ATLANTIS COATING

CHARACTERISTICS

- Pilot hole in concrete needed; thread is created by the anchor during the installation process
- No special drill bit required; install using standard-sized ANSI tolerance drill bits
- Code listed under IBC/IRC in accordance with ICC-ES AC193 and ACI 355.2 for uncracked concrete.
- Qualified for static loading conditions
- Removable, leaving concrete surface flat. Ideal for temporary anchoring (e.g. formwork, bracing) or applications where fixtures may need to be moved
- Suitable when reduced edge distances or spacing required
- Atlantis coating for high corrosion resistance
- Use for medium duty loads.
- Anchor shall be installed through standard fixture holes
- Length ID code stamped on head of each anchor
- Under head serrations
- To be installed with specific setting tool

APPLICATIONS

- Window installations
- Door frames
- Exterior installation into concrete or masonry
- Interior hand rails
- Joint flashing
- HVAC strapping
- Wood headers
- Electrical equipment' shelving brackets

APPROVALS

ICC ES

ESR-5090

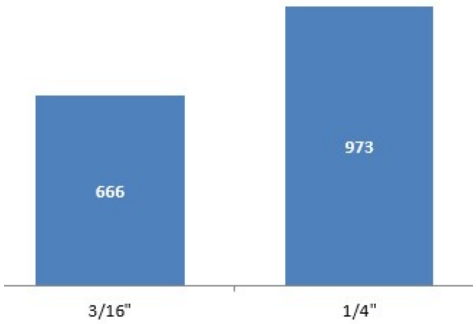
MIAMI-DADE COUNTY APPROVED

NOA 23-0815.01

Codes compliance:
IBC / IRC 2021, 2018, 2015, 2012
LABC / LARC 2023
CBC / CRC 2022
FBC 2023

BASE MATERIALS

ALLOWABLE TENSION LOADS IN CONCRETE 22500 psi with α=1,40 [lbf]



SIZES

3/16" – 1/4"

DRILL CONDITION

Dry

1. RANGE

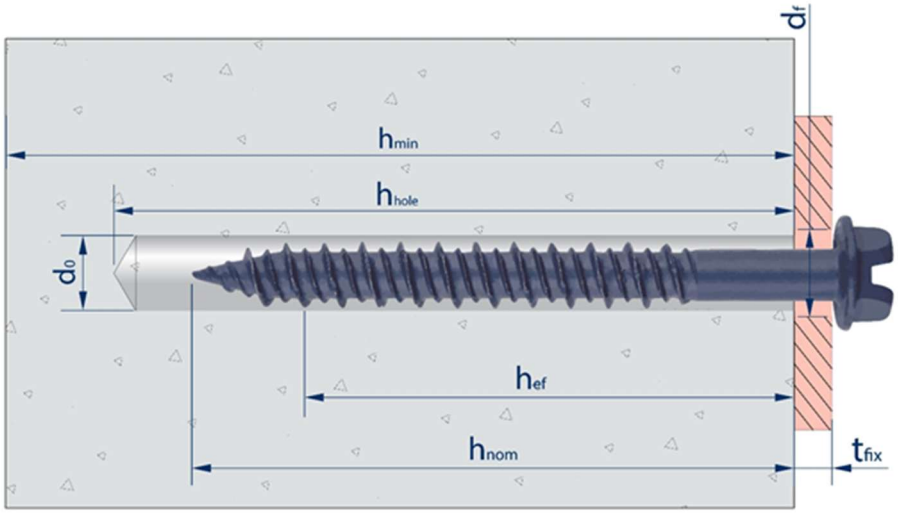
ITEM	CODE	SIZES	PHOTO	COMPONENTS	MATERIAL
1	**BCH**	3/16" – 1/4"		Screw	Carbon steel Coating: blue, white Atlantis
2	**BCF**				Carbon steel Coating: blue, white Atlantis

2. ACCESORIES

ITEM	CODE	PHOTO	DESCRIPTION
1	**DOBCH**		Blu-con setting tool, composed by: • Drill bit 3/16 • Drill bit 1/4 • Socket 1/4 • Socket 5/16 • Phillips PH2 tip • Phillips PH3 tip • Allen key • Adaptor • Sleeve extender
2	**MOBOMBA**		Hand pump / Dust blower.

