

# R-KEM II with Threaded Rods for Concrete

Universal polyester (styrene free) resin - European Approval for 15 substrates



## Approvals and Reports

- ETA-21/0243
- UKTA-22/6131



## Product information

### Features and benefits

- Approved for use in non-cracked concrete (EAD 330499-01-0601), working life up to 100 years
- Available in a winter version with faster curing time. It can be used from -20°C.
- Three colors - standard, stone & gray
- The most convenient bonded anchor for general purpose use
- Quick, secure and simple installation
- Product with wide spectrum of use in the medium load capacity area
- Ideal for applications where mechanical anchors are not suitable
- Easy dosage thanks to patented self-opening system and use of manual or electric gun
- Option of use standard manual silicone gun

### Applications

- Consoles
- Staircases
- Gates
- High racking
- Canopies
- Sanitary appliances
- Steel constructions
- Railings
- Handrails
- Ladders
- Cable trays

### Base materials

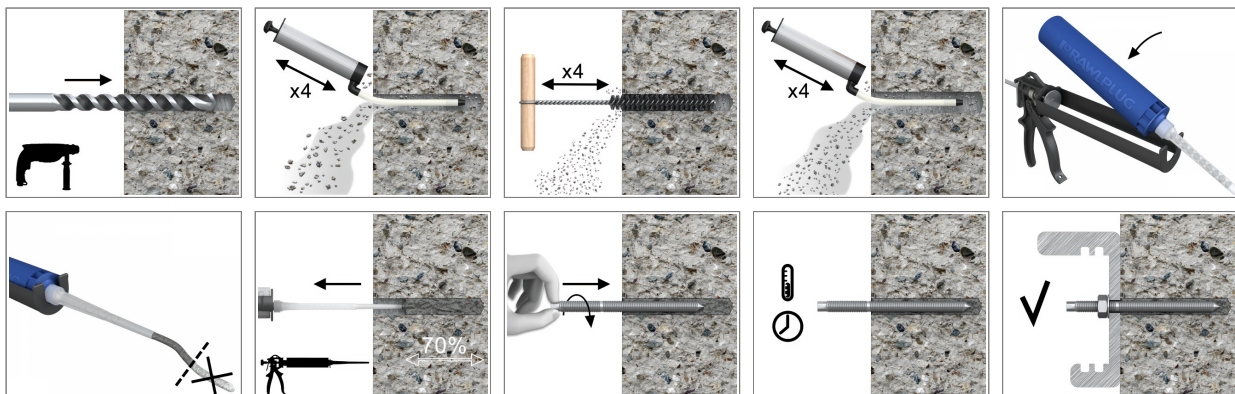
#### Approved for use in:

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

#### Also suitable for use in:

- Natural Stone (after site testing)

## Installation guide



## Product information

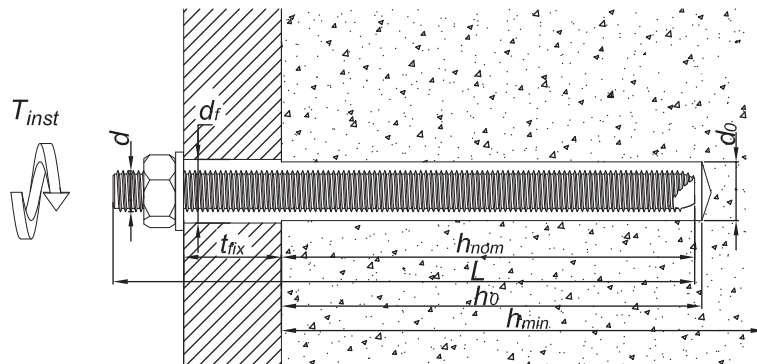
1. Drill hole to the required diameter and depth for stud size being used.
2. Solid substrates: clean the drill hole thoroughly with brush and hand pump at least four times before installation.
3. Insert cartridge into gun and attach nozzle.
4. Dispense to waste until even colour is obtained.
5. Insert 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-KEM-II-175       | R-KEMII   | Styrene Free Polyester Resin                                       | 175    |
| R-KEM-II-300       |           |                                                                    | 300    |
| R-KEM-II-410       |           |                                                                    | 410    |
| R-KEM-II-300-W     | R-KEMII-W | Low Temperature (Winter) / Rapid Cure Styrene Free Polyester Resin | 300    |
| R-KEM-II-300-S     | R-KEMII-S | High Temperature (Summer) / Slow Cure Styrene Free Polyester Resin |        |
| R-KEM-II-175-SET   | R-KEMII   | Set with 4 studs and plastic sleeves                               | 175    |
| R-KEM-II-300-SET   |           |                                                                    | 300    |
| R-KEM-II-300-STONE |           | Stone colour Styrene Free Polyester Resin                          | 410    |
| R-KEM-II-410-STONE |           |                                                                    | 300    |
| R-KEM-II-300-GREY  |           | Grey colour Styrene Free Polyester Resin                           | 410    |
| R-KEM-II-410-GREY  |           |                                                                    | 300    |
| R-KEM-II-300-SV    |           | Styrene Free Polyester Resin                                       | 300    |

