GENERAL INFORMATION

ULTRACON+®

Concrete Screw Anchor

PRODUCT DESCRIPTION

The UltraCon+ fastening system is a complete family of screw anchors for light to medium duty applications in concrete, masonry block, brick, and wood base materials. The UltraCon+ is fast and easy to install and provides a neat, finished appearance. The UltraCon+ screw anchor is engineered with matched tolerance drill bits and installation tools designed to meet the needs of the user and also provide optimum performance. The UltraCon+ features a gimlet point for self-drilling into wood base materials without pre-drilling.
The UltraCon+ screw anchor is available in carbon steel with a Stalgard coating in several colors. Head styles include a slotted hex washer head, phillips flat head.

GENERAL APPLICATIONS AND USES

- Window and door frames
- Shutters and guards
- Lighting fixtures
- Thresholds
- Joint flashing
- Screened enclosures

FEATURES AND BENEFITS

+ Available in several head styles
+ Several colors and finishes to match application
+ Removable (reusable in wood)
+ Gimlet point for self drilling into wood
+ Does not exert expansion forces
+ No hole spotting required
+ Good corrosion protection with Stalgard coating
+ High-low thread design for greater stability and grip

APPROVALS AND LISTINGS

- International Code Council, Evaluation Service (ICC-ES), ESR-3068 for uncracked concrete, ESR-3196 for masonry, ESR-3042 for wood, and ESR-3213 for chemically treated lumber
- Code compliant with the International Building Code/International Residential Code: 2021 IBC/IRC, 2018 IBC/IRC, 2015 IBC/IRC, and 2012 IBC/IRC
- Tested in accordance with ACI 355.2 and ICC-ES AC193 (including ASTM E488) for use in concrete, ICC-ES AC106 for use in masonry, ICC-ES AC233 for use in wood, and ICC-ES AC257 for use in pressure treated lumber
- Evaluated and qualified by an accredited independent testing laboratory for reliability against brittle failure, e.g. hydrogen embrittlement
- City of Los Angeles, LABC Supplement (within ICC-ES evaluation reports)
- Miami-Dade County Notice of Acceptance (NOA) No. 21-0113.01
- Florida Statewide Approval FL29080

GUIDE SPECIFICATIONS

CSI Divisions: 03 16 00 - Concrete Anchors, 04 05 19.16 - Masonry Anchors, 05 05 19 - Post-Installed Concrete Anchors and 06 05 23 - Wood, Plastic, and Composite Fastenings.

MATERIAL SPECIFICATIONS

Anchor Component	Specification
Anchor Body	Case hardened carbon steel
Coating/Plating/Finish	Stalgard® (various colors) 1000 hour rating for ASTM B117 salt spray test

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ULTRACON+

HEAD STYLES

- Slotted Hex Washer Head
- Phillips Flat Head

ANCHOR MATERIALS

- Carbon Steel with Stalgard Coating

ANCHOR SIZE RANGE (TYP.)

- 3/16" and 1/4" diameters in various lengths

SUITABLE BASE MATERIALS

- Normal-weight Concrete
- Lightweight Concrete
- Grouted Concrete Masonry
- Hollow Concrete Masonry (CMU)
- Solid Brick Masonry
- Wood

CODE LISTED ICC-ES ESR-3068 UNCRACKED CONCRETE

CODE LISTED ICC-ES ESR-3196 MASONRY

CODE LISTED ICC-ES ESR-3042 WOOD-TO-WOOD

CODE LISTED ICC-ES ESR-3213 CHEMICALLY TREATED LUMBER

MIAMI-DADE COUNTY APPROVED

INSTALLATION SPECIFICATIONS

UltraCon+ Carbon Steel Hex Head

Dimension	Nominal Anchor Diameter, d	
	3/16"	1/4"
UltraCon+ Drill Bit Size, d_{bit} (in.)	5/32"	3/16"
Typ. Fixture Clearance Hole, d_h (in.)	1/4"	5/16"
Head Height (in.)	7/64"	9/64"
Hex Head Wrench/Socket Size	1/4"	5/16"
Washer O.D., d_w (in.)	11/32"	13/32"
Washer Thickness, (in.)	1/32"	1/32"

UltraCon+ Carbon Steel Flat Head

Dimension	Nominal Anchor Diameter, d	
	3/16"	1/4"
UltraCon+ Drill Bit Size, d_{bit} (in.)	5/32"	3/16"
Typ. Fixture Clearance Hole, d_h (in.)	1/4"	5/16"
Phillips Head O.D., (in.)	3/8"	1/2"
Phillips Head Height, (in.)	9/64"	3/16"
Phillips Bit Size (No.)	2	3

1. For minimum nominal embedment depths, h_{nom}, see the performance data tables. The minimum hole depth, h_o, is 1/4-inch more than the selected nominal embedment depth.
2. In light gauge steel material (0.036 / 20 gauge and thinner), the clearance hole can be the same diameter as the drill bit.
3. Pre-drilling is not required for UltraCon+ screw anchors into wood base materials (but can be considered).

Head Marking

Hex Washer Head

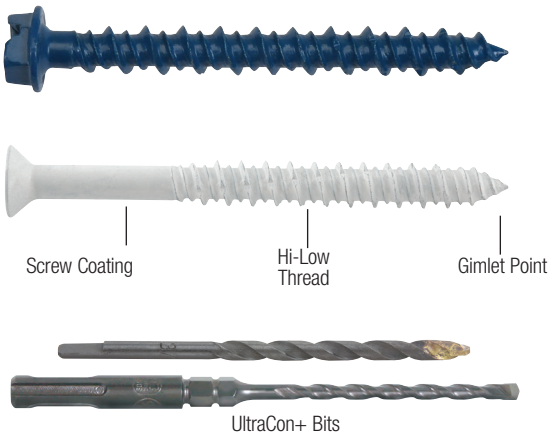
Philips Flat Head

TrimFit Flat Head

Hex Flange Head

Legend
'D' Marking = UltraCon+
'+' Symbol = Strength Design Compliant Anchor
'C' Mark = Length Identification Mark
'•' Mark = TrimFit Flat Head Identification

Matched Tolerance System



UltraCon+ Length Code Identification System

Length ID marking on head		□	A	B	C	D	E	F	G	H	I	J
Overall anchor length ℓ_{anch} (inches)	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"

Installation Table for UltraCon+ in Concrete and Masonry[1]

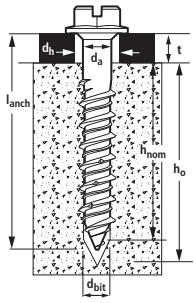
Anchor Property/Setting Information	Notation	Units	Nominal Anchor Size (in.)	
			3/16	1/4
Anchor outside diameter	d	in. (mm)	0.145 (3.7)	0.185 (4.7)
Nominal drill bit diameter	d_{bit}	in.	5/32 UltraCon+ Bit	3/16 UltraCon+ Bit
UltraCon+ bit tolerance range	-	in.	0.170 to 0.176	0.202 to 0.206
Hex head socket size	-	in.	1/4	5/16
Phillips bit size (No.)	-	-	2	3
Maximum manual installation torque	$T_{inst,max}$	ft-lbs	3	5
Maximum powered installation torque	T_{screw}	ft-lbs	Not applicable using UltraCon+ installation socket tool	

1. For minimum nominal embedment depths, h_{nom}, see the performance data tables. The minimum hole depth, h_o, is 1/4-inch more than the selected nominal embedment depth.

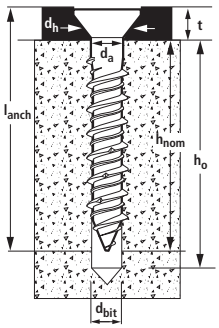
Installation Table for UltraCon+ in Wood

Anchor Property/Setting Information	Notation	Units	Nominal Anchor Size (in.)	
			3/16	1/4
Anchor outside diameter	d	in. (mm)	0.145 (3.7)	0.185 (4.7)
Nominal drill bit diameter	d_{bit}	in.	Pre-drilling is not required for UltraCon+ into wood base materials (but can be considered)	
Hex head socket size	-	in.	1/4	5/16
Phillips bit size (No.)	-	-	2	3

UltraCon+ Anchor Detail



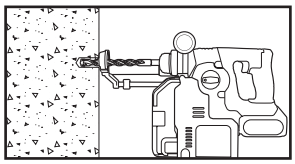
Hex Head



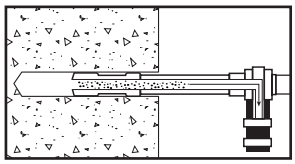
Flat Head

INSTALLATION INSTRUCTIONS

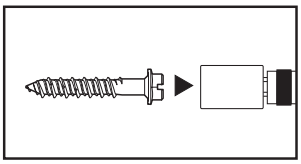
Installation Instruction for UltraCon+



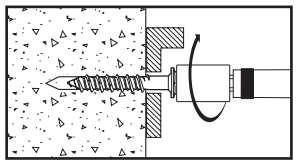
Step 1
Using the proper drill bit size, drill a hole into the base material to the required depth, h_o, which is a 1/4-inch deeper than the minimum embedment depth, h_{nom}.



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



Step 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.



Step 4
Place the point of the UltraCon+ through the fixture into the pre-drilled hole and drive the anchor in one steady continuous motion until it is fully seated at the proper embedment. The driver will automatically disengage from the head of the screw anchor.

PERFORMANCE DATA (ASD)

Ultimate and Allowable Load Capacities for UltraCon+ in Normal-Weight Concrete[1,2,3]

