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European Technical Assessment

**ETA-17/0783
of 22/08/2019**

General Part

Technical Assessment Body issuing the European Technical Assessment

Instytut Techniki Budowlanej

Trade name of the construction product

R-LX

Product family to which the construction product belongs

Concrete screw for multiple use for non-structural applications in 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 3 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

European Assessment Document (EAD)
330747-00-0601 "Fasteners for use in concrete for redundant non-structural systems"

This version replaces

ETA-17/0783 issued on 22/06/2018

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Specific Part

1 Technical description of the product

The R-LX are concrete screw anchors. The anchors are made of zinc plated (ZP) or zinc flaked (ZF) steel.

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

The description of the product is given in Annex A.

2 Specification of the intended use in accordance with the applicable European Assessment Document (EAD)

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

The performances given 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 or the Technical 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 Performance of the product

3.1.1 Mechanical resistance and stability (BWR 1)

Essential characteristic	Performance
Characteristic resistance in concrete	See Annex C1 and C2
Edge distances and spacing	See Annex C1 and C2

3.1.2 Safety in case of fire (BWR 2)

Essential characteristic	Performance
Reaction to fire	Anchors satisfy requirements for Class A1
Resistance to fire	See Annex C3

3.2 Methods used for the assessment

The assessment of the products has been made in accordance with EAD 330747-00-0601.

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

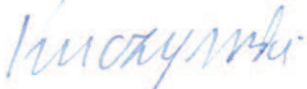
According to Decision 97/161/EC of the European Commission the system 2+ of assessment and verification of constancy of performance applies (see Annex V to Regulation (EU) No 305/2011).

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

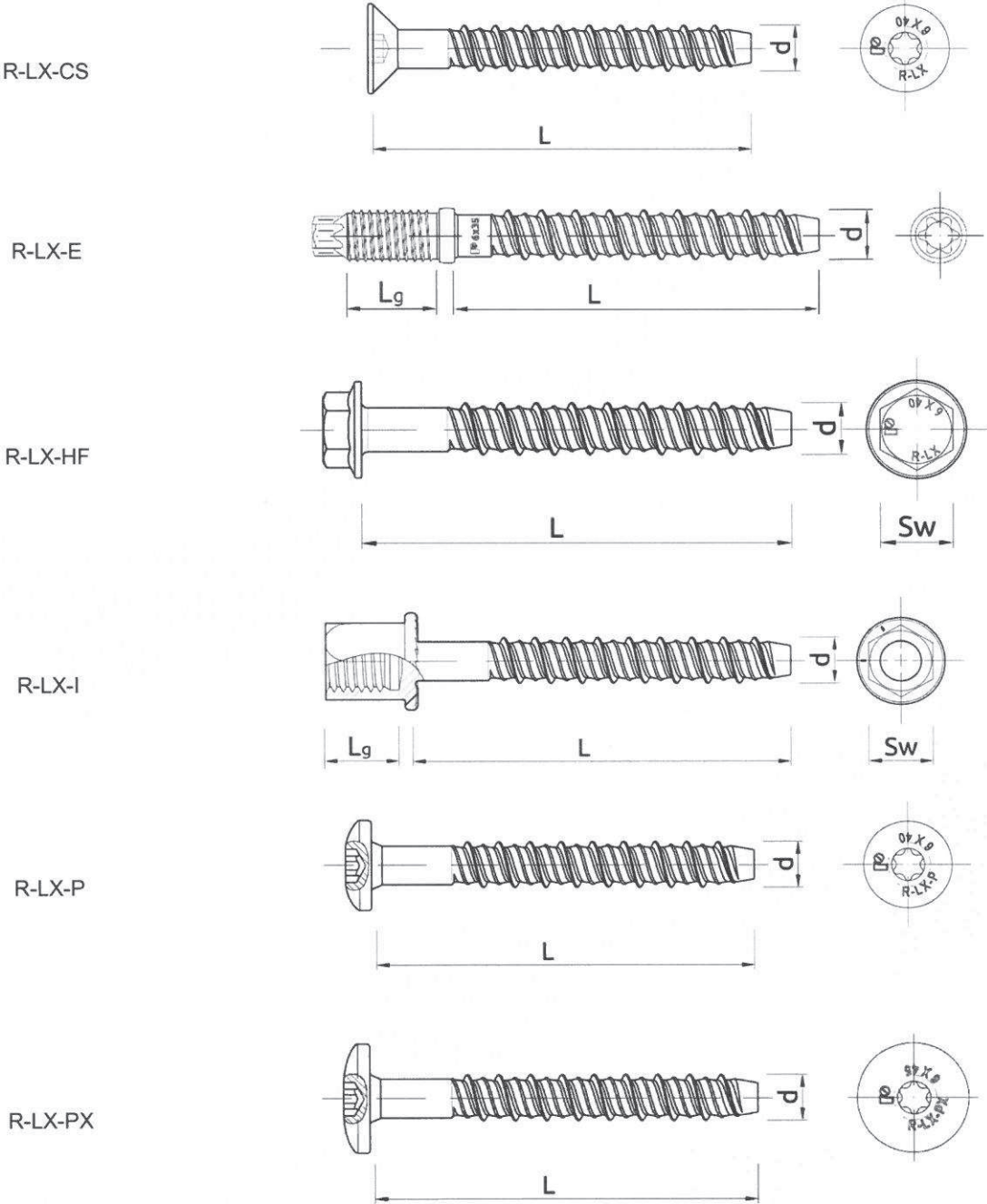
Technical details necessary for the implementation of the AVCP system are laid down in the control plan which is deposited at Instytut Techniki Budowlanej.

