MOPURE

CERTIFICATES

STRUCTURAL FIXINGS IN CRACKED & UNCRACKED CONCRETE ETA 14/0156

REBAR CONNECTIONS ETA 14/0325

ICC ES ESR-3807

SEISMIC C1

ÉMISSIONS DANS L'AIR INTÉRIEUR A+

LEED TESTED

BASE MATERIAL

CHARACTERISTICS

- Assessed for structural applications in cracked and non-cracked concrete, M10 to M30. Rebar used as stud from Ø10 to Ø32.
- Assessed for post-installed rebar connections Ø8 to Ø32.
- Evaluation Report ESR-3807 according to IBC and IRC (USA)
- Pure Epoxy 1:1, cartridges of 300 + 300 ml.
- LEED and A+ certificates.
- Use for high loads, static or quasi-static. Seismic loads C1.
- Working life of 50 and/or 100 years.
- Valid for dry and wet holes.
- Valid for zinc plated steel, hot-dip galvanized, stainless steel A2, A4 and HCR.
- Temperature range: from -40ºC to +80ºC (long term maximum temperature +50ºC).

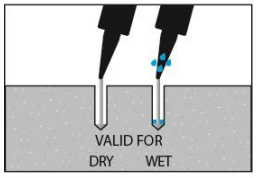
VALID FOR

Ø8 – Ø32 Rebar

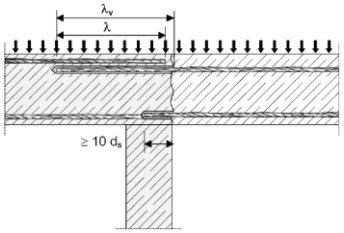
APPLICATIONS

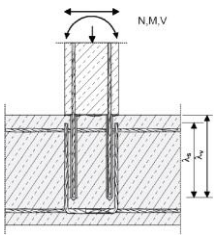
- Use in indoor and outdoor environments.
- Structural applications.
- Fixing of building substructures.
- Rebar and start rebar.
- Safety barriers, billboards, heavy engine, etc.
- Large metric sizes, retaining walls.

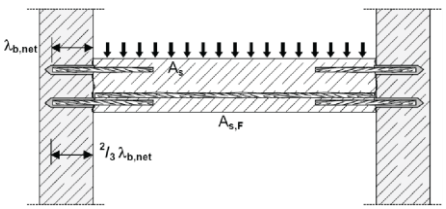
DRILL HOLE CONDITION

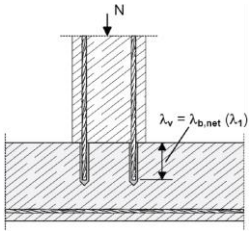


APPLICATION EXAMPLES









1. RANGE

ITEM	CODE	SIZE	PHOTO	COMPONENT	MATERIAL	
1	**MOPURE600**	600 ml.		PURE EPOXY MORTAR	Pure Epoxy mortar. Format: side by side cartridges of 600 ml	12

2. ACCESORIES

ITEM	CODE	PHOTO	COMPONENT	MATERIAL
1	**MOPISPUR6**		APPLICATION GUN	Gun for 600 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

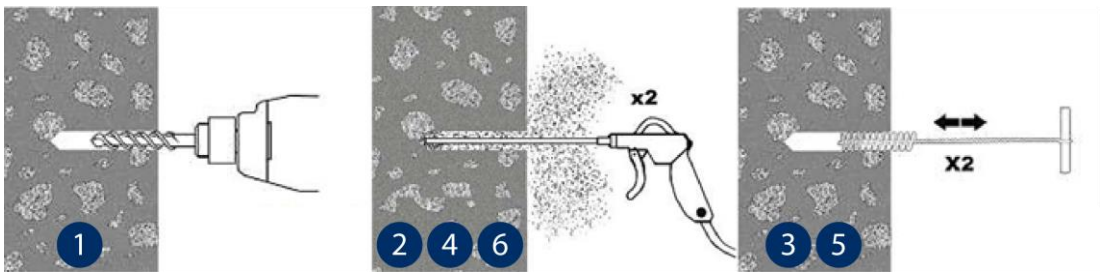
Always use and wear your personal protective equipment (PPE)

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: MOPURE ≥ +5 ºC
Use drill in hammer mode.
Drill to the specified diameter and depth values

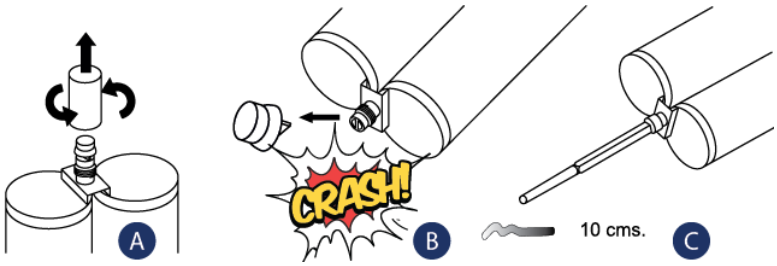
2 - 6. BLOW AND CLEAN

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.



