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TAPCON ANCHORS WITH ADVANCED THREADFORM TECHNOLOGY

CSI Section:
04 05 19.16 Masonry Anchors

1.0 RECOGNITION

The Tapcon Anchors recognized in this report have been evaluated for use as an alternative to cast-in-place anchors as set forth in IBC Section 2107.1. The structural properties of the Tapcon Anchors comply with the intent of the provisions of the following codes and regulations:

- 2021, 2018, and 2015 International Building Code® (IBC)
- 2021, 2018, and 2015 International Residential Code® (IRC)
- 2022 California Building Code (CBC) – attached Supplement
- 2022 California Residential Code (CRC) – attached Supplement
- 2023 Florida Building Code (FBC, Building) – attached Supplement
- 2023 Florida Building Code, Residential (FBC, Residential) – attached Supplement

2.0 LIMITATIONS

Use of the Tapcon Anchors recognized in this report is contingent on the limitations listed as follows:

2.1 The installation of the Tapcon Anchors shall comply with the IBC, IRC, and other applicable standards, the manufacturer's installation instructions, and this evaluation report. Where discrepancies occur, the most constraining shall prevail.

2.2 Screw anchor sizes, dimensions, and minimum embedment depths are as specified in this report.

2.3 The Tapcon Anchors shall be installed in holes that are predrilled with Tapcon carbide-tipped drilled bits complying with ANSI B212.15-1994 in accordance with the installation details as described in Figures 3 and 4 of this report.

2.4 Fatigue and impact loading is outside the scope of this report; criteria has not yet been developed and is unavailable to assess these types of loadings for the performance of anchors.

2.5 Tapcon Anchors may be installed in fire-resistive construction when one of the following limitations is met and not excluded for use in accordance with the IBC or IRC.

- Anchors in a fire-resistive envelope or membrane.
- Anchors that are used in construction in structural applications to reinforce gravity load-bearing components, or secure fire-resistive approved material, and have been evaluated to established criteria for resistance to fire.
- Nonstructural components: Anchors may be used where required to support or attach nonstructural components.

2.6 Use of the Tapcon Anchors is restricted to interior locations protected from moisture.

2.7 Since an acceptance criteria for evaluating the fulfillment of the Tapcon Anchors in cracked masonry is inaccessible at this time, the use of screw anchors is restricted when installed in uncracked masonry. Cracking happens when $f_t > f_r$ due to applied loads or deformations.

2.8 Special inspection shall be furnished as set forth in Section 3.4 of this report.

2.9 Tapcon Anchors may be used to resist short-term loading due to wind or seismic forces in structures assigned to Seismic Design Category A and B only under the IBC. The Tapcon Anchors shall be subjected to no capacity increases when using the allowable loads or load combinations in wind or seismic loads.

2.10 Prior to installation, the construction documents shall demonstrate compliance with this report and shall be submitted to the building official. The construction documents shall be prepared by a registered design professional in accordance with Section 107.1 of the IBC.

2.11 The Tapcon Anchors recognized in this report are produced operating in compliance with a validated quality control program.

3.0 PRODUCT USE

3.1 General: The Tapcon Anchors are used to resist static, tensile, and shear loads in uncracked, grouted or ungrouted, masonry construction complying with IBC Section 2104. The Tapcon Anchors may also be used where an engineered design has been provided as set forth in IRC Section R301.1.3.

3.2 Design: The design of the Tapcon Anchors using allowable load value capacities shown in Table 2 of this report for use in allowable stress design as set forth in Section 2107.1 of the IBC.

The Tapcon Anchors are installed only in the face shell of the grouted or ungrouted concrete masonry units **(**CMUs). Allowable tension loads, shear loads, embedment depths, spacing requirements, and end and edge distances for screw anchors installed in fully-grouted CMU construction are exhibited in Tables 2 and 3 of this report.

In lieu of TMS 402 Section 8.1.3.3, allowable loads for the Tapcon Anchors installed in the face shell of the grouted or ungrouted uncracked CMU subjected to combined axial tension and shear shall satisfy Equation 1:

$$(P_s/P_t) + (V_s/V_t) \leq 1.0 \qquad (1)$$

Where:

P_s = Applied service tension load.
P_t = Allowable service tension load.
V_s = Applied service shear load.
V_t = Allowable service shear load.

