

R-SPL SafetyPlus - Loose Bolt

High performance mechanical anchor - loose bolt option



Approvals and Reports

- ETA-11/0126
- UKTA-22/6101



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

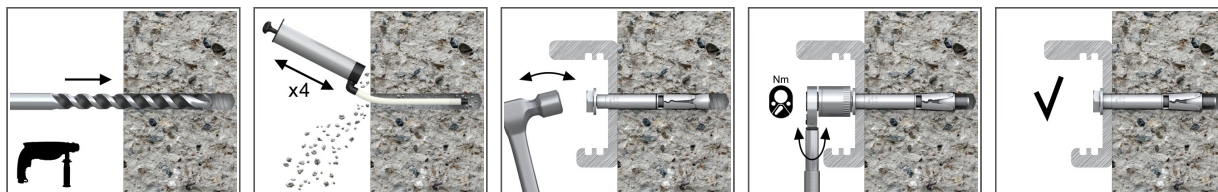
Approved for use in:

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

Also suitable for use in:

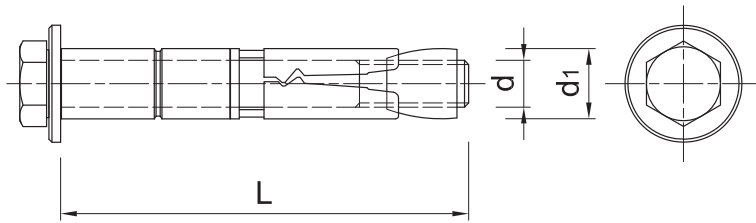
- Natural Stone (after site testing)

Installation guide



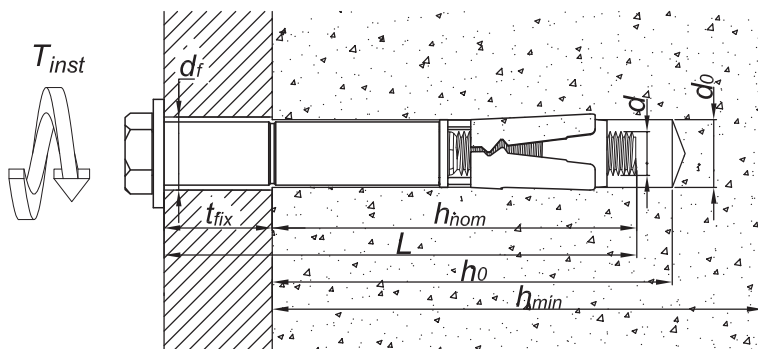
1. Drill a hole of required diameter and depth
2. Clear the hole of drilling dust and debris (using blowpump or equivalent method)
3. Insert anchor through fixture into hole and tap until required installation depth is achieved
4. Tighten to the recommended torque

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_o [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_o [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 | 100.0 | 125.0 |
| TENSION LOAD | | | | | | | |
| STEEL FAILURE | | | | | | | |
| Characteristic resistance | $N_{Rk,s}$ | [kN] | 29.30 | 46.40 | 57.40 | 125.6 | 196.0 |
| 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] | 180.0 | 210.0 | 240.0 | 300.0 | 375.0 |
| Edge distance | $c_{cr,N}$ | [mm] | 90.00 | 105.0 | 120.0 | 150.0 | 188.0 |
| CONCRETE SPLITTING FAILURE | | | | | | | |
| Installation safety factor | γ_{inst} | - | 1.20 | 1.20 | 1.20 | 1.20 | 1.20 |
| Spacing | $s_{cr,sp}$ | [mm] | 180.0 | 210.0 | 240.0 | 300.0 | 375.0 |
| Edge distance | $c_{cr,sp}$ | [mm] | 90.00 | 105.0 | 120.0 | 150.0 | 188.0 |

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 | 152.0 | 365.9 | 728.5 |
| 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 | 100.0 | 125.0 |
| 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