# MOPUR3

## CHARACTERISTICS

- Assessed for non-carbonated concrete class from C12/15 to C50/60.
- Post-installed rebar from Ø8 to Ø32.
- Certificate of contact with drinking water (WRAS).
- Fire resistance certificate for post-installed rebar (CSTB).
- Use for high loads.
- Pure epoxy 3:1 red colored.
- Styrene free
- Easy set up.
- Use for static or quasi-static loads and C1&C2 seismic loads.
- Temperature range: from -40ºC to +70ºC (long term maximum temperature +50ºC).
- Suitable for dry and wet concrete holes.
- Suitable for diamond core drilling.

## CERTIFICATES

CE ETA 17/0659 — STRUCTURAL FIXINGS IN CRACKED & UNCRACKED CONCRETE

CE ETA 17/0658 — REBAR CONNECTIONS

FIRE RESISTANCE

SEISMIC C2&C1

WRAS APPROVED PRODUCT

LEED TESTED

ÉMISSIONS DANS L'AIR INTÉRIEUR A+ (A+ A B C)

## APPLICATIONS

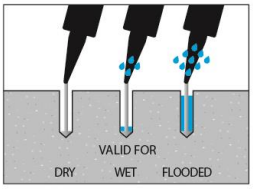
- Overlapping joints with existing reinforcement in a building component.
- Anchoring of the reinforcement at a slab or beam support, end support/bearing of a slab designed as simply supported as well as its reinforcement for restraint forces.
- Anchoring of reinforcement of building components stressed primarily in compression.
- Anchoring of reinforcement to cover the line of acting tensile force.

## BASE MATERIAL

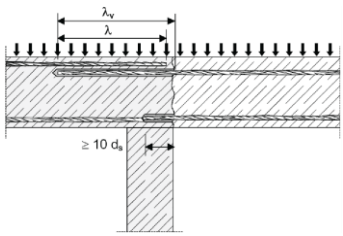

## VALID FOR

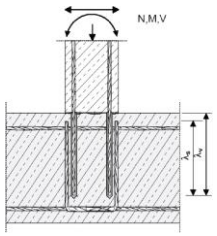

**ø8 – ø32 Rebar**

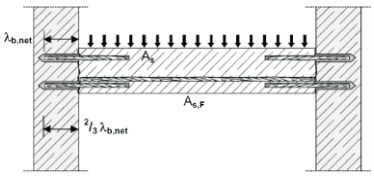
## DRILL HOLE CONDITION

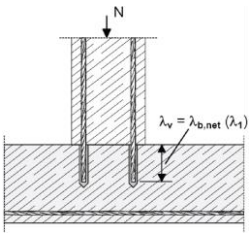



## APPLICATION EXAMPLES





## 1. RANGE

| ITEM | CODE | SIZE | PHOTO | COMPONENT | MATERIAL | |
|---|---|---|---|---|---|---|
| 1 | **MOPUR30385**<br>**MOPUR30585** | 385 ml.<br>585 ml. |  | PURE EPOXY MORTAR | Pure epoxy resin.<br>Format: cartridges of 385 and 585 ml. | 12 |

## 2. ACCESORIES

| ITEM | CODE | PHOTO | COMPONENT | MATERIAL |
|---|---|---|---|---|
| 1 | **MOPISP3385** |  | APPLICATION GUNS | Gun for 385 ml cartridges |
| | **MOPISP3585** |  | | Gun for 585 ml cartridges |
| 2 | **MORCEPKIT** |  | CLEANING BRUSHES | 3 Cleaning brushes kit of ø14, ø20 and ø29 mm. |
| 3 | **MOBOMBA** |  | CLEANING PUMP | Pump for cleaning dust and drill hole fragments |
| 4 | **MORCAPU** |  | MIXING NOZZLE | Plastic. Helix static mixer. |

## 3. PRODUCT SET UP

### 3.1. SETTING UP PROCEDURE

**0. PROTECT YOURSELF**

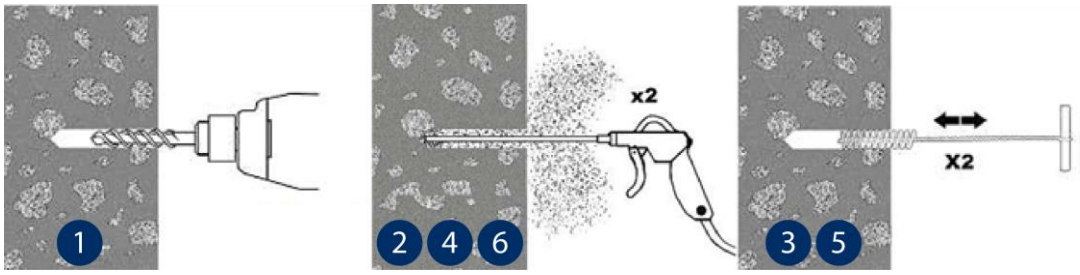
Always use and wear your personal protective equipment (PPE).

