

Technical Product Specifications:

SEISMIC ANCHORS

Approval/calculation possibilities:

- ETAG 001
- NZS 1170.5:2004
- NZS 3101.1&2:2006 A3
- NZS 4219:2009
- NZS 4541:2020

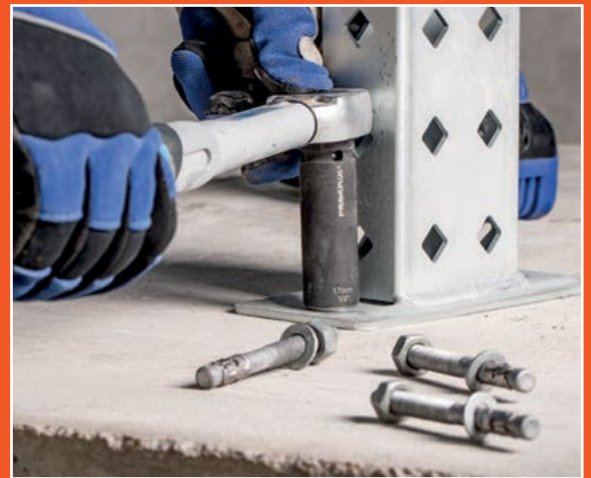


RAWLPLUG® BY FDG

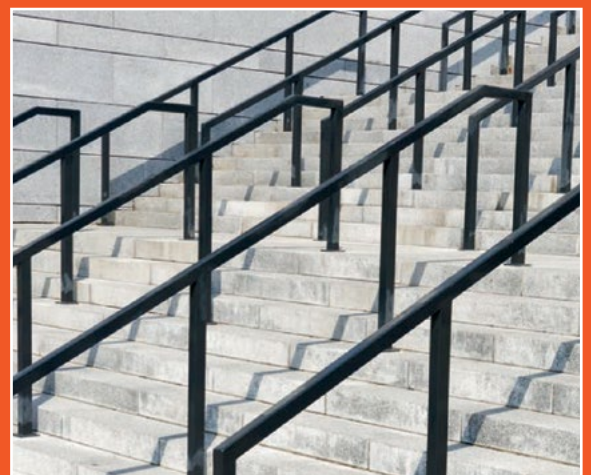
HEAVY DUTY FIXINGS WITH SEISMIC CERTIFICATIONS

Whether you are hanging HVAC equipment or installing plumbing, fire and electrical systems, FDG has a full range of C1 C2 Certified Seismic Anchors that meet New Zealand Building Standard NZS 4219:2009.

Our collection of C1 C2 rated seismic restraints include Through Bolts, Screw Bolts and Rod Hangers, in a range sizes and finishes, including; Zinc Flake and Stainless Steel.



- ✓ ***HVAC Support Systems***
- ✓ ***Cable Support Systems***
- ✓ ***Pipe Support Systems***
- ✓ ***Fire Support Systems***
- ✓ ***Mezzanine Floors***



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36 Zinc Plated Internally Threaded Concrete Screw Anchor



42 Zinc Flake Throughbolt



50 Stainless Steel Throughbolt



01. Zinc Plated Hex With Flange Concrete Screw Anchor

Self-tapping concrete screwbolt



Approvals and Reports

- ETA 17/0806



Features and benefits

- Time-efficient through-fixing installation with streamlined procedure - simply drill and drive.
- Completely removable with possibility of reuse.
- Unique design with patented threadform ensures high performance for relatively small hole diameter.
- Non-expansion functioning ensures low risk of damage to base material and makes FDG-R-LX ideal for installation near edges and adjacent anchors.
- High performance in both uncracked and cracked concrete.
- Different head types for any application.
- Oversize head for fixtures with elongated holes.
- Excellent product for temporary fixing.
- Suitable for standard and reduced embedment depth.

Applications

- Through-fixing
- Temporary anchorages
- Formwork support systems
- Balustrading & handrails
- Fencing & gates manufacturing and installation
- Racking systems
- Public seating
- Scaffolding

Base materials

Approved for use in:

- Cracked concrete
- C20/25-C50/60
- Non-cracked concrete
- C20/25-C50/60
- Reinforced concrete
- Unreinforced concrete

Also suitable for use in:

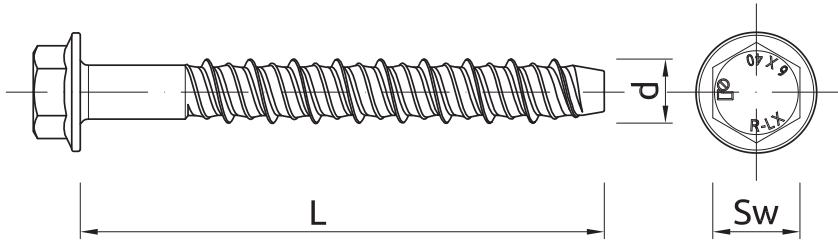
- Natural Stone (after site testing)

Installation guide



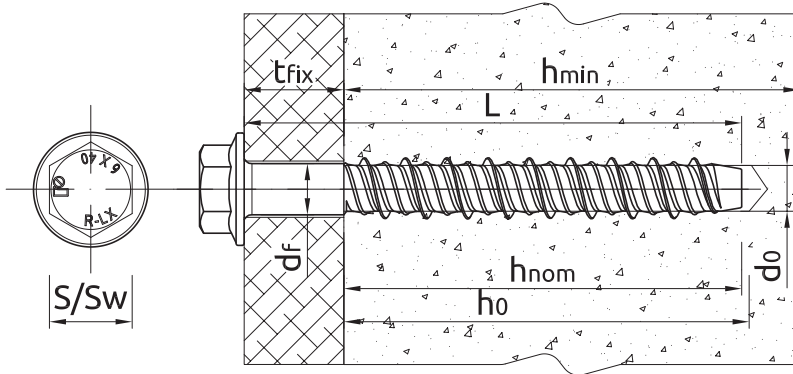
- Drill the hole with rotary hammer drilling machine. Drill to a required depth.
- Blow out dust at least 4 times with a hand pump.
- Possibility of unscrewing and re-screwing.
- Tighten to the recommended torque.
- After installation.

Product Information



Size	Product Code	Approval type	Anchor		Fixture		
			Diameter	Length	Max. thickness t _{fix} for:		Hole diameter
			d	L	h _{nom,red}	h _{nom,std}	d _f
			[mm]	[mm]	[mm]	[mm]	[mm]
5	FDG-R-LX-05X035-HF-ZP	ETA-17/0806	6.3	35	-	-	7
	FDG-R-LX-05X050-HF-ZP	ETA-17/0806	6.3	50	-	7	7
	FDG-R-LX-05X075-HF-ZP	ETA-17/0806	6.3	75	-	32	7
6	FDG-R-LX-06X050-HF-ZP	ETA-17/0806	7.5	50	7	-	9
	FDG-R-LX-06X060-HF-ZP	ETA-17/0806	7.5	60	17	5	9
	FDG-R-LX-06X075-HF-ZP	ETA-17/0806	7.5	75	32	20	9
	FDG-R-LX-06X090-HF-ZP	ETA-17/0806	7.5	90	47	35	9
	FDG-R-LX-06X100-HF-ZP	ETA-17/0806	7.5	100	57	45	9
	FDG-R-LX-06X130-HF-ZP	ETA-17/0806	7.5	130	87	75	9
	FDG-R-LX-06X150-HF-ZP	ETA-17/0806	7.5	150	107	95	9
8	FDG-R-LX-08X060-HF-ZP	ETA-17/0806	10	60	10	-	12
	FDG-R-LX-08X075-HF-ZP	ETA-17/0806	10	75	25	5	12
	FDG-R-LX-08X090-HF-ZP	ETA-17/0806	10	90	40	20	12
	FDG-R-LX-08X100-HF-ZP	ETA-17/0806	10	100	50	30	12
	FDG-R-LX-08X120-HF-ZP	ETA-17/0806	10	120	70	50	12
	FDG-R-LX-08X130-HF-ZP	ETA-17/0806	10	130	80	60	12
	FDG-R-LX-08X150-HF-ZP	ETA-17/0806	10	150	100	80	12
10	FDG-R-LX-10X060-HF-ZP	ETA-17/0806	12.5	60	5	-	14
	FDG-R-LX-10X065-HF-ZP	ETA-17/0806	12.5	65	10	-	14
	FDG-R-LX-10X075-HF-ZP	ETA-17/0806	12.5	75	20	-	14
	FDG-R-LX-10X085-HF-ZP	ETA-17/0806	12.5	85	30	-	14
	FDG-R-LX-10X090-HF-ZP	ETA-17/0806	12.5	90	35	5	14
	FDG-R-LX-10X100-HF-ZP	ETA-17/0806	12.5	100	45	15	14
	FDG-R-LX-10X110-HF-ZP	ETA-17/0806	12.5	110	55	25	14
	FDG-R-LX-10X120-HF-ZP	ETA-17/0806	12.5	120	65	35	14
	FDG-R-LX-10X130-HF-ZP	ETA-17/0806	12.5	130	75	45	14
	FDG-R-LX-10X140-HF-ZP	ETA-17/0806	12.5	140	85	55	14
12	FDG-R-LX-12X075-HF-ZP	ETA-17/0806	14.9	75	15	-	16
	FDG-R-LX-12X100-HF-ZP	ETA-17/0806	14.9	100	40	-	16
	FDG-R-LX-12X130-HF-ZP	ETA-17/0806	14.9	130	70	30	16
	FDG-R-LX-12X150-HF-ZP	ETA-17/0806	14.9	150	90	50	16
14	FDG-R-LX-14X080-HF-ZP	ETA-17/0806	17	80	5	-	18
	FDG-R-LX-14X105-HF-ZP	ETA-17/0806	17	105	30	-	18
	FDG-R-LX-14X115-HF-ZP	ETA-17/0806	17	115	40	-	18
	FDG-R-LX-14X135-HF-ZP	ETA-17/0806	17	135	60	15	18
	FDG-R-LX-14X160-HF-ZP	ETA-17/0806	17	160	85	40	18

Installation data



Size			5	6	8	10	12	14
Thread diameter	d	[mm]	6.3	7.5	10	12.5	14.9	17
Hole diameter in substrate	d ₀	[mm]	5	6	8	10	12	14
Wrench size	Sw	[mm]	8	10	13	15	16	19
External diameter of washer		[mm]	12	14	18	22	27	32
Max. torque for impact screw driver	T _{imp,max}	[Nm]	200	400	900	950	950	950
STANDARD EMBEDMENT DEPTH								
Min. hole depth in substrate	h _{0,s}	[mm]	50	65	80	95	110	130
Real hole depth in substrate	h ₀	[mm]	L + 10 - t _{fix}	L + 10 - t _{fix}	L + 10 - t _{fix}	L + 10 - t _{fix}	L + 10 - t _{fix}	L + 10 - t _{fix}
Min. installation depth	h _{nom,s}	[mm]	43	55	70	85	100	120
Min. substrate thickness	h _{min,s}	[mm]	100	100	110	130	155	190
Min. spacing	s _{min,s}	[mm]	40	45	50	60	80	100
Min. edge distance	c _{min,s}	[mm]	40	45	50	60	80	100
REDUCED EMBEDMENT DEPTH								
Min. hole depth in substrate	h _{0,r}	[mm]	-	50	60	65	70	85
Real hole depth in substrate	h ₀	[mm]	-	L + 10 - t _{fix}	L + 10 - t _{fix}	L + 10 - t _{fix}	L + 10 - t _{fix}	L + 10 - t _{fix}
Min. installation depth	h _{nom,r}	[mm]	-	43	50	55	60	75
Min. substrate thickness	h _{min,r}	[mm]	-	100	100	100	110	110
Min. spacing	s _{min,r}	[mm]	-	45	50	60	80	100
Min. edge distance	c _{min,r}	[mm]	-	45	50	60	80	100

Mechanical Properties

Size			5	6	8	10	12	14
Nominal ultimate tensile strength - tension	f _{uk}	[N/mm ²]	1300	1250	1200	1050	1000	1020
Nominal yield strength - tension	f _{yk}	[N/mm ²]	1150	1100	1050	950	900	800
Cross sectional area - tension	A _s	[mm ²]	19.6	28.3	50.3	78.5	113	153.9
Elastic section modulus	W _{el}	[mm ³]	12.2	21.2	50.3	98.1	169.4	269.3
Characteristic bending resistance	M _{Rk,s}	[Nm]	19	31.8	72.4	123.6	203.3	329.6
Design bending resistance	M	[Nm]	12.7	21.2	48.3	82.4	135.5	219.7

Basic Performance Data

Performance data for single anchor without influence of edge distance and spacing.

Size			5	6	8	10	12	14
Nominal ultimate tensile strength - tension	f _{uk}	[N/mm ²]	1300	1250	1200	1050	1000	1020
Nominal yield strength - tension	f _{yk}	[N/mm ²]	1150	1100	1050	950	900	800
Cross sectional area - tension	A _s	[mm ²]	19.6	28.3	50.3	78.5	113	153.9
Elastic section modulus	W _{el}	[mm ³]	12.2	21.2	50.3	98.1	169.4	269.3
Characteristic bending resistance	M _{Rk,s}	[Nm]	19	31.8	72.4	123.6	203.3	329.6
Design bending resistance	M	[Nm]	12.7	21.2	48.3	82.4	135.5	219.7

Basic Performance Data

Size		5	6	8	10	12	14
MEAN ULTIMATE LOAD							
TENSION LOAD $N_{R_{u,m}}$							
NON-CRACKED CONCRETE C20/25							
Standard embedment depth	[kN]	10.10	14.80	26.04	35.37	44.72	59.96
Reduced embedment depth	[kN]	-	12.22	14.58	17.08	18.37	26.79
CRACKED CONCRETE C20/25							
Standard embedment depth	[kN]	7.10	11.10	16.10	24.89	31.47	41.92
Reduced embedment depth	[kN]	-	8.60	10.10	10.70	10.80	17.40
SHEAR LOAD $V_{R_{u,m}}$							
NON-CRACKED CONCRETE C20/25							
Standard embedment depth	[kN]	14.66	18.37	26.04	51.91	71.19	98.91
Reduced embedment depth	[kN]	-	12.22	14.58	17.08	18.37	26.79
CRACKED CONCRETE C20/25							
Standard embedment depth	[kN]	10.32	12.93	18.33	49.78	62.94	83.83
Reduced embedment depth	[kN]	-	8.60	10.26	12.02	12.93	18.85
CHARACTERISTIC LOAD							
TENSION LOAD N_{R_k}							
NON-CRACKED CONCRETE C20/25							
Standard embedment depth	[kN]	7.00	12.00	18.98	25.78	32.59	43.41
Reduced embedment depth	[kN]	-	8.90	10.63	12.45	13.39	19.52
CRACKED CONCRETE C20/25							
Standard embedment depth	[kN]	4.50	7.00	13.00	18.05	22.82	30.39
Reduced embedment depth	[kN]	-	6.23	7.00	8.00	7.00	13.00
SHEAR LOAD V_{R_k}							
NON-CRACKED CONCRETE C20/25							
Standard embedment depth	[kN]	8.90	13.39	18.98	41.20	57.00	78.50
Reduced embedment depth	[kN]	-	8.90	10.63	12.45	13.39	19.52
CRACKED CONCRETE C20/25							
Standard embedment depth	[kN]	6.23	9.37	13.29	36.09	45.63	60.77
Reduced embedment depth	[kN]	-	6.23	7.44	8.71	9.37	13.66
DESIGN LOAD							
TENSION LOAD N_{R_d}							
NON-CRACKED CONCRETE C20/25							
Standard embedment depth	[kN]	3.89	8.00	12.65	17.19	21.73	28.94
Reduced embedment depth	[kN]	-	5.94	7.08	8.30	8.93	13.01
CRACKED CONCRETE C20/25							
Standard embedment depth	[kN]	2.50	4.67	8.67	12.03	15.21	20.26
Reduced embedment depth	[kN]	-	4.16	4.67	5.33	4.67	8.67
SHEAR LOAD V_{R_d}							
NON-CRACKED CONCRETE C20/25							
Standard embedment depth	[kN]	5.94	8.93	12.65	27.47	38.00	52.33
Reduced embedment depth	[kN]	-	5.94	7.08	8.30	8.93	13.01
CRACKED CONCRETE C20/25							
Standard embedment depth	[kN]	4.16	6.25	8.86	24.06	30.42	40.52
Reduced embedment depth	[kN]	-	4.16	4.96	5.81	6.25	9.11

Design Performance Data

(-) failure is not decisive

Size			5	6		8		10		12		14	
Min. installation depth	h_{nom}	[mm]	43.00	35.00	55.00	50.00	70.00	55.00	85.00	60.00	100.0	75.00	120.0
Effective embedment depth	h_{ef}	[mm]	32.00	24.70	42.00	36.00	53.00	40.00	65.00	42.00	76.00	54.00	92.00
TENSION LOAD													
STEEL FAILURE													
Characteristic resistance	$N_{Rk,s}$	[kN]	25.50	35.40	35.40	60.40	60.40	82.40	82.40	113.0	113.0	157.0	157.0
Partial safety factor	γ_{Ms}	-	1.40	1.40	1.40	1.40	1.40	1.40	1.40	1.40	1.40	1.50	1.50
PULL-OUT FAILURE; NON-CRACKED CONCRETE C20/25													
Characteristic resistance	$N_{Rk,p}$	[kN]	7.00	-	12.00	-	-	-	-	-	-	-	-
PULL-OUT FAILURE; CRACKED CONCRETE C20/25													
Characteristic resistance	$N_{Rk,p}$	[kN]	4.50	-	7.00	7.00	13.00	8.00	-	7.00	-	13.00	-
PULL-OUT FAILURE													
Installation safety factor	γ_{inst}	-	1.20	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Increasing factors for $N_{Rd,p}$ - C30/37	ψ_c	-	1.08	1.08	1.08	1.08	1.08	1.08	1.08	1.08	1.08	1.08	1.08
Increasing factors for $N_{Rd,p}$ - C40/50	ψ_c	-	1.15	1.15	1.15	1.15	1.15	1.15	1.15	1.15	1.15	1.15	1.15
Increasing factors for $N_{Rd,p}$ - C50/60	ψ_c	-	1.19	1.19	1.19	1.19	1.19	1.19	1.19	1.19	1.19	1.19	1.19
CONCRETE CONE FAILURE													
Installation safety factor	γ_{inst}	-	1.20	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Factor for cracked concrete	$k_{cr,N}$	-	7.70	7.70	7.70	7.70	7.70	7.70	7.70	7.70	7.70	7.70	7.70
Factor for non-cracked concrete	$k_{ucr,N}$	-	11.00	11.00	11.00	11.00	11.00	11.00	11.00	11.00	11.00	11.00	11.00
Spacing	$s_{cr,N}$	[mm]	90.00	90.00	126.0	112.0	160.0	120.0	196.0	126.0	228.0	165.0	276.0
Edge distance	$c_{cr,N}$	[mm]	45.00	45.00	63.00	56.00	80.00	60.00	98.00	63.00	114.0	83.00	138.0
CONCRETE SPLITTING FAILURE													
Installation safety factor	γ_{inst}	-	1.20	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Spacing	$s_{cr,sp}$	[mm]	90.00	90.00	126.0	112.0	160.0	136.0	222.0	126.0	228.0	188.0	312.0
Edge distance	$c_{cr,sp}$	[mm]	45.00	45.00	63.00	56.00	80.00	68.00	111.0	63.00	114.0	94.00	156.0
SHEAR LOAD													
STEEL FAILURE													
Characteristic resistance without lever arm	$V_{Rk,s}$	[kN]	12.70	17.70	17.70	30.20	30.20	41.20	41.20	57.00	57.00	78.50	78.50
Ductility factor	k_γ	-	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80
Characteristic resistance with lever arm	$M_{Rk,s}$	[Nm]	19.00	31.80	31.80	72.40	72.40	123.6	123.6	203.3	203.3	329.6	329.6
Partial safety factor	γ_{Ms}	-	1.50	1.50	1.50	1.50	1.50	1.50	1.50	1.50	1.50	1.50	1.50
CONCRETE PRY-OUT FAILURE													
Factor	k	-	1.00	1.00	1.00	1.00	1.00	1.00	2.00	1.00	2.00	1.00	2.00
Installation safety factor	γ_{inst}	-	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
CONCRETE EDGE FAILURE													
Effective length of anchor	ℓ_f	[mm]	43.00	43.00	35.00	50.00	70.00	55.00	85.00	60.00	100.0	75.00	120.0
Anchor diameter	d_{nom}	[mm]	5.00	6.00	6.00	8.00	8.00	10.00	10.00	12.00	12.00	14.00	14.00
Installation safety factor	γ_{inst}	-	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Design Performance Data

