EXPANDET®

Svedebuen 2-6 DK-3230
Tlf.: +45 70227979
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# Declaration of Performance

*No. DEA990115*

## Multi-Monti Concrete Screw

| **Intended use or uses of the construction product according to ETAG 001 parts 1 and 3** | | |
|---|---|---|
| Generic type | | Concrete Screw |
| Base material | | Cracked & Un-cracked concrete C20/25 to C50/60 acc. to EN 206-1:2003 |
| A | Material | Galvanized carbon steel acc. EN10263 |
| | Durability | Internal dry conditions |
| B | Material | Stainless steel 1.4401 and 1.4571 |
| | Durability | Dry internal conditions, external atmospheric exposure (including industrial and marine environment) or exposure in permanently damp internal conditions if no particular aggressive conditions exist. |
| C | Material | High resistant corrosion stainless steel 1.4529 class 70 according to EN ISO 3506 for all conditions. |
| | Durability | dry internal conditions, external atmospheric exposure, in permanently damp internal conditions or in other particular aggressive conditions - e.g. permanent, alternating immersion in seawater, splash zone of seawater, chloride atmosphere of indoor swimming pools or atmosphere with chemical pollution (e.g. in desulphurization plants or road tunnels where de-icing materials are used). |
| Loading | | static, quasi-static |
| Fire Reaction | | A1 according to EN13501-1 |
| | | |
| ETA-05/0010 & ETA-05/0011 issued by | | DEUTSCHES INSTITUT FÜR BAUTECHNIK (DIBt) |
| On the basis of | | ETAG 001 |
| Certificates of Conformity issued by | | Otto-Graf-Institut Stutgart |
| ETA-05/0010 | | 0672-CPD-0083 |
| ETA-05/0011 | | 0672-CPD-0084 |
| Under System | | 2+ |

| **Declared performances according to ETAG 001 parts 1 and 3** | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| **Essential Characteristics** | | | **Performance** | | | | | | | |
| | | | **MMS 7,5** | **MMS 10** | **MMS 12** | **MMS 14** | **MMS 16** | **MMS 7,5 (A4)** | **MMS 10 (A4)** | **MMS 12 (A4)** |
| **Installation parameters** | | | | | | | | | | |
| d | Diameter of anchor bolt or thread diameter | [mm] | 7,5 | 10,1 | 12,0 | 14,3 | 16,7 | 7,5 | 10,1 | 12,4 |
| $d_0$ | Nominal diameter of drill bit | [mm] | 6 | 8 | 10 | 12 | 14 | 6 | 8 | 10 |
| $d_{fix}$ | Diameter of clearance hole in the fixture | [mm] | 9 | 12 | 14 | 16 | 18 | 9 | 12 | 14 |
| $h_{eff}$ | Minimum effective anchorage depth | [mm] | 40 | 47,5 | 54,5 | 71,5 | 87,5 | 40 | 47,5 | 54,5 |
| $h_1$ | Depth of the drilling hole | [mm] | 65 | 75 | 85 | 105 | 130 | 75 | 90 | 100 |
| $h_{nom}$ | Embedment Depth | [mm] | 55 | 65 | 75 | 95 | 115 | 65 | 75 | 90 |
| $h_{min}$ | Minimum thickness of the concrete member | [mm] | 100 | 115 | 125 | 150 | 180 | 105 | 130 | 140 |
| $s_{min}$ | Minimum spacing | [mm] | 40 | 50 | 60 | 90 | 100 | 40 | 50 | 60 |
| for $c \geq$ | Edge distance | [mm] | 40 | 50 | 60 | 90 | 100 | 40 | 50 | 60 |
| $c_{min}$ | Minimum edge distance | [mm] | 40 | 50 | 60 | 90 | 100 | 40 | 50 | 60 |
| for $s \geq$ | Anchor spacing | [mm] | 40 | 50 | 60 | 90 | 100 | 40 | 50 | 60 |

