R-RBL, R-RBP Rawlbolt®

World's most popular all-purpose expanding shield anchor

Installation movie

Approvals and Reports

- ETA-11/0479; ETAG 001-2, Option 1
  A1 (96/603/EC)


R-RBL


R-RBP

Product information

Features and benefits

- RAWLBOLT® - first ever mechanical anchor in the world, forerunner of all of the later mechanical anchors
- For use in cracked and non-cracked concrete (ETA option 1), hollow-core slabs, flooring blocks and ceramics
- Product recommended for applications requiring fire resistance (up to 120 minutes)
- Three-piece expanding sleeve provides maximum expansion to ensure optimum loads and safety are achieved in various substrates
- Wide range of diameters (M6 to M24)
- Made of 5.8 class carbon steel (EN ISO 4042) with zinc plating not thinner than 5um

Applications

- Roller shutter doors
- Fire doors
- Steelwork
- Security grills
- Machinery
- Pipework/ductwork supports

Base materials

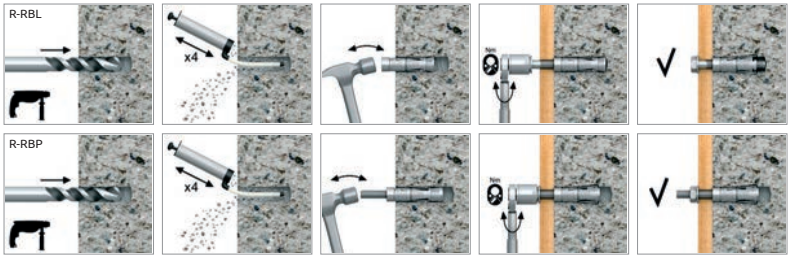
Approved for use in:

- Cracked concrete C20/25-C50/60
- Non-cracked concrete C20/25-C50/60

Also suitable for use in:

- Natural Stone
- Hollow Brick

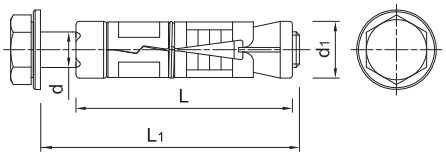
Installation guide



1. Drill a hole of required diameter and depth. Note: When fixing into brickwork. mortar joints should be avoided
2. Clear the hole of drilling dust and debris (using blow pump and brush or equivalent method)
3. Remove pre-assembled bolt and washer. Insert shield into hole and tap home with hammer until flush with surface
4. Insert bolt with washer through fixture into the shield
5. Tighten to the recommended torque

Product information

R-RBL



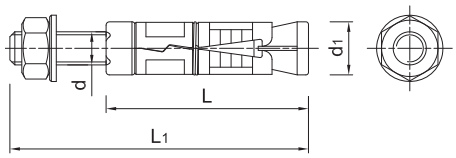
Size	Product Code	Anchor			Fixture		
		Bolt diameter	External diameter	Bolt length	Max. thickness	Min. thickness	Hole diameter
		d	d_1	L_1	t_{fix}		d_f
		[mm]	[mm]	[mm]	[mm]	[mm]	[mm]
M6	R-RBL-M06/10W	6	12	55	10	0	6.5
	R-RBL-M06/25W	6	12	70	25	0	6.5
	R-RBL-M06/40W	6	12	85	40	0	6.5
M8	R-RBL-M08/10W	8	14	65	10	0	9
	R-RBL-M08/25W	8	14	80	25	0	9
	R-RBL-M08/40W	8	14	95	40	0	9
M10	R-RBL-M10/10W	10	16	75	10	0	11
	R-RBL-M10/25W	10	16	90	25	0	11
	R-RBL-M10/50W	10	16	115	50	0	11
	R-RBL-M10/75W	10	16	140	75	0	11
M12	R-RBL-M12/10W	12	20	90	10	0	13
	R-RBL-M12/25W	12	20	105	25	0	13
	R-RBL-M12/40W	12	20	120	40	0	13
	R-RBL-M12/60W	12	20	140	60	0	13

Product information (cont.)