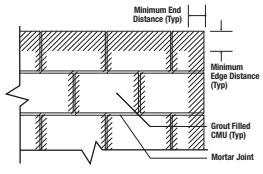
Nominal Anchor Diameter d in.	Minimum Embed. Depth h_{nom} in. (mm)	Minimum Edge Distance in. (mm)	Minimum Spacing in. (mm)	Minimum Concrete Compressive Strength											
				f'c =2,500 psi (17.3 Mpa)				f'c =3,000 psi (20.7 Mpa)				f'c =4,000 psi (27.6 Mpa)			
				Ultimate		Allowable		Ultimate		Allowable		Ultimate		Allowable	
				Tension lbs. (kN)	Shear lbs. (kN)	Tension lbs. (kN)	Shear lbs. (kN)	Tension lbs. (kN)	Shear lbs. (kN)	Tension lbs. (kN)	Shear lbs. (kN)	Tension lbs. (kN)	Shear lbs. (kN)	Tension lbs. (kN)	Shear lbs. (kN)
3/16	1-3/4 (44.4)	1 (25.4)	1 (25.4)	1,080 (4.8)	305 (1.3)	270 (1.2)	75 (0.3)	1,145 (5.0)	325 (1.4)	285 (1.3)	80 (0.4)	1,245 (5.5)	325 (1.4)	310 (1.4)	80 (0.4)
	1-3/4 (44.4)		1-1/8 (28.6)	1,190 (5.2)	305 (1.3)	295 (1.3)	75 (0.3)	1,255 (5.5)	325 (1.4)	315 (1.4)	80 (0.4)	1,370 (6.0)	325 (1.4)	340 (1.5)	80 (0.4)
	1-3/4 (44.4)		2-1/4 (57.2)	1,365 (6.0)	600 (2.6)	340 (1.5)	150 (0.7)	1,440 (6.3)	635 (2.8)	360 (1.6)	160 (0.7)	1,570 (6.9)	635 (2.8)	395 (1.7)	160 (0.7)
	1 (25.4)		3 (76.2)	580 (2.6)	435 (1.9)	145 (0.7)	110 (0.5)	615 (2.7)	460 (2.0)	155 (0.7)	115 (0.5)	670 (2.9)	460 (2.0)	170 (0.7)	115 (0.5)
	1-3/8 (34.9)			815 (3.6)	455 (2.0)	205 (0.9)	115 (0.5)	860 (3.8)	485 (2.1)	215 (1.0)	120 (0.5)	940 (4.1)	485 (2.1)	235 (1.0)	120 (0.5)
	1-3/4 (44.4)		3-3/8 (85.7)	1,365 (6.0)	600 (2.6)	340 (1.5)	150 (0.7)	1,440 (6.3)	635 (2.8)	360 (1.6)	160 (0.7)	1,570 (6.9)	635 (2.8)	395 (1.7)	160 (0.7)
	1-3/4 (44.4)	2-1/2 (63.5)	1-1/8 (28.6)	1,465 (6.4)	1,200 (5.3)	365 (1.6)	300 (1.3)	1,550 (6.8)	1,265 (5.6)	390 (1.7)	315 (1.4)	1,690 (7.4)	1,265 (5.6)	425 (1.9)	315 (1.4)
	1-3/4 (44.4)		2-1/4 (57.15)	1,465 (6.4)	1,200 (5.3)	365 (1.6)	300 (1.3)	1,550 (6.8)	1,265 (5.6)	390 (1.7)	315 (1.4)	1,690 (7.4)	1,265 (5.6)	425 (1.9)	315 (1.4)
	1 (25.4)		3 (76.2)	580 (2.6)	640 (2.8)	145 (0.7)	160 (0.7)	615 (2.7)	680 (3.0)	155 (0.7)	170 (0.8)	670 (2.9)	680 (3.0)	170 (0.7)	170 (0.8)
	1-3/8 (34.9)			1,220 (5.4)	735 (3.2)	305 (1.4)	185 (0.8)	1,290 (5.7)	775 (3.4)	325 (1.4)	195 (0.9)	1,405 (6.2)	775 (3.4)	350 (1.6)	195 (0.9)
	1-3/4 (44.4)		3-3/8 (85.7)	1,465 (6.4)	1,200 (5.3)	365 (1.6)	300 (1.3)	1,550 (6.8)	1,265 (5.6)	390 (1.7)	315 (1.4)	1,690 (7.4)	1,265 (5.6)	425 (1.9)	315 (1.4)
1/4	1-3/4 (44.4)	1 (25.4)	1 (25.4)	1,265 (5.6)	340 (1.5)	315 (1.4)	85 (0.4)	1,360 (6.0)	370 (1.6)	340 (1.5)	95 (0.4)	1,525 (6.7)	370 (1.6)	380 (1.7)	95 (0.4)
	1-3/4 (44.4)		1-1/2 (38.1)	1,265 (5.6)	385 (1.7)	315 (1.4)	95 (0.4)	1,325 (5.8)	415 (1.8)	340 (1.5)	105 (0.5)	1,525 (6.7)	415 (1.8)	380 (1.7)	105 (0.5)
	1-3/4 (44.4)		3 (76.2)	1,720 (7.6)	420 (1.8)	430 (1.9)	105 (0.5)	1,850 (8.1)	450 (2.0)	465 (2.0)	115 (0.5)	2,075 (9.1)	450 (2.0)	520 (2.3)	115 (0.5)
	1 (25.4)		4 (101.6)	770 (3.4)	495 (2.2)	195 (0.9)	125 (0.6)	830 (3.7)	530 (2.3)	210 (0.9)	135 (0.6)	930 (4.1)	530 (2.3)	235 (1.0)	135 (0.6)
	1-3/8 (34.9)			1,105 (4.9)	640 (2.8)	275 (1.2)	160 (0.7)	1,190 (5.2)	690 (3.0)	300 (1.3)	175 (0.8)	1,335 (5.9)	690 (3.0)	335 (1.5)	175 (0.8)
	1-3/4 (44.4)			1,975 (8.7)	645 (2.8)	495 (2.2)	160 (0.7)	2,120 (9.3)	690 (3.0)	530 (2.3)	175 (0.8)	2,380 (10.5)	690 (3.0)	595 (2.6)	175 (0.8)
	1-3/4 (44.4)	2-1/2 (63.5)	1-1/2 (38.1)	2,200 (9.7)	1,590 (7.0)	550 (2.4)	400 (1.8)	2,365 (10.4)	1,710 (7.5)	590 (2.6)	430 (1.9)	2,650 (11.7)	1,710 (7.5)	665 (2.9)	430 (1.9)
	1-3/4 (44.4)		3 (76.2)	2,200 (9.7)	1,635 (7.2)	550 (2.4)	410 (1.8)	2,365 (10.4)	1,755 (7.7)	590 (2.6)	440 (1.9)	2,650 (11.7)	1,755 (7.7)	665 (2.9)	440 (1.9)
	1 (25.4)		4 (101.6)	805 (3.5)	1,260 (5.6)	200 (0.9)	315 (1.4)	865 (3.8)	1,355 (6.0)	215 (1.0)	340 (1.5)	970 (4.3)	1,355 (6.0)	245 (1.1)	340 (1.5)
	1-3/8 (34.9)			1,755 (7.7)	1,750 (7.7)	440 (1.9)	440 (1.9)	1,885 (8.3)	1,885 (8.3)	470 (2.1)	470 (2.1)	2,115 (9.3)	1,885 (8.3)	530 (2.3)	470 (2.1)
	1-3/4 (44.5)			2,125 (9.4)	1,395 (6.1)	530 (2.4)	350 (1.5)	2,285 (10.1)	1,500 (6.6)	570 (2.5)	375 (1.7)	2,565 (11.3)	1,500 (6.6)	640 (2.8)	375 (1.7)

1. Tabulated Ultimate load values are for anchors installed in uncracked concrete. Concrete compressive strength must be at the specified minimum at the time of installation.
2. Allowable load capacities listed are calculated using an applied safety factor of 4.0. Consideration of safety factors of 10 or higher may be necessary depending on the application, such as life safety or overhead.
3. Linear interpolation may be used to determine allowable loads for intermediate compressive strengths.

Ultimate and Allowable Load Capacities for UltraCon+ Anchors Installed in the Face of Hollow Concrete Masonry[1,2,3]

Nominal Anchor Diameter d in.	Minimum Embed. Depth h_{nom} In. (mm)	Minimum Edge Distance In. (mm)	Minimum End Distance In. (mm)	Minimum Spacing In. (mm)	Minimum ASTM C90 Block Type	Ultimate Load		Allowable Load	
						Tension lbs. (kN)	Shear lbs. (kN)	Tension lbs. (kN)	Shear lbs. (kN)
3/16	1-1/4 (31.8)	1 (25.4)	2 (50.8)	1-1/2 (38.1)	Normal Weight	740 (3.3)	405 (1.8)	150 (0.7)	80 (0.4)
	1-1/4 (31.8)			3 (76.2)	Normal Weight	815 (3.6)	585 (2.6)	165 (0.7)	115 (0.5)
	1-1/4 (31.8)			6 (152.4)	Normal Weight	815 (3.6)	585 (2.6)	165 (0.7)	115 (0.5)
	1 (25.4)	2 (50.8)	2 (50.8)	1-1/2 (38.1)	Lightweight	300 (1.3)	460 (2.1)	55 (0.3)	90 (0.4)
	1 (25.4)			3 (76.2)	Lightweight	340 (1.5)	460 (2.1)	65 (0.3)	90 (0.4)
	1-1/4 (31.8)			1-1/2 (38.1)	Normal Weight	740 (3.3)	700 (3.1)	150 (0.7)	140 (0.6)
	1-1/4 (31.8)	2-1/2 (63.5)	2-1/2 (63.5)	1-1/8 (28.6)	Normal Weight	790 (3.5)	935 (4.1)	160 (0.7)	185 (0.8)
	1-1/4 (31.8)			2-1/4 (57.2)	Normal Weight	790 (3.5)	935 (4.1)	160 (0.7)	185 (0.8)
	1-1/4 (31.8)			6 (152.4)	Normal Weight	790 (3.5)	935 (4.1)	160 (0.7)	185 (0.8)
	1 (25.4)	3 (76.2)	3 (76.2)	1-1/2 (38.1)	Lightweight	385 (1.8)	670 (3.0)	80 (0.4)	135 (0.6)
	1 (25.4)			3 (76.2)	Lightweight	440 (2.0)	670 (3.0)	90 (0.4)	135 (0.6)
1/4	1-1/4 (31.8)	1 (25.4)	2 (50.8)	1-1/2 (38.1)	Normal Weight	725 (3.2)	475 (2.1)	145 (0.6)	95 (0.4)
	1-1/4 (31.8)			3 (76.2)	Normal Weight	940 (4.1)	800 (3.5)	190 (0.8)	160 (0.7)
	1-1/4 (31.8)			6 (152.4)	Normal Weight	725 (3.2)	690 (3.0)	145 (0.6)	140 (0.6)
	1 (25.4)	2 (50.8)	2 (50.8)	2 (50.8)	Lightweight	435 (1.9)	530 (2.4)	90 (0.4)	90 (0.4)
	1 (25.4)			4 (101.6)	Lightweight	495 (2.2)	530 (2.4)	100 (0.4)	90 (0.4)
	1-1/4 (31.8)			2 (50.8)	Normal Weight	760 (3.4)	740 (3.3)	150 (0.6)	150 (0.7)
	1-1/4 (31.8)			4 (101.6)	Normal Weight	950 (4.2)	740 (3.3)	190 (0.8)	150 (0.7)
	1-1/4 (31.8)	2-1/2 (63.5)	2-1/2 (63.5)	1-1/2 (38.1)	Normal Weight	800 (3.5)	1,220 (5.4)	160 (0.7)	245 (1.1)
	1-1/4 (31.8)			3 (76.2)	Normal Weight	880 (3.9)	1,450 (6.4)	175 (0.8)	290 (1.3)
	1-1/4 (31.8)			6 (152.4)	Normal Weight	880 (3.9)	1,450 (6.4)	175 (0.8)	290 (1.3)
	1 (25.4)	3 (76.2)	3 (76.2)	2 (50.8)	Lightweight	510 (2.3)	820 (3.6)	100 (0.4)	165 (0.7)
	1 (25.4)			4 (101.6)	Lightweight	580 (2.6)	820 (3.6)	115 (0.5)	165 (0.7)

1. Tabulated load values are for anchors installed in minimum 8-inch-wide, Type II, light weight or normal weight concrete masonry units conforming to ASTM C90 that have reached the minimum designated ultimate compressive strength at the time of installation (f'm ≥ 2,000 psi). Mortar must be a minimum Grade N.
2. Allowable load capacities listed are calculated using an applied safety factor of 5.0. Consideration of safety factors of 10 or higher may be necessary depending on the application, such as life safety or overhead.
3. Allowable shear loads into the face shell of a masonry wall may be applied in any direction.

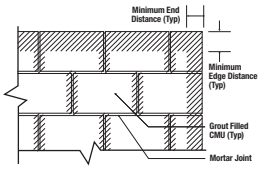


Wall Face
Permissible Anchor Locations
(Un-hatched Area)

Ultimate and Allowable Load Capacities for UltraCon+ Anchors Installed in the Face of Grout-Filled Concrete Masonry[1,2,3]

Nominal Anchor Diameter d	Minimum Embed. Depth h_{nom} in. (mm)	Minimum Edge Distance in. (mm)	Minimum End Distance in. (mm)	Minimum Spacing in. (mm)	Installation Location	Minimum ASTM C90 Block Type	Ultimate Load		Allowable Load	
							Tension lbs. (kN)	Shear lbs. (kN)	Tension lbs. (kN)	Shear lbs. (kN)
3/16	1-3/4 (44.4)	1 (25.4)	2 (50.8)	1-1/2 (38.1)	Face	Normal Weight	510 (2.2)	435 (1.9)	100 (0.4)	85 (0.4)
	1-3/4 (44.4)			3-3/8 (85.7)	Face	Normal Weight	1,415 (6.2)	435 (1.9)	285 (1.2)	85 (0.4)
	2-1/4 (57.2)			4-1/2 (114.3)	Face	Normal Weight	2,080 (9.1)	755 (3.3)	415 (1.8)	150 (0.7)
	1-3/4 (44.4)	2-1/2 (63.5)	2-1/2 (63.5)	3-3/8 (85.7)	Face	Normal Weight	1,415 (6.2)	1,105 (4.9)	285 (1.2)	220 (1.0)
	1-3/4 (44.4)			3-9/16 (90.5)	Face	Normal Weight	1,485 (6.5)	1,260 (5.5)	295 (1.3)	250 (1.1)
	2-1/4 (57.2)			4-1/2 (114.3)	Face	Normal Weight	2,080 (9.1)	1,260 (5.5)	415 (1.8)	250 (1.1)
	1-1/2 (38.1)	8 (203.2)	3 (76.2)	3 (76.2)	Mortar	Lightweight	625 (2.8)	660 (2.9)	125 (0.6)	130 (0.6)
	1-1/2 (38.1)	3 (76.2)	3 (76.2)	3 (76.2)	Face	Lightweight	410 (1.8)	600 (2.7)	80 (0.4)	120 (0.5)
1/4	1-3/4 (44.4)	1 (25.4)	2 (50.8)	1-1/2 (38.1)	Face	Normal Weight	980 (4.3)	460 (2.0)	195 (0.9)	90 (0.4)
	1-3/4 (44.4)			4 (101.6)	Face	Normal Weight	1,855 (8.2)	1,045 (4.6)	370 (1.6)	210 (0.9)
	1-3/4 (44.4)	2-1/2 (63.5)	2-1/2 (63.5)	4 (101.6)	Face	Normal Weight	1,980 (8.7)	1,450 (6.4)	395 (1.7)	290 (1.3)
	2-1/4 (57.2)			4 (101.6)	Face	Normal Weight	3,135 (13.8)	1,440 (6.3)	625 (2.8)	290 (1.3)
	1-1/2 (38.1)	8 (203.2)	3 (76.2)	4 (101.6)	Mortar	Lightweight	730 (3.3)	1,010 (4.5)	145 (0.7)	200 (0.9)
	1-1/2 (38.1)	3 (76.2)	3 (76.2)	4 (101.6)	Face	Lightweight	650 (2.9)	1,010 (4.5)	130 (0.6)	200 (0.9)

1. Tabulated load values for anchors installed in lightweight concrete masonry units are based on minimum 6-inch-wide, Type II block conforming to ASTM C90 that have reached the minimum designated ultimate compressive strength at the time of installation (f'm ≥ 1,500 psi). Mortar must be a minimum Grade N.
2. Allowable load capacities listed are calculated using an applied safety factor of 5.0. Consideration of safety factors of 10 or higher may be necessary depending on the application, such as life safety or overhead.
3. Allowable shear loads into the face shell of a masonry wall may be applied in any direction.

