

Rebar anchoring system



EPOBAR

- EPOXY acrylate resin
- Fast cure time
- Storage time 16 months
- Usable in wet environments
- Good fire performance
- Cartridge compatible with standard injection gun
- Usable with XTD dust free drill bit

Mechanical characteristics of rebars

Nominal steel rebar Ø		Ø8	Ø10	Ø12	Ø14	Ø16	Ø20	Ø25	Ø32	Ø40
Sections (cm²)		0,503	0,785	1,13	1,54	2,01	3,14	4,91	8,04	12,57
Min. resistances to failure (kN)	Fe E400	21,13	32,97	47,46	64,68	84,42	131,88	206,22	337,68	527,94
	Fe E500	25,90	40,43	58,20	79,31	103,52	161,71	252,87	414,06	647,36
Ultimate limit load N _{Rd} (kN)	Fe E500	21,85	34,15	49,17	66,93	87,42	136,59	213,43	349,56	546,36

The mechanical characteristics of the high adhesion rebars are defined in the NFA 35-016 and NFA 35-017 standards.

FIRE BEHAVIOUR

- see pages 162 to 165



Setting time

Temperature	Max. time for installation	Curing time	
		Dry concrete	Wet concrete
40°C	3 min.	50 min.	1 h 40 min.
30°C to 39°C	3 min.	1 h 5 min.	2 h 10 min.
20°C to 29°C	6 min.	1 h 50 min.	3 h 40 min.
10°C to 19°C	11 min.	3 h 10 min.	6 h 20 min.
5°C to 9°C	22 min.	4 h 10 min.	8 h 20 min.
0°C to 4°C ⁽¹⁾	48 min.	5 h 15 min.	10 h 30 min.
-5°C to -1°C ⁽¹⁾	120 min.	6 h 40 min.	13 h 20 min.

⁽¹⁾ the cartridge temperature must be ≥ to 5°C

Sizing rules for steel reinforcement fixings for concrete according to eurocode 2 regulations and ETA 08/0201

The basic anchorage length $L_{b,reqd}$ (mm) for the ultimate limit load for rebar F_{Rd} (N) is given by following equation:

$$L_{b,reqd} = \frac{F_{Rd}}{\Pi \cdot \varnothing \cdot \eta_1 \cdot \eta_2 \cdot f_{bd}}$$

The design anchorage length L_{bd} (mm) is determined as follow:

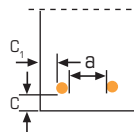
$$L_{bd} = L_{b,reqd} \cdot \alpha_2 \cdot \alpha_5$$

- F_{Rd} : Design ultimate load (N)
 f_{bd} : Design value of the bond strength in N/mm²
 $\varnothing$: Rebar diameter (mm)
 η_1 : depends on bond conditions - $\eta_1 = 1$ ("good bond" conditions). See § 8.4.2 (EN 1992-1-1)
 η_2 : depends on rebar diameter - $\eta_2 = 1$ for $\varnothing_{rebar} \leq 32$ mm

with α_2 : Influence of concrete minimum cover

$$\alpha_2 = 1 - 0,15 (C_d - \varnothing_{rebar}) / \varnothing_{rebar} \geq 0,7$$

$$C_d = \min \left(C ; C_1 ; \frac{a}{2} \right)$$



with α_5 : Influence of the confinement by transverse pressure

The factor α_5 take into account of the effect of the pressure transverse to the plane of splitting along the design length.

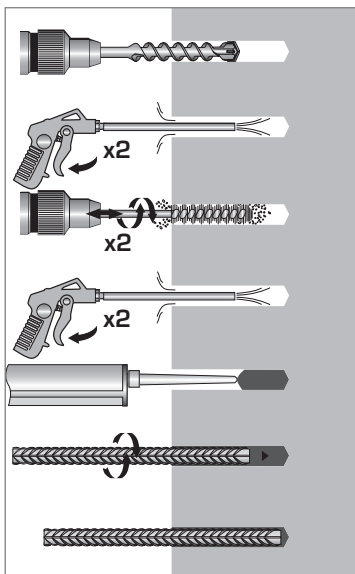
$$\alpha_5 = 1 - 0,04 \cdot p \geq 0,7$$

where p is the transverse pressure at the ultimate limit state along L_{bd} in MPa.

p (MPa)	α_5
3	0,88
5	0,8
7	0,72

Concrete class	f_{ck} (MPa)	f_{bd} (MPa)
C20/25	20	2,3
C25/30	25	2,7
C30/37	30	3,0
C35/45	35	3,4
C40/50	40	3,7
C45/55	45	4,0
C50/60	50	4,3

INSTALLATION*



*Premium cleaning :

- 2 blowing with compressed air
- 2 brushing with brushed fitted on a drilling machine
- 2 blowing with compressed air

Limit of this formula

The max. anchor depth will be limited to 900 mm with pneumatic injection tool.



Eurocode 2 table for straight rebar anchoring

CONCRETE C25/30 - HAMMER DRILLING



Rebar Ø (mm)	Drilling Ø d ₀ (mm)	Length of anchor L _{bd} (mm)	Ultimate limit load (daN) without influence of center distance and/or edge ⁽¹⁾ (α ₂ = 0,7)	Ultimate limit load (daN) with influence of center distance and/or edge ⁽²⁾ (α ₂ = 1)	Number of sealings per SPIT EPOBAR cartridge ⁽³⁾	
					410 ml	825 ml
8	10	100	969	679	120,8	243,2
		190	1842	1289	63,6	128,0
		225	2185	1530	53,6	107,9
		322	-	2185	37,5	75,5
10	12	121	1466	1026	81,7	164,4
		230	2787	1951	43,0	86,5
		282	3415	2391	35,1	70,6
		403	-	3415	24,6	49,4
12	15	145	2108	1476	37,0	74,5
		280	4072	2850	19,2	38,6
		338	4917	3442	15,9	32,0
		483	-	4917	11,1	22,4
14	18	169	2867	2007	20,1	40,5
		330	5598	3919	10,3	20,7
		395	6693	4685	8,6	17,3
		564	-	6693	6,0	12,1
16	20	193	3742	2619	15,7	31,5
		370	7174	5022	8,2	16,4
		451	8742	6119	6,7	13,5
		644	-	8742	4,7	9,4
20	25	242	5865	4105	8,0	16,1
		470	11391	7973	4,1	8,3
		564	13659	9561	3,4	6,9
		805	-	13659	2,4	4,8
25	30	302	9149	6404	3,6	7,3
		550	16662	11663	2,0	4,0
		704	21342	14939	1,5	3,1
		1006	-	21342	1,1	2,2
28	35	338	11468	8028	2,9	5,9
		600	20358	14250	1,6	3,3
		789	26770	18739	1,3	2,5
		1127	-	26770	0,9	1,8
32	40	386	14968	10477	2,0	3,9
		750	29082	20358	1,0	2,0
		900	34956	24469	0,8	1,7
		1200	-	32572	0,6	1,3

⁽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.

$$1,2 \times (d_0^2 - \varnothing_{\text{rebar}}^2) \times \pi \times L_{bd} / 4$$