

# Injection mortar UPM44

## Load table

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

For the design the complete current assessment ETA-02/0022 has to be considered.

| Type           | Material /<br>surface <sup>3)</sup> | Effective<br>anchor-<br>ogedepth<br><br>$h_{ef}$ [mm] | Minimum-<br>member<br>thickness<br><br>$h_{min}$ [mm] | Maximum in-<br>stallation-<br>torque<br><br>$T_{inst,max}$ [Nm] | Cracked concrete                                                                                                                                        |                      |                     |                     | Non-cracked concrete                                                                                                                                    |                      |                     |                     |
|----------------|-------------------------------------|-------------------------------------------------------|-------------------------------------------------------|-----------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------|---------------------|---------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------|---------------------|---------------------|
|                |                                     |                                                       |                                                       |                                                                 | Permissible tension ( $N_{perm}$ ) and shear loads ( $V_{perm}$ ); minimum<br>spacing ( $s_{min}$ ) and edge distances ( $c_{min}$ ) with reduced loads |                      |                     |                     | Permissible tension ( $N_{perm}$ ) and shear loads ( $V_{perm}$ ); minimum<br>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 M8  | 5.8                                 | 60                                                    | 100                                                   | 10                                                              | 3.9                                                                                                                                                     | 6.3                  | 40                  | 40                  | 7.9                                                                                                                                                     | 6.3                  | 40                  | 40                  |
| UPM-A/ASTA M8  | 5.8                                 | 80                                                    | 110                                                   | 10                                                              | 5.3                                                                                                                                                     | 6.3                  | 40                  | 40                  | 9                                                                                                                                                       | 6.3                  | 40                  | 40                  |
| UPM-A/ASTA M8  | 5.8                                 | 160                                                   | 190                                                   | 10                                                              | 9                                                                                                                                                       | 6.3                  | 40                  | 40                  | 9                                                                                                                                                       | 6.3                  | 40                  | 40                  |
| UPM-A/ASTA M8  | R-70                                | 60                                                    | 100                                                   | 10                                                              | 3.9                                                                                                                                                     | 6                    | 40                  | 40                  | 7.9                                                                                                                                                     | 6                    | 40                  | 40                  |
| UPM-A/ASTA M8  | R-70                                | 80                                                    | 110                                                   | 10                                                              | 5.3                                                                                                                                                     | 6                    | 40                  | 40                  | 9.9                                                                                                                                                     | 6                    | 40                  | 40                  |
| UPM-A/ASTA M8  | R-70                                | 160                                                   | 190                                                   | 10                                                              | 9.9                                                                                                                                                     | 6                    | 40                  | 40                  | 9.9                                                                                                                                                     | 6                    | 40                  | 40                  |
| UPM-A/ASTA M10 | 5.8                                 | 60                                                    | 100                                                   | 20                                                              | 5.4                                                                                                                                                     | 9.7                  | 45                  | 45                  | 9.9                                                                                                                                                     | 9.7                  | 45                  | 45                  |
| UPM-A/ASTA M10 | 5.8                                 | 90                                                    | 120                                                   | 20                                                              | 8.1                                                                                                                                                     | 9.7                  | 45                  | 45                  | 13.8                                                                                                                                                    | 9.7                  | 45                  | 45                  |
| UPM-A/ASTA M10 | 5.8                                 | 200                                                   | 230                                                   | 20                                                              | 13.8                                                                                                                                                    | 9.7                  | 45                  | 45                  | 13.8                                                                                                                                                    | 9.7                  | 45                  | 45                  |
| UPM-A/ASTA M10 | R-70                                | 60                                                    | 100                                                   | 20                                                              | 5.4                                                                                                                                                     | 9.2                  | 45                  | 45                  | 9.9                                                                                                                                                     | 9.2                  | 45                  | 45                  |
| UPM-A/ASTA M10 | R-70                                | 90                                                    | 120                                                   | 20                                                              | 8.1                                                                                                                                                     | 9.2                  | 45                  | 45                  | 14.8                                                                                                                                                    | 9.2                  | 45                  | 45                  |
| UPM-A/ASTA M10 | R-70                                | 200                                                   | 230                                                   | 20                                                              | 15.7                                                                                                                                                    | 9.2                  | 45                  | 45                  | 15.7                                                                                                                                                    | 9.2                  | 45                  | 45                  |
