



## Power-Bolt®

### HEAVY DUTY, SELF-UNDERCUTTING SLEEVE TYPE ANCHOR

#### BASE MATERIAL

Concrete, Block, Brick, Stone

#### SIZE RANGE

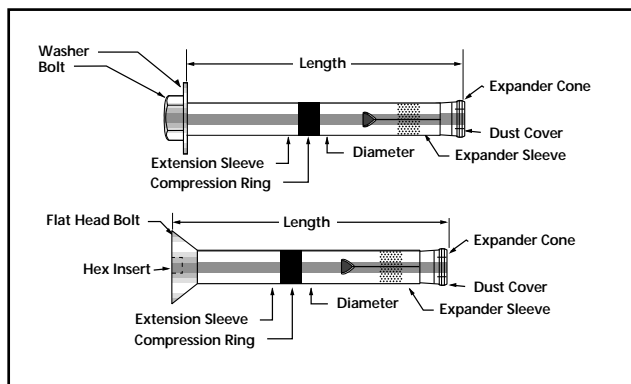
1/4" x 1" to 1-1/4" x 9"

#### ANCHOR MATERIAL

Carbon Steel & Type 304 Stainless Steel

### PRODUCT DESCRIPTION

The Power-Bolt anchor (formerly known as the Rawl-Bolt) is a heavy duty sleeve style self-undercutting anchor which is vibration resistant and removable. It is available with a finished hex head or flat head with a hex key insert and can be used in concrete, block, brick, or stone.



Expansion occurs at two levels within the drilled hole. First, the cone is pulled into the large triple-tined expansion sleeve, developing a mid-level, compression force. Further turning causes the threaded bolt to advance into the threads of the expander cone, forcing its four sections outward. This action undercuts the base material deep in the anchor hole, greatly increasing the holding power of the Power-Bolt.

The bolt and cone remain locked together which prevents loosening under even the most severe vibratory conditions.

The Power-Bolt is also designed to draw the fixture into full bearing against the base material through the action of its flexible compression ring. As the anchor is being tightened, the nylon compression ring will crush if necessary to tightly secure the fixture against the face of the base material.

The internal bolt of the Power-Bolt is removable and reusable in the same anchor hole making it ideal for applications such as mounting machinery which may need to be removed for service and for temporary applications such as heavy duty form work.

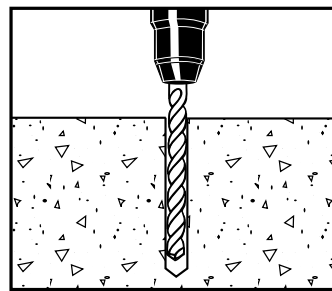
#### LENGTH IDENTIFICATION

The Power-Bolt anchor has a length identification mark stamped on the head of the anchor as shown, making inspection of installed anchors easy.

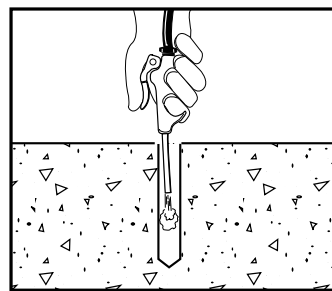
MARK	A	B	C	D	E	F	G	H
From	1-1/2"	2"	2-1/2"	3"	3-1/2"	4"	4-1/2"	5"
Up to	2"	2-1/2"	3"	3-1/2"	4"	4-1/2"	5"	5-1/2"

MARK	I	J	K	L	M	N	O	P
From	5-1/2"	6"	6-1/2"	7"	7-1/2"	8"	8-1/2"	9"
Up to	6"	6-1/2"	7"	7-1/2"	8"	8-1/2"	9"	9-1/2"

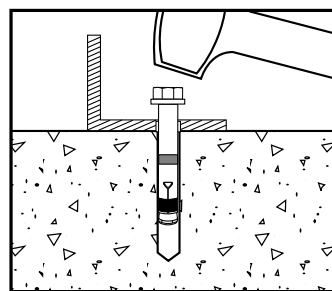
### INSTALLATION PROCEDURES



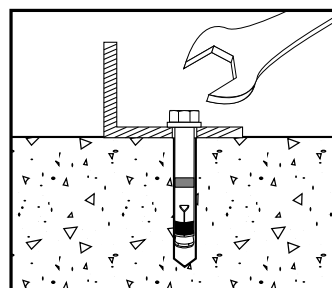
Using the proper diameter bit, drill a hole into the base material to a depth of at least 1/2" or one anchor diameter deeper than the embedment required. The tolerances of the drill bit used should meet the requirements of ANSI Standard B212.15.



Blow the hole clean of dust and other material. Do not expand the anchor prior to installation.



Drive the anchor through the fixture into the anchor hole until the bolt head is firmly seated against the fixture. Be sure the anchor is driven to the required embedment depth.



Tighten the anchor by turning the head 3 to 5 turns past finger tight or by applying the guide installation torque from the finger tight position.



## ANCHOR SIZES AND STYLES

The following tables list the sizes and styles of standard Power-Bolt anchors including both zinc plated carbon steel and stainless steel. To select the proper minimum anchor length, determine the embedment depth required to obtain the desired load capacity. Then add the thickness of the fixture, including any spacers or shims, to the embedment depth.

