

# Declaration of Performance

## 1109-CPR-0506

**1. Unique identification code of the product-type:** Mungo MQL plastic anchor for multiple use in concrete and masonry for non-structural applications

**2. Manufacturer:** Mungo Befestigungstechnik AG, Bornfeldstrasse 2, CH-4603 Olten/Switzerland

**3. System/s of AVCP:** System 2+

**4. Intended use or use/es:**

| Product   | Intended use   |
|---|--|
| Plastic anchors for use in concrete and masonry | For use in systems, such as façade systems, for fixing or supporting elements which contribute to the stability of the systems |

**5. European Assessment Document:** ETAG 020 Part 1: “Plastic anchors for multiple use in concrete and masonry for non-structural applications”, Edition March 2012, used as EAD

**European Technical Assessment:** ETA-11/0008 of 28 April 2016

**Technical Assessment Body:** DIBt – Deutsches Institut für Bautechnik

**Notified body/ies:** IFBT GmbH NB 1109

**6. Declared performance:**

**Mechanical resistance and stability (BWR 1)**

The essential characteristic regarding mechanical resistance and stability are included under the Basic Works Requirements Safety in use.

**Safety and accessibility (BWR 4)**

| Essential characteristic                              | Performance                             |
|---|---|
| Characteristic resistance for tension and shear loads | See appendix, especially Annex C1 to C4 |
| Characteristic resistance for bending moments         | See appendix, especially Annex C1       |
| Displacements under shear and tension loads           | See appendix, especially Annex C1       |
| Anchor distances and dimensions of members            | See appendix, especially B2 to B3       |

**Safety in case of fire (BWR 1)**

| Essential characteristic | Performance                                 |
|--------------------------|---|
| Reaction to fire         | Anchorage satisfy requirements for Class A1 |
| Resistance to fire       | No performance assessed                     |

The performance of the product identified above is in conformity with the set of declared performance/s. This declaration of performance is issued, in accordance with Regulation (EU) No 305/2011, under the sole responsibility of the manufacturer identified above.

Signed for and on behalf of the manufacturer by:

Dipl.-Ing. Massimo Pirozzi  
Head of Engineering

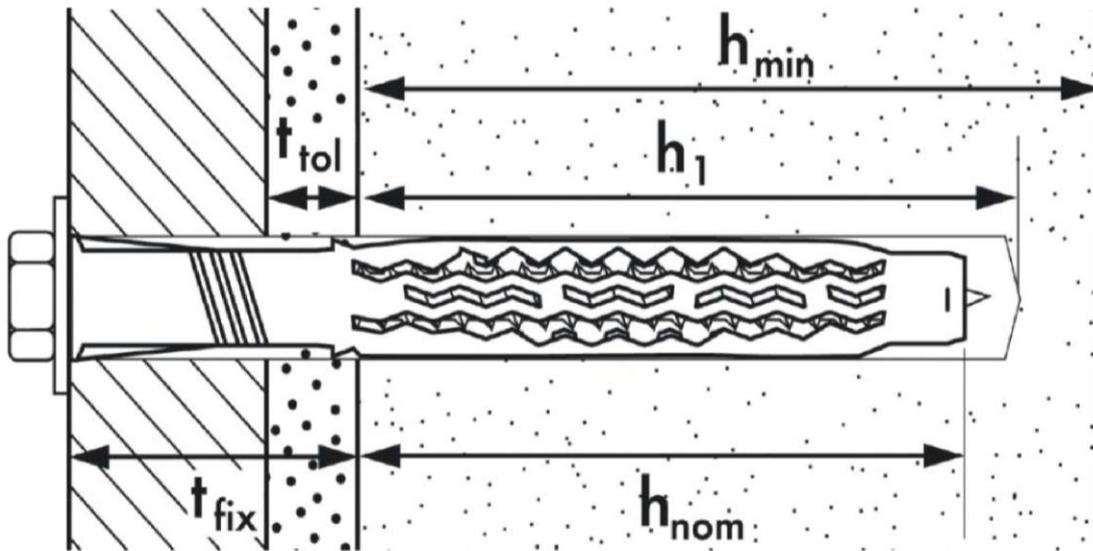


Olten, 2018-26-07



This DoP Has been prepared in different languages. In case there is a dispute on the interpretation the English version shall always prevail. The Appendix includes voluntary and complementary information in English language exceeding the (language as neutrally specified) legal requirements.

