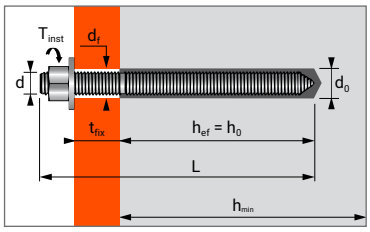
VIPER XTREM

ETA - 17/0514
*ETA - 17/0513

Vinylester resin, for use in cracked and non-cracked concrete and seismic performance category C1



CHARACTERISTICS

Zn ZINC COATED STEEL
A4 STAINLESS STEEL
TR TROPICAL VERSION
XTREM
WRAS APPROVED PRODUCT
BREEAM tested
LEED tested
GEV-EMICODE EC2 low emission

APPLICATION

- Steel profiles
- Fixing machinery (resistant to vibration)
- Storage tanks, pipes
- Signs
- Guard rails
- Electrical insulated fixings

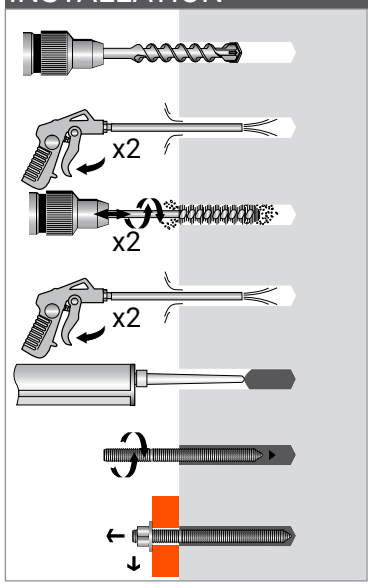
* ETA - 17/0513: for post-installed rebars applications

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

INSTALLATION



TECHNICAL DATA

RANGE	Min. anchor depth (mm) h_{ef}	Max. thick. of part to be fixed (mm) t_{fix}	Min. thick of base material (mm) h_{min}	Thread diameter (mm) d	Drilling depth (mm) h_0	Drilling diameter (mm) d_0	Clearance diameter (mm) d_f	Total anchor length (mm) L	Tighten torque (Nm) T_{inst}	Code[1] SPIT stud zinc coated steel	Code[1] SPIT stud stainless steel A4
M8X110	80	15	110	8	80	10	9	110	10	060215	060222
M10X130	90	20	120	10	90	12	12	130	20	060216	060223
M12X160	110	25	140	12	110	14	14	160	30	060217	060224
M16X190	125	35	160	16	125	18	18	190	60	060218	060225
M20X260	170	65	220	20	170	25	22	260	120	060219	060226
M24X300	210	63	265	24	210	28	26	300	200	060220	060227
M30X380	280	70	350	30	280	35	33	380	400	060221	-
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	

[1]These are SPIT Studs, for standard Studs (zinc coated or stainless steel versions) see catalogue.

ANCHOR MECHANICAL PROPERTIES

SIZE			M8	M10	M12	M16	M20	M24	M30
SPIT Studs									
f_{uk}	[N/mm²]	Min. tensile strength	600	600	600	600	520	520	520
f_{yk}	[N/mm²]	Yield strength	420	420	420	420	420	420	420
$M^0_{Rk,s}$	[Nm]	Characteristic bending moment	22	45	79	200	301	520	1052
Studs Grade 8.8									
f_{uk}	[N/mm²]	Min. tensile strength	800	800	800	800	800	800	800
f_{yk}	[N/mm²]	Yield strength	640	640	640	640	640	640	640
$M^0_{Rk,s}$	[Nm]	Characteristic bending moment	30	60	105	266	519	898	1799
Studs Grade A4-70									
f_{uk}	[N/mm²]	Min. tensile strength	700	700	700	700	700	700	-
f_{yk}	[N/mm²]	Yield strength	350	350	350	350	350	350	-
$M^0_{Rk,s}$	[Nm]	Characteristic bending moment	26	52	92	233	454	786	-

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			M8	M10	M12	M16	M20	M24	M30
Anchorage depth	h_{ef}	[mm]	80	90	110	125	170	210	280
Minimum thickness of base material	h_{min}	[mm]	110	120	140	160	220	265	350
Characteristic edge and spacing distance for full anchor capacity	$C_{cr} \geq$	[mm]	80	90	110	125	170	210	280
	$S_{cr} \geq$	[mm]	160	180	220	250	340	420	560
Minimum distances for cracked and non-cracked concrete	C_{min}	[mm]	40	45	45	50	55	60	80
	$S \geq$	[mm]	40	50	60	75	90	115	140
	S_{min}	[mm]	40	50	60	75	90	115	140
	$C \geq$	[mm]	40	45	45	50	55	60	80

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		M8	M10	M12	M16	M20	M24	M30
$h_{ef\ min}$	[mm]	56	70	84	112	140	168	210
$h_{ef\ max}$	[mm]	160	200	240	320	400	480	360
$\tau_{Rk,uncr}$	[N/mm²]	15	15	15	13	11	10	8,5

