

R-SPL SafetyPlus - Loose Bolt

High performance mechanical anchor - loose bolt option



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

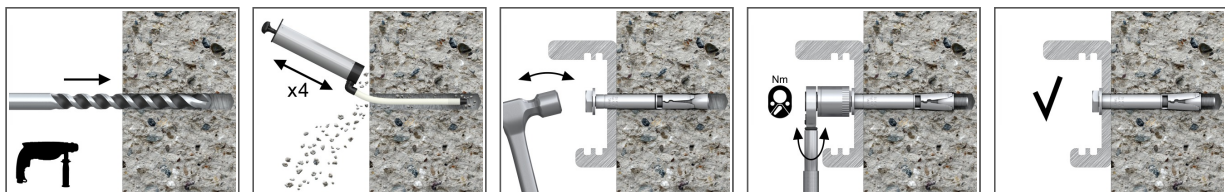
Approved for use in:

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

Also suitable for use in:

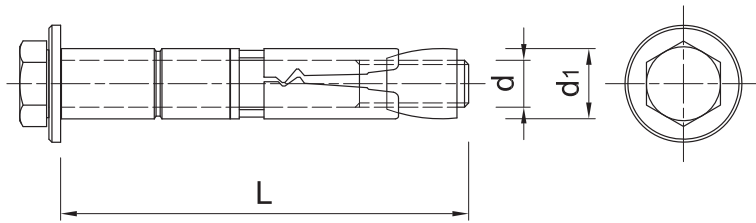
- Natural Stone (after site testing)

Installation guide



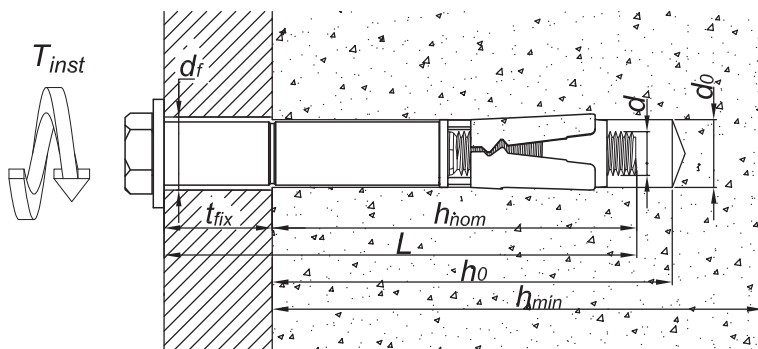
1. Drill a hole of required diameter and depth
2. Clear the hole of drilling dust and debris (using blowpump or equivalent method)
3. Insert anchor through fixture into hole and tap until required installation depth is achieved
4. Tighten to the recommended torque

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]
M8	R-SPL-08090/15	8	12	90	15	14
	R-SPL-08110/40	8	12	110	40	14
M10	R-SPL-10105/20	10	15	105	20	17
	R-SPL-10120/40	10	15	120	40	17
	R-SPL-10140/60	10	15	140	60	17
M12	R-SPL-12120/25	12	18	120	25	20
	R-SPL-12150/50	12	18	150	50	20
M16	R-SPL-16145/25	16	24	145	25	26
	R-SPL-16170/50	16	24	170	50	26
M20	R-SPL-20175/30	20	28	175	30	30

Installation data



Size	M8	M10	M12	M16	M20		
Thread diameter	d	[mm]	8	10	12	16	20
Hole diameter in substrate	d_0	[mm]	12	15	18	24	28
Installation torque	T_{inst}	[Nm]	25	50	80	180	275
Wrench size	Sw	[mm]	13	17	19	24	30
Min. hole depth in substrate	h_0	[mm]	85	95	105	130	160
Min. installation depth	h_{nom}	[mm]	70	80	90	110	130
Min. substrate thickness	h_{min}	[mm]	100	105	120	150	188
Min. spacing	s_{min}	[mm]	60	70	80	100	125
Min. edge distance	c_{min}	[mm]	90	105	120	150	186

Mechanical properties

Size			M8	M10	M12	M16	M20
Nominal ultimate tensile strength - tension	f_{uk}	[N/mm ²]	800	800	800	800	800
Nominal yield strength - tension	f_{yk}	[N/mm ²]	640	640	640	640	640
Cross sectional area - tension	A_s	[mm ²]	36.6	58	84.3	157	245
Elastic section modulus	W_{el}	[mm ³]	50.3	98.2	169.7	402.1	785.4
Characteristic bending resistance	$M^0_{Rk,s}$	[Nm]	45.04	87.97	152.01	365.97	728.54
Design bending resistance	M	[Nm]	36.03	70.38	121.61	292.78	592.83

