FRIULSIDER YOUR FIXING FACTORY

Declaration of Performance

DoP nr. kemvinyl

Bonded anchor Vinylester resin in cartridge

CE

1. Identification of the product: **KEM V Vinylester**

2. Identification code (art. 11.4), for the batch or serial number see packaging:

Type of Cartridge	Format	Cod.
Coaxial	380-410-420 ml	**94103000**00 /01-02-03-04-05-06-07-08 (420ml)
Side-by-side	345 ml	**94201000**00/01-02-03-04-05-06-07-08 (345ml)
Sealant Gun	280-300 ml	**94301000**00/01-02-03-04-05-06-07-08 (300ml)

3. Intended use: **See Annex I°**

4. Manufacturer (art. 11.5): **Friulsider** SpA via trieste,1 - 33048 San Giovanni al Natisone (UD) - Italy

5. Authorised representative (art. 12.2): Not Relevant

6. System of Assessment AVCP (annex V): **System 1**

7/8. Harmonised Specification & Notified Body:

	Name of Body	System of Assessment	Reference	EAD / hEN Document
Technical Specification Document	DiBt [TAB]	1	**ETA-08/0383**	**EAD 330499-01-0601**
Constancy of Performance & FPC	MPA Darmstadt 1343 [NB]	1	1343-CPR-M 527-12	EAD 330499-00-0601
Technical Specification Document	DiBt [TAB]	1	**ETA-12/0533**	**EAD 330087-00-0601**
Constancy of Performance & FPC	MPA Darmstadt 1343 [NB]	1	1343-CPR-M 527-11	EAD 330087-00-0601
Technical Specification Document	DiBt [TAB]	1	**ETA-12/0543**	**ETAG029**
Constancy of Performance & FPC	MPA Darmstadt 1343 [NB]	1	1343-CPR-M 527-6_10.16	ETAG029

9. Declared Performance: **See Annexes**

10. The performance of the product identified in points 1 and 2 is in conformity with declared performance in point 9.
This declaration of performance is issued under the sole responsibility of Friulsider SpA.

Signed for and behalf of the manufacturer by:

Function	Name	Signature	Place and date of issue
Technical Manager	Raffaele Palmieri		San Giovanni al Natisone, 04-03-2020

ANNEX I° "Intended use"

Generic type	Bonded anchor for anchorage of **Threaded Rod** and **Rebar** as **ETA-08/0383**
Base Material	**Concrete** C20/25 to C50/60 acc. to EN206-1
Use category	▪ Installation in dry and wet concrete (flooded holes up to d.16) ▪ Overhead installation
Material & Durability	▪ Galvanized steel cl.4.6 to cl.8.8 acc. to EN ISO898 for dry internal conditions ▪ Stainless Steel cl. A4-50/70/80 acc. to EN ISO3506 for internal and external use without particular aggressive conditions ▪ High Resistant Stainless Steel HCR-50/70/80 acc. to EN ISO3506 for all conditions ▪ Rebar Class B and C as EN 1992-1-1:2004+AC:2010, Annex C
Loading	**Static, quasi-static and Seismic load**
Temperature Range	▪ -40°C to +40°C max long term temperature +24°C and max short term temperature +40°C ▪ -40°C to +80°C max long term temperature +50°C and max short term temperature +80°C ▪ -40°C to +120°C max long term temperature +72°C and max short term temperature +120°C
Fire Reaction	A1 according to EN 13501-1

Generic type	Bonded anchor for anchorage of **Post-Installed Rebar Connection** as **ETA-12/0533**
Base Material	Non-carbonated Concrete C12/15 to C50/60 acc. to EN206-1 [max 0,4 % CL]
Use category	▪ Installation in dry and wet concrete (not flooded holes) ▪ Overlap joint with existing reinforcement in a building component ▪ Anchoring of the reinforcement at a slab or beam support ▪ Anchoring of reinforcement of building components stressed primarily in compression ▪ Anchoring of reinforcement to cover the envelope line of tensile force in the bending member
Material & Durability	▪ Rebar Class B and C as EN 1992-1-1:2004+AC:2010, Annex C ▪ ZA Tension Anchor B500 B as DIN 488 for internal and external use without particular aggressive conditions ▪ ZA Tension Anchor Stainless Steel A4 as DIN 488 for internal and external use without particular aggressive conditions ▪ ZA Tension Anchor High Resistance Stainless Steel HCR as DIN 488 for all conditions
Loading	**Static, quasi-static and Fire Exposure as EN1992-1 [EC2]**
Temperature Range	-40°C to +80°C max long term temperature +50°C and max short term temperature +80°C
Fire Reaction	A1 according to EN 13501-1

