

TELJESÍTMÉNYNYILATKOZAT

DoP 0416

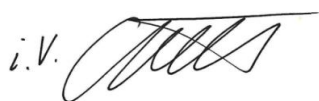
fischer HybridPower-hez (Fémdübelek betonban történő felhasználásra)

HU

- A terméktípus egyedi azonosító kódja: **DoP 0416**
- Felhasználás célja(i): **Repedésmentes betonba utólag beszerelhető rögzítőelem, ld. a Mellékletet, különösen ezt a mellékletet B1 - B3.**
- Gyártó: **fischerwerke GmbH & Co. KG, Klaus-Fischer-Str. 1, 72178 Waldachtal, Németország**
- A meghatalmazott képviselő: **–**
- Az AVCP-rendszer(ek): **1**
- Az európai értékelési dokumentum: **EAD 330232-02-0601**
Európai műszaki értékelés: **ETA-26/0167; 2026-06-23**
A műszaki értékelést végző szerv: **ETA-Danmark A/S**
Bejelentett szerv(ek): **2873 TU Darmstadt**
- A nyilatkozatban szereplő teljesítmény(ek):
Mechanikus szilárdság és stabilitás (BWR 1)
Karakterisztikus ellenállás húzásra (statikus és kvázi-statikusan terhelések) Módszer A:
1 Ellenállás acél szakadás tönkremenetel esetén: Mellékletet C1
2 Ellenállás kihúzószakadás tönkremenetel esetén: Mellékletet C1
3 Ellenállás beton szakadókúp tönkremenetel esetén: Mellékletet C2
4 Ellenállóképesség: Mellékletet C1
5 Min. perem- és tengelytávolság: Mellékletet B2
6 Peremtávolság hasadási tönkremenetel megelőzésére: Mellékletet C2
Karakterisztikus ellenállás nyírásra (statikus és kvázi-statikusan terhelések):
7 Ellenállás acél szakadás tönkremenetel esetén (nyírás): Mellékletet C3
8 Ellenállás pry-out tönkremenetel esetén: Mellékletet C3
Karakterisztikus ellenállás az egyszerűbb tervezés érdekében:
9 Módszer B: NPD
10 Módszer C: NPD
Elmozdulások:
11 Elmozdulások statikus és kvázi-statikusan terhelés esetén: Mellékletet C5
Merevség:
12 Merevség az elasztikus tartományban húzóterhelés alatt: NPD
13 Merevségi jellemzők húzóterheléshez nemlineáris rugómodellek esetén: NPD
Jellemző ellenállás a C1 szeizmikus teljesítménykategóriához:
14 Ellenállás húzó terhelés esetén: NPD
15 Ellenállás nyíró terhelés esetén, Faktor Annuláris rés: NPD
Karakterisztikus ellenállás és elmozdulások a C2 szeizmikus teljesítménykategóriához:
16 Ellenállás húzó terhelés esetén, elmozdulások: NPD
17 Ellenállás nyíró terhelés esetén, elmozdulások, Faktor Annuláris rés: NPD
Biztonság tűz esetén (BWR 2)
18 Tűzzel szembeni viselkedés: Osztály (A1)
Tűzállóság:
19 Tűzállóság acél tönkremenetelnél (húzásra): Mellékletet C4
20 Tűzállóság kihúzószakadás tönkremenetel esetén (húzásra): Mellékletet C4
21 Tűzállóság acél tönkremenetel esetén (nyírásra): Mellékletet C4
Tartósság:
22 Tartósság: Mellékletet B1
- Megfelelő műszaki dokumentáció és/vagy egyedi műszaki dokumentáció: **–**

A fent azonosított termék teljesítménye megfelel a bejelentett teljesítmény(ek)nek. A 305/2011/EU rendeletnek megfelelően e teljesítménynyilatkozat kiadásáért kizárólag a fent meghatározott gyártó a felelős.

