VYHLÁSENIE O PARAMETROCH

DoP 0416

pre fischer HybridPower (mechanická kotva do betónu)

SK

1. Jedinečný identifikačný kód typu výrobku: **DoP 0416**

2. Zamýšľané použitie/použitia: **Dodatočné upevnenie v betóne bez trhlín., pozri prílohu, najmä prílohy B1 - B3.**

3. Výrobca: **fischerwerke GmbH & Co. KG, Klaus-Fischer-Str. 1, 72178 Waldachtal, Nemecko**

4. Splnomocnený zástupca: **–**

5. Systém(-y) posudzovania a overovania nemennosti parametrov: **1**

6. Európsky hodnotiaci dokument: **EAD 330232-02-0601**
   Európske technické posúdenie: **ETA-26/0167; 2026-06-23**
   Orgán technického posudzovania: **ETA-Danmark A/S**
   Notifikovaný(-é) subjekt(-y): **2873 TU Darmstadt**

7. Deklarované parametre:
   Mechanická odolnosť a stabilita (BWR 1)
   Charakteristická odolnosť v ťahu (statické a kvázistatické zaťaženie) Metóda A:
   1 Odolnosť voči porušeniu ocele: Prílohy C1
   2 Odolnosť voči porušeniu vytiahnutím: Prílohy C1
   3 Odolnosť voči porušeniu betónového kužeľa: Prílohy C2
   4 Robustnosť: Prílohy C1
   5 Minimálna vzdialenosť od okraj a osová vzdialenosť: Prílohy B2
   6 Vzdialenosť od okraja voči rozštiepniu pri zaťažení: Prílohy C2
   Charakteristická odolnosť v šmyku (statické a kvázistatické zaťaženie):
   7 Odolnosť voči porušeniu ocele: (Zaťaženie šmykom) Prílohy C3
   8 Odolnosť voči vylomeniu: Prílohy C3
   Charakteristická odolnosť pre zjednodušený návrh:
   9 Metóda B: NPD
   10 Metóda C: NPD
   Posuny:
   11 Posuny pri statickom a kvázistatickom zaťažení: Prílohy C5
   Tuhosť:
   12 Tuhosť v elastickom rozsahu pri ťahovom zaťažení: NPD
   13 Charakteristiky tuhosti pre ťahové zaťaženie pre nelineárne pružinové modely: NPD
   Charakteristický odpor pre seizmickú výkonnostnú kategóriu C1:
   14 Odolnosť pri zaťažení ťahom,: NPD
   15 Odolnosť pri zaťažení šmykom:, Faktor prstencovej medzery: NPD
   Charakteristická odolnosť a posuny pre seizmické výkonnostné kategórie C2:
   16 Odolnosť pri zaťažení ťahom, posuny: NPD
   17 Odolnosť pri zaťažení šmykom, posuny, Faktor prstencovej medzery: NPD
   Bezpečnosť v prípade požiaru (BWR 2)
   18 Reakcia na oheň: Trieda (A1)
   Odolnosť proti ohňu:
   19 Požiarna odolnosť voči porušeniu ocele (Zaťaženie ťahom) Prílohy C4
   20 Požiarna odolnosť voči vytiahnutiu (Zťaženie tahom) Prílohy C4
   21 Požiarna odolnosť voči porušeniu ocele (Zaťaženie šmykom) Prílohy C4
   životnosť:
   22 životnosť: Prílohy B1

8. Vhodná technická dokumentácia a/alebo špecifická technická dokumentácia: **–**

Uvedené parametre výrobku sú v zhode so súborom deklarovaných parametrov. Toto vyhlásenie o parametroch sa v súlade s nariadením (EÚ) č. 305/2011 vydáva na výhradnú zodpovednosť uvedeného výrobcu.

Podpísal(-a) za a v mene výrobcu:

i.V.

Dr. Christian Weber, Vedúci vývoja
Tumlingen, 2026-08-01

Dieter Pfaff, Vedúci Medzinárodnej produkčnej federácie a riadenia kvality

Toto vyhlásenie o vlastnostiach bolo vyhotovené v rôznych jazykoch. V prípade, že dôjde k rozdielnemu výkladu má anglická verzia vždy prednosť.
Príloha obsahuje dobrovoľné a doplňujúce informácie v anglickom jazyku. Tieto vychádzajú zo zákonom stanovených požiadaviek (jazykovo neutrálnych) .