Size	Product Code	Anchor			Fixture		
		Bolt diameter	External diameter	Bolt length	Max. thickness	Min. thickness	Hole diameter
		d	d_1	L_1	t_{fix}		d_f
		[mm]	[mm]	[mm]	[mm]	[mm]	[mm]
M16	R-RBL-M16/15W	16	25	135	15	0	17
	R-RBL-M16/30W	16	25	150	30	10	17
	R-RBL-M16/60W	16	25	180	60	30	17
M20	R-RBL-M20/60W	20	32	195	60	25	22
	R-RBL-M20/100W	20	32	235	110	60	22
M24	R-RBL-M24/100W*	24	38	255	100	25	26
	R-RBL-M24/150W*	24	38	300	150	100	26

*Sizes not included in the approval

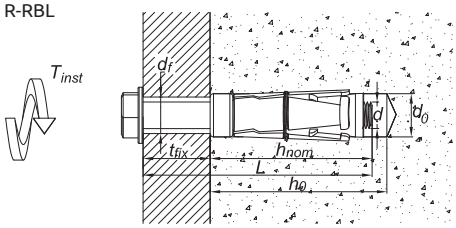
R-RBP



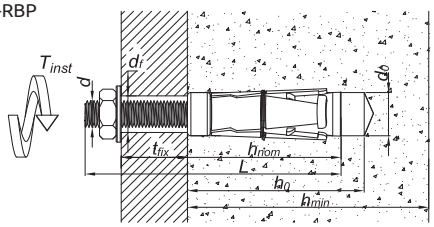
Size	Product Code	Anchor			Fixture		
		Bolt diameter	External diameter	Length	Max. thickness	Min. thickness	Hole diameter
		d	d_1	L_1	t_{fix}		d_f
		[mm]	[mm]	[mm]	[mm]	[mm]	[mm]
M6	R-RBP-M06/10W	6	12	65	10	0	6.5
	R-RBP-M06/25W	6	12	80	25	0	6.5
	R-RBP-M06/60W	6	12	115	60	0	6.5
M8	R-RBP-M08/10W	8	14	75	10	0	9
	R-RBP-M08/25W	8	14	90	25	0	9
	R-RBP-M08/60W	8	14	125	60	0	9
M10	R-RBP-M10/15W	10	16	90	15	0	11
	R-RBP-M10/30W	10	16	105	30	0	11
	R-RBP-M10/60W	10	16	135	60	0	11
M12	R-RBP-M12/15W	12	20	110	15	0	13
	R-RBP-M12/30W	12	20	125	30	0	13
	R-RBP-M12/75W	12	20	170	75	0	13
M16	R-RBP-M16/15W	16	25	150	15	0	17
	R-RBP-M16/35W	16	25	170	35	10	17
	R-RBP-M16/75W	16	25	210	75	35	17
M20	R-RBP-M20/15W	20	32	170	15	0	22
	R-RBP-M20/30W	20	32	185	30	10	22
	R-RBP-M20/100W	20	32	255	100	30	22
M24	R-RBP-M24/75W	24	38	255	75	0	26

Installation data

R-RBL



R-RBP



Size			M6	M8	M10	M12	M16	M20	M24
Thread diameter	d	[mm]	6	8	10	12	16	20	24
Hole diameter in substrate	d_0	[mm]	12	14	16	20	25	32	38
Installation torque	T_{inst}	[Nm]	6.5	15	27	50	120	230	400
Min. hole depth in substrate	h_0	[mm]	50	55	65	85	125	140	160
Installation depth	h_{nom}	[mm]	45	50	60	80	120	135	155
Min. substrate thickness	h_{min}	[mm]	100				142.5	172.5	240
Min. spacing	s_{min}	[mm]	35	40	50	60	95	115	210
Min. edge distance	c_{min}	[mm]	53	60	75	90	143	173	188