Generic type	Bonded anchor for anchorage of **threaded rod** on **Masonry** as **ETA-12/0543**
Base Material	**b, c** e **d**, **Solid brick, Hollow brick and Autoclaved Areated Concrete** as EN771
Use category	▪ d/d: installation and use in dry masonry ▪ w/w: installation and use in wet masonry
Material & Durability	▪ Galvanized steel cl.4.6 to cl.8.8 acc. to EN ISO898 for dry internal conditions ▪ Stainless Steel cl. A4-50/70/80 acc. to EN ISO3506 for internal and external use without particular aggressive conditions ▪ High Resistant Stainless Steel HCR-50/70/80 acc. to EN ISO3506 for all conditions
Loading	**Static, quasi-static**
Temperature Range	▪ -40°C to +40°C max long term temperature +24°C and max short term temperature +40°C ▪ -40°C to +80°C max long term temperature +50°C and max short term temperature +80°C ▪ -40°C to +120°C max long term temperature +72°C and max short term temperature +120°C
Fire Reaction	A1 according to EN 13501-1

ANNEX II°

Declared Performances as ETA-08/0383 and EAD 330499-01-0601
Design method as EN 1992-4:2018

ESSENTIAL CHARACTERISTICS				PERFORMANCE							
d	**THREADED ROD**			**M8**	**M10**	**M12**	**M16**	**M20**	**M24**	**M27**	**M30**
d_0	Nominal diameter of drill bit		[mm]	10	12	14	18	24	28	32	35
h_{ef}	Effective embedment depth	$h_{ef,min}$	[mm]	60	60	70	80	90	96	108	120
		$h_{ef,std}$	[mm]	80	90	110	125	170	210	240	270
		$h_{ef,max}$	[mm]	160	200	240	320	400	480	540	600
h_{min}	Minimum thickness of the concrete member		[mm]	$h_{ef} + 30 \geq 100$			$h_{ef} + 2d_0$				
T_{inst}	Torque moment (max)		[Nm]	10	20	40	80	120	160	180	200
s_{min}	Minimum spacing		[mm]	40	50	60	80	100	120	135	150
c_{min}	Minimum edge distance		[mm]	40	50	60	80	100	120	135	150
TENSION Steel failure											
$N_{Rk,s}$	Tension Steel charact. failure	cl. 4.6-4.8	[kN]	15	23	34	63	98	141	184	224
		cl. 5.6-5.8	[kN]	18	29	42	78	122	176	230	280
		cl. 8.8	[kN]	29	46	67	125	196	282	368	449
		A4-70 (50)	[kN]	26	41	59	110	171	247	(230)	(281)
$N_{Rk,s,eq,C1}$	Tension Steel charact. failure Cat. Seismic **C1**		[kN]	$1,0 \times N_{Rk,s}$							
$\gamma_{Ms,N}$ [1)]	Partial safety factor	cl. 4.6-5.6	[-]	2,0							
		cl. 4.8-5.8-8.8	[-]	1,5							
		A4-70 (50)	[-]	1,87						(2,86)	
Combined pull-out and concrete failure: "DRY-WET"											
$\tau_{Rk,ucr}$	Characteristic bond resistance for **un-cracked concrete** C20/25	40°/24°C	[MPa]	**10**	**12**	**12**	**12**	**12**	**11**	**10**	**9**
		80°/50°C	[Mpa]	**7,5**	**9**	**9**	**9**	**9**	**8,5**	**7,5**	**6,5**
		120°/72°C	[MPa]	**5,5**	**6,5**	**6,5**	**6,5**	**6,5**	**6,5**	**5,5**	**5**
$\tau_{Rk,cr}$	Characteristic bond resistance for **Cracked concrete** C20/25	40°/24°C	[MPa]	**4**	**5**	**5,5**	**5,5**	**5,5**	**5,5**	**6,5**	**6,5**
		80°/50°C	[Mpa]	**2,5**	**3,5**	**4**	**4**	**4**	**4**	**4,5**	**4,5**
		120°/72°C	[MPa]	**2**	**2,5**	**3**	**3**	**3**	**3**	**3,5**	**3,5**
$\tau_{Rk,eq,C1}$	Characteristic bond resistance for **Cat. Seismic C1** C20/25	40°/24°C	[MPa]	**2,5**	**3,1**	**3,7**	**3,7**	**3,7**	**3,8**	**4,5**	**4,5**
		80°/50°C	[Mpa]	**1,6**	**2,2**	**2,7**	**2,7**	**2,7**	**2,8**	**3,1**	**3,1**
		120°/72°C	[MPa]	**1,3**	**1,6**	**2**	**2**	**2**	**2,1**	**2,4**	**2,4**
Combined pull-out and concrete failure: "FLOODED HOLES"				M8	M10	M12	M16	M20	M24	M27	M30
$\tau_{Rk,ucr}$	Characteristic bond resistance for **un-cracked concrete** C20/25	40°/24°C	[MPa]	7,5	8,5	8,5	8,5	(NPD)			
		80°/50°C	[MPa]	5,5	6,5	6,5	6,5				
		120°/72°C	[MPa]	4	5	5	5				
$\tau_{Rk,cr}$	Characteristic bond resistance for **Cracked concrete** C20/25	40°/24°C	[MPa]	4	4	5,5	5,5	(NPD)			
		80°/50°C	[MPa]	2,5	3	4	4				
		120°/72°C	[MPa]	2	2,5	3	3				
$\tau_{Rk,eq,C1}$	Characteristic bond resistance for **Category Seismic C1** C20/25	40°/24°C	[MPa]	2,5	2,5	3,7	3,7	(NPD)			
		80°/50°C	[MPa]	1,6	1,9	2,7	2,7				
		120°/72°C	[MPa]	1,3	1,6	2	2				
ψ_c	Increasing factor for concrete	C30/37	[-]	1,04							
		C40/50	[-]	1,08							
		C50/60	[-]	1,10							
ψ^0_{sus}	Reduction factor for C20/25 cracked, un-cracked concrete and Seismic Category	40°/24°C	[-]	0,73							
		80°/50°C	[-]	0,65							
		120°/72°C	[-]	0,57							
ψ_c	Increasing factor for concrete (Seismic Category)	da C25/30 a C50/60	[-]	1,0							
Concrete Cone failure											
$K_{cr,N}$	Factor acc. to EN 1992-4 § 7.2.1.4 cracked		[-]	7,7							
$K_{ucr,N}$	Factor acc. to EN 1992-4 § 7.2.1.4 un-cracked		[-]	11,0							
$c_{cr,N}$	Critical edge distance		[mm]	$1,5 \times h_{ef}$							
$s_{cr,N}$	Critical spacing		[mm]	$2,0 \times C_{cr,N}$							
Splitting failure											
$c_{cr,sp}$	Critical edge distance for Splitting	$h/h_{ef} \geq 2,0$	[mm]	$1,0 \times h_{ef}$							
		$2,0 > h/h_{ef} > 1,3$	[mm]	$2 \times h_{ef}(2,5 - h/h_{ef})$							
		$h/h_{ef} \leq 1,3$	[mm]	$2,4 \times h_{ef}$							
$s_{cr,sp}$	Critical spacing for Splitting		[mm]	$2,0 \times C_{cr,sp}$							
γ_{inst}	Installation safety factor for dry and wet concrete		[-]	1,0	1,2						
γ_{inst}	Installation safety factor for flooded holes		[-]	1,4				(NPD)			

