

### INFORMATION

The torque controlled Throughbolt is a stainless steel high performance anchor for use in non-cracked concrete and structural applications such as:

- Façades
- Gates
- Guard rails
- Cable trays
- Staircases
- Ladders
- Cantilevers

### BASE MATERIAL

- Concrete C20/25 to C50/60
- Non-Cracked Concrete

### FEATURES

- High Performance
- Corrosion Resistance
- Wide Range Of Sizes
- Fast And Secure Installation
- Through Fixing
- Three way Expansion Sleeve
- Stainless Steel A4/316
- Close Spacing And Edge Distance
- Reduced Embedment Depth
- Reaction To Fire Class A1

### APPROVALS

European Technical Assessment  
Option 7 Non-Cracked Concrete



ETA-07/0332

### RELATED PRODUCTS

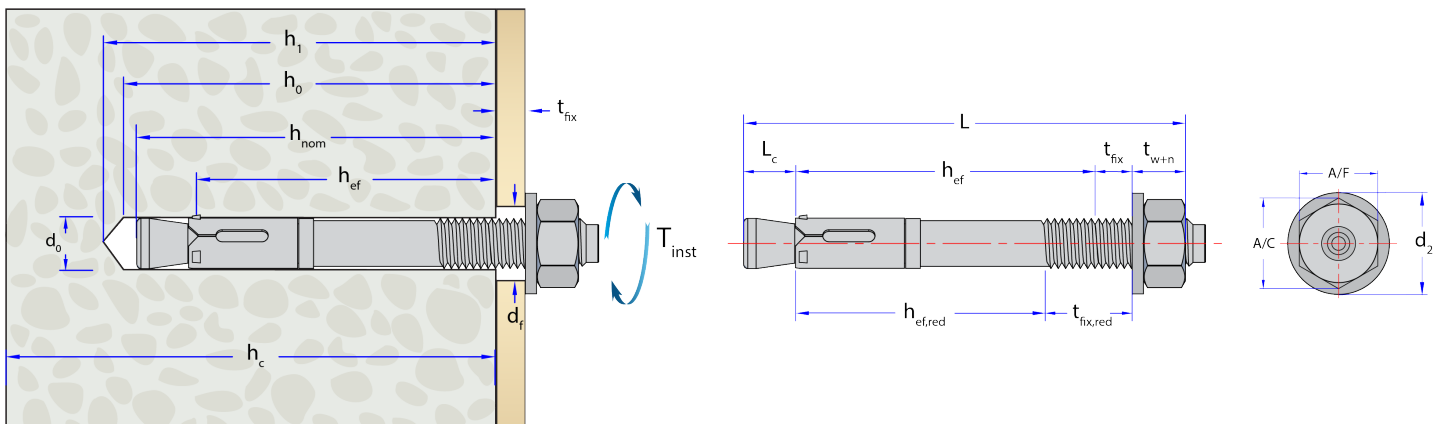


SDS+ Drill Bits

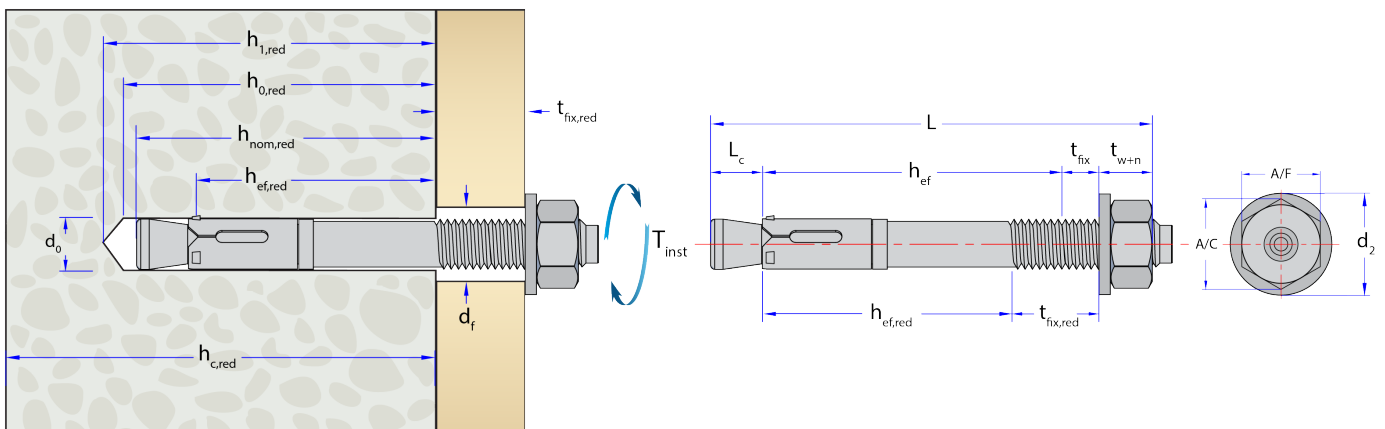


Hole Cleaning Pump

### RANGE AND LOAD DATA

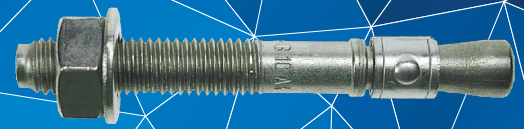


STANDARD EMBEDMENT



REDUCED EMBEDMENT

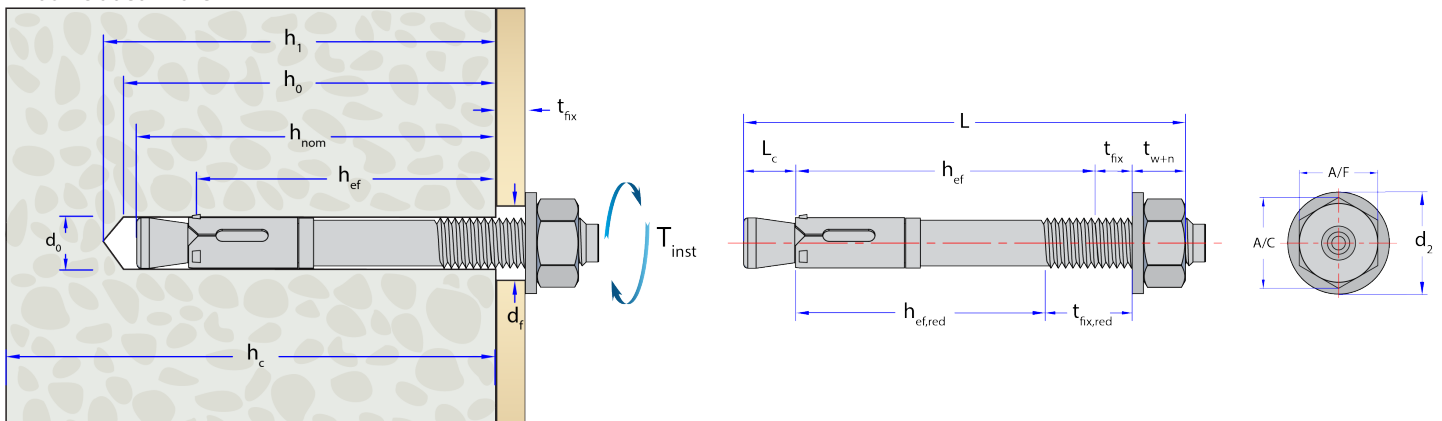




## RANGE AND LOAD DATA

| RANGE DATA               |                |                          |                     |                |                        |             |                           |                       |                          |              |               |                    |                       |                   |
|--------------------------|----------------|--------------------------|---------------------|----------------|------------------------|-------------|---------------------------|-----------------------|--------------------------|--------------|---------------|--------------------|-----------------------|-------------------|
| Part Number              | Size of Thread | Min. Structure Thickness | Drill Hole Diameter | Min Hole Depth | Fixture Clearance Hole | Cone Length | Effective Embedment Depth | Max Fixture Thickness | Washer and Nut Thickness | Total Length | Thread Length | Width Across Flats | Washer Outer diameter | Tightening Torque |
|                          |                | ( $h_c$ )                | ( $d_o$ )           | ( $h_1$ )      | ( $d_f$ )              | ( $L_c$ )   | ( $h_{ef}$ )              | ( $t_{fix}$ )         | ( $t_{w+n}$ )            | (L)          | ( $L_{th}$ )  | (A/F)              | ( $d_2$ )             | ( $T_{inst}$ )    |
|                          |                | mm                       | mm                  | mm             | mm                     | mm          | mm                        | mm                    | mm                       | mm           | mm            | mm                 | mm                    | Nm                |
| STANDARD EMBEDMENT DEPTH |                |                          |                     |                |                        |             |                           |                       |                          |              |               |                    |                       |                   |
| TSS06040*                | M6             | 100                      | 6                   | 55             | 7                      | 10          | 40                        | -                     | 7                        | 40           | 16            | 10                 | 12                    | 6                 |
| TSS06065                 |                |                          |                     |                |                        |             |                           | 10                    |                          | 67           | 30            |                    |                       |                   |