For type testing the results of the tests performed as part of the assessment for the European Technical Assessment shall be used unless there are changes in the production line or plant. In such cases the necessary type testing has to be agreed between Instytut Techniki Budowlanej and the notified body.

Issued in Warsaw on 22/08/2019 by Instytut Techniki Budowlanej



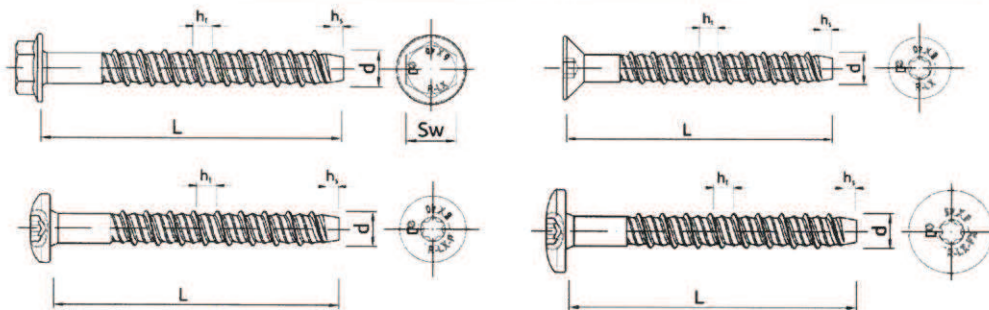
Krzysztof Kuczyński, PhD
Deputy Director of ITB



R-LX	Annex A1 of European Technical Assessment ETA-17/0783
Product description Characteristic of the product	

Table A1: Dimensions and material for R-LX-HF, R-LX-CS, R-LX-P and R-LX-PX

Anchor size			R-LX-05	R-LX-06	R-LX-08	R-LX-10	R-LX-14
Thread size	d	mm	6,3	7,5	10,0	12,5	17,0
Length of anchor	L	mm	30 - 250	35 - 250	55 - 250	60 - 250	80 - 250
Nominal hole diameter	d ₀	mm	5	6	8	10	14
Tip chamfer	h _s	mm	2,5	3	4	4,5	6
Pitch	h _t	mm	5	6	7	8	12
Material: Carbon steel	f _{uk}	N/mm ²	1300	1250	1200	1050	1020
	f _{yk}	N/mm ²	1150	1100	1050	950	800
Coating			Zinc Plated (ZP ≥ 5 µm) or Zinc Flaked (ZF ≥ 5 µm)				

