

Power-Bolt+ (PB+) *Heavy Duty Sleeve Anchor*

PRODUCT DESCRIPTION

The Power-Bolt+ (PB+) anchor is a torque controlled, heavy duty sleeve style anchor which is designed for consistent performance in cracked and uncracked concrete. Suitable base materials include normal-weight concrete and sand-lightweight concrete. The anchor is manufactured with a zinc plated carbon steel bolt, sleeve, cone and expansion clip. The PB+ has a low profile finished hex head.

GENERAL APPLICATIONS AND USES

- Structural connections, i.e., beam and column anchorage
- Safety-related attachments and tension zone applications
- Interior applications / low level corrosion environment
- Heavy duty applications

FEATURES AND BENEFITS

- + Consistent performance in high and low strength concrete
- + Nominal drill bit size is the same as the anchor diameter
- + Anchor can be installed through standard fixture holes
- + Length ID code and identifying marking stamped on head of each anchor
- + Anchor design allows for follow-up expansion after setting under tensile loading
- + High shear load capacity

APPROVALS AND LISTINGS

International Code Council, Evaluation Service (ICC-ES), ESR-3260 for cracked and uncracked concrete

Code compliant with International Building Code (IBC) and International Residential Code (IRC)

Tested in accordance with ACI 355.2 and ICC-ES AC193 (including ASTM E 488) for use in structural concrete under the design provisions of ACI 318 (Strength Design method using Appendix D)

Evaluated and qualified by an accredited independent testing laboratory for recognition in cracked and uncracked concrete including seismic and wind loading (Category 1 anchors)

GUIDE SPECIFICATIONS

CSI Divisions: 03 16 00 - Concrete Anchoring and 05 05 19 - Post Installed Concrete Anchors
Expansion anchors shall be Power-Bolt+ (PB+) as supplied by Powers Fasteners, Inc., Brewster, NY. Anchors shall be installed in accordance with published instructions and the Authority Having Jurisdiction.

MATERIAL SPECIFICATIONS

Anchor component	Specification
Bolt	Medium carbon steel (Grade 8 equivalent)
Washer	Conforms to ASTM F844
Cone	AISI C1035-C1040
Expansion Clip	AISI C1045-C1050
Metal Sleeve	Medium carbon steel tubing (seamless)
Compression Ring & Retainer Nut	Engineered plastic
Plating	Zinc plating according to ASTM B 633, SC1 Type III (Fe/Zn 5). Minimum plating requirements for Mild Service Condition.

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Power-Bolt+ (PB+) Assembly

HEAD STYLES

Finished Hex Head

ANCHOR MATERIALS

Zinc plated carbon steel bolt, washer, cone, sleeve, and expansion clip; assembled with a plastic compression ring and retainer nut

ANCHOR SIZE RANGE (TYP.)

1/2" diameter through 5/8" diameter

SUITABLE BASE MATERIALS

Normal-weight concrete
 Sand-lightweight concrete



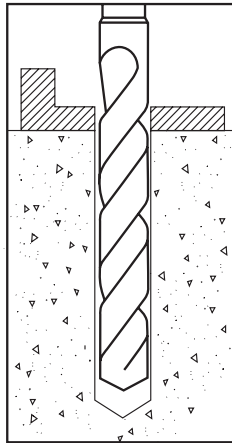
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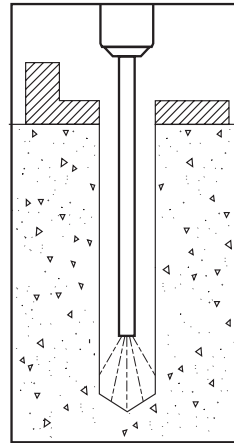
Powers Design Assist
 Real Time Anchor Design Software
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INSTALLATION INSTRUCTIONS

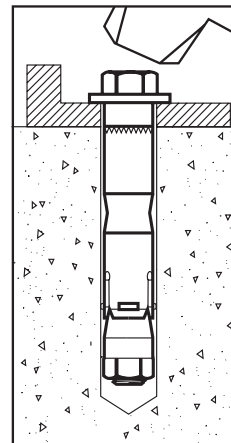
Installation Instructions for Power-Bolt+ (PB+) Anchor



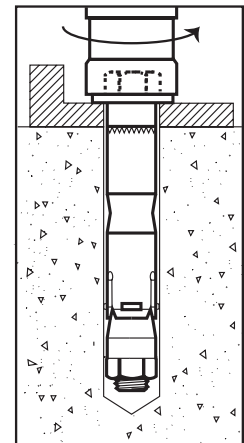
1. Using the proper drill bit size, drill a hole into the base material to the required depth. The tolerances of the drill bit used should meet the requirements of ANSI Standard B212.15.