Installed condition for MQL 10



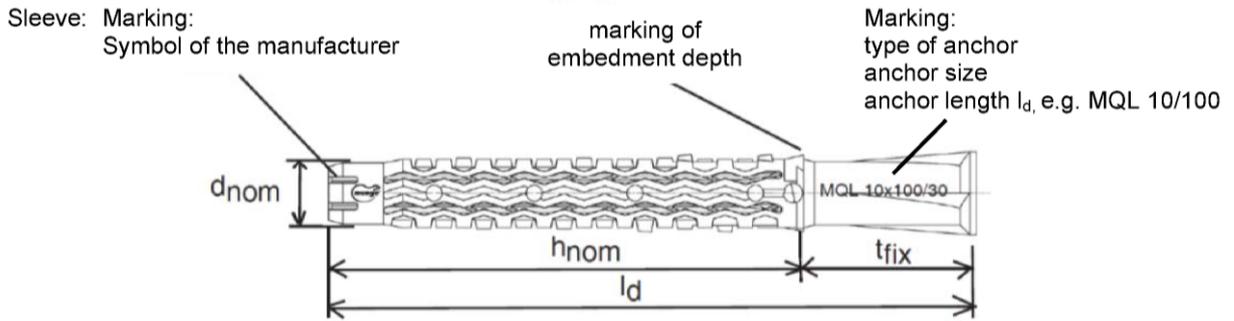
Legend

- $h_{min}$  = minimum thickness of structural part
- $h_1$  = depth of drilled hole to deepest point
- $t_{tol}$  = thickness of equalizing layer or non-load-bearing coating (non-structural layer)
- $t_{fix}$  = thickness of fixture (including non-load-bearing coating)
- $h_{nom}$  = overall anchor embedment depth in the base material

Mungo MQL Universal Frame Plug

Product description  
Installed condition

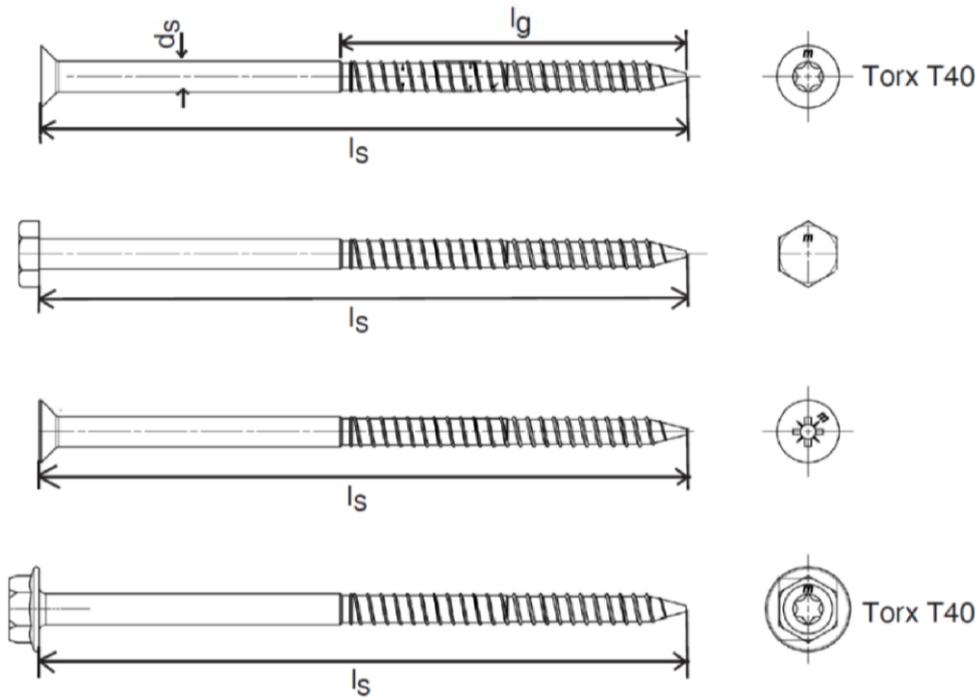
Annex A 1



Version with broad collar:



Special screws:



Mungo MQL Universal Frame Plug

Product description  
Anchor types and special screws

Annex A 2

**Table A1: Dimensions**

| Anchor type                | Plastic sleeve    |                   |                       |                       |               |                  |               | Special screw <sup>2)</sup> |               |                     |
|----------------------------|-------------------|-------------------|-----------------------|-----------------------|---------------|------------------|---------------|-----------------------------|---------------|---------------------|
|                            | $h_{nom}$<br>[mm] | $d_{nom}$<br>[mm] | $t_{fix,min}$<br>[mm] | $t_{fix,max}$<br>[mm] | $l_d$<br>[mm] | $d_{kd}$<br>[mm] | $d_k$<br>[mm] | $d_s$<br>[mm]               | $l_G$<br>[mm] | $l_{S,min}$<br>[mm] |
| <b>MQL 10<sup>1)</sup></b> | 70                | 10                | 10                    | 330                   | 80 - 400      | 2                | 18            | 7                           | 77            | 85                  |

<sup>1)</sup> For description of the anchor the length of the plastic sleeve  $l_d$  is indicated additionally, e.g. for  $l_d=140$  mm: anchor MQL 10/ 140

<sup>2)</sup> The screw length  $l_s$  is 5 mm larger than the length of the plastic sleeve  $l_s$ , so the screw penetrates the appropriate plastic sleeve correctly.

**Table A2: Materials**

| Name           | Material  |
|----------------|---|
| Plastic sleeve | Polyamide, PA6<br>colour orange   |
| Special screw  | steel 6.8, zinc plated $\geq 5\mu\text{m}$ acc. to EN ISO 4042:2001-01<br>blue passivated |
|                | stainless steel A4 according to EN 10088-3:2014<br>material number 1.4401, 1.4301, 1.4571 |

**Mungo MQL Universal Frame Plug**

**Product description**  
Dimensions and materials

**Annex A 3**

### Specifications of intended use

#### Anchorage subject to:

- Static and quasi-static loads
- Multiple fixing of non-structural applications

**Table B1: Application categories in terms of base material and temperature range**

| Application categories   |   | See Annex | Anchor type<br>MQL 10 |
|--|---|-----------|-----------------------|
| <b>Base material</b> <sup>3)</sup>   |   |           |                       |
| <b>a</b>   | Reinforced or unreinforced normal weight concrete <sup>3)</sup> with strength classes $\geq$ C12/15 acc. to EN 206-1:2014 | C 1       | ✓                     |
| <b>b</b>   | Solid brick masonry <sup>1)2)3)</sup>   | C 2       | ✓                     |
| <b>c</b>   | Hollow brick masonry <sup>2)3)</sup>  | C 3 + C 4 | ✓                     |
| <b>d</b>   | Autoclaved aerated concrete   | -         | -                     |
| <b>Temperature range</b>   |   |           |                       |
| <b>Tb</b>  | min T = -20°C to +80°C (maximum short term temperature +80°C and maximum long term temperature +50°C)                     |           | ✓                     |
| <sup>1)</sup> Note: The characteristic resistance is also valid for larger brick sizes and higher compressive strength.<br><sup>2)</sup> Clay bricks and calcium silicate bricks and mortar strength class $\geq$ M2,5 acc. to EN 998-2:2010<br><sup>3)</sup> For other base materials of the use categories a, b or c the characteristic resistance of the anchor may be determined by job site tests according to ETAG 020, Annex B, Edition March 2012. |   |           |                       |