Characteristic Resistance under fire exposure in concrete C20/25 to C50/60

Size			5	6	8	10	12	14					
R (for EI) = 30 min													
Effective embedment depth	h_{ef}	[mm]	32.00	24.70	42.00	36.00	53.00	40.00	65.00	42.00	76.00	54.00	92.00
TENSION LOAD													
STEEL FAILURE													
Characteristic resistance	$N_{Rk,s}$	[kN]	0.20	0.28	0.28	0.75	0.75	1.57	1.57	2.26	2.26	3.08	3.08
PULL-OUT FAILURE													
Characteristic resistance	$N_{Rk,p}$	[kN]	1.13	1.38	1.75	1.88	3.25	2.00	4.75	1.75	6.50	3.25	8.50
SHEAR LOAD													
STEEL FAILURE													
Characteristic resistance without lever arm	$V_{Rk,s}$	[kN]	0.20	0.28	0.28	0.75	0.75	1.57	1.57	2.26	2.26	3.08	3.08
Characteristic resistance with lever arm	$M_{Rk,s}$	[Nm]	0.15	0.25	0.25	0.90	0.90	2.36	2.36	4.07	4.07	6.47	6.47
R (for EI) = 60 min													
Effective embedment depth	h_{ef}	[mm]	32.00	24.70	42.00	36.00	53.00	40.00	65.00	42.00	76.00	54.00	92.00
TENSION LOAD													
STEEL FAILURE													
Characteristic resistance	$N_{Rk,s}$	[kN]	0.18	0.25	0.25	0.65	0.65	1.18	1.18	1.70	1.70	2.31	2.31
PULL-OUT FAILURE													
Characteristic resistance	$N_{Rk,p}$	[kN]	1.13	1.38	1.75	1.88	3.25	2.00	4.75	1.75	6.50	3.25	8.50
SHEAR LOAD													
STEEL FAILURE													
Characteristic resistance without lever arm	$V_{Rk,s}$	[kN]	0.18	0.25	0.25	0.65	0.65	1.18	1.18	1.70	1.70	2.31	2.31
Characteristic resistance with lever arm	$M_{Rk,s}$	[Nm]	0.13	0.23	0.23	0.78	0.78	1.77	1.77	3.05	3.05	4.85	4.85
R (for EI) = 90 min													
Effective embedment depth	h_{ef}	[mm]	32.00	24.70	42.00	36.00	53.00	40.00	65.00	42.00	76.00	54.00	92.00
TENSION LOAD													
STEEL FAILURE													
Characteristic resistance	$N_{Rk,s}$	[kN]	0.14	0.20	0.20	0.50	0.50	1.02	1.02	1.47	1.47	2.00	2.00
PULL-OUT FAILURE													
Characteristic resistance	$N_{Rk,p}$	[kN]	1.13	1.38	1.75	1.88	3.25	2.00	4.75	1.75	6.50	3.25	8.50
SHEAR LOAD													
STEEL FAILURE													
Characteristic resistance without lever arm	$V_{Rk,s}$	[kN]	0.14	0.20	0.20	0.50	0.50	1.02	1.02	1.47	1.47	2.00	2.00
Characteristic resistance with lever arm	$M_{Rk,s}$	[Nm]	0.10	0.18	0.18	0.60	0.60	1.53	1.53	2.65	2.65	4.20	4.20
R (for EI) = 120 min													
Effective embedment depth	h_{ef}	[mm]	32.00	24.70	42.00	36.00	53.00	40.00	65.00	42.00	76.00	54.00	92.00
TENSION LOAD													
STEEL FAILURE													
Characteristic resistance	$N_{Rk,s}$	[kN]	0.10	0.14	0.14	0.40	0.40	0.79	0.79	1.13	1.13	1.54	1.54
PULL-OUT FAILURE													
Characteristic resistance	$N_{Rk,p}$	[kN]	0.90	1.10	1.40	1.50	2.60	1.60	3.80	1.40	5.20	2.60	6.80
SHEAR LOAD													
STEEL FAILURE													
Characteristic resistance without lever arm	$V_{Rk,s}$	[kN]	0.10	0.14	0.14	0.40	0.40	0.79	0.79	1.13	1.13	1.54	1.54
Characteristic resistance with lever arm	$M_{Rk,s}$	[Nm]	0.07	0.13	0.13	0.48	0.48	1.18	1.18	2.04	2.04	3.23	3.23

Design Performance Data

Allowable values for resistance in case of Seismic performance category C1

Size			8	10	14
Effective embedment depth	h_{ef}	[mm]	53.00	65.00	92.00
TENSION LOAD, STEEL FAILURE					
Characteristic resistance	$N_{Rk,s}$	[kN]	60.40	82.40	157.00
Partial safety factor	$\gamma_{MsN,seisC1}$	-	1.40	1.40	1.50
TENSION LOAD, PULL-OUT FAILURE					
Characteristic resistance	$N_{Rk,p}$	[kN]	5.40	13.50	19.20
Installation safety factor	γ_{inst}	-	1.00	1.00	1.00
SHEAR LOAD, STEEL FAILURE					
Characteristic resistance without lever arm	$V_{Rk,s}$	[kN]	15.10	27.40	52.30
Partial safety factor	$\gamma_{MsV,seisC1}$	-	1.50	1.50	1.50

Allowable values for resistance in case of Seismic performance category C2

Size			8	10	14
Effective embedment depth	h_{ef}	[mm]	53.00	65.00	92.00
TENSION LOAD, STEEL FAILURE					
Characteristic resistance	$N_{Rk,s}$	[kN]	60.40	82.40	157.00
Partial safety factor	$\gamma_{MsN,seisC2}$	-	1.40	1.40	1.50
TENSION LOAD, PULL-OUT FAILURE					
Characteristic resistance	$N_{Rk,p}$	[kN]	1.57	4.91	14.87
Installation safety factor	γ_{inst}	-	1.00	1.00	1.00
SHEAR LOAD, STEEL FAILURE					
Characteristic resistance without lever arm	$V_{Rk,s}$	[kN]	9.90	20.60	35.10
Partial safety factor	$\gamma_{MsV,seisC2}$	-	1.50	1.50	1.50

Product Commercial Data

Product Code	Anchor	Quantity [pcs]	Weight [kg]
	Length [mm]	Box	
FDG-R-LX-05X035-HF-ZP	35	100	0.10
FDG-R-LX-05X050-HF-ZP	50	100	1.02
FDG-R-LX-05X075-HF-ZP	75	100	1.17
FDG-R-LX-06X050-HF-ZP	50	100	1.59
FDG-R-LX-06X060-HF-ZP	60	100	1.83
FDG-R-LX-06X075-HF-ZP	75	100	2.1
FDG-R-LX-06X090-HF-ZP	90	100	2.5
FDG-R-LX-06X100-HF-ZP	100	100	2.7
FDG-R-LX-06X130-HF-ZP	130	100	3.3
FDG-R-LX-06X150-HF-ZP	150	100	3.8
FDG-R-LX-08X060-HF-ZP	60	100	3.4
FDG-R-LX-08X075-HF-ZP	75	100	4.0
FDG-R-LX-08X090-HF-ZP	90	100	4.5
FDG-R-LX-08X100-HF-ZP	100	100	4.9

Product Commercial Data

Product Code	Anchor	Quantity [pcs]	Weight [kg]
	Length [mm]	Box	Box
FDG-R-LX-08X120-HF-ZP	120	50	2.9
FDG-R-LX-08X130-HF-ZP	130	50	3.0
FDG-R-LX-08X150-HF-ZP	150	50	3.4
FDG-R-LX-10X060-HF-ZP	60	50	2.7
FDG-R-LX-10X065-HF-ZP	65	50	2.8
FDG-R-LX-10X075-HF-ZP	75	50	3.1
FDG-R-LX-10X085-HF-ZP	85	50	3.4
FDG-R-LX-10X090-HF-ZP	90	50	3.6
FDG-R-LX-10X100-HF-ZP	100	50	3.8
FDG-R-LX-10X110-HF-ZP	110	25	2.2
FDG-R-LX-10X120-HF-ZP	120	25	2.2
FDG-R-LX-10X130-HF-ZP	130	25	2.4
FDG-R-LX-10X140-HF-ZP	140	25	2.5
FDG-R-LX-10X150-HF-ZP	150	25	2.7
FDG-R-LX-12X075-HF-ZP	75	50	4.6
FDG-R-LX-12X100-HF-ZP	100	50	5.6
FDG-R-LX-12X130-HF-ZP	130	50	6.9
FDG-R-LX-12X150-HF-ZP	150	50	7.8
FDG-R-LX-14X080-HF-ZP	80	20	2.7
FDG-R-LX-14X105-HF-ZP	105	20	3.3
FDG-R-LX-14X115-HF-ZP	115	20	3.6
FDG-R-LX-14X135-HF-ZP	135	20	4.0
FDG-R-LX-14X160-HF-ZP	160	15	3.6

1) ETA 17/0806

02. Zinc Flake Coated Hex With Flange Concrete Screw Anchor

Self-tapping concrete screwbolt



Approvals and Reports

- ETA 17/0806



Features and benefits

- Time efficient installation through streamlined procedure - simply drill and drive.
- Completely removable with possibility of reuse.
- Unique design with patented threadform ensures high performance for relatively small hole diameter.
- Non-expansion functioning ensures low risk of damage to base material and makes FDG-R-LX ideal for installation near edges and adjacent anchors.
- Special zinc flake corrosion-resistant coating.
- High performance in both uncracked and cracked concrete.
- Different head types for any application.
- Oversize head for fixtures with elongated holes.
- Excellent product for temporary fixing.

Applications

- Through-fixing
- Temporary anchorages
- Formwork support systems
- Balustrading & handrails
- Fencing & gates manufacturing and installation
- Racking systems
- Public seating
- Scaffolding

Base materials

Approved for use in:

- Cracked concrete C20/25-C50/60
- Non-cracked concrete C20/25-C50/60
- Reinforced concrete
- Unreinforced concrete

Also suitable for use in:

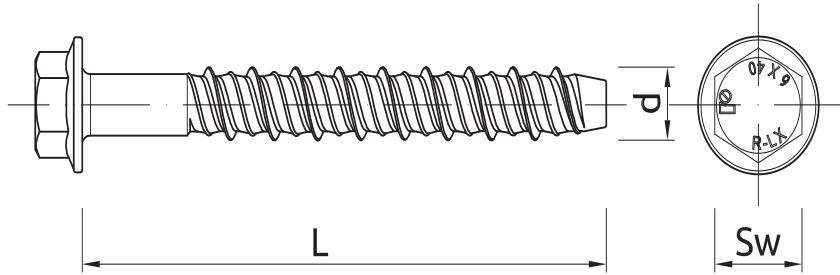
- Natural Stone (after site testing)

Installation guide



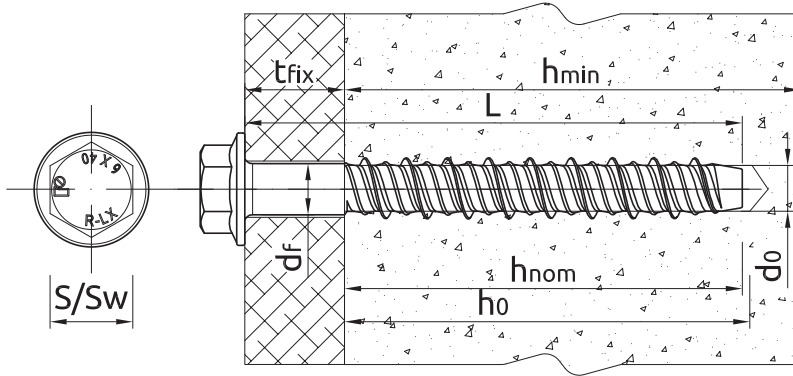
1. Drill the hole with rotary hammer drilling machine. Drill to a required depth.
2. Blow out dust at least 4 times with a hand pump.
3. Possibility of unscrewing and re-screwing.
4. Tighten to the recommended torque.
5. After installation.

Product Information



Size	Product Code	Approval type	Anchor		Fixture		
			Diameter	Length	Max. thickness t _{fix} for:		Hole diameter
			d	L	h _{nom,red}	h _{nom,std}	d _f
			[mm]	[mm]	[mm]	[mm]	[mm]
5	FDG-R-LX-05X050-HF-ZF	ETA-17/0806	6.3	50	-	7	7
	FDG-R-LX-05X075-HF-ZF	ETA-17/0806	6.3	75	-	32	7
6	FDG-R-LX-06X050-HF-ZF	ETA-17/0806	7.5	50	7	-	9
	FDG-R-LX-06X075-HF-ZF	ETA-17/0806	7.5	75	32	20	9
	FDG-R-LX-06X100-HF-ZF	ETA-17/0806	7.5	100	57	45	9
	FDG-R-LX-06X150-HF-ZF	ETA-17/0806	7.5	150	107	95	9
	FDG-R-LX-06X130-HF-ZF	ETA-17/0806	7.5	130	87	75	9
8	FDG-R-LX-08X060-HF-ZF	ETA-17/0806	10	60	10	-	12
	FDG-R-LX-08X075-HF-ZF	ETA-17/0806	10	75	25	5	12
	FDG-R-LX-08X090-HF-ZF	ETA-17/0806	10	90	40	20	12
	FDG-R-LX-08X100-HF-ZF	ETA-17/0806	10	100	50	30	12
	FDG-R-LX-08X130-HF-ZF	ETA-17/0806	10	130	80	60	12
	FDG-R-LX-08X150-HF-ZF	ETA-17/0806	10	150	100	80	12
10	FDG-R-LX-10X065-HF-ZF	ETA-17/0806	12.5	65	10	-	14
	FDG-R-LX-10X075-HF-ZF	ETA-17/0806	12.5	75	20	-	14
	FDG-R-LX-10X085-HF-ZF	ETA-17/0806	12.5	85	30	-	14
	FDG-R-LX-10X100-HF-ZF	ETA-17/0806	12.5	100	45	15	14
	FDG-R-LX-10X120-HF-ZF	ETA-17/0806	12.5	120	65	35	14
	FDG-R-LX-10X140-HF-ZF	ETA-17/0806	12.5	140	85	55	14
12	FDG-R-LX-12X075-HF-ZF	ETA-17/0806	14.9	75	15	-	16
	FDG-R-LX-12X100-HF-ZF	ETA-17/0806	14.9	100	40	-	16
	FDG-R-LX-12X130-HF-ZF	ETA-17/0806	14.9	130	70	30	16
	FDG-R-LX-12X150-HF-ZF	ETA-17/0806	14.9	150	90	50	16
14	FDG-R-LX-14X080-HF-ZF	ETA-17/0806	17	80	5	-	18
	FDG-R-LX-14X105-HF-ZF	ETA-17/0806	17	105	30	-	18
	FDG-R-LX-14X115-HF-ZF	ETA-17/0806	17	115	40	-	18
	FDG-R-LX-14X135-HF-ZF	ETA-17/0806	17	135	60	15	18
	FDG-R-LX-14X135-HF-ZF	ETA-17/0806	17	135	60	15	18

Installation data



Size			5	6	8	10	12	14
Thread diameter	d	[mm]	6.3	7.5	10	12.5	14.9	17
Hole diameter in substrate	d ₀	[mm]	5	6	8	10	12	14
Wrench size	Sw	[mm]	8	10	13	15	16	19
External diameter of washer		[mm]	12	14	18	22	27	32
Max. torque for impact screw driver	T _{imp,max}	[Nm]	200	400	900	950	950	950
STANDARD EMBEDMENT DEPTH								
Min. hole depth in substrate	h _{0,s}	[mm]	50	65	80	95	110	130
Real hole depth in substrate	h ₀	[mm]	L + 10 - t _{fix}	L + 10 - t _{fix}	L + 10 - t _{fix}	L + 10 - t _{fix}	L + 10 - t _{fix}	L + 10 - t _{fix}
Min. installation depth	h _{nom,s}	[mm]	43	55	70	85	100	120
Min. substrate thickness	h _{min,s}	[mm]	100	100	110	130	155	190
Min. spacing	s _{min,s}	[mm]	40	45	50	60	80	100
Min. edge distance	c _{min,s}	[mm]	40	45	50	60	80	100
REDUCED EMBEDMENT DEPTH								
Min. hole depth in substrate	h _{0,r}	[mm]	-	50	60	65	70	85
Real hole depth in substrate	h ₀	[mm]	-	L + 10 - t _{fix}	L + 10 - t _{fix}	L + 10 - t _{fix}	L + 10 - t _{fix}	L + 10 - t _{fix}
Min. installation depth	h _{nom,r}	[mm]	-	43	50	55	60	75
Min. substrate thickness	h _{min,r}	[mm]	-	100	100	100	110	110
Min. spacing	s _{min,r}	[mm]	-	45	50	60	80	100
Min. edge distance	c _{min,r}	[mm]	-	45	50	60	80	100

Mechanical Properties

Size			5	6	8	10	12	14
Nominal ultimate tensile strength - tension	f _{uk}	[N/mm ²]	1300	1250	1200	1050	1000	1020
Nominal yield strength - tension	f _{yk}	[N/mm ²]	1150	1100	1050	950	900	800
Cross sectional area - tension	A _s	[mm ²]	19.6	28.3	50.3	78.5	113	153.9
Elastic section modulus	W _{el}	[mm ³]	12.2	21.2	50.3	98.1	169.4	269.3
Characteristic bending resistance	M ⁰ _{Rk,s}	[Nm]	19	31.8	72.4	123.6	203.3	329.6
Design bending resistance	M	[Nm]	12.7	21.2	48.3	82.4	135.5	219.7

Basic Performance Data

Performance data for single anchor without influence of edge distance and spacing.

