



FR

DÉCLARATION DES PERFORMANCES

DoP 0349

pour le système d'injection fischer Superbond (fixation à scellement pour utilisation dans le béton)

1. Code d'identification unique du type de produit: DoP 0349

2. Usage(s) prévu(s): Fixation dans du béton fissuré ou non fissuré, voir annexes, en particulier les

annexes B1 - B17.

3. Fabricant: fischerwerke GmbH & Co. KG, Otto-Hahn-Straße 15, 79211 Denzlingen, Allemagne

4. Mandataire:

5. Système(s) d'évaluation et de vérification de la

constance des performances:

6. Document d'évaluation européen: EAD 330499-01-0601, Edition 04/2020

Evaluation Technique Européenne: ETA-12/0258; 2023-10-24

Organisme d'évaluation technique: DIBt- Deutsches Institut für Bautechnik

Organisme(s) notifié(s): 2873 TU Darmstadt

7. Performance(s) déclarée(s):

Résistance mécanique et stabilité (BWR 1)

Résistance caractéristique à la charge de traction (charge statique et quasi-statique):

Résistance à la rupture de l'acier (charge de traction): Annexes C1 - C3

Résistance à la rupture par extraction glissement: et rupture du cône béton: Annexes C4-C10

Résistance à la rupture du cône béton: Annexe C4

Distance au bord pour éviter la rupture par fendage sous charge: Annexe C4

Robustesse: Annexes C4-C10

Couple de serrage maxi: Annexes B4-B6,B8 Distance au bord et entraxe mini: Annexes B4 - B8

Résistance caractéristique à la charge de cisaillement (charge statique et quasi-statique):

Résistance à la rupture de l'acier: Annexes C2, C3 Résistance à la rupture par effet de levier: Annexe C4 Résistance à la rupture du béton en bord de dalle: Annexe C4

Déplacements sous charge à court et long terme:

Déplacements sous charge à court et long terme: Annexes C11, C12

Résistance caractéristique et déplacements pour les catégories de performance sismique C1 et C2:

Résistance à la charge de traction, catégorie C1: Annexes C13 - C15 Résistance à la charge de traction, catégorie C2: Annexes C13, C16 Résistance à la charge de cisaillement, catégorie C1: Annexes C13, C14 Résistance à la charge de cisaillement, catégorie C2: Annexes C13, C16

Facteur espace annulaire: Annexe C13

Hygiène, santé et environnement (BWR 3)

Contenu, émission et/ou rejet de substances dangereuses: NPD

8. <u>Documentation technique appropriée et/ou documentation technique spécifique:</u>

Les performances du produit identifié ci-dessus sont conformes aux performances déclarées. Conformément au règlement (UE) no 305/2011, la présente déclaration des performances est établie sous la seule responsabilité du fabricant mentionné ci-dessus.

Signé pour le fabricant et en son nom par:

Dr.-Ing. Oliver Geibig, Directeur Général Business Units & Ingénierie

Jürgen Grün, Directeur Général Chimie & Qualité

Tumlingen, 2023-11-07

Cette DoP a été préparée en plusieurs langues. En cas de différend relatif à l'interprétation, la version anglaise prévaudra.

L'annexe comprend des informations volontaires et complémentaires en langue anglaise dépassant les exigences légales (spécifiées de manière neutre).

Fischer DATA DOP_ECs_V92.xlsm 1/1



Translation guidance Essential Characteristics and Performance Parameters for Annexes

Guide de traduction des caractéristiques essentielles et des paramètres de performance pour les annexes

anial resistance and stability (DMD 4)						
nanical resistance and stability (BWR 1)						
	itique):	N _{Rk,s} [kN]				
		NRk,s [KIV]				
		7 4 7 104 21 0 11/05)				
	:	$\begin{split} &T_{Rk} \text{ and/or } T_{Rk,100} \left[\text{N/mm}^2\right], \psi^0_{\text{sus}} \left[\text{-}\right] \text{ (BF)} \\ &N_{Rk,p} \text{ and/or } N_{Rk,p,100} \left[\text{kN}\right] \text{ (BEF)} \end{split}$				
esistance to concrete cone failure:		c _{cr,N} [mm], k _{cr,N} , k _{ucr,N} [-]				
ésistance à la rupture du cône béton:						
dge distance to prevent splitting under load:		c _{cr,sp} [mm]				
sistance au bord pour éviter la rupture par fendage sous charge:						
cobustness:		Y _{inst} [-]				
obustesse:						
Maximum installation torque:		max T _{inst} [Nm] (BF)				
couple de serrage maxi:						
nstallation torque:		T _{inst} [Nm] (BEF)				
Couple de serrage:						
finimum edge distance and spacing:		c _{min} , s _{min} , h _{min} [mm]				
istance au bord et entraxe mini:						
acteristic resistance to shear load (static and quasi-static loading):		·				
stance caractéristique à la charge de cisaillement (charge statique et quas	i-statique):					
esistance to steel failure:		V ⁰ _{Rk,s} [kN], M ⁰ _{Rk,s} [Nm], k ₇ [-]				
ésistance à la rupture de l'acier:						
esistance to pry-out failure:		k ₈ [-]				
ésistance à la rupture par effet de levier:						
lesistance to concrete edge failure:		d _{nom} , I _f [mm]				
ésistance à la rupture du béton en bord de dalle:						
acements under short-term and long-term loading:						
acements sous charge à court et long terme:						
isplacements under short-term and long-term loading:		δ_0 , δ_{∞} [mm or mm/(N/mm ²)]				
, , , , , , , , , , , , , , , , , , , ,						
acteristic resistance and displacements for seismic performance categories C1	and C2:					
stance caractéristique et déplacements pour les catégories de performanc	e sismique	C1 et C2:				
esistance to tension load, displacements:						
ésistance à la charge de traction, catégorie C1:	C1	N _{Rk,s,C1} [kN] (all)				
		$T_{Rk,C1}$ [N/mm ²] (BF)				
		N _{Rk,p,C1} [kN] (BEF)				
ésistance à la charge de traction, catégorie C2:	C2	N _{Rk,s,C2} [kN] (all)				
		$T_{Rk,C2}[N/mm^2]$ (BF)				
		N _{Rk,p,C2} [kN] (BEF)				
	1	δ _{N,C2} [mm] (all)				
lésistance à la charge de cisaillement, catégorie C1:	C1	V _{Rk,s,C1} [kN] (all)				
ésistance à la charge de cisaillement, catégorie C2:	C2	$V_{Rk,s,C2}$ [kN] (all) $\delta_{V,C2}$ [mm] (all)				
actor annular gap:	_1	α _{qap} [-]				
acteur espace annulaire:		3-r - *				
ene, health and the environment (BWR 3)						
,						
ène, santé et environnement (BWR 3)						
ène, santé et environnement (BWR 3) Content, emission and/or release of dangerous substances:						
	stance mécanique et stabilité (BWR 1) racteristic resistance to tension load (static and quasi-static loading): stance caractéristique à la charge de traction (charge statique et quasi-static loading): stance caractéristique à la charge de traction): Resistance à la rupture de l'acier (charge de traction): Resistance à la rupture par extraction glissement: et rupture du cône béton Resistance à la rupture du cône béton: Resistance à la rupture pur éviter la rupture par fendage sous charge: Robustesse: Robustesse	stance mécanique et stabilité (BWR 1) racteristic resistance to tension load (static and quasi-static loading): stance caractéristique à la charge de traction (charge statique et quasi-statique): tesistance to steel failure: tésistance à la rupture de l'acier (charge de traction): tesistance à la rupture par extraction glissement: et rupture du cône béton: tesistance à la rupture que cone failure: tésistance à la rupture du cône béton: de distance to concrete cone failure: tésistance à la rupture du cône béton: de distance to prevent splitting under load: distance au bord pour éviter la rupture par fendage sous charge: tobustness: tobustness: tobustness: tobustness: tobustness: tobuste de serrage dinimum edge distance and spacing: distance au bord et entraxe mini: stateristic resistance to shear load (static and quasi-static loading): statance caractéristique à la charge de cisaillement (charge statique et quasi-statique): tésistance à la rupture de l'acier: tésistance à la rupture par effet de levier: tésistance à la rupture par effet de levier: tésistance à la rupture par effet de levier: tésistance à la rupture du béton en bord de dalle: lacements under short-term and long-term loading: lacements sous charge à court et long terme: déplacements on concrete deplacements for seismic performance categories C1 and C2: stance caractéristique et déplacements pour les catégories de performance sismique tesistance à la charge de traction, catégorie C2: C1 désistance à la charge de cisaillement, catégorie C2: c2 desistance à la charge de cisaillement, catégorie C2: c3 desistance à la charge de cisaillement, catégorie C2: c4 desistance à la charge de cisaillement, catégorie C2:				

Fischer DATA DOP_ECs_V92.xlsm Appendix 0

Specific Part

1 Technical description of the product

The injection system fischer Superbond is a bonded anchor for use in concrete consisting of a cartridge with injection mortar fischer FIS SB or a resin capsule fischer RSB and a steel element according to Annex A 5.

The steel element is placed into a drilled hole filled with injection mortar and is anchored via the bond between metal part, injection mortar and concrete.

The resin capsule is placed into a drilled hole and the steel element is driven by rotary hammer drill or tangential impact screw driver or cordless drill screw driver. The anchor rod is anchored via the bond between steel element, chemical mortar and concrete.

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 B 4 to B 8, C 1 to C 10
Characteristic resistance to shear load (static and quasi-static loading)	See Annex C 1 to C 4
Displacements under short-term and long-term loading	See Annex C 11 and C 12
Characteristic resistance and displacements for seismic performance categories C1 and C2	See Annex C 13 to C 16

3.2 Hygiene, health and the environment (BWR 3)

Essential characteristic	Performance
Content, emission and/or release of dangerous substances	No performance assessed

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

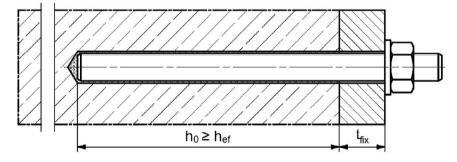
In accordance with the European Assessment Document EAD 330499-01-0601 the applicable European legal act is: [96/582/EC].

The system to be applied is: 1

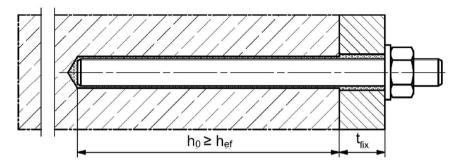
Installation conditions part 1

anchor rod or fischer anchor rod RG M with fischer injection system FIS SB

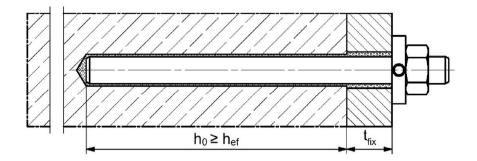
Pre-positioned installation



Push through installation (annular gap filled with mortar)



Pre-positioned or push through installation with subsequently injected fischer filling disk (annular gap filled with mortar)



Figures not to scale

 h_0 = drill hole depth

h_{ef} = effective embedment depth

 t_{fix} = thickness of fixture

fischer Superbond

Product description
Installation conditions part 1

Annex A 1

Appendix 3 / 42

Installation conditions part 2 Reinforcing bar with fischer injection system FIS SB $h_0 \ge h_{ef}$ fischer rebar anchor FRA with fischer injection system FIS SB Pre-positioned installation $h_0 \ge h_{nom}$ Push through installation (annular gap filled with mortar) $h_0 \ge h_{nom}$ Figures not to scale h_0 = drill hole depth h_{ef} = effective embedment depth overall fastener embedment depth in t_{fix} = thickness of fixture hnom the concrete

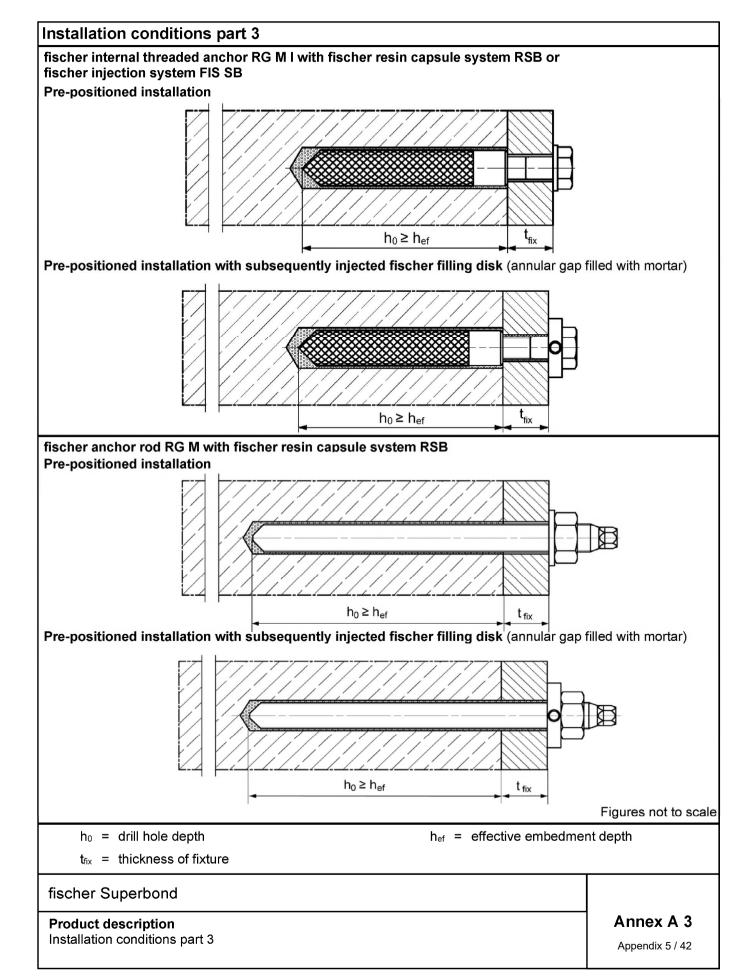
fischer Superbond

Product description

Installation conditions part 2

Annex A 2

Appendix 4 / 42



Overview system components Part 1 Injection cartridge (shuttle cartridge) with sealing cap; Size: 390 ml, 585 ml, 1500 ml Imprint: fischer FIS SB or FIS SB High Speed, processing notes, shelf-life. piston travel, scale (optional), curing times and processing times (depending on temperature), hazard code, size, volume Resin capsule Sizes: 8, 10 mini, 10, 12 mini, 12, 16 mini, 16, 16 E, 20, 20 E / 24, 30 RSB Static mixer FIS MR Plus for Injection cartridge 390 ml Static mixer FIS UMR Injection cartridges ≥ 585 ml Injection adapter and extension tube Ø 9 for static mixer FIS MR Plus; Injection adapter and extension tube Ø 9 or Ø 15 for static mixer FIS UMR Figures not to scale fischer Superbond Annex A 4 System description Overview system components part 1; Appendix 6 / 42 cartridges / capsule / static mixer / accessories