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| Essential Characteristics | | | Performance | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | MMS 7,5 | MMS 10 | MMS 12 | MMS 14 | MMS 16 | MMS 7,5 (A4) | MMS 10 (A4) | MMS 12 (A4) |
| **Steel Failure** | | | | | | | | | | |
| $N_{Rk,s}$ | Characteristic resistance in un-cracked concrete class C20/25 | [kN] | 19,4 | 16,0 | 25,0 | 30,0 | 43,0 | 23,0 | 16,0 | 25,0 |
| $\gamma_{Ms}$ | **Partial safety factor** | [-] | 1,4 | | | | | | | |
| **Pullout Failure** | | | | | | | | | | |
| $N_{Rk,p,ucr}$ | Characteristic resistance in un-cracked concrete class C20/25 | [kN] | 7,5 | 12,0 | 16,0 | 30,0 | 40,0 | 7,5 | 12,0 | 16,0 |
| $N_{Rk,p,cr}$ | Characteristic resistance in cracked concrete class C20/25 | [kN] | 5,0 | 9,0 | 12,0 | 20,0 | 30,0 | 5,0 | 9,0 | 12,0 |
| $\gamma_2$ | **Partial safety factor** | [-] | 1,2 | | | | | | | |
| $\psi_{c,ucr}$ C30/37 | Increasing factor for un-cracked concrete C30/37 | [-] | 1,22 | | | | | | | |
| $\psi_{c,ucr}$ C40/50 | Increasing factor for un-cracked concrete C40/50 | [-] | 1,41 | | | | | | | |
| $\psi_{c,ucr}$ C50/60 | Increasing factor for un-cracked concrete C50/60 | [-] | 1,55 | | | | | | | |
| **Resistance for Concrete Cone failure** | | | | | | | | | | |
| $s_{cr,N}$ | Critical spacing | [mm] | $3,0h_{eff}$ | | | | | | | |
| $c_{cr,N}$ | Critical edge distance | [mm] | $1,5h_{eff}$ | | | | | | | |
| **Resistance for splitting failure** | | | | | | | | | | |
| $s_{cr,sp}$ | Critical spacing (splitting) | [mm] | $3,0h_{eff}$ | | | | | | | |
| $c_{cr,sp}$ | Critical edge distance(splitting) | [mm] | $1,5h_{eff}$ | | | | | | | |
| **Displacement on Tension Load** | | | | | | | | | | |
| N | Service tension value in un-cracked concrete | [kN] | 3,0 | 4,0 | 5,3 | 10,1 | 13,7 | 2,6 | 4,0 | 5,3 |
| N | Service tension value in cracked concrete | [kN] | 2,0 | 3,0 | 4,0 | 7,2 | 9,7 | 1,7 | 3,0 | 4,0 |
| $\delta_0$ | Short term displacement under tension load | [mm] | 0,1 | 0,1 | 0,2 | 0,3 | 0,4 | 0,1 | 0,1 | 0,2 |
| $\delta_\infty$ | Long term displacement under tension load | [mm] | 0,2 | 0,3 | 0,6 | 0,8 | 0,8 | 0,2 | 0,2 | 0,6 |
| **Shear, steel failure** | | | | | | | | | | |
| $V_{Rk,s}$ | Shear Steel characteristic failure | [kN] | 6,9 | 16,0 | 23,0 | 36,0 | 49,0 | 12,3 | 20,0 | 33,0 |
| $M^0_{Rk,s}$ | Bending Moment characteristic failure | [Nm] | 19,0 | 38,0 | 71,0 | 132 | 217 | 22,0 | 45,0 | 93,0 |
| $\gamma_{m,sV}$ | Partial safety factor for shear steel failure (4.6 steel) | [-] | 1,5 | | | | | | | |
| **Shear Concrete Edge failure mode** | | | | | | | | | | |
| k | Factor for concrete edge failure | [-] | 1,0 | 2,0 | 2,0 | 2,0 | 2,0 | 1,0 | 2,0 | 2,0 |
| **Shear Concrete Edge failure mode** | | | | | | | | | | |
| $l_f$ | Effective length of anchor under shear loading | [-] | 40,0 | 47,5 | 54,5 | 71,5 | 87,5 | 40,0 | 47,5 | 54,5 |
| Dnom | Effeftive diameter of the anchor | [mm] | 6 | 8 | 10 | 12 | 14 | 6 | 8 | 10 |
| **Displacement on Shear Load** | | | | | | | | | | |
| V | Service shear load in concrete | [kN] | 3,3 | 8,9 | 14,7 | 20,3 | 28,1 | 5,9 | 9,7 | 15,7 |
| $\delta_{V0}$ | Short term displacement under shear load | [mm] | 0,8 | 3,0 | 3,0 | 3,0 | 4,5 | 1,7 | 3,0 | 3,2 |
| $\delta_{V\infty}$ | Long term displacement under shear load | [mm] | 1,2 | 4,5 | 4,5 | 4,5 | 6,0 | 2,6 | 4,5 | 4,8 |