Size			5	6	8	10	12	14
Nominal ultimate tensile strength - tension	f _{uk}	[N/mm ²]	1300	1250	1200	1050	1000	1020
Nominal yield strength - tension	f _{yk}	[N/mm ²]	1150	1100	1050	950	900	800
Cross sectional area - tension	A _s	[mm ²]	19.6	28.3	50.3	78.5	113	153.9
Elastic section modulus	W _{el}	[mm ³]	12.2	21.2	50.3	98.1	169.4	269.3
Characteristic bending resistance	M ⁰ _{Rk,s}	[Nm]	19	31.8	72.4	123.6	203.3	329.6
Design bending resistance	M	[Nm]	12.7	21.2	48.3	82.4	135.5	219.7

Basic Performance Data

Size		5	6	8	10	12	14
MEAN ULTIMATE LOAD							
TENSION LOAD N $R_{u,m}$							
NON-CRACKED CONCRETE C20/25							
Standard embedment depth	[kN]	10.10	14.80	26.04	35.37	44.72	59.96
Reduced embedment depth	[kN]	-	12.22	14.58	17.08	18.37	26.79
CRACKED CONCRETE C20/25							
Standard embedment depth	[kN]	7.10	11.10	16.10	24.89	31.47	41.92
Reduced embedment depth	[kN]	-	8.60	10.10	10.70	10.80	17.40
SHEAR LOAD V $R_{u,m}$							
NON-CRACKED CONCRETE C20/25							
Standard embedment depth	[kN]	14.66	18.37	26.04	51.91	71.19	98.91
Reduced embedment depth	[kN]	-	12.22	14.58	17.08	18.37	26.79
CRACKED CONCRETE C20/25							
Standard embedment depth	[kN]	10.32	12.93	18.33	49.78	62.94	83.83
Reduced embedment depth	[kN]	-	8.60	10.26	12.02	12.93	18.85
CHARACTERISTIC LOAD							
TENSION LOAD N R_k							
NON-CRACKED CONCRETE C20/25							
Standard embedment depth	[kN]	7.00	12.00	18.98	25.78	32.59	43.41
Reduced embedment depth	[kN]	-	8.90	10.63	12.45	13.39	19.52
CRACKED CONCRETE C20/25							
Standard embedment depth	[kN]	4.50	7.00	13.00	18.05	22.82	30.39
Reduced embedment depth	[kN]	-	6.23	7.00	8.00	7.00	13.00
SHEAR LOAD V R_k							
NON-CRACKED CONCRETE C20/25							
Standard embedment depth	[kN]	8.90	13.39	18.98	41.20	57.00	78.50
Reduced embedment depth	[kN]	-	8.90	10.63	12.45	13.39	19.52
CRACKED CONCRETE C20/25							
Standard embedment depth	[kN]	6.23	9.37	13.29	36.09	45.63	60.77
Reduced embedment depth	[kN]	-	6.23	7.44	8.71	9.37	13.66
DESIGN LOAD							
TENSION LOAD N R_d							
NON-CRACKED CONCRETE C20/25							
Standard embedment depth	[kN]	3.89	8.00	12.65	17.19	21.73	28.94
Reduced embedment depth	[kN]	-	5.94	7.08	8.30	8.93	13.01
CRACKED CONCRETE C20/25							
Standard embedment depth	[kN]	2.50	4.67	8.67	12.03	15.21	20.26
Reduced embedment depth	[kN]	-	4.16	4.67	5.33	4.67	8.67
SHEAR LOAD V R_d							
NON-CRACKED CONCRETE C20/25							
Standard embedment depth	[kN]	5.94	8.93	12.65	27.47	38.00	52.33
Reduced embedment depth	[kN]	-	5.94	7.08	8.30	8.93	13.01
CRACKED CONCRETE C20/25							
Standard embedment depth	[kN]	4.16	6.25	8.86	24.06	30.42	40.52
Reduced embedment depth	[kN]	-	4.16	4.96	5.81	6.25	9.11

Design Performance Data

(-) failure is not decisive

Size			5	6	8	10	12	14					
Min. installation depth	h_{nom}	[mm]	43.00	35.00	55.00	50.00	70.00	55.00	85.00	60.00	100.0	75.00	120.0
Effective embedment depth	h_{ef}	[mm]	32.00	24.70	42.00	36.00	53.00	40.00	65.00	42.00	76.00	54.00	92.00
TENSION LOAD													
STEEL FAILURE													
Characteristic resistance	$N_{Rk,s}$	[kN]	25.50	35.40	35.40	60.40	60.40	82.40	82.40	113.0	113.0	157.0	157.0
Partial safety factor	γ_{Ms}	-	1.40	1.40	1.40	1.40	1.40	1.40	1.40	1.40	1.40	1.50	1.50
PULL-OUT FAILURE; NON-CRACKED CONCRETE C20/25													
Characteristic resistance	$N_{Rk,p}$	[kN]	7.00	-	12.00	-	-	-	-	-	-	-	-
PULL-OUT FAILURE; CRACKED CONCRETE C20/25													
Characteristic resistance	$N_{Rk,p}$	[kN]	4.50	-	7.00	7.00	13.00	8.00	-	7.00	-	13.00	-
PULL-OUT FAILURE													
Installation safety factor	γ_{inst}	-	1.20	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Increasing factors for $N_{Rd,p}$ - C30/37	ψ_c	-	1.08	1.08	1.08	1.08	1.08	1.08	1.08	1.08	1.08	1.08	1.08
Increasing factors for $N_{Rd,p}$ - C40/50	ψ_c	-	1.15	1.15	1.15	1.15	1.15	1.15	1.15	1.15	1.15	1.15	1.15
Increasing factors for $N_{Rd,p}$ - C50/60	ψ_c	-	1.19	1.19	1.19	1.19	1.19	1.19	1.19	1.19	1.19	1.19	1.19
CONCRETE CONE FAILURE													
Installation safety factor	γ_{inst}	-	1.20	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Factor for cracked concrete	$k_{cr,N}$	-	7.70	7.70	7.70	7.70	7.70	7.70	7.70	7.70	7.70	7.70	7.70
Factor for non-cracked concrete	$k_{ucr,N}$	-	11.00	11.00	11.00	11.00	11.00	11.00	11.00	11.00	11.00	11.00	11.00
Spacing	$s_{cr,N}$	[mm]	90.00	90.00	126.0	112.0	160.0	120.0	196.0	126.0	228.0	165.0	276.0
Edge distance	$c_{cr,N}$	[mm]	45.00	45.00	63.00	56.00	80.00	60.00	98.00	63.00	114.0	83.00	138.0
CONCRETE SPLITTING FAILURE													
Installation safety factor	γ_{inst}	-	1.20	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Spacing	$s_{cr,sp}$	[mm]	90.00	90.00	126.0	112.0	160.0	136.0	222.0	126.0	228.0	188.0	312.0
Edge distance	$c_{cr,sp}$	[mm]	45.00	45.00	63.00	56.00	80.00	68.00	111.0	63.00	114.0	94.00	156.0
SHEAR LOAD													
STEEL FAILURE													
Characteristic resistance without lever arm	$V_{Rk,s}$	[kN]	12.70	17.70	17.70	30.20	30.20	41.20	41.20	57.00	57.00	78.50	78.50
Ductility factor	k_γ	-	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80
Characteristic resistance with lever arm	$M_{Rk,s}$	[Nm]	19.00	31.80	31.80	72.40	72.40	123.6	123.6	203.3	203.3	329.6	329.6
Partial safety factor	γ_{Ms}	-	1.50	1.50	1.50	1.50	1.50	1.50	1.50	1.50	1.50	1.50	1.50
CONCRETE PRY-OUT FAILURE													
Factor	k	-	1.00	1.00	1.00	1.00	1.00	1.00	2.00	1.00	2.00	1.00	2.00
Installation safety factor	γ_{inst}	-	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
CONCRETE EDGE FAILURE													
Effective length of anchor	ℓ_f	[mm]	43.00	43.00	35.00	50.00	70.00	55.00	85.00	60.00	100.0	75.00	120.0
Anchor diameter	d_{nom}	[mm]	5.00	6.00	6.00	8.00	8.00	10.00	10.00	12.00	12.00	14.00	14.00
Installation safety factor	γ_{inst}	-	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Design Performance Data

Characteristic Resistance under fire exposure in concrete C20/25 to C50/60

Size			5	6	8	10	12	14					
R (for EI) = 30 min													
Effective embedment depth	h_{ef}	[mm]	32.00	24.70	42.00	36.00	53.00	40.00	65.00	42.00	76.00	54.00	92.00
TENSION LOAD													
STEEL FAILURE													
Characteristic resistance	$N_{Rk,s}$	[kN]	0.20	0.28	0.28	0.75	0.75	1.57	1.57	2.26	2.26	3.08	3.08
PULL-OUT FAILURE													
Characteristic resistance	$N_{Rk,p}$	[kN]	1.13	1.38	1.75	1.88	3.25	2.00	4.75	1.75	6.50	3.25	8.50
SHEAR LOAD													
STEEL FAILURE													
Characteristic resistance without lever arm	$V_{Rk,s}$	[kN]	0.20	0.28	0.28	0.75	0.75	1.57	1.57	2.26	2.26	3.08	3.08
Characteristic resistance with lever arm	$M_{Rk,s}$	[Nm]	0.15	0.25	0.25	0.90	0.90	2.36	2.36	4.07	4.07	6.47	6.47
R (for EI) = 60 min													
Effective embedment depth	h_{ef}	[mm]	32.00	24.70	42.00	36.00	53.00	40.00	65.00	42.00	76.00	54.00	92.00
TENSION LOAD													
STEEL FAILURE													
Characteristic resistance	$N_{Rk,s}$	[kN]	0.18	0.25	0.25	0.65	0.65	1.18	1.18	1.70	1.70	2.31	2.31
PULL-OUT FAILURE													
Characteristic resistance	$N_{Rk,p}$	[kN]	1.13	1.38	1.75	1.88	3.25	2.00	4.75	1.75	6.50	3.25	8.50
SHEAR LOAD													
STEEL FAILURE													
Characteristic resistance without lever arm	$V_{Rk,s}$	[kN]	0.18	0.25	0.25	0.65	0.65	1.18	1.18	1.70	1.70	2.31	2.31
Characteristic resistance with lever arm	$M_{Rk,s}$	[Nm]	0.13	0.23	0.23	0.78	0.78	1.77	1.77	3.05	3.05	4.85	4.85
R (for EI) = 90 min													
Effective embedment depth	h_{ef}	[mm]	32.00	24.70	42.00	36.00	53.00	40.00	65.00	42.00	76.00	54.00	92.00
TENSION LOAD													
STEEL FAILURE													
Characteristic resistance	$N_{Rk,s}$	[kN]	0.14	0.20	0.20	0.50	0.50	1.02	1.02	1.47	1.47	2.00	2.00
PULL-OUT FAILURE													
Characteristic resistance	$N_{Rk,p}$	[kN]	1.13	1.38	1.75	1.88	3.25	2.00	4.75	1.75	6.50	3.25	8.50
SHEAR LOAD													
STEEL FAILURE													
Characteristic resistance without lever arm	$V_{Rk,s}$	[kN]	0.14	0.20	0.20	0.50	0.50	1.02	1.02	1.47	1.47	2.00	2.00
Characteristic resistance with lever arm	$M_{Rk,s}$	[Nm]	0.10	0.18	0.18	0.60	0.60	1.53	1.53	2.65	2.65	4.20	4.20
R (for EI) = 120 min													
Effective embedment depth	h_{ef}	[mm]	32.00	24.70	42.00	36.00	53.00	40.00	65.00	42.00	76.00	54.00	92.00
TENSION LOAD													
STEEL FAILURE													
Characteristic resistance	$N_{Rk,s}$	[kN]	0.10	0.14	0.14	0.40	0.40	0.79	0.79	1.13	1.13	1.54	1.54
PULL-OUT FAILURE													
Characteristic resistance	$N_{Rk,p}$	[kN]	0.90	1.10	1.40	1.50	2.60	1.60	3.80	1.40	5.20	2.60	6.80
SHEAR LOAD													
STEEL FAILURE													
Characteristic resistance without lever arm	$V_{Rk,s}$	[kN]	0.10	0.14	0.14	0.40	0.40	0.79	0.79	1.13	1.13	1.54	1.54
Characteristic resistance with lever arm	$M_{Rk,s}$	[Nm]	0.07	0.13	0.13	0.48	0.48	1.18	1.18	2.04	2.04	3.23	3.23

Design Performance Data

Allowable values for resistance in case of Seismic performance category C1

Size			8	10	14
Effective embedment depth	h_{ef}	[mm]	53.00	65.00	92.00
TENSION LOAD, STEEL FAILURE					
Characteristic resistance	$N_{Rk,s}$	[kN]	60.40	82.40	157.00
Partial safety factor	$\gamma_{MsN,seisC1}$	-	1.40	1.40	1.50
TENSION LOAD, PULL-OUT FAILURE					
Characteristic resistance	$N_{Rk,p}$	[kN]	5.40	13.50	19.20
Installation safety factor	γ_{inst}	-	1.00	1.00	1.00
SHEAR LOAD, STEEL FAILURE					
Characteristic resistance without lever arm	$V_{Rk,s}$	[kN]	15.10	27.40	52.30
Partial safety factor	$\gamma_{MsV,seisC1}$	-	1.50	1.50	1.50

Allowable values for resistance in case of Seismic performance category C2

Size			8	10	14
Effective embedment depth	h_{ef}	[mm]	53.00	65.00	92.00
TENSION LOAD, STEEL FAILURE					
Characteristic resistance	$N_{Rk,s}$	[kN]	60.40	82.40	157.00
Partial safety factor	$\gamma_{MsN,seisC2}$	-	1.40	1.40	1.50
TENSION LOAD, PULL-OUT FAILURE					
Characteristic resistance	$N_{Rk,p}$	[kN]	1.57	4.91	14.87
Installation safety factor	γ_{inst}	-	1.00	1.00	1.00
SHEAR LOAD, STEEL FAILURE					
Characteristic resistance without lever arm	$V_{Rk,s}$	[kN]	9.90	20.60	35.10
Partial safety factor	$\gamma_{MsV,seisC2}$	-	1.50	1.50	1.50

Product Commercial Data

Product Code	Anchor	Quantity [pcs]	Weight [kg]
	Length [mm]	Box	
FDG-R-LX-05X050-HF-ZF	50	100	1.02
FDG-R-LX-05X075-HF-ZF	75	100	1.17
FDG-R-LX-06X050-HF-ZF	50	100	1.62
FDG-R-LX-06X075-HF-ZF	75	100	2.2
FDG-R-LX-06X100-HF-ZF	100	100	2.7
FDG-R-LX-06X150-HF-ZF	150	100	3.8
FDG-R-LX-06X130-HF-ZF	130	100	3.3
FDG-R-LX-08X060-HF-ZF	60	100	3.4
FDG-R-LX-08X075-HF-ZF	75	100	4.0
FDG-R-LX-08X090-HF-ZF	90	100	4.5
FDG-R-LX-08X100-HF-ZF	100	100	4.9
FDG-R-LX-08X130-HF-ZF	130	50	3.1
FDG-R-LX-08X150-HF-ZF	150	50	3.4
FDG-R-LX-10X065-HF-ZF	65	50	2.8

Product Commercial Data

Product Code	Anchor	Quantity [pcs]
	Length [mm]	Box
FDG-R-LX-10X075-HF-ZF	75	50
FDG-R-LX-10X085-HF-ZF	85	50
FDG-R-LX-10X100-HF-ZF	100	50
FDG-R-LX-10X120-HF-ZF	120	25
FDG-R-LX-10X140-HF-ZF	140	25
FDG-R-LX-12X075-HF-ZF	75	50
FDG-R-LX-12X100-HF-ZF	100	50
FDG-R-LX-12X130-HF-ZF	130	50
FDG-R-LX-12X150-HF-ZF	150	50
FDG-R-LX-14X080-HF-ZF	80	20
FDG-R-LX-14X105-HF-ZF	105	20
FDG-R-LX-14X115-HF-ZF	115	20
FDG-R-LX-14X135-HF-ZF	135	20
FDG-R-LX-14X135-HF-ZF	135	20

1) ETA 17/0806

Weight [kg]
Box
3.1
3.4
3.8
2.3
2.5
4.6
5.8
6.9
8.0
2.7
3.4
3.6
4.1
4.1

03. Zinc Plated Countersunk Concrete Screw Anchor

Self-tapping concrete screwbolt



Approvals and Reports

- ETA 17/0806



Features and benefits

- Time efficient installation through streamlined procedure - simply drill and drive.
- Completely removable with possibility of reuse.
- Unique design with patented threadform ensures high performance for relatively small hole diameter.
- Non-expansion functioning ensures low risk of damage to base material and makes FDG-R-LX ideal for installation near edges and adjacent anchors.
- High performance in non-cracked concrete.
- Different head types for any application.
- Oversize head for fixtures with elongated holes.
- Excellent product for temporary fixing.
- Suitable for standard and reduced embedment depth.
- Concrete screws can be used in earthquake-prone zones - seismic category C1 and C2.

Applications

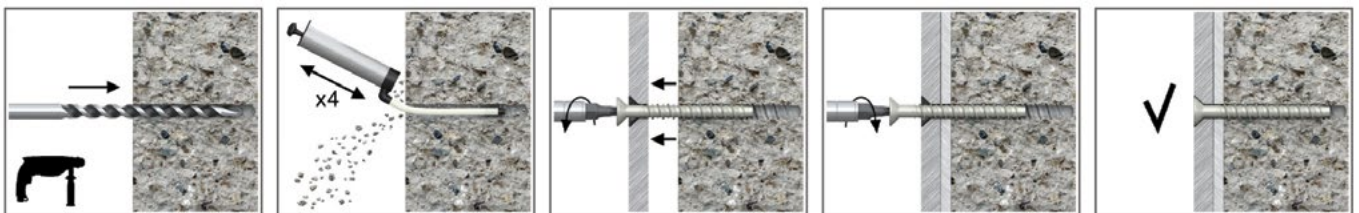
- Through-fixing
- Temporary anchorages
- Formwork support systems
- Balustrading & handrails
- Fencing & gates manufacturing and installation
- Racking systems
- Public seating
- Scaffolding

Base materials

Approved for use in:

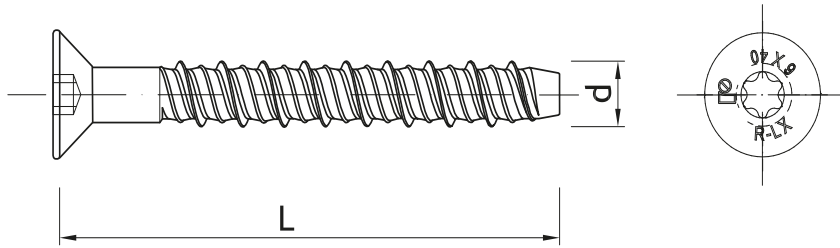
- Cracked concrete C20/25-C50/60
- Non-cracked concrete C20/25-C50/60
- Reinforced concrete
- Unreinforced concrete

Installation guide



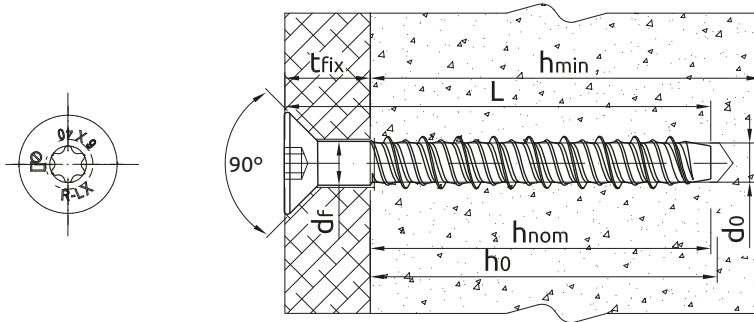
- Drill the hole with rotary hammer drilling machine. Drill to a required depth.
- Blow out dust at least 4 times with a hand pump.
- Possibility of unscrewing and re-screwing.
- Tighten to the recommended torque.
- After installation.

