



Approval body for construction products and types of construction

#### **Bautechnisches Prüfamt**

An institution established by the Federal and Laender Governments



### European Technical Assessment

### ETA-17/0301 of 27 September 2021

English translation prepared by DIBt - Original version in German language

### **General Part**

Technical Assessment Body issuing the Deutsches Institut für Bautechnik **European Technical Assessment:** Trade name of the construction product Sika AnchorFix®-2002 for concrete Product family Bonded fastener for use in concrete to which the construction product belongs Manufacturer Sika Services AG Tüffenwies 16-22 8064 ZÜRICH **SCHWEIZ** Sika Plant No. 1485 Manufacturing plant This European Technical Assessment 35 pages including 3 annexes which form an integral part contains of this assessment This European Technical Assessment is EAD 330499-01-0601, Edition 04/2020 issued in accordance with Regulation (EU) No 305/2011, on the basis of This version replaces ETA-17/0301 issued on 7 April 2017

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### Specific Part

### 1 Technical description of the product

The "Sika AnchorFix®-2002 for concrete" is a bonded anchor consisting of a cartridge with injection mortar Injection mortar Sika AnchorFix®-2002 and a steel element according to Annex A3 and A5.

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 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 and/or 100 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 3, C 1 to C 4, C 6 to C 7, C 9 to C 10				
Characteristic resistance to shear load (static and quasi-static loading)	See Annex C 1, C 5, C 8, C 11				
Displacements under short-term and long-term loading	See Annex C 12 to C 14				
Characteristic resistance and displacements for seismic performance categories C1 and C2	See Annex C 15 to C 18				

### 3.2 Hygiene, health and the environment (BWR 3)

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



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# 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

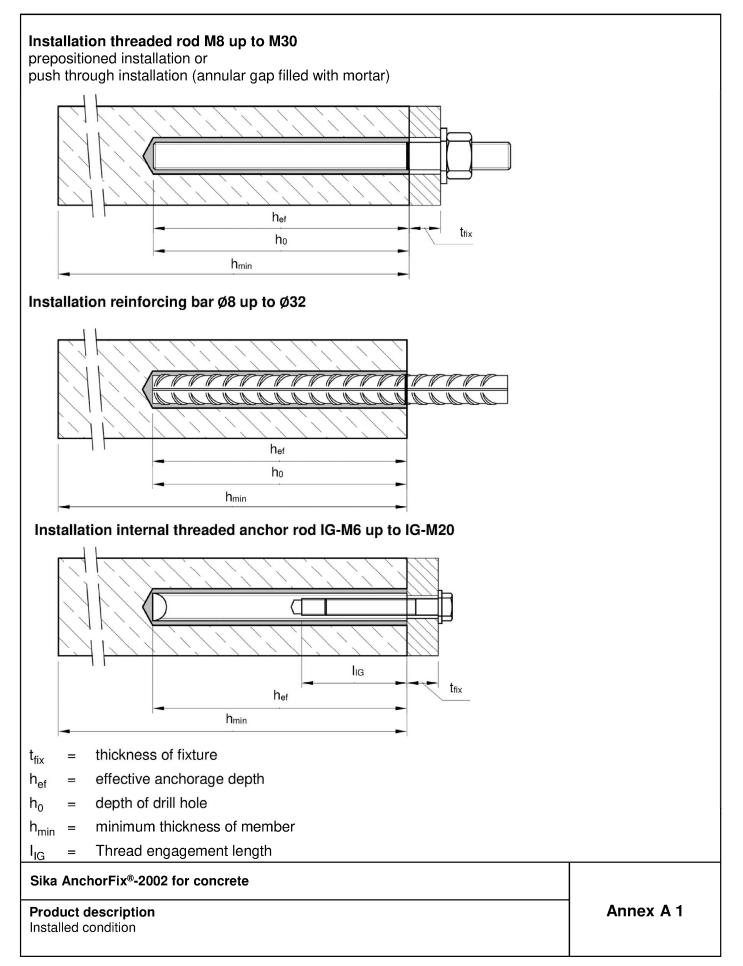
# 5 Technical details necessary for the implementation of the AVCP system, as provided for in the applicable European Assessment Document

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

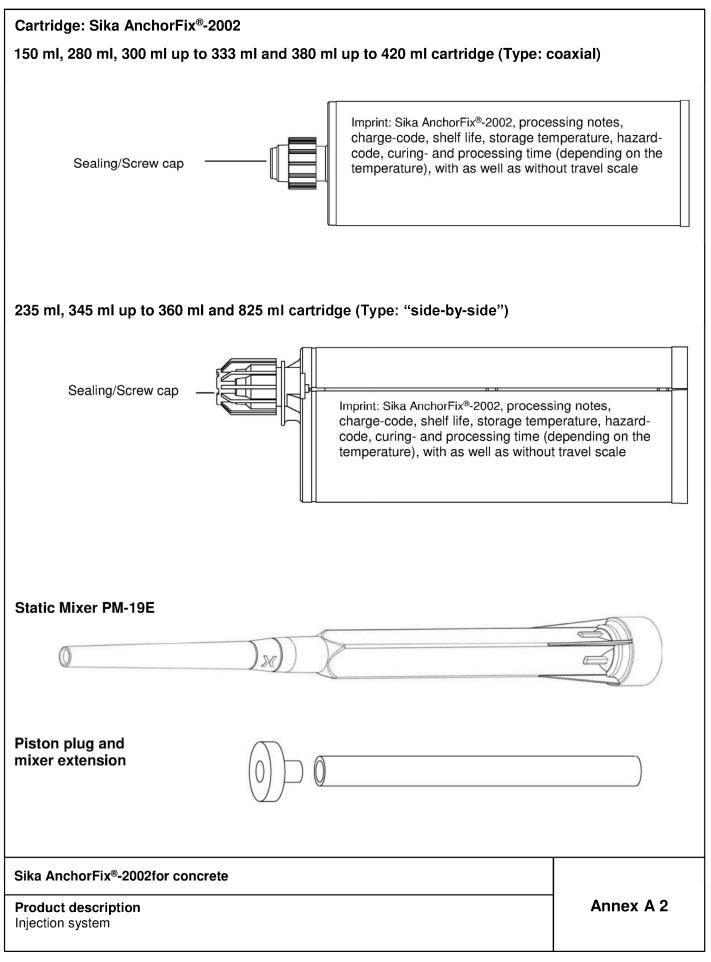
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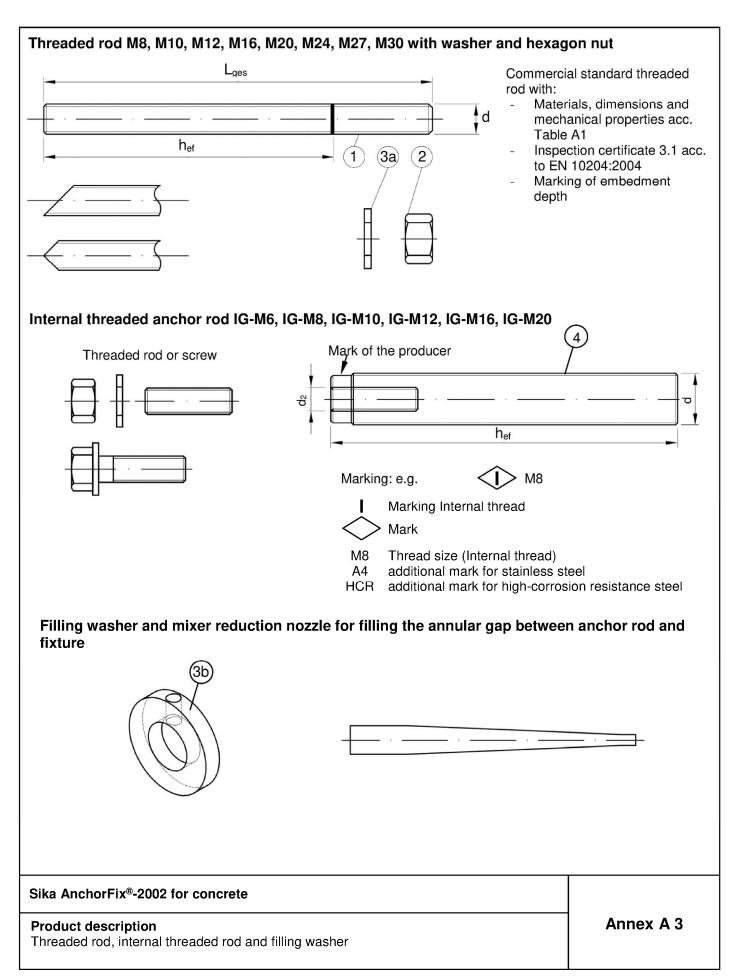








