



ETA-Danmark A/S  
Göteborg Plads 1  
DK-2150 Nordhavn  
Tel. +45 72 24 59 00  
Fax +45 72 24 59 04  
Internet [www.etadanmark.dk](http://www.etadanmark.dk)

Authorised and notified according  
to Article 29 of the Regulation (EU)  
No 305/2011 of the European  
Parliament and of the Council of 9  
March 2011

MEMBER OF EOTA



## European Technical Assessment ETA-07/0322 of 26/01/2015

### I General Part

**Technical Assessment Body issuing the ETA and designated according to Article 29 of the Regulation (EU) No 305/2011: ETA-Danmark A/S**

**Trade name of the construction product:**

MMT TK ANCHOR

**Product family to which the above construction product belongs:**

Torque-controlled expansion anchor for use in non-cracked concrete

**Manufacturer:**

MMT di Mangiarotti B. Snc  
Via 1\* Maggio 9/13  
IT-27010 Filighera (PV)  
Tel. +39 0382 960350  
Fax +39 0382 969901

**Manufacturing plant:**

MMT di Mangiarotti B. Snc  
Via 1\* Maggio 9/13  
IT-27010 Filighera (PV)

**This European Technical Assessment contains:**

16 pages including 13 annexes which form an integral part of the document

**This European Technical Assessment is issued in accordance with Regulation (EU) No 305/2011, on the basis of:**

Guideline for European Technical Approval (ETAG) No. 001 Metal Anchors for use in concrete, Part 2 – torque controlled expansion anchors, April 2013, used as European Assessment Document (EAD).

**This version replaces:**

The previous ETA with the same number issued on 2013-06-26 and expiry on 2015-01-26

Translations of this European Technical Assessment in other languages shall fully correspond to the original issued document and should be identified as such.

Communication of this European Technical Assessment, including transmission by electronic means, shall be in full (except the confidential Annexes referred to above). However, partial reproduction may be made, with the written consent of the issuing Technical Assessment Body. Any partial reproduction has to be identified as such.

## **II SPECIFIC PART OF THE EUROPEAN TECHNICAL ASSESSMENT**

### **1 Technical description of product and intended use**

#### **Technical description of the product**

The MMT TK ANCHOR in the range from M8 to M16 is an anchor made of steel, with one expansion cone, which is placed into a drilled hole and anchored by torque-controlled expansion.

For the installed anchor see drawings given in the Annex A1 to A3.

The characteristic material values, dimensions and tolerances of the anchors not indicated in Annexes shall correspond to the respective values laid down in the technical documentation<sup>1</sup> of this European Technical Assessment.

The anchors are intended to be used with embedment depth given in Annex A2, Table A1. For the installed anchor see Figure given in Annex A1. The intended use specifications of the product are detailed in the Annex B1.

### **2 Specification of the intended use in accordance with the applicable EAD**

The performances given in Section 3 are only valid if the anchor is used in compliance with the specifications and conditions given in Annex B1 to B3

The provisions made in this European Technical Assessment are based on an assumed intended working life of the anchor of 50 years.

The indications given on the working life cannot be interpreted as a guarantee given by the producer or Assessment Body, but are to be regarded only as a means for choosing the right products in relation to the expected economically reasonable working life of the works.

---

<sup>1</sup> The technical documentation of this European Technical Assessment is deposited at ETA-Danmark and, as far as relevant for the tasks of the Notified bodies involved in the attestation of conformity procedure, is handed over to the notified bodies.

### **3 Performance of the product and references to the methods used for its assessment**

#### **3.1 Characteristics of product**

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

The essential characteristics are detailed in the Annex from C1 to C3.

##### **Safety in case of fire (BWR 2):**

The essential characteristics are detailed in the Annex from C4.

##### **Hygiene, health and the environment (BWR3):**

Regarding the dangerous substances contained in this European Technical Assessment, there may be other requirements applicable to the products falling within its scope (e.g. transposed European legislation and national laws, regulations and administrative provisions). In order to meet the provisions of the Construction Products Regulation, these requirements need also to be complied with, when and where they apply.

