

## R-RBP Rawlbolt® - Bolt Projecting for use in hollow core slab and ceramic substrates

World's most popular all-purpose expanding shield anchor - bolt projecting version



### 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
- Three-pieces expanding sleeve of maximum expansion provides optimal load and safety of use in any substrate
- Wide range of diameters (M6 to M20)

#### Applications

- Roller shutter doors
- Fire doors
- Steelwork
- Security grills
- Heavy machinery
- Pipework/duct work support

#### Base materials

##### Approved for use in:

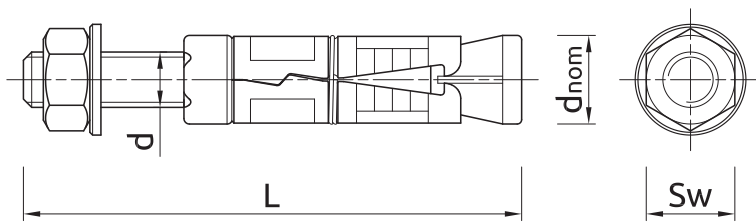
- Solid clay brick  $\geq 20\text{MPa}$
- Hollow Lightweight Concrete Block LAC 5  $\geq 5\text{MPa}$
- Hollow Sand-lime Brick  $\geq 15\text{MPa}$
- Concrete hollow floor block (eg. Teriva)
- Hollow-core Slab C20/25
- Hollow-core Slab C30/37-C50/60

### Installation guide



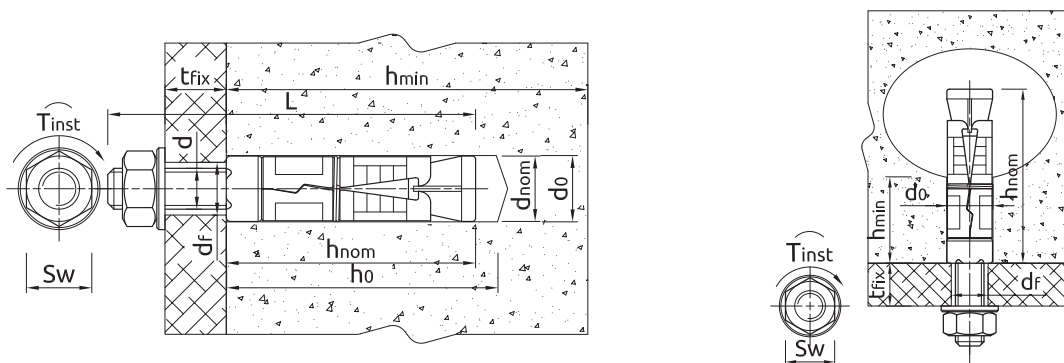
1. Drill a hole of required diameter and depth
2. Remove nut and washer and insert anchor into hole. Tap home with hammer until flush with surface
3. Position fixture over the projecting bolt
4. Add washer and nut and tighten to recommended torque

Product information



Size	Product Code	Anchor			Fixture		Approval type
		Diameter	External diameter	Length	Max. thickness	Hole diameter	
		$d$ [mm]	$d_{nom}$ [mm]	$L$ [mm]	$t_{fix}$ [mm]	$d_f$ [mm]	
M6	R-RBP-M06/10W	6	12	65	10	6,5	-
	R-RBP-M06/25W	6	12	80	25	6,5	-
	R-RBP-M06/60W	6	12	115	60	6,5	-
M8	R-RBP-M08/10W	8	14	75	10	9	-
	R-RBP-M08/25W	8	14	90	25	9	-
	R-RBP-M08/60W	8	14	125	60	9	-
M10	R-RBP-M10/15W	10	16	90	15	11	-
	R-RBP-M10/30W	10	16	105	30	11	-
	R-RBP-M10/60W	10	16	135	60	11	-
M12	R-RBP-M12/15W	12	20	110	15	13	-
	R-RBP-M12/30W	12	20	125	30	13	-
	R-RBP-M12/75W	12	20	170	75	13	-
M16	R-RBP-M16/15W	16	25	150	15	17	-
	R-RBP-M16/35W	16	25	170	35	17	-
	R-RBP-M16/75W	16	25	210	75	17	-
M20	R-RBP-M20/15W	20	32	170	15	22	-
	R-RBP-M20/30W	20	32	185	30	22	-
	R-RBP-M20/100W	20	32	255	100	22	-
M24	R-RBP-M24/75W	24	38	255	75	26	-

