# Declaration of Performance 2323-CPR-0001

valid from lot no 922099 to lot no ******

**m2/m2-C/m2-CG** Throughbolt

(Torque-controlled expansion anchor made of galvanized steel for use in non-cracked concrete)

| Intended Use or Uses of the Construction Product According to ETAG 001 Parts 1 and 2 | |
|---|---|
| Generic type | torque controlled expansion anchor sleeve type |
| Base material | non-cracked concrete C20/25 to C50/60 acc. to EN 206-1:2000-12 |
| Material | made of galvanized steel |
| Durability | internal dry conditions |
| Loading | static, quasi-static |
| Fire resistance | F120 |
| Fire reaction | A1 according to EN13501-1 |
| | |
| ETA - 05/0070 issued by | Deutsches Institut für Bautechnik DIBt, Berlin |
| On the basis of | ETAG 001, Part 2 Option 7 |
| Certificate of Conformity ****-CPR-**** issued by | IEA GmbH & Co. KG |
| Under AVCP System | 1 |

| Declared Performances According to ETAG 001 Parts 1 and 2 | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Essential Characteristics | | | Performance | | | | | |
| | | | M6 | M8 | M10 | M12 | M16 | M20 |
| **Installation Parameters** | | | | | | | | |
| $d_0$ | Nominal diameter of drill bit | [mm] | 6 | 8 | 10 | 12 | 16 | 20 |
| $h_{ef}$ | Effective anchorage depth | [mm] | 40 | 50 | 58 | 68 | 80 | 100 |
| $H_1$ | Minimum installation depth | [mm] | 60 | 70 | 80 | 90 | 110 | 130 |
| $h_{min}$ | Minimum thickness of the concrete member | [mm] | 100 | 100 | 120 | 140 | 160 | 200 |
| $T_{inst}$ | Nominal torque moment | [Nm] | 5 | 15 | 30 | 50 | 100 | 200 |
| $s_{min}$ | Minimum spacing | [mm] | 40 | 45 | 50 | 75 | 100 | 200 |
| for c ≥ | Edge distance | [mm] | 70 | 45 | 50 | 80 | 190 | 400 |
| $c_{min}$ | Minimum edge distance | [mm] | 40 | 45 | 50 | 75 | 130 | 300 |
| for s ≥ | Anchor spacing | [mm] | 80 | 45 | 50 | 80 | 190 | 350 |
| **Installation Parameters for l> 185mm** | | | | | | | | |
| $s_{min}$ | Minimum spacing | [mm] | - | - | 110 | 120 | - | - |
| for c ≥ | Edge distance | [mm] | - | - | 200 | 320 | - | - |
| $c_{min}$ | Minimum edge distance | [mm] | - | - | 150 | 240 | - | - |
| for s ≥ | Anchor spacing | [mm] | - | - | 210 | 240 | - | - |
| **Characteristic tension loads** | | | | | | | | |
| **Tension Steel Failure Mode** | | | | | | | | |
| $N_{Rk,s}$ | Tension Steel characteristic failure | [kN] | 10 | 19 | 33 | 43 | 77 | 124 |
| $\gamma_{m,sN}$ | Partial safety factor for tension steel failure | [-] | 1,4 | | | | | |
| **Pull-Out Failure Mode** | | | | | | | | |
| $N_{Rk,p,ucr}$ | Tension characteristic load in non-cracked concrete C20/25 | [kN] | 7,5 | 12 | 16 | 25 | 30 | 50 |
| $\gamma_{MP}$ | Partial safety factor | [-] | 1,5 | | | 1,8 | | |
| $\psi_c$ C30/37 | Increasing factor for concrete C30/37 | [-] | 1,17 | | | | | |
| $\psi_c$ C40/50 | Increasing factor for concrete C40/50 | [-] | 1,32 | | | | | |
| $\psi_c$ C50/60 | Increasing factor for concrete C50/60 | [-] | 1,42 | | | | | |
| **Pull-Out Failure Mode** | | | | | | | | |
| $s_{cr,sp}$ | Critical spacing | [mm] | 200 | 250 | 290 | 340 | 400 | 500 |
| $c_{cr,sp}$ | Critical edge distance | [mm] | 100 | 125 | 145 | 170 | 200 | 250 |