[1)] In absence of other national regulations.

ANNEX III°

Declared Performances as ETA-08/0383 and EAD 330499-01-0601
Design method as EN 1992-4:2018

ESSENTIAL CHARACTERISTICS				PERFORMANCE							
d THREADED ROD				**M8**	**M10**	**M12**	**M16**	**M20**	**M24**	**M27**	**M30**
SHEAR Steel failure											
$V_{Rk,s}$	Shear Steel charact. failure	cl. 4.6-4.8	[kN]	9	14	20	38	59	85	110	115
		cl. 5.6-5.8	[kN]	11	17	25	47	74	106	138	168
		cl. 8.8	[kN]	15	23	34	63	98	141	184	224
		A4-70 (50)	[kN]	13	20	30	55	86	124	(115)	(140)
$V_{Rk,eq,C1}$	Shear Steel charact. failure Cat. Sismica **C1**		[kN]	0,70 x $V_{Rk,s}$							
$M^0_{Rk,s}$	Charact. Bending Moment	cl. 4.6-4.8	[Nm]	15	30	52	133	260	449	666	900
		cl. 5.6-5.8	[Nm]	19	37	65	166	324	560	833	1123
		cl. 8.8	[Nm]	30	60	105	266	519	896	1333	1797
		A4-70 (50)	[Nm]	26	52	92	232	454	784	(832)	(1125)
$M^0_{Rk,s,eq,C1}$	Charact. Bending Moment Cat. Sismica **C1**		[Nm]	(NPD)							
$\gamma_{Ms,V}$ [2]	Partial safety factor	cl. 4.6-5.6	[-]	1,67							
		cl. 4.8-5.8-8.8	[-]	1,25							
		A4-70 (50)	[-]	1,56						(2,38)	
K_7	Ductility factor acc. to EN 1992-4 § 7.2.2.3.1		[-]	1,0							
Concrete Pry-out failure											
K_8	Factor acc. to EN 1992-4 § 7.2.2.4		[-]	2,0							
γ_{inst}	Installation safety factor		[-]	1,0							
Concrete Edge failure											
l_f	Effective length of anchor		[-]	min (h_{ef}; 12xd_{nom})						min(h_{ef}; 300mm)	
d_{nom}	Outside diameter of anchor		[mm]	8	10	12	16	20	24	27	30
γ_{inst}	Installation safety factor		[-]	1,0							
α_{gap}	Factor for anular gap		[-]	0,5 (1,0) [1]							