Installation data



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
Min. installation depth	$h_{nom}$	[mm]	45	50	60	80	120	135	155
Min. hole depth in substrate	$h_0$	[mm]	50	55	65	85	125	140	160
Wrench size	$Sw$	[mm]	10	13	17	19	24	30	36

## Installation data

Size			M6	M8	M10	M12	M16	M20	M24
<b>SOLID SUBSTRATES</b>									
Installation torque	$T_{inst}$	[Nm]	6.5	15	27	50	120	230	-
Min. substrate thickness	$h_{min}$	[mm]	100	100	100	100	142	172	-
Min. spacing	$s_{min}$	[mm]	35	40	50	60	95	115	-
Min. edge distance	$c_{min}$	[mm]	53	60	75	90	143	173	-
<b>CERAMIC AND HOLLOW SUBSTRATES</b>									
Installation torque	$T_{inst}$	[Nm]	3	5	8	10	15	20	-
Min. spacing	$s_{min}$	[mm]	100	100	100	100	100	115	-
Min. edge distance	$c_{min}$	[mm]	100	100	100	100	143	173	-
Installation torque	$T_{inst}$	[Nm]	-	-	-	-	-	-	400
Min. substrate thickness	$h_{min}$	[mm]	-	-	-	-	-	-	240
Min. spacing	$s_{min}$	[mm]	-	-	-	-	-	-	210
Min. edge distance	$c_{min}$	[mm]	-	-	-	-	-	-	188

## Mechanical properties

Size			M6	M8	M10	M12	M16	M20	M24
Nominal ultimate tensile strength - tension	$f_{uk}$	[N/mm <sup>2</sup> ]	500	500	500	500	500	500	500
Nominal yield strength - tension	$f_{yk}$	[N/mm <sup>2</sup> ]	400	400	400	400	400	400	400
Cross sectional area - tension	$A_s$	[mm <sup>2</sup> ]	20.1	36.6	58	84.3	157	245	353
Elastic section modulus	$W_{el}$	[mm <sup>3</sup> ]	21.21	50.27	98.17	169.65	402.12	785.4	1357.17
Characteristic bending resistance	$M^0_{Rk,s}$	[Nm]	12.72	30.16	58.9	101.79	241.27	471.24	814.3
Design bending resistance	M	[Nm]	10.18	24.13	47.12	81.43	193.02	376.99	651.44

## Basic performance data

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

Size		M24
<b>NON-CRACKED CONCRETE</b>		
Effective embedment depth $h_{ef}$	[mm]	125.00
<b>CRACKED CONCRETE</b>		
Effective embedment depth $h_{ef}$	[mm]	125.00
<b>MEAN ULTIMATE LOAD</b>		
<b>TENSION LOAD <math>N_{Ru,m}</math></b>		
NON-CRACKED CONCRETE	[kN]	94.33
CRACKED CONCRETE	[kN]	66.38
<b>SHEAR LOAD <math>V_{Ru,m}</math></b>		
NON-CRACKED CONCRETE	[kN]	97.13
CRACKED CONCRETE	[kN]	97.13
<b>CHARACTERISTIC LOAD</b>		
<b>TENSION LOAD <math>N_{Rk}</math></b>		
NON-CRACKED CONCRETE	[kN]	68.75
CRACKED CONCRETE	[kN]	48.13
<b>SHEAR LOAD <math>V_{Rk}</math></b>		
NON-CRACKED CONCRETE	[kN]	88.30
CRACKED CONCRETE	[kN]	88.30