Translation guidance Essential Characteristics and Performance Parameters for Annexes

Základné charakteristiky a parametre výkonu – pokyny na preklad pre prílohy

Mechanical resistance and stability (BWR 1) **Mechanická odolnosť a stabilita (BWR 1)**		
Characteristic resistance under static and quasi-static loading, Method A **Charakteristická odolnosť v ťahu (statické a kvázistatické zaťaženie) Metóda A:**		
1	Resistance to steel failure: **Odolnosť voči porušeniu ocele:**	$N_{Rk,s}$ [kN], E_s [N/mm^2]
2	Resistance to pull- out failure: **Odolnosť voči porušeniu vytiahnutím:**	$N_{Rk,p}$ [kN], ψ_c
3	Resistance to concrete cone failure: **Odolnosť voči porušeniu betónového kužeľa:**	$k_{cr,N}$, $k_{ucr,N}$ [-], h_{ef}, $c_{cr,N}$ [mm]
4	Robustness: **Robustnosť:**	γ_{inst} [-]
5	Minimum edge distance and spacing: **Minimálna vzdialenosť od okraj a osová vzdialenosť:**	c_{min}, s_{min}, h_{min} [mm]
6	Edge distance to prevent splitting under load: **Vzdialenosť od okraja voči rozštiepniu pri zaťažení:**	$N^0_{Rk,sp}$ [kN], $c_{cr,sp}$ [mm]
Characteristic resistance to shear load (static and quasi-static loading), Method A **Charakteristická odolnosť v šmyku (statické a kvázistatické zaťaženie):**		
7	Resistance to steel failure under shear load: **Odolnosť voči porušeniu ocele: (Zaťaženie šmykom)**	$V^0_{Rk,s}$ [kN], $M^0_{Rk,s}$ [Nm], k_7 [-]
8	Resistance to pry-out failure: **Odolnosť voči vylomeniu:**	k_8 [-]
Characteristic Resistance for simplified design: **Charakteristická odolnosť pre zjednodušený návrh:**		
9	Method B: **Metóda B:**	F^0_{Rk} [kN], $M^0_{Rk,s}$ [Nm] ψ_c [-], c_{cr}, s_{cr}, c_{min}, s_{min}, h_{min} [mm]
10	Method C: **Metóda C:**	F_{Rk} [kN], $M^0_{Rk,s}$ [Nm], c_{cr}, s_{cr}, h_{min} [mm]
Displacements **Posuny:**		
11	Displacements under static and quasi-static loading: **Posuny pri statickom a kvázistatickom zaťažení:**	δ_{N0}, $\delta N_{50years}$, $\delta N_{100years}$, δ_{V0}, $\delta_{V\infty}$ [mm]
12	Stiffness characteristics for tension loading for non-linear spring models:	$k_{1,cr}$, $k_{2,cr}$, $k_{3,cr}$, $k_{4,cr}$ [kN/mm]
Tuhosť:		
12	Stiffness in the elastic range under tension loading **Tuhosť v elastickom rozsahu pri ťahovom zaťažení:**	$k_{A,ucr}$, $k_{A,cr}$ [N/mm]
13	Stiffness characteristics for tension loading for non-linear spring models **Charakteristiky tuhosti pre ťahové zaťaženie pre nelineárne pružinové modely:**	$k_{A,ucr}$, $k_{B,ucr}$, $k_{C,ucr}$, $k_{D,ucr}$ [N/mm] $k_{A,cr}$, $k_{B,cr}$, $k_{C,cr}$, $k_{D,cr}$ [N/mm]
Characteristic resistance for seismic performance category C1: **Charakteristický odpor pre seizmickú výkonnostnú kategóriu C1:**		
14	Resistance to tension load: **Odolnosť pri zaťažení ťahom,:**	$N_{Rk,s,C1}$ [kN], $N_{Rk,p,C1}$ [kN]
15	Resistance to shear load:, Factor annular gap: **Odolnosť pri zaťažení šmykom:, Faktor prstencovej medzery:**	$V_{Rk,s,C1}$ [kN]
Characteristic resistance and displacements for seismic performance categorie C2: **Charakteristická odolnosť a posuny pre seizmické výkonnostné kategórie C2:**		
16	Resistance to tension load, displacements: **Odolnosť pri zaťažení ťahom, posuny:**	$N_{Rk,s,C2}$ [kN], $N_{Rk,p,C2}$ [kN] $\delta_{N,C2(0,5)}$, $\delta_{N,C2(0,8)}$ [mm]
17	Resistance to shear load and displacements, factor annular gap: **Odolnosť pri zaťažení šmykom, posuny, Faktor prstencovej medzery:**	$V_{Rk,s,C2}$ [kN], $\delta_{V,C2(0,5)}$, $\delta_{V,C2(0,8)}$ [mm]
Safety in case of fire (BWR 2) **Bezpečnosť v prípade požiaru (BWR 2)**		
18	Reaction to fire: **Reakcia na oheň:**	Class
Resistance to fire: **Odolnosť proti ohňu:**		
19	Fire resistance to steel failure (tension load): **Požiarna odolnosť voči porušeniu ocele (Zaťaženie ťahom)**	$N_{Rk,s,fi}$ [kN]
20	Fire resistance to pull-out failure (tension load): **Požiarna odolnosť voči vytiahnutiu (Zťaženie tahom)**	$N_{Rk,p,fi}$ [kN]
21	Fire resistance to steel failure (shear load): **Požiarna odolnosť voči porušeniu ocele (Zaťaženie šmykom)**	$V_{Rk,s,fi}$ [kN], $M^0_{Rk,s,fi}$ [Nm]
Aspects of durability **životnosť:**		
22	Durability: **životnosť:**	Class

