TEHCNICAL DATASHEET

INDEX
A PERFECT FIXING

MTD-X

CHARACTERISTICS

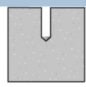
- Installation by controlled torque
- Use for heavy duty loads.
- Nominal drill bit size is the same as the anchor diameter
- Anchor can be installed through standard fixture holes
- Ring marks for correct embedment depth indication: accurate installation depth
- Washer and nut pre-assembled
- Length ID code stamped on head of each anchor
- Anchor design allows for follow-up expansion after setting under tensile loading
- Code listed under IBC/IRC in accordance with ICC-ES AC193 and ACI 355.2 for cracked and uncracked concrete.
- Qualified for static, wind and seismic loads.
- Available in zinc-plated steel with sherardized clip

BASE MATERIAL

SIZE RANGE

1/4" – 3/4"

DRILL HOLE CONDITION

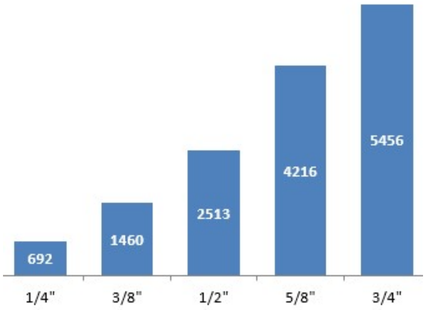


DRY

APPLICATION

- Structural connections, i.e., beam and column anchorage.
- Safety-related attachments.
- Interior applications / low level corrosion environment.
- Tension zone applications, i.e., cable trays and strut, pipe supports, fire sprinklers.
- Seismic and wind loading.
- Indoor structural fixings in concrete
- Safety barriers
- Fixing billboards, boilers, signals, advertising hoardings, etc.
- Installation of sprinkler systems.

ALLOWABLE TENSION LOADS FOR DEEP EMBEDMENT DEPTH IN 2500 psi UNCRACKED CONCRETE with α=1,48 [lb]



APPROVALS

ESR-4200

Florida approval FL30478

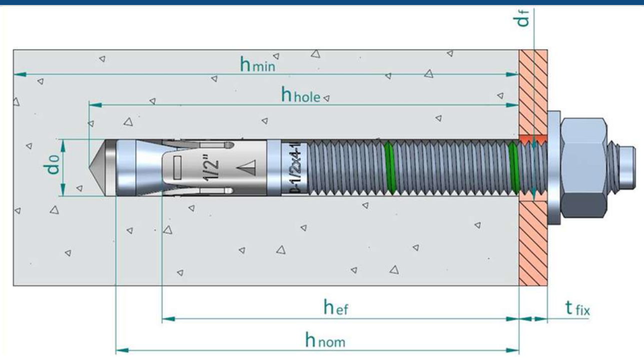
Codes compliance:
IBC 2021, 2018, 2015, 2013, 2009 and 2006
IRC 2018, 2015, 2013, 2009 and 2006
LABC 2020
LARC 2020
CBC 2019
CRC 2019
FBC 2020
FRC 2020

APPLICATIONS EXAMPLES

1. RANGE

ITEM	CODE	SIZE	PHOTO	COMPONENTS	MATERIAL
1	**MTD-X**	1/4" – 3/4"		Bolt Clip Nut Washer	Carbon steel Carbon steel, sherardized EN 13811 ASME B18.2.2 class 2B ASME B18.21.1 type A series N Coating: zinc-plated ≥ 0,0002 in

