Deutsches Institut für Bautechnik

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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-20/0887 of 8 February 2021

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	TILCA Wedge Anchor BL / BS
Product family to which the construction product belongs	Mechanical fastener for use in concrete
Manufacturer	EFCO Befestigungstechnik AG Grabenstraße 1 8606 NÄNIKON SCHWEIZ
Manufacturing plant	Werk 1, Deutschland
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 330232-00-0601

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Specific Part

1 Technical description of the product

The TILCA Wedge Anchor BL / BS is an anchor made of galvanised steel which is placed into a drilled hole and anchored by torque-controlled expansion.

The product description is given in Annex A.

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 anchor is used in compliance with the specifications and conditions given in Annex B.

The verifications and assessment methods on which this European Technical Assessment is based lead to the assumption of a working life of the anchor 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
Characteristic resistance to tension load (static and quasi-static loading)	See Annex B3 and C1
Characteristic resistance to shear load (static and quasi-static loading)	See Annex C2
Displacements (static and quasi-static loading)	See Annex C3
Characteristic resistance and displacements for seismic performance categories C1 and C2	No performance assessed
Durability	See Annex B1

3.2 Safety in case of fire (BWR 2)

Essential characteristic	Performance
Reaction to fire	Class A1
Resistance to fire	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 330232-00-0601 the applicable European legal act is: [96/582/EC].

The system to be applied is: 1

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 with Deutsches Institut für Bautechnik.

Issued in Berlin on 8 February 2021 by Deutsches Institut für Bautechnik

Dipl.-Ing. Beatrix Wittstock
Head of Section

beglaubigt:
Baderschneider

Deutsches Institut für Bautechnik DIBt

TILCA Wedge Anchor BL / BS

Installation condition

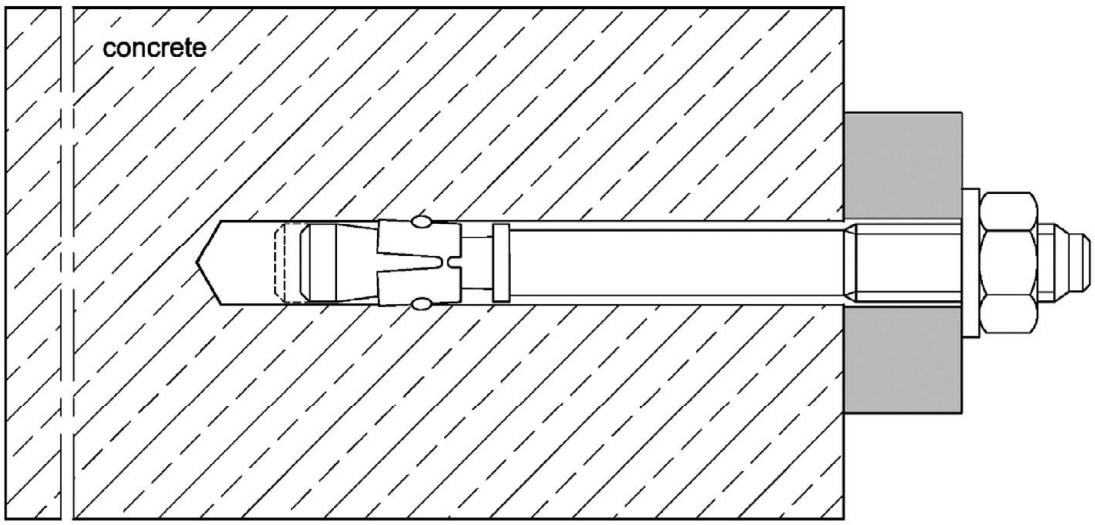
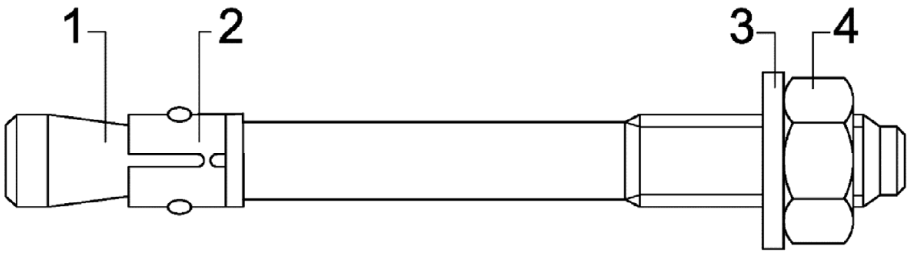