**1. DRILLING THE HOLE**

Check the concrete base is compact and porosity is insignificant. Suitable for wet or dry drill holes.
Cartridge installation temperature: ≥ 5 ºC.
Base material installation temperature: MOPUR3 ≥ +5 ºC.
Use drill in hammer mode.
Drill to the specified diameter and depth values.

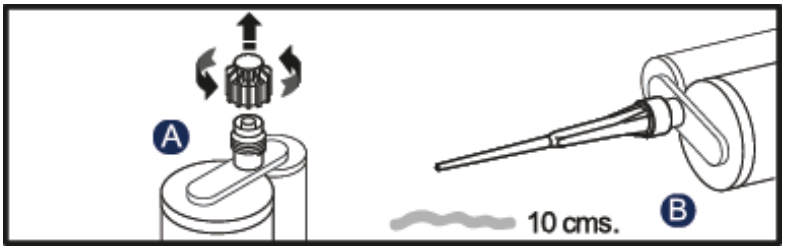
**2 - 6. BLOW AND CLEAN**

Clear the drill holes completely of dust and fragments by following the procedure shown in the picture. If the drill hole is flooded, the water must be removed before mortar is injected.



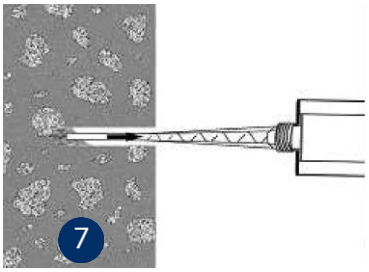
**A – B. OPEN CARTRIDGE**

Screw the nozzle into the cartridge and place the assembly in the application gun. Squeeze on the trigger repeatedly until the mortar comes out of the nozzle in a uniform red color. Any iridescence indicates improper mixing. Always discard the first two doses of each cartridge: these are never to be used for fixing.



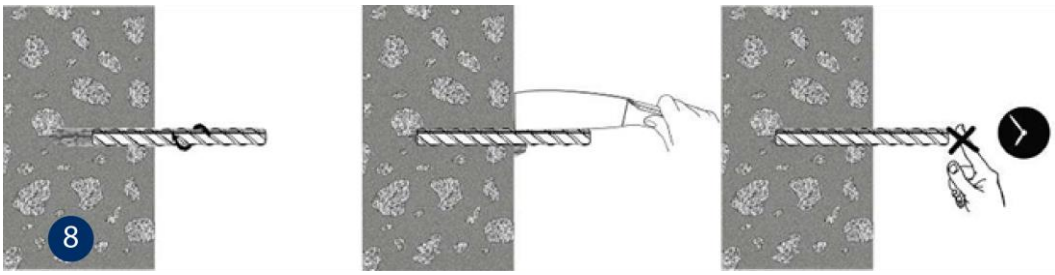

**7. INJECT MORTAR**

Insert the nozzle to the bottom of the drill hole and apply mortar: gradually remove the nozzle, ensuring there are no air bubbles.
Fill the hole to ½ and ¾ of its depth.
In the event of not fully using the cartridge, leave nozzle attached. Only change if using again and handling time has expired, remembering to discard the first two doses of mortar.




**8. INSERT THE REBAR**

Introduce the rebar to be installed by screwing it lightly down to the installation depth value manually; ensuring the mortar covers the rebar rivet. The introduction of the anchor must take place within the handling time. The mortar must seep from the top of the drill hole to ensure it is completely full and there are no gaps between the rebar and the drill hole.




## 3.2 TEMPERATURE AND CURING TIME

| TYPE | Base material temperature [ºC] | Handling time [min] | Curing time [hrs] |
|---|---|---|---|
| MOPUR3 | +5 | 300 | 24 |
| | +5 a +10 | 150 | 24 |
| | +10 a +15 | 40 | 18 |
| | +15 a +20 | 25 | 12 |
| | +20 a +25 | 18 | 8 |
| | +25 a +30 | 12 | 6 |
| | +30 a +35 | 8 | 4 |
| | +35 a +40 | 6 | 2 |

## 4. STORAGE CONDITIONS

Keep the product stored in a cool, dry place, away from direct sunlight and heat sources, at an average temperature between +5 ºC and +25 ºC.


Shelf life of unopened cartridge: 18 months from the date of manufacture. The expiration date is indicated on the cartridge.