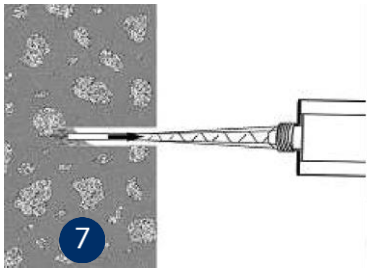
A – B – C. OPEN CARTRIDGE

Remove the plug from the cartridge and hit the cartridge against a rigid surface. The mouth must be hit above the thread otherwise, threading won't be possible. Once the mouth has been opened, insert the mixing nozzle in the gun. Pull the trigger repeatedly until the mortar comes out of the nozzle in a uniform grey color. Any iridescence indicates improper mixing. Always discard the first two doses of each cartridge: these should never be used for fixing.



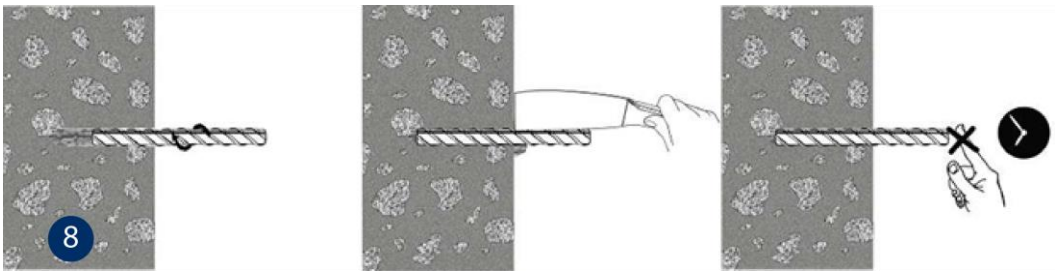
7. INJECT MORTAR

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.

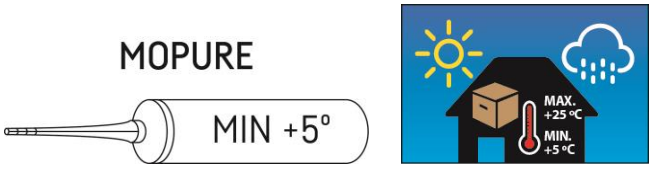


3.2 TEMPERATURE AND CURING TIME

TYPE	Base material temperature [ºC]	Handling time [min]	Curing time [hrs]
MOPURE	+5 to +10	20	24
	+10 to +15	20	12
	+15 to +20	15	8
	+20 to +25	11	7
	+25 to +30	8	6
	+30 to +35	6	5
	+35 to +40	4	4
	+40	3	3

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: 24 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) ≤ 8 > 8	± 6,0 ± 4,5	
Bond: Minimum relative rib area, $f_{R,min}$	Nominal bar size (mm) 8 to 12 > 12	0,040 0,056	

