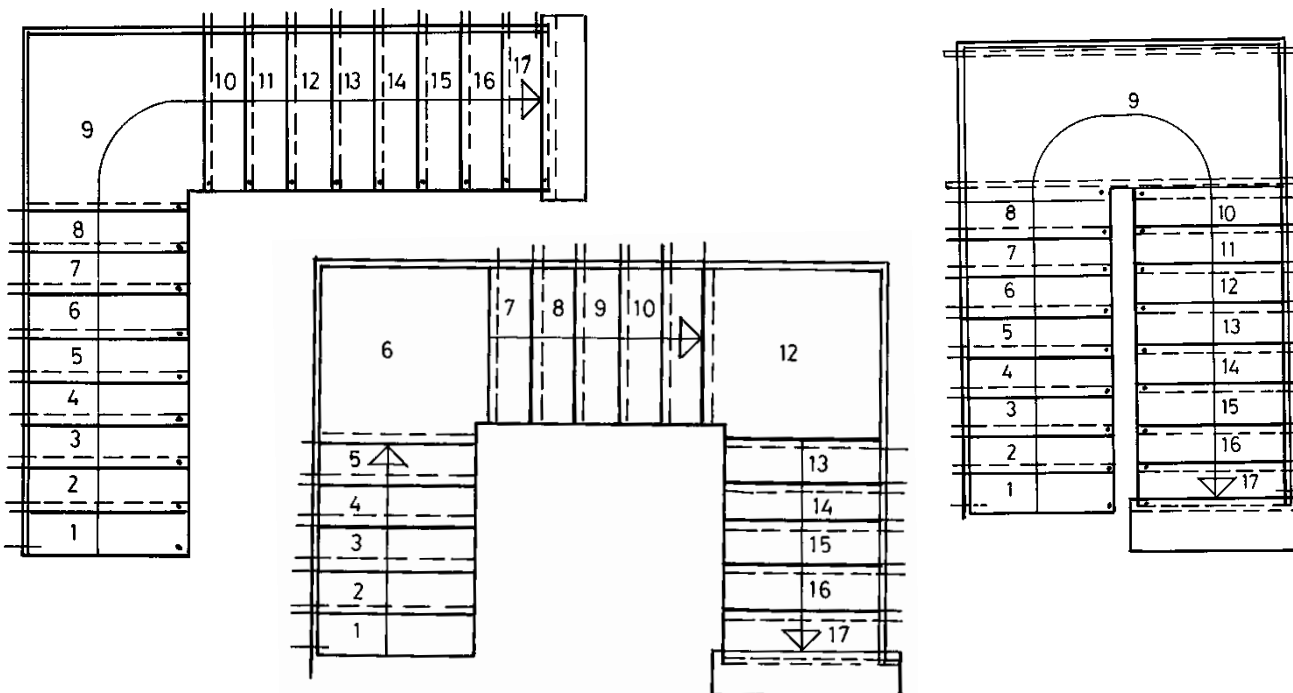
WE1- and WE2-Stair System Hasler

Annex A1

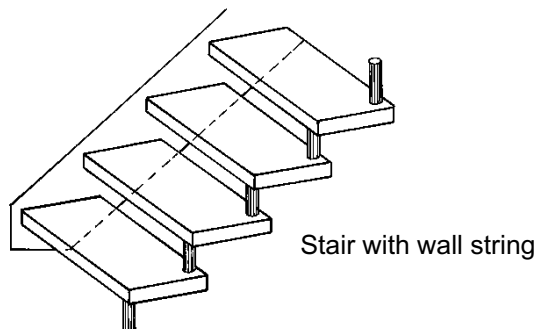
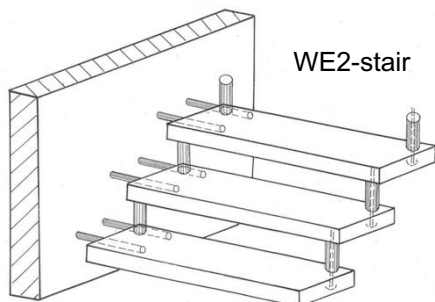
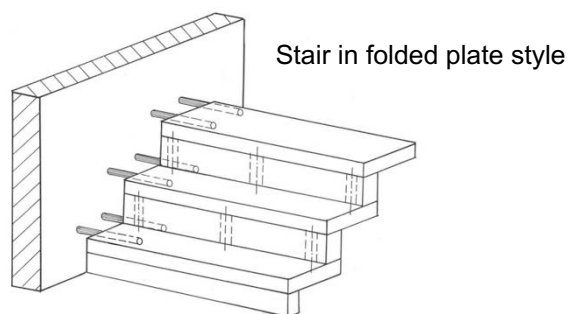
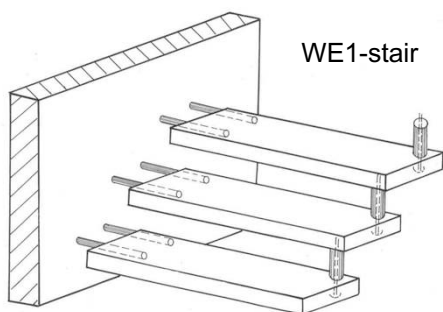
Types of plan (Part 1)

Types of plan (Part 2)