II SPECIFIC PART OF THE EUROPEAN TECHNICAL ASSESSMENT

1 Technical description of product

The fischer HybridPower is a plastic anchor consisting of a plug sleeve made of polyamide combined with a metal sceleton (power wedge), and a special screw made of either galvanized steel with an additional organic coating or stainless steel according to Annex A3. The anchor is available with two different head types; a hexagon head (type FUS) and a countersunk head (type T).

The anchors are intended for use in both cracked and uncracked concrete of strength classes ranging from C20/25 to C50/60.

The anchor is screwed into a predrilled cylindrical drill hole, and the power wedges interlock with the base material ensuring a secure anchorage.

The product description is given in Annex A and the intended use specifications of the product are detailed in Annex B.

2 Specification of the intended use(s) in accordance with the applicable European Assessment Document (hereinafter EAD)

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 provisions made in this European Technical Assessment are based on an assumed intended working life of the anchor 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 resistance to tension load (static and quasi-static loading) Method A	
Resistance to steel failure under tension load	Annex C1
Resistance to pull-out failure	Annex C1
Resistance to concrete cone failure	Annex C2
Robustness	Annex C1
Minimum edge distance and spacing	Annex B2
Edge distance to prevent splitting under load	Annex C2
Characteristic resistance to shear load (static and quasi-static loading)	
Resistance to steel failure under shear load	Annex C3
Resistance to pry-out failure	Annex C3
Characteristic resistance for simplified methods	
Method B	Not relevant
Method C	Not relevant
Displacements	
Displacements under static and quasi-static loading	Annex C5
Stiffness	
Stiffness in the elastic range under tension loading	No performance assessed
Stiffness characteristics for tension loading for non-linear spring models	No performance assessed
Characteristic resistance for seismic performance category C1	
Resistance to tension load	No performance assessed
Resistance to shear load	No performance assessed
Characteristic resistance and displacements for seismic performance category C2	
Resistance to tension load and displacements	No performance assessed

Characteristic	Assessment of characteristic
Resistance to shear load and displacements	No performance assessed
3.2 Safety in case of fire (BWR2)	
Reaction to fire	Class A1
Resistance to fire	
Fire resistance to steel failure under tension load	Annex C4
Fire resistance to pull-out failure	Annex C4
Fire resistance to steel failure under shear load	Annex C4
3.3 Aspects of durability	
Durability	Annex B1

See additional information in section 3.9

3.9 General aspects related to the performance of the product

The European Technical Assessment is issued for the product on the basis of agreed data/information, deposited with ETA-Danmark, which identifies the product that has been assessed and judged. Changes to the product or production process, which could result in this deposited data/information being incorrect, should be notified to ETA-Danmark before the changes are introduced. ETA-Danmark will decide whether or not such changes affect the ETA and consequently the validity of the CE marking on the basis of the ETA and if so whether further assessment or alterations to the ETA, shall be necessary.

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

4.1 AVCP system

According to the decision 1996/582/EC of the European Commission, the system(s) of assessment and verification of constancy of performance (see Annex V to Regulation (EU) No. 305/2011) is 1.