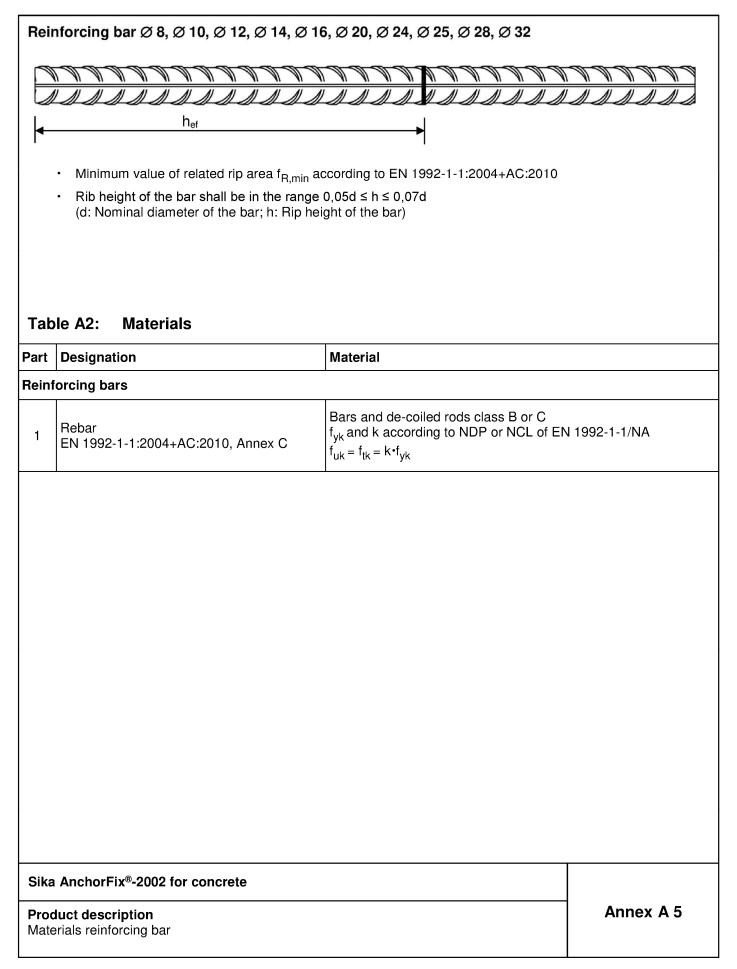






ter	Designation	Material				
		acc. to EN ISO 683-4:2				
		5 µm acc. to EN ISO			004 40 0000	
		40 µm acc. to EN ISO 45 µm acc. to EN ISO		2009 and EN ISO 10684:2 3:2016	004+AC:2009 or	
0		Property class	17000	Characteristic steel	Characteristic steel	Elongation at
				ultimate tensile strength	yield strength	fracture
				$f_{uk} = 400 \text{ N/mm}^2$	$f_{yk} = 240 \text{ N/mm}^2$	A <sub>5</sub> > 8%
1	Threaded rod	acc. to		$f_{uk} = 400 \text{ N/mm}^2$	$f_{yk} = 320 \text{ N/mm}^2$	A <sub>5</sub> > 8%
		EN ISO 898-1:2013		f <sub>uk</sub> = 500 N/mm <sup>2</sup>	f <sub>yk</sub> = 300 N/mm <sup>2</sup>	A <sub>5</sub> > 8%
				f <sub>uk</sub> = 500 N/mm²	$f_{yk} = 400 \text{ N/mm}^2$	A <sub>5</sub> > 8%
			8.8	f <sub>uk</sub> = 800 N/mm²	$f_{yk} = 640 \text{ N/mm}^2$	A <sub>5</sub> ≥ 12% <sup>3)</sup>
		acc. to	4	for threaded rod class 4.6		
2	Hexagon nut	EN ISO 898-2:2012	5	for threaded rod class 5.6		
			8	for threaded rod class 8.8		
3a	Washer			alvanised or sherardized ISO 7089:2000, EN ISO 7	193.2000 or EN ISO	7094.2000
3b	Filling washer			alvanised or sherardized	000.2000 OF EN 130	, 004.2000)
			<u>6</u> 96	Characteristic steel	Characteristic steel	Elongation at
	Internal threaded	Property class		ultimate tensile strength	yield strength	fracture
4	anchor rod	acc. to		f <sub>uk</sub> = 500 N/mm²	f <sub>yk</sub> = 400 N/mm²	A <sub>5</sub> > 8%
		EN ISO 898-1:2013	8.8	f <sub>uk</sub> = 800 N/mm²	f <sub>yk</sub> = 640 N/mm <sup>2</sup>	A <sub>5</sub> > 8%
		<b>nce steel</b> (Material 1.452		/ 1.4362 or 1.4578, acc. to 1.4565, acc. to EN 10088- Characteristic steel		Elongation at
		Property class		ultimate tensile strength	yield strength	fracture
	Threaded rod <sup>1)4)</sup>		50	f <sub>uk</sub> = 500 N/mm <sup>2</sup>	f <sub>yk</sub> = 210 N/mm <sup>2</sup>	A <sub>5</sub> ≥ 8%
1	Inneaueurou			f 700 NI/		
1	Threaded Tod ??	acc. to	70	f <sub>uk</sub> = 700 N/mm²	$f_{yk} = 450 \text{ N/mm}^2$	A <sub>5</sub> ≥ 12% <sup>3)</sup>
1	Threaded Tod //	acc. to EN ISO 3506-1:2020	70 80	f <sub>uk</sub> = 700 N/mm <sup>2</sup> f <sub>uk</sub> = 800 N/mm <sup>2</sup>	$f_{yk} = 450 \text{ N/mm}^2$ $f_{yk} = 600 \text{ N/mm}^2$	$A_5 \ge 12\%^{3}$ $A_5 \ge 12\%^{3}$
1		EN ISO 3506-1:2020		$f_{uk} = 800 \text{ N/mm}^2$ for threaded rod class 50	<b>J</b>	
1	Hexagon nut <sup>1)4)</sup>		80 50 70	f <sub>uk</sub> = 800 N/mm <sup>2</sup> for threaded rod class 50 for threaded rod class 70	<b>J</b>	
		EN ISO 3506-1:2020 acc. to EN ISO 3506-1:2020	80 50 70 80	f <sub>uk</sub> = 800 N/mm <sup>2</sup> for threaded rod class 50 for threaded rod class 70 for threaded rod class 80	$f_{yk} = 600 \text{ N/mm}^2$	$A_5 \ge 12\%^{3}$
		EN ISO 3506-1:2020 acc. to EN ISO 3506-1:2020 A2: Material 1.4301 / 1 A4: Material 1.4401 / 1 HCR: Material 1.4529	80 50 70 80 .4307 .4404 or 1.4	$f_{uk} = 800 \text{ N/mm}^2$ for threaded rod class 50 for threaded rod class 70 for threaded rod class 80 7 / 1.4311 / 1.4567 or 1.454 4 / 1.4571 / 1.4362 or 1.457 565, acc. to EN 10088-1:2	f <sub>yk</sub> = 600 N/mm <sup>2</sup> 11, acc. to EN 10088- 78, acc. to EN 10088- 2014	A <sub>5</sub> ≥ 12% <sup>3)</sup> 1:2014 1:2014
2 3a	Hexagon nut <sup>1)4)</sup>	EN ISO 3506-1:2020 acc. to EN ISO 3506-1:2020 A2: Material 1.4301 / 1 A4: Material 1.4401 / 1 HCR: Material 1.4529	80 50 70 80 .4307 .4404 or 1.4 6, EN	$f_{uk} = 800 \text{ N/mm}^2$ for threaded rod class 50 for threaded rod class 70 for threaded rod class 80 7 / 1.4311 / 1.4567 or 1.454 7 / 1.4571 / 1.4362 or 1.457 565, acc. to EN 10088-1: 2 ISO 7089:2000, EN ISO 7	f <sub>yk</sub> = 600 N/mm <sup>2</sup> 11, acc. to EN 10088- 78, acc. to EN 10088- 2014	A <sub>5</sub> ≥ 12% <sup>3)</sup> 1:2014 1:2014
2 3a	Hexagon nut <sup>1)4)</sup> Washer	EN ISO 3506-1:2020 acc. to EN ISO 3506-1:2020 A2: Material 1.4301 / 1 A4: Material 1.4401 / 1 HCR: Material 1.4529 (e.g.: EN ISO 887:2000	80 50 70 80 .4307 .4404 or 1.4 6, EN	$f_{uk} = 800 \text{ N/mm}^2$ for threaded rod class 50 for threaded rod class 70 for threaded rod class 80 7 / 1.4311 / 1.4567 or 1.454 7 / 1.4571 / 1.4362 or 1.457 565, acc. to EN 10088-1: 2 ISO 7089:2000, EN ISO 7	f <sub>yk</sub> = 600 N/mm <sup>2</sup> 11, acc. to EN 10088- 78, acc. to EN 10088- 2014	A <sub>5</sub> ≥ 12% <sup>3)</sup> 1:2014 1:2014
2 3a 3b	Hexagon nut <sup>1)4)</sup> Washer Filling washer	EN ISO 3506-1:2020 acc. to EN ISO 3506-1:2020 A2: Material 1.4301 / 1 A4: Material 1.4401 / 1 HCR: Material 1.4529 (e.g.: EN ISO 887:2000 Stainless steel A4, Hig Property class	80 50 70 80 .4307 .4404 or 1.4 6, EN	$f_{uk} = 800 \text{ N/mm}^2$ for threaded rod class 50 for threaded rod class 70 for threaded rod class 80 7 / 1.4311 / 1.4567 or 1.454 / 1.4571 / 1.4362 or 1.457 565, acc. to EN 10088-1:2 ISO 7089:2000, EN ISO 7 rosion resistance steel Characteristic steel	f <sub>yk</sub> = 600 N/mm <sup>2</sup> 11, acc. to EN 10088- 28, acc. to EN 10088- 2014 093:2000 or EN ISO	A <sub>5</sub> ≥ 12% <sup>3)</sup> 1:2014 1:2014 7094:2000) Elongation at
2 3a	Hexagon nut <sup>1)4)</sup> Washer	EN ISO 3506-1:2020 acc. to EN ISO 3506-1:2020 A2: Material 1.4301 / 1 A4: Material 1.4401 / 1 HCR: Material 1.4529 (e.g.: EN ISO 887:2000 Stainless steel A4, Hig	80 50 70 80 .4307 .4404 or 1.4 6, EN h corr	$f_{uk} = 800 \text{ N/mm}^2$ for threaded rod class 50 for threaded rod class 70 for threaded rod class 80 7 / 1.4311 / 1.4567 or 1.454 / 1.4571 / 1.4362 or 1.457 565, acc. to EN 10088-1:2 ISO 7089:2000, EN ISO 7 rosion resistance steel Characteristic steel ultimate tensile strength	$f_{yk} = 600 \text{ N/mm}^2$ 11, acc. to EN 10088- 78, acc. to EN 10088- 2014 093:2000 or EN ISO Characteristic steel yield strength	A <sub>5</sub> ≥ 12% <sup>3)</sup> 1:2014 1:2014 7094:2000) Elongation at fracture
2 3a 3b 4	Hexagon nut <sup>1)4)</sup> Washer Filling washer Internal threaded anchor rod <sup>1)2)</sup> Property class 70 or a for IG-M20 only property	EN ISO 3506-1:2020 acc. to EN ISO 3506-1:2020 A2: Material 1.4301 / 1 A4: Material 1.4401 / 1 HCR: Material 1.4529 (e.g.: EN ISO 887:2000 Stainless steel A4, Hig Property class acc. to EN ISO 3506-1:2020 80 for threaded rods and herty class 50	80 50 70 80 .4307 .4404 or 1.4 5, EN h corr 50 70	$f_{uk} = 800 \text{ N/mm}^2$ for threaded rod class 50 for threaded rod class 70 for threaded rod class 80 7 / 1.4311 / 1.4567 or 1.454 7 / 1.4571 / 1.4362 or 1.457 565, acc. to EN 10088-1: 2 ISO 7089:2000, EN ISO 7 rosion resistance steel Characteristic steel ultimate tensile strength $f_{uk} = 500 \text{ N/mm}^2$ $f_{uk} = 700 \text{ N/mm}^2$ on nuts up to M24 and Intern	$f_{yk} = 600 \text{ N/mm}^2$ $f_{yk} = 600 \text{ N/mm}^2$ $f_{yk} = 600 \text{ N/mm}^2$ $f_{yk} = 200 \text{ N/mm}^2$ $f_{yk} = 450 \text{ N/mm}^2$	$A_5 \ge 12\%^{3}$ 1:2014         1:2014         7094:2000)         Elongation at fracture $A_5 > 8\%$ $A_5 > 8\%$ $A_5 > 8\%$
2 3a 3b 4 1) 2) 3)	Hexagon nut <sup>1)4)</sup> Washer Filling washer Internal threaded anchor rod <sup>1)2)</sup> Property class 70 or 3 for IG-M20 only prope A <sub>5</sub> > 8% fracture elon	EN ISO 3506-1:2020 acc. to EN ISO 3506-1:2020 A2: Material 1.4301 / 1 A4: Material 1.4401 / 1 HCR: Material 1.4529 (e.g.: EN ISO 887:2000 Stainless steel A4, Hig Property class acc. to EN ISO 3506-1:2020 80 for threaded rods and f erty class 50 gation if <u>no</u> use for seismi	80 50 70 80 .4307 .4404 or 1.4 5, EN h corr 50 70 rexage	$f_{uk} = 800 \text{ N/mm}^2$ for threaded rod class 50 for threaded rod class 70 for threaded rod class 80 7 / 1.4311 / 1.4567 or 1.454 7 / 1.4571 / 1.4362 or 1.457 565, acc. to EN 10088-1: 2 ISO 7089:2000, EN ISO 7 rosion resistance steel Characteristic steel ultimate tensile strength $f_{uk} = 500 \text{ N/mm}^2$ $f_{uk} = 700 \text{ N/mm}^2$ on nuts up to M24 and Intern	$f_{yk} = 600 \text{ N/mm}^2$ $f_{yk} = 600 \text{ N/mm}^2$ $f_{yk} = 600 \text{ N/mm}^2$ $f_{3}$ , acc. to EN 10088- 2014 $093:2000 \text{ or EN ISO}^2$ Characteristic steel yield strength $f_{yk} = 210 \text{ N/mm}^2$ $f_{yk} = 450 \text{ N/mm}^2$ hal threaded anchor ro	$A_5 \ge 12\%^{3}$ 1:2014         1:2014         7094:2000)         Elongation at fracture $A_5 > 8\%$ $A_5 > 8\%$ $A_5 > 8\%$
2 3a 3b 4	Hexagon nut <sup>1)4)</sup> Washer Filling washer Internal threaded anchor rod <sup>1)2)</sup> Property class 70 or 3 for IG-M20 only prope A <sub>5</sub> > 8% fracture elon	EN ISO 3506-1:2020 acc. to EN ISO 3506-1:2020 A2: Material 1.4301 / 1 A4: Material 1.4401 / 1 HCR: Material 1.4529 (e.g.: EN ISO 887:2000 Stainless steel A4, Hig Property class acc. to EN ISO 3506-1:2020 80 for threaded rods and herty class 50 gation if <u>no</u> use for seisming y for stainless steel A4 and	80 50 70 80 .4307 .4404 or 1.4 5, EN h corr 50 70 rexage	$f_{uk} = 800 \text{ N/mm}^2$ for threaded rod class 50 for threaded rod class 70 for threaded rod class 80 7 / 1.4311 / 1.4567 or 1.454 7 / 1.4571 / 1.4362 or 1.457 565, acc. to EN 10088-1: 2 ISO 7089:2000, EN ISO 7 rosion resistance steel Characteristic steel ultimate tensile strength $f_{uk} = 500 \text{ N/mm}^2$ $f_{uk} = 700 \text{ N/mm}^2$ on nuts up to M24 and Internormance category C2	$f_{yk} = 600 \text{ N/mm}^2$ $f_{yk} = 600 \text{ N/mm}^2$ $f_{yk} = 600 \text{ N/mm}^2$ $f_{3}$ , acc. to EN 10088- 2014 $093:2000 \text{ or EN ISO}^2$ Characteristic steel yield strength $f_{yk} = 210 \text{ N/mm}^2$ $f_{yk} = 450 \text{ N/mm}^2$ hal threaded anchor ro	$A_5 \ge 12\%^{3}$ 1:2014         1:2014         7094:2000)         Elongation at fracture $A_5 > 8\%$ $A_5 > 8\%$ $A_5 > 8\%$







