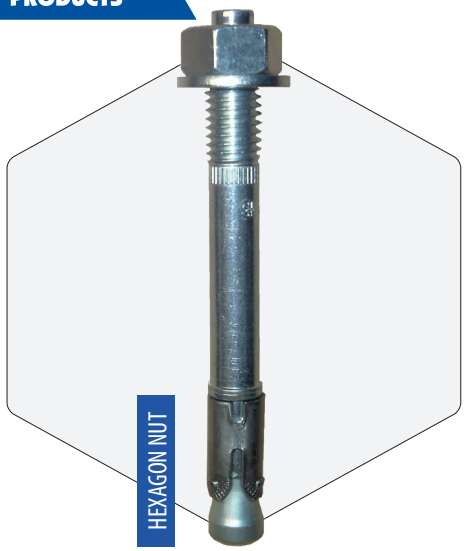
Option 1 Throughbolt
Clear Zinc Plated



INFORMATION

The torque controlled Throughbolt is a zinc plated high performance anchor for use in cracked/non-cracked concrete and structural applications such as:

- Columns
- Guard rails
- Façades
- Staircases
- Silo installation
- Machines
- Cantilever beams

BASE MATERIAL

- Concrete C20/25 to C50/60
- Cracked Concrete
- Non-Cracked Concrete

FEATURES

- High Performance
- Wide Range Of Sizes
- Fast And Secure Installation
- Through Fixing
- Three way Expansion Sleeve
- Zinc Plated Min. 5µm
- Close Spacing And Edge Distance
- Reduced Embedment Depth
- Reaction To Fire Class A1
- Fire Resistant Loading

APPROVALS

European Technical Assessment
Option 1 Cracked Concrete

ETA 13/0364
Fire Resistance

ETA 13/0364

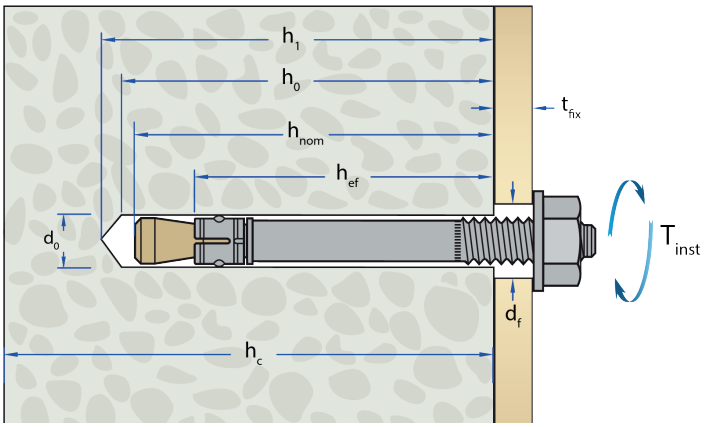
C1, C2
Seismic Performance Categories
(M10 to M20 with standard anchorage depths)