A gyártó nevében és részéről aláíró személy:



Dr. Christian Weber, Fejlesztési vezető
Tumlingen, 2026-08-01



Dieter Pfaff, Nemzetközi Termelési Szövetségért és Minőségért felelős vezérigazgató

Ez a Teljesítmény nyilatkozat különböző nyelveken elkészült. Vitás értelmezés esetén az angol verzió az irányadó.
A melléklet a (nyelvsemleges formában megadott) törvényi előírásokon túl önkéntesen megadott, kiegészítő információkat is tartalmaz angolul.

Translation guidance Essential Characteristics and Performance Parameters for Annexes

Mellékletek Alapvető jellemzői és Teljesítményparaméterei fordítási útmutató

Mechanical resistance and stability (BWR 1)		
Mechanikus szilárdság és stabilitás (BWR 1)		
Characteristic resistance under static and quasi-static loading, Method A		
Karakterisztikus ellenállás húzásra (statikus és kvázi-statisz terhelések) Módszer A:		
1	Resistance to steel failure: Ellenállás acél szakadás tönkremenetel esetén:	$N_{Rk,s}$ [kN], E_s [N/mm ²]
2	Resistance to pull-out failure: Ellenállás kihúzóadás tönkremenetel esetén:	$N_{Rk,p}$ [kN], ψ_c
3	Resistance to concrete cone failure: Ellenállás beton szakadó kúp tönkremenetel esetén:	$k_{cr,N}$, $k_{ucr,N}$ [-], h_{ef} , $c_{cr,N}$ [mm]
4	Robustness: Ellenállóképesség:	γ_{inst} [-]
5	Minimum edge distance and spacing: Min. perem- és tengelytávolság:	c_{min} , s_{min} , h_{min} [mm]
6	Edge distance to prevent splitting under load: Peremtávolság hasadási tönkremenetel megelőzésére:	$N^0_{Rk,sp}$ [kN], $c_{cr,sp}$ [mm]
Characteristic resistance to shear load (static and quasi-static loading), Method A		
Karakterisztikus ellenállás nyírásra (statikus és kvázi-statisz terhelések):		
7	Resistance to steel failure under shear load: Ellenállás acél szakadás tönkremenetel esetén (nyírás):	$V^0_{Rk,s}$ [kN], $M^0_{Rk,s}$ [Nm], k_7 [-]
8	Resistance to pry-out failure: Ellenállás pry-out tönkremenetel esetén:	k_8 [-]
Characteristic Resistance for simplified design:		
Karakterisztikus ellenállás az egyszerűbb tervezés érdekében:		
9	Method B: Módszer 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: Módszer C:	F_{Rk} [kN], $M^0_{Rk,s}$ [Nm], c_{cr} , s_{cr} , h_{min} [mm]
Displacements		
Elmozdulások:		
11	Displacements under static and quasi-static loading: Elmozdulások statikus és kvázi-statisz terhelés esetén:	δ_{N0} , $\delta_{N50years}$, $\delta_{N100years}$, 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]
Merevség:		
12	Stiffness in the elastic range under tension loading Merevség az elasztikus tartományban húzóterhelés alatt:	$k_{A,ucr}$, $k_{A,cr}$ [N/mm]
13	Stiffness characteristics for tension loading for non-linear spring models Merevségi jellemzők húzóterheléshez nemlineáris rugómodellek esetén:	$k_{A,ucr}$, $k_{B,ucr}$, $k_{C,ucr}$, $k_{D,ucr}$ [N/mm] $k_{A,cr}$, $k_{B,cr}$, $k_{C,cr}$, $k_{D,cr}$ [N/mm]
Characteristic resistance for seismic performance category C1:		
Jellemző ellenállás a C1 szeizmikus teljesítménykategóriához:		
14	Resistance to tension load: Ellenállás húzó terhelés esetén:	$N_{Rk,s,C1}$ [kN], $N_{Rk,p,C1}$ [kN]
15	Resistance to shear load:, Factor annular gap: Ellenállás nyíró terhelés esetén:, Faktor Annuláris rés:	$V_{Rk,s,C1}$ [kN]
Characteristic resistance and displacements for seismic performance categorie C2:		
Karakterisztikus ellenállás és elmozdulások a C2 szeizmikus teljesítménykategóriához:		
16	Resistance to tension load, displacements: Ellenállás húzó terhelés esetén, elmozdulások:	$N_{Rk,s,C2}$ [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: Ellenállás nyíró terhelés esetén, elmozdulások, Faktor Annuláris rés:	$V_{Rk,s,C2}$ [kN], $\delta_{V,C2(0,5)}$, $\delta_{V,C2(0,8)}$ [mm]
Safety in case of fire (BWR 2)		
Biztonság tűz esetén (BWR 2)		
18	Reaction to fire: Tűzzel szembeni viselkedés:	Class
Resistance to fire:		
Tűzállóság:		
19	Fire resistance to steel failure (tension load): Tűzállóság acél tönkremenetelnél (húzásra):	$N_{Rk,s,fi}$ [kN]
20	Fire resistance to pull-out failure (tension load): Tűzállóság kihúzóadás tönkremenetel eseén (húzásra):	$N_{Rk,p,fi}$ [kN]
21	Fire resistance to steel failure (shear load): Tűzállóság acél tönkremenetel esetén (nyírásra):	$V_{Rk,s,fi}$ [kN], $M^0_{Rk,s,fi}$ [Nm]
Aspects of durability		
Tartósság:		
22	Durability: Tartósság:	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 skeleton (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
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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
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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
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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
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Resistance to fire