3.3 Installation: The Tapcon Anchors shall be installed as set forth in the IBC, IRC, or TMS 402 and TMS 602, the manufacturer's installation instructions, and this evaluation report. Where conflicts occur between provisions, the IBC or IRC shall apply in accordance with Section 102.4.1 of the IBC. The Tapcon Anchors locations shall comply with this evaluation report and the construction documents approved by the building official. Holes shall be ¼-inch deeper than anchor embedment depth, drilled with a rotary hammer drill, vacuuming the drill debris, blowing out the drill hole with compressed air, and installing an anchor to the nominal embedment depth utilizing the Condrive® installation tool. Installation steps are illustrated in Figure 3 of this report. Qualified locations in masonry walls are provided in Figure 4 of this report.

3.4 Special Inspection: Periodic special inspection shall be provided in accordance with Section 1705.4 of the IBC, provided the masonry construction has quality assurance requirements as specified in Tables 3 and 4 of TMS 602-16 Section 1.6A (2021 and 2018 IBC), or Section 3.1 of TMS 402-13 (2015 IBC). The special inspector shall be present as often as required in accordance with the statement of inspection. The duties of the special inspector include verifying the installation of the anchor type, anchor dimensions, masonry unit type and compliance with ASTM C90, grout and mortar compressive strengths, hole dimensions, drill bit size, anchor spacing, edge and end distances, anchor embedment, and adherence to the installation instructions described in this report. Additional requirements in accordance with Sections 1704 through 1707 of the IBC shall be observed, and the load values in Table 2 of this report shall comply with these requirements.

4.0 PRODUCT DESCRIPTION

4.1 Tapcon Anchors: The Tapcon Anchors are manufactured from carbon steel with supplementary heat treatment. The Tapcon Anchors are provided with a colored polymer-type topcoat over a zinc-flake polymer-type base coat. The Tapcon anchors are available in $^{3}/_{16}$-inch and ¼-inch diameters with multiple lengths. The Tapcon Anchors' head styles and details are shown in Figures 1 and 2 of this report.

4.2 Materials:

4.2.1 Concrete Masonry Units (CMUs): CMUs shall be lightweight, medium weight, or normal weight in compliance with ASTM C90. The nominal size of the CMU shall be 8 inches wide by 8 inches high by 16 inches long (i.e., 8x8x16).

4.2.2 Grout: The grout shall comply with Article 2.2 of TMS 602 as set forth in Section 2103.3 of the IBC or Section R606.2.12 of the IRC. When f'_m (minimum compressive strength) exceeds 2,000 psi, the provided grout compressive strength shall equal or exceed f'_m, as set forth in ASTM C1019 and Section 2.2B of TMS 602.

4.2.3 Mortar: Mortar shall be Type M or Type S as set forth in Section 2103.2 of the IBC or Section R606.2.8 of the 2021 and 2018 IRC and R606.2.7 of the 2015 IRC, as applicable.

5.0 IDENTIFICATION

The Tapcon Anchors are labeled on the packaging, bearing the company name (ITW Brands), product name (Tapcon Screw Anchors), the anchor diameter and length, and the evaluation report number (IAPMO UES ER-994). Refer to Table 1 of this report for the length identification codes being used.

The IAPMO Uniform Evaluation Service Mark of Conformity may also be used as shown below:

IAPMO UES ER-994

6.0 SUBSTANTIATING DATA

6.1 Data in compliance with ICC-ES AC106, Acceptance Criteria for Predrilled Fasteners (Screw Anchors) in Masonry.

6.2 Test reports are from laboratories in compliance with ISO/IEC 17025.

7.0 STATEMENT OF RECOGNITION

This evaluation report describes the results of research completed by IAPMO Uniform Evaluation Service on the Tapcon Anchors to assess conformance to the codes shown in Section 1.0 of this report and serves as documentation of the product certification. Products are manufactured under a quality control program with periodic inspection under the supervision of IAPMO UES.

For additional information about this evaluation report please visit www.uniform-es.org or email us at info@uniform-es.org

TABLE 1 – Length Identification Codes

Length ID marking on the head		-	A	B	C	D	E	F	G	H	I	J
Length of anchor (inch)	From	1	1 1/2	2	2 1/2	3	3 1/2	4	4 1/2	5	5 1/2	6
	Strictly Less Than	1 1/2	2	2 1/2	3	3 1/2	4	4 1/2	5	5 1/2	6	6 1/2

TABLE 2 -Allowable Tension and Shear Loads for Tapcon Screw Anchors Installed In CMU[1,2,3]

Anchor Diameter (in.)	Embedment Depth (in.)	Drill Bit Diameter (in.)	Allowable Tension Loads (lb.)		Allowable Shear Loads (lb.)	
			Lightweight	Medium/Normal	Lightweight	Medium/Normal
3/16	1	0.173	40	65	95	135
1/4	1	0.204	45	105	100	160

[1] The allowable load values are for screw anchors installed in the face shell in CMU that conform with ASTM C90 as lightweight, medium weight, or normal weight.