##### **Safety in use (BWR4):**

For basic requirement Safety in use the same criteria are valid for Basic Requirement Mechanical resistance and stability (BWR1).

##### **Sustainable use of natural resources (BWR7)**

No performance determined

Other Basic Requirements are not relevant.

#### **3.2 Methods of assessment**

The assessment of fitness of the anchor for the intended use in relation to the requirements for mechanical resistance and stability and safety in use in the sense of the Basic Works Requirements 1 and 4 has been made in accordance with the « Guideline for European Technical Assessment of Metal Anchors for use in Concrete », Part 1 « Anchors in general » and Part 2 « Torque controlled expansion anchors».

In addition to the specific clauses relating to dangerous substances contained in this European technical Assessment, there may be other requirements applicable to the products falling within its scope (e.g. transposed European legislation and national laws, regulations and administrative provisions). In order to meet the provisions of the Construction Products Regulation, these requirements need also to be complied with, when and where they apply.

#### **4 Attestation and verification of constancy of performance (AVCP)**

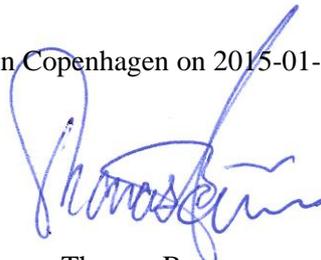
##### **4.1 AVCP system**

According to the decision 96/582/EC of the European Commission, the system(s) of assessment and verification of constancy of performance (see Annex V to Regulation (EU) No 305/2011) is 1.

#### **5 Technical details necessary for the implementation of the AVCP system, as foreseen in the applicable EAD**

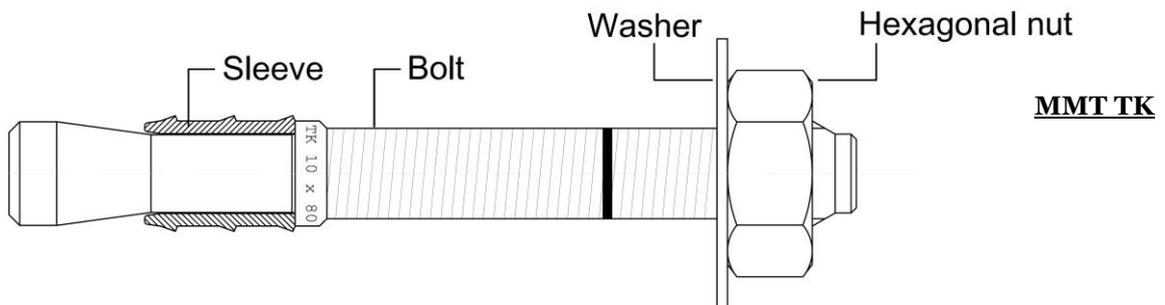
Technical details necessary for the implementation of the AVCP system are laid down in the control plan deposited at ETA-Danmark