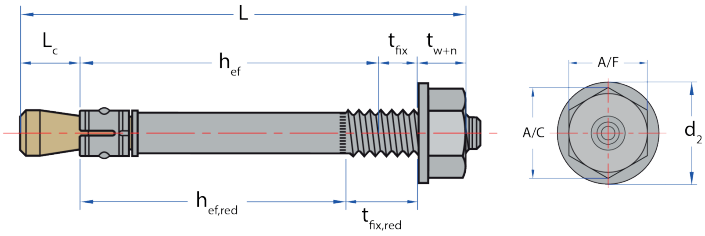
RELATED PRODUCTS

SDS+ Drill Bits

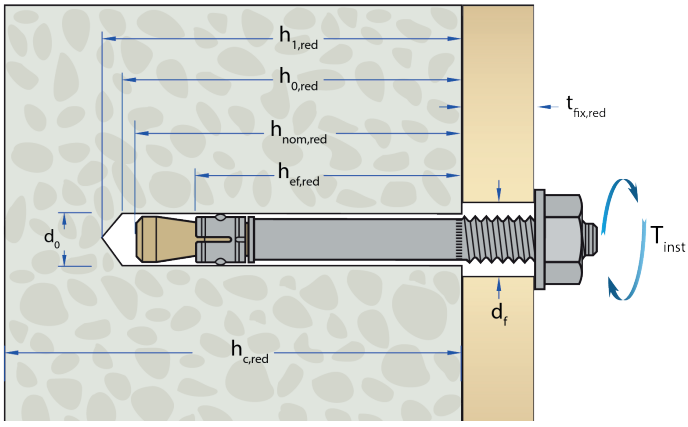
Hole Cleaning Pump

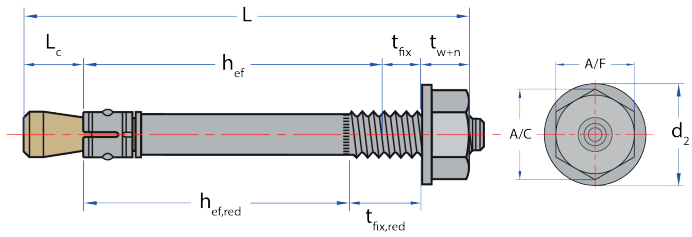
RANGE AND LOAD DATA





STANDARD EMBEDMENT





REDUCED EMBEDMENT

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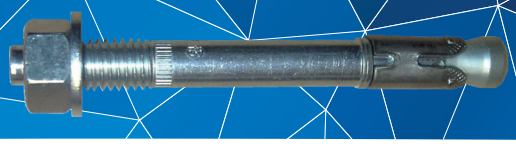
Re03 February 2022

Technical Data Sheet

Option 1 Throughbolt
Clear Zinc Plated



RANGE AND LOAD DATA

RANGE DATA														
Part Number	Size of Thread	Min. Structure Thickness	Drill Hole Diameter	Min Hole Depth	Fixture Clearance Hole	Cone Length	Effective Embedment Depth	Max Fixture Thickness	Washer and Nut Thickness	Total Length	Thread Length	Width Across Flats	Washer Outer diameter	Tightening Torque
	-	(h_c)	(d_0)	(h_1)	(d_f)	(L_c)	(h_{ef})	(t_{fix})	(t_{w+n})	(L)	(L_{th})	(A/F)	(d_2)	(T_{inst})
		mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	Nm
STANDARD EMBEDMENT DEPTH														
ETA08075	M8	100	8	60	9	11	46	10	8	75	32	13	16	20
ETA08095								30		95	52			
ETA08115								50		115	72			
ETA10090	M10	120	10	75	12	10	60	10	10	90	42	17	20	25
ETA10110								30		110	62			
ETA10130								50		130	82			
ETA12110	M12	140	12	90	14	14	70	15	13	110	51	19	24	45
ETA12125								30		125	66			
ETA12160								65		160	101			
ETA12180								85		180	121			
ETA16135	M16	170	16	110	18	17	85	15	16	135	56	24	30	90
ETA16170								50		170	91			
ETA16200								80		200	121			
ETA20165	M20	200	20	125	22	21	100	30	21	165	50	30	37	160
ETA20195								60		195	70			
REDUCED EMBEDMENT DEPTH														
Part Number	Size of Thread	Red. Min. Structure Thickness	Drill Hole Diameter	Red. Min. Hole Depth	Fixture Clearance Hole	Cone Length	Red. Effective Embedment Depth	Red. Max. Fixture Thickness	Washer and Nut Thickness	Total Length	Thread Length	Width Across Flats	Washer Outer diameter	Tightening Torque
	-	$(h_{c,red})$	(d_0)	$(h_{1,red})$	(d_f)	(L_c)	$(h_{ef,red})$	$(t_{fix,red})$	(t_{w+n})	(L)	(L_{th})	(A/F)	(d_2)	(T_{inst})
		mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	Nm
ETA08075	M8	80	8	49	9	11	35	21	8	75	32	13	16	20
ETA08095								41		95	52			
ETA08115								61		115	72			
ETA10090	M10	80	10	55	12	10	40	30	10	90	42	17	20	25
ETA10110								50		110	62			
ETA10130								70		130	82			
ETA12110	M12	100	12	70	14	14	50	35	13	110	51	19	24	45
ETA12125								50		125	66			
ETA12160								85		160	101			
ETA12180								105		180	121			
ETA16135	M16	140	16	90	18	17	65	35	16	135	56	24	30	90
ETA16170								70		170	91			
ETA16200								100		200	121			

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Option 1 Throughbolt
Clear Zinc Plated