The tables below are referred to EN 1992-1-1 Annex C Table C.1 and C.2N Properties of reinforcement:

## 5. REBAR PROPERTIES

| **Product form** | | **Bars and de-coiled rods** | |
|---|---|---|---|
| Class | | B | C |
| Characteristic yield strength fyk or f0,2k (MPa) | | 400 to 600 | |
| Minimum value of k = (ft / fy)k | | ≥ 1,08 | ≥ 1,15 |
| | | | < 1,35 |
| Characteristic strain at maximum force εuk (%) | | ≥ 5,0 | ≥ 7,5 |
| Bendability | | Bend / Rebend test | |
| Maximum deviation from nominal mass (individual bar) (%) | Nominal bar size (mm)<br>≤ 8<br>> 8 | ± 6,0<br>± 4,5 | |
| Bond:<br>Minimum relative rib area, $f_{R,min}$ | Nominal bar size (mm)<br>8 to 12<br>> 12 | 0,040<br>0,056 | |

## 6. MINIMUM/MAXIMUM LENGTHS

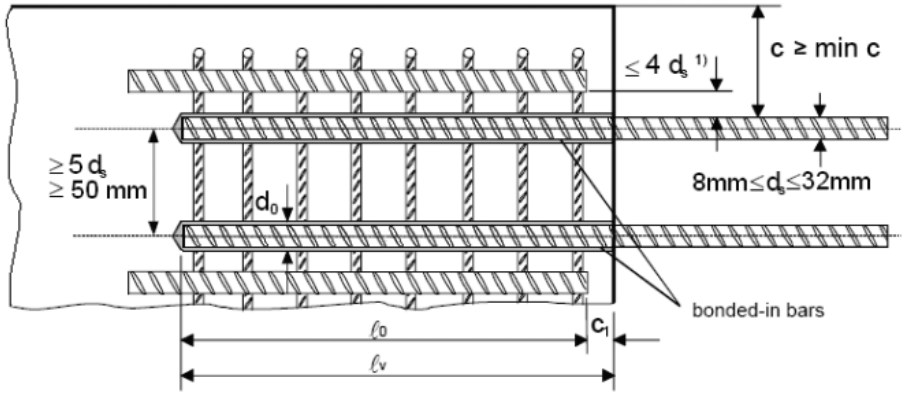
| **Rebar** | | **Minimum** | | **Maximum** |
|---|---|---|---|---|
| **Ød$_s$ [mm]** | **$f_{y,k}$ [N/mm2]** | **Anchorage ℓ$_{b,min}$ [mm]** | **Overlap ℓ$_{0,min}$ [mm]** | **ℓ$_{max}$ [mm]** |
| 8 | 500 | 113 | 200 | 400 |
| 10 | 500 | 142 | 200 | 500 |
| 12 | 500 | 170 | 200 | 600 |
| 14 | 500 | 198 | 210 | 700 |
| 16 | 500 | 227 | 240 | 800 |
| 20 | 500 | 284 | 300 | 1000 |
| 25 | 500 | 354 | 375 | 1000 |
| 28 | 500 | 397 | 420 | 1000 |
| 32 | 500 | 454 | 480 | 1000 |

## 7. DESIGN BOND RESISTANCE [N/mm2]

| Rebar Ø $d_s$ [mm] | Concrete class | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | C12/15 | C16/20 | C20/25 | C25/30 | C30/37 | C35/45 | C40/50 | C45/55 | C50/60 |
| 8 a 28 | 1,6 | 2,0 | 2,3 | 2,7 | 3,0 | 3,4 | 3,7 | 4,0 | 4,3 |
| 32 | | | | | | | | 3,7 | |

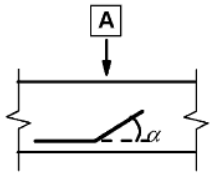
## 8. PRECALCULATED VALUE TABLES

- Design Load Approach according to Eurocode 2 and EOTA technical report 023.
- Data information according to ETA 17/0658.
- Non-cracked concrete, dry or wet conditions
- Temperature range: -40ºC to +80ºC (long term maximum temperature +50ºC).
- Minimum spacing conditions ≥5$d_s$, min 50 mm:

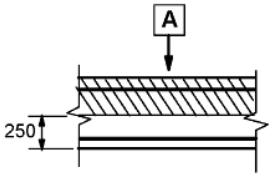



- Minimum concrete covering
  - compressed air drilling ≥ 50 + 0,06 $L_b$
  - hammer drilling ≥ 30 + 0,08 $L_b$ ≥ 2ϕ

- Good bond Conditions (EU2, figure 8.2):

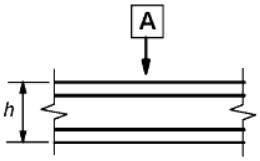



a) 45º ≤ α ≤ 90º

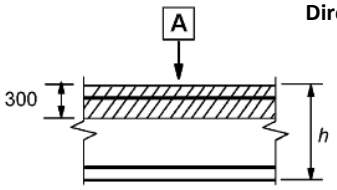



c) *h* > 250 mm

A - Concreting Direction




b) *h* ≤ 250 mm




d) *h* > 600 mm

a) y b) "good" bond conditions for all types of rebars

c) y d) no shaded area – "good" bond conditions
shaded area – "poor" bond contidions

* For other bond conditions, multiply resistance by 0,7.

