

Heavy-Duty Expansion Anchors

SafetyPlus:

R-SPLII

R-SPL

- Loose Bolt

R-SPL-BP

- Bolt Projecting

R-SPL-C

- Countersunk

Case-hardened nut with optimum taper angle for maximum expansion

Integral controlled collapse and anti-rotation feature ensures fixture is firmly secured

Sleeve provides maximum shear load resistance

Unique zig-zag feature provides balanced expansion ensuring secure setting and maximum load carrying capacity

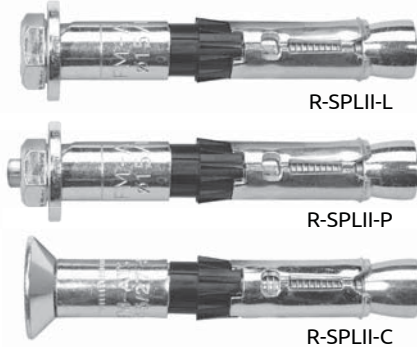
High strength steel washer

8.8 grade bolts



R-SPLII, R-SPLII-P, R-SPLII-C SafetyPlus

High performance mechanical anchor for cracked and non-cracked concrete



Approvals and Reports

- ETA-14/0345, Option 1



Versions

- R-SPLII-L - Loose Bolt
- R-SPLII-P - Bolt Projecting
- R-SPLII-C - Countersunk

Product overview

Features and benefits

- Mechanical anchor for highest tension and shear loads
- Seismic category C2 for Structural applications. Seismic category C1 for non-structural use in areas with low seismic risk
- For usage with required fire resistance
- Option 1 ETA For Cracked and Non- Cracked Concrete
- Antirotation brush to prevent rotation during installation
- Anchor's construction allows easy through-installation (drilling and installation through fixed material)
- Three types of tips (nut, flat or tapered bolt) allow simple fitment for installed element
- 8.8 grade steel material of anchor provides high durability

Applications

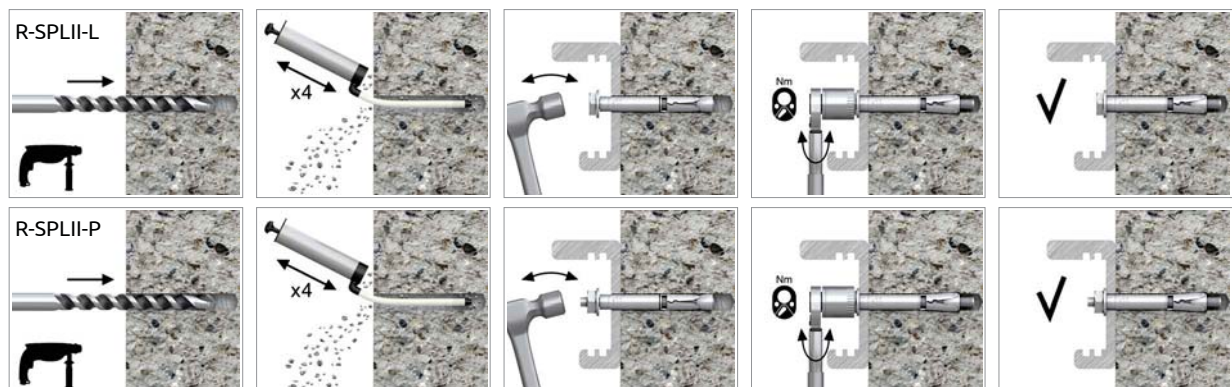
- Structural steel
- Masonry support
- Cladding restraints
- Road Signs
- Heavy machinery
- Racking systems
- Industrial doors
- Safety barriers

Base materials

Approved for use in:

- Non-cracked concrete C20/25-C50/60
- Cracked concrete C20/25-C50/60
- Reinforced concrete
- Concrete subjected to seismic actions cat. C1/C2

Installation guide



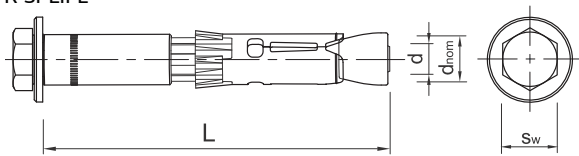
Installation guide (cont.)