### R-STUDS

| Size | Product Code    |                  |                  | Anchor   |        | Fixture        |
|------|-----------------|------------------|------------------|----------|--------|----------------|
|      | Steel class 5.8 | Steel class 8.8  | Steel grade A4   | Diameter | Length | Hole diameter  |
|      |                 |                  |                  | d        | L      | d <sub>f</sub> |
|      |                 |                  |                  | [mm]     | [mm]   | [mm]           |
| M8   | R-STUDS-08110   | R-STUDS-08110-88 | R-STUDS-08110-A4 | 8        | 110    | 9              |
|      | R-STUDS-08160   | -                | R-STUDS-08160-A4 | 8        | 160    | 9              |
| M10  | R-STUDS-10130   | R-STUDS-10130-88 | R-STUDS-10130-A4 | 10       | 130    | 12             |
|      | R-STUDS-10170   | -                | -                | 10       | 170    | 12             |
|      | R-STUDS-10190   | -                | -                | 10       | 190    | 12             |
| M12  | R-STUDS-12160   | R-STUDS-12160-88 | R-STUDS-12160-A4 | 12       | 160    | 14             |
|      | R-STUDS-12190   | -                | R-STUDS-12190-A4 | 12       | 190    | 14             |
|      | R-STUDS-12220   | -                | -                | 12       | 220    | 14             |
|      | R-STUDS-12260   | -                | -                | 12       | 260    | 14             |
|      | R-STUDS-12300   | -                | R-STUDS-12300-A4 | 12       | 300    | 14             |
| M16  | R-STUDS-16190   | R-STUDS-16190-88 | R-STUDS-16190-A4 | 16       | 190    | 18             |
|      | R-STUDS-16220   | -                | -                | 16       | 220    | 18             |
|      | R-STUDS-16260   | -                | -                | 16       | 260    | 18             |
|      | R-STUDS-16300   | -                | -                | 16       | 300    | 18             |
|      | R-STUDS-16380   | -                | -                | 16       | 380    | 18             |
| M20  | R-STUDS-20260   | R-STUDS-20260-88 | R-STUDS-20260-A4 | 20       | 260    | 22             |
|      | R-STUDS-20300   | -                | -                | 20       | 300    | 22             |
|      | R-STUDS-20350   | -                | -                | 20       | 350    | 22             |
| M24  | R-STUDS-24300   | R-STUDS-24300-88 | R-STUDS-24300-A4 | 24       | 300    | 26             |
| M30  | R-STUDS-30380   | R-STUDS-30380-88 | -                | 30       | 380    | 32             |

