

R-KEX II with Threaded Rods

Premium pure epoxy resin approved for use in cracked and non-cracked concrete



Approvals and Reports

- ETA-21/0244
- UKTA-22/6132



Product information

Features and benefits

- Approved for use with threaded rods for use in cracked and non-cracked concrete (EAD 330499-01-0601), working life up to 100 years df
- The strongest resin in the epoxy resin class
- Suitable for use in dry and wet substrates including flooded holes (use category I1 & I2)
- Seismic category C1, C2
- Installation direction D3 (downward and horizontal and upwards installation)
- Minimal shrinkage provides option of use in diamond-drilled holes and oversized holes
- Very high chemical resistance – suitable for applications exposed to influence of various agents (industrial or marine environment)
- Extended working time ensures easy installation of metal components (up to 30 min. in 20°C)

Applications

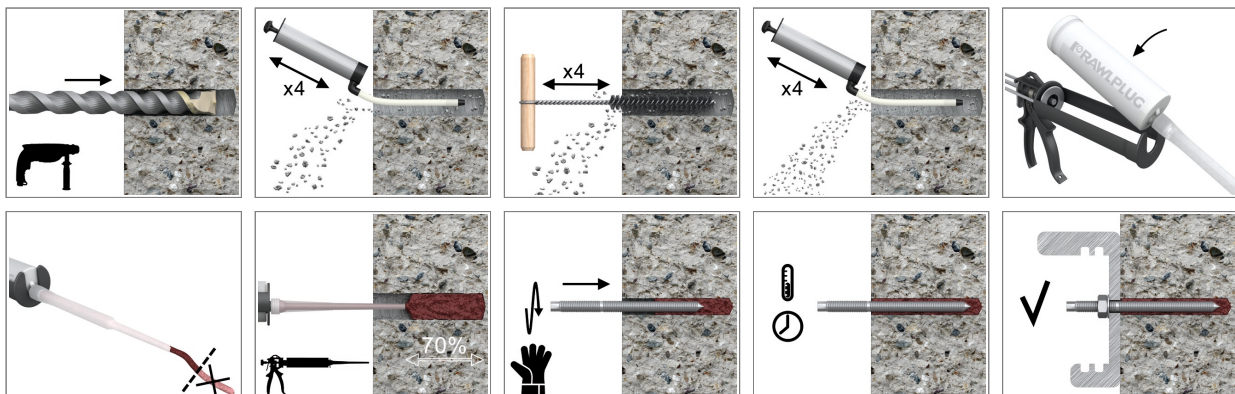
- Safety barriers
- Formwork support systems
- Structural steelwork
- Street lamps
- Curtain walling
- Racking systems
- Balustrading
- Barriers
- Cladding restraints
- Masonry support
- Heavy machinery
- Platforms

Base materials

Approved for use in:

- Cracked concrete C20/25-C50/60
- Non-cracked concrete C20/25-C50/60

Installation guide



Product information

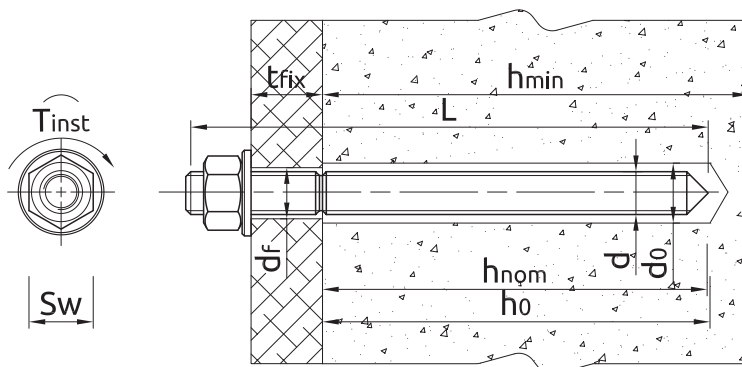
1. Drill hole to the required diameter and depth for stud size being used.
2. Clean the hole thoroughly with brush and hand pump at least four times before installation.
3. Insert cartridge into gun and attach nozzle.
4. Dispense to waste until even colour is obtained.
5. Insert the mixer nozzle to the bottom of the drill hole and inject resin, slowly withdrawing the nozzle as the hole is filled to 70% of its depth.
6. Immediately insert the stud, slowly and with slight twisting motion. Remove any excess resin around the hole before it sets and leave it undisturbed until the curing time elapses.
7. Attach fixture and tighten the nut to the required torque.

| Product Code | Resin | Description / Resin Type | Volume |
|--------------|----------|--------------------------|--------|
| | | | [ml] |
| R-KEX-II-385 | R-KEX II | Epoxy Resin | 385 |
| R-KEX-II-600 | | | 600 |