Product Information



Size	Product Code	Anchor		Fixture		
		Diameter	Length	Max. thickness t_{fix} for:		Hole diameter
		d	L	$h_{nom,red}$	$h_{nom,std}$	d_f
		[mm]	[mm]	[mm]	[mm]	[mm]
5	FDG-R-LX-05X050-CS-ZP	6.3	50	-	7	7
	FDG-R-LX-05X075-CS-ZP	6.3	75	-	32	7
6	FDG-R-LX-06X050-CS-ZP	7.5	50	7	-	9
	FDG-R-LX-06X060-CS-ZP	7.5	60	17	5	9
	FDG-R-LX-06X075-CS-ZP	7.5	75	32	20	9
	FDG-R-LX-06X090-CS-ZP	7.5	90	47	35	9
	FDG-R-LX-06X100-CS-ZP	7.5	100	57	45	9
	FDG-R-LX-06X120-CS-ZP	7.5	120	77	65	9
	FDG-R-LX-06X130-CS-ZP	7.5	130	87	75	9
	FDG-R-LX-06X140-CS-ZP	7.5	140	97	85	9
	FDG-R-LX-06X150-CS-ZP	7.5	150	107	95	9
	FDG-R-LX-06X160-CS-ZP	7.5	160	117	105	9
8	FDG-R-LX-08X060-CS-ZP	10	60	10	-	12
	FDG-R-LX-08X075-CS-ZP	10	75	25	5	12
	FDG-R-LX-08X090-CS-ZP	10	90	40	20	12
	FDG-R-LX-08X100-CS-ZP	10	100	50	30	12
	FDG-R-LX-08X120-CS-ZP	10	120	70	50	12
	FDG-R-LX-08X130-CS-ZP	10	130	80	60	12
	FDG-R-LX-08X150-CS-ZP	10	150	100	80	12
10	FDG-R-LX-10X060-CS-ZP	12.5	60	5	-	14
	FDG-R-LX-10X065-CS-ZP	12.5	65	10	-	14
	FDG-R-LX-10X075-CS-ZP	12.5	75	20	-	14
	FDG-R-LX-10X085-CS-ZP	12.5	85	30	-	14
	FDG-R-LX-10X090-CS-ZP	12.5	90	35	5	14
	FDG-R-LX-10X100-CS-ZP	12.5	100	45	15	14
	FDG-R-LX-10X110-CS-ZP	12.5	110	55	25	14
	FDG-R-LX-10X120-CS-ZP	12.5	120	65	35	14
	FDG-R-LX-10X130-CS-ZP	12.5	130	75	45	14
	FDG-R-LX-10X140-CS-ZP	12.5	140	85	55	14
	FDG-R-LX-10X150-CS-ZP	12.5	150	95	65	14
	FDG-R-LX-10X160-CS-ZP	12.5	160	105	75	14

Installation data



Size			5	6	8	10
Thread diameter	d	[mm]	6.3	7.5	10	12.5
Hole diameter in substrate	d ₀	[mm]	5	6	8	10
Screw drive	-	[-]	T25	T40	T50	T50
Head diameter		[mm]	10.9	15.9	21.3	21.3
Max. torque for impact screw driver	T _{imp,max}	[Nm]	200	400	900	950
STANDARD EMBEDMENT DEPTH						
Min. hole depth in substrate	h _{0,s}	[mm]	50	65	80	95
Real hole depth in substrate	h ₀	[mm]	L + 10 - t _{fix}	L + 10 - t _{fix}	L + 10 - t _{fix}	L + 10 - t _{fix}
Min. installation depth	h _{nom,s}	[mm]	43	55	70	85
Min. substrate thickness	h _{min,s}	[mm]	100	100	110	130
Min. spacing	s _{min,s}	[mm]	40	45	50	60
Min. edge distance	c _{min,s}	[mm]	40	45	50	60
REDUCED EMBEDMENT DEPTH						
Min. hole depth in substrate	h _{0,r}	[mm]	-	50	60	65
Real hole depth in substrate	h ₀	[mm]	-	L + 10 - t _{fix}	L + 10 - t _{fix}	L + 10 - t _{fix}
Min. installation depth	h _{nom,r}	[mm]	-	43	50	55
Min. substrate thickness	h _{min,r}	[mm]	-	100	100	100
Min. spacing	s _{min,r}	[mm]	-	45	50	60
Min. edge distance	c _{min,r}	[mm]	-	45	50	60

Mechanical Properties

Size			5	6	8	10
Nominal ultimate tensile strength - tension	f _{uk}	[N/mm ²]	1300	1250	1200	1050
Nominal yield strength - tension	f _{yk}	[N/mm ²]	1150	1100	1050	950
Cross sectional area - tension	A _s	[mm ²]	19.6	28.3	50.3	78.5
Elastic section modulus	W _{el}	[mm ³]	12.2	21.2	50.3	98.1
Characteristic bending resistance	M ⁰ _{Rk,s}	[Nm]	19	31.8	72.4	123.6
Design bending resistance	M	[Nm]	12.7	21.2	48.3	82.4

Basic Performance Data

Performance data for single anchor without influence of edge distance and spacing.

Size			5	6	8	10
Nominal ultimate tensile strength - tension	f _{uk}	[N/mm ²]	1300	1250	1200	1050
Nominal yield strength - tension	f _{yk}	[N/mm ²]	1150	1100	1050	950
Cross sectional area - tension	A _s	[mm ²]	19.6	28.3	50.3	78.5
Elastic section modulus	W _{el}	[mm ³]	12.2	21.2	50.3	98.1
Characteristic bending resistance	M ⁰ _{Rk,s}	[Nm]	19	31.8	72.4	123.6
Design bending resistance	M	[Nm]	12.7	21.2	48.3	82.4

Basic Performance Data

Size		5	6	8	10
MEAN ULTIMATE LOAD					
TENSION LOAD N $R_{u,m}$					
NON-CRACKED CONCRETE C20/25					
Standard embedment depth	[kN]	10.10	14.80	26.04	35.37
Reduced embedment depth	[kN]	-	12.22	14.58	17.08
CRACKED CONCRETE C20/25					
Standard embedment depth	[kN]	7.10	11.10	16.10	24.89
Reduced embedment depth	[kN]	-	8.60	10.10	10.70
SHEAR LOAD V $R_{u,m}$					
NON-CRACKED CONCRETE C20/25					
Standard embedment depth	[kN]	14.66	18.37	26.04	51.91
Reduced embedment depth	[kN]	-	12.22	14.58	17.08
CRACKED CONCRETE C20/25					
Standard embedment depth	[kN]	10.32	12.93	18.33	49.78
Reduced embedment depth	[kN]	-	8.60	10.26	12.02
CHARACTERISTIC LOAD					
TENSION LOAD N R_k					
NON-CRACKED CONCRETE C20/25					
Standard embedment depth	[kN]	7.00	12.00	18.98	25.78
Reduced embedment depth	[kN]	-	8.90	10.63	12.45
CRACKED CONCRETE C20/25					
Standard embedment depth	[kN]	4.50	7.00	13.00	18.05
Reduced embedment depth	[kN]	-	6.23	7.00	8.00
SHEAR LOAD V R_k					
NON-CRACKED CONCRETE C20/25					
Standard embedment depth	[kN]	8.90	13.39	18.98	41.20
Reduced embedment depth	[kN]	-	8.90	10.63	12.45
CRACKED CONCRETE C20/25					
Standard embedment depth	[kN]	6.23	9.37	13.29	36.09
Reduced embedment depth	[kN]	-	6.23	7.44	8.71
DESIGN LOAD					
TENSION LOAD N R_d					
NON-CRACKED CONCRETE C20/25					
Standard embedment depth	[kN]	3.89	8.00	12.65	17.19
Reduced embedment depth	[kN]	-	5.94	7.08	8.30
CRACKED CONCRETE C20/25					
Standard embedment depth	[kN]	2.50	4.67	8.67	12.03
Reduced embedment depth	[kN]	-	4.16	4.67	5.33
SHEAR LOAD V R_d					
NON-CRACKED CONCRETE C20/25					
Standard embedment depth	[kN]	5.94	8.93	12.65	27.47
Reduced embedment depth	[kN]	-	5.94	7.08	8.30
CRACKED CONCRETE C20/25					
Standard embedment depth	[kN]	4.16	6.25	8.86	24.06
Reduced embedment depth	[kN]	-	4.16	4.96	5.81

Design Performance Data

(-) failure is not decisive

Size			5		6		8		10	
Min. installation depth	h_{nom}	[mm]	43.00	-	35.00	55.00	50.00	70.00	55.00	85.00
Effective embedment depth	h_{ef}	[mm]	32.00	-	24.70	42.00	36.00	53.00	40.00	65.00
TENSION LOAD										
STEEL FAILURE										
Characteristic resistance	$N_{Rk,s}$	[kN]	25.50	-	35.40	35.40	60.40	60.40	82.40	82.40
Partial safety factor	γ_{Ms}	-	1.40	-	1.40	1.40	1.40	1.40	1.40	1.40
PULL-OUT FAILURE; NON-CRACKED CONCRETE C20/25										
Characteristic resistance	$N_{Rk,p}$	[kN]	7.00	-	-	12.00	-	-	-	-
PULL-OUT FAILURE; CRACKED CONCRETE C20/25										
Characteristic resistance	$N_{Rk,p}$	[kN]	4.50	-	-	7.00	7.00	13.00	8.00	-
PULL-OUT FAILURE										
Installation safety factor	γ_{inst}	-	1.20	-	1.00	1.00	1.00	1.00	1.00	1.00
Increasing factors for $N_{Rd,p}$ - C30/37	ψ_c	-	1.08	-	1.08	1.08	1.08	1.08	1.08	1.08
Increasing factors for $N_{Rd,p}$ - C40/50	ψ_c	-	1.15	-	1.15	1.15	1.15	1.15	1.15	1.15
Increasing factors for $N_{Rd,p}$ - C50/60	ψ_c	-	1.19	-	1.19	1.19	1.19	1.19	1.19	1.19
CONCRETE CONE FAILURE										
Installation safety factor	γ_{inst}	-	1.20	-	1.00	1.00	1.00	1.00	1.00	1.00
Factor for cracked concrete	$k_{cr,N}$	-	7.70	-	7.70	7.70	7.70	7.70	7.70	7.70
Factor for non-cracked concrete	$k_{ucr,N}$	-	11.00	-	11.00	11.00	11.00	11.00	11.00	11.00
Spacing	$s_{cr,N}$	[mm]	90.00	-	90.00	126.0	112.0	160.0	120.0	196.0
Edge distance	$c_{cr,N}$	[mm]	45.00	-	45.00	63.00	56.00	80.00	60.00	98.00
CONCRETE SPLITTING FAILURE										
Installation safety factor	γ_{inst}	-	1.20	-	1.00	1.00	1.00	1.00	1.00	1.00
Spacing	$s_{cr,sp}$	[mm]	90.00	-	90.00	126.0	112.0	160.0	136.0	222.0
Edge distance	$c_{cr,sp}$	[mm]	45.00	-	45.00	63.00	56.00	80.00	68.00	111.0
SHEAR LOAD										
STEEL FAILURE										
Characteristic resistance without lever arm	$V_{Rk,s}$	[kN]	12.70	-	17.70	17.70	30.20	30.20	41.20	41.20
Ductility factor	k_7	-	0.80	-	0.80	0.80	0.80	0.80	0.80	0.80
Characteristic resistance with lever arm	$M_{Rk,s}$	[Nm]	19.00	-	31.80	31.80	72.40	72.40	123.6	123.6
Partial safety factor	γ_{Ms}	-	1.50	-	1.50	1.50	1.50	1.50	1.50	1.50
CONCRETE PRY-OUT FAILURE										
Factor	k	-	1.00	-	1.00	1.00	1.00	1.00	1.00	2.00
Installation safety factor	γ_{inst}	-	1.00	-	1.00	1.00	1.00	1.00	1.00	1.00
CONCRETE EDGE FAILURE										
Effective length of anchor	ℓ_f	[mm]	43.00	-	43.00	35.00	50.00	70.00	55.00	85.00
Anchor diameter	d_{nom}	[mm]	5.00	-	6.00	6.00	8.00	8.00	10.00	10.00
Installation safety factor	γ_{inst}	-	1.00	-	1.00	1.00	1.00	1.00	1.00	1.00

Design Performance Data

Characteristic Resistance under fire exposure in concrete C20/25 to C50/60

Size			5		6		8		10	
TENSION LOAD										
Edge distance	c_{cr}	[mm]	-	-	-	-	-	-	-	-
Spacing	s_{cr}	[mm]	-	-	-	-	-	-	-	-
R (for EI) = 30 min										
TENSION LOAD										
STEEL FAILURE										
Characteristic resistance	$N_{Rk,s}$	[kN]	-	0.20	0.28	0.28	0.75	0.75	1.57	1.57
PULL-OUT FAILURE										
Characteristic resistance	$N_{Rk,p}$	[kN]	-	1.13	1.38	1.75	1.88	3.25	2.00	4.75
SHEAR LOAD										
STEEL FAILURE										
Characteristic resistance without lever arm	$V_{Rk,s}$	[kN]	-	0.20	0.28	0.28	0.75	0.75	1.57	1.57
Characteristic resistance with lever arm	$M_{Rk,s}$	[Nm]	-	0.15	0.25	0.25	0.90	0.90	2.36	2.36
Effective embedment depth	h_{ef}	[mm]	-	32.00	24.70	42.00	36.00	53.00	40.00	65.00
R (for EI) = 60 min										
TENSION LOAD										
STEEL FAILURE										
Characteristic resistance	$N_{Rk,s}$	[kN]	-	0.18	0.25	0.25	0.65	0.65	1.18	1.18
PULL-OUT FAILURE										
Characteristic resistance	$N_{Rk,p}$	[kN]	-	1.13	1.38	1.75	1.88	3.25	2.00	4.75
SHEAR LOAD										
STEEL FAILURE										
Characteristic resistance without lever arm	$V_{Rk,s}$	[kN]	-	0.18	0.25	0.25	0.65	0.65	1.18	1.18
Characteristic resistance with lever arm	$M_{Rk,s}$	[Nm]	-	0.13	0.23	0.23	0.78	0.78	1.77	1.77
Effective embedment depth	h_{ef}	[mm]	-	32.00	24.70	42.00	36.00	53.00	40.00	65.00
R (for EI) = 90 min										
TENSION LOAD										
STEEL FAILURE										
Characteristic resistance	$N_{Rk,s}$	[kN]	-	0.14	0.20	0.20	0.50	0.50	1.02	1.02
PULL-OUT FAILURE										
Characteristic resistance	$N_{Rk,p}$	[kN]	-	1.13	1.38	1.75	1.88	3.25	2.00	4.75
SHEAR LOAD										
STEEL FAILURE										
Characteristic resistance without lever arm	$V_{Rk,s}$	[kN]	-	0.14	0.20	0.20	0.50	0.50	1.02	1.02
Characteristic resistance with lever arm	$M_{Rk,s}$	[Nm]	-	0.10	0.18	0.18	0.60	0.60	1.53	1.53
Effective embedment depth	h_{ef}	[mm]	-	32.00	24.70	42.00	36.00	53.00	40.00	65.00
R (for EI) = 120 min										
TENSION LOAD										
STEEL FAILURE										
Characteristic resistance	$N_{Rk,s}$	[kN]	-	0.10	0.14	0.14	0.40	0.40	0.79	0.79
PULL-OUT FAILURE										
Characteristic resistance	$N_{Rk,p}$	[kN]	-	0.90	1.10	1.40	1.50	2.60	1.60	3.80
SHEAR LOAD										
STEEL FAILURE										
Characteristic resistance without lever arm	$V_{Rk,s}$	[kN]	-	0.10	0.14	0.14	0.40	0.40	0.79	0.79
Characteristic resistance with lever arm	$M_{Rk,s}$	[Nm]	-	0.07	0.13	0.13	0.48	0.48	1.18	1.18
Effective embedment depth	h_{ef}	[mm]	-	32.00	24.70	42.00	36.00	53.00	40.00	65.00

Design Performance Data

Allowable values for resistance in case of Seismic performance category C1

Size			8	10
Effective embedment depth	h_{ef}	[mm]	53.00	65.00
TENSION LOAD, STEEL FAILURE				
Characteristic resistance	$N_{Rk,s}$	[kN]	60.40	82.40
Partial safety factor	$\gamma_{MsN,seisC1}$	-	1.40	1.40
TENSION LOAD, PULL-OUT FAILURE				
Characteristic resistance	$N_{Rk,p}$	[kN]	5.40	13.50
Installation safety factor	γ_{inst}	-	1.00	1.00
SHEAR LOAD, STEEL FAILURE				
Characteristic resistance without lever arm	$V_{Rk,s}$	[kN]	15.10	27.40
Partial safety factor	$\gamma_{MsV,seisC1}$	-	1.50	1.50

Allowable values for resistance in case of Seismic performance category C2

Size			8	10
Effective embedment depth	h_{ef}	[mm]	53.00	65.00
TENSION LOAD, STEEL FAILURE				
Characteristic resistance	$N_{Rk,s}$	[kN]	60.40	82.40
Partial safety factor	$\gamma_{MsN,seisC2}$	-	1.40	1.40
TENSION LOAD, PULL-OUT FAILURE				
Characteristic resistance	$N_{Rk,p}$	[kN]	1.57	4.91
Installation safety factor	γ_{inst}	-	1.00	1.00
SHEAR LOAD, STEEL FAILURE				
Characteristic resistance without lever arm	$V_{Rk,s}$	[kN]	9.90	20.60
Partial safety factor	$\gamma_{MsV,seisC2}$	-	1.50	1.50

Product Commercial Data

Product Code	Anchor	Quantity [pcs]	Weight [kg]
	Length [mm]	Box	
FDG-R-LX-05X050-CS-ZP	50	100	0.91
FDG-R-LX-05X075-CS-ZP	75	100	1.29
FDG-R-LX-06X050-CS-ZP	50	100	1.59
FDG-R-LX-06X060-CS-ZP	60	100	1.52
FDG-R-LX-06X075-CS-ZP	75	100	1.76
FDG-R-LX-06X090-CS-ZP	90	100	2.2
FDG-R-LX-06X100-CS-ZP	100	100	2.3
FDG-R-LX-06X120-CS-ZP	120	100	2.9
FDG-R-LX-06X130-CS-ZP	130	100	3.0
FDG-R-LX-06X140-CS-ZP	140	100	3.3
FDG-R-LX-06X150-CS-ZP	150	100	3.5
FDG-R-LX-06X160-CS-ZP	160	100	3.6
FDG-R-LX-08X060-CS-ZP	60	100	2.7
FDG-R-LX-08X075-CS-ZP	75	100	3.2

Product Commercial Data

Product Code	Anchor	Quantity [pcs]
	Length [mm]	Box
FDG-R-LX-08X090-CS-ZP	90	100
FDG-R-LX-08X100-CS-ZP	100	100
FDG-R-LX-08X120-CS-ZP	120	50
FDG-R-LX-08X130-CS-ZP	130	50
FDG-R-LX-08X150-CS-ZP	150	50
FDG-R-LX-10X060-CS-ZP	60	50
FDG-R-LX-10X065-CS-ZP	65	50
FDG-R-LX-10X075-CS-ZP	75	50
FDG-R-LX-10X085-CS-ZP	85	50
FDG-R-LX-10X090-CS-ZP	90	50
FDG-R-LX-10X100-CS-ZP	100	50
FDG-R-LX-10X110-CS-ZP	110	50
FDG-R-LX-10X120-CS-ZP	120	25
FDG-R-LX-10X130-CS-ZP	130	25
FDG-R-LX-10X140-CS-ZP	140	25
FDG-R-LX-10X150-CS-ZP	150	20
FDG-R-LX-10X160-CS-ZP	160	20

Weight [kg]
Box
3.8
4.2
2.5
2.7
3.1
2.1
2.2
2.6
2.8
3.1
3.4
3.6
2.0
2.1
2.3
2.0
2.1

1) ETA 17/0806

04. Zinc Flake Coated Countersunk Concrete Screw Anchor

Self-tapping concrete screwbolt



Approvals and Reports

- ETA 17/0806



Features and benefits

- Time efficient installation through streamlined procedure - simply drill and drive.
- Completely removable with possibility of reuse.
- Unique design with patented threadform ensures high performance for relatively small hole diameter and low torque level during installation even in high strength concrete.
- Non-expansion functioning ensures low risk of damage to base material and makes FDG-R-LX ideal for installation near edges and adjacent anchors.
- Highest performance in both cracked and non-cracked concrete.
- Special zinc flake coating for increased corrosion resistance.
- Different head types for any application.
- Possibility of multiple use in high-strength concrete.
- Allround product for any application.