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

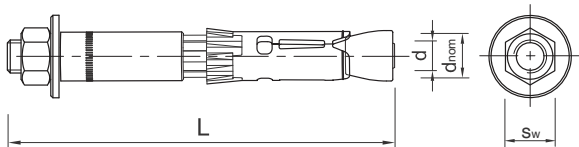
Product information

R-SPLII-L



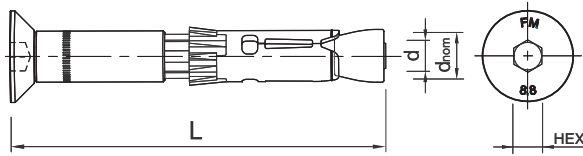
Size	Product Code	Anchor			Fixture	
		Bolt diameter	External diameter	Length	Max. thickness	Hole diameter
		d	d _i	L	t _{fix}	d _f
		[mm]	[mm]	[mm]	[mm]	
R-SPLII SafetyPlus - Loose Bolt						
M6	R-SPL-II-06080/20L	6	10	80	20	12
	R-SPL-II-06110/50L	6	10	110	50	12
M8	R-SPL-II-08080/10L	8	10	80	10	14
	R-SPL-II-08090/20L	8	10	90	20	14
	R-SPL-II-08120/20L	8	10	120	50	14
M10	R-SPL-II-10090/10L	10	15	90	10	17
	R-SPL-II-10100/20L	10	15	100	20	17
	R-SPL-II-10130/50L	10	15	130	50	17
M12	R-SPL-II-12110/10L	12	18	110	10	20
	R-SPL-II-12125/25L	12	18	125	25	20
	R-SPL-II-12150/50L	12	18	150	50	20
M16	R-SPL-II-16125/10L	16	24	125	10	26
	R-SPL-II-16140/25L	16	24	140	25	26

R-SPLII-P



Size	Product Code	Anchor			Fixture	
		Bolt diameter	External diameter	Length	Max. thickness	Hole diameter
		d	d _i	L	t _{fix}	d _f
		[mm]	[mm]	[mm]	[mm]	
R-SPLII-P SafetyPlus - Bolt Projecting						
M6	R-SPL-II-06080/20P	6	10	80	20	12
	R-SPL-II-06110/50P	6	10	110	50	12
M8	R-SPL-II-08090/20P	8	12	90	20	14
M10	R-SPL-II-10100/20P	10	15	100	20	17
M12	R-SPL-II-12125/25P	12	18	125	25	20
M16	R-SPL-II-16125/10P	16	24	125	10	26

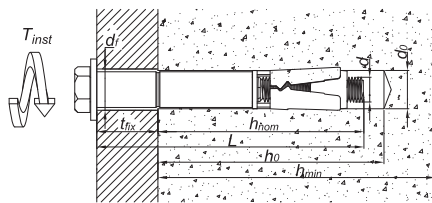
R-SPLII-C



Size	Product Code	Anchor			Fixture	
		Bolt diameter	External diameter	Length	Max. thickness	Hole diameter
		d	d _e	L	t _{fix}	d _f
		[mm]	[mm]	[mm]	[mm]	[mm]
R-SPLII-C SafetyPlus - Countersunk						
M6	R-SPL-II-06080/20C	6	10	80	25	17*/12
M8	R-SPL-II-08090/26C	8	12	90	26	21*/14
M10	R-SPL-II-10100/27C	10	15	100	27	26*/17
M12	R-SPL-II-12125/33C	12	18	125	33	31*/20

*Maximum head diameter

Installation data



Size			M6	M8	M10	M12	M16
Thread diameter	d	[mm]	6	8	10	12	16
Hole diameter in substrate	d ₀	[mm]	10	12	15	18	24
Installation torque	T _{inst}	[Nm]	10	20	45	80	150
Min. hole depth in substrate	h ₀	[mm]	75	85	95	115	130
Installation depth	h _{nom}	[mm]	60	70	80	100	115
Min. substrate thickness	h _{min}	[mm]	100	120	140	180	200
Min. spacing	s _{min}	[mm]	50	60	70	80	100
Min. edge distance	c _{min}	[mm]	50	60	70	80	100

Mechanical properties

Size			M6	M8	M10	M12	M16
Nominal ultimate tensile strength - tension	f _{uk}	[N/mm ²]	800	800	800	800	830
Nominal yield strength - tension	f _{yk}	[N/mm ²]	640	640	640	640	640
Cross sectional area - tension	A _s	[mm ²]	20.1	36.6	58.0	84.3	157.0
Elastic section modulus	W _{el}	[mm ³]	21.2	50.3	98.2	169.7	402.1
Characteristic bending resistance	M ⁰ _{Rk,s}	[Nm]	12	30	60	105	266
Design bending resistance	M	[Nm]	9.6	24	48	84	214

Basic performance data

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

Size		M6	M8	M10	M12	M16	M6	M8	M10	M12	M16
Substrate		Non-cracked concrete					Cracked concrete				
Standard embedment depth h _{ef}	[mm]	49	59	67	88	99	49	59	67	88	99
CHARACTERISTIC LOAD											
TENSION LOAD N _{Rk}	[kN]	17.3	22.9	27.7	41.7	49.7	9.0	12.0	16.0	25.0	35.5
SHEAR LOAD V _{Rk}	[kN]	14.0	22.9	42.0	50.0	97.0	12.3	16.3	39.5	50.0	70.9

Basic performance data (cont.)