2. INSTALLATION DATA



Parameter	Symbol	Units	Nominal anchor diameter							
			1/4"	3/8"	1/2"		5/8"		3/4"	
ICC approved			✓	✓	✓	✓	✓	✓	✓	✓
FM certified				✓	✓	✓		✓	✓	✓
UL certified				✓	✓	✓		✓	✓	✓
Florida approved				✓	✓	✓	✓	✓	✓	✓
Outside diameter	d_0	in (mm)	1/4 (6.4)	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)	1.68 (43)	2.33 (59)	2.33 (59)	3.59 (91)	3.23 (82)	4.49 (114)	3.74 (95)	5.26 (134)
Effective embedment depth	h_{ef}	in (mm)	1 1/2 (38)	2 (51)	2 (51)	3 1/4 (83)	2 3/4 (70)	4 (102)	3 1/4 (83)	4 3/4 (121)
Minimum hole depth	h_{hole}	in (mm)	2 (51)	2 5/8 (67)	2 5/8 (67)	4 (102)	3 1/2 (89)	4 3/4 (121)	4 (102)	5 3/4 (146)
Maximum fixture clearance hole dia.	d_f	in (mm)	5/16 (7.9)	7/16 (11.1)	9/16 (14.3)	9/16 (14.3)	11/16 (17.5)	11/16 (17.5)	7/8 (22.2)	7/8 (22.2)
Installation torque	T_{inst}	ft lbf (Nm)	5 (7)	30 (41)	45 (61)	45 (61)	75 (102)	75 1) (102)	150 (203)	150 (203)
Minimum concrete thickness	h_{min}	in (mm)	4 (102)	4 (102)	4 (102)	6 (152)	5 1/2 (140)	6 (152)	6 1/2 (165)	6 (152)
Critical edge distance	c_{ac}	in (mm)	2 3/4 (70)	6 (152)	6 (152)	7 1/2 (191)	7 (178)	8 ½ (216)	9 (229)	12 (305)
Minimum edge distance (c_{min}) for spacing (s ≥)	c_{min}	in (mm)	1 3/4 (44)	2 1/2 (64)	3 (76)	2 1/2 (64)	3 1/2 (89)	7 (178)	3 1/2 (89)	5 (127)
	s ≥	in (mm)	2 1/4 (57)	6 1/2 (165)	6 (152)	6 (152)	8 (203)	4 1/4 (108)	6 (152)	10 1/2 (267)
Minimum spacing (s_{min}) for edge distance (c ≥)	s_{min}	in (mm)	2 1/4 (57)	2 1/2 (64)	2 3/4 (70)	2 1/2 (64)	4 1/2 (114)	4 1/4 (108)	4 (102)	5 (127)
	c ≥	in (mm)	1 3/4 (44)	4 (102)	6 (152)	4 (102)	6 (152)	7 (178)	5 (127)	10 1/2 (267)
Minimum overall anchor length	ℓ_{anc}	in (mm)	1 3/4 (44)	3 (76)	3 1/2 (89)	4 1/2 (114)	4 1/4 (108)	5 1/2 (140)	5 (127)	6 1/2 (165)
Maximum fixture thickness 2)	t_{fix}	in (mm)	L - 2.10 (L - 53)	L - 2.87 (L - 73)	L - 3.06 (L - 78)	L - 4.32 (L - 110)	L - 4.07 (L - 103)	L - 5.33 (L - 135)	L - 4.72 (L - 120)	L - 6.24 (L - 159)
Spanner	Sw	-	7/16	9/16	3/4		15/16		1-1/8	

For SI: 1 inch = 25.4 mm, 1 ft-lb = 1.356 Nm.
The embedment depth, h_{nom}, is measured from the outside surface of the concrete member to the embedded end of the anchor prior to tightening.

The listed minimum overall anchor length is based on anchor sizes commercially available at the time of publication compared with the requirements to achieve the minimum nominal embedment depth and possible fixture attachment.

Holes in metal fixtures to be mounted should match the diameter specified in the table.

Caution: do not use impact wrench to set or tighten anchor.

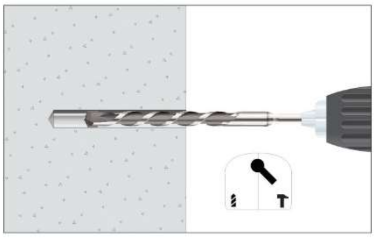
Caution: oversized holes in base material will make it difficult to set the anchor and will reduce the anchors' load capacity

[1)] Use installation torque 80 ft.lbf for FM applications.

[2)] L = Total anchor length

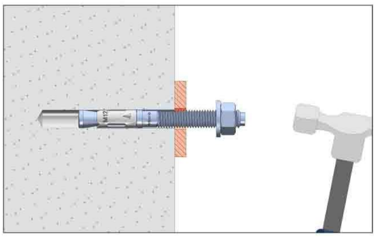
Length ID marking on stud	Units	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q
Length of the anchor min ≥	in	1 1/2	2	2 1/2	3	3 1/2	4	4 1/2	5	5 1/2	6	6 1/2	7	7 1/2	8	8 1/2	9	9 1/2
Length of the anchor max <	in	2	2 1/2	3	3 1/2	4	4 1/2	5	5 1/2	6	6 1/2	7	7 1/2	8	8 1/2	9	9 1/2	10

