

GENERAL INFORMATION

BANG-IT®+

Concrete Inserts

PRODUCT DESCRIPTION

Bang-It+ concrete inserts are designed for installation in and through composite steel deck (i.e. "pan-deck") used to support newly poured concrete floors or roof slabs.

Bang-It+ concrete inserts are specifically designed to provide hangar attachments for mechanical, electrical, plumbing (MEP) and fire protection.

After installation, the protective sleeve of the insert protrudes below the surface of the deck. The sleeves are color coded by size and allow overhead attachment of steel threaded rod in sizes ranging from 1/4" to 3/4" in diameter, including 1/4-3/8" and 3/8-1/2" multi version. The sleeve prevents sprayed fireproofing material and acoustical dampening products from clogging the internal threads of the insert. It also prevents burying, masking or losing the insert location. A hex impact plate offers resistance to rotation within the concrete as a steel threaded rod is being installed.

GENERAL APPLICATIONS AND USES

- Hanging Pipe and Sprinkler Systems
- HVAC Ductwork and Strut Channels
- Suspending Trapeze and Cable Trays
- Mechanical Unit Overhead Utilities
- Conduit and Lighting System
- Seismic Loading and Cracked Concrete

FEATURES AND BENEFITS

- + Fast and simple to install, low installed cost
- + Color coded by size for simple identification
- + Bang-It+ can be installed in upper and lower steel deck profiles with limited concrete topping thickness (see installation details)
- + Hex head does not rotate when set
- + Insert design allows for full thread engagement
- + Suitable for seismic and wind loading

APPROVALS AND LISTINGS

- International Code Council, Evaluation Service (ICC-ES), ESR-3657 for concrete
- Code compliant with the 2018 IBC/IRC, 2015 IBC/IRC, 2012 IBC/IRC and 2009 IBC/IRC
- Tested in accordance with ASTM E488 and ICC-ES AC446 for use in cracked and uncracked concrete under the design provisions of ACI 318 (Strength Design method)
- Evaluated and qualified by an accredited independent testing laboratory for recognition in cracked and uncracked concrete
- Underwriters Laboratories (UL Listed) - File No. EX1289, see listing for sizes
Also UL listed and recognized for use in air handling spaces (i.e. plenum rated locations)
- FM Approvals (Factory Mutual) – File No. J.I. 3015153

GUIDE SPECIFICATIONS

CSI Divisions: 03 15 19 - Cast-In Concrete Anchors and 03 16 00 - Concrete Anchors. Concrete inserts shall be Bang-It+ as supplied by DEWALT, Towson, MD. Anchors shall be installed in accordance with published instructions and the Authority Having Jurisdiction.

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BANG-IT+
STEEL DECK INSERT

ANCHOR MATERIALS

- Carbon Steel and Engineered Plastic

ROD/ANCHOR SIZE RANGE (TYP.)

- 1/4" to 3/4" threaded rod including 1/4"-3/8" and 3/8"-1/2" multi version

SUITABLE BASE MATERIALS

- Normal-weight Concrete
- Lightweight Concrete



MATERIAL SPECIFICATIONS

Bang-It+

Anchor Component	Component Material
Insert Body	AISI 1008 Carbon Steel or equivalent
Flange	AISI 1008 Carbon Steel or equivalent
Spring	Steel Music Wire
Protective Sleeve	Engineered Plastic
Zinc Plating	ASTM B 633 (Fe/Zn5) Min. Plating requirements for Mild Service Condition

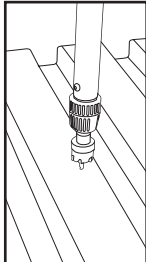
Material Properties for Threaded Rod

Steel Description	Steel Specification (ASTM)	Rod Diameter (inch)	Minimum Yield Strength, f_y (ksi)	Minimum Ultimate Strength, f_u (ksi)
Standard carbon rod	A 36 or A 307, Grade C	1/4 to 3/4	36.0	58.0
High strength carbon rod	A 193, Grade B7	1/4 to 3/4	105.0	125.0

INSTALLATION INSTRUCTIONS

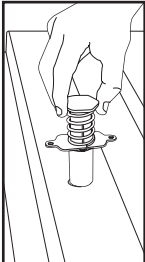
Installation Instructions for Bang-It+

Create Hole



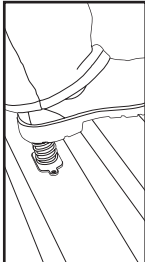
Step 1
Cut (e.g., drill/punch) a hole in the steel deck to the hole size required by the insert.