**Table A2:** Dimensions and material for R-LX-I and R-LX-E

Anchor size			R-LX-05	R-LX-06	R-LX-08	R-LX-10
Thread size	d	mm	6,3	7,5	10,0	12,5
Length of anchor	L	mm	25 - 250	35 - 250	50 - 250	55 - 250
Nominal hole diameter	d ₀	mm	5	6	8	10
Tip chamfer	h _s	mm	2,5	3	4	4,5
Pitch	h _t	mm	5	6	7	8
Minimum thread length	L _g ≥	mm	8	8	8	8
Internal/external thread	-		M6	M6, M8, M10	M10, M12, M16	M12, M16
Material: Carbon steel	f _{uk}	N/mm ²	1300	1250	1200	1050
	f _{yk}	N/mm ²	1150	1100	1050	950
Coating			Zinc Plated (ZP ≥ 5 µm) or Zinc Flaked (ZF ≥ 5 µm)			

**R-LX**

Product description
Characteristic of the product

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SPECIFICATION OF INTENDED USE

Anchorage subject to:

- Multiple use for non-structural applications.
- Static and quasi-static loads.
- Anchorages with requirements related to resistance to fire – only for normal weight concrete.

Base material:

- Reinforced or unreinforced normal weight concrete of strength class C20/25 at minimum to C50/60 at maximum according to EN 206.
- Non-cracked and cracked concrete: all sizes.
- Precast prestressed hollow concrete slabs (with $w/e \leq 4,2$) and strength class C30/37 at minimum to C50/60 at maximum according to EN 206: size R-LX-06 only.

Use conditions (environmental conditions):

- Structures subject to dry internal conditions.

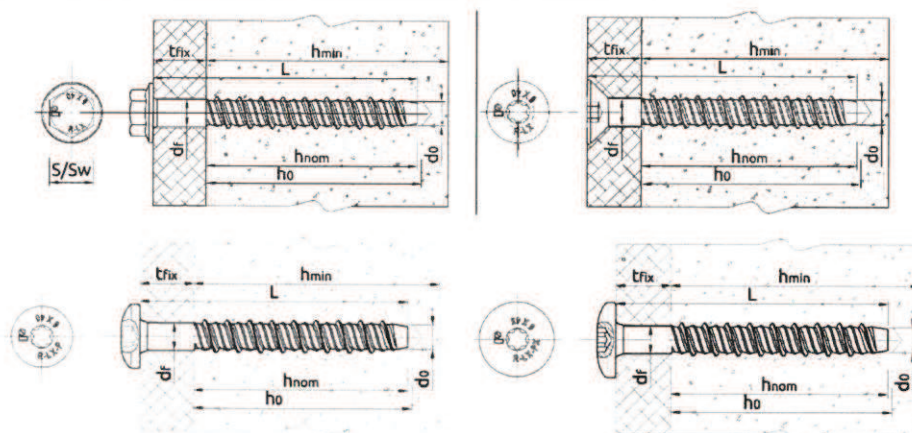
Design:

- 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 transmitted. 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 under static and quasi-static loads and under fire exposure are designed in accordance with EN 1992-4:2018.

Installation:

- Rotary percussive machine drilling only.
- Anchor installation carried out by appropriately qualified personnel and under the supervision of the person responsible for technical matters of the site.
- Anchor installation in accordance with the manufacturer's specifications and drawings and using the appropriate tools.
- Check of concrete being well compacted, e.g. without significant voids.
- Positioning of the drill holes without damaging the reinforcement.
- Anchor installation such that the effective anchorage depth is complied with.
- After installation further turning of the anchor is not possible.
- The head of the anchor is supported on the fixture and is not damaged.