#### Use conditions (environmental conditions):

- Structures subject to dry internal conditions (zinc coated steel, stainless steel).
- The specific screw made of galvanised steel may also be used in structures subject to external atmospheric exposure, if the area of the head of the screw is protected against moisture and driving rain after mounting of the fixing unit in this way, that intrusion of moisture into the anchor shaft is prevented. Therefore there shall be an external cladding or a ventilated rainscreen mounted in front of the head of the screw and the head of the screw itself shall be coated with a soft plastic, permanently elastic bitumen-oil-combination coating (e. g. undercoating or body cavity protection for cars).
- Structures subject to external atmospheric exposure (including industrial and marine environment) and to permanently damp internal condition, if no particular aggressive conditions exist (stainless steel).  
Note: Particular aggressive conditions are e.g. permanent, alternating immersion in seawater or the splash zone of seawater, chloride atmosphere of indoor swimming pools or atmosphere with extreme chemical pollution (e.g. in desulphurization plants or road tunnels where de-icing materials are used).

#### Design:

- The anchorages are to be designed in accordance with the ETAG 020, Annex C, Edition March 2012, under the responsibility of an engineer experienced in anchorages and masonry work.
- Verifiable calculation notes and drawings shall be prepared taking account of the loads to be anchored, the nature and strength of the base materials and the dimensions of the anchorage members as well as of the relevant tolerances. The position of the anchor is indicated on the design drawings.
- Fasteners are only to be used for multiple use for non-structural application according to ETAG 020, Edition March 2012.

#### Installation:

- Hole drilling by the drill modes according to Annex C1 - C4
- Anchor installation carried out by appropriately qualified personnel and under the supervision of the person responsible for technical matters of the site.
- Installation temperature from -20°C to +50°C
- Exposure to UV due to solar radiation of the anchor not protected  $\leq$  6 weeks

**Mungo MQL Universal Frame Plug**

**Intended use  
Specifications**

**Annex B 1**

**Table B2: Installation parameters**

| Anchor type   |           |      | MQL 10                                  |
|---|-----------|------|---|
| Base material   |           |      | Concrete<br>solid brick<br>hollow brick |
| Overall anchor embedment depth in the base material <sup>1)2)</sup> | $h_{nom}$ | [mm] | $\geq 70$                               |
| Nominal drill hole diameter   | $d_{nom}$ | [mm] | 10                                      |
| Cutting diameter of drill bit                                       | $d_{cut}$ | [mm] | $\leq 10,45$                            |
| Depth of drill hole to deepest point <sup>1)</sup>                  | $h_1$     | [mm] | 80                                      |
| Diameter of clearance hole in fixture                               | $d_f$     | [mm] | 10,5                                    |

<sup>1)</sup> see Annex A 1

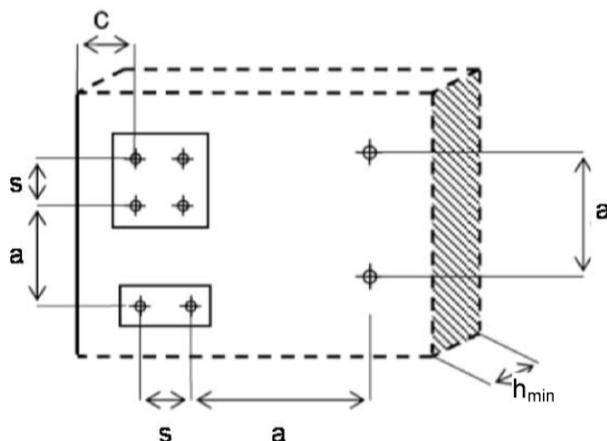
<sup>2)</sup> In masonry made of hollow or perforated bricks the influence of  $h_{nom} > 70$  mm has to be determined by job site tests according to ETAG 020, Annex B.

**Table B3: Minimum thickness of member, edge distance and spacing in concrete**

| Anchor type | Strength category | Minimum thickness of member | Characteristic edge distance | Characteristic spacing | Minimum edge distance | Minimum spacing |
|-------------|-------------------|-----------------------------|------------------------------|------------------------|-----------------------|-----------------|
|             |                   | $h_{min}$                   | $c_{cr,N}$                   | $s_{cr,N}$             | $c_{min}$             | $s_{min}$       |
|             |                   | [mm]                        | [mm]                         | [mm]                   | [mm]                  | [mm]            |
| MQL 10      | C12/15            | 100                         | 140                          | 140                    | 70                    | 140             |
|             | $\geq C16/20$     | 100                         | 100                          | 100                    | 50                    | 100             |

Fixing points with spacing  $a \leq s_{cr,N}$  are considered as a group with a max. characteristic resistance  $N_{Rk,p}$  acc. to Table C3. For a spacing  $a > s_{cr,N}$  the anchors are considered as single anchors, each with a characteristic resistance  $N_{Rk,p}$  acc. to Table C3.