Position



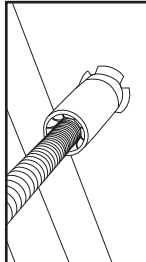
Step 2
Place the plastic sleeve of the insert through hole in steel deck.

Mount



Step 3
Step on or impact the insert head to engage. Optionally, base plate of insert can also be screwed to steel deck.

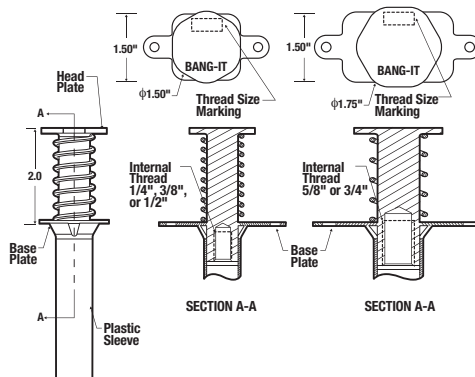
Attach



Step 4
After concrete pour and cure, install threaded steel element (rod/bolt) into the insert. Trim away plastic sleeve as needed for application and attach fixture as applicable (e.g. seismic brace).

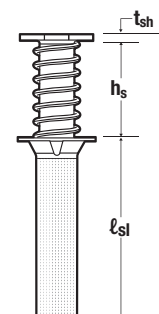
INSTALLATION SPECIFICATIONS

Bang-It+ Cast-In-Place Inserts for Concrete Filled Steel Deck Floor and Roof Assemblies



Bang-It+

Dimension	Units	Notation	Nominal Rod/Anchor Size								
			1/4-3/8" Multi"	3/8-1/2" Multi	1/4"	3/8"	1/2"	5/8"	3/4"		
Thread Size, UNC	TPI	-	1/4-20	3/8-16	3/8-16	1/2-13	1/4-20	3/8-16	1/2-13	5/8-11	3/4-10
Approx. Internal Thread Length	in.	-	3/8	5/8	1/2	3/4	3/8	5/8	11/16	15/16	1-1/8
Approx. Internal Thread Projection through Deck Soffit, after setting	in.	-	0	5/8	0	3/4	3/4				
Base Plate Thickness	in.	-	1/16								
Length of Plastic Sleeve	in.	ℓ_{sl}	3-3/8								
Approx. Height of Spring	in.	h_s	1-13/16								
Steel Head Plate Thickness	in.	t_{sh}	1/8								
Overall Insert Length	in.	ℓ	5-7/16								
Metal Hole Saw Diameter	in.	-	13/16 or 7/8							1-3/16 or 1-1/4	
Sugg. Metal Hole Saw Drilling Speed	rpm	-	700-900							500-700	



REFERENCE DATA (ASD)

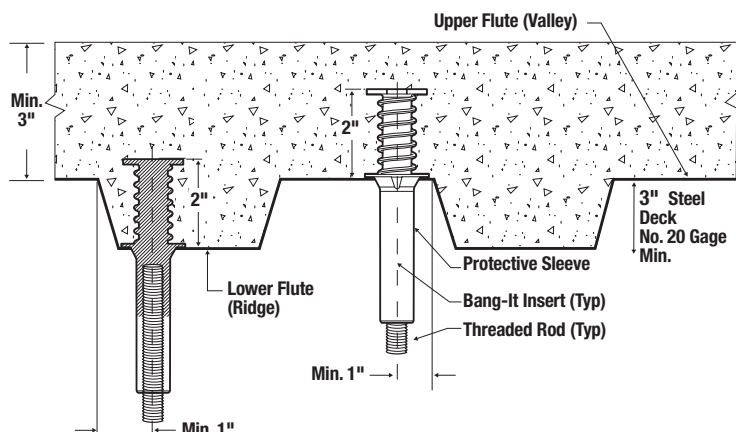
Ultimate and Allowable Load Capacities for Bang-It+ Inserts Installed in Sand-Lightweight Concrete or Normal Weight over Steel Deck^{1,2,3}



Rod/Insert Diameter d in.	Nominal Embedment Depth h, in.	Flute Location in Deck	Insert Spacing in.	End Distance in.	f'c ≥ 3,000 psi			
					Ultimate Load		Allowable Load	
					Tension lbs.	Shear lbs.	Tension lbs.	Shear lbs.
1/4	2	Upper	6	6	4,450	2,500	1,115	835
		Lower			3,320	2,500	830	625
3/8	2	Upper	6	6	5,750	3,350	1,915	1,115
		Lower			3,320	3,350	830	840
1/2	2	Upper	6	6	7,110	3,350	2,370	1,115
		Lower			3,320	3,350	830	840
5/8	2	Upper	6	6	8,810	3,350	2,935	1,115
		Lower	6		3,960	3,350	990	840
3/4	2	Upper	6	6	8,810	3,350	2,935	1,115
		Lower	6		3,960	3,350	990	840