DESIGN LOAD											
TENSION LOAD N_{Rd}	[kN]	11.5	15.3	18.5	27.8	33.2	6.00	8.0	10.7	16.7	23.6
SHEAR LOAD V_{Rd}	[kN]	11.2	15.3	33.6	40.0	66.3	8.23	10.88	26.3	39.6	47.3
RECOMMENDED LOAD*											
TENSION LOAD N_{Rec}	[kN]	8.25	10.9	13.2	19.9	23.7	4.29	5.71	7.62	11.9	16.9
SHEAR LOAD V_{Rec}	[kN]	8.00	10.9	24.0	28.6	47.4	5.88	7.77	18.8	28.3	33.8

Seismic performance data

Size	M6	M8	M10	M12	M16	M6	M8	M10	M12	M16	
Seismic Performance Category	C1					C2					
Standard embedment depth h_{ef}	[mm]	49	59	67	88	99	49	59	67	88	99
CHARACTERISTIC LOAD											
TENSION STEEL FAILURE NRk.s.seis	[kN]	16.0	29.0	46.0	67.0	126.0	-	29.0	46.0	67.0	126.0
PULL-OUT FAILURE NRk.p.seis	[kN]	6.8	12.0	16.0	25.0	35.5*	-	3.9	7.8	15.3	28.8
SHEAR STEEL FAILURE VRk.s.seis	[kN]	9.8	13.0	20.0	20.0	48.5	-	10.2	17.0	17.0	43.9
DESIGN LOAD											
TENSION STEEL FAILURE NRd.s.seis	[kN]	10.7	19.3	30.7	44.7	84.0	-	19.3	30.7	44.7	84.0
PULL-OUT FAILURE NRd.p.seis	[kN]	4.5	8.0	10.7	16.7	23.7	-	2.6	5.2	10.2	19.2
SHEAR STEEL FAILURE VRd.s.seis	[kN]	7.84	6.4	16.0	16.0	38.8	-	8.16	13.6	13.6	35.1

*Pull-Out Failure not decisive

Product commercial data

Size	Product Code	Anchor		Quantity [pcs]			Weight [kg]			Bar Code
		Diameter [mm]	Length [mm]	Box	Outer	Pallet	Box	Outer	Pallet	
R-SPLII SafetyPlus - Loose Bolt										
M6	R-SPL-II-06080/20L	6	80	50	400	9600	2.2	17.2	412.8	5010445007217
	R-SPL-II-06110/50L	6	110	50	300	7200	2.9	17.4	417.6	5010445007224
M8	R-SPL-II-08080/10L	8	80	25	200	4800	1.6	13.0	312.0	5010445007231
	R-SPL-II-08090/20L	8	90	25	200	4800	1.8	14.4	345.6	5010445007248
	R-SPL-II-08120/20L	8	120	25	150	3600	2.4	14.4	345.6	5010445007255
M10	R-SPL-II-10090/10L	10	90	20	160	3840	2.3	18.7	449.3	5010445007262
	R-SPL-II-10100/20L	10	100	20	160	3840	2.6	20.5	491.5	5010445007279
	R-SPL-II-10130/50L	10	130	20	120	2880	3.4	20.2	483.8	5010445007286
M12	R-SPL-II-12110/10L	12	110	20	80	1920	4.2	17.0	407.0	5010445007293
	R-SPL-II-12125/25L	12	125	20	20	3840	4.8	4.8	917.8	5010445007309
	R-SPL-II-12150/50L	12	150	20	20	3840	5.6	5.6	1075.2	5010445007316
M16	R-SPL-II-16125/10L	16	125	10	60	1440	4.4	26.2	629.3	5010445007323
	R-SPL-II-16140/25L	16	140	10	40	960	4.8	19.2	460.8	5010445007330
R-SPLII-P SafetyPlus - Bolt Projecting										
M6	R-SPL-II-06080/20P	6	80	50	400	9600	2.1	16.9	404.7	5010445007347
	R-SPL-II-06110/50P	6	110	50	300	7200	3.0	17.7	425.2	5010445007354
M8	R-SPL-II-08090/20P	8	90	25	200	4800	1.7	13.8	331.8	5010445007361
M10	R-SPL-II-10100/20P	10	100	20	160	3840	2.6	20.6	495.4	5010445007378
M12	R-SPL-II-12125/25P	12	125	20	20	3840	4.6	4.6	874.4	5010445007385
M16	R-SPL-II-16125/10P	16	125	10	60	1440	4.3	25.9	622.7	5010445007392
R-SPLII-C SafetyPlus - Countersunk										
M6	R-SPL-II-06080/20C	6	80	50	400	9600	2.1	16.6	398.4	5010445007408
M8	R-SPL-II-08090/26C	8	90	25	200	4800	1.8	14.0	336.0	5010445007415
M10	R-SPL-II-10100/27C	10	100	20	160	3840	2.3	18.6	445.4	5010445007422
M12	R-SPL-II-12125/33C	12	125	20	80	1920	4.5	18.1	433.9	5010445007439