Overview system components Part 2 anchor rod Sizes: M8. M10. M12. M16. M20. M24. M27. M30 fischer anchor rod RG M Sizes: M8, M10, M12, M16, M20, M24, M30 fischer internal threaded anchor RG M I Size: M8, M10, M12, M16, M20 Screw / threaded rod / washer / hexagon nut fischer filling disc with injection adapter Reinforcing bar Nominal diameters: \$\phi 8\$, \$\phi 10\$, \$\phi 12\$, \$\phi 14\$, \$\phi 16\$, \$\phi 20\$, \$\phi 25\$, \$\phi 28\$, \$\phi 32\$ fischer rebar anchor FRA Sizes: M12, M16, M20, M24 Figures not to scale fischer Superbond Annex A 5 System description Overview system components part 2; Appendix 7 / 42 steel components, injection adapter

Overview system components Part 3 Cleaning brush BS Blow-out pump AB G Compressed-air cleaning tool ABP Figures not to scale fischer Superbond Annex A 6 System description Overview system components part 3; Appendix 8 / 42 cleaning brush / blow-out pump

Tab	le A7.1: Mate	erials					
Part	Designation		Material				
1	Injection cartridge		Mortar, hardener, filler				
		Steel		High corrosion resistant steel HCR 2)			
	Steel grade	zinc plated	acc. to EN 10088-1:2014 Corrosion resistance class CRC III acc. to EN 1993-1-4:2006+A1:2015	acc. to EN 10088-1:2014 Corrosion resistance class CRC V acc. to EN 1993-1-4:2006+A1:2015			
2	Anchor rod	Property class 4.8, 5.8 or 8.8; EN ISO 898-1:2013 zinc plated $\geq 5 \mu m$, EN ISO 4042:2022/Zn5/An(A2K) or hot dip galvanised $\geq 40 \mu m$ EN ISO 10684:2004 $f_{uk} \leq 1000 \text{ N/mm}^2$ $A_5 > 12\%$ fracture elongation	Property class 50, 70 or 80 EN ISO 3506-1:2020 1.4401; 1.4404; 1.4578; 1.4571; 1.4439; 1.4362; 1.4062, 1.4662, 1.4462; EN 10088-1:2014 $f_{uk} \le 1000 \text{ N/mm}^2$ $A_5 > 12\%$ fracture elongation	Property class 50 or 80 EN ISO 3506-1:2020 or property class 70 with f_{yk} = 560 N/mm² 1.4565; 1.4529; EN 10088-1:2014 f_{uk} ≤ 1000 N/mm² A_5 > 12% fracture elongation			
			5 > 8 %, for applications witho smic performance category C2				
3	Washer ISO 7089:2000	zinc plated ≥ 5 µm, EN ISO 4042:2022/Zn5/An(A2K), or hot dip galvanised ≥ 40 µm EN ISO 10684:2004	1.4401; 1.4404; 1.4578;1.4571; 1.4439; 1.4362; EN 10088-1:2014	1.4565; 1.4529; EN 10088-1:2014			
4	Hexagon nut	Property class 4, 5 or 8; EN ISO 898-2:2012 zinc plated ≥ 5 μm, EN ISO 4042:2022/Zn5/An(A2K), or hot dip galvanised ≥ 40 μm EN ISO 10684:2004	Property class 50, 70 or 80 EN ISO 3506-2:2020 1.4401; 1.4404; 1.4578; 1.4571; 1.4439; 1.4362; EN 10088-1:2014	Property class 50, 70 or 80 EN ISO 3506-2:2020 1.4565; 1.4529 EN 10088-1:2014			
5	fischer internal threaded anchor RG M I	Property class 5.8 ISO 898-1:2013 zinc plated ≥ 5 μm, EN ISO 4042:2022/Zn5/An(A2K)	Property class 70 EN ISO 3506-1:2020 1.4401; 1.4404; 1.4578; 1.4571; 1.4439; 1.4362; EN 10088-1:2014	Property class 70 EN ISO 3506-1:2020 1.4565; 1.4529; EN 10088-1:2014			
6	Commercial standard screw or threaded rod for fischer internal threaded anchor RG M I	Property class 5.8 or 8.8; EN ISO 898-1:2013 zinc plated \geq 5 μ m, EN ISO 4042:2022/Zn5/An(A2K) $A_5 > 8 \%$ fracture elongation	Property class 70 EN ISO 3506-1:2020 1.4401; 1.4404; 1.4578; 1.4571; 1.4439; 1.4362; EN 10088-1:2014 A ₅ > 8 % fracture elongation	Property class 70 EN ISO 3506-1:2020 1.4565; 1.4529; EN 10088-1:2014 A ₅ > 8 % fracture elongation			
7	fischer filling disk similar to DIN 6319-G	zinc plated ≥ 5 μm, EN ISO 4042:2022/Zn5/An(A2K) or hot dip galvanised ≥ 40 μm EN ISO 10684:2004	1.4401; 1.4404; 1.4578; 1.4571; 1.4439; 1.4362; EN 10088-1:2014	1.4565;1.4529; EN 10088-1:2014			
8	Reinforcing bar EN 1992-1-1:2004 and AC:2010, Annex C	Bars and de-coiled rods, class B of f_{yk} and k according to NDP or NCI of $f_{uk} = f_{tk} = k \cdot f_{yk} (A_5 > 8\%)$					
9	Rebar part: Bars and de-coiled rods class B or C with f_{yk} and k according to NDP or NCI of EN 1992-1-1:2004+AC:2010 / $f_{uk} = f_{tk} = k \cdot f_{yk} \ (A_5 > 8\%)$ Threaded part: Property class 80 EN ISO 3506-1:2020						
fisc	her Superbond						
	duct description			Annex A 7			
Mate	erials			Appendix 9 / 42			

Specifications of intended use part 1

Table B1.1: Overview use and performance categories, injection mortar system FIS SB

Anchorages subject to)	FIS SB with									
		Ancho	Anchor rod fischer internal threaded anchor RG M I				•	anchor FRA			
Hammer drilling with standard drill bit	\$4400000000 			V0000000000	all s	sizes					
Hammer drilling with hollow drill bit (fischer "FHD", Heller "Duster Expert"; Bosch "Speed Clean"; Hilti "TE-CD, TE-YD", DreBo "D-Plus", DreBo "D-Max")	Ī		Nominal drill bit diameter (d₀) 12 mm to 35 mm								
Diamond drilling					_	1)					
Static and quasi static loading, in	uncracked concrete cracked concrete	all sizes	Tables: C1.1 C4.1 C5.1 C11.1	all sizes	Tables: C2.1 C4.1 C7.1 C11.2	all sizes	Tables: C3.1 C4.1 C9.1 C12.1	all sizes	Tables: C3.2 C4.1 C10.1 C12.2		
Seismic performance category (only hammer drilling with	C1	all sizes	Tables: C13.1 C14.2 C15.1	_	1)	Tables: C14.1 C14.2 C15.2 C15.2					
standard / hollow drill bits)	C2	M12 M16 M20 M24	Tables: C13.1 C14.2 C16.1			_1)	_1)	-	Í		
Use I1	dry or wet concrete				all s	sizes					
category I2	water filled hole				-	1)					
Installation direction			D3 (down	ward and I	norizontal	and upwa	rds (e.g.,	overhead))			
Installation method			ŗ	•	•	sh through		n			
Installation						C to T _{i,max} =					
temperature 			3 High Sp	•		C to T _{i,max} =					
·	ature range I		C to +40 °			/ T _{It} = +24					
	ature range II		C to +80 °			/ T _{It} = +50					
temperature _{Tempera}			to +120 °			$C / T_{lt} = +7$					
l empera	ture range IV	-40 °C	to +150 °	l st	= +150 °(C / T _{It} = +9	U TC				
- No periorillance							T				
Intended use Specifications part 1		tion made	r evetem !	EIQ QD				Annex Appendix			

Specifications of intended use part 2

Table B2.1: Overview use and performance categories, resin capsule system RSB

Anchorages subject	to	RSB with						
		fischer anch	or rod RG M	fischer internal thre	aded anchor RG MI			
Hammer drilling with standard drill bit	5444000000		all s	sizes				
Hammer drilling with hollow drill bit (fischer "FHD", Heller "Duster Expert"; Bosch "Speed Clean"; Hilti "TE-CD, TE-YD", DreBo "D-Plus", DreBo "D-Max")	Ī		it diameter (d₀) o 35 mm	all sizes				
Diamond drilling			all s	izes 1)				
Static and quasi	uncracked concrete	all sizes	Tables: C1.1	all sizes	Tables: C2.1			
static loading, in	cracked concrete	all sizes 1)	C4.1 C6.1 C11.1	all sizes 1)	C4.1 C8.1 C11.2			
Seismic performance category (only	C1	all sizes	Tables: C13.1 C14.2 C15.1	_	2)			
hammer drilling with standard / hollow drill bits)	C2	_2)						
Use I1	dry or wet concrete		all s	sizes				
category l2	water filled hole		alls	sizes				
Installation direction		D3 (down	ward and horizontal	and upwards (e.g. o	overhead))			
Installation method			only pre-position	oned installation				
Installation temperat	ture		T _{i,min} = -30 °C	to T _{i,max} = +40 °C				
Tempo	erature range I	-40 °C to +40 °	$T_{st} = +40 \text{ °C}$	/ T _{It} = +24 °C				
Service Tempe	rature range II	-40 °C to +80 °($T_{st} = +80 \text{ °C}$	/ T _{It} = +50 °C				
temperature Temper	rature range III	-40 °C to +120 °	C T _{st} = +120 °C	C / T _{It} = +72 °C				
Temper	rature range IV	-40 °C to +150 °	C T _{st} = +150 °C	C / T _{It} = +90 °C				
1) For diamond dri 2) No performance		concrete only nomi	nal drill bit diameter	s (d₀) ≥ 18 mm are p	ermitted.			

fischer Superbond	
Intended use Specifications part 2, fischer resin capsule system RSB	Annex B 2 Appendix 11 / 42

Specifications of intended use part 3

Base materials:

 Compacted reinforced or unreinforced normal weight concrete without fibres of strength classes C20/25 to C50/60 according to EN 206:2013+A1:2016

Use conditions (Environmental conditions):

- Structures subject to dry internal conditions
 (zinc coated steel, stainless steel or high corrosion resistant steel).
- For all other conditions according to EN1993-1-4:2006+A1:2015 corresponding to corrosion resistance classes to Annex A 7 Table A7.1.

Design

- Fastenings have to be designed by a responsible engineer with experience of concrete anchor design.
- Verifiable calculation notes and drawings are to be 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.).
- Fastenings are designed in accordance with:
 EN 1992-4:2018 and EOTA Technical Report TR 055, Edition February 2018.

Installation:

- Fastener installation is to be 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: The hole shall be filled with mortar.
- Fastening depth should be marked and adhered to on installation.
- Overhead installation is allowed (necessary equipment see installation instruction).

fischer Superbond	
Intended use	Annex B 3
Specifications part 3	Appendix 12 / 42

Installation parameters for anchor rods in combination with injection Table B4.1: mortar system FIS SB

Anchor rods			Thread	M8	M10	M12	M16	M20	M24	M27	M30
Nominal drill hole	diameter	d₀		10	12	14	18	24	28	30	35
Drill hole depth		h ₀] [h ₀ ≥ h _{ef}						•	
Cff a atil va a mala a din	a a m t al a m th	h _{ef, min}] [60	60	70	80	90	96	108	120
Effective embedn	nent depth	h _{ef, max}] [160	200	240	320	400	480	540	600
Minimum spacing edge distance	and minimum	S _{min} = C _{min}	[mm]	40	45	55	65	85	105	120	140
Diameter of the clearance hole of the fixture	pre-positioned installation	d _f		9	12	14	18	22	26	30	33
	push through installation	d _f		11	14	16	20	26	30	33	40
Min. thickness of concrete member h _{min}] [h _{ef} + 30 (≥ 100)			h _{ef} + 2d ₀					
Maximum setting	torque	max T _{inst}	[Nm]	10	20	40	60	120	150	200	300



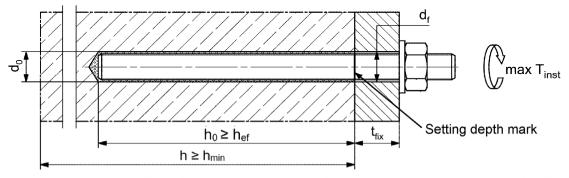


Marking (on random place) fischer anchor rod:

Steel zinc plated PC¹) 8.8	• or +	Steel hot-dip PC ¹⁾ 8.8	•			
High corrosion resistant steel HCR PC ¹⁾ 50	•	High corrosion resistant steel HCR PC ¹⁾ 70	-			
High corrosion resistant steel HCR PC ¹⁾ 80	(Stainless steel R property class 50	~			
Stainless steel R property class 801)	*					
Alternatively: Colour coding according to DIN 976-1: 2016						

¹⁾ PC = property class

Installation conditions:



Commercial standard threaded rods, washers and hexagon nuts may also be used if the following requirements are fulfilled:

- Materials, dimensions and mechanical properties according to Annex A 7, Table A7.1.
- Inspection certificate 3.1 according to EN 10204:2004, the documents have to be stored.
- Setting depth is marked.

