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European Technical Assessment

**ETA 23/0707
of 24/01/2025**

Technical Assessment Body issuing the ETA: Technical and Test Institute
for Construction Prague

Trade name of the construction product

R-HLX

**Product family to which the construction
product belongs**

Product area code: 33
Concrete screw for use in cracked
and uncracked concrete

Manufacturer

Rawlplug S.A.
Ul. Kwidzyńska 6
51-416 Wrocław
Poland

Manufacturing plant

Manufacturing Plant No 2

**This European Technical Assessment
contains**

15 pages including 13 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 330232-01-0601
Mechanical fasteners for use in concrete

This version replaces

ETA 23/0707 issued on 19/03/2024

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1. Technical description of the product

The R-HLX concrete screw in sizes of 6, 8, 10, 12 and 14 is made of carbon steel with coating.

The anchor is screwed into a drilled cylindrical hole. The special thread of the anchor cuts an internal thread into the member while setting. The anchorage is characterised by mechanical interlock in the special thread.

The installed anchor is shown in Annex A1.

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

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

The provisions made in this European Technical Assessment are based on an assumed 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, but are to be regarded only as a means for choosing the 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 (static and quasi-static loading)	See Annex C 1 and C 2
Displacement	See Annex C 1 and C 2
Characteristic resistance for seismic performance category C1 and C2	See Annex C 4

3.2 Safety in case of fire (BWR 2)

Essential characteristic	Performance
Reaction to fire	Class A1 according to EN 13501-1
Resistance to fire	See Annex C 3

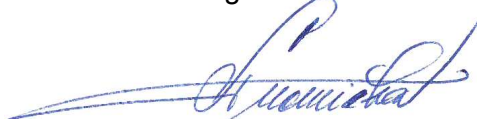
4. Assessment and verification of constancy of performance (AVCP) system applied with reference to its legal base

According to the Decision 96/582/EC of the European Commission¹, the system 1 of assessment verification of constancy of performance (see Annex V to the Regulation (EU) No 305/2011) apply.

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

Technical details necessary for the implementation of the AVCP system are laid down in the control plan deposited at Technical and Test Institute for Construction Prague.