Issued in Copenhagen on 2015-01-26 by

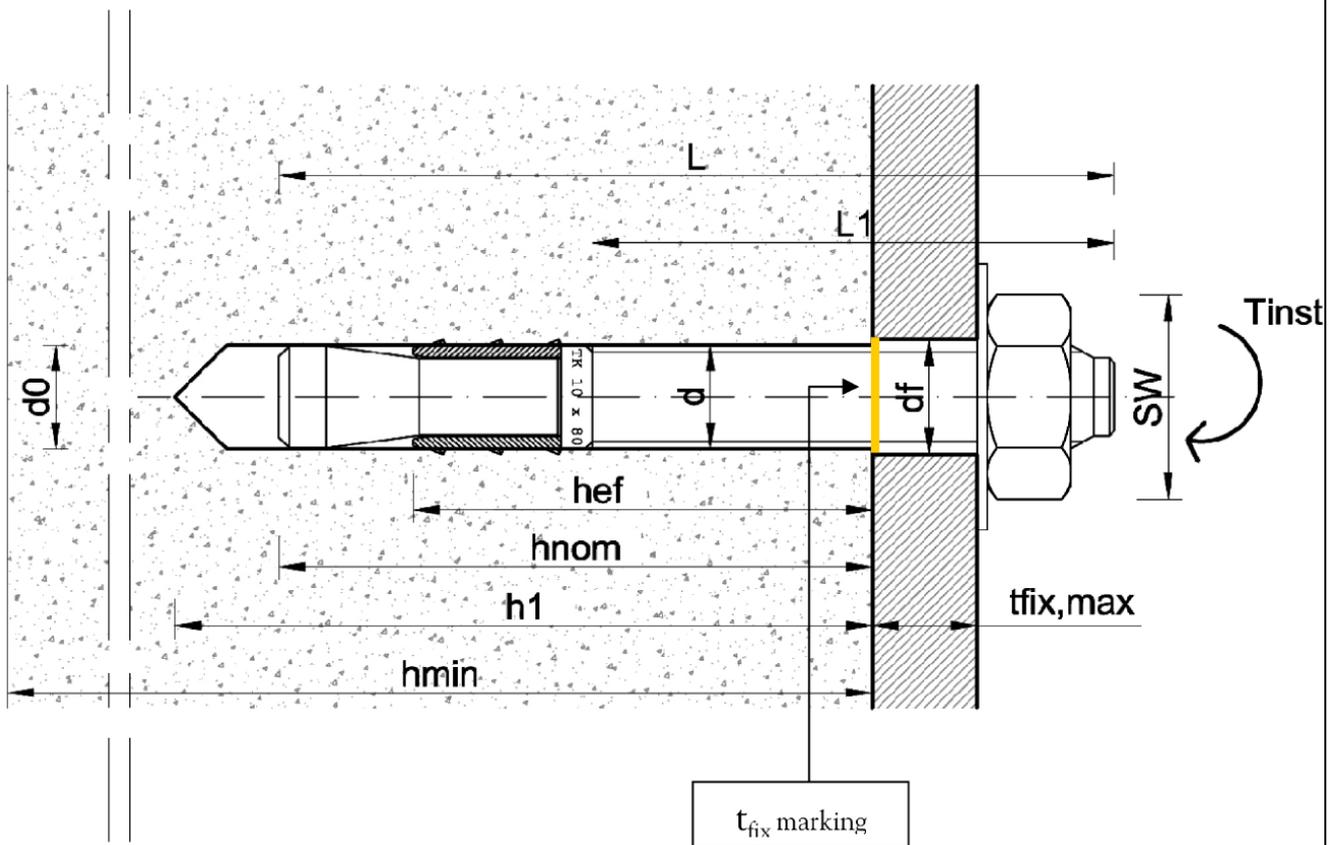


Thomas Bruun  
Managing Director, ETA-Danmark

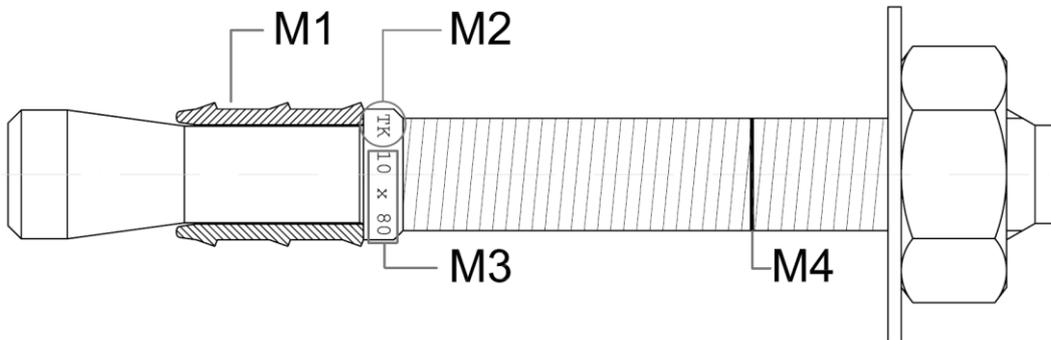
**Assembled anchor:**



**Illustration of the anchor in use**



|                          |  |
|--------------------------|--|
| <b>MMT TK</b>            | <b>Annex A1</b>                                    |
| Product and intended use | of European<br>Technical Assessment<br>ETA-07/0322 |