2. Remove dust and debris from the hole using a hand pump, compressed air or a vacuum.



3. Drive anchor through the fixture into the hole. Be sure the anchor is driven to the minimum required embedment depth, h_{nom} .



4. Tighten the anchor with a torque wrench by applying the required installation torque, T_{inst} .

ANCHOR SPECIFICATIONS

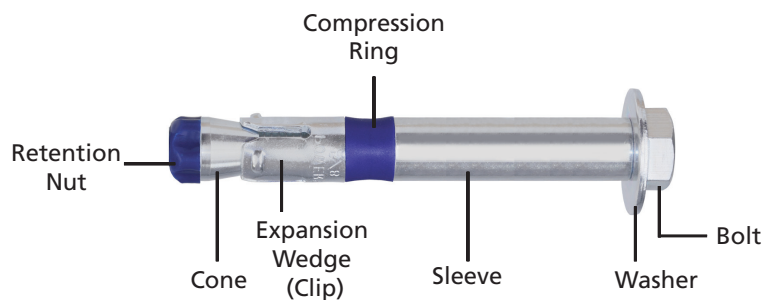
Head Marking



'PB+' Symbol = Power-Bolt+ Strength Design Compliant (see ordering information)

Letter Code = Length Identification Mark

Power-Bolt+ (PB+) Anchor Assembly



Length Identification

Mark	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R
From	1-1/2"	2"	2-1/2"	3"	3-1/2"	4"	4-1/2"	5"	5-1/2"	6"	6-1/2"	7"	7-1/2"	8"	8-1/2"	9"	9-1/2"	10"
Up to but not including	2"	2-1/2"	3"	3-1/2"	4"	4-1/2"	5"	5-1/2"	6"	6-1/2"	7"	7-1/2"	8"	8-1/2"	9"	9-1/2"	10"	11"

Length identification mark indicates overall length of anchor.

INSTALLATION SPECIFICATIONS

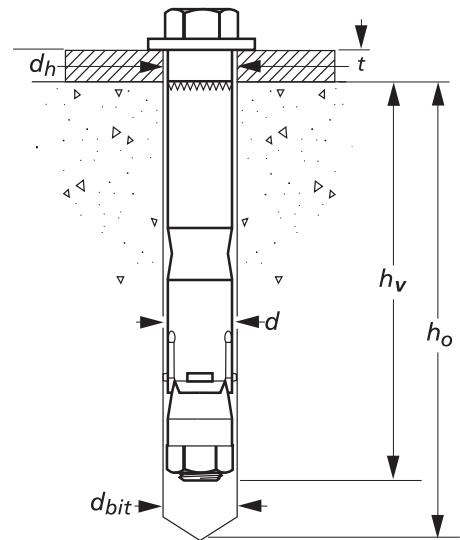


Power-Bolt+ (PB+) Anchor Installation Specifications

Anchor Property/Setting Information	Notation	Units	Nominal Anchor Diameter (in.)	
			1/2	5/8
Anchor outside diameter	d_a	in. (mm)	0.500 (12.7)	0.625 (15.9)
Internal bolt diameter (UNC)	-	in. (mm)	3/8 (9.5)	7/16 (11.1)
Nominal drill bit diameter	d_{bit}	in. ANSI	1/2 ANSI	5/8 ANSI
Minimum diameter of hole clearance in fixture	d_h	in. (mm)	9/16 (14.3)	11/16 (17.5)
Minimum embedment depth	h_v	in. (mm)	3-1/4 (83)	3-3/4 (95)
Minimum hole depth	h_o	in. (mm)	3-1/2 (84)	4 (102)
Minimum member thickness	h_{min}	in. (mm)	5 (127)	6-1/2 (165)
Installation torque	T_{inst}	ft.-lbf. (N-m)	40 (54)	60 (81)
Bolt Head Height	-	in. (mm)	9/32 (7.1)	5/16 (7.9)
Torque wrench/socket size	-	in.	3/4	15/16