Issued in Prague on 24.01.2025



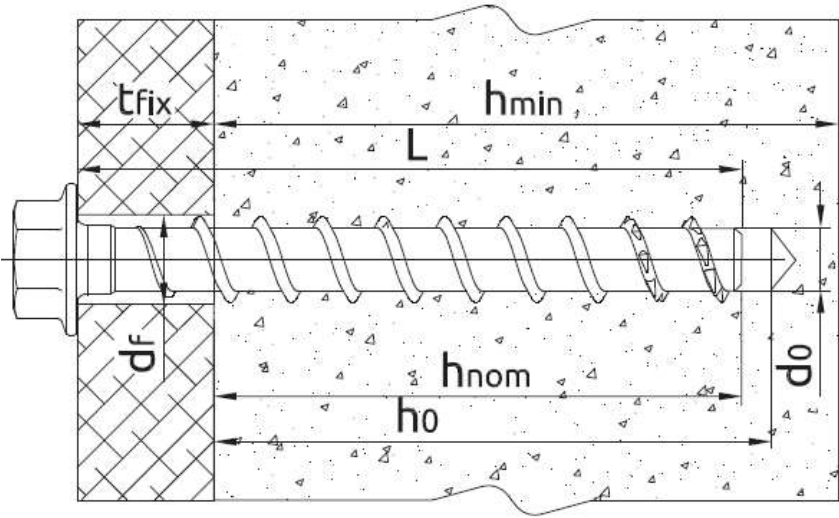
By

Ing. Jiří Studnička, Ph.D.
Head of the Technical Assessment Body

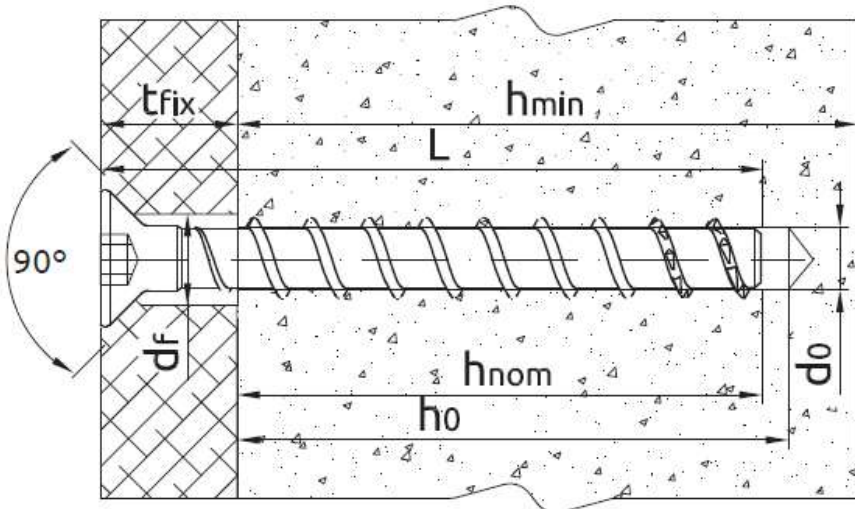


¹ Official Journal of the European Communities L 254 08.10.1996

R-HLX-HF - Installed screw



R-HLX-CS - Installed screw



R-HLX

Product description
Installed conditions

Annex A 1

R-HLX – Types

Type	Design
R-HLX-HF	
R-HLX-CS	
R-HLX-E	
R-HLX-I	
R-HLX-P	
R-HLX-PX	
HLX-SI	

R-HLX

Product description

Materials

Marking

Annex A 2

Table A1 - Materials

Material
Carbon steel; rupture elongation $A_5 \geq 12\%$
Galvanized zinc plating ($\geq 5 \mu\text{m}$), acc ISO 4042 or
Zinc flake ($\geq 5 \mu\text{m}$), acc. ISO 10683

R-HLX and HLX-SI – Marking



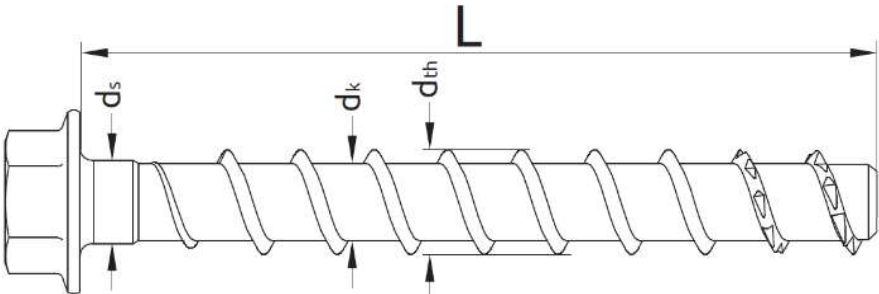
Marking:
R-HLX Identifying mark of the producer
D x L, where:
D – screw size [mm], e. g. 10
L – length of a screw [mm], e. g. 100



HLX-SI head
D x L, where:
D – screw size [mm], e. g. 10
L – length of a screw [mm], e. g. 100

Table A2 - Dimensions

Nominal diameter	d_{nom}	[mm]	6	8	10	12	14
Threaded outer diameter	d_{th}	[mm]	7,9	10,4	12,7	14,9	16,9
Core diameter	d_k	[mm]	5,6	7,5	9,3	11,5	13,3
Shaft diameter	d_s	[mm]	5,85	7,85	9,8	11,95	13,85
Head sizes R-HLX-HF	Sw	[-]	10	13	SW15	SW17	SW21
Head sizes CS	T	[-]	T40	T50	T50	T50	T50



R-HLX

Product description
Dimensions

Annex A 3

Specifications of intended use

Anchorage subject to:

- Static and quasi-static loads
- Fire exposure
- Seismic performance category C1
- Seismic performance category C2, only standard embedment depth

Base materials

- Cracked or uncracked concrete.
- Reinforced or unreinforced normal weight concrete of strength class C20/25 at minimum and C50/60 at maximum according EN 206:2013+A1:2016.