| TSS08050*                | M8             | 100                      | 8                   | 65             | 9                      | 13          | 44                        | -                     | 8                        | 50           | 22            | 13                 | 16                    | 15                |
| TSS08075                 |                |                          |                     |                |                        |             |                           | 10                    |                          | 75           | 40            |                    |                       |                   |
| TSS08095                 |                |                          |                     |                |                        |             |                           | 30                    |                          | 95           | 60            |                    |                       |                   |
| TSS08120                 |                |                          |                     |                |                        |             |                           | 55                    |                          | 120          | 85            |                    |                       |                   |
| TSS10060*                | M10            | 100                      | 10                  | 70             | 12                     | 17          | 48                        | -                     | 10                       | 60           | 25            | 17                 | 20                    | 25                |
| TSS10080                 |                |                          |                     |                |                        |             |                           | 10                    |                          | 85           | 40            |                    |                       |                   |
| TSS10100                 |                |                          |                     |                |                        |             |                           | 30                    |                          | 105          | 60            |                    |                       |                   |
| TSS10125                 |                |                          |                     |                |                        |             |                           | 50                    |                          | 125          | 80            |                    |                       |                   |
| TSS10175                 |                |                          |                     |                |                        |             |                           | 100                   |                          | 175          | 80            |                    |                       |                   |
| TSS10215                 | 140            | 215                      | 80                  |                |                        |             |                           |                       |                          |              |               |                    |                       |                   |