|  |                 |   |
|--|-----------------|---|
| <b>Marking 1</b> (On the body of the expansion sleeve) | 10-A2           | Anchor diameter and material                        |
| <b>Marking 2</b> (On the body of the anchor)           | TK              | Producer identifying mark and name of the anchor    |
| <b>Marking 3</b> (On the body of the anchor)           | 10 x 80         | Nominal thread diameter x length of the anchor body |
| <b>Marking 4</b> (On the thread of the anchor)         | thread incision | $t_{fix}$ length                                    |

**Table A1: Anchor dimensions**

| Anchor     | Nominal diameter of the drill bit<br>[mm] | Minimum thickness of the concrete<br>$h_{min}$<br>[mm] | Depth of the drilled hole<br>$h_1$<br>[mm] | Setting depth<br>$h_{nom}$<br>[mm] | Effective anchorage depth<br>$h_{ef}$<br>[mm] | Diameter of the hole in the fixture<br>$d_f$<br>[mm] | Max fixture thickness<br>$T_{fix}$<br>[mm] | Tightening torque<br>$T_{inst}$<br>[Nm] | SW<br>[mm] |
|------------|---|--|--|------------------------------------|---|--|--|---|------------|
| <b>M8</b>  | 8   | 110  | 65   | 55                                 | 43,2  | 9  | 45   | 15                                      | 13         |
| <b>M10</b> | 10  | 120  | 70   | 60                                 | 46,6  | 11   | 50   | 30                                      | 17         |
| <b>M12</b> | 12  | 160  | 95   | 80                                 | 63,6  | 14   | 250  | 50                                      | 19         |
| <b>M16</b> | 16  | 200  | 120  | 100                                | 75,8  | 18   | 280  | 100                                     | 24         |

**MMT TK**

Anchors and dimensions

**Annex A2**

of European  
Technical Assessment  
ETA-07/0322

**Table A2: Anchor materials**

| <b>Component</b> | <b>Manufacturing process</b> | <b>Standard</b>     | <b>Steel class</b> | <b>Coating</b>                                    |
|------------------|------------------------------|---------------------|--------------------|---|
| Sleeve           | Press-forming                | -                   | AISI 304           | -   |
| Washer           | Cutting                      | ISO 7093<br>EN10111 | 5.8                | UNI ISO 2081<br>Fe/Zn 7<br>zincplated             |
| Hexagonal Nut    | Cold forming                 | ISO 898 - 2         | 6                  | UNI ISO 2081<br>ISO 4042<br>Fe/Zn 7<br>zincplated |
| Bolt             | Machined                     | ISO 898-1           | 5.8                | UNI ISO 2081<br>ISO 4042<br>Fe/Zn 7<br>zincplated |

MMT TK

Materials

**Annex A3**  
of European  
Technical Assessment  
ETA-07/0322

**Use:**

The anchors are intended to be used for anchorages for which requirements for mechanical resistance and stability and safety in use in the sense of the Basic Requirements 1 and 4 of Regulation 305/2011 (EU) shall be fulfilled and failure of anchorages made with these products would compromise the stability of the works, cause risk to human life and/or lead to considerable economic consequences.

**Anchors subject to:**

- Static and quasi-static loads: sizes M8, M10, M12 and M16.
- .

**Base materials:**

- Reinforced or unreinforced normal weight concrete of strength class C20/25 at minimum to C50/60 at maximum according to EN 206-1.
- Non-cracked concrete: sizes M8, M10, M12 and M16.