**Scheme of spacing and edge distances in concrete**



**Mungo MQL Universal Frame Plug**

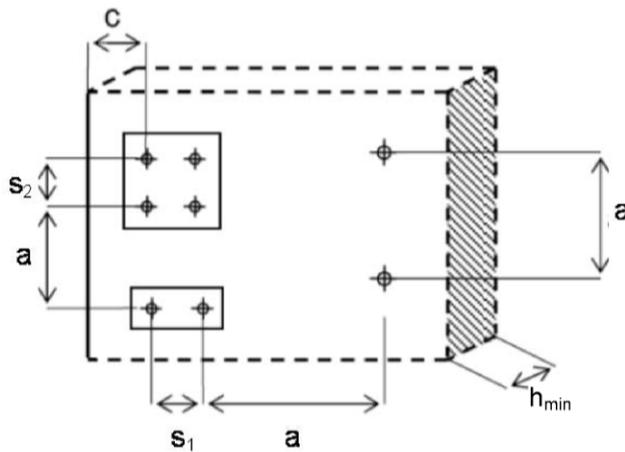
**Intended use**  
Installation parameters, edge distance and spacing in concrete

**Annex B 2**

**Table B4: Minimale Bauteildicke, Randabstand und Achsabstand in Mauerwerk**

| Base material                                    | See Annex | Minimum member thickness | Minimum edge distance | Characteristic spacing                   | Minimum spacing  |                  |           |
|--|-----------|--------------------------|-----------------------|--|------------------|------------------|-----------|
|  |           |                          |                       |  | vertical to edge | parallel to edge |           |
|  |           |                          |                       |  | $h_{min}$        | $c_{min}$        | $a_{min}$ |
|  |           | [mm]                     | [mm]                  | [mm]                                     | [mm]             | [mm]             | [mm]      |
| Solid clay brick<br>Mz 20/2,0 - 2DF              | C 2       | 115                      | 100                   | max (250 mm, $s_{1,min}$ , $s_{2,min}$ ) | 200              | 400              |           |
| Solid calcium silicate bricks<br>KS 12/2,0 - 2DF | C 2       | 115                      |                       |  |                  |                  |           |
| Hollow clay brick<br>HLz 12/1,2 - 10DF           | C 3       | 240                      |                       |  |                  |                  |           |
| Ital. Hollow clay brick<br>Mattone               | C 3       | 240                      |                       |  |                  |                  |           |
| Calcium silicate hollow brick<br>KSL 12/1,2-10DF | C 4       | 240                      |                       |  |                  |                  |           |

**Scheme of spacing and edge distances in masonry**

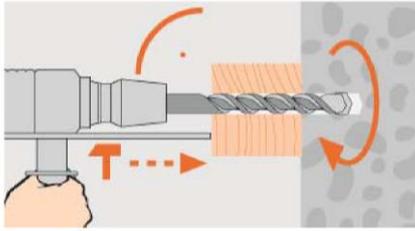


**Mungo MQL Universal Frame Plug**

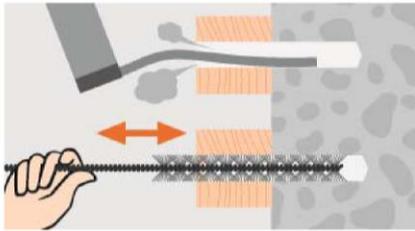
**Intended use**  
Edge distance and spacing in masonry

**Annex B 3**

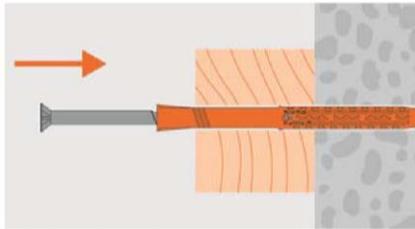
### Installation instructions in concrete and solid brick:



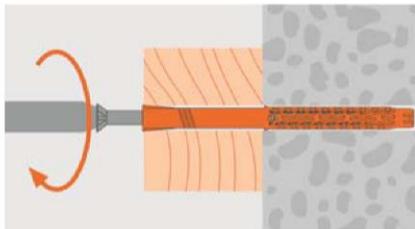
Drill the hole by **hammer drilling**.  
Chose drill diameter and drill hole depth according to Table B2.  
Temperature of base material  $\geq -20^{\circ}\text{C}$ .



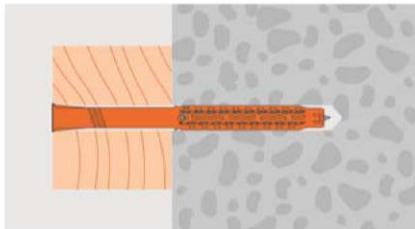
Pre-cleaning the drill hole with a brush, then hole-blowing with a pump.



Setting the anchor with the preassembled fastener through the part to be fixed.



Push the anchor till the collar of the sleeve contacts the part to be fixed, then fix the part with screw.



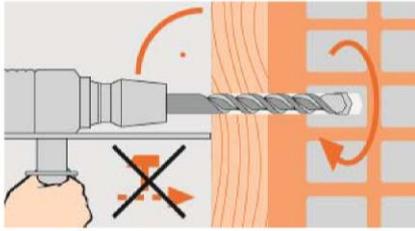
Tightening the fastener until sleeve collar contact.

#### Mungo MQL Universal Frame Plug

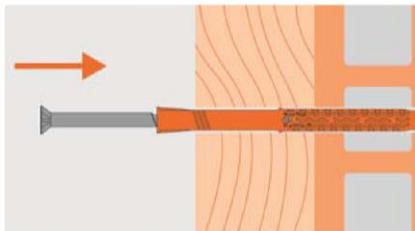
**Intended use**  
Installation instructions in concrete and solid brick

**Annex B 4**

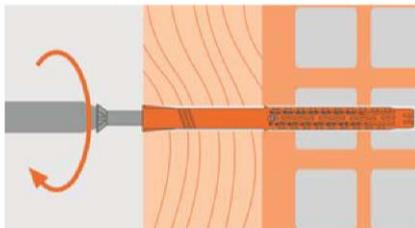
**Installation instructions in hollow brick:**



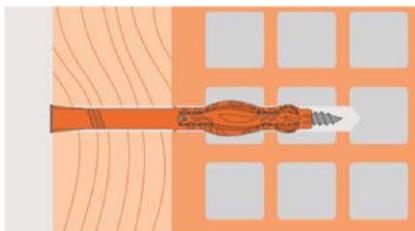
Drill the hole according to the method given in Table C6 and C7 by **rotary drilling** (without hammering) or **hammer drilling**.  
Chose drill hole diameter and drill hole depth according to Table B2.  
Temperature of base material  $\geq -20^{\circ}\text{C}$ .



Setting the anchor with the preassembled fastener through the part to be fixed.



Push the anchor until the collar contacts the part to be fixed, then fix the part with screw.



Tighten the fastener until sleeve collar contact.

**Mungo MQL Universal Frame Plug**

**Intended use**  
Installation instructions in hollow brick

**Annex B 5**

**Table C1: Characteristic bending resistance of the special screw**

| Anchor type                       |               |                   | MQL 10            |                 |
|-----------------------------------|---------------|-------------------|-------------------|-----------------|
| Steel type                        |               |                   | Zinc plated steel | Stainless steel |
| Characteristic bending resistance | $M_{Rk,s}$    | [Nm]              | 15,3              | 17,8            |
| Partial safety factor             | $\gamma_{Ms}$ | <sup>1)</sup> [-] | 1,25              | 1,56            |

<sup>1)</sup> In absence of other national regulations.