R-LX	Annex B1 of European Technical Assessment ETA-17/0783
Intended use Specification	



Installed anchor R-LX-HF, R-LX-CS, R-LX-P and R-LX-PX

Table B1: Installation parameters – **standard** embedment depth

Anchor size			R-LX-05	R-LX-06	R-LX-08	R-LX-10	R-LX-14
Nominal drill bit diameter	d_0	mm	5	6	8	10	14
Cutting diameter of drill bit	$d_{cut} \leq$	mm	5,40	6,40	8,45	10,45	14,50
Depth of drill hole*	$h_0 \geq$	mm	50	65	80	95	130
Nominal embedment depth	h_{nom}	mm	40	55	70	85	120
Effective embedment depth	h_{ef}	mm	30	42	53	65	92
Clearance hole in the fixture	d_f	mm	7	9	12	14	18
Maximum installation torque	$T_{imp,max}$	Nm	200	400	900	950	950
Minimum thickness of member	h_{min}	mm	80	84	110	130	190
Thickness of the fixture, max.	t_{fix}	mm	$L - h_{nom}$				

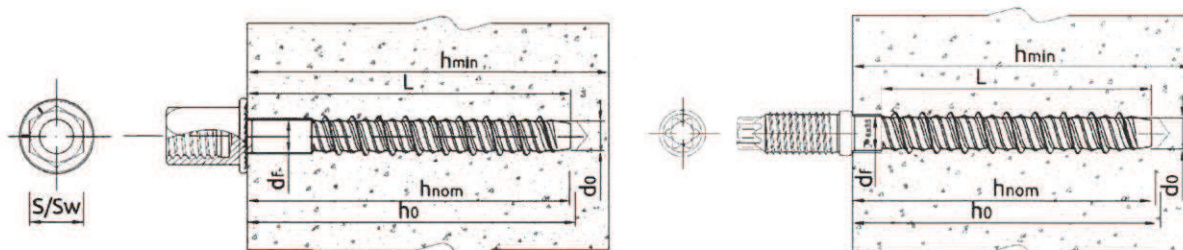
*Real depth of drill hole $h_0 = L + 10 - t_{fix}$ **Table B2:** Installation parameters – **reduced** embedment depth

Anchor size			R-LX-05	R-LX-06		R-LX-08	R-LX-10	R-LX-14
Nominal drill bit diameter	d_0	mm	5	6	6	8	10	14
Cutting diameter of drill bit	$d_{cut} \leq$	mm	5,40	6,40	6,40	8,45	10,45	14,50
Depth of drill hole*	$h_0 \geq$	mm	35	45	50	60	65	85
Nominal embedment depth	h_{nom}	mm	25	35	39	50	55	75
Effective embedment depth	h_{ef}	mm	17,5	24,7	30	37	40	55
Clearance hole in the fixture	d_f	mm	7	9	9	12	14	18
Maximum installation torque	$T_{imp,max}$	Nm	200	400	400	900	950	950
Minimum thickness of member	h_{min}	mm	80	80	80	80	80	110
Thickness of the fixture, max.	t_{fix}	mm	$L - h_{nom}$					

*Real depth of drill hole $h_0 = L + 10 - t_{fix}$ **R-LX**

Intended use
Installation parameters – concrete

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Installed anchor R-LX-I and R-LX-E

Table B3: Installation parameters – **standard** embedment depth

Anchor size			R-LX-05	R-LX-06	R-LX-08	R-LX-10
Nominal drill bit diameter	d_0	mm	5	6	8	10
Cutting diameter of drill bit	$d_{cut} \leq$	mm	5,40	6,40	8,45	10,45
Depth of drill hole*	$h_0 \geq$	mm	50	65	80	95
Nominal embedment depth	h_{nom}	mm	40	55	70	85
Effective embedment depth	h_{ef}	mm	30	42	53	65
Maximum installation torque	$T_{imp,max}$	Nm	200	400	900	950
Minimum thickness of member	h_{min}	mm	80	84	110	130

*Real depth of drill hole $h_0 = L + 10 - t_{fix}$ **Table B4:** Installation parameters – **reduced** embedment depth

Anchor size			R-LX-05	R-LX-06		R-LX-08	R-LX-10
Nominal drill bit diameter	d_0	mm	5	6	6	8	10
Cutting diameter of drill bit	$d_{cut} \leq$	mm	5,40	6,40	6,40	8,45	10,45
Depth of drill hole*	$h_0 \geq$	mm	35	45	50	60	65
Nominal embedment depth	h_{nom}	mm	25	35	39	50	55
Effective embedment depth	h_{ef}	mm	17,5	24,7	30	37	40
Maximum installation torque	$T_{imp,max}$	Nm	200	400	400	900	950
Minimum thickness of member	h_{min}	mm	80	80	80	80	80

