UNIVERSAL

R-RBL RAWLBOLT® - LOOSE BOLT

For use in cracked and uncracked concrete

FEATURES AND BENEFITS

- For use in cracked and non-cracked concrete, hollow-core slabs, flooring blocks and ceramics.
- RAWLBOLT® - first ever mechanical anchor in the world, forerunner of all of the later mechanical anchors.
- Large contact area of expanded arms increases load-bearing capacity and security.
- Wide range of diameters (M6 to M20).
- User-friendly - enables fast installation.
- Three-pieces expanding sleeve of maximum expansion provides optimal load and safety of use in any substrate.
- Product recommended for applications requiring fire resistance.

SUBSTRATES

- Cracked concrete C20/25-C50/60
- Non-cracked concrete C20/25-C50/60
- Unreinforced concrete
- Reinforced concrete
- Hollow-core slab
- Concrete hollow floor block (eg. Teriva)
- Masonry
- High-density natural stone



R-RBL RAWLBOLT® - LOOSE BOLT



APPLICATIONS

- Barriers
- Doors and windows
- Gates
- Repair of machinery
- Sanitary and gas installations
- Steel structures





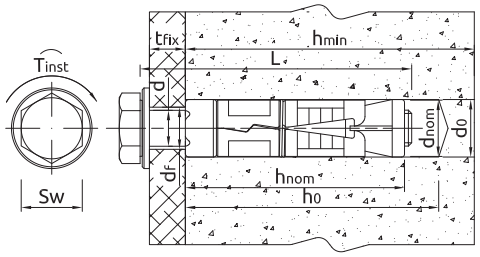
Wroclaw, Poland
The National Forum of Music

INSTALLATION GUIDE



1. Drill a hole of required diameter and depth.
2. Clear the hole of drilling dust and debris (using blowpump 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. Insert bolt through fixture and tighten to the recommended torque.

INSTALLATION DATA



Size			M6	M8	M10	M12	M16	M20
Thread diameter	d	[mm]	6	8	10	12	16	20
Hole diameter in substrate	d_0	[mm]	12	14	16	20	25	32
Hole diameter in fixture	d_f	[mm]	6,5	9,0	11,0	13,0	17,0	22,0
Installation torque	T_{inst}	[Nm]	6,5	15	27	50	120	230
Wrench size	Sw	[mm]	10	13	17	19	24	30
Min. hole depth in substrate	$h_{0,s}$	[mm]	50	55	65	85	125	140
Min. installation depth	h_{nom}	[mm]	45	50	60	80	120	135
Min. substrate thickness	$h_{min,s}$	[mm]	100	100	100	100	142,5	172,5
Min. edge distance	c_{min}	[mm]	52,5	60	75	90	142,5	172,5
Min. spacing	s_{min}	[mm]	35	40	50	60	95	115

MECHANICAL PROPERTIES

Size			M6	M8	M10	M12	M16	M20
Nominal ultimate tensile strength - tension	f_{uk}	[N/mm²]	500	500	500	500	500	500
Nominal yield strength	f_{yk}	[N/mm²]	400	400	400	400	400	400
Cross sectional area	A_s	[mm²]	20,1	36,6	58,0	84,3	157,0	245,0
Elastic section modulus	W_{el}	[mm³]	21,2	50,2	98,1	169,6	402,1	785,4
Characteristic bending resistance	$M^0_{Rk,s}$	[Nm]	12,7	30,1	58,9	101,7	241,2	471,2
Design bending resistance	M	[Nm]	10,1	24,1	47,1	81,4	193,0	376,9

BASIC PERFORMANCE DATA

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

Size			M6	M8	M10	M12	M16	M20
Nominal embedment depth	h_{nom}	[mm]	45	50	60	80	120	135
MEAN ULTIMATE RESISTANCE								
UNCRACKED CONCRETE								
Tension load	$N_{Ru,m}$	[kN]	7,80	9,75	15,60	20,80	52,00	65,00
Shear load	$V_{Ru,m}$	[kN]	5,53	10,07	15,95	23,19	43,18	67,38
CRACKED CONCRETE								
Tension load	$N_{Ru,m}$	[kN]	5,20	6,50	7,80	15,60	20,80	39,00
Shear load	$V_{Ru,m}$	[kN]	5,53	10,07	15,95	23,19	43,18	67,38