Use conditions (Environmental conditions)

- Structures subject to dry internal conditions.

Design:

- The anchorages are designed under the responsibility of an engineer experienced in anchorages and concrete work.
- The anchorages are designed in accordance with the EN 1992-4:2018 and Technical Report TR 055, Edition February 2018.
- Anchorages under fire exposure have to be designed in accordance with EN 1992-4, Annex D.
- Anchorages under seismic actions have to be designed in accordance with EN 1992-4, Annex C.
- 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. positions of the fastener relative to reinforcement or to support, etc.).

Installation:

- Anchor installation carried out by appropriately qualified personnel and under the supervision of the person responsible for technical matters of the site.
- Use of the anchor only as supplied by the manufacturer without exchanging any components of the anchor.
- Anchor installation in accordance with the manufacturer's specifications and drawings using the appropriate tools.
- Effective anchoring depth, edge distance and spacing not less than the specified values without minus tolerance.
- In case of aborted drill hole: new drilling at a minimum distance away of twice the depth of the aborted hole or smaller distance if the aborted drill hole is filled with high strength mortar and if under shear or oblique tension load it is not in the direction of load application.

R-HLX

Intended use
Specifications

Annex B 1

Table B1 - Installation parameters for standard embedment depth

Type	Drill hole diameter	Maximum cutting diameter	Nominal embedment depth	Min. hole depth	Max. hole diameter in fixture	Maximum installation torque	Minimum thickness of concrete member	Minimum spacing	Minimum edge distance
	d_0 [mm]	$d_{cut,max}$ [mm]	h_{nom} [mm]	h_0 [mm]	d_f [mm]	$T_{imp,max}$ [Nm]	h_{min} [mm]	s_{min} [mm]	c_{min} [mm]
R-HLX-6	6	6,4	55	65	9	250	80	35	35
R-HLX-8	8	8,45	70	85	12	350	110	35	35
R-HLX 10	10	10,45	85	95	14	650	130	60	60
R-HLX 12	12	12,45	100	110	16	1000	155	80	80
R-HLX 14	14	14,45	115	125	18	1000	190	100	100

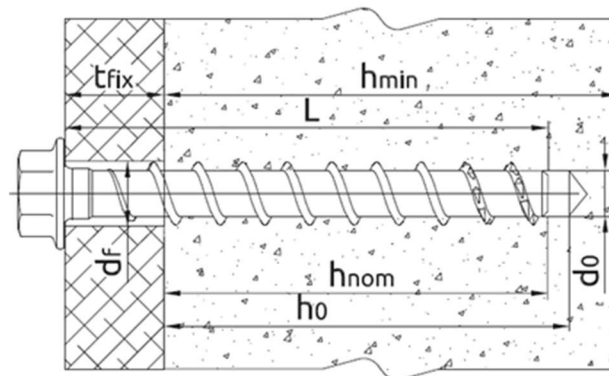
Table B2 - Installation parameters for medium embedment depth

Type	Drill hole diameter	Maximum cutting diameter	Nominal embedment depth	Min. hole depth	Max. hole diameter in fixture	Maximum installation torque	Minimum thickness of concrete member	Minimum spacing	Minimum edge distance
	d_0 [mm]	$d_{cut,max}$ [mm]	h_{nom} [mm]	h_0 [mm]	d_f [mm]	$T_{imp,max}$ [Nm]	h_{min} [mm]	s_{min} [mm]	c_{min} [mm]
R-HLX-6	6	6,4	40	50	9	250	80	35	35
R-HLX-8	8	8,45	60	70	12	350	110	35	35
R-HLX 10	10	10,45	75	85	14	650	120	60	60
R-HLX 12	12	12,45	80	90	16	1000	130	80	80
R-HLX 14	14	14,45	85	95	18	1000	130	100	100