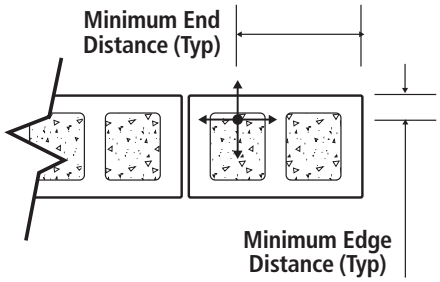


Wall Face
Permissible Anchor Locations
(Un-hatched Area)

Ultimate and Allowable Load Capacities for UltraCon+ Anchors Installed into the Tops of Grout Filled Concrete Masonry Walls[1,2,3]

Nominal Anchor Diameter d in.	Minimum Embed. h_{nom} in. (mm)	Minimum Edge Distance in. (mm)	Minimum End Distance in. (mm)	Minimum ASTM C-90 Block Type	Ultimate Loads		Allowable Loads	
					Tension lbs (kN)	Shear lbs (kN)	Tension lbs (kN)	Shear lbs (kN)
3/16	1-1/2 (38.1)	1-1/2 (38.1)	3 (76.2)	Lightweight	450 (2.0)	510 (2.3)	90 (0.4)	100 (0.5)
1/4	1-1/2 (38.1)	1-1/2 (38.1)	3 (76.2)	Lightweight	825 (3.7)	780 (3.5)	165 (0.7)	155 (0.7)

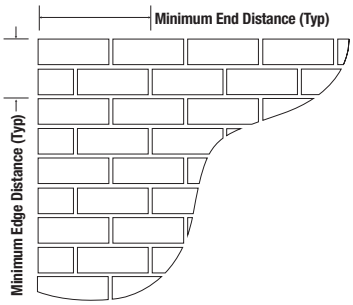
1. Tabulated load values are for 3/16-inch and 1/4-inch anchors installed in minimum 6-inch-wide, Type II, light weight concrete masonry units conforming to ASTM C 90 that have reached the minimum designated ultimate compressive strength at the time of installation (f'm ≥ 1,500 psi). Mortar must be a minimum Grade N.
2. Allowable load capacities listed are calculated using an applied safety factor of 5.0. Consideration of safety factors of 10 or higher may be necessary depending on the application, such as life safety or overhead.
3. The tabulated values are applicable to anchors installed at a critical spacing between anchors of 16 times the anchor diameter.



Allowable Load Capacities for UltraCon+ Anchors Installed in Clay Brick Masonry[1,2,3,4]

Nominal Anchor Diameter d in.	Minimum Embed. h_v in. (mm)	Minimum Edge Distance in. (mm)	Minimum End Distance in. (mm)	Installation Location	Tension lbs. (kN)	Shear lbs. (kN)
3/16	1-1/2 (38.1)	1-3/4 (44.5)	1-3/4 (44.5)	Face	380 (1.7)	165 (0.7)
				Mortar Joint	300 (1.3)	190 (0.8)
1/4				Face	605 (2.7)	270 (1.2)
				Mortar Joint	200 (0.9)	155 (0.7)

1. Tabulated load values are for anchors installed in multiple wythe, minimum Grade SW, solid clay brick masonry walls conforming to ASTM C 62. Mortar must be minimum Type N. Masonry compressive strength must be at the specified minimum at the time of installation (f'm ≥ 1,500 psi).
2. Allowable load capacities listed are calculated using and applied safety factor of 5.0. Consideration of safety factors of 10 or higher may be necessary depending upon the application such as lifesafety or overhead.
3. Allowable shear loads into the face or mortar joint of the brick masonry wall may be applied in any direction.
4. The tabulated values are applicable for anchors installed at a critical spacing between anchors of 12 times the anchor diameter.



Average Withdrawal Capacity and Average Bending Yield Moment of UltraCon+ in Wood[1,2]

Nominal Anchor Diameter d in.	Minimum Embed. h_v in. (mm)	Minimum Edge Distance in. (mm)	Withdrawal Capacity[1] lbs. (kN)		Screw Bending Yield psi (MPa)
			DFL	SYP	
3/16	1 (25.4)	1-3/4 (44.5)	540 (2.4)	-	69,000 (475)
	1-1/2 (38.1)	1-3/4 (44.5)	820 (3.7)	-	69,000 (475)
1/4	1 (25.4)	1-3/4 (44.5)	680 (3.0)	260 (1.6)	97,000 (670)
	1-1/2 (38.1)	1-3/4 (44.5)	1,050 (4.7)	735 (3.3)	97,000 (670)

1. 1. Ultimate load capacities are based on laboratory tests and must be reduced by a minimum safety factor of 3.0 or greater to determine allowable working load.
1. 2. Tests in Douglas-Fir Larch (DFL) with minimum Specific Gravity of 0.42 and tests in Southern Yellow Pine (SYP) with minimum Specific Gravity of 0.55; screws oriented tangential to wood grain.

STRENGTH DESIGN INFORMATION

Installation Table for UltraCon+ in Concrete[1]

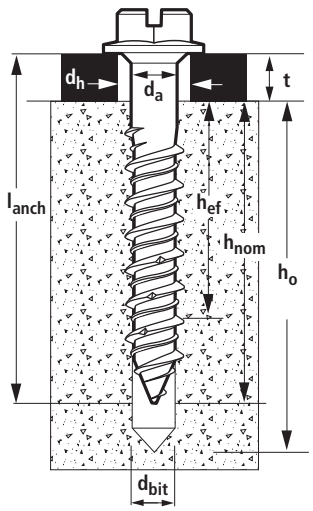
CODE LISTED
ICC-ES ESR-3068

Anchor Property/Setting Information	Notation	Units	3/16	1/4
Nominal outside anchor diameter	d_a	in. (mm)	0.145 (3.7)	0.185 (4.7)
Nominal drill bit diameter	d_{bit}	in. (mm)	5/32 UltraCon+ Bit	3/16 UltraCon+ Bit
UltraCon+ bit tolerance range	-	in.	0.170 to 0.176	0.202 to 0.206
Minimum nominal embedment depth	h_{nom}	in. (mm)	1-3/4 (44)	1-3/4 (44)
Effective embedment	h_{ef}	in. (mm)	1.23 (31)	1.23 (31)
Minimum hole depth	h_{hole}	in. (mm)	h_{nom} + 1/4 (6.4)	h_{nom} + 1/4 (6.4)
Minimum concrete member thickness	h_{min}	in. (mm)	3-1/4 (83)	3-1/4 (83)
Minimum overall anchor length[2]	ℓ_{anch}	in. (mm)	2-1/4 (57)	2-1/4 (57)
Minimum edge distance	c_{min}	in. (mm)	1-3/4 (44)	1-3/4 (44)
Minimum spacing distance	s_{min}	in. (mm)	1 (25)	2 (51)
Maximum manual installation torque	$T_{inst,max}$	ft-lbs	3	5
Maximum powered installation torque	T_{screw}	ft-lbs	Not applicable using UltraCon+ installation socket tool	
Phillips bit size (No.)	-	-	2	3

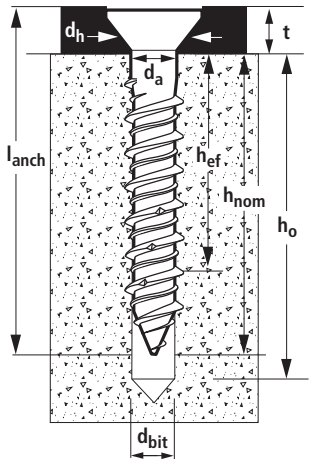
For SI: 1 inch = 25.4 mm, 1 ft-lbf = 1.356 N-m.

1. The Information presented in this table is to be used in conjunction with the design criteria of ACI 318 (-19 and -14) Chapter 17 or ACI 318-11 Appendix D, as applicable.
2. The minimum overall anchor length for the hex head versions can be 1.75-inch (44 mm) provided the fixture does not exceed 0.036-inch (0.91mm) in thickness.

UltraCon+ Anchor Detail



Hex Head



Flat Head

Tension Design Information for UltraCon+ Anchor in Concrete[1,2]

CODE LISTED
ICC-ES ESR-3068

Design Characteristic	Notation	Units	Nominal Anchor Size (Inch)	
			3/16	1/4
Anchor category	1,2 or 3	-	1	1
Nominal embedment depth	h_{nom}	in. (mm)	1-3/4 (44)	1-3/4 (44)
STEEL STRENGTH IN TENSION[4]				
Minimum specified ultimate tensile strength (neck)	f_{uta}	ksi (N/mm^2)	100 (689)	100 (689)
Effective tensile stress area (neck)	$A_{se,N}$	in^2 (mm^2)	0.0162 (10.4)	0.0268 (17.3)
Steel strength in tension[8]	N_{sa}	lb (kN)	1,620 (7.2)	2,680 (12.0)
Reduction factor for steel strength[3]	ϕ	-	0.65	
CONCRETE BREAKOUT STRENGTH IN TENSION[7]				
Effective embedment	h_{ef}	in. (mm)	1.23 (31.2)	1.23 (31.2)
Effectiveness factor for concrete breakout	k_{uncr}	-	24	24
Modification factor for cracked and uncracked concrete[5]	$\Psi_{c,N}$	-	1.0 See note 5	1.0 See note 5
Critical edge distance	c_{ac}	in. (mm)	3 (76.2)	3 (76.2)
Reduction factor for concrete breakout strength[3]	ϕ	-	0.65 (Condition B)	
PULLOUT STRENGTH IN TENSION[7]				
Characteristic pullout strength, uncracked concrete (2,500 psi)[6]	$N_{p,uncr}$	lb (kN)	635 (2.8)	940 (4.2)
Reduction factor for pullout strength[3]	ϕ	-	0.65 (Condition B)	

For SI: 1 inch = 25.4 mm, 1 ksi = 6.895 N/mm^2, 1 lbf = 0.0044 kN.