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



Types of construction

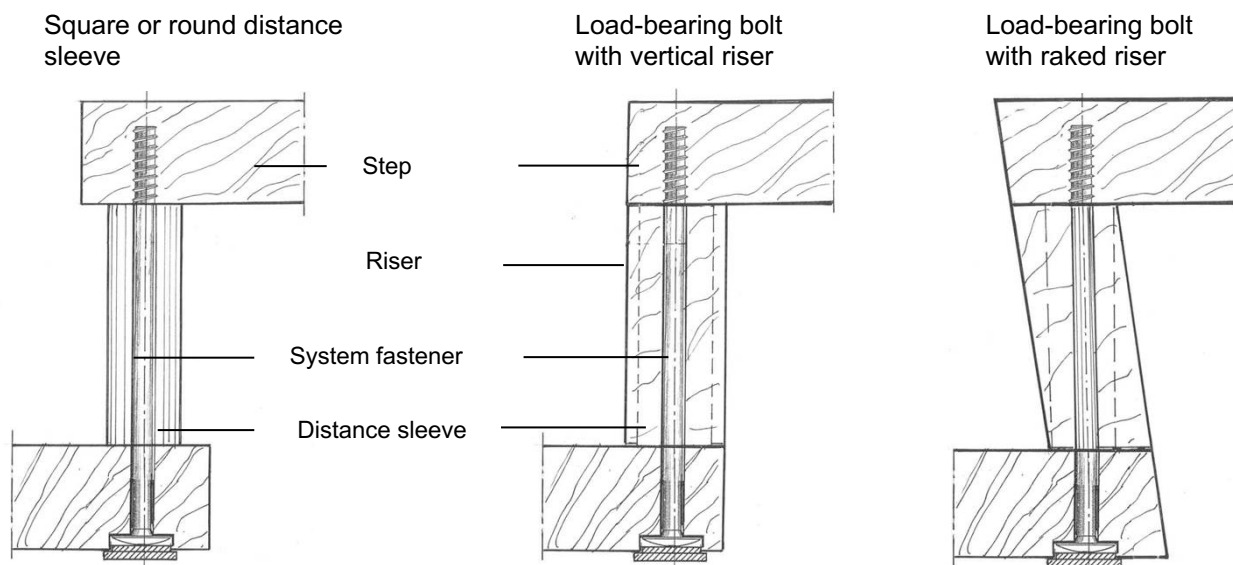


WE1- and WE2-Stair System Hasler

Types of plan (Part 2), Types of construction

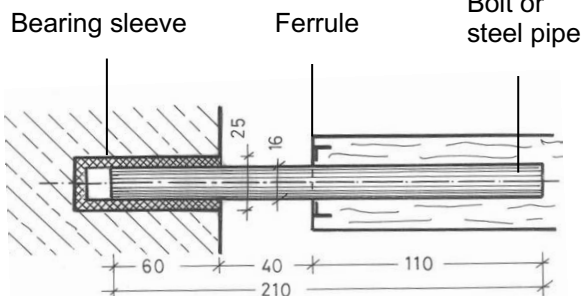
Annex A2

Load-bearing bolts

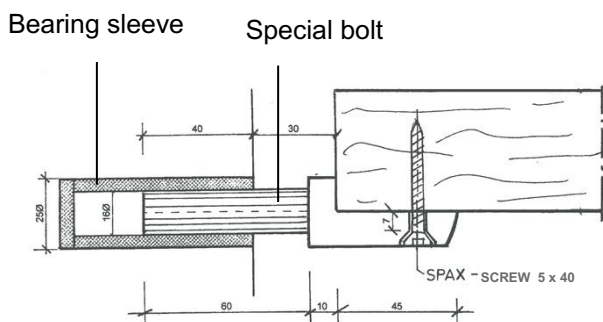
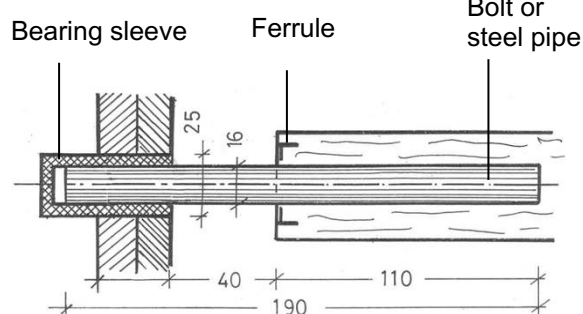


Wall ties

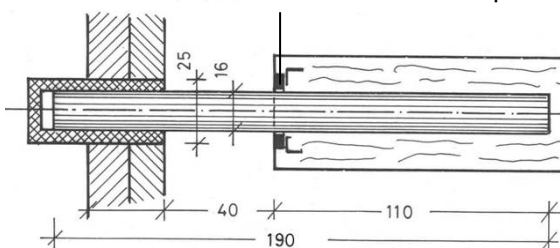
Masonry or concrete



OSB-Plate



Steps made of wood species oak, ash, nut tree, merbau: with additional steel plate