**Resistances values can be increased in the following scenarios:**

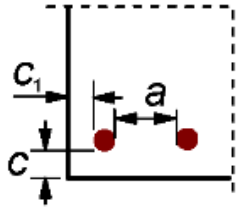
- **In case of transverse tension / compression pressure ($\alpha_2$)**
- **In case of concreting cover ($\alpha_5$)**
- **In case of overlapping ($\alpha_6$)**

## VALUES FOR $\alpha_2$ , $\alpha_5$ AND $\alpha_6$

| INFLUENCING FACTOR | REINFORCEMENT BAR | |
|---|---|---|
| | IN TENSION | IN TENSION |
| Concrete Cover | $\alpha_2 = 1 - 0{,}15\,(c_d - Ø)/Ø$<br>$\geq 0{,}7$<br>$\leq 1{,}0$ | $\alpha_2 = 1 - 0{,}15\,(c_d - Ø)/Ø$<br>$\geq 0{,}7$<br>$\leq 1{,}0$ |
| Confinement by transverse pressure | $\alpha_5 = 1 - 0{,}004p$<br>$\geq 0{,}7$<br>$\leq 1{,}0$ | $\alpha_5 = 1 - 0{,}004p$<br>$\geq 0{,}7$<br>$\leq 1{,}0$ |
| Overlapping length | $\alpha_6 = (p_1/25)^{0{,}25}$<br>$\geq 1{,}0$<br>$\leq 1{,}5$ | |

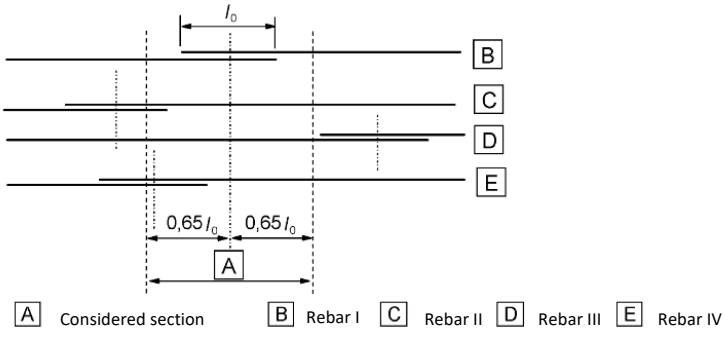
Where:

$c_d$ = min (a/2, $c_1$, c)




$p$: transverse pressure [MPa] at ultimate limit state along $l_{bd}$

$p_1$ is the percentage of reinforcement lapped within 0,65 10 from the centre of the lap length considered



# CONCRETE CLASS 20/25

**Concrete compressive strength [$f_{ck,cube}$]: 25 N/mm²**

| **Rebar Ø** | $d_s$ | [mm] | **Ø8** | **Ø10** | **Ø12** | **Ø14** | **Ø16** | **Ø20** | **Ø25** | **Ø28** | **Ø32** |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Rebar Size | $d_s$ | [mm] | 8 | 10 | 12 | 14 | 16 | 20 | 25 | 28 | 32 |
| Cross-sectional area | $A_s$ | [mm²] | 50,3 | 78,5 | 113,1 | 153,9 | 201,1 | 314,2 | 490,9 | 615,8 | 804,2 |
| Steel Yield | $f_{yd}$ | [kN] | 500 | 500 | 500 | 500 | 500 | 500 | 500 | 500 | 500 |
| Partial safety factor | $\gamma_{M,s}$ | [mm²] | 1,15 | 1,15 | 1,15 | 1,15 | 1,15 | 1,15 | 1,15 | 1,15 | 1,15 |
| Design steel resistance | $N_{Rd,s}$ | [kN] | 21,9 | 34,1 | 49,2 | 66,9 | 87,4 | 136,6 | 213,4 | 267,7 | 349,7 |
| Bond stress | $f_{bd}$ | [N/mm²] | 2,30 | 2,30 | 2,30 | 2,30 | 2,30 | 2,30 | 2,30 | 2,30 | 2,30 |
| Drilled hole diameter | $d_h$ | [mm] | 12 | 14 | 16 | 18 | 20 | 25 | 32 | 35 | 40 |
| Bar spacing ≥ | s | [mm] | 50 | 50 | 60 | 70 | 80 | 100 | 125 | 140 | 160 |
| Edge distance (compressed air drilling) ≥ | c | [mm] | $50 + 0{,}06\ L_b$ | | | | | | | | |
| Edge distance (hammer drilling) ≥ | c | [mm] | $30 + 0{,}08\ L_b \geq 2\phi$ | | | | | | | | |