Fire resistance to steel failure under tension load	Annex C4
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Fire resistance to pull-out failure	Annex C4
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Fire resistance to steel failure under shear load	Annex C4
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3.3 Aspects of durability

Durability	Annex B1
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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.

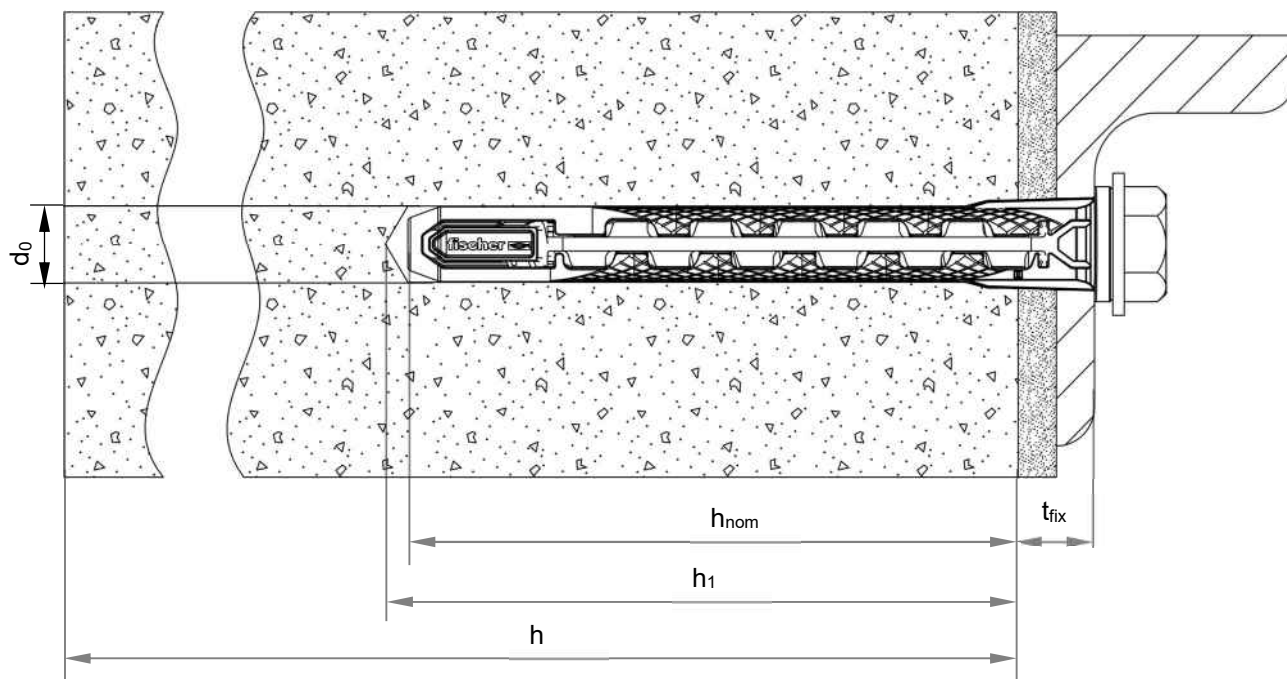
5 Technical details necessary for the implementation of the AVCP system, as provided for in the applicable EAD