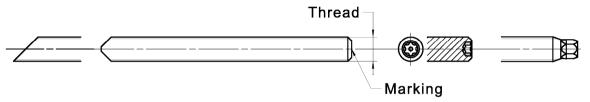
Figures not to scale

fischer Superbond Annex B 4 Intended use Installation parameters for anchor rods in combination with injection mortar system Appendix 13 / 42 FIS SB

Table B5.1: Installation parameters for fischer anchor rods RG M in combination with resin capsule system RSB

Anchor rod RG M		Thread	M8	M10	M12	M16	M20	M24	M30
Nominal drill hole diameter	d ₀		10	12	14	18	25	28	35
Drill hole depth	h ₀] [h₀≥ h _{ef}			
	h _{ef,1}] [75	75	95			
Effective embedment depth	h _{ef,2}] [80	90	110	125	170	210	280
	h _{ef,3}] [150	150	190	210		
Minimum spacing and minimur edge distance	n S _{min} = C _{min}	[mm]	40	45	55	65	85	105	140
Diameter of the pre- clearance hole of position the fixture installati			9	12	14	18	22	26	33
Min. thickness of concrete member	h _{min}			h _{ef} + 30 (≥ 100)			h _{ef} +	- 2d ₀	•
Maximum setting torque	max T _{inst}	[Nm]	10	20	40	60	120	150	300

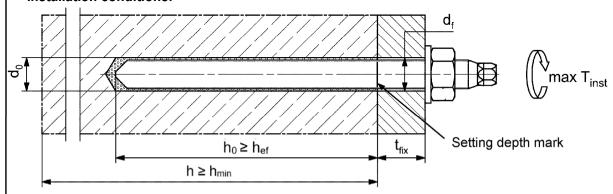
fischer anchor rod RG M



Marking (on random place) fischer anchor rod RG M:

Steel zinc plated PC¹) 8.8	• or +	Steel hot-dip PC ¹⁾ 8.8	•
High corrosion resistant steel HCR PC1) 50	•	High corrosion resistant steel HCR PC ¹⁾ 70	-
High corrosion resistant steel HCR PC ¹⁾ 80	(Stainless steel R property class 50	~
Stainless steel R property class 80	*		3
Alternatively: Colour coding according to DIN 9	76-1:2016	¹⁾ PC = property	class

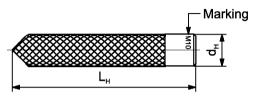
Installation conditions:

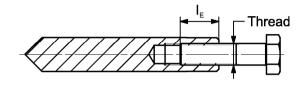


fischer Superbond	
Intended use Installation parameters for fischer anchor rods RG M in combination with resin capsule system RSB	Annex B 5 Appendix 14 / 42

Table B6.1: Installation parameters for fischer internal threaded anchors RG M I											
Internal threaded anchor RG M	I	Thread	M8	M10	M12	M16	M20				
Sleeve diameter	$d_{nom} = d_H$		12	16	18	22	28				
Nominal drill hole diameter	d ₀		14	18	20	24	32				
Drill hole depth				$h_0 \ge h_{ef} = L_H$							
Effective embedment depth (h _{ef} = L _H)	h _{ef}		90	90	125	160	200				
Minimum spacing and minimum edge distance	S _{min} = C _{min}	[mm]	55	65	75	95	125				
Diameter of clearance hole in the fixture	df		9	12	14	18	22				
Minimum thickness of concrete member	h _{min}		120	125	165	205	260				
Maximum screw-in depth	I _{E,max}	1	18	23	26	35	45				
Minimum screw-in depth	I _{E,min}	1	8	10	12	16	20				
Maximum installation torque	max T _{inst}	[Nm]	10	20	40	80	120				

fischer internal threaded anchor RG M I





Marking:

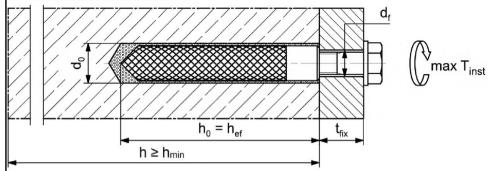
Anchor size e. g.: M10

Stainless steel → additional R; e.g.: M10 R

High corrosion resistant steel R→ additional C; e.g.: M10 HCR

Retaining bolt or threaded rods (including nut and washer) must comply with the appropriate material and strength class of **Annex A 7**, **Table A7.1**.

Installation conditions:



fischer Superbond	
Intended use Installation parameters for fischer internal threaded anchors RG M I	Annex B 6 Appendix 15 / 42

Table B7.1: Installation parameters for reinforcing bars											
Nominal diameter of the bar		ф	8 ¹⁾	10 ¹⁾	12 ¹⁾	14	16	20	25	28	32
Nominal drill hole diameter	d₀		10 12	12 14	14 16	18	20	25	30	35	40
Drill hole depth	h o						h₀ ≥ he				
Effective embedment death	$\mathbf{h}_{ef,min}$		60	60	70	75	80	90	100	112	128
Effective embedment depth	h _{ef,max}]	160	200	240	280	320	400	500	560	640
Minimum spacing and minimum edge distance	S _{min} = C _{min}	[mm]	40	45	55	60	65	85	110	130	160
Minimum thickness of concrete member h _m			1	+ 30 : 100)		•	•	h _{ef} + 2	2 d 0		

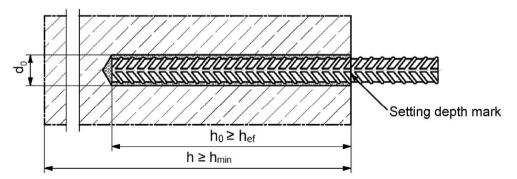
¹⁾ Both drill hole diameters can be used

Reinforcing bar



- The minimum value of related rib area f_{R,min} must fulfil the requirements of EN 1992-1-1:2004+AC:2010
- The rib height must be within the range: $0.05 \cdot \phi \le h_{rib} \le 0.07 \cdot \phi$ (ϕ = Nominal diameter of the bar, h_{rib} = rib height)

Installation conditions:



fischer Superbond	
Intended use	Annex B 7
Installation parameters reinforcing bars	Appendix 16 / 42

Table B8.1:	Installation p	aramete	ers for f	ischer	rebar	anchor FRA			
Rebar anchor FR	A		Thread	M1	2 ¹⁾	M16	M20	M24	
Nominal diameter	ф		1:	2	16	20	25		
Nominal drill hole diameter d ₀				14	16	20	25	30	
Drill hole depth	h ₀				h _{ef}	+ _e			
Egg. at the second second	h _{ef,min}		70	0	80	90	96		
Effective embedme	h _{ef,max}		140		220	300	380		
Distance concrete welded joint	le		100						
Minimum spacing and minimum edge distance		S _{min} = C _{min}	[mm]	55		65	85	105	
Diameter of	pre-positioned anchorage	≤ d _f		14	4	18	22	26	
clearance hole in the fixture	push through anchorage	≤ d _f		18	8	22	26	32	
Minimum thickness of concrete member hn		h _{min}		h ₀ + 30 (≥ 100)			h ₀ + 2d ₀		
Maximum installation torque max T			[Nm]	40	0	60	120	150	

¹⁾ Both drill hole diameters can be used

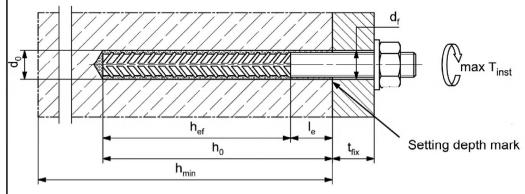
fischer rebar anchor FRA



Marking frontal e. g:

FRA (for stainless steel);
FRA HCR (for high corrosion resistant steel)

Installation conditions:



fischer Superbond	
Intended use	Annex B 8
Installation parameters rebar anchor FRA	Appendix 17 / 42

Table B9.	1:	Dimer	nsion o	f resin	capsu	le RSI	3						
Resin capsule RSB		RSB 8	RSB 10 mini	RSB 10	RSB 12 mini	RSB 12	RSB 16 mini	RSB 16	RSB 16 E	RSB 20	RSB 20 E / 24	RSB 30	
Capsule diameter	er dp 9,0		9,0	10,5		12,5		16,5			23,0		27,5
Capsule length	LP	[mm]	85	72	90	72	97	72	95	123	160	190	260



Table B9.2: Assignment of resin capsule RSB to fischer anchor rod RG M

Anchor rod RG M			M8	M10	M12	M16	M20	M24	M30
Effective embedment depth	h _{ef, 1}	[mm]		75	75	95			
Related capsule RSB		[-]		10 mini	12 mini	16 mini			
Effective embedment depth	h _{ef, 2}	[mm]	80	90	110	125	170	210	280
Related capsule RSB		[-]	8	10	12	16	20	20 E/ 24	30
Effective embedment depth	h _{ef, 3}	[mm]		150	150	190	210		
Related capsule RSB		[-]		2 x 10 mini	2 x 12 mini	2 x 16 mini	20 E / 24		

Table B9.3: Assignment of resin capsule RSB to fischer internal threaded anchor RG M I

Internal threaded anchor RG M I			М8	M10	M12	M16	M20
Effective embedment depth	h _{ef}	[mm]	90	90	125	160	200
Related capsule RSB		[-]	10	12	16	16 E	20 E / 24

fischer	Superbond
---------	-----------

Intended use

Dimensions of the capsules; Assignment of the capsule to the fischer anchor rod RG M and fischer internal threaded anchor RG M I

Annex B 9

Appendix 18 / 42

Table B10.1: Combined setting methods for resin capsule RSB with fischer anchor rod RG M

Anchor rod RG M	Minimum temper- ature at anchoring base [°C]	Minimum tem- perature of the resin capsule [°C]	M8	M10	M12	M16	M20	M24	M30
Rotary hammer	-30	-15	√						
Tangential impact screw driver	-10	-10	-	√	√	√	-	-	-
Cordless drill screw driver	-10	5	✓	√	√	√	-	-	-

Table B10.2: Combined setting methods for resin capsule RSB with fischer internal threaded anchor RG M I

fischer internal threaded anchor RG M I	Minimum temper- ature at anchoring base [°C]	Minimum tem- perature of the resin capsule [°C]	M8	M10	M12	M16	M20
Rotary hammer	-30	-15	✓	✓	✓	✓	✓
Tangential impact screw driver	-10	-10	✓	✓	✓	-	-
Cordless drill screw driver	-10	5	✓	✓	✓	-	-

Combined setting methods for resin capsule RSB with fischer anchor rod RG M or fischer internal threaded anchor RG M I

Annex B 10

Appendix 19 / 42

Table B11.1: Parameters of the cleaning brush BS (steel brush with steel bristles)

The size of the cleaning brush refers to the drill hole diameter

Nominal drill hole diameter	d₀		10	12	14	16	18	20	24	25	28	30	32	35	40
Steel brush diameter BS	dь	[mm]	11	14	16	2	0	25	26	27	30		40		-
Steel brush diameter BSB	dь		-	-	-	-	-	-	-	-	-		-		42



Table B11.2: Conditions for use static mixer without an extension tube

Nominal drill hole diameter	d ₀		10	12	14	16	18	20	24	25	28	30	35	40
Drill hole depth h ₀	FIS MR Plus	[mm]	≤ 9	90	≤ 120	≤ 140	≤ 150	≤ 160	≤ 190			≤ 210		
by using	FIS UMR		-	-	≤ 90	≤ 160	≤ 180	≤ 190	≤ 2	220		≤ 2	250	

Table B11.3: Maximum processing time of the mortar and minimum curing time (During the curing time of the mortar the concrete temperature may not fall below the listed minimum temperature. Minimal cartridge temperature +5 °C; minimal resin capsule temperature -15 °C)

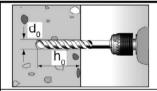
Temperature at	l '.	ocessing time	Mi	nimum curing til	me
anchoring base [°C]	FIS SB	FIS SB High Speed	FIS SB	FIS SB High Speed	RSB
-30 to -20					120 h
> -20 to -15		60 min		24 h	48 h
> -15 to -10	60 min	30 min	36 h	8 h	30 h
> -10 to -5	30 min	15 min	24 h	3 h	16 h
> -5 to 0	20 min	10 min	8 h	2 h	10 h
> 0 to 5	13 min	5 min	4 h	1 h	45 min
> 5 to 10	9 min	3 min	2 h	45 min	30 min
> 10 to 20	5 min	2 min	1 h	30 min	20 min
> 20 to 30	4 min	1 min	45 min	15 min	5 min
> 30 to 40	2 min		30 min		3 min

fischer Superbond	
Intended use Cleaning brush (steel brush) Processing time and curing time	Annex B 11 Appendix 20 / 42

Installation instructions part 1; Injection mortar system FIS SB

Drilling and cleaning the hole (hammer drilling with standard drill bit)

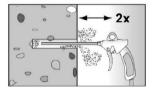
1



Drill the hole

Nominal drill hole diameter d_0 and drill hole depth h_0 see Tables B4.1, B6.1, B7.1, B8.1.

2

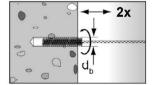


Clean the drill hole:

Blow out the drill hole twice, with oil free compressed air ($p \ge 6$ bar) In uncracked concrete the use of the manual blow-out pump ABG is possible (Installation parameters: $d_0 < 18$ mm and $h_{ef} < 10d$)

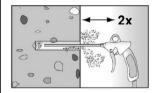


3



Brush the drill hole twice. For drill hole diameter ≥ 30 mm use a power drill. For deep holes use an extension. Corresponding brushes see **Table B11.1**.

4



Clean the drill hole:

Blow out the drill hole twice, with oil free compressed air ($p \ge 6$ bar) In uncracked concrete the use of the manual blow-out pump ABG is possible (Installation parameters: $d_0 < 18$ mm and $h_{ef} < 10d$)



Go to step 5 (Annex B 12)

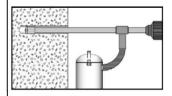
Drilling and cleaning the hole (hammer drilling with hollow drill bit)

1



Check a suitable hollow drill (see **Table B1.1**) for correct operation of the dust extraction.

2



Use a suitable dust extraction system, e. g. fischer FVC 35 M or a comparable dust extraction system with equivalent performance data.

Drill the hole with hollow drill bit. The dust extraction system has to extract the drill dust nonstop during the drilling process and must be adjusted to maximum power. Nominal drill hole diameter **d**₀ and drill hole depth **h**₀ see **Tables B4.1**, **B6.1**, **B7.1**, **B8.1**.

Go to step 5 (Annex B 12)

fischer Superbond

Intended use

Installation instructions part 1; injection mortar system FIS SB

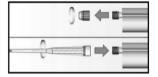
Annex B 12

Appendix 21 / 42

Installation instructions part 2; injection mortar system FIS SB

Preparing the cartridge

5



Remove the sealing cap

Screw on the static mixer (the spiral in the static mixer must be clearly visible).

6





Place the cartridge into the dispenser.

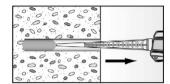
7

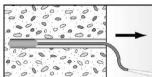




Extrude approximately 10 cm of material out until the resin is evenly grey in colour. Do not use mortar that is not uniformly grey.

Injection of the mortar





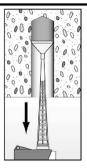
8

For h_0 = $h_{\rm ef}$ fill approximately 2/3 of the drill hole with mortar. For h_0 > $h_{\rm ef}$ more mortar is needed. Always begin from the bottom of the hole and avoid bubbles.



The conditions for mortar injection without extension tube can be found in **Table B11.2.**

For deeper drill holes, than those mentioned in **Table B11.2**, use a suitable extension tube.