| **Anchorage length, $L_b$ [mm]** | **Design tensile pull-out bond resistance, $N_{Rd}$ [kN]** | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 113 | 6,5 | | | | | | | | |
| 142 | 8,2 | 10,3 | | | | | | | |
| 170 | 9,8 | 12,3 | 14,7 | | | | | | |
| 198 | 11,4 | 14,3 | 17,2 | 20,0 | | | | | |
| 200 | 11,6 | 14,5 | 17,3 | 20,2 | | | | | |
| 210 | 12,1 | 15,2 | 18,2 | 21,2 | | | | | |
| 227 | 13,1 | 16,4 | 19,7 | 23,0 | 26,2 | | | | |
| 240 | 13,9 | 17,3 | 20,8 | 24,3 | 27,7 | | | | |
| 284 | 16,4 | 20,5 | 24,6 | 28,7 | 32,8 | 41,0 | | | |
| 300 | 17,3 | 21,7 | 26,0 | 30,3 | 34,7 | 43,4 | | | |
| 354 | 20,5 | 25,6 | 30,7 | 35,8 | 40,9 | 51,2 | 63,9 | | |
| 375 | 21,7 | 27,1 | 32,5 | 37,9 | 43,4 | 54,2 | 67,7 | | |
| 397 | **21,9** | 28,7 | 34,4 | 40,2 | 45,9 | 57,4 | 71,7 | 80,3 | |
| 400 | **21,9** | 28,9 | 34,7 | 40,5 | 46,2 | 57,8 | 72,3 | 80,9 | |
| 420 | | 30,3 | 36,4 | 42,5 | 48,6 | 60,7 | 75,9 | 85,0 | |
| 454 | | 32,8 | 39,4 | 45,9 | 52,5 | 65,6 | 82,0 | 91,9 | 105,0 |
| 480 | | **34,1** | 41,6 | 48,6 | 55,5 | 69,4 | 86,7 | 97,1 | 111,0 |
| 500 | | **34,1** | 43,4 | 50,6 | 57,8 | 72,3 | 90,3 | 101,2 | 115,6 |
| 600 | | | **49,2** | 60,7 | 69,4 | 86,7 | 108,4 | 121,4 | 138,7 |
| 700 | | | | **66,9** | 80,9 | 101,2 | 126,4 | 141,6 | 161,9 |
| 800 | | | | | **87,4** | 115,6 | 144,5 | 161,9 | 185,0 |
| 1000 | | | | | | **136,6** | 180,6 | 202,3 | 231,2 |
| **Length to develop steel yield, $L_{b,rqd}$ [mm]** | **378** | **473** | **567** | **662** | **756** | **945** | **1.181** | **1.323** | **1.512** |

NOT ALLOWED AREA

REBAR YIELDING AREA

Values shaded in light blue are not allowed for overlapping joints

# CONCRETE CLASS 30/37

**Concrete compressive strength [$f_{ck,cube}$]: 37 N/mm²**

| **Rebar Ø** | $d_s$ | [mm] | **Ø8** | **Ø10** | **Ø12** | **Ø14** | **Ø16** | **Ø20** | **Ø25** | **Ø28** | **Ø32** |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Rebar Size | $d_s$ | [mm] | 8 | 10 | 12 | 14 | 16 | 20 | 25 | 28 | 32 |
| Cross-sectional area | $A_s$ | [mm²] | 50,3 | 78,5 | 113,1 | 153,9 | 201,1 | 314,2 | 490,9 | 615,8 | 804,2 |
| Steel Yield | $f_{yd}$ | [kN] | 500 | 500 | 500 | 500 | 500 | 500 | 500 | 500 | 500 |
| Partial safety factor | $\gamma_{M,s}$ | [mm²] | 1,15 | 1,15 | 1,15 | 1,15 | 1,15 | 1,15 | 1,15 | 1,15 | 1,15 |
| Design steel resistance | $N_{Rd,s}$ | [kN] | 21,9 | 34,1 | 49,2 | 66,9 | 87,4 | 136,6 | 213,4 | 267,7 | 349,7 |
| Bond stress | $f_{bd}$ | [N/mm²] | 3,00 | 3,00 | 3,00 | 3,00 | 3,00 | 3,00 | 3,00 | 3,00 | 2,70 |
| Drilled hole diameter | $d_h$ | [mm] | 12 | 14 | 16 | 18 | 20 | 25 | 32 | 35 | 40 |
| Bar spacing ≥ | s | [mm] | 50 | 50 | 60 | 70 | 80 | 100 | 125 | 140 | 160 |
| Edge distance (compressed air drilling) ≥ | c | [mm] | $50 + 0{,}06\ L_b$ | | | | | | | | |
| Edge distance (hammer drilling) ≥ | c | [mm] | $30 + 0{,}08\ L_b \geq 2\phi$ | | | | | | | | |