R-STUDS

| Size | Product Code | | | Anchor | | Fixture | | |
|------|-------------------|------------------|------------------|----------|--------|---------------|-------------------------------|---------------|
| | Steel class 5.8 | Steel class 8.8 | Steel grade A4 | Diameter | Length | Hole diameter | Max. thickness t_{fix} for: | |
| | | | | d | L | d_f | $h_{nom,min}$ | $h_{nom,12d}$ |
| | | | | [mm] | [mm] | [mm] | [mm] | [mm] |
| M8 | R-STUDS-08110 | R-STUDS-08110-88 | R-STUDS-08110-A4 | 8 | 110 | 9 | 40 | 4 |
| | R-STUDS-08160 | - | R-STUDS-08160-A4 | 8 | 160 | 9 | 90 | 54 |
| M10 | R-STUDS-10130 | R-STUDS-10130-88 | R-STUDS-10130-A4 | 10 | 130 | 12 | 48 | - |
| | R-STUDS-10170 | - | - | 10 | 170 | 12 | 88 | 38 |
| | R-STUDS-10190 | - | - | 10 | 190 | 12 | 108 | 58 |
| M12 | R-STUDS-12160 | R-STUDS-12160-88 | R-STUDS-12160-A4 | 12 | 160 | 14 | 65 | 1 |
| | R-STUDS-12190 | - | R-STUDS-12190-A4 | 12 | 190 | 14 | 95 | 31 |
| | R-STUDS-12220 | - | - | 12 | 220 | 14 | 145 | 61 |
| | R-STUDS-12260 | - | - | 12 | 260 | 14 | 165 | 101 |
| | R-STUDS-12300 | R-STUDS-12300-88 | R-STUDS-12300-A4 | 12 | 300 | 14 | 205 | 141 |
| M16 | R-STUDS-16190 | R-STUDS-16190-88 | R-STUDS-16190-A4 | 16 | 190 | 18 | 71 | - |
| | R-STUDS-16220 | R-STUDS-16220-88 | - | 16 | 220 | 18 | 101 | 9 |
| | R-STUDS-16260 | - | - | 16 | 260 | 18 | 141 | 49 |
| | R-STUDS-16300 | - | - | 16 | 300 | 18 | 181 | 89 |
| | R-STUDS-16380 | - | - | 16 | 380 | 18 | 261 | 169 |
| M20 | R-STUDS-20260 | R-STUDS-20260-88 | R-STUDS-20260-A4 | 20 | 260 | 22 | 117 | - |
| | R-STUDS-20300 | R-STUDS-20300-88 | - | 20 | 300 | 22 | 157 | 37 |
| | R-STUDS-20350 | - | - | 20 | 350 | 22 | 207 | 87 |
| | R-STUDS-20220-HDG | R-STUDS-20220-88 | - | 20 | 220 | 22 | 77 | - |
| | R-STUDS-20270-HDG | - | - | 20 | 270 | 22 | - | - |
| M24 | R-STUDS-24300 | R-STUDS-24300-88 | R-STUDS-24300-A4 | 24 | 300 | 26 | 132 | - |
| M30 | R-STUDS-30380 | R-STUDS-30380-88 | - | 30 | 380 | 32 | 181 | - |

Installation data



Installation data

R-STUDS

| Size | | | M8 | M10 | M12 | M16 | M20 | M24 | M30 |
|--------------------------------|----------------------|------|--------------------------------|--------------------------------|--------------------------------|------------------------------------|------------------------------------|------------------------------------|------------------------------------|
| Thread diameter | d | [mm] | 8 | 10 | 12 | 16 | 20 | 24 | 30 |
| Hole diameter in substrate | d ₀ | [mm] | 10 | 12 | 14 | 18 | 24 | 28 | 35 |
| Hole diameter in fixture | d _f | [mm] | 9 | 12 | 14 | 18 | 22 | 26 | 33 |
| Min. hole depth in substrate | h ₀ | [mm] | h _{nom} + 5 | h _{nom} + 5 | h _{nom} + 5 | h _{nom} + 5 | h _{nom} + 5 | h _{nom} + 5 | h _{nom} + 5 |
| Min. substrate thickness | h _{min} | [mm] | h _{nom} + 30 ≥ 100 | h _{nom} + 30 ≥ 100 | h _{nom} + 30 ≥ 100 | h _{nom} + 2d ₀ | h _{nom} + 2d ₀ | h _{nom} + 2d ₀ | h _{nom} + 2d ₀ |
| Installation torque | T _{inst} | [Nm] | 10 | 20 | 40 | 80 | 120 | 180 | 200 |
| Min. spacing | s _{min} | [mm] | 40 | 40 | 40 | 50 | 60 | 70 | 85 |
| Min. edge distance | c _{min} | [mm] | 40 | 40 | 40 | 50 | 60 | 70 | 85 |
| MINIMUM EMBEDMENT DEPTH | | | | | | | | | |
| Min. installation depth | h _{nom,min} | [mm] | 60 | 70 | 80 | 100 | 120 | 140 | 165 |
| MAXIMUM EMBEDMENT DEPTH | | | | | | | | | |
| Min. installation depth | h _{nom,max} | [mm] | 160 | 200 | 240 | 320 | 400 | 480 | 600 |

Minimum working and curing time

| Resin temperature | Concrete temperature | Curing time* | Working time |
|-------------------|----------------------|--------------|--------------|
| [°C] | [°C] | [min] | [min] |
| 5 | 5 | 2880 | 150 |
| 10 | 10 | 1080 | 120 |
| 20 | 20 | 480 | 35 |
| 25 | 30 | 300 | 12 |

*For wet concrete the curing time must be doubled

Mechanical properties

| Size | | | M8 | M10 | M12 | M16 | M20 | M24 | M30 |
|---|--------------------------------|----------------------|-----|-----|-----|-----|-----|-----|------|
| R-STUDS Metric Threaded Rods - Steel Class 5.8 | | | | | | | | | |
| Nominal ultimate tensile strength - tension | f _{uk} | [N/mm ²] | 500 | 500 | 500 | 500 | 500 | 500 | 500 |
| Nominal yield strength - tension | f _{yk} | [N/mm ²] | 400 | 400 | 400 | 400 | 400 | 400 | 400 |
| Cross sectional area - tension | A _s | [mm ²] | 37 | 58 | 84 | 157 | 245 | 353 | 560 |
| Elastic section modulus | W _{el} | [mm ³] | 31 | 62 | 109 | 278 | 541 | 935 | 1868 |
| Characteristic bending resistance | M ⁰ _{Rk,s} | [Nm] | 19 | 37 | 65 | 166 | 324 | 561 | 1124 |
| Design bending resistance | M | [Nm] | 15 | 30 | 52 | 133 | 259 | 449 | 899 |
| Allowable bending resistance | M _{rec} | [Nm] | 11 | 21 | 37 | 95 | 185 | 321 | 642 |
| R-STUDS Metric Threaded Rods - Steel Class 8.8 | | | | | | | | | |
| Nominal ultimate tensile strength - tension | f _{uk} | [N/mm ²] | 800 | 800 | 800 | 800 | 800 | 800 | 800 |
| Nominal yield strength - tension | f _{yk} | [N/mm ²] | 640 | 640 | 640 | 640 | 640 | 640 | 640 |
| Cross sectional area - tension | A _s | [mm ²] | 37 | 58 | 84 | 157 | 245 | 353 | 560 |
| Elastic section modulus | W _{el} | [mm ³] | 31 | 62 | 109 | 278 | 541 | 935 | 1868 |
| Characteristic bending resistance | M ⁰ _{Rk,s} | [Nm] | 30 | 60 | 105 | 266 | 519 | 898 | 1799 |
| Design bending resistance | M | [Nm] | 24 | 48 | 84 | 213 | 416 | 718 | 1439 |
| Allowable bending resistance | M _{rec} | [Nm] | 17 | 34 | 60 | 152 | 297 | 513 | 1028 |

