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Authorised and notified according to Article 29 of the Regulation (EU) No 305/2011 of the European Parliament and of the Council of 9 March 2011

European Technical Assessment ETA-21/1065 of 2022/01/11

I General Part

Technical Assessment Body issuing the ETA and designated according to Article 29 of the Regulation (EU) No 305/2011: ETA-Danmark A/S	
Trade name of the construction product:	Tecfi Concrete Screw HXE
Product family to which the above construction product belongs:	Metal fastener for use in concrete for redundant non-structural system
Manufacturer:	Tecfi SpA Strada Statale Appia, Km. 193 IT-81050 Pastorano (CE) Tel. +39 0823 88 33 38 Fax +39 0823 88 32 60 Internet www.tecfi.it
Manufacturing plant:	Tecfi S.p.A. plant 1 and 2 Tecfi S.p.A. plant 3
This European Technical Assessment contains:	13 pages including 8 annexes which form an integral part of this assessment
This European Technical Assessment is issued in accordance with Regulation (EU) No 305/2011, on the basis of:	EAD 330747-00-0601 - Fasteners for use in concrete for redundant non-structural systems
This version replaces:	

II SPECIFIC PART OF THE EUROPEAN TECHNICAL ASSESSMENT

1 Technical description of product and intended use

Technical description of the product

Tecfi Concrete Screw HXE is a concrete screw made of galvanized steel. The anchor is installed in a drilled hole and anchored by deformation-controlled expansion.

The HXE fastener is made of steel (f_{uk}=750 MPa; f_{yk}=640MPa) in two different coating versions:
- Zinc plated;
- Special Tecfi “Steel Saver” coating

An illustration of the product is given in Annex A.

The fastener is placed into pre-drilled hole perpendicular to the surface (maximum deviation 5°) in concrete and it is anchored therein by mechanical means.

The characteristic material values, dimensions and tolerances of the anchors not indicated in Annexes shall correspond to the respective values laid down in the technical documentation of this European Technical Assessment.

The anchors are intended to be used with embedment depth given in Annex B, Table B1. The intended use specifications of the product are detailed in the Annex B1

2 Specification of the intended use in accordance with the applicable EAD

These mechanical fasteners can be used to connect non-structural elements to structural components.

The performances given in Section 3 are only valid if the fastener is used in compliance with the specifications and conditions given in Annex B.

The provisions made in this European Technical Assessment are based on an assumed intended working life of the anchor of 50 years.

The indications given on the working life cannot be interpreted as a guarantee given by the producer or Assessment Body, but are to be regarded only as a means for choosing the right products in relation to the expected economically reasonable working life of the works.

3 Performance of the product and references to the methods used for its assessment

3.1 Characteristics of product

Safety in case of fire (BWR 2):
Reaction to fire: The anchors are made from steel classified as Euroclass A1 in accordance with EN 13501-1 and Commission Delegated Regulation 2016/364.

Resistance to fire: The essential characteristics are detailed in the Annex C2.

Hygiene, health and the environment (BWR3):
No performance assessed.

Safety in use (BWR4):
The essential characteristics are detailed in the Annex C1.

Other Basic Requirements are not relevant.

3.2 Methods of assessment

The assessment of fitness of the fastener for the intended use in relation to the requirements for mechanical resistance and stability and safety in use in the sense of the Basic Requirements 1 and 4 has been made in accordance with EAD 330747-00-0601 - Fasteners for use in concrete for redundant non-structural systems.

4 Assessment and verification of constancy of performance (AVCP)

4.1 AVCP system

According to the decision 97/161/EC of the European Commission, the system(s) of assessment and verification of constancy of performance (see Annex V to Regulation (EU) No 305/2011) is 2+.

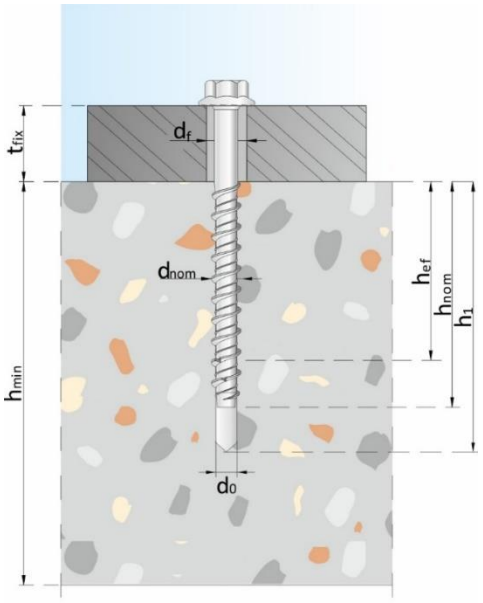
5 Technical details necessary for the implementation of the AVCP system, as foreseen in the applicable EAD