For overhead installation, deep holes ($h_0 > 250$ mm) or drill hole diameter ($d_0 \ge 30$ mm) use an injection-adapter.

Go to step 9 (Annex B 13)

fischer Superbond

Intended use

Installation instructions part 2; injection mortar system FIS SB

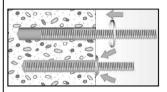
Annex B 13

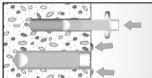
Appendix 22 / 42

Installation instructions part 3; injection mortar system FIS SB

Installation of anchor rods or fischer internal threaded anchors RG M I

9





Only use clean and oil-free metal part. Mark the setting depth of the metal part. Push the anchor rod or fischer internal threaded RG M I anchor down to the bottom of the hole, turning it slightly while doing so.

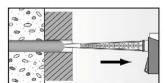
After inserting the metal part, excess mortar must be emerged around the anchor element. If not, pull out the metal part immediately and reiniect mortar.

9a



For overhead installations support the metal part with wedges.

(e. g. fischer centering wedges).



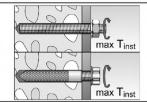
For push through installation fill the annular gap with mortar.

10



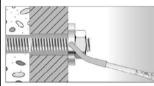
Wait for the specified curing time t_{cure} see **Table B11.3**.

11



Mounting the fixture max T_{inst} see **Tables B4.1** and **B6.1**.

Option

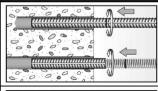


After the minimum curing time is reached, the gap between metal part and fixture (annular clearance) may be filled with mortar via the fischer filling disc. Compressive strength ≥ 50 N/mm² (e.g. fischer injection mortars FIS HB, FIS SB, FIS V, FIS EM Plus).

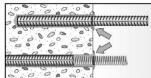
ATTENTION: Using fischer filling disc reduces t_{fix} (usable length of the anchor).

Installation reinforcing bars and fischer rebar anchor FRA

9



Only use clean and oil-free reinforcing bars or fischer FRA. Mark the setting depth. Turn while using force to push the reinforcement bar or the fischer FRA into the filled hole up to the setting depth mark.



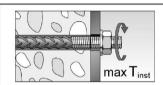
When the setting depth mark is reached, excess mortar must be emerged from the mouth of the drill hole. If not, pull out the anchor element immediately and reinject mortar.

10



Wait for the specified curing time t_{cure} see **Table B11.3**.

11



Mounting the fixture max T_{inst} see **Table B8.1**.

fischer Superbond

Intended use

Installation instructions part 3; injection mortar system FIS SB

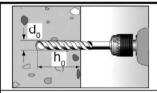
Annex B 14

Appendix 23 / 42

Installation instructions part 4; resin capsule RSB

Drilling and cleaning the hole (hammer drilling with standard drill bit)

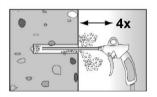
1



Drill the hole.

Nominal drill hole diameter d₀ and drill hole depth h₀ see Tables B5.1 and B6.1

2



Clean the drill hole:

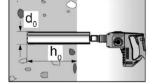
Blow out the drill hole four times, with oil free compressed air ($p \ge 6$ bar) In uncracked concrete the use of the manual blow-out pump ABG is possible (Installation parameters: $d_0 < 18$ mm and $h_{ef} < 10d$)



Go to step 6 (Annex B 16)

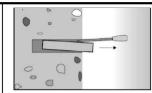
Drilling and cleaning the hole (wet drilling with diamond drill bit)

1



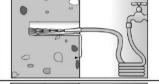
Drill the hole.

Drill hole diameter d₀ and drill hole depth h₀ see **Tables B5.1** and **B6.1**



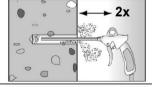
Break the drill core and remove it.

2



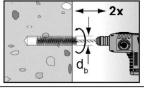
Flush the drill hole with clean water until it flows clear.

3



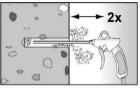
Blow out the drill hole twice, using oil-free compressed air (p > 6 bar).

4



Brush the drill hole twice using a power drill. Corresponding brushes see **Table B11.1**.

5



Blow out the drill hole twice, using oil-free compressed air (p > 6 bar).

Go to step 6 (Annex B 16)

fischer Superbond

Intended use

Installation instructions part 4; resin capsule RSB

Annex B 15

Appendix 24 / 42

Installation instructions part 5; resin capsule RSB

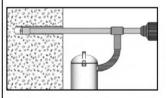
Drilling and cleaning the hole (hammer drilling with hollow drill bit)





Check a suitable hollow drill (see **Table B2.1**) for correct operation of the dust extraction.

2



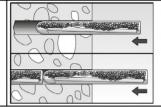
Use a suitable dust extraction system, e. g. fischer FVC 35 M or a comparable dust extraction system with equivalent performance data.

Drill the hole with hollow drill bit. The dust extraction system has to extract the drill dust nonstop during the drilling process and must be adjusted to maximum power. Nominal drill hole diameter **d**₀ and drill hole depth **h**₀ see **Tables B5.1** and **B6.1**

Go to step 6 (Annex B 16)

Installation fischer anchor rod RG M or fischer internal threaded anchor RG M I

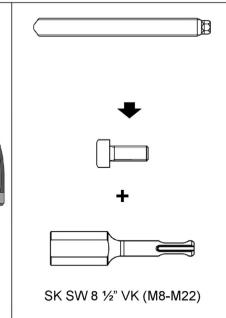
6

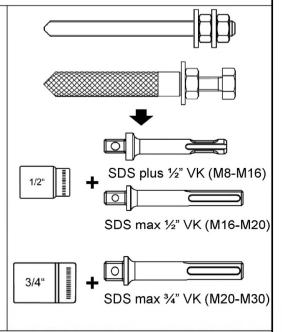


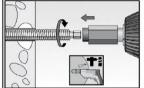
Insert the resin capsule into the drill hole by hand. Suitable resin capsule RSB or RSB mini see **Table B9.2**.

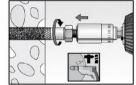
Installation with rotary hammer











Only use clean and grease-free metal parts. Using a suitable adapter, drive the fischer anchor rod RG M or the fischer internal threaded anchor RG M I into the capsule using a rotary hammer on rotary hammer mode. Stop when the metal parts reaches the bottom of the hole and is set to the correct embedment depth.

fischer Superbond

Intended use

Installation instructions part 5; resin capsule RSB

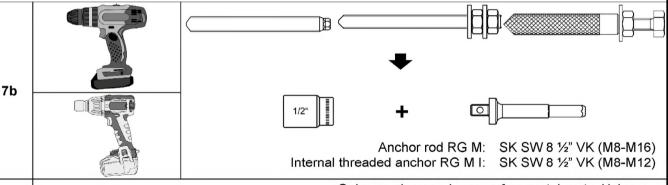
Annex B 16

Appendix 25 / 42

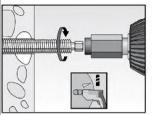
Installation instructions part 6; resin capsule RSB

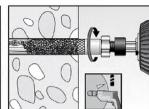
Installation fischer anchor rod RG M or fischer internal threaded anchor RG M I (continue)

Installation with cordless drill or tangential impact screwdriver (Specification according to step 7c)



7с

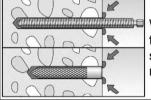




Only use clean and grease-free metal parts. Using a suitable adapter, drive the fischer anchor rod RG M or the fischer internal threaded anchor RG M I into the capsule using a cordless drill screwdriver (only drilling operation, torque = 0 - 32 Nm and idle speed = 0 - 450 revolutions per minute, e.g., FEIN ASB 18, 1st gear or equivalent power tool) or tangential impact screw driver (torque = 0 - 400 Nm and idle speed = 0-2.150 revolutions per minute; e.g. fischer FSS 18V 400BL, torque setting 12 or equivalent power tool).

Stop when the metal parts reaches the bottom of the hole and is set to the correct embedment depth.

8



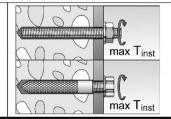
When reaching the correct embedment depth, excess mortar must emerge from the mouth of the drill hole. If not, the metal parts must be pulled out directly and a second resin capsule must be pushed into the drill hole. Setting process must be repeated (Step 7).

9



Wait for the specified curing time, t_{cure} see **Table B11.3**.

10



Mounting the fixture max T_{inst} see **Tables B5.1** and **B6.1**.

fischer Superbond

Intended use

Installation instructions part 6; resin capsule RSB

Annex B 17

Appendix 26 / 42

Table C1.1: Characteristic resistance to steel failure under tension / shear loading of fischer anchor rods and standard threaded rods

Anch	or rod / standard thre	aded rod			M8	M10	M12	M16	M20	M24	M27	M30		
Chara	acteristic resistance to	o steel fa	ilure	unde	r tensio	n loadin	g ³⁾							
g g			4.8		15(13)	23(21)	33	63	98	141	184	224		
Characteristic esistance N _{RK,s}	Steel zinc plated	>	5.8		19(17)	29(27)	43	79	123	177	230	281		
Characteristic esistance N _{Rk}		Property class	8.8 50	FI- N 13	29(27)	47(43)	68	126	196	282	368	449		
arac stan	Stainless steel R and	rop cla	50	[kN]	19	29	43	79	123	177	230	281		
Che esis	high corrosion	ш	70		26	41	59	110	172	247	322	393		
	resistant steel HCR		80		30	47	68	126	196	282	368	449		
Partia	al factors 1)													
.			4.8					1,	50					
[호	Steel zinc plated	≥	5.8					1,	50					
ial fae Yмs,∾		ropert class	8.8	[-]				1,	50					
Partial factor Yms,N	Stainless steel R and	Property class	50					2,						
۳ ا	high corrosion	_	70				1,87		r HCR: 1	1,50				
	resistant steel HCR		80					1,	60					
	acteristic resistance to	o steel fa	ilure	unde	r shear	loading	3) 							
witho	out lever arm													
Ω×̈́			4.8		9(8)	14(13)	20	38	59	85	110	135		
Characteristic esistance V ⁰ Rk,s	Steel zinc plated	. 4	5.8		11(10)	17(16)	25	47	74	106	138	168		
 		Property class	8.8	[kN]	15(13)	23(21)	34	63	98	141	184	225		
ara star	Stainless steel R and	9 2 3	50	[·····]	9	15	21	39	61	89	115	141		
Si C	high corrosion	_	70		13	20	30	55	86	124	161	197		
_	resistant steel HCR		80		15	23	34	63	98	141	184	225		
	ity factor		k 7	[-]				1	,0					
with I	ever arm				Γ	ı			Г		ı			
ر چ ک	_		4.8		15(13)	30(27)	52	133	259	448	665	899		
risti ⊠	Steel zinc plated	≯ "	5.8		19(16)	37(33)	65	166	324	560	833	1123		
Characteristic		Property class	8.8	[Nm]	30(26)	60(53)	105	266	519	896	1333	1797		
nara star	Stainless steel R and	Р С С	50	•	19	37	65	166	324	560	833	1123		
Characteristic resistance M ⁰ RK,s	high corrosion resistant steel HCR		70		26	52	92	232	454	784	1167	1573		
			80		30	60	105	266	519	896	1333	1797		
Partia	al factors 1)													
 5	Steel zinc plated		4.8						25 25					
act /	Steel Zille plated	erty ss	2.0		1.25									
Partial factor	Stainless steel R and	Property class	5.8 8.8 50	[-]	1.25 2.38									
Parl	high corrosion	₫,	70				1.56		HCR: 1	.25 ²⁾				
<u> </u>	resistant steel HCR		80						33					

fischer Superbond

Performances

Characteristic resistance to steel failure under tension and shear loading of fischer anchor rods and standard threaded rods

Annex C 1

Appendix 27 / 42

 $^{^{1)}}$ In absence of other national regulations $^{2)}$ Only admissible for high corrosion resistant steel C, with f_{yk} / $f_{uk} \ge 0.8$ and $A_5 > 12$ % (e.g. fischer anchor rods)

³⁾ Values in brackets are valid for undersized threaded rods with smaller stress area A_s for hotdip galvanized standard threaded rods according to EN ISO 10684:2004+AC:2009

Table C2.1: Characteristic resistance to steel failure under tension / shear loading of fischer internal threaded anchors RG M I

fischer internal	thread	ed anchors	RG M I		M8	M10	M12	M16	M20
Characteristic r	esistan	ce to steel	failure	unde	r tension loa	ding			•
		Property	5.8		19	29	43	79	123
Charact.	N.	class	8.8	FI-NIT	29	47	68	108	179
resistance with screw	$N_{Rk,s}$	Property	R	[kN]	26	41	59	110	172
301011		class 70	HCR		26	41	59	110	172
Partial factors ¹⁾									
		Property	5.8				1,50		
Partial factors	0.00	class	8.8	[-]			1,50		
Fartial factors	γMs,N	Property	R	נ־ן			1,87		
		class 70	HCR				1,87		
Characteristic r	esistan	ce to steel	failure	unde	r shear load	ing			
Without lever a	rm								
		Property	5.8		9,2	14,5	21,1	39,2	62,0
Charact. resistance with	$V^0_{Rk,s}$	class	8.8	[kN]	14,6	23,2	33,7	54,0	90,0
screw	V KK,S	Property	_R	[KIN]	12,8	20,3	29,5	54,8	86,0
		class 70	HCR		12,8	20,3	29,5	54,8	86,0
Ductility factor			k ₇	[-]			1,0		
With lever arm									
Ola 1		Property	5.8		20	39	68	173	337
Charact. resistance with	M^0 Rk,s	class	8.8	[Nm]	30	60	105	266	519
screw	IVI KK,S	Property	R	ניאיין	26	52	92	232	454
		class 70	HCR		26	52	92	232	454
Partial factors ¹⁾									
		Property	5.8				1,25		
Partial factors	7/84- \/	class	8.8	[-]			1,25		
i artial lactors	γMs,V	Property	R	[-]			1,56		
		class 70	HCR				1,56		

¹⁾ In absence of other national regulations

fischer	Superbond
---------	-----------

Characteristic resistance to steel failure under tension / shear loading of fischer internal threaded anchor RG M I