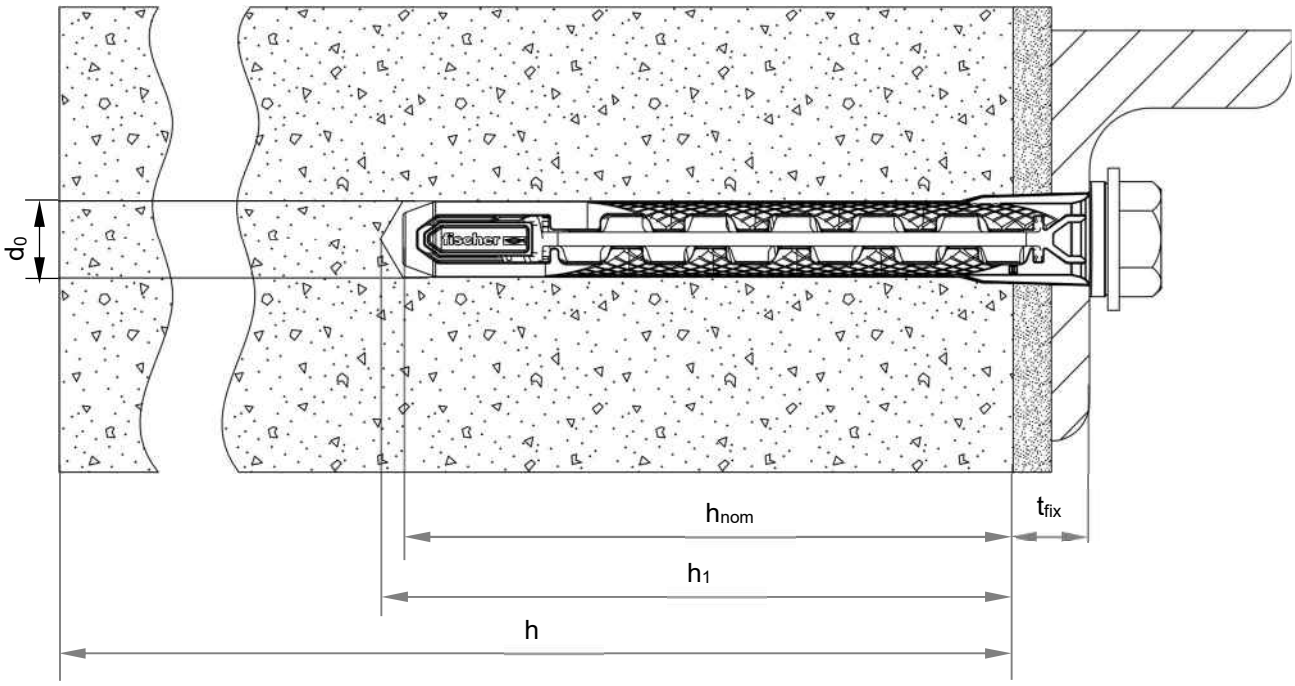
5 Technical details necessary for the implementation of the AVCP system, as provided for in the applicable EAD

Technical details necessary for the implementation of the AVCP system are laid down in the control plan deposited at ETA-Danmark prior to CE marking.

The following standards and documents are referred to in this European Technical Assesment:

− EOTA European Assessment Document EAD 330232-02-0601: Mechanical fasteners for use in concrete
− EN 206:2013+A2:2021: Concrete – Specification, performance, production and conformity
− EN 1992-4:2019-04: Eurocode 2 - Design of concrete structures - Part 4: Design of fastenings for use in concrete; German version EN 1992-4:2018
− EN 1993-1-4:2006 + A1:2015: Eurocode 3: Design of steel structures - Part 1-4: General rules - Supplementary rules for stainless steels
− EN ISO 4042:2018: Fasteners – Electroplated coating systems

fischer HybridPower

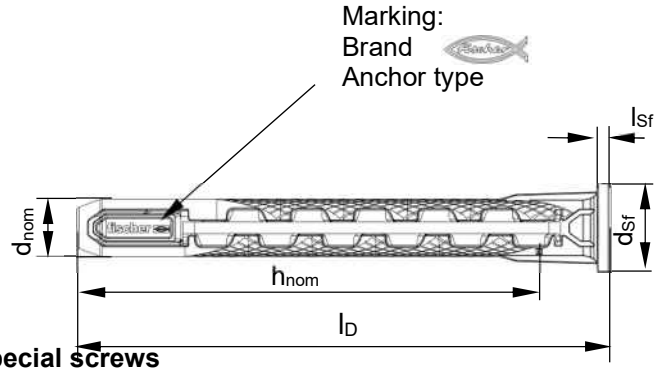


Legend

d_0	=	Nominal drill hole diameter
h_{nom}	=	Overall plastic anchor embedment depth in the base material
h_1	=	Depth of drill hole to deepest point
h	=	Thickness of concrete member
t_{fix}	=	Thickness of fixture and / or non-load bearing layer