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

Issued in Copenhagen on 2022-01-11 by

Thomas Bruun
Managing Director, ETA-Danmark

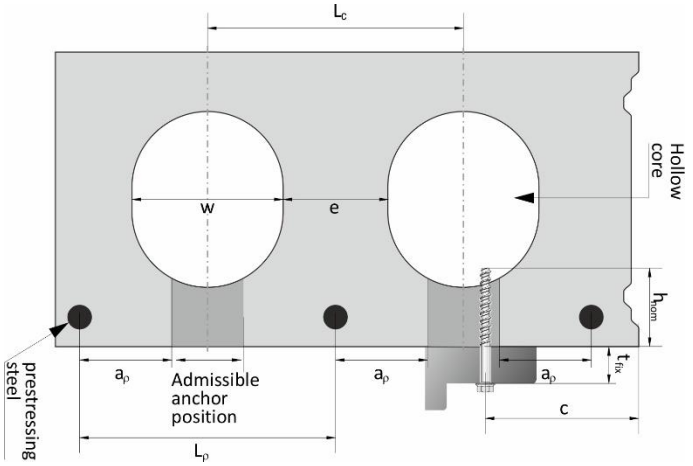
Installed conditions



Installation details

d_{nom}	Outside diameter of the fastener
d_{cut}	Maximum cutting diameter of the drill bit
t_{fix}	Thickness of the fixtures
d_0	Diameter of the drill hole
d_f	Diameter of the clearance hole in the fixture
h_{min}	Minimum thickness of the concrete member
h_{nom}	Overall fastener embedment depth
h_{ef}	Anchorage depth

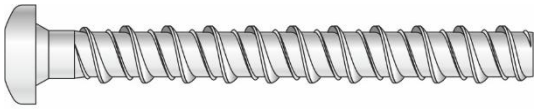
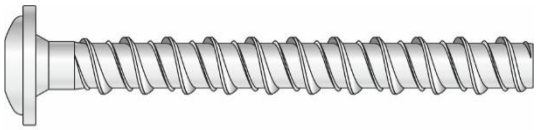
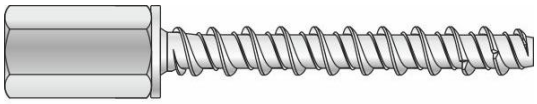
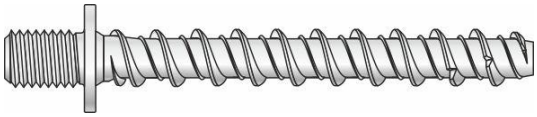
Installed conditions in hollow core slab



Installation details for hollow core slabs

a_p	Minimum spacing between prestressing steel and fastener position
L_p	Minimum prestressing steel distance
L_c	Minimum core spacing
e	Width of the concrete flange
w	Width of the hole section in the core

Tecfi Concrete Screw HXE	**Annex A1**
Product description Installed condition	

	Zinc plated version	Special coating version
	HXE 01	HXE 41
	HXE 85	HXE 39
	HXE 02	HXE 42
	HXE 12	HXE 40
	HXE 03	HXE 43
	HXE 05	HXE 45
	HXE 06	HXE 46
	HXE 07	HXE 48 [1)]
	HXE 87	HXE 47

[1)] Available also with Coupling nut with special coating as HXE 49.

Tecfi Concrete Screw HXE	**Annex A2**
Product description Fastener types and material - 1	

Item code description, coating, and material

ITEM	Description	f_y [Mpa]	f_u [Mpa]
HXE 01 – HXE 41	Hexagonal flanged washer head screw	640	750
HXE 85 – HXE 39	Dual thread screw with hexagonal shank		
HXE 02 – HXE 42	Dual thread screw with hexagonal shank, nut and washer according to ISO 7089		
HXE 12 – HXE 40	Dual thread screw with hexagonal shank, nut, and washer according to ISO 7093		
HXE 03 – HXE 43	Flat countersunk head with ribs screw		
HXE 05 – HXE 45	Cylindrical head screw		
HXE 06 – HXE 46	Pan head screw		
HXE 07 – HXE 47- HXE 49	Dual thread with collar screw, with metric coupling nut		
HXE 87 – HXE 47	Dual thread with collar screw		

