

ICC-ES Evaluation Report

ESR-3196

Reissued October 2023

Revised April 2024

Subject to renewal October 2024


This report also contains:

- LABC Supplement

- FBC Supplement

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<p>DIVISION: 04 00 00— MASONRY</p> <p>Section: 04 05 19.16— Masonry Anchors</p>	<p>REPORT HOLDER: DEWALT</p> <p>ADDITIONAL LISTEE:</p> <p>ALL POINTS SCREW, BOLT & SPECIALTY</p> <p>THE HILLMAN GROUP</p>	<p>EVALUATION SUBJECT: ULTRACON®+ SCREW ANCHORS IN MASONRY (DEWALT)</p>	
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1.0 EVALUATION SCOPE

Compliance with the following codes:

- 2021, 2018, 2015 and 2012 [International Building Code® \(IBC\)](#)
- 2021, 2018, 2015 and 2012 [International Residential Code \(IRC\)](#)

For evaluation for compliance with codes adopted by the [Los Angeles Department of Building and Safety \(LADBS\)](#), see [ESR-3196 LABC and LARC Supplement](#).

Property evaluated:

Structural

2.0 USES

The UltraCon+ screw anchors, including product names described in Section 3.1 of this report, are used as anchorage to resist static, wind and seismic tension and shear loads in fully grout-filled concrete masonry units.

The UltraCon+ screw anchors are alternatives to cast-in-place anchors described in Section 8.1.3 (2016 edition) of TMS 402, Section 8.1.3 (2013 edition), or Section 2.1.4 (2011 edition) of TMS 402/ACI 530/ASCE 5, as applicable and as referenced in Section 2107.1 of the IBC.

The UltraCon+ screw anchors are permitted to be used in structures regulated under the IRC, provided an engineered design is submitted in accordance with Section R301.1.3.

3.0 DESCRIPTION

3.1 UltraCon+ Screw Anchors:

The screw anchors are comprised of a one-piece threaded anchor body with a hex head, a slotted hex head, countersunk flat head with either a Phillips drive or star drive recess, or countersunk TrimFit flat head with either a Phillips drive or star drive recess.

Product names for the report holder and the additional listees are presented in the following table of this report.

COMPANY NAME	PRODUCT NAME
DEWALT	UltraCon®+
All Points Screw, Bolt & Specialty	AP Tapper+
The Hillman Group	Hillman Tapper+

Available nominal diameters are $3/16$ -inch and $1/4$ -inch. The anchors are manufactured from low-carbon steel that is case-hardened, and they have a Stalgard® coating (Perma-seal® for Tapper+) available in various colors. The UltraCon+ screw anchor and drill bits are illustrated in [Figure 2](#) of this report.

The anchor body is formed with alternating high-low threads and a gimlet point tip. The anchors are installed in a predrilled hole with a powered tool during which the threads on the anchor body tap into the sides of the predrilled hole and interlock with the base material during installation. Installation specifications are given in [Table 1](#) and [Figures 1](#) and [3](#) of this report.

3.2 Grout-filled Concrete Masonry:

The specified compressive strength of masonry, f'_m , at 28 days must be a minimum of 1,500 psi (10.3 MPa). Fully grouted masonry walls must be constructed from the following materials:

3.2.1 Concrete Masonry Units (CMUs): Grout-filled concrete masonry walls must be constructed from minimum 6-inch-wide (152 mm), Grade N, Type II, concrete masonry units (CMUs) conforming to ASTM C90.

3.2.2 Grout: Grout-filled concrete masonry units must be fully grouted with grout complying with Section 2103.3 (2021, 2018 and 2015 IBC), 2103.13 of the 2012 IBC, or Section R606 (2021, 2018 and 2015 IRC) and R609.1.1 of the 2012 IRC, as applicable. The grout must have a minimum compressive strength of 2,000 psi (13.8 MPa) at 28 days

3.2.3 Mortar: Mortar must be Types M, S or N, prepared in accordance with Section 2103 of the IBC, or Section R606 (2021, 2018 and 2015 IRC) or Section R607 of the 2012 IRC, as applicable.