3. INTALLATION DATA

3.1 INSTALLATION DRAWING



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3.2 MARK ON HEAD

Length ID marking on head	Units	B	C	D	E	F	G	H	I	J
Length of the anchor min ≥	in	2	2 1/2	3	3 1/2	4	4 1/2	5	5 1/2	6
Length of the anchor max <	in	2 1/2	3	3 1/2	4	4 1/2	5	5 1/2	6	6 1/2

3.3 INSTALLATION PARAMETERS

Parameter	Symbol	Units	3/16"	1/4"
ICC approved			✓	✓
Nominal outside diameter	d_a	in (mm)	3/16 (4.8)	1/4 (6.4)
Drill bit nominal diameter	d_{bit}	in (mm)	5/32 (4.0)	3/16 (4.8)
Nominal embedment depth	h_{nom}	in (mm)	2.00 (51)	2.10 (53)
Effective embedment depth	h_{ef}	in (mm)	1.45 (37)	1.45 (37)
Minimum hole depth	h_{hole}	in (mm)	h_{nom} + ¼ (h_{nom} + 6.3)	h_{nom} + ¼ (h_{nom} + 6.3)
Maximum baseplate clearance hole diameter	d_h	in (mm)	7/32 (5.6)	9/32 (7,1)
Installation torque	T_{inst}	(--)	Use Index Blu-con setting tool. See section 3	
Minimum concrete thickness	h_{min}	in (mm)	3 1/2 (89)	3 1/2 (89)
Critical edge distance	c_{ac}	in (mm)	3 (76)	3 (76)
Minimum spacing	s_{min}	in (mm)	2 1/2 (64)	2 1/2 (64)
Minimum edge distance	c_{min}	in (mm)	2 (51)	2 (51)
Minimum overall anchor length	ℓ_{anc}	in (mm)	2 1/8 (54)	2 1/4 (57)
Fixture thickness	t_{fix}	in (mm	L – 2 (L – 51)	L – 2.1 (L – 53)
Spanner	Hexagonal	SW	1/4	5/16
	Countersunk		PH 2	PH3

3.4 INSTALLATION PROCEDURE

	**1. DRILLING** Drill a hole into the base material of the correct diameter using a drill bit that meets the requirements of ANSI B212.15. Drill hole ¼" deeper than fastener's engagement
	**2. BLOW AND CLEAN** Remove dust and debris from hole using a hand pump, compressed air or a vacuum to remove loose particles left from drilling.
	**3. INSTALL** Place Blu-con setting tool with drive socket over the drill bit
	**4. APPLY THE TORQUE** Using drill, hammer mode disabled, drive screw through fixture into hole until nut driver spins free from head of screw.