1. Allowable load capacities listed are calculated using an applied safety factor of 3.0 for installations in the upper flute and 4.0 for installations in the lower flute.
2. The allowable working load must be the lesser of the insert capacity or the steel strength of the threaded rod.
3. For 1/4", 3/8" and 1/2" Inserts:
 The allowable tension load for a single insert installed in the **upper** flute must be adjusted as follows for spacing less than 6 inches.
 When the insert are spaced 2" center-to-center across the flute the insert tension capacity must be reduced by 40 percent.
 When the insert are spaced 2" center-to-center along the flute the insert tension capacity must be reduced by 50 percent.
 The allowable tension load for a single insert installed into the **lower** flute must be adjusted as follows for spacing less than 6 inches.
 When the insert are spaced 2" center-to-center across the flute the insert tension capacity must be reduced by 30 percent.
 When the insert are spaced 2" center-to-center along the flute the insert tension capacity must be reduced by 35 percent.

Sand-Lightweight Concrete or Normal Weight Concrete over Steel Deck (Minimum 3,000 psi)



Allowable Steel Strength for Threaded Rod

Anchor Diameter d in.	Nominal Area of Rod in. ²	Allowable Tension			Allowable Shear		
		ASTM A36 lbs.	ASTM A307 Grade C lbs.	ASTM A193 Grade B7 lbs.	ASTM A36 lbs.	ASTM A307 Grade C lbs.	ASTM A193 Grade B7 lbs.
1/4	0.0491	940	940	2,160	485	485	1,030
3/8	0.1104	2,115	2,115	4,375	1,090	1,090	2,255
1/2	0.1963	3,755	3,755	7,775	1,940	1,940	4,055
5/8	0.3068	5,870	5,870	12,150	3,025	3,025	6,260
3/4	0.4418	8,455	8,455	17,495	4,355	4,355	9,010

Allowable tension = $f_u (A_{nom}) (0.33)$; Allowable shear = $f_u (A_{nom}) (0.17)$

STRENGTH DESIGN (SD)

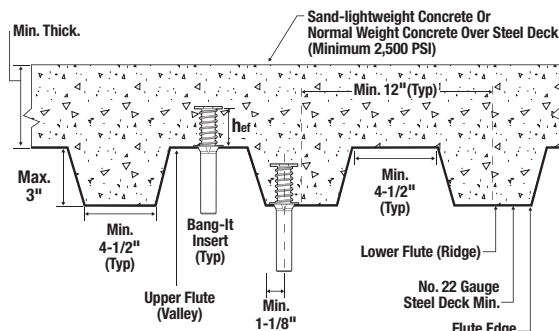
Bang-It+ Insert Design Information^{1,2,3,4,5,6,7,8,9}

Design Information		Symbol	Units	1/4-inch	3/8-inch	1/2-inch	5/8-inch	3/4-inch
Insert O.D.		d_a (d_o)	in. (mm)	0.7 (18)	0.7 (18)	0.7 (18)	1.0 (25)	1.0 (25)
Insert head net bearing area		A_{brg}	in ² (mm ²)	1.20 (762)	1.20 (762)	1.20 (762)	1.30 (839)	1.30 (839)
Effective embedment depth		h_{ef}	in. (mm)	1.75 (45)	1.75 (45)	1.75 (45)	1.75 (45)	1.75 (45)
Minimum member thickness		h_{min}	-	See Deck Figures as applicable				
Minimum spacing and edge distances	Upper flute	S_{min}, C_{min}	-	See ACI 318 Section D.8.1 and D.8.2				
	Lower flute	S_{min}, C_{min}	-	See Deck Figures as applicable				
Effectiveness factor for cracked concrete		k_c	- (SI)	24 (10)	24 (10)	24 (10)	24 (10)	24 (10)
Modification factor for tension strength in uncracked concrete		$\psi_{c,N}$	-	1.25	1.25	1.25	1.25	1.25
Nominal tension strength of single insert in tension as governed by steel strength (4-1/2" W-Deck, B-Deck, 3-7/8" W-Deck)		$N_{sa,insert}$	lb (kN)	10,440 (46.4)	10,440 (46.4)	8,850 (43.5)	11,985 (53.3)	11,985 (53.3)
Nominal tension strength of single insert in tension as governed by steel strength, for seismic loading (4-1/2" W-Deck, B-Deck, 3-7/8" W-Deck)		$N_{sa,insert,eq}$	lb (kN)	10,440 (46.4)	10,440 (46.4)	8,850 (43.5)	11,985 (53.3)	11,985 (53.3)
Nominal steel shear strength of single insert in the soffit of concrete on steel deck, (4-1/2" W-Deck)		$V_{sa,insert,deck}$	lb (kN)	2,280 (10.2)	2,280 (10.2)	2,280 (10.2)	3,075 (13.7)	3,075 (13.7)
Nominal steel shear strength of single insert in the soffit of concrete on steel deck, for seismic loading, (4-1/2" W-Deck)		$V_{sa,insert,deck,eq}$	lb (kN)	2,280 (10.2)	2,280 (10.2)	2,280 (10.2)	2,695 (12.0)	2,695 (12.0)
Nominal steel shear strength of single insert in the soffit of concrete on steel deck, (B-Deck, 3-7/8" W-Deck)		$V_{sa,insert,deck}$	lb (kN)	2,080 (10.2)	2,080 (10.2)	2,080 (10.2)	2,975 (13.2)	2,975 (13.2)
Nominal steel shear strength of single insert in the soffit of concrete on steel deck, for seismic loading, (B-Deck, 3-7/8" W-Deck)		$V_{sa,insert,deck,eq}$	lb (kN)	2,080 (10.2)	2,080 (10.2)	2,080 (10.2)	2,695 (12.0)	2,695 (12.0)