| **Anchorage length, $L_b$ [mm]** | **Design tensile pull-out bond resistance, $N_{Rd}$ [kN]** | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 113 | 8,5 | | | | | | | | |
| 142 | 10,7 | 13,4 | | | | | | | |
| 170 | 12,8 | 16,0 | 19,2 | | | | | | |
| 198 | 14,9 | 18,7 | 22,4 | 26,1 | | | | | |
| 200 | 15,1 | 18,8 | 22,6 | 26,4 | | | | | |
| 210 | 15,8 | 19,8 | 23,8 | 27,7 | | | | | |
| 227 | 17,1 | 21,4 | 25,7 | 30,0 | 34,2 | | | | |
| 240 | 18,1 | 22,6 | 27,1 | 31,7 | 36,2 | | | | |
| 284 | 21,4 | 26,8 | 32,1 | 37,5 | 42,8 | 53,5 | | | |
| 300 | **21,9** | 28,3 | 33,9 | 39,6 | 45,2 | 56,5 | | | |
| 354 | **21,9** | 33,4 | 40,0 | 46,7 | 53,4 | 66,7 | 83,4 | | |
| 375 | **21,9** | **34,1** | 42,4 | 49,5 | 56,5 | 70,7 | 88,4 | | |
| 397 | **21,9** | **34,1** | 44,9 | 52,4 | 59,9 | 74,8 | 93,5 | 104,8 | |
| 400 | **21,9** | **34,1** | 45,2 | 52,8 | 60,3 | 75,4 | 94,2 | 105,6 | |
| 420 | | **34,1** | 47,5 | 55,4 | 63,3 | 79,2 | 99,0 | 110,8 | |
| 454 | | **34,1** | **49,2** | 59,9 | 68,5 | 85,6 | 107,0 | 119,8 | 136,9 |
| 480 | | **34,1** | **49,2** | 63,3 | 72,4 | 90,5 | 113,1 | 126,7 | 144,8 |
| 500 | | **34,1** | **49,2** | 66,0 | 75,4 | 94,2 | 117,8 | 131,9 | 150,8 |
| 600 | | | **49,2** | **66,9** | **87,4** | 113,1 | 141,4 | 158,3 | 181,0 |
| 700 | | | | **66,9** | **87,4** | 131,9 | 164,9 | 184,7 | 164,9 |
| 800 | | | | | **87,4** | **136,6** | 188,5 | 211,1 | 188,5 |
| 1000 | | | | | | **136,6** | **213,4** | 263,9 | 301,6 |
| **Length to develop steel yield, $L_{b,rqd}$ [mm]** | **290** | **362** | **435** | **507** | **580** | **725** | **906** | **1.014** | **1.288** |

NOT ALLOWED AREA

REBAR YIELDING AREA

Values shaded in light blue are not allowed for overlapping joints

# CONCRETE CLASS 40/50

**Concrete compressive strength [$f_{ck,cube}$]: 50 N/mm²**

| **Rebar Ø** | $d_s$ | [mm] | **Ø8** | **Ø10** | **Ø12** | **Ø14** | **Ø16** | **Ø20** | **Ø25** | **Ø28** | **Ø32** |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Rebar Size | $d_s$ | [mm] | 8 | 10 | 12 | 14 | 16 | 20 | 25 | 28 | 32 |
| Cross-sectional area | $A_s$ | [mm²] | 50,3 | 78,5 | 113,1 | 153,9 | 201,1 | 314,2 | 490,9 | 615,8 | 804,2 |
| Steel Yield | $f_{yd}$ | [kN] | 500 | 500 | 500 | 500 | 500 | 500 | 500 | 500 | 500 |
| Partial safety factor | $\gamma_{M,s}$ | [mm²] | 1,15 | 1,15 | 1,15 | 1,15 | 1,15 | 1,15 | 1,15 | 1,15 | 1,15 |
| Design steel resistance | $N_{Rd,s}$ | [kN] | 21,9 | 34,1 | 49,2 | 66,9 | 87,4 | 136,6 | 213,4 | 267,7 | 349,7 |
| Bond stress | $f_{bd}$ | [N/mm²] | 3,70 | 3,70 | 3,70 | 3,70 | 3,70 | 3,70 | 3,70 | 3,70 | 2,70 |
| Drilled hole diameter | $d_h$ | [mm] | 12 | 14 | 16 | 18 | 20 | 25 | 32 | 35 | 40 |
| Bar spacing ≥ | s | [mm] | 50 | 50 | 60 | 70 | 80 | 100 | 125 | 140 | 160 |
| Edge distance (compressed air drilling) ≥ | c | [mm] | $50 + 0{,}06\ L_b$ | | | | | | | | |
| Edge distance (hammer drilling) ≥ | c | [mm] | $30 + 0{,}08\ L_b \geq 2\phi$ | | | | | | | | |