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| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| **Displacement on Tension Load** | | | | | | | | | |
| $N_{ucr}$ | Service tension load in non-cracked concrete | | [kN] | 3,6 | 5,7 | 7,6 | 9,9 | 11,9 | 19,8 |
| $\delta_{N0,ucr}$ | Short term displacement under tension load | | [mm] | 0,3 | | | | | |
| $\delta_{N\infty,ucr}$ | Long term displacement under tension load | | [mm] | 1,3 | | | | | |
| **Characteristic shear loads** | | | | | | | | | |
| **Shear Steel Failure Mode** | | | | | | | | | |
| $V_{Rk,s}$ | Shear Steel characteristic failure | | [kN] | 4,5 | 11 | 18 | 24 | 33 | 51 |
| $M^0_{Rk,s}$ | Bending Moment characteristic failure | | [Nm] | 12 | 27 | 56,8 | 91,6 | 249 | 486,2 |
| $\gamma_{m,sV}$ | Partial safety factor for shear steel failure | | [-] | 1,5 | 1,29 | 1,27 | 1,25 | 1,5 | 1,5 |
| **Shear Concrete Edge Failure Mode** | | | | | | | | | |
| $l_{ef}$ | Effective anchorage length | | [mm] | 40 | 50 | 58 | 68 | 80 | 100 |
| **Concrete Pry-Out Failure** | | | | | | | | | |
| k | Factor in equation (5.6) of ETAG Annex C, § 5.2.3.3 | | [-] | 1,0 | | 2,0 | | | |
| **Displacement on Shear Load** | | | | | | | | | |
| V | Service shear load in concrete | | [kN] | 1,9 | 3,5 | 5,5 | 7,5 | 14,0 | 21,9 |
| $\delta_{V0}$ | Short term displacement under shear load | | [mm] | 1,6 | 2,2 | 2,4 | 2,7 | 3,3 | 3,8 |
| $\delta_{V\infty}$ | Long term displacement under shear load | | [mm] | 2,4 | 3,2 | 3,6 | 4,1 | 4,9 | 5,7 |
| **Characteristic tension load under fire exposure** | | | | | | | | | |
| **Tension Steel Failure Mode** | | | | | | | | | |
| $N^0_{Rk,S,fi}$ | Characteristic load capacity | R30 | [kN] | 0.13 | 0.25 | 0.6 | 1.1 | 2.1 | 3.6 |
| $N^0_{Rk,S,fi}$ | | R60 | [kN] | 0.11 | 0.22 | 0.5 | 0.9 | 1.6 | 2.7 |
| $N^0_{Rk,S,fi}$ | | R90 | [kN] | 0.09 | 0.17 | 0.41 | 0.7 | 1.4 | 2.4 |
| $N^0_{Rk,S,fi}$ | | R120 | [kN] | 0.06 | 0.12 | 0.33 | 0.6 | 1.0 | 1.8 |
| **Pull-Out Failure Mode** | | | | | | | | | |
| $N_{Rk,p,fi}$ | Characteristic load capacity in concrete ≥ C20/25 | R30/60/90 | [kN] | 1.9 | 3.0 | 4.0 | 6.3 | 7.5 | 12.5 |
| $N_{Rk,p,fi}$ | | R120 | [kN] | 1.5 | 2.4 | 3.2 | 5.0 | 6.0 | 10.0 |
| **Splitting Failure Mode** | | | | | | | | | |
| $N^0_{Rk,c,fi}$ | Characteristic load capacity in concrete ≥ C20/25 | R30/60/90 | [kN] | 1.8 | 3.2 | 4.6 | 6.9 | 10.3 | 18.0 |
| $N^0_{Rk,c,fi}$ | | R120 | [kN] | 1.5 | 2.5 | 3.7 | 5.5 | 8.2 | 14.4 |
| $h_{ef}$ | Effective anchorage depth | | [mm] | 40 | 50 | 58 | 68 | 80 | 100 |
| $h_{min}$ | Minimum thickness of the concrete member | | [mm] | 100 | 100 | 120 | 140 | 160 | 200 |
| $S_{Cr,N,fi}$ | Spacing distance | | [mm] | $4*h_{ef}$ | | | | | |
| $S_{min}$ | | | [mm] | 40 | 45 | 50 | 75 | 100 | 200 |
| $C_{Cr,N,fi}$ | Edge distance with fire exposure from one side | | [mm] | $2*h_{ef}$ | | | | | |
| $C_{min}$ | | | [mm] | 80 | 100 | 120 | 140 | 200 | 400 |
| | Fire exposure from more than one side | | [mm] | ≥ 300mm | | | | | 400 |
| **Characteristc shear load under fire exposure** | | | | | | | | | |
| **Steel failure without lever arm** | | | | | | | | | |
| $V_{Rk,s,fi}$ | Characteristic load capacity | R30 | [kN] | 0.20 | 0.37 | 0.9 | 1.7 | 3.1 | 4.9 |
| $V_{Rk,s,fi}$ | | R60 | [kN] | 0.18 | 0.33 | 0.8 | 1.3 | 2.3 | 3.7 |
| $V_{Rk,s,fi}$ | | R90 | [kN] | 0.14 | 0.26 | 0.6 | 1.1 | 2.0 | 3.2 |
| $V_{Rk,s,fi}$ | | R120 | [kN] | 0.10 | 0.18 | 0.46 | 0.8 | 1.6 | 2.4 |
| **Steel failure wit lever arm** | | | | | | | | | |
| $M^0_{Rk,s,fi}$ | Characteristic load capacity | R30 | [kN] | 0.08 | 0.21 | 0.7 | 1.4 | 3.6 | 8.3 |
| $M^0_{Rk,s,fi}$ | | R60 | [kN] | 0.07 | 0.19 | 0.6 | 1.1 | 2.7 | 6.2 |
| $M^0_{Rk,s,fi}$ | | R90 | [kN] | 0.05 | 0.14 | 0.44 | 0.9 | 2.3 | 5.4 |
| $M^0_{Rk,s,fi}$ | | R120 | [kN] | 0.04 | 0.10 | 0.35 | 0.7 | 1.8 | 4.1 |
| k | Factor in equation (5.6) of ETAG Annex C, § 5.2.3.3 | | [-] | 1.0 | 1.0 | 2.0 | 2.0 | 2.0 | 2.0 |
| $V_{Rk,cp,fi}$ | Characteristic load capacity | R30/60/90 | [kN] | 1.8 | 3.2 | 9.2 | 13.7 | 20.6 | 36. |
| $V_{Rk,cp,fi}$ | | R120 | [kN] | 1.5 | 2.5 | 7.4 | 11 | 16.5 | 28.8 |

