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ICC-ES Listing Report
ELC-4200

Issued May 2025

This listing is subject to renewal May 2026.

CSI: DIVISION: 03 00 00—CONCRETE
Section: 03 16 00—Concrete Anchors

DIVISION: 05 00 00—METALS
Section: 05 05 19—Post-Installed Concrete Anchors

Product Certification System:

The ICC-ES product-certification system includes evaluating reports of tests of standard manufactured product, prepared by accredited testing laboratories and provided by the listee, to verify compliance with applicable codes and standards. The system also involves factory inspections, and assessment and surveillance of the listee's quality system.

Product: INDEX MTD-X And MTD-M Wedge Anchors For Cracked And Uncracked Concrete

Listee: BILONTEC INDUSTRIAL S.L. (dba TÉCNICAS EXPANSIVAS S.L., INDEX)

Compliance with the following standards:

INDEX MTD-X and MTD-M wedge anchors for cracked and uncracked concrete, when applied in accordance with the manufacturer's instructions, conform to the following standards:

- Annex D, Anchorage of CSA A23.3-19, Design of Concrete Structures, CSA Group.

Compliance with the following codes:

INDEX MTD-X and MTD-M wedge anchors for cracked and uncracked concrete as described in this listing report, are in conformance with CSA A23.3-19, Annex D, as referenced in the applicable section of the following code editions:

- *National Building Code of Canada*® 2020
  Applicable Section: Division B, Part 4, Section 4.3.3.

Description of anchors:

INDEX MTD-X and MTD-M Wedge Anchors are torque-controlled, mechanical expansion anchors consisting of an anchor body, expansion clip, nut, and washer. A typical anchor is shown in Figure 1 of this report. The anchor body has a tapered mandrel formed on the installed end of the anchor and a threaded section at the opposite end. The taper of the mandrel increases in diameter towards the installed end of the anchor. The three-segment expansion clip wraps around the tapered mandrel. Before installation, this expansion clip is free to rotate about the mandrel. The anchor is set by applying torque to the hex nut; the mandrel is drawn into the expansion clip, which engages the drilled hole and transfers the load to the base material.

MTD-X Wedge Anchor, Carbon Steel:

The anchor bodies are manufactured by cold forming from carbon steel materials conforming to JIS G 3507. The zinc plating on the anchor body complies with ASTM B633 SC1 type III, with a minimum 0.0002 inch (5 µm) thickness. The expansion clip is fabricated from low carbon steel conforming to JIS G 3141. The sherardized coating of the clips complies with EN 13811 Class 15 with a minimum 0.0006 inch (15 µm) thickness. The hex nut for the carbon steel MTD-X anchor conforms to ASME B18.2.2. The washer for the carbon steel MTD-X anchor conforms to ASME B18.21.1.

MTD-M Wedge Anchor, Stainless Steel:

The anchor bodies are manufactured by machining and cold forming from stainless steel materials conforming to AISI 304 and 304HC, respectively. The expansion clip is fabricated from stainless steel conforming to AISI 304. The sherardized coating of the clips complies with EN 13811 Class 15 with a minimum 0.0006 inch

(15 µm) thickness. The hex nut for the stainless steel MTD-M anchor conforms to ASTM F594. The washer for the stainless steel MTD-M anchor conforms to ASME B18.21.1.