Basic performance data

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

Size			M8	M10	M12	M16	M20
Effective embedment depth h_{ef}	[mm]		60.00	70.00	80.00	100.00	125.00
MEAN ULTIMATE LOAD							
TENSION LOAD $N_{Ru,m}$	[kN]		10.84	14.46	19.28	42.17	48.19
SHEAR LOAD $V_{Ru,m}$	[kN]		20.28	31.68	45.62	81.95	77.81
CHARACTERISTIC LOAD							
TENSION LOAD N_{Rk}	[kN]		9.00	12.00	16.00	35.00	40.00
SHEAR LOAD V_{Rk}	[kN]		19.20	30.00	43.20	77.60	73.68
DESIGN LOAD							
TENSION LOAD N_{Rd}	[kN]		5.00	6.67	8.89	19.44	22.22
SHEAR LOAD V_{Rd}	[kN]		15.36	24.00	34.56	62.08	58.94

Design performance data

(-) failure is not decisive

Size			M8	M10	M12	M16	M20
Effective embedment depth	h_{ef}	[mm]	60.00	70.00	80.00	100.00	125.00
TENSION LOAD							
STEEL FAILURE							
Characteristic resistance	$N_{Rk,s}$	[kN]	29.30	46.40	57.40	125.60	196.00
Partial safety factor	γ_{Ms}	-	1.50	1.50	1.50	1.50	1.50
PULL-OUT FAILURE; NON-CRACKED CONCRETE C20/25							
Characteristic resistance	$N_{Rk,p}$	[kN]	9.00	12.00	16.00	35.00	40.00
PULL-OUT FAILURE							
Installation safety factor	γ_{inst}	-	1.20	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	1.22
Increasing factors for $N_{Rd,p}$ - C40/50	ψ_c	-	1.41	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	1.55
CONCRETE CONE FAILURE							
Installation safety factor	γ_{inst}	-	1.20	1.20	1.20	1.20	1.20
Factor for non-cracked concrete	$k_{ucr,N}$	-	11.00	11.00	11.00	11.00	11.00
Spacing	$s_{cr,N}$	[mm]	180.00	210.00	240.00	300.00	375.00
Edge distance	$c_{cr,N}$	[mm]	90.00	105.00	120.00	150.00	188.00
CONCRETE SPLITTING FAILURE							
Installation safety factor	γ_{inst}	-	1.20	1.20	1.20	1.20	1.20
Spacing	$s_{cr,sp}$	[mm]	180.00	210.00	240.00	300.00	375.00
Edge distance	$c_{cr,sp}$	[mm]	90.00	105.00	120.00	150.00	188.00

Design performance data

Size			M8	M10	M12	M16	M20
SHEAR LOAD							
STEEL FAILURE							
Characteristic resistance without lever arm	$V_{Rk,s}$	[kN]	19.20	30.00	43.20	77.60	73.68
Ductility factor	k_{γ}	-	0.80	0.80	0.80	0.80	0.80
Characteristic resistance with lever arm	$M_{Rk,s}$	[Nm]	45.04	87.97	152.01	365.97	728.54
Partial safety factor	γ_{Ms}	-	1.25	1.25	1.25	1.25	1.25
CONCRETE PRY-OUT FAILURE							
Factor	k	-	2.00	2.00	2.00	2.00	2.00
Installation safety factor	γ_{inst}	-	1.00	1.00	1.00	1.00	1.00
CONCRETE EDGE FAILURE							
Effective length of anchor	ℓ_f	[mm]	60.00	70.00	80.00	100.00	125.00
Anchor diameter	d_{nom}	[mm]	8.00	10.00	12.00	16.00	20.00
Installation safety factor	γ_{inst}	-	1.00	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-08090/15 ¹⁾	8	90	50	50	8000	3.8	3.8	638.0	5010445500107
R-SPL-08110/40 ¹⁾	8	110	50	50	8000	4.6	4.6	770.8	5010445500152
R-SPL-10105/20 ¹⁾	10	105	50	50	8000	6.6	6.6	1089.2	5010445500206
R-SPL-10120/40 ¹⁾	10	120	50	50	6000	7.9	7.9	976.2	5010445500251
R-SPL-10140/60 ¹⁾	10	140	50	50	4000	9.0	9.0	752.0	5010445500305
R-SPL-12120/25 ¹⁾	12	120	25	25	4000	5.8	5.8	956.4	5010445500350
R-SPL-12150/50 ¹⁾	12	150	25	25	3000	7.0	7.0	870.6	5010445500404
R-SPL-16145/25 ¹⁾	16	145	10	10	1600	4.8	4.8	801.4	5010445500503
R-SPL-16170/50 ¹⁾	16	170	10	10	1200	5.6	5.6	700.3	5010445500558
R-SPL-20175/30 ¹⁾	20	175	10	10	1200	8.4	8.4	1033.4	5010445500657

1) ETA-11/0126