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**European Technical Assessment Body
for construction products**



European Technical Assessment

**ETA-20/0768
of 26 June 2026**

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

WDB-08, WDB-10, WDB-12

Product family
to which the construction product belongs

Mechanical fasteners for use in concrete

Manufacturer

Klimas Wkret-met Sp. z o.o.
Kuznica Kiedrzynska
ul. Wincentego Witosa 170/176
42-233 MYKANÓW
POLEN

Manufacturing plant

Plant 4

This European Technical Assessment
contains

20 pages including 3 annexes which form an integral part
of this assessment

This European Technical Assessment is
issued in accordance with Article 95(4) of
Regulation (EU) 2024/3110, on the basis of

EAD 330232-02-0601

This version replaces

ETA-20/0768 issued on 25 November 2020

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Specific Part

1 Technical description of the product

The concrete screw WDB of sizes 8, 10 and 12 is an anchor made of galvanized and stainless steel. The anchor is screwed into a predrilled cylindrical drill hole. The special thread of the anchor cuts an internal thread into the member while setting. The anchorage is characterised by mechanical interlock in the special thread.

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, C1 and C2
Characteristic resistance to shear load (static and quasi-static loading)	See Annex C4
Displacements (static and quasi-static loading)	See Annex C3 and C5
Stiffness	No performance assessed
Characteristic resistance for seismic performance categorie C1	See Annex C6 and C7
Characteristic resistance and displacements for seismic performance categorie C2	No performance assessed

3.2 Safety in case of fire (BWR 2)

Essential characteristic	Performance
Reaction to fire	Class A1
Resistance to fire	See Annex C8 and C9

3.3 Aspects of durability linked with the Basic Works Requirements

Essential characteristic	Performance
Durability	See Annex B1

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

In accordance with European Assessment Document EAD No. 330232-02-0601 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

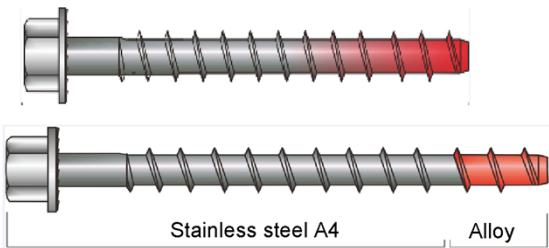
Technical details necessary for the implementation of the AVCP system are laid down in the control plan deposited at Deutsches Institut für Bautechnik.