Mechanical properties

| Size | | | M8 | M10 | M12 | M16 | M20 | M24 | M30 |
|--|--------------|----------------------|-----|-----|-----|-----|-----|-----|------|
| R-STUDS Metric Threaded Rods - Steel Class A4 | | | | | | | | | |
| Nominal ultimate tensile strength - tension | f_{uk} | [N/mm ²] | 700 | 700 | 700 | 700 | 700 | 700 | 700 |
| Nominal yield strength - tension | f_{yk} | [N/mm ²] | 450 | 450 | 450 | 450 | 450 | 450 | 450 |
| Cross sectional area - tension | A_s | [mm ²] | 37 | 58 | 84 | 157 | 245 | 353 | 560 |
| Elastic section modulus | W_{el} | [mm ³] | 31 | 62 | 109 | 278 | 541 | 935 | 1868 |
| Characteristic bending resistance | $M^0_{Rk,s}$ | [Nm] | 26 | 52 | 92 | 233 | 454 | 786 | 1574 |
| Design bending resistance | M | [Nm] | 17 | 34 | 59 | 149 | 291 | 504 | 1009 |
| Allowable bending resistance | M_{rec} | [Nm] | 12 | 24 | 42 | 107 | 208 | 360 | 721 |

Basic performance data

R-STUDS

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

| Size | M8 | M10 | M12 | M16 | M20 | M24 | M30 | M8 | M10 | M12 | M16 | M20 | M24 | M30 | |
|--|----------------------|------|------|------|-------|-------|-------|------------------|------|------|------|-------|-------|-------|-------|
| Substrate | Non-cracked concrete | | | | | | | Cracked concrete | | | | | | | |
| MEAN ULTIMATE LOAD | | | | | | | | | | | | | | | |
| TENSION LOAD $N_{Ru,m}$ | | | | | | | | | | | | | | | |
| R-STUDS METRIC THREADED RODS - STEEL CLASS 5.8 | | | | | | | | | | | | | | | |
| Minimum embedment depth | [kN] | 18.9 | 30.5 | 44.1 | 67.5 | 88.7 | 111.8 | 143.1 | 18.9 | 27.8 | 34.0 | 47.5 | 62.4 | 76.7 | 100.7 |
| Maximum embedment depth | [kN] | 18.9 | 30.5 | 44.1 | 81.9 | 128.1 | 184.8 | 294.0 | 18.9 | 30.5 | 44.1 | 81.9 | 128.1 | 184.8 | 294.0 |
| R-STUDS METRIC THREADED RODS - STEEL CLASS 8.8 | | | | | | | | | | | | | | | |
| Minimum embedment depth | [kN] | 28.7 | 39.5 | 48.3 | 67.5 | 88.7 | 111.8 | 143.1 | 22.1 | 27.8 | 34.0 | 47.5 | 62.4 | 76.7 | 100.7 |
| Maximum embedment depth | [kN] | 30.5 | 48.3 | 70.4 | 132.3 | 205.8 | 296.1 | 471.1 | 30.5 | 48.3 | 70.4 | 132.3 | 205.8 | 196.1 | 471.5 |
| R-STUDS METRIC THREADED RODS - STEEL CLASS A4 | | | | | | | | | | | | | | | |
| Minimum embedment depth | [kN] | 27.3 | 39.5 | 48.3 | 67.5 | 88.7 | 111.8 | 143.1 | 22.1 | 27.8 | 34.0 | 47.5 | 62.4 | 76.7 | 100.7 |
| Maximum embedment depth | [kN] | 27.3 | 43.1 | 62.0 | 115.5 | 179.6 | 259.4 | 412.7 | 27.3 | 43.1 | 62.0 | 115.5 | 179.6 | 259.4 | 412.7 |
| SHEAR LOAD $V_{Ru,m}$ | | | | | | | | | | | | | | | |
| R-STUDS METRIC THREADED RODS - STEEL CLASS 5.8 | | | | | | | | | | | | | | | |
| Minimum embedment depth | [kN] | 13.3 | 21.3 | 30.5 | 57.1 | 88.9 | 128.9 | 196.4 | 13.3 | 21.3 | 30.5 | 57.1 | 88.9 | 128.9 | 196.4 |
| Maximum embedment depth | [kN] | 13.3 | 21.3 | 30.5 | 57.1 | 88.9 | 128.9 | 196.4 | 13.3 | 21.3 | 30.5 | 57.1 | 88.9 | 128.9 | 196.4 |
| R-STUDS METRIC THREADED RODS - STEEL CLASS 8.8 | | | | | | | | | | | | | | | |
| Minimum embedment depth | [kN] | 18.3 | 29.0 | 42.2 | 79.4 | 123.5 | 177.7 | 282.9 | 18.3 | 29.0 | 42.2 | 79.4 | 123.5 | 153.4 | 201.4 |
| Maximum embedment depth | [kN] | 18.3 | 29.0 | 42.2 | 79.4 | 123.5 | 177.7 | 282.9 | 18.3 | 29.0 | 42.2 | 79.4 | 123.5 | 177.7 | 282.9 |
| R-STUDS METRIC THREADED RODS - STEEL CLASS A4 | | | | | | | | | | | | | | | |
| Minimum embedment depth | [kN] | 16.4 | 16.4 | 37.2 | 69.3 | 107.7 | 155.6 | 247.6 | 16.4 | 25.8 | 31.2 | 69.3 | 107.7 | 155.6 | 201.4 |
| Maximum embedment depth | [kN] | 16.4 | 16.4 | 37.2 | 69.3 | 107.7 | 155.6 | 247.6 | 16.4 | 25.8 | 31.2 | 69.3 | 107.7 | 155.6 | 247.6 |

