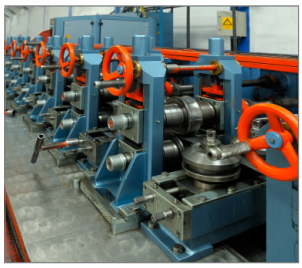
R-RBP Rawlbolt - Bolt Projecting for use in cracked and non-cracked concrete.

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



Approvals and Reports

- ETA-11/0479 (M6 - M20)

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
- Three-pieces expanding sleeve of maximum expansion provides optimal load and safety of use in any substrate
- Wide range of diameters (M6 to M24)

Applications

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

Base materials

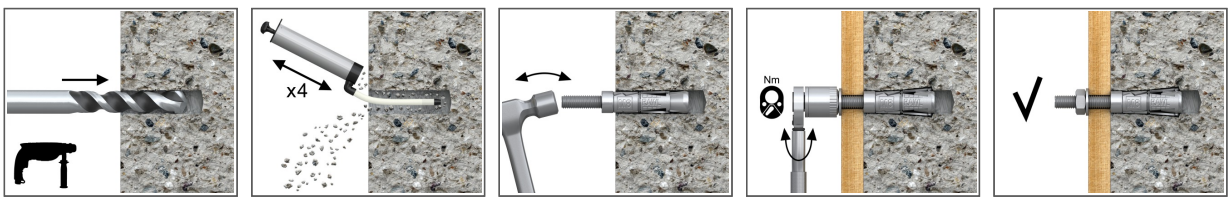
Approved for use in:

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

Also suitable for use in:

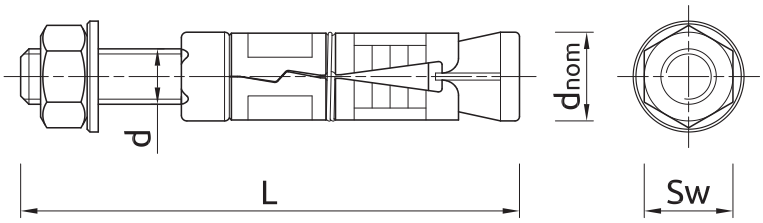
- Solid clay brick 20MPa
- Hollow Sand-lime Brick 15MPa
- Natural Stone
- Hollow Lightweight Concrete Block
- Hollow-core Slab
- Concrete hollow floor block (eg. Teriva)

Installation guide



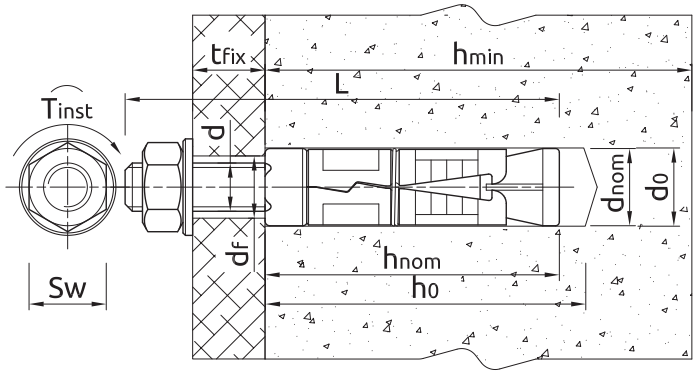
1. Drill a hole of required diameter and depth. Note: When fixing into brickwork, mortar joints should be avoided
2. Clear the hole of drilling dust and debris (using blowpump or equivalent method)
3. Remove nut and washer and insert anchor into hole. Tap home with hammer until flush with surface
4. Position fixture over the projecting bolt
5. Add washer and nut and tighten to recommended torque