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 Assessment:

- 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

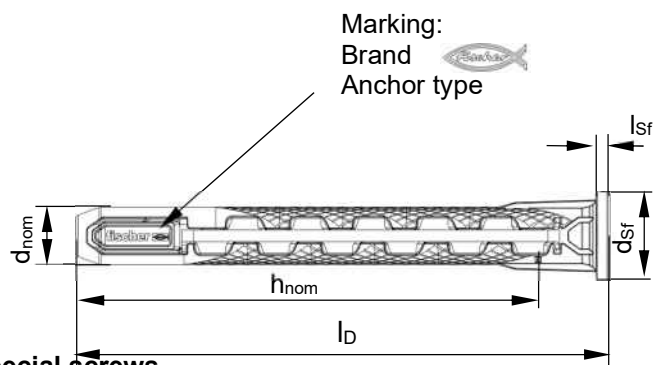
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Product description
Installed anchor

Annex A1

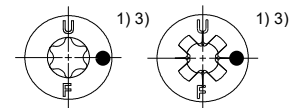
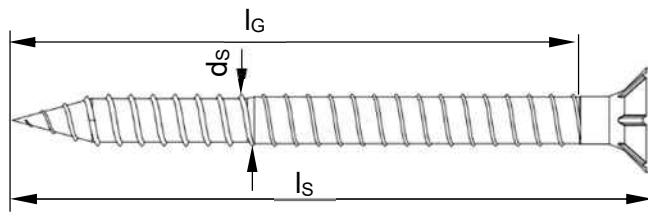
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Anchor sleeve – HybridPower

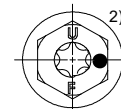
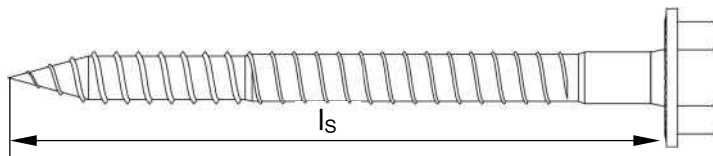


Special screws

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

fischer HybridPower

Product description

Anchor type and special screws
Marking and dimensions

Annex A2

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Table A3.1: Materials

Name	Material
HybridPower anchor sleeve	- Polyamide, PA6, colour: red
HybridPower skeleton	- 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 $\geq 6 \mu\text{m}$) <u>or</u> - Stainless steel "A2" of corrosion resistance class CRC II in accordance with EN 1993-1-4 <u>or</u> - Stainless steel "A4" or "R" of corrosion resistance class CRC III in accordance with EN 1993-1-4

fischer HybridPower**Product description**
Materials**Annex A3**

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Specifications of intended use

Anchorage 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.

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Intended use
Specifications

Annex B1

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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.