6. MINIMUM/MAXIMUM LENGTHS

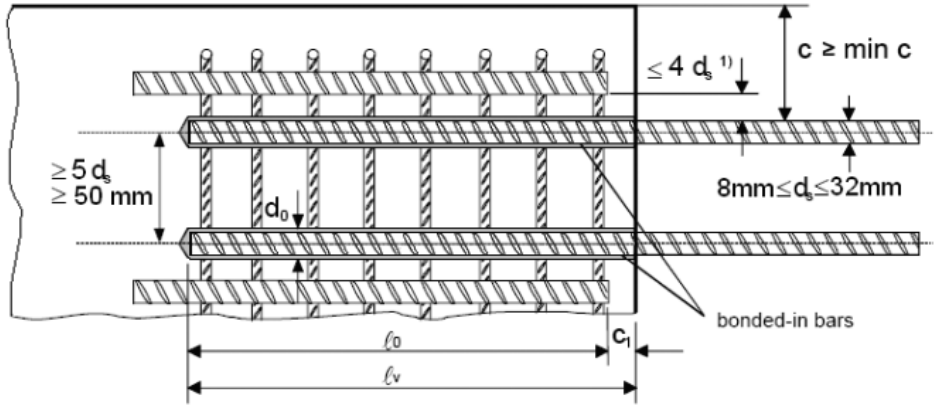
Rebar		**Minimum**		**Maximum**
Ød$_s$ [mm]	**$f_{y,k}$ [N/mm2]**	**Anchorage $\ell_{b,min}$ [mm]**	**Overlap $\ell_{0,min}$ [mm]**	**ℓ_{max} [mm]**
8	500	170	300	400
10	500	212	300	500
12	500	255	300	600
14	500	298	315	700
16	500	340	360	800
20	500	425	450	1000
25	500	532	563	1000
28	500	595	630	1000
32	500	681	720	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 to 14	1,6	2,0	2,3	2,7	3,0	3,4	3,7	3,7	3,7
16								3,7	4,0
20 to 26								4,0	4,0
28								3,7	3,7
32					2,7	3,0	3,0	3,0	3,0

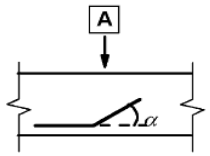
8. PRECALCULATED VALUE TABLES

- **Design Load Approach according to Eurocode 2 and EOTA technical report 023.**
- **Data information according to ETA 13/0780.**
- **Non-cracked concrete, dry or wet conditions**
- **Temperature range: -40ºC to +80ºC (long term maximum temperature +50ºC).**
- **Minimum spacing conditions ≥5ds, min 50 mm:**

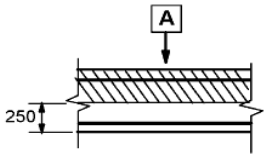


- **Minimum concrete covering**
  - **compressed air drilling ≥ 50 + 0,06 L_b**
  - **hammer drilling ≥ 30 + 0,08 L_b ≥ 2ϕ**

- **Good bond Conditions (EU2, figure 8.2):**

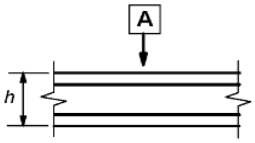


a) 45° ≤ α ≤ 90°

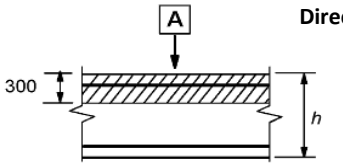


c) *h* > 250 mm

A - Concreting Direction



b) *h* ≤ 250 mm



d) *h* > 600 mm

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

:) y d) no shaded area – "good" bond :onditions
:haded area – "poor" bond contidions

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

Resistances values can be increased in the following scenarios:

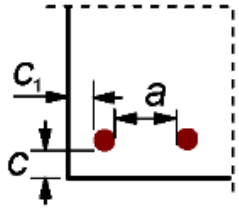
- **In case of transverse tension / compression pressure (α_2)**
- **In case of concreting cover (α_5)**
- **In case of overlapping (α_6)**

VALUES FOR α_2 , α_5 AND α_6

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

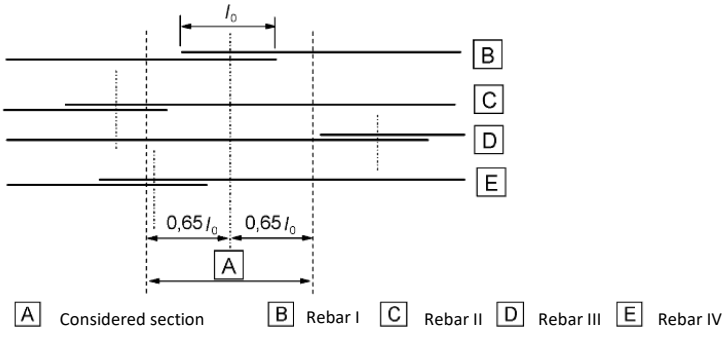
Where:

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 center 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	$f_{bd,PIR}$	[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]**								
170	9,8								
212	12,3	15,3							
255	14,7	18,4	22,1						
298	17,2	21,5	25,8	30,1					
300	17,3	21,7	26,0	30,3					
315	18,2	22,8	27,3	31,9					
340	19,7	24,6	29,5	34,4	39,3				
360	20,8	26,0	31,2	36,4	41,6				
400	**21,9**	28,9	34,7	40,5	46,2				
425		30,7	36,9	43,0	49,1	61,4			
450		32,5	39,0	45,5	52,0	65,0			
500		**34,1**	43,4	50,6	57,8	72,3			
532			46,1	53,8	61,5	76,9	96,1		
563			48,8	57,0	65,1	81,4	101,7		
595			**49,2**	60,2	68,8	86,0	107,5	120,4	
600				60,7	69,4	86,7	108,4	121,4	
630				63,7	72,8	91,0	113,8	127,5	
REBAR				**66,9**	78,7	98,4	123,0	137,8	157,5
700				**66,9**	80,9	101,2	126,4	141,6	161,9
720					83,2	104,0	130,1	145,7	166,5
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 YELDING AREA

Values shaded in grey 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	$f_{bd,PIR}$	[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]**								
170	12,8								
212	16,0	20,0							
255	19,2	24,0	28,8						
298	21,9	28,1	33,7	39,3					
300	21,9	28,3	33,9	39,6					
315	21,9	29,7	35,6	41,6					
340	21,9	32,0	38,5	44,9	51,3				
360	21,9	33,9	40,7	47,5	54,3				
400	**21,9**	**34,1**	45,2	52,8	60,3				
425		**34,1**	48,1	56,1	64,1	80,1			
450		**34,1**	**49,2**	59,4	67,9	84,8			
500		**34,1**	**49,2**	66,0	75,4	94,2			
532			**49,2**	**66,9**	80,2	100,3	125,3		
563			**49,2**	**66,9**	84,9	106,1	132,7		
595			**49,2**	**66,9**	**87,4**	112,2	140,2	157,0	
600				**66,9**	**87,4**	113,1	141,4	158,3	
630				**66,9**	**87,4**	118,8	148,4	166,3	
681				**66,9**	**87,4**	128,4	160,5	179,7	184,8
700				**66,9**	**87,4**	131,9	164,9	184,7	190,0
720					**87,4**	135,7	169,6	190,0	195,4
800					**87,4**	**136,6**	188,5	211,1	217,1
1000						**136,6**	**213,4**	263,9	271,4
Length to develop steel yield, $L_{b,rqd}$ [mm]	**290**	**362**	**435**	**507**	**580**	**725**	**906**	**1.014**	**1.288**

NOT ALLOWED AREA

REBAR YELDING AREA

Values shaded in grey 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	$f_{bd,PIR}$	[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]**								
170	15,8								
212	19,7	24,6							
255	**21,9**	29,6	35,6						
298	**21,9**	**34,1**	41,6	48,5					
300	**21,9**	**34,1**	41,8	48,8					
315	**21,9**	**34,1**	43,9	51,3					
340	**21,9**	**34,1**	47,4	55,3	63,2				
360	**21,9**	**34,1**	**49,2**	58,6	67,0				
400	**21,9**	**34,1**	**49,2**	65,1	74,4				
425		**34,1**	**49,2**	**66,9**	79,0	98,8			
450		**34,1**	**49,2**	**66,9**	83,7	104,6			
500		**34,1**	**49,2**	**66,9**	**87,4**	116,2			
532			**49,2**	**66,9**	**87,4**	123,7	154,6		
563			**49,2**	**66,9**	**87,4**	130,9	163,6		
595			**49,2**	**66,9**	**87,4**	**136,6**	172,9	193,7	
600				**66,9**	**87,4**	**136,6**	174,4	195,3	
630				**66,9**	**87,4**	**136,6**	183,1	205,0	
681				**66,9**	**87,4**	**136,6**	197,9	221,6	205,4
700				**66,9**	**87,4**	**136,6**	203,4	227,8	211,1
720					**87,4**	**136,6**	209,2	234,3	217,1
800					**87,4**	**136,6**	**213,4**	260,4	241,3
1000						**136,6**	**213,4**	**267,7**	301,6
Length to develop steel yield, $L_{b,rqd}$ [mm]	**235**	**294**	**352**	**411**	**470**	**587**	**734**	**822**	**1.159**