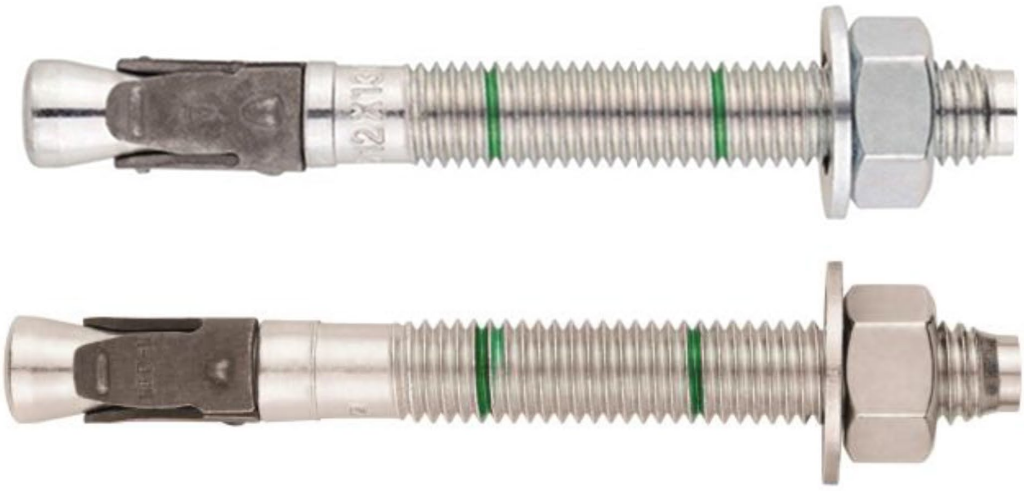


FIGURE 1—MTD-X AND MTD-M WEDGE ANCHOR

Identification:

1. The ICC-ES mark of conformity, electronic labeling, or the listing report number (ELC-4200) along with the name, registered trademark, or registered logo of the listee must be included in the product label.

2. In addition, the anchors are identified by packaging labeled with the evaluation report holder's name (Bilontec Industrial S.L.) and address, anchor name and anchor size. The anchors have the letters MTD-X or MTD-M and the anchor size embossed on the sleeve.

3. The report holder's contact information is the following:

   BILONTEC INDUSTRIAL S.L.
   (dba TÉCNICAS EXPANSIVAS S.L., INDEX)
   BIZKARGI 6
   48195 LARRABETZU (BIZKAIA). SPAIN
   (+34) 941-272-131
   www.indexfix.com
   info@indexfix.com

Installation: Installation parameters are provided in Table 1 and 2 and in Figure 2 and 3. Anchors must be installed per the manufacturer's published instructions and this report. Anchor locations must comply with this report and the plans and specifications approved by the code official. Anchors must be installed in holes drilled into concrete using carbide-tipped drill bits complying with ANSI B212.15-1994. The nominal drill diameter must be equal to the nominal diameter of the anchor. Prior to anchor installation, the hole must be cleaned in accordance with the manufacturer's published installation instructions. The anchor must be hammered into the predrilled hole until the embedment depth ring mark flushes with the concrete surface. The nut must be tightened against the washer until the torque value, T_{inst}, specified in Table 1 and 2, is achieved.

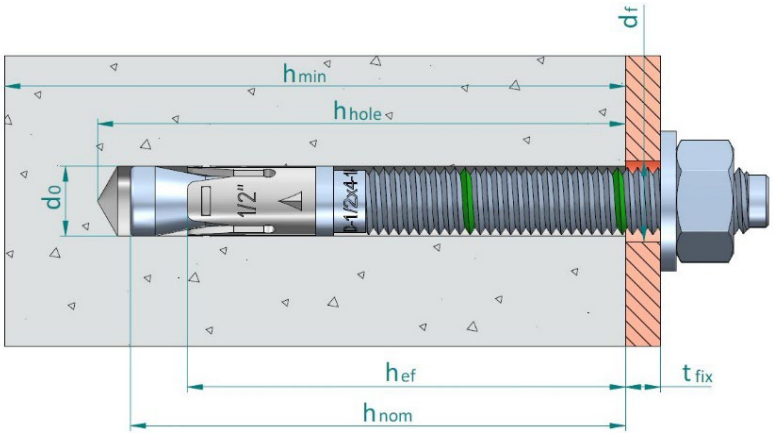
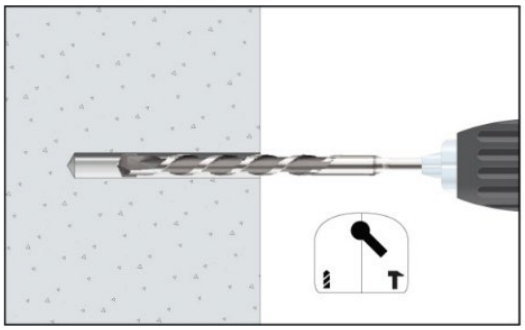
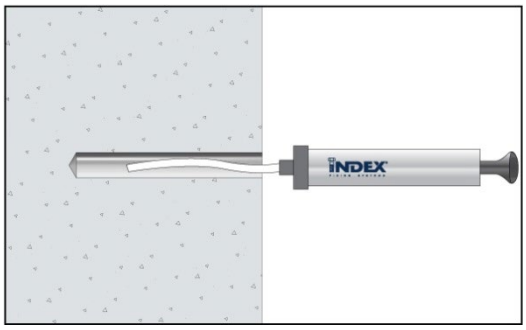