[1] Value in brackets valid for filled annular gab between anchor and clearance hole in the fixture. Use of special filling washer Annex A3 of ETA-08/0383 is required;

[2] In absence of other national regulations.

Displacements under TENSION load (threaded rod) [1]				M8	M10	M12	M16	M20	M24	M27	M30
$\delta_{N0,ucr}$ -factor	Short term displacement in **Normal Concrete**	40°/24°C	[mm/MPa]	0,021	0,023	0,026	0,031	0,036	0,041	0,045	0,049
		80°/50°C		0,050	0,056	0,063	0,075	0,088	0,100	0,110	0,119
		120°/72°C		0,050	0,056	0,063	0,075	0,088	0,100	0,110	0,119
$\delta_{N\infty,ucr}$ - factor	Long term displacement in **Normal Concrete**	40°/24°C	[mm/MPa]	0,030	0,033	0,037	0,045	0,052	0,060	0,065	0,071
		80°/50°C		0,072	0,081	0,090	0,108	0,127	0,145	0,159	0,172
		120°/72°C		0,072	0,081	0,090	0,108	0,127	0,145	0,159	0,172
$\delta_{N0,cr}$ - factor	Short term displacement in **Cracked Concrete**	40°/24°C	[mm/MPa]	0,090	0,070						
		80°/50°C		0,219	0,170						
		120°/72°C		0,219	0,170						
$\delta_{N\infty,cr}$ - factor	Long term displacement in **Cracked Concrete**	40°/24°C	[mm/MPa]	0,105	0,105						
		80°/50°C		0,255	0,245						
		120°/72°C		0,255	0,245						

[1] Calculation of the displacement: $\delta N0 = \delta_{N0}$- factor · τ; τ: action bond stress for tension
$\delta N\infty = \delta_{N\infty}$- factor · τ.

Displacements under SHEAR load (threaded rod) [1]			M8	M10	M12	M16	M20	M24	M27	M30
$\delta_{V0,ucr}$ - factor	Short term displacement in **Normal Concrete**	[mm/kN]	0,06	0,06	0,05	0,04	0,04	0,03	0,03	0,03
$\delta_{V\infty,ucr}$ - factor	Long term displacement in **Normal Concrete**		0,09	0,08	0,08	0,06	0,06	0,05	0,05	0,05
$\delta_{V0,cr}$ - factor	Short term displacement in **Cracked Concrete**	[mm/kN]	0,12	0,12	0,11	0,10	0,09	0,08	0,08	0,07
$\delta_{V\infty,cr}$ - factor	Long term displacement in **Cracked Concrete**		0,18	0,18	0,17	0,15	0,14	0,13	0,12	0,10

[1] Calculation of the displacement: $\delta V0 = \delta_{V0}$- factor · V ; V: action shear load
$\delta V\infty = \delta_{V\infty}$- factor · V.

ANNEX IV°

Declared Performances as ETA-08/0383 and EAD 330499-01-0601
Design method as EN 1992-4:2018