Mechanical properties

Size			M6	M8	M10	M12	M16	M20	M24
Nominal ultimate tensile strength - tension	f_{uk}	[N/mm²]	500	500	500	500	500	500	500
Nominal yield strength - tension	f_{yk}	[N/mm²]	400	400	400	400	400	400	400
Cross sectional area - tension	A_s	[mm²]	20.1	36.6	58.0	84.3	157.0	245.0	353.0
Elastic section modulus	W_{el}	[mm³]	12.7	31.2	62.3	109.2	277.5	540.9	935.5
Characteristic bending resistance	$M^0_{Rk,s}$	[Nm]	7.60	19.0	37.0	66.0	166.0	325.0	561.0
Design bending resistance	M	[Nm]	6.10	15.0	30.0	52.0	133.0	260.0	449.0

Basic performance data

Performance data for single anchor without influence of edge distance and spacing

Size		M6	M8	M10	M12	M16	M20	M24
Embedment depth h_{ef}	[mm]	35	40	50	60	95	115	125
MEAN ULTIMATE LOAD								
TENSION LOAD $N_{Ru,m}$								
NON-CRACKED CONCRETE	[kN]	6.36	8.35	15.2	18.4	48.8	56.6	94.3
CRACKED CONCRETE	[kN]	4.06	5.31	7.12	12.0	18.2	34.2	-
SHEAR LOAD $V_{Ru,m}$								
NON-CRACKED CONCRETE	[kN]	6.04	11.0	17.4	25.3	47.1	73.5	105.9
CRACKED CONCRETE	[kN]	6.04	11.0	17.4	25.3	47.1	73.5	-
CHARACTERISTIC LOAD								
TENSION LOAD N_{Rk}								
NON-CRACKED CONCRETE	[kN]	6.00	7.50	12.0	16.0	40.0	50.0	70.0
CRACKED CONCRETE	[kN]	4.00	5.00	6.00	12.0	16.0	30.0	-
SHEAR LOAD V_{Rk}								
NON-CRACKED CONCRETE	[kN]	5.03	7.50	12.0	21.1	39.3	61.2	88.3
CRACKED CONCRETE	[kN]	4.00	5.00	6.00	21.1	32.0	60.0	-
DESIGN LOAD								
TENSION LOAD N_{Rd}								
NON-CRACKED CONCRETE	[kN]	3.33	4.17	6.67	8.89	22.2	27.8	38.9
CRACKED CONCRETE	[kN]	2.22	2.78	3.33	6.67	8.89	16.7	-
SHEAR LOAD V_{Rd}								
NON-CRACKED CONCRETE	[kN]	3.33	4.17	6.67	16.9	31.4	49.0	70.6
CRACKED CONCRETE	[kN]	2.22	2.78	3.3	13.3	17.8	33.3	-
RECOMMENDED LOAD								
TENSION LOAD N_{rec}								
NON-CRACKED CONCRETE	[kN]	2.38	2.98	4.76	6.35	15.9	19.8	27.8
CRACKED CONCRETE	[kN]	1.59	1.99	2.38	4.76	6.35	11.9	-
SHEAR LOAD V_{rec}								
NON-CRACKED CONCRETE	[kN]	2.38	2.98	4.76	12.1	22.4	35.0	50.4
CRACKED CONCRETE	[kN]	1.59	1.99	2.38	9.52	12.7	23.8	-