Table B3 – Installation parameters for reduced embedment depth

Type	Drill hole diameter	Maximum cutting diameter	Nominal embedment depth	Min. hole depth	Max. hole diameter in fixture	Maximum installation torque	Minimum thickness of concrete member	Minimum spacing	Minimum edge distance
	d_0 [mm]	$d_{cut,max}$ [mm]	h_{nom} [mm]	h_0 [mm]	d_f [mm]	$T_{imp,max}$ [Nm]	h_{min} [mm]	s_{min} [mm]	c_{min} [mm]
R-HLX-6	6	6,4	35 ¹⁾	45	9	250	80	35	35
R-HLX-8	8	8,45	50	60	12	350	110	35	35
R-HLX 10	10	10,45	55	65	14	650	100	60	60
R-HLX 12	12	12,45	60	70	16	1000	110	80	80
R-HLX 14	14	14,45	65	75	18	1000	110	100	100

¹⁾ Use restricted to anchoring statically indeterminate structural components

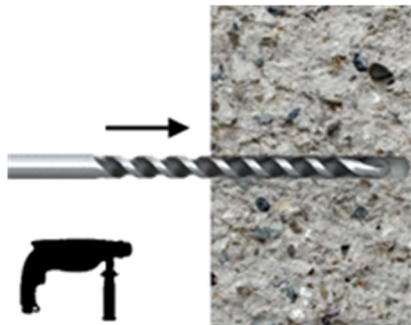
**R-HLX**

Intended use
Installation parameters

Annex B 2

Installation instructions I – with cleaning (see Table C1 - γ_{inst})

1a

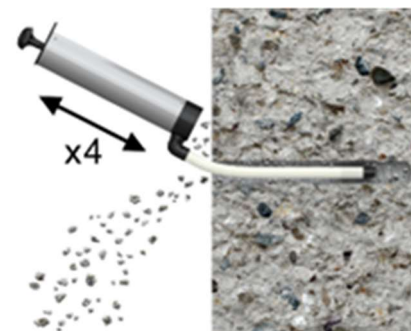


1. Drill the hole with a hammer drill (1a) or a dust-free drill (1b) to the required depth.
Drill hole depth: $h_1 \geq L - t_{fix} + 10 \text{ mm}$

1b



2.



2. Clean the hole (blow dust at least 4 times with the hand pump). When using a dust-free drill bit (1b), it is not necessary to clean the hole by pump.

3.



3. Screw the concrete screw into the hole with an impact wrench and a suitable impact socket. Tighten until the fixture is clamped to the substrate.
Installation with any tangential impact wrench.

4.



4. Finish screwing when the screw head presses the fastened element/substrate. The screw head must not be damaged.

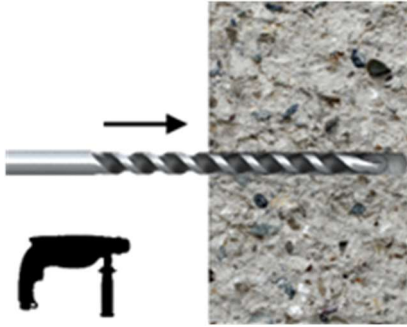
R-HLX

Intended use
Installation instructions I

Annex B 3

Installation instructions II – without cleaning (see Table C1 - γ_{inst})

1



1. Drill the hole with a hammer drill to the required depth and 3x ventilation after drilling is executed (moving the drill bit in and out drill hole 3 times after the recommended drilling depth is achieved).

Drill hole depth: $h_1 \geq L - t_{fix} + 25 \text{ mm}$

2.



2. Screw the concrete screw into the hole with an impact wrench and a suitable impact socket. Tighten until the fixture is clamped to the substrate.

Installation with any tangential impact wrench.

3.