ESSENTIAL CHARACTERISTICS				PERFORMANCE								
d	**REBAR**			**Ø8**	**Ø 10**	**Ø 12**	**Ø 14**	**Ø 16**	**Ø 20**	**Ø 25**	**Ø 28**	**Ø 32**
d_0	Nominal diameter of drill bit		[mm]	12	14	16	18	20	24	32	35	40
h_{ef}	Effective embedment depth	$h_{ef,min}$	[mm]	60	60	70	75	80	90	100	112	128
		$h_{ef,std}$	[mm]	80	90	110	115	125	170	210	250	270
		$h_{ef,max}$	[mm]	160	200	240	280	320	400	500	580	640
h_{min}	Minimum thickness of the concrete member		[mm]	$h_{ef} + 30 \geq 100$		$h_{ef} + 2d_0$						
s_{min}	Minimum spacing		[mm]	40	50	60	70	80	100	125	140	160
c_{min}	Minimum edge distance		[mm]	40	50	60	70	80	100	125	140	160
TENSION Steel failure												
$N_{Rk,s}$	Tension Steel charact. failure		[kN]	$A_s \times f_{uk}$ [1]								
$N_{Rk,s,eq,C1}$	Tension Steel charact. failure Cat. Seismic **C1**		[kN]	$1,0 \times A_s \times f_{uk}$ [1]								
A_s	Area resistant		[mm²]	50	79	113	154	201	314	491	616	804
$\gamma_{Ms,N}$ [2]	Partial safety factor		[-]	1,4								
Combined pull-out and concrete failure: "DRY-WET"				**Ø8**	**Ø 10**	**Ø 12**	**Ø 14**	**Ø 16**	**Ø 20**	**Ø 25**	**Ø 28**	**Ø 32**
$\tau_{Rk,ucr}$	Characteristic bond resistance for **un-cracked concrete** C20/25	40°/24°C	[MPa]	**10**	**12**	**12**	**12**	**12**	**12**	**11**	**10**	**8,5**
		80°/50°C	[MPa]	**7,5**	**9**	**9**	**9**	**9**	**9**	**8**	**7**	**6**
		120°/72°C	[MPa]	**5,5**	**6,5**	**6,5**	**6,5**	**6,5**	**6,5**	**6**	**5**	**4,5**
$\tau_{Rk,cr}$	Characteristic bond resistance for **Cracked concrete** C20/25	40°/24°C	[MPa]	**4**	**5**	**5,5**	**5,5**	**5,5**	**5,5**	**5,5**	**6,5**	**6,5**
		80°/50°C	[MPa]	**2,5**	**3,5**	**4**	**4**	**4**	**4**	**4**	**4,5**	**4,5**
		120°/72°C	[MPa]	**2**	**2,5**	**3**	**3**	**3**	**3**	**3**	**3,5**	**3,5**
$\tau_{Rk,seis,C1}$	Characteristic bond resistance for **Cat. Seismic C1** C20/25	40°/24°C	[MPa]	**2,5**	**3,1**	**3,7**	**3,7**	**3,7**	**3,7**	**3,8**	**4,5**	**4,5**
		80°/50°C	[MPa]	**1,6**	**2,2**	**2,7**	**2,7**	**2,7**	**2,7**	**2,8**	**3,1**	**3,1**
		120°/72°C	[MPa]	**1,3**	**1,6**	**2**	**2**	**2**	**2**	**2,1**	**2,4**	**2,4**
Combined pull-out and concrete failure: "FLOODED HOLES"												
$\tau_{Rk,ucr}$	Characteristic bond resistance for **un-cracked concrete** C20/25	40°/24°C	[MPa]	7,5	8,5	8,5	8,5	8,5	(NPD)			
		80°/50°C	[MPa]	5,5	6,5	6,5	6,5	6,5				
		120°/72°C	[MPa]	4	5	5	5	5				
$\tau_{Rk,cr}$	Characteristic bond resistance for **Cracked concrete** C20/25	40°/24°C	[MPa]	4	4	5,5	5,5	5,5	(NPD)			
		80°/50°C	[MPa]	2,5	3	4	4	4				
		120°/72°C	[MPa]	2	2,5	3	3	3				
$\tau_{Rk,eq,C1}$	Characteristic bond resistance for **Cat. Seismic C1** C20/25	40°/24°C	[MPa]	2,5	2,5	3,7	3,7	3,7	(NPD)			
		80°/50°C	[MPa]	1,6	1,9	2,7	2,7	2,7				
		120°/72°C	[MPa]	1,3	1,6	2	2	2				
ψ^0_{sus}	Reduction factor for C20/25 cracked, un-cracked concrete and Seismic Category	40°/24°C	[-]	0,73								
		80°/50°C	[-]	0,65								
		120°/72°C	[-]	0,57								
ψ_c	Increasing factor for concrete (Seismic Category)	da C25/30 a C50/60	[-]	1,0								
Concrete Cone failure												
$K_{cr,N}$	Factor acc. to EN 1992-4 § 7.2.1.4 cracked		[-]	7,7								
$K_{ucr,N}$	Factor acc. to EN 1992-4 § 7.2.1.4 un-cracked		[-]	11,0								
$c_{cr,N}$	Critical edge distance		[mm]	$1,5 \times h_{ef}$								
$s_{cr,N}$	Critical spacing		[mm]	$2,0 \times C_{cr,N}$								
Splitting failure												
$c_{cr,sp}$	Critical edge distance for Splitting	$h/h_{ef} \geq 2,0$	[mm]	$1,0 \times h_{ef}$								
		$2,0 > h/h_{ef} > 1,3$	[mm]	$2 \times h_{ef} (2,5 - h/h_{ef})$								
		$h/h_{ef} \leq 1,3$	[mm]	$2,4 \times h_{ef}$								
$s_{cr,sp}$	Critical spacing for Splitting			$2,0 \times C_{cr,sp}$								
γ_{inst}	Installation safety factor for dry and wet concrete			1,2								
γ_{inst}	Installation safety factor for flooded holes			1,4					(NPD)			

[1] f_{uk} shall be taken from the specifications of reinforcing bars;
[2] In absence of other national regulations.