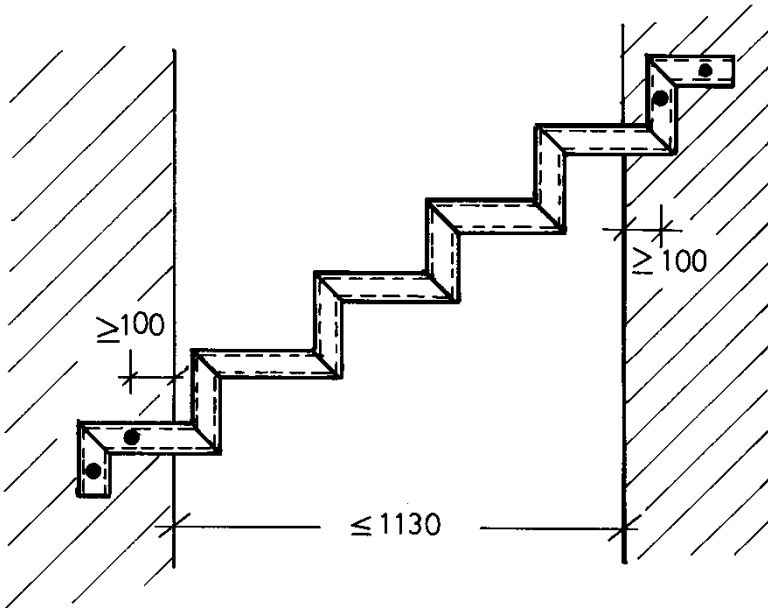


WE1- and WE2-Stair System Hasler

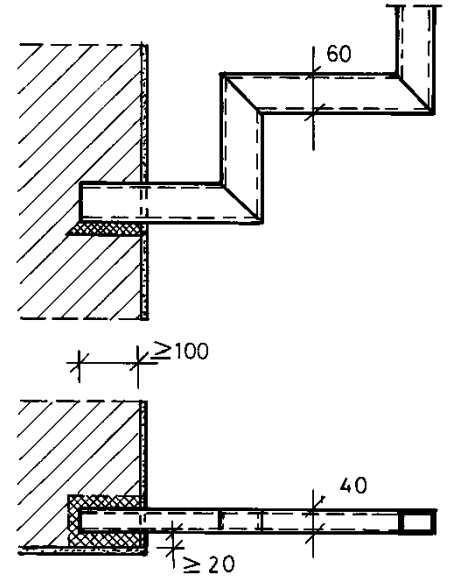
Load-bearing bolts and wall ties

Annex A3

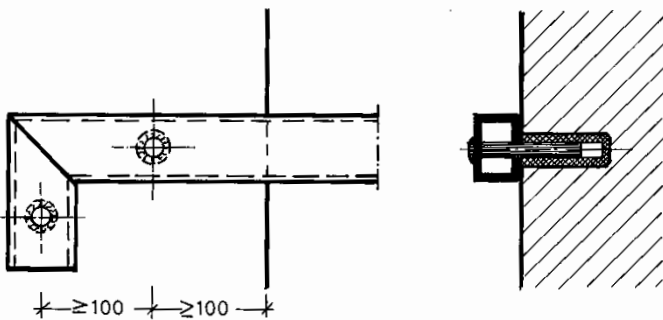
Wall-replacement-beam made of steel



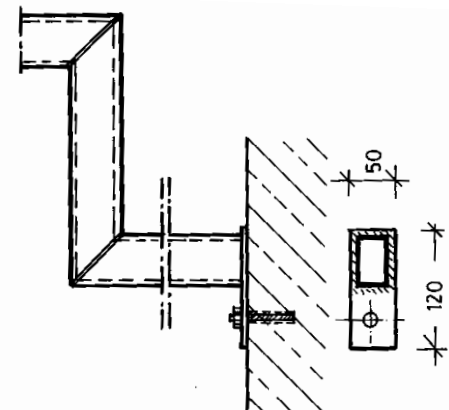
Support Type A



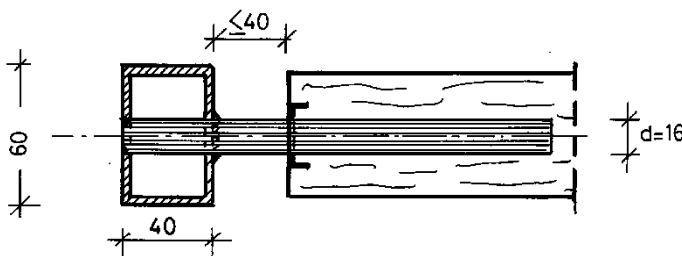
Support Type B



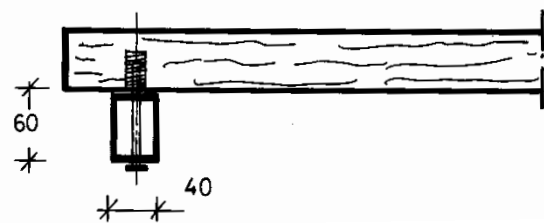
Support Type C



Step - beam - joint (bolt)



Step - beam - joint (screwed)