**Temperature range:**

The anchors may be used in the following temperature range:

- Normal internal temperature ranges

**Use conditions (Environmental conditions):**

- The anchors may be used in structures subject to dry internal conditions only.

**Installation:**

The anchors may be installed in:

- Dry concrete: sizes M8, M10, M12 and M16.

**Proposed design methods:**

- Static and quasi-static load: ETA Guideline for Metal anchors for concrete, annex C, method A

|                              |   |
|------------------------------|---|
| <b>MMT TK</b>                | <b>Annex B1</b><br>of European<br>Technical Assessment<br>ETA-07/0322 |
| Intended use - Specification |   |

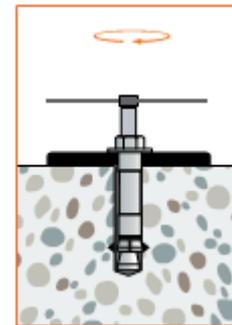
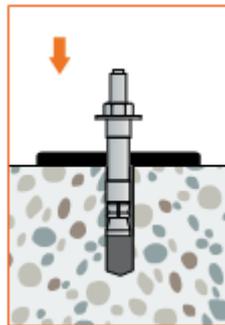
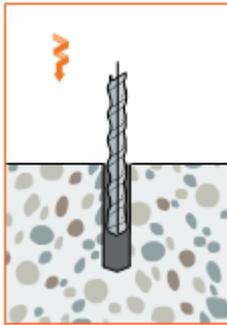
**Table B1: Installation data**

|                   |                                   |                      |   |   |  |  |
|-------------------|-----------------------------------|----------------------|---|---|--|--|
| External Diameter | $d_o$                             | [mm]                 | 8   | 10  | 12   | 16   |
| Screw Diameter    | $d$                               | [mm]                 | 8   | 10  | 12   | 16   |
| Screw Length*     | $L$                               | [mm]                 | L min 67 mm -<br>L max 115 mm               | L min 75 mm -<br>L max 120 mm               | L min 100 mm -<br>L max 360 mm               | L min 120 mm -<br>L max 400 mm               |
| Effective length  | $h_{ef}$                          | [mm]                 | 43,2  | 46,6  | 63,6   | 75,8   |
| Fixture thickness | $t_{fix}$                         | [mm]                 | $t_{fix}$ min 3 mm -<br>$t_{fix}$ max 45 mm | $t_{fix}$ min 5 mm -<br>$t_{fix}$ max 50 mm | $t_{fix}$ min 5 mm -<br>$t_{fix}$ max 250 mm | $t_{fix}$ min 5 mm -<br>$t_{fix}$ max 280 mm |
| TK<br>Anchor body | $A_{s,red}$<br>Reduced<br>Section | [mm <sup>2</sup> ]   | 26.4  | 43.0  | 59.4   | 103.9  |
|                   | $A_s$<br>Threated<br>section      | [mm <sup>2</sup> ]   | 36.6  | 58.0  | 84.3   | 157.0  |
|                   | $f_{uk}$                          | [N/mm <sup>2</sup> ] | 500   | 500   | 500  | 500  |
|                   | $f_{yk}$                          | [N/mm <sup>2</sup> ] | 400   | 400   | 400  | 400  |
| Minimum distances | $s_{min}$                         | [mm]                 | 48  | 60  | 72   | 96   |
|                   | $c_{min}$                         | [mm]                 | 64  | 80  | 96   | 128  |
|                   | $h_{min}$                         | [mm]                 | 110   | 120   | 160  | 200  |

MMT TK

Intended use - data

**Annex B2**  
of European  
Technical Assessment  
ETA-07/0322



|   |  |  |
|---|--|--|
| <p>1. Use a general drill bit to drill hole for anchor according to the drilling depth and diameter required by the specification model of the anchor bolt installed;</p> | <p>2. Before installing, first by hand tightly fasten the anchor bolt nut to ensure all the components of the anchor bolt have no looseness, then insert the anchor bolt in the drilled hole</p> | <p>3. Tightly screw the nut, adopt torsion wrench to tightly screw according to the tightening moment required by the specification and model of the anchor bolt installed</p> |
|---|--|--|

|                              |   |
|------------------------------|---|
| <p><b>MMT TK</b></p>         | <p><b>Annex B3</b><br/>of European<br/>Technical Assessment<br/>ETA-07/0322</p> |
| <p>Procedure for setting</p> |   |