## Basic performance data

Size		M24	
<b>DESIGN LOAD</b>			
<b>TENSION LOAD <math>N_{Rd}</math></b>			
NON-CRACKED CONCRETE	[kN]	32.74	
CRACKED CONCRETE	[kN]	22.92	
<b>SHEAR LOAD <math>V_{Rd}</math></b>			
NON-CRACKED CONCRETE	[kN]	70.64	
CRACKED CONCRETE	[kN]	64.17	

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

Size		M6	M8	M10	M12	M16	M20
<b>CHARACTERISTIC LOAD</b>							
<b>TENSION LOAD <math>N_{Rk}</math></b>							
<b>Hollow core slab min. C20/25</b>							
Wall thickness	Material class	[kN]					
23	C30/37	[kN]	4.00	4.50	-	-	-
	C35/45	[kN]	2.00	4.50	-	-	-
	C45/55	[kN]	2.00	4.50	-	-	-
	C50/60	[kN]	2.00	4.50	-	-	-
35	C30/37	[kN]	6.50	11.00	16.00	-	-
	C35/45	[kN]	7.00	12.00	17.00	-	-
	C45/55	[kN]	8.00	14.00	19.00	-	-
	C50/60	[kN]	8.50	15.00	20.00	-	-
40	C30/37	[kN]	7.00	16.00	19.00	24.00	-
	C35/45	[kN]	8.00	18.00	20.00	28.00	-
	C45/55	[kN]	8.50	20.00	22.00	30.00	-
	C50/60	[kN]	9.50	22.00	24.00	32.00	-
50	C20/25	[kN]	8.00	8.50	8.50	8.50	8.50
<b>Beam-and-block floor (eg.Terriva 4.0/2), min. 25mm wall thickness</b>		[kN]	1.20	2.00	-	-	-
<b>Lightweight concrete LAC class 5</b>		[kN]	5.50	5.50	5.50	5.50	-
<b>Solid clay brick class 20</b>		[kN]	6.00	6.00	6.00	6.00	-
<b>Silicate hollow block class 15</b>		[kN]	1.50	-	-	-	-
<b>SHEAR LOAD <math>V_{Rk}</math></b>							
<b>Hollow core slab min. C20/25</b>							
Wall thickness	Material class	[kN]					
23	C30/37	[kN]	4.00	4.50	-	-	-
	C35/45	[kN]	2.00	4.50	-	-	-
	C45/55	[kN]	2.00	4.50	-	-	-
	C50/60	[kN]	2.00	4.50	-	-	-
35	C30/37	[kN]	5.00	9.00	14.00	-	-
	C35/45	[kN]	5.00	9.00	14.00	-	-
	C45/55	[kN]	5.00	9.00	14.00	-	-
	C50/60	[kN]	5.00	9.00	14.00	-	-
40	C30/37	[kN]	5.00	9.00	14.00	20.00	-
	C35/45	[kN]	5.00	9.00	14.00	20.00	-
	C45/55	[kN]	5.00	9.00	14.00	20.00	-
	C50/60	[kN]	5.00	9.00	14.00	20.00	-
50	C20/25	[kN]	5.00	8.50	8.50	8.50	8.50
<b>Beam-and-block floor (eg.Terriva 4.0/2), min. 25mm wall thickness</b>		[kN]	1.20	2.00	-	-	-
<b>Lightweight concrete LAC class 5</b>		[kN]	5.00	5.50	5.50	5.50	-
<b>Solid clay brick class 20</b>		[kN]	5.00	6.00	6.00	6.00	-
<b>Silicate hollow block class 15</b>		[kN]	1.50	-	-	-	-