Base material tammer drilling (HD), tammer drilling with hollow drill it (HDB) r compressed air drilling (CD)     M8 to M30, Ø8 to Ø32, IG-M6 to IG-M20     M8 to M30, Ø8 to Ø32, IG-M6 to IG-M20       r compressed air drilling (CD)     I: -40 °C to +40 °C <sup>1</sup> ) II: -40 °C to +80 °C <sup>2</sup> ) III: -40 °C to +120 °C <sup>3</sup> ) IV: -40 °C to +160 °C <sup>4</sup> )     I: -40 °C to +80 °C       Anchorages subject to seismic action:     for Performance Category C1     for Performance Category for Performance Category C1     for Performance Category M12 to M24       Base material it (HDB) r compressed air drilling (CD)     M8 to M30, II: -40 °C to +40 °C <sup>1</sup> ) II: -40 °C to +40 °C <sup>1</sup> )     M12 to M24		-	s of intended use		
Base material         Uncracked concrete         Cracked concrete         Uncracked concrete         crack concrete           iammer drilling (HD), iammer drilling with hollow drill (HDB)         M8 to M30, Ø8 to Ø32, IG-M6 to IG-M20         M8 to M30, Ø8 to Ø32, IG-M6 to IG-M20         M8 to M30, Ø8 to Ø32, IG-M6 to IG-M20           remperature Range:         II: -40 °C to +40 °C10, II: -40 °C to +40 °C20, III: -40 °C to +120 °C30, IV: -40 °C to +160 °C40         II: -40 °C to +40 °C10, III: -40 °C to +80 °C20, III: -40 °C to +160 °C40           Anchorages subject to seismic action:         for Performance Category C1         for Performance Category IV: -40 °C to +160 °C40           mmer drilling (HD), Iammer drilling (HD), Iammer drilling with hollow drill it (HDB)         M8 to M30, Ø8 to Ø32         M12 to M24           emperature Range:         I: -40 °C to +40 °C10, III: -40 °C to +10 °C30, III: -40 °C to +10 °C30, III: -40 °C to +10 °C30, III: -40 °C to +10 °C10, IV: -40 °C to +10 °C20, IV: -40 °C to +10 °C10, IV: -	Anchorages subject to static a	-			
Base material Hammer drilling (HD), Ammer drilling with hollow drill bit (HDB) or compressed air drilling (CD)         M8 to M30, (Ø8 to Ø32, IG-M6 to IG-M20)         M8 to M30, (Ø8 to Ø32, IG-M6 to IG-M20)           remperature Range:         I: -40 °C to +40 °C1) II: -40 °C to +120 °C3) II: -40 °C to +120 °C3) IV: -40 °C to +160 °C4)         I: -40 °C to +40 °C           Anchorages subject to seismic action:         for Performance Category C1         for Performance Category C1           Anchorages auterial         Cracked and uncracked concrete           Hammer drilling (HD), Hammer drilling (HD), Hammer drilling (HD), Hammer drilling (HD), Hammer drilling (CD)         M8 to M30, II: -40 °C to +40 °C1)           I: -40 °C to +40 °C to +40 °C1)         II: -40 °C to +40 °C1)           I: -40 °C to +40 °C to +40 °C1)         II: -40 °C to +40 °C1)           I: -40 °C to +40 °C to +10 °C		for a working li	fe of 50 years	for a work	ing life of 100 years
Hammer drilling with hollow drill bit (HDB)       Mile 10 M30, B to 332, IG-M6 to IG-M20       Mile 10 M30, B to 332, IG-M6 to IG-M20         remperature Range:       I: -40 °C to +40 °C1) II: -40 °C to +100 °C2) IV: -40 °C to +100 °C2) IV: -40 °C to +100 °C4)       I: -40 °C to +40 °C1) II: -40 °C to +80 °C2) IV: -40 °C to +100 °C4)         Anchorages subject to seismic action:       for Performance Category C1       for Performance Category IV: -40 °C to +100 °C1)         Hammer drilling (HD), Hammer drilling with hollow drill bit (HDB)       M8 to M30, II: -40 °C to +40 °C1)       M12 to M24         Temperature Range:       I: -40 °C to +40 °C1)       I: -40 °C to +40 °C1)       I: -40 °C to +40 °C1)         II: -40 °C to +80 °C2)       II: -40 °C to +40 °C1)       II: -40 °C to +40 °C1)       II: -40 °C to +40 °C1)         II: -40 °C to +80 °C2)       II: -40 °C to +80 °C2)       III: -40 °C to +80 °C1)       III: -40 °C to +80 °C1)         III: -40 °C to +120 °C3)       III: -40 °C to +120 °C3)       III: -40 °C to +120 °C1)       III: -40 °C to +120 °C1)         * (max long-term temperature +24 °C and max short-term temperature +40 °C)       * (max long-term temperature +72 °C and max short-term temperature +10 °C)       * (max long-term temperature +72 °C and max short-term temperature +100 °C)         * (max long-term temperature +72 °C and max short-term temperature +100 °C)       * (max long-term temperature +72 °C and max short-term temperature +100 °C)       * (max long-term temperature +72 °C and max short-term temperature +10	Base material				cracked concrete
Femperature Range:       II: -40 °C to +80 °C2i III: -40 °C to +120 °C3i IV: -40 °C to +120 °C3i IV: -40 °C to +120 °C3i IV: -40 °C to +160 °C4i       II: -40 °C to +80 °         Anchorages subject to seismic action:       for Performance Category C1       for Performance Category C1         Base material       Cracked and uncracked concrete         Hammer drilling (HD).       M8 to M30,         Hammer drilling with hollow drill       M8 to M30,         Joint (HDB)       Ø8 to Ø32         or compressed air drilling (CD)       II: -40 °C to +40 °C1i         II: -40 °C to +120 °C3i       III: -40 °C to +40 °C1i         III: -40 °C to +120 °C3i       III: -40 °C to +120 °C3i         III: -40 °C to +120 °C3i       III: -40 °C to +120 °C3i         III: -40 °C to +160 °C4i       IV: -40 °C to +160 °C4i         ') (max long-term temperature +24 °C and max short-term temperature +30 °C)       iii (max long-term temperature +22 °C and max short-term temperature +30 °C)         *) (max long-term temperature +120 °C and max short-term temperature +100 °C)       *(max long-term temperature +10° °C and max short-term temperature +100 °C)         *) (max long-term temperature +10° °C and max short-term temperature +100 °C)       *(max long-term temperature +10° °C and max short-term temperature +100 °C)         *) (max long-term temperature +10° °C and max short-term temperature +100 °C)       *(max long-term temperature +10° °C and max short-term temperature +10° °C)	Hammer drilling with hollow drill bit (HDB)	Ø8 to	¢	Ø8 to Ø32,	
Image: Status Status       for Performance Category C1       for Performance Category C1         for Performance Category C1       for Performance Category C1       for Performance Category C1         Base material       Cracked and uncracked concrete         Hammer drilling (HD), Hammer drilling with hollow drill       M8 to M30, Ø8 to Ø32       M12 to M24         Femperature drilling (CD)       I: -40 °C to +40 °C1)       I: -40 °C to +40 °C1)       I: -40 °C to +40 °C         Femperature Range:       II: -40 °C to +120 °C3)       III: -40 °C to +120 °C3)       III: -40 °C to +120 °C1)         *       *       *       *       *       *         *       *       *       *       *       *         *       *       *       *       *       *       *         *	Femperature Range:	II: - 40 °C III: - 40 °C			
Base material       Cracked and uncracked concrete         Hammer drilling (HD), Hammer drilling with hollow drill bit (HDB)       M8 to M30, Ø8 to Ø32       M12 to M24         Femperature Range:       I: -40 °C to +40 °C1)       I: -40 °C to +80 °C2)         III: -40 °C to +120 °C3)       III: -40 °C to +120 °C3)         IV: -40 °C to +160 °C4)       IV: -40 °C to +160 °C4)         ************************************	Anchorages subject to seismic	action:			
Hammer drilling (HD), Hammer drilling with hollow drill bit (HDB)       M8 to M30, Ø8 to Ø32       M12 to M24         Temperature Range:       I: -40 °C to +40 °C <sup>1</sup> )       I: -40 °C to +40 °C <sup>2</sup> )       II: -40 °C to +40 °C <sup>3</sup> Temperature Range:       II: -40 °C to +120 °C <sup>3</sup> III: -40 °C to +120 °C <sup>3</sup> III: -40 °C to +120 °C <sup>3</sup> 10       (max long-term temperature +24 °C and max short-term temperature +40 °C)       10       °C and max short-term temperature +20 °C         20       (max long-term temperature +72 °C and max short-term temperature +120 °C)       10       °C         30       (max long-term temperature +72 °C and max short-term temperature +120 °C)       °C         40       (max long-term temperature +72 °C and max short-term temperature +120 °C)       °C         50       (max long-term temperature +100 °C and max short-term temperature +160 °C)       °C         40       (max long-term temperature +100 °C and max short-term temperature +160 °C)       °C         9       (max long-term temperature +100 °C and max short-term temperature +160 °C)       °C         9       (max long-term temperature +100 °C and max short-term temperature +160 °C)       °C         9       (max long-term temperature +100 °C and max short-term temperature +160 °C)       °C         9       (max long-term temperature +100 °C and max short-term temperature +160 °C)       °C		for Performance	e Category C1	for Perforr	mance Category C2
Hammer drilling with hollow drill       M8 to M30, Ø8 to Ø32       M12 to M24         or compressed air drilling (CD)       I: -40 °C to +40 °C1)       I: -40 °C to +40 °C1)       I: -40 °C to +40 °C1)         Temperature Range:       I: -40 °C to +80 °C2)       II: -40 °C to +80 °C1)       II: -40 °C to +80 °C1)         11: -40 °C to +120 °C3)       III: -40 °C to +120 °C3)       III: -40 °C to +120 °C3)       III: -40 °C to +160 °C1)         11: -40 °C to +120 °C3)       III: -40 °C to +160 °C4)       IV: -40 °C to +160 °C1)       V: -40 °C to +160 °C1)         11: -40 °C to +72 °C and max short-term temperature +80 °C1       30 (max long-term temperature +72 °C and max short-term temperature +120 °C1)       40 °C cond max short-term temperature +120 °C1)         11: -40 °C to -100 °C and max short-term temperature +120 °C1)       40 °C cond max short-term temperature +120 °C1)       40 °C cond max short-term temperature +120 °C1)         12: (max long-term temperature +72 °C and max short-term temperature +120 °C1)       40 °C1 cond max short-term temperature +120 °C1)       40 °C1 cond max short-term temperature +120 °C1)         13: (max long-term temperature +100 °C and max short-term temperature +120 °C1)       40 °C1 cond max short-term temperature +120 °C1)       40 °C1 cond °C1)         14: (max long-term temperature +100 °C and max short-term temperature +120 °C1)       50 °C1       50 °C1         14: (max long-term temperature +100 °C and max short-term temperature +120 °C1)       50 °C1	Base material		Cracked and und	cracked concrete	9
Temperature Range:       I: -40 °C to +40 °C <sup>1</sup> )       I: -40 °C to +40 °C <sup>1</sup> )         II: -40 °C to +80 °C <sup>2</sup> )       II: -40 °C to +80 °C <sup>2</sup> )       II: -40 °C to +80 °C <sup>1</sup> )         III: -40 °C to +120 °C <sup>3</sup> )       III: -40 °C to +120 °C <sup>3</sup> )       III: -40 °C to +120 °C <sup>3</sup> )         IV: -40 °C to +160 °C <sup>4</sup> )       IV: -40 °C to +160 °C <sup>4</sup> )       IV: -40 °C to +160 °C <sup>4</sup> )         *       °C and max short-term temperature +80 °C         *       °(max long-term temperature +72 °C and max short-term temperature +10 °C)         *       °(max long-term temperature +100 °C and max short-term temperature +120 °C)         *       °(max long-term temperature +100 °C and max short-term temperature +160 °C)         Base materials:       •         •       Compacted, reinforced or unreinforced normal weight concrete without fibres according to EN 206:2013 + A1:2016.         Use conditions (Environmental conditions):       •         •       Structures subject to dry internal conditions (all materials).         •       For all other conditions according to EN 1993-1-4:2006+A1:2015 corresponding to corrosion resistance class:         -       Stainless steel Stahl A2 according to Annex A 4, Table A1: CRC II         -       Stainless steel Stahl A4 according to Annex A 4, Table A1: CRC III	Hammer drilling with hollow drill bit (HDB)			M	112 to M24
<ul> <li><sup>2)</sup> (max long-term temperature +50 °C and max short-term temperature +80 °C)</li> <li><sup>3)</sup> (max long-term temperature +72 °C and max short-term temperature +120 °C)</li> <li><sup>4)</sup> (max long-term temperature +100 °C and max short-term temperature +160 °C)</li> <li><b>Base materials:</b></li> <li>Compacted, reinforced or unreinforced normal weight concrete without fibres according to EN 206:2013 + A1:2016.</li> <li>Strength classes C20/25 to C50/60 according to EN 206:2013 + A1:2016.</li> <li><b>Use conditions (Environmental conditions):</b></li> <li>Structures subject to dry internal conditions (all materials).</li> <li>For all other conditions according to EN 1993-1-4:2006+A1:2015 corresponding to corrosion resistance class: <ul> <li>Stainless steel Stahl A2 according to Annex A 4, Table A1: CRC II</li> <li>Stainless steel Stahl A4 according to Annex A 4, Table A1: CRC III</li> </ul> </li> </ul>	Temperature Range:	II: - 40 °C III: - 40 °C	to +80 °C <sup>2)</sup> to +120 °C <sup>3)</sup>	II: - 40 III: - 40	) °C to +80 °C <sup>2)</sup> ) °C to +120 °C <sup>3)</sup>
<ul> <li>Structures subject to dry internal conditions (all materials).</li> <li>For all other conditions according to EN 1993-1-4:2006+A1:2015 corresponding to corrosion resistance class:         <ul> <li>Stainless steel Stahl A2 according to Annex A 4, Table A1: CRC II</li> <li>Stainless steel Stahl A4 according to Annex A 4, Table A1: CRC III</li> </ul> </li> </ul>	<ul> <li><sup>2)</sup> (max long-term temperature</li> <li><sup>3)</sup> (max long-term temperature</li> <li><sup>4)</sup> (max long-term temperature</li> <li>Base materials:</li> <li>Compacted, reinforced or unre</li> <li>EN 206:2013 + A1:2016.</li> </ul>	e +50 °C and max sh e +72 °C and max sh e +100 °C and max s einforced normal weig	ort-term temperature ort-term temperature hort-term temperatu	e +80 °Ć) e +120 °C) re +160 °C) fibres according	ı to
	<ul> <li>Structures subject to dry intern</li> <li>For all other conditions accord class:         <ul> <li>Stainless steel Stahl A2</li> <li>Stainless steel Stahl A4</li> </ul> </li> </ul>	nal conditions (all ma ling to EN 1993-1-4:2 according to Annex according to Annex	2006+Á1:2015 corres A 4, Table A1: CRC A 4, Table A1: CRC	 	osion resistance
Sika AnchorFix <sup>®</sup> -2002 for concrete	Sika AnchorFix <sup>®</sup> -2002 for concre	te			

Intended Use Specifications Annex B 1



### Design:

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

### Installation:

- · Dry, wet concrete or flooded bore holes (not sea-water).
- Hole drilling by hammer (HD), hollow (HDB) or compressed air drill mode (CD).
- Overhead installation allowed.
- Anchor installation carried out by appropriately qualified personnel and under the supervision of the person responsible for technical matters of the site.
- The injection mortar is assessed for installation at minimum concrete temperature of -5°C, where subsequently the temperature in the concrete does not rise at a rapid rate, i.e. from the minimum installation temperature to 24°C within a 12-hour period.

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Intended Use Specifications Annex B 2

#### Deutsches Institut für Bautechnik

Table B1: Ir	stallation par	ameters fo	or threa	ded r	bd								
Anchor size				M8	M10	M12	M16	M20	M24	M27	M30		
Diameter of elemen	t	d = d <sub>nom</sub>	[mm]	8	10	12	16	20	24	27 30			
Nominal drill hole di	ameter	d <sub>0</sub>	[mm]	10	12	14	18	22	28	8 30 35			
Effective embedmer	at dopth	h <sub>ef,min</sub>	[mm]	60	60	70	80	90 96 108 120		120			
	it depth	h <sub>ef,max</sub>	[mm]	160	200	240	320	400	480	540	540 600		
Diameter of clearance hole in	Prepositioned ins	tallation d <sub>f</sub> ≤	[mm]	9	12	14	18	22	26	30 33			
the fixture <sup>1)</sup>	Push through i	nstallation d <sub>f</sub>	[mm]	12	14	16	20	24	30	33	40		
Maximum torque mo	oment	max T <sub>inst</sub> ≤	[Nm]	10	20	40 <sup>2)</sup>	60	100	170	250	300		
Minimum thickness	of member	h <sub>min</sub>	[mm]		<sub>f</sub> + 30 m : 100 mr			I	n <sub>ef</sub> + 2d <sub>0</sub>				
Minimum spacing		s <sub>min</sub>	[mm]	40	50	60	75	95	115	125	140		
Minimum edge dista	ince	c <sub>min</sub>	[mm]	35	40	45	50	60	65	75	80		

<sup>1)</sup> For application under seismic loading the diameter of clearance hole in the fixture shall be at maximum  $d_1 + 1$ mm or alternatively the annular gap between fixture and threaded rod shall be filled force-fit with mortar.

