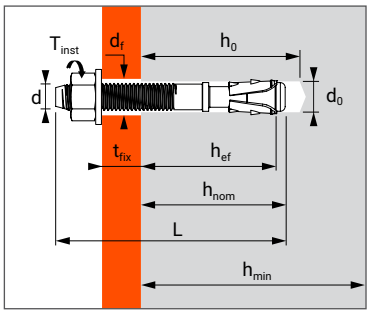
FIX Z XTREM

ETA - 15/0388
*ETA - 17/0073

Torque controlled expansion anchor, for use in cracked and non-cracked concrete and seismic performance categories C1 & C2



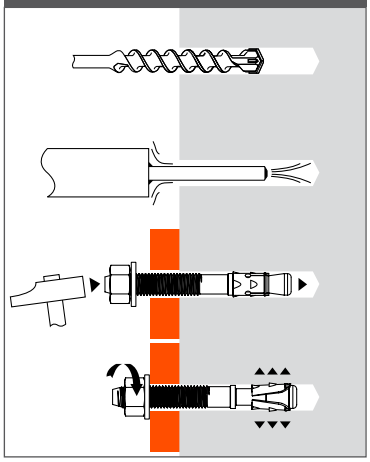
CHARACTERISTICS

Vds CEA 4001
M8 - M12

APPLICATION

- Steel and timber framework and beams
- Lift guide rails
- Industrial doors and gates
- Brickwork support angles
- Storage systems
- Wall plates
- Safety barriers
- Cladding brackets
- Curtain-walls

INSTALLATION



TECHNICAL DATA

RANGE	Letter marking	Maximum anchorage depth					Minimum anchorage depth					Thread Ø	Drilling Ø	Clear-ance Ø	Total anchor length	Tighten torque	Code
		Max. anchor depth	Embed. depth	Max. thick. of part to be fixed	Drilling depth	Min. thick. of base mate-rial	Min. anchor depth	Embed. depth	Max. thick. of part to be fixed	Drilling depth	Min. thick. of base mate-rial						
		(mm) h_{ef}	(mm) h_{nom}	(mm) t_{fix}	(mm) h_0	(mm) h_{min}	(mm) h_{ef}	(mm) h_{nom}	(mm) t_{fix}	(mm) h_0	(mm) h_{min}	(mm) d	(mm) d_0	(mm) d_f	(mm) L	(Nm) T_{inst}	
8X65/5	B	46	55	5	65	100	-	-	-	-	-	8	8	9	65	20	057763
8X75/15	D			15											75		057764
8X90/30	E			30											90		057765
8X120/60	G			60											120		057766
10X85/25-5	D	60	68	5	75	120	40	48	25	55	100	10	10	12	85	45	057768
10X90/30-10	E			10					30						90		057769
10X100/40-20	F			20					40						100		057770
10X120/60-40	G			40					60						120		057771
10X140/80-60	I			60					80						140		057772
10X160/100-80	-			80					100						160		057773
12X105/30-10	F	70	80	10	90	140	50	60	30	70	100	12	12	14	105	60	057775
12X115/40-20	G			20					40						115		057776
12X135/60-40	I			40					60						135		057777
12X155/80-60	J			60					80						155		057796
12X180/105-85	L			85					105						180		057779
16X145/45-25	I	85	98	25	110	170	65	78	45	90	130	16	16	18	145	110	057781
16X170/70-50	K			50					70						170		057782
16X180/80-60	L			60					80						180		057783
20X170/30	K	100	113	30	130	200	-	-	-	-	-	20	20	22	170	160	057785
20X200/60	M			60											200		057786
20X220/80	O			80											220		057787
Large Washer (LW)																	
8X65/5	B	46	55	5	65	100	-	-	-	-	-	8	8	9	65	20	057666
8X130/70	I			70											130		057667
10X160/100-80	J	60	68	80	75	120	40	48	100	55	100	10	10	12	160	45	057668
12X135/60-40	I	70	80	40	90	140	50	60	60	70	100	12	12	14	135	60	057669
12X155/80-60	J			60					80						155		057670
12X180/105-85	L			85					105						180		057671
12X220/123*	O			123			-	-	-	-	-				220		057672
12X255/158*	R			158			-	-	-	-	-				255		057673
16X180/80-60	L	85	98	60	105	170	65	78	80	105	170	16	16	18	180	110	057675
16X220/100*	O			100			-	-	-	-	-				220	100	057676
16X250/130*	Q			130			-	-	-	-	-				250	100	057677