| TSS12085                 | M12            | 130                      | 12                  | 90             | 14                     | 18          | 65                        | -                     | 13                       | 95           | 50            | 19                 | 24                    | 50                |
| TSS12100                 |                |                          |                     |                |                        |             |                           | 10                    |                          | 105          | 60            |                    |                       |                   |
| TSS12115                 |                |                          |                     |                |                        |             |                           | 20                    |                          | 115          | 70            |                    |                       |                   |
| TSS12145                 |                |                          |                     |                |                        |             |                           | 50                    |                          | 145          | 100           |                    |                       |                   |
| TSS12200                 | 105            | 200                      | 100                 |                |                        |             |                           |                       |                          |              |               |                    |                       |                   |
| TSS16110                 | M16            | 160                      | 16                  | 110            | 18                     | 21          | 80                        | -                     | 17                       | 115          | 60            | 24                 | 30                    | 100               |
| TSS16125                 |                |                          |                     |                |                        |             |                           | 10                    |                          | 130          | 70            |                    |                       |                   |
| TSS16150                 |                |                          |                     |                |                        |             |                           | 30                    |                          | 150          | 90            |                    |                       |                   |
| TSS16175                 |                |                          |                     |                |                        |             |                           | 60                    |                          | 180          | 110           |                    |                       |                   |
| TSS20170                 | M20            | 200                      | 20                  | 130            | 22                     | 24          | 100                       | 35                    | 21                       | 180          | 70            | 30                 | 35                    | 160               |
| TSS20220                 |                |                          |                     |                |                        |             |                           | 95                    |                          | 240          | 70            |                    |                       |                   |