**Table C1: Characteristic strength value and safety coefficients for tension loads design method A**

| HARMONIZED TECHNICAL SPECIFICATION: ETAG 001 PART 3  |                        |      |             |      |      |      |
|--|------------------------|------|-------------|------|------|------|
| ESSENTIAL CHARACTERISTICS  |                        |      | PERFORMANCE |      |      |      |
|  |                        |      | M8          | M10  | M12  | M16  |
| Steel failure  | $N_{Rk,s}$             | [kN] | 13.2        | 21.5 | 29.7 | 51.9 |
|  | $\gamma_{MS}^{(1)}$    | -    | 1.50        | 1.50 | 1.50 | 1.50 |
|  | $N_{Rk,s}/\gamma_{MS}$ | [kN] | 8.8         | 14.3 | 19.8 | 34.6 |
| Pull-out failure   | $N_{Rk,P}$<br>C20/25   | [kN] | 7.5         | 9.0  | 12.0 | 25.0 |
|  | $\gamma_2$             | -    | 1.00        | 1.00 | 1.00 | 1.00 |
|  | $\gamma_{MP}^{(2)}$    | -    | 1.50        | 1.50 | 1.50 | 1.80 |
|  | $N_{Rk,P}/\gamma_{MP}$ | [kN] | 5.0         | 6.0  | 8.0  | 13.9 |
|  | $\Psi_c$ C30           | -    | 1.22        |      |      |      |
|  | $\Psi_c$ C40           | -    | 1.41        |      |      |      |
|  | $\Psi_c$ C50           | -    | 1.55        |      |      |      |
| Critical distances   | $s_{cr,N}$             | [mm] | 144         | 180  | 210  | 270  |
|  | $c_{cr,N}$             | [mm] | 72          | 90   | 105  | 135  |
|  | $s_{cr,sp}$            | [mm] | 144         | 180  | 210  | 270  |
|  | $c_{cr,sp}$            | [mm] | 72          | 90   | 105  | 135  |
| Tension load   | $N^{(3)}$              | [kN] | 3.6         | 4.3  | 5.7  | 9.9  |
| Displacements  | $\delta_{No}$          | [mm] | 0.02        | 0.03 | 0.04 | 0.07 |
|  | $\delta_{N\infty}$     | [mm] | -           | -    | 0.33 | -    |
| <p><sup>(1)</sup> In absence of national regulations</p> <p><sup>(2)</sup> In absence of national regulations <math>\gamma_{MP} = \gamma_{MC} = \gamma_c * \gamma_1 * \gamma_2</math> with: <math>\gamma_1 = 1.0</math> and <math>\gamma_c = 1.5</math></p> <p><sup>(3)</sup> The load N is evaluated according to point 6.1.2.2.8 ETAG 001 - part 1</p> |                        |      |             |      |      |      |

MMT TK

Performance for static and quasi-static loads: Resistances, tension

**Annex C1**  
of European  
Technical Assessment  
ETA-07/0322

**Table C2: Characteristic strength value and safety coefficients for shear loads design method A  
For sizes M8, M10, M12 with lengths up to 180 mm and M16 with lengths up to 220 mm**

