

# Injection mortar UPM33

## Load table

Permissible loads of a single anchor<sup>1) 2)</sup> in normal concrete of strength class C20/25.  
For the design the complete current assessment ETA-10/0171 has to be considered.

| Type           | Material / surface <sup>3)</sup> | Effective anchor-depth<br>$h_{ef}$ [mm] | Minimum member thickness<br>$h_{min}$ [mm] | Maximum installation-torque<br>$T_{inst,max}$ [Nm] | Cracked concrete                                                                                                                                     |                      |                     |                     | Non-cracked concrete                                                                                                                                 |                      |                     |                     |
|----------------|----------------------------------|-----------------------------------------|--------------------------------------------|----------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------|---------------------|---------------------|------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------|---------------------|---------------------|
|                |                                  |                                         |                                            |                                                    | Permissible tension ( $N_{perm}$ ) and shear loads ( $V_{perm}$ ); minimum spacing ( $s_{min}$ ) and edge distances ( $c_{min}$ ) with reduced loads |                      |                     |                     | Permissible tension ( $N_{perm}$ ) and shear loads ( $V_{perm}$ ); minimum spacing ( $s_{min}$ ) and edge distances ( $c_{min}$ ) with reduced loads |                      |                     |                     |
|                |                                  |                                         |                                            |                                                    | $N_{perm}^{4)}$ [kN]                                                                                                                                 | $V_{perm}^{4)}$ [kN] | $s_{min}^{4)}$ [mm] | $c_{min}^{4)}$ [mm] | $N_{perm}^{4)}$ [kN]                                                                                                                                 | $V_{perm}^{4)}$ [kN] | $s_{min}^{4)}$ [mm] | $c_{min}^{4)}$ [mm] |
| UPM-A/ASTA M6  | 5.8                              | 50                                      | 100                                        | 5                                                  | -                                                                                                                                                    | -                    | -                   | -                   | 3.4                                                                                                                                                  | 2.9                  | 40                  | 40                  |
| UPM-A/ASTA M6  | 5.8                              | 60                                      | 100                                        | 5                                                  | -                                                                                                                                                    | -                    | -                   | -                   | 4                                                                                                                                                    | 2.9                  | 40                  | 40                  |
| UPM-A/ASTA M6  | 5.8                              | 72                                      | 110                                        | 5                                                  | -                                                                                                                                                    | -                    | -                   | -                   | 4.8                                                                                                                                                  | 2.9                  | 40                  | 40                  |
| UPM-A/ASTA M6  | R-70                             | 50                                      | 100                                        | 5                                                  | -                                                                                                                                                    | -                    | -                   | -                   | 3.4                                                                                                                                                  | 3.2                  | 40                  | 40                  |
| UPM-A/ASTA M6  | R-70                             | 60                                      | 100                                        | 5                                                  | -                                                                                                                                                    | -                    | -                   | -                   | 4                                                                                                                                                    | 3.2                  | 40                  | 40                  |
| UPM-A/ASTA M6  | R-70                             | 72                                      | 110                                        | 5                                                  | -                                                                                                                                                    | -                    | -                   | -                   | 4.8                                                                                                                                                  | 3.2                  | 40                  | 40                  |
| UPM-A/ASTA M8  | 5.8                              | 60                                      | 100                                        | 10                                                 | -                                                                                                                                                    | -                    | -                   | -                   | 6.6                                                                                                                                                  | 5.1                  | 40                  | 40                  |
| UPM-A/ASTA M8  | 5.8                              | 80                                      | 110                                        | 10                                                 | -                                                                                                                                                    | -                    | -                   | -                   | 8.8                                                                                                                                                  | 5.1                  | 40                  | 40                  |
| UPM-A/ASTA M8  | 5.8                              | 160                                     | 190                                        | 10                                                 | -                                                                                                                                                    | -                    | -                   | -                   | 9                                                                                                                                                    | 5.1                  | 40                  | 40                  |
| UPM-A/ASTA M8  | R-70                             | 60                                      | 100                                        | 10                                                 | -                                                                                                                                                    | -                    | -                   | -                   | 6.6                                                                                                                                                  | 6                    | 40                  | 40                  |
| UPM-A/ASTA M8  | R-70                             | 80                                      | 110                                        | 10                                                 | -                                                                                                                                                    | -                    | -                   | -                   | 8.8                                                                                                                                                  | 6                    | 40                  | 40                  |
| UPM-A/ASTA M8  | R-70                             | 160                                     | 190                                        | 10                                                 | -                                                                                                                                                    | -                    | -                   | -                   | 9.9                                                                                                                                                  | 6                    | 40                  | 40                  |
| UPM-A/ASTA M10 | 5.8                              | 60                                      | 100                                        | 20                                                 | 4.5                                                                                                                                                  | 8.6                  | 45                  | 45                  | 8.2                                                                                                                                                  | 8.6                  | 45                  | 45                  |