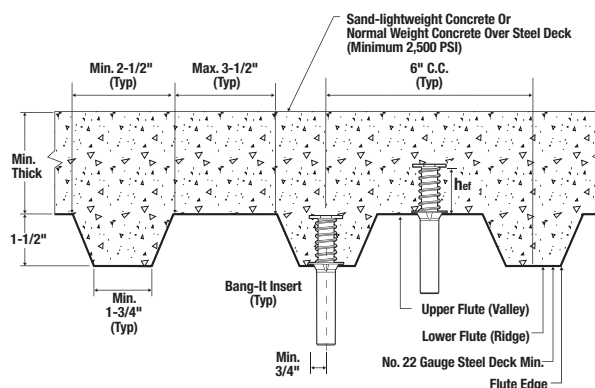
For SI: 1 inch = 25.4 mm, 1 inch² = 635 mm², 1 pound = 4.45 N, 1 psi = 0.006895 MPa. For pound-inch unit: 1 mm = 0.03937 inches.

- Concrete must have a compressive strength f'_c of 2,500 psi minimum.
- Design of headed cast-in specialty inserts shall be in accordance with the provisions of ACI 318-14 Chapter 17 or ACI 318-11 Appendix D for cast-in headed anchors.
- Strength reduction factors (ϕ) for the inserts are based on ACI 318-14 17.3.3 or ACI 318-11 D.4.3 for cast-in headed anchors. Condition B is assumed. Strength reduction factors for load combinations in accordance with ACI 318-14 Section 5.3 or ACI 318-11 Section 9.2 governed by steel strength of the insert are taken as 0.65 for tension and 0.60 for shear; values correspond to brittle steel elements. The value of ϕ applies when the load combinations of IBC Section 1605.2, ACI 318-14 Section 5.3 or ACI 318-11 Section 9.2 are used in accordance with ACI 318-14 17.3.3 or ACI 318-11 D.4.3. 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.
- The concrete tension strength of headed cast-in specialty inserts in concrete filled steel deck assemblies shall be calculated in accordance with ACI 318-14 Chapter 17 or ACI 318-11 Appendix D and Deck Figures.
- Insert O.D. is the outside diameter of the headed insert body.
- Minimum spacing distance between anchors and minimum edge distances for anchors shall be in accordance with Deck Figures, as applicable, and noted provisions.
- Only the largest size of threaded rod or bolt for the multi inserts (e.g. 1/2-inch diameter for 3/8- & 1/2-inch insert) must be used for applications resisting shear loads.
- The strengths shown in the table are for inserts only. Design professional is responsible for checking threaded rod strength in tension, shear, and combined tension and shear, as applicable. See Steel Design Information table for common threaded rod elements.
- The tabulated insert strength values are applicable to installations in the lower flute or upper flute of the steel deck profiles; see Deck Figures.

