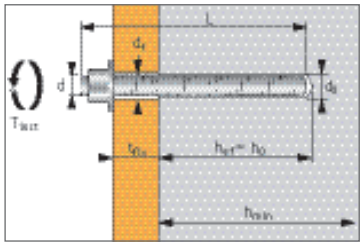
# SPIT MULTI-MAX

## Zinc coated & stainless steel

ETA Option 7 ¬ **Methacrylate chemical resin**

n° 13/0435



## Technical data

| MULTI-MAX Resin with threaded rods | Max. anchor depth (mm) | Max. thick of base material (mm) | Ø thread (mm) | Drilling depth (mm) | Ø Drill bit (mm) | Ø Clearance (mm) | Total rod length (mm) | Max. tighten (Nm) |
|---|---|---|---|---|---|---|---|---|
| | $h_{ef}$ | $h_{min}$ | d | $h_o$ | $d_o$ | $d_f$ | L | $T_{inst}$ |
| Rod M8 | 80 | 110 | 8 | 80 | 10 | 9 | 110 | 10 |
| Rod M10 | 90 | 120 | 10 | 90 | 12 | 12 | 130 | 20 |
| Rod M12 | 110 | 140 | 12 | 110 | 14 | 14 | 160 | 30 |
| Rod M16 | 125 | 160 | 16 | 125 | 18 | 18 | 190 | 60 |
| Rod M20 | 170 | 220 | 20 | 170 | 25 | 22 | 260 | 120 |
| Rod M24 | 210 | 265 | 24 | 210 | 28 | 26 | 300 | 200 |
| MULTI-MAX: Dual component cartridge methacrylate resin | | | | - vol. 280 ml | | | Code | 060040 |
| | | | | - vol. 410 ml | | | Code | 060047 |

## APPLICATION

- Fixing steel framed structures
- Fixing machinery (resistant to vibration)
- Fixing of storage silos, refinery pipework supports
- Fixing motorway signs
- Fixing safety barriers

## MATERIAL

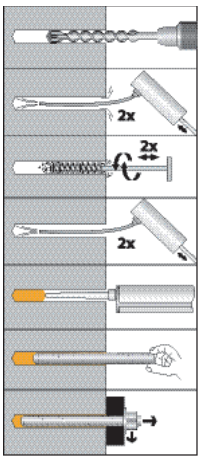
- **Threaded rod M8-M16:** cold formed steel NF A35-053
- **Threaded rod M20-M30:** 11 SMnPb37 - NFA 35-561
- **Nut:** Steel, EN 20898-2 grade 6 or 8
- **Washer:** Steel DIN 513
- **Zinc coating 5 µm min.** NF E25-009

## Anchor mechanical properties

| Threaded part (maxima Rod) | | M8 | M10 | M12 | M16 | M20 | M24 |
|---|---|---|---|---|---|---|---|
| $f_{uk}$ (N/mm²) | Min. tensile strength | 600 | 600 | 600 | 600 | 520 | 520 |
| $f_{yk}$(N/mm²) | Yield strength | 420 | 420 | 420 | 420 | 420 | 420 |
| As (mm²) | Stressed cross-section | 36,6 | 58 | 84,3 | 157 | 227 | 326,9 |
| $W_{el}$ (mm³) | Elastic section modulus | 31,2 | 62,3 | 109,2 | 277,5 | 482,4 | 833,7 |
| $M^0_{Rk,s}$ (Nm) | Characteristic bending moment | 22 | 45 | 78 | 200 | 301 | 520 |
| M (Nm) | Recommended bending moment | 9,0 | 18,4 | 31,8 | 81,6 | 122,9 | 212,2 |

## INSTALLATION

Standard cleaning




## Working time and curing time

| Ambient temperature (°C) | Working time | Curing time |
|---|---|---|
| 30°C > T ≥ 40°C | 2 min | 35 min |
| 20°C > T ≥ 30°C | 4 min | 45 min |
| 10°C > T ≥ 20°C | 6 min | 60 min |
| 5°C > T ≥ 10°C | 12 min | 90 min |
| 0°C > T ≥ 5°C | 18 min | 180 min |
| -5°C > T ≥ 0°C | - | 360 min |

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The loads specified on this page allow judging the product's performances, but cannot be used for the designing.
The data given in the pages "CC method" have to be applied.