Product information



Size	Product Code	Anchor			Fixture		
		Diameter	External diameter	Length	Max. thickness	Min. thickness	Hole diameter
		d	d_{nom}	L	t_{Fix}		d_F
		[mm]	[mm]	[mm]	[mm]	[mm]	[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	10	17
	R-RBP-M16/75W	16	25	210	75	35	17
M20	R-RBP-M20/15W	20	32	170	15	-	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	-	26
	R-RBP-M24/150W	24	38	300	150	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
Installation torque	T_{inst}	[Nm]	6.5	15	27	50	120	230	400
Wrench size	Sw	[mm]	10	13	17	19	24	30	24
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	100	100	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	84.3	157	245	353
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]	7.6	19	37	66	166	325	561
Design bending resistance	M	[Nm]	6.1	15	30	52	133	260	449

Basic performance data

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

Size		M6	M8	M10	M12	M16	M20	M24
MEAN ULTIMATE LOAD								
TENSION LOAD $N_{Ru,m}$								
NON-CRACKED CONCRETE	[kN]	6.36	8.35	15.24	18.48	48.77	56.55	94.30
CRACKED CONCRETE	[kN]	4.06	5.31	7.12	12.01	18.24	34.16	-
SHEAR LOAD $V_{Ru,m}$								
NON-CRACKED CONCRETE	[kN]	6.04	10.98	17.40	25.30	47.10	73.50	105.90
CRACKED CONCRETE	[kN]	6.04	10.98	17.40	25.30	47.10	73.50	-
CHARACTERISTIC LOAD								
TENSION LOAD N_{Rk}								
NON-CRACKED CONCRETE	[kN]	6.00	7.50	12.00	16.00	40.00	50.00	70.00
CRACKED CONCRETE	[kN]	4.00	5.00	6.00	12.00	16.00	30.00	-
SHEAR LOAD V_{Rk}								
NON-CRACKED CONCRETE	[kN]	5.03	7.50	12.00	21.08	39.25	61.25	88.30
CRACKED CONCRETE	[kN]	4.00	5.00	6.00	21.08	39.25	61.25	-

Basic performance data

Size		M6	M8	M10	M12	M16	M20	M24
DESIGN LOAD								
TENSION LOAD N_{Rd}								
NON-CRACKED CONCRETE	[kN]	3.33	4.17	6.67	8.89	22.22	27.78	38.90
CRACKED CONCRETE	[kN]	2.22	2.78	3.33	6.67	8.89	16.67	-
SHEAR LOAD V_{Rd}								
NON-CRACKED CONCRETE	[kN]	3.33	4.17	6.67	16.86	31.40	49.00	70.60
CRACKED CONCRETE	[kN]	2.22	2.78	3.33	16.86	31.40	49.00	-
RECOMMENDED LOAD								
TENSION LOAD N_{rec}								
NON-CRACKED CONCRETE	[kN]	2.38	2.98	4.76	6.35	15.87	19.84	27.80
CRACKED CONCRETE	[kN]	1.59	1.99	2.38	4.76	6.35	11.91	-
SHEAR LOAD V_{rec}								
NON-CRACKED CONCRETE	[kN]	2.38	2.98	4.76	12.05	22.43	35.00	50.40
CRACKED CONCRETE	[kN]	1.59	1.99	2.38	12.05	22.43	35.00	-