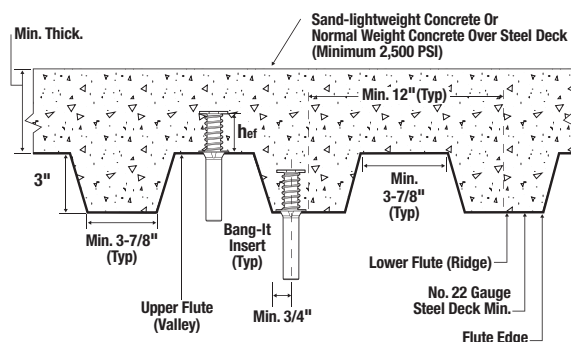
Bang-It+ Inserts Installed in Soffit of Concrete Filled Steel Deck Floor and Roof Assemblies, 4-1/2 -inch W-Deck^{1,2,3,4}



Bang-It+ Inserts Installed in Soffit of Concrete Filled Steel Deck Floor and Roof Assemblies, B-Deck^{1,2,3,4,5,6,7}



Bang-It+ Inserts Installed in Soffit of Concrete Filled Steel Deck Floor and Roof Assemblies, 3-7/8 -inch W-Deck^{1,2,3,8}



1. Inserts may be placed in the upper flute or lower flute of the steel deck assembly. Inserts in the lower flute require a minimum 1.5" of concrete topping thickness (min. thick) from the top of the deck at the location of the installation. Upper flute installations require a minimum 3" topping thickness concrete (min. thick) from the top of the deck at the location of the installation.
2. Axial spacing for Bang-It inserts along the flute length shall be minimum 3 ϕ_{ref} .
3. Upper flute Bang-It+ inserts are not subject to steel deck dimension limitations, or the minimum steel deck gauge limitations.
4. Inserts in the lower flute of 4-1/2-inch W-Deck may be installed with a maximum 1-1/8 -inch offset in either direction from the center of the flute. The offset distance may be increased for flute widths greater than those shown provided the minimum lower flute edge distance of 1-1/8 -inch is also satisfied.
5. Inserts in the lower flute of B-Deck may be installed with a maximum 1/8 -inch offset in either direction from the center of the flute. The offset distance may be increased for flute widths greater than those shown provided the minimum lower flute edge distance of 3/4 -inch is also satisfied.
6. Lower flute installations of B-Deck with flutes widths greater than 1-3/4 -inch are permitted.
7. Lower flute installations of B-Deck in flute depths greater than 1-1/2 -inch are permitted provided the minimum edge distance of 3/4 -inch is met and the minimum lower flute width is increased proportionally (e.g. applicable to a lower flute depth of 2-inch with a minimum lower flute width of 2-1/4 -inch).
8. Inserts in the lower flute of 3-7/8-inch W-Deck may be installed with a maximum 1-3/16 -inch offset in either direction from the center of the flute.

Specifications And Physical Properties Of Common Carbon Steel Threaded Rod Elements¹

Threaded Rod Specification		Units	Min. Specified Ultimate Strength, F_{uts}	Min. Specified Yield Strength 0.2 Percent Offset, F_{ys}	F_{uts} — F_{ys}	Elongation Minimum Percent ²	Reduction Of Area Min. Percent	Related Nut Specification ³
Carbon Steel	ASTM A36/A36M ² and F1554 ³ Grade 36	psi (MPa)	58,000 (400)	36,000 (248)	1.61	23	40 (50 for A36)	ASTM A194 / A563 Grade A
	ASTM F1554 ³ Grade 105	psi (MPa)	125,000 (862)	105,000 (724)	1.19	15	45	ASTM A194 / A563 Grade DH
	ASTM A193/A193M ⁴ Grade B7	psi (MPa)	125,000 (860)	105,000 (720)	1.19	16	50	

For SI: 1 inch = 25.4 mm, 1 psi = 0.006897 MPa. For pound-inch units: 1 mm = 0.03937 inch, 1 MPa = 145.0 psi.

1. Inserts may be used in conjunction with all grades of continuously threaded carbon steels (all-thread) that comply with code reference standards and that have thread characteristics comparable with ANSI B1.1 UNC Coarse Thread Series.
2. Standard Specification for Carbon Structural Steel.
3. Standard Specification for Anchor Bolts, Steel, 36, 55, and 105-ksi Yield Strength.
4. Standard Specification for Alloy-Steel and Stainless Steel Bolting Materials for High Temperature or High Pressure Service and Other Special Purpose Applications.
5. Based on 2-inch (50 mm) gauge length except ASTM A193, which are based on a gauge length of 4d (d_{rod}).
6. Where nuts are applicable, nuts of other grades and style having specified proof load stress greater than the specified grade and style are also suitable.