FIGURE 2—ANCHOR INSTALLATION PARAMETERS



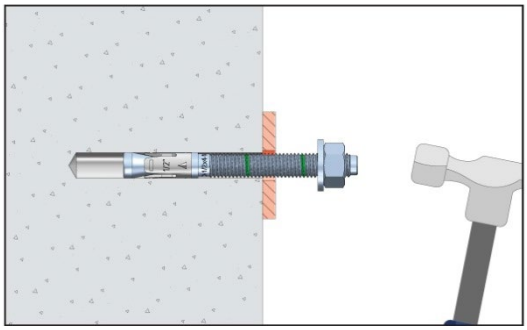
1. DRILL

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 CLEAR

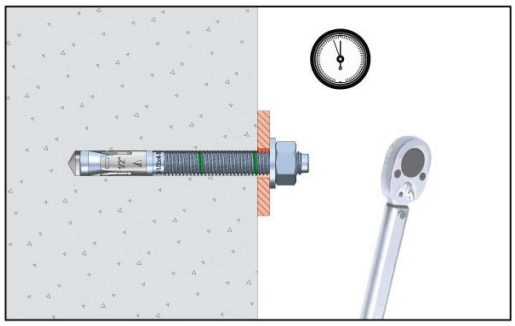
Remove dust and debris from hole using a hand pump, compressed air, or a vacuum to remove loose particles left from drilling.



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 leveled with the base material surface.

Use a hammer if necessary.



4. APPLY TORQUE

Tighten the anchor with a torque wrench by applying the required installation torque, T_{ins}. Note: the threaded stud will draw up during tightening of the nut; the expansion wedge (clip) remains in the original position.

Once installed, the total length of the anchor may be checked using the letter on the head.

FIGURE 3—MANUFACTURER'S PUBLISHED INSTALLATION INSTRUCTIONS

Anchor setting information:

TABLE 1—MTD-X ANCHOR INSTALLATION PARAMETERS[1]

Characteristic	Symbol	Unit	Nominal Anchor Diameter								
			1/4“	3/8”	1/2"		5/8”			3/4"	
Outside Diameter	d_o	mm (in.)	6.4 (1/4)	9.5 (3/8)	12.7 (1/2)	12.7 (1/2)	15.9 (5/8)	15.9 (5/8)		19.1 (3/4)	19.1 (3/4)
Nominal Embedment Depth	h_{nom}	mm	43	59	59	91	82	114		95	134
Effective Embedment Depth	h_{ef}	mm	38	51	51	83	70	102		83	121
Minimum Hole Depth	h_{hole}	mm	51	67	67	102	89	121		102	146
Clearance Hole Diameter	d_f	mm	7.9	11.1	14.3		17.5			22.2	
Recommended Installation Torque	T_{inst}	Nm	7	41	61		102			203	
Minimum Concrete Thickness	h_{min}	mm	102	102	102	152	140	152	165	152	203
Critical Edge Distance	c_{ac}	mm	70	152	152	191	178	216		229	305
Minimum Edge Distance (c_{min}) for Spacing (s ≥)	c_{min}	mm	44	64	76	64	89	178	89	127	114
	$s \geq$	mm	57	165	152	152	203	108	152	267	241
Minimum Spacing (s_{min}) for Edge Distance (c ≥)	s_{min}	mm	57	64	70	64	114	108	102	127	102
	$c \geq$	mm	44	102	152	102	152	178	127	267	216
Minimum Overall Anchor Length	l_{anch}	mm	57	76	89	114	108	140		127	165
Torque Wrench Socket Size	-	in.	7/16	9/16	3/4		15/16			1 1/8	

[1]The tabulated data is to be used in conjunction with the design criteria of CSA A23.3-19 Annex D.

