TorqueMaster Large Diameter Concrete Screw Anchor Tech Sheet

Facts & Features

- Tested according to ACI 355.2 and AC193 (ICC ESR #-4460)
- Qualified for static, wind, and seismic loading conditions (seismic design categories A through F)
- Code listed under IBC/IRC in accordance with ICC-ES AC193 & ACI 355.2 for cracked & uncracked concrete
- Installs using standard-sized ANSI tolerance drill bits
- Suitable when reduced edge distances or spacing is required
- Finished hex head leaves no exposed threads
- Fully removable
- Exterior grade coating tested in chemically treated wood according to AC257

TorqueMaster Large Diameter Concrete Screw Anchor

Applications

- Structural fastening in cracked & uncracked concrete in indoor conditions
- Formwork and fastening
- Anchoring racking and shelving
- Railings and handrails
- Ledger attachment

Code Approvals/Listings

- 2018, 2015, 2012, and 2009 International Building Code® (IBC)
- 2018, 2015, 2012, and 2009 International Residential Code® (IRC)
- 2019 and 2016 California Building Code (CBC)
- 2019 and 2016 California Residential Code (CRC)
- 2017 City of Los Angeles Building Code (LABC)
- 2017 City of Los Angeles Residential Code (LARC)
- 2017 Florida Building Code – Building (FBC)
- 2017 Florida Building Code – Residential (FRC)
- Florida Building Code High Velocity Hurricane Zone (HVHZ) Provisions
- Miami Dade NOA # 20-1103.16

Florida Approval # FL30477

ESR-4460

NOA # 20-1103.16

Coating Information

- 3-layer exterior coating
- Independently tested according to AC257 Exposure Condition 3
- Exceeds the protection offered by hot-dipped galvanized coatings
- Approved for use in exterior environments and chemically treated lumber

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TorqueMaster L.D. Screw Anchor Length Code Identification System

Length ID marking on hex head		A	B	C	D	E	F	G	H	I	J	K	L	M	N
Overall Anchor Length (in.)	From	1 1/2	2	2 1/2	3	3 1/2	4	4 1/2	5	5 1/2	6	6 1/2	7	7 1/2	8
	Up to, but not including	2	2 1/2	3	3 1/2	4	4 1/2	5	5 1/2	6	6 1/2	7	7 1/2	8	8 1/2

TorqueMaster L.D. Screw Anchor Product Data

Size (in.)	SKU	Thread Length (in.)	Drill Bit Size (in.)	Wrench/Socket Size (in.)	Box Qty
3/8” x 1-3/4”	53246	1-3/4”	3/8”	9/16”	50
3/8” x 2-1/2”	53247	2-1/2”	3/8”	9/16”	50
3/8” x 3”	53248	3”	3/8”	9/16”	50
3/8” x 4”	53249	4”	3/8”	9/16”	50
1/2” x 3”	53250	3”	1/2”	3/4"	25
1/2” x 4”	53251	4”	1/2”	3/4"	25
1/2” x 5”	53252	5”	1/2”	3/4"	25
1/2” x 6”	53253	5”	1/2”	3/4"	20
1/2” x 8”	54917	5”	1/2”	3/4"	10
5/8” x 3”	53254	3”	5/8”	15/16”	10
5/8” x 4”	53255	4”	5/8”	15/16”	10
5/8” x 5”	53256	5”	5/8”	15/16”	10
5/8” x 6”	53257	6”	5/8”	15/16”	10
5/8” x 8”	54918	6”	5/8”	1-1/8”	5
3/4” x 4-1/2”	53258	4”	3/4”	1-1/8”	10
3/4” x 5-1/2”	53259	5”	3/4”	1-1/8”	10
3/4” x 6-1/4”	53260	5”	3/4”	1-1/8”	5
3/4” x 8”	54919	7”	3/4”	1-1/8”	5

TorqueMaster L.D. Screw Anchor Installation Instructions

1. **DRILL** hole in concrete using a hammer drill. Use TorqueMaster SDS+ drill bits and an SDS hammer drill for best results. The hole must be at least 1/4” deeper than the length of the fastener.
2. **CLEAN** hole of debris and dust using a vacuum or compressed air.
3. **DRIVE** fastener into pre-drilled hole using a powered impact wrench. Anchor should be driven until the head washer comes in contact with the part being fastened. The anchor must be snug after installation.