| UPM-A/ASTA M12 | 5.8                                 | 70                                                    | 100                                                   | 40                                                              | 7.5                                                                                                                                                     | 14.3                 | 55                  | 55                  | 13.7                                                                                                                                                    | 14.3                 | 55                  | 55                  |
| UPM-A/ASTA M12 | 5.8                                 | 110                                                   | 140                                                   | 40                                                              | 11.8                                                                                                                                                    | 14.3                 | 55                  | 55                  | 20.5                                                                                                                                                    | 14.3                 | 55                  | 55                  |
| UPM-A/ASTA M12 | 5.8                                 | 240                                                   | 270                                                   | 40                                                              | 20.5                                                                                                                                                    | 14.3                 | 55                  | 55                  | 20.5                                                                                                                                                    | 14.3                 | 55                  | 55                  |
| UPM-A/ASTA M12 | R-70                                | 70                                                    | 100                                                   | 40                                                              | 7.5                                                                                                                                                     | 13.7                 | 55                  | 55                  | 13.7                                                                                                                                                    | 13.7                 | 55                  | 55                  |
| UPM-A/ASTA M12 | R-70                                | 110                                                   | 140                                                   | 40                                                              | 11.8                                                                                                                                                    | 13.7                 | 55                  | 55                  | 21.7                                                                                                                                                    | 13.7                 | 55                  | 55                  |
| UPM-A/ASTA M12 | R-70                                | 240                                                   | 270                                                   | 40                                                              | 22.5                                                                                                                                                    | 13.7                 | 55                  | 55                  | 22.5                                                                                                                                                    | 13.7                 | 55                  | 55                  |
| UPM-A/ASTA M16 | 5.8                                 | 80                                                    | 120                                                   | 60                                                              | 11.5                                                                                                                                                    | 23                   | 65                  | 65                  | 16.8                                                                                                                                                    | 26.9                 | 65                  | 65                  |
| UPM-A/ASTA M16 | 5.8                                 | 125                                                   | 170                                                   | 60                                                              | 18                                                                                                                                                      | 26.9                 | 65                  | 65                  | 29.9                                                                                                                                                    | 26.9                 | 65                  | 65                  |
| UPM-A/ASTA M16 | 5.8                                 | 320                                                   | 360                                                   | 60                                                              | 37.6                                                                                                                                                    | 26.9                 | 65                  | 65                  | 37.6                                                                                                                                                    | 26.9                 | 65                  | 65                  |
| UPM-A/ASTA M16 | R-70                                | 80                                                    | 120                                                   | 60                                                              | 11.5                                                                                                                                                    | 23                   | 65                  | 65                  | 16.8                                                                                                                                                    | 25.2                 | 65                  | 65                  |
| UPM-A/ASTA M16 | R-70                                | 125                                                   | 170                                                   | 60                                                              | 18                                                                                                                                                      | 25.2                 | 65                  | 65                  | 29.9                                                                                                                                                    | 25.2                 | 65                  | 65                  |
| UPM-A/ASTA M16 | R-70                                | 320                                                   | 360                                                   | 60                                                              | 42                                                                                                                                                      | 25.2                 | 65                  | 65                  | 42                                                                                                                                                      | 25.2                 | 65                  | 65                  |
| UPM-A/ASTA M20 | 5.8                                 | 90                                                    | 140                                                   | 120                                                             | 14                                                                                                                                                      | 28                   | 85                  | 85                  | 20                                                                                                                                                      | 40                   | 85                  | 85                  |
| UPM-A/ASTA M20 | 5.8                                 | 170                                                   | 220                                                   | 120                                                             | 28                                                                                                                                                      | 42.3                 | 85                  | 85                  | 48.3                                                                                                                                                    | 42.3                 | 85                  | 85                  |
| UPM-A/ASTA M20 | 5.8                                 | 400                                                   | 450                                                   | 120                                                             | 58.6                                                                                                                                                    | 42.3                 | 85                  | 85                  | 58.6                                                                                                                                                    | 42.3                 | 85                  | 85                  |
