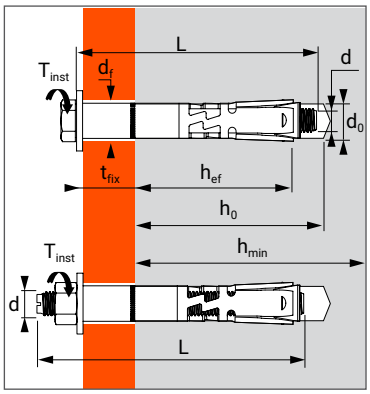
TRIGA Z XTREM

ETA - 05/0044

High security, high performance fixing for use in cracked and non-cracked concrete and seismic performance categories C1 & C2

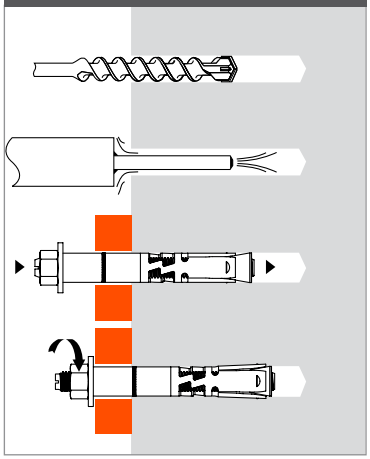


CHARACTERISTICS

APPLICATION

- Safety critical loads
- Overhead crane rails
- Steel columns and walkways
- Wall plates
- Safety rails

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 Ø (mm) d	Drilling depth (mm) h_0	Drilling Ø (mm) d_0	Clear-ance Ø (mm) d_f	Total anchor length (mm) L	Tighten torque (Nm) T_{inst}	Code
V6-10/5	50	5	100	M6	70	10	12	65	15	050673
V6-10/20		20						80		050674
V8-12/1*	60	1	120	M8	80	12	14	65	25	050677
V8-12/10		10						80		050678
V8-12/20		20						90		050679
V8-12/50		50						120		053001
E8-12/20		20						99		050681
E8-12/55		55						134		050684
V10-15/1*	70	1	140	M10	90	15	17	75	50	050687
V10-15/10		10						95		050688
V10-15/20		20						105		050689
V10-15/55		55						140		053003
E10-15/20		20						114		050691
E10-15/35		35						129		050692
E10-15/55		55						149		050693
V12-18/1*	80	1	160	M12	105	18	20	80	80	053905
V12-18/10		10						105		050696
V12-18/25		25						120		050697
V12-18/55		55						150		053004
E12-18/25		25						132		050698
E12-18/45		45						152		050699
E12-18/65		65						172		050701
E12-18/100		100						207		050702
V16-24/10	100	10	200	M16	131	24	26	130	120	050704
V16-24/25		25						145		050705
V16-24/50		50						170		050710
E16-24/25		25						159		050706
E16-24/55		55						189		050707
E16-24/100		100						234		050708
V20-28/25	125	25	250	M20	157	28	31	170	200	050711
E20-28/25		25						192		050712
E20-28/60		60						227		050713
E20-28/100		100						267		050714
TF V8-12/16	60	16	120	M8	80	12	14	85	25	050686
TF V8-12/26	60	26	120	M8	80	12	14	95	25	053002
TF V10-15/27	70	27	140	M10	90	15	17	105	50	050695
TF V12-18/40*	80	40	160	M12	105	18	20	130	80	050715
E12-18/A*	80	-	160	M12	105	18	-	162	80	050703
E12-18/QC*	80	-	160	M12	105	18	-	178	80	050671

* Do not belong to ETA

ANCHOR MECHANICAL PROPERTIES

SIZE			M6	M8	M10	M12	M16	M20
f_{uk}	[N/mm²]	Min. tensile strength	800	800	800	800	800	830
f_{yk}	[N/mm²]	Yield strength	640	640	640	640	640	660
$S_{eq,V}$	[mm²]	Equivalent stressed cross-section bolt version	39,2	76,1	108,8	175,3	335,1	520,2
$S_{eq,E}$	[mm²]	Equivalent stressed cross-section threaded stud version	35,2	61,8	82,0	104,1	183,3	277,3
W_{el}	[mm³]	Elastic section modulus	12,7	31,2	62,3	109,2	277,5	541,0
$M^0_{Rk,s}$	[Nm]	Characteristic bending moment	12,2	30,0	59,8	104,8	266,4	538,8
M	[Nm]	Recommended bending moment	5,8	12,4	24,8	43,5	110,7	216,0
SW	[mm]	Key size	10	13	16	18	24	30

