CLEAR FORM

UCAN FASTENING PRODUCTS

TORPEDO™ BOLT

REQUEST FOR APPROVAL

TO:

NAME: _____ TITLE: _____

COMPANY: _____ PHONE: _____

FAX: _____ E-MAIL: _____

ADDRESS: _____

☐ FASTENER SUBSTITUTION ☐ FASTENER RECOMMENDATION ☐ ALTERNATIVE FASTENER

Please review the attached technical data and approve the **TORPEDO™ BOLT** (Part No. _____) for the following application(S) below:

PROJECT:

NAME: _____

ADDRESS: _____

SPECIFIED FASTENER: _____

FASTENING APPLICATION: _____

LOCATION: _____ DWG NO.: _____

SPECIFICATION REF: DWG NO: _____ PAGE: _____ PARAGRAPH: _____

SUBMITTED BY:

NAME: _____

COMPANY: _____

ADDRESS: _____

PHONE: _____

FAX: _____

E-MAIL: _____

DATE: _____

FOR USE BY THE ENGINEER OR/AND ARCHITECT

☐ APPROVED

☐ APPROVED AS NOTED

☐ ADDITIONAL INFORMATION REQUIRED

☐ REJECTED, REASON FOR REJECTION:

BY: _____

DATE: _____

PRINT SAVE

UCAN TORPEDO® BOLT

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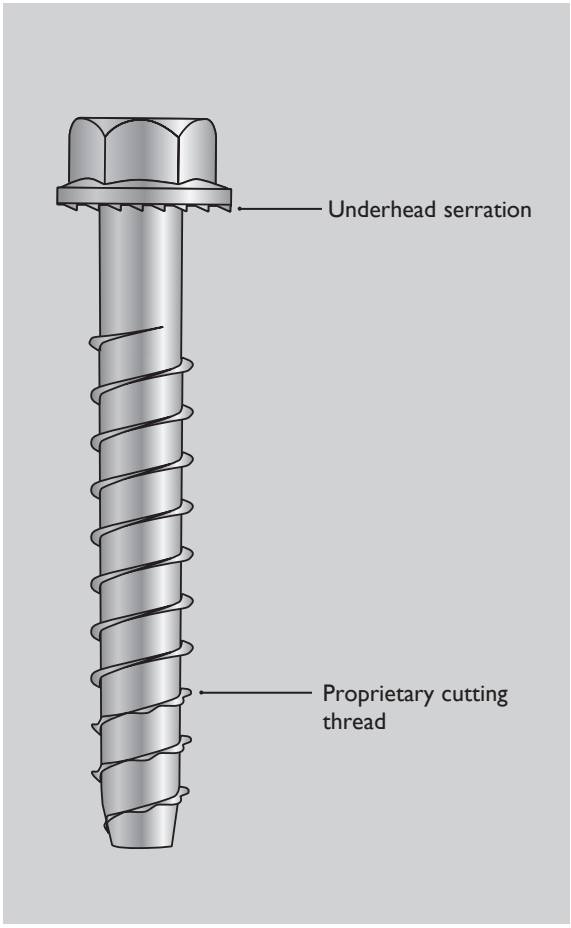
DESCRIPTION

UCAN TORPEDO® BOLT is an excellent anchoring solution for medium duty applications. TORPEDO® is available in both mechanically galvanized carbon steel as well as 316 Stainless Steel. For this reason, TORPEDO® is suitable for a wide variety of applications. Matched with a standard UCAN ANSI tolerance drill bit, this fastener exhibits consistently high load values. UCAN TORPEDO® BOLT installs quickly leaving the clean appearance of a finished hex washer head on the working surface.