CRACKED CONCRETE – C20/25

SIZE		M8	M10	M12	M16	M20	M24	M30
$h_{ef\ min}$	[mm]	40	40	48	64	80	96	120
$h_{ef\ max}$	[mm]	160	200	240	320	400	480	600
$\tau_{Rk,cr}$	[N/mm²]	6,5	6,5	6,5	6,5	6,5	6,5	6,0

SHEAR

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

SIZE		M8	M10	M12	M16	M20	M24	M30
$h_{ef\ min}$	[mm]	56	70	84	112	140	168	210
$h_{ef\ max}$	[mm]	160	200	240	320	400	480	360
SPIT studs								
$V_{Rk,s}$	[kN]	*9,2*	*15,0*	*21,0*	*39,0*	*61,0*	*88,0*	*140,0*
Studs Grade 8.8								
$V_{Rk,s}$	[kN]	*15,0*	*23,0*	*34,0*	*63,0*	*98,0*	*141,0*	*224,0*
Studs Grade A4-70								
$V_{Rk,s}$	[kN]	*13,0*	*20,0*	*30,0*	*55,0*	*86,0*	*124,0*	*140,0*

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		M8	M10	M12	M16	M20	M24	M30
h_{ef}	[mm]	80	90	110	125	170	210	280
SPIT Studs								
N_{Rec}	[kN]	*8,7*	*13,8*	*20,1*	32,7	51,9	71,3	106,8
Studs Grade 8.8								
N_{Rec}	[kN]	*13,8*	20,0	27,0	32,7	51,9	71,3	106,8
Studs Grade A4-70								
N_{Rec}	[kN]	*9,9*	*15,7*	*22,5*	32,7	51,9	71,3	*70,2*

CRACKED CONCRETE – C20/25

SIZE		M8	M10	M12	M16	M20	M24	M30
h_{ef}	[mm]	80	90	110	125	170	210	280
SPIT Studs								
N_{Rec}	[kN]	6,2	8,8	12,8	19,4	33,1	49,0	75,4
Studs Grade 8.8								
N_{Rec}	[kN]	6,2	8,8	12,8	19,4	33,1	49,0	75,4
Studs Grade A4-70								
N_{Rec}	[kN]	6,2	8,8	12,8	19,4	33,1	49,0	*70,2*

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

SHEAR

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

SIZE		M8	M10	M12	M16	M20	M24	M30
h_{ef}	[mm]	80	90	110	125	170	210	280
SPIT studs								
V_{Rec}	[kN]	*5,1*	*8,6*	*12,0*	*22,3*	*34,9*	*50,3*	*80,0*
Studs Grade 8.8								
V_{Rec}	[kN]	*8,6*	*13,1*	*19,4*	*36,0*	*56,0*	*80,6*	*128,0*
Studs Grade A4-70								
V_{Rec}	[kN]	*6,0*	*9,2*	*13,7*	*25,2*	*39,4*	*56,8*	*64,1*

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

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

VIPER XTREM

i-Expert Software

Design resistances for static, seismic and fire 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			M8	M10	M12	M16	M20	M24	M30
h_{ef}	[mm]		80	90	110	125	170	210	280
SPIT studs		C20/25	*12,2*	*19,3*	*28,1*	45,8	72,7	99,8	149,5
$N_{Rd,uncr}$	[kN]	C40/50	*12,2*	*19,3*	*28,1*	*52,3*	*81,3*	*117,3*	*186,7*
Studs grade 8.8		C20/25	*19,3*	28,0	37,8	45,8	72,7	99,8	149,5
$N_{Rd,uncr}$	[kN]	C40/50	*19,3*	30,3	44,4	58,3	96,3	129,8	197,4
Studs grade A4-70		C20/25	*13,9*	*21,9*	*31,6*	45,8	72,7	99,8	*98,3*
$N_{Rd,uncr}$	[kN]	C40/50	*13,9*	*21,9*	*31,6*	58,3	*92,0*	129,8	*98,3*

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

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

$\gamma_{Mc} = 1,5$

SPIT studs & Studs grade 8.8 : $\gamma_{Ms,N} = 1,5$; Studs grade A4-70 : $\gamma_{Ms,N} = 1,87$

SHEAR

SIZE			M8	M10	M12	M16	M20	M24	M30
h_{ef}	[mm]		80	90	110	125	170	210	280
SPIT studs									
$V_{Rd,s}$	[kN]	≥C20/25	*7,2*	*12,0*	*16,8*	*31,2*	*48,8*	*70,4*	*112,0*
Studs grade 8.8									
$V_{Rd,s}$	[kN]	≥C20/25	*12,0*	*18,4*	*27,2*	*50,4*	*78,4*	*112,8*	*179,2*
Studs grade A4-70									
$V_{Rd,s}$	[kN]	≥C20/25	*8,3*	*12,8*	*19,2*	*35,3*	*55,1*	*79,5*	*89,7*