TRIGA Z XTREM

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

SIZE			M6	M8	M10	M12	M16	M20
Anchorage depth	h_{ef}	[mm]	50	60	70	80	100	125
Minimum thickness of base material	h_{min}	[mm]	100	120	140	160	200	250
Characteristic edge and spacing distance for full anchor capacity	$C_{cr} \geq$	[mm]	75	90	105	120	150	187,5
	$S_{cr} \geq$	[mm]	150	180	210	240	300	375
Minimum distances for cracked and non-cracked concrete	C_{min}	[mm]	50	60	70	80	100	150
	$S \geq$	[mm]	100	100	160	160	180	300
	S_{min}	[mm]	50	60	70	80	100	125
	$C \geq$	[mm]	80	100	100	160	180	300

CHARACTERISTIC RESISTANCES [kN]

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

TENSILE

NON-CRACKED CONCRETE – C20/25

SIZE	M6	M8	M10	M12	M16	M20
h_{ef} [mm]	50	60	70	80	100	125
$N_{Rk,p}$ [kN]	17,4	20,0	28,8	35,2	49,2	68,8

CRACKED CONCRETE – C20/25

SIZE	M6	M8	M10	M12	M16	M20
h_{ef} [mm]	50	60	70	80	100	125
$N_{Rk,p}$ [kN]	5,0	12,0	16,0	24,6	34,4	48,1

SHEAR

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

SIZE	M6	M8	M10	M12	M16	M20
h_{ef} [mm]	50	60	70	80	100	125
Type V/TF						
$V_{Rk,s}$ [kN]	*23,4*	*32,6*	*49,1*	*72,7*	*117,2*	*173,5*
Type E						
$V_{Rk,s}$ [kN]	*14,3*	*19,0*	*31,0*	*47,4*	*93,1*	*109,9*

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 $\geq S_{cr}$ and edge distance $\geq C_{cr}$.

TENSILE

NON-CRACKED CONCRETE – C20/25

SIZE	M6	M8	M10	M12	M16	M20
h_{ef} [mm]	50	60	70	80	100	125
N_{Rec} [kN]	7,6	9,5	13,7	16,8	23,4	32,7

CRACKED CONCRETE – C20/25

SIZE	M6	M8	M10	M12	M16	M20
h_{ef} [mm]	50	60	70	80	100	150
N_{Rec} [kN]	2,4	5,7	7,6	11,7	16,4	22,9

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

SHEAR

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

SIZE	M6	M8	M10	M12	M16	M20
h_{ef} [mm]	50	60	70	80	100	125
Type V/TF						
V_{Rec} [kN]	*13,4*	*18,6*	*28,1*	*41,5*	*67,0*	*99,1*
Type E						
V_{Rec} [kN]	*8,2*	*10,9*	*17,7*	*27,1*	*53,2*	*62,8*

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

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

TRIGA Z 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			M6	M8	M10	M12	M16	M20
h_{ef}	[mm]		50	60	70	80	100	125
$N_{Rd,uncr}$	[kN]	C20/25	10,7	13,3	19,2	23,5	32,8	45,8
		C40/50	10,7	18,9	27,2	33,2	46,4	64,8

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

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

$\gamma_{Mc} = 1,5$

SHEAR

SIZE			M6	M8	M10	M12	M16	M20
h_{ef}	[mm]		50	60	70	80	100	125
Type V/TF								
$V_{Rd,s}$	[kN]	≥ C20/25	*18,7*	*26,1*	*39,3*	*58,2*	*93,8*	*138,8*
Type E								
$V_{Rd,s}$	[kN]	≥ C20/25	*11,4*	*15,2*	*24,8*	*37,9*	*74,5*	*87,9*