<sup>2)</sup> Maximum Torque moment for M12 with steel Grade 4.6 is 35 Nm

### Table B2: Installation parameters for rebar

Rebar size			Ø 81)	Ø 10 <sup>1)</sup>	Ø 12 <sup>1)</sup>	Ø 14	Ø 16	Ø 20	Ø 24 <sup>1)</sup>	Ø 25 <sup>1)</sup>	Ø 28	Ø 32
Diameter of element	d = d <sub>nom</sub>	[mm]	8	10	12	14	16	20	24	25	28	32
Nominal drill hole diameter	d <sub>0</sub>	[mm]	10 12	12 14	14 16	18	20	25	30 32	30 32	35	40
Effective embedment depth	h <sub>ef,min</sub>	[mm]	60	60	70	75	80	90	96	100	112	128
Effective embedment depth	h <sub>ef,max</sub>	[mm]	160	200	240	280	320	400	480	500	560	640
Minimum thickness of member	h <sub>min</sub>	[mm]	-	30 mm 00 mm	2			ł	n <sub>ef</sub> + 2d <sub>0</sub>			
Minimum spacing	s <sub>min</sub>	[mm]	40	50	60	70	75	95	120	120	130	150
Minimum edge distance	c <sub>min</sub>	[mm]	35	40	45	50	50	60	70	70	75	85
1) In a Marco and the all shattle for all shattle												

<sup>1)</sup> both nominal drill hole diameter can be used

### Table B3: Installation parameters for Internal threaded rod

Anchor size			IG-M6	IG-M8	IG-M10	IG-M12	IG-M16	IG-M20
Internal diameter of sleeve	d <sub>2</sub>	[mm]	6	8	10	12	16	20
Outer diameter of sleeve1)	d = d <sub>nom</sub>	[mm]	10	12	16	20	24	30
Nominal drill hole diameter	d <sub>0</sub>	[mm]	12	14	18	22	28	35
Effective embedment depth	h <sub>ef,min</sub>	[mm]	60	70	80	90	96	120
Effective embedment depth	h <sub>ef,max</sub>		200	240	320	400	480	120 600 22 100 20/40
Diameter of clearance hole in the fixture	d <sub>f</sub> ≤	[mm]	7	9	12	14	18	22
Maximum torque moment	max T <sub>inst</sub> ≤	[Nm]	10	10	20	40	60	100
Thread engagement length min/max	l <sub>IG</sub>	[mm]	8/20	8/20	10/25	12/30	16/32	20/40
Minimum thickness of member	h <sub>min</sub>	[mm]		30 mm 0 mm		h <sub>ef</sub> +	- 2d₀	
Minimum spacing	s <sub>min</sub>	[mm]	50	60	75	95	115	140
Minimum edge distance	c <sub>min</sub>	[mm]	40	45	50	60	65	80
<sup>1)</sup> With metric threads according to	EN 1993-1-8:2	005+AC	:2009					

Intended Use

Installation parameters



REFERE			10	manna	WARRAN				
Rebar	Internal threaded rod	d <sub>0</sub> Drill bit - Ø HD, HDB, CD			d <sub>b,min</sub> min. Brush - Ø	Piston plug			
[mm]	[mm]	[mm]		[mm]	[mm]		Ļ	$\rightarrow$	
8		10	RB10	11,5	10,5		•		
8 / 10	IG-M6	12	RB12	13,5	12,5		No plug	required	
10 / 12	IG-M8	14	RB14	15,5	14,5		No plug	required	
12		16	RB16	17,5	16,5				
14	IG-M10	18	RB18	20,0	18,5	VS18			
16		20	RB20	22,0	20,5	VS20			
	IG-M12	22	RB22	24,0	22,5	VS22			
20		25	RB25	27,0	25,5		h.>	h.>	
	IG-M16								all
							250 mm	250 mm	
				34,0	,				
28	IG-M20			37,0	35,5				
32		40	RB40	43,5	40,5	VS40			
	[mm] 8 8 / 10 10 / 12 12 14 16 20 24 / 25 24 / 25 28	Rebar         threaded rod           [mm]         [mm]           8         [mm]           8         IG-M6           10 / 12         IG-M8           12         IG           14         IG-M10           16         IG-M12           20         IG-M16           24 / 25         IG-M20           28         IG-M20	Rebar         threaded rod         Drill bit - Ø HD, HDB, CD           [mm]         [mm]         III bit - Ø HD, HDB, CD           [mm]         [mm]         III bit - Ø HD, HDB, CD           8         [mm]         [mm]           8         10         10           8         10         10           8         10         12           10/12         IG-M6         12           10/12         IG-M10         18           14         IG-M10         18           16         20         22           20         25         25           20         IG-M16         28           24/25         30         32           28         IG-M20         35	Internal threaded rod         do Drill bit - Ø HD, HDB, CD         do Brus           [mm]         [mm]         [mm]         Brus           [mm]         [mm]         [mm]         Brus           8         10         RB10           8/10         IG-M6         12         RB12           10/12         IG-M8         14         RB14           12         IG-M10         18         RB18           16         20         RB20           IG-M12         22         RB22           20         25         RB25           IG-M16         28         RB28           24/25         30         RB30           24/25         32         RB32           28         IG-M20         35	Rebar         threaded rod         Drill bit - Ø HD, HDB, cD         Brush - Ø           [mm]         [mm]         [mm]         [mm]           8         10         RB10         11,5           8 / 10         IG-M6         12         RB12         13,5           10 / 12         IG-M8         14         RB14         15,5           12         IG-M10         18         RB18         20,0           16         20         RB20         22,0           16         IG-M12         22         RB22         24,0           20         25         RB25         27,0           IG-M16         28         RB28         30,0           24 / 25         30         RB30         31,8           24 / 25         IG-M20         35         RB35         37,0	Internal threaded rod         d0 Drill bit - Ø HD, HDB, CD $d_b$ Brush - Ø $d_{b,min}$ min. Brush - Ø           [mm]         [mm]         [mm]         [mm]         [mm]         [mm]           8         10         RB10         11,5         10,5           8/10         IG-M6         12         RB12         13,5         12,5           10/12         IG-M8         14         RB14         15,5         14,5           12         16         RB16         17,5         16,5           14         IG-M10         18         RB18         20,0         18,5           16         20         RB20         22,0         20,5           20         IG-M12         22         RB22         24,0         22,5           20         IG-M16         28         RB28         30,0         28,5           24 / 25         30         RB30         31,8         30,5           24 / 25         32         RB32         34,0         32,5           28         IG-M20         35         RB35         37,0         35,5	$ \begin{array}{ c c c c c c c c c c c c c c c c c c c$	$ \begin{array}{ c c c c c c c c c c c c c c c c c c c$	$ \begin{array}{ c c c c c c } \hline \begin{tabular}{ c c c c } \hline \begin{tabular}{ c c c c c } \hline \begin{tabular}{ c c c c c c } \hline \begin{tabular}{ c c c c c c c } \hline \begin{tabular}{ c c c c c c c c } \hline \begin{tabular}{ c c c c c c c c c c c c c c c c c c c$



MAC - Hand pump (volume 750 ml) Drill bit diameter  $(d_0)$ : 10 mm to 20 mm Drill hole depth  $(h_0)$ : < 10 d<sub>s</sub> Only in uncracked concrete



CAC - Rec. compressed air tool (min 6 bar) Drill bit diameter (d<sub>0</sub>): all diameters

HDB – Hollow drill bit system

Drill bit diameter (d<sub>0</sub>): all diameters The hollow drill bit system contains the Heller Duster Expert hollow drill bit and a

class M vacuum with minimum negative pressure of 253 hPa and flow rate of minimum 150 m<sup>3</sup>/h (42 l/s).

### Sika AnchorFix<sup>®</sup>-2002 for concrete

### Intended Use

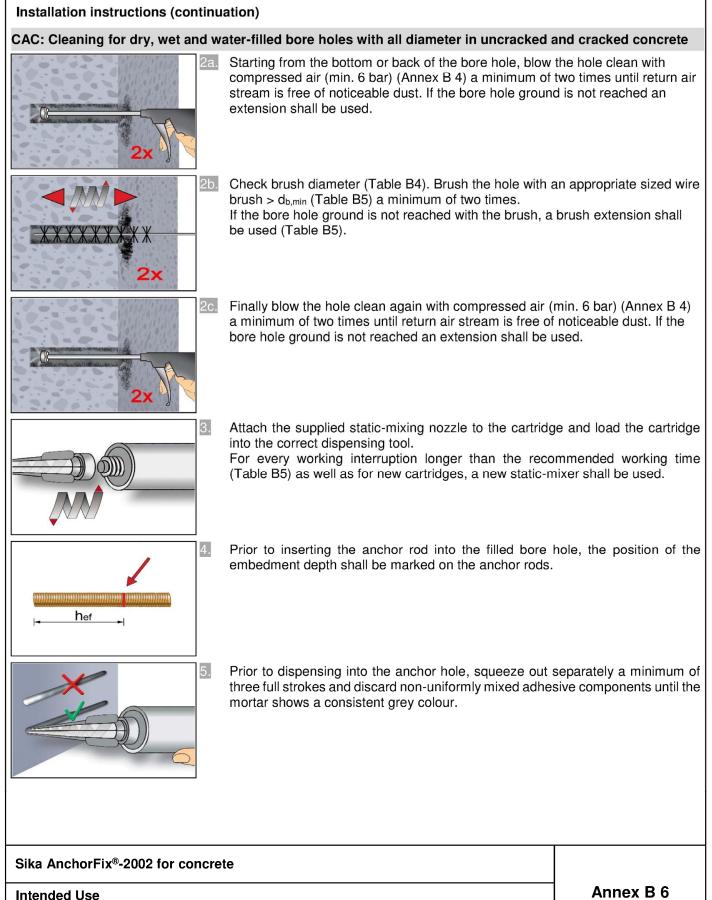
Cleaning and setting tools

Annex B 4



### Installation instructions Drilling of the bore hole 1a. Hammer (HD) or compressed air drilling (CD) Drill a hole into the base material to the size and embedment depth required by the selected anchor (Table B1, B2, or B3). Proceed with Step 2. In case of aborted drill hole, the drill hole shall be filled with mortar. Hollow drill bit system (HDB) (see Annex B 3) 1b Drill a hole into the base material to the size and embedment depth required by the selected anchor (Table B1, B2, or B3). This drilling system removes the dust and cleans the bore hole during drilling (all conditions). Proceed with Step 3. In case of aborted drill hole, the drill hole shall be filled with mortar. Attention! Standing water in the bore hole must be removed before cleaning. MAC: Cleaning for dry and wet bore hole with diameter $d_0 \le 20$ mm and bore hole depth $h_0 \le 10d_{nom}$ (uncracked concrete only!) Starting from the bottom or back of the bore hole, blow the hole clean with handpump (Annex B 4) a minimum of four times until return air stream is free of noticeable dust. 2b. Check brush diameter (Table B4). Brush the hole with an appropriate sized wire brush > $d_{b,min}$ (Table B4) a minimum of four times in a twisting motion. If the bore hole ground is not reached with the brush, a brush extension must be used. Finally blow the hole clean again with handpump (Annex B 4) a minimum of four times until return air stream is free of noticeable dust. After cleaning, the bore hole has to be protected against re-contamination in an appropriate way, until dispensing the mortar in the bore hole. If necessary, the cleaning has to be repeated directly before dispensing the mortar. In-flowing water must not contaminate the bore hole again. Sika AnchorFix<sup>®</sup>-2002 for concrete Annex B 5 Intended Use Installation instructions





Installation instructions (continuation)

Annex B 6



Installation instructions (continu	ation)
6.	Starting from the bottom or back of the cleaned anchor hole, fill the hole up to approximately two-thirds with adhesive. Slowly withdraw the static mixing nozzle as the hole fills to avoid creating air pockets. If the bottom or back of the anchor hole is not reached, an appropriate extension nozzle must be used. Observe the gel-/ working times given in Table B5.
	<ul> <li>Piston plugs shall be used according to Table B4 for the following applications:</li> <li>Horizontal assembly (horizontal direction) and ground erection (vertical downwards direction): Drill bit-Ø d<sub>0</sub> ≥ 18 mm and embedment depth h<sub>ef</sub> &gt; 250mm</li> <li>Overhead assembly (vertical upwards direction): Drill bit-Ø d<sub>0</sub> ≥ 18 mm Assemble mixing nozzle, extension and piston plug before injecting mortar.</li> </ul>
8.	Insert piston plug to back of the hole and inject adhesive. If the bottom or back of the anchor hole is not reached, an appropriate extension nozzle must be used. During injection the piston plug is naturally pushed out of the borehole by the back pressure of the mortar. Observe the gel-/ working times given in Table B5.
9.	Push the threaded rod or reinforcing bar into the anchor hole while turning slightly to ensure positive distribution of the adhesive until the embedment mark has reached the surface level. The anchor shall be free of dirt, grease, oil or other foreign material.
10.	After inserting the anchor, the annular gab between anchor rod and concrete, in case of a push through installation additionally also the fixture, must be complete filled with mortar. If excess mortar is not visible at the top of the hole, the requirement is not fulfilled and the application has to be renewed.
	For overhead application the anchor rod shall be fixed (e.g. wedges) until the mortar has started to harden.
Sika AnchorFix <sup>®</sup> -2002 for concre	te

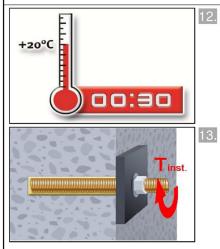
### Intended Use

Annex B 7

Installation instructions (continuation)



### Installation instructions (continuation)



After full curing, the add-on part can be installed with up to the max. torque (Table B1 or B3) by using a calibrated torque wrench. In case of prepositioned installation the annular gab between anchor and fixture can be optional filled with mortar. Therefor substitute the washer by the filling washer and connect the mixer reduction nozzle to the tip of the mixer. The annular gap is filled with mortar,

Allow the adhesive to cure to the specified time prior to applying any load or torque. Do not move or load the anchor until it is fully cured (attend Table B5).