Issued in Berlin on 26 June 2026 by Deutsches Institut für Bautechnik

Dipl.-Ing. Beatrix Wittstock
Head of Section

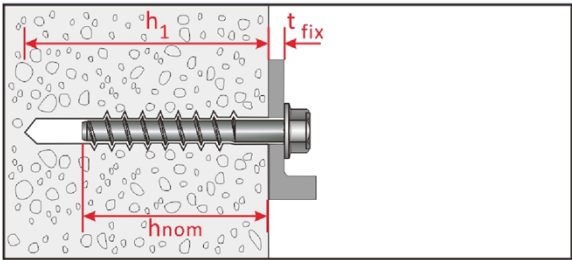
beglaubigt:
Tempel

Product in the installed condition

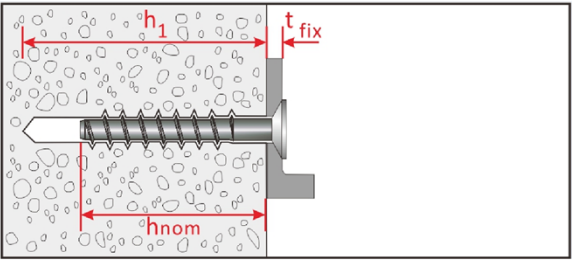


Steel 10B21

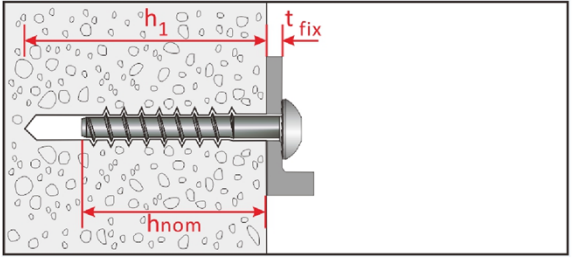
Stainless steel A4



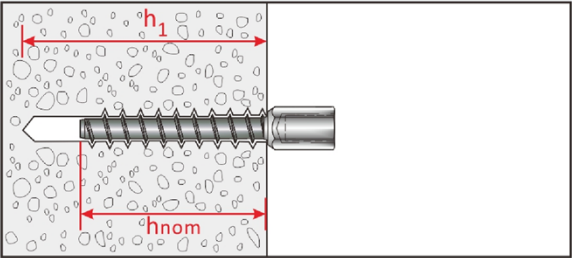
Hexagon Head : WDB-LS, WDB-LSF
10B21 (WDB8, WDB10, WDB12)
A4 (WDB8, WDB10, WDB12)



Countersunk Head : WDB-LP
10B21 (WDB8, WDB10)
A4 (WDB8, WDB10)



Pan Head : WDB-LG
10B21 (WDB8, WDB10)
A4 (WDB8, WDB10)



Hanger Bolt : WDB-GW
A4 (WDB10-M12)

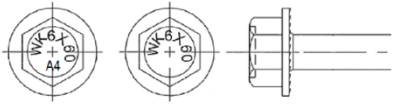
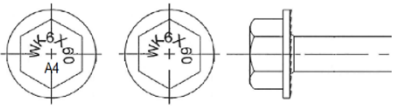
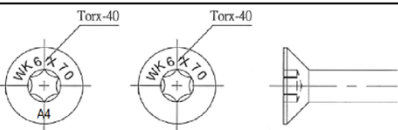
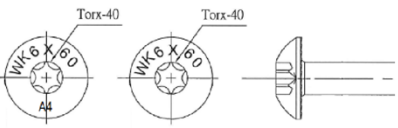
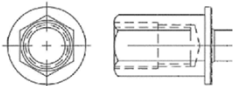
WDB-08, WDB-10, WDB-12

Product description
Installed condition

Annex A1

Table A1: Materials and screw types

Name	Material											
Screw fastener	Head marking		material									
	WDB		Steel 10B21 acc. to SAE-J403 zinc coating: electroplated (> 5 μm) or mechanical plated (> 30 μm) (only head type –LS and –LSF)									
	WDB A4		Stainless steel 1.4401, 1.4404 (both A4)									
Fastener size / head types			WDB 8			WDB 10			WDB 12			
			-LS -LSF -LP -LG	-LS -LSF -LG	-LP -LG	-LS -LSF -LP -LG	-LS -LSF -GW	-LP -LG	-LS -LSF			
			Material		10B21	A4		10B21	A4		10B21	A4
			Characteristic yield strength		f _{yk}	N/mm ²	780	640	432	750	640	432
Characteristic tensile strength		f _{uk}	N/mm ²	870	800	540	850	800	540	850	800	
Elongation at rupture		As	[%]	≤ 8								

	Hexagon washer head 1) WDB-LS size 8,10,12 (10B21 steel) 2) WDB-LS A4 size 8,10,12 (stainless A4)
	Hexagon washer head 3) WDB-LSF size 8,10,12 (10B21 steel) 4) WDB-LSF A4 size 8,10,12 (stainless A4)
	Countersunk head 5) WDB-LP size 8,10 (10B21 steel) 6) WDB-LP A4 size 8,10 (stainless A4)
	Pan head 7) WDB-LG size 8,10 (10B21 steel) 8) WDB-LG A4 size 8,10 (stainless A4)
	Hanger Bolt head 9) WDB-GW A4 size 10 with M12 internal thread (stainless A4)

WDB-08, WDB-10, WDB-12

Product description
Materials and screw types

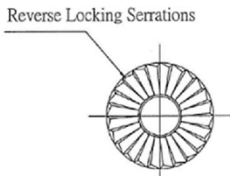
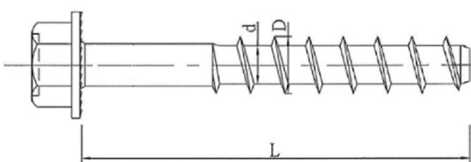
Annex A2