1. The data in this table is intended to be used with the design provisions of ACI 318 (-19 and -14) Chapter 17 or ACI 318-11 Appendix D, as applicable.
2. Installation must comply with published instructions and details.
3. All values of ϕ were determined from the load combinations of IBC Section 1605.2, ACI 318 (-19 and -14) Section 5.2 or ACI 318-11 Section 9.2, as applicable. If the load combinations of ACI 318-11 Appendix C are used, the appropriate value of ϕ must be determined in accordance with ACI 318-11 D.4.4. For reinforcement that meets ACI 318 (-19 and -14) Chapter 17 or ACI 318-11 Appendix D, as applicable, requirements for Condition A, see ACI 318 (-19 and -14) 17.3.3 or ACI 318-11 D. 4.3, as applicable, for the appropriate ϕ factor.
4. The UltraCon+ anchor is considered a brittle steel element as defined by ACI 318-14 2.3 or ACI 318-11 D.1, as applicable.
5. For all design cases use $\Psi_{c,N} = 1.0$. The appropriate effectiveness factor for uncracked concrete (k_{uncr}) must be used.
6. For all design cases use $\Psi_{c,P} = 1.0$. For the calculation of $N_{p,uncr}$, the nominal pullout strength can be adjusted by calculation according to:
   $N_{pn,f'c} = N_{p,uncr} \left(\frac{f'c}{2,500}\right)^n$ (lbs, psi), $N_{pn,f'c} = N_{p,uncr} \left(\frac{f'c}{17.2}\right)^n$ (N,MPa)
   Where f'c is the specified concrete compressive strength and whereby the exponent $n = 0.3$ for the 3/16-inch-diameter (4.8mm) anchors, $n = 0.4$ for 1/4-inch-diameter (6.4mm) anchors.
7. Anchors are permitted to be used in lightweight concrete provided the modification factor λ_a equal to 0.8λ is applied to all values of $\sqrt{f'c}$ affecting N_n and V_n. λ shall be determined in accordance with the corresponding version of ACI 318.
8. Tabulated values for steel strength in tension must be used for design.

Shear Design Information for UltraCon+ Anchor in Concrete[1,2]

CODE LISTED
ICC-ES ESR-3068

Design Characteristic	Notation	Units	Nominal Anchor Diameter	
			3/16"	1/4"
Anchor category	1, 2 or 3	-	1	1
Nominal embedment depth	h_{nom}	in. (mm)	1-3/4 (44)	1-3/4 (44)
STEEL STRENGTH IN SHEAR[4]				
Steel strength in shear[5]	V_{sa}	lb (kN)	810 (3.6)	1,180 (5.3)
Reduction factor for steel strength[3]	ϕ	-	0.60	
CONCRETE BREAKOUT STRENGTH IN SHEAR[6]				
Load bearing length of anchor	ℓ_e	in. (mm)	1.23 (32)	1.23 (32)
Nominal anchor diameter	d_a	in. (mm)	0.145 (3.7)	0.185 (4.7)
Reduction factor for concrete breakout[3]	ϕ	-	0.70 (Condition B)	
PRYOUT STRENGTH IN SHEAR[6]				
Coefficient for pryout strength	k_{cp}	-	1.0	1.0
Effective embedment	h_{ef}	in. (mm)	1.23 (31.2)	1.23 (31.2)
Reduction factor for pryout strength[3]	ϕ	-	0.70 (Condition B)	

For SI: 1 inch = 25.4 mm, 1 lbf = 0. 0044 kN.

1. The data in this table is intended to be used with the design provisions of ACI 318 (-19 and -14) Chapter 17 or ACI 318-11 Appendix D, as applicable.
2. Installation must comply with published instructions and details.
3. All values of ϕ were determined from the load combinations of IBC Section 1605.2 , ACI 318 (-19 and -14) Section 5.2 or ACI 318-11 Section 9.2, as applicable. If the load combinations of ACI 318-11 Appendix C are used, 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 318-19 17.5.3, ACI 318-14 17.3.3 or ACI 318-11 D. 4.3, as applicable, for the appropriate ϕ factor.
4. The UltraCon+ anchor is considered a brittle steel element as defined by ACI 318 (-19 and -14) 2.3 or ACI 318-11 D.1, as applicable.
5. Tabulated values for steel strength in shear must be used for design.
6. Anchors are permitted to be used in lightweight concrete provided the modification factor λ_a equal to 0.8λ is applied to all values of $\sqrt{f'c}$ affecting N_n and V_n. λ shall be determined in accordance with the corresponding version of ACI 318.

DESIGN STRENGTH TABLES (SD)

Tension and Shear Design Strengths for UltraCon+ 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	
		ϕNn Tension (lbs.)	ϕVn Shear (lbs.)	ϕNn Tension (lbs.)	ϕVn Shear (lbs.)	ϕNn Tension (lbs.)	ϕVn Shear (lbs.)	ϕNn Tension (lbs.)	ϕVn Shear (lbs.)	ϕNn Tension (lbs.)	ϕVn Shear (lbs.)
3/16	1-3/4	415	485	435	485	475	485	535	485	585	485
1/4	1-3/4	610	710	655	710	735	710	865	710	975	710

■ - Steel Strength Controls ■ - Concrete Breakout Strength Controls ■ - Anchor Pullout/Pryout Strength Controls

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:
   - $_{a1}$ is greater than or equal to the critical edge distance, c_{ac} (table values based on $c_{a1} = c_{ac}$).
   - $_{a2}$ is greater than or equal to 1.5 times c_{a1}.

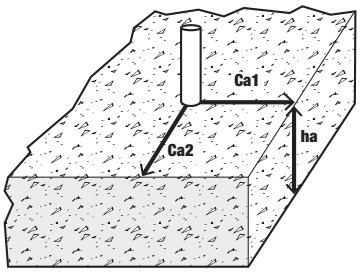
2- Calculations were performed according to ACI 318 (-19 and -14), Chapter 17. The load level corresponding to the controlling failure mode is listed. (e.g. For tension: steel, concrete breakout and pullout; For shear: steel, concrete breakout and pryout). Furthermore, the capacities for concrete breakout 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 (ø) were based on ACI 318 (-19 and -14), Section 5.3 for load combinations. Condition B is assumed.

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 (-19 and -14), Chapter 17.

6- Interpolation is not permitted to be used with the tabular values. For intermediate base material compressive strengths please see ACI 318 (-19 and -14), Chapter 17. For other design conditions including seismic considerations please see ACI 318 (-19 and -14), Chapter 17.



ORDERING INFORMATION

Item #	Description	Package Size
3802	3/16 (1/4 HEX) X 1-1/4 HEX HEAD MASONRY SCREW BLUE (INCLUDES AN INSTALLATION DRILL BIT)	100 PER BOX
3802J	3/16 (1/4 HEX) X 1-1/4 HEX HEAD MASONRY SCREW BLUE (INCLUDES AN INSTALLATION DRILL BIT)	100 PER JAR
3803	3/16 (1/4 HEX) X 1-3/4 HEX HEAD MASONRY SCREW BLUE (INCLUDES AN INSTALLATION DRILL BIT)	100 PER BOX
3803J	3/16 (1/4 HEX) X 1-3/4 HEX HEAD MASONRY SCREW BLUE (INCLUDES AN INSTALLATION DRILL BIT)	100 PER JAR
3804	3/16 (1/4 HEX) X 2-1/4 HEX HEAD MASONRY SCREW BLUE (INCLUDES AN INSTALLATION DRILL BIT)	100 PER BOX
3804J	3/16 (1/4 HEX) X 1-3/4 HEX HEAD MASONRY SCREW BLUE (INCLUDES AN INSTALLATION DRILL BIT)	100 PER JAR
3805	3/16 (1/4 HEX) X 1-3/4 HEX HEAD MASONRY SCREW BLUE (INCLUDES AN INSTALLATION DRILL BIT)	100 PER BOX
3805J	HEX HEAD MASONRY SCREW BLUE 3/16 X 2-3/4	100 PER JAR
3806	HEX HEAD MASONRY SCREW BLUE 3/16 X 3-1/4	100 PER BOX
3807	HEX HEAD MASONRY SCREW BLUE 3/16 X 3-3/4	100 PER BOX
3808	HEX HEAD MASONRY SCREW BLUE 3/16 X 4	100 PER BOX
3902	1/4 (5/16 HEX) X 1-1/4 HEX HEAD MASONRY SCREW BLUE (INCLUDES AN INSTALLATION DRILL BIT)	100 PER BOX
3902J	1/4 (5/16 HEX) X 1-1/4 HEX HEAD MASONRY SCREW BLUE (INCLUDES AN INSTALLATION DRILL BIT)	100 PER JAR
3903	1/4 (5/16 HEX) X 1-3/4 HEX HEAD MASONRY SCREW BLUE (INCLUDES AN INSTALLATION DRILL BIT)	100 PER BOX
3903J	1/4 (5/16 HEX) X 1-3/4 HEX HEAD MASONRY SCREW BLUE (INCLUDES AN INSTALLATION DRILL BIT)	100 PER JAR
3904	1/4 (5/16 HEX) X 2-1/4 HEX HEAD MASONRY SCREW BLUE (INCLUDES AN INSTALLATION DRILL BIT)	100 PER BOX
3904J	1/4 (5/16 HEX) X 2-1/4 HEX HEAD MASONRY SCREW BLUE (INCLUDES AN INSTALLATION DRILL BIT)	100 PER JAR
3905	1/4 (5/16 HEX) X 2-3/4 HEX HEAD MASONRY SCREW BLUE (INCLUDES AN INSTALLATION DRILL BIT)	100 PER BOX
3905J	1/4 (5/16 HEX) X 2-3/4 HEX HEAD MASONRY SCREW BLUE (INCLUDES AN INSTALLATION DRILL BIT)	100 PER JAR
3906	1/4 (5/16 HEX) X 3-1/4 HEX HEAD MASONRY SCREW BLUE (INCLUDES AN INSTALLATION DRILL BIT)	100 PER BOX
3906J	1/4 (5/16 HEX) X 3-1/4 HEX HEAD MASONRY SCREW BLUE (INCLUDES AN INSTALLATION DRILL BIT)	100 PER JAR WITH BIT
3907	1/4 (5/16 HEX) X 3-3/4 HEX HEAD MASONRY SCREW BLUE (INCLUDES AN INSTALLATION DRILL BIT)	100 PER BOX
3908	1/4 (5/16 HEX) X 4 HEX HEAD MASONRY SCREW BLUE (INCLUDES AN INSTALLATION DRILL BIT)	100 PER BOX
3810	FLAT HD MASONRY SCREW BLUE 3/16 X 1-1/4	100 PER BOX
3810J	FLAT HD MASONRY SCREW BLUE 3/16 X 1-1/4	100 PER JAR
3811	FLAT HD MASONRY SCREW BLUE 3/16 X 1-3/4	100 PER BOX
3811J	FLAT HD MASONRY SCREW BLUE 3/16 X 1-3/4	100 PER JAR
3813	FLAT HD MASONRY SCREW BLUE 3/16 X 2-1/4	100 PER BOX
3813J	FLAT HD MASONRY SCREW BLUE 3/16 X 2-1/4	100 PER JAR
3814	FLAT HD MASONRY SCREW BLUE 3/16 X 2-3/4	100 PER BOX
3814J	FLAT HD MASONRY SCREW BLUE 3/16 X 2-3/4	100 PER JAR
3815	FLAT HD MASONRY SCREW BLUE 3/16 X 3-1/4	100 PER BOX
3816	FLAT HD MASONRY SCREW BLUE 3/16 X 3-3/4	100 PER BOX
3910	FLAT HD MASONRY SCREW BLUE 1/4 X 1-1/4	100 PER BOX
3910J	FLAT HD MASONRY SCREW BLUE 1/4 X 1-1/4	100 PER JAR
3911	FLAT HD MASONRY SCREW BLUE 1/4 X 1-3/4	100 PER BOX
3911J	FLAT HD MASONRY SCREW BLUE 1/4 X 1-3/4	100 PER JAR
3913	FLAT HD MASONRY SCREW BLUE 1/4 X 2-1/4	100 PER BOX
3913J	FLAT HD MASONRY SCREW BLUE 1/4 X 2-1/4	100 PER JAR
3912	FLAT HD MASONRY SCREW BLUE 1/4 X 2-3/4	100 PER BOX
3912J	FLAT HD MASONRY SCREW BLUE 1/4 X 2-3/4	100 PER JAR
3914	FLAT HD MASONRY SCREW BLUE 1/4 X 3-1/4	100 PER BOX
3915	FLAT HD MASONRY SCREW BLUE 1/4 X 3-3/4	100 PER BOX
3916	FLAT HD MASONRY SCREW BLUE 1/4 X 4	100 PER BOX
3917	FLAT HD MASONRY SCREW BLUE 1/4 X 5	100 PER BOX

GENERAL INFORMATION

ULTRACON+®

Concrete Screw Anchor

PRODUCT DESCRIPTION

The UltraCon+ fastening system is a complete family of screw anchors for light to medium duty applications in concrete, masonry block, brick, and wood base materials. The UltraCon+ is fast and easy to install and provides a neat, finished appearance. The UltraCon+ screw anchor is engineered with matched tolerance drill bits and installation tools designed to meet the needs of the user and also provide optimum performance. The UltraCon+ features a gimlet point for self-drilling into wood base materials without pre-drilling.
The UltraCon+ screw anchor is available in carbon steel with a Stalgard coating in several colors. Head styles include a slotted hex washer head, phillips flat head.