\* Not included in the ETA



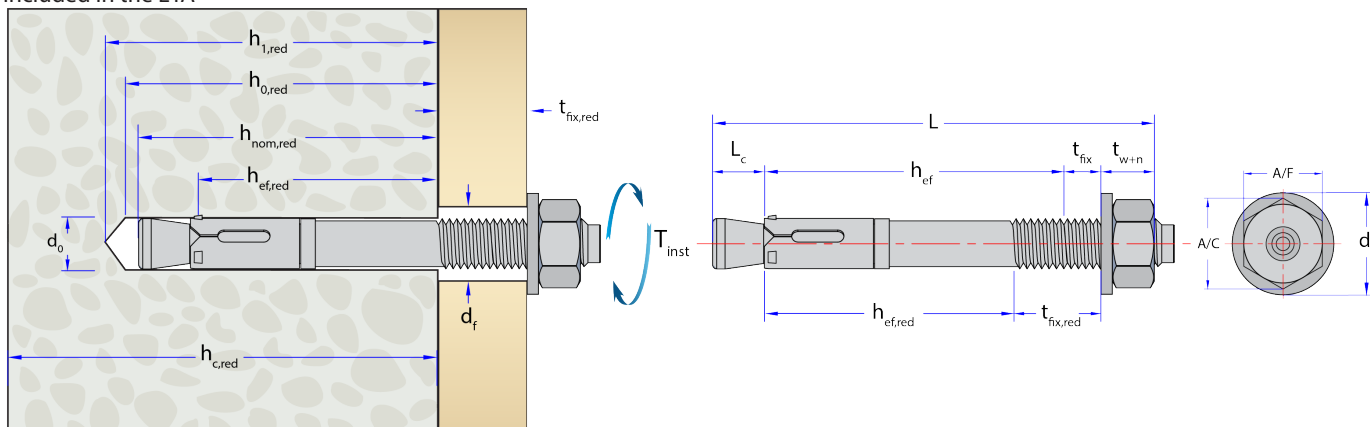
STANDARD EMBEDMENT





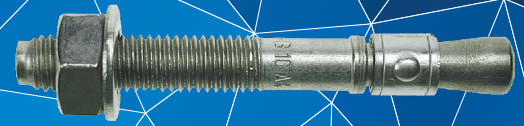
| RANGE DATA              |                |                               |                     |                       |                        |                 |                                |                             |                          |              |                    |                    |                       |                      |     |
|-------------------------|----------------|-------------------------------|---------------------|-----------------------|------------------------|-----------------|--------------------------------|-----------------------------|--------------------------|--------------|--------------------|--------------------|-----------------------|----------------------|-----|
| Part Number             | Size of Thread | Red. Min. Structure Thickness | Drill Hole Diameter | Red. Min. Hole Depth  | Fixture Clearance Hole | Cone Length     | Red. Effective Embedment Depth | Red. Max. Fixture Thickness | Washer and Nut Thickness | Total Length | Thread Length      | Width Across Flats | Washer Outer diameter | Tightening Torque    |     |
|                         |                | ( $h_{c,red}$ )<br>mm         | ( $d_0$ )<br>mm     | ( $h_{1,red}$ )<br>mm | ( $d_f$ )<br>mm        | ( $L_c$ )<br>mm | ( $h_{ef,red}$ )<br>mm         | ( $t_{fix,red}$ )<br>mm     | ( $t_{w+n}$ )<br>mm      | (L)<br>mm    | ( $L_{th}$ )<br>mm | (A/F)<br>mm        | ( $d_2$ )<br>mm       | ( $T_{inst}$ )<br>Nm |     |
| REDUCED EMBEDMENT DEPTH |                |                               |                     |                       |                        |                 |                                |                             |                          |              |                    |                    |                       |                      |     |
| TSS06040                | M6             | 80                            | 6                   | 35                    | 7                      | 10              | 18                             | 5                           | 7                        | 40           | 16                 | 10                 | 12                    | 6                    |     |
| TSS06065                |                |                               |                     | 45                    |                        |                 | 30                             | 20                          |                          |              | 67                 |                    |                       |                      | 30  |
| TSS08050                | M8             | 80                            | 8                   | 45                    | 9                      | 13              | 24                             | 5                           | 8                        | 50           | 22                 | 13                 | 16                    | 15                   |     |
| TSS08075                |                |                               |                     | 55                    |                        |                 | 19                             | 75                          |                          |              | 40                 |                    |                       |                      |     |
| TSS08095                |                |                               |                     | 35                    |                        |                 | 39                             | 95                          |                          |              | 60                 |                    |                       |                      |     |
| TSS08120                |                |                               |                     | 64                    |                        |                 | 120                            | 85                          |                          |              |                    |                    |                       |                      |     |
| TSS10060                | M10            | 100                           | 10                  | 50                    | 12                     | 17              | 25                             | 10                          | 10                       | 60           | 25                 | 17                 | 20                    | 25                   |     |
| TSS10080                |                |                               |                     | 16                    |                        |                 | 85                             | 40                          |                          |              |                    |                    |                       |                      |     |
| TSS10100                |                |                               |                     | 36                    |                        |                 | 105                            | 60                          |                          |              |                    |                    |                       |                      |     |
| TSS10125                |                |                               |                     | 42                    |                        |                 | 56                             | 125                         |                          |              | 80                 |                    |                       |                      |     |
| TSS10175                |                |                               |                     | 106                   |                        |                 | 175                            | 80                          |                          |              |                    |                    |                       |                      |     |
| TSS10215                |                |                               |                     | 146                   |                        |                 | 215                            | 80                          |                          |              |                    |                    |                       |                      |     |
| TSS12085                | M12            | 100                           | 12                  | 75                    | 14                     | 18              | 50                             | 14                          | 13                       | 95           | 50                 | 19                 | 24                    | 50                   |     |
| TSS12100                |                |                               |                     |                       |                        |                 |                                | 25                          |                          |              | 105                |                    |                       |                      | 60  |
| TSS12115                |                |                               |                     |                       |                        |                 |                                | 35                          |                          |              | 115                |                    |                       |                      | 70  |
| TSS12145                |                |                               |                     |                       |                        |                 |                                | 65                          |                          |              | 145                |                    |                       |                      | 100 |
| TSS12200                |                |                               |                     |                       |                        |                 |                                | 120                         |                          |              | 200                |                    |                       |                      | 100 |
| TSS16110                | M16            | 130                           | 16                  | 95                    | 18                     | 21              | 64                             | 14                          | 17                       | 115          | 60                 | 24                 | 30                    | 100                  |     |
| TSS16125                |                |                               |                     |                       |                        |                 |                                | 26                          |                          |              | 130                |                    |                       |                      | 70  |
| TSS16150                |                |                               |                     |                       |                        |                 |                                | 46                          |                          |              | 150                |                    |                       |                      | 90  |
| TSS16175                |                |                               |                     |                       |                        |                 |                                | 76                          |                          |              | 180                |                    |                       |                      | 110 |
| TSS20170                | M20            | 160                           | 20                  | 110                   | 22                     | 24              | 78                             | 57                          | 21                       | 180          | 70                 | 30                 | 35                    | 160                  |     |
| TSS20220                |                |                               |                     |                       |                        |                 |                                | 117                         |                          |              | 240                |                    |                       |                      | 70  |