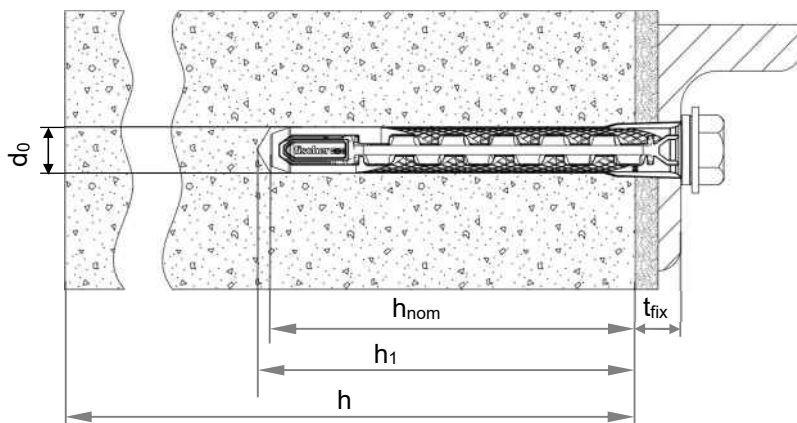


Table B2.2: Minimum thickness of concrete members, minimum edge distances and minimum spacing

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

Figure not to scale

fischer HybridPower

Intended use

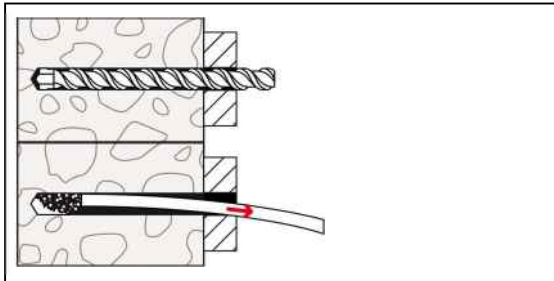
Installation parameters
Minimum thickness of member, edge distances and spacing

Annex B2

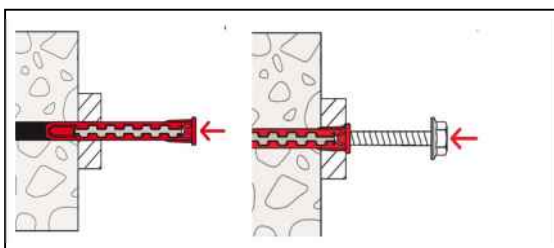
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Installation instructions

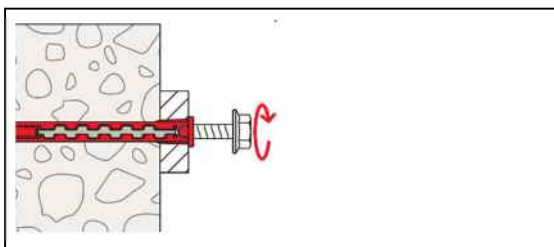
The following pictures show fixing through timber in concrete.



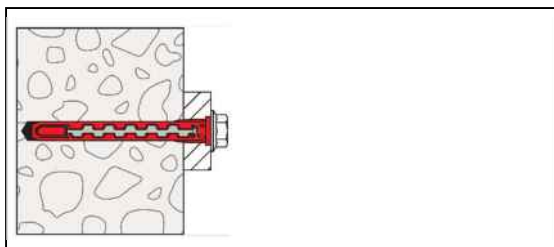
1. Drill the bore hole as per Table B2.1 using hammer drilling.
2. Remove dust from borehole.



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

fischer HybridPower

Intended use
Installation instructions

Annex B3

Appendix 11 / 16

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		$h_{nom} \geq$ [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	$\gamma_{Ms}^{1)}$	[-]	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 C30/37 C35/45 C40/50 C45/55 C50/60	[-]	1,00
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 C30/37 C35/45 C40/50 C45/55 C50/60	[-]		1,05
			1,08	
			1,12	
			1,15	
			1,18	
			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.