GENERAL APPLICATIONS AND USES

- Window and door frames
- Shutters and guards
- Lighting fixtures
- Thresholds
- Joint flashing
- Screened enclosures

FEATURES AND BENEFITS

+ Available in several head styles
+ Several colors and finishes to match application
+ Removable (reusable in wood)
+ Gimlet point for self drilling into wood
+ Does not exert expansion forces
+ No hole spotting required
+ Good corrosion protection with Stalgard coating
+ High-low thread design for greater stability and grip

APPROVALS AND LISTINGS

- International Code Council, Evaluation Service (ICC-ES), ESR-3068 for uncracked concrete, ESR-3196 for masonry, ESR-3042 for wood, and ESR-3213 for chemically treated lumber
- Code compliant with the International Building Code/International Residential Code: 2021 IBC/IRC, 2018 IBC/IRC, 2015 IBC/IRC, and 2012 IBC/IRC
- Tested in accordance with ACI 355.2 and ICC-ES AC193 (including ASTM E488) for use in concrete, ICC-ES AC106 for use in masonry, ICC-ES AC233 for use in wood, and ICC-ES AC257 for use in pressure treated lumber
- Evaluated and qualified by an accredited independent testing laboratory for reliability against brittle failure, e.g. hydrogen embrittlement
- City of Los Angeles, LABC Supplement (within ICC-ES evaluation reports)
- Miami-Dade County Notice of Acceptance (NOA) No. 21-0113.01
- Florida Statewide Approval FL29080

GUIDE SPECIFICATIONS

CSI Divisions: 03 16 00 - Concrete Anchors, 04 05 19.16 - Masonry Anchors, 05 05 19 - Post-Installed Concrete Anchors and 06 05 23 - Wood, Plastic, and Composite Fastenings.

MATERIAL SPECIFICATIONS

Anchor Component	Specification
Anchor Body	Case hardened carbon steel
Coating/Plating/Finish	Stalgard® (various colors) 1000 hour rating for ASTM B117 salt spray test

SECTION CONTENTS

General Information.....1
Material Specifications.....1
Installation Specifications.....2
Installation Instructions.....3
Performance Data (ASD).....4
Strength Design Information.....8
Design Strength Tables (SD).....10
Ordering Information.....11

ULTRACON+

HEAD STYLES

- Slotted Hex Washer Head
- Phillips Flat Head

ANCHOR MATERIALS

- Carbon Steel with Stalgard Coating

ANCHOR SIZE RANGE (TYP.)

- 3/16" and 1/4" diameters in various lengths

SUITABLE BASE MATERIALS

- Normal-weight Concrete
- Lightweight Concrete
- Grouted Concrete Masonry
- Hollow Concrete Masonry (CMU)
- Solid Brick Masonry
- Wood

CODE LISTED ICC-ES ESR-3068 UNCRACKED CONCRETE

CODE LISTED ICC-ES ESR-3196 MASONRY

CODE LISTED ICC-ES ESR-3042 WOOD-TO-WOOD

CODE LISTED ICC-ES ESR-3213 CHEMICALLY TREATED LUMBER

MIAMI-DADE COUNTY APPROVED

INSTALLATION SPECIFICATIONS

UltraCon+ Carbon Steel Hex Head

Dimension	Nominal Anchor Diameter, d	
	3/16"	1/4"
UltraCon+ Drill Bit Size, d_{bit} (in.)	5/32"	3/16"
Typ. Fixture Clearance Hole, d_h (in.)	1/4"	5/16"
Head Height (in.)	7/64"	9/64"
Hex Head Wrench/Socket Size	1/4"	5/16"
Washer O.D., d_w (in.)	11/32"	13/32"
Washer Thickness, (in.)	1/32"	1/32"

UltraCon+ Carbon Steel Flat Head

Dimension	Nominal Anchor Diameter, d	
	3/16"	1/4"
UltraCon+ Drill Bit Size, d_{bit} (in.)	5/32"	3/16"
Typ. Fixture Clearance Hole, d_h (in.)	1/4"	5/16"
Phillips Head O.D., (in.)	3/8"	1/2"
Phillips Head Height, (in.)	9/64"	3/16"
Phillips Bit Size (No.)	2	3

1. For minimum nominal embedment depths, h_{nom}, see the performance data tables. The minimum hole depth, h_o, is 1/4-inch more than the selected nominal embedment depth.
2. In light gauge steel material (0.036 / 20 gauge and thinner), the clearance hole can be the same diameter as the drill bit.
3. Pre-drilling is not required for UltraCon+ screw anchors into wood base materials (but can be considered).

Head Marking

Hex Washer Head

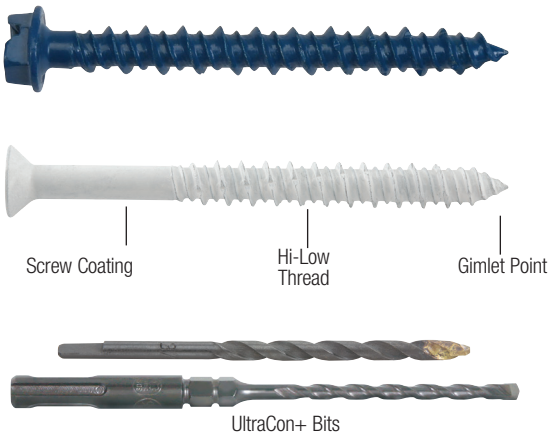
Philips Flat Head

TrimFit Flat Head

Hex Flange Head

Legend
'D' Marking = UltraCon+
'+' Symbol = Strength Design Compliant Anchor
'C' Mark = Length Identification Mark
'•' Mark = TrimFit Flat Head Identification

Matched Tolerance System



UltraCon+ Length Code Identification System

Length ID marking on head		□	A	B	C	D	E	F	G	H	I	J
Overall anchor length ℓ_{anch} (inches)	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"

Installation Table for UltraCon+ in Concrete and Masonry[1]

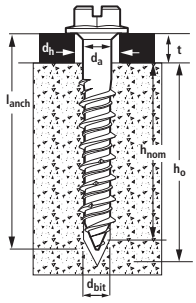
Anchor Property/Setting Information	Notation	Units	Nominal Anchor Size (in.)	
			3/16	1/4
Anchor outside diameter	d	in. (mm)	0.145 (3.7)	0.185 (4.7)
Nominal drill bit diameter	d_{bit}	in.	5/32 UltraCon+ Bit	3/16 UltraCon+ Bit
UltraCon+ bit tolerance range	-	in.	0.170 to 0.176	0.202 to 0.206
Hex head socket size	-	in.	1/4	5/16
Phillips bit size (No.)	-	-	2	3
Maximum manual installation torque	$T_{inst,max}$	ft-lbs	3	5
Maximum powered installation torque	T_{screw}	ft-lbs	Not applicable using UltraCon+ installation socket tool	

1. For minimum nominal embedment depths, h_{nom}, see the performance data tables. The minimum hole depth, h_o, is 1/4-inch more than the selected nominal embedment depth.

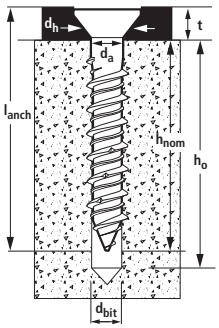
Installation Table for UltraCon+ in Wood

Anchor Property/Setting Information	Notation	Units	Nominal Anchor Size (in.)	
			3/16	1/4
Anchor outside diameter	d	in. (mm)	0.145 (3.7)	0.185 (4.7)
Nominal drill bit diameter	d_{bit}	in.	Pre-drilling is not required for UltraCon+ into wood base materials (but can be considered)	
Hex head socket size	-	in.	1/4	5/16
Phillips bit size (No.)	-	-	2	3

UltraCon+ Anchor Detail



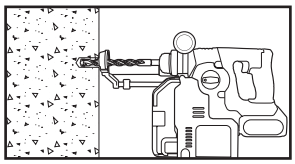
Hex Head



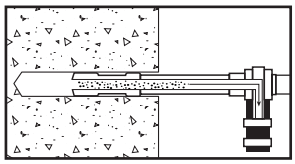
Flat Head

INSTALLATION INSTRUCTIONS

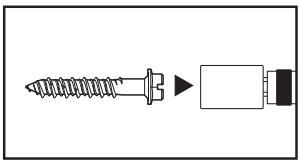
Installation Instruction for UltraCon+



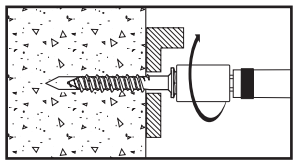
Step 1
Using the proper drill bit size, drill a hole into the base material to the required depth, h_o, which is a 1/4-inch deeper than the minimum embedment depth, h_{nom}.



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



Step 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.



Step 4
Place the point of the UltraCon+ through the fixture into the pre-drilled hole and drive the anchor in one steady continuous motion until it is fully seated at the proper embedment. The driver will automatically disengage from the head of the screw anchor.

PERFORMANCE DATA (ASD)

Ultimate and Allowable Load Capacities for UltraCon+ in Normal-Weight Concrete[1,2,3]