| UPM-A/ASTA M10 | 5.8                              | 90                                      | 120                                        | 20                                                 | 6.7                                                                                                                                                  | 8.6                  | 45                  | 45                  | 12.3                                                                                                                                                 | 8.6                  | 45                  | 45                  |
| UPM-A/ASTA M10 | 5.8                              | 200                                     | 230                                        | 20                                                 | 13.8                                                                                                                                                 | 8.6                  | 45                  | 45                  | 13.8                                                                                                                                                 | 8.6                  | 45                  | 45                  |
| UPM-A/ASTA M10 | R-70                             | 60                                      | 100                                        | 20                                                 | 4.5                                                                                                                                                  | 9.2                  | 45                  | 45                  | 8.2                                                                                                                                                  | 9.2                  | 45                  | 45                  |
| UPM-A/ASTA M10 | R-70                             | 90                                      | 120                                        | 20                                                 | 6.7                                                                                                                                                  | 9.2                  | 45                  | 45                  | 12.3                                                                                                                                                 | 9.2                  | 45                  | 45                  |
| UPM-A/ASTA M10 | R-70                             | 200                                     | 230                                        | 20                                                 | 15                                                                                                                                                   | 9.2                  | 45                  | 45                  | 15.7                                                                                                                                                 | 9.2                  | 45                  | 45                  |
| UPM-A/ASTA M12 | 5.8                              | 70                                      | 100                                        | 40                                                 | 6.3                                                                                                                                                  | 12                   | 55                  | 55                  | 11.4                                                                                                                                                 | 12                   | 55                  | 55                  |
| UPM-A/ASTA M12 | 5.8                              | 110                                     | 140                                        | 40                                                 | 9.9                                                                                                                                                  | 12                   | 55                  | 55                  | 18.1                                                                                                                                                 | 12                   | 55                  | 55                  |
| UPM-A/ASTA M12 | 5.8                              | 240                                     | 270                                        | 40                                                 | 20.5                                                                                                                                                 | 12                   | 55                  | 55                  | 20.5                                                                                                                                                 | 12                   | 55                  | 55                  |
| UPM-A/ASTA M12 | R-70                             | 70                                      | 100                                        | 40                                                 | 6.3                                                                                                                                                  | 13.7                 | 55                  | 55                  | 11.4                                                                                                                                                 | 13.7                 | 55                  | 55                  |
| UPM-A/ASTA M12 | R-70                             | 110                                     | 140                                        | 40                                                 | 9.9                                                                                                                                                  | 13.7                 | 55                  | 55                  | 18.1                                                                                                                                                 | 13.7                 | 55                  | 55                  |
| UPM-A/ASTA M12 | R-70                             | 240                                     | 270                                        | 40                                                 | 21.5                                                                                                                                                 | 13.7                 | 55                  | 55                  | 22.5                                                                                                                                                 | 13.7                 | 55                  | 55                  |
| UPM-A/ASTA M16 | 5.8                              | 80                                      | 120                                        | 60                                                 | 9.6                                                                                                                                                  | 22.3                 | 65                  | 65                  | 14                                                                                                                                                   | 22.3                 | 65                  | 65                  |
| UPM-A/ASTA M16 | 5.8                              | 125                                     | 170                                        | 60                                                 | 15                                                                                                                                                   | 22.3                 | 65                  | 65                  | 24.9                                                                                                                                                 | 22.3                 | 65                  | 65                  |
| UPM-A/ASTA M16 | 5.8                              | 320                                     | 360                                        | 60                                                 | 37.6                                                                                                                                                 | 22.3                 | 65                  | 65                  | 37.6                                                                                                                                                 | 22.3                 | 65                  | 65                  |
| UPM-A/ASTA M16 | R-70                             | 80                                      | 120                                        | 60                                                 | 9.6                                                                                                                                                  | 23                   | 65                  | 65                  | 14                                                                                                                                                   | 25.2                 | 65                  | 65                  |
| UPM-A/ASTA M16 | R-70                             | 125                                     | 170                                        | 60                                                 | 15                                                                                                                                                   | 25.2                 | 65                  | 65                  | 24.9                                                                                                                                                 | 25.2                 | 65                  | 65                  |
| UPM-A/ASTA M16 | R-70                             | 320                                     | 360                                        | 60                                                 | 38.3                                                                                                                                                 | 25.2                 | 65                  | 65                  | 42                                                                                                                                                   | 25.2                 | 65                  | 65                  |
| UPM-A/ASTA M20 | 5.8                              | 90                                      | 140                                        | 120                                                | 11.7                                                                                                                                                 | 28                   | 85                  | 85                  | 16.7                                                                                                                                                 | 34.9                 | 85                  | 85                  |