### CARBON STEEL HEX HEAD POWER-BOLT

Carbon steel Power-Bolt anchors are manufactured using a Grade 5 bolt. They are plated with a commercial bright zinc finish and have a supplementary chromate treatment in accordance with ASTM Specification B 633, SCl, Type III (Fe/Zn 5).

CAT. NO.	SIZE	DRILL DIA.	MIN. EMBED	STD. BOX	STD. CTN.	WT./ 100
6900	1/4" x 1"	1/4"	7/8"	100	600	2
6902	1/4" x 1-3/4"	1/4"	1-1/4"	100	600	3
6906	1/4" x 3"	1/4"	1-1/4"	100	600	5
6907	5/16" x 1-3/4"	5/16"	1-1/2"	100	600	5
6908	5/16" x 2-1/2"	5/16"	1-1/2"	50	300	6
6909	5/16" x 3-1/2"	5/16"	1-1/2"	50	300	8
6910	3/8" x 2-1/4"	3/8"	2"	50	300	8
6911*	3/8" x 1-7/8"	3/8"	1-1/4"	100	600	6
6913	3/8" x 3"	3/8"	2"	50	300	11
6914	3/8" x 3-1/2"	3/8"	2"	50	300	12
6916	3/8" x 4"	3/8"	2"	50	300	14
6930	1/2" x 2-3/4"	1/2"	2-1/2"	50	200	16
6932	1/2" x 3-3/4"	1/2"	2-1/2"	25	150	21
6934	1/2" x 4-3/4"	1/2"	2-1/2"	25	150	26
6936	1/2" x 5-3/4"	1/2"	2-1/2"	25	150	32
6940	5/8" x 3"	5/8"	2-3/4"	20	120	28
6942	5/8" x 4"	5/8"	2-3/4"	15	90	40
6944	5/8" x 5"	5/8"	2-3/4"	15	90	47
6945	5/8" x 6"	5/8"	2-3/4"	15	90	57
6947	5/8" x 8-1/2"	5/8"	2-3/4"	10	40	77
6950	3/4" x 3-1/4"	3/4"	3"	15	90	47
6952	3/4" x 4-1/4"	3/4"	3"	10	60	58
6954	3/4" x 5-1/4"	3/4"	3"	10	60	70
6956	3/4" x 7-1/4"	3/4"	3"	10	40	105
6957	3/4" x 8-1/4"	3/4"	3"	10	40	110
6970	1" x 6"	1"	4-1/4"	10	90	170
6971	1" x 7"	1"	4-1/4"	10	90	195
6974	1-1/4" x 7"	1-1/4"	6"	5	15	290
6975	1-1/4" x 9"	1-1/4"	6"	5	15	360

*The published length is measured from below the washer to the end of the anchor.*

\* This size does not have a compression ring.

### CARBON STEEL FLAT HEAD POWER-BOLT

The flat head Power-Bolt anchor has a hex key insert formed in the head of the bolt. Each box contains an allen wrench which matches the insert size.

CAT. NO.	SIZE	DRILL DIA.	MIN. EMBED	STD. BOX	STD. CTN.	WT./ 100
6981	3/8" x 3-3/4"	3/8"	2"	50	300	14
6982	3/8" x 5"	3/8"	2"	50	300	17
6983	3/8" x 6"	3/8"	2"	50	300	20
6984	1/2" x 5"	1/2"	2-1/2"	25	150	26
6987	5/8" x 5-1/2"	5/8"	2-3/4"	15	90	57

*The published length is the entire length of the anchor measured end to end.*

### STAINLESS STEEL HEX HEAD POWER-BOLT

Stainless steel Power-Bolt anchors are manufactured from 300 series stainless steel (passivated).

CAT. NO.	SIZE	DRILL DIA.	MIN. EMBED	STD. BOX	STD. CTN.	WT./ 100
5900	1/4" x 1"	1/4"	7/8"	100	600	2
5902	1/4" x 1-3/4"	1/4"	1-1/4"	100	600	3
5906	1/4" x 3"	1/4"	1-1/4"	100	600	5
5910	3/8" x 2-1/4"	3/8"	2"	50	300	10
5914	3/8" x 3-1/2"	3/8"	2"	50	300	12
5916	3/8" x 4"	3/8"	2"	50	300	14
5930	1/2" x 2-3/4"	1/2"	2-1/2"	50	200	16
5934	1/2" x 4-3/4"	1/2"	2-1/2"	25	150	26
5944	5/8" x 5"	5/8"	2-3/4"	15	90	47
5946	5/8" x 7"	5/8"	2-3/4"	15	60	67
5954	3/4" x 5-1/4"	3/4"	3"	15	60	70
5957	3/4" x 8-1/4"	3/4"	3"	10	40	110

*The published length is measured from below the washer to the end of the anchor.*