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

Power-Bolt+ (PB+) Anchor Detail



REFERENCE PERFORMANCE DATA
Ultimate Load Capacities for Power-Bolt+ (PB+) in Normal-Weight Concrete ¹

Nominal Anchor Diameter d in.	Minimum Embedment Depth in.	Minimum Concrete Compressive Strength - f'c (psi)									
		2,500		3,000		4,000		6,000		8,000	
		Tension (lbs.)	Shear (lbs.)	Tension (lbs.)	Shear (lbs.)	Tension (lbs.)	Shear (lbs.)	Tension (lbs.)	Shear (lbs.)	Tension (lbs.)	Shear (lbs.)
1/2	2-1/2	3,880	7,420	4,250	8,030	4,905	8,030	5,150	8,030	5,518	8,030
1/2	3	5,190	8,030	5,685	8,030	6,560	8,030	7,985	8,030	9,065	8,030
1/2	3-1/4	7,120	8,030	7,660	8,030	8,645	8,030	9,400	8,030	10,835	8,030
5/8	2-3/4	4,745	9,975	5,195	10,930	6,000	12,620	6,845	13,155	7,200	13,155
5/8	3-1/2	6,995	9,975	7,660	10,930	8,845	12,620	11,325	13,155	12,900	13,155
5/8	3-3/4	8,710	12,015	9,545	14,320	11,020	16,535	12,820	18,250	14,800	18,250

1. The tabulated load values are applicable to single anchors installed in uncracked concrete with no edge or spacing considerations.

ALLOWABLE STRESS DESIGN (ASD) PERFORMANCE DATA

Allowable Load Capacities for Power-Bolt+ (PB+) in Normal-Weight Concrete ^{1,2,3}

Nominal Anchor Diameter d in.	Minimum Embedment Depth in.	Minimum Concrete Compressive Strength - f'c (psi)									
		2,500		3,000		4,000		6,000		8,000	
		Tension (lbs.)	Shear (lbs.)	Tension (lbs.)	Shear (lbs.)	Tension (lbs.)	Shear (lbs.)	Tension (lbs.)	Shear (lbs.)	Tension (lbs.)	Shear (lbs.)
1/2	2-1/2	970	1,855	1,065	2,010	1,225	2,010	1,290	2,010	1,380	2,010
1/2	3	1,300	2,010	1,420	2,010	1,640	2,010	1,995	2,010	2,265	2,010
1/2	3-1/4	1,780	2,010	1,915	2,010	2,160	2,010	2,350	2,010	2,710	2,010
5/8	2-3/4	1,185	2,495	1,300	2,735	1,500	3,155	1,710	3,290	1,800	3,290
5/8	3-1/2	1,750	2,495	1,915	2,735	2,210	3,155	2,830	3,290	3,225	3,290
5/8	3-3/4	2,180	3,005	2,385	3,580	2,755	4,135	3,205	4,565	3,700	4,565

1. 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 applications, such as life safety or overhead.
2. Tabulated load values are for anchors installed in concrete. Concrete compressive strength must be at the specified minimum at the time of installation.
3. Allowable load capacities are multiplied by reduction factors when anchor spacing or edge distances are less than critical distances.

ALLOWABLE STRESS DESIGN (ASD) DESIGN CRITERIA



Spacing Reduction Factors -Tension (F_{NS})			
Diameter d (in)		1/2	5/8
Critical Spacing s_{cr} (in)		7-7/8	9
Minimum Spacing s_{min} (in)		4-1/2	6
Min. Slab Thickness h_{min} (in)		5	6-1/2
Minimum Embedment h_v (in)		2-5/8	3
Spacing Distance (inches)	4	-	-
	4-1/2	0.83	-
	5	0.85	-
	5-1/2	0.88	-
	6	0.91	0.85
	6-1/2	0.93	0.87
	7	0.96	0.90
	7-1/2	0.98	0.92
	8	1.00	0.95
	8-1/2	1.00	0.97
9	1.00	1.00	