### Table B5: Maximum working time and minimum curing time

Concrete	temp	erature	Gelling working time	Minimum curing time in dry concrete	Minimum curing time in wet concrete
- 5 °C	to	- 1 °C	50 min	5 h	10 h
0°C	to	+ 4 °C	25 min	3,5 h	7 h
+ 5 °C	to	+ 9 °C	15 min	2 h	4 h
+ 10 °C	to	+ 14 °C	10 min	1 h	2 h
+ 15 °C	to	+ 19 °C	6 min	40 min	80 min
+ 20 °C	to	+ 29 °C	3 min	30 min	60 min
+ 30 °C	to	+ 40 °C	2 min	30 min	60 min
Cartridge	temp	erature		+5°C to +40°C	

when mortar oozes out of the washer.

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Installation instructions (continuation) Curing time Annex B 8



Si	ze			M8	M10	M12	M16	M20	M24	M27	M30
Cr	oss section area	A <sub>s</sub>	[mm²]	36,6	58	84,3	157	245	353	459	561
Cł	naracteristic tension resistance, Steel failu		1	•							
St	eel, Property class 4.6 and 4.8	N <sub>Rk,s</sub>	[kN]	15 (13)	23 (21)	34	63	98	141	184	224
St	eel, Property class 5.6 and 5.8	N <sub>Rk,s</sub>	[kN]	18 (17)	29 (27)	42	78	122	176	230	280
St	eel, Property class 8.8	N <sub>Rk,s</sub>	[kN]	29 (27)	46 (43)	67	125	196	282	368	449
St	ainless steel A2, A4 and HCR, class 50	N <sub>Rk,s</sub>	[kN]	18	29	42	79	123	177	230	281
St	ainless steel A2, A4 and HCR, class 70	N <sub>Rk,s</sub>	[kN]	26	41	59	110	171	247	_3)	_3)
	ainless steel A4 and HCR, class 80	N <sub>Rk,s</sub>	[kN]	29	46	67	126	196	282	_3)	_3)
Cł	naracteristic tension resistance, Partial fac	tor <sup>2)</sup>									
St	eel, Property class 4.6 and 5.6	γMs,N	[-]				2,0	C			
St	eel, Property class 4.8, 5.8 and 8.8	γMs,N	[-]				1,5	5			
St	ainless steel A2, A4 and HCR, class 50	γ <sub>Ms,N</sub>	[-]				2,8	6			
St	ainless steel A2, A4 and HCR, class 70	γ <sub>Ms,N</sub>	[-]				1,8	7			
	ainless steel A4 and HCR, class 80	γ <sub>Ms,N</sub>	[-]				1,6	6			
Cł	naracteristic shear resistance, Steel failure	<b>;</b> <sup>1)</sup>	1							1	
F	Steel, Property class 4.6 and 4.8	V <sup>0</sup> <sub>Rk,s</sub>	[kN]	9 (8)	14 (13)	20	38	59	85	110	135
r arm	Steel, Property class 5.6 and 5.8	V <sup>0</sup> Rk,s	[kN]	11 (10)	17 (16)	25	47	74	106	138	168
lever	Steel, Property class 8.8	V <sup>0</sup> <sub>Bk.s</sub>	[kN]	15 (13)	23 (21)	34	63	98	141	184	224
out l	Stainless steel A2, A4 and HCR, class 50	V <sup>0</sup> Rk.s	[kN]	9	15	21	39	61	88	115	140
Without	Stainless steel A2, A4 and HCR, class 70	V <sup>0</sup> Rk.s	[kN]	13	20	30	55	86	124	_3)	_3)
>	Stainless steel A4 and HCR, class 80	V <sup>0</sup> Rk,s	[kN]	15	23	34	63	98	141	_3)	_3)
	Steel, Property class 4.6 and 4.8	M <sup>0</sup> Rk,s	[Nm]	15 (13)	30 (27)	52	133	260	449	666	900
arm	Steel, Property class 5.6 and 5.8	M <sup>0</sup> Rk,s	[Nm]	19 (16)	37 (33)	65	166	324	560	833	1123
	Steel, Property class 8.8	M <sup>0</sup> Rk,s	[Nm]	30 (26)	60 (53)	105	266	519	896	1333	1797
ith lever	Stainless steel A2, A4 and HCR, class 50	M <sup>0</sup> Rk,s	[Nm]	19	37	66	167	325	561	832	1125
Vit	Stainless steel A2, A4 and HCR, class 70	M <sup>0</sup> Rk,s	[Nm]	26	52	92	232	454	784	_3)	_3)
	Stainless steel A4 and HCR, class 80	M <sup>0</sup> Rk,s	[Nm]	30	59	105	266	519	896	_3)	_3)
Cł	haracteristic shear resistance, Partial facto		1							1	
St	eel, Property class 4.6 and 5.6	γ <sub>Ms,V</sub>	[-]				1,6	57			
St	eel, Property class 4.8, 5.8 and 8.8	γ <sub>Ms,V</sub>	[-]				1,2	25			
St	ainless steel A2, A4 and HCR, class 50	γ <sub>Ms,V</sub>	[-]				2,3	8			
St	ainless steel A2, A4 and HCR, class 70	γ <sub>Ms,V</sub>	[-]				1,5	6			
St	ainless steel A4 and HCR, class 80	γ <sub>Ms,V</sub>	[-]				1,3	3			

<sup>2)</sup> in absence of national regulation
 <sup>3)</sup> Anchor type not part of the ETA

### Sika AnchorFix<sup>®</sup>-2002 for concrete

### Performances

Characteristic values for steel tension resistance and steel shear resistance of threaded rods



# Table C2: Characteristic values for Concrete cone failure and Splitting with all kind of action

Anchor size				All Anchor types and sizes	
Concrete cone fa	ailure		·		
Uncracked concre	ete	k <sub>ucr,N</sub>	[-]	11,0	
Cracked concrete	)	k <sub>cr,N</sub>	[-]	7,7	
Edge distance		c <sub>cr,N</sub>	[mm]	1,5 h <sub>ef</sub>	
Axial distance		s <sub>cr,N</sub>	[mm]	2 c <sub>cr,N</sub>	
Splitting		1	- I		
	h/h <sub>ef</sub> ≥ 2,0			1,0 h <sub>ef</sub>	
Edge distance	2,0 > h/h <sub>ef</sub> > 1,3	c <sub>cr,sp</sub>	[mm]	$2 \cdot h_{ef} \left( 2,5 - \frac{h}{h_{ef}} \right)$	
	h/h <sub>ef</sub> ≤ 1,3	_		2,4 h <sub>ef</sub>	
Axial distance		s <sub>cr,sp</sub>	[mm]	2 c <sub>cr,sp</sub>	

### Sika AnchorFix<sup>®</sup>-2002 for concrete

### Performances

Characteristic values for Concrete cone failure and Splitting with all kind of action



Table	e C3: Charac for a we	teristic value orking life of		n loads ι	under	stati	c and	quas	si-sta	tic ac	tion	
	r size threaded ro	d			M8	M10	M12	M16	M20	M24	M27	M30
Steel fa		atanaa	N	ELEN II			Δ • f	<sub>Jk</sub> (or s	oo Tah			
	teristic tension resi	stance	N <sub>Rk,s</sub>	[kN]								
Partial Combi		a navata failuva	γMs,N	[-]				see Ta	ible C1			
	ned pull-out and one contract of the contract		d concrete C20	/25								
	I: 40°C/24°C			[N/mm <sup>2</sup> ]	17	17	16	15	14	13	13	13
Temperature range	II: 80°C/50°C	Dry, wet	<sup>τ</sup> Rk,ucr	[N/mm <sup>2</sup> ]	17	17	16	15	14	13	13	13
rature	III: 120°C/72°C	concrete and flooded bore	<sup>τ</sup> Rk,ucr		15	14	14	13	14	12	11	11
edme	IV: 160°C/100°C	hole	<sup>τ</sup> Rk,ucr	[N/mm <sup>2</sup> ]								
			<sup>T</sup> Rk,ucr	[N/mm²]	12	11	11	10	9,5	9,0	9,0	9,0
	cteristic bond resist	ance in cracked c	concrete C20/28									
Temperature range	I: 40°C/24°C	Dry, wet	<sup>τ</sup> Rk,cr	[N/mm <sup>2</sup> ]	7,0	7,5	8,0	9,0	8,5	7,0	7,0	7,0
ture	II: 80°C/50°C	concrete and	<sup>τ</sup> Rk,cr	[N/mm <sup>2</sup> ]	7,0	7,5	8,0	9,0	8,5	7,0	7,0	7,0
Ipera	III: 120°C/72°C	flooded bore hole	<sup>τ</sup> Rk,cr	[N/mm <sup>2</sup> ]	6,0	6,5	7,0	7,5	7,0	6,0	6,0	6,0
Ten	IV: 160°C/100°C		<sup>τ</sup> Rk,cr	[N/mm <sup>2</sup> ]	5,5	5,5	6,0	6,5	6,0	5,5	5,5	5,5
Redukt	tion factor $\psi^{0}{}_{sus}$ in	cracked and unc	racked concret	e C20/25								
nge	I: 40°C/24°C							0,9	90			
Temperature range	II: 80°C/50°C	Dry, wet concrete and	0					0,	87			
oerati	III: 120°C/72°C	flooded bore hole	$\Psi^0$ sus	[-]				0,	75			
Tem	IV: 160°C/100°C							0,	66			
			C25/30						02			
			C30/37					1,0				
	sing factors for cond	crete	C35/45					1,0				
$\Psi_{c}$			C40/50						08			
			C45/55 C50/60						09 10			
Concre	ete cone failure		030/00					Ι,	10			
		elevant paramete	er					see Ta	ble C2			
Splittir	-											
1		elevant paramete	er					see Ta	ble C2			
Installa	ation factor			1						No Per	former	
for drv	and wet concrete	MAC	_				1,2				essed	ice
		CAC HDB	_ <sup>γ</sup> inst	[-]					,0			
for floo	ded bore hole	CAC	-						,2 ,4			
									, <b>.</b>			
Perfor	AnchorFix <sup>®</sup> -2002 mances cteristic values of ter		static and quasi	-static action	n					Anne	x C 3	5



Table	e C4: Charac for a w	teristic value orking life of		on loads	unde	r stat	ic and	d qua	si-sta	atic a	ction	
Anchor	size threaded ro	d			M8	M10	M12	M16	M20	M24	M27	M30
Steel fai	lure											
Characte	eristic tension resi	istance	N <sub>Rk,s</sub>	[kN]			$A_s \cdot f$	<sub>uk</sub> (or s	ee Tab	ole C1)		
Partial fa	actor		γ <sub>Ms,N</sub>	[-]				see Ta	able C1			
Combin	ed pull-out and o	concrete failure		1								
Charact	eristic bond resist	ance in uncracke	d concrete C2	0/25								
Temperature range	I: 40°C/24°C	Dry, wet concrete and	<sup>τ</sup> Rk,ucr,100	[N/mm <sup>2</sup> ]	17	17	16	15	14	13	13	13
	II: 80°C/50°C	flooded bore hole	<sup>τ</sup> Rk,ucr,100	[N/mm <sup>2</sup> ]	17	17	16	15	14	13	13	13
	eristic bond resist	ance in cracked o	concrete C20/2	25							· · · · ·	
Temperature range	l: 40°C/24°C	Dry, wet concrete and	<sup>τ</sup> Rk,cr,100	[N/mm <sup>2</sup> ]	5,5	6,0	6,5	6,5	6,5	6,5	6,5	6,5
Temp	II: 80°C/50°C	flooded bore hole	<sup>τ</sup> Rk,cr,100	[N/mm²]	5,5	6,0	6,5	6,5	6,5	6,5	6,5	6,5
			C25/30					1,	02			
			C30/37						,04			
	ng factors for con	crete	C35/45						,07			
ψC			C40/50						,08			
			C45/55						,09			
			C50/60					1,	,10			
Concret	te cone failure							T		<u></u>		
Splitting		elevant paramete	er					see 1a	able C2	<u>-</u>		
Spiittini	-	elevant paramete	or					500 T/	able C2	)		
Installat	tion factor	lelevant paramete	51					366 10		-		
motana										No Pe	rforman	ce
f		MAC					1,2				sessed	
for dry a	nd wet concrete	CAC	γ <sub>inst</sub>	[-]				1	,0			
		HDB							,2			
for flood	ed bore hole	CAC						1	,4			

Sika AnchorFix®-2002 for concrete

### Performances

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



Table C5: Characteristic va	lues of	shear	r loads	s unde	er stat	ic and	quas	i-statio	c action	
Anchor size threaded rod			M8	M10	M12	M16	M20	M24	M27	M30
Steel failure without lever arm						•	•	•		
Characteristic shear resistance Steel, strength class 4.6, 4.8 and 5.6, 5.8	V <sup>0</sup> <sub>Rk,s</sub>	[kN]			0,6 •	A <sub>s</sub> ∙f <sub>uk</sub>	(or see	Table C	1)	
Characteristic shear resistance Steel, strength class 8.8 Stainless Steel A2, A4 and HCR, all strength classes	V <sup>0</sup> <sub>Rk,s</sub>	[kN]			0,5 ·	A <sub>s</sub> ∙f <sub>uk</sub>	(or see	Table C	1)	
Partial factor	γ <sub>Ms,V</sub>	[-]				see	Table C	:1		
Ductility factor	k <sub>7</sub>	[-]					1,0			
Steel failure with lever arm	1	11								
Characteristic bending moment	M <sup>0</sup> <sub>Rk,s</sub>	[Nm]			1,2 • 1	W <sub>el</sub> ∙ f <sub>u</sub> ⊧	(or see	Table C	21)	
Elastic section modulus	W <sub>el</sub>	[mm³]	31	62	109	277	541	935	1387	1874
Partial factor	γMs,V	[-]				see	Table C	1		
Concrete pry-out failure										
Factor	k <sub>8</sub>	[-]					2,0			
Installation factor	$\gamma_{inst}$	[-]					1,0			
Concrete edge failure										
Effective length of fastener	۱ <sub>f</sub>	[mm]		r	nin(h <sub>ef</sub> ; 1	2 · d <sub>nor</sub>	m)		min(h <sub>ef</sub> ;	300mm)
Outside diameter of fastener	d <sub>nom</sub>	[mm]	8	10	12	16	20	24	27	30
Installation factor	γinst	[-]					1,0			