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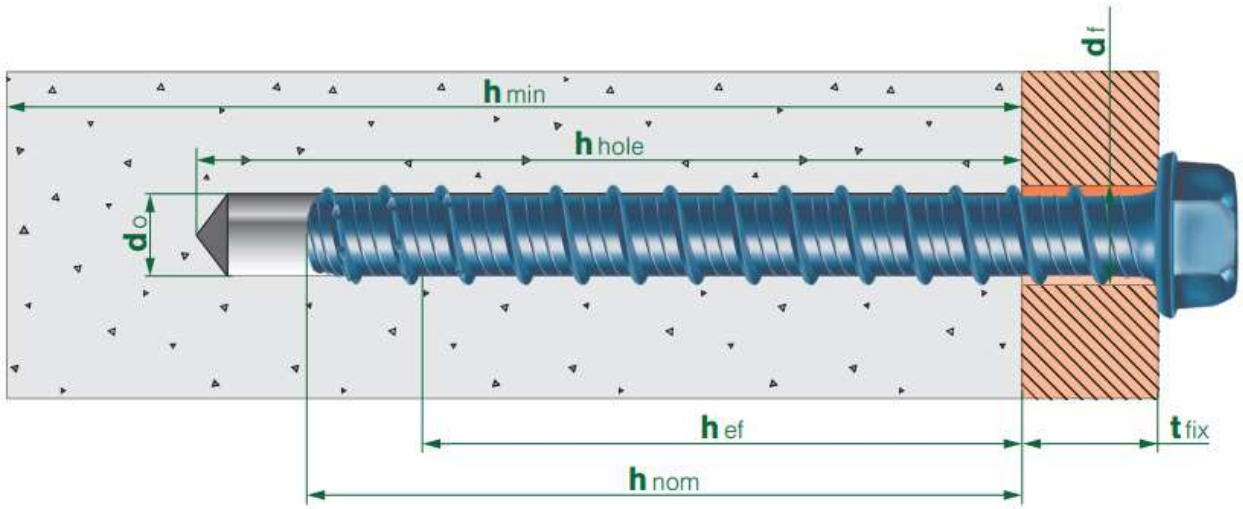
TorqueMaster Large Diameter Concrete Screw Anchor Tech Sheet

TorqueMaster L.D. Screw Anchor Installation Parameters

Characteristic	Symbol	Unit	Nominal Anchor Diameter (inch)							
			3/8		1/2		5/8		3/4	
Drill Bit Diameter	D_o	in. (mm)	3/8 (9.5)	3/8 (9.5)	1/2 (12.7)	1/2 (12.7)	5/8 (15.9)	5/8 (15.9)	3/4 (19.1)	3/4 (19.1)
Nominal Embedment Depth	h_{nom}	in. (mm)	2 1/2 (64)	3 1/4 (83)	3 (76)	4 1/4 (108)	3 1/4 (83)	5 (127)	4 (102)	6 1/4 (159)
Effective Embedment Depth	h_{ef}	in. (mm)	1.85 (47)	2.49 (63)	2.21 (56	3.27 (83)	2.36 (60)	3.85 (98)	2.97 (75)	4.89 (124)
Minimum Hole Depth	h_{hole}	in. (mm)	2 3/4 (70)	3 1/2 (89)	3 3/8 (86)	4 5/8 (117)	3 5/8 (92)	5 3/8 (137)	4 3/8 (111)	6 5/8 (168)
Fixture Hole Diameter	d_f	in. (mm)	1/2 (12.7)		5/8 (15.9)		3/4 (19.1)		7/8 (22.2)	
Maximum Installation Torque	$T_{inst,max}$	ft-lbf (N-m)	35 (47)	50 (68)	45 (61)	65 (88)	85 (115)	100 (136)	115 (156)	150 (203)
Maximum Impact Wrench Torque Rating	$T_{impact.max}$	ft-lbf (N-m)	380 (515)	380 (515)	380 (515)	380 (515)	380 (515)	380 (515)	380 (515)	380 (515)
Minimum Concrete Thickness	h_{min}	in. (mm)	4 (102)	4 3/4 (121)	4 3/4 (121)	6 3/4 (171)	5 (127)	7 (178)	6 (152)	8 1/8 (206)
Critical Edge Distance	C_{ac}	in. (mm)	4 (102)	5 (127)	4 1/2 (114)	5 (127)	3 3/4 (95)	7 (178)	4 1/2 (114)	8 (203)
Minimum Edge Distance (C_{min})	C_{min}	in. (mm)	1 1/2 (38)	1 1/2 (38)	1 3/4 (44)	1 3/4 (44)	1 3/4 (44)	1 3/4 (44)	1 3/4 (44)	1 3/4 (44)
Minimum Anchor Spacing (S_{min})	S_{min}	in. (mm)	3 (76)	3 (76)	3 (76)	3 (76)	4 (102)	4 (102)	4 (102)	4 (102)
Minimum Overall Anchor Length		in. (mm)	2 3/4 (76)	3 1/2 (89)	3 1/4 (82)	4 1/2 (114)	3 1/2 (89)	5 1/4 (133)	4 1/4 (108)	6 1/2 (165)
Torque Wrench Socket Size	-	in. (mm)	9/16		3/4		15/16		1 1/8	
Maximum Fixture Thickness[2]	t_{fix}	in. (mm)	L-2 1/2 (L-64)	L-3 1/4 (L-83	L-3 (L-76)	L-4 1/4 (L-108)	L-3 1/4 (L-83)	L-5 (L-127)	L-4 (L-102)	L-6 1/4 (L-159)