Edge Distance Reduction Factors- Tension (F_{NC})			
Diameter d (in)		1/2	5/8
Critical Distance c_{cr} (in)		8	6
Minimum Edge Distance c_{min} (in)		3-1/4	4-1/2
Min. Slab Thickness h_{min} (in)		5	6-1/2
Minimum Embedment h_v (in)		2-5/8	3
Edge Distance (inches)	3	-	-
	3-1/4	0.41	-
	3-1/2	0.44	-
	4	0.50	-
	4-1/2	0.56	0.75
	5	0.63	0.83
	5-1/2	0.69	0.92
	6	0.75	1.00
	6-1/2	0.81	1.00
	7	0.88	1.00
7-1/2	0.94	1.00	
8	1.00	1.00	

Spacing Reduction Factors -Shear (F_{VS})			
Diameter d (in)		1/2	5/8
Critical Spacing s_{cr} (in)		7-7/8	9
Minimum Spacing s_{min} (in)		4-1/2	6
Min. Slab Thickness h_{min} (in)		5	6-1/2
Minimum Embedment h_v (in)		2-5/8	3
Spacing Distance (inches)	4	-	-
	4-1/2	0.89	-
	5	0.91	-
	5-1/2	0.93	-
	6	0.94	0.89
	6-1/2	0.96	0.91
	7	0.97	0.93
	7-1/2	0.99	0.94
	8	1.00	0.96
	8-1/2	1.00	0.98
9	1.00	1.00	

Edge Distance Reduction Factors -Shear (F_{VC})			
Diameter d (in)		1/2	5/8
Critical Distance c_{cr} (in)		7-7/8	9
Minimum Distance c_{min} (in)		3-1/4	4-1/2
Min. Slab Thickness h_{min} (in)		5	6-1/2
Minimum Embedment h_v (in)		2-5/8	3
Edge Distance (inches)	3	-	-
	3-1/4	0.41	-
	3-1/2	0.44	-
	4	0.51	-
	4-1/2	0.57	0.50
	5	0.63	0.56
	5-1/2	0.70	0.61
	6	0.76	0.67
	6-1/2	0.83	0.72
	7	0.89	0.78
7-1/2	0.95	0.83	
8	1.00	0.89	
8-1/2	1.00	0.94	
9	1.00	1.00	



STRENGTH DESIGN INFORMATION

MECHANICAL ANCHORS

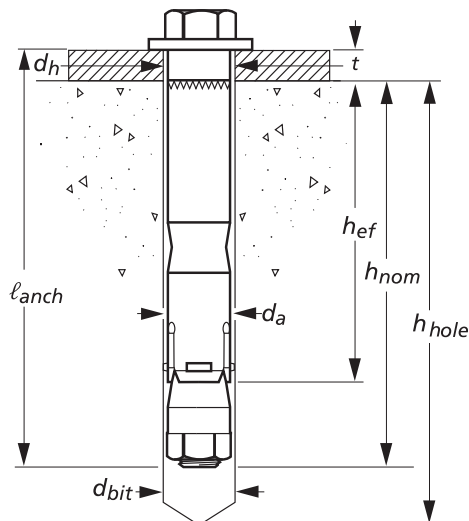
Power-Bolt+ (PB+) Anchor Installation Specifications¹

Anchor Property/Setting Information	Notation	Units	Nominal Anchor Diameter (in.)	
			1/2	5/8
Anchor outside diameter	d_a	in. (mm)	0.500 (12.7)	0.625 (15.9)
Internal bolt diameter (UNC)	-	in. (mm)	3/8 (9.5)	7/16 (11.1)
Minimum diameter of hole clearance in fixture	d_h	in. (mm)	9/16 (14.3)	11/16 (17.5)
Nominal drill bit diameter	d_{bit}	in.	1/2 ANSI	5/8 ANSI
Minimum nominal embedment depth	h_{nom}	in. (mm)	3-1/4 (83)	3-3/4 (95)
Effective embedment	h_{ef}	in. (mm)	2-5/8 (67)	3 (76)
Minimum hole depth ³	h_{hole}	in. (mm)	3-3/4 (95)	4-1/4 (108)
Minimum member thickness	h_{min}	in. (mm)	5 (127)	6-1/2 (165)
Minimum overall anchor length ²	ℓ_{anch}	in. (mm)	3-1/2 (89)	4 (102)
Minimum edge distance	c_{min}	in. (mm)	3-1/4 (83)	4-1/2 (114)
Minimum spacing distance	s_{min}	in. (mm)	4-1/2 (114)	6 (152)
Critical edge distance	c_{ac}	in. (mm)	8 (203)	6 (152)
Installation torque	T_{inst}	ft.-lbf. (N-m)	40 (54)	60 (81)
Bolt Head Height	-	in. (mm)	1/4 (7.1)	5/16 (7.9)
Torque wrench/socket size	-	in.	3/4	15/16