Table A1: Designation and materials

Part	Designation	Material electroplated ≥ 5 µm, acc. to EN ISO 4042:2018
1	Conical bolt	Cold formed steel
2	Expansion sleeve	Steel
3	Washer	Steel
4	Hexagon nut	Steel, property class 8



TILCA Wedge Anchor BL / BS	Annex A1
Product description Installation situation and materials	

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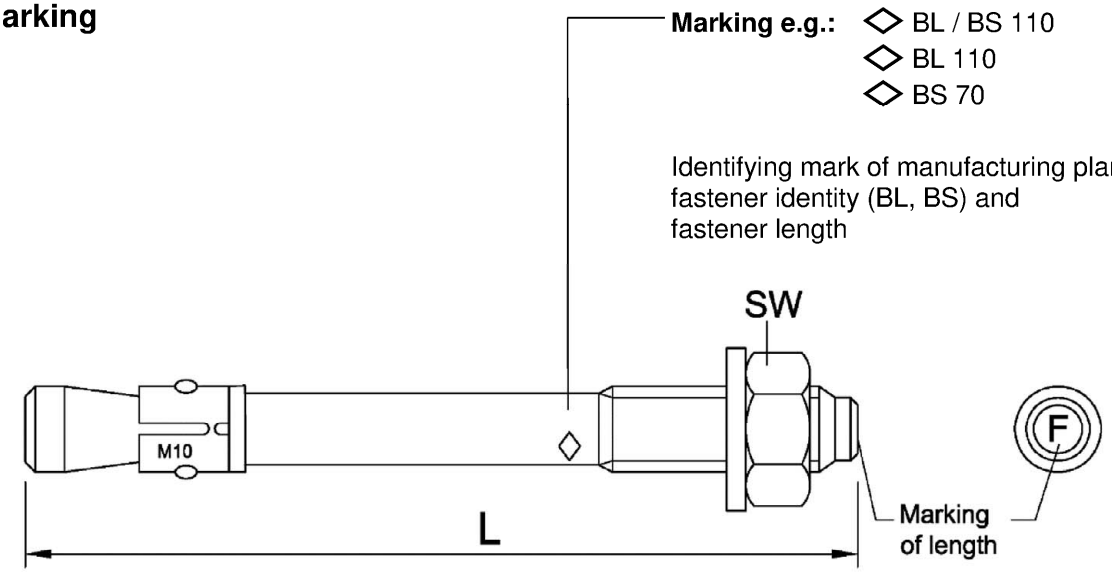
Marking



Marking of length	A	B	C	D	E	F	G	H	I	J	K	L	M
Length of fastener min ≥	38,1	50,8	63,5	76,2	88,9	101,6	114,3	127,0	139,7	152,4	165,1	177,8	190,5
Length of fastener max <	50,8	63,5	76,2	88,9	101,6	114,3	127,0	139,7	152,4	165,1	177,8	190,5	203,2

Marking of length	N	O	P	Q	R	S	T	U	V	W	X	Y	Z
Length of fastener min ≥	203,2	215,9	228,6	241,3	254,0	279,4	304,8	330,2	355,6	381,0	406,4	431,8	457,2
Length of fastener max <	215,9	228,6	241,3	254,0	279,4	304,8	330,2	355,6	381,0	406,4	431,8	457,2	483,0

Dimensions in mm

Table A2: Dimensions

Fastener size	Fastener length L		Wrench size [SW]
	Standard anchorage depth	Reduced anchorage depth	
M8	t_{fix} + 66,5	$t_{fix\ hef,red}$ + 52,5	13
M10	t_{fix} + 74,0	$t_{fix\ hef,red}$ + 66,0	17
M12	t_{fix} + 97,5	$t_{fix\ hef,red}$ + 82,5	19
M16	t_{fix} + 121,0	$t_{fix\ hef,red}$ + 104,0	24