NOT ALLOWED AREA

REBAR YIELDING AREA

Values shaded in grey 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	$f_{bd,PIR}$	[N/mm²]	3,70	3,70	3,70	3,70	4,00	4,00	4,00	3,70	3,00
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]**								
170	15,8								
212	19,7	24,6							
255	**21,9**	29,6	35,6						
298	**21,9**	**34,1**	41,6	48,5					
300	**21,9**	**34,1**	41,8	48,8					
315	**21,9**	**34,1**	43,9	51,3					
340	**21,9**	**34,1**	47,4	55,3	68,4				
360	**21,9**	**34,1**	**49,2**	58,6	72,4				
400	**21,9**	**34,1**	**49,2**	65,1	80,4				
425		**34,1**	**49,2**	**66,9**	85,5	106,8			
450		**34,1**	**49,2**	**66,9**	**87,4**	113,1			
500		**34,1**	**49,2**	**66,9**	**87,4**	125,7			
532			**49,2**	**66,9**	**87,4**	133,7	167,1		
563			**49,2**	**66,9**	**87,4**	**136,6**	176,9		
595			**49,2**	**66,9**	**87,4**	**136,6**	186,9	193,7	
600				**66,9**	**87,4**	**136,6**	188,5	195,3	
630				**66,9**	**87,4**	**136,6**	197,9	205,0	
681				**66,9**	**87,4**	**136,6**	**213,4**	221,6	205,4
700				**66,9**	**87,4**	**136,6**	**213,4**	227,8	211,1
720					**87,4**	**136,6**	**213,4**	234,3	217,1
800					**87,4**	**136,6**	**213,4**	260,4	241,3
1000						**136,6**	**213,4**	**267,7**	301,6
Length to develop steel yield, $L_{b,rqd}$ [mm]	**217**	**272**	**326**	**380**	**435**	**543**	**679**	**822**	**1.159**

REBAR YIELDING AREA

NOT ALLOWED AREA

Values shaded in grey are not allowed for overlapping joints

9. CHEMICAL RESISTANCE

Chemical resistance of the product for different kind of chemical environments and for a specific concentration.

Chemical Environment	Concentration	Result	Chemical Environment	Concentration	Result
Aqueous Solution Acetic Acid	10%	C	Hexane	100%	C
Acetone	100%	X	Hydrochloric Acid	10%	✓
Aqueous Solution Aluminium Chloride	Saturated	✓		15%	✓
Aqueous Solution Aluminium Nitrate	10%	✓		25%	C
Ammonia Solution	5%	✓	Hydrogen Sulphide Gas	100%	✓
Jet Fuel	100%	C	Isoproyl Alcohol	100%	X
Benzene	100%	C	Linseed Oil	100%	✓
Benzoic Acid	Saturated	✓	Lubricating Oil	100%	✓
Benzyl Alcohol	100%	X	Mineral Oil	100%	✓
Sodium Hypochlorite Solution	5 - 15%	✓	Paraffin / Kerosene (Domestic)	100%	C
Butyl Alcohol	100%	C	Phenol Aqueous Solution	1%	C
Calcium Sulphate Aqueous Solution	Saturated	✓	Phosphoric Acid	50%	✓
Carbon Monoxide	Gas	✓	Potassium Hydroxide	10% / pH13	✓
Carbon Tetrachloride	100%	C	Sea Water	100%	C
Chlorine Water	Saturated	X	Styrene	100%	C
Chloro Benzene	100%	X	Sulphur Dioxide Solution	10%	✓
Citric Acid Aqueous Solution	Saturated	✓	Sulphur Dioxide (40°C)	5%	✓
Cyclohexanol	100%	✓	Sulphuric Acid	10%	✓
Diesel Fuel	100%	C		50%	✓
Diethylene Glycol	100%	✓	Turpentine	100%	C
Ethanol	95%	X	White Spirit	100%	✓
Ethanol Aqueous Solution	20%	C	Xylene	100%	C
Heptane	100%	C	**Contact only to a maximum of 25°C.**		C
Resistant to 75°C with at least 80% of physical properties retained.		✓	**Not Resistant**		X

10. OFFICIAL DOCUMENTATION

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

- MOPURE Safety Data Sheet.
- European Technical Assessment ETA 14/0156 for use on cracked and non-cracked concrete according to EAD 330232-00-0601 Guide, option 1, for M10 to M30. Assessment for seismic loads C1.
- European Technical Approval ETA 14/0325 for the installation of post-installed concrete reinforcements with diameters from 8 to 32 mm according to technical report EAD 330087-01-0601.
- ICC-ES Evaluation Report ESR-3807 according to International Building Code (IBC 2003, 2006, 2009, 2012 and 205) and International Residential Code (IRC 2003, 2006, 2009, 2012 and 205).
- Classified A+ according to French Regulation DEVL11044875A relative to the emission of volatile pollutants for indoor use.
- LEED MOPURE Certification of sustainability.
- Declaration of Performance DoP MOPURE.
- INDEXcal anchor calculation software.
- INDEXmor cartridge calculation needs software.