FEATURES

- Available in both mechanically galvanized carbon steel and 316 Stainless steel
- Grade 316 stainless UTB for high corrosion resistance applications. Also for exterior anchoring in normal environmental condition
- Use with UCAN standard ANSI compliant drill
- Fast installation and reduced edge distance requirements, compared to mechanical expansion anchors.
- One piece fastener with finished hex washer head.
- Unique thread pattern facilitates ease of installation
- Anchor can be set with an impact or manual socket wrench.
- Underhead serrations.
- Removable–Ideal for temporary anchoring applications.
- Reusable– Reusing the anchor reduces the holding power; the number of reuses depends on the anchor diameter and concrete compressive strength.
- Anchor size is stamped on head for easy identification and enhanced quality control after anchor Installation.

TYPICAL APPLICATIONS

- Racking, Railing, Sill plates, Stadium seating.
- Tilt-up braces, Formwork, Anchoring equipment

LIMITATIONS

Not recommended for installation into uncured concrete(less than 7 days old).

APPROVAL / LISTINGS

ICC-ES® Listed ESR- 4596
UTB 12212, UTB 123, UTB 124, UTB 125 & UTB 126

ESR-4596

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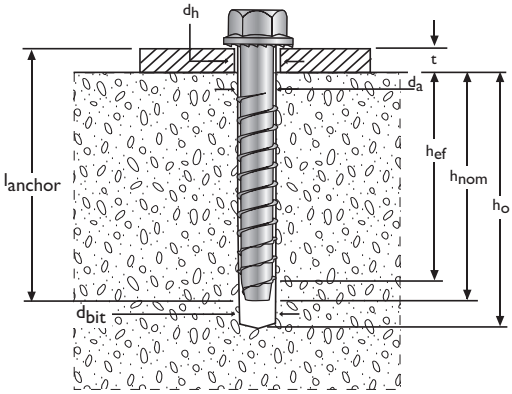
UCAN TORPEDO® BOLT

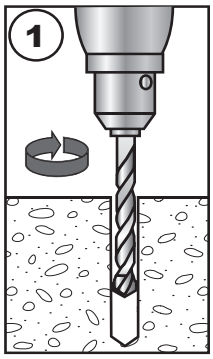
MATERIAL SPECIFICATIONS

Properties	Carbon Steel	Stainless Steel	Stainless Steel - bimetal
Anchor body	Heat treated carbon steel	410 hardened stainless steel	316 Stainless steel body with carbon steel cutting up
Head style	Hex flange head with locking serrations		
Corrosion protection	Mechanically galvanized as per ASTM B-695, Class 65, Type I	410 stainless steel, with RUSPRO® coated	316 Stainless steel, passivated, with yellow zinc plating on cutting tip

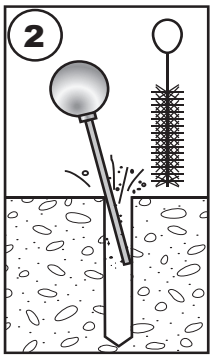
INSTALLATION INFORMATION



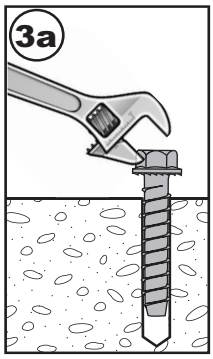
INSTALLATION INSTRUCTIONS



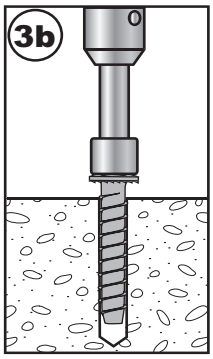
Drill hole to the specified diameter and depth



Blow out dust from the hole



Place anchor in drilled hole



Apply installation torque to set anchor

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TECHNICAL DATA FOR CARBON STEEL UTB FOR LIMIT STATE/ STRENGTH DESIGN IN CRACKED AND UNCRACKED CONCRETE

TABLE 1- Torpedo bolt screw anchor instalation information[1]