Basic performance data

| Size | M8 | M10 | M12 | M16 | M20 | M24 | M30 | M8 | M10 | M12 | M16 | M20 | M24 | M30 | |
|--|------|------|------|------|-------|-------|-------|-------|------|------|------|-------|-------|-------|-------|
| CHARACTERISTIC LOAD | | | | | | | | | | | | | | | |
| TENSION LOAD N_{Rk} | | | | | | | | | | | | | | | |
| R-STUDS METRIC THREADED RODS - STEEL CLASS 5.8 | | | | | | | | | | | | | | | |
| Minimum embedment depth | [kN] | 18.0 | 28.8 | 35.2 | 49.2 | 64.7 | 81.5 | 104.3 | 12.1 | 17.6 | 21.1 | 34.4 | 45.3 | 57.0 | 73.0 |
| Maximum embedment depth | [kN] | 18.0 | 29.0 | 42.0 | 78.0 | 122.0 | 176.0 | 280.0 | 18.0 | 29.0 | 42.0 | 78.0 | 122.0 | 176.0 | 280.0 |
| R-STUDS METRIC THREADED RODS - STEEL CLASS 8.8 | | | | | | | | | | | | | | | |
| Minimum embedment depth | [kN] | 22.9 | 28.8 | 35.2 | 49.2 | 64.7 | 81.5 | 104.3 | 12.1 | 17.6 | 21.1 | 34.4 | 45.3 | 57.0 | 73.0 |
| Maximum embedment depth | [kN] | 29.0 | 46.0 | 67.0 | 126.0 | 196.0 | 282.0 | 449.0 | 29.0 | 46.0 | 63.3 | 112.6 | 175.9 | 217.2 | 282.7 |
| R-STUDS METRIC THREADED RODS - STEEL CLASS A4 | | | | | | | | | | | | | | | |
| Minimum embedment depth | [kN] | 22.9 | 28.8 | 35.2 | 49.2 | 64.7 | 81.5 | 104.3 | 12.1 | 17.6 | 21.1 | 34.4 | 45.3 | 57.0 | 73.0 |
| Maximum embedment depth | [kN] | 26.0 | 41.0 | 59.0 | 110.0 | 171.0 | 247.0 | 393.0 | 26.0 | 41.0 | 59.0 | 110.0 | 171.0 | 217.2 | 282.7 |
| SHEAR LOAD V_{Rk} | | | | | | | | | | | | | | | |
| R-STUDS METRIC THREADED RODS - STEEL CLASS 5.8 | | | | | | | | | | | | | | | |
| Minimum embedment depth | [kN] | 11.0 | 17.0 | 25.0 | 47.0 | 73.0 | 106.0 | 168.0 | 11.0 | 17.0 | 25.0 | 47.0 | 73.0 | 106.0 | 168.0 |
| Maximum embedment depth | [kN] | 11.0 | 17.0 | 25.0 | 47.0 | 73.0 | 106.0 | 168.0 | 11.0 | 17.0 | 25.0 | 47.0 | 73.0 | 106.0 | 168.0 |
| R-STUDS METRIC THREADED RODS - STEEL CLASS 8.8 | | | | | | | | | | | | | | | |
| Minimum embedment depth | [kN] | 15.0 | 23.0 | 34.0 | 63.0 | 98.0 | 141.0 | 208.5 | 15.0 | 23.0 | 34.0 | 63.0 | 90.5 | 114.1 | 146.0 |
| Maximum embedment depth | [kN] | 15.0 | 23.0 | 34.0 | 63.0 | 98.0 | 141.0 | 224.0 | 15.0 | 23.0 | 34.0 | 63.0 | 98.0 | 141.0 | 224.0 |
| R-STUDS METRIC THREADED RODS - STEEL CLASS A4 | | | | | | | | | | | | | | | |
| Minimum embedment depth | [kN] | 13.0 | 20.0 | 29.0 | 55.0 | 86.0 | 124.0 | 196.0 | 13.0 | 20.0 | 29.0 | 55.0 | 86.0 | 114.1 | 146.0 |
| Maximum embedment depth | [kN] | 13.0 | 20.0 | 29.0 | 55.0 | 86.0 | 124.0 | 196.0 | 13.0 | 20.0 | 29.0 | 55.0 | 86.0 | 124.0 | 196.0 |
| DESIGN LOAD | | | | | | | | | | | | | | | |
| TENSION LOAD N_{Rd} | | | | | | | | | | | | | | | |
| R-STUDS METRIC THREADED RODS - STEEL CLASS 5.8 | | | | | | | | | | | | | | | |
| Minimum embedment depth | [kN] | 12.0 | 19.2 | 23.5 | 32.8 | 43.1 | 54.3 | 69.5 | 8.04 | 11.7 | 14.1 | 23.0 | 30.2 | 38.0 | 48.7 |
| Maximum embedment depth | [kN] | 12.0 | 19.3 | 28.0 | 52.0 | 81.3 | 117.3 | 186.7 | 12.0 | 19.3 | 28.0 | 52.0 | 81.3 | 117.3 | 186.7 |
| R-STUDS METRIC THREADED RODS - STEEL CLASS 8.8 | | | | | | | | | | | | | | | |
| Minimum embedment depth | [kN] | 15.2 | 19.2 | 23.5 | 32.8 | 43.1 | 54.3 | 69.5 | 8.04 | 11.7 | 14.1 | 23.0 | 30.2 | 38.0 | 48.7 |
| Maximum embedment depth | [kN] | 19.3 | 30.7 | 44.7 | 84.0 | 130.7 | 188.0 | 299.3 | 19.3 | 30.7 | 42.2 | 75.1 | 117.3 | 144.8 | 188.5 |
| R-STUDS METRIC THREADED RODS - STEEL CLASS A4 | | | | | | | | | | | | | | | |
| Minimum embedment depth | [kN] | 13.9 | 19.2 | 23.5 | 32.8 | 43.1 | 54.3 | 69.5 | 8.04 | 11.7 | 14.1 | 23.0 | 30.2 | 38.0 | 48.7 |
| Maximum embedment depth | [kN] | 13.9 | 21.9 | 31.6 | 58.8 | 91.4 | 132.1 | 210.2 | 13.9 | 21.9 | 31.6 | 58.8 | 91.4 | 132.1 | 188.5 |
| SHEAR LOAD V_{Rd} | | | | | | | | | | | | | | | |
| R-STUDS METRIC THREADED RODS - STEEL CLASS 5.8 | | | | | | | | | | | | | | | |
| Minimum embedment depth | [kN] | 8.80 | 13.6 | 20.0 | 37.6 | 58.4 | 84.8 | 134.0 | 8.80 | 13.6 | 20.0 | 37.6 | 58.4 | 76.1 | 97.3 |
| Maximum embedment depth | [kN] | 8.80 | 13.6 | 20.0 | 37.6 | 58.4 | 84.8 | 134.0 | 8.80 | 13.6 | 20.0 | 37.6 | 58.4 | 84.8 | 134.4 |
| R-STUDS METRIC THREADED RODS - STEEL CLASS 8.8 | | | | | | | | | | | | | | | |
| Minimum embedment depth | [kN] | 12.0 | 18.4 | 27.2 | 50.4 | 78.4 | 108.7 | 139.0 | 12.0 | 18.4 | 27.2 | 45.9 | 60.4 | 76.1 | 97.3 |
| Maximum embedment depth | [kN] | 12.0 | 18.4 | 27.2 | 50.4 | 78.4 | 112.8 | 179.2 | 12.0 | 18.4 | 27.2 | 50.4 | 78.4 | 112.8 | 179.2 |
| R-STUDS METRIC THREADED RODS - STEEL CLASS A4 | | | | | | | | | | | | | | | |
| Minimum embedment depth | [kN] | 8.33 | 12.8 | 18.6 | 35.3 | 55.1 | 79.5 | 125.6 | 8.33 | 12.8 | 18.6 | 35.3 | 55.1 | 76.1 | 97.3 |
| Maximum embedment depth | [kN] | 8.33 | 12.8 | 18.6 | 35.3 | 55.1 | 79.5 | 125.6 | 8.33 | 12.8 | 18.6 | 35.3 | 55.1 | 79.5 | 125.6 |