\* Not included in the ETA



REDUCED EMBEDMENT





### NON-CRACKED CONCRETE

#### STANDARD EMBEDMENT

| Performance Data (C20/25 non-cracked concrete) |                                        |                                          |                           |                    |                      |                    |                      |                    |                    |       |                          |       |
|------------------------------------------------|----------------------------------------|------------------------------------------|---------------------------|--------------------|----------------------|--------------------|----------------------|--------------------|--------------------|-------|--------------------------|-------|
| Size Of Thread                                 | Effective Embedment Depth ( $h_{ef}$ ) | Minimum Concrete Thickness ( $h_{min}$ ) | Characteristic Resistance |                    | Design Resistance    |                    | Approved Resistance  |                    | Design Spacing (S) |       | Design Edge Distance (C) |       |
|                                                |                                        |                                          | Tensile ( $N_{Rk}$ )      | Shear ( $V_{Rk}$ ) | Tensile ( $N_{Rd}$ ) | Shear ( $V_{Rd}$ ) | Tensile ( $N_{Ap}$ ) | Shear ( $V_{Ap}$ ) | Tensile            | Shear | Tensile                  | Shear |
| -                                              | mm                                     | mm                                       | kN                        | kN                 | kN                   | kN                 | kN                   | kN                 | mm                 | mm    | mm                       | mm    |
| M6                                             | 40                                     | 100                                      | 7.5                       | 7.0                | 5.0                  | 5.6                | 3.5                  | 4.0                | 40                 | 40    | 40                       | 70    |
| M8                                             | 44                                     | 100                                      | 12.0                      | 12.0               | 8.0                  | 9.6                | 5.7                  | 6.8                | 90                 | 130   | 90                       | 100   |
| M10                                            | 48                                     | 100                                      | 16.0                      | 16.8               | 10.6                 | 11.1               | 7.5                  | 7.9                | 130                | 150   | 120                      | 120   |
| M12                                            | 65                                     | 130                                      | 25.0                      | 27.0               | 16.6                 | 21.6               | 11.8                 | 15.4               | 300                | 60    | 160                      | 200   |
| M16                                            | 80                                     | 160                                      | 36.1                      | 50.0               | 24.0                 | 40.0               | 17.1                 | 28.5               | 410                | 160   | 210                      | 340   |
| M20                                            | 100                                    | 200                                      | 50.5                      | 86.0               | 33.6                 | 61.4               | 24.0                 | 43.8               | 560                | 250   | 280                      | 460   |