### Sika AnchorFix®-2002 for concrete

Performances

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



	r size internal thre	eaded anchor roo	ds		IG-M6	IG-M8	IG-M10	IG-M12	IG-M16	IG-M20
Steel fa			N		4.0					4.00
	teristic tension res	·	N <sub>Rk,s</sub>	[kN]	10	17	29	42	76	123
	trength class	8.8	N <sub>Rk,s</sub>	[kN]	16	27	46	67	121	196
	factor, strength cla		γ <sub>Ms,N</sub>	[-]			1	,5		
	teristic tension res 4 and HCR, Strenç		N <sub>Rk,s</sub>	[kN]	14	26	41	59	110	124
Partial f			γ <sub>Ms,N</sub>	[-]			1,87			2,86
	ned pull-out and o									
	teristic bond resist	ance in uncracked		1						
Temperature range	I: 40°C/24°C		<sup>τ</sup> Rk,ucr	[N/mm <sup>2</sup> ]	17	16	15	14	13	13
nperati range	II: 80°C/50°C	Dry, wet concret	e <sup>τ</sup> Rk,ucr	[N/mm <sup>2</sup> ]	17	16	15	14	13	13
rar rar	III: 120°C/72°C	flooded bore hol	e <sup>τ</sup> Rk,ucr	[N/mm <sup>2</sup> ]	14	14	13	12	12	11
Теі	IV: 160°C/100°C		<sup>τ</sup> Rk,ucr	[N/mm <sup>2</sup> ]	11	11	10	9,5	9,0	9,0
Charac	teristic bond resist	ance in cracked c	oncrete C20	)/25			•			
Ire	I: 40°C/24°C		<sup>τ</sup> Rk,cr	[N/mm <sup>2</sup> ]	7,5	8,0	9,0	8,5	7,0	7,0
Temperature range	II: 80°C/50°C	Dry, wet concret	e τ <sub>Rk,cr</sub>	[N/mm <sup>2</sup> ]	7,5	8,0	9,0	8,5	7,0	7,0
nperat range	III: 120°C/72°C	and flooded bore hol	-	[N/mm <sup>2</sup> ]	6,5	7,0	7,5	7,0	6,0	6,0
Ten	IV: 160°C/100°C		τ <sub>Rk,cr</sub>	[N/mm <sup>2</sup> ]	5,5	6,0	6,5	6,0	5,5	5,5
-	ion factor $\psi^0$ sus in	cracked and upp	,			0,0	0,0	0,0	0,0	0,0
	I: 40°C/24°C				.5			90		
e tur		Dry, wet concret								
Temperature range	II: 80°C/50°C	and	Ψ <sup>0</sup> sus	[-]			,	87		
d me La	III: 120°C/72°C	flooded bore hol	e					75		
Ť	IV: 160°C/100°C							66		
				25/30			,	02		
Incrose	ing factors for con	arata		30/37 35/45				04 07		
Ψc	ing lactors for con			40/50				07		
τC				45/55				09		
				50/60				10		
Concre	ete cone failure									
	nt parameter						see Ta	able C2		
•	ig failure									
	nt parameter						see Ta	able C2		
Installa	ation factor	MAC				1.0		No Port		
for dry :	and wet concrete	MAC CAC				1,2		.0	ormance a	issessed
	and wet concrete	HDB	γinst	[-]				,0 ,2		
for flood	ded bore hole	CAC						<u>,                                    </u>		
The o	enings (incl. nut anc characteristic tensio G-M20 strength clas	n resistance for st								d rod.
Sika A	AnchorFix®-2002	for concrete								



Ancho	r size internal thre	eaded anchor ro	ds		IG-M6	IG-M8	IG-M10	IG-M12	IG-M16	IG-M20
Steel fa	ailure <sup>1)</sup>					1				I
Charac	teristic tension res	istance, 5.8	N <sub>Rk,s</sub>	[kN]	10	17	29	42	76	123
Steel, s	trength class	8.8	N <sub>Rk,s</sub>	[kN]	16	27	46	67	121	196
Partial f	factor, strength cla	ss 5.8 and 8.8	γ <sub>Ms,N</sub>	[-]		1	1	,5	1	
	teristic tension res 4 and HCR, Streng		,	[kN]	14	26	41	59	110	124
Partial f			γ <sub>Ms,N</sub>	[-]		•	1,87		•	2,86
Combii	ned pull-out and o	concrete cone fa		I						I
	teristic bond resist	ance in uncracke	d concrete C	20/25		-		-	-	-
Temperature range	I: 40°C/24°C	Dry, wet concre	e <sup>T</sup> Rk,ucr,100	[N/mm²]	17	16	15	14	13	13
Temp ra	II: 80°C/50°C	flooded bore ho	e <sub>7Rk,ucr,100</sub>	[N/mm²]	17	16	15	14	13	13
	teristic bond resist	ance in cracked o	oncrete C20/	/25			1			
Temperature range	I: 40°C/24°C	Dry, wet concret	e <sup>τ</sup> Rk,cr,100	[N/mm <sup>2</sup> ]	6,0	6,5	6,5	6,5	6,5	6,5
Tempor	II: 80°C/50°C	flooded bore ho	e <sub>7Rk,cr,100</sub>	[N/mm²]	6,0	6,5	6,5	6,5	6,5	6,5
			C25				,	02		
			C30				,	04		
	ing factors for con	crete	C35				,	07		
Ψc			C40 C45					08 09		
			C45					10		
Concre	ete cone failure			,			.,			
Releva	nt parameter						see Ta	able C2		
Splittin	ig failure									
	nt parameter						see Ta	able C2		
nstalla	ation factor									
		MAC	_			1,2			ormance a	assessed
or dry a	and wet concrete	CAC	γ <sub>inst</sub>	[-]				,0		
	ded bore hole	HDB CAC						,2 ,4		
<sup>1)</sup> Faste The o	enings (incl. nut anc characteristic tensio G-M20 strength clas	washer) must co n resistance for s					erty class o	f the interr		d rod.
Sika /	AnchorFix <sup>®</sup> -2002	for concrete								C 7

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Anchor size for internal thread	ed ancl	nor rods		IG-M6	IG-M8	IG-M10	IG-M12	IG-M16	IG-M20
Steel failure without lever arm <sup>1</sup>	)						I		I
Characteristic shear resistance,	5.8	V <sup>0</sup> Rk,s	[kN]	5	9	15	21	38	61
Steel, strength class	8.8	V <sup>0</sup> Rk,s	[kN]	8	14	23	34	60	98
Partial factor, strength class 5.8 a	and 8.8	γ <sub>Ms,V</sub>	[-]				1,25		
Characteristic shear resistance, Stainless Steel A4 and HCR, Strength class 70 <sup>2)</sup>		V <sup>0</sup> Rk,s	[kN]	7	13	20	30	55	40
Partial factor		γ <sub>Ms,V</sub>	[-]			1,56			2,38
Ductility factor		k <sub>7</sub>	[-]				1,0		
Steel failure with lever arm <sup>1)</sup>									
Characteristic bending moment,	5.8	M <sup>0</sup> <sub>Rk,s</sub>	[Nm]	8	19	37	66	167	325
Steel, strength class	8.8	M <sup>0</sup> <sub>Rk,s</sub>	[Nm]	12	30	60	105	267	519
Partial factor, strength class 5.8 a	and 8.8	γ <sub>Ms,V</sub>	[-]				1,25		
Characteristic bending moment, Stainless Steel A4 and HCR, Strength class 70 <sup>2)</sup>		M <sup>0</sup> Rk,s	[Nm]	11	26	52	92	233	456
Partial factor		γ <sub>Ms,V</sub>	[-]			1,56			2,38
Concrete pry-out failure									
Factor		k <sub>8</sub>	[-]				2,0		
Installation factor		γ <sub>inst</sub>	[-]				1,0		
Concrete edge failure		•	•						
Effective length of fastener		۱ <sub>f</sub>	[mm]		min	(h <sub>ef</sub> ; 12 • c	i <sub>nom</sub> )		min(h <sub>ef</sub> ; 300mm
Outside diameter of fastener		d <sub>nom</sub>	[mm]	10	12	16	20	24	30
Installation factor		γ <sub>inst</sub>	[-]		I		1,0	1	
<ol> <li><sup>1)</sup> Fastenings (incl. nut and washed The characteristic tension resistance)</li> <li><sup>2)</sup> For IG-M20 strength class 50 is</li> </ol>	ance for								

### Sika AnchorFix®-2002 for concrete

#### Performances

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



Table	e C9: Charac for a we	teristic va orking life			bads	und	er sta	atic a	nd q	uasi	-stati	ic act	ion	
Ancho	r size reinforcing	bar			Ø 8	Ø 10	Ø 12	Ø 14	Ø 16	Ø 20	Ø 24	Ø 25	Ø 28	Ø 32
Steel fa	ailure													
Charac	cteristic tension resi	stance	N <sub>Rk,s</sub>	[kN]						f <sub>uk</sub> <sup>1)</sup>				
Cross s	section area		A <sub>s</sub>	[mm²]	50	79	113	154	201	314	452	491	616	804
Partial			γ <sub>Ms,N</sub>	[-]					1,	4 <sup>2)</sup>				
	ined pull-out and o													
	cteristic bond resist										10			
ture	I: 40°C/24°C	Dry, wet	<sup>τ</sup> Rk,ucr	[N/mm <sup>2</sup> ]	14	14	14	14	13	13	13	13	13	13
iperati range	II: 80°C/50°C	concrete and	<sup>τ</sup> Rk,ucr	[N/mm <sup>2</sup> ]	14	14	14	14	13	13	13	13	13	13
Temperature range	III: 120°C/72°C	flooded	<sup>τ</sup> Rk,ucr	[N/mm <sup>2</sup> ]	13	12	12	12	12	11	11	11	11	11
	IV: 160°C/100°C	bore hole	<sup>τ</sup> Rk,ucr	[N/mm <sup>2</sup> ]	9,5	9,5	9,5	9,0	9,0	9,0	9,0	9,0	8,5	8,5
Charac	cteristic bond resista	ance in crack	ed concrete	C20/25										
nre	I: 40°C/24°C	Dry, wet	<sup>τ</sup> Rk,cr	[N/mm <sup>2</sup> ]	5,5	5,5	6,0	6,5	6,5	6,5	6,5	7,0	7,0	7,0
Temperature range	II: 80°C/50°C	concrete and	$\tau_{Rk,cr}$	[N/mm <sup>2</sup> ]	5,5	5,5	6,0	6,5	6,5	6,5	6,5	7,0	7,0	7,0
mpe	III: 120°C/72°C	flooded	<sup>τ</sup> Rk,cr	[N/mm <sup>2</sup> ]	4,5	5,0	5,0	5,5	5,5	5,5	5,5	6,0	6,0	6,0
Te	IV: 160°C/100°C	bore hole	<sup>τ</sup> Rk,cr	[N/mm <sup>2</sup> ]	4,0	4,5	4,5	5,0	5,0	5,0	5,0	5,0	5,0	5,0
	tion factor $\psi^0{}_{sus}$ in	cracked and	uncracked c	oncrete C	20/25		1				1			
Temperature range	I: 40°C/24°C	Dry, wet							0,	90				
ture I	II: 80°C/50°C	concrete and	Ψ <sup>0</sup> sus	[-]					0,	87				
npera	III: 120°C/72°C	flooded bore hole								75				
Ter	IV: 160°C/100°C		005	( <u> </u>						66				
			C25/ C30/							02 04				
Increas	sing factors for cond	crete	C35/							04				
$\Psi_{c}$	5		C40/							08				
			C45/							09				
			C50/	/60					1,	10				
	ete cone failure													
	int parameter								see Ta	able C2	2			
Splittin	-									able C2	2			
	Int parameter ation factor							:			<u> </u>			
mstalla		MAC					1,2			No	Perfor	mance	asses	sed
for dry	and wet concrete	CAC	1				., 스		1	,0	. 51101			334
Ĺ		HDB	<sup>γ</sup> inst	[-]						,2				
for floo	ded bore hole	CAC							1	,4				
	hall be taken from th osence of national re		ns of reinforci	ng bars										
Perfor	AnchorFix <sup>®</sup> -2002 rmances cteristic values of ter			d quasi-sta	tic acti	on					А	nnex	c 9	
				-										

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Table	e C10: Chara for a w	cteristic va /orking life			oads	und	er st	atic a	and c	luasi	-stat	ic ac	tion	
Anchor	r size reinforcing	bar			Ø 8	Ø 10	Ø 12	Ø 14	Ø 16	Ø 20	Ø 24	Ø 25	Ø 28	Ø 32
Steel fa	ailure				1									
Charact	teristic tension re	sistance	N <sub>Rk,s</sub>	[kN]		_		_	As	f <sub>uk</sub> 1)			-	_
Cross s	section area		A <sub>s</sub>	[mm²]	50	79	113	154	201	314	452	491	616	804
Partial f	factor		γ <sub>Ms,N</sub>	[-]					1	,4 <sup>2)</sup>				
	ned pull-out and				•									
	teristic bond resis		acked concre	te C20/25	1	1			1		1			
Temperature range	I: 40°C/24°C	Dry, wet concrete and	<sup>τ</sup> Rk,ucr,100	[N/mm <sup>2</sup> ]	14	14	14	14	13	13	13	13	13	13
Temp ra	II: 80°C/50°C	flooded bore hole	<sup>τ</sup> Rk,ucr,100	[N/mm <sup>2</sup> ]	14	14	14	14	13	13	13	13	13	13
Charact	teristic bond resis	tance in crack	ed concrete	C20/25										
Temperature range	I: 40°C/24°C	Dry, wet concrete and	<sup>τ</sup> Rk,cr,100	[N/mm²]	4,5	4,5	4,5	4,5	4,5	4,0	4,0	4,0	4,0	4,0
Tempe rar	II: 80°C/50°C	flooded bore hole	<sup>τ</sup> Rk,cr,100	[N/mm <sup>2</sup> ]	4,5	4,5	4,5	4,5	4,5	4,0	4,0	4,0	4,0	4,0
			C25	/30		•			1	,02				•
			C30							,04				
	ing factors for cor	ncrete	C35							,07				
ψC			C40 C45							,08 ,09				
			C50							,0 <u>9</u> ,10				
Concre	ete cone failure								•	,				
Relevar	nt parameter								see Ta	able C	2			
Splittin	g													
	nt parameter								see Ta	able C	2			
Installa	ation factor		1	1	1									
r i		MAC	_				1,2				Perfor	mance	asse	ssed
for dry a	and wet concrete	CAC HDB	γ <sub>inst</sub>	[-]						,0 ,2				
for floor	ded bore hole	CAC	-							, <u>2</u> ,4				
<sup>1)</sup> f <sub>uk</sub> sh <sup>2)</sup> in ab	nall be taken from t sence of national i	he specificatio regulation	ns of reinforci	ing bars										
	AnchorFix®-2002	2 for concret	e								Δ	nnex	C 10	
	cteristic values of t	ension loads u	nder static an	id quasi-sta	atic acti	ion					~			•