Steel Design Information For Common Threaded Rod Elements Used With Concrete Inserts^{1,2,3,4}

Design Information	Symbol	Units	1/4-inch	3/8-inch	1/2-inch	5/8-inch	3/4-inch
Threaded rod nominal outside diameter	d_{rod}	in. (mm)	0.250 (6.4)	0.375 (9.5)	0.500 (12.7)	0.625 (15.9)	0.750 (19.1)
Threaded rod effective cross-sectional area	A_{se}	in ² (mm ²)	0.032 (21)	0.078 (50)	0.142 (92)	0.226 (146)	0.335 (216)
Nominal tension strength of ASTM A36 threaded rod as governed by steel strength	$N_{sa,rod,A36}$	lb (kN)	1,855 (8.2)	4,525 (20.0)	8,235 (36.6)	13,110 (58.3)	19,430 (86.3)
Nominal seismic tension strength of ASTM A36 threaded rod as governed by steel strength	$N_{sa,rod,A36,eq}$	lb (kN)	1,855 (8.2)	4,525 (20.0)	8,235 (36.6)	13,110 (58.3)	19,430 (86.4)
Nominal tension strength of ASTM A193, Gr. B7 threaded rod as governed by steel strength	$N_{sa,rod,B7}$	lb (kN)	4,000 (17.7)	9,750 (43.1)	17,750 (78.9)	28,250 (125.7)	41,875 (186.0)
Nominal seismic tension strength of ASTM A193, Gr. B7 threaded rod as governed by steel strength	$N_{sa,rod,B7,eq}$	lb (kN)	4,000 (17.7)	9,750 (43.1)	17,750 (78.9)	28,250 (125.7)	41,875 (186.0)
Nominal shear strength of ASTM A36 threaded rod as governed by steel strength	$V_{sa,rod,A36}$	lb (kN)	1,115 (4.9)	2,715 (12.1)	4,940 (22.0)	7,865 (35.0)	11,660 (51.9)
Nominal seismic shear strength of ASTM A36 threaded rod as governed by steel strength	$V_{sa,rod,A36,eq}$	lb (kN)	780 (3.5)	1,900 (8.4)	3,460 (15.4)	5,505 (24.5)	8,160 (36.3)
Nominal shear strength of ASTM A193, Gr. B7 threaded rod as governed by steel strength	$V_{sa,rod,B7}$	lb (kN)	2,385 (10.6)	5,815 (25.9)	10,640 (47.3)	16,950 (75.4)	25,085 (111.6)
Nominal seismic shear strength of ASTM A193, Gr. B7 threaded rod as governed by steel strength	$V_{sa,rod,B7,eq}$	lb (kN)	1,680 (7.5)	4,095 (18.2)	7,455 (33.2)	11,865 (52.8)	17,590 (78.2)

For SI: 1 inch = 25.4 mm, 1 pound = 0.00445 kN, 1 in² = 645.2 mm². For pound-inch unit: 1 mm = 0.03937 inches.

1. Values provided for steel element material types based on minimum specified strengths and calculated in accordance with ACI 318-11 Eq. (D-2) and Eq. (D-29).
2. ϕN_{sa} shall be the lower of the $\phi N_{sa,rod}$ or $\phi N_{sa,insert}$ for static steel strength in tension; for seismic loading $\phi N_{sa,eq}$ shall be the lower of the $\phi N_{sa,rod,eq}$ or $\phi N_{sa,insert,eq}$.
3. ϕV_{sa} shall be the lower of the $\phi V_{sa,rod}$ or $\phi V_{sa,insert}$ for static steel strength in tension; for seismic loading $\phi V_{sa,eq}$ shall be the lower of the $\phi V_{sa,rod,eq}$ or $\phi V_{sa,insert,eq}$.
4. Strength reduction factors shall be taken from ACI 318-14 17.3.3 or ACI 318-11 D.4.3 for steel elements. Condition B is assumed. Strength reduction factors for load combinations in accordance with ACI 318-14 Section 5.3 or ACI 318-11 Section 9.2 governed by steel strength of the threaded rod are taken as 0.75 for tension and 0.65 for shear; values correspond to ductile steel elements. The value of ϕ applies when the load combinations of IBC Section 1605.2, ACI 318-14 Section 5.3 or ACI 318-11 Section 9.2 are used in accordance with ACI 318-14 17.3.3 or ACI 318-11 D.4.3. 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.