5. DESIGN INFORMATION

5.1 TENSION DESIGN INFORMATION

Design characteristic	Notation	Units	Nominal anchor diameter	
			3/16"	1/4"
Nominal embedment depth	h_{nom}	in (mm)	2.00 (51)	2.10 (53)
Anchor category	1, 2 or 3	-	2	1
STEEL STRENGTH IN TENSION (ACI 318-14 17.4.1 or ACI 318-11 D.5.1)				
Minimum specified ultimate tensile strength	f_{uta}	psi (N/mm^2)	125,000 (862)	125,000 (862)
Minimum specified yield strength	f_y	psi (N/mm^2)	100,000 (689)	100,000 (689)
Effective tensile stress area	$A_{se,N}$	in^2 (mm^2)	0.0131 (8,5)	0.0233 (15,0)
Steel strength in tension[3]	N_{sa}	lb (kN)	1,638 (7,28)	2,913 (12,96)
Safety factor for steel strength[4]	Φ_{sa}	-	0.65	
PULLOUT STRENGTH IN TENSION (ACI 318-14 17.4.3 or ACI 318-11 D.5.3)				
Characteristic pullout strength (2,500 psi)[6]	$N_{p,uncr}$	lb (kN)	1,695 (7.54)	2,153 (9,58)
Normalization exponent	n	-	0.07	0.29
Strength reduction factor for pullout strength in tension[4]	Φ_{cb}	-	0.55	0.65
CONCRETE BREAKOUT STRENGTH IN TENSION (ACI 318-14 17.4.2 or ACI 318-11 D.5.2)				
Effective embedment	h_{ef}	in (mm)	1.45 (37)	1.45 (37)
Effectiveness factor	k_{uncr}	-	24	24
Critical edge distance	c_{ac}	in (mm)	3 (76)	3 (76)
Strength reduction factor for concrete strength in tension[4]	Φ_p	-	0.55	0.65
Axial stiffness in service load range[7]	β_{uncr}	lb/in (kN/mm)	91,231 (15,977)	83,502 (14,623)

For SI: 1 inch = 25.4 mm, 1 in^2 = 645 mm^2, 1 psi = 0,00689 N/mm^2; 1 lb = 0,00445 kN, 1 lbf/in = 0,175 kN/mm

1. The data in this table is intended to be used with the design provisions of ACI 318-14 Chapter 17 or ACI 318 Appendix D, as applicable; for anchors resisting seismic load combinations the additional requirements of ACI 318-14 17.2.3 or ACI 318 D.3.3, as applicable, shall apply.
2. Installation must comply with published instructions and details.
3. Tabulated values for steel strength in tension are based on test results per ACI 355.2 and must be used for design.
4. All values of Φ were determined from the load combinations of IBC Section 1605.2, ACI 318-14 Section 5.3 or ACI 318-11 Section 9.2, as applicable (condition B). If the load combinations of ACI 318-11 Appendix C are used, then the appropriate value of Φ must be determined in accordance with ACI 318-11 D.4.4. For reinforcement that meets ACI 318-14 Chapter 17 or ACI 318 Appendix D, as applicable, requirements for Condition A, see ACI 318-14 17.3.3 or ACI 318-11 D.4.3, as applicable, for the appropriate Φ factor when the load combinations of IBC Section 1605.2, ACI 318-14 Section 5.3 or ACI 318-11 Section 9.2, as applicable, are used.
5. Blu-con concrete screw is considered a ductile steel element in tension as defined by ACI 318-14 2.3 or ACI 318 D.1, as applicable.
6. For concrete compressive strength greater than 2,500 psi, N_{pn} = (pullout strength value from table)*(specified concrete compressive strength/2500)^n
7. Mean values shown; actual stiffness varies considerable depending on concrete strength, loading and geometry of application.
8. Anchors are permitted to be used in sand-lightweight concrete provided that N_b and N_{pn} are multiplied by a factor of 0.60.