| UPM-A/ASTA M20 | 5.8                              | 170                                     | 220                                        | 120                                                | 23.3                                                                                                                                                 | 34.9                 | 85                  | 85                  | 40.3                                                                                                                                                 | 34.9                 | 85                  | 85                  |
| UPM-A/ASTA M20 | 5.8                              | 400                                     | 450                                        | 120                                                | 54.9                                                                                                                                                 | 34.9                 | 85                  | 85                  | 58.6                                                                                                                                                 | 34.9                 | 85                  | 85                  |
| UPM-A/ASTA M20 | R-70                             | 90                                      | 140                                        | 120                                                | 11.7                                                                                                                                                 | 28                   | 85                  | 85                  | 16.7                                                                                                                                                 | 39.4                 | 85                  | 85                  |
| UPM-A/ASTA M20 | R-70                             | 170                                     | 220                                        | 120                                                | 23.3                                                                                                                                                 | 39.4                 | 85                  | 85                  | 40.3                                                                                                                                                 | 39.4                 | 85                  | 85                  |
| UPM-A/ASTA M20 | R-70                             | 400                                     | 450                                        | 120                                                | 54.9                                                                                                                                                 | 39.4                 | 85                  | 85                  | 65.7                                                                                                                                                 | 39.4                 | 85                  | 85                  |
| UPM-A/ASTA M24 | 5.8                              | 96                                      | 160                                        | 150                                                | -                                                                                                                                                    | -                    | -                   | -                   | 18.4                                                                                                                                                 | 44.1                 | 105                 | 105                 |
| UPM-A/ASTA M24 | 5.8                              | 210                                     | 270                                        | 150                                                | -                                                                                                                                                    | -                    | -                   | -                   | 56.5                                                                                                                                                 | 50.9                 | 105                 | 105                 |
| UPM-A/ASTA M24 | 5.8                              | 480                                     | 540                                        | 150                                                | -                                                                                                                                                    | -                    | -                   | -                   | 84.3                                                                                                                                                 | 50.9                 | 105                 | 105                 |
| UPM-A/ASTA M24 | R-70                             | 96                                      | 160                                        | 150                                                | -                                                                                                                                                    | -                    | -                   | -                   | 18.4                                                                                                                                                 | 44.1                 | 105                 | 105                 |
| UPM-A/ASTA M24 | R-70                             | 210                                     | 270                                        | 150                                                | -                                                                                                                                                    | -                    | -                   | -                   | 56.5                                                                                                                                                 | 56.8                 | 105                 | 105                 |
| UPM-A/ASTA M24 | R-70                             | 480                                     | 540                                        | 150                                                | -                                                                                                                                                    | -                    | -                   | -                   | 94.3                                                                                                                                                 | 56.8                 | 105                 | 105                 |
| UPM-A/ASTA M30 | 5.8                              | 120                                     | 190                                        | 300                                                | -                                                                                                                                                    | -                    | -                   | -                   | 25.7                                                                                                                                                 | 61.6                 | 140                 | 140                 |
| UPM-A/ASTA M30 | 5.8                              | 280                                     | 350                                        | 300                                                | -                                                                                                                                                    | -                    | -                   | -                   | 89                                                                                                                                                   | 80.6                 | 140                 | 140                 |
| UPM-A/ASTA M30 | 5.8                              | 600                                     | 670                                        | 300                                                | -                                                                                                                                                    | -                    | -                   | -                   | 133.8                                                                                                                                                | 80.6                 | 140                 | 140                 |
| UPM-A/ASTA M30 | R-70                             | 120                                     | 190                                        | 300                                                | -                                                                                                                                                    | -                    | -                   | -                   | 25.7                                                                                                                                                 | 61.6                 | 140                 | 140                 |
| UPM-A/ASTA M30 | R-70                             | 280                                     | 350                                        | 300                                                | -                                                                                                                                                    | -                    | -                   | -                   | 89                                                                                                                                                   | 90.2                 | 140                 | 140                 |
| UPM-A/ASTA M30 | R-70                             | 600                                     | 670                                        | 300                                                | -                                                                                                                                                    | -                    | -                   | -                   | 150.1                                                                                                                                                | 90.2                 | 140                 | 140                 |