| HARMONIZED TECHNICAL SPECIFICATION: ETAG 001 PART 2  |                        |      |             |      |      |       |
|--|------------------------|------|-------------|------|------|-------|
| ESSENTIAL CHARACTERISTICS  |                        |      | PERFORMANCE |      |      |       |
|  |                        |      | M8          | M10  | M12  | M16   |
| Steel failure without lever arm  | $V_{Rk,s}$             | [kN] | 6.6         | 10.1 | 21.1 | 39.3  |
|  | $\gamma_{MS}^{(1)}$    | -    | 1.25        | 1.25 | 1.25 | 1.25  |
|  | $V_{Rk,s}/\gamma_{MS}$ | [kN] | 5.3         | 8.1  | 16.9 | 31.4  |
| Steel failure with lever arm   | $M_{Rk,s}^0$           | [Nm] | 18.7        | 37.4 | 65.4 | 166.0 |
|  | $\gamma_{MS}^{(1)}$    | -    | 1.25        | 1.25 | 1.25 | 1.25  |
|  | $M_{Rk,s}/\gamma_{MS}$ | [Nm] | 15.0        | 29.9 | 52.3 | 132.8 |
| Concrete edge failure  | l <sub>f</sub>         | [mm] | 51          | 56   | 75   | 93    |
|  | d <sub>nom</sub>       | [mm] | 8           | 10   | 12   | 16    |
|  | $\gamma_{Mc}^{(2)}$    | -    | 1.50        | 1.50 | 1.50 | 1.80  |
| Pry-out failure  | k                      | -    | 1           | 1    | 2    | 2     |
|  | $\gamma_{Mc}^{(2)}$    | -    | 1.5         | 1.5  | 1.5  | 1.80  |
| Shear load   | $V^{(3)}$              | [kN] | 3.8         | 5.8  | 12.0 | 22.4  |
| Displacements  | $\delta_{V0}$          | [mm] | 2.4         | 3.4  | 3.6  | 3.7   |
|  | $\delta_{V\infty}$     | [mm] | 3.6         | 5.1  | 5.4  | 5.5   |
| <sup>(1)</sup> In absence of national regulations<br><sup>(2)</sup> In absence of national regulations $\gamma_{Mc} = \gamma_c * \gamma_1 * \gamma_2$ with: $\gamma_1 = 1.0$ and $\gamma_c = 1.5$<br><sup>(3)</sup> The load N is evaluated according to point 6.1.2.2.8 ETAG 001 - part 1 |                        |      |             |      |      |       |

MMT TK

Performance for static and quasi-static loads: Resistances, shear

**Annex C2**  
of European  
Technical Assessment  
ETA-07/0322

**Table C3 Characteristic strength value and safety coefficients for shear loads design method A**  
**For sizes M12 with lengths up to 360 mm and M16 with lengths up to 400 mm**

| HARMONIZED TECHNICAL SPECIFICATION: ETAG 001 PART 2  |                        |      |             |       |
|--|------------------------|------|-------------|-------|
| ESSENTIAL CHARACTERISTICS  |                        |      | PERFORMANCE |       |
|  |                        |      | M12         | M16   |
| Steel failure without lever arm  | $V_{Rk,s}$             | [kN] | 8.8         | 13.5  |
|  | $\gamma_{MS}^{(1)}$    | -    | 1.25        | 1.25  |
|  | $V_{Rk,s}/\gamma_{MS}$ | [kN] | 7.0         | 10.8  |
| Steel failure with lever arm   | $M_{Rk,s}^o$           | [Nm] | 65.4        | 166.0 |
|  | $\gamma_{MS}^{(1)}$    | -    | 1.25        | 1.25  |
|  | $M_{Rk,s}/\gamma_{MS}$ | [Nm] | 52.3        | 132.8 |
| Concrete edge failure  | $l_f$                  | [mm] | 75          | 93    |
|  | $d_{nom}$              | [mm] | 12          | 16    |
|  | $\gamma_{Mc}^{(2)}$    | -    | 1.50        | 1.80  |
| Pry-out failure  | $k$                    | -    | 2           | 2     |
|  | $\gamma_{Mc}^{(2)}$    | -    | 1.5         | 1.8   |
| Shear load   | $V^{(3)}$              | [kN] | 4.2         | 5.4   |
| Displacements  | $\delta_{V_0}$         | [mm] | 5.0         | 4.7   |
|  | $\delta_{V_\infty}$    | [mm] | 7.5         | 7.1   |
| <sup>(1)</sup> In absence of national regulations<br><sup>(2)</sup> In absence of national regulations $\gamma_{Mc} = \gamma_c * \gamma_1 * \gamma_2$ with: $\gamma_1 = 1.0$ and $\gamma_c = 1.5$<br><sup>(3)</sup> The load V is evaluated according to point 6.1.2.2.8 ETAG 001 - part 1 |                        |      |             |       |

