

TUC OPT 1 CONCRETE BOLT

Features:

- Through fixing
- Approved for cracked and non-crack concrete
- Rapid Installation
- Hardened Steel with Zinc Plating, minimum 5um
- Fire tested class A1 resistant

Benefits:

- Quick and simple installation
- One anchor for concrete from C20/25 to C50/60
- Adjustable fixture thickness
- Removable for use with temporary structures



Concrete Ranges: C20/C25 according to EN 206:2013+A1:2016

Certification: European technical assessment 25/0814 & 25/0817

Product Range

Product Code	Thread Diam	Anchor Length	Drill Hole Diam	Minimum Emb		Nominal Emb		Maximum Emb		Fixture Clearance Hole	Hex Head
				Hole Depth	Fixture Thickness	Hole Depth	Fixture Thickness	Hole Depth	Fixture Thickness		
	d	L	d _o	h _{min}	t _{fix}	h _{nom}	t _{fix}	h _{max}	t _{fix}	d _f	A/F
	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm
TUC06050	8	50	6	44	5	55	-	-	-	8	10
TUC06075		75			30		20				
TUC06100		100			55		45				
TUC06130		130			85		75				
TUC06150		150			105		95				
TUC08060	10	60	8	50	10	65	-	-	-	11	13
TUC08075		75			25		10				
TUC08100		100			50		35				
TUC10060	12	60	10	55	5	65	-	85	-	13	15
TUC10075		75			20		-		-		
TUC10100		100			45		35		15		
TUC10125		125			70		60		40		
TUC10140		140			85		75		55		
TUC10150		150			95		85		65		
TUC12075	14	75	12	65	10	85	-	100	-	15	16
TUC12100		100			35		15		-		
TUC12120		120			55		35		20		
TUC12130		130			65		45		30		
TUC12150		150			85		65		50		
TUC14100	16	100	14	85	15	100	-	115	-	17	18
TUC14120		120			35		20		5		
TUC14130		130			45		30		15		
TUC14150		150			65		50		35		
TUC16100	18	100	16	100	0	100	-	-	-	19	21
TUC16150		150			50		30		-		
TUC16200		200			100		80		-		

Installation Data

Anchor Diameter			6	8	10	12	14	16
Effective Embedment Depth	h_{eff}							
Shallow		[mm]	30	34	37	44	60	71
Nominal		[mm]	41	47	45	61	72	88
Maximum		[mm]	-	-	62	73	85	-
Minimum Concrete Thickness	h_{min}							
Minimum Embedment		[mm]	80	80	80	100	120	150
Nominal Embedment		[mm]	80	80	90	120	150	150
Deep Embedment		[mm]	-	-	120	150	150	-
Minimum Spacing	s_{min}	[mm]	35	35	40	50	60	70
Minimum Edge Distance	c_{min}	[mm]	35	35	40	50	60	70
Setting Torque	T_{inst}	[Nm]	10	20	30	50	60	80
Maximum torque impact screwdriver		[Nm]	250			350		

Uncracked concrete								
Design Spacing Spacing- Tension		$S_{cr,N,ucr}$						
Minimum Embedment		[mm]	35	35	75	50	120	195
Nominal Embedment		[mm]	35	55	70	55	185	205
Deep Embedment		[mm]	-	-	125	70	115	-
Design Edge Distance - Tension		$C_{cr,N,ucr}$						
Minimum Embedment		[mm]	40	45	45	55	70	100
Nominal Embedment		[mm]	45	50	55	70	100	115
Deep Embedment		[mm]	-	-	75	80	95	-
Design Edge Distance - Shear		$C_{cr,V,ucr}$						
Minimum Embedment		[mm]	70	75	80	95	260	335
Nominal Embedment		[mm]	90	105	95	270	345	465
Deep Embedment		[mm]	-	-	215	275	380	-

Cracked concrete								
Design Spacing Spacing- Tension		$S_{cr,N,cr}$						
Minimum Embedment		[mm]	-	35	40	95	135	100
Nominal Embedment		[mm]	35	75	100	65	215	185
Deep Embedment		[mm]	-	-	105	90	200	-
Design Edge Distance - Tension		$C_{cr,N,cr}$						
Minimum Embedment		[mm]	-	35	40	50	75	70
Nominal Embedment		[mm]	35	50	60	60	110	105
Deep Embedment		[mm]	-	-	65	65	110	-
Design Edge Distance - Shear		$C_{cr,V,cr}$						
Minimum Embedment		[mm]	70	75	80	95	255	330
Nominal Embedment		[mm]	90	100	95	270	340	315
Deep Embedment		[mm]	-	-	280	350	300	-

Steel failure

Characteristic tensile resistance	$N_{rk,s}$	[kN]	20.2		38.2		61.8		80.9		112		148.1	
Partial safety factor	γ_{Ms}	[-]	1.5											
Characteristic shear resistance no lever arm	$V_{rk,s}$	[kN]	9.3	12.6	16.3	20.3	27.6	31.2	34.5	40.4	56.0	56.0	71.5	73.4
Factor considering ductility	k_7	[-]	1.0											
Partial safety factor	γ_{Ms}	[-]	1.5											
Characteristic bending resistance	$M^0_{rk,s}$	[Nm]	16.2		42.1		86.7		137.8		224.2		340.9	