ITEM	Finishing
HXE 01, HXE 85, HXE 02, HXE 12, HXE 03, HXE 05, HXE 06, HXE 07, HXE 87	**Materials galvanised ≥ 5µm according to ISO 4042**
HXE 41, HXE 39, HXE 42, HXE 43, HXE40 HXE 45, HXE 46, HXE 48, HXE 49	**Material coated with special Tecfi STEEL SAVER protective coating**
HXE 47	**SCREW: Material coated with special Tecfi STEEL SAVER protective coating** **COUPLING NUT: Materials galvanised ≥ 5µm according to ISO 4042**

Specifications of intended use

Anchorages subject to:

- Static and quasi-static loads.
- Fire exposure (not in prestressed slabs).
- For use in concrete for redundant non-structural system (EAD330747).

Base materials:

- Reinforced or unreinforced normal weight concrete according to EN 206:2013+A2:2021.
- Strength classes C20/25 to C50/60 according to EN 206:2013+A2:2021.
- Cracked or uncracked concrete.
- Precast, pre-stressed hollow core slab with w/e ≤ 4,8 and strength classes C45/55 to C50/60.

Use conditions (Environmental conditions):

- Anchorages subject to dry internal conditions

Design:

- Anchorages are designed under the responsibility of an engineer experienced in anchorages and concrete work.
- Verifiable calculation notes and drawings are prepared taking account of the loads to be anchored. The position of the fastener is indicated on the design drawings (e.g. position of the fastener relative to reinforcement or to supports, etc.).
- Anchorages in concrete under static or quasi-static actions and under fire exposure are designed in accordance with:
  - EN 1992-4 Design method A and EOTA Technical report TR055
  - In case of requirements for resistance to fire exposure it must be ensured that local spalling of the concrete cover does not occur.
- Anchorages in hollow core slab under static or quasi-static actions are designed in accordance with:
  - EN 1992-4 Design method B and EOTA Technical report TR055

Installation:

- Hole drilling by rotary plus hammer mode only
- Fastener installation carried out by appropriately qualified personnel and under the supervision of the person responsible for technical matters of the site.
- In case of aborted hole: new drilling at a minimum distance away of twice the depth of the aborted hole or smaller distance if the aborted hole is filled with high strength mortar and if under shear or oblique tension load it is not the direction of the load application.
- After installation further turning of the fastener is not possible. The head of the fastener is supported on the fixture and is not damaged.

Table B1: installation details.

Denomination		HXE Ø5/6		HXE Ø6/8	
Nominal drill hole diameter	d_o = [mm]	5		6	
Cutting diameter of drill bit	$d_{cut} \leq$ [mm]	5,35		6,40	
Diameter of clearance in the fixture	d_f = [mm]	7		9	
Outside diameter of fastener	d_{nom} = [mm]	6		8	
Overall anchor embedment depth in the concrete	**h_{nom}=[mm]**	**35**	**55**	**35**	**45**
Effective anchorage depth	h_{ef} = [mm]	27	45	27	36
Minimum length of the fastener HXE 01	L=[mm]	36	56	36	46
Depth of drill hole	h_1 = [mm]	50	75	50	60
Minimum thickness of concrete member	h_{min} = [mm]	80	90	80	80
Minimum edge distance	c_{min} = [mm]	40	40	35	35
Minimum spacing	s_{min} = [mm]	35	35	35	35

Table B2: Head related installation details

Denomination		HXE Ø5/6	HXE Ø6/8
HXE 01- HXE 41 Wrench Size	SW	10	13
HXE 85 – HXE 40 – HXE 02 – HXE 42 – HXE 12 – HXE 44 Wrench Size	SW	4	5
HXE 03- HXE 43 Hexalobular recess size	T	T-30	T-30
HXE 05 – HXE 45 Hexalobular recess size	T	T-30	T-30
HXE 06 – HXE 46 Hexalobular recess size	T	T-30	T-30
HXE 07 – HXE 48 – HXE 49 – HXE 87 – HXE 47 Wrench size of the coupling nut	SW	10	13

All head requires an impact screw driver (impact wrench) with maximum 185 Nm torque