<sup>1)</sup> Design according to EN 1992-4:2018 (for static resp. quasi-static loads). The partial safety factors for material resistance as regulated in the ETA as well as a partial safety factor for load actions of  $\gamma_L = 1.4$  are considered. As a single anchor counts e.g. an anchor with a spacing  $s \geq 3 \times h_{ef}$  and an edge distance  $c \geq 1.5 \times h_{ef}$ . Accurate data see ETA.

<sup>2)</sup> The specified loads are valid for anchorages in dry and damp concrete. For temperatures in the anchoring substrate up to 50 °C (resp. short term up to 80 °C). Drill hole cleaning as per specification in the ETA. The factor  $\Psi_{sus}$  for sustained load was taken into account with 1.0.

<sup>3)</sup> Further steel grades, versions and technical data see ETA, e.g. for dry internal conditions, galvanised steel (zp/gvz); for damp interiors and for outdoor use, stainless steel (R).

<sup>4)</sup> In the case of combinations of tension and shear loads, bending moments with reduced or minimum spacing and edge distances (anchor groups), the design must be carried out in accordance with the provisions of the complete ETA and the provisions of the EN 1992-4:2018. We recommend using our anchor design software DesignFIX.

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## Load table

Permissible loads of a single anchor<sup>1) 2)</sup> in normal concrete of strength class C20/25.

For the design the complete current assessment ETA-10/0171 has to be considered.

| Type    | Screw Material <sup>3)</sup> | Effective anchor-<br>age depth | Minimum member<br>thickness | Maximum installation-<br>torque | Permissible tension ( $N_{perm}$ ) and shear loads ( $V_{perm}$ ); minimum spacing ( $s_{min}$ ) and edge distances ( $c_{min}$ )<br>with reduced loads |                               |                              |                              |
|---------|------------------------------|--------------------------------|-----------------------------|---------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------|------------------------------|------------------------------|
|         |                              | $h_{ef}$ [mm]                  | $h_{min}$ [mm]              | $T_{inst,max}$ [Nm]             | $N_{perm}$ <sup>4)</sup> [kN]                                                                                                                           | $V_{perm}$ <sup>4)</sup> [kN] | $s_{min}$ <sup>4)</sup> [mm] | $c_{min}$ <sup>4)</sup> [mm] |
| IST M8  | 5.8                          | 90                             | 120                         | 10                              | 9.0                                                                                                                                                     | 5.3                           | 55                           | 55                           |
| IST M8  | 8.8                          | 90                             | 120                         | 10                              | 13.8                                                                                                                                                    | 8.3                           | 55                           | 55                           |
| IST M8  | R-70                         | 90                             | 120                         | 10                              | 9.9                                                                                                                                                     | 5.9                           | 55                           | 55                           |
| IST M10 | 5.8                          | 90                             | 130                         | 20                              | 13.8                                                                                                                                                    | 8.3                           | 65                           | 65                           |
| IST M10 | 8.8                          | 90                             | 130                         | 20                              | 16.7                                                                                                                                                    | 13.3                          | 65                           | 65                           |
| IST M10 | R-70                         | 90                             | 130                         | 20                              | 15.7                                                                                                                                                    | 9.3                           | 65                           | 65                           |
| IST M12 | 5.8                          | 125                            | 170                         | 40                              | 20.5                                                                                                                                                    | 12.1                          | 75                           | 75                           |
| IST M12 | 8.8                          | 125                            | 170                         | 40                              | 26.6                                                                                                                                                    | 19.3                          | 75                           | 75                           |
| IST M12 | R-70                         | 125                            | 170                         | 40                              | 22.5                                                                                                                                                    | 13.5                          | 75                           | 75                           |
| IST M16 | 5.8                          | 160                            | 210                         | 80                              | 37.6                                                                                                                                                    | 22.4                          | 95                           | 95                           |
| IST M16 | 8.8                          | 160                            | 210                         | 80                              | 39.5                                                                                                                                                    | 30.9                          | 95                           | 95                           |
| IST M16 | R-70                         | 160                            | 210                         | 80                              | 39.5                                                                                                                                                    | 25.1                          | 95                           | 95                           |
| IST M20 | 5.8                          | 200                            | 260                         | 120                             | 55.2                                                                                                                                                    | 35.4                          | 125                          | 125                          |
| IST M20 | 8.8                          | 200                            | 260                         | 120                             | 55.2                                                                                                                                                    | 42.9                          | 125                          | 125                          |
| IST M20 | R-70                         | 200                            | 260                         | 120                             | 55.2                                                                                                                                                    | 39.4                          | 125                          | 125                          |