Table A2: Dimensions and markings

Fastener size			WDB 8				WDB 10				WDB 12	
Head type			LS, LSF, LG		LP		LS, LSF, LG, GW		LP		LS, LSF	
Material			10B21	A4	10B21	A4	10B21	A4	10B21	A4	10B21	A4
Embedment depth	h_{nom}	[mm]	65	85	65	85	75	100	75	100	95	120
	min L	[mm]	70	90	75	95	80	105	85	110	100	125
Length of fastener	max L	[mm]	150				150				150	
Thread diameter	D	[mm]	9,9				12,5				14,3	
Shaft diameter	d	[mm]	7,4				9,4				11,3	
Thread pitch	p	[mm]	5,8				7,7				8,1	

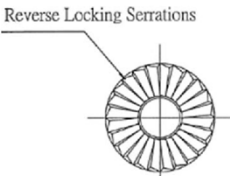
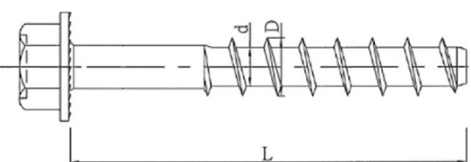
Steel
10B21

Head marking:
Identifying mark of
producer: WK
Nominal size: e.g. 8mm,
Length L: e.g. 70mm



Stainless
Steel
A4

Head marking:
Identifying mark of
producer: WK
Nominal size: e.g. 8mm,
Length L: e.g. 70mm
Material: A4



WDB-08, WDB-10, WDB-12

Product description
Dimensions and markings

Annex A3

Specifications of Intended use

Anchorage subject to:

- Static and quasi-static loads
- Seismic action for performance category C1
- Fire exposure

Base materials:

- Compacted reinforced or unreinforced normal weight concrete without fibres according to EN 206:2013 + A2:2021
- Strength classes C20/25 to C50/60 according to EN 206:2013 + A2:2021
- Cracked and uncracked concrete.

Use conditions (Environmental conditions)

- Anchorages subject to dry internal conditions. (zinc plated steel and stainless steel)
- For all other conditions corresponding to corrosion resistance classes CRC according to EN 1993-1-4:2006 + A1:2015:
 - Stainless steel according to Annex A2, screw with marking A4: CRC III

Design:

- Anchorages 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.).
- Anchorages are designed in accordance with EN 1992-4:2018 and Technical Report TR 055, Edition February 2018.

Installation:

- Hammer drilling only.
- Anchor installation carried out by appropriately qualified personnel and under the supervision of the person responsible for technical matters of the site.
- In case of aborted hole: new drilling at a minimum distance away of twice the depth of the aborted hole or smaller distance if the aborted hole is filled with high strength mortar and if under shear or oblique tension load it is not the direction of the load application.
- After installation further turning of the anchor shall not be possible.
- The head of the anchor must be fully engaged on the fixture and show no signs of damage.

WDB-08, WDB-10, WDB-12

Intended Use
Specifications

Annex B1

Table B1: Installation parameters (Steel 10B21)

Fastener size			WDB 8			WDB 10			WDB 12
Head type			LS LSF	LP	LG	LS LSF	LP	LG	LS LSF
Material			Steel 10B21						
Diameter of drill bit	d ₀	[mm]	8			10			12
Embedment depth	h _{nom}	[mm]	65			75			95
Min. hole depth in concrete	h ₁ ≥	[mm]	75			85			105
Effective embedment depth	h _{ef}	[mm]	50,6			58,1			75,4
Clearance hole in the fixture	d _f	[mm]	11			13			15
Thickness of fixture	t _{fix}	[mm]	5-85	10-85	5-85	5-75	10-75	5-75	5-55
Installation torque	T _{inst}	[Nm]	40	- ¹⁾	- ¹⁾	60	- ¹⁾	- ¹⁾	80
Wrench size (types: LS, LSF)	WS	[mm]	13	-	-	17	-	-	19
Torx size (types: LP, LG)	TX	-	-	45		-	50		-
Max. power output, machine setting	T _{max} ≤	[Nm]	185	120	120	350	120	120	350

1) For the installation of the LP and LG head types only impact screw driver can be used.