Applications

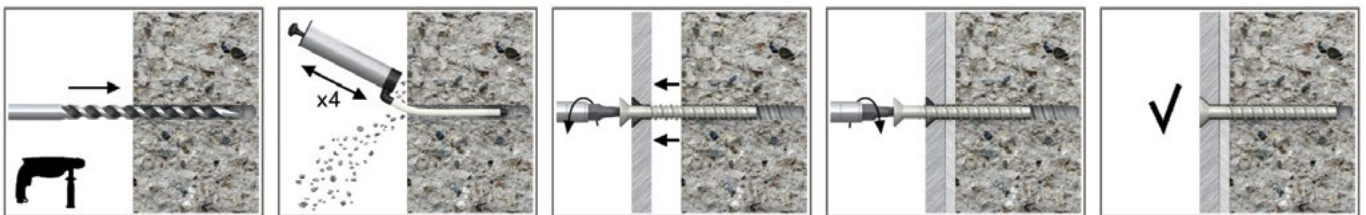
- Through-fixing
- Temporary anchorages
- Formwork support systems
- Balustrading & handrails
- Fencing & gates manufacturing and installation
- Racking systems
- Public seating
- Scaffolding

Base materials

Approved for use in:

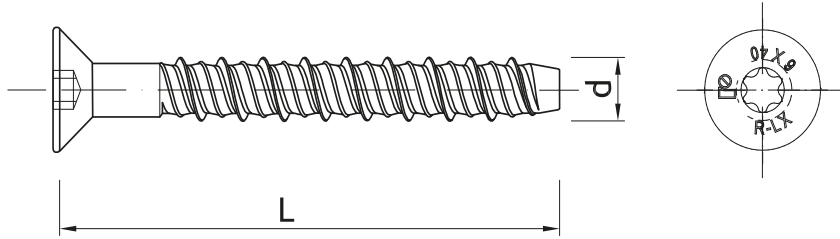
- Cracked concrete C20/25-C50/60
- Non-cracked concrete C20/25-C50/60
- Reinforced concrete
- Unreinforced concrete

Installation guide



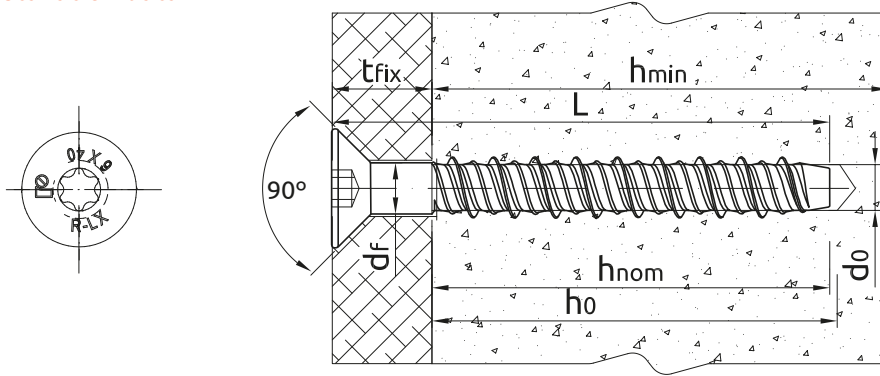
- Drill the hole with rotary hammer drilling machine. Drill to a required depth.
- Blow out dust at least 4 times with a hand pump.
- Possibility of unscrewing and re-screwing.
- Tighten to the recommended torque.
- After installation.

Product Information



Size	Product Code	Anchor		Fixture		
		Diameter	Length	Max. thickness t_{fix} for:		Hole diameter
		d	L	$h_{nom,red}$	$h_{nom,std}$	d_f
		[mm]	[mm]	[mm]	[mm]	[mm]
5	FDG-R-LX-05X050-CS-ZF	6.3	50	-	7	7
	FDG-R-LX-05X075-CS-ZF	6.3	75	-	32	7
6	FDG-R-LX-06X050-CS-ZF	7.5	50	7	-	9
	FDG-R-LX-06X075-CS-ZF	7.5	75	32	20	9
	FDG-R-LX-06X100-CS-ZF	7.5	100	57	45	9
	FDG-R-LX-06X120-CS-ZF	7.5	120	77	65	9
	FDG-R-LX-06X130-CS-ZF	7.5	130	87	75	9
	FDG-R-LX-06X140-CS-ZF	7.5	140	97	85	9
	FDG-R-LX-06X150-CS-ZF	7.5	150	107	95	9
	FDG-R-LX-06X160-CS-ZF	7.5	160	117	105	9
8	FDG-R-LX-08X060-CS-ZF	10	60	10	-	12
	FDG-R-LX-08X075-CS-ZF	10	75	25	5	12
	FDG-R-LX-08X090-CS-ZF	10	90	40	20	12
	FDG-R-LX-08X100-CS-ZF	10	100	50	30	12
	FDG-R-LX-08X130-CS-ZF	10	130	80	60	12
	FDG-R-LX-08X150-CS-ZF	10	150	100	80	12
10	FDG-R-LX-10X065-CS-ZF	12.5	65	10	-	14
	FDG-R-LX-10X075-CS-ZF	12.5	75	20	-	14
	FDG-R-LX-10X085-CS-ZF	12.5	85	30	-	14
	FDG-R-LX-10X100-CS-ZF	12.5	100	45	15	14
	FDG-R-LX-10X120-CS-ZF	12.5	120	65	35	14
	FDG-R-LX-10X140-CS-ZF	12.5	140	85	55	14
	FDG-R-LX-10X160-CS-ZF	12.5	160	105	75	14

Installation data



Size			5	6	8	10
Thread diameter	d	[mm]	6.3	7.5	10	12.5
Hole diameter in substrate	d ₀	[mm]	5	6	8	10
Screw drive	-	[-]	T25	T40	T50	T50
Head diameter		[mm]	10.9	15.9	21.3	21.3
Max. torque for impact screw driver	T _{imp,max}	[Nm]	200	400	900	950
STANDARD EMBEDMENT DEPTH						
Min. hole depth in substrate	h _{0,s}	[mm]	50	65	80	95
Real hole depth in substrate	h ₀	[mm]	L + 10 - t _{fix}	L + 10 - t _{fix}	L + 10 - t _{fix}	L + 10 - t _{fix}
Min. installation depth	h _{nom,s}	[mm]	43	55	70	85
Min. substrate thickness	h _{min,s}	[mm]	100	100	110	130
Min. spacing	s _{min,s}	[mm]	40	45	50	60
Min. edge distance	c _{min,s}	[mm]	40	45	50	60
REDUCED EMBEDMENT DEPTH						
Min. hole depth in substrate	h _{0,r}	[mm]	-	50	60	65
Real hole depth in substrate	h ₀	[mm]	-	L + 10 - t _{fix}	L + 10 - t _{fix}	L + 10 - t _{fix}
Min. installation depth	h _{nom,r}	[mm]	-	43	50	55
Min. substrate thickness	h _{min,r}	[mm]	-	100	100	100
Min. spacing	s _{min,r}	[mm]	-	45	50	60
Min. edge distance	c _{min,r}	[mm]	-	45	50	60

Mechanical Properties

Size			5	6	8	10
Nominal ultimate tensile strength - tension	f _{uk}	[N/mm ²]	1300	1250	1200	1050
Nominal yield strength - tension	f _{yk}	[N/mm ²]	1150	1100	1050	950
Cross sectional area - tension	A _s	[mm ²]	19.6	28.3	50.3	78.5
Elastic section modulus	W _{el}	[mm ³]	12.2	21.2	50.3	98.1
Characteristic bending resistance	M ⁰ _{Rk,s}	[Nm]	19	31.8	72.4	123.6
Design bending resistance	M	[Nm]	12.7	21.2	48.3	82.4

Basic Performance Data

Performance data for single anchor without influence of edge distance and spacing.

Size		5	6	8	10
NON-CRACKED CONCRETE C20/25					
Standard embedment depth h _{nom}	[mm]	43.00	55.00	70.00	85.00
Reduced embedment depth h _{nom}	[mm]	-	35.00	50.00	55.00
CRACKED CONCRETE C20/25					
Standard embedment depth h _{nom}	[mm]	43.00	55.00	70.00	85.00
Reduced embedment depth h _{nom}	[mm]	-	35.00	50.00	55.00

Basic Performance Data

MEAN ULTIMATE LOAD					
TENSION LOAD N _{Ru,m}					
NON-CRACKED CONCRETE C20/25					
Standard embedment depth	[kN]	10.10	14.80	26.04	35.37
Reduced embedment depth	[kN]	-	12.22	14.58	17.08
CRACKED CONCRETE C20/25					
Standard embedment depth	[kN]	7.10	11.10	16.10	24.89
Reduced embedment depth	[kN]	-	8.60	10.10	10.70
SHEAR LOAD V _{Ru,m}					
NON-CRACKED CONCRETE C20/25					
Standard embedment depth	[kN]	14.66	18.37	26.04	51.91
Reduced embedment depth	[kN]	-	12.22	14.58	17.08
CRACKED CONCRETE C20/25					
Standard embedment depth	[kN]	10.32	12.93	18.33	49.78
Reduced embedment depth	[kN]	-	8.60	10.26	12.02
CHARACTERISTIC LOAD					
TENSION LOAD N _{Rk}					
NON-CRACKED CONCRETE C20/25					
Standard embedment depth	[kN]	7.00	12.00	18.98	25.78
Reduced embedment depth	[kN]	-	8.90	10.63	12.45
CRACKED CONCRETE C20/25					
Standard embedment depth	[kN]	4.50	7.00	13.00	18.05
Reduced embedment depth	[kN]	-	6.23	7.00	8.00
SHEAR LOAD V _{Rk}					
NON-CRACKED CONCRETE C20/25					
Standard embedment depth	[kN]	8.90	13.39	18.98	41.20
Reduced embedment depth	[kN]	-	8.90	10.63	12.45
CRACKED CONCRETE C20/25					
Standard embedment depth	[kN]	6.23	9.37	13.29	36.09
Reduced embedment depth	[kN]	-	6.23	7.44	8.71
DESIGN LOAD					
TENSION LOAD N _{Rd}					
NON-CRACKED CONCRETE C20/25					
Standard embedment depth	[kN]	3.89	8.00	12.65	17.19
Reduced embedment depth	[kN]	-	5.94	7.08	8.30
CRACKED CONCRETE C20/25					
Standard embedment depth	[kN]	2.50	4.67	8.67	12.03
Reduced embedment depth	[kN]	-	4.16	4.67	5.33
SHEAR LOAD V _{Rd}					
NON-CRACKED CONCRETE C20/25					
Standard embedment depth	[kN]	5.94	8.93	12.65	27.47
Reduced embedment depth	[kN]	-	5.94	7.08	8.30
CRACKED CONCRETE C20/25					
Standard embedment depth	[kN]	4.16	6.25	8.86	24.06
Reduced embedment depth	[kN]	-	4.16	4.96	5.81

Design Performance Data

(-) failure is not decisive

Size			5		6		8		10	
Min. installation depth	h_{nom}	[mm]	43.00	-	35.00	55.00	50.00	70.00	55.00	85.00
Effective embedment depth	h_{ef}	[mm]	32.00	-	24.70	42.00	36.00	53.00	40.00	65.00
TENSION LOAD										
STEEL FAILURE										
Characteristic resistance	$N_{Rk,s}$	[kN]	25.50	-	35.40	35.40	60.40	60.40	82.40	82.40
Partial safety factor	γ_{Ms}	-	1.40	-	1.40	1.40	1.40	1.40	1.40	1.40
PULL-OUT FAILURE; NON-CRACKED CONCRETE C20/25										
Characteristic resistance	$N_{Rk,p}$	[kN]	7.00	-	-	12.00	-	-	-	-
PULL-OUT FAILURE; CRACKED CONCRETE C20/25										
Characteristic resistance	$N_{Rk,p}$	[kN]	4.50	-	-	7.00	7.00	13.00	8.00	-
PULL-OUT FAILURE										
Installation safety factor	γ_{inst}	-	1.20	-	1.00	1.00	1.00	1.00	1.00	1.00
Increasing factors for $N_{Rd,p}$ - C30/37	ψ_c	-	1.08	-	1.08	1.08	1.08	1.08	1.08	1.08
Increasing factors for $N_{Rd,p}$ - C40/50	ψ_c	-	1.15	-	1.15	1.15	1.15	1.15	1.15	1.15
Increasing factors for $N_{Rd,p}$ - C50/60	ψ_c	-	1.19	-	1.19	1.19	1.19	1.19	1.19	1.19
CONCRETE CONE FAILURE										
Installation safety factor	γ_{inst}	-	1.20	-	1.00	1.00	1.00	1.00	1.00	1.00
Factor for cracked concrete	$k_{cr,N}$	-	7.70	-	7.70	7.70	7.70	7.70	7.70	7.70
Factor for non-cracked concrete	$k_{ucr,N}$	-	11.00	-	11.00	11.00	11.00	11.00	11.00	11.00
Spacing	$s_{cr,N}$	[mm]	90.00	-	90.00	126.0	112.0	160.0	120.0	196.0
Edge distance	$c_{cr,N}$	[mm]	45.00	-	45.00	63.00	56.00	80.00	60.00	98.00
CONCRETE SPLITTING FAILURE										
Installation safety factor	γ_{inst}	-	1.20	-	1.00	1.00	1.00	1.00	1.00	1.00
Spacing	$s_{cr,sp}$	[mm]	90.00	-	90.00	126.0	112.0	160.0	136.0	222.0
Edge distance	$c_{cr,sp}$	[mm]	45.00	-	45.00	63.00	56.00	80.00	68.00	111.0
SHEAR LOAD										
STEEL FAILURE										
Characteristic resistance without lever arm	$V_{Rk,s}$	[kN]	12.70	-	17.70	17.70	30.20	30.20	41.20	41.20
Ductility factor	k_γ	-	0.80	-	0.80	0.80	0.80	0.80	0.80	0.80
Characteristic resistance with lever arm	$M_{Rk,s}$	[Nm]	19.00	-	31.80	31.80	72.40	72.40	123.6	123.6
Partial safety factor	γ_{Ms}	-	1.50	-	1.50	1.50	1.50	1.50	1.50	1.50
CONCRETE PRY-OUT FAILURE										
Factor	k	-	1.00	-	1.00	1.00	1.00	1.00	1.00	2.00
Installation safety factor	γ_{inst}	-	1.00	-	1.00	1.00	1.00	1.00	1.00	1.00
CONCRETE EDGE FAILURE										
Effective length of anchor	ℓ_f	[mm]	43.00	-	43.00	35.00	50.00	70.00	55.00	85.00
Anchor diameter	d_{nom}	[mm]	5.00	-	6.00	6.00	8.00	8.00	10.00	10.00
Installation safety factor	γ_{inst}	-	1.00	-	1.00	1.00	1.00	1.00	1.00	1.00

Design Performance Data

Characteristic Resistance under fire exposure in concrete C20/25 to C50/60

Size			5	6	8	10
TENSION LOAD						
Edge distance	c_{cr}	[mm]	-	-	-	-
Spacing	s_{cr}	[mm]	-	-	-	-
R (for EI) = 30 min						
TENSION LOAD						
STEEL FAILURE						
Characteristic resistance	$N_{Rk,s}$	[kN]	-	0.20	0.28	1.57
PULL-OUT FAILURE						
Characteristic resistance	$N_{Rk,p}$	[kN]	-	1.13	1.38	4.75
SHEAR LOAD						
STEEL FAILURE						
Characteristic resistance without lever arm	$V_{Rk,s}$	[kN]	-	0.20	0.28	1.57
Characteristic resistance with lever arm	$M_{Rk,s}$	[Nm]	-	0.15	0.25	2.36
Effective embedment depth	h_{ef}	[mm]	-	32.00	24.70	65.00
R (for EI) = 60 min						
TENSION LOAD						
STEEL FAILURE						
Characteristic resistance	$N_{Rk,s}$	[kN]	-	0.18	0.25	1.18
PULL-OUT FAILURE						
Characteristic resistance	$N_{Rk,p}$	[kN]	-	1.13	1.38	4.75
SHEAR LOAD						
STEEL FAILURE						
Characteristic resistance without lever arm	$V_{Rk,s}$	[kN]	-	0.18	0.25	1.18
Characteristic resistance with lever arm	$M_{Rk,s}$	[Nm]	-	0.13	0.23	1.77
Effective embedment depth	h_{ef}	[mm]	-	32.00	24.70	65.00
R (for EI) = 90 min						
TENSION LOAD						
STEEL FAILURE						
Characteristic resistance	$N_{Rk,s}$	[kN]	-	0.14	0.20	1.02
PULL-OUT FAILURE						
Characteristic resistance	$N_{Rk,p}$	[kN]	-	1.13	1.38	4.75
SHEAR LOAD						
STEEL FAILURE						
Characteristic resistance without lever arm	$V_{Rk,s}$	[kN]	-	0.14	0.20	1.02
Characteristic resistance with lever arm	$M_{Rk,s}$	[Nm]	-	0.10	0.18	1.53
Effective embedment depth	h_{ef}	[mm]	-	32.00	24.70	65.00
R (for EI) = 120 min						
TENSION LOAD						
STEEL FAILURE						
Characteristic resistance	$N_{Rk,s}$	[kN]	-	0.10	0.14	0.79
PULL-OUT FAILURE						
Characteristic resistance	$N_{Rk,p}$	[kN]	-	0.90	1.10	3.80
SHEAR LOAD						
STEEL FAILURE						
Characteristic resistance without lever arm	$V_{Rk,s}$	[kN]	-	0.10	0.14	0.79
Characteristic resistance with lever arm	$M_{Rk,s}$	[Nm]	-	0.07	0.13	1.18
Effective embedment depth	h_{ef}	[mm]	-	32.00	24.70	65.00

Design Performance Data

Allowable values for resistance in case of Seismic performance category C1

Size			8	10
Effective embedment depth	h_{ef}	[mm]	53.00	65.00
TENSION LOAD, STEEL FAILURE				
Characteristic resistance	$N_{Rk,s}$	[kN]	60.40	82.40
Partial safety factor	$\gamma_{MsN,seisC1}$	-	1.40	1.40
TENSION LOAD, PULL-OUT FAILURE				
Characteristic resistance	$N_{Rk,p}$	[kN]	5.40	13.50
Installation safety factor	γ_{inst}	-	1.00	1.00
SHEAR LOAD, STEEL FAILURE				
Characteristic resistance without lever arm	$V_{Rk,s}$	[kN]	15.10	27.40
Partial safety factor	$\gamma_{MsV,seisC1}$	-	1.50	1.50

Allowable values for resistance in case of Seismic performance category C2

Size			8	10
Effective embedment depth	h_{ef}	[mm]	53.00	65.00
TENSION LOAD, STEEL FAILURE				
Characteristic resistance	$N_{Rk,s}$	[kN]	60.40	82.40
Partial safety factor	$\gamma_{MsN,seisC2}$	-	1.40	1.40
TENSION LOAD, PULL-OUT FAILURE				
Characteristic resistance	$N_{Rk,p}$	[kN]	1.57	4.91
Installation safety factor	γ_{inst}	-	1.00	1.00
SHEAR LOAD, STEEL FAILURE				
Characteristic resistance without lever arm	$V_{Rk,s}$	[kN]	9.90	20.60
Partial safety factor	$\gamma_{MsV,seisC2}$	-	1.50	1.50

Product Commercial Data

Product Code	Anchor	Quantity [pcs]	Weight [kg]
	Length [mm]	Box	
FDG-R-LX-05X050-CS-ZF	50	100	0.89
FDG-R-LX-05X075-CS-ZF	75	100	1.27
FDG-R-LX-06X050-CS-ZF	50	100	1.59
FDG-R-LX-06X075-CS-ZF	75	100	1.83
FDG-R-LX-06X100-CS-ZF	100	100	2.4
FDG-R-LX-06X120-CS-ZF	120	100	3.0
FDG-R-LX-06X130-CS-ZF	130	100	3.0
FDG-R-LX-06X140-CS-ZF	140	100	3.2
FDGR-LX-06X150-CS-ZF	150	100	3.4
FDG-R-LX-06X160-CS-ZF	160	100	3.5
FDG-R-LX-08X060-CS-ZF	60	100	2.7
FDG-R-LX-08X075-CS-ZF	75	100	3.3
FDG-R-LX-08X090-CS-ZF	90	100	4.0
FDG-R-LX-08X100-CS-ZF	100	100	4.4

Product Commercial Data

Product Code	Anchor	Quantity [pcs]
	Length [mm]	Box
FDG-R-LX-08X130-CS-ZF	130	50
FDG-R-LX-08X150-CS-ZF	150	50
FDG-R-LX-10X065-CS-ZF	65	50
FDG-R-LX-10X075-CS-ZF	75	50
FDG-R-LX-10X085-CS-ZF	85	50
FDG-R-LX-10X100-CS-ZF	100	50
FDG-R-LX-10X120-CS-ZF	120	25
FDG-R-LX-10X140-CS-ZF	140	25
FDG-R-LX-10X160-CS-ZF	160	20

Weight [kg]
Box
2.8
3.1
2.3
2.6
2.8
3.3
2.0
2.3
2.1

1) ETA 17/0806

05. Zinc Plated Internally Threaded Concrete Screw Anchor

Self-tapping concrete screwbolt



Approvals and Reports

- ETA 17/0806



Features and benefits

- Time-efficient installation through streamlined procedure - simply drill and drive.
- Completely removable.
- Unique design with patented threadform ensures high performance for relatively small hole diameter.
- Non-expansion functioning ensures low risk of damage to base material and makes FDG-R-LX ideal for installation near edges and adjacent anchors.
- High performance in non-cracked concrete.
- Oversize head for fixtures with elongated holes.
- Suitable for standard and reduced embedment depth.