<sup>1)</sup> Design according to EN 1992-4:2018 (for static resp. quasi-static loads). The partial safety factors for material resistance as regulated in the ETA as well as a partial safety factor for load actions of  $\gamma_L = 1.4$  are considered. As a single anchor counts e.g. an anchor with a spacing  $s \geq 3 \times h_{ef}$  and an edge distance  $c \geq 1.5 \times h_{ef}$ . Accurate data see ETA.

<sup>2)</sup> The specified loads are valid for anchorages in dry and damp concrete. For temperatures in the anchoring substrate up to 50 °C (resp. short term up to 80 °C). Drill hole cleaning as per specification in the ETA. The factor  $\Psi_{sus}$  for sustained load was taken into account with 1.0.

<sup>3)</sup> Further steel grades, versions and technical data see ETA, e.g. for dry internal conditions, galvanised steel (zp/gvz); for damp interiors and for outdoor use, stainless steel (R).

<sup>4)</sup> In the case of combinations of tension and shear loads, bending moments with reduced or minimum spacing and edge distances (anchor groups), the design must be carried out in accordance with the provisions of the complete ETA and the provisions of the EN 1992-4:2018. We recommend using our anchor design software DesignFix.

# Injection mortar UPM33

## Load table

Permissible loads<sup>1)</sup> <sup>2)</sup> for a single anchor in masonry for pre-positioned installation.

For the design the complete current assessment ETA-15/0554 has to be considered.