4.0 DESIGN AND INSTALLATION

4.1 Allowable Stress Design:

The design load values for anchors described in this report are based on allowable stress design (ASD) under the codes described in Section 1.0 of this report.

Allowable tension and shear loads for installation in fully grout-filled masonry wall faces are noted in [Table 3](#) of this report. The allowable tension and shear loads are for anchors installed in the grouted cells, the center web of the concrete masonry units and horizontal mortared bed joints of the fully grouted CMU construction. Allowable loads for anchors installed within $1\frac{3}{8}$ inches (35 mm) of the vertical (head) joint, as depicted in [Figure 4](#), are beyond the scope of this report.

Allowable tension and shear loads for installation in fully grout-filled masonry wall tops are noted in [Table 4](#) of this report. The allowable tension and shear loads are for anchors installed at a minimum end distance of 3 inches (76 mm) and a minimum edge distance of $1\frac{1}{2}$ inches (38 mm). Allowable loads for anchors installed within $1\frac{1}{2}$ inches (38 mm) of the vertical (head) joint are beyond the scope of this report.

The allowable loads for anchors installed in fully grout-filled concrete masonry subjected to combined tension and shear forces must be determined by the following equation:

$$\left(\frac{P_s}{P_t}\right) + \left(\frac{V_s}{V_t}\right) \leq 1$$

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.

4.2 Installation:

Anchors must be installed in accordance with this report ([Figure 3](#)) and the manufacturer's published installation instructions (MPII). Anchor locations must comply with the approved plans and specifications. The anchors must not be installed until the base material has reached its minimum designated compressive strength. The UltraCon+ drill bit size, hole diameter, hole depth, embedment depth, spacing, edge distance and base material must comply with the requirements of this report. Installation procedures and locations must be in accordance with [Tables 1, 3](#) and [4](#) as well as [Figures 1, 3](#) and [4](#) of this report.

4.3 Special Inspections:

Anchors must be installed with special inspection. Special inspection must be in accordance with Section 1704 and 1705 of the IBC. For fasteners installed under special inspection, the following items must be inspected: fastener type, fastener dimensions, masonry dimensions and compressive strength, grout and mortar compliance with Section 3.2 of this report, drill bit size, fastener spacing, edge distances and fastener embedment (as applicable). The special inspector must verify that anchor installation is in compliance with this report and in accordance with the manufacturer's published installation instructions.

5.0 CONDITIONS OF USE:

The UltraCon[®]+ Screw Anchors in masonry described in this report are suitable alternatives to what is specified in the codes listed in Section 1.0 of this report, subject to the following conditions:

- 5.1 The anchors must be identified and installed in accordance with this report and the manufacturer's published installation instructions. In the event of a conflict between the instructions in this report and the manufacturer's instructions, this report must govern.
- 5.2 UltraCon+ screw anchor sizes, dimensions, and allowable loads must be as set forth in this report.
- 5.3 Anchors resisting static, seismic and wind tension and shear loads in concrete masonry must be designed in accordance with Section 4.1 of this report.
- 5.4 For installations in concrete masonry, anchors are recognized to static, seismic and wind tension and shear load applications. When using the basic load combinations in accordance with 2021 IBC Section 1605.1 or 2018, 2015 and 2012 Section 1605.3.1, allowable loads are not permitted to be increased for seismic or wind loading. For the 2021, 2018, 2015 or 2012 IBC, the allowable loads or load combinations must not be adjusted.
- 5.5 Grout and mortar shall have reached its minimum specified compressive strength prior to installation of the anchors.
- 5.6 Anchors must be installed in holes predrilled in substrates described in this report, using only UltraCon+ carbide-tipped drill bits complying with the dimensions in [Table 1](#) of this report.
- 5.7 Calculations demonstrating that the applied loads are less than the allowable loads described in this report must be submitted to the code official for approval. The calculations must be prepared by a registered design professional where required by the statutes of the jurisdiction in which the project is being constructed.
- 5.8 Since an ICC-ES acceptance criteria for evaluating data to determine the performance of screw anchors subjected to fatigue and shock loading is unavailable at this time, the use of these anchors under these conditions is beyond the scope of this report.
- 5.9 Where not otherwise prohibited by the code, anchors are permitted for installation in fire-resistance-rated construction provided at least one of the following conditions is fulfilled:
 - Anchors are used to resist wind or seismic forces only.
 - Anchors that support fire-resistance-rated construction or gravity load-bearing structural elements are within 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.
 - Anchors are used to support nonstructural elements.
- 5.10 Since an ICC-ES acceptance criteria for evaluating data to determine the performance of screw anchors in cracked masonry is unavailable at this time, the use of screw anchors is limited to installation in uncracked masonry. Cracking occurs when $f_t > f_r$ due to service loads or deformations.
- 5.11 Special inspection, when required, must be provided in accordance with Section 4.3 of this report.
- 5.12 See [ESR-3213](#) for installation in which UltraCon+ screw anchors are used in contact with treated wood.
- 5.13 Anchors are limited to dry, interior use.
- 5.14 The UltraCon+ screw anchors are manufactured under an approved quality control program with inspections by ICC-ES.