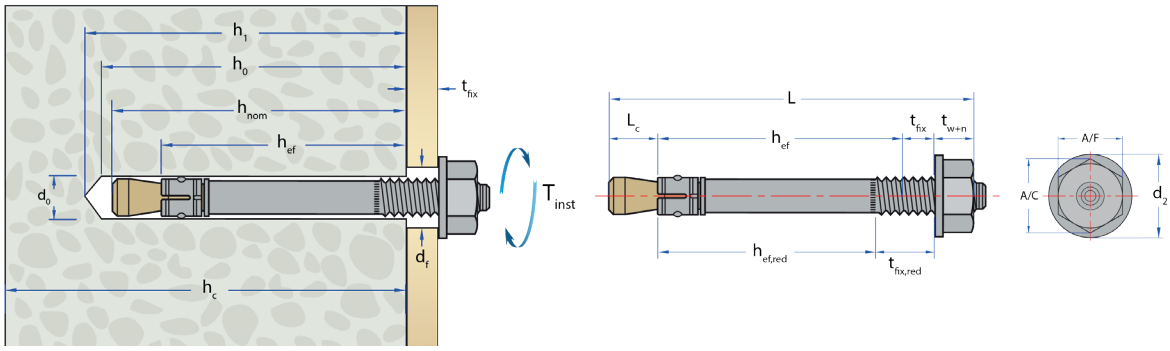
NON-CRACKED CONCRETE

REDUCED EMBEDMENT

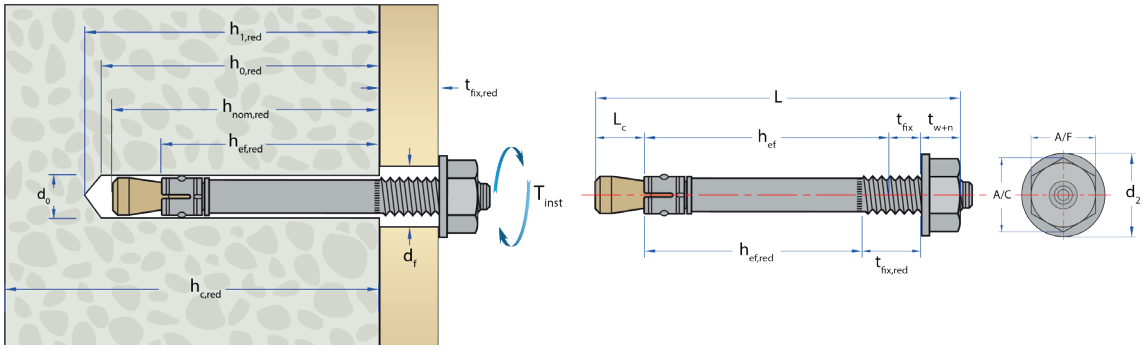
Performance Data (C20/25 non-cracked concrete)												
Size Of Thread	Effective Embedment Depth (h_{ef})	Minimum Concrete Thickness (h_{min})	Characteristic Resistance		Design Resistance		Approved Resistance		Design Spacing (S)		Design Edge Distance (C)	
			Tensile (N_{Rk})	Shear (V_{Rk})	Tensile (N_{Rd})	Shear (V_{Rd})	Tensile (N_{Ap})	Shear (V_{Ap})	Tensile	Shear	Tensile	Shear
-	mm	mm	kN	kN	kN	kN	kN	kN	mm	mm	mm	mm
M8	35	80	7.5	12.2	5.0	9.7	3.5	6.9	50	40	70	120
M10	40	80	9.0	20.1	6.0	16.0	4.2	11.4	90	70	70	200
M12	50	100	17.9	30.0	11.9	24.0	8.5	17.1	250	110	130	270
M16	65	140	26.5	63.5	17.6	42.3	12.5	30.2	200	200	170	390

STANDARD EMBEDMENT

Performance Data (C20/25 non-cracked concrete)												
Size Of Thread	Effective Embedment Depth (h_{ef})	Minimum Concrete Thickness (h_{min})	Characteristic Resistance		Design Resistance		Approved Resistance		Design Spacing (S)		Design Edge Distance (C)	
			Tensile (N_{Rk})	Shear (V_{Rk})	Tensile (N_{Rd})	Shear (V_{Rd})	Tensile (N_{Ap})	Shear (V_{Ap})	Tensile	Shear	Tensile	Shear
-	mm	mm	kN	kN	kN	kN	kN	kN	mm	mm	mm	mm
M8	46	100	12.0	12.2	8.0	9.7	5.7	6.9	80	40	80	110
M10	60	120	16.0	20.1	10.6	16.0	7.5	11.4	110	60	90	160
M12	70	140	25.0	30.0	16.6	24.0	11.8	17.1	240	60	140	220
M16	85	170	35.0	55.0	23.3	44.0	16.6	31.4	330	100	190	360
M20	100	200	50.5	69.0	33.6	51.8	24.0	37.0	400	100	200	380



STANDARD EMBEDMENT



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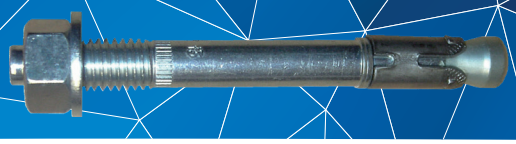