Table B2: Installation parameters (Stainless Steel A4)

Fastener size			WDB 8			WDB 10				WDB 12
Head type			LS LSF	LP	LG	LS LSF	GW	LP	LG	LS LSF
Material			Stainless A4							
Diameter of drill bit	d ₀	[mm]	8			10				12
Embedment depth	h _{nom}	[mm]	85			100				120
Min. hole depth in concrete	h ₁ ≥	[mm]	95			110				130
Effective embedment depth	h _{ef}	[mm]	51,9			58,7				75,6
Clearance hole	d _f	[mm]	11			13				15
Thickness of fixture	t _{fix}	[mm]	5-65	10-65	5-65	5-50	5-50	10-50	5-50	5-30
Installation torque	T _{inst}	[Nm]	_1)	_1)	_1)	_1)	_1)	_1)	_1)	_1)
Wrench size (types: LS, LSF, GW)	WS	[mm]	13	-	-	17	19	-	-	19
Torx size (types: LP, LG)	TX	-	-	45		-	-	50		-
Max. torque moment, machine setting	T _{max} ≤	[Nm]	120	120	120	185	185	185	185	185

1) For the installation of the LP and LG head types only impact screw driver can be used.

WDB-08, WDB-10, WDB-12

Intended Use
Installation parameters

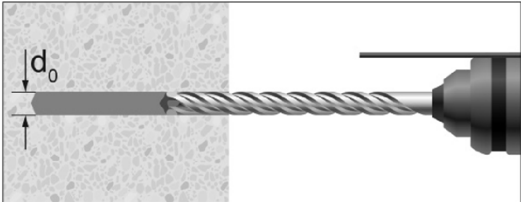
Annex B2

Table B3: Minimum thickness of member, Minimum spacing and edge distance

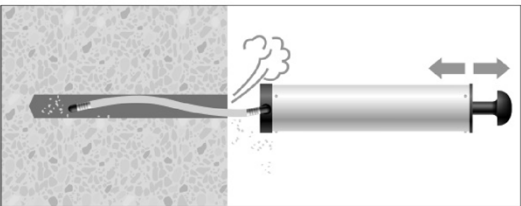
Fastener size			WDB 8		WDB 10		WDB 12	
Head type			LS, LSF, LP, LG		LS, LSF, LP, LG, GW		LS,LSF	
Material			10B21	A4	10B21	A4	10B21	A4
Minimum member thickness	h_{min}	[mm]	110	125	130	140	160	170
Minimum edge distance	c_{min}	[mm]	50	50	60	60	70	70
Minimum spacing	s_{min}	[mm]	50	50	60	60	70	70

WDB-08, WDB-10, WDB-12		Annex B3
Intended Use		
Minimum member thickness, minimum edge distance and anchor spacing		

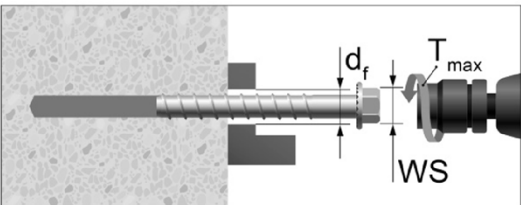
Installation instruction



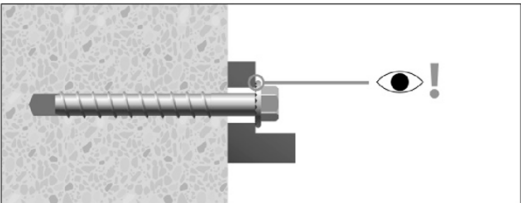
Drill the hole to the bore hole depth h_1 .



Clean the hole.



Screw in the anchor by using a torque wrench or an impact screw driver.
In case of using torque wrench: T_{inst} acc. to Table B1 and B2.
In case of using impact screw driver: T_{max} acc. to Table B1 and B2
WS= Wrench Size



Control of complete setting, full contact of screw head with fixture part.