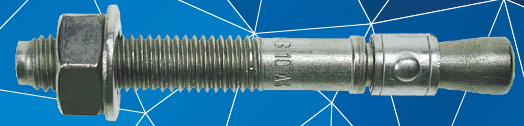
#### REDUCED EMBEDMENT

| Performance Data (C20/25 non-cracked concrete) |                                        |                                          |                           |                    |                      |                    |                      |                    |                    |       |                          |       |
|------------------------------------------------|----------------------------------------|------------------------------------------|---------------------------|--------------------|----------------------|--------------------|----------------------|--------------------|--------------------|-------|--------------------------|-------|
| Size Of Thread                                 | Effective Embedment Depth ( $h_{ef}$ ) | Minimum Concrete Thickness ( $h_{min}$ ) | Characteristic Resistance |                    | Design Resistance    |                    | Approved Resistance  |                    | Design Spacing (S) |       | Design Edge Distance (C) |       |
|                                                |                                        |                                          | Tensile ( $N_{Rk}$ )      | Shear ( $V_{Rk}$ ) | Tensile ( $N_{Rd}$ ) | Shear ( $V_{Rd}$ ) | Tensile ( $N_{Ap}$ ) | Shear ( $V_{Ap}$ ) | Tensile            | Shear | Tensile                  | Shear |
| -                                              | mm                                     | mm                                       | kN                        | kN                 | kN                   | kN                 | kN                   | kN                 | mm                 | mm    | mm                       | mm    |
| M6*                                            | 30                                     | 80                                       | 6.0                       | 8.3                | 4.0                  | 5.5                | 2.8                  | 3.9                | 40                 | 90    | 60                       | 70    |
| M8*                                            | 35                                     | 80                                       | 9.0                       | 10.5               | 6.0                  | 6.9                | 4.2                  | 4.9                | 80                 | 110   | 90                       | 90    |
| M10                                            | 42                                     | 100                                      | 12.0                      | 13.7               | 8.0                  | 9.1                | 5.7                  | 6.5                | 100                | 130   | 100                      | 100   |
| M12                                            | 50                                     | 100                                      | 17.9                      | 17.9               | 11.9                 | 11.9               | 8.5                  | 8.5                | 300                | 150   | 150                      | 130   |
| M16                                            | 64                                     | 130                                      | 25.9                      | 51.7               | 17.2                 | 34.4               | 12.2                 | 24.5               | 200                | 200   | 160                      | 330   |
| M20                                            | 78                                     | 160                                      | 34.8                      | 69.6               | 23.1                 | 46.3               | 16.5                 | 33.0               | 240                | 240   | 200                      | 390   |

\* Use is restricted to anchorage of indeterminate structural components.

For variations in structure thickness, reduced spacing and edge calculations download the free **Anchor Calculation Program** from [www.jcpfixings.co.uk](http://www.jcpfixings.co.uk)





### SUPPLEMENTARY DATA

| Influence Of Concrete Strength (Cracked/Non-cracked Concrete) |                   |        |        |        |        |
|---------------------------------------------------------------|-------------------|--------|--------|--------|--------|
| Concrete strength                                             |                   | C20/25 | C30/37 | C40/50 | C50/60 |
| Cylinder                                                      | N/mm <sup>2</sup> | 20     | 30     | 40     | 50     |
| Cube                                                          | N/mm <sup>2</sup> | 25     | 37     | 50     | 60     |
| Factor                                                        | -                 | 1.0    | 1.22   | 1.41   | 1.55   |