TILCA Wedge Anchor BL / BS

Product description
Marking, dimensions and materials

Annex A2

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Specifications of intended use

TILCA Wedge Anchor	BL				BS			
	M8	M10	M12	M16	M8	M10	M12	M16
Static or quasi-static action	✓				✓			
Uncracked concrete	✓				✓			
Standard anchorage depth	✓				-			
Reduced anchorage depth	✓				✓			

Base materials:

- Compacted, reinforced or unreinforced normal weight concrete (without fibers) according to EN 206:2013 + A1:2016
- Strength classes C20/25 to C50/60 according to EN 206:2013 + A1:2016

Use conditions (Environmental conditions):

- Structures subject to dry internal conditions

Design:

- Fastenings are designed under the responsibility of an engineer experienced in anchorages and concrete work.
- Verifiable calculation notes and drawings are prepared taking account of the loads to be anchored. The position of the anchor is indicated on the design drawings (e.g. position of the anchor relative to reinforcement or to supports, etc.).
- Design according to EN 1992-4:2018 and Technical Report TR 055

Installation:

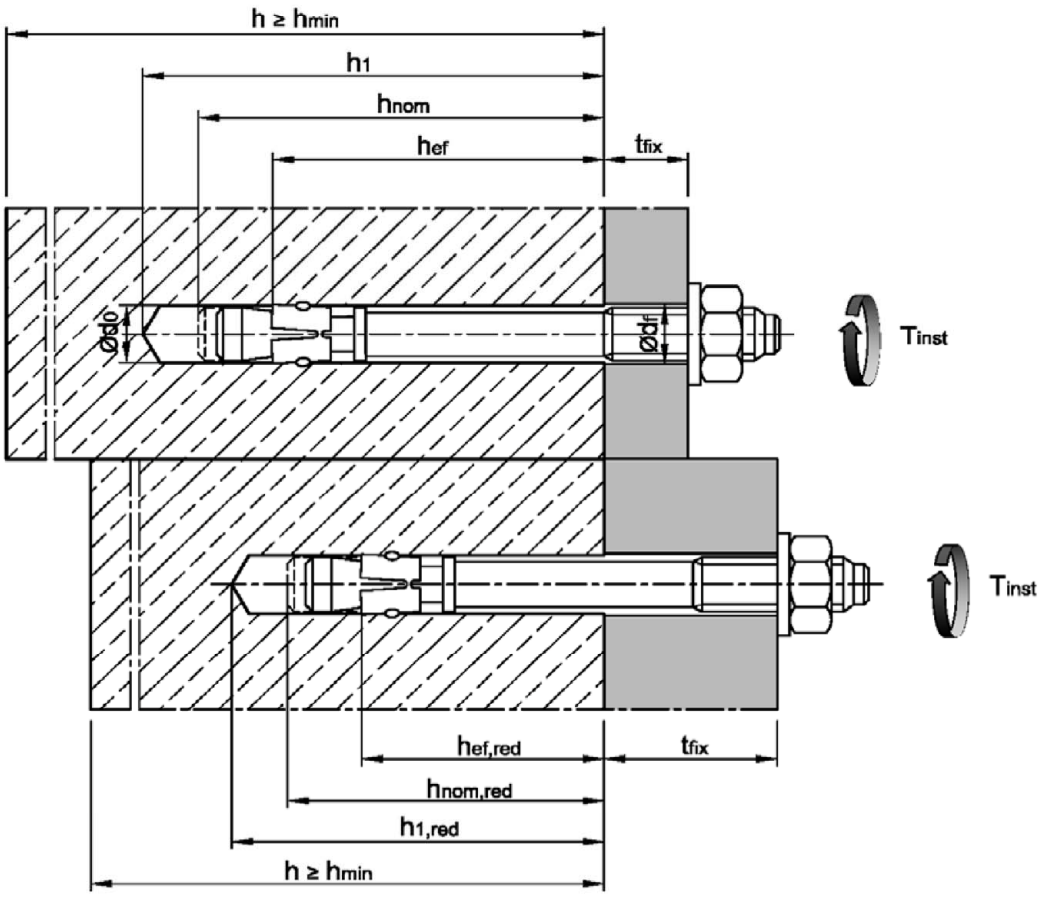
- Drilling by hammer drill bit or vacuum drill bit
- For anchorages with embedment depth h_{ef} < 40mm, the use is restricted to anchorages of statically indeterminate non-structural systems