Washer	Standard (NF E 25513)					Large (DIN 440 / ISO 7094)			
SIZE	M8	M10	M12	M16	M20	M8	M10	M12	M16
Outer Ø [mm]	16	20	24	30	36	28	34	44	56
Thickness [mm]	1,6	2	2,5	3	3	3	3	4	5

ANCHOR MECHANICAL PROPERTIES

SIZE			M8	M10	M12	M12 L>220	M16	M16 L>220	M20
Cross-section above cone									
f_{uk}	[N/mm²]	Min. tensile strength	900	830	830	830	720	720	600
f_{yk}	[N/mm²]	Yield strength	800	670	670	670	580	580	580
As	[mm²]	Stressed cross-section	22,9	35,3	45,4	45,4	88,2	88,2	165,1
Threaded part									
f_{uk}	[N/mm²]	Min. tensile strength	750	730	730	730	600	600	500
f_{yk}	[N/mm²]	Yield strength	680	580	580	580	480	480	410
As	[mm²]	Stressed cross-section	36,6	58,0	84,3	84,3	156,0	156,0	245,0
W_{el}	[mm³]	Elastic section modulus	31,2	62,3	109,2	109,2	277,5	277,5	540,9
$M^0_{Rk,s}$	[Nm]	Characteristic bending moment	28,0	52,8	91,3	78,6	194,0	199,8	315,7
M	[Nm]	Recommended bending moment	8,7	14,7	25,8	22,4	54,4	57,0	90,5
SW	[mm]	Key size	13	17	19	19	24	24	30

FIX Z XTREM

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

SIZE			M8	M10	M10	M12	M12	M16	M16	M20
Anchorage depth	h_{ef}	[mm]	46	40	60	50	70	65	85	100
Minimum thickness of base material	h_{min}	[mm]	100	100	120	100	140	130	170	200
Characteristic edge and spacing distance for full anchor capacity	$C_{cr} \geq$	[mm]	69	60	90	75	105	97,5	127,5	150
	$S_{cr} \geq$	[mm]	138	120	180	150	210	195	255	300
Minimum distances for non-cracked concrete	C_{min}	[mm]	50	60	60	60	60	90	90	100
	$S \geq$	[mm]	75	120	120	145	145	140	140	160
	S_{min}	[mm]	50	55	55	60	60	90	90	130
	$C \geq$	[mm]	90	70	70	100	100	105	105	120
Minimum distances for cracked concrete	C_{min}	[mm]	50	55	55	60	60	80	80	100
	$S \geq$	[mm]	75	90	90	145	145	110	110	130
	S_{min}	[mm]	50	55	55	60	60	90	90	100
	$C \geq$	[mm]	65	70	70	100	100	100	100	120

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		M8	M10	M12	M12 L>220	M16	M16 L>220	M20
$h_{ef,1}$	[mm]	46	60	70	70	85	85	100
$N_{Rk,p}$	[kN]	9,0	20,0	30,0	20,0	40,0	35,0	49,2
$h_{ef,2}$	[mm]	-	40	50	-	65	-	-
$N_{Rk,p}$	[kN]	-	12,4	17,4	-	25,8	-	-

CRACKED CONCRETE – C20/25

SIZE		M8	M10	M12	M12 L>220	M16	M16 L>220	M20
$h_{ef,1}$	[mm]	46	60	70	70	85	85	100
$N_{Rk,p}$	[kN]	5,0	9,0	16,0	12,0	20,0	25,0	30,0
$h_{ef,2}$	[mm]	-	40	50	-	65	-	-
$N_{Rk,p}$	[kN]	-	8,7	12,2	-	18,0	-	-

SHEAR

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

SIZE		M8	M10	M12	M12 L>220	M16	M16 L>220	M20
$h_{ef,1}$	[mm]	46	60	70	70	85	85	100
$h_{ef,2}$	[mm]	-	40	50	-	65	-	-
$V_{Rk,s}$	[kN]	*13,7*	*16,0*	*23,0*	*25,3*	*45,0*	*47,1*	*61,0*