3. Finish screwing when the screw head presses the fastened element/substrate. The screw head must not be damaged.

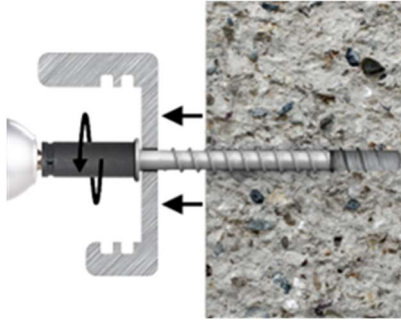
R-HLX

Intended use
Installation instructions II

Annex B 4

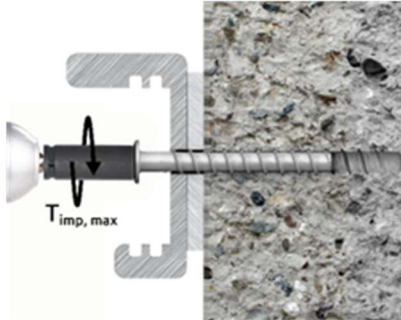
Installation instructions III – adjustment (see Table C1)

4.



4. Possibility to unscrew the fixed anchor to a maximum height of 10mm.
In the adjustment process, the permissible thickness of the fastened elements (T_{fix}) must be observed.

5.



5. Adjust the element and tighten until the fixture is clamped to the substrate.
Installation with any impact wrench with tangential impact.

6.



6. Finish screwing when the screw head presses the fastened element (substrate).
The adjustment operation can be performed twice.

Adjustment not allowed for anchorage subjected to seismic actions.

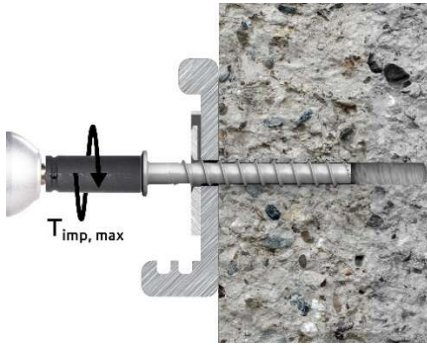
R-HLX

Intended use
Installation instructions III

Annex B 5

Installation instructions IV: filling of the annular gap (see Tables C7 and C8 - α_{gap})

1.



1. Place the sealing ring on the fixture. Screw the concrete screw into the hole using an impact wrench and an appropriate impact socket. Tighten until the element is pressed to the surface. Installation using any impact wrench with a tangential impact.

2.



2. Finish screwing in when the screw head and the ring presses with the fastened element/substrate. The screw head must not be damaged.

3.



3. Place the dispensing nozzle in the opening of the sealing ring. Fill the annular gap with resin.

4.