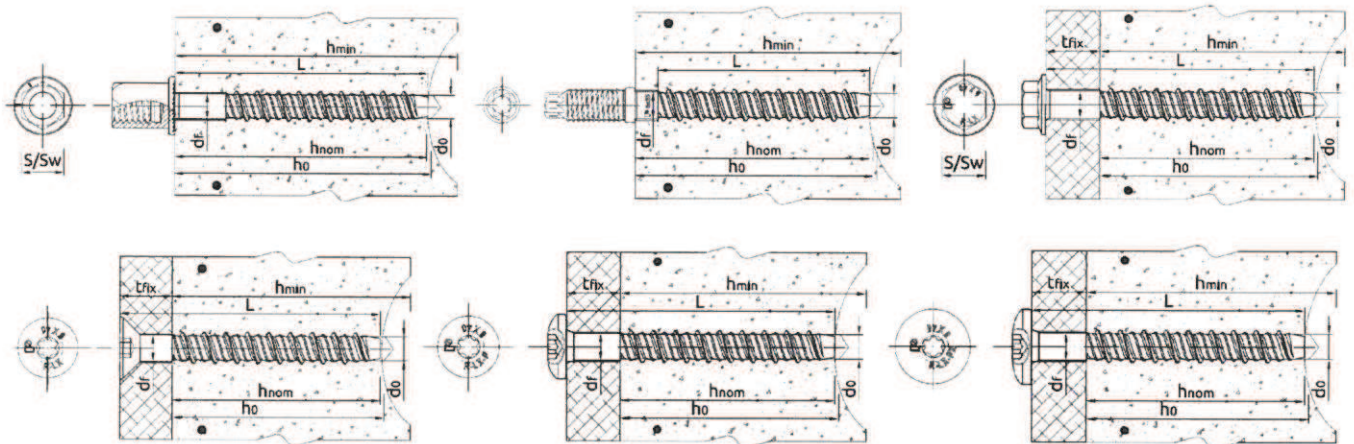
*Real depth of drill hole $h_0 = L + 10 - t_{fix}$ **Table B5:** Minimum spacing and edge distance

Anchor size			R-LX-05	R-LX-06	R-LX-08	R-LX-10	R-LX-14
Minimum edge distance	c_{min}	mm	40	45	50	60	100
Minimum spacing	s_{min}	mm	40	45	50	60	100

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Intended use
Installation parameters – concrete

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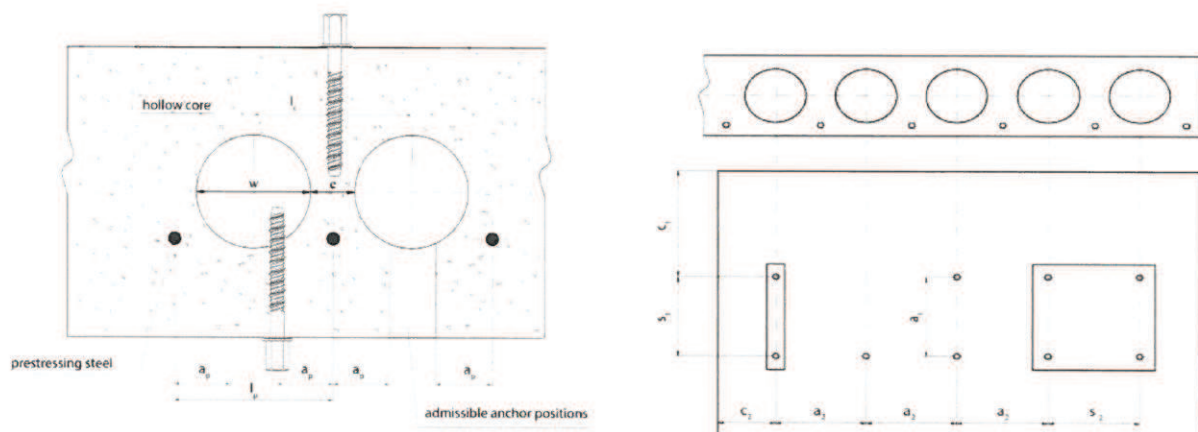