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. L = total anchor length
3. For a glossary of definitions for terms listed above, visit www.fastenerconnection.com



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TorqueMaster Large Diameter Concrete Screw Anchor Tech Sheet

TorqueMaster L.D. Screw Anchor Tension & Shear Design Information[1,2]

Characteristic	Symbol	Unit	Nominal Anchor Diameter							
			3/8"		1/2"		5/8"		3/4"	
Nominal Embedment Depth	h_{nom}	in (mm)	2 ½ (64)	3 ¼ (83)	3 (76)	4 ¼ (108)	3 ¼ (83)	5 (127)	4 (102)	6 ¼ (159)
Anchor Category	1, 2, or 3	-	1							
Steel Strength in Tension and Shear										
Minimum specified ultimate strength	f_{uta}	psi (N/mm^2)	111,000 (765)		107,000 (738)		102,000 (703)		99,000 (683)	
Minimum specified yield strength	f_y	psi (N/mm^2)	88,800 (612)		85,600 (590)		81,600 (563)		79,200 (546)	
Effective stress area (screw anchor body)	A_{se}	in^2 (mm^2)	0.0943 (60.8)		0.1768 (114.4)		0.2703 (174.4)		0.3988 (257.3)	
Steel Strength in Tension	N_{sa}	lb (kN)	10,465 (46.6)		18,920 (84.1)		27,570 (122.6)		39,480 (175.6)	
Strength Reduction Factor for Steel Failure in Tension	$Ø_{sa}$	-	0.65							
Steel Strength in Shear	V_{sa}	lb (kN)	4,815 (21.4)	4,850 (21.6)	7,270 (32.3)	9,370 (41.7)	10,300 (45.8)	12,735 (56.7)	14,240 (63.3)	14,240 (63.3)
Steel Strength in Shear, Seismic	$V_{sa,eq}$	lb (kN)	4,075 (18.1)	4,075 (18.1)	5,075 (22.6)	7,140 (31.8)	8,030 (35.7)	10,300 (45.8)	12,105 (53.9)	12,105 (53.9)
Strength Reduction Factor for Steel Failure in Shear	$Ø_{sa}$	-	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)	-	-	3,225 (14.3)	-	-	-	-	-
Pullout Strength in Cracked Concrete, Seismic	$N_{p,eq}$	lb (kN)	-	-	3,225 (14.3)	-	-	-	-	-
Normalization Exponent, Uncracked Concrete	n	-	-	-	0.50	-	-	-	-	-
Normalization Exponent, Cracked Concrete	n	-	-	-	0.35	-	-	-	-	-
Strength Reduction Factor for Pullout Strength in Tension	$Ø_p$	-	0.65							
Concrete Breakout Strength in Tension										
Effective Embedment	h_{ef}	in (mm)	1.85 (47)	2.49 (63)	2.21 (56)	3.27 (83)	2.36 (60)	3.85 (98)	2.97 (75)	4.89 (124)
Effectiveness Factor for Uncracked Concrete	k_{uncr}	-	27			24				
Effectiveness Factor for Cracked Concrete	K_{cr}	-	17		21	17				
Strength Reduction Factor for Concrete Breakout Strength in Tension	$Ø_{cb}$	-	0.65							
Axial stiffness in service load range in uncracked concrete	β_{uncr}	lb/inch (N/mm)	63,150 (11,059)	207,850 (36,400)	139,250 (24,386)	140,060 (24,528)	222,870 (39,031)	254,980 (44,653)	292,630 (51,247)	305,530 (53,506)
Axial stiffness in service load range in cracked concrete	β_{cr}	lb/inch (N/mm)	63,150 (11,059	174,020 (30,476)	130,385 (22,834)	140,060 (24,528)	105,130 (18,411)	192,280 (33,673)	160,050 (28,029)	165,525 (28,968)
Concrete Breakout Strength in Shear										
Nominal Diameter	d_o[2]	in (mm)	3/8 (9.5)	3/8 (9.5)	1/2 (12.7)	1/2 (12.7)	5/8 (15.9)	5/8 (15.9)	3/4 (19.1)	3/4 (19.1)
Load Bearing Length of Anchor	l_e	in (mm)	1.85 (47)	2.49 (2.49)	2.21 (56)	3.27 (83)	2.36 (60)	3.85 (98)	2.97 (75)	4.89 (124)
Reduction Factor for Concrete Breakout Strength in Shear	$Ø_{cb}$	-	0.70							
Concrete Pryout Strength in Shear										
Coefficient for Pryout strength	k_{cp}	-	1.0			2.0	1.0	2.0		
Reduction Factor for Pryout Strength in Shear	$Ø_{cp}$	-	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, the resistance does not need to be considered

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