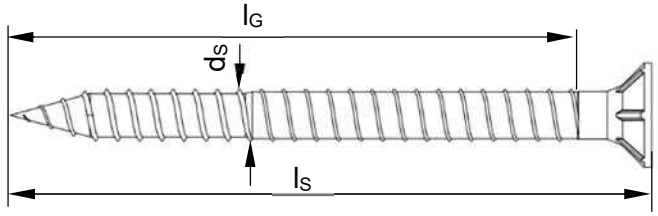
Figure not to scale

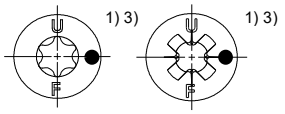
Anchor sleeve – HybridPower



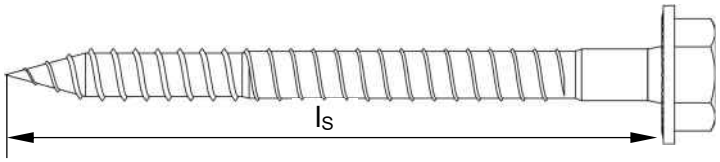
Special screws

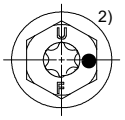
Countersunk screw





Hexagonal screw with washer





1) Additional marking for the special screw, stainless steel version: e.g. "A4" or "R" or “A2”.
2) Internal driving feature for Torx bit is optional for hexagonal head.
3) Optional additional version with underhead ribs.

Table A2.1: Dimensions

Anchor type	Anchor sleeve					Special screw		
	h_{nom} [mm]	d_{nom} [mm]	l_D [mm]	l_{Sf} [mm]	d_{Sf} [mm]	d_S [mm]	l_G [mm]	l_S [mm]
HybridPower FUS	80	10	90-230	2,5	15	7,0	77	l_D
HybridPower T	80	10	90-230	2,5	15	7,0	77	l_D

Legend

h_{nom}	=	Overall plastic anchor embedment depth in the base material
d_{nom}	=	Nominal diameter of the anchor sleeve
l_D	=	Length of the anchor sleeve
l_{Sf}	=	Thickness of the anchor sleeve collar
d_{Sf}	=	Diameter of the anchor sleeve collar
d_S	=	Diameter of the screw
l_G	=	Thread length of the screw
l_S	=	Length of the screw

Figures not to scale

Table A3.1: Materials

Name	Material
HybridPower anchor sleeve	- Polyamide, PA6, colour: red
HybridPower sceleton	- Ferritic stainless steel
Special screw	- Galvanised steel gvz with Zn5/Ag or Zn5/An in accordance with EN ISO 4042 with additional organic layer (Zn5/Ag/T7 or Zn5/An/T7, resp., total layer thickness ≥ 6 µm) **or** - Stainless steel “A2” of corrosion resistance class CRC II in accordance with EN 1993-1-4 **or** - Stainless steel “A4” or “R” of corrosion resistance class CRC III in accordance with EN 1993-1-4

Specifications of intended use

Anchorages subject to:

- Static and quasi-static loads.
- Fire exposure.

Base materials:

- Reinforced or unreinforced compacted normal weight concrete without fibres (cracked or uncracked) in accordance with EN 206-1.
- Strength classes C20/25 to C50/60 in accordance with EN 206-1.

Use conditions (Environmental conditions):

- Temperature Range: - 20 °C to + 50 °C.
- Structures subject to dry internal conditions (HybridPower, HybridPower A2, HybridPower A4, HybridPower R).
- For all other conditions according to EN 1993-1-4 corresponding to corrosion resistance class (CRC):
  - for CRC II: for HybridPower A2
  - for CRC III: for HybridPower A4 or HybridPower R

Design:

- The structural design is conducted under responsibility of a designer experienced in the field of anchorages and concrete works.
- Verifiable calculation notes and drawings are to be prepared taking account of the loads to be anchored. The position of the fastener is indicated on the design drawings (e.g. position of the fastener relative to reinforcement or to supports, etc.).
- Design of fastenings according to EN 1992-4.