## Basic performance data

Size			M6	M8	M10	M12	M16	M20
<b>DESIGN LOAD</b>								
<b>TENSION LOAD <math>N_{Rd}</math></b>								
<b>Hollow core slab min. C20/25</b>								
Wall thickness	Material class							
23	C30/37	[kN]	2.20	2.50	-	-	-	-
	C35/45	[kN]	1.10	2.50	-	-	-	-
	C45/55	[kN]	1.10	2.50	-	-	-	-
	C50/60	[kN]	1.10	2.50	-	-	-	-
35	C30/37	[kN]	3.60	6.10	8.90	-	-	-
	C35/45	[kN]	3.90	6.70	9.40	-	-	-
	C45/55	[kN]	4.40	7.80	10.60	-	-	-
	C50/60	[kN]	4.70	8.30	11.10	-	-	-
40	C30/37	[kN]	3.90	8.90	10.60	13.30	-	-
	C35/45	[kN]	4.40	10.00	11.10	15.60	-	-
	C45/55	[kN]	4.70	11.10	12.20	16.70	-	-
	C50/60	[kN]	5.30	12.20	13.30	17.80	-	-
50	C20/25	[kN]	4.40	4.70	4.70	4.70	4.70	4.70
<b>Beam-and-block floor (eg.Terriva 4.0/2), min. 25mm wall thickness</b>		[kN]	0.70	1.10	-	-	-	-
<b>Lightweight concrete LAC class 5</b>		[kN]	2.00	2.20	2.20	2.20	-	-
<b>[English]: Cegła ceramiczna pełna 20MPa</b>		[kN]	2.00	2.40	2.40	2.40	-	-
<b>Silicate hollow block class 15</b>		[kN]	0.60	-	-	-	-	-
<b>SHEAR LOAD <math>V_{Rd}</math></b>								
<b>Hollow core slab min. C20/25</b>								
Wall thickness	Material class							
23	C30/37	[kN]	3.20	3.60	-	-	-	-
	C35/45	[kN]	1.60	3.60	-	-	-	-
	C45/55	[kN]	1.60	3.60	-	-	-	-
	C50/60	[kN]	1.60	3.60	-	-	-	-
35	C30/37	[kN]	4.00	7.20	11.20	-	-	-
	C35/45	[kN]	4.00	7.20	11.20	-	-	-
	C45/55	[kN]	4.00	7.20	11.20	-	-	-
	C50/60	[kN]	4.00	7.20	11.20	-	-	-
40	C30/37	[kN]	4.00	7.20	11.20	16.00	-	-
	C35/45	[kN]	4.00	7.20	11.20	16.00	-	-
	C45/55	[kN]	4.00	7.20	11.20	16.00	-	-
	C50/60	[kN]	4.00	7.20	11.20	16.00	-	-
50	C20/25	[kN]	4.00	6.80	6.80	6.80	6.80	6.80
<b>Beam-and-block floor (eg.Terriva 4.0/2), min. 25mm wall thickness</b>		[kN]	1.00	1.60	-	-	-	-
<b>Lightweight concrete LAC class 5</b>		[kN]	4.00	4.40	4.40	4.40	-	-
<b>[English]: Cegła ceramiczna pełna 20MPa</b>		[kN]	4.00	4.80	4.80	4.80	-	-
<b>Silicate hollow block class 15</b>		[kN]	1.20	-	-	-	-	-