ANNEX V°

Declared Performances as ETA-08/0383 and EAD 330499-01-0601
Design method as EN 1992-4:2018

ESSENTIAL CHARACTERISTICS			PERFORMANCE								
d	**REBAR**		**Ø8**	**Ø 10**	**Ø 12**	**Ø 14**	**Ø 16**	**Ø 20**	**Ø 25**	**Ø 28**	**Ø 32**
SHEAR Steel failure											
$V_{Rk,s}$	Shear Steel charact. failure	[kN]	0,5 x A_s x f_{uk} [1]								
$V_{Rk,s,seis,C1}$	Shear Steel charact. failure Cat. Seismic **C1**	[kN]	0,35 x A_s x f_{uk} [1]								
A_s	Area resistant	[mm²]	50	79	113	154	201	314	491	616	804
$M^0_{Rk,s}$	Charact. Bending Moment	[Nm]	1,2 x W_{el} x f_{uk} [1]								
$M^0_{Rk,s\ seis,C1}$	Charact. Bending Moment Cat. Seismic **C1**	[Nm]	(NPD)								
W_{el}	Elastic section modulus	[mm³]	50	98	170	269	402	785	1534	2155	3217
$\gamma_{m,sV}$ [2]	Partial safety factor	[-]	1,5								
Concrete Pryout failure											
k_8	Factor acc. to EN 1992-4 § 7.2.2.4	[-]	2,0								
γ_{inst}	Installation safety factor	[-]	1,0								
Concrete Edge failure											
l_f	Effective length of anchor	[-]	min (h_{ef}; 12xd_{nom})						min (h_{ef}; 300mm)		
d_{nom}	Outside diameter of anchor	[mm]	8	10	12	14	16	20	25	28	32
γ_{inst}	Installation safety factor	[-]	1,0								
α_{gap}	Factor for anular gap	[-]	0,5 (1,0) [3]								

[1] f_{uk} shall be taken from the specifications of reinforcing bars;
[2] In absence of other national regulations;
[3] Value in brackets valid for filled annular gab between anchor and clearance hole in the fixture. Use of special filling washer Annex A3 of ETA-08/0383 is required.

Displacements under TENSION load (rebar) [1]				**Ø8**	**Ø 10**	**Ø 12**	**Ø 14**	**Ø 16**	**Ø 20**	**Ø 25**	**Ø 28**	**Ø 32**
$\delta_{N0,ucr}$ -factor	Short term displacement in **Normal Concrete**	40°/24°C	[mm/MPa]	0,021	0,023	0,026	0,028	0,031	0,036	0,043	0,047	0,052
		80°/50°C		0,050	0,056	0,063	0,069	0,075	0,088	0,104	0,113	0,126
		120°/72°C		0,050	0,056	0,063	0,069	0,075	0,088	0,104	0,113	0,126
$\delta_{N\infty,ucr}$ - factor	Long term displacement in **Normal Concrete**	40°/24°C	[mm/MPa]	0,030	0,033	0,037	0,041	0,045	0,052	0,061	0,071	0,075
		80°/50°C		0,072	0,081	0,090	0,099	0,108	0,127	0,149	0,163	0,181
		120°/72°C		0,072	0,081	0,090	0,099	0,108	0,127	0,149	0,163	0,181
$\delta_{N0,cr}$ - factor	Short term displacement in **Cracked Concrete**	40°/24°C	[mm/MPa]	0,090					0,070			
		80°/50°C		0,219					0,170			
		120°/72°C		0,219					0,170			
$\delta_{N\infty,cr}$ - factor	Long term displacement in **Cracked Concrete**	40°/24°C	[mm/MPa]	0,105					0,105			
		80°/50°C		0,255					0,245			
		120°/72°C		0,255					0,245			

[1] Calculation of the displacement: $\delta N0 = \delta_{N0}$- factor · τ; τ: action bond stress for tension
$\delta N\infty = \delta_{N\infty}$- factor · τ.