6.0 EVIDENCE SUBMITTED

Data in accordance with the [ICC-ES Acceptance Criteria for Predrilled Fasteners \(Screw Anchors\) in Masonry \(AC106\)](#), dated March 2018 (editorially revised December 2020).

7.0 IDENTIFICATION

- 7.1 The ICC-ES mark of conformity, electronic labeling, or the evaluation report number (ICC-ES ESR-3196) along with the name, registered trademark, or registered logo of the report holder and/or listee must be included in the product label.

7.2 In addition, the screw anchors and additional product names described in Section 3.1 of this report must be identified in the field by labels on the packaging bearing the company name (DEWALT), the product name (UltraCon+), the anchor diameter and length. In addition, the anchor length code (see [Table 2](#)) is stamped on the head of each screw anchor.

7.3 The report holder’s contact information is the following:

DEWALT
701 EAST JOPPA ROAD
TOWSON, MARYLAND 21286
(800) 524-3244
www.DEWALT.com
anchors@DEWALT.com

7.4 The additional listees’ contact information is the following:

ALL POINTS SCREW, BOLT & SPECIALTY
1590 NW 27TH AVENUE, #9
POMPANO BEACH, FLORIDA 33069
info@allpointsscrew.com

THE HILLMAN GROUP
10590 HAMILTON AVENUE
CINCINNATI, OHIO 45231
info@hillmangroup.com

TABLE 1—ULTRACON+ SCREW ANCHOR INSTALLATION SPECIFICATIONS¹

Anchor Property / Setting Information	Symbol	Units	Nominal Anchor Size, d (inch)	
			³ / ₁₆	¹ / ₄
Nominal outside anchor diameter	d_a	in.	0.145	0.185
Nominal drill bit diameter	d_{bit}	in.	⁵ / ₃₂ UltraCon+ bit	³ / ₁₆ UltraCon+ bit
UltraCon+ bit tolerance range	-	in.	0.170 to 0.176	0.202 to 0.206
Hex head wrench / socket size	d_h	in.	¹ / ₄	⁵ / ₁₆
Hex head Height	-	in.	⁷ / ₆₄	⁹ / ₆₄
Flat head bit tip size	Phillips drive	-	No.	2
	star drive	-	No.	T-25

For SI: 1 inch = 25.4 mm, 1 ft-lb = 1.356 N-m.

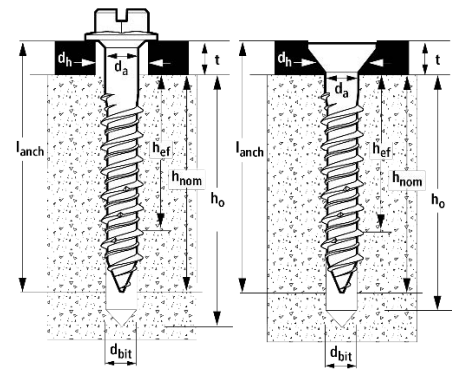


FIGURE 1—SCREW ANCHOR DETAIL

TABLE 2—FASTENER SPECIFICATIONS – ULTRACON+ SCREW ANCHOR

Length ID marking on head ¹	#	A	B	C	D	E	F	G	H	I	J
From	1	1 1/2	2	2 1/2	3	3 1/2	4	4 1/2	5	5 1/2	6
Up to but not including	1 1/2	2	2 1/2	3	3 1/2	4	4 1/2	5	5 1/2	6	6 1/2

For SI: 1 inch = 25.4 mm; 1 psi = 6.9 kPa.