| **Anchorage length, $L_b$ [mm]** | **Design tensile pull-out bond resistance, $N_{Rd}$ [kN]** | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 113 | 10,5 | | | | | | | | |
| 142 | 13,2 | 16,5 | | | | | | | |
| 170 | 15,8 | 19,8 | 23,7 | | | | | | |
| 198 | 18,4 | 23,0 | 27,6 | 32,2 | | | | | |
| 200 | 18,6 | 23,2 | 27,9 | 32,5 | | | | | |
| 210 | 19,5 | 24,4 | 29,3 | 34,2 | | | | | |
| 227 | 21,1 | 26,4 | 31,7 | 36,9 | 42,2 | | | | |
| 240 | **21,9** | 27,9 | 33,5 | 39,1 | 44,6 | | | | |
| 284 | **21,9** | 33,0 | 39,6 | 46,2 | 52,8 | 66,0 | | | |
| 300 | **21,9** | **34,1** | 41,8 | 48,8 | 55,8 | 69,7 | | | |
| 354 | **21,9** | **34,1** | **49,2** | 57,6 | 65,8 | 82,3 | 102,9 | | |
| 375 | **21,9** | **34,1** | **49,2** | 61,0 | 69,7 | 87,2 | 109,0 | | |
| 397 | **21,9** | **34,1** | **49,2** | 64,6 | 73,8 | 92,3 | 115,4 | 129,2 | |
| 400 | **21,9** | **34,1** | **49,2** | 65,1 | 74,4 | 93,0 | 116,2 | 130,2 | |
| 420 | | **34,1** | **49,2** | **66,9** | 78,1 | 97,6 | 122,1 | 136,7 | |
| 454 | | **34,1** | **49,2** | **66,9** | 84,4 | 105,5 | 131,9 | 147,8 | 168,9 |
| 480 | | **34,1** | **49,2** | **66,9** | **87,4** | 111,6 | 139,5 | 156,2 | 178,5 |
| 500 | | **34,1** | **49,2** | **66,9** | **87,4** | 116,2 | 145,3 | 162,7 | 186,0 |
| 600 | | | **49,2** | **66,9** | **87,4** | **136,6** | 174,4 | 195,3 | 223,2 |
| 700 | | | | **66,9** | **87,4** | **136,6** | 203,4 | 227,8 | 260,4 |
| 800 | | | | | **87,4** | **136,6** | **213,4** | 260,4 | 297,6 |
| 1000 | | | | | | **136,6** | **213,4** | **267,7** | **349,7** |
| **Length to develop steel yield, $L_{b,rqd}$ [mm]** | **235** | **294** | **352** | **411** | **470** | **587** | **734** | **822** | **940** |