R-RBL RAWLBOLT® - LOOSE BOLT

Size			M6	M8	M10	M12	M16	M20
CHARACTERISTIC RESISTANCE								
UNCRACKED CONCRETE								
Tension load	N_{Rk}	[kN]	6,00	7,50	12,00	16,00	40,00	50,00
Shear load	V_{Rk}	[kN]	5,03	9,15	14,50	21,08	39,25	61,25
CRACKED CONCRETE								
Tension load	N_{Rk}	[kN]	4,00	5,00	6,00	12,00	16,00	30,00
Shear load	V_{Rk}	[kN]	5,03	8,71	12,17	21,08	39,25	61,25
DESIGN RESISTANCE								
UNCRACKED CONCRETE								
Tension load	N_{Rd}	[kN]	3,33	4,17	6,67	8,89	22,22	27,78
Shear load	V_{Rd}	[kN]	4,02	7,32	11,60	16,86	31,40	49,00
CRACKED CONCRETE								
Tension load	N_{Rd}	[kN]	2,22	2,78	3,33	6,67	8,89	16,67
Shear load	V_{Rd}	[kN]	4,02	5,81	8,12	16,86	31,40	49,00
RECOMMENDED LOAD								
UNCRACKED CONCRETE								
Tension load	N_{rec}	[kN]	2,38	2,98	4,76	6,35	15,87	19,84
Shear load	V_{rec}	[kN]	2,87	5,23	8,29	12,04	22,43	35,00
CRACKED CONCRETE								
Tension load	N_{rec}	[kN]	1,59	1,99	2,38	4,76	6,35	11,91
Shear load	V_{rec}	[kN]	2,87	4,15	5,80	12,04	22,43	35,00

DESIGN PERFORMANCE DATA

Static loads

Size			M6	M8	M10	M12	M16	M20
Effective embedment depth	h_{ef}	[mm]	35	40	50	60	95	115
TENSION LOAD								
STEEL FAILURE								
Characteristic resistance	$N_{Rk,s}$	[kN]	10,05	18,30	29,00	42,15	78,50	122,50
Partial safety factor	γ_{MS}	[-]	1,5	1,5	1,5	1,5	1,5	1,5
PULL-OUT FAILURE								
Characteristic resistance in uncracked concrete C20/25	$N_{Rk,p,ucr}$	[kN]	6	7,5	12	16	40	50
Characteristic resistance in cracked concrete C20/25	$N_{Rk,p,cr}$	[kN]	4	5	6	12	16	30
Installation safety factor	γ_{inst}	[-]	1,2	1,2	1,2	1,2	1,2	1,2
Increasing factors for concrete C30/37	Ψ_c	[-]	1,22	1,22	1,22	1,22	1,22	1,22
Increasing factors for concrete C40/50	Ψ_c	[-]	1,41	1,41	1,41	1,41	1,41	1,41
Increasing factors for concrete C50/60	Ψ_c	[-]	1,55	1,55	1,55	1,55	1,55	1,55
CONCRETE CONE FAILURE								
Factor for cracked concrete	$k_{cr,N}$	[-]	7,7	7,7	7,7	7,7	7,7	7,7
Factor for uncracked concrete	$k_{ucr,N}$	[-]	11,0	11,0	11,0	11,0	11,0	11,0
Installation safety factor	γ_{inst}	[-]	1,2	1,2	1,2	1,2	1,2	1,2
Spacing	$s_{cr,N}$	[mm]	105	120	150	180	285	345
Edge distance	$c_{cr,N}$	[mm]	52,5	60	75	90	143	173
CONCRETE SPLITTING FAILURE								
Spacing	$s_{cr,N}$	[mm]	105	120	150	180	285	345
Edge distance	$c_{cr,N}$	[mm]	53	60	75	90	143	173
Installation safety factor	γ_{inst}	[-]	1,2	1,2	1,2	1,2	1,2	1,2
SHEAR LOAD								
STEEL FAILURE								
Characteristic resistance without lever arm	$V^0_{Rk,s}$	[kN]	5,03	9,15	14,50	21,08	39,25	61,25
Ductility factor	k_7	[-]	0,8	0,8	0,8	0,8	0,8	0,8
Characteristic resistance with lever arm	$M_{Rk,s}$	[Nm]	7,63	18,74	37,39	65,52	166,52	324,62
Partial safety factor	γ_{MS}	[-]	1,25	1,25	1,25	1,25	1,25	1,25
CONCRETE PRY-OUT FAILURE								
Factor	k	[-]	1,0	1,0	1,0	2,0	2,0	2,0
Installation safety factor	γ_{inst}	[-]	1,2	1,2	1,2	1,2	1,2	1,2
CONCRETE EDGE FAILURE								
Effective length of anchor	ℓ_f	[mm]	35	40	50	60	95	115
Anchor diameter	d_{nom}	[mm]	6	8	10	12	16	20
Installation safety factor	γ_{inst}	[-]	1,2	1,2	1,2	1,2	1,2	1,2