TILCA Wedge Anchor BL / BS	Annex B1
Intended use Specifications	

Deutsches Institut für Bautechnik DIBt

Table B1: Installation parameters

Fastener size			M8	M10	M12	M16
Nominal drill hole diameter	d_0 =	[mm]	8	10	12	16
Cutting diameter of drill bit	$d_{cut} \leq$	[mm]	8,45	10,45	12,50	16,50
Diameter of clearance hole in the fixture	$d_f \leq$	[mm]	9	12	14	18
Installation torque	T_{inst} =	[Nm]	15	30	50	100
Standard anchorage depth						
Effective anchorage depth	$h_{ef} \geq$	[mm]	44	48	65	82
Depth of drill hole	$h_1 \geq$	[mm]	65	70	90	110
Embedment depth	$h_{nom} \geq$	[mm]	56	62	82	102
Reduced anchorage depth						
Effective anchorage depth	$h_{ef,red} \geq$	[mm]	30	40	50	65
Depth of drill hole	$h_{1,red} \geq$	[mm]	50	60	75	95
Embedment depth	$h_{nom,red} \geq$	[mm]	42	54	67	85



TILCA Wedge Anchor BL / BS

Intended use
Installation data

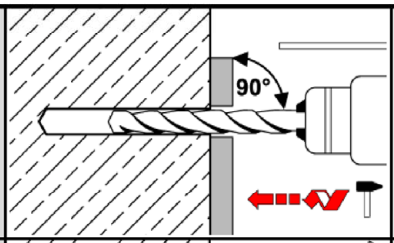
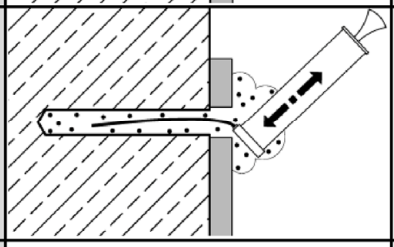
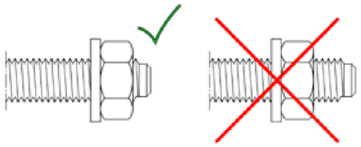
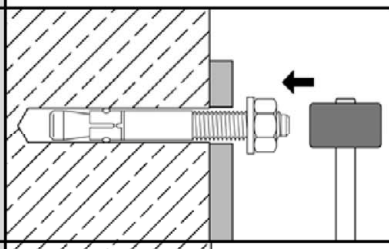
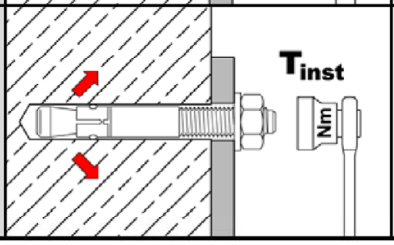
Annex B2

Deutsches Institut für Bautechnik DIBt

Table B2: Minimum spacing and edge distances

Fastener size			M8	M10	M12	M16
Minimum member thickness	h_{min}	[mm]	100	100	130	170
Minimum spacing	s_{min}	[mm]	40	55	75	90
Minimum edge distance	c_{min}	[mm]	45	65	90	105

Installation instructions

1		Drill hole perpendicular to concrete surface by hammer drill bit or vacuum drill bit. If using a vacuum drill bit, proceed with step 3.
2		Blow out dust. Alternatively vacuum clean down to the bottom of the hole.
3		Check position of nut.
4		Drive in anchor, such that h_{ef} or $h_{ef,red}$ is met.
5		Apply installation torque T_{inst} as specified in Table B1.