Installed anchor R-LX-I, R-LX-E, R-LX-HF, R-LX-CS, R-LX-P and R-LX-PX (hollow concrete slabs)

Table B6: Installation parameters

Anchor size			R-LX-06
Nominal drill bit diameter	d_0	mm	6
Cutting diameter of drill bit	$d_{cut} \leq$	mm	6,40
Depth of drill hole*	$h_0 \geq$	mm	45
Nominal embedment depth	h_{nom}	mm	35
Effective embedment depth	h_{ef}	mm	24,7
Maximum installation torque	$T_{imp,max}$	Nm	400
Minimum edge distance	c_{min}	mm	50
Minimum spacing	s_{min}	mm	100
Minimum distance between anchor groups	a_{min}	mm	100

*Real depth of drill hole $h_0 = L + 10 - t_{fix}$



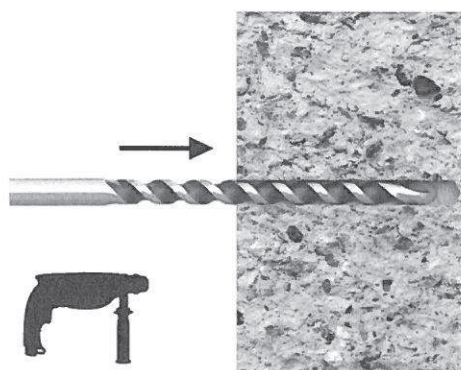
c_1, c_2 - edge distance
 s_1, s_2 - anchor spacing
 a_1, a_2 - distance between anchor groups

Core width / Web thickness	$\leq 4,2$
Core distance	$l_c \geq 100 \text{ mm}$
Prestressing steel	$l_p \geq 100 \text{ mm}$
Distance between anchor position and prestressing steel	$a_p \geq 50 \text{ mm}$

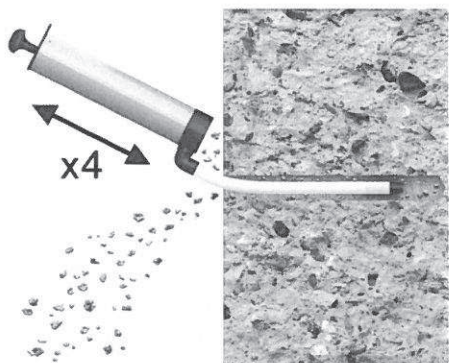
R-LX

Intended use
 Installation parameters – hollow concrete slabs

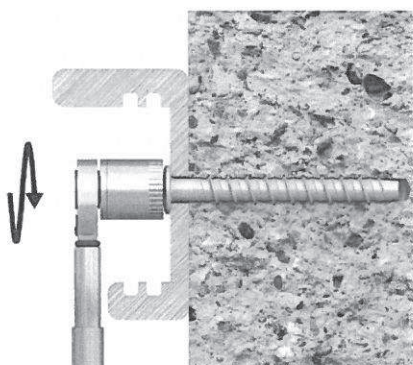
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Drill the hole with rotary hammer drilling machine.
Drill to a required depth.



Clean the drill hole (blow out dust at least 4 times
with a hand pump).



Tighten the anchor to the substrate.
Installation with any torque impact screw driver up
to the maximum torque moment ($T_{imp,max}$).



After installation a further turning of the screw
must not be possible. The head of the screw must
be in contact with the fixture / substrate and is not
damaged.