Basic performance data

| Size | M8 | M10 | M12 | M16 | M20 | M24 | M30 | M8 | M10 | M12 | M16 | M20 | M24 | M30 | |
|--|------|------|------|------|------|------|-------|-------|------|------|------|------|------|-------|-------|
| RECOMMENDED LOAD | | | | | | | | | | | | | | | |
| TENSION LOAD N_{rec} | | | | | | | | | | | | | | | |
| R-STUDS METRIC THREADED RODS - STEEL CLASS 5.8 | | | | | | | | | | | | | | | |
| Minimum embedment depth | [kN] | 8.57 | 13.7 | 16.7 | 23.4 | 30.8 | 38.8 | 49.7 | 5.74 | 8.38 | 10.1 | 16.4 | 21.6 | 27.2 | 34.8 |
| Maximum embedment depth | [kN] | 8.57 | 13.8 | 20.0 | 37.1 | 58.1 | 83.8 | 133.3 | 8.57 | 13.8 | 20.0 | 37.1 | 58.1 | 83.8 | 133.3 |
| R-STUDS METRIC THREADED RODS - STEEL CLASS 8.8 | | | | | | | | | | | | | | | |
| Minimum embedment depth | [kN] | 10.9 | 13.7 | 16.8 | 23.4 | 30.8 | 38.8 | 49.7 | 5.74 | 8.38 | 10.1 | 16.4 | 21.6 | 27.2 | 34.8 |
| Maximum embedment depth | [kN] | 13.8 | 21.9 | 31.9 | 60.0 | 93.3 | 134.3 | 213.8 | 13.8 | 21.9 | 30.2 | 55.6 | 83.8 | 103.4 | 134.6 |
| R-STUDS METRIC THREADED RODS - STEEL CLASS A4 | | | | | | | | | | | | | | | |
| Minimum embedment depth | [kN] | 9.93 | 13.7 | 16.8 | 23.4 | 30.8 | 38.8 | 49.7 | 5.74 | 8.38 | 10.1 | 16.4 | 21.6 | 27.2 | 34.8 |
| Maximum embedment depth | [kN] | 9.93 | 15.7 | 22.5 | 42.0 | 65.3 | 94.4 | 150.1 | 9.93 | 15.7 | 22.5 | 42.0 | 65.3 | 94.4 | 134.6 |
| SHEAR LOAD V_{rec} | | | | | | | | | | | | | | | |
| R-STUDS METRIC THREADED RODS - STEEL CLASS 5.8 | | | | | | | | | | | | | | | |
| Minimum embedment depth | [kN] | 6.29 | 9.71 | 14.3 | 26.9 | 41.7 | 60.6 | 96.0 | 6.29 | 9.71 | 14.3 | 26.9 | 41.7 | 54.3 | 69.5 |
| Maximum embedment depth | [kN] | 6.29 | 9.71 | 14.3 | 26.9 | 41.7 | 60.6 | 96.0 | 6.29 | 9.71 | 14.3 | 26.9 | 41.7 | 60.6 | 96.0 |
| R-STUDS METRIC THREADED RODS - STEEL CLASS 8.8 | | | | | | | | | | | | | | | |
| Minimum embedment depth | [kN] | 8.57 | 13.1 | 19.4 | 36.0 | 56.0 | 77.6 | 99.3 | 8.57 | 13.1 | 19.4 | 32.8 | 43.1 | 54.3 | 69.5 |
| Maximum embedment depth | [kN] | 8.57 | 13.1 | 19.4 | 36.0 | 56.0 | 80.6 | 128.0 | 8.57 | 13.1 | 19.4 | 36.0 | 56.0 | 80.6 | 128.0 |
| R-STUDS METRIC THREADED RODS - STEEL CLASS A4 | | | | | | | | | | | | | | | |
| Minimum embedment depth | [kN] | 5.95 | 9.16 | 13.3 | 25.2 | 39.4 | 56.8 | 89.7 | 5.95 | 9.16 | 13.3 | 25.2 | 39.4 | 54.3 | 69.5 |
| Maximum embedment depth | [kN] | 5.95 | 9.16 | 13.3 | 25.2 | 39.4 | 56.8 | 89.7 | 5.95 | 9.16 | 13.3 | 25.2 | 39.4 | 56.8 | 89.7 |