TABLE 2—MTD-M ANCHOR INSTALLATION PARAMETERS[1]

Characteristic	Symbol	Unit	Nominal Anchor Diameter							
			1/4”	3/8”	1/2"		5/8”		3/4"	
Outside Diameter	d_o	mm (in.)	6.4 (1/4)	9.5 (3/8)	12.7 (1/2)	12.7 (1/2)	15.9 (5/8)	15.9 (5/8)	19.1 (3/4)	19.1 (3/4)
Nominal Embedment Depth	h_{nom}	mm	43	59	59	91	82	114	95	134
Effective Embedment Depth	h_{ef}	mm	38	51	51	83	70	102	83	121
Minimum Hole Depth	h_{hole}	mm	51	67	67	102	89	121	102	146
Clearance Hole Diameter	d_f	mm	7.9	11.1	14.3		17.5		22.2	
Recommended Installation Torque	T_{inst}	Nm	7	27	61		108		203	
Minimum Concrete Thickness	h_{min}	mm	102	102	102	152	140	165	152	203
Critical Edge Distance	c_{ac}	mm	76	165	165	191	178	216	229	305
Minimum Edge Distance (c_{min}) for Spacing (s ≥)	c_{min}	mm	44	64	76	64	89	89	127	114
	$s \geq$	mm	57	165	152	152	203	152	267	241
Minimum Spacing (s_{min}) for Edge Distance (c ≥)	s_{min}	mm	57	64	70	64	114	102	127	102
	$c \geq$	mm	44	102	152	102	152	127	267	216
Minimum Overall Anchor Length	l_{anch}	mm	57	76	89	114	108	140	127	165
Torque Wrench Socket Size	-	in.	7/16	9/16	3/4		15/16		1 1/8	

[1]The tabulated data is to be used in conjunction with the design criteria of CSA A23.3-19 Annex D.

TABLE 3—MTD-X AND MTD-M WEDGE ANCHOR LENGTH CODE IDENTIFICATION SYSTEM

Length ID marking on threaded stud head		**A**	**B**	**C**	**D**	**E**	**F**	**G**	**H**	**I**	**J**	**K**	**L**	**M**	**N**	**O**	**P**	**Q**
Overall anchor length (mm)	From	38	51	64	76	89	102	114	127	140	152	165	178	191	203	216	229	241
	Up to, but not including	51	64	76	89	102	114	127	140	152	165	178	191	203	216	229	241	254

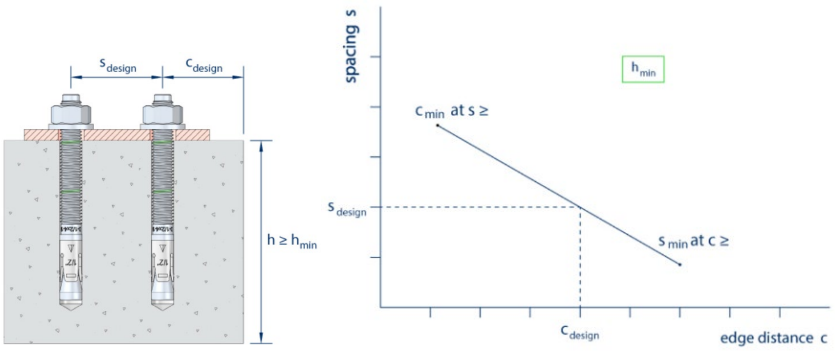


FIGURE 4—INTERPOLATION OF MINIMUM EDGE DISTANCE AND ANCHOR SPACING[1]

[1]This interpolation applies to the cases when two sets of minimum edge distances, c_{min}, and minimum spacing distances, s_{min}, are given in Table 1 and 2 for a given anchor diameter under the same effective embedment depth, h_{ef}, and corresponding minimum member thickness, h_{min}.

Ultimate Limit States Design:

Design resistance of anchors for compliance with the 2020 NBCC must be determined in accordance with CSA A23.3-19 Annex D, and this listing report.

Design parameters provided in Table 4 and 5 of this listing report are based on the 2020 NBCC (CSA A23.3-19). The limit states design of anchors must comply with CSA A23.3-19 D.5.1, except as required in CSA A23.3-19 D.4.3.1.