Anchor size reinforcing bar			Ø 8	Ø 10	Ø 12	Ø 14	Ø 16	Ø 20	Ø 24	Ø 25	Ø 28	Ø 32
Steel failure without lever arm				•		•						
Characteristic shear resistance	V <sup>0</sup> Rk,s	[kN]					0,50	• A <sub>s</sub> •	f <sub>uk</sub> 1)			
Cross section area	A <sub>s</sub>	[mm <sup>2</sup> ]	50	79	113	154	201	314	452	491	616	804
Partial factor	γ <sub>Ms,V</sub>	[-]		•		•		1,5 <sup>2)</sup>				
Ductility factor	k <sub>7</sub>	[-]						1,0				
Steel failure with lever arm			·									
Characteristic bending moment	M <sup>0</sup> Rk,s	[Nm]					1.2	w <sub>el</sub> •	f <sub>uk</sub> 1)			
Elastic section modulus	W <sub>el</sub>	[mm <sup>3</sup> ]	50	98	170	269	402	785	1357	1534	2155	3217
Partial factor	γ <sub>Ms,V</sub>	[-]						1,5 <sup>2)</sup>	•			
Concrete pry-out failure		·	·									
Factor	k <sub>8</sub>	[-]						2,0				
Installation factor	γinst	[-]						1,0				
Concrete edge failure		•										
Effective length of fastener	۱ <sub>f</sub>	[mm]		I	min(h <sub>e</sub>	<sub>ef</sub> ; 12 •	d <sub>nom</sub>	)		min(	h <sub>ef</sub> ; 300	mm)
Outside diameter of fastener	d <sub>nom</sub>	[mm]	8	10	12	14	16	20	24	25	28	32
Installation factor	γinst	[-]						1,0				
<ol> <li><sup>1)</sup> f<sub>uk</sub> shall be taken from the specifica</li> <li><sup>2)</sup> in absence of national regulation</li> </ol>	ations of reinfo	rcing bars										

Performances

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



Anchor size threaded	l rod		M8	M10	M12	M16	M20	M24	M27	M30
Uncracked concrete	C20/25 under s	tatic and quasi-st	tatic acti	on for a	working	g life of	50 and 1	l00 year	s	1
Temperature range	δ <sub>N0</sub> -factor	[mm/(N/mm <sup>2</sup> )]	0,031	0,032	0,034	0,037	0,039	0,042	0,044	0,046
I: 40°C/24°C II: 80°C/50°C	$\delta_{N\infty}$ -factor	[mm/(N/mm <sup>2</sup> )]	0,040	0,042	0,044	0,047	0,051	0,054	0,057	0,060
Temperature range	δ <sub>N0</sub> -factor	[mm/(N/mm <sup>2</sup> )]	0,032	0,034	0,035	0,038	0,041	0,044	0,046	0,04
III: 120°C/72°C	δ <sub>N∞</sub> -factor	[mm/(N/mm <sup>2</sup> )]	0,042	0,044	0,045	0,049	0,053	0,056	0,059	0,06
Temperature range	δ <sub>N0</sub> -factor	[mm/(N/mm <sup>2</sup> )]	0,121	0,126	0,131	0,142	0,153	0,163	0,171	0,17
IV: 160°C/100°C	δ <sub>N∞</sub> -factor	[mm/(N/mm <sup>2</sup> )]	0,124	0,129	0,135	0,146	0,157	0,168	0,176	0,18
Cracked concrete un	der static and o	quasi-static action	n for a w	orking l	ife of 50	and 10	) years			
Temperature range	δ <sub>N0</sub> -factor	[mm/(N/mm <sup>2</sup> )]	0,081	0,083	0,085	0,090	0,095	0,099	0,103	0.10
I: 40°C/24°C	δ <sub>N∞</sub> -factor	[mm/(N/mm <sup>2</sup> )]	0,104	0,107	0,110	0,116	0,122	0,128	0,133	0,13
II: 80°C/50°C	δ <sub>N∞</sub> factor	[mm/(N/mm <sup>2</sup> )]	0,084	0,086	0,088	0,093	0,098	0,103	0,107	0,11
Temperature range III: 120°C/72°C	δ <sub>N∞</sub> -factor	[mm/(N/mm <sup>2</sup> )]	0,108	0,000	0,000	0,121	0,030	0,133	0,138	0,14
Temperature range	δ <sub>N0</sub> -factor	[mm/(N/mm <sup>2</sup> )]	0,312	0,321	0,330	0,349	0,367	0,385	0,399	0,41
IV: 160°C/100°C	$\delta_{N\infty}$ -factor	[mm/(N/mm <sup>2</sup> )]	0,321	0,330	0,340	0,358	0,377	0,396	0,410	0,42
<sup>1)</sup> Calculation of the c $\delta_{N0} = \delta_{N0}$ -factor · τ $\delta_{N\infty} = \delta_{N\infty}$ -factor · 1 <b>Table C13: Dis</b>	; τ:a. τ;	ction bond stress fo under shear l		thread	ed roc	8)				
$\begin{split} \delta_{N0} &= \delta_{N0}\text{-factor} \cdot \tau \\ \delta_{N\infty} &= \delta_{N\infty}\text{-factor} \cdot \tau \end{split}$ Table C13: Disp	; t: a t; placements			thread	ed roc	i) M16	M20	M24	M27	МЗС
$\begin{split} \delta_{N0} &= \delta_{N0} \text{-factor} \cdot \tau \\ \delta_{N\infty} &= \delta_{N\infty} \text{-factor} \cdot \tau \end{split}$ Table C13: Disp Anchor size threaded	; t: a t; placements I rod	under shear I	oad <sup>2)</sup> ( M8	M10	M12	,	M20	M24	M27	M3(
δ <sub>N0</sub> = δ <sub>N0</sub> -factor · τ δ <sub>N∞</sub> = δ <sub>N∞</sub> -factor · τ Table C13: Dis Anchor size threaded Uncracked and crack	; t: a t; placements I rod	under shear I	oad <sup>2)</sup> ( M8	M10	M12	,	<b>M20</b>	M24	<b>M27</b>	<b>M30</b>
$δ_{NO} = δ_{NO}$ -factor · τ $δ_{N∞} = δ_{N∞}$ -factor · τ <b>Table C13: Dis</b> Anchor size threaded Uncracked and crack All temperature	; τ: a c; placements I rod ed concrete ur	under shear l	oad <sup>2)</sup> ( M8 asi-stati	M10 c action	M12	M16				0,03
δN0 = δN0-factor · τ δN∞ = δN∞-factor · τ  Table C13: Dis  Anchor size threaded  Uncracked and crack  All temperature $ δ$	; $\tau$ : a placements I rod ed concrete ur $\delta_{V0}$ -factor $\delta_{V\infty}$ -factor displacement (;	under shear I nder static and qu [mm/kN]	oad <sup>2)</sup> ( M8 asi-stati 0,06 0,09	M10 c action 0,06	M12 0,05	<b>M16</b>	0,04	0,03	0,03	0,0
$\begin{split} \delta_{N0} &= \delta_{N0} \text{-factor} \cdot \tau \\ \delta_{N\infty} &= \delta_{N\infty} \text{-factor} \cdot \tau \\ \end{split}$ <b>Table C13: Disp Anchor size threaded Uncracked and crack All temperature</b> ranges <sup>2)</sup> Calculation of the construction of the construction.	; $\tau$ : a placements I rod ed concrete ur $\delta_{V0}$ -factor $\delta_{V\infty}$ -factor displacement (;	under shear I nder static and qu [mm/kN] [mm/kN]	oad <sup>2)</sup> ( M8 asi-stati 0,06 0,09	M10 c action 0,06	M12 0,05	<b>M16</b>	0,04	0,03	0,03	I I



Anchor size Inter	nal thr	eaded rod			IG-M6	IG-M8	B IG-M	0 IG-M1	2 IG-M16	IG-M20
Uncracked conci	ete un	der static a	nd quasi-stat	ic actio	n for a wo	orking lit	e of 50 ar	d 100 year:	\$	1
Temperature ra		$\delta_{N0}$ -factor	[mm/(N/	′mm²)]	0,032	0,034	0,03	7 0,039	0,042	0,046
I: 40°C/24°0 II: 80°C/50°0		δ <sub>N∞</sub> -factor	[mm/(N/	′mm²)]	0,042	0,044	0,04	7 0,051	0,054	0,060
Temperature ra		δ <sub>N0</sub> -factor	[mm/(N/	′mm²)]	0,034	0,035	0,03	3 0,041	0,044	0,048
III: 120°C/72		$\delta_{N\infty}$ -factor	[mm/(N/	ímm²)]	0,044	0,045	0,04	0,053	0,056	0,062
Temperature ra	Inge	$\delta_{N0}$ -factor	[mm/(N/	′mm²)]	0,126	0,131	0,14	2 0,153	0,163	0,179
IV: 160°C/100	°Č	$\delta_{N\infty}$ -factor	· [mm/(N/	′mm²)]	0,129	0,135	0,14	6 0,157	0,168	0,184
Cracked concret		r static and	quasi-static	action	for a work	ing life	of 50 and	100 years		
Temperature ra		$\delta_{N0}$ -factor	[mm/(N/	′mm²)]	0,083	0,085	0,09	0,095	0,099	0,106
II: 80°C/50°		$\delta_{N\infty}$ -factor	· [mm/(N/	′mm²)]	0,170	0,110	0,11	6 0,122	0,128	0,137
Temperature ra	Inge	$\delta_{N0}$ -factor	[mm/(N/	′mm²)]	0,086	0,088	0,09	3 0,098	0,103	0,110
III: 120°C/72	Ϋ́C	$\delta_{N\infty}$ -factor	· [mm/(N/	′mm²)]	0,111	0,114	0,12	l 0,127	0,133	0,143
Temperature ra	inde	δ <sub>N0</sub> -factor	[mm/(N/	′mm²)]	0,321	0,330	0,34	0,367	0,385	0,412
IV: 160°C/100 <sup>1)</sup> Calculation of $\delta_{N0} = \delta_{N0}$ -facto $\delta_{N\infty} = \delta_{N\infty}$ -facto	the disp or $\cdot \tau$ ; or $\cdot \tau$ ;			bond st	0,330 ress for ter ad <sup>2)</sup> (Int				0,396	0,424
IV: 160°C/100 <sup>1)</sup> Calculation of $\delta_{N0} = \delta_{N0}$ -fact $\delta_{N\infty} = \delta_{N\infty}$ -fact	eČ the disp or · τ; or · τ; Displa		τ: action	bond st	ress for ter ad <sup>2)</sup> (Int	nsion			0,396	0,424
IV: $160^{\circ}$ C/100 <sup>1)</sup> Calculation of $\delta_{N0} = \delta_{N0}$ -fact $\delta_{N\infty} = \delta_{N\infty}$ -fact <b>Table C15:</b> Anchor size Inter	eČ the disp or • τ; or • τ; <b>Displa</b> nal thr	acement eaded rod	τ: action s under sh	bond st ear loa	ress for ter ad <sup>2)</sup> (Int M6 G	ernal t	hreaded	rod)		
IV: $160^{\circ}$ C/100 <sup>1)</sup> Calculation of $\delta_{N0} = \delta_{N0}$ -fact $\delta_{N\infty} = \delta_{N\infty}$ -fact <b>Table C15:</b> Anchor size Inter Uncracked and c	eČ the disp or • τ; or • τ; <b>Displa</b> nal thr	acement eaded rod concrete u	τ: action s under sh	ear loa	ress for ter ad <sup>2)</sup> (Int M6 IG si-static a	ernal t	hreaded IG-M10	IG-M12		0,424 IG-M20 0,04
IV: $160^{\circ}$ C/100 <sup>1)</sup> Calculation of $\delta_{N0} = \delta_{N0}$ -fact $\delta_{N\infty} = \delta_{N\infty}$ -fact <b>Table C15:</b> Anchor size Inter	$\begin{tabular}{lllllllllllllllllllllllllllllllllll$	acement acement eaded rod concrete L actor actor blacement	τ: action s under sh	ear loa IG-I nd quas 0,0 0,1	ress for ter ad <sup>2)</sup> (Int M6 IG si-static a	ernal t i-M8	hreaded	rod)	IG-M16	IG-M20

### Sika AnchorFix®-2002 for concrete

#### Performances

Displacements under static and quasi-static action (Internal threaded anchor rod)