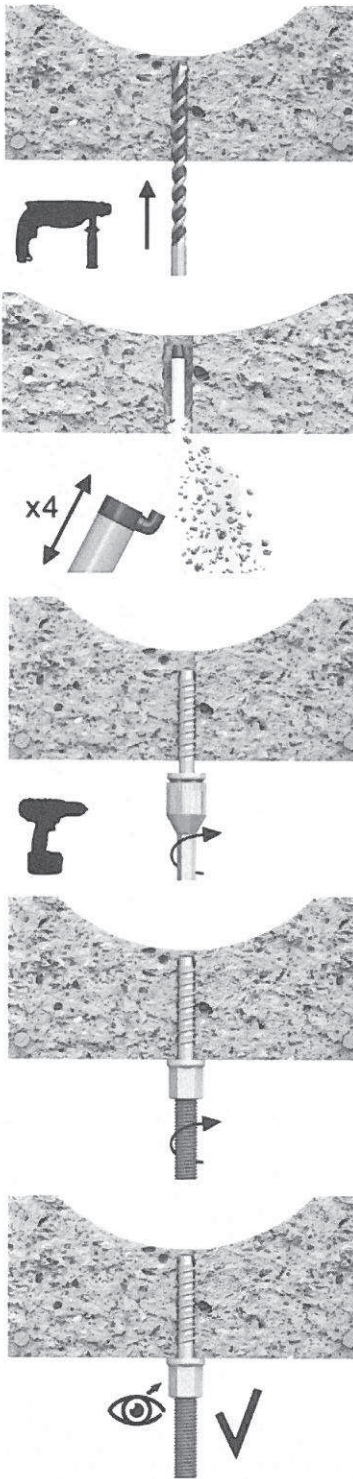
R-LX

Intended use

Installation instruction and tools – concrete –
R-LX-CS, R-LX-E, R-LX-HF, R-LX-I, R-LX-P, R-LX-PX

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Drill the hole with rotary hammer drilling machine. Drill to a required depth.

Clean the drill hole (blow out dust at least 4 times with a hand pump).

Cleaning of drill hole is not necessary in case of:

- drilling vertically upwards or
- drilling vertically downwards and the drill hole depth has been increased. It is recommended to increase the drill hole depth with additional $3 \times d_0$.

Tighten the anchor to the substrate.

Installation with any torque impact screw driver up to the maximum torque moment ($T_{imp,max}$).

Install the fastening element.

After installation a further turning of the screw must not be possible. The head of the screw must be in contact with the fixture / substrate and is not damaged.

R-LX

Intended use

Installation instruction and tools – hollow concrete slabs –
R-LX-CS, R-LX-E, R-LX-HF, R-LX-I, R-LX-P, R-LX-PX

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Table C1: Characteristic values in concrete – standard embedment depth

Anchor			R-LX				
Size			R-LX-05	R-LX-06	R-LX-08	R-LX-10	R-LX-14
Any load directions							
Characteristic resistance in cracked and non-cracked concrete C20/25	F_{Rk}^0	[kN]	5	9	12	20	30
Installation safety factor	γ_{inst}	[-]	1,2	1,0			
Increasing factors for F_{Rk}^0	ψ_c	C30/37	1,08				
		C40/50	1,15				
		C50/60	1,19				
Effective embedment depth	h_{ef}	[mm]	30	42	53	65	92
Spacing	s_{cr}	[mm]	90	126	160	196	276
Edge distance	c_{cr}	[mm]	45	63	80	98	138
Shear load with lever arm							
Characteristic bending moment	$M_{Rk,s}^0$	[Nm]	19,0	31,8	72,4	123,6	329,6
Partial safety factor	$\gamma_{M,s}$	[-]	1,5				

Table C2: Characteristic values in concrete – reduced embedment depth

Anchor			R-LX				
Size			R-LX-05	R-LX-06	R-LX-08	R-LX-10	R-LX-14
Any load directions							
Characteristic resistance in cracked and non-cracked concrete C20/25	F_{Rk}^0	[kN]	3	6	7,5	9	12
Installation safety factor	γ_{inst}	[-]	1,2	1,0			
Increasing factors for F_{Rk}^0	ψ_c	C30/37	1,08				
		C40/50	1,15				
		C50/60	1,19				
Effective embedment depth	h_{ef}	[mm]	17,5	30	37	40	55
Spacing	s_{cr}	[mm]	70	90	120	120	180
Edge distance	c_{cr}	[mm]	35	45	60	60	90
Shear load with lever arm							
Characteristic bending moment	$M_{Rk,s}^0$	[Nm]	19,0	31,8	72,4	123,6	329,6
Partial safety factor	$\gamma_{M,s}$	[-]	1,5				