Material resistance factors must be ϕ_c = 0.65 and ϕ_s = 0.85 in accordance with CSA A23.3-19 Sections 8.4.2 and 8.4.3, and resistance modification factor, R, as given in CSA A23.3-19 Section D.5.3, and noted in Table 4 and 5 of this listing report, must be used for load combinations calculated in accordance with Division B, Part 4, Section 4.1.3 of the 2020 NBCC, or Annex C of CSA A23.3-19. The nominal steel strength N_{sa} or V_{sa}, in Table 4 and 5 of this listing report must be multiplied by ϕ_s and R to determine the factored resistance N_{sar} or V_{sar}. The nominal pullout strengths $N_{p,uncr}$, $N_{p,cr}$ or $N_{p,eq}$ in Table 4 and 5 of this listing report must be multiplied by ϕ_c and R to determine the factored resistance $N_{cpr,uncr}$, $N_{cpr,cr}$, or $N_{cpr,eq}$, respectively.

TABLE 4—MTD-X ANCHOR DESIGN INFORMATION[1,2,3,4]

Characteristic	Symbol	Unit	Nominal Anchor Diameter							
			1/4"	3/8"	1/2"		5/8"		3/4"	
Outside Diameter	d_o	mm (in.)	6.4 (1/4)	9.5 (3/8)	12.7 (1/2)	12.7 (1/2)	15.9 (5/8)	15.9 (5/8)	19.1 (3/4)	19.1 (3/4)
Nominal Embedment Depth	h_{nom}	mm	43	59	59	91	82	114	95	134
Effective Embedment Depth	h_{ef}	mm	38	51	51	83	70	102	83	121
Effective Steel Stress Area (Threads)	A_{se}[2]	mm^2	20.5	49.7	91.0	91.0	145.8	145.8	215.5	215.5
Effective Steel Stress Area (Neck)	A_{se}[2]	mm^2	14,8	36.3	64.5	64.5	103.2	103.2	153.5	153.5
Steel Strength in Tension and Shear										
Minimum Specified Yield Strength (Threads)	f_y	N/mm^2	480							
Minimum Specified Yield Strength (Neck)	f_y	N/mm^2	624	585			560		530	
Minimum Specified Ultimate Strength	f_{ut}	N/mm^2	600							
Steel Strength in Tension	N_{sa}	kN	11.6	27.2	47.2	47.2	72.2	72.2	101.1	101.1
Resistance modification factor for steel strength, tension	R	-	0.80							
Steel Strength in Shear	V_{sa}	kN	4.33	12.7	21.4	21.4	40.2	40.2	54.7	63.5
Steel Strength in Shear, Seismic	$V_{sa,eq}$	kN	NA	12.1	17.9	17.9	34.2	34.2	39.4	39.4
Resistance modification factor for steel strength, shear	R	-	0.75							
Pullout Strength in Tension										
Pullout Strength in Uncracked Concrete	$N_{p,uncr}$	kN	7.01	14.79	15.10	25.46	-	-	-	-
Pullout Strength in Cracked Concrete	$N_{p,cr}$	kN	NA	9.62	-	18.91	-	-	-	-
Pullout Strength in Cracked Concrete, Seismic	N_{eq}	kN	NA	9.41	-	18.91	-	-	-	-
Anchor Category	1, 2 or 3	-	1	1	1	1	1	1	1	1
Resistance modification factor for tension, concrete failure modes, Condition B	R	-	1.00							
Concrete Breakout Strength in Tension										
Effectiveness Factor for Uncracked Concrete	k_{uncr}	-	10	10	10	10	10	10	11	10
Effectiveness Factor for Cracked Concrete	k_{cr}	-	-	7	7	7	9	7	9	9
Resistance modification factor for tension, concrete failure modes, Condition B	R	-	1.00							
Axial stiffness in service load range in uncracked concrete	β_{uncr}	N/mm	28,424	29,690	51,972	22,594	23,503	15,580	29,053	24,242
Axial stiffness in service load range in cracked concrete	β_{cr}	N/mm	NA	13,001	13,359	9,225	8,570	10,758	13,241	15,830
Normalization Exponent, Uncracked Concrete	n	-	0.32	0.38	0.39	0.50	0.50	0.50	0.50	0.50
Normalization Exponent, Cracked Concrete	n	-	NA	0.50	0.50	0.46	0.50	0.50	0.50	0.50
Concrete Breakout Strength in Shear										
Nominal Diameter	d_o	mm	6.4	9.5	12.7	12.7	15.9	15.9	19.1	19.1
Load Bearing Length of Anchor	l_e	mm	38	51	51	83	70	102	83	121
Resistance modification factor for tension, concrete failure modes, Condition B	R	-	1.00							
Concrete Pryout Strength in Shear										
Coefficient for Pryout Strength	k_{cp}	-	1.0	1.0	1.0	2.0	2.0	2.0	2.0	2.0
Resistance modification factor for tension, concrete failure modes, Condition B	R	-	1.00							

For **SI:** 1 inch = 25.4mm, 1lbf = 4.45N, 1 lb/in = 0.175 N/mm, 1 psi = 0.00689 MPa = 0.00689 N/mm², 1 in^2 = 645 mm^2, 1 lb/in = 0.175 N/mm.