TILCA Wedge Anchor BL / BS

Intended use
Minimum spacing and edge distances, Installation instructions

Annex B3

Deutsches Institut für Bautechnik DIBt

Table C1: Characteristic values for **tension loads**

Fastener size			**M8**	**M10**	**M12**	**M16**
Installation factor	γ_{inst}	[-]	1,0			
Steel failure						
Characteristic resistance	$N_{Rk,s}$	[kN]	18,1	30,4	41,6	84,0
Partial factor	γ_{Ms}	[-]	1,5			
Pull-out						
Characteristic resistance in uncracked concrete C20/25 (**Standard** anchorage depth)	$N_{Rk,p}$	[kN]	12	14	32	38
Characteristic resistance in uncracked concrete C20/25 (**Reduced** anchorage depth)	$N_{Rk,p}$	[kN]	7,5	10	19	26
Increasing factor for $N_{Rk,p}$	ψ_C	[-]	$\left(\frac{f_{ck}}{20}\right)^{0,5}$			
Splitting						
Characteristic resistance in uncracked concrete C20/25	$N^0_{Rk,sp}$	[kN]	min [$N_{Rk,p}$; $N^0_{Rk,c}$]			
Spacing	$s_{cr,sp}$	[mm]	3 h_{ef}			
Edge distance	$c_{cr,sp}$	[mm]	1,5 h_{ef}			
Concrete cone failure						
Effective anchorage depth (**Standard** anchorage depth)	$h_{ef} \geq$	[mm]	44	48	65	82
Effective anchorage depth (**Reduced** anchorage depth)	$h_{ef,red} \geq$	[mm]	30 [1)]	40	50	65
Spacing	$s_{cr,N}$	[mm]	3 h_{ef}			
Edge distance	$c_{cr,N}$	[mm]	1,5 h_{ef}			
Factor for uncracked concrete	$k_{ucr,N}$	[-]	11,0			
Factor for cracked concrete	$k_{cr,N}$	[-]	No performance assessed			

[1)] Use restricted to internal exposure and statically indeterminate structural components, when in case of failure the load may be distributed to other fasteners

TILCA Wedge Anchor BL / BS

Performance
Characteristic values for **tension loads**

Annex C1

Deutsches Institut für Bautechnik DIBt

Table C2: Characteristic values for **shear loads**

Fastener size			**M8**	**M10**	**M12**	**M16**
Installation factor	γ_{inst}	[-]	1,0			
Steel failure without lever arm						
Characteristic shear resistance	$V^0_{Rk.s}$	[kN]	10,3	16,2	23,6	44,0
Partial factor	γ_{Ms}	[-]	1,25			
Ductility factor	k_7	[-]	1,0			
Steel failure with lever arm						
Characteristic bending resistance	$M^0_{Rk.s}$	[Nm]	21	42	73	186
Partial factor	γ_{Ms}	[-]	1,25			
Concrete pry-out failure						
Pry-out factor for $\mathbf{h_{ef}}$ (**Standard** anchorage depth)	k_8	[-]	1,0	1,0	2,0	2,0
Pry-out factor for $\mathbf{h_{ef,red}}$ (**Reduced** anchorage depth)	k_8	[-]	1,0	1,0	1,0	2,0
Concrete edge failure						
Effective length of fastener in shear loading for $\mathbf{h_{ef}}$ (**Standard** anchorage depth)	l_f	[mm]	44	48	65	82
Effective length of fastener in shear loading for $\mathbf{h_{ef\ red}}$ (**Reduced** anchorage depth)	$l_{f,red}$	[mm]	30 [1)]	40	50	65
Outside diameter of fastener	d_{nom}	[mm]	8	10	12	16

[1)] Use restricted to internal exposure and statically indeterminate structural components, when in case of failure the load may be distributed to other fasteners

TILCA Wedge Anchor BL / BS

Performance
Characteristic values for **shear loads**

Annex C2

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Table C3: Displacements under **tension load**

Fastener size			**M8**	**M10**	**M12**	**M16**
Tension load	N	[kN]	5,71	6,67	12,29	17,38
Displacement	δ_{N0}	[mm]	0,32	0,18	0,64	1,81
	$\delta_{N\infty}$	[mm]	3,65			

Table C4: Displacements under **shear load**

Fastener size			**M8**	**M10**	**M12**	**M16**
Shear load	V	[kN]	5,86	9,28	13,49	25,12
Displacement	δ_{V0}	[mm]	1,70	1,02	1,75	1,93
	$\delta_{V\infty}$	[mm]	2,55	1,53	2,63	2,90

TILCA Wedge Anchor BL / BS

Performance
Displacements

Annex C3