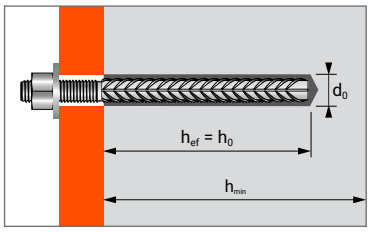
VIPER XTREM

ETA - 17/0514
*ETA - 17/0513

Vinylester resin for starter bar fastenings, for use in cracked & non-cracked concrete and seismic performance C1 category



CHARACTERISTICS

TROPICAL VERSION

WRAS APPROVED PRODUCT · BREEAM tested · LEED tested · EC2

APPLICATION

- Starter bar fastenings in non-reinforced concrete
- Connections for shear loads

FIELD OF USE

Shelf life : 18 months
Installation temperature: -10°C / +40°C
In-Service temperature range:
- Range 1: -40°C / +40°C
- Range 2: -40°C /+80°C

Installation conditions:
- Category 1: Dry or wet concrete
- Category 2: Flooded holes

TECHNICAL DATA

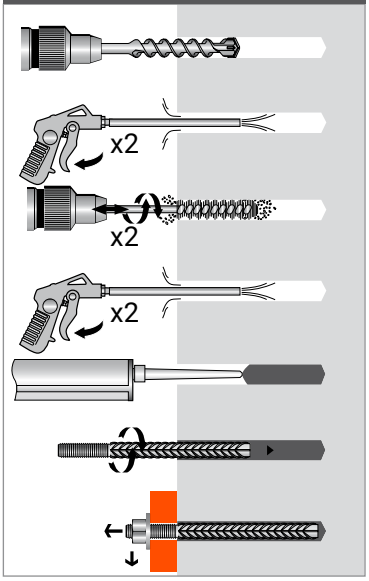
SIZE	Minimum anchor depth (mm) h_{ef} min	Maximum anchor depth (mm) h_{ef} max	Minimum thickness of base material (mm) h_{min}	Drilling diameter (mm) d_0
Ø8	56	160	h_{ef} + 30 mm ≥ 100 mm	10
Ø10	70	200		12
Ø12	84	240		15
Ø16	112	320	$h_{ef} + 2d_0$	18
Ø20	140	400		25
VIPER XTREM cartridge 280 ml				060187
VIPER XTREM cartridge 410 ml				060189 / 060188
VIPER XTREM TR cartridge (Tropical version) 410 ml				060201
VIPER XTREM cartridge 825 ml				060190

MECHANICAL CHARACTERISTICS

NOMINAL DIAMETER			Ø8	Ø10	Ø12	Ø16	Ø20
Sections	[cm²]		0,503	0,785	1,13	2,01	3,14
Min. resistance to failure	[kN]	Fe E400	21,13	32,97	47,46	84,42	131,88
		Fe E500	25,90	40,43	58,20	103,52	161,71
Ultimate limit load N_{Rd}	[kN]	Fe E500	21,85	34,15	49,17	87,42	136,59

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

INSTALLATION



* PREMIUM CLEANING:
- 2 blowing with compressed air
- 2 brushing with brushed fitted on a drilling machine
- 2 blowing with compressed air

SETTING TIME

TEMPERATURE	MAX. TIME FOR INSTALLATION		CURING TIME	
	Standard version	Tropical version	Standard version	Tropical version
-10°C ▸ -5°C	90 min.	-	24 h	-
-4°C ▸ 0°C	50 min.	-	240 min.	-
1°C ▸ 5°C	25 min.	60 min.	120 min.	240 min.
6°C ▸ 10°C	15 min.	40 min.	90 min.	180 min.
11°C ▸ 20°C	7 min.	15 min.	60 min.	120 min.
21°C ▸ 30°C	4 min.	8 min.	45 min.	60 min.
31°C ▸ 40°C	2 min.	4 min.	30 min.	60 min.