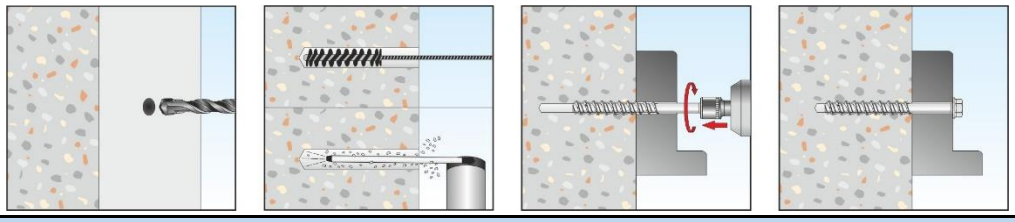
Drill bit

HXE fastener size	Drill bit item code
Ø 5	EO 01 05 160 EOX 41 05 160
Ø 6	EO 01 06 210 EOX 41 06 210

Blowing pump

Item code: DW 01 00 001

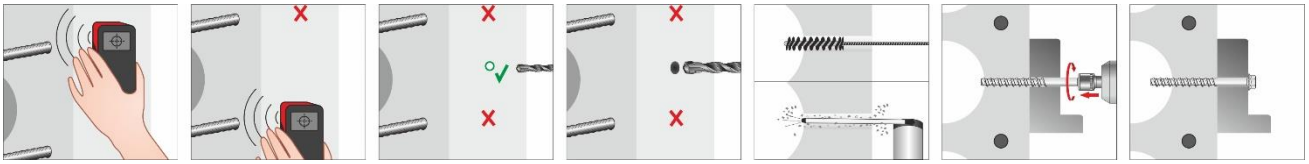
Installation instructions in normal concrete



Step 1	Drill a hole into the concrete in rotary plus hammer mode
Step 2	Remove the dust into the hole using a brush and a blowing pump
Step 3	Place the fixture
Step 4	Install the fastener using an impact screw driver (impact wrench)

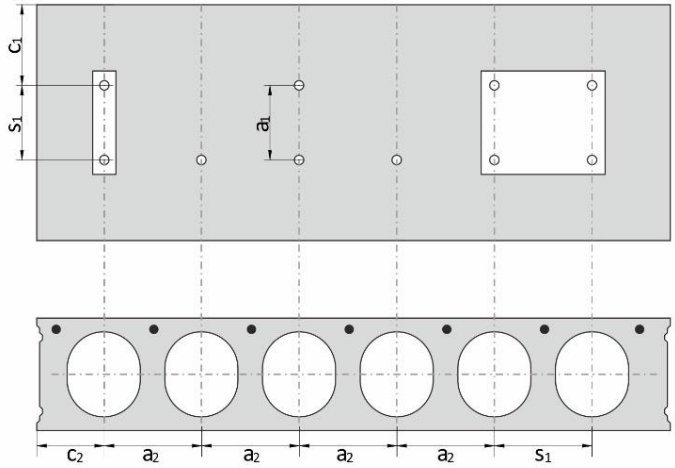
For HXE 85, HXE 40, HXE 02, HXE 42, HXE 12, HXE 44, Through fixing is allowed (place the fixture before placing the fastener)

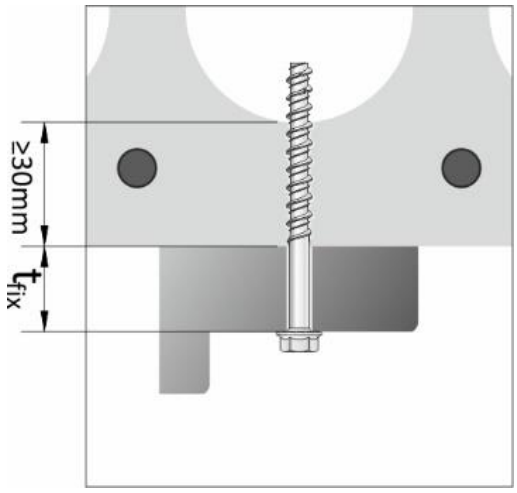
Installation instructions in Hollow core slab



Step 1 - 3	Find and mark the position of the prestressing element; fastener shall be placed between those element
Step 4	Drill a hole into the concrete in rotary plus hammer mode
Step 5	Remove the dust into the hole using a brush and a blowing pump
Step 6	Place the fixture
Step 7	Install the fastener using an impact screw driver (impact wrench)