[1]The tabulated data is to be used in conjunction with the design provisions of CSA A23.3-19 Annex D; for anchors resisting seismic load combinations the additional requirements of CSA A23.3-19 D4.3 shall apply.

[2]All values of R for use with the load combinations of Division B, Part 4, Section 4.1.3 of the 2020 NBCC, CSA A23.3-19 Annex C. Condition B applies where supplementary reinforcement in conformance with CSA A23.3-19 D.5.3(c), is not provided, or where pullout or pryout strength governs. For cases where the presence of supplementary reinforcement can be verified, the strength reduction factors associated with Condition A may be used.

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

[4]NA = Not Applicable.

TABLE 5—MTD-M ANCHOR DESIGN INFORMATION[1,2,3,4]

Characteristic	Symbol	Unit	Nominal Anchor Diameter							
			1/4"	3/8"	1/2"		5/8"		3/4"	
Outside Diameter	d_o	mm (in.)	6.4 ($^1/_4$)	9.5 ($^3/_8$)	12.7 ($^1/_2$)	12.7 ($^1/_2$)	15.9 ($^5/_8$)	15.9 ($^5/_8$)	19.1 ($^3/_4$)	19.1 ($^3/_4$)
Nominal Embedment Depth	h_{nom}	mm	43	59	59	91	82	114	95	134
Effective Embedment Depth	h_{ef}	mm	38	51	51	83	70	102	83	121
Effective Steel Stress Area (Threads)	A_{se}[2]	mm^2	20.5	49.7	91.0	91.0	145.8	145.8	215.5	215.5
Effective Steel Stress Area (Neck)	A_{se}[2]	mm^2	14,8	39.6	72.4	72.4	105.7	105.7	153.9	153.9
Steel Strength in Tension and Shear										
Minimum Specified Yield Strength (Threads)	f_y	N/mm^2	525	487			525			
Minimum Specified Yield Strength (Neck)	f_y	N/mm^2	602							
Minimum Specified Ultimate Strength (Threads)	f_{ut}	N/mm^2	700	650			700			
Minimum Specified Ultimate Strength (Neck)	f_{ut}	N/mm^2	700							
Steel Strength in Tension	N_{sa}	kN	11.6	27.7	50.7	50.7	74.0	74.0	107.7	107.7
Resistance modification factor for steel strength, tension	R	-	0.80							
Steel Strength in Shear	V_{sa}	kN	8.3	17.8	21.1	32.5	45.2	45.2	65.9	65.9
Steel Strength in Shear, Seismic	$V_{sa,eq}$	kN	NA	17.8	21.1	29.3	34.4	34.4	47.0	47.0
Resistance modification factor for steel strength, shear	R	-	0.75							
Pullout Strength in Tension										
Pullout Strength in Uncracked Concrete	$N_{p,uncr}$	kN	5.6	14.7	16.6	27.8	-	44.4	-	-
Pullout Strength in Cracked Concrete	$N_{p,cr}$	kN	NA	10.5	9.4	-	-	-	-	-
Pullout Strength in Cracked Concrete, Seismic	N_{eq}	kN	NA	10.5	9.4	-	-	-	-	-
Anchor Category	1, 2 or 3	-	1	1	1	1	1	1	1	1
Resistance modification factor for tension, concrete failure modes, Condition B	R	-	1.00							
Concrete Breakout Strength in Tension										
Effectiveness Factor for Uncracked Concrete	k_{uncr}	-	10	10	10	10	10	10	10	10
Effectiveness Factor for Cracked Concrete	k_{cr}	-	-	7	7	7	7	7	9	7
Resistance modification factor for tension, concrete failure modes, Condition B	R	-	1.00							
Axial stiffness in service load range in uncracked concrete	β_{uncr}	N/mm	22,902	17,455	31,003	7,965	31,411	13,116	49,546	36,683
Axial stiffness in service load range in cracked concrete	β_{cr}	N/mm	NA	6,722	12,359	7,248	12,481	7,655	27,075	21,159
Normalization Exponent, Uncracked Concrete	n	-	0.13	0.30	0.32	0.48	0.27	0.44	0.43	0.33
Normalization Exponent, Cracked Concrete	n	-	NA	0.45	0.50	0.49	0.50	0.50	0.27	0.43
Concrete Breakout Strength in Shear										
Nominal Diameter	d_o	mm	6.4	9.5	12.7	12.7	15.9	15.9	19.1	19.1
Load Bearing Length of Anchor	l_e	mm	38	51	51	83	70	102	83	121
Resistance modification factor for shear, concrete failure modes, Condition B	R	-	1.00							
Concrete Pryout Strength in Shear										
Coefficient for Pryout Strength	k_{cp}	-	1.0	1.0	1.0	2.0	2.0	2.0	2.0	2.0
Resistance modification factor for shear, concrete failure modes, Condition B	R	-	1.00							