Characteristic	Symbol	Unit	Nominal Anchor diameter
			1/2-inch
Nominal Anchor Diameter	d_a	in (mm)	1/2 (12.7)
Nominal Drill Bit Diameter	d_{bit}	in (mm)	1/2 (12.7)
Nominal Embedment Depth	h_{nom}	in (mm)	3 (76)
Effective Embedment Depth	h_{ef}	in (mm)	2.28 (58)
Minimum Hole Depth	h_{hole}	in (mm)	3 1/4 (83)
Fixture Hole Diameter	d_f	in (mm)	5/8 (15.9)
Maximum Installation Torque	$T_{inst,max}$	ft.lbs (kN.m)	55 (75)
Maximum impact wrench torque rating	$T_{impact.max}$	ft.lbs (kN.m)	380 (515)
Minimum Concrete Thickness	h_{min}	in (mm)	4 1/2 (114)
Critical Edge Distance	C_{ac}	in (mm)	4 (102)
Minimum Edge Distance	C_{min}	in (mm)	2 (51)
Minimum Spacing	S_{min}	in (mm)	3 (76)

1 The tabulated data is to be used in conjunction with the design criteria given in ACI 318-14 Chapter 17 or ACI 318-11 Appendix D, as applicable.

TABLE 2 - RESISTANCE FACTORS FOR LIMIT STATE DESIGN IN ACCORDANCE WITH CSA A23.3-14, ANNEX D1

Setting information	Symbol	Units	Nominal Anchor Diameter
			1/2"
Concrete material resistance factor	Φ_c	-	0.65
Steel material resistance factor	Φ_s	-	0.85
Strength reduction factor for tension, steel failure modes	R		0.80
Strength reduction factor for shear, steel failure modes	R		0.75
Strength reduction factor for tension, concrete failure modes	R	Cond. A	1.15
		Cond. B	1.00
Strength reduction factor for Shear, concrete failure modes	R	Cond. A	1.15
		Cond. B	1.00
Coefficient for factored concrete breakout in tension, cracked concrete	K	-	7
Modification factor concrete resistance to account uncracked concrete	$\Psi c,N$	-	1.4

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TORPEDO ANCHOR

TABLE 3 - TORPEDO BOLT SCREW ANCHOR DESIGN INFORMATION[1,2,3,4]

Characteristic	Symbol	Unit	Nominal Anchor diameter 1/2-inch
Nominal Embedment Depth	h_{nom}	in (mm)	3 (76)
Anchor Category	d_{bit}	-	1
Steel Strength in Tension and Shear			
Minimum specified ultimate strength	f_{uta}	psi (N/mm²)	147,000 (1,014)
Minimum specified yield strength	f_y	psi (N/mm²)	117,600 (811)
Effective stress area (screw anchor body)	A_{se}	in² (mm²)	0.193 (124.5)
Steel Strength in Tension	N_{sa}	lb (KN)	24,125 (107.3)
Strength Reduction Factor for Steel Failure in Tension	Ø	-	0.65
Steel Strength in Shear	V_{sa}	lb (KN)	6,570 (29.2)
Steel Strength in Shear, Seismic	$V_{sa,eq}$	lb (KN)	6,570 (29.2)
Strength Reduction Factor for Steel Failure in Shear	Ø	-	0.60
Pullout Strength in Tension[3]			
Pullout Strength in Uncracked Concrete	$N_{p,uncr}$	lb (KN)	-
Pullout Strength in Cracked Concrete	$N_{p,cr}$	lb (KN)	-
Pullout Strength in Cracked Concrete, Seismic	$N_{p,eq}$	lb (KN)	-
Concrete Breakout Strength in Tension			
Effective embedment	h_{er}	im (mm)	2.28 (58)
Effectiveness Factor for Uncracked Concrete	k_{uncr}	-	27
Effectiveness Factor for Cracked Concrete	k_{cr}	-	17
Strength Reduction Factor for Concrete Breakout Strength in Tension	Ø	-	17
Axial stiffness in service load range in uncracked concrete	$ß_{uncr}$	lb/inch (N/mm)	189,880 (33,250)
Axial stiffness in service load range in cracked concrete	$ß_{cr}$	lb/inch (N/mm)	101,150 (17,715)
Concrete Breakout Strength in Shear			
Nominal Diameter	do^2	in (mm)	1/2 (12.7)
Load Bearing Length of Anchor	le	in (mm)	2.28 (58)
Reduction Factor for Concrete Breakout Strength in Shear	Ø	-	0.70
Concrete Pryout Strength in Shear			
Coefficient for Pryout Strength	k_{cp}	-	1.0
Reduction Factor for Pryout Strength in Shear	Ø	-	0.70

[1]The tabulated data is to be used in conjunction with the design criteria given in ACI 318-14 Chapter 17 or ACI 318-11 Appendix D, as applicable.