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 Appendix D.
2. The listed minimum overall anchor length is based on anchor sizes available at the time of publication compared with the requirements for the minimum nominal embedment depth and fixture attachment.
3. For installations with fixture thickness 1/4 inch or greater, the minimum hole depth may be reduced by 1/4 inch.

Power-Bolt+ (PB+) Anchor Detail



STRENGTH DESIGN INFORMATION

**Tension Design information for Power-Bolt+ (PB+) Anchor in Concrete
(for use with load combinations taken from ACI 318, Section 9.2)^{1,2}**



Design Characteristic	Notation	Units	Nominal Anchor Diameter	
			1/2	5/8
Anchor category	1,2 or 3	-	1	1
Nominal embedment depth	h_{nom}	in. (mm)	3-1/4 (83)	3-3/4 (95)
STEEL STRENGTH IN TENSION⁴				
Minimum specified yield strength	f_y	ksi (N/mm ²)	130 (896)	130 (896)
Minimum specified ultimate tensile strength	f_{uta}^9	ksi (N/mm ²)	150 (1034)	150 (1034)
Effective tensile stress area (threads)	A_{se}	in ² (mm ²)	0.0775 (50)	0.1063 (68.6)
Steel strength in tension	N_{sa}^9	lb (kN)	9,685 (43.1)	13,285 (59.1)
Reduction factor for steel strength ³	Φ	-	0.75	
CONCRETE BREAKOUT STRENGTH IN TENSION				
Effective embedment	h_{ef}	in. (mm)	2.625 (67)	3.000 (76)
Effectiveness factor for uncracked concrete	k_{ucr}	-	27	27
Effectiveness factor for cracked concrete	k_{cr}	-	17	17
Modification factor for cracked and uncracked concrete ⁵	$\psi_{c,N}^9$	-	1.0	1.0
Critical edge distance (uncracked concrete)	c_{ac}	in. (mm)	8 (203)	6 (152)
Reduction factor for concrete breakout strength ³	Φ	-	0.65 (Condition B)	
PULLOUT STRENGTH IN TENSION (NON-SEISMIC APPLICATIONS)⁷				
Characteristic pullout strength, uncracked concrete (2,500 psi)	$N_{p,uncr}$	lb (kN)	Not Applicable ⁶	Not Applicable ⁶
Characteristic pullout strength, cracked concrete (2,500 psi)	$N_{p,cr}$	lb (kN)	Not Applicable ⁶	Not Applicable ⁶
Reduction factor for pullout strength ³	Φ	-	0.65 (Condition B)	
PULLOUT STRENGTH IN TENSION FOR SEISMIC APPLICATIONS⁷				
Characteristic pullout strength, seismic (2,500 psi) ⁸	N_{eq}^9	lb (kN)	Not Applicable ⁶	Not Applicable ⁶
Reduction factor for pullout strength ³	Φ	-	0.65 (Condition B)	

For SI: 1 inch = 25.4 mm; 1 ksi = 6.894 N/mm²;
1 lb = 0.0044 kN.

- The data in this table is intended to be used with the design provisions of ACI 318 Appendix D; for anchors resisting seismic load combinations the additional requirements of ACI 318 D.3.3 must apply.
- Installation must comply with published instructions and details.
- All values of Φ apply to the load combinations of IBC Section 1605.2.1, UBC Section 1612.2.1, or ACI 318 Section 9.2. If the load combinations of UBC Section 1902.2 or ACI 318 Appendix C are used, the appropriate value of Φ must be determined in accordance with ACI 318 D.4.5. For reinforcement that complies with ACI 318 Appendix D requirements for Condition A, the appropriate Φ factor must be determined in accordance with ACI 318 D.4.4.
- The PB+ is considered a ductile steel element as defined by ACI 318 D.1. Tabulated values for steel strength in tension must be used for design.
- For all design cases use $\psi_{c,N} = 1.0$. The appropriate effectiveness factor for cracked concrete (k_{cr}) or uncracked concrete (k_{uncr}) must be used.
- Pullout strength will not control design of indicated anchors. Do not calculate pullout strength for indicated anchor size and embedment.
- Anchors are permitted to be used in sand-lightweight concrete provided that N_p and N_{pn} are multiplied by a factor of 0.60.
- Tabulated values for characteristic pullout strength in tension are for seismic applications and based on test results in accordance with ACI 355.2, Section 9.5.
- For 2003 IBC, f_{uta} replaces f_{ut} ; N_{sa} replaces N_s ; ψ_{cp} replaces ψ_3 ; and N_{eq} replaces $N_{p,seis}$.