For **SI:** 1 inch = 25.4mm, 1lbf = 4.45N, 1 lb/in = 0.175 N/mm, 1 psi = 0.00689 MPa = 0.00689 N/mm², 1 in^2 = 645 mm^2, 1 lb/in = 0.175 N/mm.

[1]The tabulated data is to be used in conjunction with the design provisions of CSA A23.3-19 Annex D; for anchors resisting seismic load combinations the additional requirements of CSA A23.3-19 D4.3 shall apply.

[2]All values of R for use with the load combinations of Division B, Part 4, Section 4.1.3 of the 2020 NBCC, CSA A23.3-19 Annex C. Condition B applies where supplementary reinforcement in conformance with CSA A23.3-19 D.5.3(c), is not provided, or where pullout or pryout strength governs. For cases where the presence of supplementary reinforcement can be verified, the strength reduction factors associated with Condition A may be used.

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

[4]NA = Not Applicable.

Conditions of listing:

1. The listing report addresses only conformance with the standards and code sections noted above.
2. Approval of the product's use is the sole responsibility of the local code official.
3. The listing report applies only to the materials tested and as submitted for review by ICC-ES.
4. Anchor sizes, dimensions, minimum embedment depths and other installation parameters are as set forth in this listing report.
5. The $^1/_4$-inch-diameter anchors must be limited to use in concrete with a specified strength, f'_c, from 17.2 to 58.6 MPa. Anchors must be installed in uncracked normal-weight concrete and lightweight concrete having a specified compressive strength, f'_c, of 17.2 MPa to 58.6 MPa.
6. The $^3/_8$-inch through $^3/_4$-inch diameter anchors must be limited to use in concrete with a specified strength, f'_c, from 17.2 to 58.6 MPa. Anchors must be installed in cracked and uncracked normal-weight concrete and lightweight concrete having a specified compressive strength, f'_c, of 17.2 MPa to 58.6 MPa.
7. The values of f'_c used for calculation purposes must not exceed 55.2 MPa.
8. Limit states design values must be established in accordance with this listing report.
9. The use of fatigue or shock loading for these anchors under such conditions is beyond the scope of this listing report.
10. Anchors [except the 6.4 mm ($^1/_4$-inch)] may be used to resist short-term loading due to wind or seismic forces in locations designed according to NBCC 2020.
11. Where not otherwise prohibited in the code as referenced in CSA A23.3-19, INDEX MTD-X and MTD-M Wedge Anchors are permitted for use with fire-resistance-rated construction provided that at least one of the following conditions is fulfilled:
    a. The anchors are used to resist wind or seismic forces only.
    b. Anchors that support a fire-resistance-rated envelope or a fire-resistance-rated membrane are protected by approved fire-resistance-rated materials, or have been evaluated for resistance to fire exposure in accordance with recognized standards.
    c. Anchors are used to support nonstructural elements.
12. Use of zinc-coated carbon steel anchors is limited to dry, interior locations.
13. Use of anchors made of stainless steel as specified in this report are permitted for exterior exposure and damp environments.
14. Use of anchors made of stainless steel as specified in this report are permitted for contact with preservative-treated and fire-retardant-treated wood.