## Number of sealings per cartridge

| Studs diameter | M8 | M10 | M12 | M16 | M20 | M24 |
|---|---|---|---|---|---|---|
| Drilling Ø (mm) | 10 | 12 | 14 | 18 | 25 | 28 |
| Drilling depth (mm) | 80 | 90 | 110 | 125 | 170 | 210 |
| Nb. of sealings for one cartridge | | | | | | |
| MULTIMAX 280 | 103 | 75 | 52 | 35 | 8 | 7 |
| MULTIMAX 410 | 151 | 110 | 76 | 51 | 12 | 10 |

## Ultimate ($N_{Ru,m}$, $V_{Ru,m}$) / characteristic loads ($N_{Rk}$, $V_{Rk}$) in kN

Mean Ultimate loads are derived from test results in admissible service conditions, and characteristic loads are statistically determined.

### TENSILE

| Anchor size | M8 | M10 | M12 | M16 | M20 | M24 |
|---|---|---|---|---|---|---|
| $h_{ef}$ | *80* | *90* | *110* | *125* | *170* | *210* |
| $N_{Ru,m}$ | **21,1** | **29,6** | **41,1** | **58,5** | **99,5** | **138,3** |
| $N_{Rk}$ | 18,1 | 25,4 | 35,2 | 50,3 | 85,5 | 118,8 |

### SHEAR

| Anchor size | M8 | M10 | M12 | M16 | M20 | M24 |
|---|---|---|---|---|---|---|
| $V_{Ru,m}$ | 15,92 | 22,75 | 32,8 | 56,2 | 73,6 | 115,0 |
| $V_{Rk}$ | 10,98 | 18,9 | 25,3 | 46,8 | 59,02 | 95,8 |

## Design Loads ($N_{Rd}$, $V_{Rd}$) for one anchor without edge or spacing influence in kN

$$N_{Rd} = \frac{N_{Rk}^{*}}{\gamma_{Mc}}$$

$$V_{Rd} = \frac{V_{Rk}^{*}}{\gamma_{Ms}}$$

*Derived from test results

### TENSILE

| Anchor size | M8 | M10 | M12 | M16 | M20 | M24 |
|---|---|---|---|---|---|---|
| $h_{ef}$ | *80* | *90* | *110* | *125* | *170* | *210* |
| $N_{Rd}$ | **12,1** | **14,1** | **19,6** | **27,9** | **47,5** | **66,0** |

$\gamma_{Mc}$ = 1,5 for M8 & $\gamma_{Ms}$ = 1,8 for M10 to M24

### SHEAR

| Anchor size | M8 | M10 | M12 | M16 | M20 | M24 |
|---|---|---|---|---|---|---|
| $V_{Rd}$ | 7,7 | 13,2 | 17,7 | 32,7 | 39,3 | 63,9 |

$\gamma_{Ms}$ = 1,43 for M8 to M16 & $\gamma_{Ms}$ = 1,5 for M20 to M24

## Recommended loads ($N_{rec}$, $V_{rec}$) for one anchor without edge or spacing influence in kN

$$N_{Rec} = \frac{N_{Rk}^{*}}{\gamma_{M}.\gamma_{F}}$$

$$V_{Rec} = \frac{V_{Rk}^{*}}{\gamma_{M}.\gamma_{F}}$$

*Derived from test results

### TENSILE

| Anchor size | M8 | M10 | M12 | M16 | M20 | M24 |
|---|---|---|---|---|---|---|
| $h_{ef}$ | *80* | *90* | *110* | *125* | *170* | *210* |
| $N_{Rec}$ | **8,6** | **10,1** | **14,0** | **19,9** | **33,9** | **47,1** |

$\gamma_F$ = 1,4

$\gamma_{Mc}$ = 1,5 for M8 & $\gamma_{Mc}$ = 1,8 for M10 to M24

### SHEAR

| Anchor size | M8 | M10 | M12 | M16 | M20 | M24 |
|---|---|---|---|---|---|---|
| $V_{Rec}$ | 5,5 | 9,4 | 12,6 | 23,4 | 28,1 | 45,6 |

$\gamma_F$ = 1,4

$\gamma_{Ms}$ = 1,43 for M8 to M16 & $\gamma_{Ms}$ = 1,5 for M20 to M24

# SPIT MULTI-MAX

## Zinc coated & stainless steel



TENSILE in kN

Pull out resistance for dry, wet concrete (1)