## 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 <sub>0</sub>       | [mm] | 10                             | 12                             | 14                             | 18                                 | 24                                 | 28                                 | 35                                 |
| Hole diameter in fixture       | d <sub>f</sub>       | [mm] | 9                              | 12                             | 14                             | 18                                 | 22                                 | 26                                 | 33                                 |
| Min. hole depth in substrate   | h <sub>0</sub>       | [mm] | h <sub>nom</sub> + 5           | h <sub>nom</sub> + 5           | h <sub>nom</sub> + 5           | h <sub>nom</sub> + 5               | h <sub>nom</sub> + 5               | h <sub>nom</sub> + 5               | h <sub>nom</sub> + 5               |
| Min. substrate thickness       | h <sub>min</sub>     | [mm] | h <sub>nom</sub> + 30<br>≥ 100 | h <sub>nom</sub> + 30<br>≥ 100 | h <sub>nom</sub> + 30<br>≥ 100 | h <sub>nom</sub> + 2d <sub>0</sub> | h <sub>nom</sub> + 2d <sub>0</sub> | h <sub>nom</sub> + 2d <sub>0</sub> | h <sub>nom</sub> + 2d <sub>0</sub> |
| Installation torque            | T <sub>inst</sub>    | [Nm] | 10                             | 20                             | 40                             | 80                                 | 120                                | 180                                | 300                                |
| Min. spacing                   | s <sub>min</sub>     | [mm] | 40                             | 40                             | 40                             | 50                                 | 60                                 | 70                                 | 85                                 |
| Min. edge distance             | c <sub>min</sub>     | [mm] | 40                             | 40                             | 40                             | 50                                 | 60                                 | 70                                 | 85                                 |
| <b>MINIMUM EMBEDMENT DEPTH</b> |                      |      |                                |                                |                                |                                    |                                    |                                    |                                    |
| Min. installation depth        | h <sub>nom,min</sub> | [mm] | 60                             | 70                             | 80                             | 100                                | 120                                | 140                                | 165                                |
| <b>MAXIMUM EMBEDMENT DEPTH</b> |                      |      |                                |                                |                                |                                    |                                    |                                    |                                    |
| Min. installation depth        | h <sub>nom,max</sub> | [mm] | 160                            | 200                            | 240                            | 320                                | 400                                | 480                                | 600                                |

## Minimum working and curing time

### R-KEM II

| Resin temperature | Concrete temperature | Curing time* | Working time |
|-------------------|----------------------|--------------|--------------|
| [°C]              | [°C]                 | [min]        | [min]        |
| 5                 | -20                  | -            | -            |
| 5                 | -15                  | -            | -            |
| 5                 | -10                  | -            | -            |
| 5                 | -5                   | 8 h          | 70           |
| 5                 | 0                    | 4 h          | 45           |
| 5                 | 5                    | 2 h          | 25           |
| 10                | 10                   | 1.5 h        | 15           |
| 15                | 15                   | 1 h          | 9            |
| 20                | 20                   | 45           | 5            |
| 25                | 30                   | 30           | 2            |
| 25                | 35                   | -            | -            |
| 25                | 40                   | -            | -            |

\*For wet concrete the curing time must be doubled

## Installation data

### R-KEMII-W

| Resin temperature | Concrete temperature | Curing time* | Working time |
|-------------------|----------------------|--------------|--------------|
| [°C]              | [°C]                 | [min]        | [min]        |
| 5                 | -20                  | 24 h         | 45           |
| 5                 | -15                  | 18 h         | 30           |
| 5                 | -10                  | 8 h          | 20           |
| 5                 | -5                   | 5 h          | 11           |
| 5                 | 0                    | 2 h          | 7            |
| 5                 | 5                    | 1 h          | 5            |
| 10                | 10                   | 45           | 2            |
| 15                | 15                   | 30           | 1.5          |
| 20                | 20                   | 15           | 1            |
| 25                | 30                   | -            | -            |
| 25                | 35                   | -            | -            |
| 25                | 40                   | -            | -            |

\*For wet concrete the curing time must be doubled

### R-KEMII-S

| Resin temperature | Concrete temperature | Curing time* | Working time |
|-------------------|----------------------|--------------|--------------|
| [°C]              | [°C]                 | [min]        | [min]        |
| 5                 | -20                  | -            | -            |
| 5                 | -15                  | -            | -            |
| 5                 | -10                  | -            | -            |
| 5                 | -5                   | 24 h         | 180          |
| 5                 | 0                    | 18 h         | 120          |
| 5                 | 5                    | 12 h         | 60           |
| 10                | 10                   | 8 h          | 45           |
| 15                | 15                   | 6 h          | 25           |
| 20                | 20                   | 4 h          | 15           |
| 25                | 30                   | 1.5 h        | 7            |
| 25                | 35                   | 1 h          | 6            |
| 25                | 40                   | 45           | 5            |