Base materials

Approved for use in:

- Cracked concrete
C20/25-C50/60
- Non-cracked concrete
C20/25-C50/60
- Reinforced concrete
- Unreinforced concrete

Approved for use in:

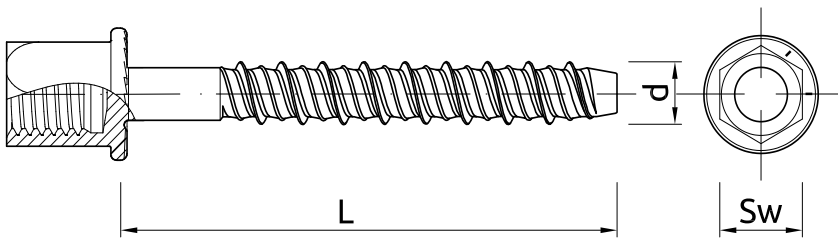
- Natural Stone (after site testing)

Installation guide



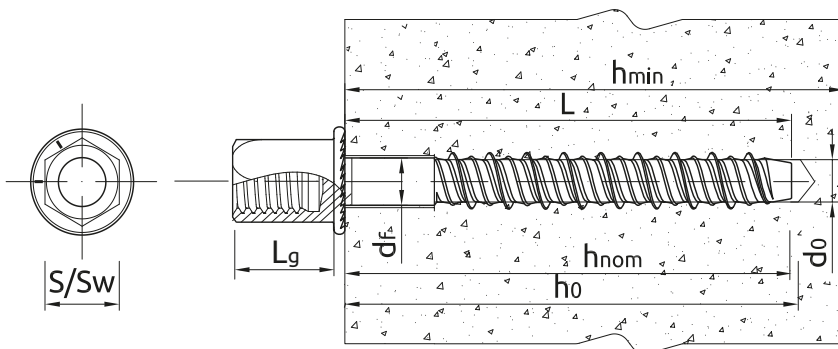
- Drill the hole with rotary hammer drilling machine. Drill to a required depth.
- Blow out dust at least 4 times with a hand pump.
- Possibility of unscrewing and re-screwing.
- Tighten to the recommended torque.
- After installation.

Product Information



Size	Product Code	Anchor	
		Diameter	Length
		d	L
		[mm]	[mm]
6	FDG-R-LX-06X055-I10-ZP	7.5	55

Installation data



Size			6
Thread diameter	d	[mm]	7.5
Hole diameter in substrate	d ₀	[mm]	6
Wrench size	Sw	[mm]	13
External diameter of washer		[mm]	16
Max. torque for impact screw driver	T _{imp,max}	[Nm]	400
STANDARD EMBEDMENT DEPTH			
Min. hole depth in substrate	h _{0,s}	[mm]	65
Real hole depth in substrate	h ₀	[mm]	L + 10 - t _{fix}
Min. installation depth	h _{nom,s}	[mm]	55
Min. substrate thickness	h _{min,s}	[mm]	100
Min. spacing	s _{min,s}	[mm]	45
Min. edge distance	c _{min,s}	[mm]	45
REDUCED EMBEDMENT DEPTH			
Min. hole depth in substrate	h _{0,r}	[mm]	50
Real hole depth in substrate	h ₀	[mm]	L + 10 - t _{fix}
Min. installation depth	h _{nom,r}	[mm]	43
Min. substrate thickness	h _{min,r}	[mm]	100
Min. spacing	s _{min,r}	[mm]	45
Min. edge distance	c _{min,r}	[mm]	45

Mechanical Properties

Size			6
Nominal ultimate tensile strength - tension	f_{uk}	[N/mm ²]	1250
Nominal yield strength - tension	f_{yk}	[N/mm ²]	1100
Cross sectional area - tension	A_s	[mm ²]	28.3
Elastic section modulus	W_{el}	[mm ³]	21.2
Characteristic bending resistance	$M^0_{Rk,s}$	[Nm]	31.8
Design bending resistance	M	[Nm]	21.2

Basic Performance Data

Performance data for single anchor without influence of edge distance and spacing.

Size			6
NON-CRACKED CONCRETE C20/25			
Standard embedment depth h_{nom}	[mm]		55.00
Reduced embedment depth h_{nom}	[mm]		35.00
CRACKED CONCRETE C20/25			
Standard embedment depth h_{nom}	[mm]		55.00
Reduced embedment depth h_{nom}	[mm]		35.00
MEAN ULTIMATE LOAD			
TENSION LOAD $N_{Rk,m}$			
NON-CRACKED CONCRETE C20/25			
Standard embedment depth	[kN]		14.80
Reduced embedment depth	[kN]		12.22
CRACKED CONCRETE C20/25			
Standard embedment depth	[kN]		11.10
Reduced embedment depth	[kN]		8.60
SHEAR LOAD $V_{Rk,m}$			
NON-CRACKED CONCRETE C20/25			
Standard embedment depth	[kN]		18.37
Reduced embedment depth	[kN]		12.22
CRACKED CONCRETE C20/25			
Standard embedment depth	[kN]		12.93
Reduced embedment depth	[kN]		8.60
CHARACTERISTIC LOAD			
TENSION LOAD N_{Rk}			
NON-CRACKED CONCRETE C20/25			
Standard embedment depth	[kN]		12.00
Reduced embedment depth	[kN]		8.90
CRACKED CONCRETE C20/25			
Standard embedment depth	[kN]		7.00
Reduced embedment depth	[kN]		6.23
SHEAR LOAD V_{Rk}			
NON-CRACKED CONCRETE C20/25			
Standard embedment depth	[kN]		13.39
Reduced embedment depth	[kN]		8.90
CRACKED CONCRETE C20/25			
Standard embedment depth	[kN]		9.37
Reduced embedment depth	[kN]		6.23

Basic Performance Data

DESIGN LOAD		
TENSION LOAD N_{Rd}		
NON-CRACKED CONCRETE C20/25		
Standard embedment depth	[kN]	8.00
Reduced embedment depth	[kN]	5.94
CRACKED CONCRETE C20/25		
Standard embedment depth	[kN]	4.67
Reduced embedment depth	[kN]	4.16
SHEAR LOAD V_{Rd}		
NON-CRACKED CONCRETE C20/25		
Standard embedment depth	[kN]	8.93
Reduced embedment depth	[kN]	5.94
CRACKED CONCRETE C20/25		
Standard embedment depth	[kN]	6.25
Reduced embedment depth	[kN]	4.16

Design Performance Data

(-) failure is not decisive

Size			6	
Min. installation depth	h_{nom}	[mm]	35.00	55.00
Effective embedment depth	h_{ef}	[mm]	24.70	42.00
TENSION LOAD				
STEEL FAILURE				
Characteristic resistance	$N_{Rk,s}$	[kN]	35.40	35.40
Partial safety factor	γ_{Ms}	-	1.40	1.40
PULL-OUT FAILURE; NON-CRACKED CONCRETE C20/25				
Characteristic resistance	$N_{Rk,p}$	[kN]	-	12.00
PULL-OUT FAILURE; CRACKED CONCRETE C20/25				
Characteristic resistance	$N_{Rk,p}$	[kN]	-	7.00
PULL-OUT FAILURE				
Installation safety factor	γ_{inst}	-	1.00	1.00
Increasing factors for $N_{Rd,p}$ - C30/37	ψ_c	-	1.08	1.08
Increasing factors for $N_{Rd,p}$ - C40/50	ψ_c	-	1.15	1.15
Increasing factors for $N_{Rd,p}$ - C50/60	ψ_c	-	1.19	1.19
CONCRETE CONE FAILURE				
Installation safety factor	γ_{inst}	-	1.00	1.00
Factor for cracked concrete	$k_{cr,N}$	-	7.70	7.70
Factor for non-cracked concrete	$k_{ucr,N}$	-	11.00	11.00
Spacing	$s_{cr,N}$	[mm]	90.00	126.0
Edge distance	$c_{cr,N}$	[mm]	45.00	63.00
CONCRETE SPLITTING FAILURE				
Installation safety factor	γ_{inst}	-	1.00	1.00
Spacing	$s_{cr,sp}$	[mm]	90.00	126.0
Edge distance	$c_{cr,sp}$	[mm]	45.00	63.00

Design Performance Data

Size			6	
SHEAR LOAD				
STEEL FAILURE				
Characteristic resistance without lever arm	V _{Rk,s}	[kN]	17.70	17.70
Ductility factor	k ₇	-	0.80	0.80
Characteristic resistance with lever arm	M _{Rk,s}	[Nm]	31.80	31.80
Partial safety factor	γ _{Ms}	-	1.50	1.50
CONCRETE PRY-OUT FAILURE				
Factor	k	-	1.00	1.00
Installation safety factor	γ _{inst}	-	1.00	1.00
CONCRETE EDGE FAILURE				
Effective length of anchor	ℓ _f	[mm]	43.00	35.00
Anchor diameter	d _{nom}	[mm]	6.00	6.00
Installation safety factor	γ _{inst}	-	1.00	1.00

Design Performance Data

Characteristic Resistance under fire exposure in concrete C20/25 to C50/60

Size			6	
R (for EI) = 30 min				
Effective embedment depth	h_{ef}	[mm]	24.70	42.00
TENSION LOAD				
STEEL FAILURE				
Characteristic resistance	$N_{Rk,s}$	[kN]	0.28	0.28
PULL-OUT FAILURE				
Characteristic resistance	$N_{Rk,p}$	[kN]	1.38	1.75
SHEAR LOAD				
STEEL FAILURE				
Characteristic resistance without lever arm	$V_{Rk,s}$	[kN]	0.28	0.28
Characteristic resistance with lever arm	$M_{Rk,s}$	[Nm]	0.25	0.25
R (for EI) = 60 min				
Effective embedment depth	h_{ef}	[mm]	24.70	42.00
TENSION LOAD				
STEEL FAILURE				
Characteristic resistance	$N_{Rk,s}$	[kN]	0.25	0.25
PULL-OUT FAILURE				
Characteristic resistance	$N_{Rk,p}$	[kN]	1.38	1.75
SHEAR LOAD				
STEEL FAILURE				
Characteristic resistance without lever arm	$V_{Rk,s}$	[kN]	0.25	0.25
Characteristic resistance with lever arm	$M_{Rk,s}$	[Nm]	0.23	0.23
R (for EI) = 90 min				
Effective embedment depth	h_{ef}	[mm]	24.70	42.00
TENSION LOAD				
STEEL FAILURE				
Characteristic resistance	$N_{Rk,s}$	[kN]	0.20	0.20
PULL-OUT FAILURE				
Characteristic resistance	$N_{Rk,p}$	[kN]	1.38	1.75

SHEAR LOAD				
STEEL FAILURE				
Characteristic resistance without lever arm	$V_{Rk,s}$	[kN]	0.20	0.20
Characteristic resistance with lever arm	$M_{Rk,s}$	[Nm]	0.18	0.18
R (for EI) = 120 min				
Effective embedment depth	h_{ef}	[mm]	24.70	42.00
TENSION LOAD				
STEEL FAILURE				
Characteristic resistance	$N_{Rk,s}$	[kN]	0.14	0.14
PULL-OUT FAILURE				
Characteristic resistance	$N_{Rk,p}$	[kN]	1.10	1.40
SHEAR LOAD				
STEEL FAILURE				
Characteristic resistance without lever arm	$V_{Rk,s}$	[kN]	0.14	0.14
Characteristic resistance with lever arm	$M_{Rk,s}$	[Nm]	0.13	0.13

Product Commercial Data

Product Code	Anchor	Quantity [pcs]	Weight [kg]
	Length [mm]	Box	Box
FDG-R-LX-06X055-I10-ZP	55	100	2.4

1) ETA 17/0806

06. Zinc Flake Throughbolt

Self-tapping concrete screwbolt



Approvals and Reports

- ETA 17/0806



Features and benefits

- New generation of throughbolt with unique corrosion-resistant coating.
- High performance in cracked and non-cracked concrete confirmed by ETA Option 1.
- Highest quality ensures maximum load capability.
- For applications requiring fire resistance up to 120 minutes.
- Suitable for reduced embedment to avoid contact with reinforcement.
- Embedment depth markings help to ensure precise installation of the anchor.
- Design of FDG-R-HPTII allows drilling and installing directly through the fixture and helps to reduce installation time.
- Fire resistant.
- Anchors can be used in earthquake risk zones - seismic category C1 and C2.

Applications

- Cladding restraints
- Consoles
- Barriers
- Structural steel
- Curtain walling
- Handrails
- Heavy Plant
- Balustrading
- Passenger lifts
- Facades
- Racking systems
- Platforms
- Fencing & gates manufacturing and installation

Base materials

Approved for use in:

- Cracked concrete C20/25-C50/60
- Non-cracked concrete C20/25-C50/60
- Reinforced concrete
- Unreinforced concrete

Also suitable for use in:

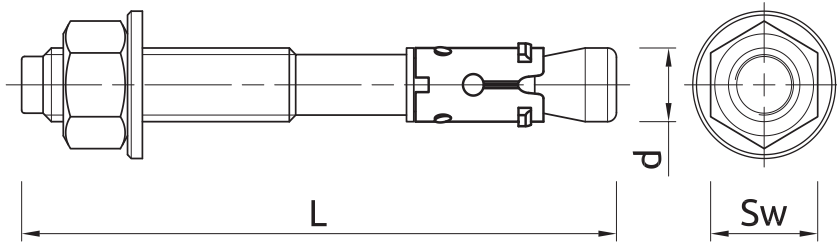
- Natural Stone (after site testing)

Installation guide



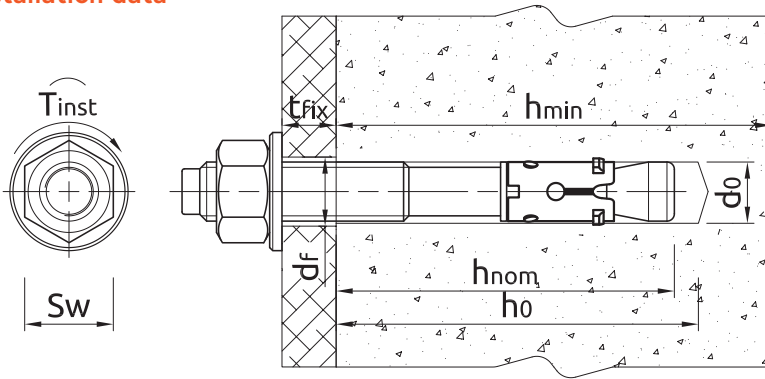
1. Drill a hole of required diameter and depth.
2. Clear the hole of drilling dust and debris (using blowpump or equivalent method).
3. Lightly tap the throughbolt through the fixture into hole with a hammer, until fixing depth is reached.
4. Tighten to the recommended torque.

Product Information



Size	Product Code	Anchor		Fixture		
		Diameter	Length	Max. thickness t _{fix} for:		Hole diameter
		d	L	h _{nom,red}	h _{nom,std}	d _f
		[mm]	[mm]	[mm]	[mm]	[mm]
M8	FDG-R-HPTIIZF-08065/15	8	65	15	-	9
	FDG-R-HPTIIZF-08080/15	8	80	30	15	9
	FDG-R-HPTIIZF-08100/35	8	100	50	35	9
	FDG-R-HPTIIZF-08115/50	8	115	65	50	9
M10	FDG-R-HPTIIZF-10065/5	10	65	5	-	11
	FDG-R-HPTIIZF-10080/20	10	80	20	-	11
	FDG-R-HPTIIZF-10095/15	10	95	35	15	11
	FDG-R-HPTIIZF-10115/35	10	115	55	35	11
	FDG-R-HPTIIZF-10130/50	10	130	70	50	11
M12	FDG-R-HPTIIZF-12080/5	12	80	5	-	13
	FDG-R-HPTIIZF-12100/5	12	100	25	5	13
	FDG-R-HPTIIZF-12120/25	12	120	45	25	13
	FDG-R-HPTIIZF-12135/40	12	135	60	40	13
	FDG-R-HPTIIZF-12150/55	12	150	75	55	13
M16	FDG-R-HPTIIZF-16105/10	16	105	10	-	18
	FDG-R-HPTIIZF-16125/5	16	125	25	5	18
	FDG-R-HPTIIZF-16140/20	16	140	40	20	18
	FDG-R-HPTIIZF-16180/60	16	180	80	60	18
	FDG-R-HPTIIZF-16220/100	16	220	120	100	18
M20	FDG-R-HPTIIZF-20125/5	20	125	5	-	22
	FDG-R-HPTIIZF-20160/20	20	160	40	20	22
	FDG-R-HPTIIZF-20200/60	20	200	80	60	22

Installation data



Size			M8	M10	M12	M16	M20
Thread diameter	d	[mm]	8	10	12	16	20
Hole diameter in substrate	d _o	[mm]	8	10	12	16	20
Installation torque	T _{inst}	[Nm]	10	20	40	100	180
Wrench size	Sw	[mm]	13	17	19	24	30
External diameter of washer		[mm]	16	20	24	30	37
STANDARD EMBEDMENT DEPTH							
Min. hole depth in substrate	h _{0,s}	[mm]	65	79	90	110	129
Min. installation depth	h _{nom,s}	[mm]	55	69	80	100	119
Min. substrate thickness	h _{min,s}	[mm]	100	120	140	170	200
Min. spacing (Non-cracked concrete)	s _{min,s}	[mm]	50	70	90	160	180
Min. spacing (Cracked concrete)	s _{min,s}	[mm]	50	70	90	160	180
Min. edge distance (Non-cracked concrete)	c _{min,s}	[mm]	40	50	65	85	100
Min. edge distance (Cracked concrete)	c _{min,s}	[mm]	40	45	65	90	100
REDUCED EMBEDMENT DEPTH							
Min. hole depth in substrate	h _{0,r}	[mm]	50	59	70	90	110
Min. installation depth	h _{nom,r}	[mm]	40	49	60	80	100
Min. substrate thickness	h _{min,r}	[mm]	100	100	100	130	160
Min. spacing (Non-cracked concrete)	s _{min,r}	[mm]	55	75	150	190	300
Min. spacing (Cracked concrete)	s _{min,r}	[mm]	55	75	150	190	300
Min. edge distance (Non-cracked concrete)	c _{min,r}	[mm]	45	60	70	100	160
Min. edge distance (Cracked concrete)	c _{min,r}	[mm]	40	50	80	110	120

Mechanical Properties

Size			M8	M10	M12	M16	M20
Nominal ultimate tensile strength - tension	f _{uk}	[N/mm ²]	620	620	620	620	620
Nominal ultimate tensile strength - shear	f _{uk}	[N/mm ²]	520	520	520	520	520
Nominal yield strength - tension	f _{yk}	[N/mm ²]	531	531	531	531	531
Nominal yield strength - shear	f _{yk}	[N/mm ²]	416	416	416	416	416
Cross sectional area - tension	A _s	[mm ²]	25.5	40.7	60.1	106.6	162.9
Cross sectional area - shear	A _s	[mm ²]	38.9	61.7	89.6	165.2	259.1
Elastic section modulus	W _{el}	[mm ³]	34.3	68.3	119.6	299.5	588.3
Characteristic bending resistance	M _{Rk,s}	[Nm]	19	38	67	167	328
Design bending resistance	M	[Nm]	15	31	53	134	263

Basic Performance Data

Performance data for single anchor without influence of edge distance and spacing.