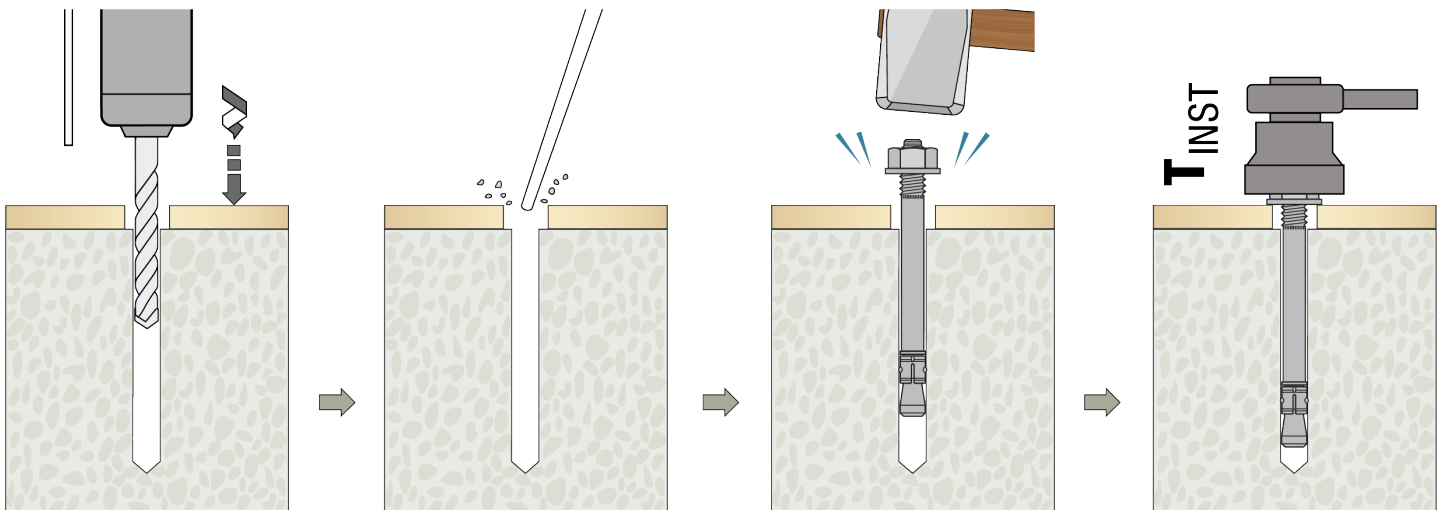
**Important Note:**  
When using concrete factors ensure that loads do not exceed Steel Design Resistance.

| Steel Failure  |                                                |                                         |                                          |                                                |                                          |                                          |
|----------------|------------------------------------------------|-----------------------------------------|------------------------------------------|------------------------------------------------|------------------------------------------|------------------------------------------|
| Size Of Thread | Tensile Resistance                             |                                         |                                          | Shear Resistance                               |                                          |                                          |
|                | Characteristic Resistance (N <sub>Rk,s</sub> ) | Design Resistance (N <sub>Rd,s</sub> )* | Approved Resistance (N <sub>Ra,s</sub> ) | Characteristic Resistance (V <sub>Rk,s</sub> ) | Design Resistance (V <sub>Rd,s</sub> **) | Approved Resistance (V <sub>Ra,s</sub> ) |
| -              | kN                                             | kN                                      | kN                                       | kN                                             | kN                                       | kN                                       |
| M6             | 10.0                                           | 6.6                                     | 4.7                                      | 7.0                                            | 5.6                                      | 4.0                                      |
| M8             | 18.0                                           | 12.0                                    | 8.5                                      | 12.0                                           | 9.6                                      | 6.8                                      |
| M10            | 30.0                                           | 20.0                                    | 14.2                                     | 19.0                                           | 15.2                                     | 10.8                                     |
| M12            | 44.0                                           | 29.3                                    | 20.9                                     | 27.0                                           | 21.6                                     | 15.4                                     |
| M16            | 88.0                                           | 58.6                                    | 41.8                                     | 50.0                                           | 40.0                                     | 28.5                                     |
| M20            | 134.0                                          | 79.7                                    | 56.9                                     | 86.0                                           | 61.4                                     | 43.8                                     |

\* A partial safety factor ( $\gamma_{MS}$ ) equal to 1.50 for M6 to M16 (1.68 for M20) is included.

\*\* A partial safety factor ( $\gamma_{MS}$ ) equal to 1.25 for M6 to M16 (1.40 for M20) is included.

### INSTALLATION INSTRUCTIONS



-Position fixture and drill correct diameter hole to corresponding depth

-Clean hole by blowing to remove drilling debris and dust

-Insert anchor through fixture into concrete and lightly hammer into concrete

-Tighten with torque wrench to recommended torque