CRACKED CONCRETE

REDUCED EMBEDMENT

Performance Data (C20/25 cracked concrete)												
Size Of Thread	Effective Embedment Depth (h_{ef})	Minimum Concrete Thickness (h_{min})	Characteristic Resistance		Design Resistance		Approved Resistance		Design Spacing (S)		Design Edge Distance (C)	
			Tensile (N_{Rk})	Shear (V_{Rk})	Tensile (N_{Rd})	Shear (V_{Rd})	Tensile (N_{Ap})	Shear (V_{Ap})	Tensile	Shear	Tensile	Shear
-	mm	mm	kN	kN	kN	kN	kN	kN	mm	mm	mm	mm
M8	35	80	5.0	12.2	3.3	9.7	2.3	6.9	50	70	40	180
M10	40	80	7.5	21.8	5.0	14.5	3.5	10.3	80	120	70	260
M12	50	100	12.7	30.5	8.4	20.3	6.0	14.5	150	150	80	320
M16	65	140	18.8	45.2	12.5	30.1	8.9	21.5	200	200	100	390

STANDARD EMBEDMENT

Performance Data (C20/25 cracked concrete)												
Size Of Thread	Effective Embedment Depth (h_{ef})	Minimum Concrete Thickness (h_{min})	Characteristic Resistance		Design Resistance		Approved Resistance		Design Spacing (s)		Design Edge Distance (c)	
			Tensile (N_{Rk})	Shear (V_{Rk})	Tensile (N_{Rd})	Shear (V_{Rd})	Tensile(N_{Ra})	Shear (V_{Ra})	Tensile	Shear	Tensile	Shear
-	mm	mm	kN	kN	kN	kN	kN	kN	mm	mm	mm	mm
M8	46	100	5.0	12.2	3.3	9.7	2.3	6.9	40	40	40	160
M10	60	120	9.0	20.1	6.0	16.0	4.2	11.4	50	50	50	230
M12	70	140	16.0	30.0	10.6	24.0	7.5	17.1	110	90	80	320
M16	85	170	25.0	55.0	16.6	44.0	11.8	31.4	200	250	110	530
M20	100	200	36.0	69.0	24.0	51.8	17.1	37.0	300	170	150	550

FIRE RESISTANCE DATA

Fire Resistance Data (Standard Embedment Depth In C20/25 to C50/60 cracked or non-cracked concrete)*																		
Size Of Thread	Effective Embedment Depth	Minimum Concrete Thickness	Design Resistance**								Approved Resistance							
			30min (R30)		60min (R60)		90min (R90)		120min (R120)		30min (R30)		60min (R60)		90min (R90)		120min (R120)	
	(h_{ef})	(h_{min})	Tensile ($N_{Rd,fi}$)	Shear ($V_{Rd,fi}$)	Tensile ($N_{Rd,fi}$)	Shear ($V_{Rd,fi}$)	Tensile ($N_{Rd,fi}$)	Shear ($V_{Rd,fi}$)	Tensile ($N_{Rd,fi}$)	Shear ($V_{Rd,fi}$)	Tensile ($N_{Rd,fi}$)	Shear ($V_{Rd,fi}$)	Tensile ($N_{Rd,fi}$)	Shear ($V_{Rd,fi}$)	Tensile ($N_{Rd,fi}$)	Shear ($V_{Rd,fi}$)	Tensile ($N_{Rd,fi}$)	Shear ($V_{Rd,fi}$)
-	mm	mm	kN		kN		kN		kN		kN		kN		kN		kN	
M8	46	100	1.4	1.6	1.1	1.5	0.8	1.2	0.7	1.0	1.0	1.1	0.8	1.1	0.6	0.9	0.5	0.7
M10	60	120	2.2	2.6	1.8	2.5	1.4	2.1	1.2	2.0	1.6	1.9	1.3	1.8	1.0	1.5	0.9	1.4
M12	70	140	3.2	3.8	2.8	3.6	2.4	3.5	2.2	3.4	2.3	2.7	2.0	2.6	1.7	2.5	1.6	2.4
M16	85	170	6.0	7.0	5.2	6.8	4.4	6.5	4.0	6.4	4.3	5.0	3.7	4.9	3.1	4.6	2.9	4.6
M20	100	200	9.4	11.0	8.2	11.0	6.9	10.0	6.3	10.0	6.7	7.9	5.9	7.9	4.9	7.1	4.5	7.1

* The determination covers anchors with a fire attack from one side only. If the fire attack is from more than one side, the design method may be taken only, if the edge distance of the anchor is c ≥ 300 mm and ≥ 2 h_{ef}.