4. Correctly installed screw with a sealing ring filled with resin.

R-HLX

Intended use
Installation instructions IV

Annex B 6

Table C1 – Characteristic resistance under tension load

Size			6			8			10			12			14			
Nominal embedment depth		h_{nom} [mm]	35 ²⁾	40	55	50	60	70	55	75	85	60	80	100	65	85	115	
Adjustment																		
Max. thickness of adjustment layers		t_{adj} [mm]	-	-	10	10	10	10	-	-	10	-	-	10	-	-	10	
Max. number of adjustments		n_a [-]	-	-	2	2	2	2	-	-	2	-	-	2	-	-	2	
Steel failure																		
Characteristic resistance		$N_{Rk,s}$ [kN]	19,4			35,4			54,3			83,1			111,1			
Partial safety factor		γ_{Ms} [-]	1,5															
Pull-out failure																		
Characteristic resistance in uncracked concrete C20/25		$N_{Rk,p,ucr}$ [kN]	4,5	8,0 ¹⁾	13,8 ¹⁾	11,9 ¹⁾	16,3 ¹⁾	20,6 ¹⁾	13,4 ¹⁾	22,3 ¹⁾	27,6 ¹⁾	15,4 ¹⁾	24,6 ¹⁾	35,2 ¹⁾	16,9 ¹⁾	26,4 ¹⁾	43,4 ¹⁾	
Characteristic resistance in cracked concrete C20/25		$N_{Rk,p,cr}$ [kN]	2,0	2,0	3,5	8,0	9,0	11,0	9,4 ¹⁾	15,6 ¹⁾	19,3 ¹⁾	10,7 ¹⁾	17,2 ¹⁾	24,6 ¹⁾	11,8 ¹⁾	18,5 ¹⁾	30,4 ¹⁾	
C25/30		ψ_c [-]	1,08						1,10									
C30/37			1,17						1,22									
C35/45			1,27						1,34									
C40/50			1,32						1,41									
C45/55			1,37						1,48									
C50/60			1,42						1,55									
Increasing factor for concrete																		
Concrete cone and splitting failure																		
Effective embedment depth		h_{ef} [mm]	26	30	43	39	43	56	42	59	68	46	63	80	49	66	92	
Factor for concrete cone failure for uncracked concrete		$k_{ucr,N}$ [-]	11,0															
Factor for concrete cone failure for cracked concrete		$k_{cr,N}$ [-]	7,7															
Robustness		γ_{inst} [-]	1,0 ³⁾	1,0 ³⁾	1,0	1,0	1,0	1,0	1,0	1,0	1,0	1,0	1,0	1,0	1,0	1,0	1,0	
with cleaning			1,2 ⁴⁾	1,2 ⁴⁾	1,0	1,0	1,0	1,0	1,0	1,0	1,0	1,0	1,0	1,0	1,0	1,0	1,0	
without cleaning																		
Spacing		concrete cone failure	$S_{cr,N}$ [mm]	3 • h_{ef}														
		splitting failure	$S_{cr,sp}$ [mm]	80	90	130	120	150	170	120	180	200	140	200	240	150	200	280
Edge distance		concrete cone failure	$C_{cr,N}$ [mm]	1,5 • h_{ef}														
		splitting failure	$C_{cr,sp}$ [mm]	40	45	65	60	75	85	60	90	100	70	100	120	75	100	140

¹⁾ limited to $N_{Rk,c}$

²⁾ Use restricted to anchoring statically indeterminate structural components

³⁾ See Annex B 3

⁴⁾ See Annex B 4

Table C2 – Displacement under tension load

Size			6			8			10			12			14		
Nominal embedment depth	h_{nom}	[mm]	35	40	55	50	60	70	55	75	85	60	80	100	65	85	115
Tension load in uncracked concrete	N	[kN]	2,1	3,8	6,6	5,7	7,8	9,8	7,03	15,03	19,28	8,02	17,92	30,52	10,41	21,63	38,86
Displacement	δ_{N0}	[mm]	0,9	1,0	1,3	0,8	1,1	1,3	0,4	0,4	0,6	0,4	0,4	0,6	0,4	0,6	0,7
	$\delta_{N\infty}$	[mm]	2,0	2,0	2,0	2,0	2,0	2,0	1,2	1,1	1,2	1,2	1,1	1,2	1,3	1,2	1,4
Tension load in cracked concrete	N	[kN]	1,0	1,0	1,7	3,8	4,3	5,2	4,55	9,05	13,62	6,60	10,25	22,56	7,60	14,30	28,41
Displacement	δ_{N0}	[mm]	0,4	0,5	0,5	1,1	1,4	1,7	0,4	0,4	0,5	0,5	0,5	0,7	0,6	0,7	0,7
	$\delta_{N\infty}$	[mm]	2,0	2,0	2,0	2,0	2,0	2,0	2,0	2,0	2,0	2,0	2,0	2,0	2,0	2,0	2,0