Installation:

- Fastener installation is to be carried out by appropriately qualified personnel and under the supervision of the person responsible for technical matters on the site.
- Use of the fastener only as supplied by the manufacturer without exchanging the components of the fastener.
- Hammer drilling.
- Drill hole created perpendicular +/- 5° to concrete surface, positioning without damaging the reinforcement.
- In case of aborted hole: new drilling at a minimum distance twice the depth of the aborted drill hole or smaller distance if the aborted drill hole is filled with high strength mortar and if under shear or oblique tension load it is not in the direction of load application.
- Installation temperature: - 20 °C to + 40 °C.
- Exposure to UV due to solar radiation of the anchor not protected by rendering ≤ 6 weeks.
- No ingress of water in the borehole at temperatures < 0°C.

Table B2.1: Installation parameters

Anchor type				HybridPower, HybridPower A2, HybridPower A4, HybridPower R
Nominal drill hole diameter	d_0	=	[mm]	10
Cutting diameter of drill bit	d_{cut}	≤	[mm]	10,45
Overall plastic anchor embedment depth in the base material	h_{nom}	≥	[mm]	80
Depth of drill hole to deepest point	h_1	≥	[mm]	90
Diameter of clearance hole in the fixture	d_f	≤	[mm]	10,50[1)]
Thickness of fixture and / or non-load bearing layer	t_{fix}	≥	[mm]	1

[1)] In combination of hexagon screw with washer and anchor sleeve, use in elongated hole under tensile load is allowed.

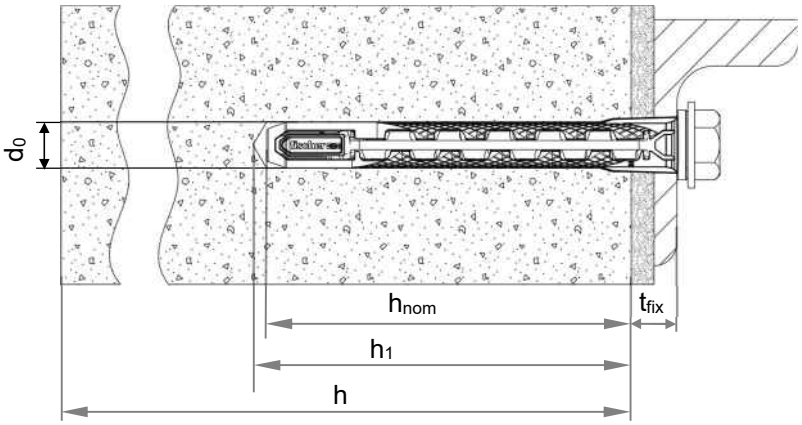


Table B2.2: Minimum thickness of concrete members, minimum edge distances and minimum spacing

Anchor type			HybridPower, HybridPower A2, HybridPower A4, HybridPower R
			10
Minimum edge distance and spacing			
Uncracked concrete Cracked concrete	c_{min}	[mm]	50
Uncracked concrete Cracked concrete	s_{min}	[mm]	50
Minimum thickness of concrete member	h_{min}	[mm]	100

Figure not to scale

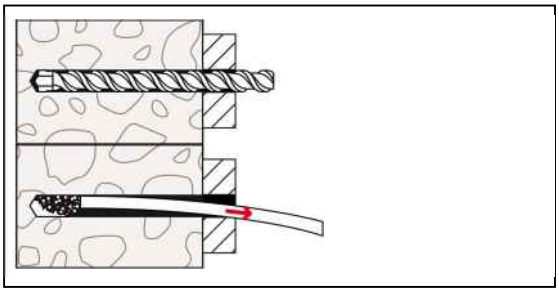
fischer HybridPower

Intended use
Installation parameters
Minimum thickness of member, edge distances and spacing

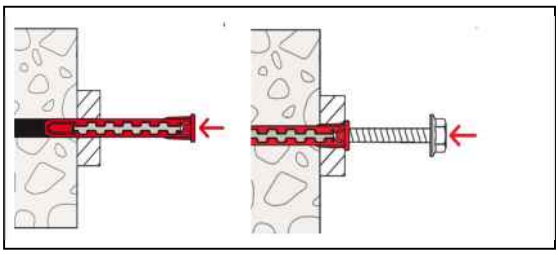
Annex B2

Installation instructions

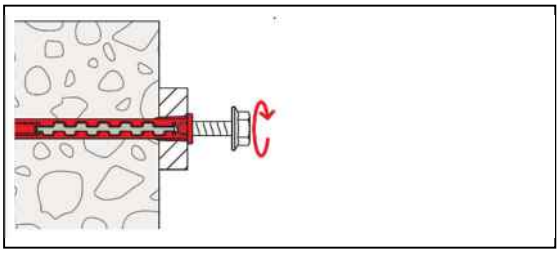
The following pictures show fixing through timber in concrete.