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| The initial value $V^0_{Rk,c,fi}$ fort he caracteristic load capacity in concrete C20/25 bis C50/60 under fire exposure can be determined by the following equation with $V^0_{Rk,c}$ as the initial value for the characteristic load capacity in condrete C20/25: | | | | |
|---|---|---|---|---|
| $V_{Rk,c,fi}$ | | ≤ R90 | [kN] | $V^0_{Rk,c,fi} = 0.25*V^0_{Rk,c}$ |
| $V_{Rk,c,fi}$ | | R120 | [kN] | $V^0_{Rk,c,fi} = 0.20*V^0_{Rk,c}$ |

**The above performances apply for the following article numbers:**

| d | Marking $d_o$ x L /$t_{fix}$ [mm] | Art. No Washer DIN 125 | Art. No Washer DIN 9021 |
|---|---|---|---|
| M6 | M6x65/10 | 3200606 | - |
| | M6x80/25 | 3200608 | - |
| M8 | M8x80/10 | 3200808 | 3210808 |
| | M8x85/15 | 3200885 | - |
| | M8x95/25 | 3200809 | - |
| | M8x115/45 | 3200811 | - |
| | M8x165/95 | 3200816 | 3210816 |
| M10 | M10x95/15 | 3201009 | 3211009 |
| | M10x110/30 | 3201011 | 3211011 |
| | M10x125/45 | 3201012 | 3211012 |
| | M10x140/60 | 3201014 | - |
| | M10x160/80 | 3201016 | 3211016 |
| | M10x180/100 | 3201018 | 3211018 |
| M12 | M12x110/15 | 3201211 | 3211211 |
| | M12x125/30 | 3201212 | 3211212 |
| | M12x145/50 | 3201214 | 3211214 |
| | M12x165/70 | 3201216 | 3211216 |
| | M12x185/90 | 3201218 | 3211218 |
| | M12x200/105 | - | 1471220 |
| | M12x220/125 | - | 1471222 |
| | M12x240/145 | - | 1471224 |
| | M12x260/165 | - | 1471226 |
| | M12x280/185 | - | 1471228 |
| | M12x300/205 | - | 1471230 |
| | M12x330/235 | - | 1471233 |
| | M12x360/265 | - | 1471236 |
| M16 | M16x130/15 | 3201613 | - |
| | M16x145/30 | 3201614 | - |
| | M16x160/45 | 3201616 | - |
| | M16x180/65 | 3201618 | - |
| | M16x220/105 | - | 1471622 |
| | M16x240/125 | - | 1471624 |
| | M16x260/145 | - | 1471626 |
| | M16x280/165 | - | 1471628 |
| | M16x300/185 | - | 1471630 |
| | M16x330/215 | - | 1471633 |
| | M16x440/325 | - | 1471644 |
| M20 | M20x160/30 | 1452016 | - |
| | M20x200/70 | - | 1472020 |
| | M20x270/140 | - | 1472027 |

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The performances of the product identified by the above identification code are in conformity with the declared performance.

This declaration of performance is issued under the sole responsibility of Mungo AG.

Signed for and on behalf of the manufacturer by:

| Name and Functions | Place and Date of Issue | Signature |
|---|---|---|
| Roman Wyss<br>Produktmanager | Olten, 17.07.2015 | |

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**Further Information:**

Liability for printing errors is excluded. The full content of the corresponding ETA has to be observed.



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