3. PRODUCT INSTALLATION

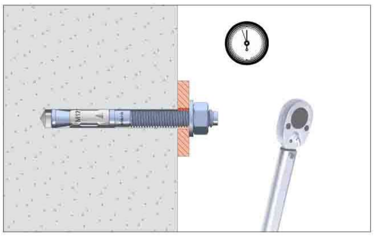


1. DRILLING
Drill a hole into the base material of the correct diameter and depth using a drill bit that meets the requirements of ANSI B212.15

2. BLOW AND CLEAN
Remove dust and debris from hole using a hand pump, compressed air or a vacuum to remove loose particles left from drilling.

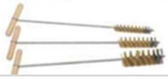


3. INSTALL
Position the washer on the anchor and thread on the nut. If installing through a fixture drive the anchor through the fixture into the hole. Be sure the anchor is driven until the corresponding green mark depth is levelled with the base material surface. Use a hammer if necessary.



4. APPLY THE TORQUE
Tighten the anchor with a torque wrench by applying the required installation torque, Tins. Note: the threaded stud will draw up during tightening of the nut the expansion wedge (nut) remains in the original position. Once installed, the total length of the anchor may be checked using the letter on the head

4. INSTALLATION ACCESSORIES

Code no.	Description	Box qty.	Image
MOBOMBA	Hand pump / Dust blower.	1	
MORCEPKIT	Kit 3 cleaning brushes	1	

5. DESIGN INFORMATION

Tension design information

Design characteristic		Notation	Units	Nominal anchor diameter							
				1/4"	3/8"	1/2"		5/8"		3/4"	
Nominal embedment depth		h_{nom}	in (mm)	1.68 (43)	2.33 (59)	2.33 (59)	3.59 (91)	3.23 (82)	4.49 (114)	3.74 (95)	5.26 (134)
Anchor category		1, 2 or 3	-	1	1	1		1		1	
STEEL STRENGTH IN TENSION (ACI 318-14 17.4.1 or ACI 318-11 D.5.1)											
Minimum specified ultimate tensile strength (neck)		f_{uta}	psi (N/mm^2)	113,000 (780)	108,788 (750)	105,878 (730)		101,526 (700)		95,728 (660)	
Minimum specified yield strength (neck)		f_y	psi (N/mm^2)	90.500 (624)	85,000 (585)	85,000 (585)		81,000 (560)		77,000 (530)	
Effective tensile stress area (neck)		$A_{se,N}$	in^2 (mm^2)	0.0230 (14,8)	0.0562 (36.3)	0.100 (64.5)		0.160 (103.2)		0.238 (153.5)	
Steel strength in tension[3]		N_{sa}	lb (kN)	2,599 (11.6)	6,125 (27.2)	10,600 (47.2)		16,240 (72.2)		22,730 (101.1)	
Safety factor for steel strength[4]		ϕ_{sa}	-	0.75							
PULLOUT STRENGTH IN TENSION (ACI 318-14 17.4.3 or ACI 318-11 D.5.3)											
Characteristic pullout strength, uncracked concrete (2,500 psi)[6,7]		$N_{p,uncr}$	lb (kN)	1,575 (7.01)	3,325 (14.79)	3,394 (15.10)	5,723 (25.46)	-	-	-	-
Characteristic pullout strength, cracked concrete (2,500 psi)[6,7]		$N_{p,cr}$	lb (kN)	NA	2,163 (9.62)	-	4,252 (18.91)	-	-	-	-
Characteristic pullout strength, cracked concrete (2,500 psi), sesimic[6,7,8]		$N_{p,eq}$	lb (kN)	NA	2,115 (9.41)	-	4,252 (18.91)	-	-	-	-
Normalization exponent	Uncracked concrete	n	-	0.32	0.38	0.39	0.50	0.50	0.50	0.50	0.50
	Cracked concrete	n	-	NA	0.50	0.50	0.46	0.50	0.50	0.50	0.50
Strength reduction factor for pullout strength in tension[4]		ϕ_{cb}	-	0.65							
CONCRETE BREAKOUT STRENGTH IN TENSION (ACI 318-14 17.4.2 or ACI 318-11 D.5.2)											
Effective embedment		h_{ef}	in (mm)	1 1/2 (38)	2 (51)	2 (51)	3 1/4 (83)	2 3/4 (70)	4 (102)	3 1/4 (83)	4 3/4 (121)
Effectiveness factor for uncracked concrete[9]		k_{uncr}	-	24	24	24	24	24	24	27	24
Effectiveness factor for cracked concrete[9]		k_{cr}	-	NA	17	17	17	21	17	21	21
Critical edge distance		c_{ac}	in (mm)	2 3/4 (70)	6 (152)	6 (152)	7 1/2 (191)	7 (178)	8 1/2 (216)	9 (229)	12 (305)
Strength reduction factor for pullout strength in tension[4]		ϕ_p	-	0.65							
Axial stiffness in service load range[10]	Uncracked concrete	β_{uncr}	lb/in (kN/mm)	162,306 (28,424)	169,540 (29,690)	296,770 (51,972)	129,020 (22,594)	134,210 (23,503)	88,970 (15,580)	165,900 (29,053)	138,430 (24,242)
	Cracked concrete	β_{cr}	lb/in (kN/mm)	NA	74,240 (13,001)	76,285 (13,359)	52,680 (9,225)	48,940 (8,570)	61,430 (10,758)	75,610 (13,241)	90,400 (15,830)