\*For wet concrete the curing time must be doubled

## Mechanical properties

| Size                                                  |              |                      | M8  | M10 | M12 | M16 | M20 | M24 | M30  |
|-------------------------------------------------------|--------------|----------------------|-----|-----|-----|-----|-----|-----|------|
| <b>R-STUDS Metric Threaded Rods - Steel Class 5.8</b> |              |                      |     |     |     |     |     |     |      |
| Nominal ultimate tensile strength - tension           | $f_{uk}$     | [N/mm <sup>2</sup> ] | 500 | 500 | 500 | 500 | 500 | 500 | 500  |
| Nominal yield strength - tension                      | $f_{yk}$     | [N/mm <sup>2</sup> ] | 400 | 400 | 400 | 400 | 400 | 400 | 400  |
| Cross sectional area - tension                        | $A_s$        | [mm <sup>2</sup> ]   | 37  | 58  | 84  | 157 | 245 | 353 | 560  |
| Elastic section modulus                               | $W_{el}$     | [mm <sup>3</sup> ]   | 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  |

## Mechanical properties

| Size                                                  |              |                      | M8  | M10 | M12 | M16 | M20 | M24 | M30  |
|-------------------------------------------------------|--------------|----------------------|-----|-----|-----|-----|-----|-----|------|
| <b>R-STUDS Metric Threaded Rods - Steel Class 8.8</b> |              |                      |     |     |     |     |     |     |      |
| Nominal ultimate tensile strength - tension           | $f_{uk}$     | [N/mm <sup>2</sup> ] | 800 | 800 | 800 | 800 | 800 | 800 | 800  |
| Nominal yield strength - tension                      | $f_{yk}$     | [N/mm <sup>2</sup> ] | 640 | 640 | 640 | 640 | 640 | 640 | 640  |
| Cross sectional area - tension                        | $A_s$        | [mm <sup>2</sup> ]   | 37  | 58  | 84  | 157 | 245 | 353 | 560  |
| Elastic section modulus                               | $W_{el}$     | [mm <sup>3</sup> ]   | 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 |
| <b>R-STUDS Metric Threaded Rods - Steel Class A4</b>  |              |                      |     |     |     |     |     |     |      |
| Nominal ultimate tensile strength - tension           | $f_{uk}$     | [N/mm <sup>2</sup> ] | 700 | 700 | 700 | 700 | 700 | 700 | 700  |
| Nominal yield strength - tension                      | $f_{yk}$     | [N/mm <sup>2</sup> ] | 450 | 450 | 450 | 450 | 450 | 450 | 450  |
| Cross sectional area - tension                        | $A_s$        | [mm <sup>2</sup> ]   | 37  | 58  | 84  | 157 | 245 | 353 | 560  |
| Elastic section modulus                               | $W_{el}$     | [mm <sup>3</sup> ]   | 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   |
|------------------------------------------------|------|----------------------|------|------|-------|-------|-------|-------|
| Substrate                                      |      | Non-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                 | 26.4 | 40.7 | 63.4  | 88.7  | 111.8 | 143.1 |
| Maximum embedment depth                        | [kN] | 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] | 21.1                 | 26.4 | 40.7 | 65.4  | 88.7  | 111.8 | 143.1 |
| Maximum embedment depth                        | [kN] | 30.5                 | 48.3 | 70.4 | 132.3 | 205.8 | 296.1 | 471.5 |
| R-STUDS METRIC THREADED RODS - STEEL CLASS A4  |      |                      |      |      |       |       |       |       |
| Minimum embedment depth                        | [kN] | 21.1                 | 26.4 | 40.7 | 65.4  | 88.7  | 111.8 | 143.1 |
| Maximum embedment depth                        | [kN] | 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] | 11.3                 | 18.3 | 26.5 | 49.1  | 76.9  | 110.9 | 176.4 |
| Maximum embedment depth                        | [kN] | 11.3                 | 18.3 | 26.5 | 49.1  | 76.9  | 110.9 | 176.4 |
| 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 | 279.9 |
| Maximum embedment depth                        | [kN] | 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                 | 25.8 | 37.2 | 69.3  | 107.7 | 155.6 | 247.6 |
| Maximum embedment depth                        | [kN] | 16.4                 | 25.8 | 37.2 | 69.3  | 107.7 | 155.6 | 247.6 |