CHEMICAL RESISTANCE OF THE SPIT VIPER RESIN

CHEMICAL SUBSTANCES	CONCENTRATION %	RESISTANCE	CHEMICAL SUBSTANCES	CONCENTRATION %	RESISTANCE
Acetic acid	50-75	(o)	Heptane	100	(+)
Acetic acid	0-50	(+)	Hexane	100	(o)
Acetone	10	(+)	Hydrochloric acid	25	(o)
Ammonium hydroxide or Ammoniac	20	(o)	Hydrochloric acid	15	(+)
Ammonium hydroxide or Ammoniac	5	(+)	Lactic acid	0-100	(+)
Bromine water	5	(+)	Nitric acid	5-15	(o)
Chlorine water	0-100	(+)	Phosphoric acid	80	(+)
Citric acid	0-100	(+)	Phosphoric acid, vapor and condensed		(+)
Concentrated phosphoric acid	100	(+)	Sea water	0-100	(+)
Deionized water	0-100	(+)	Sodium carbonate	10	(+)
Demineralized water		(+)	Sodium chloride	0-100	(+)
Diesel fuel	0-100	(+)	Sodium hydroxide (or Caustic soda)	25	(o)
Ethyl alcohol (Ethanol)	10	(o)	Sulphuric acid	71-75	(o)
Ethylene glycol	0-100	(+)	Sulphuric acid	0-70	(+)
Formic acid	10	(+)	Sulphuric acid	Fumes	(+)
Fuel	100	(+)	Sulphuric acid / Phosphoric acid	10:20	(+)
Heavy motor oil	100	(+)	Turpentine (oil)		(o)

Resistant (+): the samples in contact with the substances did not show any Screwible damage such as cracks, attacked surfaces, burst corners nor large swelling. Sensitive (o): use with care regarding exposure of the field of usage, precautions to be taken. The samples in contact with the substance slightly attacked the material.

VIPER XTREM

MINIMUM THICKNESS OF CONCRETE, CHARATERISTIC & MINIMUM DISTANCES FOR SPACING, EDGE

SIZE			Ø8	Ø10	Ø12	Ø16	Ø20
Anchorage depth	h_{ef}	[mm]	80	100	120	160	200
Minimum thickness of base material	h_{min}	[mm]	110	130	150	200	250
Characteristic edge and spacing distance for full anchor capacity	$C_{cr} \geq$	[mm]	120	150	180	240	300
	$S_{cr} \geq$	[mm]	240	300	360	480	600
Minimum distances for cracked and non-cracked concrete	C_{min}	[mm]	40	50	60	80	100
	$S \geq$	[mm]	40	50	60	80	100
	S_{min}	[mm]	40	50	60	80	100
	$C \geq$	[mm]	40	50	60	80	100

CHARACTERISTIC RESISTANCES [kN]

Characteristic resistances are shown as informative, and have to be used by application of safety factors .

In tensile loads, the table below shows bond strength in N/mm². All dimensions can be installed with embedment length between 7d to 20d.

The characteristic tensile load is determined with the formular : $N^0_{Rk,p} = \Pi.d\ h_{ef}\ .\ \tau_{Rk}$

TENSILE

NON-CRACKED CONCRETE – C20/25

SIZE		Ø8	Ø10	Ø12	Ø16	Ø20
$h_{ef\ min}$	[mm]	56	70	84	112	140
$h_{ef\ max}$	[mm]	160	200	240	320	400
Rebar Fe E500						
$\tau_{Rk,uncr}$	[N/mm²]	13,0	13,0	13,0	13,0	13,0

CRACKED CONCRETE – C20/25

SIZE		Ø8	Ø10	Ø12	Ø16	Ø20
$h_{ef\ min}$	[mm]	56	70	84	112	140
$h_{ef\ max}$	[mm]	160	200	240	320	400
Rebar Fe E500						
$\tau_{Rk,cr}$	[N/mm²]	5,0	5,0	5,5	5,5	6,0

SHEAR

CRACKED AND NON-CRACKED CONCRETE – C20/25 to C50/60

SIZE		Ø8	Ø10	Ø12	Ø16	Ø20
$h_{ef\ min}$	[mm]	56	70	84	112	140
$h_{ef\ max}$	[mm]	160	200	240	320	400
Rebar Fe E500						
V_{Rks}	[kN]	*14,0*	*22,0*	*31,0*	*55,0*	*86,0*

RECOMMENDED LOADS OF ONE ANCHOR WITHOUT INFLUENCE OF SPACING & CONCRETE EDGE [kN]

Recommended values are determined from performances given in the ETA, and are guaranteed for spacing ≥ S_{cr} and edge distance ≥ C_{cr}.

TENSILE

NON-CRACKED CONCRETE – C20/25

SIZE		Ø8	Ø10	Ø12	Ø16	Ø20
h_{ef}	[mm]	80	100	120	160	200
Rebar Fe E500						
N_{Rec}	[kN]	12,4	19,4	28,0	47,4	66,3

CRACKED CONCRETE – C20/25

SIZE		Ø8	Ø10	Ø12	Ø16	Ø20
h_{ef}	[mm]	80	100	120	160	200
Rebar Fe E500						
N_{Rec}	[kN]	4,8	7,5	11,8	21,1	35,9