**Table C2: Characteristic resistance of the screw**

| Anchor type                                  |               |                   | MQL 10            |                 |
|--|---------------|-------------------|-------------------|-----------------|
| Failure of expansion element (special screw) |               |                   | Zinc plated steel | Stainless steel |
| Characteristic tension resistance            | $N_{Rk,s}$    | [kN]              | 17,0              | 19,8            |
| Partial safety factor for $N_{Rk,s}$         | $\gamma_{Ms}$ | <sup>1)</sup> [-] | 1,5               | 1,87            |
| Characteristic shear resistance              | $V_{Rk,s}$    | [kN]              | 8,5               | 8,5             |
| Partial safety factor for $V_{Rk,s}$         | $\gamma_{Ms}$ | <sup>1)</sup> [-] | 1,25              | 1,56            |

<sup>1)</sup> In absence of other national regulations.

**Table C3: Characteristic resistance in in concrete (use category a)**

| Anchor type   |            |      | MQL 10          |  |
|---|------------|------|-----------------|--|
| Drilling method   |            |      | Hammer drilling |  |
| <b>Pullout failure (plastic sleeve)</b>                           |            |      |                 |  |
| <b>concrete C12/15</b>  |            |      |                 |  |
| Characteristic resistance 50°C <sup>1)</sup> / 80°C <sup>2)</sup> | $N_{Rk,p}$ | [kN] | 1,5             |  |
| <b>concrete ≥ C16/20</b>  |            |      |                 |  |
| Characteristic resistance 50°C <sup>1)</sup> / 80°C <sup>2)</sup> | $N_{Rk,p}$ | [kN] | 2,5             |  |

<sup>1)</sup> Maximum long term temperature

<sup>2)</sup> Maximum short term temperature

**Table C4: Displacements<sup>1)</sup> under tension and shear load in concrete and masonry**

| Anchor type   | Tension load |               |                    | Shear load |                   |                    |
|---------------|--------------|---------------|--------------------|------------|-------------------|--------------------|
|               | $F$          | $\delta_{N0}$ | $\delta_{N\infty}$ | $F$        | $\delta_{V0}$     | $\delta_{V\infty}$ |
|               | [kN]         | [mm]          | [mm]               | [kN]       | [mm]              | [mm]               |
| <b>MQL 10</b> | 1,0          | 0,06          | 0,12               | 4,5        | 3,0 <sup>3)</sup> | 4,5 <sup>3)</sup>  |

<sup>1)</sup> Valid for all temperature ranges.

<sup>2)</sup> Intermediate values by linear interpolation.

<sup>3)</sup> The displacements under shear load may increase in case of an annular gap in the fixture.

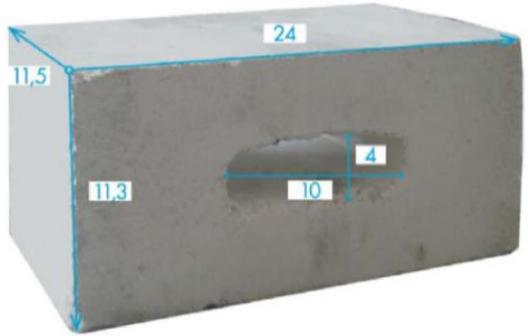
**Mungo MQL Universal Frame Plug**

**Performances**

Characteristic resistance in concrete, characteristic resistance of the screw  
displacements under tension and shear load in concrete and masonry

**Annex C 1**

**Table C5: Characteristic resistance for MQL 10 in solid masonry (use category b) –  
clay brick and calcium silicate brick**

| Base material   | Geometry<br>(format/ length/ width/ height)<br>[mm]                                  | Min. compressive strength<br>$f_b$ [N/mm <sup>2</sup> ]<br>bulk density<br>$\geq \rho$ [kg/dm <sup>3</sup> ] | Drilling method <sup>1)</sup> | Characteristic resistance<br>$F_{Rk}$ [kN] |
|---|--|--|-------------------------------|--|
|   |  |  |                               | MQL 10                                     |
| <b>Clay solid brick acc. to EN 771-1:2011 / DIN 105-100:2012-01</b>           |  |  |                               |  |
| Mz 20/2,0<br><br>2DF:<br>240<br>115<br>113                                    |    | 10 / 2,0   | H                             | 2,0  |
|   |  | 20 / 2,0   | H                             | 3,0  |
| <b>Calcium silicate solid brick acc. to EN 771-2:2011 / DIN V 106:2005-10</b> |  |  |                               |  |
| KSV 12/2,0<br><br>2DF:<br>240<br>115<br>113                                   |  | 10 / 2,0   | H                             | 1,5  |
|   |  | 20 / 2,0   | H                             | 2,5  |