Edge Distance and spacing for Hollow core slab installation





Minimum thickness of concrete slab

Denomination			HXE Ø5/6		HXE Ø6/8	
Nominal embedment depth	h_{nom}	[mm]	35	55	35	45
Minimum edge distance 30 mm Thickness	C_1, C_2	[mm]	100	100	100	100
Minimum edge distance 50 mm Thickness			100	135	100	110
Minimum fastener spacing	S_1, S_2	[mm]	200	200	200	200
Minimum group spacing	a_1, a_2	[mm]	200	200	200	200
Minimum core spacing	Lc	[mm]	100	100	100	100
Minimum prestressing steel distance	L_p	[mm]	100	100	100	100
Minimum spacing between prestressing steel and fastener position	a_p	[mm]	100	100	100	100

Table C1: Performances for design method A, tension, in concrete C20/25 to C50/60

Type of fastener / Size			HXE Ø5/6		HXE Ø6/8	
Steel failure						
Characteristic Resistance	$N_{Rk,s}$	[kN]	14,7		21,2	
Partial safety factor	γ_{Ms} [1)]	[-]	1,41		1,41	
Pull-out Failure						
Effective embedment depth	h_{ef}	[mm]	27	45	27	36
Characteristic Resistance in uncracked concrete C20/25	$N_{Rk,p}$	[kN]	5,5	9,5	6,0	6,5
Characteristic Resistance in cracked concrete C20/25			2,5	5,0	3,0	3,5
Installation safety factor	γ_{inst}	[-]	1,0		1,2	
Increasing factors for $N_{Rk,p}$ for cracked and uncracked concrete	Ψ_c	C30/37	1,13	1,13	1,22	1,18
		C40/50	1,23	1,23	1,41	1,32
		C50/60	1,32	1,32	1,58	1,44
Concrete cone failure and splitting failure						
Spacing	$s_{cr,N}$	[mm]	3 x h_{ef}			
Edge distance	$c_{cr,N}$	[mm]	1,5 x h_{ef}			
Spacing (splitting)	$s_{cr,sp}$	[mm]	100	150	120	150
Edge distance (splitting)	$c_{cr,sp}$	[mm]	50	75	60	75

[1)] In absence of other national regulations.

Table C2: Performances for design method A, shear, in concrete C20/25 to C50/60

Type of fastener / Size			HXE Ø5/6		HXE Ø6/8	
Steel failure without level arm						
Characteristic Resistance	$V^0_{Rk,s}$	[kN]	5,1		8,7	
Partial safety factor	γ_{Ms} [1)]	[-]	1,50		1,50	
Steel failure with level arm						
Characteristic bending Resistance	$M^0_{Rk,s}$	[Nm]	11		19	
Ductility factor	k_7	[-]	0,8		0,8	
Partial safety factor	γ_{Ms} [1)]	[-]	1,5		1,5	
Concrete pryout failure						
Effective embedment depth	h_{ef}	[mm]	27	45	27	36
Factor for pryout	k_8	[-]	1,0		1,0	
Concrete edge failure						
Effective diameter of the fastener for shear	d_{nom}	[mm]	5		6	
Effective length of the fastener	l_f	[mm]	35	55	35	45

Table C3: Performances for design method B, in precast prestressed hollow core slabs C45/55

Type of fastener/ Size			HXE Ø5/6		HXE Ø6/8	
Hollow Core Slab – 30 mm Thickness						
Effective embedment depth in concrete	h_{ef}	[mm]	27	30	27	30
Basic Design Resistance	$F_{Rk}{}^0$	[kN]	2,5	2,5	3,5	3,5
Installation safety factor	γ_{inst}	[-]	1,0		1,2	
Characteristic edge distance	C_{cr}	[mm]	100	100	100	100
Characteristic spacing	S_{cr}	[mm]	200	200	200	200
Hollow Core Slab – 50 mm Thickness						
Effective embedment depth in concrete	h_{ef}	[mm]	27	45	27	36
Basic Design Resistance	$F_{Rk}{}^0$	[kN]	5	5	7	7
Installation safety factor	γ_{inst}	[-]	1,0		1,2	
Characteristic edge distance	C_{cr}	[mm]	100	135	100	110
Characteristic spacing	S_{cr}	[mm]	200	200	200	200