| UPM-A/ASTA M20 | R-70                                | 90                                                    | 140                                                   | 120                                                             | 14                                                                                                                                                      | 28                   | 85                  | 85                  | 20                                                                                                                                                      | 39.4                 | 85                  | 85                  |
| UPM-A/ASTA M20 | R-70                                | 170                                                   | 220                                                   | 120                                                             | 28                                                                                                                                                      | 39.4                 | 85                  | 85                  | 48.3                                                                                                                                                    | 39.4                 | 85                  | 85                  |
| UPM-A/ASTA M20 | R-70                                | 400                                                   | 450                                                   | 120                                                             | 65.7                                                                                                                                                    | 39.4                 | 85                  | 85                  | 65.7                                                                                                                                                    | 39.4                 | 85                  | 85                  |
| UPM-A/ASTA M24 | 5.8                                 | 96                                                    | 160                                                   | 150                                                             | 15.4                                                                                                                                                    | 30.8                 | 105                 | 105                 | 22                                                                                                                                                      | 44.1                 | 105                 | 105                 |
| UPM-A/ASTA M24 | 5.8                                 | 210                                                   | 270                                                   | 150                                                             | 33.9                                                                                                                                                    | 60.6                 | 105                 | 105                 | 67.9                                                                                                                                                    | 60.9                 | 105                 | 105                 |
| UPM-A/ASTA M24 | 5.8                                 | 480                                                   | 540                                                   | 150                                                             | 77.6                                                                                                                                                    | 60.6                 | 105                 | 105                 | 84.3                                                                                                                                                    | 60.9                 | 105                 | 105                 |
| UPM-A/ASTA M24 | R-70                                | 96                                                    | 160                                                   | 150                                                             | 15.4                                                                                                                                                    | 30.8                 | 105                 | 105                 | 22                                                                                                                                                      | 44.1                 | 105                 | 105                 |
| UPM-A/ASTA M24 | R-70                                | 210                                                   | 270                                                   | 150                                                             | 33.9                                                                                                                                                    | 56.8                 | 105                 | 105                 | 67.9                                                                                                                                                    | 56.8                 | 105                 | 105                 |
| UPM-A/ASTA M24 | R-70                                | 480                                                   | 540                                                   | 150                                                             | 77.6                                                                                                                                                    | 56.8                 | 105                 | 105                 | 94.3                                                                                                                                                    | 56.8                 | 105                 | 105                 |
| UPM-A/ASTA M30 | 5.8                                 | 120                                                   | 190                                                   | 300                                                             | 21.5                                                                                                                                                    | 43.1                 | 140                 | 140                 | 30.8                                                                                                                                                    | 61.6                 | 140                 | 140                 |
| UPM-A/ASTA M30 | 5.8                                 | 280                                                   | 350                                                   | 300                                                             | 50.3                                                                                                                                                    | 96                   | 140                 | 140                 | 106.8                                                                                                                                                   | 96                   | 140                 | 140                 |
| UPM-A/ASTA M30 | 5.8                                 | 600                                                   | 670                                                   | 300                                                             | 107.7                                                                                                                                                   | 96                   | 140                 | 140                 | 133.8                                                                                                                                                   | 96                   | 140                 | 140                 |
| UPM-A/ASTA M30 | R-70                                | 120                                                   | 190                                                   | 300                                                             | 21.5                                                                                                                                                    | 43.1                 | 140                 | 140                 | 30.8                                                                                                                                                    | 61.6                 | 140                 | 140                 |
| UPM-A/ASTA M30 | R-70                                | 280                                                   | 350                                                   | 300                                                             | 50.3                                                                                                                                                    | 90.2                 | 140                 | 140                 | 106.8                                                                                                                                                   | 90.2                 | 140                 | 140                 |
| UPM-A/ASTA M30 | R-70                                | 600                                                   | 670                                                   | 300                                                             | 107.7                                                                                                                                                   | 90.2                 | 140                 | 140                 | 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)</sup> <sup>2)</sup> in normal concrete of strength class C20/25.

For the design the complete current assessment ETA-02/0022 has to be considered.