**For combined loads and shear with lever arm use Anchor Calculation Program.

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SUPPLEMENTARY DATA

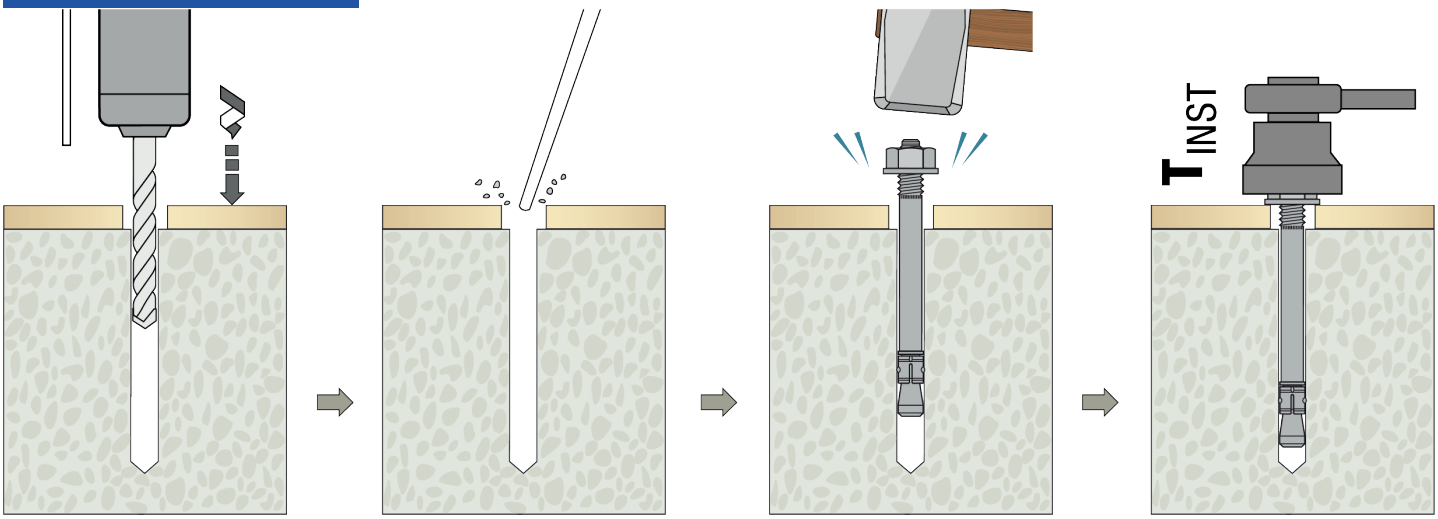
Influence Of Concrete Strength (Cracked/Non-cracked Concrete)					
Concrete strength		C20/25	C30/37	C40/50	C50/60
Cylinder	N/mm²	20	30	40	50
Cube	N/mm²	25	37	50	60
Factor	-	1.0	1.22	1.41	1.55

Important Note:
When using concrete factors ensure that loads do not exceed Steel Design Resistance.

Steel Failure						
Size Of Thread	Tensile Resistance			Shear Resistance		
	Characteristic Resistance ($N_{Rk,s}$)	Design Resistance ($N_{Rd,s}$)*	Approved Resistance ($N_{Ra,s}$)	Characteristic Resistance ($V_{Rk,s}$)	Design Resistance ($V_{Rd,s}$)**	Approved Resistance ($V_{Ra,s}$)
-	kN	kN	kN	kN	kN	kN
M8	16.0	10.4	7.4	12.2	9.7	6.9
M10	27.0	17.6	12.5	20.1	16.0	11.4
M12	40.0	26.6	19.0	30.0	24.0	17.1
M16	60.0	40.0	28.5	55.0	44.0	31.4
M20	86.0	53.7	38.3	69.0	51.8	37.0

* A partial safety factor (γ_{MS}) equal to 1.53 for M8 and M10 (1.50 for M12 and M16 and 1.6 for M20) is included.
** A partial safety factor (γ_{MS}) equal to 1.25 is included (1.33 for M20).

INSTALLATION INSTRUCTIONS



-Position fixture and drill correct diameter hole to corresponding depth

-Clean hole by blowing to remove drilling debris and dust

-Insert anchor through fixture into concrete and lightly hammer into concrete

-Tighten with torque wrench to recommended torque

INSTALLATION INSTRUCTIONS VIDEO

To watch the video and subscribe, please click on the link or scan the QR code:

How to install a Throughbolt

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