[2] Embedment is measured from the masonry surface to the embedded end of the screw anchor.

[3] Screw anchors shall be installed in grouted or ungrouted cells. The minimum edge and end distances shall be maintained.

TABLE 3 - Allowable Spacing and Edge Distances for Tapcon Screw Anchors Installed In CMU[1,2,4,5,6]

Property	Notation	Unit	Nominal Anchor Size	
			$^3/_{16}$ inch	¼ inch
Critical edge distance	C_{cr}	inches	4	4
Minimum edge distance	C_{min}	inches	2	2
Edge distance reduction factors – Tension	---	---	0.91[3]	0.88[3]
Edge distance reduction factors – Shear	---	---	0.93	0.80
Critical spacing distance	S_{cr}	inches	3	4
Minimum spacing distance	S_{min}	inches	1½	2
Spacing reduction factors – Tension	---	---	1	0.84
Spacing reduction factors – Shear	---	---	1	0.81

[1] The critical edge and critical spacing distances are for full anchor capacity

[2] The minimum edge and minimum spacing distances are for the reduced anchor capacity.

[3] The reduction is only applicable to anchors installed in lightweight concrete masonry units.

[4] The reduction factors in tension or in shear apply only to the allowable loads in Table 2 of this report.

[5] The reduction factors in tension or in shear with either edge distances between critical and minimum were derived by linear interpolation.

[6] The reduction factors in tension or in shear with spacing distances between critical and minimum were derived by linear interpolation.