R-SPL, R-SPL-BP, R-SPL-C SafetyPlus

High performance mechanical anchor



Approvals and Reports

- ETA-11/0126; ETAG 001-2, Option 7



Versions

- R-SPL - Loose Bolt
- R-SPL-BP - Bolt Projecting
- R-SPL-C - Countersunk

Product overview

Features and benefits

- Design of SafetyPlus allows 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

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

Also suitable for use in:

- Natural Stone

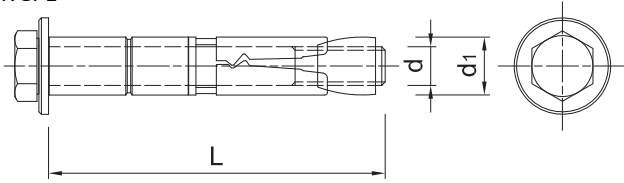
Installation guide



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

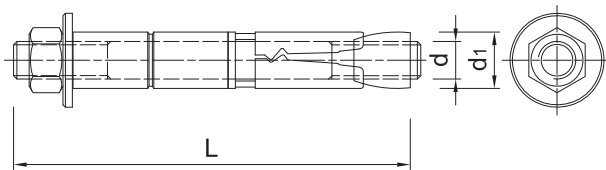
Product information

R-SPL



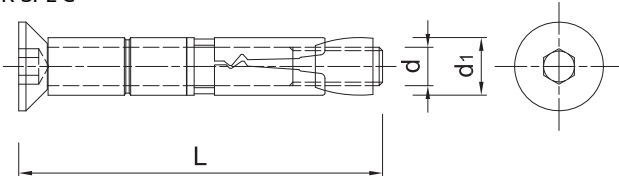
Size	Product Code	Anchor			Fixture	
		Bolt diameter	External diameter	Length	Max. thickness	Hole diameter
		d	d ₁	L	t _{fix}	d _f
		[mm]	[mm]	[mm]	[mm]	[mm]
M8	R-SPL-08090/15	8	12	90	15	14
	R-SPL-08110/40	8	12	110	40	14
M10	R-SPL-10105/20	10	15	105	20	17
	R-SPL-10120/40	10	15	120	40	17
	R-SPL-10140/60	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

R-SPL-BP



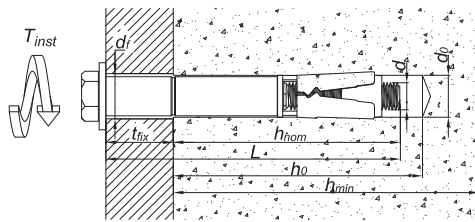
Size	Product Code	Anchor			Fixture	
		Bolt diameter	External diameter	Length	Max. thickness	Hole diameter
		d	d ₁	L	t _{fix}	d _f
		[mm]	[mm]	[mm]	[mm]	[mm]
M8	R-SPL-BP-08095/15	8	12	95	15	14
M10	R-SPL-BP-10110/20	10	15	110	20	17
M12	R-SPL-BP-12135/25	12	18	120	25	20
	R-SPL-BP-12160/50	12	18	160	50	20
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

R-SPL-C



Size	Product Code	Anchor				Fixture	
		Bolt diameter	External diameter	Head diameter	Length	Max. thickness	Hole diameter
		d	d ₁	d ₂	L	t _{fix}	d _f
		[mm]	[mm]	[mm]	[mm]	[mm]	
M8	R-SPL-C-08090/20	8	12	22	90	20	14
M10	R-SPL-C-10105/25	10	15	28	105	25	17
M12	R-SPL-C-12125/30	12	18	33	120	30	20
M16	R-SPL-C-16145/30	16	24	40	145	30	26