Design performance data

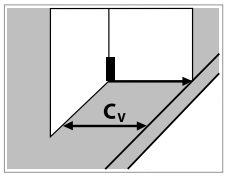
Size			M6	M8	M10	M12	M16	M20	M24
Embedment depth	h_{ef}	[mm]	35	40	50	60	95	115	125
TENSION LOAD									
STEEL FAILURE									
Characteristic resistance	$N_{Rk,s}$	[kN]	10.05	18.3	29	42.15	78.5	122.5	176.5
Design resistance γ_{Ms}= 1.5	$N_{Rd,s}$	[kN]	6.7	12.2	19.33	28.1	52.33	81.67	117.6
PULL-OUT FAILURE; NON-CRACKED CONCRETE C20/25									
Characteristic resistance	$N_{Rk,p}$	[kN]	6	7.5	12	16	40	50	70
Design resistance γ_{Mp}= 1.8	$N_{Rd,p}$	[kN]	3.33	4.17	6.67	8.89	22.22	27.78	38.9
PULL-OUT FAILURE; CRACKED CONCRETE C20/25									
Characteristic resistance	$N_{Rk,p}$	[kN]	4	5	6	12	16	30	-
Design resistance γ_{Mp}= 1.8	$N_{Rd,p}$	[kN]	2.22	2.78	3.33	6.67	8.89	16.67	-
Spacing	$s_{cr,N}$	[mm]	105	120	150	180	285	345	375
Edge distance	$c_{cr,N}$	[mm]	53	60	75	90	143	173	188
SHEAR LOAD									
CONCRETE EDGE FAILURE; NON-CRACKED CONCRETE C20/25									
Edge distance	c_1	[mm]	53	60	75	90	143	173	-
Characteristic resistance for c_1	$V_{Rk,c}$	[kN]	7.38	9.11	13.03	17.72	36.78	50.82	58.89
Design resistance γ_{Mc}= 1.8	$V_{Rd,c}$	[kN]	4.1	5.06	7.24	9.84	20.44	28.23	32.72
CONCRETE EDGE FAILURE; CRACKED CONCRETE C20/25									
Edge distance	c_1	[mm]	53	60	75	90	143	173	188
Characteristic resistance for c_1	$V_{Rk,c}$	[kN]	5.16	6.46	9.23	12.55	25.94	35.86	-
Design resistance γ_{Mc}= 1.8	$V_{Rd,c}$	[kN]	2.87	3.59	5.13	6.97	14.41	19.92	-

Design performance data (cont.)

Size			M6	M8	M10	M12	M16	M20	M24
CONCRETE PRY-OUT FAILURE; NON-CRACKED CONCRETE C20/25									
	k	-	1	1	1	2	2	2	2
Characteristic resistance	$V_{Rk,cp}$	[kN]	6	7.5	12	32	80	100	140
Design resistance γ_{Mc}= 1.8	$V_{Rd,cp}$	[kN]	3.33	4.17	6.67	17.78	44.44	55.56	77.78
CONCRETE PRY-OUT FAILURE; CRACKED CONCRETE C20/25									
	k	-	1	1	1	2	2	2	2
Characteristic resistance	$V_{Rk,cp}$	[kN]	4	5	6	24	32	60	-
Design resistance γ_{Mc}= 1.8	$V_{Rd,cp}$	[kN]	2.22	2.78	3.33	13.33	17.78	33.33	-
STEEL FAILURE									
Characteristic resistance without lever arm	$V_{Rk,s}$	[kN]	5.03	9.15	14.5	21.08	39.25	61.25	88.3
Design resistance γ_{Ms}= 1.25	$V_{Rd,s}$	[kN]	4.02	7.32	11.6	16.86	31.4	49	70.6

Reduction / increasing resistance factors for edge distance and spacing

Edge distance (shear)



Tables only valid for one edge $>c_{min}$ and $s \geq 3c_V$ For other cases use the Rawl-plug Anchor Calculator

Increasing factors for edge distance $>C_{min}$ applicable to $V_{Rd,c}$ for non-cracked concrete from „Design Performance" table

C_V [mm]	M6		M8		M10		M12		M16		M20		M24	
	$h \geq 1.5c_V$	h_{min}	$h \geq 1.5c_V$	h_{min}	$h \geq 1.5c_V$	h_{min}	$h \geq 1.5c_V$	h_{min}	$h \geq 1.5c_V$	h_{min}	$h \geq 1.5c_V$	h_{min}	$h \geq 1.5c_V$	h_{min}
55	0.81	0.81												
60			0.82	0.82										
75					0.92	0.92								
90							1.00	0.86						
100							1.15	0.94						
135							1.72	1.21						
145								1.28	1.00	0.82				
160								1.39	1.16	0.89				
175								1.50	1.30	0.96	1.00	0.82		
190								1.61	1.45	1.03	1.13	0.88	1.00	0.82
200								1.69	1.56	1.07	1.21	0.92	1.09	0.86
240										1.25	1.53	1.06	1.38	0.99
265										1.36	1.75	1.15	1.57	1.08
305										1.53		1.29	1.88	1.21
350												1.45		1.35
430												1.73		1.60
550														1.98

Increasing factors for edge distance $>C_{min}$ applicable to $V_{Rd,c}$ for cracked concrete from „Design Performance" table.