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

TENSILE

NON-CRACKED CONCRETE – C20/25

SIZE		M8	M10	M12	M12 L>220	M16	M16 L>220	M20
$h_{ef,1}$	[mm]	46	60	70	70	85	85	100
N_{Rec}	[kN]	4,3	9,5	14,3	9,5	19,0	16,6	23,4
$h_{ef,2}$	[mm]	-	40	50	-	65	-	-
N_{Rec}	[kN]	-	5,9	8,3	-	12,3	-	-

CRACKED CONCRETE – C20/25

SIZE		M8	M10	M12	M12 L>220	M16	M16 L>220	M20
$h_{ef,1}$	[mm]	46	60	70	70	85	85	100
N_{Rec}	[kN]	2,4	4,3	7,6	5,7	9,5	12,0	14,3
$h_{ef,2}$	[mm]	-	40	50	-	65	-	-
N_{Rec}	[kN]	-	4,1	5,8	-	8,6	-	-

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

SHEAR

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

SIZE		M8	M10	M12	M12 L>220	M16	M16 L>220	M20
$h_{ef,1}$	[mm]	46	60	70	70	85	85	100
$h_{ef,2}$	[mm]	-	40	50	-	65	-	-
V_{Rec}	[kN]	*6,5*	*9,0*	*12,9*	*14,4*	*25,7*	*26,9*	*29,0*

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

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

FIX 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			M8	M10	M12	M12 L>220	M16	M16 L>220	M20
$h_{ef,1}$	[mm]		46	60	70	70	85	85	100
$N_{Rd,uncr}$	[kN]	C20/25	6,0	13,3	20,0	13,3	26,7	23,3	32,8
		C40/50	8,5	15,3	23,0	18,8	34,0	32,9	46,4
$h_{ef,2}$	[mm]		-	40	50	-	65	-	-
$N_{Rd,uncr}$	[kN]	C20/25	-	8,3	11,6	-	17,2	-	-
		C40/50	-	9,5	13,3	-	21,9	-	-

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

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

γ_{Mc} = 1,5 ; M8 : $\gamma_{Ms,N}$ = 1,4 ; M10-M16 : $\gamma_{Ms,N}$ = 1,48 ; M20 : $\gamma_{Ms,N}$ = 1,5

SHEAR

SIZE			M8	M10	M12	M12 L>220	M16	M16 L>220	M20
$h_{ef,1}$	[mm]		46	60	70	70	85	85	100
$h_{ef,2}$	[mm]		-	40	50	-	65	-	-
$V_{Rd,s}$	[kN]	≥ C20/25	*9,1*	*12,6*	*18,1*	*20,2*	*36,0*	*37,7*	*40,7*

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

M8 : $\gamma_{Ms,V}$ = 1,5 ; M10-M16 : $\gamma_{Ms,V}$ = 1,27 ; M20 : $\gamma_{Ms,V}$ = 1,5;

M12-M16 L>220 : $\gamma_{Ms,V}$ = 1,25

DESIGN RESISTANCE FOR STATIC LOADS IN CRACKED CONCRETE [kN]

TENSILE

SIZE			M8	M10	M12	M12 L>220	M16	M16 L>220	M20
$h_{ef,1}$	[mm]		46	60	70	70	85	85	100
$N_{Rd,cr}$	[kN]	C20/25	3,3	6,0	10,7	8,0	13,3	16,7	20,0
		C40/50	4,7	6,9	12,3	11,3	17,0	23,5	28,3
$h_{ef,2}$	[mm]		-	40	50	-	65	-	-
$N_{Rd,cr}$	[kN]	C20/25	-	5,8	8,1	-	12,0	-	-
		C40/50	-	6,7	9,3	-	15,3	-	-

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

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

γ_{Mc} = 1,5 ; M8 : $\gamma_{Ms,N}$ = 1,4 ; M10-M16 : $\gamma_{Ms,N}$ = 1,48 ; M20 : $\gamma_{Ms,N}$ = 1,5

SHEAR

SIZE			M8	M10	M12	M12 L>220	M16	M16 L>220	M20
$h_{ef,1}$	[mm]		46	60	70	70	85	85	100
$h_{ef,2}$	[mm]		-	40	50	-	65	-	-
$V_{Rd,s}$	[kN]	≥ C20/25	*9,1*	*12,6*	*18,1*	*20,2*	*36,0*	*37,7*	*40,7*

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

M8 : $\gamma_{Ms,V}$ = 1,5 ; M10-M16 : $\gamma_{Ms,V}$ = 1,27 ; M20 : $\gamma_{Ms,V}$ = 1,5