Displacements under SHEAR load (rebar) [1]			**Ø8**	**Ø 10**	**Ø 12**	**Ø 14**	**Ø 16**	**Ø 20**	**Ø 25**	**Ø 28**	**Ø 32**
$\delta_{V0,ucr}$ - factor	Short term displacement in **Normal Concrete**	[mm/kN]	0,06	0,05	0,05	0,04	0,04	0,04	0,03	0,03	0,03
$\delta_{V\infty,ucr}$ - factor	Long term displacement in **Normal Concrete**		0,09	0,08	0,08	0,06	0,06	0,05	0,05	0,04	0,04
$\delta_{V0,cr}$ - factor	Short term displacement in **Cracked Concrete**	[mm/kN]	0,12	0,12	0,11	0,11	0,10	0,09	0,08	0,08	0,07
$\delta_{V\infty,cr}$ - factor	Long term displacement in **Cracked Concrete**		0,18	0,18	0,17	0,16	0,15	0,14	0,12	0,11	0,10

[1] Calculation of the displacement: $\delta V0 = \delta_{V0}$- factor · V ; V: action shear load
$\delta V\infty = \delta_{V\infty}$- factor · V.

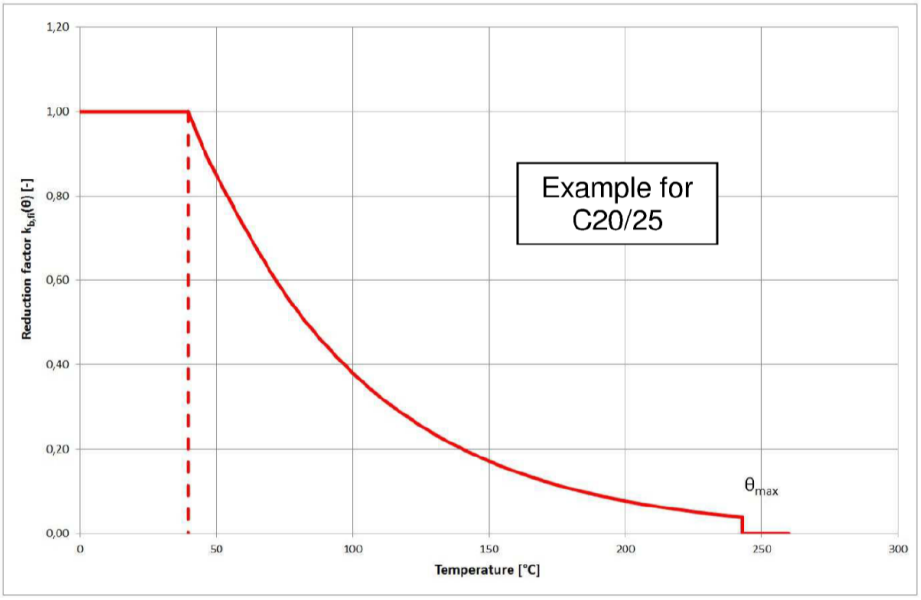
ANNEX VI°

Declared Performances as ETA-12/0553 and EAD 330087-00-0601
Design method as EN 1992-1-1:2004+AC:2010 and ETA-12/0553

ESSENTIAL CHARACTERISTICS				PERFORMANCE										
d	**POST-INSTALLED REBAR**			**Ø8**	**Ø10**	**Ø12**	**Ø14**	**Ø16**	**Ø20**	**Ø22**	**Ø24**	**Ø25**	**Ø28**	**Ø32**
d_0	Nominal diameter of drill bit		[mm]	12	14	16	18	20	25	28	32	32	35	40
$\ell_{v,MAX}$	Maximum embedment depth		[mm]	see table B2 of ETA-12/0553										
$\ell_{b,min}$	Minimum anchorage length		[mm]	§ 8.6 - § 8.7 EN 1992-1-1:2004+AC2010										
$\ell_{0,min}$	Lap length		[mm]	§ 8.11 EN 1992-1-1:2004+AC2010										
α_{lb}	Amplification Factor for $\ell_{b,min}$ and $\ell_{0,min}$		[-]	1,0										
c [1) 2)]	Minimum concrete cover min c	Without drilling Aid – hammer drilling HD	[mm]	30 mm + 0,06•l_v ≥ 2•Ø								40 mm + 0,06•l_v ≥ 2•Ø		
		Without drilling Aid – compr. air drilling CD	[mm]	50 mm + 0,08•l_v								60 mm + 0,08•l_v		
		With drilling Aid – hammer drilling HD	[mm]	30 mm + 0,02•l_v ≥ 2•Ø								40 mm + 0,02•l_v ≥ 2•Ø		
		With drilling Aid – compr. air drilling CD	[mm]	50 mm + 0,02•l_v								60 mm + 0,02•l_v		
s_{min}	Minimum spacing		[mm]	≥ 5•Ø ≥ 50 mm										
Design values of ultimate bond resistance														
f_{bd}	**Bond design value resistance** *"for all drilling methods for good conditions"*	C12/15	[N/mm²]	**1,6**										
		C16/20	[N/mm²]	**2,0**										
		C20/25	[N/mm²]	**2,3**										
		C25/30	[N/mm²]	**2,7**										
		C30/37	[N/mm²]	**3,0**										
		C35/45	[N/mm²]	**3,4**										
		C40/50	[N/mm²]	**3,7**										
		C45/55	[N/mm²]	**4,0 (3,7** for **Ø28÷32)**										
		C50/60	[N/mm²]	**4,3 (3,7** for **Ø28÷32)**										
$f_{bd,c}$	*"for all other bond conditions"*		[N/mm²]	f_{bd} • 0,7										
FIRE EXPOSURE Design method as **EN 1992-1-1:2004+AC:2008**														
$f_{bd,fi}$	**Bond design value resistance Under fire exposure**		[N/mm²]	[3)] $f_{bd,fi} = k_{fi}(\theta) \cdot f_{bd} \cdot \gamma_c / \gamma_{Mfi}$										