## Basic performance data

Size			M6	M8	M10	M12	M16	M20
<b>RECOMMENDED LOAD</b>								
<b>TENSION LOAD <math>N_{rec}</math></b>								
<b>Hollow core slab min. C20/25</b>								
Wall thickness	Material class							
23	C30/37	[kN]	1.60	1.80	-	-	-	-
	C35/45	[kN]	0.80	1.80	-	-	-	-
	C45/55	[kN]	1.60	1.80	-	-	-	-
	C50/60	[kN]	0.80	1.80	-	-	-	-
35	C30/37	[kN]	2.60	4.40	6.30	-	-	-
	C35/45	[kN]	2.80	4.80	6.70	-	-	-
	C45/55	[kN]	3.20	5.60	7.50	-	-	-
	C50/60	[kN]	3.40	6.00	7.90	-	-	-
40	C30/37	[kN]	2.80	6.30	7.50	9.50	-	-
	C35/45	[kN]	3.20	7.10	7.90	11.10	-	-
	C45/55	[kN]	3.40	7.90	8.70	11.90	-	-
	C50/60	[kN]	3.80	8.70	9.50	12.70	-	-
50	C20/25	[kN]	3.20	3.40	3.40	3.40	3.40	3.40
<b>Beam-and-block floor (eg.Terriva 4.0/2), min. 25mm wall thickness</b>		[kN]	0.50	0.80	-	-	-	-
<b>Lightweight concrete LAC class 5</b>		[kN]	1.40	1.60	1.60	1.60	-	-
<b>[English]: Cegła ceramiczna pełna 20MPa</b>		[kN]	1.40	1.70	1.70	1.70	-	-
<b>Silicate hollow block class 15</b>		[kN]	0.40	-	-	-	-	-
<b>SHEAR LOAD <math>V_{rec}</math></b>								
<b>Hollow core slab min. C20/25</b>								
Wall thickness	Material class							
23	C30/37	[kN]	2.30	2.60	-	-	-	-
	C35/45	[kN]	1.10	2.60	-	-	-	-
	C45/55	[kN]	1.10	2.60	-	-	-	-
	C50/60	[kN]	1.10	2.60	-	-	-	-
35	C30/37	[kN]	2.90	5.10	8.00	-	-	-
	C35/45	[kN]	2.90	5.10	8.00	-	-	-
	C45/55	[kN]	2.90	5.10	8.00	-	-	-
	C50/60	[kN]	2.90	5.10	8.00	-	-	-
40	C30/37	[kN]	2.90	5.10	8.00	11.40	-	-
	C35/45	[kN]	2.90	5.10	8.00	11.40	-	-
	C45/55	[kN]	2.90	5.10	8.00	11.40	-	-
	C50/60	[kN]	2.90	5.10	8.00	11.40	-	-
50	C20/25	[kN]	2.90	4.90	4.90	4.90	4.90	4.90
<b>Beam-and-block floor (eg.Terriva 4.0/2), min. 25mm wall thickness</b>		[kN]	0.70	1.10	-	-	-	-
<b>Lightweight concrete LAC class 5</b>		[kN]	2.90	3.10	3.10	3.10	-	-
<b>[English]: Cegła ceramiczna pełna 20MPa</b>		[kN]	2.90	3.40	3.40	3.40	-	-
<b>Silicate hollow block class 15</b>		[kN]	0.90	-	-	-	-	-