| Type                                                                     | Compressive brick strength<br>$f_b$ [N/mm <sup>2</sup> ] | Brick raw density<br>$\rho$ [kg/dm <sup>3</sup> ] | Minimum brick dimensions <sup>3)</sup><br>[L x B x H] [mm] | Effective anchorage depth<br>$h_{ef}$ [mm] | Minimum member thickness<br>$h_{min}$ [mm] | Maximum installation torque<br>$T_{inst,max}$ [Nm] | Permissible tensile load <sup>4)</sup><br>$N_{perm}$ [kN] | Permissible shear load <sup>4)</sup><br>$V_{perm}$ [kN] | Minimum spacing <sup>5)</sup><br>$s_{min}^{\parallel} / s_{min}^{\perp}$ [mm] | Characteristic resp. minimum edge distance <sup>5)</sup><br>$c_{cr} = c_{min}$ [mm] |
|--------------------------------------------------------------------------|----------------------------------------------------------|---------------------------------------------------|------------------------------------------------------------|--------------------------------------------|--------------------------------------------|----------------------------------------------------|-----------------------------------------------------------|---------------------------------------------------------|-------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
| <b>Solid brick Mz, NF, acc. to EN 771-1</b>                              |                                                          |                                                   |                                                            |                                            |                                            |                                                    |                                                           |                                                         |                                                                               |                                                                                     |
| M8                                                                       | ≥ 12                                                     | ≥ 1,8                                             | 240 x 115 x 71                                             | ≥ 50                                       | 115                                        | 10                                                 | 1.14                                                      | 0.71                                                    | 240 / 75                                                                      | 100                                                                                 |
| M10                                                                      | ≥ 12                                                     | ≥ 1,8                                             | 240 x 115 x 71                                             | 80                                         | 115                                        | 10                                                 | 1.43                                                      | 1.14                                                    | 240 / 75                                                                      | 100                                                                                 |
| M10                                                                      | ≥ 12                                                     | ≥ 1,8                                             | 240 x 115 x 71                                             | 200                                        | 240                                        | 10                                                 | 3.43                                                      | 2.43                                                    | 240 / 75                                                                      | 100                                                                                 |
| M12                                                                      | ≥ 12                                                     | ≥ 1,8                                             | 240 x 115 x 71                                             | 80                                         | 115                                        | 10                                                 | 1.57                                                      | 1.14                                                    | 240 / 75                                                                      | 100                                                                                 |
| M12                                                                      | ≥ 12                                                     | ≥ 1,8                                             | 240 x 115 x 71                                             | 200                                        | 240                                        | 10                                                 | 2.29                                                      | 3.29                                                    | 240 / 75                                                                      | 100                                                                                 |
| <b>Solid sand-lime brick KS, acc. to EN 771-2</b>                        |                                                          |                                                   |                                                            |                                            |                                            |                                                    |                                                           |                                                         |                                                                               |                                                                                     |
| M8                                                                       | ≥ 12                                                     | ≥ 1,8                                             | 240 x 115 x 71                                             | 50                                         | 115                                        | 5                                                  | 1.14                                                      | 0.43                                                    | 80 / 150                                                                      | 60                                                                                  |
| M8                                                                       | ≥ 12                                                     | ≥ 1,8                                             | 240 x 115 x 71                                             | 100                                        | 240                                        | 5                                                  | 2.29                                                      | 0.86                                                    | 80 / 300                                                                      | 60                                                                                  |
| M10                                                                      | ≥ 12                                                     | ≥ 1,8                                             | 240 x 115 x 71                                             | 100                                        | 240                                        | 15                                                 | 1.57                                                      | 0.57                                                    | 80 / 300                                                                      | 60                                                                                  |
| M10                                                                      | ≥ 12                                                     | ≥ 1,8                                             | 240 x 115 x 71                                             | 200                                        | 240                                        | 15                                                 | 3.43                                                      | 0.57                                                    | 80 / 600                                                                      | 60                                                                                  |
| M12                                                                      | ≥ 12                                                     | ≥ 1,8                                             | 240 x 115 x 71                                             | 100                                        | 240                                        | 15                                                 | 1.29                                                      | 0.57                                                    | 80 / 300                                                                      | 60                                                                                  |
| M12                                                                      | ≥ 12                                                     | ≥ 1,8                                             | 240 x 115 x 71                                             | 200                                        | 240                                        | 15                                                 | 3.43                                                      | 0.57                                                    | 80 / 300                                                                      | 60                                                                                  |
| <b>Perforated sand-lime brick KSL, acc. to EN 771-2<sup>3)</sup></b>     |                                                          |                                                   |                                                            |                                            |                                            |                                                    |                                                           |                                                         |                                                                               |                                                                                     |
| M8 with UPM-SH 12x85 K                                                   | ≥ 12                                                     | ≥ 1,4                                             | 240 x 175 x 113                                            | 85                                         | 175                                        | 2                                                  | 0.71                                                      | 0.71                                                    | 100 / 115                                                                     | 60                                                                                  |