## Basic performance data

| Size                                           |      | 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] | 14.3 | 20.9 | 27.1 | 40.2  | 60.3  | 68.6  | 85.5  |
| Maximum embedment depth                        | [kN] | 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] | 14.3 | 20.9 | 27.1 | 40.2  | 60.3  | 68.6  | 85.5  |
| Maximum embedment depth                        | [kN] | 29.0 | 46.0 | 67.0 | 126.0 | 196.0 | 235.2 | 311.0 |
| R-STUDS METRIC THREADED RODS - STEEL CLASS A4  |      |      |      |      |       |       |       |       |
| Minimum embedment depth                        | [kN] | 14.3 | 20.9 | 27.1 | 40.2  | 60.3  | 68.6  | 85.5  |
| Maximum embedment depth                        | [kN] | 26.0 | 41.0 | 59.0 | 110.0 | 171.0 | 235.2 | 311.0 |
| SHEAR LOAD $V_{Rk}$                            |      |      |      |      |       |       |       |       |
| R-STUDS METRIC THREADED RODS - STEEL CLASS 5.8 |      |      |      |      |       |       |       |       |
| Minimum embedment depth                        | [kN] | 9.00 | 14.0 | 21.0 | 39.0  | 61.0  | 88.0  | 140.0 |
| Maximum embedment depth                        | [kN] | 9.00 | 14.0 | 21.0 | 39.0  | 61.0  | 88.0  | 140.0 |
| R-STUDS METRIC THREADED RODS - STEEL CLASS 8.8 |      |      |      |      |       |       |       |       |
| Minimum embedment depth                        | [kN] | 15.0 | 23.0 | 34.0 | 63.0  | 98.0  | 137.2 | 171.1 |
| Maximum embedment depth                        | [kN] | 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 | 171.1 |
| Maximum embedment depth                        | [kN] | 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] | 6.82 | 11.6 | 15.1 | 22.3  | 33.5  | 38.1  | 47.5  |
| Maximum embedment depth                        | [kN] | 12.0 | 19.3 | 28.0 | 52.0  | 81.3  | 117.3 | 172.8 |
| R-STUDS METRIC THREADED RODS - STEEL CLASS 8.8 |      |      |      |      |       |       |       |       |
| Minimum embedment depth                        | [kN] | 6.82 | 11.6 | 15.1 | 22.3  | 33.5  | 38.1  | 47.5  |
| Maximum embedment depth                        | [kN] | 18.2 | 30.7 | 44.7 | 71.5  | 111.7 | 130.7 | 172.8 |
| R-STUDS METRIC THREADED RODS - STEEL CLASS A4  |      |      |      |      |       |       |       |       |
| Minimum embedment depth                        | [kN] | 6.82 | 11.6 | 15.1 | 22.3  | 33.5  | 38.1  | 47.5  |
| Maximum embedment depth                        | [kN] | 13.9 | 21.9 | 31.6 | 58.8  | 91.4  | 130.7 | 172.8 |
| SHEAR LOAD $V_{Rd}$                            |      |      |      |      |       |       |       |       |
| R-STUDS METRIC THREADED RODS - STEEL CLASS 5.8 |      |      |      |      |       |       |       |       |
| Minimum embedment depth                        | [kN] | 7.20 | 11.2 | 16.8 | 31.2  | 48.8  | 70.4  | 112.0 |
| Maximum embedment depth                        | [kN] | 7.20 | 11.2 | 16.8 | 31.2  | 48.8  | 70.4  | 112.0 |
| R-STUDS METRIC THREADED RODS - STEEL CLASS 8.8 |      |      |      |      |       |       |       |       |
| Minimum embedment depth                        | [kN] | 12.0 | 18.4 | 27.2 | 50.4  | 78.4  | 91.5  | 114.0 |
| Maximum embedment depth                        | [kN] | 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  | 114.0 |
| Maximum embedment depth                        | [kN] | 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   |
|------------------------------------------------|------|------|------|------|------|------|------|-------|
| RECOMMENDED LOAD                               |      |      |      |      |      |      |      |       |
| TENSION LOAD $N_{rec}$                         |      |      |      |      |      |      |      |       |
| R-STUDS METRIC THREADED RODS - STEEL CLASS 5.8 |      |      |      |      |      |      |      |       |
| Minimum embedment depth                        | [kN] | 4.87 | 8.29 | 10.8 | 16.0 | 23.9 | 27.2 | 33.9  |
| Maximum embedment depth                        | [kN] | 5.87 | 13.8 | 20.0 | 37.1 | 58.1 | 83.8 | 123.4 |
| R-STUDS METRIC THREADED RODS - STEEL CLASS 8.8 |      |      |      |      |      |      |      |       |
| Minimum embedment depth                        | [kN] | 4.87 | 8.29 | 10.8 | 16.0 | 23.9 | 27.2 | 33.9  |
| Maximum embedment depth                        | [kN] | 13.0 | 21.9 | 31.9 | 51.1 | 79.8 | 93.4 | 123.4 |
| R-STUDS METRIC THREADED RODS - STEEL CLASS A4  |      |      |      |      |      |      |      |       |
| Minimum embedment depth                        | [kN] | 4.87 | 8.29 | 10.8 | 16.0 | 23.9 | 27.2 | 33.9  |
| Maximum embedment depth                        | [kN] | 9.93 | 15.7 | 22.5 | 42.0 | 65.3 | 93.4 | 123.4 |
| SHEAR LOAD $V_{rec}$                           |      |      |      |      |      |      |      |       |
| R-STUDS METRIC THREADED RODS - STEEL CLASS 5.8 |      |      |      |      |      |      |      |       |
| Minimum embedment depth                        | [kN] | 5.14 | 8.00 | 12.0 | 22.3 | 34.9 | 50.3 | 80.0  |
| Maximum embedment depth                        | [kN] | 5.14 | 8.00 | 12.0 | 22.3 | 34.9 | 50.3 | 80.0  |
| R-STUDS METRIC THREADED RODS - STEEL CLASS 8.8 |      |      |      |      |      |      |      |       |