more details according to the technical documentation

all dimensions in mm

WE1- and WE2-Stair System Hasler

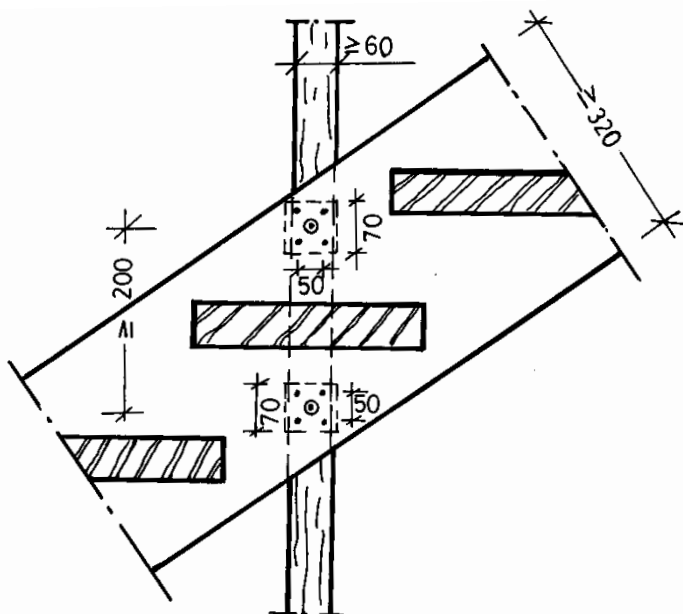
Wall replacement beam made of steel

Annex A4

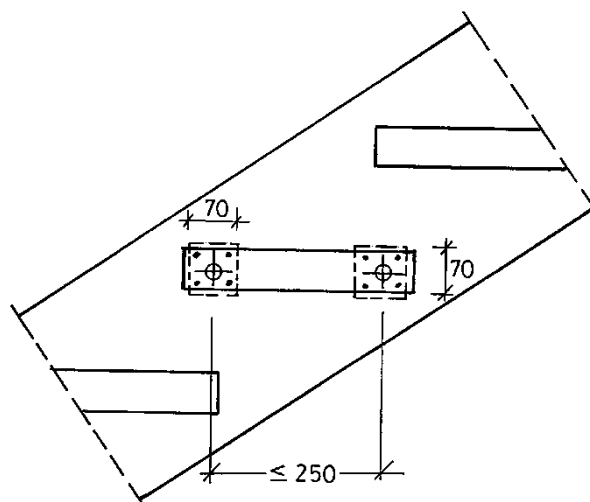
Wall string made of wood

Connection to wall with distance $e \leq 800$ mm

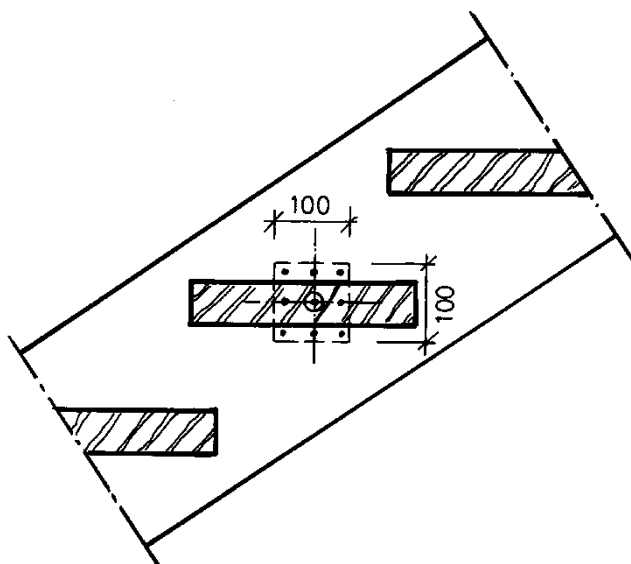
Connection at wood frame wall



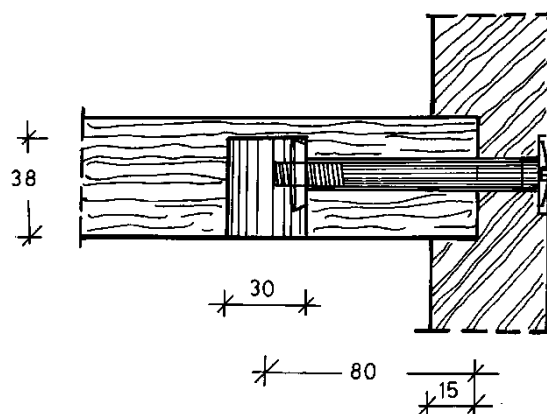
Connection at masonry wall



Connection at concrete wall



Step - string - joint



more details according to the technical documentation

all dimensions in mm

WE1- and WE2-Stair System Hasler

Wall string made of wood

Annex A5

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

Component	Material ¹⁾	Dimension		Value	Reaction to fire
steps, risers	solid wood ²⁾	thickness	[mm]	54 ³⁾	D-s2, d0
load-bearing bolt / system fastener	steel	diameter	[mm]	10	A1
load-bearing bolt - distance sleeve	solid wood ²⁾	diameter	[mm]	45 or 50	D-s2, d0
		cross section a x b	[mm]	50 x 50	
wall tie	round steel or steel pipe	diameter	[mm]	16	A1
		diameter x wall thickness	[mm]	16 x 2,0	
		embedment depth wall	[mm]	60 (32) ⁴⁾	
		embedment depth wall (special bolt)	[mm]	40	
		embedment depth step	[mm]	110	
wall replacement beam	steel hollow section	height / width / wall thickness	[mm]	60 / 40 / 4	A1
wall string	solid wood ²⁾	height / width	[mm]	320 / 45	D-s2, d0
landing beam	solid wood ²⁾	- ⁵⁾	-	- ⁵⁾	D-s2, d0
	steel hollow section	- ⁵⁾	-	- ⁵⁾	A1
bearing sleeve (wall tie)	plastics	diameter	[mm]	25	not relevant

- 1) characteristic values of material according to technical documentation
 2) only hardwood of the following species: beech, oak, maple, acacia, nut tree, ash, merbau
 3) thicknesses of steps for type of plan G and V depending on additional support (according to Table 2 and 3)
 4) value in brackets for OSB-wall
 5) according to technical documentation

WE1- and WE2-Stair System Hasler

Minimum dimensions of relevant stair components and reaction to fire

Annex A6

Table 2: Minimum dimensions of thickness of steps of stairs with straight flights depending on additional support