Table C3.1: Characteris reinforcing		tance	to steel fai	lure u	nder te	ension	and s	hear lo	pading	of
Nominal diameter of the bar		ф	8 10	12	14	16	20	25	28	32
Characteristic resistance to st	eel failure	unde	r tension load	ling						
Characteristic resistance	$N_{Rk,s}$	[kN]				A₅ · f uk²)			
Characteristic resistance to ste	eel failure	unde	r shear loadin	g						
Without lever arm										
Characteristic resistance	V^0 Rk,s	[kN]			k 6 ¹) ⋅ A _s ⋅ f	uk ²⁾			
Ductility factor	k 7	[-]				1,0				
With lever arm										
Characteristic resistance	M^0 Rk,s	[Nm]			1,2	· W _{el} ·	$f_{uk}^{2)}$			
= 0,5 for fasteners m = 0,5 for fasteners m ²⁾ f _{uk} respectively shall be tak Table C3.2: Characteris	nade of car nade of sta ken from th	bon stonistic	steel cifications of th	f _{uk} ≤ 10 ne rebar	000 N/m		and s	hear lo	oading	ı of
= 0,5 for fasteners m 2) fuk respectively shall be tak Table C3.2: Characteris fischer rek	nade of car nade of sta ken from th stic resist	bon stones inless ne spectance	eel with 500 < steel cifications of the to steel fai FRA	f _{uk} ≤ 10 ne rebar	000 N/m			hear lo		
= 0,5 for fasteners m 2) f _{uk} respectively shall be tak Table C3.2: Characteris fischer reb fischer rebar anchor FRA	nade of car nade of sta ken from th stic resisi	bon stonion in the special spe	eel with 500 < steel cifications of the to steel fai RA M12	f _{uk} ≤ 10 ne rebar lure ui	000 N/m		and s	hear lo	oading M2	
= 0,5 for fasteners m 2) fuk respectively shall be tak Table C3.2: Characteristic fischer reb fischer rebar anchor FRA Characteristic resistance to ste	nade of car nade of sta ken from th stic resist par anch eel failure	tance ors F	eel with 500 < steel cifications of the to steel fai RA M12 r tension load	f _{uk} ≤ 10 ne rebar lure ui	000 N/m		M20		M2	24
= 0,5 for fasteners m 2) fuk respectively shall be tak Table C3.2: Characteristic fischer recognised for the company of the	nade of car nade of sta ken from th stic resisi	bon stonion in the special spe	eel with 500 < steel cifications of the to steel fai RA M12	f _{uk} ≤ 10 ne rebar lure ui	000 N/m					24
= 0,5 for fasteners m 2) fuk respectively shall be tak Table C3.2: Characteristic fischer retains fischer rebar anchor FRA Characteristic resistance to stee Characteristic resistance Partial factor 1)	nade of car nade of sta ken from th stic resist par anch eel failure	ton strinless ne spectance nors Funder	eel with 500 < steel cifications of the to steel fai RA M12 r tension load	f _{uk} ≤ 10 ne rebar lure ui	000 N/m		M20		M2	24
= 0,5 for fasteners m 2) fuk respectively shall be tak Table C3.2: Characteristic resistance to ste Characteristic resistance Partial factor Partial factor	nade of car nade of sta ken from th stic resist par anch eel failure NRk,s	tance ors F under [kN]	eel with 500 < steel cifications of the to steel fairs. M12 r tension load 62,1	f _{uk} ≤ 10 ne rebar lure ui	000 N/m	ension	M20		M2	24
= 0,5 for fasteners m 2) fuk respectively shall be tak Table C3.2: Characteristic fischer retains fischer rebar anchor FRA Characteristic resistance to stee Characteristic resistance Partial factor Characteristic resistance to stee Characteristic resistance	nade of car nade of sta ken from th stic resist par anch eel failure NRk,s	tance ors F under [kN]	eel with 500 < steel cifications of the to steel fairs. M12 r tension load 62,1	f _{uk} ≤ 10 ne rebar lure ui	000 N/m	ension	M20		M2	24
= 0,5 for fasteners m 2) fuk respectively shall be tak Table C3.2: Characteristic fischer rek Characteristic resistance to ste Characteristic resistance Partial factor Characteristic resistance to ste Without lever arm	nade of car nade of sta ken from th stic resist par anch eel failure NRk,s	tance ors F under [kN]	eel with 500 < steel cifications of the to steel fairs. M12 r tension load 62,1	f _{uk} ≤ 10 ne rebar lure ui	000 N/m	ension	M20		M2	3,0
= 0,5 for fasteners m 2) fuk respectively shall be tak Table C3.2: Characteristic fischer retains fischer resistance to stemple fischer fisc	nade of car nade of sta ken from th stic resist par anch eel failure NRk,s	tance ors F under	eel with 500 < steel cifications of the to steel fairs. M12 r tension load 62,1	f _{uk} ≤ 10 ne rebar lure ui	000 N/m	ension	M20 172,7		M2 263	3,0
= 0,5 for fasteners m 2) fuk respectively shall be take Table C3.2: Characteristic fischer retains fischer retains fischer retains fischer retains fischer retains fischer retains fischer resistance to stemplate fischer resistance Characteristic resistance for stemplate fischer resistance to stemplate fischer resistance to stemplate fischer resistance to stemplate fischer resistance fischer resistance fischer resistance fischer resistance fischer resistance fischer retains fischer retain	nade of car nade of sta ken from the stic resist car anch eel failure NRk,s yms,N eel failure	tance ors F under [kN] [kN]	eel with 500 < steel cifications of the to steel fairs. M12 r tension load 62,1	f _{uk} ≤ 10 ne rebar lure ui	000 N/m	ension	M20 172,7		M2 263	3,0
= 0,5 for fasteners m 2) fuk respectively shall be take Table C3.2: Characteristic fischer retains fischer resistance to stempt fischer fisch	nade of car nade of sta ken from th stic resist car anch eel failure NRk,s yms,N eel failure V ⁰ Rk,s k ₇	tance ors F under [kN] [kN]	eel with 500 < steel cifications of the to steel fairs. M12 r tension load 62,1	f _{uk} ≤ 10 ne rebar lure un	000 N/m	ension	M20 172,7		M2 263	3,0
= 0,5 for fasteners m 2) fuk respectively shall be tak Table C3.2: Characteristic fischer retains fischer resistance Partial factor Characteristic resistance to stem to the fischer retains fischer retai	nade of car nade of sta ken from th stic resist car anch eel failure NRk,s yms,N eel failure V ⁰ Rk,s k ₇	tance ors F under [kN] [kN] [kN]	eel with 500 < steel cifications of the to steel fair FRA M12 r tension load 62,1 r shear loadin 33,7	f _{uk} ≤ 10 ne rebar lure un	000 N/m nder te M16 110,5	ension	M20 172,7		M2 263	3,0

¹⁾ In absence of other national regulations

fis	cher Superbond
	_

Performances Characteristic resistance to steel failure under tension and shear loading of reinforcing bars and fischer rebar anchors FRA

Annex C 3

Size									All siz	es			
Tension loading													
Installation factor		γinst	[-]		S	ee anr	nex	C 5 t	o C 10	and o	C 15 to (C16	
Factors for the compre	ssive stren	•		ete > C									
	C25/30	<u> </u>							1,02	!			
	C30/37								1,04				
Increasing factor ψ _c for cracked or uncracked	C35/45								1,07				
concrete	C40/50	Ψ_{c}	[-]						1,08				
$\tau_{Rk(X,Y)} = \psi_c \cdot \tau_{Rk(C20/25)}$	C45/55								1,09				
, , , , , , , , , , , , , , , , , , ,	C50/60								1,10				
Splitting failure	000/00								1,10	'			
	/ h _{ef} ≥ 2,0								1,0 h				
	$0 > h / h_{ef}$												
Edge distance	> 1,3	C cr,sp	[mm]					4,6	h _{ef} -	1,8 h			
h	/ h _{ef} ≤ 1,3								2,26 h	l ef			
Spacing		Scr,sp							2 Ccr,s	sp			
Concrete cone failure			•										
Uncracked concrete		k ucr,N	F 1						11,0				
Cracked concrete		k cr,N	[-]						7,7				
Edge distance		C _{cr,N}							1,5 h	ef			
Spacing		S cr,N	[mm]						2 C cr,I	N			
Factors for sustained to	ension load	ding	•										
Temperature range			[-]	24 °C	/ 40 °C	50	°C	/ 80 °	°C 7	2 °C /	120 °C	90 °C /	150 °C
Factor		$\Psi^0_{ ext{sus}}$	[-]	0	,84		0,	86		0,	84	0,	91
Shear loading													
Installation factor		γinst	[-]						1,0				
Concrete pry-out failure	•												
Factor for pry-out failure		k ₈	[-]						2,0				
Concrete edge failure													
Effective length of fasten	er in			f	or d _{nom} :	< 24 n	ım.	min ((h _{of} : 1	2 d	1		
shear loading		lf	[mm]								, 300 mm)	1	
Calculation diameters													
Size				M8	M10	м·	12	M1	16	M20	M24	M27	M30
fischer anchor rods and													
standard threaded rods		d_{nom}		8	10	1	2	16	o	20	24	27	30
fischer internal threaded anchors	s RG M I	d_{nom}	[mm]	12	16	1	8	22	2	28	_1)	_1)	_1)
fischer rebar anchor FRA	\	d _{nom}		_1)	_1)	1	2	16	3	20	25	_1)	_1)
Size (nominal diameter o	f the bar)		ф	8	10	12		14	16	20	25	28	32
Reinforcing bar		d _{nom}	[mm]	8	10	12		14	16	20	25	28	32
1) Anchor type not part	t of the ETA	١									'		
fischer Superbond													
Performances											∣ ⊿	nnex	C 4
			under t								1 1	·	-

Table C5.1: Characteristic resistance to combined pull-out and concrete failure for fischer anchor rods and standard threaded rods in hammer drilled holes in combination with injection mortar FIS SB; uncracked or cracked concrete

				,			, c.			0100110		71010
Anchor r	od /	standard thread	led rod		M8	M10	M12	M16	M20	M24	M27	M30
Combine	d pu	illout and concr	ete con	e failure								
Thread d	ame	ter	d	[mm]	8	10	12	16	20	24	27	30
Uncrack	ed co	oncrete										
Characte	risti	c bond resistan	ce in un	cracked o	concret	e C20/25	5					
Hammer-	drillir	ng with standard	drill bit c	r hollow d	rill bit (d	ry or wet	concret	<u>e)</u>				
	l:	24 °C / 40 °C			12	13	13	13	13	12	10	10
Tem-	II:	50 °C / 80 °C		[N1/2]	12	12	12	13	13	12	10	10
perature range	III:	72 °C / 120 °C	て Rk,ucr	[N/mm ²]	10	11	11	11	11	11	9,0	9,0
	IV:	90 °C / 150 °C			10	10	10	11	10	10	8,0	8,0
Installati	actors											
Dry or we	ncrete	[-]	1,0									
Cracked	con	crete										
Characte	risti	c bond resistan	ce in cr	acked cor	ncrete C	20/25						
Hammer-	drillir	ng with standard	drill bit c	r hollow d	<u>rill bit (d</u>	ry or wet	concret	<u>e)</u>				
	l:	24 °C / 40 °C			6,5	7,0	7,5	7,5	7,5	7,5	7,5	7,5
Tem-	II:	50 °C / 80 °C	_	[N]/mama21	6,0	6,5	7,5	7,5	7,5	7,5	7,0	7,0
perature range	III:	72 °C / 120 °C	$ au_{Rk,cr}$	[N/mm ²]	5,5	6,0	6,5	6,5	6,5	6,5	6,0	6,0
	IV:	90 °C / 150 °C			5,0	5,5	6,0	6,0	6,0	6,0	5,5	5,5
Installati	on fa	actors										
Dry or we	t cor	ncrete	γinst	[-]				1,	,0			

fischer S	uperbond
-----------	----------

Characteristic resistance to combined pull-out and concrete failure for fischer anchor rod andstandard threaded rods with injection mortar FIS SB

Annex C 5

Appendix 31 / 42

Table C6.1: Characteristic resistance to combined pull-out and concrete failure for fischer anchor rods RG M in hammer or diamond drilled holes in combination with resin capsule RSB: uncracked or cracked concrete

		•									
Anchor i	od R	G M			M8	M10	M12	M16	M20	M24	M30
Combine	ed pu	Illout and concr	ete con	e failure							
Thread d	iame	ter	d	[mm]	8	10	12	16	20	24	30
Uncrack											
		c bond resistan									
<u>Hammer-</u>		ng with standard	<u>drill bit c</u>	or hollow d		I		1	1		
	l:	24 °C / 40 °C			12	13	13	13	13	12	10
Tem- perature		50 °C / 80 °C	<i>T</i> D	[N/mm ²]	12	12	12	13	13	12	10
range	III:	72 °C / 120 °C	€RK,ucr	[10	11	11	11	11	11	9,0
	IV:	90 °C / 150 °C			10	10	10	11	10	10	8,0
Diamond	-drilli	ng (dry or wet co	ncrete a	s well as v	water fille	d hole)					
	l:	24 °C / 40 °C			13	13	14	14	14	13	11
Tem-	II:	50 °C / 80 °C		[N1/2]	12	13	13	14	13	13	10
perature range	III:	72 °C / 120 °C	$ au_{Rk,ucr}$	[N/mm ²]	11	12	12	12	12	11	9,5
	IV:	90 °C / 150 °C			10	11	11	11	11	10	8,5
Installati	on fa	actors				•		•	•		
Dry or we	et cor	ncrete	20:	[-]				1,0			
Water filled hole		γinst	[-]	1	,2			1,0			
Cracked concrete											
		c bond resistan									
<u>Hammer-</u>		ng with standard	drill bit c	or hollow d		1					
-		24 °C / 40 °C			6,5	7,0	7,5	7,5	7,5	7,5	7,5
Tem- perature		50 °C / 80 °C	Tpkor	[N/mm²]	6,0	6,5	7,5	7,5	7,5	7,5	7,0
range	III:	72 °C / 120 °C	$ au_{Rk,cr}$		5,5	6,0	6,5	6,5	6,5	6,5	6,0
	IV:	90 °C / 150 °C			5,0	5,5	6,0	6,0	6,0	6,0	5,5
<u>Diamond</u>	-drilli	ng (dry or wet co	ncrete a	s well as v	water fille	d hole)		T	ı		Γ
	l:	24 °C / 40 °C			_1)	_1)	_1)	7,5	7,5	7,5	7,5
Tem- perature	II:	50 °C / 80 °C	-	[N/mm ²]	_1)	_1)	_1)	7,5	7,5	7,5	7,0
range	III:	72 °C / 120 °C	$ au_{Rk,cr}$		_1)	_1)	_1)	6,5	6,5	6,5	6,5
-	IV:	90 °C / 150 °C			_1)	_1)	_1)	6,0	6,0	6,0	6,0
Installati	on fa	actors									
Dry or we			γinst	[-]				1,0			
Water fill	ed ho	ole	Imar		1	,2			1,0		
¹⁾ No p	erfor	mance assessed									