Tension and Shear Design Strengths for Bang-It+ Inserts Installed in the Soffit of Uncracked Concrete Filled Steel Deck Floor and Roof Assemblies^{1,2,3,4,5,6}

Nominal Anchor Diameter	Embed. Depth h_{ef} (in.)	Minimum Concrete Compressive Strength											
		$f'_c = 3,000$ psi											
		4-1/2" W-Deck				B-Deck				3-7/8" W-Deck			
		Upper Flute		Lower Flute		Upper Flute		Lower Flute		Upper Flute		Lower Flute	
		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.)	ϕN_n Tension (lbs.)	ϕV_n Shear (lbs.)
1/4	1-3/4	2,665	1,370	1,340	1,370	2,265	1,250	595	1,250	2,265	1,250	1,145	1,250
3/8	1-3/4	2,665	1,370	1,340	1,370	2,265	1,250	595	1,250	2,265	1,250	1,145	1,250
1/2	1-3/4	2,665	1,370	1,340	1,370	2,265	1,250	595	1,250	2,265	1,250	1,145	1,250
5/8	1-3/4	2,665	1,845	1,340	1,845	2,265	1,785	595	1,785	2,265	1,785	1,145	1,785
3/4	1-3/4	2,665	1,845	1,340	1,845	2,265	1,785	595	1,785	2,265	1,785	1,145	1,785

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

Tension and Shear Design Strengths for Bang-It+ Inserts Installed in the Soffit of Cracked Concrete Filled Steel Deck Floor and Roof Assemblies^{1,2,3,4,5,6}

Nominal Anchor Diameter	Embed. Depth h_{ef} (in.)	Minimum Concrete Compressive Strength											
		$f'_c = 3,000$ psi											
		4-1/2" W-Deck				B-Deck				3-7/8" W-Deck			
		Upper Flute		Lower Flute		Upper Flute		Lower Flute		Upper Flute		Lower Flute	
		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.)	ϕN_n Tension (lbs.)	ϕV_n Shear (lbs.)
1/4	1-3/4	1,810	1,370	1,070	1,370	1,810	1,250	475	1,250	1,810	1,250	915	1,250
3/8	1-3/4	1,810	1,370	1,070	1,370	1,810	1,250	475	1,250	1,810	1,250	915	1,250
1/2	1-3/4	1,810	1,370	1,070	1,370	1,810	1,250	475	1,250	1,810	1,250	915	1,250
5/8	1-3/4	1,810	1,845	1,070	1,845	1,810	1,785	475	1,785	1,810	1,785	915	1,785
3/4	1-3/4	1,810	1,845	1,070	1,845	1,810	1,785	475	1,785	1,810	1,785	915	1,785

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

- Tabular values are provided for illustration and are applicable for single anchors installed in sand-lightweight 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} .
 - C_{a2} is greater than or equal to 1.5 times C_{a1} .
- Calculations were performed following methodology in ACI 318-14 Chapter 17 or ACI 318-11 Appendix D. The load level corresponding to the failure mode listed [steel strength of insert ($N_{sa,insert}$, $V_{sa,insert}$), concrete breakout strength, or pryout strength] must be checked against the tabulated steel strength of the corresponding threaded rod type, ($N_{sa,rod}$, $V_{sa,rod}$), the lowest load level controls.
- Strength reduction factors shall be taken from ACI 318-14 17.3.3 or ACI 318-11 D.4.3 for cast-in headed anchors. Condition B is assumed. Strength reduction factors for load combinations in accordance with ACI 318-14 Section 5.3 or ACI 318-11 Section 9.2 governed by steel strength of the insert are taken as 0.65 for tension and 0.60 for shear; values correspond to brittle steel elements. Tabular values are permitted for short-term static loads only, seismic loading is not considered with these tables.
- For designs that include combined tension and shear, the interaction of tension and shear loads must be calculated in accordance with ACI 318-14 Chapter 17 or ACI 318-11 Appendix D.
- Interpolation is not permitted to be used with the tabular values. For intermediate base material compressive strengths please see ACI 318-14 Chapter 17 or ACI 318-11 Appendix D and information contained in this product supplement. For other design conditions including seismic considerations please see ACI 318-14 Chapter 17 or ACI 318-11 Appendix D.

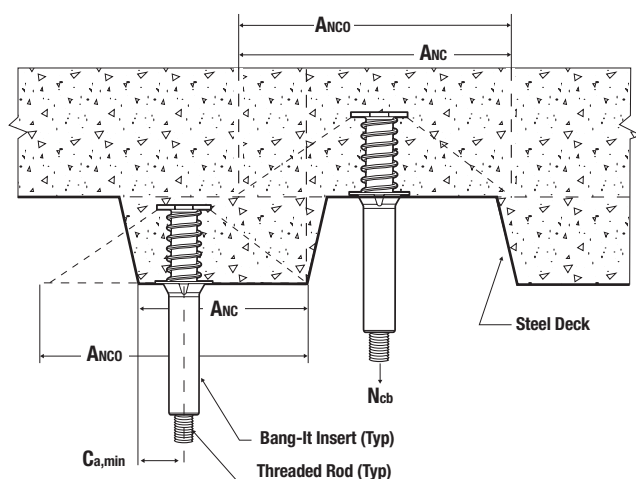
Tension and Shear Design Strength of Steel Elements (Steel Strength)^{1,2,3,4}