¹For purposes of measuring overall fastener length, the hex head versions are measured from the underside of the head to the bottom of the tip; flat head versions of the UltraCon+ are measured from the top of the head to the tip of the anchor.

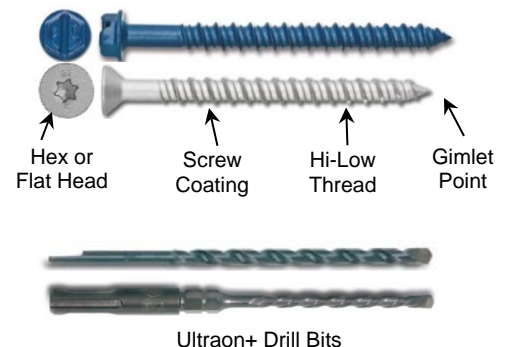
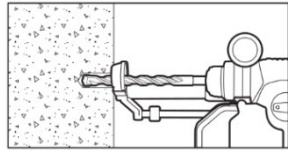
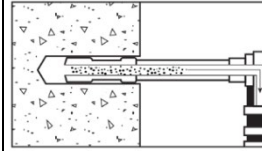


FIGURE 2—ULTRACON+ SCREW ANCHORS AND DRILL BITS

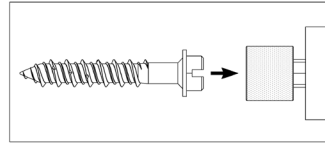
(Slotted Hex Head and star drive flat head shown for illustration – Shank and thread specifications are the same for screws with other head types.)



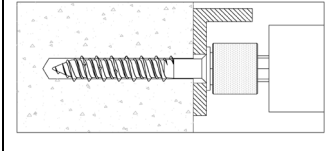
1.) Using the proper UltraCon+ drill bit size, drill a hole into the base material to the required depth, h_o , which is a 1/4-inch deeper than the minimum embedment depth, h_{nom} . The tolerances of the UltraCon+ bit used must meet the tolerance range in Table 1.



2.) Remove dust and debris from hole during drilling (e.g. dust extractor) or following drilling (e.g. suction, forced air) to extract loose particles left from drilling.



3.) Attach a UltraCon+ installation socket tool for the selected anchor size to a percussion drill and set the drill to rotary only mode. Mount the screw anchor head into the socket. For flat head versions a bit tip must be used with the socket tool.



4.) Place the point of the UltraCon+ anchor through the fixture into the predrilled hole and drive the anchor until it is fully seated at the proper embedment. The socket tool will automatically disengage from the head of the UltraCon+.

FIGURE 3—ULTRACON+ INSTALLATION INSTRUCTIONS

TABLE 3—ALLOWABLE TENSION AND SHEAR LOADS FOR ULTRACON+ SCREW ANCHORS INSTALLED IN THE FACE OF GROUT-FILLED CONCRETE MASONRY^{1,2,3,4,5}

ANCHOR INSTALLED INTO GROUTED MASONRY WALL FACE								
NOMINAL ANCHOR SIZE d (inch)	MINIMUM EMBEDMENT h_{nom} (inches)	MINIMUM EDGE / END DISTANCE, C_{min} (inches)	MINIMUM SPACING, S_{min} (inches)	TENSION (pounds)		DIRECTION OF LOADING	SHEAR (pounds)	
				Minimum Masonry Compressive Strength, f'_m			Minimum Masonry Compressive Strength, f'_m	
				1,500 psi	2,000 psi	1,500 psi	2,000 psi	
3/16	1 1/2	3	1 1/2	80	95	Towards edge	115	135
						Towards end	130	150
1/4	1 1/2	3	2	130	150	Any	200	235

For SI: 1 inch = 25.4 mm; 1 lbs = 0.0044 kN.