Performances

Characteristic resistance to combined pull-out and concrete failure for fischer anchor rod RG M with resin capsule RSB

Annex C 6

Appendix 32 / 42

fischer Superbond

Table C7.1: Characteristic resistance to combined pull-out and concrete failure for fischer internal threaded anchors RG M I in hammer drilled holes in combination with injection mortar FIS SB; uncracked or cracked concrete

		•			,				
Internal t	threa	ded anchor RG	МΙ		M8	M10	M12	M16	M20
Combine	ed pu	ıllout and concr	ete con	e failure					
Sleeve di	iame	ter	d	[mm]	12	16	18	22	28
Uncrack	ed c	oncrete							
Characte	eristi	c bond resistan	ce in un	cracked o	concrete C2	0/25			
<u>Hammer</u>	<u>-drilliı</u>	ng with standard	drill bit c	r hollow d	rill bit (dry or	wet concrete	2)		
Tem- perature range	l:	24 °C / 40 °C			12	12	11	11	9,5
		50 °C / 80 °C	_	[N]/mm ² 1	12	11	11	10	9,0
	III:	72 °C / 120 °C	て Rk,ucr	[N/mm ²]	11	10	10	9,0	8,0
	IV:	90 °C / 150 °C			10	9,5	9,0	8,5	7,5
Installati	on fa	actors					•		
Dry or we	et cor	ncrete	γinst	[-]			1,0		
Cracked	con	crete							
Characte	eristi	c bond resistan	ce in cr	acked cor	ncrete C20/2	5			
Hammer-	-drilliı	ng with standard	drill bit c	r hollow d	rill bit (dry or	wet concrete	2)		
	l:	24 °C / 40 °C					5,0		
Tem-		50 °C / 80 °C	_	[N]/mama ²]			5,0		
perature range	III:	72 °C / 120 °C	$ au_{Rk,cr}$	[N/mm ²]			4,5		
-	IV:	90 °C / 150 °C					4,0		
Installati	on fa	actors							
Dry or we	et cor	ncrete	γinst	[-]		<u> </u>	1,0		

fischer Si	uperbond
------------	----------

Characteristic resistance to combined pull-out and concrete failure for fischer internal threaded anchor RG M I with injection mortar FIS SB

Table C8.1: Characteristic resistance to combined pull-out and concrete failure for fischer internal threaded anchors RG M I in hammer or diamond drilled holes in combination with resin capsule RSB: uncracked or cracked concrete

Internal t	threaded anchor RG	МΙ		M8	M8 M10 M12 M16 M20						
Combine	ed pullout and concr	ete con	e failure								
Sleeve di	ameter	d	[mm]	12	16	18	22	28			
Uncrack	ed concrete										
Characte	eristic bond resistan	ce in ur	cracked o	oncrete C20	0/25						
<u>Hammer</u>	drilling with standard	drill bit o	r hollow d	rill bit (dry or	wet concrete	as well as wa	ater filled hole)			
	I: 24 °C / 40 °C			12	12	11	11	9,5			
Tem- perature	II: 50 °C / 80 °C	T	[N/mm ²]	12	11	11	10	9,0			
range	III: 72 °C / 120 °C	τ Rk,ucr		11	10	10	9,0	8,0			
	IV: 90 °C / 150 °C			10	9,5	9,0	8,5	7,5			
<u>Diamond</u>	-drilling (dry or wet co	ncrete a	s well as v	vater filled ho	ole)	•	•				
	I: 24 °C / 40 °C			13	12	12	11	10			
Tem- perature range	II: 50 °C / 80 °C		[N]/mama21	13	12	12	11	9,5			
	III: 72 °C / 120 °C	$ au_{Rk,ucr}$	[N/mm ²]	11	11	10	9,5	8,5			
	IV: 90 °C / 150 °C			10	10	9,5	9,0	8,0			
Installati	on factors		1			•	1				
Dry or we	et concrete	Vinat	[-]			1,0					
Water fille		γinst	F.1	1,2		1	,0				
Cracked concrete											
	eristic bond resistan							<u> </u>			
<u>Hammer-</u>	drilling with standard	<u>arılı bit c</u>	or hollow di	rill bit (dry or	wet concrete		ater filled hole)			
Tom	I: 24 °C / 40 °C			5,0							
Tem- perature	II: 50 °C / 80 °C	$ au_{Rk,cr}$	[N/mm ²]	5,0							
range	III: 72 °C / 120 °C			4,5							
	IV: 90 °C / 150 °C			4,0							
<u>Diamond</u>	-drilling (dry or wet co	ncrete a	<u>is well as v</u>		ole)						
_	I: 24 °C / 40 °C			_1)			,0				
Tem- perature	II: 50 °C / 80 °C	$ au_{Rk,cr}$	[N/mm ²]	_1)		5	,0				
range	III: 72 °C / 120 °C	CRK,CI		_1)		4	-,5				
	IV: 90 °C / 150 °C			_1)		4	·,0				
Installati	on factors										
	et concrete	γinst	[-]		I	1,0					
Water fille	ed hole	Luist	r J	1,2		1	,0				
¹⁾ No p	erformance assessed	l									

fischer Superbond

Performances

Characteristic resistance to combined pull-out and concrete failure for fischer internal threaded anchor RG M I with resin capsule RSB

Annex C 8

Appendix 34 / 42

Table 0	29.1	: Characte	ristic re	sistance	to co	mbine	ed pul	l-out a	and co	ncrete	failure	e for	
		reinforci mortar F	_							n with	inject	tion	
Nominal	dian	neter of the bar	13 3D,	Ф	8	10	12	14	16	20	25	28	32
Combine	ed pu	ıllout and concr	ete cone	•									
Bar diam	eter		d	[mm]	8	10	12	14	16	20	25	28	32
Uncrack	ed c	oncrete											
Characte	eristi	c bond resistan	ce in un	cracked o	concre	te C20/	25						
<u>Hammer-</u>	<u>drilliı</u>	ng with standard	<u>drill bit o</u>	<u>r hollow d</u>	rill bit (d	dry or w	et conc	rete)	ı			r	
Tem- perature range	<u>l:</u>	24 °C / 40 °C			8,0	8,5	9,0	9,5	9,5	10	9,5	9,0	7,5
	II:	50 °C / 80 °C	_	[N/mm ²]	8,0	8,5	9,0	9,0	9,5	9,5	9,0	8,5	7,5
	III:	72 °C / 120 °C	τ Rk,ucr		7,0	7,5	8,0	8,0	8,5	8,5	8,0	7,5	6,5
	IV:	90 °C / 150 °C			6,5	7,0	7,0	7,5	7,5	8,0	7,5	7,0	6,0
Installati	on fa	actors											
Dry or we	et cor	ncrete	γinst	[-]					1,0				
Cracked	con	crete											
Characte	eristi	c bond resistan	ce in cra	cked co	ncrete	C20/25							
<u>Hammer-</u>	<u>drilli</u>	ng with standard	<u>drill bit o</u>	r hollow d	rill bit (d	dry or w	et conc	rete)					
	l:	24 °C / 40 °C			4,5	6,0	6,0	6,0	7,0	6,0	6,0	6,0	6,0
Tem- perature	II:	50 °C / 80 °C	_	[N/mm ²]	4,5	5,5	5,5	5,5	6,5	6,0	6,0	6,0	6,0
range	III:	72 °C / 120 °C	て Rk,cr		4,0	5,0	5,0	5,0	6,0	5,5	5,5	5,5	5,5
	IV:	90 °C / 150 °C			3,5	4,5	4,5	4,5	5,5	5,0	5,0	5,0	5,0
Installati	on fa	actors	·										

1,0

fischer	Superbond
---------	-----------

Dry or wet concrete

Characteristic resistance to combined pull-out and concrete failure for reinforcing bars with injection mortar FIS SB

[-]

 γ_{inst}

Annex C 9

Appendix 35 / 42

Table C10.1: Characteristic resistance to combined pull-out and concrete failure for fischer rebar anchors FRA in hammer drilled holes in combination with injection mortar FIS SB; uncracked or cracked concrete

		_				ı	I	ı
fischer r	ebar	anchor FRA			M12	M16	M20	M24
Combine	ed pu	illout and concr	ete cone	failure				
Bar diam	eter		d	[mm]	12	16	20	25
Uncrack	ed co	oncrete						
Characte	eristi	c bond resistan	ce in un	cracked o	concrete C20/25	5		
<u>Hammer-</u>	drillir	ng with standard	<u>drill bit o</u>	r hollow d	rill bit (dry or wet	t concrete)		
	l:	24 °C / 40 °C			9,0	9,5	10	9,5
Tem- perature	II:	50 °C / 80 °C	τ Rk,ucr	[N]/mm ² 1	9,0	9,5	9,5	9,0
range	III:	72 °C / 120 °C		[N/mm ²]	8,0	8,5	8,5	8,0
_	IV:	90 °C / 150 °C			7,0	7,5	8,0	7,5
Installati	on fa	actors						
Dry or we	et cor	ncrete	γinst	[-]		1	,0	
Cracked	con	crete						
Characte	eristi	c bond resistan	ce in cra	cked cor	ncrete C20/25			
<u>Hammer</u>	<u>drillir</u>	ng with standard	<u>drill bit o</u>	<u>r hollow d</u>	rill bit (dry or wet	t concrete)		
	l:	24 °C / 40 °C			6,0	7,0	6,0	6,0
Tem-		50 °C / 80 °C		[N]/mama21	5,5	6,5	6,0	6,0
perature range	III:	72 °C / 120 °C	τ Rk,cr	[N/mm ²]	5,0	6,0	5,5	5,5
-	IV:	90 °C / 150 °C			4,5	5,5	5,0	5,0
Installati	on fa	actors						
Dry or we	et cor	ncrete	γinst	[-]		1	,0	

fischer S	Super	bond
-----------	-------	------

Characteristic resistance to combined pull-out and concrete failure for fischer rebar anchors FRA with injection mortar FIS SB

Annex C 10

Appendix 36 / 42

Displacement-Factors for tension loading¹) Juncracked or cracked concrete; Temperature range I, II, III, IV Displacement-Factor [mm/(N/mm²)]		rod	M8	M10	M12	M16	M20	M24	M27	M30
Displacement	Displace	ement-Factors	for tensior	loading ¹⁾						
					re range I,	II, III, IV				
Displacement-Factors for shear loading ² Displacement-Factor [mm/kN]	N0-Factor	[mm/(N1/mm²)]	0,07	0,08	0,09	0,10	0,11	0,12	0,12	0,13
Displacement Displacements Temperature range I, II, III, IV Displacement	N∞-Factor	_[[mm/(N/mm-)]	0,13	0,14	0,15	0,17	0,17	0,18	0,19	0,19
10 0,18 0,15 0,12 0,09 0,07 0,06 0,05 0,27 0,22 0,18 0,14 0,11 0,09 0,08 0,08 0,07 0,06 0,05 0,27 0,22 0,18 0,14 0,11 0,09 0,08 0,08 0,00 0,008 0,00 0,008 0,000 0,008 0,	Displace	ement-Factors	for shear l	oading ²⁾						
	Jncrack	ked or cracked	concrete;	Temperatu	re range I,	II, III, IV				1
1) Calculation of effective displacement: $0,27 0,22 0,18 0,14 0,11 0,09 0,08$ 1) Calculation of effective displacement: $\delta_{N0} = \delta_{N0-Factor} \cdot \tau$ $\delta_{V0} = \delta_{V0-Factor} \cdot V$ $\delta_{N\infty} = \delta_{N0-Factor} \cdot \tau$ $\delta_{V\infty} = \delta_{V\infty-Factor} \cdot V$ τ : acting bond strength under tension loading $\delta_{N0} = \delta_{N0-Factor} \cdot V$ The proof of	V0-Factor	[mm/kN]	0,18	0,15	0,12	0,09	0,07	0,06	0,05	0,05
$\delta_{N0} = \delta_{N0\text{-Factor}} \cdot \tau$ $\delta_{N\infty} = \delta_{N\infty\text{-Factor}} \cdot \tau$ $\tau: acting bond strength under tension loading$ $V: acting shear loading$ $V: actin$	V∞-Factor	[11111/1014]	0,27	0,22	0,18	0,14	0,11	0,09	0,08	0,07
$\delta_{N\infty} = \delta_{N\infty\text{-Factor}} \cdot \tau$ $\tau: acting bond strength under tension loading$ $V: acting shear loading$ Table C11.2: Displacements for fischer internal threaded anchors RG M I Internal threaded anchors RG M I Internal threaded anchors RG M I Displacement-Factors for tension loading 1) Uncracked or cracked concrete; Temperature range I, II, III, IV $\delta_{NO\text{-Factor}} \text{ [mm/(N/mm^2)]} \begin{array}{c} 0.09 & 0.10 & 0.10 & 0.11 & 0.7 \\ 0.13 & 0.15 & 0.15 & 0.17 & 0.7 \\ 0.15 \text{ placement-Factors for shear loading}^2) \\ \text{Uncracked or cracked concrete; Temperature range I, II, III, IV} \delta_{NO\text{-Factor}} \text{ [mm/kN]} \begin{array}{c} 0.12 & 0.09 & 0.08 & 0.07 & 0.00 \\ 0.18 & 0.14 & 0.12 & 0.10 & 0.00 \\ 0.18 & 0.14 & 0.12 & 0.10 & 0.00 \\ 0.01 & 0.01 & 0.01 \\ 0.02 & 0.01 & 0.01 & 0.01 \\ 0.03 & 0.01 & 0.01 & 0.01 \\ 0.04 & 0.01 & 0.01 & 0.01 \\ 0.05 & 0.01 & 0.01 \\ 0.05 & 0.01 & 0.01$	1) Calcu	ılation of effectiv	e displacer	ment:		2) Calculati	on of effect	ive displace	ment:	
Table C11.2: Displacements for fischer internal threaded anchors RG M I I	δ _{N0} =	δ N0-Factor \cdot $ au$				$\delta_{V0} = \delta_{V0}$	-Factor · V			
Table C11.2: Displacements for fischer internal threaded anchors RG M I Internal threaded anchor RG M I Displacement-Factors for tension loading¹) Uncracked or cracked concrete; Temperature range I, II, III, IV SNO-Factor [mm/(N/mm²)]	δ _{N∞} =	δN∞-Factor · τ				$\delta_{V\infty} = \delta_{V\infty}$	-Factor · V			
Table C11.2: Displacements for fischer internal threaded anchors RG M I Internal threaded anchor RG M I Displacement-Factors for tension loading¹) Uncracked or cracked concrete; Temperature range I, II, III, IV SNO-Factor [mm/(N/mm²)]	τ: act	ina bond strena	th under ter	nsion loadin	na	V: acting	shear load	ling		
Incracked or cracked concrete; Temperature range I, II, III, IV N0-Factor (mm/(N/mm²)) 0,09 0,10 0,10 0,11 0,1			M8		M10	М	12	M16		M20
mm/(N/mm²) 0,09	Displacement-Factors for tension loading ¹⁾									
mm/(N/mm²) 0,13			concrete:	Temperatu	re range I,	II, III, IV				
O,13		ed or cracked				I	I .			
Uncracked or cracked concrete; Temperature range I, II, III, IV Uncolor			0,09		-					0,19
	N0-Factor N∞-Factor	[mm/(N/mm²)]	0,09 0,13		-					0,19 0,19
[mm/kN] 0,18 0,14 0,12 0,10 0,0	No-Factor No-Factor Displace	[mm/(N/mm²)] ement-Factors	0,09 0,13 for shear l	oading ²⁾	0,15	0,				
	No-Factor N∞-Factor Displace Jncrack	[mm/(N/mm²)] ement-Factors	0,09 0,13 for shear l concrete;	oading ²⁾ Temperatu	0,15	0,	15	0,17		0,19
→ Calculation of effective displacement:	No-Factor N∞-Factor Displace Jncrack	ement-Factors	0,09 0,13 for shear le concrete; 0,12	oading ²⁾ Temperatu	0,15 re range I, 0,09	0, II, III, IV 0,	08	0,17		0,19
	No-Factor Displace Jncrack No-Factor	ement-Factors ked or cracked [mm/kN]	0,09 0,13 for shear le concrete; 0,12 0,18	oading ²⁾ Temperatu	0,15 re range I, 0,09	0, II, III, IV 0, 0,	08 12	0,17 0,07 0,10		0,19
$\delta_{N0} = \delta_{N0\text{-Factor}} \cdot \tau$ $\delta_{V0} = \delta_{V0\text{-Factor}} \cdot V$	No-Factor No-Factor Displace Jncrack No-Factor No-Factor No-Factor No-Factor	ement-Factors ked or cracked [mm/kN]	0,09 0,13 for shear le concrete; 0,12 0,18	oading ²⁾ Temperatu	0,15 re range I, 0,09	0, II, III, IV 0, 0, 2) Calculati	08 12 con of effect	0,17 0,07 0,10		0,19
	NO-Factor N∞-Factor Displace Jncrack NO-Factor V∞-Factor 1) Calcu δN0 =	ement-Factors ked or cracked [mm/kN] llation of effective δN0-Factor · τ	0,09 0,13 for shear le concrete; 0,12 0,18	oading ²⁾ Temperatu	0,15 re range I, 0,09	0, II, III, IV 0, 0, 0 , 0 , 0 , 0 , 0 , 0 , 0	08 12 ion of effect	0,17 0,07 0,10		0,19
τ: acting bond strength under tension loading V: acting shear loading	No-Factor Sixplace Jncrack Six0-Factor O'x-Factor 1) Calcu δNo = δNo =	ement-Factors ked or cracked [mm/kN] ulation of effectiv δN0-Factor · τ δN∞-Factor · τ	0,09 0,13 for shear le concrete; 0,12 0,18 /e displacer	oading ²⁾ Temperatu ment:	0,15 re range I, 0,09 0,14	0, II, III, IV 0, 0, 2) Calculati $\delta_{V0} = \delta_{V0}$ $\delta_{V\infty} = \delta_{V\infty}$	08 12 con of effect	0,17 0,07 0,10 tive displace		0,19