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

SPIT studs & Studs grade 8.8 : $\gamma_{Ms,V} = 1,25$; Studs grade A4-70 : $\gamma_{Ms,V} = 1,56$

DESIGN RESISTANCE FOR STATIC LOADS IN CRACKED CONCRETE [kN]

TENSILE

SIZE			M8	M10	M12	M16	M20	M24	M30
h_{ef}	[mm]		80	90	110	125	170	210	280
SPIT studs / Studs grade ≥ 5.8 / Studs grade A4-70									
$N_{Rd,cr}$	[kN]	≥C20/25	8,7	12,3	18,0	27,2	46,3	68,6	105,6

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

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

$\gamma_{Mc} = 1,5$

SPIT studs & Studs grade 8.8 : $\gamma_{Ms,N} = 1,5$; Studs grade A4-70 : $\gamma_{Ms,N} = 1,87$

SHEAR

SIZE			M8	M10	M12	M16	M20	M24	M30
h_{ef}	[mm]		80	90	110	125	170	210	280
SPIT studs									
$V_{Rd,s}$	[kN]	≥C20/25	*7,2*	*12,0*	*16,8*	*31,2*	*48,8*	*70,4*	*112,0*
Studs grade 8.8									
$V_{Rd,s}$	[kN]	≥C20/25	*12,0*	*18,4*	*27,2*	*50,4*	*78,4*	*112,8*	*179,2*
Studs grade A4-70									
$V_{Rd,s}$	[kN]	≥C20/25	*8,3*	*12,8*	*19,2*	*35,3*	*55,1*	*79,5*	*89,7*

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

SPIT studs & Studs grade 8.8 : $\gamma_{Ms,V} = 1,25$; Studs grade A4-70 : $\gamma_{Ms,V} = 1,56$

DESIGN RESISTANCE FOR SEISMIC LOADS CATEGORY C1 [kN]

TENSILE

SIZE			M8	M10	M12	M16	M20	M24	M30
h_{ef}	[mm]		80	90	110	125	170	210	280
SPIT studs / Studs grade ≥ 5.8 / Studs grade A4-70									
$N_{Rd,C1}$	[kN]	C20/25	8,0	11,7	18,0	25,6	43,3	59,4	91,4

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

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

$\gamma_{Mc} = 1,5$

SPIT studs & Studs grade 8.8 : $\gamma_{Ms,N} = 1,5$; Studs grade A4-70 : $\gamma_{Ms,N} = 1,87$

SHEAR

SIZE			M8	M10	M12	M16	M20	M24	M30
h_{ef}	[mm]		80	90	110	125	170	210	280
SPIT studs									
$V_{Rd,s,C1}$	[kN]	≥C20/25	*5,1*	*8,1*	*11,8*	*22,0*	*34,2*	*49,3*	*78,4*
Studs grade 8.8									
$V_{Rd,s,C1}$	[kN]	≥C20/25	*8,1*	*12,9*	*18,8*	*35,0*	*56,8*	*82,0*	*130,5*
Studs grade A4-70									
$V_{Rd,s,C1}$	[kN]	≥C20/25	*5,8*	*9,2*	*13,2*	*24,7*	*38,6*	*55,4*	*41,3*

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

SPIT studs & Studs grade 8.8 : $\gamma_{Ms,V} = 1,25$; Studs grade A4-70 : $\gamma_{Ms,V} = 1,56$

DESIGN RESISTANCE FOR FIRE EXPOSURE [kN]

TENSILE

SIZE		M8	M10	M12	M16	M20	M24	M30
h_{ef}	[mm]	80	90	110	125	170	210	280
$N_{Rd,fi}$ R30	[kN]	1,6	2,3	3,1	5,8	9,0	13,0	20,6
$N_{Rd,fi}$ R60	[kN]	1,1	1,7	2,4	4,5	7,1	10,2	16,2
$N_{Rd,fi}$ R90	[kN]	0,5	1,0	1,8	3,3	5,2	7,5	11,9
$N_{Rd,fi}$ R120	[kN]	0,3	0,7	1,5	2,7	4,2	6,1	9,7

$N_{Rd,fi} = N_{Rk,s,fi} / \gamma_{M,fi}$

$\gamma_{M,fi} = 1,0$

SHEAR

SIZE		M8	M10	M12	M16	M20	M24	M30
h_{ef}	[mm]	80	90	110	125	170	210	280
$V_{Rd,fi}$ R30	[kN]	1,6	2,3	3,1	5,8	9,0	13,0	20,6
$V_{Rd,fi}$ R60	[kN]	1,1	1,7	2,4	4,5	7,1	10,2	16,2
$V_{Rd,fi}$ R90	[kN]	0,5	1,0	1,8	3,3	5,2	7,5	11,9
$V_{Rd,fi}$ R120	[kN]	0,3	0,7	1,5	2,7	4,2	6,1	9,7

$V_{Rd,fi} = V_{Rk,s,fi} / \gamma_{M,fi}$

$\gamma_{M,fi} = 1,0$

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