Anchor size rein	forcing bar		Ø 8	Ø 10	Ø 12	Ø 14	Ø 16	Ø 20	Ø 24	Ø 25	Ø 28	Ø 32
Uncracked conc	rete under st	atic and quasi-	static a	ction fo	r a worł	king life	of 50 ɛ	and 100	years			1
Temperature	$\delta_{N0}$ -factor	[mm/(N/mm <sup>2</sup> )]	0,031	0,032	0,034	0,035	0,037	0,039	0,042	0,043	0,045	0,04
range I: 40°C/24°C II: 80°C/50°C	$\delta_{N\infty}$ -factor	[mm/(N/mm <sup>2</sup> )]	0,040	0,042	0,044	0,045	0,047	0,051	0,054	0,055	0,058	0,06
Temperature	δ <sub>N0</sub> -factor	[mm/(N/mm <sup>2</sup> )]	0,032	0,034	0,035	0,036	0,038	0,041	0,044	0,045	0,047	0,05
range III: 120°C/72°C	$\delta_{N\infty}$ -factor	[mm/(N/mm <sup>2</sup> )]	0,042	0,044	0,045	0,047	0,049	0,053	0,056	0,057	0,060	0,06
Temperature	$\delta_{N0}$ -factor	[mm/(N/mm <sup>2</sup> )]	0,121	0,126	0,131	0,137	0,142	0,153	0,163	0,164	0,172	0,18
range IV: 160°C/100°C	$\delta_{N\infty}$ -factor	[mm/(N/mm <sup>2</sup> )]	0,124	0,129	0,135	0,141	0,146	0,157	0,168	0,169	0,177	0,19
Cracked concret	e under stati	c and quasi-sta	tic actio	on for a	workin	g life of	50 and	l 100 ye	ears		•	
Temperature range	$\delta_{N0}$ -factor	[mm/(N/mm <sup>2</sup> )]	0,081	0,083	0,085	0,087	0,090	0,095	0,099	0,099	0,103	0,10
I: 40°C/24°C II: 80°C/50°C	$\delta_{N\infty}$ -factor	[mm/(N/mm²)]	0,104	0,107	0,110	0,113	0,116	0,122	0,128	0,128	0,133	0,14
Temperature	δ <sub>N0</sub> -factor	[mm/(N/mm <sup>2</sup> )]	0,084	0,086	0,088	0,090	0,093	0,098	0,103	0,103	0,107	0,11
range III: 120°C/72°C	$\delta_{N\infty}$ -factor	[mm/(N/mm <sup>2</sup> )]	0,108	0,111	0,114	0,118	0,121	0,127	0,133	0,133	0,138	0,14
Temperature	δ <sub>N0</sub> -factor	[mm/(N/mm <sup>2</sup> )]	0,312	0,321	0,330	0,340	0,349	0,367	0,385	0,385	0,399	0,42
range	$\delta_{N\infty}$ -factor	[mm/(N/mm <sup>2</sup> )]	0,321	0,330	0,340	0,349	0,358	0,377	0,396	0,396	0,410	0,44
IV: 160°C/100°C <sup>1)</sup> Calculation of $\delta_{N0} = \delta_{N0}$ -fact $\delta_{N\infty} = \delta_{N\infty}$ -fact <b>Table C17:</b>	the displacem or · τ; or · τ;		d stress f	or tensic	n	r)						
<sup>1)</sup> Calculation of $\delta_{N0} = \delta_{N0}$ -fact $\delta_{N\infty} = \delta_{N\infty}$ -fact <b>Table C17:</b>	the displacem or · τ; or · τ; <b>Displacem</b>	r: action bond	d stress f	or tensic	n (reba		Ø 16	<i>α</i> 20	Ø 24	Ø 25	<i>(</i> , 28)	<i>(</i> <b>3 )</b>
<sup>1)</sup> Calculation of	the displacem or · τ; or · τ; <b>Displacem</b> forcing bar	ient τ: action bond	stress f shear Ø 8	or tensic load <sup>2)</sup> Ø 10	on (reba Ø 12	Ø 14	Ø 16	Ø 20	Ø 24	Ø 25	Ø 28	Ø3
<sup>1)</sup> Calculation of	the displacem or τ; or τ; <b>Displacem</b> forcing bar tracked conc	ent τ: action bond nents under	stress f shear Ø 8 ic and q	or tensic load <sup>2)</sup> Ø 10 juasi-sta	on (reba Ø 12 atic acti	Ø 14			I			Ø 3:
<sup>1)</sup> Calculation of	the displacem or · τ; or · τ; <b>Displacem</b> forcing bar	ient τ: action bond	stress f shear Ø 8	or tensic load <sup>2)</sup> Ø 10	on (reba Ø 12 atic acti 0,05	Ø 14	Ø 16 0,04 0,06	Ø <b>20</b> 0,04 0,05	Ø 24 0,03 0,05	Ø <b>25</b> 0,03 0,05	Ø 28 0,03 0,04	Ø <b>3</b> 0,03
<sup>1)</sup> Calculation of	the displacem or $\cdot \tau$ ; <b>Displacem</b> forcing bar forcing bar racked conc $\delta_{V0}$ -factor $\delta_{V\infty}$ -factor the displacem or $\cdot V$ ;	rete under stati [mm/kN]	stress f         Shear         Ø 8         ic and q         0,06         0,09	or tensic <b>load</b> <sup>2)</sup> Ø 10 uasi-sta 0,05	on <b>(reba</b> Ø 12 atic acti 0,05	Ø 14 on 0,04	0,04	0,04	0,03	0,03	0,03	0,0

Displacements under static and quasi-static action (rebar)



# Table C18: Characteristic values of tension loads under seismic action(performance category C1) for a working life of 50 and 100 years

Ancho	r size threaded rod				M8	M10	M12	M16	M20	M24	M27	M30
Steel fa	ailure			_								
Charac	teristic tension resis	tance	N <sub>Rk,s,eq,C1</sub>	[kN]				1,0 •	N <sub>Rk,s</sub>			
Partial	factor		γ <sub>Ms,N</sub>	[-]				see Ta	able C1			
Combi	ned pull-out and co	oncrete failure	•									
Charac	teristic bond resista	nce in cracked a	nd uncracked	concrete C2	0/25		-					
e	I: 40°C/24°C		<sup>τ</sup> Rk,eq,C1	[N/mm²]	7,0	7,5	8,0	9,0	8,5	7,0	7,0	7,0
Temperature range	II: 80°C/50°C	Dry, wet	<sup>τ</sup> Rk,eq,C1	[N/mm <sup>2</sup> ]	7,0	7,5	8,0	9,0	8,5	7,0	7,0	7,0
mpe ran	III: 120°C/72°C	flooded bore	<sup>τ</sup> Rk,eq,C1	[N/mm <sup>2</sup> ]	6,0	6,5	7,0	7,5	7,0	6,0	6,0	6,0
Те	IV: 160°C/100°C		<sup>τ</sup> Rk,eq,C1	[N/mm <sup>2</sup> ]	5,5	5,5	6,0	6,5	6,0	5,5	5,5	5,5
Increas	sing factors for concr	ete $\psi_{C}$	C25/30 to	C50/60				1	,0			
Installa	ation factor		•									
for dry	and wet concrete	CAC						1	,0			
	and wet concrete	HDB	γinst	[-]				1	,2			
for floo	ded bore hole	CAC						1	,4			

Anchor size threaded rod			M8	M10	M12	M16	M20	M24	M27	M30
Steel failure										
Characteristic shear resistance (Seismic C1)	V <sub>Rk,s,eq,C1</sub>	[kN]				0,70	) • V <sup>0</sup> Rk	,S		
Partial factor	γMs,V	[-]				see	Table C	1		
Factor for annular gap	$\alpha_{gap}$	[-]				0,	5 (1,0) <sup>1)</sup>			

<sup>1)</sup> Value in brackets valid for filled annular gab between anchor and clearance hole in the fixture. Use of special filling washer Annex A 3 is recommended

### Sika AnchorFix®-2002 for concrete

### Performances

Characteristic values of tension and shear loads under seismic action (performance category C1) for a working life of 50 and 100 years (threaded rod)



Table	e C20: Charact (perforr		alues of te ategory C1										irs			
Anchor	r size reinforcing	bar			Ø	8 0	ð 10	Ø 12	Ø 1	4 Ø 1	16 Ø	<b>5 20</b>	Ø 24	Ø 25	Ø 28	Ø 32
Steel fa				<u>г</u>								r 1)				
	teristic tension resi	stance	N <sub>Rk,s,eq,C1</sub>		_				<del></del>			• f <sub>uk</sub> 1)			1	
	ection area		A <sub>s</sub>	[mm <sup>2</sup> ]	5	0	79	113	154	1 20		314	452	491	616	804
Partial f			γMs,N	[-]							1,4 <sup>2)</sup>	)				
	ned pull-out and on teristic bond resista				narat	<u> </u>	0/25									
		ance in crac									_				I	
Temperature range	I: 40°C/24°C	Dry, wet	<sup>τ</sup> Rk,eq,C1	[N/mm <sup>2</sup>			5,5	6,0	6,5			6,5	6,5	7,0	7,0	7,0
ature	II: 80°C/50°C	concrete and	<sup>τ</sup> Rk,eq,C1	[N/mm <sup>2</sup>	-		5,5	6,0	6,5			6,5	6,5	7,0	7,0	7,0
mper	III: 120°C/72°C	flooded bore hole	<sup>τ</sup> Rk,eq,C1	[N/mm <sup>2</sup>	-		5,0	5,0	5,5			5,5	5,5	6,0	6,0	6,0
· ·	IV: 160°C/100°C		<sup>τ</sup> Rk,eq,C1	[N/mm <sup>2</sup>	] 4,	,0	4,5	4,5	5,0	) 5,	0 5	5,0	5,0	5,0	5,0	5,0
	ing factors for cond	rete $\psi_{C}$	C25/30 to	o C50/60							1,0					
Installa	tion factor			1												
for dry a	and wet concrete	CAC HDB	γ <sub>inst</sub>	[-]							1,0 1,2					
for flood	ded bore hole	CAC									1,4					
Anchor	(perforr size reinforcing l		ategory C1	· 	Ø 8	Ø 10	0 Ø 1	2 Ø	14 Ø	16 Ø	ð 20	Ø 24	Ø 2	5 Ø	28	Ø 32
Steel fa	ailure															
Charact	teristic shear resist	ance	V <sub>Rk,s,eq</sub>	[kN]					C	),35 ·	A <sub>s</sub> ·	f <sub>uk</sub> 1)				
Cross s	ection area		A <sub>s</sub>	[mm²]	50	79	11	3 1:	54 2	201 3	314	452	491	6	516	804
Partial f	actor		γ <sub>Ms,V</sub>	[-]		•	•		•	1	,5 <sup>2)</sup>		•	•	•	
Factor	for annular gap		α <sub>gap</sub>	[-]						0,5	(1,0)	3)				
<sup>2)</sup> in ab <sup>3)</sup> Value Anne	hall be taken from the sence of national re e in brackets valid fo ex A 3 is recommend anchorFix®-2002	gulation or filled annu led	lar gab betwee	-	and	clear	ance	hole i	n the	fixture	e. Use	e of s	pecial	filling	washe	er
Charac	mances steristic values of ter orking life of 50 and			er seismic	actio	on (pe	erforn	nance	cate	gory C	21)		Ar	inex	C 10	6



Table C22: Characte (perform						eismic ac of 50 and 1		ears	
Anchor size threaded rod					M12	2 M1	6	M20	M24
Steel failure									•
Characteristic tension resist Steel, strength class 8.8 Stainless Steel A4 and HCF Strength class ≥70		N <sub>Rk,s,ec</sub>	q,C2	[kN]			1,0 •	N <sub>Rk,s</sub>	
Partial factor		γ <sub>Ms,N</sub>		[-]		S	see Ta	ble C1	
Combined pull-out and co	ncrete failu								
Characteristic bond resistar			cked c	oncrete C2	0/25				
<u></u> I: 40°C/24°C		<sup>τ</sup> Rk,eq,C	2	[N/mm <sup>2</sup> ]	3,6	3,5	5	3,3	2,3
II: 80°C/50°C	Dry, wet concrete ar			[N/mm <sup>2</sup> ]	3,6	3,5	5	3,3	2,3
9         1: 40°C/24°C           1: 80°C/50°C         11: 120°C/72°C           11: 120°C/72°C         11: 120°C/72°C	flooded bor			[N/mm <sup>2</sup> ]	3,1	3,0	)	2,8	2,0
IV: 160°C/100°C	hole	<sup>τ</sup> Rk,eq,C		[N/mm <sup>2</sup> ]	2,5	· · · ·		2,5	1,8
Increasing factors for concre	i ete w			C50/60	_,•		1.	,	1,0
Installation factor	τιο <sub>Ψ</sub> ς	020	/00 10	000/00			1	0	
for dry and wet concrete	CAC HDB	γinst		[-]				0	
for flooded bore hole	CAC							4	
(perform	ance cat	egory C2	)	M12		M16		M20	M24
Steel failure									
Characteristic shear resista Steel, strength class 8.8 Stainless Steel A4 and HCF Strength class ≥70		, Rk,s,eq,C2	[kN]			0,70 ·	V <sup>0</sup> Rk,	S	
Partial factor	γ	Ms,V	[-]			see Ta	able C	1	
Factor for annular gap	c	<sup>4</sup> gap	[-]			0,5 (	( <b>1</b> ,0) <sup>1)</sup>		
<sup>1)</sup> Value in brackets valid for Annex A 3 is recommende		r gab betwee	n anch	or and clear	ance hole	e in the fixture	e. Use o	of special fill	ing washer
Sika AnchorFix®-2002 fo	or concrete	•							
<b>Performances</b> Characteristic values of tens for a working life of 50 and 1	sion and shea 00 years (thr	ar loads unde readed rod)	r seisn	nic action (pe	erformand	ce category C	2)	Ann	ex C 17



Anchor size threa	ded rod		M12	M16	M20	M24
Cracked concrete	under seismic act	tion (performan	ce category C2)			
All temperature	δ <sub>N,eq,C2(DLS)</sub>	[mm]	0,24	0,27	0,29	0,27
ranges	$\delta_{N,eq,C2(ULS)}$	[mm]	0,55	0,51	0,50	0,58
Table C25: [	Displacements	under shear	· load (threade	d rod)		
		under shear	r load (threade	d rod) M16	M20	M24
Anchor size threa			M12	1	M20	<b>M2</b> 4
Anchor size threa	ded rod		M12	1	<b>M20</b> 3,1	<b>M2</b> 4 3,5

### Sika AnchorFix®-2002 for concrete

### Performances

Displacements under seismic action (performance category C2) (threaded rods)