| Type    | Screw Material <sup>3)</sup> | Effective anchor-<br>ogedepth | 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]             | $N_{perm}^{4)}$ [kN]                                                                                                                                    | $V_{perm}^{4)}$ [kN] | $s_{min}^{4)}$ [mm] | $c_{min}^{4)}$ [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                              | 19,0                                                                                                                                                    | 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                              | 23,8                                                                                                                                                    | 19,3                 | 75                  | 75                  |
| IST M12 | R-70                         | 125                           | 170                         | 40                              | 22,5                                                                                                                                                    | 13,5                 | 75                  | 75                  |
| IST M16 | 5.8                          | 160                           | 210                         | 80                              | 35,7                                                                                                                                                    | 22,4                 | 95                  | 95                  |
| IST M16 | 8.8                          | 160                           | 210                         | 80                              | 35,7                                                                                                                                                    | 35,8                 | 95                  | 95                  |
| IST M16 | R-70                         | 160                           | 210                         | 80                              | 35,7                                                                                                                                                    | 25,1                 | 95                  | 95                  |
| IST M20 | 5.8                          | 200                           | 260                         | 120                             | 54,8                                                                                                                                                    | 35,4                 | 125                 | 125                 |
| IST M20 | 8.8                          | 200                           | 260                         | 120                             | 54,8                                                                                                                                                    | 42,9                 | 125                 | 125                 |
| IST M20 | R-70                         | 200                           | 260                         | 120                             | 54,8                                                                                                                                                    | 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.

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## Load table

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

For the design the complete current assessment ETA-15/0555 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>                              |                                                          |                                                   |                                                            |                                            |                                            |                                                     |                                                           |                                                         |                                                                           |                                                                                     |
| M6                                                                       | ≥ 12                                                     | ³ 1,8                                             | 240 x 115 x 71                                             | ³ 50                                       | 115                                        | 4                                                   | 1,14                                                      | 0,71                                                    | 240 / 75                                                                  | 100                                                                                 |
| M8                                                                       | ≥ 12                                                     | ³ 1,8                                             | 240 x 115 x 71                                             | ³ 50                                       | 115                                        | 10                                                  | 1,14                                                      | 0,71                                                    | 240 / 75                                                                  | 100                                                                                 |
| M10                                                                      | ≥ 12                                                     | ³ 1,8                                             | 240 x 115 x 71                                             | 80                                         | 115                                        | 10                                                  | 1,42                                                      | 1,14                                                    | 240 / 75                                                                  | 100                                                                                 |
| M10                                                                      | ≥ 12                                                     | ³ 1,8                                             | 240 x 115 x 71                                             | 200                                        | 240                                        | 10                                                  | 3,43                                                      | 2,43                                                    | 240 / 75                                                                  | 100                                                                                 |
| M12                                                                      | ≥ 12                                                     | ³ 1,8                                             | 240 x 115 x 71                                             | 80                                         | 115                                        | 10                                                  | 1,57                                                      | 1,14                                                    | 240 / 75                                                                  | 100                                                                                 |
| M12                                                                      | ≥ 12                                                     | ³ 1,8                                             | 240 x 115 x 71                                             | 200                                        | 240                                        | 10                                                  | 2,29                                                      | 3,28                                                    | 240 / 75                                                                  | 100                                                                                 |
| <b>Solid sand-lime brick KS, acc. to EN 771-2</b>                        |                                                          |                                                   |                                                            |                                            |                                            |                                                     |                                                           |                                                         |                                                                           |                                                                                     |
| M6                                                                       | ³ 12                                                     | ³ 1,8                                             | 240 x 115 x 71                                             | 50                                         | 115                                        | 3                                                   | 1,14                                                      | 0,42                                                    | 80 / 150                                                                  | 60                                                                                  |
| M6                                                                       | ³ 12                                                     | ³ 1,8                                             | 240 x 115 x 71                                             | 100                                        | 115                                        | 3                                                   | 1,57                                                      | 0,89                                                    | 80 / 300                                                                  | 60                                                                                  |