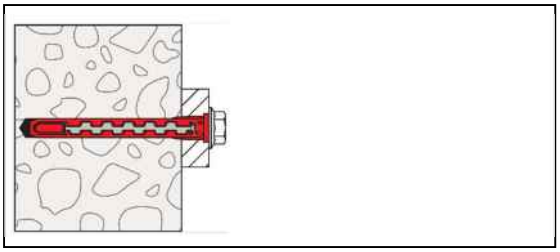
1. Drill the bore hole as per Table B2.1 using hammer drilling.
2. Remove dust from borehole.



3. Insert anchor (screw and sleeve) by using a hammer until the collar of the plastic sleeve is flush with the surface of the fixture.



4. The screw is screwed-in until the head of the screw touches the sleeve. The anchor is correctly installed, if the head of the screw fits tight on the surface and nor the anchor sleeve neither the screw cannot be turned-in any further.



5. Correctly installed anchor.

Figures not to scale

Table C1.1: Characteristic values of tension resistance under static and quasi-static action

Anchor type				HybridPower, HybridPower A2, HybridPower A4, HybridPower R
				10
Overall plastic anchor embedment depth in the base material		h_{nom} ≥	[mm]	80
Steel failure				
Characteristic tension resistance	HybridPower	$N_{Rk,s}$	[kN]	21,70
	HybridPower A2			
	HybridPower A4			
	HybridPower R			
Partial factor for steel failure	HybridPower	γ_{Ms} 1)	[-]	1,55
	HybridPower A2			
	HybridPower A4			
	HybridPower R			
Pullout failure				
Characteristic resistance in cracked concrete C20/25		$N_{Rk,p,cr}$	[kN]	2,00 2)
Increasing factor ψ_c for cracked concrete $N_{Rk,p,cr} = \psi_c \times N_{Rk,p,cr}$ (C20/25)	C25/30		[-]	1,00
	C30/37			
	C35/45			
	C40/50			
	C45/55			
	C50/60			
Installation sensitivity factor for cracked concrete		$\gamma_{inst,cr}$	[-]	1,00
Characteristic resistance in uncracked concrete C20/25		$N_{Rk,p,ucr}$	[kN]	10,50
Increasing factor ψ_c for uncracked concrete $N_{Rk,p,ucr} = \psi_c \times N_{Rk,p,ucr}$ (C20/25)	C25/30		[-]	1,05
	C30/37			1,08
	C35/45			1,12
	C40/50			1,15
	C45/55			1,18
	C50/60			1,20
Installation sensitivity factor for uncracked concrete		$\gamma_{inst,ucr}$	[-]	1,00

1) In absence of other national regulations.
2) If it is ensured that the temperature during working life does not exceed + 30°C, the values may be increased by 1,08.

Table C2.1: Characteristic values of tension resistance under static and quasi-static action

Anchor type					HybridPower, HybridPower A2, HybridPower A4, HybridPower R
					10
Overall plastic anchor embedment depth in the base material		h_{nom}	≥	[mm]	80
Concrete cone and splitting failure					
Effective embedment depth for calculation	cracked concrete	$h_{ef,cr}$	≥	[mm]	35
	uncracked concrete	$h_{ef,ucr}$	≥		53
Factor for cracked concrete		$k_{cr,N}$		[-]	7,7
Factor for uncracked concrete		$k_{ucr,N}$			11,0
Characteristic spacing	cracked concrete	$s_{cr,N,cr}$		[mm]	105
	unracked concrete	$s_{cr,N,ucr}$			159
Characteristic edge distance	cracked concrete	$c_{cr,N,cr}$		[mm]	53
	unracked concrete	$c_{cr,N,ucr}$			80
Characteristic spacing for splitting failure	cracked concrete	$s_{cr,sp,cr}$		[mm]	2 x $c_{cr,sp}$
	unracked concrete	$s_{cr,sp,ucr}$			
Characteristic edge distance for splitting failure	cracked concrete	$c_{cr,sp,cr}$		[mm]	49
	unracked concrete	$c_{cr,sp,ucr}$			53
Characteristic resistance to splitting		$N^0_{Rk,sp}$		[kN]	min {$N^0_{Rk,c}$; $N_{Rk,p}$}[1)]

[1)] $N^0_{Rk,c}$ according to EN 1992-4.