Table C4: Performances under fire exposure in concrete C20/25 to C50/60 (tension)

Type of fastener / Size			**HXE Ø6/8**
Nominal embedment depth	h_{nom}	[mm]	45
Steel failure			
Characteristic Resistance, exposure time 30 minutes	$N_{Rk,s,fi,30}$	[kN]	0,3
Characteristic Resistance, exposure time 60 minutes	$N_{Rk,s,fi,60}$	[kN]	0,3
Characteristic Resistance, exposure time 90 minutes	$N_{Rk,s,fi,90}$	[kN]	0,2
Characteristic Resistance, exposure time 120 minutes	$N_{Rk,s,fi,120}$	[kN]	0,1
Pullout failure			
Characteristic Resistance, exposure time 30 minutes	$N_{Rk,p,fi,30}$	[kN]	0,8
Characteristic Resistance, exposure time 60 minutes	$N_{Rk,p,fi,60}$	[kN]	0,8
Characteristic Resistance, exposure time 90 minutes	$N_{Rk,p,fi,90}$	[kN]	0,8
Characteristic Resistance, exposure time 120 minutes	$N_{Rk,p,fi,120}$	[kN]	0,6
Concrete cone failure			
Characteristic Resistance, exposure time 30 minutes	$N_{Rk,c,fi,30}$	[kN]	1,3
Characteristic Resistance, exposure time 60 minutes	$N_{Rk,c,fi,60}$	[kN]	1,3
Characteristic Resistance, exposure time 90 minutes	$N_{Rk,c,fi,90}$	[kN]	1,3
Characteristic Resistance, exposure time 120 minutes	$N_{Rk,c,fi,120}$	[kN]	1,1
Spacing	$S_{cr,N}$	[mm]	$4 \cdot h_{ef}$
Edge Distance	$C_{cr,N}$	[mm]	$2 \cdot h_{ef}$
Minimum edge distance in case of fire exposure from one side	C_{min}	[mm]	$2 \cdot h_{ef}$
Minimum edge distance in case of fire exposure from more than one side	C_{min}	[mm]	max {300, $2 \cdot h_{ef}$ }

Table C5: Performances under fire exposure in concrete C20/25 to C50/60 (shear)

Type of fastener / Size			**HXE Ø6/8**
Nominal embedment depth	h_{nom}	[mm]	45
Steel failure without level arm			
Characteristic Resistance, exposure time 30 minutes	$V_{Rk,s,fi,30}$	[kN]	0,3
Characteristic Resistance, exposure time 60 minutes	$V_{Rk,s,fi,60}$	[kN]	0,3
Characteristic Resistance, exposure time 90 minutes	$V_{Rk,s,fi,90}$	[kN]	0,2
Characteristic Resistance, exposure time 120 minutes	$V_{Rk,s,fi,120}$	[kN]	0,1
Steel failure with level arm			
Characteristic Resistance, exposure time 30 minutes	$M^0_{Rk,s,fi,30}$	[kN]	0,3
Characteristic Resistance, exposure time 60 minutes	$M^0_{Rk,s,fi,60}$	[kN]	0,2
Characteristic Resistance, exposure time 90 minutes	$M^0_{Rk,s,fi,90}$	[kN]	0,2
Characteristic Resistance, exposure time 120 minutes	$M^0_{Rk,s,fi,120}$	[kN]	0,1
Pryout failure			
k_8		(-)	1,0
Characteristic Resistance, exposure time 30 minutes	$V_{Rk,cp,fi,30}$	[kN]	1,3
Characteristic Resistance, exposure time 60 minutes	$V_{Rk,cp,fi,60}$	[kN]	1,3
Characteristic Resistance, exposure time 90 minutes	$V_{Rk,cp,fi,90}$	[kN]	1,3
Characteristic Resistance, exposure time 120 minutes	$V_{Rk,cp,fi,120}$	[kN]	1,1
Concrete Edge Failure			
The characteristic resistance $V_{rk,cp,fi,Ri}$ in concrete C20/25 to C50/60 is determined by: **$V^0_{Rk,c,fi(90)}$ = 0,25 x $V^0_{Rk,c}$** (R30, R60, R90) and **$V^0_{Rk,c,fi(120)}$ = 0,20 x $V^0_{Rk,c}$** (R120) with $V^0_{Rk,c}$ as an initial value of the characteristic resistance of a single fastener in cracked concrete C20/25			