[2]All values of Ø were determined from the load combinations of IBC Section 1605.2, ACI 318-14 Section 5.3 or ACI 318-11 Section 9.2, as applicable. If the load combinations of ACI 318-11 Appendix C are used, then the appropriate value of Ø must be determined in accordance with ACI 318-11 D.4.4. For reinforcement that meets ACI 318-14 Chapter 17 or ACI 318 Appendix D, as applicable, requirements for Condition A, see ACI 318-14 17.3.3 or ACI 318-11 D.4.3, as applicable, for the appropriate Ø factor when the load combinations of IBC Section 1605.2, ACI 318-14 Section 5.3 or ACI 318-11 Section 9.2, as applicable, are used.

[3]Where no value is reported for pullout strength, this resistance does not need to be considered.

[4] For Limit State Design as per CSA A23.3-19 Annex D, material resistance factors (Φ) and resistance modification factor (R) listed in Table 2 shall be used.

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TECHNICAL DATA FOR CARBON STEEL UTB FOR ALLOWABLE STREGTH DESIGN IN UNCRACKED CONCRETE

TABLE 4 - Installation Details

Characteristic	Symbol	Unit	Nominal Anchor diameter			
Anchor diameter	d_a	in.	1/4	3/8	5/8	3/4
Drill bit diameter	d_{bit}	in.	1/4	3/8	5/8	3/4
Clearance hole diameter	d_f	in.	3/8	1/2	3/4	7/8
Installation Torque	T_{inst}	ft-lbs	8	25	85	150
Nominal embedment	h_{nom}	in.	1-3/4	2 3-3/4	2 3-3/4	3-3/4 4-1/2
Effective embedment	h_{ef}	in.	1-1/2	1-3/4 3-1/2	1-3/4 3-1/2	3-1/2 4-1/4
Minimum hole depth	h_o	in.	2	2-1/2 4-1/4	2-1/2 4-1/4	4-1/4 5
Critical edge distance	-	in.	2	3-1/2 5-1/2	3-1/2 5-1/2	5-1/2 6-3/4
Minimum edge distance	-	in.	1-3/4	1-3/4	1-3/4	1-3/4
Critical anchor spacing	-	in.	3	4-1/2	7-1/2	9
Minimum anchor spacing	-	in.	1	1-1/2	2-1/2	3
Head height	-	in.	1/4	3/8	19/32	45/64
Washer OD	-	in.	1/2	3/4	1-5/32	1-3/8
Wrench socket size	-	in.	7/16	9/16	15/16	1-1/8

TABLE 5 - Ultimate and Allowable Load Data

Anchor diameter	Drill bit diameter	Nominal embedment		Allowable Load Data				Ultimate Load Data			
				3000 psi concrete		6000 psi concrete		3000 psi concrete		6000 psi concrete	
in.	in.	in.	Units	Tension	Shear	Tension	Shear	Tension	Shear	Tension	Shear
1/4	1/4	1-1/2	lbs	181	430	256	670	725	1719	1025	2680
			kN	0.81	1.91	1.14	2.98	3.22	7.65	4.56	11.92
1/4	1/4	2-1/2	lbs	610	430	863	670	2440	1719	3450	2680
			kN	2.71	1.91	3.84	2.98	10.85	7.65	15.35	11.92
3/8	3/8	2	lbs	916	892	1295	1742	3664	3567	5182	6967
			kN	4.07	3.97	5.76	7.75	16.30	15.87	23.05	30.99
3/8	3/8	3-1/2	lbs	2080	2050	2941	3007	8319	8199	11764	12030
			kN	9.25	9.12	13.08	13.38	37.00	36.47	52.33	53.51
5/8	5/8	2	lbs	864	1164	1221	1643	3454	4657	4885	6573
			kN	3.84	5.18	5.43	7.31	15.37	20.72	21.73	29.24
5/8	5/8	3-1/2	lbs	2324	2389	3287	3168	9296	9557	13147	12670
			kN	10.34	10.63	14.62	14.09	41.35	42.51	58.48	56.36
3/4	3/4	2-1/2	lbs	1078	1569	1525	2254	4313	6276	6099	9015
			kN	4.80	6.98	6.78	10.03	19.18	27.92	27.13	40.1
3/4	3/4	4	lbs	2632	3167	3723	4729	10530	12667	14891	18918
			kN	11.71	14.09	16.56	21.04	46.84	56.35	66.24	84.15