## Design performance data

Size			M24
Effective embedment depth	$h_{ef}$	[mm]	125.0
<b>TENSION LOAD</b>			
<b>STEEL FAILURE</b>			
Characteristic resistance	$N_{Rk,s}$	[kN]	176.5
Partial safety factor	$\gamma_{Ms}$	-	1.50
<b>PULL-OUT FAILURE; NON-CRACKED CONCRETE C20/25</b>			
Characteristic resistance	$N_{Rk,p}$	[kN]	-
<b>PULL-OUT FAILURE; CRACKED CONCRETE C20/25</b>			
Characteristic resistance	$N_{Rk,p}$	[kN]	-
<b>PULL-OUT FAILURE</b>			
Installation safety factor	$\gamma_{inst}$	-	1.40
Increasing factors for $N_{Rd,p}$ - C30/37	$\psi_c$	-	1.00
Increasing factors for $N_{Rd,p}$ - C40/50	$\psi_c$	-	1.00
Increasing factors for $N_{Rd,p}$ - C50/60	$\psi_c$	-	1.00
<b>CONCRETE CONE FAILURE</b>			
Factor for cracked concrete	$k_{cr,N}$	-	7.70
Factor for non-cracked concrete	$k_{ucr,N}$	-	11.00
Installation safety factor	$\gamma_{inst}$	-	1.40
Spacing	$s_{cr,N}$	[mm]	375.0
Edge distance	$c_{cr,N}$	[mm]	188.0
<b>CONCRETE SPLITTING FAILURE</b>			
Spacing	$s_{cr,sp}$	[mm]	375.0
Edge distance	$c_{cr,sp}$	[mm]	188.0
Installation safety factor	$\gamma_{inst}$	-	1.40
<b>SHEAR LOAD</b>			
<b>STEEL FAILURE</b>			
Characteristic resistance without lever arm	$V_{Rk,s}$	[kN]	88.30
Ductility factor	$k_\gamma$	-	0.80
Characteristic resistance with lever arm	$M_{Rk,s}$	[Nm]	583.4
Partial safety factor	$\gamma_{Ms}$	-	1.25
<b>CONCRETE PRY-OUT FAILURE</b>			
Factor	$k$	-	2.00
Installation safety factor	$\gamma_{inst}$	-	1.00
<b>CONCRETE EDGE FAILURE</b>			
Effective length of anchor	$\ell_f$	[mm]	125.0
Anchor diameter	$d_{nom}$	[mm]	24.00
Installation safety factor	$\gamma_{inst}$	-	1.00

## Product commercial data

Product Code	Anchor		Quantity [pcs]			Weight [kg]			Bar Codes
	Diameter [mm]	Length [mm]	Box	Outer	Pallet	Box	Outer	Pallet	
R-RBP-M06/10W	6	65	50	400	16000	1.59	12.7	538.8	5906675283593
R-RBP-M06/25W	6	80	50	400	16000	1.73	13.8	582.0	5906675283616
R-RBP-M06/60W	6	115	50	50	8000	2.0	2.0	354.0	5906675283630
R-RBP-M08/10W	8	75	50	400	9600	2.8	22.6	573.4	5906675283654
R-RBP-M08/25W	8	90	50	50	8000	3.1	3.1	528.4	5906675283678
R-RBP-M08/60W	8	125	50	50	8000	3.7	3.7	614.8	5906675283692
R-RBP-M10/15W	10	90	50	50	8000	5.0	5.0	825.2	5906675283715
R-RBP-M10/30W	10	105	50	50	6000	5.3	5.3	666.0	5906675283739
R-RBP-M10/60W	10	135	50	50	8000	6.1	6.1	998.0	5906675283753
R-RBP-M12/15W	12	110	25	25	4000	4.6	4.6	767.2	5906675283760
R-RBP-M12/30W	12	125	25	25	4000	4.9	4.9	818.4	5906675283777

## Product commercial data

Product Code	Anchor		Quantity [pcs]			Weight [kg]			Bar Codes
	Diameter [mm]	Length [mm]	Box	Outer	Pallet	Box	Outer	Pallet	
R-RBP-M12/75W	12	170	25	25	3000	5.8	5.8	721.8	5906675283784
R-RBP-M16/15W	16	150	10	10	1600	4.4	4.4	733.5	5906675283791
R-RBP-M16/35W	16	170	10	10	1600	4.7	4.7	773.5	5906675283807
R-RBP-M16/75W	16	210	10	10	1200	5.3	5.3	662.9	5906675283814
R-RBP-M20/15W	20	170	10	10	1200	8.0	8.0	985.1	5906675283821
R-RBP-M20/30W	20	185	10	10	1200	8.3	8.3	1030.4	5906675283838
R-RBP-M20/100W	20	255	10	10	1200	9.9	9.9	1219.2	5906675284781
R-RBP-M24/75W	24	255	5	5	600	7.1	7.1	887.2	5906675283852