fischer Superbond	
Performances	Annex C 11
Displacements for anchor rods and fischer internal threaded anchors RG M I	Appendix 37 / 42

Displacement-Factors for tension loading Displacement-Factors for tension loading Displacement-Factors for tension loading Displacement-Factor Displacement-Factors for shear loading Displac	of the bar	8	10	12	14	16	20	25	28	32
Displacement Factor	-	for tensio	n loading	1)						
NoFactor mm/(N/mm²) 0,11 0,13 0,13 0,15 0,16 0,16 0,18 0,20 0,20	-		_		je I, II, III, I	V				
No.Factor No.	N0-Factor	0,07	0,08	0,09	0,09	0,10	0,11	0,12	0,13	0,13
Oncracked or cracked concrete; Temperature range , , , ,	N∞-Factor [mm/(N/mm²)	0,11	0,13	0,13	0,15	0,16	0,16	0,18	0,20	0,20
1	Displacement-Factors	for shear	loading ²⁾							
mm/kN 0,27 0,22 0,18 0,16 0,14 0,11 0,09 0,08 0,06	Incracked or cracked	d concrete;	Tempera	ture rang	je I, II, III, I	V				1
1	[mm/kN]	· ·	•	· ·		-	· ·		<u> </u>	0,05
$\delta_{N0} = \delta_{N0\text{-Factor}} \cdot \tau \qquad \delta_{V\infty} = \delta_{V\infty\text{-Factor}} \cdot V$ $\delta_{N\infty} = \delta_{N\infty\text{-Factor}} \cdot \tau \qquad \delta_{V\infty} = \delta_{V\infty\text{-Factor}} \cdot V$ $\tau : \text{ acting bond strength under tension loading} \qquad V : \text{ acting shear loading}$ $\text{Table C12.2: Displacements for fischer rebar anchors FRA}$ $\text{Scher rebar anchor} \qquad M12 \qquad M16 \qquad M20 \qquad M24$ $\text{Displacement-Factors for tension load}^{1)}$ $\text{Uncracked or cracked concrete; Temperature range I, II, III, IV}$ $\text{NN-Factor} \qquad [mm/(N/mm^2)] \qquad 0.09 \qquad 0.10 \qquad 0.11 \qquad 0.12 \qquad 0.12 \qquad 0.13 \qquad 0.15 \qquad 0.16 \qquad 0.18 \qquad 0.18 0.18 0.18 0.18 0.18 0.18 0.18 0.18 0.18 0.18 0.18 0.18 0.18 0.18 0.18 0.14 \qquad 0.11 \qquad 0.09 0.09 0.07 \qquad 0.06 0.09 0.07 0.06 0.09 0.07 0.06 0.09 0.07 0.09 0.09 0.07 0.09 0.07 0.09 $	V∞-Factor	0,27	0,22	0,18	0,16	0,14	0,11	0,09	0,08	0,06
$\delta_{N\infty} = \delta_{N\infty\text{-Factor}} \cdot \tau$ $\tau: \text{ acting bond strength under tension loading}$ $V: \text{ acting shear loading}$ $Table C12.2: Displacements for fischer rebar anchors FRA$ $Scher rebar anchor$ RA $M12$ $M16$ $M20$ $M24$ $Alisplacement-Factors for tension load^{1)}$ $Alicracked or cracked concrete; Temperature range I, II, III, IV$ $Alicracked or cracked concrete; Temperature range I, II, III, IV$ $Alicracked or cracked concrete; Temperature range I, II, III, IV$ $Alicracked or cracked concrete; Temperature range I, II, III, IV$ $Alicracked or cracked concrete; Temperature range I, II, III, IV$ $Alicracked or cracked concrete; Temperature range I, II, III, IV$ $Alicracked or cracked concrete; Temperature range I, II, III, IV Alicracked or cracked concrete; Temperature range I, II, III, IV Alicracked or cracked concrete; Temperature range I, II, III, IV Alicracked or cracked concrete; Temperature range I, II, III, IV Alicracked or cracked concrete; Temperature range I, II, III, IV Alicracked or cracked concrete; Temperature range I, II, III, IV Alicracked or cracked concrete; Temperature range I, II, III, IV Alicracked or cracked concrete; Temperature range I, II, III, IV Alicracked or cracked concrete; Temperature range I, II, III, IV Alicracked or cracked concrete; Temperature range I, II, III, IV Alicracked or cracked concrete; Temperature range I, II, III, IV Alicracked or cracked concrete; Temperature range I, II, III, IV Alicracked or cracked concrete; Temperature range I, II, III, IV Alicracked or cracked concrete; Temperature range I, II, III, IV Alicracked or cracked concrete; Temperature range I, II, III, IV Alicracked or cracked concrete; Temperature range I, II, III, IV Alicracked or cracked concrete; Temperature range I, II, III, IV Alicracked or cracked concrete; Temperature range I, II, III, IV Alicracked or cracked concrete; Temperature range I, II, III, IV Alicracked or cracked concrete; Temperature range I, II, III, IV Alicracked or cracked concrete; Temperature range I$	1) Calculation of effect	ive displace	ment:		²⁾ Cal	culation of	effective	displacem	ent:	
Table C12.2: Displacements for fischer rebar anchors FRA Sischer rebar anchor RA M12 M16 M20 M24 Displacement-Factors for tension load¹ Uncracked or cracked concrete; Temperature range I, II, III, IV NO-Factor $[mm/(N/mm^2)] 0,09 0,10 0,11 0,12 0,18$ Displacement-Factors for shear load² Uncracked or cracked concrete; Temperature range I, II, III, IV VO-Factor $[mm/kN] 0,12 0,09 0,07 0,18$ Displacement-Factors $[mm/kN] 0,12 0,09 0,07 0,06 0,18$ Uncracked or cracked concrete; Temperature range I, II, III, IV VO-Factor $[mm/kN] 0,12 0,09 0,07 0,06 0,18$ Uncracked or cracked concrete; Temperature range I, II, III, IV VO-Factor $[mm/kN] 0,12 0,09 0,07 0,06 0,18$ Uncracked or cracked concrete; Temperature range I, II, III, IV VO-Factor $[mm/kN] 0,12 0,09 0,07 0,06 0,07 0,06 0,07 0,08 0,07 0,08 0,07 0,08 0,07 0,08 0,07 0,08 0,07 0,08 0,07 0,08 0,07 0,08 0,07 0,09 0,07 0,0$	$\delta_{\text{N0}} = \delta_{\text{N0-Factor}} \cdot \tau$				δ_{V0}	= $\delta_{\text{V0-Factor}}$	· V			
Fable C12.2: Displacements for fischer rebar anchors FRA discher rebar anchor RA with the property of the pro	$\delta_{N\infty} = \delta_{N\infty\text{-Factor}} \cdot \tau$				$\delta_{V\infty}$	= $\delta_{V\infty ext{-Factor}}$	· V			
ischer rebar anchor RA M12 M16 M20 M24 Displacement-Factors for tension load¹) Uncracked or cracked concrete; Temperature range I, II, III, IV	τ: acting bond stren	gth under te	nsion loa	ding	V: a	acting shea	ar loading			
scher rebar anchor RA M12 M16 M20 M24 isplacement-Factors for tension load¹) ncracked or cracked concrete; Temperature range I, II, III, IV NO-Factor $ mm/(N/mm^2) $ 0,09 0,10 0,11 0,12 0,13 0,15 0,16 0,18 isplacement-Factors for shear load²) ncracked or cracked concrete; Temperature range I, II, III, IV NO-Factor $ mm/kN $ 0,12 0,09 0,07 0,06 0,07 0,06 0,18 0,18 0,14 0,11 0,09 Ocalculation of effective displacement: $\delta_{NO} = \delta_{NO-Factor} \cdot \tau$ $\delta_{V\infty} = \delta_{V\infty-Factor} \cdot V$ $\delta_{N\infty} = \delta_{N\infty-Factor} \cdot \tau$ $\delta_{V\infty} = \delta_{V\infty-Factor} \cdot V$	able C12.2: Dis	splaceme	nts for f	ischer r	ebar an	chors FI	RA			
Pisplacement-Factors for tension load ¹⁾ Uncracked or cracked concrete; Temperature range I, II, III, IV $ \frac{NO-Factor}{N\infty-Factor} \begin{bmatrix} mm/(N/mm^2) \end{bmatrix} & 0,09 & 0,10 & 0,11 & 0,12 \\ 0,13 & 0,15 & 0,16 & 0,18 \\ \hline Displacement-Factors for shear load2) Uncracked or cracked concrete; Temperature range I, II, III, IV \frac{NO-Factor}{N\infty-Factor} \begin{bmatrix} mm/kN \end{bmatrix} & 0,12 & 0,09 & 0,07 & 0,06 \\ 0,18 & 0,14 & 0,11 & 0,09 \\ \hline 1) Calculation of effective displacement: \delta_{NO} = \delta_{NO-Factor} \cdot \tau & \delta_{V\infty} = \delta_{V\infty-Factor} \cdot V \\ \delta_{N\infty} = \delta_{N\infty-Factor} \cdot \tau & \delta_{V\infty} = \delta_{V\infty-Factor} \cdot V $		- This is a second	1115 101 1	ischer i	epar arr	CHOIS FI				
$ \begin{array}{c ccccccccccccccccccccccccccccccccccc$		N	112		M16		M20		M2	4
$\begin{array}{c} N_{0}-F_{actor} \\ N_{\infty}-F_{actor} \end{array} \begin{bmatrix} mm/(N/mm^2) \end{bmatrix} & 0,09 & 0,10 & 0,11 & 0,12 \\ 0,13 & 0,15 & 0,16 & 0,18 \\ \hline \\ \textit{Displacement-Factors for shear load}^2 \\ \hline \\ \textit{Displacement-Factor for shear load}^2 \\ \hline \\ Displacement-Factor for shear l$	Displacement-Factors	s for tensio	n load¹)							
$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	Incracked or cracked	d concrete;	Tempera	ture rang	je I, II, III, I	V				
Displacement-Factors for shear load ²⁾ Uncracked or cracked concrete; Temperature range I, II, III, IV	Imm/(N/mm²)	1			•					
Incracked or cracked concrete; Temperature range I, II, III, IV V0-Factor V∞-Factor V∞-Factor Imm/kN 0,12 0,09 0,07 0,06 0,14 0,11 0,09 0,09 0,07 0,06 0,18 0,14 0,11 0,09 0,09 0,07 0,06 0,06 0,08 0,08 0,09 0,07 0,06 0,09 0,07 0,06 0,09 0,07 0,06 0,09 0,07 0,06 0,09 0,07 0,06 0,09 0,07 0,06 0,09 0,07 0,06 0,09 0,07 0,06 0,09 0,07 0,06 0,09 0,07 0,06 0,09 0,07 0,06 0,09 0,07 0,06 0,09 0,07 0,06 0,09 0,07 0,06 0,09 0,07 0,06 0,09 0,07 0,06 0,09 0,07 0,09 0,07 0,06 0,09 0,07 0,09 0,07 0,06 0,09 0,07 0,09 0,07 0,09 0,07 0,09 0,07 0,09 0,07 0,09 0,07 0,09 0,09 0,07 0,09 0,09 0,07 0,09 0,09 0,07 0,09 0,09 0,09 0,07 0,09	N∞-Factor	- 0			0,15		0,16		0,1	8
$ \begin{array}{c ccccccccccccccccccccccccccccccccccc$	•			.4		\ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \				
[mm/kN] 0,18 0,14 0,11 0,09 1) Calculation of effective displacement: $\delta_{N0} = \delta_{N0\text{-Factor}} \cdot \tau$ $\delta_{V\infty} = \delta_{V\infty\text{-Factor}} \cdot V$ $\delta_{V\infty} = \delta_{V\infty\text{-Factor}} \cdot V$				iture rang		<u>V</u>	0.07		0.0	6
1) Calculation of effective displacement: 2) Calculation of effective displacement: $\delta_{N0} = \delta_{N0\text{-Factor}} \cdot \tau \qquad \delta_{V0} = \delta_{V0\text{-Factor}} \cdot V$ $\delta_{N\infty} = \delta_{N\infty\text{-Factor}} \cdot \tau \qquad \delta_{V\infty} = \delta_{V\infty\text{-Factor}} \cdot V$	I IMM/KINI				•					
$\delta_{\text{N0}} = \delta_{\text{N0-Factor}} \cdot \tau $ $\delta_{\text{V0}} = \delta_{\text{V0-Factor}} \cdot \text{V}$ $\delta_{\text{V}\infty} = \delta_{\text{V}\infty\text{-Factor}} \cdot \text{V}$						oulation of		dianlaaan		
$\delta_{N\infty} = \delta_{N\infty\text{-Factor}} \cdot \tau$ $\delta_{V\infty} = \delta_{V\infty\text{-Factor}} \cdot V$		ive displace	ment.					uispiacem	ent.	
τ: acting bond strength under tension loading V: acting shear loading										
		gth under te	ension loa	ding						
	t: acting bond stren									
	t: acting bond stren									
	t: acting bond stren									
	t: acting bond stren									
	t: acting bond stren									
fischer Superbond		ı								

