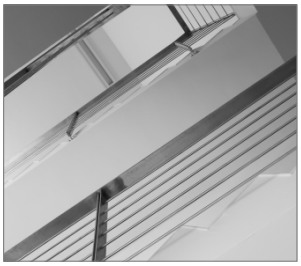
R-SPL-BP SafetyPlus - Bolt Projecting

High performance mechanical anchor - bolt projecting version



Approvals and Reports

- ETA-11/0126

Product information

Features and benefits

- High performance in non-cracked concrete confirmed by ETA Option 7
- Design of SafetyPlus allows for easy through fixing
- Integral controlled collapse and anti-rotation feature ensures fixture is firmly secured
- Unique zig-zag feature provides balanced expansion, ensuring secure setting and maximised load-bearing capacity
- Case-hardened nut with optimum taper angle for enhanced expansion
- Fire resistant

Applications

- Structural steel
- Masonry support
- Cladding restraints
- Road Signs
- Heavy machinery
- Racking systems
- Industrial doors
- Safety barriers

Base materials

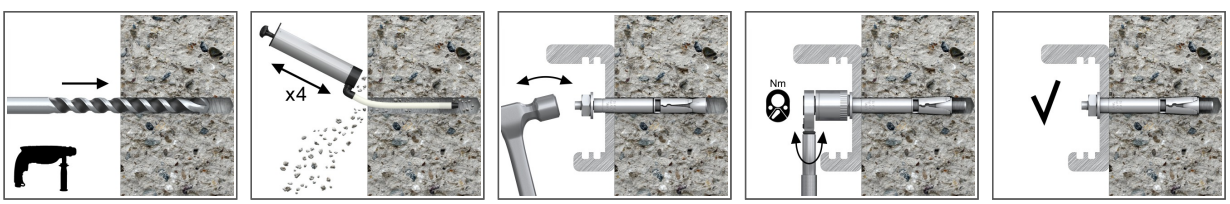
Approved for use in:

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

Also suitable for use in:

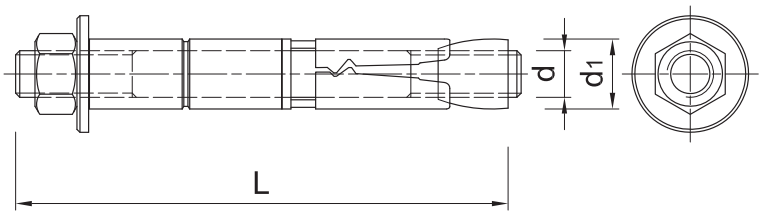
- Natural Stone (after site testing)

Installation guide



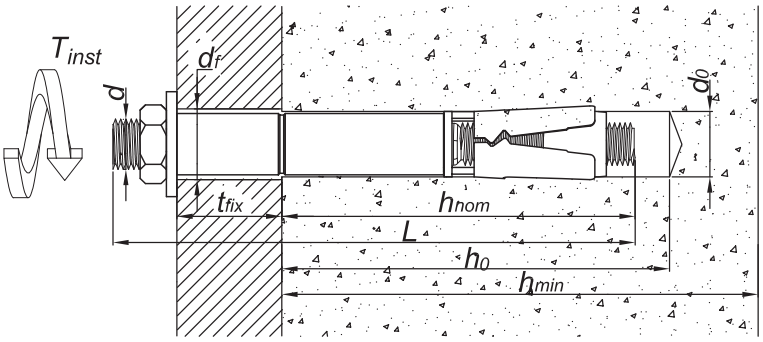
1. Drill a hole of required diameter and depth
2. Clear the hole of drilling dust and debris (using blowpump or equivalent method)
3. Insert anchor through fixture into hole and tap until required installation depth is achieved
4. Tighten to the recommended torque

Product information



Size	Product Code	Anchor			Fixture	
		Thread size	External diameter	Length	Max. thickness	Hole diameter
		d	d_{nom}	L	t_{fix}	d_f
		[mm]	[mm]	[mm]	[mm]	[mm]
M10	R-SPL-BP-10110/20	10	15	110	20	17
M12	R-SPL-BP-12135/25	12	18	135	25	20
	R-SPL-BP-12160/50	12	18	160	50	20
M16	R-SPL-BP-16160/25	16	24	160	25	26
	R-SPL-BP-16185/50	16	24	185	50	26
M20	R-SPL-BP-20190/30	20	28	190	30	30

Installation data



Size			M10	M12	M16	M20
Thread diameter	d	[mm]	10	12	16	20
Hole diameter in substrate	d_0	[mm]	15	18	24	28
Installation torque	T_{inst}	[Nm]	50	80	180	275
Wrench size	Sw	[mm]	17	19	24	30
Min. hole depth in substrate	h_0	[mm]	95	105	130	160
Min. installation depth	h_{nom}	[mm]	80	90	110	130
Min. substrate thickness	h_{min}	[mm]	105	120	150	188
Min. spacing	s_{min}	[mm]	70	80	100	125
Min. edge distance	c_{min}	[mm]	105	120	150	186