Design performance data

R-STUDS

| Size | | | M8 | M10 | M12 | M16 | M20 | M24 | M30 |
|--|-----------------|----------------------|---------------------|---------------------|---------------------|---------------------|---------------------|---------------------|---------------------|
| TENSION LOAD | | | | | | | | | |
| STEEL FAILURE; STEEL CLASS 5.8 | | | | | | | | | |
| Characteristic resistance | $N_{Rk,s}$ | [kN] | 18.00 | 29.00 | 42.00 | 78.00 | 122.00 | 176.00 | 280.00 |
| Partial safety factor | γ_{Ms} | - | 1.50 | 1.50 | 1.50 | 1.50 | 1.50 | 1.50 | 1.50 |
| STEEL FAILURE; STEEL CLASS 8.8 | | | | | | | | | |
| Characteristic resistance | $N_{Rk,s}$ | [kN] | 29.00 | 46.00 | 67.00 | 126.00 | 196.00 | 282.00 | 448.00 |
| Partial safety factor | γ_{Ms} | - | 1.50 | 1.50 | 1.50 | 1.50 | 1.50 | 1.50 | 1.50 |
| STEEL FAILURE; STEEL GRADE A4-70 | | | | | | | | | |
| Characteristic resistance | $N_{Rk,s}$ | [kN] | 26.00 | 41.00 | 59.00 | 110.00 | 171.00 | 247.00 | 392.00 |
| Partial safety factor | γ_{Ms} | - | 1.87 | 1.87 | 1.87 | 1.87 | 1.87 | 1.87 | 1.87 |
| COMBINED PULL-OUT AND CONCRETE CONE FAILURE; NON-CRACKED CONCRETE, C20/25 (40°C/24°C) | | | | | | | | | |
| Characteristic bond resistance | T_{Rk} | [N/mm ²] | 17.00 | 16.00 | 17.00 | 15.00 | 15.00 | 13.00 | 12.00 |
| Sustained load factor | ψ_{sus}^0 | - | 0.75 | 0.75 | 0.75 | 0.75 | 0.75 | 0.75 | 0.75 |
| COMBINED PULL-OUT AND CONCRETE CONE FAILURE; NON-CRACKED CONCRETE, C20/25 (80°C/50°C) | | | | | | | | | |
| Characteristic bond resistance | T_{Rk} | [N/mm ²] | 15.00 | 14.00 | 15.00 | 13.00 | 13.00 | 12.00 | 10.00 |
| Sustained load factor | ψ_{sus}^0 | - | 0.72 | 0.72 | 0.72 | 0.72 | 0.72 | 0.72 | 0.72 |
| COMBINED PULL-OUT AND CONCRETE CONE FAILURE; CRACKED CONCRETE, C20/25 (40°C/24°C) | | | | | | | | | |
| Characteristic bond resistance | T_{Rk} | [N/mm ²] | 8.00 | 8.00 | 7.00 | 7.00 | 7.00 | 6.00 | 5.00 |
| Sustained load factor | ψ_{sus}^0 | - | 0.75 | 0.75 | 0.75 | 0.75 | 0.75 | 0.75 | 0.75 |
| COMBINED PULL-OUT AND CONCRETE CONE FAILURE; CRACKED CONCRETE, C20/25 (80°C/50°C) | | | | | | | | | |
| Characteristic bond resistance | T_{Rk} | [N/mm ²] | 7.00 | 7.00 | 6.00 | 6.00 | 6.00 | 5.00 | 4.00 |
| Sustained load factor | ψ_{sus}^0 | - | 0.72 | 0.72 | 0.72 | 0.72 | 0.72 | 0.72 | 0.72 |
| COMBINED PULL-OUT AND CONCRETE CONE FAILURE | | | | | | | | | |
| Installation safety factor | γ_{inst} | - | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Increasing factors for $N_{Rd,p}$ - C30/37 | ψ_c | - | 1.04 | 1.04 | 1.04 | 1.04 | 1.04 | 1.04 | 1.04 |
| Increasing factors for $N_{Rd,p}$ - C40/50 | ψ_c | - | 1.07 | 1.07 | 1.07 | 1.07 | 1.07 | 1.07 | 1.07 |
| Increasing factors for $N_{Rd,p}$ - C50/60 | ψ_c | - | 1.09 | 1.09 | 1.09 | 1.09 | 1.09 | 1.09 | 1.09 |
| CONCRETE CONE FAILURE | | | | | | | | | |
| Installation safety factor | γ_{inst} | - | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Factor for cracked concrete | $k_{cr,N}$ | - | 7.70 | 7.70 | 7.70 | 7.70 | 7.70 | 7.70 | 7.70 |
| Factor for non-cracked concrete | $k_{ucr,N}$ | - | 11.00 | 11.00 | 11.00 | 11.00 | 11.00 | 11.00 | 11.00 |
| Edge distance | $c_{cr,N}$ | [mm] | 1.5*h _{ef} | 1.5*h _{ef} | 1.5*h _{ef} | 1.5*h _{ef} | 1.5*h _{ef} | 1.5*h _{ef} | 1.5*h _{ef} |
| Spacing | $s_{cr,N}$ | [mm] | 3.0*h _{ef} | 3.0*h _{ef} | 3.0*h _{ef} | 3.0*h _{ef} | 3.0*h _{ef} | 3.0*h _{ef} | 3.0*h _{ef} |
| CONCRETE SPLITTING FAILURE | | | | | | | | | |
| Installation safety factor | γ_{inst} | - | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