5.2 SHEAR DESIGN INFORMATION

Design characteristic	Notation	Units	Nominal anchor diameter	
			3/16"	1/4"
Nominal embedment depth	h_{nom}	in (mm)	2.00 (51)	2.10 (53)
Anchor category	1, 2 or 3	-	2	1
STEEL STRENGTH IN SHEAR (ACI 318-14 17.5.1 or ACI 318-11 D.6.1)				
Minimum specified ultimate tensile strength	f_{uta}	psi (N/mm^2)	125,000 (862)	125,000 (862)
Minimum specified yield strength	f_y	psi (N/mm^2)	100,000 (689)	100,000 (689)
Effective tensile stress area	$A_{se,V}$	in^2 (mm^2)	0.0131 (8,5)	0.0233 (15.0)
Steel strength in shear[3]	V_{sa}	lb (kN)	844 (3.75)	1,653 (7.40)
Safety factor for steel strength[3]	Φ_{sa}	-	0.60	
CONCRETE BREAKOUT STRENGTH IN SHEAR (ACI 318-14 17.5.2 or ACI 318-11 D.6.2)				
Nominal anchor diameter	d_a	in (mm)	3/16 (4.8)	1/4 (6.4)
Load bearing length of anchor	ℓ_e	in (mm)	1.45 (37)	1.45 (37)
Strength reduction factor for concrete strength in shear[5]	Φ_{cb}	-	0.70	
PRYOUT STRENGTH IN SHEAR (ACI 318-14 17.5.3 or ACI 318-11 D.6.3)				
Coefficient for pryout strength	k_{cp}	-	1.0	1.0
Effective embedment depth	h_{ef}	in (mm)	2.00 (51)	2.10 (53)
Reduction factor for pryout strength in shear[5]	Φ_{cp}	-	0.70	

For SI: 1 inch = 25.4 mm, 1 in^2 = 645 mm^2, 1 psi = 0,00689 N/mm^2; 1 lb = 0,00445 kN

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

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

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

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

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

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

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

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

Tension and shear design strengths for Blu-con in uncracked concrete

Nominal anchor diameter (in.)	Nominal embed. h_{nom} (in.)	Minimum concrete compressive strength									
		f'_c = 2,500 psi		f'_c = 3,000 psi		f'_c = 4,000 psi		f'_c = 6,000 psi		f'_c = 8,000 psi	
		ΦN_n Tension (lbs.)	ΦV_n Shear (lbs.)	ΦN_n Tension (lbs.)	ΦV_n Shear (lbs.)	ΦN_n Tension (lbs.)	ΦV_n Shear (lbs.)	ΦN_n Tension (lbs.)	ΦV_n Shear (lbs.)	ΦN_n Tension (lbs.)	ΦV_n Shear (lbs.)
3/16	2.00	932	506	944	506	963	506	991	506	1,011	506
1/4	2.10	1,362	992	1,475	992	1,604	992	1,804	992	1,893	992
Color code:		Pullout		Concrete / pryout		Steel					

Converted allowable loads for Blu-con

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

To facilitate the translation of LRFD characteristic values to ASD values, a scenario of dead load and live load level is used to conservatively address the most common application as follows: 50% dead load; 50% live load. ACI 318-14 Equation (5.3.1b) provides a conversion factor of 1,40 which is divided into the LRFD characteristic resistances and multiplied by a ϕ factor (according to the failure type) to determine an equivalent ASD load.

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

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

Converted allowable loads for Blu-con in uncracked concrete

Nominal anchor diameter (in.)	Nominal embed. h_{nom} (in.)	Minimum concrete compressive strength									
		f'_c = 2,500 psi		f'_c = 3,000 psi		f'_c = 4,000 psi		f'_c = 6,000 psi		f'_c = 8,000 psi	
		ΦN_n Tension (lbs.)	ΦV_n Shear (lbs.)	ΦN_n Tension (lbs.)	ΦV_n Shear (lbs.)	ΦN_n Tension (lbs.)	ΦV_n Shear (lbs.)	ΦN_n Tension (lbs.)	ΦV_n Shear (lbs.)	ΦN_n Tension (lbs.)	ΦV_n Shear (lbs.)
3/16	2.00	666	362	674	362	688	362	708	362	722	362
1/4	2.10	973	708	1,054	708	1,146	708	285	708	1,352	708

1. Allowable load values are calculated using a conversion factor, α, from factored design strengths.
2. Tabulated allowable load values assume 30% dead load and 70% live load, with controlling load combination 1,2D + 1,6L. Calculated weighted average for the conversion factor, α = 1,2*(0,5) + 1,6*(0,5) = 1,40.