Load Data

Characteristics Resistance

Uncracked concrete - minimum embedment

Anchor Diameter			6	8	10	12	14	16
N_{Rk}		[kN]	1.0	6.5	7.5	10.0	19.0	28.0
V_{Rk}		[kN]	8.0	9.7	11.0	14.3	45.7	58.8

Design Resistance

N_{Rd}		[kN]	0.4	3.5	4.3	4.7	10.5	15.5
V_{Rd}		[kN]	3.8	3.1	5.20	6.8	25.4	32.7

Recommended Resistance

N_{rec}		[kN]	0.7	4.6	5.4	7.1	13.6	20.0
V_{rec}		[kN]	5.7	6.9	7.9	10.2	32.6	42.0

Characteristics Resistance

Uncracked concrete - nominal embedment

N_{Rk}		[kN]	7.5	11.0	11.0	15.0	28.0	36.0
V_{Rk}		[kN]	12.9	15.8	14.8	40.4	60.1	81.2

Design Resistance

N_{Rd}		[kN]	4.1	6.1	6.1	8.3	15.5	20.0
V_{Rd}		[kN]	7.1	8.8	8.2	26.9	33.4	45.1

Recommended Resistance

N_{rec}		[kN]	2.9	4.4	4.4	5.9	11.1	14.3
V_{rec}		[kN]	5.1	6.3	5.9	19.2	23.9	32.2

Characteristics Resistance

Uncracked concrete - deep embedment

N_{Rk}		[kN]	-	-	20.0	20.0	28.0	-
V_{Rk}		[kN]	-	-	31.2	40.4	56.0	-

Design Resistance

N_{Rd}		[kN]	-	-	11.1	11.1	15.5	-
V_{Rd}		[kN]	-	-	20.8	26.9	37.3	-

Recommended Resistance

N_{rec}		[kN]	-	-	7.9	7.9	11.1	-
V_{rec}		[kN]	-	-	14.9	19.2	26.6	-

Characteristics Resistance

Cracked concrete - minimum embedment

Anchor Diameter			6	8	10	12	14	16
N_{Rk}		[kN]	-	2.5	4.5	7.0	14.0	15.0
V_{Rk}		[kN]	5.6	6.8	7.7	10.0	32.0	41.2

Design Resistance

N_{Rd}		[kN]	-	1.2	2.1	3.3	7.7	8.3
V_{Rd}		[kN]	2.7	3.2	3.7	4.8	17.7	22.9

Recommended Resistance

N_{rec}		[kN]	-	0.9	1.5	2.4	5.5	5.9
V_{rec}		[kN]	1.9	2.3	2.6	3.4	12.6	16.4

Characteristics Resistance

Cracked concrete - nominal embedment

N_{Rk}		[kN]	4.0	8.5	9.0	11.0	21.0	24.0
V_{Rk}		[kN]	9.0	11.1	10.4	32.8	42.0	56.8

Design Resistance

N_{Rd}		[kN]	2.2	4.7	5.0	6.1	11.6	13.3
V_{Rd}		[kN]	5.0	6.1	5.7	18.2	23.3	31.6

Recommended Resistance

N_{rec}		[kN]	1.6	3.4	3.6	4.4	8.3	9.5
V_{rec}		[kN]	3.6	4.4	4.1	13.0	16.6	22.6

Characteristics Resistance

Cracked concrete - deep embedment

Anchor Diameter			6	8	10	12	14	16
N_{Rk}		[kN]	-	-	13.0	15.0	24.0	-
V_{Rk}		[kN]	-	-	33.6	42.9	53.9	-

Design Resistance

N_{Rd}		[kN]	-	-	7.2	8.3	13.3	-
V_{Rd}		[kN]	-	-	18.6	23.8	30.0	-

Recommended Resistance

N_{rec}		[kN]	-	-	5.1	5.9	9.5	-
V_{rec}		[kN]	-	-	13.3	17.0	21.4	-

Increasing Concrete Factors

Anchor Diameter	6	6	8	8	10	10	10	12	12	12	14	14	14	16	16
Ψc C30/37	1.09	1.10	1.06	1.09	1.06	1.07	1.08	1.06	1.08	1.06	1.07	1.07	1.07	1.08	1.09
Ψc C40/45	1.16	1.18	1.11	1.17	1.11	1.13	1.13	1.11	1.14	1.10	1.11	1.11	1.12	1.14	1.16
Ψc C50/60	1.21	1.25	1.15	1.23	1.14	1.18	1.18	1.15	1.18	1.13	1.15	1.15	1.16	1.19	1.22

When using increasing factors care must be taken not to exceed steel limits

Fire Loads

Characteristic resistance under fire exposure in cracked and uncracked concrete C20/25 to C50/60