Resistance to tension and shear loads under fire exposure

Size			M6	M8	M10	M12	M16	M20
Effective embedment depth	h_{ef}	[mm]	35	40	50	60	95	115
R (for EI) = 30 min **TENSION LOAD**								
STEEL FAILURE								
Characteristic resistance	$N_{Rk,s,fi,30}$	[kN]	0,2	0,4	0,9	1,7	3,1	4,9

R-RBL RAWLBOLT® - LOOSE BOLT

Size			M6	M8	M10	M12	M16	M20
PULL-OUT FAILURE								
Characteristic resistance	$N_{Rk,p,fi,30}$	[kN]	1,0	1,3	1,5	3,0	4,0	7,5
SHEAR LOAD								
STEEL FAILURE								
Characteristic resistance without lever arm	$V_{Rk,s,fi,30}$	[kN]	0,2	0,4	0,9	1,7	3,1	4,9
Characteristic resistance with lever arm	$M^0_{Rk,s,fi,30}$	[Nm]	0,2	0,4	1,1	2,6	6,7	13,0
R (for EI) = 60 min TENSION LOAD								
STEEL FAILURE								
Characteristic resistance	$N_{Rk,s,fi,60}$	[kN]	0,2	0,3	0,8	1,3	2,4	3,7
PULL-OUT FAILURE								
Characteristic resistance	$N_{Rk,p,fi,60}$	[kN]	1,0	1,3	1,5	3,0	4,0	7,5
SHEAR LOAD								
STEEL FAILURE								
Characteristic resistance without lever arm	$V_{Rk,s,fi,60}$	[kN]	0,2	0,3	0,8	1,3	2,4	3,7
Characteristic resistance with lever arm	$M^0_{Rk,s,fi,60}$	[Nm]	0,1	0,3	1,0	2,0	5,0	9,7
R (for EI) = 90 min TENSION LOAD								
STEEL FAILURE								
Characteristic resistance	$N_{Rk,s,fi,90}$	[kN]	0,1	0,3	0,6	1,1	2,0	3,2
PULL-OUT FAILURE								
Characteristic resistance	$N_{Rk,p,fi,90}$	[kN]	1,0	1,3	1,5	3,0	4,0	7,5
SHEAR LOAD								
STEEL FAILURE								
Characteristic resistance without lever arm	$V_{Rk,s,fi,90}$	[kN]	0,1	0,3	0,6	1,1	2,0	3,2
Characteristic resistance with lever arm	$M^0_{Rk,s,fi,90}$	[Nm]	0,1	0,3	0,7	1,7	4,3	8,4
R (for EI) = 120 min TENSION LOAD								
STEEL FAILURE								
Characteristic resistance	$N_{Rk,s,fi,120}$	[kN]	0,1	0,2	0,5	0,8	1,6	2,5
PULL-OUT FAILURE								
Characteristic resistance	$N_{Rk,p,fi,120}$	[kN]	0,8	1,0	1,2	2,4	3,2	6,0
SHEAR LOAD								
STEEL FAILURE								
Characteristic resistance without lever arm	$V_{Rk,s,fi,120}$	[kN]	0,1	0,2	0,5	0,8	1,6	2,5
Characteristic resistance with lever arm	$M^0_{Rk,s,fi,120}$	[Nm]	0,1	0,2	0,6	1,3	3,3	6,5