Size		M8	M10	M12	M16	M20
NON-CRACKED CONCRETE						
Standard embedment depth h_{ef}	[mm]	47.00	59.00	68.00	85.00	99.00
Reduced embedment depth h_{ef}	[mm]	32.00	39.00	48.00	65.00	80.00
CRACKED CONCRETE						
Standard embedment depth h_{ef}	[mm]	47.00	59.00	68.00	85.00	99.00
Reduced embedment depth h_{ef}	[mm]	32.00	39.00	48.00	65.00	80.00
MEAN ULTIMATE LOAD						
TENSION LOAD $N_{R_{u,m}}$						
NON-CRACKED CONCRETE						
Standard embedment depth	[kN]	12.40	20.60	27.70	45.50	64.80
Reduced embedment depth	[kN]	9.60	13.60	17.60	34.50	47.10
CRACKED CONCRETE						
Standard embedment depth	[kN]	7.50	12.50	19.90	27.30	41.90
Reduced embedment depth	[kN]	4.80	8.60	12.80	26.80	32.70
SHEAR LOAD $V_{R_{u,m}}$						
NON-CRACKED CONCRETE						
Standard embedment depth	[kN]	12.20	19.20	28.00	51.50	80.90
Reduced embedment depth	[kN]	10.10	16.44	22.45	51.50	80.90
CRACKED CONCRETE						
Standard embedment depth	[kN]	12.20	19.20	28.00	51.50	80.90
Reduced embedment depth	[kN]	8.60	11.57	15.80	49.78	66.66
CHARACTERISTIC LOAD						
TENSION LOAD N_{R_k}						
NON-CRACKED CONCRETE						
Standard embedment depth	[kN]	9.00	12.00	20.00	35.00	48.46
Reduced embedment depth	[kN]	7.50	9.00	12.00	25.78	35.20
CRACKED CONCRETE						
Standard embedment depth	[kN]	5.00	9.00	12.00	20.00	30.00
Reduced embedment depth	[kN]	3.00	6.00	9.00	16.00	24.64
SHEAR LOAD V_{R_k}						
NON-CRACKED CONCRETE						
Standard embedment depth	[kN]	9.10	15.70	23.70	47.10	60.60
Reduced embedment depth	[kN]	8.90	11.98	16.36	47.10	60.60
CRACKED CONCRETE						
Standard embedment depth	[kN]	9.10	15.61	23.70	47.10	60.60
Reduced embedment depth	[kN]	6.23	8.39	11.45	36.09	49.28

Basic Performance Data

DESIGN LOAD						
TENSION LOAD N_{Rd}						
NON-CRACKED CONCRETE						
Standard embedment depth	[kN]	5.00	8.00	13.33	23.33	32.30
Reduced embedment depth	[kN]	4.17	5.00	8.00	17.19	23.47
CRACKED CONCRETE						
Standard embedment depth	[kN]	2.78	6.00	8.00	13.33	20.00
Reduced embedment depth	[kN]	1.67	3.33	6.00	10.67	16.43
SHEAR LOAD V_{Rd}						
NON-CRACKED CONCRETE						
Standard embedment depth	[kN]	7.28	12.56	18.96	37.68	48.48
Reduced embedment depth	[kN]	5.94	7.99	10.91	34.37	46.93
CRACKED CONCRETE						
Standard embedment depth	[kN]	7.28	10.40	18.96	35.98	45.23
Reduced embedment depth	[kN]	4.16	5.59	7.63	24.06	32.85

Design Performance Data

(-) failure is not decisive

Size			M8		M10		M12		M16		M20	
Effective embedment depth	h_{ef}	[mm]	32.00	47.00	39.00	59.00	48.00	68.00	65.00	85.00	80.00	99.00
TENSION LOAD												
STEEL FAILURE												
Characteristic resistance	$N_{Rk,s}$	[kN]	11.00	11.00	17.50	17.50	25.80	25.80	45.80	45.80	70.00	70.00
Partial safety factor	γ_{Ms}	-	1.40	1.40	1.40	1.40	1.40	1.40	1.40	1.40	1.40	1.40
PULL-OUT FAILURE; NON-CRACKED CONCRETE C20/25												
Characteristic resistance	$N_{Rk,p}$	[kN]	7.50	9.00	9.00	12.00	12.00	20.00	-	35.00	-	-
PULL-OUT FAILURE; CRACKED CONCRETE C20/25												
Characteristic resistance	$N_{Rk,p}$	[kN]	3.00	5.00	6.00	9.00	9.00	12.00	16.00	20.00	-	30.00
PULL-OUT FAILURE												
Installation safety factor	γ_{inst}	-	1.20	1.20	1.20	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Increasing factors for $N_{Rd,p}$ - C30/37	ψ_c	-	1.20	1.12	1.16	1.22	1.22	1.00	1.11	1.14	1.12	1.07
Increasing factors for $N_{Rd,p}$ - C40/50	ψ_c	-	1.40	1.22	1.33	1.44	1.44	1.00	1.22	1.28	1.26	1.14
Increasing factors for $N_{Rd,p}$ - C50/60	ψ_c	-	1.60	1.33	1.50	1.67	1.67	1.00	1.33	1.43	1.39	1.21
CONCRETE CONE FAILURE												
Factor for cracked concrete	$k_{cr,N}$	-	7.70	7.70	7.70	7.70	7.70	7.70	7.70	7.70	7.70	7.70
Factor for non-cracked concrete	$k_{ucr,N}$	-	11.00	11.00	11.00	11.00	11.00	11.00	11.00	11.00	11.00	11.00
Installation safety factor	γ_{inst}	-	1.20	1.20	1.20	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Spacing	$s_{cr,N}$	[mm]	96.00	141.0	117.0	177.0	144.0	204.0	195.0	255.0	240.0	297.0
Edge distance	$c_{cr,N}$	[mm]	48.00	71.00	59.00	89.00	72.00	102.0	98.00	128.0	120.0	149.0
CONCRETE SPLITTING FAILURE												
Spacing	$s_{cr,sp}$	[mm]	170.0	220.0	200.0	300.0	250.0	340.0	320.0	430.0	410.0	530.0
Edge distance	$c_{cr,sp}$	[mm]	85.00	110.0	100.0	150.0	125.0	170.0	160.0	215.0	205.0	265.0
Installation safety factor	γ_{inst}	-	1.20	1.20	1.20	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Design Performance Data

(-) failure is not decisive

SHEAR LOAD												
STEEL FAILURE												
Characteristic resistance without lever arm	$V_{Rk,s}$	[kN]	9.10	9.10	15.70	15.70	23.70	23.70	47.10	47.10	60.60	60.60
Ductility factor	k_7	-	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80
Characteristic resistance with lever arm	$M_{Rk,s}$	[Nm]	22.00	22.00	45.00	45.00	79.00	79.00	200.0	200.0	389.0	389.0
Partial safety factor	γ_{Ms}	-	1.25	1.25	1.25	1.25	1.25	1.25	1.25	1.25	1.25	1.25
CONCRETE PRY-OUT FAILURE												
Factor	k	-	1.00	1.00	1.00	1.00	1.00	2.00	2.00	2.00	2.00	2.00
Installation safety factor	γ_{inst}	-	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
CONCRETE EDGE FAILURE												
Effective length of anchor	ℓ_f	[mm]	32.00	47.00	39.00	59.00	48.00	68.00	65.00	85.00	80.00	99.00
Anchor diameter	d_{nom}	[mm]	8.00	8.00	10.00	10.00	12.00	12.00	16.00	16.00	20.00	20.00
Installation safety factor	γ_{inst}	-	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

The use of the reduced embedment depth M8 and M10 is restricted to anchoring statically indeterminate structural components.

Design Performance Data

Resistance to tension and shear loads under fire exposure

Size			M8		M10		M12		M16		M20	
R (for EI) = 30 min												
Effective embedment depth	h_{ef}	[mm]	32.00	47.00	39.00	59.00	48.00	68.00	65.00	85.00	80.00	99.00
TENSION LOAD												
STEEL FAILURE												
Characteristic resistance	$N_{Rk,s}$	[kN]	0.40	0.40	0.90	0.90	1.70	1.70	3.10	3.10	4.90	4.90
PULL-OUT FAILURE												
Characteristic resistance	$N_{Rk,p}$	[kN]	0.80	1.30	1.50	2.30	2.30	3.00	4.00	5.00	-	-
SHEAR LOAD												
STEEL FAILURE												
Characteristic resistance without lever arm	$V_{Rk,s}$	[kN]	0.40	0.40	0.90	0.90	1.70	1.70	3.10	3.10	4.90	4.90
Characteristic resistance with lever arm	$M_{Rk,s}$	[Nm]	0.40	0.40	1.10	1.10	2.60	2.60	6.70	6.70	13.00	13.00
R (for EI) = 60 min												
Effective embedment depth	h_{ef}	[mm]	32.00	47.00	39.00	59.00	48.00	68.00	65.00	85.00	80.00	99.00
TENSION LOAD												
STEEL FAILURE												
Characteristic resistance	$N_{Rk,s}$	[kN]	0.30	0.30	0.80	0.80	1.30	1.30	2.40	2.40	3.70	3.70
PULL-OUT FAILURE												
Characteristic resistance	$N_{Rk,p}$	[kN]	0.80	1.30	1.50	2.30	2.30	3.00	4.00	5.00	-	-
SHEAR LOAD												
STEEL FAILURE												
Characteristic resistance without lever arm	$V_{Rk,s}$	[kN]	0.30	0.30	0.80	0.80	1.30	1.30	2.40	2.40	3.70	3.70
Characteristic resistance with lever arm	$M_{Rk,s}$	[Nm]	0.30	0.30	1.00	1.00	2.00	2.00	5.00	5.00	9.70	9.70
R (for EI) = 90 min												
Effective embedment depth	h_{ef}	[mm]	32.00	47.00	39.00	59.00	48.00	68.00	65.00	85.00	80.00	99.00
TENSION LOAD												
STEEL FAILURE												
Characteristic resistance	$N_{Rk,s}$	[kN]	0.30	0.30	0.60	0.60	1.10	1.10	2.00	2.00	3.20	3.20
PULL-OUT FAILURE												
Characteristic resistance	$N_{Rk,p}$	[kN]	0.80	1.30	1.50	2.30	2.30	3.00	4.00	5.00	-	-

Design Performance Data

Resistance to tension and shear loads under fire exposure

SHEAR LOAD												
STEEL FAILURE												
Characteristic resistance without lever arm	$V_{Rk,s}$	[kN]	0.30	0.30	0.60	0.60	1.10	1.10	2.00	2.00	3.20	3.20
Characteristic resistance with lever arm	$M_{Rk,s}$	[Nm]	0.30	0.30	0.70	0.70	1.70	1.70	4.30	4.30	8.40	8.40
R (for EI) = 120 min												
Effective embedment depth	h_{ef}	[mm]	32.00	47.00	39.00	59.00	48.00	68.00	65.00	85.00	80.00	99.00
TENSION LOAD												
STEEL FAILURE												
Characteristic resistance	$N_{Rk,s}$	[kN]	0.20	0.20	0.50	0.50	0.80	0.80	1.60	1.60	2.50	2.50
PULL-OUT FAILURE												
Characteristic resistance	$N_{Rk,p}$	[kN]	0.60	1.00	1.20	1.80	1.80	2.40	3.20	4.00	-	-
SHEAR LOAD												
STEEL FAILURE												
Characteristic resistance without lever arm	$V_{Rk,s}$	[kN]	0.20	0.20	0.50	0.50	0.80	0.80	1.60	1.60	2.50	2.50
Characteristic resistance with lever arm	$M_{Rk,s}$	[Nm]	0.20	0.20	0.60	0.60	1.30	1.30	3.30	3.30	6.50	6.50

Design Performance Data

Allowable values for resistance in case of Seismic performance category C1

Size			M8		M10		M12		M16		M20	
Effective embedment depth	h_{ef}	[mm]	32.00	47.00	39.00	59.00	48.00	68.00	65.00	85.00	80.00	99.00
TENSION LOAD, STEEL FAILURE												
Characteristic resistance	$N_{Rk,s}$	[kN]	11.00	11.00	17.50	17.50	25.80	25.80	45.80	45.80	70.00	70.00
Partial safety factor	$\gamma_{MsN,seisC1}$	-	1.40	1.40	1.40	1.40	1.40	1.40	1.40	1.40	1.40	1.40
TENSION LOAD, PULL-OUT FAILURE												
Characteristic resistance	$N_{Rk,p}$	[kN]	3.00	5.00	6.00	9.00	9.00	12.00	16.00	20.00	-	30.00
Installation safety factor	γ_{inst}	-	1.20	1.20	1.20	1.00	1.00	1.00	1.00	1.00	1.00	1.00
SHEAR LOAD, STEEL FAILURE												
Characteristic resistance without lever arm	$V_{Rk,s}$	[kN]	-	5.20	-	9.40	23.80	23.80	33.30	33.30	55.10	55.10
Partial safety factor	$\gamma_{MsV,seisC1}$	-	1.25	1.25	1.25	1.25	1.25	1.25	1.25	1.25	1.25	1.25

Allowable values for resistance in case of Seismic performance category C2

Size			M10	M12	M16
Effective embedment depth	h_{ef}	[mm]	59.00	68.00	85.00
TENSION LOAD, STEEL FAILURE					
Characteristic resistance	$N_{Rk,s}$	[kN]	17.50	25.80	45.80
Partial safety factor	$\gamma_{MsN,seisC2}$	-	1.40	1.40	1.40
TENSION LOAD, PULL-OUT FAILURE					
Characteristic resistance	$N_{Rk,p}$	[kN]	3.40	7.00	10.90
Installation safety factor	γ_{inst}	-	1.00	1.00	1.00
SHEAR LOAD, STEEL FAILURE					
Characteristic resistance without lever arm	$V_{Rk,s}$	[kN]	9.20	11.10	28.20
Partial safety factor	$\gamma_{MsV,seisC2}$	-	1.25	1.25	1.25

Product Commercial Data

Product Code	Anchor		Quantity (pcs)	Weight (kg)
	Diameter [mm]	Length [mm]	Box	Box
FDGR-HPTIIF-08065	8	65	100	2.8
FDGR-HPTIIF-08080	8	80	100	3.2
FDGR-HPTIIF-08100	8	100	100	3.9
FDGR-HPTIIF-08115	8	115	100	4.3
FDGR-HPTIIF-10065/5	10	65	50	2.4
FDGR-HPTIIF-10080	10	80	50	2.8
FDGR-HPTIIF-10095	10	95	50	3.1
FDGR-HPTIIF-10115	10	115	50	3.6
FDGR-HPTIIF-10130/50	10	130	50	4.0
FDGR-HPTIIF-12080/5	12	80	50	4.1
FDGR-HPTIIF-12100/5	12	100	50	4.8
FDGR-HPTIIF-12120	12	120	50	5.4
FDGR-HPTIIF-12135/40	12	135	50	6.1
FDGR-HPTIIF-12150/55	12	150	50	6.6
FDGR-HPTIIF-16105	16	105	25	4.6
FDGR-HPTIIF-16125/5	16	125	25	5.3
FDGR-HPTIIF-16140/20	16	140	25	5.7
FDGR-HPTIIF-16180/60	16	180	25	7.1
FDGR-HPTIIF-16220/100	16	220	25	8.2
FDGR-HPTIIF-20125/5	20	125	25	8.2
FDGR-HPTIIF-20160/20	20	160	25	10.1
FDGR-HPTIIF-20200/60	20	200	10	4.9

1) ETA 17/0184

07. Stainless Steel Throughbolt

Stainless steel throughbolt anchor for cracked and non-cracked concrete



Approvals and Reports

- ETA 17/0806



Features and benefits

- Stainless steel anchor for the highest corrosion resistance.
- High performance in cracked and non-cracked concrete confirmed by ETA Option 1.
- Highest quality ensures maximum load capability.
- For applications requiring fire resistance up to 120 minutes.
- Suitable for reduced embedment to avoid contact with reinforcement.
- Embedment depth markings help to ensure precise installation of the anchor.
- Design of FDGR-HPTII allows drilling and installing directly through the fixture and helps to reduce installation time.
- Suitable for installation in corrosive environments category C1, C2, C3, C4 and C5.
- Anchors can be used in earthquake risk zones - seismic category C1 and C2.

Applications

- Cladding restraints
- Barriers
- Structural steel
- Curtain walling
- Handrails
- Heavy Plant
- Balustrading
- Passenger lifts
- Facades
- Fencing & gates manufacturing and installation
- Masonry support
- Platforms
- Public seating
- Racking systems

Base materials

Approved for use in:

- Cracked concrete C20/25-C50/60
- Non-cracked concrete C20/25-C50/60
- Reinforced concrete
- Unreinforced concrete

Also suitable for use in:

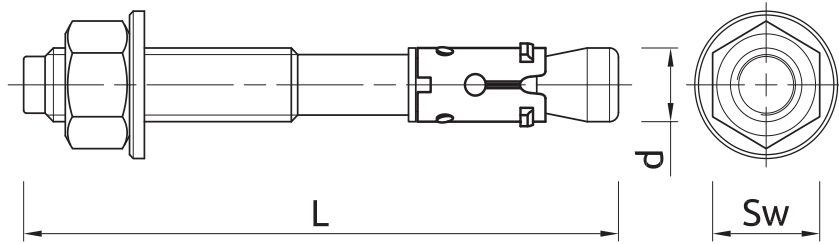
- Natural Stone (after site testing)

Installation guide



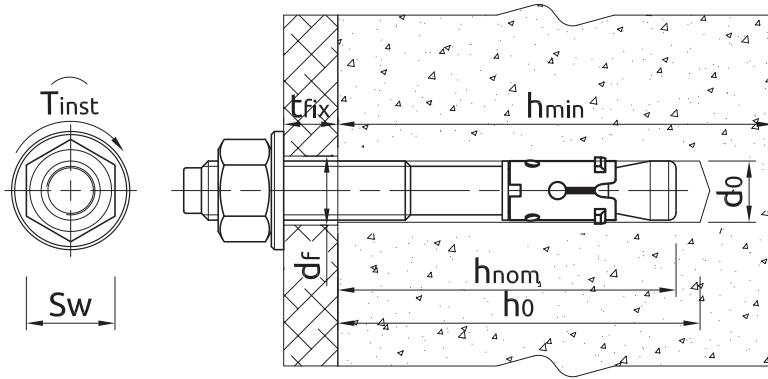
1. Drill a hole of required diameter and depth.
2. Clear the hole of drilling dust and debris (using blowpump or equivalent method).
3. Lightly tap the throughbolt through the fixture into hole with a hammer, until fixing depth is reached.
4. Tighten to the recommended torque.