¹The tabulated allowable loads are for anchors installed in minimum 6-inch-wide (152 mm) grout-filled concrete masonry units described in Section 3.2 of this report and must have reached the minimum specified masonry compressive strength at the time of installation.

²The minimum embedment, h_{nom} , is measured from the outside surface of the concrete masonry unit to the embedded end of the anchor.

³Anchors may only be installed in the grouted cells and in cell webs and bed joints not closer than 1 3/8 inches from head joints. The minimum edge and end distances, C_{min} , must be maintained.

⁴The tabulated minimum edge and end distances, C_{min} , are equal to the critical edge distance, C_{cr} , for the anchors. The tabulated minimum spacing S_{min} , is also equal to the critical spacing, S_{cr} , for the anchors.

⁵The tabulated allowable loads are based on a safety factor of 5.0.

TABLE 4—ALLOWABLE TENSION AND SHEAR LOADS FOR ULTRACON+ SCREW ANCHORS INSTALLED INTO THE TOP OF GROUT-FILLED CONCRETE MASONRY^{1,2,3,4,5}

ANCHOR INSTALLED INTO TOP OF GROUTED MASONRY WALLS									
NOMINAL ANCHOR SIZE d (inch)	MINIMUM EMBEDMENT h_{nom} (inches)	MINIMUM EDGE DISTANCE $C_{min,1}$ (inches)	MINIMUM END DISTANCE $C_{min,2}$ (inches)	MINIMUM SPACING S_{min} (inches)	TENSION (pounds)		DIRECTION OF LOADING	SHEAR (pounds)	
					Minimum Masonry Compressive Strength, f'_m			Minimum Masonry Compressive Strength, f'_m	
					1,500 psi	2,000 psi	1,500 psi	2,000 psi	
3/16	1 1/2	1 1/2	3	3	90	105	Any	100	115
1/4	1 1/2	1 1/2	3	2	165	190	Any	155	180

For SI: 1 inch = 25.4 mm; 1 lbs = 0.0044 kN.

¹The tabulated allowable loads are for anchors installed in minimum 6-inch-wide (152 mm) grout-filled concrete masonry units described in Section 3.2. of this report and must have reached the minimum specified masonry compressive strength at the time of installation.

²The minimum embedment, h_{nom} , is measured from the outside surface of the concrete masonry unit to the embedded end of the anchor.

³Anchors may only be installed in the grouted cells not closer than 1 1/2 inches from head joints. The minimum edge and end distances, C_{min} , must be maintained.

⁴The tabulated minimum edge and end distances, C_{min} , are equal to the critical edge distance, C_{cr} , for the anchors. The tabulated minimum spacing S_{min} , is also equal to the critical spacing, S_{cr} , for the anchors.

⁵The tabulated allowable loads are based on a safety factor of 5.0.

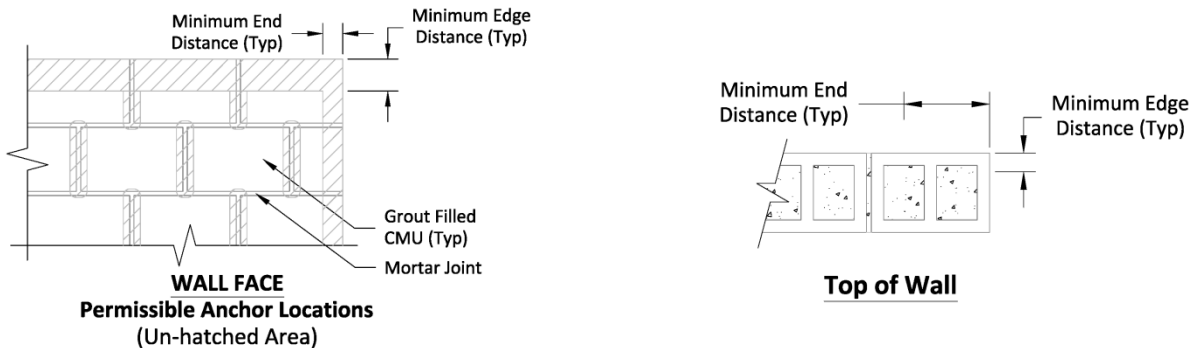


FIGURE 4—ULTRACON+ SCREW ANCHORS INSTALLED INTO GROUT-FILLED CONCRETE MASONRY

DIVISION: 04 00 00—MASONRY
Section: 04 05 19.16—Masonry Anchors

REPORT HOLDER:**DEWALT****EVALUATION SUBJECT:****ULTRACON®+ SCREW ANCHORS IN MASONRY (DEWALT)****1.0 REPORT PURPOSE AND SCOPE****Purpose:**