R-HLX

Performances

Characteristic resistance under tension load
Displacement under tension load

Annex C 1

Table C3 – Characteristic resistance under shear load

Size		6			8			10			12			14		
Nominal embedment depth	h_{nom} [mm]	35 ¹⁾	40	55	50	60	70	55	75	85	60	80	100	65	85	115
Steel failure without lever arm																
Characteristic resistance	$V_{Rk,s}^0$ [kN]	9,7			17,7			27,2			41,6			55,6		
Ductility factor	k_7 [-]	1,0														
Partial safety factor	γ_{Ms} [-]	1,25														
Steel failure without lever arm																
Characteristic resistance	$M_{Rk,s}^0$ [Nm]	16,1			39,8			75,8			143,4			221,7		
Partial safety factor	γ_{Ms} [-]	1,25														
Concrete cone pry-out failure																
Pry-out factor	k_8 [-]	1,0	1,0	1,0	1,0	2,0	2,0	1,0	2,0	2,0	2,0	2,0	2,0	2,0	2,0	2,0
Installation safety factor	γ_{inst} [-]	1,0														
Concrete edge failure																
Effective length of anchor	l_f [mm]	35	40	55	50	60	70	55	75	85	60	80	100	65	85	115
Anchor diameter	d_{nom} [mm]	6			8			10			12			14		
Installation safety factor	γ_{inst} [-]	1,0														

¹⁾ Use restricted to anchoring statically indeterminate structural components

Table C4 – Displacement under shear load

Size		6			8			10			12			14		
Shear load in cracked and uncracked concrete	V [kN]	5,5			10,1			14,3			20,8			27,8		
Displacement	δ_{V0} [mm]	6,0			3,0			1,1			1,4			1,7		
	$\delta_{V\infty}$ [mm]	9,0			4,5			1,7			2,1			2,6		

R-HLX**Performances**

Characteristic resistance under shear load
Displacement under shear load

Annex C 2

Table C5 – Characteristic values for fire resistance under tension load¹⁾

Size		6			8			10			12			14			
Nominal embedment depth h_{nom} [mm]		35 ²⁾	40	55	50	60	70	55	75	85	60	80	100	65	85	115	
Fire resistance duration at 30 minutes																	
Steel failure	$N_{Rk,s,fi(30)}$	[kN]	1,8			3,8			6,6			11,4			15,2		
Pull-out failure	$N_{Rk,p,fi(30)}$	[kN]	0,5	0,5	0,8	2,0	2,2	2,7	2,3	3,9	4,8	2,6	4,3	6,1	2,9	4,6	7,6
Fire resistance duration at 60 minutes																	
Steel failure	$N_{Rk,s,fi(60)}$	[kN]	1,4			2,9			5,0			8,5			11,4		
Pull-out failure	$N_{Rk,p,fi(60)}$	[kN]	0,5	0,5	0,8	2,0	2,2	2,7	2,3	3,9	4,8	2,6	4,3	6,1	2,9	4,6	7,6
Fire resistance duration at 90 minutes																	
Steel failure	$N_{Rk,s,fi(90)}$	[kN]	1,0			2,0			3,4			5,7			7,6		
Pull-out failure	$N_{Rk,p,fi(90)}$	[kN]	0,5	0,5	0,8	2,0	2,2	2,7	2,3	3,9	4,8	2,6	4,3	6,1	2,9	4,6	7,6
Fire resistance duration at 120 minutes																	
Steel failure	$N_{Rk,s,fi(120)}$	[kN]	0,8			1,6			2,6			4,3			5,7		
Pull-out failure	$N_{Rk,p,fi(120)}$	[kN]	0,4	0,4	0,7	1,6	1,8	2,2	1,8	3,1	3,8	2,1	3,4	4,9	2,3	3,6	6,0
Spacing	$S_{cr,N}$	[mm]	4 h_{ef}														
Edge distance	$C_{cr,N}$	[mm]	2 h_{ef}														
In case of fire attack from more than one side, the edge distance of the anchor has to be ≥ 300 mm and $\geq 2 h_{ef}$																	

¹⁾ In absence of other national regulations, the partial safety factor for resistance under fire exposure is recommended

$\gamma_{M,fi} = 1,0$ for steel failure and concrete related failure modes under shear loading.