1) Not allowed Diamond Drilling
2) The minimum concrete cover acc. EC 1992-1-1:2004+AC:2010 must be observed
3) With: $k_{b,fi}(\theta)$ = reduction factor under fire exposure (see graphics below)
   f_{bd} = see table above
   γ_c = partial safety factor acc.to EN 1992-1-1
   $\gamma_{M,fi}$ = partial safety factor acc.to EN 1992-1-2 under fire exposure

Example graph of Reduction factor $k_{b,fi}(\theta)$ for concrete classes C20/25 for good bond conditions:



ANNEX VII°

Declared Performances as ETA-12/0543 and ETAG029
Design method as TR054

ESSENTIAL CHARACTERISTICS					PERFORMANCE					
Installation parameters				**SOLID MASONRY**	**M8**		**M10**		**M12**	
d_0	Nominal diameter of drill bit			[mm]	10		12		14	
h_{ef}	Effective embedment depth			[mm]	80		90		100	
T_{inst}	Torque moment (max)			[Nm]	2					
Characteristic resistance to TENSILE and SHEAR loads [2]					M8		M10		M12	
Type[3]	density [Kg/dm³]	compress. [N/mm²]	Range temperature		$N_{Rk,b}$ (tensile)	$V_{Rk,b}$ (shear)	$N_{Rk,b}$ (tensile)	$V_{Rk,b}$ (shear)	$N_{Rk,b}$ (tensile)	$V_{Rk,b}$ (shear)
Solid Brick [3]	ρ ≥ 1,6	**f_b ≥ 10**	40°/24°C	[kN]	3,5	3,5	3,5	3,5	4,0	3,5
			80°/50°C	[kN]	3,5		3,5		4,0	
			120°/72°C	[kN]	2,5		3,0		3,5	
	ρ ≥ 1,6	**f_b ≥ 28**	40°/24°C	[kN]	5,5	5,5	6,0	5,5	7,0	5,5
			80°/50°C	[kN]	5,5		6,0		7,0	
			120°/72°C	[kN]	4,5		5,0		6,0	
γ_M [1]	Partial safety factor			[-]	2,5					
Installation parameters				**HOLLOW MASONRY "with bussola"**	**M8**		**M10**		**M12**	
d_0	Nominal diameter of drill bit			[mm]	12		16		20	
h_{ef}	Effective embedment depth			[mm]	80		85		85	
T_{inst}	Torque moment (max)			[Nm]	2					
Characteristic resistance to TENSILE and SHEAR loads [2]					M8		M10		M12	
Type[3]	density [Kg/dm³]	compress. [N/mm²]	Range temperature		$N_{Rk,b}$ (tensile)	$V_{Rk,b}$ (shear)	$N_{Rk,b}$ (tensile)	$V_{Rk,b}$ (shear)	$N_{Rk,b}$ (tensile)	$V_{Rk,b}$ (shear)
Brick Doppio UNI[3]	ρ ≥ 1,2	**f_b ≥ 28**	40°/24°C	[kN]	1,2	2,5	1,2	2,5	1,2	2,5
			80°/50°C	[kN]	1,2		1,2		1,2	
			120°/72°C	[kN]	0,9		0,9		0,9	
Brick Forato leggero[3]	ρ ≥ 0,8	**f_b ≥ 6**	40°/24°C	[kN]	0,5	2,5	0,5	2,5	0,5	2,5
			80°/50°C	[kN]	0,5		0,5		0,5	
			120°/72°C	[kN]	0,4		0,4		0,4	
γ_M [1]	Partial safety factor			[-]	2,5					

[1] In absence of other national regulations;
[2] Resistance values valid with Ccr edge distances, see ETA-12/0543 even for shorter distances;
[3] See ETA-12/0543 for the description of bricks and for use on other types of bricks.