C_V [mm]	M6		M8		M10		M12		M16		M20	
	$h \geq 1.5c_V$	h_{min}	$h \geq 1.5c_V$	h_{min}	$h \geq 1.5c_V$	h_{min}	$h \geq 1.5c_V$	h_{min}	$h \geq 1.5c_V$	h_{min}	$h \geq 1.5c_V$	h_{min}
55	0.78	0.78										
60			0.77	0.77								
75					0.65	0.65						
90							1.00	0.86				
100							1.15	0.94				
145							1.89	1.28	1.02	0.83		
165								1.43	1.21	0.92		
175								1.50		0.96	1.02	0.83
200								1.69		1.08	1.21	0.92
230								1.91		1.21	1.45	1.03
255											1.67	1.12
340												1.42
380												1.56
410												1.66

Design performance data (cont.)

Edge distance (tension)

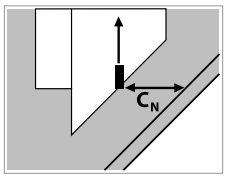


Table only valid for one edge $<C_{cr,N}$ and $S \geq S_{cr,N}$ For other cases use the Rawlplug Anchor Calculator

Reduction factors for edge distance $<C_{cr,N}$ applicable to N_{Rd} or N_{rec} for cracked and non-cracked concrete from „Basic Performance" table

C_N [mm]	M6		M8		M10		M12		M16		M20		M24	
	h≥ $1.84h_{min}$	h_{min}	h≥ $1.84h_{min}$	h_{min}	h≥ $1.84h_{min}$	h_{min}	h≥ $1.84h_{min}$	h_{min}	h≥ $1.84h_{min}$	h_{min}	h≥ $1.84h_{min}$	h_{min}	h≥ $1.84h_{min}$	h_{min}
55	1.0	1.0												
60			1.0	1.0										
75					1.0	1.0								
90							1.0	1.0						
145									1.0	1.0				
175											1.0	1.0		
190													1.0	1.0

Spacing

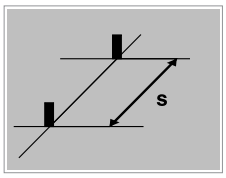


Table only valid for one spacing $<s_{cr,N}$ and $c \geq c_{cr,N}$ For other cases use the Rawlplug Anchor Calculator

Reduction factors for spacing $<S_{cr,N}$ applicable to N_{Rd} / V_{Rd} or N_{rec} / V_{rec} for non-cracked concrete from „Basic Performance" table

s [mm]	M6		M8		M10		M12		M16		M20		M24	
	h≥ $1.84h_{min}$	h_{min}	h≥ $1.84h_{min}$	h_{min}	h≥ $1.84h_{min}$	h_{min}	h≥ $1.84h_{min}$	h_{min}	h≥ $1.84h_{min}$	h_{min}	h≥ $1.84h_{min}$	h_{min}	h≥ $1.84h_{min}$	h_{min}
35	0.67	0.67												
40	0.69	0.69	0.67	0.67										
50	0.74	0.74	0.71	0.71	0.67	0.67								
60	0.79	0.79	0.75	0.75	0.70	0.70	0.67	0.67						
80	0.88	0.88	0.83	0.83	0.77	0.77	0.72	0.72						
95	0.95	0.95	0.90	0.90	0.82	0.82	0.76	0.76	0.67	0.67				
100	0.98	0.98	0.92	0.92	0.83	0.83	0.78	0.78	0.68	0.68				
105	1.00	1.00	0.94	0.94	0.85	0.85	0.79	0.79	0.68	0.68				
115			0.98	0.98	0.88	0.88	0.82	0.82	0.70	0.70	0.67	0.67		
120			1.00	1.00	0.90	0.90	0.83	0.83	0.71	0.71	0.67	0.67		
150					1.00	1.00	0.92	0.92	0.76	0.76	0.72	0.72	0.70	0.70
180							1.00	1.00	0.82	0.82	0.76	0.76	0.74	0.74
200									0.85	0.85	0.79	0.79	0.77	0.77
220									0.89	0.89	0.82	0.82	0.79	0.79
250									0.94	0.94	0.86	0.86	0.83	0.83
285									1.00	1.00	0.91	0.91	0.88	0.88
300											0.93	0.93	0.90	0.90
345											1.00	1.00	0.96	0.96
375													1.00	1.00