Thickness of steps	Number of rises without support				Stair in folded plate style
	WE1-stair with distance sleeve		WE2-stair with distance sleeve		
	Ø 50 mm	50 x 50 mm	Ø 50 mm	50 x 50 mm	
58 mm	7	9	10	11	11
62 mm	8	9	11	12	13
68 mm	8	9	13	14	16
72 mm	-	-	-	16	16
74 mm	-	-	16	16	16

Table 3: Minimum dimensions of thickness of steps of stairs with one quarter turn depending on additional support

Thickness of steps	Number of rises without support					
	WE1-stair with distance sleeve			WE2-stair with distance sleeve		
	Ø 45 mm	Ø 50 mm	50 x 50 mm	Ø 45 mm	Ø 50 mm	50 x 50 mm
54 mm	-	-	-	-	14	16
58 mm	12	13	13	-	14	16
60 mm	-	-	-	-	-	16
62 mm	-	-	13	-	16	16
63 mm	-	-	-	-	16	16
66 mm	-	-	-	16	16	16
72 mm	-	-	14	16	16	16

WE1- and WE2-Stair System Hasler

Annex A7

Minimum dimensions of thickness of steps of stairs with straight flights and quarter turn

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 apply to all types of stairs according to Annex A1 and A2; 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 $\leq 0,15$ kN/m
 - Height $\leq 1,00$ m
 - Distance of baluster $\leq 0,85$ 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 5

γ_M : recommended material partial safety factor; see Table 5

q_k , Q_k , h_k : characteristic values of imposed loads according 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 7

WE1- and WE2-Stair System Hasler

Specification of intended use (Part 1)

Annex B1

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 $8 \pm 2 \%$
- 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 connections 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 $8 \pm 2 \%$ 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 retightens the bolting of the load-bearing bolts and connections according to Annexes A3 to A5 after the first heating season and the information on the relationship between moisture content of timber components, air temperature and relative air humidity

WE1- and WE2-Stair System Hasler

Specification of intended use (Part 2)