For SI: 1 inch = 25.4 mm, 1 in² = 645 mm², 1 psi = 0,00689 N/mm²; 1 lb = 0,00445 kN, 1 lbf/in = 0,175 kN/mm

1. The data in this table is intended to be used with the design provisions of ACI 318-14 Chapter 17 or ACI 318 Appendix D, as applicable; for anchors resisting seismic load combinations the additional requirements of ACI 318-14 17.2.3 or ACI 318 D.3.3, as applicable, shall apply.
2. Installation must comply with published instructions and details.
3. Tabulated values for steel strength in tension are based on test results per ACI 355.2 and must be used for design.
4. All values of ϕ 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 ϕ 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 ϕ 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.
5. MTD-X wedge anchor is considered a ductile steel element in tension as defined by ACI 318-14 2.3 or ACI 318 D.1, as applicable.
6. For concrete compressive strength greater than 2,500 psi, N_{pn} = (pullout strength value from table)*(specified concrete compressive strength/2500)^n
7. Pullout strength does not control design of indicated anchors. Do not calculate pullout strength for indicated anchor size and embedment
8. Reported values for characteristic pullout strength in tension for seismic applications are based on test results per ACI 355.2, Section 9.5
9. Select appropriate effectiveness factor for cracked concrete (k_{cr}) or uncracked concrete (k_{ucr}).
10. Mean values shown; actual stiffness varies considerable depending on concrete strength, loading and geometry of application.
11. Anchors are permitted to be used in sand-lightweight concrete provided that N_b, N_{eq} and N_{pn} are multiplied by a factor of 0.60.

Shear design information

Design characteristic	Notation	Units	Nominal anchor diameter							
			1/4"	3/8"	1/2"		5/8"		3/4"	
Nominal embedment depth	h_{nom}	in (mm)	1.68 (43)	2.33 (59)	2.33 (59)	3.59 (91)	3.23 (82)	4.49 (114)	3.74 (95)	5.26 (134)
Anchor category	1, 2 or 3	-	1	1	1		1		1	
STEEL STRENGTH IN SHEAR (ACI 318-14 17.5.1 or ACI 318-11 D.6.1)										
Minimum specified ultimate tensile strength (threads)	f_{uta}	psi (N/mm²)	87,000 (600)	87,000 (600)	87,000 (600)		87,000 (600)		87,000 (600)	
Minimum specified yield strength (threads)	f_y	psi (N/mm²)	69,500 (480)	69,500 (480)	69,500 (480)		69,500 (480)		69,500 (480)	
Effective tensile stress area (threads)	$A_{se,V}$	in² (mm²)	0.0318 (20.5)	0.077 (49.7)	0.141 (91.0)	0.141 (91.0)	0.226 (145.8)	0.226 (145.8)	0.334 (215.5)	0.334 (215.5)
Steel strength in shear[3]	V_{sa}	lb (kN)	974 (4.33)	2,860 (12.7)	4,820 (21.4)	4,820 (21.4)	9,040 (40.2)	9,040 (40.2)	12,300 (54.7)	14,289 (63.5)
Steel strength in shear, seismic (2500 psi)[5]	$V_{sa, eq}$	lb (kN)	NA	2,720 (12.1)	4,045 (17.9)	4,045 (17.9)	7,700 (34.2)	7,700 (34.2)	8,870 (39.4)	8,870 (39.4)
Safety factor for steel strength[3]	ϕ_{sa}	-	0.65							
CONCRETE BREAKOUT STRENGTH IN SHEAR (ACI 318-14 17.5.2 or ACI 318-11 D.6.2)										
Nominal anchor diameter	d_0	in (mm)	1/4 (6.4)	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 1/2 (38)	2 (51)	2 (51)	3 1/4 (83)	2 3/4 (70)	4 (102)	3 1/4 (83)	4 3/4 (121)
Strength reduction factor for concrete strength in shear[6]	ϕ_{cb}	-	0.70							
PRYOUT STRENGTH IN SHEAR (ACI 318-14 17.5.3 or ACI 318-11 D.6.3)										
Coefficient for pryout strength	k_{cp}	-	1.0	1.0	1.0	2.0	2.0	2.0	2.0	2.0
Effective embedment depth	h_{ef}	in (mm)	1 1/2 (38)	2 (51)	2 (51)	3 1/4 (83)	2 3/4 (70)	4 (102)	3 1/4 (83)	4 3/4 (121)
Reduction factor for pryout strength in shear[6]	ϕ_{cp}	-	0.70							