| M8                                                                       | ³ 12                                                     | ³ 1,8                                             | 240 x 115 x 71                                             | 50                                         | 115                                        | 5                                                   | 1,14                                                      | 0,42                                                    | 80 / 150                                                                  | 60                                                                                  |
| M8                                                                       | ³ 12                                                     | ³ 1,8                                             | 240 x 115 x 71                                             | 100                                        | 115                                        | 5                                                   | 2,29                                                      | 0,89                                                    | 80 / 300                                                                  | 60                                                                                  |
| M10                                                                      | ³ 12                                                     | ³ 1,8                                             | 240 x 115 x 71                                             | 100                                        | 115                                        | 15                                                  | 1,57                                                      | 0,57                                                    | 80 / 300                                                                  | 60                                                                                  |
| M10                                                                      | ³ 12                                                     | ³ 1,8                                             | 240 x 115 x 71                                             | 200                                        | 240                                        | 15                                                  | 3,42                                                      | 0,57                                                    | 80 / 600                                                                  | 60                                                                                  |
| M12                                                                      | ³ 12                                                     | ³ 1,8                                             | 240 x 115 x 71                                             | 100                                        | 115                                        | 15                                                  | 1,28                                                      | 0,57                                                    | 80 / 300                                                                  | 60                                                                                  |
| M12                                                                      | ³ 12                                                     | ³ 1,8                                             | 240 x 115 x 71                                             | 200                                        | 240                                        | 15                                                  | 3,42                                                      | 0,57                                                    | 80 / 600                                                                  | 60                                                                                  |
| M16                                                                      | ³ 12                                                     | ³ 1,8                                             | 240 x 115 x 71                                             | 100                                        | 115                                        | 25                                                  | 1,57                                                      | 0,57                                                    | 80 / 300                                                                  | 60                                                                                  |
| M16                                                                      | ³ 12                                                     | ³ 1,8                                             | 240 x 115 x 71                                             | 200                                        | 240                                        | 25                                                  | 3,42                                                      | 0,57                                                    | 80 / 600                                                                  | 60                                                                                  |
| <b>Vertically perforated brick Hlz, acc. to EN 771-1<sup>3)</sup></b>    |                                                          |                                                   |                                                            |                                            |                                            |                                                     |                                                           |                                                         |                                                                           |                                                                                     |
| M6 / M8 with UPM-SH 12x85 K                                              | ³ 12                                                     | ³ 1,0                                             | 370 x 240 x 237                                            | 85                                         | 240                                        | 2                                                   | 0,34                                                      | 0,43                                                    | 100 / 100                                                                 | 100                                                                                 |
| M8 / M10 with UPM-SH 16x130 K                                            | ³ 12                                                     | ³ 1,0                                             | 370 x 240 x 237                                            | 130                                        | 240                                        | 2                                                   | 0,86                                                      | 0,57                                                    | 100 / 100                                                                 | 100                                                                                 |
| M12 / M16 with UPM-SH 20x130 K                                           | ³ 12                                                     | ³ 1,0                                             | 370 x 240 x 237                                            | 130                                        | 240                                        | 2                                                   | 1,14                                                      | 0,57                                                    | 100 / 100                                                                 | 100                                                                                 |
| <b>Perforated sand-lime brick KSL, acc. to EN 771-2<sup>3)</sup></b>     |                                                          |                                                   |                                                            |                                            |                                            |                                                     |                                                           |                                                         |                                                                           |                                                                                     |
| M6 / M8 with UPM-SH 12x85 K                                              | ³ 12                                                     | ≥ 1,4                                             | 240 x 175 x 113                                            | 85                                         | 175                                        | 2                                                   | 0,71                                                      | 0,71                                                    | 100 / 115                                                                 | 60                                                                                  |
| M8 / M10 with UPM-SH 16x130 K                                            | ³ 12                                                     | ≥ 1,4                                             | 240 x 175 x 113                                            | 130                                        | 175                                        | 2                                                   | 1,00                                                      | 1,29                                                    | 100 / 115                                                                 | 80                                                                                  |
| M12 / M16 with UPM-SH 20x85 K                                            | ³ 12                                                     | ≥ 1,4                                             | 240 x 175 x 113                                            | 85                                         | 175                                        | 2                                                   | 1,00                                                      | 1,14                                                    | 100 / 115                                                                 | 80                                                                                  |