Reduction factors for spacing $<S_{cr,N}$ applicable to N_{Rd} / V_{Rd} or N_{rec} / V_{rec} for cracked concrete from „Basic Performance" table

s [mm]	M6		M8		M10		M12		M16		M20	
	h≥1.84h_{min}	h_{min}	h≥1.84h_{min}	h_{min}	h≥1.84h_{min}	h_{min}	h≥1.84h_{min}	h_{min}	h≥1.84h_{min}	h_{min}	h≥1.84h_{min}	h_{min}
35	0.67	0.67										
40	0.69	0.69	0.67	0.67								
50	0.74	0.74	0.71	0.71	0.67	0.67						
60	0.79	0.79	0.75	0.75	0.70	0.70	0.67	0.67				
80	0.88	0.88	0.83	0.83	0.77	0.77	0.72	0.72				
95	0.95	0.95	0.90	0.90	0.82	0.82	0.76	0.76	0.67	0.67		
100	0.98	0.98	0.92	0.92	0.83	0.83	0.78	0.78	0.68	0.68		
105	1.00	1.00	0.94	0.94	0.85	0.85	0.79	0.79	0.68	0.68		
115			0.98	0.98	0.88	0.88	0.82	0.82	0.70	0.70	0.67	0.67
120			1.00	1.00	0.90	0.90	0.83	0.83	0.71	0.71	0.67	0.67
140					0.97	0.97	0.89	0.89	0.75	0.75	0.70	0.70
150					1.00	1.00	0.92	0.92	0.76	0.76	0.72	0.72
180							1.00	1.00	0.82	0.82	0.76	0.76
200									0.85	0.85	0.79	0.79
285									1.00	1.00	0.91	0.91
300											0.93	0.93
345											1.00	1.00

Design performance data (cont.)