M12-M16 L>220 : $\gamma_{Ms,V}$ = 1,25

DESIGN RESISTANCE FOR SEISMIC LOADS CATEGORY C1 [kN]

TENSILE

SIZE			M8	M10	M12	M12 L>220	M16	M16 L>220	M20
$h_{ef,1}$	[mm]		46	60	70	70	85	85	100
$N_{Rd,C1}$	[kN]	C20/25	3,1	4,9	10,7	5,6	13,3	11,7	20,0
		C40/50	4,4	7,0	15,1	7,9	18,9	16,5	28,3

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

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

γ_{Mc} = 1,5 ; M8 : $\gamma_{Ms,N}$ = 1,4 ; M10-M16 : $\gamma_{Ms,N}$ = 1,48 ; M20 : $\gamma_{Ms,N}$ = 1,5

SHEAR

SIZE			M8	M10	M12	M12 L>220	M16	M16 L>220	M20
$h_{ef,1}$	[mm]		46	60	70	70	85	85	100
$V_{Rd,s,C1}$	[kN]	≥ C20/25	*4,0*	*12,6*	*18,1*	*14,2*	*36,0*	*26,4*	*40,7*

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

M8 : $\gamma_{Ms,V}$ = 1,5 ; M10-M16 : $\gamma_{Ms,V}$ = 1,27 ; M20 : $\gamma_{Ms,V}$ = 1,5

M12-M16 L>220 : $\gamma_{Ms,V}$ = 1,25

DESIGN RESISTANCE FOR SEISMIC LOADS CATEGORY C2 [kN]

TENSILE

SIZE			M8	M10	M12	M12 L>220	M16	M16 L>220	M20
$h_{ef,1}$	[mm]		46	60	70	70	85	85	100
$N_{Rd,C2}$	[kN]	C20/25	-	1,9	4,0	3,5	12,0	5,9	17,1
		C40/50	-	2,1	4,6	4,9	15,3	8,4	24,1

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

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

γ_{Mc} = 1,5 ; M8 : $\gamma_{Ms,N}$ = 1,4 ; M10-M16 : $\gamma_{Ms,N}$ = 1,48 ; M20 : $\gamma_{Ms,N}$ = 1,5

SHEAR

SIZE			M8	M10	M12	M12 L>220	M16	M16 L>220	M20
$h_{ef,1}$	[mm]		46	60	70	70	85	85	100
$V_{Rd,s,C2}$	[kN]	≥ C20/25	-	*7,6*	*11,0*	*14,2*	*27,1*	*26,4*	*29,8*

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

M8 : $\gamma_{Ms,V}$ = 1,5 ; M10-M16 : $\gamma_{Ms,V}$ = 1,27 ; M20 : $\gamma_{Ms,V}$ = 1,5

M12-M16 L>220 : $\gamma_{Ms,V}$ = 1,25

DESIGN RESISTANCE FOR FIRE EXPOSURE [kN]

TENSILE

SIZE		M8	M10	M12	M12 L>220	M16	M16 L>220	M20
$h_{ef,1}$	[mm]	46	60	70	70	85	85	100
$N_{Rd,fi}$ R30	[kN]	0,9	2,8	3,6	1,7	6,6	3,1	10,4
$N_{Rd,fi}$ R60	[kN]	0,7	2,3	3,1	1,3	5,7	2,4	9,0
$N_{Rd,fi}$ R90	[kN]	0,5	1,8	2,6	1,1	4,9	2,0	7,6
$N_{Rd,fi}$ R120	[kN]	0,4	1,6	2,4	0,8	4,4	1,6	6,9

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

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

SHEAR

SIZE		M8	M10	M12	M12 L>220	M16	M16 L>220	M20
$h_{ef,1}$	[mm]	46	60	70	70	85	85	100
$V_{Rd,fi}$ R30	[kN]	0,9	2,8	3,6	1,7	6,6	3,1	10,4
$V_{Rd,fi}$ R60	[kN]	0,7	2,3	3,1	1,3	5,7	2,4	9,0
$V_{Rd,fi}$ R90	[kN]	0,5	1,8	2,6	1,1	4,9	2,0	7,6
$V_{Rd,fi}$ R120	[kN]	0,4	1,6	2,4	0,8	4,4	1,6	6,9

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

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

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