For SI: 1 inch = 25.4 mm, 1 in² = 645 mm², 1 psi = 0,00689 N/mm²; 1 lb = 0,00445 kN

1. The data in this table is intended to be used with the design provisions of ACI 318-14 Chapter 17 or ACI 318 Appendix D, as applicable; for anchors resisting seismic load combinations the additional requirements of ACI 318-14 17.2.3 or ACI 318 D.3.3 shall apply, as applicable.
2. Installation must comply with published instructions and details.
3. Reported values for steel strength in shear are based on test results per ACI 355.2, Section 9.4 and shall be used for design.
4. MTD-X is considered a ductile steel element as defined by ACI 318-14 2.3 or ACI 318-11 D.1, as applicable.
5. Reported values for steel strength in shear for seismic applications are based on test results per ACI 355.2, Section 9.6
6. All values of ϕ were determined from the load combinations of IBC Section 1605.2, ACI 318-14 Section 5.3 or ACI 318 Section 9.2. If the load combinations of ACI 318-11 Appendix C are used, then the appropriate value of Φ must be determined in accordance with ACI 318-11 D.4.4. For reinforcement that meets ACI 318-14 Chapter 17 or ACI 318-11 Appendix D, as applicable, requirements for Condition A, see ACI 318-14 17.3.3 or ACI 318-11 D.4.3, for the appropriate ϕ factor when the load combinations of IBC Section 1605.2, ACI 318-14 Section 5.3 or ACI 318 Section 9.2 are used.
7. Anchors are permitted to be used in sand-lightweight concrete provided that V_b and V_{cp} are multiplied by a factor of 0.60.

Factored design strength (ΦN_n and ΦV_n) calculated in accordance with ACI 318-14:

1- Tabular values are provided for illustration and are applicable for single anchors installed in normal weight concrete with minimum slab thickness, $h_a = h_{min}$, and with the following conditions:
   - C_{a1} is greater than or equal to the critical edge distance, C_{ac} (table values based on $C_{a1} = C_{ac}$).
   - C_{a2} is greater than or equal to 1.5 times C_{a1}.

2- Calculations were performed according to ACI 318-14. The load level corresponding to the controlling failure mode is listed. (e.g. For tension: steel, concrete breakout and pullout; For shear: steel, concrete breakout and pryout). Furthermore, the capacities for concrete breakout strength in tension and pryout strength in shear are calculated using the effective embedment values, h_{ef}, for the selected anchors as noted in the design information tables. Please also reference the installation specifications for more information.

3- Strength reduction factors (Φ) were based on ACI 318-14 section 17.3.3 for load combinations. Condition B is assumed. Condition B is applied where supplementary reinforcement is not supplied.

4- Tabular values are permitted for static loads only, seismic loading is not considered with these tables.

5- For designs that include combined tension and shear, the interaction of tension and shear loads must be calculated in accordance with ACI 318-14 section 17.6.

6- Interpolation is not permitted to be used with the tabular values. For intermediate base material compressive strengths please see ACI 318-14. For other design conditions including seismic considerations please see ACI 318-14.