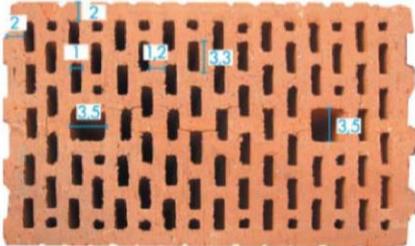
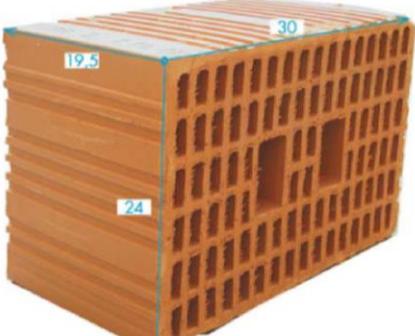
<sup>1)</sup> H = Hammer drilling; R = Rotary drilling

**Mungo MQL Universal Frame Plug**

**Performances**  
Characteristic resistances in solid masonry

**Annex C 2**

**Table C6: Characteristic resistance for MQL 10 in hollow or perforated masonry (use category c) – clay brick**

| Base material  | Geometry<br>(format/ length/ width/ height)<br>[mm]   | Min. compressive strength $f_b$<br>[N/mm <sup>2</sup> ]<br>bulk density $\geq \rho$ [kg/dm <sup>3</sup> ] | Drilling method <sup>1)</sup> | Characteristic resistance $F_{Rk}$ [kN] |
|--|---|---|-------------------------------|---|
|  |   |   |                               | MQL 10                                  |
| <b>Clay brick with perforation acc. to EN 771-1:2011 / DIN 105-100:2012-01</b> |   |   |                               |   |
| HLz 12/1,2   | <br>10DF:<br>300<br>240<br>240 | 12 / 1,2  | R                             | 1,2 <sup>2)</sup>                       |
|  |   |                         | 20 / 1,2                      | R                                       |
| Ital. perforated brick Mattone   | <br>300:<br>240<br>195       | 10 / 0,84   | R                             | 0,9 <sup>2)</sup>                       |
|  |   |                        |                               |   |

<sup>1)</sup> H = Hammer drilling; R = Rotary drilling  
<sup>2)</sup> Shear load with lever arm is not allowed.

**Mungo MQL Universal Frame Plug**

**Performances**  
Characteristic resistances in hollow masonry

**Annex C 3**

**Table C7: Characteristic resistance for MQL 10 in hollow or perforated masonry (use category c) – calcium silicate brick**

| Base material  | Geometry<br>(format/ length/ width/ height)<br>[mm] | Min. compressive strength $f_b$<br>[N/mm <sup>2</sup> ]<br>bulk density $\geq \rho$ [kg/dm <sup>3</sup> ] | Drilling method <sup>1)</sup> | Characteristic resistance $F_{Rk}$ [kN] |                   |
|--|---|---|-------------------------------|---|-------------------|
|  |   |   |                               | MQL 10                                  |                   |
| <b>Calcium silicate brick with perforation acc. to EN 771-2:2011 / DIN V 106:2005-10</b> |   |   |                               |   |                   |
| KSL 12/1,4   | 300<br>240<br>115                                   |                         | 8 / 1,4                       | H                                       | 1,2 <sup>2)</sup> |
|  |   |   |                               |   | 12 / 1,4          |

<sup>1)</sup> H = Hammer drilling; R = Rotary drilling  
<sup>2)</sup> Shear load with lever arm is not allowed.

**Mungo MQL Universal Frame Plug**

**Performances**  
Characteristic resistances in hollow masonry

**Annex C 4**