Design performance data

Size			M6	M8	M10	M12	M16	M20	M24
Effective embedment depth	h_{ef}	[mm]	35.00	40.00	50.00	60.00	95.00	115.00	125.00
TENSION LOAD									
STEEL FAILURE									
Characteristic resistance	$N_{Rk,s}$	[kN]	10.05	18.30	29.00	42.15	78.50	122.50	176.50
Design resistance γ_{Ms}= 1.5	$N_{Rd,s}$	[kN]	6.70	12.20	19.33	28.10	52.33	81.67	117.60
PULL-OUT FAILURE; NON-CRACKED CONCRETE C20/25									
Characteristic resistance	$N_{Rk,p}$	[kN]	6.00	7.50	12.00	16.00	40.00	50.00	70.00
Design resistance γ_{Mp}= 1.8	$N_{Rd,p}$	[kN]	3.33	4.17	6.67	8.89	22.22	27.78	38.90
PULL-OUT FAILURE; CRACKED CONCRETE C20/25									
Characteristic resistance	$N_{Rk,p}$	-	4.00	5.00	6.00	12.00	16.00	30.00	-
Design resistance γ_{Mp}= 1.8	$N_{Rd,p}$	-	2.22	2.78	3.33	6.67	8.89	16.67	-
Spacing	$s_{cr,N}$	[mm]	105.00	120.00	150.00	180.00	285.00	345.00	375.00
Edge distance	$c_{cr,N}$	[mm]	53.00	60.00	75.00	90.00	143.00	173.00	188.00
SHEAR LOAD									
CONCRETE EDGE FAILURE; NON-CRACKED CONCRETE C20/25									
Edge distance	c_1	[mm]	53.00	60.00	75.00	90.00	143.00	173.00	190.00
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]	4.10	5.06	7.24	9.84	20.44	28.23	32.72
CONCRETE EDGE FAILURE; CRACKED CONCRETE C20/25									
Edge distance	c_1	-	53.00	60.00	75.00	90.00	143.00	173.00	-
Characteristic resistance for c_1	$V_{Rk,c}$	-	5.16	6.46	9.23	12.55	25.94	35.86	-
Design resistance γ_{Mc}= 1.8	$V_{Rd,c}$	-	2.87	3.59	5.13	6.97	14.41	19.92	-
CONCRETE PRY-OUT FAILURE; NON-CRACKED CONCRETE C20/25									
Factor	k	-	1.00	1.00	1.00	2.00	2.00	2.00	-
Characteristic resistance	$V_{Rk,cp}$	[kN]	6.00	7.50	12.00	32.00	80.00	100.00	140.00
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									
Factor	k	-	1.00	1.00	1.00	2.00	2.00	2.00	2.00
Characteristic resistance	$V_{Rk,cp}$	-	4.00	5.00	6.00	24.00	32.00	60.00	-
Design resistance γ_{Mc}= 1.8	$V_{Rd,cp}$	-	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	14.50	21.08	39.25	61.25	88.30
Design resistance γ_{Ms}= 1.25	$V_{Rd,s}$	[kN]	4.02	7.32	11.60	16.86	31.40	49.00	70.60

Design performance data

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]	0.20	0.40	0.90	1.70	3.10	4.90
PULL-OUT FAILURE								
Characteristic resistance	$N_{Rk,p}$	[kN]	1.00	1.30	1.50	3.00	4.00	7.50
CONCRETE CONE FAILURE								
Characteristic resistance	$N_{Rk,c}$	[kN]	1.30	1.80	3.20	5.00	15.70	25.40
SHEAR LOAD								
STEEL FAILURE								
Characteristic resistance without lever arm	$V_{Rk,s}$	[kN]	0.20	0.40	0.90	1.70	3.10	4.90
Characteristic resistance with lever arm	$M_{Rk,s}$	[kN]	0.20	0.40	1.10	2.60	6.70	13.00
R (for EI) = 60 min								
TENSION LOAD								
STEEL FAILURE								
Characteristic resistance	$N_{Rk,s}$	[kN]	0.20	0.30	0.80	1.30	2.40	3.70
PULL-OUT FAILURE								
Characteristic resistance	$N_{Rk,p}$	[kN]	1.00	1.30	1.50	3.00	4.00	7.50
CONCRETE CONE FAILURE								
Characteristic resistance	$N_{Rk,c}$	[kN]	1.30	1.80	3.20	5.00	15.70	25.40
SHEAR LOAD								
STEEL FAILURE								
Characteristic resistance without lever arm	$V_{Rk,s}$	[kN]	0.20	0.30	0.80	1.30	2.40	3.70
Characteristic resistance with lever arm	$M_{Rk,s}$	[kN]	0.10	0.30	1.00	2.00	5.00	9.70
R (for EI) = 90 min								
TENSION LOAD								
STEEL FAILURE								
Characteristic resistance	$N_{Rk,s}$	[kN]	0.10	0.30	0.60	1.10	2.00	3.20
PULL-OUT FAILURE								
Characteristic resistance	$N_{Rk,p}$	[kN]	1.00	1.30	1.50	3.00	4.00	7.50
CONCRETE CONE FAILURE								
Characteristic resistance	$N_{Rk,c}$	[kN]	1.30	1.80	3.20	5.00	15.70	25.40
SHEAR LOAD								
STEEL FAILURE								
Characteristic resistance without lever arm	$V_{Rk,s}$	[kN]	0.10	0.30	0.60	1.10	2.00	3.20
Characteristic resistance with lever arm	$M_{Rk,s}$	[kN]	0.10	0.30	0.70	1.70	4.30	8.40
R (for EI) = 120 min								
TENSION LOAD								
STEEL FAILURE								
Characteristic resistance	$N_{Rk,s}$	[kN]	0.10	0.20	0.50	0.80	1.60	2.50
PULL-OUT FAILURE								
Characteristic resistance	$N_{Rk,p}$	[kN]	1.00	1.30	1.50	3.00	4.00	7.50
CONCRETE CONE FAILURE								
Characteristic resistance	$N_{Rk,c}$	[kN]	1.00	1.40	2.50	4.00	12.60	20.30
SHEAR LOAD								
STEEL FAILURE								
Characteristic resistance without lever arm	$V_{Rk,s}$	[kN]	0.10	0.20	0.50	0.80	1.60	2.50
Characteristic resistance with lever arm	$M_{Rk,s}$	[kN]	0.10	0.20	0.60	1.30	3.30	6.50