| M8 / M10 with UPM-SH 16x85 K                                             | ≥ 12                                                     | ≥ 1,4                                             | 240 x 175 x 113                                            | 85                                         | 175                                        | 2                                                  | 0.86                                                      | 1.29                                                    | 100 / 115                                                                     | 80                                                                                  |
| M12 with UPM-SH 20x85 K                                                  | ≥ 12                                                     | ≥ 1,4                                             | 240 x 175 x 113                                            | 85                                         | 175                                        | 2                                                  | 0.86                                                      | 1.29                                                    | 100 / 115                                                                     | 80                                                                                  |
| M8 / M10 with UPM-SH 16x130 K                                            | ≥ 12                                                     | ≥ 1,4                                             | 240 x 175 x 113                                            | 130                                        | 175                                        | 2                                                  | 0.86                                                      | 1.29                                                    | 100 / 115                                                                     | 80                                                                                  |
| <b>Lightweight concrete hollow block Hbl, acc. EN 771-1<sup>3)</sup></b> |                                                          |                                                   |                                                            |                                            |                                            |                                                    |                                                           |                                                         |                                                                               |                                                                                     |
| M8 with UPM-SH 12x85 K                                                   | ≥ 10                                                     | ≥ 0,9                                             | 240 x 175 x 113                                            | 85                                         | 175                                        | 2                                                  | 1.14                                                      | 1.14                                                    | 240 / 115                                                                     | 100                                                                                 |
| M8 / M10 with UPM-SH 16x85 K                                             | ≥ 10                                                     | ≥ 0,9                                             | 240 x 175 x 113                                            | 85                                         | 175                                        | 2                                                  | 1                                                         | 1.57                                                    | 240 / 115                                                                     | 100                                                                                 |
| M12 with UPM-SH 20x85 K                                                  | ≥ 10                                                     | ≥ 0,9                                             | 240 x 175 x 113                                            | 85                                         | 175                                        | 2                                                  | 1.43                                                      | 1.71                                                    | 240 / 115                                                                     | 100                                                                                 |
| M8 / M10 with UPM-SH 16x130 K                                            | ≥ 10                                                     | ≥ 0,9                                             | 240 x 175 x 113                                            | 130                                        | 175                                        | 2                                                  | 1.43                                                      | 1.57                                                    | 240 / 115                                                                     | 100                                                                                 |
| M12 with UPM-SH 20x130 K                                                 | ≥ 10                                                     | ≥ 0,9                                             | 240 x 175 x 113                                            | 130                                        | 175                                        | 2                                                  | 1.43                                                      | 1.71                                                    | 240 / 115                                                                     | 100                                                                                 |
| <b>Aerated concrete acc. to EN 7714-4<sup>6)</sup></b>                   |                                                          |                                                   |                                                            |                                            |                                            |                                                    |                                                           |                                                         |                                                                               |                                                                                     |
| M8                                                                       | ≥ 2                                                      | ≥ 0,35                                            | -                                                          | ≥ 100                                      | 130                                        | 1                                                  | 0.54                                                      | 0.43                                                    | 250 / 250                                                                     | 100                                                                                 |
| M8                                                                       | ≥ 4                                                      | ≥ 0,50                                            | -                                                          | 200                                        | 230                                        | 8                                                  | 1.07                                                      | 0.71                                                    | 80 / 80                                                                       | 100                                                                                 |
| M10                                                                      | ≥ 2                                                      | ≥ 0,35                                            | -                                                          | ≥ 100                                      | 130                                        | 2                                                  | 0.54                                                      | 0.43                                                    | 250 / 250                                                                     | 100                                                                                 |
| M10                                                                      | ≥ 4                                                      | ≥ 0,50                                            | -                                                          | 200                                        | 230                                        | 12                                                 | 1.79                                                      | 0.71                                                    | 80 / 80                                                                       | 100                                                                                 |
| M12                                                                      | ≥ 2                                                      | ≥ 0,35                                            | -                                                          | ≥ 100                                      | 130                                        | 2                                                  | 0.71                                                      | 0.54                                                    | 250 / 250                                                                     | 100                                                                                 |
| M12                                                                      | ≥ 4                                                      | ≥ 0,50                                            | -                                                          | 200                                        | 230                                        | 16                                                 | 1.79                                                      | 0.71                                                    | 80 / 80                                                                       | 100                                                                                 |

<sup>1)</sup> The required partial safety factors for material resistance as well as a partial safety factor for load actions of  $\gamma_L = 1.4$  are considered. Load values are valid for zinc-plated steel, stainless steel R and highly corrosion resistant steel HCR. In perforated bricks and hollow blocks threaded rod UPM-A/ASTA in combination with perforated sleeve UPM-SH.

<sup>2)</sup> The given loads are valid for installation and use of fixations in dry masonry - use category d/d - for temperatures in the substrate up to 50 °C (resp. short term up to 80 °C) and drill hole cleaning according to assessment. The given brick types in combination with the permissible loads are an extract of the assessment.

<sup>3)</sup> More information about, e.g. hole patterns, assortment of perforated sleeves UPM-SH see assessment.

<sup>4)</sup> In the case of combinations of tensile and shear loads, bending moments and reduced edge and axial spacings (anchor groups), the design must be carried out in accordance with the provisions of the complete assessment.

<sup>5)</sup> Minimum feasible spacing resp. edge distance. Details as well as to the distances to joints see assessment.

<sup>6)</sup> Cylindrical drill hole.