WDB-08, WDB-10, WDB-12		Annex B4
Intended Use Installation Instruction		

Table C1: Characteristic resistance under tension loading (Steel 10B21)

Fastener size			WDB 8			WDB 10			WDB 12
Head type			LS LSF	LP	LG	LS LSF	LP	LG	LS LSF
Material			Steel 10B21						
Embedment depth	h _{nom}	[mm]	65			75			95
Steel failure									
Characteristic resistance	N _{Rk,s}	[kN]	35,9			57,0			83,0
Partial factor	γ _{Ms,N} ¹⁾	[-]	1,4			1,4			1,4
Pull-out failure									
Characteristic resistance in cracked concrete C20/25	N _{Rk,p,cr}	[kN]	7,0			10,0			16,0
Characteristic resistance in uncracked concrete C20/25	N _{Rk,p,ucr}	[kN]	9,0	9,0	6,5	16,0	16,0	11,0	25,0
Increasing factors for N _{Rk,p} in cracked or uncracked concrete N _{Rk,p} = N _{Rk,p} (C20/25) · ψ _c	ψ _c	C30/37	1,22						
		C40/50	1,41						
		C50/60	1,58						
Installation factor	γ _{inst}	[-]	1,4			1,0			1,2
Concrete cone failure									
Effective embedment depth	h _{ef}	[mm]	50,6			58,1			75,4
Characteristic edge distance	c _{cr,N}	[mm]	1,5h _{ef}						
Characteristic spacing	s _{cr,N}	[mm]	3h _{ef}						
Factor for cracked concrete	k _{cr}	[-]	7,7						
Factor for uncracked concrete	k _{ucr}	[-]	11,0						
Splitting failure									
Characteristic resistance in uncracked concrete C20/25	N ⁰ _{Rk,sp}	[kN]	min (N _{Rk,p} ; N ⁰ _{Rk,c} ²⁾)						
Characteristic edge distance for splitting	c _{cr,sp}	[mm]	1,5h _{ef}						
Characteristic anchor spacing for splitting	s _{cr,sp}	[mm]	3h _{ef}						

1) In absence of other national regulations.

2) $N^0_{Rk,c}$ for C20/25 acc. to EN 1992-4:2018

WDB-08, WDB-10, WDB-12

Performance
Characteristic values under tension loading

Annex C1

Table C2: Characteristic resistance under tension loading (Stainless Steel A4)

Fastener size			WDB 8			WDB 10				WDB 12
Head type			LS LSF	LP	LG	LS LSF	GW	LP	LG	LS LSF
Material			Stainless steel A4							
Embedment depth	h_{nom}	[mm]	85			100				120
Steel failure										
Characteristic resistance	$N_{Rk,s}$	[kN]	33,0	22,3	22,3	53,7	53,7	36,2	36,2	78,1
Partial factor	$\gamma_{Ms,N}^{1)}$	[-]	1,5			1,5				1,5
Pull-out failure										
Characteristic resistance in cracked concrete C20/25	$N_{Rk,p,cr}$	[kN]	7,0	4,5	4,0	7,0	7,0	7,0	7,0	16,0
Characteristic resistance in uncracked concrete C20/25	$N_{Rk,p,ucr}$	[kN]	9,0	5,5	4,0	16,0	16,0	10,0	7,0	25,0
Increasing factors for $N_{Rk,p}$ in cracked or uncracked concrete $N_{Rk,p} = N_{Rk,p(C20/25)} \cdot \psi_c$	ψ_c	C30/37	1,22							
		C40/50	1,41							
		C50/60	1,58							
Installation factor	γ_{inst}	[-]	1,4			1,0				1,2
Concrete cone failure										
Effective embedment depth	h_{ef}	[mm]	51,9			58,7				75,6
Characteristic edge distance	$c_{cr,N}$	[mm]	1,5 h_{ef}							
Characteristic spacing	$s_{cr,N}$	[mm]	3 h_{ef}							
Factor for cracked concrete	k_{cr}	[-]	7,7							
Factor for uncracked concrete	k_{ucr}	[-]	11,0							
Splitting failure										
Characteristic resistance in uncracked concrete C20/25	$N^0_{Rk,sp}$	[kN]	$\min(N_{Rk,p}; N^0_{Rk,c}^{2)})$							
Characteristic edge distance for splitting	$c_{cr,sp}$	[mm]	1,5 h_{ef}							
Characteristic anchor spacing for splitting	$s_{cr,sp}$	[mm]	3 h_{ef}							

1) In absence of other national regulations.