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

$\gamma_{Ms,V} = 1,25$

DESIGN RESISTANCE FOR STATIC LOADS IN CRACKED CONCRETE [kN]

TENSILE

SIZE			M6	M8	M10	M12	M16	M20
h_{ef}	[mm]		50	60	70	80	100	125
$N_{Rd,cr}$	[kN]	C20/25	3,3	8,0	10,7	16,4	23,0	32,1
		C40/50	4,7	11,3	15,1	23,2	32,5	45,4

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

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

$\gamma_{Mc} = 1,5$

SHEAR

SIZE			M6	M8	M10	M12	M16	M20
h_{ef}	[mm]		50	60	70	80	100	125
Type V/TF								
$V_{Rd,s}$	[kN]	≥ C20/25	*18,7*	*26,1*	*39,3*	*58,2*	*93,8*	*138,8*
Type E								
$V_{Rd,s}$	[kN]	≥ C20/25	*11,4*	*15,2*	*24,8*	*37,9*	*74,5*	*87,9*

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

$\gamma_{Ms,V} = 1,25$

DESIGN RESISTANCE FOR SEISMIC LOADS CATEGORY C1 [kN]

TENSILE

SIZE			M6	M8	M10	M12	M16	M20
h_{ef}	[mm]		50	60	70	80	100	125
$N_{Rd,C1}$	[kN]	C20/25	-	-	6,1	17,2	24,0	-
		C40/50	-	-	8,7	24,3	33,9	-

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

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

$\gamma_{Mc} = 1,5$

SHEAR

SIZE			M6	M8	M10	M12	M16	M20
h_{ef}	[mm]		50	60	70	80	100	125
$V_{Rd,s}$	[kN]	≥ C20/25	-	-	*13,7*	*22,7*	*48,4*	-

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

$\gamma_{Ms,V} = 1,25$

DESIGN RESISTANCE FOR SEISMIC LOADS CATEGORY C2 [kN]

TENSILE

SIZE			M6	M8	M10	M12	M16	M20
h_{ef}	[mm]		50	60	70	80	100	125
$N_{Rd,C2}$	[kN]	C20/25	-	-	3,5	6,3	11,0	-
		C40/50	-	-	5,0	8,9	15,6	-

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

$N_{Rd,C2} = \min[N_{Rk,p,eq,C2} / \gamma_{Mc} ; N_{Rk,s,eq,C2} / \gamma_{Ms,N}]$

$\gamma_{Mc} = 1,5$

SHEAR

SIZE			M6	M8	M10	M12	M16	M20
h_{ef}	[mm]		50	60	70	80	100	125
$V_{Rd,s,C2}$	[kN]	≥ C20/25	-	-	*11,6*	*22,7*	*46,5*	-

$V_{Rd,s,C2} = V_{Rk,s,eq,C2} / \gamma_{Ms,V}$

$\gamma_{Ms,V} = 1,25$

DESIGN RESISTANCE FOR FIRE EXPOSURE [kN]

TENSILE

SIZE		M6	M8	M10	M12	M16	M20
h_{ef}	[mm]	50	60	70	80	100	125
$N_{Rd,fi}$ R30	[kN]	0,9	2,8	4,5	17,6	32,8	51,1
$N_{Rd,fi}$ R60	[kN]	0,6	2,1	3,3	11,4	21,3	33,2
$N_{Rd,fi}$ R90	[kN]	0,4	1,3	2,1	5,3	9,8	15,3
$N_{Rd,fi}$ R120	[kN]	0,3	0,9	1,5	2,2	4,1	6,4

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

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

SHEAR

SIZE		M8	M10		M12	M16	M20
h_{ef}	[mm]	50	60	70	80	100	125
$V_{Rd,fi}$ R30	[kN]	0,9	2,8	4,5	17,6	32,8	51,1
$V_{Rd,fi}$ R60	[kN]	0,6	2,1	3,3	11,4	21,3	33,2
$V_{Rd,fi}$ R90	[kN]	0,4	1,3	2,1	5,3	9,8	15,3
$V_{Rd,fi}$ R120	[kN]	0,3	0,9	1,5	2,2	4,1	6,4

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

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

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