Resistance to tension and shear loads under fire exposure

Size			M6	M8	M10	M12	M16	M20
R (for EI) = 30 min								
TENSION LOAD								
STEEL FAILURE								
Characteristic resistance	$N_{Rk,s}$	[kN]	0.2	0.4	0.9	1.7	3.1	4.9
PULL-OUT FAILURE								
Characteristic resistance	$N_{Rk,p}$	[kN]	1	1.3	1.5	3	4	7.5
CONCRETE CONE FAILURE								
Characteristic resistance	$N_{Rk,c}$	[kN]	1.3	1.8	3.2	5	15.7	25.4
SHEAR LOAD								
STEEL FAILURE								
Characteristic resistance without lever arm	$V_{Rk,s}$	[kN]	0.2	0.4	0.9	1.7	3.1	4.9
Characteristic resistance with lever arm	$M_{Rk,s}$	[kN]	0.2	0.4	1.1	2.6	6.7	13
R (for EI) = 60 min								
TENSION LOAD								
STEEL FAILURE								
Characteristic resistance	$N_{Rk,s}$	[kN]	0.2	0.3	0.8	1.3	2.4	3.7
PULL-OUT FAILURE								
Characteristic resistance	$N_{Rk,p}$	[kN]	1	1.3	1.5	3	4	7.5
CONCRETE CONE FAILURE								
Characteristic resistance	$N_{Rk,c}$	[kN]	1.3	1.8	3.2	5	15.7	25.4
SHEAR LOAD								
STEEL FAILURE								
Characteristic resistance without lever arm	$V_{Rk,s}$	[kN]	0.2	0.3	0.8	1.3	2.4	3.7
Characteristic resistance with lever arm	$M_{Rk,s}$	[kN]	0.1	0.3	1	2	5	9.7
R (for EI) = 90 min								
TENSION LOAD								
STEEL FAILURE								
Characteristic resistance	$N_{Rk,s}$	[kN]	0.1	0.3	0.6	1.1	2	3.2
PULL-OUT FAILURE								
Characteristic resistance	$N_{Rk,p}$	[kN]	1	1.3	1.5	3	4	7.5
CONCRETE CONE FAILURE								
Characteristic resistance	$N_{Rk,c}$	[kN]	1.3	1.8	3.2	5	15.7	25.4
SHEAR LOAD								
STEEL FAILURE								
Characteristic resistance without lever arm	$V_{Rk,s}$	[kN]	0.1	0.3	0.6	1.1	2	3.2
Characteristic resistance with lever arm	$M_{Rk,s}$	[kN]	0.1	0.3	0.7	1.7	4.3	8.4
R (for EI) = 120 min								
TENSION LOAD								
STEEL FAILURE								
Characteristic resistance	$N_{Rk,s}$	[kN]	0.1	0.2	0.5	0.8	1.6	2.5
PULL-OUT FAILURE								
Characteristic resistance	$N_{Rk,p}$	[kN]	1	1.3	1.5	3	4	7.5
CONCRETE CONE FAILURE								
Characteristic resistance	$N_{Rk,c}$	[kN]	1	1.4	2.5	4	12.6	20.3
SHEAR LOAD								
STEEL FAILURE								
Characteristic resistance without lever arm	$V_{Rk,s}$	[kN]	0.1	0.2	0.5	0.8	1.6	2.5
Characteristic resistance with lever arm	$M_{Rk,s}$	[kN]	0.1	0.2	0.6	1.3	3.3	6.5

R-RBL-E, R-RBL-H, R-RB Rawlbolt®

World's most popular all-purpose expanding shield anchor

Installation movie

Approvals and Reports

- A1 (96/603/EC)

R-RB

R-RBL-E

R-RBL-H

Product information

Features and benefits

- Eyebolt and hook designed & manufactured for maximum performance
- Product recommended for applications requiring fire resistance
- Three-piece expanding sleeve provides maximum expansion to ensure optimum loads and safety are achieved in various substrates
- Hook and Eye Rawlbolts are not suitable for fall arrest systems or shock loading
- Made of 5.8 class carbon steel (EN ISO 4042) with zinc plating not thinner than 5um

Applications

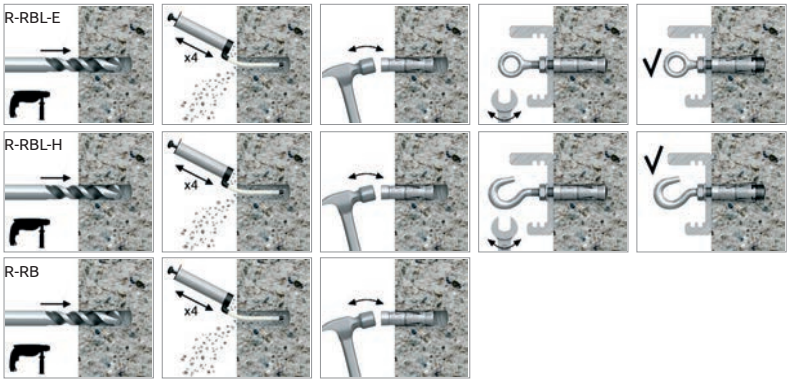
- Supporting guy ropes, stays and cables
- Supporting ladder restraints

Base materials

Approved for use in:

- Concrete

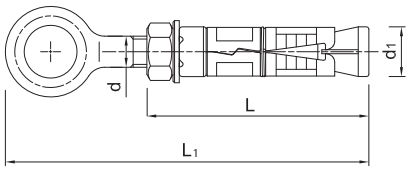
Installation guide



1. Drill a hole of required diameter and depth. Note: When fixing into brickwork, mortar joints should be avoided
2. Clear the hole of drilling dust and debris (using blow pump and brush or equivalent method)
3. Insert the anchor (tap home until flush with surface) and position eye/hook accordingly
4. Tighten to recommended torque, using the hex nut (not the eye/hook)

Product information

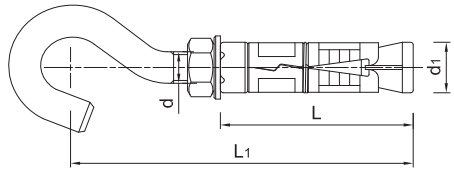
R-RBL-E



Size	Product Code	Anchor		
		Bolt diameter	External diameter	Length
		d	d_1	L_1
		[mm]	[mm]	[mm]
M6	R-RBL-06EW	6	12	73
M8	R-RBL-08EW	8	14	87
M10	R-RBL-10EW	10	16	108
M12	R-RBL-12EW	12	20	130

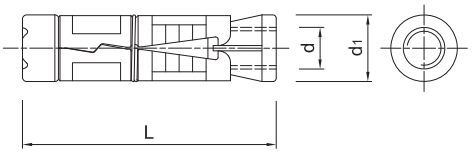
Product information (cont.)

R-RBL-H



Size	Product Code	Anchor		
		Bolt diameter	External diameter	Length
		d	d_1	L_1
		[mm]	[mm]	[mm]
M6	R-RBL-06HW	6	12	83
M8	R-RBL-08HW	8	14	98
M10	R-RBL-10HW	10	16	120
M12	R-RBL-12HW	12	20	145

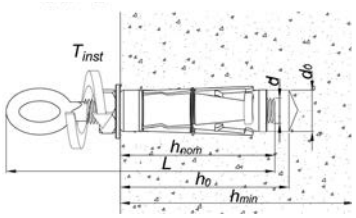
R-RB



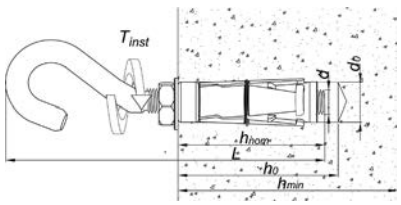
Size	Product Code	Anchor			Fixture
		Thread diameter	External diameter	Length	Hole diameter
		d	d_1	L	d_f
		[mm]	[mm]	[mm]	[mm]
M6	R-RB-M06W	6	12	45	6.5
M8	R-RB-M08W	8	14	50	9
M10	R-RB-M10W	10	16	60	11
M12	R-RB-M12W	12	20	75	13
M16	R-RB-M16W	16	25	115	17
M20	R-RB-M20W	20	32	130	22
M24	R-RB-M24W	24	38	150	26

Installation data

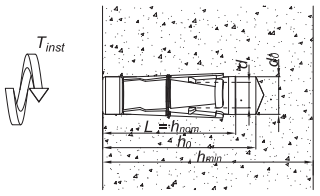
R-RBL-E



R-RBP-H



R-RB



Size			M6	M8	M10	M12	M16	M20	M24
Thread diameter	d	[mm]	6	8	10	12	16	20	24
Hole diameter in substrate	d_0	[mm]	12	14	16	20	25	32	38
Installation torque	T_{inst}	[Nm]	6.5	15	27	50	120	230	400
Min. hole depth in substrate	h_0	[mm]	50	55	65	85	125	140	160
Installation depth	h_{nom}	[mm]	45	50	60	80	120	135	155
Min. substrate thickness	h_{min}	[mm]	100				142.5	172.5	240
Min. spacing	s_{min}	[mm]	35	40	50	60	95	115	210
Min. edge distance	c_{min}	[mm]	53	60	75	90	143	173	188