Tension and shear design strengths for MTD-X in cracked concrete

Nominal anchor diameter (in.)	Nominal embed. h_{nom} (in.)	Minimum concrete compressive strength									
		f´c = 2,500 psi		f´c = 3,000 psi		f´c = 4,000 psi		f´c = 6,000 psi		f´c = 8,000 psi	
		ΦN_n Tension (lbs.)	ΦV_n Shear (lbs.)	ΦN_n Tension (lbs.)	ΦV_n Shear (lbs.)	ΦN_n Tension (lbs.)	ΦV_n Shear (lbs.)	ΦN_n Tension (lbs.)	ΦV_n Shear (lbs.)	ΦN_n Tension (lbs.)	ΦV_n Shear (lbs.)
3/8	2.33	1,406	1,683	1,540	1,844	1,778	1,859	2,178	1,859	2,515	1,859
1/2	2.33	1,563	1,683	1,712	1,844	1,977	2,129	2,421	2,607	2,795	3,010
	3.59	2,764	3,133	3,006	3,133	3,431	3,133	4,134	3,133	4,719	3,133
5/8	3.23	3,112	5,876	3,410	5,876	3,937	5,876	4,822	5,876	5,568	5,876
	4.49	4,420	5,876	4,842	5,876	5,591	5,876	6,847	5,876	7,907	5,876
3/4	3.74	3,999	7,995	4,380	7,995	5,058	7,995	6,195	7,995	7,153	7,995
	5.26	7,066	9,282	7,740	9,282	8,937	9,282	10,946	9,282	12,639	9,282
Color code:			Pullout		Concrete / pryout				Steel		

Tension and shear design strengths for MTD-X in uncracked concrete

Nominal anchor diameter (in.)	Nominal embed. h_{nom} (in.)	Minimum concrete compressive strength									
		f´c = 2,500 psi		f´c = 3,000 psi		f´c = 4,000 psi		f´c = 6,000 psi		f´c = 8,000 psi	
		ΦN_n Tension (lbs.)	ΦV_n Shear (lbs.)	ΦN_n Tension (lbs.)	ΦV_n Shear (lbs.)	ΦN_n Tension (lbs.)	ΦV_n Shear (lbs.)	ΦN_n Tension (lbs.)	ΦV_n Shear (lbs.)	ΦN_n Tension (lbs.)	ΦV_n Shear (lbs.)
1/4	1.68	1,024	633	1,085	633	1,190	633	1,355	633	1,485	633
3/8	2.33	2,161	1,859	2,316	1,859	2,584	1,859	3,014	1,859	3,362	1,859
1/2	2.33	2,206	2,376	2,369	2,603	2,650	3,005	3,104	3,133	3,472	3,133
	3.59	3,720	3,133	4,075	3,133	4,705	3,133	5,763	3,133	6,654	3,133
5/8	3.23	3,557	5,876	3,897	5,876	4,499	5,876	5,511	5,876	6,363	5,876
	4.49	6,240	5,876	6,836	5,876	7,893	5,876	9,667	5,876	11,162	5,876
3/4	3.74	5,141	7,995	5,632	7,995	6,503	7,995	7,965	7,995	9,197	7,995
	5.26	8,075	9,282	8,846	9,282	10,214	9,282	12,510	9,282	14,445	9,282
Color code:			Pullout		Concrete / pryout				Steel		

Converted allowable loads for MTD-X

ESR-4200 provides design information for load factor and characteristic resistance (LRFD), however allowable stress design (ASD) is still in use by some users. Translation of LRFD to ASD values is possible, however it is dependent on the levels of dead load and live load. Dead load is defined in the ACI 318 Building Code Requirements for Structural Concrete as "the weights of members, supported structure and permanent attachments that are likely to be present on a structure in service". Live load is defined in ACI 318-14 as "load that is not permanently applied to a structure, but is likely to occur during the service life of the structure (excluding environmental loads)". Examples of live loads are traffic on a walkway and nonpermanent loads associated with usage of a structure. Live load values are stipulated in the building code for various loading conditions and parts of structures.

To facilitate the translation of LRFD characteristic values to ASD values, a scenario of dead load and live load level is used to conservatively address the most common application as follows: 30% dead load; 70% live load. ACI 318-14 Equation (5.3.1b) provides a conversion factor of 1,48 which is divided into the LRFD characteristic resistances and multiplied by a ϕ factor (according to the failure type) to determine an equivalent ASD load.