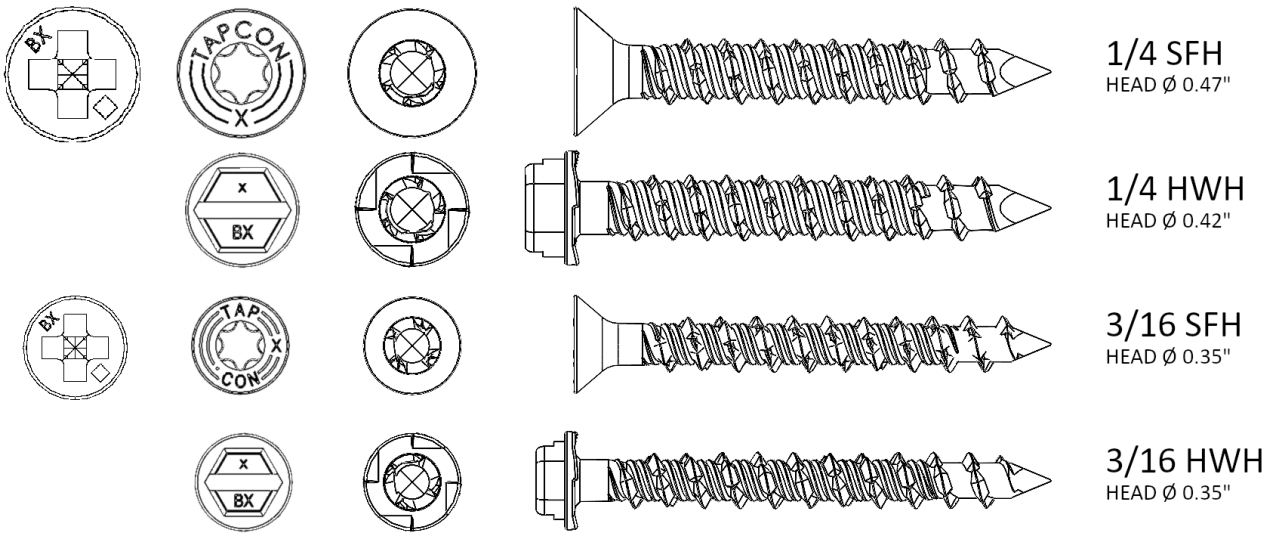


FIGURE 1 – Tapcon Anchor Illustration of Anchors

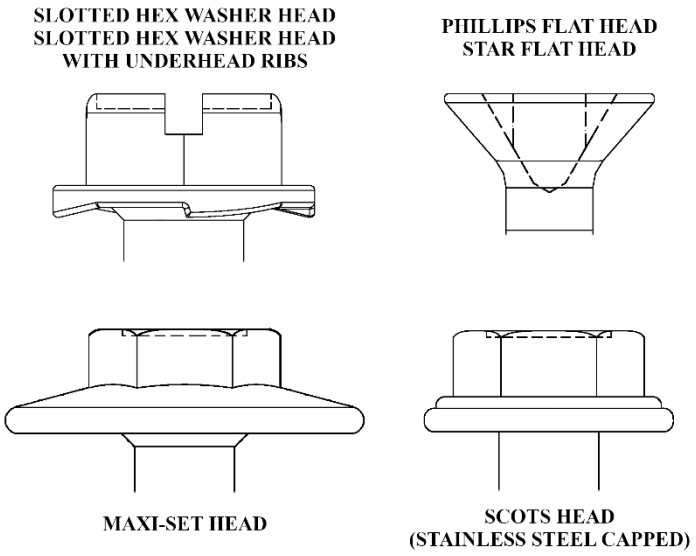
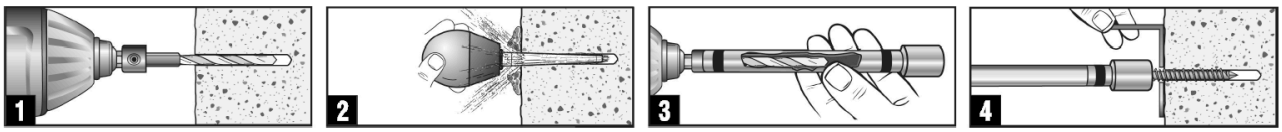


FIGURE 2 – Tapcon Anchor Head Style Details

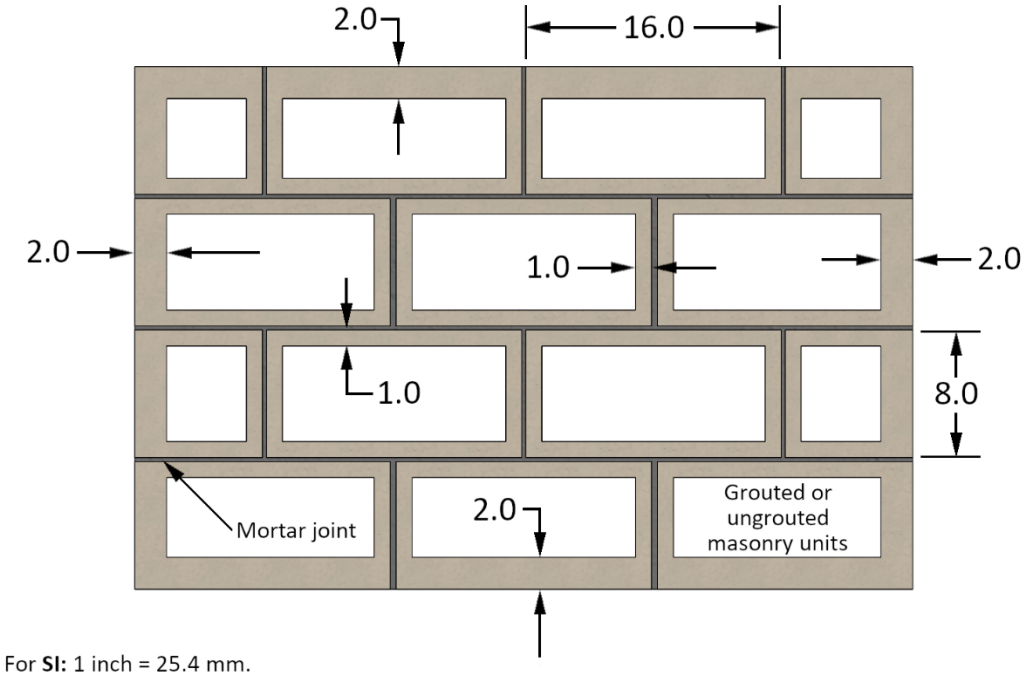
Tapcon®
#1 CHOICE OF PROFESSIONALS

Installation Instructions for 3/16" and 1/4" diameter Tapcon® Screw Anchors



1. Using a Tapcon® drill bit, drill the hole 0.25" deeper than anchor embedment.
2. Remove any excess dust/debris from hole using compressed air or vacuum.
3. Place Condrive® tool with drive socket over drill bit.
4. Using drill with hammer mode disabled, drive anchor through fixture and into hole until nut driver releases from head of anchor.

FIGURE 3 – Tapcon Anchors Installation Instructions



For **SI:** 1 inch = 25.4 mm.