Nominal Rod Diameter (in.)	Steel Elements - Threaded Rod			
	ASTM A36 and ASTM F1554 Grade 36		ASTM A193 Grade B7 and ASTM F1554 Grade 105	
	$\phi N_{sa,rod}$ Tension (lbs.)	$\phi V_{sa,rod}$ Shear (lbs.)	$\phi N_{sa,rod}$ Tension (lbs.)	$\phi V_{sa,rod}$ Shear (lbs.)
1/4	1,390	720	3,000	1,550
3/8	3,395	1,750	7,315	3,780
1/2	6,175	3,210	13,315	6,915
5/8	9,835	5,115	21,190	11,020
3/4	14,550	7,565	31,405	16,305

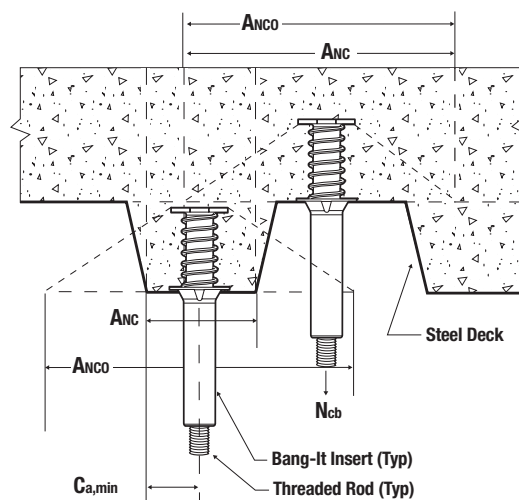
■ - Steel Strength Controls

- Steel tensile design strength according to ACI 318 Appendix D and ACI 318 Chapter 17, $\phi N_{sa} = \phi \cdot A_{se,N} \cdot f_{uta}$
- The tabulated steel design strength in tension for the threaded rod must be checked against the design strength of the steel insert, concrete breakout and pullout design strength to determine the controlling failure mode, the lowest load level controls.
- Steel shear design strength according to ACI 318 Appendix D and ACI 318 Chapter 17, $\phi N_{sa} = \phi \cdot 0.60 \cdot A_{se,N} \cdot f_{uta}$
- The tabulated steel design strength in shear for the threaded rod must be checked against the design strength of the steel insert, concrete breakout and pryout design strength to determine the controlling failure mode, the lowest load level controls.

Idealization of Concrete Filled Steel Decks for Determination of Concrete Breakout Strength in Accordance with ACI 318



Idealization of Standard Steel Deck Profiles



Idealization of B Deck Steel Deck Profiles

ORDERING INFORMATION

Bang-It® + Steel Deck Insert (UNC internal thread)

Cat.No.	Description	Color Code	Pre-Drilled Hole	Std. Qty.
7540	1/4" Bang-It+	Brown	13/16" or 7/8"	100
7542	3/8" Bang-It+	Green	13/16" or 7/8"	100
7544	1/2" Bang-It+	Yellow	13/16" or 7/8"	100
7546	5/8" Bang-It+	Red	1-3/16" or 1-1/4"	50
7548	3/4" Bang-It+	Purple	1-3/16" or 1-1/4"	50
7543	3/8-1/2" Bang-It+ Multi Insert	Gray	13/16" or 7/8"	100
PFM3521438	1/4-3/8" Bang-It+ Multi Insert	White	13/16" or 7/8"	100

Inserts are color coded to easily identify location and diameter of the internally threaded coupling.



Bang-It® + Installation Accessories

Cat.No.	Description	Std. Qty.
7560	Bang-It Stand Up Pole tool	1
7562	13/16" Carbide Hole Saw for 1/4", 3/8" and 1/2" sizes	1
7564	1-3/16" Carbide Hole Saw for 5/8", 3/4" and 7/8" sizes	1
D180014IR	7/8" (22mm) Impact Ready® Hole Saw	1
D180020IR	1-1/4" (32mm) Impact Ready® Hole Saw	1
7566	Extra Carbide Hole Saw Center Bit	1
DWA1786IR	3/16" - 7/8" Impact Ready® Step Drill Bit	1
DWA1789IR	7/8" - 1-1/8" Impact Ready® Step Drill Bit	1
DCD980M2	20V Max* Lithium Ion Premium 3-Speed Drill/Driver Kit (4.0 Ah)	1
DWD220	1/2" VSR Pistol Grip Drill With E-Clutch Anti-Lock Control	1