NOT ALLOWED AREA

REBAR YIELDING AREA

Values shaded in light blue are not allowed for overlapping joints

# CONCRETE CLASS 50/60

**Concrete compressive strength [$f_{ck,cube}$]: 60 N/mm²**

| **Rebar Ø** | $d_s$ | [mm] | **Ø8** | **Ø10** | **Ø12** | **Ø14** | **Ø16** | **Ø20** | **Ø25** | **Ø28** | **Ø32** |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Rebar Size | $d_s$ | [mm] | 8 | 10 | 12 | 14 | 16 | 20 | 25 | 28 | 32 |
| Cross-sectional area | $A_s$ | [mm²] | 50,3 | 78,5 | 113,1 | 153,9 | 201,1 | 314,2 | 490,9 | 615,8 | 804,2 |
| Steel Yield | $f_{yd}$ | [kN] | 500 | 500 | 500 | 500 | 500 | 500 | 500 | 500 | 500 |
| Partial safety factor | $\gamma_{M,s}$ | [mm²] | 1,15 | 1,15 | 1,15 | 1,15 | 1,15 | 1,15 | 1,15 | 1,15 | 1,15 |
| Design steel resistance | $N_{Rd,s}$ | [kN] | 21,9 | 34,1 | 49,2 | 66,9 | 87,4 | 136,6 | 213,4 | 267,7 | 349,7 |
| Bond stress | $f_{bd}$ | [N/mm²] | 4,00 | 4,00 | 4,00 | 4,00 | 4,00 | 4,00 | 4,00 | 3,70 | 2,70 |
| Drilled hole diameter | $d_h$ | [mm] | 12 | 14 | 16 | 18 | 20 | 25 | 32 | 35 | 40 |
| Bar spacing ≥ | s | [mm] | 50 | 50 | 60 | 70 | 80 | 100 | 125 | 140 | 160 |
| Edge distance (compressed air drilling) ≥ | c | [mm] | $50 + 0{,}06\ L_b$ | | | | | | | | |
| Edge distance (hammer drilling) ≥ | c | [mm] | $30 + 0{,}08\ L_b \geq 2\phi$ | | | | | | | | |

| **Anchorage length, $L_b$ [mm]** | **Design tensile pull-out bond resistance, $N_{Rd}$ [kN]** | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 113 | 12,2 | NOT ALLOWED AREA | | | | | | | |
| 142 | 15,3 | 19,2 | | | | | | | |
| 170 | 18,4 | 23,0 | 27,6 | | | | | | |
| 198 | 21,4 | 26,7 | 32,1 | 37,4 | | | | | |
| 200 | 21,6 | 27,0 | 32,4 | 37,8 | | | | | |
| 210 | **21,9** | 28,4 | 34,0 | 39,7 | | | | | |
| 227 | **21,9** | 30,7 | 36,8 | 42,9 | 49,1 | | | | |
| 240 | **21,9** | 32,4 | 38,9 | 45,4 | 51,9 | | | | |
| 284 | **21,9** | **34,1** | 46,0 | 53,7 | 61,4 | 76,7 | | | |
| 300 | **21,9** | **34,1** | 48,6 | 56,7 | 64,8 | 81,1 | | | |
| 354 | **21,9** | **34,1** | **49,2** | **66,9** | 76,5 | 95,6 | 119,6 | | |
| 375 | **21,9** | **34,1** | **49,2** | **66,9** | 81,1 | 101,3 | 126,6 | | |
| 397 | **21,9** | **34,1** | **49,2** | **66,9** | 85,8 | 107,3 | 134,1 | 150,2 | |
| 400 | **21,9** | **34,1** | **49,2** | **66,9** | 86,5 | 108,1 | 135,1 | 151,3 | |
| 420 | | **34,1** | **49,2** | **66,9** | **87,4** | 113,5 | 141,8 | 158,9 | |
| 454 | | **34,1** | **49,2** | **66,9** | **87,4** | 122,7 | 153,3 | 171,7 | 168,9 |
| 480 | | **34,1** | **49,2** | **66,9** | **87,4** | 129,7 | 162,1 | 181,6 | 178,5 |
| 500 | | **34,1** | **49,2** | **66,9** | **87,4** | 135,1 | 168,9 | 189,1 | 186,0 |
| 600 | | | **49,2** | **66,9** | **87,4** | **136,6** | 202,6 | 226,9 | 223,2 |
| 700 | REBAR YIELDING AREA | | | **66,9** | **87,4** | **136,6** | **213,4** | 264,8 | 260,4 |
| 800 | | | | | **87,4** | **136,6** | **213,4** | **267,7** | 297,6 |
| 1000 | | | | | | **136,6** | **213,4** | **267,7** | **349,7** |
| **Length to develop steel yield, $L_{b,rqd}$ [mm]** | **202** | **253** | **303** | **354** | **404** | **505** | **632** | **708** | **940** |

Values shaded in light blue are not allowed for overlapping joints

## 9. OFFICIAL DOCUMENTATION

The following documents are available through our Sales Department or on our official website: www.indexfix.com:

- MOPUR3 Safety Data Sheet.
- European Technical Assessment ETA 17/0659 for use in cracked and non-cracked concrete according to ETAG 001 Guide, option 1, for M8 to M30.
- European Technical Approval ETA 17/0658 for the installation of post-installed rebar with diameters from 8 to 32 mm according to technical report TR023.
- Classified A+ according to French Regulation DEVL11044875A relative to the emission of volatile pollutants for indoor use.
- WRAS certificate – 1506532 of material admitted for use in contact with drinking water.
- CSTB certificate (MRF 26072903 _ SP0363-1) of 14/12/2017 of the material's behavior in contact with fire for post-installed rebar connections.
- Declaration of Performance DoP MOPUR3.
- INDEXcal anchor calculation software.
- INDEXmor cartridge calculation needs software.