$N_{Rec} = \min [N_{Rd,p} ; N_{Rd,c;} N_{Rd,s}] / \gamma_F ; \gamma_F = 1,4$

SHEAR

CRACKED AND NON-CRACKED CONCRETE – C20/25 to C50/60

SIZE		Ø8	Ø10	Ø12	Ø16	Ø20
h_{ef}	[mm]	80	100	120	160	200
Rebar Fe E500						
V_{Rec}	[kN]	*6,7*	*10,5*	*14,8*	*26,2*	*41,0*

$V_{Rec} = V_{Rd,s} / \gamma_F ; \gamma_F = 1,4$

Nota: The values indicated *in italics and underlined* correspond to steel failure

VIPER XTREM

i-Expert Software

Design resistances for static and seismic loads are determined from performances given in the ETA, and are guaranteed for spacing ≥ S_{cr} and edge distance ≥ C_{cr}. For project with reduced spacing and edge distance, we recommend to use SPIT i-Expert software to design your project according to EN 1992-4.

DESIGN RESISTANCE FOR STATIC LOADS IN NON CRACKED CONCRETE [kN]

TENSILE

SIZE			Ø8	Ø10	Ø12	Ø16	Ø20
h_{ef}	[mm]		80	100	120	160	200
Rebar Fe E500							
$N_{Rd,uncr}$	[kN]	C20/25	17,4	27,2	39,2	66,4	92,8
$N_{Rd,uncr}$	[kN]	C40/50	18,6	29,1	42,0	74,6	116,5

Distances S_{cr} and C_{cr} must be fulfilled

$N_{Rd,uncr} = \min[N_{Rk,p,uncr} / \gamma_{Mc} ; N_{Rk,s} / \gamma_{Ms,N}]$

$\gamma_{Mc} = 1,5$

Rebar Fe E500: $\gamma_{Ms,N} = 1,4$

SHEAR

SIZE			Ø8	Ø10	Ø12	Ø16	Ø20
h_{ef}	[mm]		80	100	120	160	200
Rebar Fe E500							
$V_{Rd,s}$	[kN]	≥C20/25	*9,3*	*14,7*	*20,7*	*36,7*	*57,3*

$V_{Rd,s} = V_{Rk,s} / \gamma_{Ms,V}$

Rebar Fe E500: $\gamma_{Ms,V} = 1,5$

DESIGN RESISTANCE FOR STATIC LOADS IN CRACKED CONCRETE [kN]

TENSILE

SIZE			Ø8	Ø10	Ø12	Ø16	Ø20
h_{ef}	[mm]		80	100	120	160	200
Rebar Fe E500							
$N_{Rd,cr}$	[kN]	≥C20/25	6,7	10,5	16,6	29,5	50,3

Distances S_{cr} and C_{cr} must be fulfilled

$N_{Rd,cr} = \min[N_{Rk,p,cr} / \gamma_{Mc} ; N_{Rk,s} / \gamma_{Ms,N}]$

$\gamma_{Mc} = 1,5$

Rebar Fe E500: $\gamma_{Ms,N} = 1,4$

SHEAR

SIZE			Ø8	Ø10	Ø12	Ø16	Ø20
h_{ef}	[mm]		80	100	120	160	200
Rebar Fe E500							
$V_{Rd,s}$	[kN]	≥C20/25	*9,3*	*14,7*	*20,7*	*36,7*	*57,3*

$V_{Rd,s} = V_{Rk,s} / \gamma_{Ms,V}$

Rebar Fe E500: $\gamma_{Ms,V} = 1,5$

DESIGN RESISTANCE FOR SEISMIC LOADS CATEGORY C1 [kN]

TENSILE

SIZE			Ø8	Ø10	Ø12	Ø16	Ø20
h_{ef}	[mm]		80	100	120	160	200
Rebar Fe E500							
$N_{Rd,C1}$	[kN]	C20/25	4,7	8,0	16,6	29,5	50,3

Distances S_{cr} and C_{cr} must be fulfilled

$N_{Rd,C1} = \min[N_{Rk,p,eq,C1} / \gamma_{Mc} ; N_{Rk,s,eq,C1} / \gamma_{Ms,N}]$

$\gamma_{Mc} = 1,5$

Rebar Fe E500: $\gamma_{Ms,N} = 1,4$

SHEAR

SIZE			Ø8	Ø10	Ø12	Ø16	Ø20
h_{ef}	[mm]		80	100	120	160	200
Rebar Fe E500							
$V_{Rd,s,C1}$	[kN]	≥C20/25	*3,3*	*5,1*	*7,2*	*12,8*	*20,1*

$V_{Rd,s,C1} = V_{Rk,s,eq,C1} / \gamma_{Ms,V}$

Rebar Fe E500: $\gamma_{Ms,V} = 1,5$

Nota: The values indicated *in italics and underlined* correspond to steel failure