2) $N^0_{Rk,c}$ for C20/25 acc. to EN 1992-4:2018

WDB-08, WDB-10, WDB-12

Performance
Characteristic values under tension loading

Annex C2

Table C3: Displacements under tension loads for cracked and uncracked concrete

Fastener size	Embedment depth	Material	Head type	Concrete	Tension load N	Displacement			
						δ_{N0}	$\delta_{N\infty}$		
[-]	[mm]	[-]	[-]	[-]	[kN]	[mm]	[mm]		
WDB 8	65	Steel 10B21	LS/LSF	cracked C20/25	1,5	0,1	0,8		
			LP						
			LG						
WDB 10	75		LS/LSF		4,8	0,2	1,0		
			LP						
			LG						
WDB 12	95		LS/LSF		4,8	0,3	1,2		
WDB 8	85		Stainless steel A4		LS/LSF	cracked C20/25	1,5	0,1	0,8
					LP		1,5		
		LG		1,4					
WDB 10	100	LS/LSF/GW		3,3	0,2		1,0		
		LP							
		LG							
WDB 12	120	LS/LSF		4,8	0,3		1,2		
WDB 8	65	Steel 10B21		LS/LSF	uncracked C20/25		3,1	0,1	0,8
				LP			2,2		
			LG						
WDB 10	75		LS/LSF	7,6		0,1	1,0		
			LP					5,2	
			LG						
WDB 12	95		LS/LSF	9,9		0,3	1,2		
WDB 8	85		Stainless steel A4	LS/LSF		uncracked C20/25	3,1	0,1	0,8
				LP			1,8		
		LG		1,4					
WDB 10	100	LS/LSF/GW		7,6	0,1		1,0		
		LP						4,8	
		LG						3,3	
WDB 12	120	LS/LSF		9,9	0,3		1,2		

WDB-08, WDB-10, WDB-12

Performance
Displacements under tension loading

Annex C3

Table C4: Characteristic resistance under shear loading

Fastener size			WDB 8			WDB 10			WDB 12	
Head type			LS LSF LP LG	LS LSF	LP LG	LS LSF LP LG	LS LSF, GW	LP LG	LS LSF	LS LSF
Material			10B21	A4		10B21	A4		10B21	A4
Embedment depth	h_{nom}	[mm]	65	85		75	100		95	120
Effective embedment depth	h_{ef}	[mm]	50,6	51,9		58,1	58,7		75,4	75,6
Steel failure without lever arm										
Characteristic resistance	$V^0_{RK,s}$	[kN]	16,9	16,5	11,2	26,8	26,8	18,1	39,0	39,0
Ductility factor	k_7	[-]	0,8							
Partial factor	$\gamma_{Ms,V}^{1)}$	[-]	1,5	1,25		1,5	1,25		1,5	1,25
Steel failure with lever arm										
Characteristic resistance	$M^0_{RK,s}$	[Nm]	39,1	35,9	24,2	79,0	74,4	50,2	138,8	130,6
Partial factor	$\gamma_{Ms,V}^{1)}$	[-]	1,5	1,25		1,5	1,25		1,5	1,25
Concrete pryout failure										
k-factor	k_8	[-]	1,0						2,0	
Installation factor	γ_{inst}	[-]	1,0							
Concrete edge failure										
Effective length of anchor	ℓ_f	[mm]	50,6	51,9		58,1	58,7		75,4	75,6
Outside diameter of fastener	d_{nom}	[mm]	7,25			9,24			11,15	
Installation factor	γ_{inst}	[-]	1,0							

1) In absence of other national regulations.