Product Information



Size	Product Code	Anchor		Fixture		
		Diameter	Length	Max. thickness t _{fix} for:		Hole diameter
		d	L	h _{nom,red}	h _{nom,std}	d _f
		[mm]	[mm]	[mm]	[mm]	[mm]
M8	FDG-R-HPTIIA4-08060/10	8	60	10	-	9
	FDG-R-HPTIIA4-08075/10	8	75	25	10	9
	FDG-R-HPTIIA4-08085/20	8	85	35	20	9
	FDG-R-HPTIIA4-08095/30	8	95	45	30	9
	FDG-R-HPTIIA4-08105/40	8	105	55	40	9
	FDG-R-HPTIIA4-08115/50	8	115	65	50	9
M10	FDG-R-HPTIIA4-10065/5	10	65	5	-	12
	FDG-R-HPTIIA4-10080/20	10	80	20	-	12
	FDG-R-HPTIIA4-10095/15	10	95	35	15	12
	FDG-R-HPTIIA4-10115/35	10	115	55	35	12
	FDG-R-HPTIIA4-10130/50	10	130	70	50	12
	FDG-R-HPTIIA4-10140/60	10	140	80	60	12
M12	FDG-R-HPTIIA4-12080/5	12	80	5	-	14
	FDG-R-HPTIIA4-12100/5	12	100	25	5	14
	FDG-R-HPTIIA4-12115/20	12	115	40	20	14
	FDG-R-HPTIIA4-12125/30	12	125	50	30	14
	FDG-R-HPTIIA4-12150/55	12	150	75	55	14
	FDG-R-HPTIIA4-12180/85	12	180	105	85	14
M16	FDG-R-HPTIIA4-16125/5	16	125	25	5	18
	FDG-R-HPTIIA4-16140/20	16	140	40	20	18
	FDG-R-HPTIIA4-16150/30	16	150	50	30	18
	FDG-R-HPTIIA4-16180/60	16	180	80	60	18

Installation data



Size			M8	M10	M12	M16
Thread diameter	d	[mm]	8	10	12	16
Hole diameter in substrate	d ₀	[mm]	8	10	12	16
Installation torque	T _{inst}	[Nm]	15	30	50	100
Wrench size	Sw	[mm]	13	17	19	24
External diameter of washer		[mm]	16	20	24	30
STANDARD EMBEDMENT DEPTH						
Min. hole depth in substrate	h _{0,s}	[mm]	65	80	90	110
Min. installation depth	h _{nom,s}	[mm]	55	69	80	100
Min. substrate thickness	h _{min,s}	[mm]	100	120	140	170
Min. spacing (Non-cracked concrete)	s _{min,s}	[mm]	55	70	90	135
Min. spacing (Cracked concrete)	s _{min,s}	[mm]	55	70	90	135
Min. edge distance (Non-cracked concrete)	c _{min,s}	[mm]	40	50	55	80
Min. edge distance (Cracked concrete)	c _{min,s}	[mm]	40	45	55	70
REDUCED EMBEDMENT DEPTH						
Min. hole depth in substrate	h _{0,r}	[mm]	50	60	70	90
Min. installation depth	h _{nom,r}	[mm]	40	49	60	80
Min. substrate thickness	h _{min,r}	[mm]	100	100	100	130
Min. spacing (Non-cracked concrete)	s _{min,r}	[mm]	50	70	120	150
Min. spacing (Cracked concrete)	s _{min,r}	[mm]	50	70	120	150
Min. edge distance (Non-cracked concrete)	c _{min,r}	[mm]	50	60	70	90
Min. edge distance (Cracked concrete)	c _{min,r}	[mm]	40	50	70	85

Mechanical Properties

Size			M8	M10	M12	M16
Nominal ultimate tensile strength - tension	f _{uk}	[N/mm ²]	600	600	550	550
Nominal yield strength - tension	f _{yk}	[N/mm ²]	450	450	413	413
Cross sectional area - tension	A _s	[mm ²]	36.6	58	84.3	157
Elastic section modulus	W _{el}	[mm ³]	50.27	98.17	169.65	402.12
Characteristic bending resistance	M _{Rk,s} ⁰	[Nm]	22	45	72	180
Design bending resistance	M	[Nm]	18	36	57	144

Basic Performance Data

Performance data for single anchor without influence of edge distance and spacing.

Size		M8	M10	M12	M16
NON-CRACKED CONCRETE					
Standard embedment depth h_{ef}	[mm]	47.00	59.00	68.00	85.00
Reduced embedment depth h_{ef}	[mm]	32.00	39.00	48.00	65.00
CRACKED CONCRETE					
Standard embedment depth h_{ef}	[mm]	47.00	59.00	68.00	85.00
Reduced embedment depth h_{ef}	[mm]	32.00	39.00	48.00	65.00
MEAN ULTIMATE LOAD					
TENSION LOAD N $R_{u,m}$					
NON-CRACKED CONCRETE					
Standard embedment depth	[kN]	15.40	22.80	29.20	55.80
Reduced embedment depth	[kN]	10.40	16.00	22.10	37.90
CRACKED CONCRETE					
Standard embedment depth	[kN]	9.70	11.50	18.60	30.40
Reduced embedment depth	[kN]	5.60	9.80	13.40	22.20
SHEAR LOAD V $R_{u,m}$					
NON-CRACKED CONCRETE					
Standard embedment depth	[kN]	14.00	22.20	29.60	54.50
Reduced embedment depth	[kN]	12.22	19.73	22.45	54.50
CRACKED CONCRETE					
Standard embedment depth	[kN]	12.87	21.20	29.60	54.50
Reduced embedment depth	[kN]	8.60	13.88	15.80	49.78
CHARACTERISTIC LOAD					
TENSION LOAD N R_k					
NON-CRACKED CONCRETE					
Standard embedment depth	[kN]	9.00	16.00	25.00	38.55
Reduced embedment depth	[kN]	7.50	11.98	16.36	25.78
CRACKED CONCRETE					
Standard embedment depth	[kN]	6.00	9.00	12.00	25.00
Reduced embedment depth	[kN]	3.00	7.50	9.00	16.00
SHEAR LOAD V R_k					
NON-CRACKED CONCRETE					
Standard embedment depth	[kN]	11.70	18.50	24.60	45.40
Reduced embedment depth	[kN]	8.90	14.38	16.36	45.40
CRACKED CONCRETE					
Standard embedment depth	[kN]	11.10	15.61	24.60	45.40
Reduced embedment depth	[kN]	6.23	10.06	11.45	36.09
DESIGN LOAD					
TENSION LOAD N R_d					
NON-CRACKED CONCRETE					
Standard embedment depth	[kN]	5.00	10.67	16.70	25.70
Reduced embedment depth	[kN]	4.17	6.66	10.91	17.19
CRACKED CONCRETE					
Standard embedment depth	[kN]	3.33	6.00	8.00	16.67
Reduced embedment depth	[kN]	1.67	4.17	6.00	10.67

Basic Performance Data

SHEAR LOAD V_{Rd}					
NON-CRACKED CONCRETE					
Standard embedment depth	[kN]	9.36	14.80	19.68	36.32
Reduced embedment depth	[kN]	5.94	9.59	10.91	34.37
CRACKED CONCRETE					
Standard embedment depth	[kN]	7.40	10.40	19.68	35.98
Reduced embedment depth	[kN]	4.16	6.71	7.63	24.06

Design Performance Data

(-) failure is not decisive

Size			M8		M10		M12		M16	
Effective embedment depth	h_{ef}	[mm]	32.00	47.00	39.00	59.00	48.00	68.00	65.00	85.00
TENSION LOAD										
STEEL FAILURE										
Characteristic resistance	$N_{Rk,s}$	[kN]	21.20	21.20	33.60	33.60	44.80	44.80	82.60	82.60
Partial safety factor	γ_{Ms}	-	1.50	1.50	1.50	1.50	1.50	1.50	1.50	1.50
PULL-OUT FAILURE; NON-CRACKED CONCRETE C20/25										
Characteristic resistance	$N_{Rk,p}$	[kN]	7.50	9.00	12.00	16.00	-	25.00	-	-
PULL-OUT FAILURE; CRACKED CONCRETE C20/25										
Characteristic resistance	$N_{Rk,p}$	[kN]	3.00	6.00	7.50	9.00	9.00	12.00	16.00	25.00
PULL-OUT FAILURE										
Installation safety factor	γ_{inst}	-	1.20	1.20	1.20	1.00	1.00	1.00	1.00	1.00
Increasing factors for $N_{Rd,p}$ - C30/37	ψ_c	-	1.07	1.16	1.07	1.26	1.16	1.23	1.18	1.18
Increasing factors for $N_{Rd,p}$ - C40/50	ψ_c	-	1.13	1.33	1.13	1.52	1.32	1.45	1.37	1.37
Increasing factors for $N_{Rd,p}$ - C50/60	ψ_c	-	1.20	1.50	1.20	1.78	1.49	1.67	1.55	1.55
CONCRETE CONE FAILURE										
Factor for cracked concrete	$k_{cr,N}$	-	7.70	7.70	7.70	7.70	7.70	7.70	7.70	7.70
Factor for non-cracked concrete	$k_{ucr,N}$	-	11.00	11.00	11.00	11.00	11.00	11.00	11.00	11.00
Installation safety factor	γ_{inst}	-	1.20	1.20	1.20	1.00	1.00	1.00	1.00	1.00
Spacing	$s_{cr,N}$	[mm]	96.00	141.0	117.0	177.0	144.0	204.0	195.0	255.0
Edge distance	$c_{cr,N}$	[mm]	48.00	71.00	59.00	89.00	72.00	102.0	98.00	128.0
CONCRETE SPLITTING FAILURE										
Spacing	$s_{cr,sp}$	[mm]	160.0	240.0	200.0	300.0	250.0	340.0	320.0	430.0
Edge distance	$c_{cr,sp}$	[mm]	80.00	120.0	100.0	150.0	125.0	170.0	160.0	215.0
Installation safety factor	γ_{inst}	-	1.20	1.20	1.20	1.00	1.00	1.00	1.00	1.00
SHEAR LOAD										
STEEL FAILURE										
Characteristic resistance without lever arm	$V_{Rk,s}$	[kN]	11.70	11.70	18.50	18.50	24.60	24.60	45.40	45.40
Ductility factor	k_γ	-	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Characteristic resistance with lever arm	$M_{Rk,s}$	[Nm]	22.00	22.00	42.00	45.00	72.00	72.00	180.0	180.0
Partial safety factor	γ_{Ms}	-	1.25	1.25	1.25	1.25	1.25	1.25	1.25	1.25
CONCRETE PRY-OUT FAILURE										
Factor	k	-	1.00	1.00	1.20	1.00	1.00	2.00	2.00	2.00
Installation safety factor	γ_{inst}	-	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
CONCRETE EDGE FAILURE										
Effective length of anchor	ℓ_f	[mm]	32.00	47.00	39.00	59.00	48.00	68.00	65.00	85.00
Anchor diameter	d_{nom}	[mm]	8.00	8.00	10.00	10.00	12.00	12.00	16.00	16.00
Installation safety factor	γ_{inst}	-	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

The use of the reduced embedment depth M8 and M10 is restricted to anchoring statically indeterminate structural components.

Design Performance Data

Resistance to tension and shear loads under fire exposure

Size			M8		M10		M12		M16	
R (for EI) = 30 min										
Effective embedment depth	h_{ef}	[mm]	32.00	47.00	39.00	59.00	48.00	68.00	65.00	85.00
TENSION LOAD										
STEEL FAILURE										
Characteristic resistance	$N_{Rk,s}$	[kN]	0.70	0.70	1.50	1.50	2.50	2.50	4.70	4.70
PULL-OUT FAILURE										
Characteristic resistance	$N_{Rk,p}$	[kN]	0.80	1.50	1.90	2.30	2.30	3.00	4.00	6.30
SHEAR LOAD										
STEEL FAILURE										
Characteristic resistance without lever arm	$V_{Rk,s}$	[kN]	0.70	0.70	1.50	1.50	2.50	2.50	4.70	4.70
Characteristic resistance with lever arm	$M_{Rk,s}$	[Nm]	0.70	0.70	1.90	1.90	3.90	3.90	10.00	10.00
R (for EI) = 60 min										
Effective embedment depth	h_{ef}	[mm]	32.00	47.00	39.00	59.00	48.00	68.00	65.00	85.00
TENSION LOAD										
STEEL FAILURE										
Characteristic resistance	$N_{Rk,s}$	[kN]	0.60	0.60	1.20	1.20	2.10	2.10	3.90	3.90
PULL-OUT FAILURE										
Characteristic resistance	$N_{Rk,p}$	[kN]	0.80	1.50	1.90	2.30	2.30	3.00	4.00	6.30
SHEAR LOAD										
STEEL FAILURE										
Characteristic resistance without lever arm	$V_{Rk,s}$	[kN]	0.60	0.60	1.20	1.20	2.10	2.10	3.90	3.90
Characteristic resistance with lever arm	$M_{Rk,s}$	[Nm]	0.60	0.60	1.50	1.50	3.30	3.30	8.30	8.30
R (for EI) = 90 min										
Effective embedment depth	h_{ef}	[mm]	32.00	47.00	39.00	59.00	48.00	68.00	65.00	85.00
TENSION LOAD										
STEEL FAILURE										
Characteristic resistance	$N_{Rk,s}$	[kN]	0.40	0.40	0.90	0.90	1.70	1.70	3.10	3.10
PULL-OUT FAILURE										
Characteristic resistance	$N_{Rk,p}$	[kN]	0.80	1.50	1.90	2.30	2.30	3.00	4.00	6.30
SHEAR LOAD										
STEEL FAILURE										
Characteristic resistance without lever arm	$V_{Rk,s}$	[kN]	0.40	0.40	0.90	0.90	1.70	1.70	3.10	3.10
Characteristic resistance with lever arm	$M_{Rk,s}$	[Nm]	0.40	0.40	1.20	1.20	2.60	2.60	6.70	6.70
R (for EI) = 120 min										
Effective embedment depth	h_{ef}	[mm]	32.00	47.00	39.00	59.00	48.00	68.00	65.00	85.00
TENSION LOAD										
STEEL FAILURE										
Characteristic resistance	$N_{Rk,s}$	[kN]	0.40	0.40	0.80	0.80	1.30	1.30	2.50	2.50
PULL-OUT FAILURE										
Characteristic resistance	$N_{Rk,p}$	[kN]	0.60	1.20	1.50	1.80	1.80	2.40	3.20	5.00
SHEAR LOAD										
STEEL FAILURE										
Characteristic resistance without lever arm	$V_{Rk,s}$	[kN]	0.40	0.40	0.80	0.80	1.30	1.30	2.50	2.50
Characteristic resistance with lever arm	$M_{Rk,s}$	[Nm]	0.40	0.40	1.00	1.00	2.10	2.10	5.30	5.30

Design Performance Data

Allowable values for resistance in case of Seismic performance category C1

Size			M8		M10		M12		M16	
Effective embedment depth	h_{ef}	[mm]	32.00	47.00	39.00	59.00	48.00	68.00	65.00	85.00
TENSION LOAD, STEEL FAILURE										
Characteristic resistance	$N_{Rk,s}$	[kN]	21.20	21.20	33.60	33.60	44.80	44.80	82.60	82.60
Partial safety factor	$\gamma_{MsN,seisC1}$	-	1.50	1.50	1.50	1.50	1.50	1.50	1.50	1.50
TENSION LOAD, PULL-OUT FAILURE										
Characteristic resistance	$N_{Rk,p}$	[kN]	3.00	6.00	7.50	9.00	9.00	12.00	16.00	25.00
Installation safety factor	γ_{inst}	-	1.20	1.20	1.20	1.00	1.00	1.00	1.00	1.00
SHEAR LOAD, STEEL FAILURE										
Characteristic resistance without lever arm	$V_{Rk,s}$	[kN]	-	6.70	-	12.50	18.40	18.40	39.00	39.00
Partial safety factor	$\gamma_{MsV,seisC1}$	-	1.25	1.25	1.25	1.25	1.25	1.25	1.25	1.25

Allowable values for resistance in case of Seismic performance category C2

Size			M10		M12	
Effective embedment depth	h_{ef}	[mm]	39.00	59.00	48.00	68.00
TENSION LOAD, STEEL FAILURE						
Characteristic resistance	$N_{Rk,s}$	[kN]	33.60	33.60	44.80	44.80
Partial safety factor	$\gamma_{MsN,seisC2}$	-	1.50	1.50	1.50	1.50
TENSION LOAD, PULL-OUT FAILURE						
Characteristic resistance	$N_{Rk,p}$	[kN]	2.60	3.00	3.00	4.20
Installation safety factor	γ_{inst}	-	1.20	1.00	1.00	1.00
SHEAR LOAD, STEEL FAILURE						
Characteristic resistance without lever arm	$V_{Rk,s}$	[kN]	-	8.30	-	11.10
Partial safety factor	$\gamma_{MsV,seisC2}$	-	1.25	1.25	1.25	1.25

Product Commercial Data

Product Code	Anchor		Quantity (pcs)	Weight (kg)
	Diameter [mm]	Length [mm]	Box	Box
FDG-R-HPTIIA4-08060/10	8	60	100	2.6
FDG-R-HPTIIA4-08075/10	8	75	100	3.1
FDG-R-HPTIIA4-08085/20	8	85	100	3.4
FDG-R-HPTIIA4-08095/30	8	95	100	3.7
FDG-R-HPTIIA4-080105/40	8	105	50	2.0
FDG-R-HPTIIA4-08115/50	8	115	100	4.3
FDG-R-HPTIIA4-10065/5	10	65	50	2.4
FDG-R-HPTIIA4-10080/20	10	80	50	2.8
FDG-R-HPTIIA4-10095/15	10	95	50	3.1
FDG-R-HPTIIA4-10115/35	10	115	50	3.7
FDG-R-HPTIIA4-10130/50	10	130	50	4.0
FDG-R-HPTIIA4-10140/60	10	140	50	4.3
FDG-R-HPTIIA4-12080/5	12	80	50	4.1
FDG-R-HPTIIA4-12100/5	12	100	50	4.8
FDG-R-HPTIIA4-12115/20	12	115	50	5.4
FDG-R-HPTIIA4-12125/30	12	125	50	5.8
FDG-R-HPTIIA4-12150/55	12	150	50	6.7
FDG-R-HPTIIA4-12180/85	12	180	50	7.8
FDG-R-HPTIIA4-16125/5	16	125	25	5.3
FDG-R-HPTIIA4-16140/20	16	140	25	5.8
FDG-R-HPTIIA4-16150/30	16	150	25	6.1
FDG-R-HPTIIA4-16180/60	16	180	25	7.2

1) ETA 17/0185

Notes

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