| <b>Lightweight concrete hollow block Hbl, acc. EN 771-3<sup>3)</sup></b> |                                                          |                                                   |                                                            |                                            |                                            |                                                     |                                                           |                                                         |                                                                           |                                                                                     |
| M6 / M8 with UPM-SH 12x85 K                                              | ³ 2                                                      | ³ 1,0                                             | 362 x 240 x 240                                            | 85                                         | 240                                        | 2                                                   | 0,43                                                      | 0,26                                                    | 100 / 240                                                                 | 60                                                                                  |
| M6 / M8 with UPM-SH 12x85 K                                              | ³ 4                                                      | ³ 1,0                                             | 362 x 240 x 240                                            | 85                                         | 240                                        | 2                                                   | 0,86                                                      | 0,57                                                    | 100 / 240                                                                 | 60                                                                                  |
| M8 / M10 with UPM-SH 16x85 K                                             | ³ 2                                                      | ³ 1,0                                             | 362 x 240 x 240                                            | 85                                         | 240                                        | 2                                                   | 0,43                                                      | 0,26                                                    | 100 / 240                                                                 | 60                                                                                  |
| M8 / M10 with UPM-SH 16x85 K                                             | ³ 4                                                      | ³ 1,0                                             | 362 x 240 x 240                                            | 85                                         | 240                                        | 2                                                   | 0,86                                                      | 0,57                                                    | 100 / 240                                                                 | 60                                                                                  |
| M12 / M16 with UPM-SH 20x200 K                                           | ³ 2                                                      | ³ 1,0                                             | 362 x 240 x 240                                            | 200                                        | 240                                        | 2                                                   | 0,71                                                      | 0,26                                                    | 100 / 240                                                                 | 60                                                                                  |
| M12 / M16 with UPM-SH 20x200 K                                           | ³ 4                                                      | ³ 1,0                                             | 362 x 240 x 240                                            | 200                                        | 240                                        | 2                                                   | 1,57                                                      | 0,57                                                    | 100 / 240                                                                 | 60                                                                                  |
| <b>Aerated concrete acc. to EN 771-4<sup>6)</sup></b>                    |                                                          |                                                   |                                                            |                                            |                                            |                                                     |                                                           |                                                         |                                                                           |                                                                                     |
| M8                                                                       | ³ 2                                                      | ³ 0,35                                            | -                                                          | 100                                        | 130                                        | 1                                                   | 0,54                                                      | 0,43                                                    | 250 / 250                                                                 | 100                                                                                 |
| M8                                                                       | ³ 4                                                      | ³ 0,50                                            | -                                                          | 200                                        | 230                                        | 8                                                   | 1,07                                                      | 0,71                                                    | 80 / 80                                                                   | 100                                                                                 |
| M10                                                                      | ³ 2                                                      | ³ 0,35                                            | -                                                          | 100                                        | 130                                        | 2                                                   | 0,54                                                      | 0,43                                                    | 250 / 250                                                                 | 100                                                                                 |
| M10                                                                      | ³ 4                                                      | ³ 0,50                                            | -                                                          | 200                                        | 230                                        | 12                                                  | 1,79                                                      | 0,71                                                    | 80 / 80                                                                   | 100                                                                                 |
| M12                                                                      | ³ 2                                                      | ³ 0,35                                            | -                                                          | 100                                        | 130                                        | 2                                                   | 0,71                                                      | 0,54                                                    | 250 / 250                                                                 | 100                                                                                 |
| M12                                                                      | ³ 4                                                      | ³ 0,50                                            | -                                                          | 200                                        | 230                                        | 16                                                  | 1,79                                                      | 0,71                                                    | 80 / 80                                                                   | 100                                                                                 |
| M16                                                                      | ³ 2                                                      | ³ 0,35                                            | -                                                          | 100                                        | 130                                        | 2                                                   | 0,71                                                      | 0,43                                                    | 250 / 250                                                                 | 100                                                                                 |
| M16                                                                      | ³ 4                                                      | ³ 0,50                                            | -                                                          | 200                                        | 230                                        | 20                                                  | 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.