WDB-08, WDB-10, WDB-12

Performance
Characteristic values under shear loading

Annex C4

Table C5: Displacements under shear loads for cracked and uncracked concrete

Fastener size	Embedment depth	Material	Head type	Concrete	Shear load V	Displacement					
						δ_{V0}	$\delta_{V\infty}$				
[-]	[mm]	[-]	[-]	[-]	[kN]	[mm]	[mm]				
WDB 8	65	Steel 10B21	LS/LSF	Cracked and uncracked C20/25	8,0	1,8	2,7				
			LP								
			LG								
WDB 10	75		LS/LSF		12,8						
			LP								
			LG								
WDB 12	95		LS/LSF		18,6						
WDB 8	85		Stainless steel A4		LS/LSF			Cracked and uncracked C20/25	9,4	1,8	2,7
					LP				6,4		
		LG		15,3							
WDB 10	100	LS/LSF/GW		10,3							
		LP									
		LG									
WDB 12	120	LS/LSF		22,3							

WDB-08, WDB-10, WDB-12

Performance
Displacements under shear loading

Annex C5

Table C6: Characteristic values for seismic actions C1 (Steel 10B21)

Fastener size			WDB 8			WDB 10			WDB 12
Head type			LS LSF	LP	LG	LS LSF	LP	LG	LS LSF
Material			Steel 10B21						
Embedment depth	h _{nom}	[mm]	65			75			95
Steel failure for tension and shear load									
Characteristic resistance	N _{Rk,s,C1}	[kN]	35,9			57,0			83,0
Partial safety factor	γ _{Ms,N}	[-]	1,4						
Characteristic resistance	V _{Rk,s,C1}	[kN]	11,5			18,5			26,5
Partial safety factor	γ _{Ms,V}	[-]	1,5						
Pull-out failure									
Characteristic resistance in cracked concrete C20/25	N _{Rk,p,C1}	[kN]	6,0			10,0			16,0
Concrete cone failure									
Effective embedment depth	h _{ef}	[mm]	50,6			58,1			75,4
Characteristic edge distance	c _{cr,N}	[mm]	1,5h _{ef}						
Characteristic spacing	s _{cr,N}	[mm]	3h _{ef}						
Installation factor	γ _{inst}	[-]	1,4			1,0			1,2
Concrete pryout failure									
Pry-out factor	k ₈	[-]	1,0						2,0
Concrete edge failure									
Effective length of fastener	l _f	[mm]	50,6			58,1			75,4
External diameter of fastener	d _{nom}	[mm]	8			10			12

WDB-08, WDB-10, WDB-12

Performance (10B21 steel)
Characteristic values for seismic actions C1

Annex C6

Table C7: Characteristic values for seismic actions C1 (Stainless Steel A4)

Fastener size			WDB 8			WDB 10			WDB 12
Head type			LS LSF	LP	LG	LS LSF	LP	LG	LS LSF
Material			Stainless steel A4						
Embedment depth	h _{nom}	[mm]	85			100			120
Steel failure for tension and shear load									
Characteristic resistance	N _{Rk,s,C1}	[kN]	33,0	22,3	22,3	53,7	36,2	36,2	78,1
Partial safety factor	γ _{Ms,N}	[-]	1,4						
Characteristic resistance	V _{Rk,s,C1}	[kN]	11,5	11,5	11,2	18,5	18,5	18,1	26,5
Partial safety factor	γ _{Ms,V}	[-]	1,5						
Pull-out failure									
Characteristic resistance in cracked concrete C20/25	N _{Rk,p,C1}	[kN]	6,0	4,5	4,0	7,0			16,0
Concrete cone failure									
Effective embedment depth	h _{ef}	[mm]	51,9			58,7			75,6
Characteristic edge distance	c _{cr,N}	[mm]	1,5h _{ef}						
Characteristic spacing	s _{cr,N}	[mm]	3h _{ef}						
Installation factor	γ _{inst}	[-]	1,4			1,0			1,2
Concrete pryout failure									
Pry-out factor	k ₈	[-]	1,0						2,0
Concrete edge failure									
Effective length of fastener	l _f	[mm]	51,9			58,7			75,6
External diameter of fastener	d _{nom}	[mm]	8			10			12