Table C3.1: Characteristic values of shear resistance under static and quasi-static action

Anchor type				HybridPower, HybridPower A2, HybridPower A4, HybridPower R
				10
Steel failure without lever arm				
Characteristic resistance	HybridPower HybridPower A2 HybridPower A4 HybridPower R	$V^0_{Rk,s}$	[kN]	10,80
Partial factor for steel failure		γ_{Ms} 1)	[-]	1,29
Factor for ductility	HybridPower	k_7	[-]	0,80
	HybridPower A2 HybridPower A4 HybridPower R			1,00
Steel failure with lever arm and Concrete pryout failure				
Characteristic bending resistance	HybridPower HybridPower A2 HybridPower A4 HybridPower R	$M^0_{Rk,s}$	[Nm]	20,60
Factor for pryout failure		k_8	[-]	1,00
Partial factor for steel failure		γ_{Ms} 1)	[-]	1,25
Concrete edge failure				
Effective embedment depth for calculation in cracked concrete		$l_{f,cr}$	[mm]	35
Effective embedment depth for calculation in uncracked concrete		$l_{f,ucr}$	[mm]	53
Nominal diameter of a fastener		d_{nom}	[mm]	10

1) In absence of other national regulations.

Table C4.1: Characteristic values of tension and shear resistance under fire exposure

Anchor type				HybridPower, HybridPower A2, HybridPower A4, HybridPower R
				10
Overall plastic anchor embedment depth in the base material	h_{nom}		≥ [mm]	80
Tension loading				
Characteristic resistance **steel failure**	$N_{Rk,s,fi}$	R30	[kN]	0,45
		R60		0,35
		R90		0,25
		R120		0,20
Characteristic resistance **Concrete cone failure**	$N_{Rk,c,fi}$	R30 - R90	[kN]	1,20
		R120		1,00
Characteristic resistance **pullout failure**	$N_{Rk,p,fi}$	R30	[kN]	0,45
		R60		0,35
		R90		0,25
		R120		0,20
Shear loading				
Characteristic resistance **steel failure**	$V_{Rk,s,fi}$	R30	[kN]	2,00
		R60		1,50
		R90		1,00
		R120		0,80
Characteristic resistance **pryout failure**	$V_{Rk,cp,fi}$	R30 - R90	[kN]	1,20
		R120		1,00
Characteristic resistance **concrete edge failure**	$V_{Rk,c,fi}$	R30 - R90	[kN]	5,60
		R120		4,50
Characteristic resistance **steel failure**	$M^0_{Rk,s,fi}$	R30	[Nm]	2,09
		R60		1,62
		R90		1,07
		R120		0,80

Table C4.2: Characteristic spacings and characteristic edge distances of fasteners under fire exposure for tension and shear load

Anchor type			HybridPower, HybridPower A2, HybridPower A4, HybridPower R
			10
Spacing	$s_{cr,fi}$	[mm]	140
Edge distance	$c_{cr,fi}$	[mm]	70 for fire exposure from more than one side c_{min} ≥ 300 mm.

Table C5.1: Displacements under static and quasi static tension loads

Anchor type			HybridPower, HybridPower A2, HybridPower A4, HybridPower R
			10
Displacement – factor for tensile load[1)]			
δ_{N0} - factor	in cracked concrete	[mm/kN]	0,20
$\delta_{N\infty}$ - factor			0,30
δ_{N0} - factor	in uncracked concrete		0,60
$\delta_{N\infty}$ - factor			1,10

[1)] Calculation of effective displacement:
$\delta_{N0} = \delta_{N0}$ - factor x N
$\delta_{N\infty} = \delta_{N\infty}$ - factor x N

N = Action tension loading

Table C5.2: Displacements under static and quasi static shear loads

Anchor type			HybridPower, HybridPower A2, HybridPower A4, HybridPower R
			10
Displacement – factor for shear load[2)]			
δ_{V0} - factor	in cracked and uncracked concrete	[mm/kN]	6,50
$\delta_{V\infty}$ - factor			9,80

[2)] Calculation of effective displacement:
$\delta_{V0} = \delta_{V0}$ - factor x V
$\delta_{V\infty} = \delta_{V\infty}$ - factor x V

V = Action shear loading