Product commercial data

Size	Product Code	Anchor		Quantity [pcs]			Weight [kg]			Bar Codes
		Diameter [mm]	Length [mm]	Box	Outer	Pallet	Box	Outer	Pallet	
M6	R-RBP-M06/10W[1)]	6	65	50	400	16000	1.59	12.7	538.8	5906675283593
	R-RBP-M06/25W[1)]	6	80	50	400	16000	1.73	13.8	582.0	5906675283616
	R-RBP-M06/60W[1)]	6	115	50	50	8000	2.0	2.0	354.0	5906675283630
M8	R-RBP-M08/10W[1)]	8	75	50	400	16000	2.9	22.9	946.8	5906675283654
	R-RBP-M08/25W[1)]	8	90	50	50	8000	3.1	3.1	528.4	5906675283678
	R-RBP-M08/60W[1)]	8	125	50	50	8000	3.7	3.7	614.8	5906675283692
M10	R-RBP-M10/15W[1)]	10	90	50	50	8000	5.0	5.0	825.2	5906675283715
	R-RBP-M10/30W[1)]	10	105	50	50	6000	5.3	5.3	666.0	5906675283739
	R-RBP-M10/60W[1)]	10	135	50	50	8000	6.1	6.1	998.0	5906675283753
M12	R-RBP-M12/15W[1)]	12	110	25	25	4000	4.6	4.6	767.2	5906675283760
	R-RBP-M12/30W[1)]	12	125	25	25	4000	4.9	4.9	818.4	5906675283777
	R-RBP-M12/75W[1)]	12	170	25	25	3000	5.8	5.8	721.8	5906675283784
M16	R-RBP-M16/15W[1)]	16	150	10	10	1600	4.4	4.4	733.5	5906675283791
	R-RBP-M16/35W[1)]	16	170	10	10	1600	4.7	4.7	773.5	5906675283807
	R-RBP-M16/75W[1)]	16	210	10	10	1200	5.3	5.3	662.9	5906675283814
M20	R-RBP-M20/15W[1)]	20	170	10	10	1200	8.0	8.0	985.1	5906675283821
	R-RBP-M20/30W[1)]	20	185	10	10	1200	8.3	8.3	1030.4	5906675283838
	R-RBP-M20/100W[1)]	20	255	10	10	1200	9.9	9.9	1219.2	5906675284781
M24	R-RBP-M24/75W	24	255	5	5	600	7.1	7.1	887.2	5906675283852
	R-RBP-M24/150W	24	300	2	2	400	3.2	3.2	672.0	5906675283845

1) ETA-11/0479 (M6 - M20)