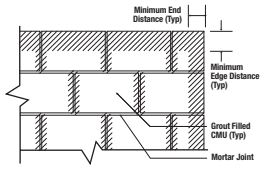
Nominal Anchor Diameter d in.	Minimum Embed. Depth h_{nom} in. (mm)	Minimum Edge Distance in. (mm)	Minimum Spacing in. (mm)	Minimum Concrete Compressive Strength											
				f'c =2,500 psi (17.3 Mpa)				f'c =3,000 psi (20.7 Mpa)				f'c =4,000 psi (27.6 Mpa)			
				Ultimate		Allowable		Ultimate		Allowable		Ultimate		Allowable	
				Tension lbs. (kN)	Shear lbs. (kN)	Tension lbs. (kN)	Shear lbs. (kN)	Tension lbs. (kN)	Shear lbs. (kN)	Tension lbs. (kN)	Shear lbs. (kN)	Tension lbs. (kN)	Shear lbs. (kN)	Tension lbs. (kN)	Shear lbs. (kN)
3/16	1-3/4 (44.4)	1 (25.4)	1 (25.4)	1,080 (4.8)	305 (1.3)	270 (1.2)	75 (0.3)	1,145 (5.0)	325 (1.4)	285 (1.3)	80 (0.4)	1,245 (5.5)	325 (1.4)	310 (1.4)	80 (0.4)
	1-3/4 (44.4)		1-1/8 (28.6)	1,190 (5.2)	305 (1.3)	295 (1.3)	75 (0.3)	1,255 (5.5)	325 (1.4)	315 (1.4)	80 (0.4)	1,370 (6.0)	325 (1.4)	340 (1.5)	80 (0.4)
	1-3/4 (44.4)		2-1/4 (57.2)	1,365 (6.0)	600 (2.6)	340 (1.5)	150 (0.7)	1,440 (6.3)	635 (2.8)	360 (1.6)	160 (0.7)	1,570 (6.9)	635 (2.8)	395 (1.7)	160 (0.7)
	1 (25.4)		3 (76.2)	580 (2.6)	435 (1.9)	145 (0.7)	110 (0.5)	615 (2.7)	460 (2.0)	155 (0.7)	115 (0.5)	670 (2.9)	460 (2.0)	170 (0.7)	115 (0.5)
	1-3/8 (34.9)			815 (3.6)	455 (2.0)	205 (0.9)	115 (0.5)	860 (3.8)	485 (2.1)	215 (1.0)	120 (0.5)	940 (4.1)	485 (2.1)	235 (1.0)	120 (0.5)
	1-3/4 (44.4)		3-3/8 (85.7)	1,365 (6.0)	600 (2.6)	340 (1.5)	150 (0.7)	1,440 (6.3)	635 (2.8)	360 (1.6)	160 (0.7)	1,570 (6.9)	635 (2.8)	395 (1.7)	160 (0.7)
	1-3/4 (44.4)	2-1/2 (63.5)	1-1/8 (28.6)	1,465 (6.4)	1,200 (5.3)	365 (1.6)	300 (1.3)	1,550 (6.8)	1,265 (5.6)	390 (1.7)	315 (1.4)	1,690 (7.4)	1,265 (5.6)	425 (1.9)	315 (1.4)
	1-3/4 (44.4)		2-1/4 (57.15)	1,465 (6.4)	1,200 (5.3)	365 (1.6)	300 (1.3)	1,550 (6.8)	1,265 (5.6)	390 (1.7)	315 (1.4)	1,690 (7.4)	1,265 (5.6)	425 (1.9)	315 (1.4)
	1 (25.4)		3 (76.2)	580 (2.6)	640 (2.8)	145 (0.7)	160 (0.7)	615 (2.7)	680 (3.0)	155 (0.7)	170 (0.8)	670 (2.9)	680 (3.0)	170 (0.7)	170 (0.8)
	1-3/8 (34.9)			1,220 (5.4)	735 (3.2)	305 (1.4)	185 (0.8)	1,290 (5.7)	775 (3.4)	325 (1.4)	195 (0.9)	1,405 (6.2)	775 (3.4)	350 (1.6)	195 (0.9)
	1-3/4 (44.4)		3-3/8 (85.7)	1,465 (6.4)	1,200 (5.3)	365 (1.6)	300 (1.3)	1,550 (6.8)	1,265 (5.6)	390 (1.7)	315 (1.4)	1,690 (7.4)	1,265 (5.6)	425 (1.9)	315 (1.4)
1/4	1-3/4 (44.4)	1 (25.4)	1 (25.4)	1,265 (5.6)	340 (1.5)	315 (1.4)	85 (0.4)	1,360 (6.0)	370 (1.6)	340 (1.5)	95 (0.4)	1,525 (6.7)	370 (1.6)	380 (1.7)	95 (0.4)
	1-3/4 (44.4)		1-1/2 (38.1)	1,265 (5.6)	385 (1.7)	315 (1.4)	95 (0.4)	1,325 (5.8)	415 (1.8)	340 (1.5)	105 (0.5)	1,525 (6.7)	415 (1.8)	380 (1.7)	105 (0.5)
	1-3/4 (44.4)		3 (76.2)	1,720 (7.6)	420 (1.8)	430 (1.9)	105 (0.5)	1,850 (8.1)	450 (2.0)	465 (2.0)	115 (0.5)	2,075 (9.1)	450 (2.0)	520 (2.3)	115 (0.5)
	1 (25.4)		4 (101.6)	770 (3.4)	495 (2.2)	195 (0.9)	125 (0.6)	830 (3.7)	530 (2.3)	210 (0.9)	135 (0.6)	930 (4.1)	530 (2.3)	235 (1.0)	135 (0.6)
	1-3/8 (34.9)			1,105 (4.9)	640 (2.8)	275 (1.2)	160 (0.7)	1,190 (5.2)	690 (3.0)	300 (1.3)	175 (0.8)	1,335 (5.9)	690 (3.0)	335 (1.5)	175 (0.8)
	1-3/4 (44.4)			1,975 (8.7)	645 (2.8)	495 (2.2)	160 (0.7)	2,120 (9.3)	690 (3.0)	530 (2.3)	175 (0.8)	2,380 (10.5)	690 (3.0)	595 (2.6)	175 (0.8)
	1-3/4 (44.4)	2-1/2 (63.5)	1-1/2 (38.1)	2,200 (9.7)	1,590 (7.0)	550 (2.4)	400 (1.8)	2,365 (10.4)	1,710 (7.5)	590 (2.6)	430 (1.9)	2,650 (11.7)	1,710 (7.5)	665 (2.9)	430 (1.9)
	1-3/4 (44.4)		3 (76.2)	2,200 (9.7)	1,635 (7.2)	550 (2.4)	410 (1.8)	2,365 (10.4)	1,755 (7.7)	590 (2.6)	440 (1.9)	2,650 (11.7)	1,755 (7.7)	665 (2.9)	440 (1.9)
	1 (25.4)		4 (101.6)	805 (3.5)	1,260 (5.6)	200 (0.9)	315 (1.4)	865 (3.8)	1,355 (6.0)	215 (1.0)	340 (1.5)	970 (4.3)	1,355 (6.0)	245 (1.1)	340 (1.5)
	1-3/8 (34.9)			1,755 (7.7)	1,750 (7.7)	440 (1.9)	440 (1.9)	1,885 (8.3)	1,885 (8.3)	470 (2.1)	470 (2.1)	2,115 (9.3)	1,885 (8.3)	530 (2.3)	470 (2.1)
	1-3/4 (44.5)			2,125 (9.4)	1,395 (6.1)	530 (2.4)	350 (1.5)	2,285 (10.1)	1,500 (6.6)	570 (2.5)	375 (1.7)	2,565 (11.3)	1,500 (6.6)	640 (2.8)	375 (1.7)

1. Tabulated Ultimate load values are for anchors installed in uncracked concrete. Concrete compressive strength must be at the specified minimum at the time of installation.
2. Allowable load capacities listed are calculated using an applied safety factor of 4.0. Consideration of safety factors of 10 or higher may be necessary depending on the application, such as life safety or overhead.
3. Linear interpolation may be used to determine allowable loads for intermediate compressive strengths.

Ultimate and Allowable Load Capacities for UltraCon+ Anchors Installed in the Face of Hollow Concrete Masonry[1,2,3]

Nominal Anchor Diameter d in.	Minimum Embed. Depth h_{nom} In. (mm)	Minimum Edge Distance In. (mm)	Minimum End Distance In. (mm)	Minimum Spacing In. (mm)	Minimum ASTM C90 Block Type	Ultimate Load		Allowable Load	
						Tension lbs. (kN)	Shear lbs. (kN)	Tension lbs. (kN)	Shear lbs. (kN)
3/16	1-1/4 (31.8)	1 (25.4)	2 (50.8)	1-1/2 (38.1)	Normal Weight	740 (3.3)	405 (1.8)	150 (0.7)	80 (0.4)
	1-1/4 (31.8)			3 (76.2)	Normal Weight	815 (3.6)	585 (2.6)	165 (0.7)	115 (0.5)
	1-1/4 (31.8)			6 (152.4)	Normal Weight	815 (3.6)	585 (2.6)	165 (0.7)	115 (0.5)
	1 (25.4)	2 (50.8)	2 (50.8)	1-1/2 (38.1)	Lightweight	300 (1.3)	460 (2.1)	55 (0.3)	90 (0.4)
	1 (25.4)			3 (76.2)	Lightweight	340 (1.5)	460 (2.1)	65 (0.3)	90 (0.4)
	1-1/4 (31.8)			1-1/2 (38.1)	Normal Weight	740 (3.3)	700 (3.1)	150 (0.7)	140 (0.6)
	1-1/4 (31.8)	2-1/2 (63.5)	2-1/2 (63.5)	1-1/8 (28.6)	Normal Weight	790 (3.5)	935 (4.1)	160 (0.7)	185 (0.8)
	1-1/4 (31.8)			2-1/4 (57.2)	Normal Weight	790 (3.5)	935 (4.1)	160 (0.7)	185 (0.8)
	1-1/4 (31.8)			6 (152.4)	Normal Weight	790 (3.5)	935 (4.1)	160 (0.7)	185 (0.8)
	1 (25.4)	3 (76.2)	3 (76.2)	1-1/2 (38.1)	Lightweight	385 (1.8)	670 (3.0)	80 (0.4)	135 (0.6)
	1 (25.4)			3 (76.2)	Lightweight	440 (2.0)	670 (3.0)	90 (0.4)	135 (0.6)
1/4	1-1/4 (31.8)	1 (25.4)	2 (50.8)	1-1/2 (38.1)	Normal Weight	725 (3.2)	475 (2.1)	145 (0.6)	95 (0.4)
	1-1/4 (31.8)			3 (76.2)	Normal Weight	940 (4.1)	800 (3.5)	190 (0.8)	160 (0.7)
	1-1/4 (31.8)			6 (152.4)	Normal Weight	725 (3.2)	690 (3.0)	145 (0.6)	140 (0.6)
	1 (25.4)	2 (50.8)	2 (50.8)	2 (50.8)	Lightweight	435 (1.9)	530 (2.4)	90 (0.4)	90 (0.4)
	1 (25.4)			4 (101.6)	Lightweight	495 (2.2)	530 (2.4)	100 (0.4)	90 (0.4)
	1-1/4 (31.8)			2 (50.8)	Normal Weight	760 (3.4)	740 (3.3)	150 (0.6)	150 (0.7)
	1-1/4 (31.8)			4 (101.6)	Normal Weight	950 (4.2)	740 (3.3)	190 (0.8)	150 (0.7)
	1-1/4 (31.8)	2-1/2 (63.5)	2-1/2 (63.5)	1-1/2 (38.1)	Normal Weight	800 (3.5)	1,220 (5.4)	160 (0.7)	245 (1.1)
	1-1/4 (31.8)			3 (76.2)	Normal Weight	880 (3.9)	1,450 (6.4)	175 (0.8)	290 (1.3)
	1-1/4 (31.8)			6 (152.4)	Normal Weight	880 (3.9)	1,450 (6.4)	175 (0.8)	290 (1.3)
	1 (25.4)	3 (76.2)	3 (76.2)	2 (50.8)	Lightweight	510 (2.3)	820 (3.6)	100 (0.4)	165 (0.7)
	1 (25.4)			4 (101.6)	Lightweight	580 (2.6)	820 (3.6)	115 (0.5)	165 (0.7)

1. Tabulated load values are for anchors installed in minimum 8-inch-wide, Type II, light weight or normal weight concrete masonry units conforming to ASTM C90 that have reached the minimum designated ultimate compressive strength at the time of installation (f'm ≥ 2,000 psi). Mortar must be a minimum Grade N.
2. Allowable load capacities listed are calculated using an applied safety factor of 5.0. Consideration of safety factors of 10 or higher may be necessary depending on the application, such as life safety or overhead.
3. Allowable shear loads into the face shell of a masonry wall may be applied in any direction.

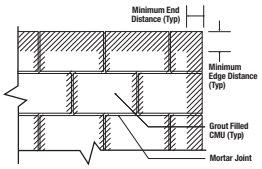


Wall Face
Permissible Anchor Locations
(Un-hatched Area)

Ultimate and Allowable Load Capacities for UltraCon+ Anchors Installed in the Face of Grout-Filled Concrete Masonry[1,2,3]

Nominal Anchor Diameter d	Minimum Embed. Depth h_{nom} in. (mm)	Minimum Edge Distance in. (mm)	Minimum End Distance in. (mm)	Minimum Spacing in. (mm)	Installation Location	Minimum ASTM C90 Block Type	Ultimate Load		Allowable Load	
							Tension lbs. (kN)	Shear lbs. (kN)	Tension lbs. (kN)	Shear lbs. (kN)
3/16	1-3/4 (44.4)	1 (25.4)	2 (50.8)	1-1/2 (38.1)	Face	Normal Weight	510 (2.2)	435 (1.9)	100 (0.4)	85 (0.4)
	1-3/4 (44.4)			3-3/8 (85.7)	Face	Normal Weight	1,415 (6.2)	435 (1.9)	285 (1.2)	85 (0.4)
	2-1/4 (57.2)			4-1/2 (114.3)	Face	Normal Weight	2,080 (9.1)	755 (3.3)	415 (1.8)	150 (0.7)
	1-3/4 (44.4)	2-1/2 (63.5)	2-1/2 (63.5)	3-3/8 (85.7)	Face	Normal Weight	1,415 (6.2)	1,105 (4.9)	285 (1.2)	220 (1.0)
	1-3/4 (44.4)			3-9/16 (90.5)	Face	Normal Weight	1,485 (6.5)	1,260 (5.5)	295 (1.3)	250 (1.1)
	2-1/4 (57.2)			4-1/2 (114.3)	Face	Normal Weight	2,080 (9.1)	1,260 (5.5)	415 (1.8)	250 (1.1)
	1-1/2 (38.1)	8 (203.2)	3 (76.2)	3 (76.2)	Mortar	Lightweight	625 (2.8)	660 (2.9)	125 (0.6)	130 (0.6)
	1-1/2 (38.1)	3 (76.2)	3 (76.2)	3 (76.2)	Face	Lightweight	410 (1.8)	600 (2.7)	80 (0.4)	120 (0.5)
1/4	1-3/4 (44.4)	1 (25.4)	2 (50.8)	1-1/2 (38.1)	Face	Normal Weight	980 (4.3)	460 (2.0)	195 (0.9)	90 (0.4)
	1-3/4 (44.4)			4 (101.6)	Face	Normal Weight	1,855 (8.2)	1,045 (4.6)	370 (1.6)	210 (0.9)
	1-3/4 (44.4)	2-1/2 (63.5)	2-1/2 (63.5)	4 (101.6)	Face	Normal Weight	1,980 (8.7)	1,450 (6.4)	395 (1.7)	290 (1.3)
	2-1/4 (57.2)			4 (101.6)	Face	Normal Weight	3,135 (13.8)	1,440 (6.3)	625 (2.8)	290 (1.3)
	1-1/2 (38.1)	8 (203.2)	3 (76.2)	4 (101.6)	Mortar	Lightweight	730 (3.3)	1,010 (4.5)	145 (0.7)	200 (0.9)
	1-1/2 (38.1)	3 (76.2)	3 (76.2)	4 (101.6)	Face	Lightweight	650 (2.9)	1,010 (4.5)	130 (0.6)	200 (0.9)