Mechanical properties

Size			M10	M12	M16	M20
Nominal ultimate tensile strength - tension	f_{uk}	[N/mm²]	800	800	800	800
Nominal yield strength - tension	f_{yk}	[N/mm²]	640	640	640	640
Cross sectional area - tension	A_s	[mm²]	58	84.3	157	245
Elastic section modulus	W_{el}	[mm³]	98.2	169.7	402.1	785.4
Characteristic bending resistance	$M^0_{Rk,s}$	[Nm]	87.97	152.01	365.97	728.54
Design bending resistance	M	[Nm]	70.38	121.61	292.78	592.83

Basic performance data

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

Size		M10	M12	M16	M20
Effective embedment depth h_{ef}	[mm]	70.00	80.00	100.00	125.00
MEAN ULTIMATE LOAD					
TENSION LOAD $N_{Ru,m}$	[kN]	14.46	19.28	42.17	48.19
SHEAR LOAD $V_{Ru,m}$	[kN]	31.68	45.62	81.95	77.81
CHARACTERISTIC LOAD					
TENSION LOAD N_{Rk}	[kN]	12.00	16.00	35.00	40.00
SHEAR LOAD V_{Rk}	[kN]	30.00	43.20	77.60	73.68
DESIGN LOAD					
TENSION LOAD N_{Rd}	[kN]	6.67	8.89	19.44	22.22
SHEAR LOAD V_{Rd}	[kN]	24.00	34.56	62.08	58.94

Design performance data

(-) failure is not decisive

Size			M10	M12	M16	M20
Effective embedment depth	h_{ef}	[mm]	70.00	80.00	100.00	125.00
TENSION LOAD						
STEEL FAILURE						
Characteristic resistance	$N_{Rk,s}$	[kN]	46.40	57.40	125.60	196.00
Partial safety factor	γ_{Ms}	-	1.50	1.50	1.50	1.50
PULL-OUT FAILURE; NON-CRACKED CONCRETE C20/25						
Characteristic resistance	$N_{Rk,p}$	[kN]	12.00	16.00	35.00	40.00
PULL-OUT FAILURE						
Installation safety factor	γ_{inst}	-	1.20	1.20	1.20	1.20
Increasing factors for $N_{Rd,p}$ - C30/37	Ψ_c	-	1.22	1.22	1.22	1.22
Increasing factors for $N_{Rd,p}$ - C40/50	Ψ_c	-	1.41	1.41	1.41	1.41
Increasing factors for $N_{Rd,p}$ - C50/60	Ψ_c	-	1.55	1.55	1.55	1.55
CONCRETE CONE FAILURE						
Installation safety factor	γ_{inst}	-	1.20	1.20	1.20	1.20
Factor for non-cracked concrete	$k_{ucr,N}$	-	11.00	11.00	11.00	11.00
Spacing	$s_{cr,N}$	[mm]	210.00	240.00	300.00	375.00
Edge distance	$c_{cr,N}$	[mm]	105.00	120.00	150.00	188.00
CONCRETE SPLITTING FAILURE						
Installation safety factor	γ_{inst}	-	1.20	1.20	1.20	1.20
Spacing	$s_{cr,sp}$	[mm]	210.00	240.00	300.00	375.00
Edge distance	$c_{cr,sp}$	[mm]	105.00	120.00	150.00	188.00
SHEAR LOAD						
STEEL FAILURE						
Characteristic resistance without lever arm	$V_{Rk,s}$	[kN]	30.00	43.20	77.60	73.68
Ductility factor	k_7	-	0.80	0.80	0.80	0.80
Characteristic resistance with lever arm	$M_{Rk,s}$	[Nm]	87.97	152.01	365.97	728.54
Partial safety factor	γ_{Ms}	-	1.25	1.25	1.25	1.25
CONCRETE PRY-OUT FAILURE						
Factor	k	-	2.00	2.00	2.00	2.00
Installation safety factor	γ_{inst}	-	1.00	1.00	1.00	1.00
CONCRETE EDGE FAILURE						
Effective length of anchor	ℓ_f	[mm]	70.00	80.00	100.00	125.00
Anchor diameter	d_{nom}	[mm]	10.00	12.00	16.00	20.00
Installation safety factor	γ_{inst}	-	1.00	1.00	1.00	1.00

Product commercial data

Product Code	Anchor		Quantity [pcs]			Weight [kg]			Bar Codes
	Thread size [mm]	Length [mm]	Box	Outer	Pallet	Box	Outer	Pallet	
R-SPL-BP-10110/20 1)	10	110	50	50	8000	6.4	6.4	1046.8	5010445501203
R-SPL-BP-12135/25 1)	12	135	25	25	4000	5.7	5.7	935.6	5010445501357
R-SPL-BP-12160/50 1)	12	160	25	25	4000	6.6	6.6	1080.4	5010445501401
R-SPL-BP-16160/25 1)	16	160	10	10	1600	4.7	4.7	780.9	5010445501500
R-SPL-BP-16185/50 1)	16	185	10	10	1200	5.5	5.5	687.8	5010445501555
R-SPL-BP-20190/30 1)	20	190	10	10	1200	8.0	8.0	988.6	5010445501654

1) ETA-11/0126