fischer HybridPower

Performances

Characteristic values of tension resistance under static and quasi-static action

Annex C1

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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	$h_{nom} \geq$ [mm]		80
Concrete cone and splitting failure			
Effective embedment depth for calculation	cracked concrete	$h_{ef,cr} \geq$ [mm]	35
	uncracked concrete	$h_{ef,ucr} \geq$ [mm]	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	$s_{cr,N,ucr}$ [mm]	159
Characteristic edge distance	cracked concrete	$c_{cr,N,cr}$ [mm]	53
	unracked concrete	$c_{cr,N,ucr}$ [mm]	80
Characteristic spacing for splitting failure	cracked concrete	$s_{cr,sp,cr}$ [mm]	$2 \times c_{cr,sp}$
	unracked concrete	$s_{cr,sp,ucr}$ [mm]	
Characteristic edge distance for splitting failure	cracked concrete	$c_{cr,sp,cr}$ [mm]	49
	unracked concrete	$c_{cr,sp,ucr}$ [mm]	53
Characteristic resistance to splitting	$N_{Rk,sp}^0$ [kN]		$\min \{N_{Rk,c}^0; N_{Rk,p}\}^{1)}$

¹⁾ $N_{Rk,c}^0$ according to EN 1992-4.

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Characteristic values of tension resistance under static and quasi-static action

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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	$V_{Rk,s}^0$ [kN]	10,80
	HybridPower A2		
	HybridPower A4		
	HybridPower R		
Partial factor for steel failure		$\gamma_{Ms}^{1)}$	1,29
Factor for ductility	HybridPower	k_7 [-]	0,80
	HybridPower A2		
	HybridPower A4		1,00
	HybridPower R		
Steel failure with lever arm and Concrete pryout failure			
Characteristic bending resistance	HybridPower	$M_{Rk,s}^0$ [Nm]	20,60
	HybridPower A2		
	HybridPower A4		
	HybridPower R		
Factor for pryout failure		k_8	1,00
Partial factor for steel failure		$\gamma_{Ms}^{1)}$ [-]	1,25
Concrete edge failure			
Effective embedment depth for calculation in cracked concrete		$l_{f,cr}$	35
Effective embedment depth for calculation in uncracked concrete		$l_{f,ucr}$ [mm]	53
Nominal diameter of a fastener		d_{nom}	10

¹⁾ In absence of other national regulations.

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Characteristic values of shear resistance under static and quasi-static action

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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}	$\geq$ [mm]	80	
Tension loading				
Characteristic resistance steel failure	$N_{Rk,s,fi}$	R30	0,45	
		R60	0,35	
		R90	0,25	
		R120	0,20	
Characteristic resistance Concrete cone failure	$N_{Rk,c,fi}$	R30 [kN]	1,20	
		- R90		
		R120	1,00	
Characteristic resistance pullout failure	$N_{Rk,p,fi}$	R30	0,45	
		R60	0,35	
		R90	0,25	
		R120	0,20	
Shear loading				
Characteristic resistance steel failure	$V_{Rk,s,fi}$	R30	2,00	
		R60	1,50	
		R90	1,00	
		R120	0,80	
Characteristic resistance pryout failure	$V_{Rk,cp,fi}$	R30 [kN]	1,20	
		- R90		
		R120	1,00	
Characteristic resistance concrete edge failure	$V_{Rk,c,fi}$	R30	5,60	
		- R90		
		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	$S_{cr,fi}$	140	
Edge distance	$C_{cr,fi}$	70	
		for fire exposure from more than one side $c_{min} \geq 300$ mm.	

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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 load¹⁾	
δ_{N0} - factor in cracked concrete	0,20
$\delta_{N\infty}$ - factor [mm/kN]	0,30
δ_{N0} - factor in uncracked concrete	0,60
$\delta_{N\infty}$ - factor	1,10

1) Calculation of effective displacement:

$$\delta_{N0} = \delta_{N0} - \text{factor} \times N$$

$$\delta_{N\infty} = \delta_{N\infty} - \text{factor} \times N$$

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 load²⁾	
δ_{V0} - factor in cracked and uncracked concrete [mm/kN]	6,50
$\delta_{V\infty}$ - factor	9,80

2) Calculation of effective displacement:

$$\delta_{V0} = \delta_{V0} - \text{factor} \times V$$

$$\delta_{V\infty} = \delta_{V\infty} - \text{factor} \times V$$

V = Action shear loading

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Displacements under tension and shear loads

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