MMT TK

Performance for static and quasi-static loads: Resistances, shear

**Annex C3**  
of European  
Technical Assessment  
ETA-07/0322

**Table C3: Resistance to fire**

| <b>HARMONIZED TECHNICAL SPECIFICATION: ETAG 001 PART 1 PARAGRAPH 5.2.2 AND TECHNICAL REPORT TR020</b> |                           |
|---|---------------------------|
| <b>ESSENTIAL CHARACTERISTICS</b>  | <b>PERFORMANCE</b>        |
| <b>Resistance to fire</b>   | No Performance Determined |

**Table C4: Reaction to fire**

| <b>HARMONIZED TECHNICAL SPECIFICATION: ETAG 001 PART 1 PARAGRAPH 5.2.1</b> |  |
|--|--|
| <b>ESSENTIAL CHARACTERISTICS</b>   | <b>PERFORMANCE</b>   |
| <b>Reaction to fire</b>  | The metal parts of metal anchors are assumed to satisfy the requirements for Class A1 of the characteristic reaction to fire, in accordance with the provisions of EC Decision 96/603/EC (as amended) without the need for testing |

**MMT TK**

Performance for exposure to fire

**Annex C4**  
of European  
Technical Assessment  
ETA-07/0322

**Table C5: Terminology and symbols**

| <b>TERMINOLOGY AND SYMBOLS</b> |   |
|--------------------------------|---|
| d                              | Diameter of anchor bolt or thread diameter  |
| d <sub>0</sub>                 | Drill hole diameter   |
| d <sub>fix</sub>               | Diameter of clearance hole in the fixture   |
| h <sub>ef</sub>                | Effective anchorage depth   |
| h <sub>1</sub>                 | Depth of the drilling hole  |
| h <sub>min</sub>               | Minimum thickness of concrete member  |
| T <sub>inst</sub>              | Torque moment to installation   |
| t <sub>fix</sub>               | Thickness to be fixed   |
| S <sub>min</sub>               | Minimum allowable spacing   |
| C <sub>min</sub>               | Minimum allowable edge distance   |
| S <sub>cr,sp</sub>             | Spacing for ensuring the transmission of the characteristic tensile resistance of a single anchor without spacing and edge effects in case of splitting failure       |
| C <sub>cr,sp</sub>             | Edge distance for ensuring the transmission of the characteristic tensile resistance of a single anchor without spacing and edge effects in case of splitting failure |
| τ <sub>Rk,ucr</sub>            | Characteristic bond resistance in un-cracked concrete class C20/25  |
| τ <sub>Rk,cr</sub>             | Characteristic bond resistance in cracked concrete class C20/25   |
| γ <sub>2</sub>                 | Partial safety factors for installation   |
| ψ <sub>c,ucr</sub>             | Increasing factor for un-cracked concrete   |
| ψ <sub>c,cr</sub>              | Increasing factor for cracked concrete  |
| k                              | Factor for concrete edge failure  |
| F                              | Service load in un-cracked (ucr) or cracked concrete (cr)   |
| δ <sub>0</sub>                 | Short term displacement under service load in un-cracked (ucr) or cracked concrete (cr)   |
| δ <sub>∞</sub>                 | Long term displacement under service load in un-cracked (ucr) or cracked concrete (cr)  |
| seis                           | Seismic action  |
| NPD                            | No declared performance   |

MMT TK

Terminology and symbols

**Annex C5**  
of European  
Technical Assessment  
ETA-07/0322