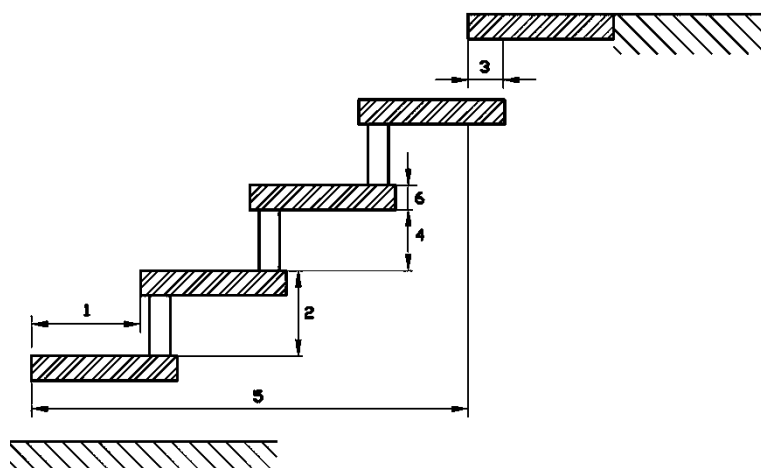
Annex B2

Table 4: Geometry

Designation			Dimension	
			minimum	maximum
going	step on walking line ¹⁾	[mm]	210	370 ²⁾
	tapered step	[mm]	60 ^{2) 3)}	540 ^{2) 4)}
rise of the stairs ¹⁾		[mm]	140 ²⁾	210
pitch of the walking line ¹⁾		[°]	21	45
overlap of the steps	Wall side	[mm]	30 ⁶⁾	- ⁵⁾
	Wall free side	[mm]	70 ⁶⁾	- ⁵⁾
number of rises		[-]	3	16 (18) ⁸⁾
openings	between stairs and wall	[mm]	- ⁵⁾	40 (30) ⁷⁾
	between consecutive steps	[mm]	- ⁵⁾	156
clear width of stairs		[mm]	500	1000
minimum headroom		[mm]	- ⁵⁾	
length of the flight		[mm]	- ⁵⁾	4050
thickness of steps		[mm]	54	- ⁵⁾

- 1) values are constant within one flight
- 2) tolerance between nominal value and actual value = ± 5 mm
- 3) inside of tapered step
- 4) outside of tapered step
- 5) not relevant
- 6) with riser overlap 20 mm
- 7) values in brackets for wall ties with special bolt
- 8) values in brackets for stairs with landing

- 1 going
- 2 rise
- 3 overlap
- 4 opening between consecutive steps
- 5 length of the flight
- 6 thickness of steps



WE1- and WE2-Stair System Hasler

Geometry of the stair

Annex C1

Table 5: Load-bearing capacity - Characteristic values of resistance

Component	Type of loading	Characteristic values of resistance			γ_M
Flight	vertical variable uniformly distributed load	q_{Rk}	[kN/m ²]	6,8	1,5 ¹⁾
	vertical variable single load	Q_{Rk}	[kN]	4,5	
	horizontal variable uniformly distributed load on barrier	h_{Rk}	[kN/m]	0,8	
Wall-replacement-beam / Landing beam	vertical variable uniformly distributed load	q_{Rk}	[kN/m ²]	5,0	1,1 ²⁾
	vertical variable single load	Q_{Rk}	[kN]	3,3	
	horizontal variable uniformly distributed load on barrier	h_{Rk}	[kN/m]	0,6	

1) Recommended partial safety factor (wood decisive), in absence of other national regulations

2) Recommended partial safety factor (steel decisive), in absence of other national regulations

Table 6: Deflections under loading

Deflection of the flight under uniformly distributed load			
uniformly distributed load	q_k	[kN/m ²]	3,0
length of the median line of the flight	L	[mm]	4050 ¹⁾
deflection under load F_S related to the median line of the flight	w_q	[mm]	≤ L/200
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_Q	[mm]	≤ L/200

1) with additional support according to Annex A7, l = reference length = distance between supports

Table 7: Imposed loads

Type of loading	Imposed loads		
vertical variable uniformly distributed load	q_k	[kN/m ²]	3,0
vertical variable single load	Q_k	[kN]	2,0
horizontal variable uniformly distributed load on barrier	h_k	[kN/m]	0,5

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

Annex C2