Design performance data

| Size | | | M8 | M10 | M12 | M16 | M20 | M24 | M30 |
|---|-----------------|------|--------------------------------|--------------------------------|--------------------------------|--------------------------------|--------------------------------|--------------------------------|--------------------------------|
| SHEAR LOAD | | | | | | | | | |
| STEEL FAILURE; STEEL CLASS 5.8 | | | | | | | | | |
| Characteristic resistance without lever arm | $V_{Rk,s}$ | [kN] | 11.00 | 17.00 | 25.00 | 47.00 | 73.00 | 106.00 | 168.00 |
| Ductility factor | k_7 | - | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Characteristic resistance with lever arm | $M_{Rk,s}$ | [Nm] | 19.00 | 37.00 | 65.00 | 166.00 | 324.00 | 561.00 | 1124.00 |
| Partial safety factor | γ_{Ms} | - | 1.25 | 1.25 | 1.25 | 1.25 | 1.25 | 1.25 | 1.25 |
| STEEL FAILURE; STEEL CLASS 8.8 | | | | | | | | | |
| Characteristic resistance without lever arm | $V_{Rk,s}$ | [kN] | 15.00 | 23.00 | 34.00 | 63.00 | 98.00 | 141.00 | 224.00 |
| Ductility factor | k_7 | - | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Characteristic resistance with lever arm | $M_{Rk,s}$ | [Nm] | 30.00 | 60.00 | 105.00 | 266.00 | 519.00 | 898.00 | 1799.00 |
| Partial safety factor | γ_{Ms} | - | 1.25 | 1.25 | 1.25 | 1.25 | 1.25 | 1.25 | 1.25 |
| STEEL FAILURE; STEEL GRADE A4-70 | | | | | | | | | |
| Characteristic resistance without lever arm | $V_{Rk,s}$ | [kN] | 13.00 | 20.00 | 29.00 | 55.00 | 86.00 | 124.00 | 196.00 |
| Ductility factor | k_7 | - | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Characteristic resistance with lever arm | $M_{Rk,s}$ | [Nm] | 26.00 | 52.00 | 92.00 | 233.00 | 454.00 | 786.00 | 1574.00 |
| Partial safety factor | γ_{Ms} | - | 1.56 | 1.56 | 1.56 | 1.56 | 1.56 | 1.56 | 1.56 |
| CONCRETE PRY-OUT FAILURE | | | | | | | | | |
| Factor | k | - | 2.00 | 2.00 | 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 | 1.00 | 1.00 |
| CONCRETE EDGE FAILURE | | | | | | | | | |
| Anchor diameter | d_{nom} | [mm] | 8.00 | 10.00 | 12.00 | 16.00 | 20.00 | 24.00 | 30.00 |
| Effective length of anchor | ℓ_f | [mm] | $\min(300; h_{ef}; 12d_{nom})$ | $\min(300; h_{ef}; 12d_{nom})$ | $\min(300; h_{ef}; 12d_{nom})$ | $\min(300; h_{ef}; 12d_{nom})$ | $\min(300; h_{ef}; 12d_{nom})$ | $\min(300; h_{ef}; 12d_{nom})$ | $\min(300; h_{ef}; 12d_{nom})$ |
| Installation safety factor | γ_{inst} | - | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

Combined pull-out and concrete cone failure (EN 1992-4:2018, p.7.2.1.6., $7.14 - N_{Rk,p}^0 = \psi_{sus}^0 * \tau_{Rk} * n * d * h_{ef}$),
 $h_{ef} = h_{nom}$

Allowable values for resistance in case of Seismic performance category C1

| Size | | | M8 | M10 | M12 | M16 | M20 | M24 | M30 |
|--|-----------------------|----------------------|-------|-------|-------|--------|--------|--------|--------|
| TENSION LOAD | | | | | | | | | |
| STEEL FAILURE; STEEL CLASS 5.8 | | | | | | | | | |
| Characteristic resistance | $N_{Rk,s}$ | [kN] | 18.00 | 29.00 | 42.00 | 78.00 | 122.00 | 176.00 | 280.00 |
| Partial safety factor | $\gamma_{MsN,seisC1}$ | - | 1.50 | 1.50 | 1.50 | 1.50 | 1.50 | 1.50 | 1.50 |
| STEEL FAILURE; STEEL CLASS 8.8 | | | | | | | | | |
| Characteristic resistance | $N_{Rk,s}$ | [kN] | 29.00 | 46.00 | 67.00 | 125.00 | 196.00 | 282.00 | 448.00 |
| Partial safety factor | $\gamma_{MsN,seisC1}$ | - | 1.50 | 1.50 | 1.50 | 1.50 | 1.50 | 1.50 | 1.50 |
| STEEL FAILURE; STEEL GRADE A4-70 | | | | | | | | | |
| Characteristic resistance | $N_{Rk,s}$ | [kN] | 25.00 | 40.00 | 59.00 | 109.00 | 171.00 | 247.00 | 392.00 |
| Partial safety factor | $\gamma_{MsN,seisC1}$ | - | 1.87 | 1.87 | 1.87 | 1.87 | 1.87 | 1.87 | 1.87 |
| COMBINED PULL-OUT AND CONCRETE CONE FAILURE; CRACKED CONCRETE, C20/25 (40°C/24°C) | | | | | | | | | |
| Characteristic bond resistance | T_{Rk} | [N/mm ²] | 6.00 | 7.00 | 6.50 | 7.00 | 6.00 | 5.50 | 4.00 |
| COMBINED PULL-OUT AND CONCRETE CONE FAILURE; CRACKED CONCRETE, C20/25 (80°C/50°C) | | | | | | | | | |
| Characteristic bond resistance | T_{Rk} | [N/mm ²] | 5.00 | 6.50 | 5.50 | 6.00 | 5.50 | 5.00 | 3.50 |
| COMBINED PULL-OUT AND CONCRETE CONE FAILURE | | | | | | | | | |
| Installation safety factor | γ_{inst} | - | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |

Design performance data

| Size | | | M8 | M10 | M12 | M16 | M20 | M24 | M30 |
|---|-----------------------|------|-------|-------|-------|-------|-------|-------|--------|
| SHEAR LOAD | | | | | | | | | |
| STEEL FAILURE; STEEL CLASS 5.8 | | | | | | | | | |
| Characteristic resistance without lever arm | $V_{Rk,s}$ | [kN] | 6.30 | 10.10 | 14.70 | 27.30 | 42.70 | 61.60 | 98.00 |
| Partial safety factor | $\gamma_{MsV,seisC1}$ | - | 1.25 | 1.25 | 1.25 | 1.25 | 1.25 | 1.25 | 1.25 |
| STEEL FAILURE; STEEL CLASS 8.8 | | | | | | | | | |
| Characteristic resistance without lever arm | $V_{Rk,s}$ | [kN] | 10.20 | 16.10 | 23.50 | 44.10 | 68.60 | 98.70 | 156.80 |
| Partial safety factor | $\gamma_{MsV,seisC1}$ | - | 1.25 | 1.25 | 1.25 | 1.25 | 1.25 | 1.25 | 1.25 |
| STEEL FAILURE; STEEL GRADE A4-70 | | | | | | | | | |
| Characteristic resistance without lever arm | $V_{Rk,s}$ | [kN] | 9.10 | 14.40 | 20.70 | 38.50 | 59.90 | 86.50 | 137.40 |
| Partial safety factor | $\gamma_{MsV,seisC1}$ | - | 1.56 | 1.56 | 1.56 | 1.56 | 1.56 | 1.56 | 1.56 |

Allowable values for resistance in case of Seismic performance category C2

| Size | | | M12 | M16 | M20 | M24 |
|--|-----------------------|----------------------|-------|--------|--------|--------|
| TENSION LOAD | | | | | | |
| STEEL FAILURE; STEEL CLASS 5.8 | | | | | | |
| Characteristic resistance | $N_{Rk,s}$ | [kN] | 42.00 | 78.00 | 122.00 | 176.00 |
| Partial safety factor | $\gamma_{MsN,seisC2}$ | - | 1.50 | 1.50 | 1.50 | 1.50 |
| STEEL FAILURE; STEEL CLASS 8.8 | | | | | | |
| Characteristic resistance | $N_{Rk,s}$ | [kN] | 67.00 | 125.00 | 196.00 | 282.00 |
| Partial safety factor | $\gamma_{MsN,seisC2}$ | - | 1.50 | 1.50 | 1.50 | 1.50 |
| STEEL FAILURE; STEEL GRADE A4-70 | | | | | | |
| Characteristic resistance | $N_{Rk,s}$ | [kN] | 59.00 | 109.00 | 171.00 | 247.00 |
| Partial safety factor | $\gamma_{MsN,seisC2}$ | - | 1.87 | 1.87 | 1.87 | 1.87 |
| COMBINED PULL-OUT AND CONCRETE CONE FAILURE; CRACKED CONCRETE, C20/25 (40°C/24°C) | | | | | | |
| Characteristic bond resistance | T_{Rk} | [N/mm ²] | 5.65 | 3.93 | 5.18 | 3.65 |
| COMBINED PULL-OUT AND CONCRETE CONE FAILURE; CRACKED CONCRETE, C20/25 (80°C/50°C) | | | | | | |
| Characteristic bond resistance | T_{Rk} | [N/mm ²] | 5.03 | 3.50 | 4.61 | 3.25 |
| COMBINED PULL-OUT AND CONCRETE CONE FAILURE | | | | | | |
| Installation safety factor | γ_{inst} | - | 1.00 | 1.00 | 1.00 | 1.00 |
| SHEAR LOAD | | | | | | |
| STEEL FAILURE; STEEL CLASS 5.8 | | | | | | |
| Characteristic resistance without lever arm | $V_{Rk,s}$ | [kN] | 11.60 | 13.70 | 26.30 | 47.00 |
| Partial safety factor | $\gamma_{MsV,seisC2}$ | - | 1.25 | 1.25 | 1.25 | 1.25 |
| STEEL FAILURE; STEEL CLASS 8.8 | | | | | | |
| Characteristic resistance without lever arm | $V_{Rk,s}$ | [kN] | 18.50 | 22.00 | 42.10 | 75.10 |
| Partial safety factor | $\gamma_{MsV,seisC2}$ | - | 1.25 | 1.25 | 1.25 | 1.25 |
| STEEL FAILURE; STEEL GRADE A4-70 | | | | | | |
| Characteristic resistance without lever arm | $V_{Rk,s}$ | [kN] | 15.80 | 19.20 | 36.90 | 66.00 |
| Partial safety factor | $\gamma_{MsV,seisC2}$ | - | 1.56 | 1.56 | 1.56 | 1.56 |

Product commercial data

| Product Code | Volume [ml] | Quantity [pcs] | | | Weight [kg] | | | Bar Codes |
|--------------|-------------|----------------|-------|--------|-------------|-------|--------|---------------|
| | | Box | Outer | Pallet | Box | Outer | Pallet | |
| R-KEX-II-385 | 385 | 10 | 10 | 560 | 6.7 | 6.7 | 405.8 | 5906675028538 |
| R-KEX-II-600 | 600 | 7 | 7 | 588 | 7.0 | 7.0 | 620.3 | 5906675293721 |

1) ETA-21/0244