STRENGTH DESIGN INFORMATION
**Shear Design information for Power-Bolt+ (PB+) Anchor in Concrete
(for use with load combinations taken from ACI 318, Section 9.2)^{1,2}**


Design Characteristic	Notation	Units	Nominal Anchor Diameter	
			1/2	5/8
Anchor category	1, 2 or 3	-	1	1
Nominal embedment depth	h_{nom}	in. (mm)	3-1/4 (83)	3-3/4 (95)
STEEL STRENGTH IN SHEAR⁴				
Minimum specified yield strength	f_y	ksi (N/mm ²)	130 (896)	130 (896)
Minimum specified ultimate strength	f_{uta}^8	ksi (N/mm ²)	150 (1034)	150 (1034)
Effective tensile stress area (threads)	A_{se}	in ² (mm ²)	0.1069 (69.0)	0.1452 (93.7)
Steel strength in shear ⁵	V_{sa}^8	lb (kN)	6,005 (26.7)	13,415 (59.7)
Reduction factor for steel strength ³	Φ	-	0.65	
CONCRETE BREAKOUT STRENGTH IN SHEAR⁶				
Load bearing length of anchor (h_{ef} or $8d_a$, whichever is less)	ℓ_e^8	in (mm)	2.625 (67)	3.000 (76)
Nominal anchor diameter	d_a	in (mm)	0.500 (12.7)	0.625 (15.9)
Reduction factor for concrete breakout ³	Φ	-	0.70 (Condition B)	
PRYOUT STRENGTH IN SHEAR⁶				
Coefficient for prout strength (1.0 for $h_{ef} < 2.5$ in., 2.0 for $h_{ef} \geq 2.5$ in.)	k_{cp}	-	2.0	2.0
Effective embedment	h_{ef}	in (mm)	2.625 (67.5)	3.000 (76)
Reduction factor for prout strength ³	Φ	-	0.70 (Condition B)	
STEEL STRENGTH IN SHEAR FOR SEISMIC APPLICATIONS				
Steel strength in shear, seismic ⁷	V_{eq}^8	lb (kN)	4,565 (20.3)	7,425 (33.0)
Reduction factor for steel strength in shear for seismic ³	Φ	-	0.65	

For SI: 1 inch = 25.4 mm; 1 ksi = 6.894 N/mm²;
1 lb = 0.0044 kN.

- The data in this table is intended to be used with the design provisions of ACI 318 Appendix D; for anchors resisting seismic load combinations the additional requirements of ACI 318 D.3.3 must apply.
- Installation must comply with published instructions and details.
- All values of Φ apply to the load combinations of IBC Section 1605.2.1, UBC Section 1612.2.1, or ACI 318 Section 9.2. If the load combinations of UBC Section 1902.2 or ACI 318 Appendix C are used, the appropriate value of Φ must be determined in accordance with ACI 318 D.4.5. For reinforcement that complies with ACI 318 Appendix D requirements for Condition A, the appropriate Φ factor must be determined in accordance with ACI 318 D.4.4.
- The PB+ is considered a ductile steel element as defined by ACI 318 D.1.
- Tabulated values for steel strength in shear must be used for design. These tabulated values are lower than calculated results using equation D-20 in ACI 318-05, ACI 318 D.6.1.2 and D-18 in ACI 318-02, D.6.1.2.
- Anchors are permitted to be used in sand-lightweight concrete provided that V_b , and V_{cp} and V_{cpq} are multiplied by a factor of 0.60.
- Tabulated values for steel strength in shear are for seismic applications and based on test results in accordance with ACI 355.2, Section 9.6.
- For the 2003 IBC f_{uta} replaces f_{ut} ; V_{sa} replaces V_s ; ℓ_e replaces ℓ ; and V_{eq} replaces $V_{sa,seis}$.