FIGURE 4 – Installation of Tapcon Anchors in Locations in Masonry Units

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TAPCON ANCHORS WITH ADVANCED THREADFORM TECHNOLOGY

CSI Section:
04 05 19.16 Masonry Anchors

1.0 RECOGNITION

The Tapcon Anchors described in IAPMO UES ER-994 and this supplemental report have been evaluated for use to resist static tension and shear loads in grouted or ungrouted concrete masonry construction. The Tapcon Anchors have been evaluated for structural performance properties, subject to the requirements in IAPMO UES ER-994 and this supplemental report. The Tapcon Anchors were evaluated for compliance with the following codes and regulations:

- 2022 California Building Code (CBC) – attached Supplement
- 2022 California Residential Code (CRC) – attached Supplement

2.0 LIMITATIONS

Use of the Tapcon Anchors recognized in this supplement is subject to the following limitations:

2.1 The design, installation, and inspection of the Tapcon Anchors shall be in accordance with the 2021 IBC and IRC for use with the 2022 CBC and CRC, as applicable, as noted in IAPMO UES ER-994.

2.2 Prior to installation, calculations, and details demonstrating compliance with the approval report and the California Building Code or California Residential Code shall be submitted to the plan check section for review and approval. The calculations and details shall be prepared, stamped, and signed by a California registered design professional.

2.3 The use of the Tapcon Anchors recognized with HCAi (OSHPD) and DSA is outside the purview of this supplemental report.

2.4 This supplement expires concurrently with IAPMO UES ER-994

FLORIDA SUPPLEMENT

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TAPCON ANCHORS WITH ADVANCED THREADFORM TECHNOLOGY

CSI Section:
04 05 19.16 Masonry Anchors

1.0 RECOGNITION

The Tapcon Anchors for use in masonry, recognized in IAPMO UES ER-994, have been evaluated for use to resist static tension and shear loads in grouted or ungrouted concrete masonry construction. The structural performance properties of the Tapcon Anchors were evaluated for compliance with the following codes:

- 2023 Florida Building Code, Building (FBC-Building)
- 2023 Florida Building Code, Residential (FBC-Residential)

2.0 LIMITATIONS

The Tapcon Anchors described in IAPMO UES ER-994 comply with the 2023 FBC-Building and the 2023 FBC-Residential, subject to the following limitations:

2.1 The design and installation of the Tapcon Anchors shall be in accordance with the 2021 International Building Code and the 2021 International Residential Code as noted in IAPMO UES ER-994.

2.2 Prior to installation, calculations and details demonstrating compliance with this report shall be submitted to the building official. The calculations and details shall be prepared by a registered design professional where required by Chapter 471, Florida Statutes, or Chapter 481, Florida Statutes.

2.3 Load combinations shall be in accordance with Section 1605.2 of the FBC-Building.

2.4 Design wind loads shall be in accordance with Section 1609.1.1 of the FBC-Building or Section R301.2.1.1 of the FBC-Residential, as applicable, and Section 1620 of the FBC-Building where used in High-velocity Hurricane Zones (HVHZ).

2.5 Use of the Tapcon Anchors in applications exposed to the weather within High-velocity Hurricane Zones (HVHZ) as set forth in the FBC-Building and the FBC-Residential is beyond the scope of this supplemental report.

2.6 Use of the Tapcon Anchors in High-velocity Hurricane Zones (HVHZ) as set forth in Section 2321.5.2 of the FBC-Building and Section R4409 of the FBC-Residential to resist wind uplift is permitted. The anchors shall be designed to resist the uplift forces as required in Section 1620 (HVHZ) of the FBC-Building or 700 pounds, whichever is greater, in accordance with FBC-Building Section 2321.7.

2.7 Use of the Tapcon Anchors in High-velocity Hurricane Zones (HVHZ) as set forth in Section 2122.7 of the FBC-Building and Section R4407 of the FBC-Residential to resist wind forces is permitted. Loading shall comply with TMS402 Section 4.1. The anchors shall be designed to resist the horizontal forces as required in Section 1620 (HVHZ) of the FBC-Building or 200 pounds per lineal foot of the wall, whichever is greater, in accordance with FBC-Building Section 2122.7.3. The Tapcon Anchors shall be embedded in reinforced grouted cells in accordance with Section 2122.7.4 of the FBC-Building.

2.8 For products falling under Subsection 5(d) of Florida Rule 61G20-3.008, verification that the report holder's quality assurance program is audited by a quality assurance entity approved by the Florida Building Commission (or the building official when the report holder does not possess an approval by the Commission) is required to provide oversight and determine that the products are being manufactured as described in this evaluation report to establish continual product performance.

2.9 This supplement expires concurrently with IAPMO UES ER-994.

For additional information about this evaluation report please visit www.uniform-es.org or email us at info@uniform-es.org