$\gamma_{Mc}$ = 1,5 for M8 & $\gamma_{Mc}$ = 1,8 for M10 to M24

Concrete cone resistance for dry, wet concrete (1)

$\gamma_{Mc}$ = 1,5 for M8 & $\gamma_{Mc}$ = 1,8 for M10 to M24

Steel resistance

5.8 & 8.8 : $\gamma_{Ms}$ = 1,5
10.9 : $\gamma_{Ms}$ = 1,4
A4 : $\gamma_{Ms}$ = 1,87

$N_{Rd} = \min(N_{Rd,p} ; N_{Rd,c} ; N_{Rd,s})$

$\beta_N = N_{Sd} / N_{Rd}$ ” 1

SHEAR in kN

Concrete edge resistance

Pryout failure

$\gamma_{Mcp}$ = 1,5

Steel resistance

5.8 et 8.8 : $\gamma_{Ms}$ = 1,25
10.9 : $\gamma_{Ms}$ = 1,5
A4 : $\gamma_{Ms}$ = 1,56

* Special grade available on request.

(1) Category 1

$V_{Rd} = \min(V_{Rd,c} ; V_{Rd,cp} ; V_{Rd,s})$

$\beta_V = V_{Sd} / V_{Rd}$ ” 1

$\beta_N + \beta_V$ ” 1,2

INFLUENCE OF CONCRETE

INFLUENCE OF SHEAR LOADING DIRECTION

$\beta$[°]

# SPIT MULTI-MAX

## Eurocode 2 table for straight rebar anchoring

### CONCRETE C25/30 - HAMMER DRILLING

ETA 13/0436

| Rebar Ø (mm) | Drilling Ø $d_0$ (mm) | Length of anchor $L_{bd}$ (mm) | Ultimate limit load (daN) <u>without influence</u> of centre distance and/or edge [1] (α2 = 0,7) | Ultimate limit load (daN) <u>with influence</u> of centre distance and/or edge [2] (α2 = 1) | Number of fixings for a SPIT MULTI-MAX cartridge [3] | |
|---|---|---|---|---|---|---|
| | | | | | *280 ml* | *410 ml* |
| 8 | 10 | 170 | 1648 | 1154 | *48,5* | *71,1* |
| | | 190 | 1842 | 1289 | *43,4* | *63,6* |
| | | 225 | **2185** | 1530 | *36,6* | *53,6* |
| | | **322** | - | **2185** | *25,6* | *37,5* |
| 10 | 12 | 213 | 2577 | 1804 | *31,7* | *46,5* |
| | | 240 | 2908 | 2036 | *28,1* | *41,2* |
| | | 282 | **3415** | 2391 | *24,0* | *35,1* |
| | | **403** | - | **3415** | *16,8* | *24,6* |
| 12 | 15 | 255 | 3711 | 2597 | *14,4* | *21,0* |
| | | 290 | 4217 | 2952 | *12,6* | *18,5* |
| | | 338 | **4917** | 3442 | *10,8* | *15,9* |
| | | **483** | - | **4917** | *7,6* | *11,1* |
| 14 | 18 | 298 | 5051 | 3536 | *7,8* | *11,4* |
| | | 340 | 5768 | 4038 | *6,8* | *10,0* |
| | | 395 | **6693** | 4685 | *5,9* | *8,6* |
| | | **564** | - | **6693** | *4,1* | *6,0* |
| 16 | 20 | 340 | 6597 | 4618 | *6,1* | *8,9* |
| | | 380 | 7367 | 5157 | *5,4* | *7,9* |
| | | 451 | **8742** | 6119 | *4,6* | *6,7* |
| | | **644** | - | **8742** | *3,2* | *4,7* |
| 20 | 25 | 425 | 8781 | 6147 | *3,1* | *4,5* |
| | | 490 | 10116 | 7081 | *2,7* | *3,9* |
| | | 662 | **13659** | 9561 | *2,0* | *2,9* |
| | | **900** | - | **13006** | *1,5* | *2,1* |

[1] Absence of edge distances greater than or equal to 7.Ø.

[2] Presence of edge distances and/or centre distances less than 7.Ø.

[3] The number of fixings per cartridge is calculated taking into account an increasing by 20% the real volume of sealing.
$1,2 \times (d_0^2 - Ø_{rebar}^2) \times \Pi \times L_{bd}/4$