STRENGTH DESIGN PERFORMANCE DATA

Factored design strength ΦN_n and ΦV_n
Calculated in accordance with ACI 318 Appendix D
Tested to the International Building Code



Tension and Shear Design Strengths for Power-Bolt+ (PB+) in Cracked Concrete^{1,2,3,4,5,6}

Nominal Anchor Diameter (in.)	Nominal Embed. h_{nom} (in.)	Minimum Concrete Compressive Strength, f'_c (psi)									
		2,500		3,000		4,000		6,000		8,000	
		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.)
1/2	3-1/4	2,350	3,525	2,575	3,860	2,970	3,905	3,640	3,905	4,205	3,905
5/8	3-3/4	2,870	3,310	3,145	3,626	3,630	4,190	4,450	5,130	5,135	5,920

Tension and Shear Design Strengths for Power-Bolt+ (PB+) in Uncracked Concrete^{1,2,3,4,5,6}

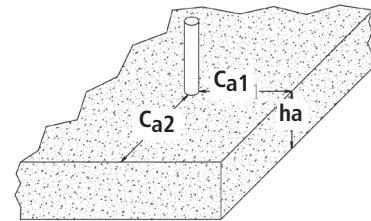
Nominal Anchor Diameter (in.)	Nominal Embed. h_{nom} (in.)	Minimum Concrete Compressive Strength, f'_c (psi)									
		2,500		3,000		4,000		6,000		8,000	
		ΦN_n Tension (lbs.)	ΦV_n Shear (lbs.)	ΦN_n Tension (lbs.)	ΦV_n Shear (lbs.)	ΦN_n Tension (lbs.)	ΦV_n Shear (lbs.)	ΦN_n Tension (lbs.)	ΦV_n Shear (lbs.)	ΦN_n Tension (lbs.)	ΦV_n Shear (lbs.)
1/2	3-1/4	3,730	3,905	4,090	3,905	4,720	3,905	5,780	3,905	6,675	3,905
5/8	3-3/4	4,560	4,635	4,995	5,076	5,770	5,865	7,065	7,180	8,155	8,290

Legend

Steel Strength Controls

Concrete Breakout Strength Controls

- Tabular values are provided for illustration and are applicable for single anchors installed in normal-weight-concrete with minimum slab thickness, $h_s = h_{min}$, 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 $1.5 c_{a1}$.
- Calculations were performed according to ACI 318-08 Appendix D. 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 table s. Please also reference the installation specifications for more information.
- Strength reduction factors (Φ) were based on ACI 318 Section 9.2 for load combinations. Condition B is assumed.
- Tabular values are permitted for 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 Appendix D.
- Interpolation is not permitted to be used with the tabular values. For intermediate base material compressive strengths please see ACI 318 Appendix D. For other design conditions including seismic considerations please see ACI 318 Appendix D.



ORDERING INFORMATION

Power-Bolt+ (Carbon Steel Version Finished Hex Head)

Cat. No.	Anchor Size	Maximum Fixture Thickness	Box Qty.	Carton Qty.
6930SD	1/2" x 2-3/4"	1/4"	50	200
6932SD	1/2" x 3-1/2"	1/4"	50	200
6934SD	1/2" x 4-3/4"	1-1/2"	25	150
6936SD	1/2" x 5-3/4"	2-1/2"	25	150
6940SD	5/8" x 3"	1/4"	20	120
6942SD	5/8" x 4"	1/4"	15	90
6944SD	5/8" x 5"	1-1/4"	15	90
6945SD	5/8" x 6"	2-1/4"	15	90
6947SD	5/8" x 8-1/2"	4-3/4"	10	40

Shaded catalog numbers denote sizes which are less than the minimum standard anchor length for strength design. The published size includes the diameter and the length is measured from below the washer to the end of the anchor.



Installation Accessories

Cat. No.	Anchor Size	Box Qty.
08466	Adjustable torque wrench with 1/2" square drive (25 to 250 ft.-lbs.)	1
08280	Hand pump / dust blower	1