Anchor Diameter		6	6	8	8	10	10	10	12	12	12	14	14	14	16	16
Nominal Emb. Depth	[mm]	44	55	50	65	55	65	85	65	85	100	85	100	115	100	120

Steel Failure for tension and shear loads

Characteristic resistance	R30	[kN]	0.22	0.22	0.42	0.42	1.03	1.03	1.03	2.02	2.02	2.02	2.80	2.80	2.80	3.70	3.70
	R60	[kN]	0.20	0.20	0.38	0.38	0.89	0.89	0.89	1.52	1.52	1.52	2.10	2.10	2.10	2.78	2.78
	R90	[kN]	0.16	0.16	0.30	0.30	0.69	0.69	0.69	1.32	1.32	1.32	1.82	1.82	1.82	2.41	2.41
	R120	[kN]	0.11	0.11	0.21	0.21	0.55	0.55	0.55	1.01	1.01	1.01	1.40	1.40	1.40	1.85	1.85
	R30	[Nm]	0.18	0.18	0.47	0.47	1.44	1.44	1.44	3.45	3.45	3.45	5.61	5.61	5.61	8.52	8.52
	R60	[Nm]	0.16	0.16	0.42	0.42	1.25	1.25	1.25	2.58	2.58	2.58	4.20	4.20	4.20	6.39	6.39
	R90	[Nm]	0.13	0.13	0.33	0.33	0.96	0.96	0.96	2.24	2.24	2.24	3.64	3.64	3.64	5.54	5.54
	R120	[Nm]	0.09	0.09	0.23	0.23	0.77	0.77	0.77	1.72	1.72	1.72	2.80	2.80	2.80	4.26	4.26

Concrete cone failure

Characteristic Resistance	R30	[kN]	-	1.85	1.16	2.61	1.43	2.34	5.21	2.21	5.00	7.84	4.80	7.57	11.47	7.31	12.51
	R60	[kN]	-	1.85	1.16	2.61	1.43	2.34	5.21	2.21	5.00	7.84	4.80	7.57	11.47	7.31	12.51
	R90	[kN]	-	1.85	1.16	2.61	1.43	2.34	5.21	2.21	5.00	7.84	4.80	7.57	11.47	7.31	12.51
	R120	[kN]	-	1.48	0.93	2.09	1.15	1.87	4.17	1.77	4.00	6.27	3.84	6.06	9.18	5.85	10.01

Pull out failure

Characteristic Resistance	R30	[kN]	-	1.00	0.63	2.13	1.13	2.25	3.25	1.75	2.75	3.75	3.5	5.25	6	3.75	6.00
	R60	[kN]	-	1.00	0.63	2.13	1.13	2.25	3.25	1.75	2.75	3.75	3.5	5.25	6	3.75	6.00
	R90	[kN]	-	1.00	0.63	2.13	1.13	2.25	3.25	1.75	2.75	3.75	3.5	5.25	6	3.75	6.00
	R120	[kN]	-	0.80	0.50	1.70	0.90	1.80	2.60	1.40	2.20	3.00	2.80	4.20	4.80	3.00	4.80

Concrete pry-out failure

Characteristic Resistance	R30	[kN]	-	1.85	1.16	2.61	1.43	2.34	10.42	2.21	10.01	15.68	9.6	15.15	22.94	14.63	25.02
	R60	[kN]	-	1.85	1.16	2.61	1.43	2.34	10.42	2.21	10.01	15.68	9.6	15.15	22.94	14.63	25.02
	R90	[kN]	-	1.85	1.16	2.61	1.43	2.34	10.42	2.21	10.01	15.68	9.6	15.15	22.94	14.63	25.02
	R120	[kN]	-	1.48	0.93	2.09	1.15	1.87	8.34	1.77	8.01	12.54	7.68	12.12	18.35	11.7	20.01

Concrete Edge failure

Characteristic Resistance	R30	[kN]	0.58	0.61	0.62	0.66	0.78	0.81	0.86	1.12	1.19	1.24	1.55	1.61	1.67	2.01	2.10
	R60	[kN]	0.58	0.61	0.62	0.66	0.78	0.81	0.86	1.12	1.19	1.24	1.55	1.61	1.67	2.01	2.10
	R90	[kN]	0.58	0.61	0.62	0.66	0.78	0.81	0.86	1.12	1.19	1.24	1.55	1.61	1.67	2.01	2.10
	R120	[kN]	0.46	0.49	0.5	0.53	0.62	0.65	0.69	0.89	0.95	0.99	1.24	1.29	1.34	1.61	1.68

Edge distance

R30 to R120	[mm]	2*h _{ef}														
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In case of fire attack from more than one side the minimum edge distance shall be ≥ 300 mm

Anchor spacing

R30 to R120	[mm]	4*h _{ef}														
Factor	[-]	1.0	1.0	1.0	1.0	1.0	1.0	2.0	1.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0

Trutek Impact Sockets
available for all diameters