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Performances
Characteristic resistance - concrete

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Table C3: Characteristic values in concrete - reduced embedment depth

Anchor size			R-LX-06
Any load directions			
Characteristic resistance in cracked and non-cracked concrete C20/25 to C50/60	F_{Rk}^0	[kN]	3
Installation safety factor	γ_{inst}	[-]	1,0
Effective embedment depth	h_{ef}	[mm]	24,7
Spacing	s_{cr}	[mm]	100
Edge distance	c_{cr}	[mm]	50
Shear load with lever arm			
Characteristic bending moment	$M_{Rk,s}^0$	[Nm]	31,8
Partial safety factor	$\gamma_{M,s}$	[-]	1,5

Table C4: Characteristic values in hollow concrete slabs

Anchor size			R-LX-06
Any load directions			
Bottom flange thickness	d_b	[mm]	≥ 35
Characteristic resistance in hollow concrete slabs C30/37	F_{Rk}	[kN]	5
Characteristic resistance in hollow concrete slabs C40/50 to C50/60	F_{Rk}	[kN]	6
Installation safety factor	γ_{inst}	[-]	1,0
Effective embedment depth	h_{ef}	[mm]	24,7
Spacing	s_{cr}	[mm]	100
Edge distance	c_{cr}	[mm]	50
Shear load with lever arm			
Characteristic bending moment	$M_{Rk,s}^0$	[Nm]	31,8
Partial safety factor	$\gamma_{M,s}$	[-]	1,5

R-LX**Performances**

Characteristic resistance – concrete and hollow concrete slabs

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Table C5: Characteristic resistance under fire exposure in concrete C20/25 to C50/60 – **standard** embedment depth

Anchor			R-LX				
Size			R-LX-05	R-LX-06	R-LX-08	R-LX-10	R-LX-14
Effective embedment depth		[mm]	30	42	53	65	92
All load directions							
Characteristic resistance $F_{Rk,fi}$ ¹⁾	R30	[kN]	0,20	0,28	0,75	1,57	3,08
	R60	[kN]	0,18	0,25	0,65	1,18	2,31
	R90	[kN]	0,14	0,20	0,50	1,02	2,00
	R120	[kN]	0,10	0,14	0,40	0,79	1,54
Spacing	$s_{cr,fi}$	[mm]	4 x h_{ef}				
Edge distance	$c_{cr,fi}$	[mm]	2 x h_{ef}				
The design method covers anchors with a fire attack from one side only. In case of fire attack from more than one side, the edge distance shall be ≥ 300 mm.							

¹⁾ in the absence of other national regulations a partial safety factor $\gamma_{M,fi} = 1,0$ is recommended

Table C6: Characteristic resistance under fire exposure in concrete C20/25 to C50/60 – **reduced** embedment depth

Anchor			R-LX				
Size			R-LX-05	R-LX-06	R-LX-08	R-LX-10	R-LX-14
Effective embedment depth		[mm]	17,5	30	37	40	55
All load directions							
Characteristic resistance $F_{Rk,fi}$ ¹⁾	R30	[kN]	-	0,28	0,75	1,57	3,00
	R60	[kN]	-	0,25	0,65	1,18	2,31
	R90	[kN]	-	0,20	0,50	1,02	2,00
	R120	[kN]	-	0,14	0,40	0,79	1,54
Spacing	$s_{cr,fi}$	[mm]	4 x h_{ef}				
Edge distance	$c_{cr,fi}$	[mm]	2 x h_{ef}				
The design method covers anchors with a fire attack from one side only. In case of fire attack from more than one side, the edge distance shall be ≥ 300 mm.							

¹⁾ in the absence of other national regulations a partial safety factor $\gamma_{M,fi} = 1,0$ is recommended

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Performances

Characteristic resistance under fire exposure – concrete

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