LOGISTICAL DATA

SKU	Base-sales unit	Unit pack	Bulk pack	Pallet	Single Package - Gross Weight	Bulk Package - Gross Weight	Palette - Gross Weight	Barcode
R-RBL-M06/10W	pcs.	50.0	400.0	16000.0	1.5	12.4	496.0	5906675283210
R-RBL-M06/25W	pcs.	50.0	400.0	16000.0	1.6	13.1	524.0	5906675283234
R-RBL-M06/40W	pcs.	50.0	50.0	8000.0	1.8	1.8	288.0	5906675283258
R-RBL-M08/10W	pcs.	50.0	400.0	16000.0	2.7	21.6	864.0	5906675283272
R-RBL-M08/25W	pcs.	50.0	50.0	8000.0	2.9	2.9	464.0	5906675283296
R-RBL-M08/40W	pcs.	50.0	50.0	8000.0	3.2	3.2	512.0	5906675283319
R-RBL-M10/10W	pcs.	50.0	50.0	8000.0	4.6	4.6	736.0	5906675283333
R-RBL-M10/25W	pcs.	50.0	50.0	8000.0	5.0	5.0	800.0	5906675283357
R-RBL-M10/50W	pcs.	50.0	50.0	6000.0	5.6	5.6	896.0	5906675283371
R-RBL-M10/75W	pcs.	50.0	50.0	8000.0	6.4	6.4	1024.0	5906675283395
R-RBL-M12/10W	pcs.	25.0	25.0	4000.0	4.2	4.2	672.0	5906675283401
R-RBL-M12/25W	pcs.	25.0	25.0	4000.0	4.5	4.5	720.0	5906675283418
R-RBL-M12/40W	pcs.	25.0	25.0	3000.0	4.9	4.9	588.0	5906675283425
R-RBL-M12/60W	pcs.	25.0	25.0	4000.0	5.2	5.2	832.0	5906675283432
R-RBL-M16/15W	pcs.	10.0	10.0	1600.0	4.1	4.1	656.0	5906675283449
R-RBL-M16/30W	pcs.	10.0	10.0	1600.0	4.4	4.4	704.0	5906675283456
R-RBL-M16/60W	pcs.	10.0	10.0	1200.0	4.8	4.8	576.0	5906675283463
R-RBL-M20/100W	pcs.	10.0	10.0	1200.0	9.8	9.8	1080.0	5906675283470
R-RBL-M20/60W	pcs.	10.0	10.0	1200.0	9.0	9.0	1176.0	5906675283487

RELATED PRODUCTS

DRILLING	Rotary Hammer Drill SDS plus; 850W; 26mm; 2.5J **R-PRH-26850** 	Cordless RawlHammer 18V SDS plus **R-PRH18-26** 	Drill bits Brickdrill SDS plus **RT-SDSB** 	Drill bits Rebardrill SDS plus **RT-SDSR** 
CLEANING	Blow Pump **R-BLOWPUMP** 			
ANCHORING	Torque wrench 20-100 Nm 1/2" **R-HTW-20-100** 	Locksmiths' Hammers **RT-HAM** 	MECHANICAL ANCHOR SETTING TOOL SDS PLUS **RT-SDSI-MA** 	
SAFETY	Protective gloves for power tools **R-PGL** 			