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| **Declared performances according to ETAG 001 part 1 & 3** | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Essential Characteristics** | | | | **Performance** | | | | | | | | |
| | | | | **MMS 7,5** | **MMS 10** | **MMS 12** | **MMS 14** | **MMS 16** | **MMS 7,5 (A4)** | **MMS 10 (A4)** | **MMS 12 (A4)** |
| Fire resistance, Concrete C20/25 to C50/60 | | | | | | | | | | | |
| $N_{Rk,s,fi,30}$ | Tension Steel failure | For fire resistance duration = 30 minutes | [kN] | 1,7 | 3,4 | 5,9 | 8,3 | 10,8 | 1,7 | 3,4 | 5,9 |
| $N_{Rk,s,fi,60}$ | | For fire resistance duration = 60 minutes | [kN] | 1,2 | 2,5 | 4,4 | 6,3 | 8,1 | 1,2 | 2,5 | 4,4 |
| $N_{Rk,s,fi,90}$ | | For fire resistance duration = 90 minutes | [kN] | 0,8 | 1,7 | 3,0 | 4,2 | 5,4 | 0,8 | 1,7 | 3,0 |
| $N_{Rk,s,fi,120}$ | | For fire resistance duration = 120 minutes | [kN] | 0,6 | 1,2 | 2,2 | 3,1 | 4,1 | 0,6 | 1,2 | 2,2 |
| $N_{Rk,s,fi,30}$ | MMS-ST with metric stud | For fire resistance duration = 30 minutes | [kN] | 1,7 | 1,8 | | | | 1,7 | 1,8 | |
| $N_{Rk,s,fi,60}$ | | For fire resistance duration = 60 minutes | [kN] | 1,2 | 1,5 | | | | 1,2 | 1,5 | |
| $N_{Rk,s,fi,90}$ | | For fire resistance duration = 90 minutes | [kN] | 0,8 | 1,1 | | | | 0,8 | 1,1 | |
| $N_{Rk,s,fi,120}$ | | For fire resistance duration = 120 minutes | [kN] | 0,6 | 1,0 | | | | 0,6 | 1,0 | |
| $V_{Rk,s,fi,30}$ | Shear Steel failure | For fire resistance duration = 30 minutes | [kN] | 1,7 | 3,4 | 5,9 | 8,3 | 10,8 | 1,7 | 3,4 | 5,9 |
| $V_{Rk,s,fi,60}$ | | For fire resistance duration = 60 minutes | [kN] | 1,2 | 2,5 | 4,4 | 6,3 | 8,1 | 1,2 | 2,5 | 4,4 |
| $V_{Rk,s,fi,90}$ | | For fire resistance duration = 90 minutes | [kN] | 0,8 | 1,7 | 3,0 | 4,2 | 5,4 | 0,8 | 1,7 | 3,0 |
| $V_{Rk,s,fi,120}$ | | For fire resistance duration = 120 minutes | [Nm] | 0,6 | 1,2 | 2,2 | 3,1 | 4,1 | 0,6 | 1,2 | 2,2 |
| $M_{Rk,s,fi,30}$ | Shear Steel failure w/ leverarm | For fire resistance duration = 30 minutes | [Nm] | 1,5 | 4,0 | 8,8 | 15,0 | 22,0 | 1,5 | 4,0 | 8,8 |
| $M_{Rk,s,fi,60}$ | | For fire resistance duration = 60 minutes | [Nm] | 1,1 | 3,0 | 6,6 | 11,0 | 17,0 | 1,1 | 3,0 | 6,6 |
| $M_{Rk,s,fi,90}$ | | For fire resistance duration = 90 minutes | [Nm] | 0,7 | 2,0 | 4,4 | 7,4 | 11,0 | 0,7 | 2,0 | 4,4 |
| $M_{Rk,s,fi,120}$ | | For fire resistance duration = 120 minutes | [Nm] | 0,5 | 1,5 | 3,3 | 5,6 | 8,3 | 0,5 | 1,5 | 3,3 |
| **Spacing and edge distance under fire exposure R30 to R120** | | | | | | | | | | | |
| $s_{cr,fi}$ | Critical spacing | | [mm] | $4 \times h_{eff}$ | | | | | | | |
| $s_{min}$ | Minimum spacing | | [mm] | 40 | 50 | 60 | 90 | 100 | 40 | 50 | 60 |
| $c_{cr,fi}$ | Critical edge distance | | [mm] | $2 \times h_{eff}$ | | | | | | | |
| $c_{min}$ | Minimum edge distance | | [mm] | $2 \times h_{eff}$ | | | | | | | |
| If fire attack is from more than one side the edge distance shall be ≥ 300 mm | | | | | | | | | | | |
| Concrete Cone & Pullout acc. EOTA TR 020, Concrete Pryout & edge failure acc. EOTA TR 020. | | | | | | | | | | | |

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 Expandet Screw Anchors A/S by:

**Place and date of issue: Græsted, 31/12/2016**

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**Lars Mortensen, Head of Technical Department**