It is the responsibility of the user to select the appropriate ASD values based on the example loadings shown in this document or alternative dead versus live loading that may be applicable to the specific design.

The ASD values are provided in the following tables for tension and shear for different concrete strengths. Other installation and design provisions in ESR-4200 must be followed.

Converted allowable loads for MTD-X in cracked concrete

Nominal anchor diameter (in.)	Nominal embed. h_{nom} (in.)	Minimum concrete compressive strength									
		f'_c = 2,500 psi		f'_c = 3,000 psi		f'_c = 4,000 psi		f'_c = 6,000 psi		f'_c = 8,000 psi	
		$T_{allowable\ ASD}$ Tension (lb)	$V_{allowable\ ASD}$ Shear (lb)	$T_{allowable\ ASD}$ Tension (lb)	$V_{allowable\ ASD}$ Shear (lb)	$T_{allowable\ ASD}$ Tension (lb)	$V_{allowable\ ASD}$ Shear (lb)	$T_{allowable\ ASD}$ Tension (lb)	$V_{allowable\ ASD}$ Shear (lb)	$T_{allowable\ ASD}$ Tension (lb)	$V_{allowable\ ASD}$ Shear (lb)
3/8	2.33	950	1,137	1,041	1,246	1,336	1,256	1,472	1,256	1,699	1,256
1/2	2.33	1,056	1,137	1,157	1,246	1,336	1,438	1,636	1,762	1,889	2,034
	3.59	1,867	2,117	2,031	2,117	2,318	2,117	2,793	2,117	3,189	2,117
5/8	3.23	2,103	3,970	2,304	3,970	2,660	3,970	3,258	3,970	3,762	3,970
	4.49	2,986	3,970	3,272	3,970	3,778	3,970	4,627	3,970	5,342	3,970
3/4	3.74	2,702	5,402	2,960	5,402	3,418	5,402	4,186	5,402	4,883	5,402
	5.26	4,774	6,272	5,230	6,272	6,039	6,272	7,396	6,272	8,540	6,272

1. Allowable load values are calculated using a conversion factor, α, from factored design strengths.
2. Tabulated allowable load values assume 30% dead load and 70% live load, with controlling load combination 1,2D + 1,6L. Calculated weighted average for the conversion factor, α = 1,2*(0,3) + 1,6*(0,7) = 1,48.

Converted allowable loads for MTD-X in uncracked concrete

Nominal anchor diameter (in.)	Nominal embed. h_{nom} (in.)	Minimum concrete compressive strength									
		f'_c = 2,500 psi		f'_c = 3,000 psi		f'_c = 4,000 psi		f'_c = 6,000 psi		f'_c = 8,000 psi	
		$T_{allowable\ ASD}$ Tension (lb)	$V_{allowable\ ASD}$ Shear (lb)	$T_{allowable\ ASD}$ Tension (lb)	$V_{allowable\ ASD}$ Shear (lb)	$T_{allowable\ ASD}$ Tension (lb)	$V_{allowable\ ASD}$ Shear (lb)	$T_{allowable\ ASD}$ Tension (lb)	$V_{allowable\ ASD}$ Shear (lb)	$T_{allowable\ ASD}$ Tension (lb)	$V_{allowable\ ASD}$ Shear (lb)
1/4	1.68	692	428	733	428	804	428	915	428	1,004	428
3/8	2.33	1,460	1,256	1,565	1,256	1,746	1,256	2,037	1,256	2,272	1,256
1/2	2.33	1,491	1,605	1,600	1,759	1,790	2,031	2,097	2,117	2,346	2,117
	3.59	2,513	2,117	2,753	2,117	3,179	2,117	3,894	2,117	4,496	2,117
5/8	3.23	2,403	3,970	2,633	3,970	3,040	3,970	3,723	3,970	4,299	3,970
	4.49	4,216	3,970	4,619	3,970	5,333	3,970	6,532	3,970	7,542	3,970
3/4	3.74	3,474	5,402	3,805	5,402	4,394	5,402	5,382	5,402	6,214	5,402
	5.26	5,456	6,272	5,977	6,272	6,901	6,272	8,452	6,272	9,760	6,272

1. Allowable load values are calculated using a conversion factor, α, from factored design strengths.
2. Tabulated allowable load values assume 30% dead load and 70% live load, with controlling load combination 1,2D + 1,6L. Calculated weighted average for the conversion factor, α = 1,2*(0,3) + 1,6*(0,7) = 1,48.