| Minimum embedment depth                        | [kN] | 8.57 | 13.1 | 19.4 | 36.0 | 56.0 | 65.4 | 81.5  |
| Maximum embedment depth                        | [kN] | 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 | 81.5  |
| Maximum embedment depth                        | [kN] | 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                                                                 | $\gamma_{Ms}$   | -                    | 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                                                                 | $\gamma_{Ms}$   | -                    | 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                                                                 | $\gamma_{Ms}$   | -                    | 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 <sup>2</sup> ] | 9.50                | 9.50                | 9.00                | 8.00                | 8.00                | 6.50                | 5.50                |
| Sustained load factor                                                                 | $\psi_{sust}^0$ | -                    | 0.81                | 0.81                | 0.81                | 0.81                | 0.81                | 0.81                | 0.81                |
| COMBINED PULL-OUT AND CONCRETE CONE FAILURE; NON-CRACKED CONCRETE, C20/25 (80°C/50°C) |                 |                      |                     |                     |                     |                     |                     |                     |                     |
| Characteristic bond resistance                                                        | $T_{Rk}$        | [N/mm <sup>2</sup> ] | 8.00                | 8.00                | 7.50                | 7.00                | 6.50                | 5.00                | 4.50                |
| Sustained load factor                                                                 | $\psi_{sust}^0$ | -                    | 0.76                | 0.76                | 0.76                | 0.76                | 0.76                | 0.76                | 0.76                |
| COMBINED PULL-OUT AND CONCRETE CONE FAILURE                                           |                 |                      |                     |                     |                     |                     |                     |                     |                     |
| Installation safety factor                                                            | $\gamma_{inst}$ | -                    | 1.40                | 1.20                | 1.20                | 1.20                | 1.20                | 1.20                | 1.20                |
| Increasing factors for $N_{Rd,p}$ - C30/37                                            | $\psi_c$        | -                    | 1.04                | 1.04                | 1.04                | 1.04                | 1.00                | 1.00                | 1.00                |
| Increasing factors for $N_{Rd,p}$ - C40/50                                            | $\psi_c$        | -                    | 1.07                | 1.07                | 1.07                | 1.07                | 1.00                | 1.00                | 1.00                |
| Increasing factors for $N_{Rd,p}$ - C50/60                                            | $\psi_c$        | -                    | 1.09                | 1.09                | 1.09                | 1.09                | 1.00                | 1.00                | 1.00                |
| CONCRETE CONE FAILURE                                                                 |                 |                      |                     |                     |                     |                     |                     |                     |                     |
| Installation safety factor                                                            | $\gamma_{inst}$ | -                    | 1.40                | 1.20                | 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               | 11.00               | 11.00               |
| Edge distance                                                                         | $c_{cr,N}$      | [mm]                 | 1.5*h <sub>ef</sub> | 1.5*h <sub>ef</sub> | 1.5*h <sub>ef</sub> | 1.5*h <sub>ef</sub> | 1.5*h <sub>ef</sub> | 1.5*h <sub>ef</sub> | 1.5*h <sub>ef</sub> |
| Spacing                                                                               | $s_{cr,N}$      | [mm]                 | 3.0*h <sub>ef</sub> | 3.0*h <sub>ef</sub> | 3.0*h <sub>ef</sub> | 3.0*h <sub>ef</sub> | 3.0*h <sub>ef</sub> | 3.0*h <sub>ef</sub> | 3.0*h <sub>ef</sub> |
| CONCRETE SPLITTING FAILURE                                                            |                 |                      |                     |                     |                     |                     |                     |                     |                     |
| Installation safety factor                                                            | $\gamma_{inst}$ | -                    | 1.40                | 1.20                | 1.20                | 1.20                | 1.20                | 1.20                | 1.20                |