WDB-08, WDB-10, WDB-12

Performance (Stainless steel A4)
Characteristic values for seismic actions C1

Annex C7

Table C8: Characteristic tension resistance values for resistance to fire

Fastener size				WDB 8			WDB 10		WDB 12	
Head type				LS LSF LP LG	LS LSF LP	LG	LS LSF LP LG	LS LSF GW LP LG	LG	LS LSF
Material				10B21	A4		10B21	A4	10B21	A4
Embedment depth [mm]				65	85		75	100	95	120
Steel failure										
Characteristic resistance	R30	N _{Rk,s,fi}	[kN]	0,41	0,8		1,0	1,7	2,0	2,9
	R60	N _{Rk,s,fi}	[kN]	0,37	0,7		0,9	1,3	1,5	2,4
	R90	N _{Rk,s,fi}	[kN]	0,29	0,5		0,7	1,0	1,3	2,0
	R120	N _{Rk,s,fi}	[kN]	0,21	0,4		0,5	0,9	1,0	1,6
Pull-out failure										
Characteristic resistance	R30	N _{Rk,p,fi}	[kN]	1,1	1,1	1,0	2,5	1,8	3,0	3,0
	R60									
	R90									
	R120	N _{Rk,p,fi}	[kN]	0,9	0,9	0,8	2,0	1,4	2,4	2,4
Concrete cone failure										
Characteristic resistance	R30	N ⁰ _{Rk,c,fi}	[kN]	3,1	3,3		4,4	4,5	8,5	8,6
	R60									
	R90									
	R120	N ⁰ _{Rk,c,fi}	[kN]	2,5	2,7		3,5	3,6	6,8	6,8
Effective embedment depth		h _{ef}	[mm]	50,6	51,9		58,1	58,7	75,4	75,6
Minimum member thickness		h _{min}	[mm]	110	125		130	140	160	170
Spacing		s _{cr,N,fi}	[mm]	4h _{ef}						
		s _{min}	[mm]	50			60		70	
Edge distance		c _{cr,N,fi}	[mm]	2h _{ef}						
Fire exposure from one side only		c _{min}	[mm]	50			60		70	
Fire exposure from more than one side				≥ 300 mm						

WDB-08, WDB-10, WDB-12

Performance

Characteristic values for resistance to fire (tension)

Annex C8

Table C9: Characteristic shear resistance values for resistance to fire

Fastener size				WDB 8		WDB 10		WDB 12	
Head type				all	all	all	all	all	all
Material				10B21	A4	10B21	A4	10B21	A4
Embedment depth [mm]				65	85	75	100	95	120
Steel failure without level arm									
Characteristic resistance	R30	$V_{Rk,s,fi}$	[kN]	0,41	0,8	1,0	1,7	2,0	2,9
	R60	$V_{Rk,s,fi}$	[kN]	0,37	0,7	0,9	1,3	1,5	2,4
	R90	$V_{Rk,s,fi}$	[kN]	0,29	0,5	0,7	1,0	1,3	2,0
	R120	$V_{Rk,s,fi}$	[kN]	0,21	0,4	0,5	0,9	1,0	1,6
Steel failure with level arm									
Characteristic resistance	R30	$M^0_{Rk,p,fi}$	[Nm]	0,45	0,9	1,4	2,3	3,4	4,9
	R60	$M^0_{Rk,p,fi}$	[Nm]	0,40	0,7	1,2	1,9	2,5	4,0
	R90	$M^0_{Rk,p,fi}$	[Nm]	0,31	0,5	0,9	1,5	2,1	3,3
	R120	$M^0_{Rk,p,fi}$	[Nm]	0,22	0,45	0,7	1,3	1,6	2,6
Pry-out failure									
k_8			[-]	1		1		2	
Characteristic resistance	R30	$V_{Rk,cp,fi}$	[kN]	3,1	3,3	4,4	4,5	17,0	17,1
	R60								
	R90								
	R120	$V_{Rk,cp,fi}$	[kN]	2,5	2,7	3,5	3,6	13,6	13,7
Concrete edge failure									
Characteristic resistance	$\leq R90$	$V_{Rk,c,fi}$	[kN]	$V^0_{Rk,c,fi} = 0.25 \cdot V^0_{Rk,c}^{1)}$					
	R120	$V_{Rk,c,fi}$	[kN]	$V^0_{Rk,c,fi} = 0.20 \cdot V^0_{Rk,c}^{1)}$					

- 1) $V^0_{Rk,c}$ = characteristic resistance for concrete edge failure in cracked concrete C20/C25 under normal temperature calculated according to EN 1992-4:2018.

WDB-08, WDB-10, WDB-12

Performance
Characteristic values for resistance to fire (shear)

Annex C9