1. Tabulated load values for anchors installed in lightweight concrete masonry units are based on minimum 6-inch-wide, Type II block conforming to ASTM C90 that have reached the minimum designated ultimate compressive strength at the time of installation (f'm ≥ 1,500 psi). Mortar must be a minimum Grade N.
2. Allowable load capacities listed are calculated using an applied safety factor of 5.0. Consideration of safety factors of 10 or higher may be necessary depending on the application, such as life safety or overhead.
3. Allowable shear loads into the face shell of a masonry wall may be applied in any direction.

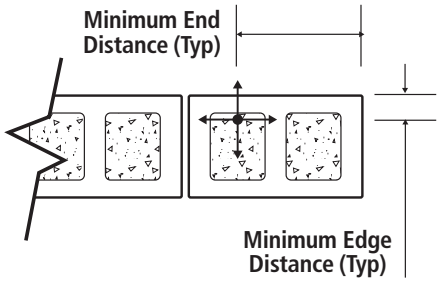


Wall Face
Permissible Anchor Locations
(Un-hatched Area)

Ultimate and Allowable Load Capacities for UltraCon+ Anchors Installed into the Tops of Grout Filled Concrete Masonry Walls[1,2,3]

Nominal Anchor Diameter d in.	Minimum Embed. h_{nom} in. (mm)	Minimum Edge Distance in. (mm)	Minimum End Distance in. (mm)	Minimum ASTM C-90 Block Type	Ultimate Loads		Allowable Loads	
					Tension lbs (kN)	Shear lbs (kN)	Tension lbs (kN)	Shear lbs (kN)
3/16	1-1/2 (38.1)	1-1/2 (38.1)	3 (76.2)	Lightweight	450 (2.0)	510 (2.3)	90 (0.4)	100 (0.5)
1/4	1-1/2 (38.1)	1-1/2 (38.1)	3 (76.2)	Lightweight	825 (3.7)	780 (3.5)	165 (0.7)	155 (0.7)

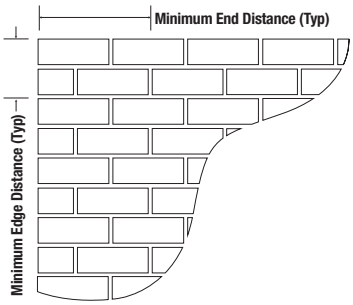
1. Tabulated load values are for 3/16-inch and 1/4-inch anchors installed in minimum 6-inch-wide, Type II, light weight concrete masonry units conforming to ASTM C 90 that have reached the minimum designated ultimate compressive strength at the time of installation (f'm ≥ 1,500 psi). Mortar must be a minimum Grade N.
2. Allowable load capacities listed are calculated using an applied safety factor of 5.0. Consideration of safety factors of 10 or higher may be necessary depending on the application, such as life safety or overhead.
3. The tabulated values are applicable to anchors installed at a critical spacing between anchors of 16 times the anchor diameter.



Allowable Load Capacities for UltraCon+ Anchors Installed in Clay Brick Masonry[1,2,3,4]

Nominal Anchor Diameter d in.	Minimum Embed. h_v in. (mm)	Minimum Edge Distance in. (mm)	Minimum End Distance in. (mm)	Installation Location	Tension lbs. (kN)	Shear lbs. (kN)
3/16	1-1/2 (38.1)	1-3/4 (44.5)	1-3/4 (44.5)	Face	380 (1.7)	165 (0.7)
				Mortar Joint	300 (1.3)	190 (0.8)
1/4				Face	605 (2.7)	270 (1.2)
				Mortar Joint	200 (0.9)	155 (0.7)

1. Tabulated load values are for anchors installed in multiple wythe, minimum Grade SW, solid clay brick masonry walls conforming to ASTM C 62. Mortar must be minimum Type N. Masonry compressive strength must be at the specified minimum at the time of installation (f'm ≥ 1,500 psi).
2. Allowable load capacities listed are calculated using and applied safety factor of 5.0. Consideration of safety factors of 10 or higher may be necessary depending upon the application such as lifesafety or overhead.
3. Allowable shear loads into the face or mortar joint of the brick masonry wall may be applied in any direction.
4. The tabulated values are applicable for anchors installed at a critical spacing between anchors of 12 times the anchor diameter.



Average Withdrawal Capacity and Average Bending Yield Moment of UltraCon+ in Wood[1,2]

Nominal Anchor Diameter d in.	Minimum Embed. h_v in. (mm)	Minimum Edge Distance in. (mm)	Withdrawal Capacity[1] lbs. (kN)		Screw Bending Yield psi (MPa)
			DFL	SYP	
3/16	1 (25.4)	1-3/4 (44.5)	540 (2.4)	-	69,000 (475)
	1-1/2 (38.1)	1-3/4 (44.5)	820 (3.7)	-	69,000 (475)
1/4	1 (25.4)	1-3/4 (44.5)	680 (3.0)	260 (1.6)	97,000 (670)
	1-1/2 (38.1)	1-3/4 (44.5)	1,050 (4.7)	735 (3.3)	97,000 (670)

1. 1. Ultimate load capacities are based on laboratory tests and must be reduced by a minimum safety factor of 3.0 or greater to determine allowable working load.
1. 2. Tests in Douglas-Fir Larch (DFL) with minimum Specific Gravity of 0.42 and tests in Southern Yellow Pine (SYP) with minimum Specific Gravity of 0.55; screws oriented tangential to wood grain.

STRENGTH DESIGN INFORMATION

Installation Table for UltraCon+ in Concrete[1]

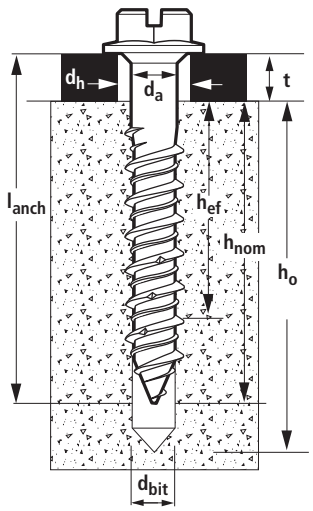
CODE LISTED
ICC-ES ESR-3068

Anchor Property/Setting Information	Notation	Units	3/16	1/4
Nominal outside anchor diameter	d_a	in. (mm)	0.145 (3.7)	0.185 (4.7)
Nominal drill bit diameter	d_{bit}	in. (mm)	5/32 UltraCon+ Bit	3/16 UltraCon+ Bit
UltraCon+ bit tolerance range	-	in.	0.170 to 0.176	0.202 to 0.206
Minimum nominal embedment depth	h_{nom}	in. (mm)	1-3/4 (44)	1-3/4 (44)
Effective embedment	h_{ef}	in. (mm)	1.23 (31)	1.23 (31)
Minimum hole depth	h_{hole}	in. (mm)	h_{nom} + 1/4 (6.4)	h_{nom} + 1/4 (6.4)
Minimum concrete member thickness	h_{min}	in. (mm)	3-1/4 (83)	3-1/4 (83)
Minimum overall anchor length[2]	ℓ_{anch}	in. (mm)	2-1/4 (57)	2-1/4 (57)
Minimum edge distance	c_{min}	in. (mm)	1-3/4 (44)	1-3/4 (44)
Minimum spacing distance	s_{min}	in. (mm)	1 (25)	2 (51)
Maximum manual installation torque	$T_{inst,max}$	ft-lbs	3	5
Maximum powered installation torque	T_{screw}	ft-lbs	Not applicable using UltraCon+ installation socket tool	
Phillips bit size (No.)	-	-	2	3

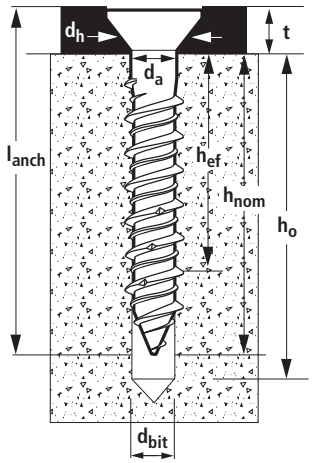
For SI: 1 inch = 25.4 mm, 1 ft-lbf = 1.356 N-m.

1. The Information presented in this table is to be used in conjunction with the design criteria of ACI 318 (-19 and -14) Chapter 17 or ACI 318-11 Appendix D, as applicable.
2. The minimum overall anchor length for the hex head versions can be 1.75-inch (44 mm) provided the fixture does not exceed 0.036-inch (0.91mm) in thickness.

UltraCon+ Anchor Detail



Hex Head



Flat Head

Tension Design Information for UltraCon+ Anchor in Concrete[1,2]

CODE LISTED
ICC-ES ESR-3068

Design Characteristic	Notation	Units	Nominal Anchor Size (Inch)	
			3/16	1/4
Anchor category	1,2 or 3	-	1	1
Nominal embedment depth	h_{nom}	in. (mm)	1-3/4 (44)	1-3/4 (44)
STEEL STRENGTH IN TENSION[4]				
Minimum specified ultimate tensile strength (neck)	f_{uta}	ksi (N/mm^2)	100 (689)	100 (689)
Effective tensile stress area (neck)	$A_{se,N}$	in^2 (mm^2)	0.0162 (10.4)	0.0268 (17.3)
Steel strength in tension[8]	N_{sa}	lb (kN)	1,620 (7.2)	2,680 (12.0)
Reduction factor for steel strength[3]	ϕ	-	0.65	
CONCRETE BREAKOUT STRENGTH IN TENSION[7]				
Effective embedment	h_{ef}	in. (mm)	1.23 (31.2)	1.23 (31.2)
Effectiveness factor for concrete breakout	k_{uncr}	-	24	24
Modification factor for cracked and uncracked concrete[5]	$\Psi_{c,N}$	-	1.0 See note 5	1.0 See note 5
Critical edge distance	c_{ac}	in. (mm)	3 (76.2)	3 (76.2)
Reduction factor for concrete breakout strength[3]	ϕ	-	0.65 (Condition B)	
PULLOUT STRENGTH IN TENSION[7]				
Characteristic pullout strength, uncracked concrete (2,500 psi)[6]	$N_{p,uncr}$	lb (kN)	635 (2.8)	940 (4.2)
Reduction factor for pullout strength[3]	ϕ	-	0.65 (Condition B)	

For SI: 1 inch = 25.4 mm, 1 ksi = 6.895 N/mm^2, 1 lbf = 0.0044 kN.