Note: The data presented in this table is based on independent laboratory testing at critical anchor spacing and edge distance.

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TORPEDO ANCHOR

PRODUCT ORDERING INFORMATION

Part number	Head style	Anchor size	Drill bit diameter	Wrench socket size	Minimum embedment	Box qty	Casse qty
UTB 14214	hex	1/4 x 2-1/4	1/4	7/16	1-1/4	100	800
UTB 143	hex	1/4 x 3	1/4	7/16	2-1/4	100	800
UTB 38134	hex	3/8 x 1-3/4	3/8	9/16	3/4	50	400
UTB 38212	hex	3/8 x 2-1/2	3/8	9/16	1-1/2	50	400
UTB 383	hex	3/8 x 3	3/8	9/16	2	50	400
UTB 384	hex	3/8 x 4	3/8	9/16	3-1/2	50	400
UTB 385	hex	3/8 x 5	3/8	9/16	3-1/2	25	75
UTB 123	hex	1/2 x 3	1/2	3/4	2	50	150
UTB 12212	hex	1/2 x 2-1/2	1/2	3/4	2	50	400
UTB 124	hex	1/2 x 4	1/2	3/4	3-1/2	40	120
UTB 125	hex	1/2 x 5	1/2	3/4	3-1/2	30	90
UTB 583	hex	5/8 x 3	5/8	15/16	2	25	75
UTB 584	hex	5/8 x 4	5/8	15/16	3-1/2	25	75
UTB 585	hex	5/8 x 5	5/8	15/16	3-1/2	20	60
UTB 586	hex	5/8 x 6	5/8	15/16	3-1/2	20	60
UTB 344	hex	3/4 x 4	3/4	1-1/8	2	15	45
UTB 345	hex	3/4 x 5	3/4	1-1/8	3-1/2	15	45
UTB 346	hex	3/4 x 6	3/4	1-1/8	3-1/2	15	45
UTB 347	hex	3/4 x 7	3/4	1-1/8	3-1/2	15	45

Note: 1/2 inch diameter UTB sizes are ICC-ES listed (ESR-4596).

LOAD ADJUSTMENT FACTORS (ALLOWABLE STRESS DESIGN)

Anchor Spacing

Diameter	Critical spacing		Minimum Spacing		Reduction Factor	
	Tension	Shear	Tension	Shear	Tension	Shear
1/4	3"	3"	1"	1"	0.5	0.7
3/8	4-1/2"	4-1/2"	1-1/2"	1-1/2"		
1/2	6"	6"	2"	2"		
5/8	7-1/2"	7-1/2"	2-1/2"	2-1/2"		
3/4	9"	9"	3"	3"		

Edge Distance

Diameter	Critical Edge Distance		Minimum Edge Distance		Reduction Factor	
	Tension	Shear	Tension	Shear	Tension	Shear
1/4	$1.5 \times h_{ef}$		$0.8 \times h_{ef}$	1-3/4"	0.75	0.25
3/8						
1/2						
5/8						
3/4						

Note: Reduction factor at critical distances equals 1.0 for edge and spacing distances between critical and minimum distances, use linear interpolation. Reduction factors are cumulative.