## 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] | 9.00                           | 14.00                          | 21.00                          | 39.00                          | 61.00                          | 88.00                          | 140.00                         |
| Ductility factor                            | $k_\gamma$      | -    | 0.80                           | 0.80                           | 0.80                           | 0.80                           | 0.80                           | 0.80                           | 0.80                           |
| 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                       | $\gamma_{Ms}$   | -    | 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                            | $k_\gamma$      | -    | 0.80                           | 0.80                           | 0.80                           | 0.80                           | 0.80                           | 0.80                           | 0.80                           |
| 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                       | $\gamma_{Ms}$   | -    | 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                            | $k_\gamma$      | -    | 0.80                           | 0.80                           | 0.80                           | 0.80                           | 0.80                           | 0.80                           | 0.80                           |
| 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                       | $\gamma_{Ms}$   | -    | 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                  | $\gamma_{inst}$ | -    | 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                  | $\ell_f$        | [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                  | $\gamma_{inst}$ | -    | 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 -  $N_{Rk,p}^0 = \psi_{sus}^0 \cdot \tau_{Rk} \cdot n \cdot d \cdot h_{ef}$ ).

$h_{ef} = h_{nom}$

## Product commercial data

| Product Code       | Volume [ml] | Quantity [pcs] |       |        | Weight [kg] |       |        | Bar Codes     |
|--------------------|-------------|----------------|-------|--------|-------------|-------|--------|---------------|
|                    |             | Box            | Outer | Pallet | Box         | Outer | Pallet |               |
| R-KEM-II-175       | 175         | 10             | 10    | 840    | 3.8         | 3.8   | 348.1  | 5906675050249 |
| R-KEM-II-300       | 300         | 10             | 10    | 840    | 5.9         | 5.9   | 529.0  | 5906675050256 |
| R-KEM-II-410       | 410         | 10             | 10    | 560    | 8.4         | 8.4   | 498.7  | 5906675408163 |
| R-KEM-II-300-W     | 300         | 10             | 10    | 840    | 5.8         | 5.8   | 516.4  | 5906675064666 |
| R-KEM-II-300-S     | 300         | 10             | 50    | 600    | 6.0         | 30.0  | 390.0  | 5906675064642 |
| R-KEM-II-175-SET   | 175         | 5              | 5     | 525    | 3.0         | 3.0   | 348.3  | 5906675057866 |
| R-KEM-II-300-SET   | 300         | 5              | 5     | 320    | 4.9         | 4.9   | 345.9  | 5906675057859 |
| R-KEM-II-300-STONE | 300         | 10             | 10    | 840    | 6.0         | 6.0   | 534.0  | 5906675038124 |
| R-KEM-II-410-STONE | 410         | 10             | 10    | 560    | 8.4         | 8.4   | 498.7  | 5906675424958 |
| R-KEM-II-300-GREY  | 300         | 10             | 10    | 840    | 6.0         | 6.0   | 534.0  | 5906675038131 |
| R-KEM-II-410-GREY  | 410         | 10             | 10    | 560    | 8.4         | 8.4   | 498.7  | 5906675424941 |
| R-KEM-II-300-SV    | 300         | 10             | 10    | 840    | 5.9         | 5.9   | 529.0  | 5906675417073 |

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