1. The data in this table is intended to be used with the design provisions of ACI 318 (-19 and -14) Chapter 17 or ACI 318-11 Appendix D, as applicable.
2. Installation must comply with published instructions and details.
3. All values of ϕ were determined from the load combinations of IBC Section 1605.2, ACI 318 (-19 and -14) Section 5.2 or ACI 318-11 Section 9.2, as applicable. If the load combinations of ACI 318-11 Appendix C are used, the appropriate value of ϕ must be determined in accordance with ACI 318-11 D.4.4. For reinforcement that meets ACI 318 (-19 and -14) Chapter 17 or ACI 318-11 Appendix D, as applicable, requirements for Condition A, see ACI 318 (-19 and -14) 17.3.3 or ACI 318-11 D. 4.3, as applicable, for the appropriate ϕ factor.
4. The UltraCon+ anchor is considered a brittle steel element as defined by ACI 318-14 2.3 or ACI 318-11 D.1, as applicable.
5. For all design cases use $\Psi_{c,N} = 1.0$. The appropriate effectiveness factor for uncracked concrete (k_{uncr}) must be used.
6. For all design cases use $\Psi_{c,P} = 1.0$. For the calculation of $N_{p,uncr}$, the nominal pullout strength can be adjusted by calculation according to:
   $N_{pn,f'c} = N_{p,uncr} \left(\frac{f'c}{2,500}\right)^n$ (lbs, psi), $N_{pn,f'c} = N_{p,uncr} \left(\frac{f'c}{17.2}\right)^n$ (N,MPa)
   Where f'c is the specified concrete compressive strength and whereby the exponent $n = 0.3$ for the 3/16-inch-diameter (4.8mm) anchors, $n = 0.4$ for 1/4-inch-diameter (6.4mm) anchors.
7. Anchors are permitted to be used in lightweight concrete provided the modification factor λ_a equal to 0.8λ is applied to all values of $\sqrt{f'c}$ affecting N_n and V_n. λ shall be determined in accordance with the corresponding version of ACI 318.
8. Tabulated values for steel strength in tension must be used for design.

Shear Design Information for UltraCon+ Anchor in Concrete[1,2]

CODE LISTED
ICC-ES ESR-3068

Design Characteristic	Notation	Units	Nominal Anchor Diameter	
			3/16"	1/4"
Anchor category	1, 2 or 3	-	1	1
Nominal embedment depth	h_{nom}	in. (mm)	1-3/4 (44)	1-3/4 (44)
STEEL STRENGTH IN SHEAR[4]				
Steel strength in shear[5]	V_{sa}	lb (kN)	810 (3.6)	1,180 (5.3)
Reduction factor for steel strength[3]	ϕ	-	0.60	
CONCRETE BREAKOUT STRENGTH IN SHEAR[6]				
Load bearing length of anchor	ℓ_e	in. (mm)	1.23 (32)	1.23 (32)
Nominal anchor diameter	d_a	in. (mm)	0.145 (3.7)	0.185 (4.7)
Reduction factor for concrete breakout[3]	ϕ	-	0.70 (Condition B)	
PRYOUT STRENGTH IN SHEAR[6]				
Coefficient for pryout strength	k_{cp}	-	1.0	1.0
Effective embedment	h_{ef}	in. (mm)	1.23 (31.2)	1.23 (31.2)
Reduction factor for pryout strength[3]	ϕ	-	0.70 (Condition B)	

For SI: 1 inch = 25.4 mm, 1 lbf = 0. 0044 kN.

1. The data in this table is intended to be used with the design provisions of ACI 318 (-19 and -14) Chapter 17 or ACI 318-11 Appendix D, as applicable.
2. Installation must comply with published instructions and details.
3. All values of ϕ were determined from the load combinations of IBC Section 1605.2 , ACI 318 (-19 and -14) Section 5.2 or ACI 318-11 Section 9.2, as applicable. If the load combinations of ACI 318-11 Appendix C are used, 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 318-19 17.5.3, ACI 318-14 17.3.3 or ACI 318-11 D. 4.3, as applicable, for the appropriate ϕ factor.
4. The UltraCon+ anchor is considered a brittle steel element as defined by ACI 318 (-19 and -14) 2.3 or ACI 318-11 D.1, as applicable.
5. Tabulated values for steel strength in shear must be used for design.
6. Anchors are permitted to be used in lightweight concrete provided the modification factor λ_a equal to 0.8λ is applied to all values of $\sqrt{f'c}$ affecting N_n and V_n. λ shall be determined in accordance with the corresponding version of ACI 318.

DESIGN STRENGTH TABLES (SD)

Tension and Shear Design Strengths for UltraCon+ 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	
		ϕNn Tension (lbs.)	ϕVn Shear (lbs.)	ϕNn Tension (lbs.)	ϕVn Shear (lbs.)	ϕNn Tension (lbs.)	ϕVn Shear (lbs.)	ϕNn Tension (lbs.)	ϕVn Shear (lbs.)	ϕNn Tension (lbs.)	ϕVn Shear (lbs.)
3/16	1-3/4	415	485	435	485	475	485	535	485	585	485
1/4	1-3/4	610	710	655	710	735	710	865	710	975	710

■ - Steel Strength Controls ■ - Concrete Breakout Strength Controls ■ - Anchor Pullout/Pryout Strength Controls

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:
   - $_{a1}$ is greater than or equal to the critical edge distance, c_{ac} (table values based on $c_{a1} = c_{ac}$).
   - $_{a2}$ is greater than or equal to 1.5 times c_{a1}.

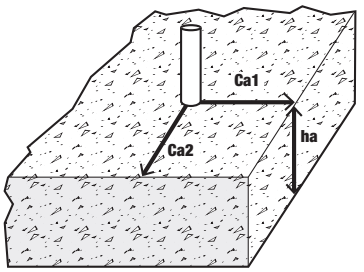
2- Calculations were performed according to ACI 318 (-19 and -14), Chapter 17. The load level corresponding to the controlling failure mode is listed. (e.g. For tension: steel, concrete breakout and pullout; For shear: steel, concrete breakout and pryout). Furthermore, the capacities for concrete breakout 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 (ø) were based on ACI 318 (-19 and -14), Section 5.3 for load combinations. Condition B is assumed.

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 (-19 and -14), Chapter 17.

6- Interpolation is not permitted to be used with the tabular values. For intermediate base material compressive strengths please see ACI 318 (-19 and -14), Chapter 17. For other design conditions including seismic considerations please see ACI 318 (-19 and -14), Chapter 17.



ORDERING INFORMATION

Item #	Description	Package Size
3802	3/16 (1/4 HEX) X 1-1/4 HEX HEAD MASONRY SCREW BLUE (INCLUDES AN INSTALLATION DRILL BIT)	100 PER BOX
3802J	3/16 (1/4 HEX) X 1-1/4 HEX HEAD MASONRY SCREW BLUE (INCLUDES AN INSTALLATION DRILL BIT)	100 PER JAR
3803	3/16 (1/4 HEX) X 1-3/4 HEX HEAD MASONRY SCREW BLUE (INCLUDES AN INSTALLATION DRILL BIT)	100 PER BOX
3803J	3/16 (1/4 HEX) X 1-3/4 HEX HEAD MASONRY SCREW BLUE (INCLUDES AN INSTALLATION DRILL BIT)	100 PER JAR
3804	3/16 (1/4 HEX) X 2-1/4 HEX HEAD MASONRY SCREW BLUE (INCLUDES AN INSTALLATION DRILL BIT)	100 PER BOX
3804J	3/16 (1/4 HEX) X 1-3/4 HEX HEAD MASONRY SCREW BLUE (INCLUDES AN INSTALLATION DRILL BIT)	100 PER JAR
3805	3/16 (1/4 HEX) X 1-3/4 HEX HEAD MASONRY SCREW BLUE (INCLUDES AN INSTALLATION DRILL BIT)	100 PER BOX
3805J	HEX HEAD MASONRY SCREW BLUE 3/16 X 2-3/4	100 PER JAR
3806	HEX HEAD MASONRY SCREW BLUE 3/16 X 3-1/4	100 PER BOX
3807	HEX HEAD MASONRY SCREW BLUE 3/16 X 3-3/4	100 PER BOX
3808	HEX HEAD MASONRY SCREW BLUE 3/16 X 4	100 PER BOX
3902	1/4 (5/16 HEX) X 1-1/4 HEX HEAD MASONRY SCREW BLUE (INCLUDES AN INSTALLATION DRILL BIT)	100 PER BOX
3902J	1/4 (5/16 HEX) X 1-1/4 HEX HEAD MASONRY SCREW BLUE (INCLUDES AN INSTALLATION DRILL BIT)	100 PER JAR
3903	1/4 (5/16 HEX) X 1-3/4 HEX HEAD MASONRY SCREW BLUE (INCLUDES AN INSTALLATION DRILL BIT)	100 PER BOX
3903J	1/4 (5/16 HEX) X 1-3/4 HEX HEAD MASONRY SCREW BLUE (INCLUDES AN INSTALLATION DRILL BIT)	100 PER JAR
3904	1/4 (5/16 HEX) X 2-1/4 HEX HEAD MASONRY SCREW BLUE (INCLUDES AN INSTALLATION DRILL BIT)	100 PER BOX
3904J	1/4 (5/16 HEX) X 2-1/4 HEX HEAD MASONRY SCREW BLUE (INCLUDES AN INSTALLATION DRILL BIT)	100 PER JAR
3905	1/4 (5/16 HEX) X 2-3/4 HEX HEAD MASONRY SCREW BLUE (INCLUDES AN INSTALLATION DRILL BIT)	100 PER BOX
3905J	1/4 (5/16 HEX) X 2-3/4 HEX HEAD MASONRY SCREW BLUE (INCLUDES AN INSTALLATION DRILL BIT)	100 PER JAR
3906	1/4 (5/16 HEX) X 3-1/4 HEX HEAD MASONRY SCREW BLUE (INCLUDES AN INSTALLATION DRILL BIT)	100 PER BOX
3906J	1/4 (5/16 HEX) X 3-1/4 HEX HEAD MASONRY SCREW BLUE (INCLUDES AN INSTALLATION DRILL BIT)	100 PER JAR WITH BIT
3907	1/4 (5/16 HEX) X 3-3/4 HEX HEAD MASONRY SCREW BLUE (INCLUDES AN INSTALLATION DRILL BIT)	100 PER BOX
3908	1/4 (5/16 HEX) X 4 HEX HEAD MASONRY SCREW BLUE (INCLUDES AN INSTALLATION DRILL BIT)	100 PER BOX
3810	FLAT HD MASONRY SCREW BLUE 3/16 X 1-1/4	100 PER BOX
3810J	FLAT HD MASONRY SCREW BLUE 3/16 X 1-1/4	100 PER JAR
3811	FLAT HD MASONRY SCREW BLUE 3/16 X 1-3/4	100 PER BOX
3811J	FLAT HD MASONRY SCREW BLUE 3/16 X 1-3/4	100 PER JAR
3813	FLAT HD MASONRY SCREW BLUE 3/16 X 2-1/4	100 PER BOX
3813J	FLAT HD MASONRY SCREW BLUE 3/16 X 2-1/4	100 PER JAR
3814	FLAT HD MASONRY SCREW BLUE 3/16 X 2-3/4	100 PER BOX
3814J	FLAT HD MASONRY SCREW BLUE 3/16 X 2-3/4	100 PER JAR
3815	FLAT HD MASONRY SCREW BLUE 3/16 X 3-1/4	100 PER BOX
3816	FLAT HD MASONRY SCREW BLUE 3/16 X 3-3/4	100 PER BOX
3910	FLAT HD MASONRY SCREW BLUE 1/4 X 1-1/4	100 PER BOX
3910J	FLAT HD MASONRY SCREW BLUE 1/4 X 1-1/4	100 PER JAR
3911	FLAT HD MASONRY SCREW BLUE 1/4 X 1-3/4	100 PER BOX
3911J	FLAT HD MASONRY SCREW BLUE 1/4 X 1-3/4	100 PER JAR
3913	FLAT HD MASONRY SCREW BLUE 1/4 X 2-1/4	100 PER BOX
3913J	FLAT HD MASONRY SCREW BLUE 1/4 X 2-1/4	100 PER JAR
3912	FLAT HD MASONRY SCREW BLUE 1/4 X 2-3/4	100 PER BOX
3912J	FLAT HD MASONRY SCREW BLUE 1/4 X 2-3/4	100 PER JAR
3914	FLAT HD MASONRY SCREW BLUE 1/4 X 3-1/4	100 PER BOX
3915	FLAT HD MASONRY SCREW BLUE 1/4 X 3-3/4	100 PER BOX
3916	FLAT HD MASONRY SCREW BLUE 1/4 X 4	100 PER BOX
3917	FLAT HD MASONRY SCREW BLUE 1/4 X 5	100 PER BOX