Installation data



Size			M8	M10	M12	M16	M20
Thread diameter	d	[mm]	8	10	12	16	20
Hole diameter in substrate	d _o	[mm]	12	15	18	24	28
Min. hole depth in substrate	h _o	[mm]	80	90	100	125	155
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	830
Nominal yield strength - tension	F _{yk}	[N/mm ²]	640	640	640	640	660
Cross sectional area - tension	A _s	[mm ²]	36.6	58.0	84.3	157.0	245.0
Elastic section modulus	W _{el}	[mm ³]	50.3	98.2	169.6	402.1	785.4
Characteristic bending resistance	M ⁰ _{Rk,s}	[Nm]	45.0	88.0	152.0	366.0	729.0
Design bending resistance	M	[Nm]	36.0	70.0	122.0	293.0	583.0

Basic performance data

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

Size		M8	M10	M12	M16	M20
Embedment depth h _{ef}	[mm]	60	70	80	100	125
MEAN ULTIMATE LOAD						
TENSION LOAD N _{Ru,m}	[kN]	15.7	19.7	28.2	60.1	66.8
SHEAR LOAD V _{Ru,m}	[kN]	25.1	35.0	57.6	98.1	88.4
CHARACTERISTIC LOAD						
TENSION LOAD N _{Rk}	[kN]	9.00	12.0	16.0	35.0	40.0
SHEAR LOAD V _{Rk}	[kN]	18.0	24.0	32.0	70.0	73.7
DESIGN LOAD						
TENSION LOAD N _{Rd}	[kN]	4.29	5.71	7.62	16.7	19.0
SHEAR LOAD V _{Rd}	[kN]	8.57	11.4	15.2	33.3	38.1
RECOMMENDED LOAD						
TENSION LOAD N _{rec}	[kN]	3.06	4.08	5.44	11.9	13.6
SHEAR LOAD V _{rec}	[kN]	6.12	8.16	10.9	23.8	27.2

Product commercial data

Size	Product Code	Anchor		Quantity [pcs]			Weight [kg]			Bar Code
		Diameter [mm]	Length [mm]	Box	Outer	Pallet	Box	Outer	Pallet	
R-SPL SafetyPlus - Loose Bolt										
M8	R-SPL-08090/15	8	90	50	50	9000	3.8	3.8	705.0	5010445500107
	R-SPL-08110/40	8	110	50	50	5400	4.7	4.7	532.2	5010445500152
M10	R-SPL-10105/20	10	105	50	50	5400	6.6	6.6	737.4	5010445500206
	R-SPL-10120/40	10	120	50	50	5400	7.2	7.2	802.2	5010445500251
	R-SPL-10140/60	10	140	50	50	3000	9.0	9.0	570.0	5010445500305
M12	R-SPL-12120/25	12	120	25	25	2250	5.8	5.8	547.5	5010445500350
	R-SPL-12150/50	12	150	25	25	2250	5.8	5.8	549.8	5010445500404
M16	R-SPL-16145/25	16	145	10	10	900	4.7	4.7	453.0	5010445500503
	R-SPL-16170/50	16	170	10	10	900	5.6	5.6	530.4	5010445500558
M20	R-SPL-20175/30	20	175	10	10	690	8.5	8.5	618.6	5010445500657
R-SPL-BP SafetyPlus - Bolt Projecting										
M8	R-SPL-BP-08095/15	8	95	50	50	9000	3.5	3.5	660.0	5010445501104
M10	R-SPL-BP-10110/20	10	110	50	50	5400	6.3	6.3	710.4	5010445501203
M12	R-SPL-BP-12135/25	12	120	25	25	2700	6.0	6.0	678.0	5010445501357
	R-SPL-BP-12160/50	12	160	25	25	2250	6.5	6.5	615.0	5010445501401
M16	R-SPL-BP-16160/25	16	160	10	10	900	4.6	4.6	445.8	5010445501500
	R-SPL-BP-16185/50	16	185	10	10	690	5.4	5.4	401.2	5010445501555
M20	R-SPL-BP-20190/30	20	190	10	10	690	8.0	8.0	582.0	5010445501654
R-SPL-C SafetyPlus - Countersunk										
M8	R-SPL-C-08090/20	8	90	50	50	9000	3.7	3.7	687.0	5010445502101
M10	R-SPL-C-10105/25	10	105	50	50	5400	6.6	6.6	737.4	5010445502200
M12	R-SPL-C-12125/30	12	120	25	25	2250	5.7	5.7	543.0	5010445502354
M16	R-SPL-C-16145/30	16	145	10	10	900	4.6	4.6	444.0	5010445502507