Table C13.1: Characteristic resistance to steel failure under tension / shear loading of fischer anchor rods and standard threaded rods under seismic action performance category C1 or C2

Anchor	rod / standard threade	ed rod			M8	M10	M12	M16	M20	M24	M27	M30
Charact	eristic resistance to s	teel fai	lure	unde	r tensio	n loadin	g ¹⁾			•	-	
fischer a	anchor rods and stand	dard th	read	ed ro	ds, perf	ormanc	e categ	ory C1 ²⁾				
ي	Stool zine plated		5.8		19(17)	29(27)	43	79	123	177	230	281
naracteristi resistance N _{Rk,s,C1}	Steel zinc plated	s rt	8.8		29(27)	47(43)	68	126	196	282	368	449
aracteris ssistano N _{Rk,s,C1}	Stainless steel R and	Property class	50	[kN]	19	29	43	79	123	177	230	281
Characteristic resistance NRK,s,C1		P O	70		26	41	59	110	172	247	322	393
	resistant steel HCR		80		30	47	68	126	196	282	368	449
fischer a	anchor rods and stand	dard th		ed ro				ory C2 ²⁾				
<u>i</u> ≧	Steel zinc plated		5.8		_4)	_4)	39	72	108	177	_4)	_4)
erisi nce		s rty	8.8		_4)	_4)	61	116	173	282	_4)	_4)
Characteristic resistance NRK,S,C2	Stainless steel R and	Property class	_50	[-]	_4)	_4)	39	72	108	177	_4)	_4)
har res	nigh conosion	٩	_70		_4)	_4)	53	101	152	247	_4)	_4)
0	resistant steel HCR		80		_4)	_4)	61	116	173	282	_4)	_4)
Charact	eristic resistance to s	teel fai	lure	unde	r shear	loading	without	lever a	rm ¹⁾			
fischer a	anchor rods, performa	ance ca	atego	ory C	1 ²⁾							
<u>.</u>	Steel zinc plated		5.8		11(10)	17(16)	25	47	74	106	138	168
Characteristic resistance V _{Rk,s,C1}	Steel Zille plated	s rt	8.8		15(13)	23(21)	34	63	98	141	184	225
aracteris esistanc V _{Rk,s,C1}	Stainless steel R and	Property class	50	[kN]	9	15	21	39	61	89	115	141
har res		P C	70		13	20	30	55	86	124	161	197
	resistant steel HCR		80		15	23	34	63	98	141	184	225
Standar	d threaded rods, perfo	ormano	e ca	tego	ry C1 ²⁾							
<u>ي</u>	Steel zinc plated		5.8		8(7)	12(11)	17	33	52	74	97	118
rristi nce	-	₹ "	8.8		11	16(14)	24	44	69	99	129	158
acte star Rk,s,(Steel Zinc plated Steel Zinc plated Stainless steel R and high corrosion	Property class	50	[kN]	6	11	15	27	43	62	81	99
Characteristic resistance VRK,S,C1	high corrosion	g S	70		9	14	21	39	60	87	113	138
U	resistant steel HCR		80		11	16	24	44	69	99	129	158
fischer a	anchor rods and stand	dard th	read	ed ro	ds, perf	ormanc	e catego	ory C2		I		
ပ္	0, 1, 1, 1		5.8		_4)	_4)	14	27	43	62	_4)	_4)
riristi oce	Steel zinc plated	₹ ″	8.8		_4)	_4)	22	44	69	99	_4)	_4)
Characteristic resistance V _{Rk,s,C2}	Stainless steel R and	Property class	50	[-]	_4)	_4)	14	27	43	62	_4)	_4)
Tesi V _F	riigii corrosiori	Pr	70		_4)	_4)	20	39	60	87	_4)	_4)
ت آ	resistant steel HCR		80		_4)	_4)	22	44	69	99	_4)	_4)
Factor	r for the annular gap	αgap		[-]				0,5 (1,0) ³⁾			
	ial factors for softeness					Table (244.0	-				

¹⁾ Partial factors for performance category C1 or C2 see Table C14.2; for fischer anchor rods FIS A / RG M the factor for steel ductility is 1.0

fischer Superbond

Performances

Characteristic resistance to steel failure under tension / shear loading for fischer anchor rods and standard threaded rods under seismic action (performance category C1 / C2)

Annex C 13

Appendix 39 / 42

²⁾ Values in brackets are valid for undersized threaded rods with smaller stress area A_s for hot dip galvanized standard threaded rods according to EN ISO 10684:2004+AC:2009.

³⁾ Values in brackets are valid for filled annular gaps between the anchor rod and the through-hole in the attachment. It is necessary to use the fischer filling disc according to Annex A 1 and A 3.

⁴⁾ No performance assessed.

Table C14.1:	Table C14.1: Characteristic resistance to steel failure under tension / shear loading for of reinforcing bars (B500B) under seismic action performance category C1											
Nominal diamete	r of the bar		ф	8	10	12	14	16	20	25	28	32
Bearing capacity	Bearing capacity under tension load, steel failure ¹⁾											
Reinforcing bar E	Reinforcing bar B500B acc. to DIN 488-2:2009-08, performance category C1											
Characteristic resi	stance	N _{Rk,s,C1}	[kN]	27,1	42,3	61,0	83,5	108,5	169,5	265,1	332,6	434,1
Bearing capacity	under shear lo	ad, steel fa	ilure	withou	ıt levei	arm ¹⁾						

14,8 21,3 29,1 37,9

59.3

92,7 | 116,4 | 151,9

Characteristic resistance

Reinforcing bar B500B acc. to DIN 488-2:2009-08, performance category C1

 $V_{Rk,s,C1}$

Table C14.2: Partial factors for fischer anchor rods, standard threaded rods and reinforcing bars (B500B) under seismic action performance category C1 or C2

[kN] 9,5

Anch	nor rod / standard threa	ded rod			M8	M10	M1:	2 M	16	M20	M24	M27	M30
Nom	inal diameter of the bar			ф	8	10	12	14	16	20	25	28	32
Tens	ion load, steel failure ¹⁾												
	Ctool zine plated		5.8						1,5	0			
γ _{Ms,I}	Steel zinc plated	- 4	8.8						1,5	0			
l ig	Stainless steel R and	Property class	50						2,8	6			
<u>a</u>	high corrosion	P O	70	[-]			1,	,87 / fis	cher	HCR: 1	,50 ²		
Partial factor γ _{Ms,N}	resistant steel HCR		80						1,6	0			
-	Reinforcing bar	В5	500B						1,4	0			
Shea	ır load, steel failure ¹⁾												
>	Ctool zine ploted		5.8						1,2	5			
YMs,	Steel zinc plated		8.8						1,2	5			
g	Stainless steel R and	Property class	50		2,38								
<u>a</u>	high corrosion	Ā	70	[-]			1,	,56 / fis	cher	HCR: 1	,25 ²		
Partial factor γ _{Ms,ν}	resistant steel HCR		80						1,3	3			
"	Reinforcing bar	B	500B						1,5	0			

¹⁾ In absence of other national regulations

fischer	Superbond
11001101	Capondona

Performances

Characteristic resist. to steel failure under tension / shear loading for reinforcing bars under seismic action (performance category C1); partial factors (perfor. category C1 / C2)

Annex C 14

¹⁾ Partial factors for performance category C1 see Table C14.2

²⁾ Only admissible for high corrosion resistant steel HCR, with f_{yk} / f_{uk} ≥ 0,8 and A₅ > 12 % (e.g. fischer anchor rods)

Table C15.1: Characteristic resistance to combined pull-out and concrete failure for fischer anchor rods and standard threaded rods in hammer drilled holes with injection mortar FIS SB or resin capsule RSB under seismic action performance category C1

Anchor I	od /	standard thread	led rod		M8	M10	M12	M16	M20	M24	M27 ¹⁾	M30
Characte	eristi	c bond resistan	ce, com	bined pul	llout an	d concre	ete cone	failure				
		ing with standa oncrete; resin ca					illed hol	es)				
	l:	24 °C / 40 °C			4,6	5,0	5,6	5,6	5,6	5,6	5,6	6,4
Tem-	II:	50 °C / 80 °C	_	[N/mm ²]	4,3	4,6	5,6	5,6	5,6	5,6	5,3	6,0
perature range	III:	72 °C / 120 °C	₹Rk,C1	[14/11111-]	3,9	4,3	4,9	4,9	4,9	4,9	4,5	5,1
	IV:	90 °C / 150 °C			3,6	3,9	4,5	4,5	4,5	4,5	4,1	4,7
Installati	on fa	actors										
Dry or we	et cor	ncrete		[]				1	,0			
Water fille	ed ho	ole	γinst	[-]	1,2	2 ²⁾			1,0) ²⁾		

¹⁾ Only use with injection mortar FIS SB.

Table C15.2: Characteristic resistance to combined pull-out and concrete failure for reinforcing bars in hammer drilled holes with injection mortar FIS SB under seismic action performance category C1

Nominal	dian	neter of the bar		ф	8	10	12	14	16	20	25	28	32
Characte	eristi	c bond resistan	ce, com	bined pu	llout ar	d cond	rete co	ne fail	ure				
Hammer	-drill	ling with standa	rd drill l	bit or holl	ow dril	bit (dr	y or we	et conc	rete)				
	I:	24 °C / 40 °C			3,2	4,3	4,5	4,5	5,3	4,5	4,5	4,5	5,1
Tem-	II:	50 °C / 80 °C	_	[N/mm ²]	3,2	3,9	4,1	4,1	4,9	4,5	4,5	4,5	5,1
perature range	III:	72 °C / 120 °C	$ au_{ ext{Rk,C1}}$		2,8	3,6	3,8	3,8	4,5	4,1	4,1	4,1	4,7
	IV:	90 °C / 150 °C			2,5	3,2	3,4	3,4	4,1	3,8	3,8	3,8	4,3
Installati	on fa	actors		•									
Dry or we	et co	ncrete	Vinet	[-]					1.0				

Dry or wet concrete	γinst	[-]	1,0

fischer	Superbond
11301101	Superbond

Performances

Characteristic resist. to combined pull-out and concrete failure under seismic action (performance category C1) for fischer anchor rods, standard threaded rods and reinf. bars

Annex C 15

²⁾ Only use with resin capsule RSB in water filled hole

Table C16.1: Characteristic resistance to combined pull-out and concrete failure for for fischer anchor rods and standard threaded rods in hammer drilled holes with injection mortar FIS SB under seismic action performance category C2

Anchor i	od /	standard threa	ded rod		M12	M16	M20	M24
Characte	risti	c bond resistar	ice, com	bined pu	lout and concre	ete cone failure		
Hammer	-drill	ing with standa	rd drill b	it or holl	ow drill bit (dry	or wet concrete	·)	
	l:	24 °C / 40 °C			4,5	3,2	2,6	3,0
Tem-	II:	50 °C / 80 °C	_	[N] (ma ma 2]	4,5	3,2	2,6	3,0
perature range	III:	72 °C / 120 °C	TRk,C2	[N/mm ²]	3,9	2,7	2,3	2,6
	IV:	90 °C / 150 °C	-		3,6	2,5	2,1	2,4
Installati	on fa	actors						
Dry or we	et cor	ncrete	γinst	[-]		1	,0	
Displace	men	t-Factors for te	nsion lo	ading¹)				
δ _{N,C2} (DLS)-	+actor		[mama//N1/mama2\]		0,09	0,10	0,11	0,12
δ _{N,C2} (ULS)-Factor		[mm/(N/mm²)]		0,15	0,17	0,17	0,18	
Displace	men	t-Factors for sh	ear load	ing²)				
δv,c2 (DLS)-	Factor		F	- /I-NII	0,18	0,10	0,07	0,06
δv,c2 (ULS)-	Factor		lmu	n/kN]	0,25	0,14	0,11	0,09

1) Calculation of effective displacement:

 $\delta_{\text{N,C2 (DLS)}} = \delta_{\text{N,C2 (DLS)-Factor}} \cdot \tau$

 $\delta_{N,C2}$ (ULS) = $\delta_{N,C2}$ (ULS)-Factor $\cdot \tau$

τ: acting bond strength under tension loading

2) Calculation of effective displacement:

 $\delta_{V,C2 (DLS)} = \delta_{V,C2 (DLS)-Factor} \cdot V$

 $\delta_{V,C2 (ULS)} = \delta_{V,C2 (ULS)-Factor} \cdot V$

V: acting shear loading

fischer Su	perbond
------------	---------

Performances

Characteristic resistance to combined pull-out and concrete failure under seismic action (performance category C2) for fischer anchor rods and standard threaded rods

Annex C 16

Appendix 42 / 42