For concrete related failure under tension $\gamma_{M,fi} = 1,0 \cdot \gamma_{inst}$

²⁾ Use restricted to anchoring statically indeterminate structural components

Table C6 – Characteristic values for fire resistance under shear load¹⁾

Size		6			8			10			12			14			
Nominal embedment depth	h_{nom}	[mm]	35 ²⁾	40	55	50	60	70	55	75	85	60	80	100	65	85	115
Fire resistance duration at 30 minutes																	
Characteristic resistance	$V_{Rk,s,fi(30)}$	[kN]	1,8			3,8			6,6			11,4			15,2		
Characteristic bending resistance	$M^0_{Rk,s,fi(30)}$	[Nm]	1,5			4,3			9,3			19,7			30,4		
Fire resistance duration at 60 minutes																	
Characteristic resistance	$V_{Rk,s,fi(60)}$	[kN]	1,4			2,9			5,0			8,5			11,4		
Characteristic bending resistance	$M^0_{Rk,s,fi(60)}$	[Nm]	1,2			3,3			7,0			14,8			22,9		
Fire resistance duration at 90 minutes																	
Characteristic resistance	$V_{Rk,s,fi(90)}$	[kN]	1,0			2,0			3,4			5,7			7,6		
Characteristic bending resistance	$M^0_{Rk,s,fi(90)}$	[Nm]	0,8			2,3			4,8			9,9			15,3		
Fire resistance duration at 120 minutes																	
Characteristic resistance	$V_{Rk,s,fi(120)}$	[kN]	0,8			1,6			2,6			4,3			5,7		
Characteristic bending resistance	$M^0_{Rk,s,fi(120)}$	[Nm]	0,7			1,8			3,7			7,4			11,5		

¹⁾ In absence of other national regulations, the partial safety factor for resistance under fire exposure is recommended

$\gamma_{M,fi} = 1,0$ for steel failure and concrete related failure modes under shear loading.

For concrete related failure under tension $\gamma_{M,fi} = 1,0 \cdot \gamma_{inst}$

²⁾ Use restricted to anchoring statically indeterminate structural components

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Performances
Resistance to fire

Annex C 3

Table C7 – Characteristic resistance under seismic action category C1

Size			6		8			10			12			14		
Nominal embedment depth	h_{nom}	[mm]	40	55	50	60	70	55	75	85	60	80	100	65	85	115
Tension load																
Steel failure	$N_{Rk,s,C1}$	[kN]	19,4		35,4			54,3			83,1			111,1		
Pull-out failure	$N_{Rk,p,C1}$	[kN]	2,0	3,5	7,6	8,6	10,5	8,6	14,4	17,8	7,6	12,2	17,5	8,4	13,1	21,6
Shear load																
Steel failure	$V_{Rk,s,C1}$	[kN]	4,7		10,6			18,7			28,7			38,3		
Reduction factor according to EN 1992-4:2018 without gap filling	α_{gap}	[-]	0,5													
Reduction factor according to EN 1992-4:2018 with gap filling (see Annex B 4)	α_{gap}	[-]	1,0													

Table C8 – Characteristic resistance under seismic action category C2

Size			8	10	12	14
Nominal embedment depth h_{nom} [mm]			70	85	100	115
Tension load						
Steel failure	$N_{Rk,s,C2}$	[kN]	35,4	54,3	83,1	111,1
Pull-out failure	$N_{Rk,p,C2}$	[kN]	2,0	8,5	13,3	19,3
Shear load						
Steel failure	$V_{Rk,s,C2}$	[kN]	3,6	8,0	22,3	21,6
Reduction factor according to EN 1992-4:2018 without gap filling	α_{gap}	[-]	0,5			
Reduction factor according to EN 1992-4:2018 with gap filling (see Annex B 4)	α_{gap}	[-]	1,0			

Table C9 – Displacement under tension and shear load - seismic action category C2

Size		8	10	12	14
Nominal embedment depth	h_{nom}	70	85	100	115
$\delta_{N,C2}(DLS)$	[mm]	0,50	0,36	0,44	0,57
$\delta_{N,C2}(ULS)$	[mm]	1,19	1,29	1,65	2,55
$\delta_{V,C2}(DLS)$	[mm]	1,98	5,59	5,00	6,66
$\delta_{V,C2}(ULS)$	[mm]	6,24	7,10	7,90	9,24

Note: Adjustment (see Annex B 5) not allowed.

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Performances

Characteristic resistance under seismic action category C1 and C2

Annex C 4