The purpose of this evaluation report supplement is to indicate that the UltraCon+ screw anchors in masonry, described in ICC-ES evaluation report [ESR-3196](#), have also been evaluated for compliance with the codes noted below as adopted by the Los Angeles Department of Building and Safety (LADBS).

Applicable code editions:

- 2020 *City of Los Angeles Building Code* (LABC)
- 2020 *City of Los Angeles Residential Code* (LARC)

2.0 CONCLUSIONS

The UltraCon+ screw anchors in masonry, described in Sections 2.0 through 7.0 of the evaluation report [ESR-3196](#), comply with the LABC Chapter 21, and the LARC, and are subjected to the conditions of use described in this report.

3.0 CONDITIONS OF USE

The UltraCon+ screw anchors in masonry described in this evaluation report supplement must comply with all of the following conditions:

- All applicable sections in the evaluation report [ESR-3196](#).
- The design, installation, conditions of use and identification of the anchors are in accordance with the 2018 *International Building Code*® (IBC) provisions noted in the evaluation report [ESR-3196](#).
- The design, installation and inspection are in accordance with additional requirements of LABC Chapters 16 and 17, as applicable.
- Under the LARC, an engineered design in accordance with LARC Section R301.1.3 must be submitted.
- The allowable design values listed in the evaluation report and tables are for the connection of the anchors to masonry substrate. The connection between the anchors and the connected members shall be checked for capacity (which may govern).
- For use in wall anchorage assemblies to flexible diaphragm applications, anchors shall be designed per the requirements of City of Los Angeles Information Bulletin P/BC 2020-071.

This supplement expires concurrently with the evaluation report, reissued October 2023 and revised April 2024.

DIVISION: 04 00 00—MASONRY
Section: 04 05 19.16—Masonry Anchors

REPORT HOLDER:

DEWALT

EVALUATION SUBJECT:

ULTRACON®+ SCREW ANCHORS IN MASONRY (DEWALT)

1.0 REPORT PURPOSE AND SCOPE**Purpose:**

The purpose of this evaluation report supplement is to indicate that UltraCon+ screw anchors in masonry, described in ICC-ES evaluation report ESR-3196, have also been evaluated for compliance with the codes noted below.

Applicable code editions:

- 2020 *Florida Building Code—Building*
- 2020 *Florida Building Code—Residential*

2.0 CONCLUSIONS

The UltraCon+ screw anchors in masonry, described in Sections 2.0 through 7.0 of the evaluation report ESR-3196, comply with the *Florida Building Code—Building* and the *Florida Building Code—Residential*, provided the design requirements are determined in accordance with the *Florida Building Code—Building* and the *Florida Building Code—Residential*, as applicable. The installation requirements noted in ICC-ES evaluation report ESR-3196 for the 2018 *International Building Code*® meet the requirements of the *Florida Building Code—Building* and the *Florida Building Code—Residential*, as applicable.

Use of the UltraCon+ screw anchors in masonry has also been found to be in compliance with the High-Velocity Hurricane Zone provisions of the *Florida Building Code—Building* and the *Florida Building Code—Residential*, with the following additional conditions:

- a) Design and installation must meet the requirements of Section 2122.7 of the *Florida Building Code—Building*.
- b) For anchorage to wood members, the connection subject to uplift, must be designed for no less than 700 pounds (3114 N).

For products falling under Florida Rule 61G20-3, verification that the report holder's quality assurance program is audited by a quality-assurance entity approved by the Florida Building Commission for the type of inspections being conducted is the responsibility of an approved validation entity (or the code official when the report holder does not possess an approval by the Commission).

This supplement expires concurrently with the evaluation report, reissued October 2023 revised April 2024.