## INSTALLATION SPECIFICATIONS

### CARBON STEEL HEX HEAD POWER-BOLT

ANCHOR SIZE	1/4"	5/16"	3/8"	1/2"
ANSI Drill Bit Size	1/4"	5/16"	3/8"	1/2"
Fixture Clearance Hole	5/16"	3/8"	7/16"	9/16"
Internal Bolt Size	10-24	1/4-20	5/16-18	3/8-16
Head Height	7/64"	11/64"	13/64"	15/64"
Washer O.D.	1/2"	5/8"	13/16"	1"
Wrench Size	5/16"	7/16"	1/2"	9/16"

ANCHOR SIZE	5/8"	3/4"	1"	1-1/4"
ANSI Drill Bit Size	5/8"	3/4"	1"	1-1/4"
Fixture Clearance Hole	11/16"	13/16"	1-1/8"	1-3/8"
Internal Bolt Size	1/2-13	5/8-11	3/4-10	1-8
Head Height	5/16"	25/64"	1/2"	43/64"
Washer O.D.	1-1/4"	1-1/2"	1-7/8"	2-3/8"
Wrench Size	3/4"	15/16"	1-1/8"	1-1/2"

### CARBON STEEL FLAT HEAD POWER-BOLT

ANCHOR SIZE	3/8"	1/2"	5/8"
ANSI Drill Bit Size	3/8"	1/2"	5/8"
Fixture Clearance Hole	7/16"	9/16"	11/16"
Internal Bolt Size	5/16-18	3/8-16	1/2-13
Head Width	3/4"	7/8"	1-1/8"
Head Height	15/64"	1/4"	21/64"
Allen Wrench Size	7/32"	5/16"	3/8"

### STAINLESS STEEL HEX HEAD POWER-BOLT

ANCHOR SIZE	1/4"	3/8"	1/2"	5/8"	3/4"
ANSI Drill Bit Size	1/4"	3/8"	1/2"	5/8"	3/4"
Fixture Clearance Hole	5/16"	7/16"	9/16"	11/16"	13/16"
Internal Bolt Size	10-24	5/16-18	3/8-16	1/2-13	5/8-11
Head Height	7/64"	13/64"	15/64"	5/16"	25/64"
Washer O.D.	1/2"	13/16"	1"	1-1/4"	1-1/2"
Wrench Size	5/16"	1/2"	9/16"	3/4"	15/16"

## MATERIAL SPECIFICATIONS

ANCHOR COMPONENT	COMPONENT MATERIAL		
	CARBON STEEL HEX HEAD	CARBON STEEL FLAT HEAD	STAINLESS STEEL HEX HEAD
Internal Bolt	Grade 5	Grade 5	*Type 304 SS
Washer	AISI 1040	N/A	Type 18-8 SS
Expansion Sleeve	AISI 1010	AISI 1010	Type 304 SS
Extension Sleeve	AISI 1010	AISI 1010	Type 304 SS
Expansion Cone	AISI 12L14	AISI 12L14	Type 303 SS
Compression Ring	Nylon	Nylon	Nylon
Dust Cap	Nylon	Nylon	Nylon
Plating	ASTM B 633, SC1, Type III (Fe/Zn 5)		N/A

\*Manufactured with a minimum yield strength of 65,000 psi.

## PERFORMANCE DATA

The following load capacities are based on testing conducted according to ASTM Standard E 488.

### ULTIMATE LOAD CAPACITIES - CONCRETE - CARBON STEEL

ANCHOR SIZE (IN)	EMBED. DEPTH (IN)	GUIDE TORQUE (FT.-LBS)	2,000 PSI CONCRETE TENSION (LBS)	2,000 PSI CONCRETE SHEAR (LBS)	4,000 PSI CONCRETE TENSION (LBS)	4,000 PSI CONCRETE SHEAR (LBS)	6,000 PSI CONCRETE TENSION (LBS)	6,000 PSI CONCRETE SHEAR (LBS)
1/4	7/8	3 - 4	1,275	1,480	1,445	1,690	1,650	1,690
1/4	1-1/4	3 - 4	1,975	2,070	2,380	2,130	2,450	2,130
1/4	1-3/4	3 - 4	1,975	2,110	2,380	2,540	2,450	2,540
1/4	2	3 - 4	2,230	2,110	2,380	2,825	2,450	2,825
1/4	2-1/2	3 - 4	2,300	2,110	2,400	3,385	2,500	3,385
5/16	1-1/2	10 - 15	2,320	2,800	2,540	3,200	2,620	3,200
5/16	2	10 - 15	2,640	3,280	3,120	4,230	3,270	4,230
5/16	3	10 - 15	3,280	4,240	3,780	5,380	4,260	5,380
3/8	2	25 - 35	3,895	4,980	4,585	6,425	5,920	7,875
3/8	2-1/2	25 - 35	4,200	4,980	4,870	7,160	6,670	7,960
3/8	3-1/2	25 - 35	4,400	4,980	6,150	8,660	7,550	8,770
1/2	2-1/2	45 - 60	5,380	8,545	7,325	9,675	7,485	9,675
1/2	3	45 - 60	7,325	10,150	9,780	10,690	9,830	12,005
1/2	3-1/2	45 - 60	7,745	10,150	10,245	10,690	10,775	12,005
1/2	5	45 - 60	8,060	11,930	10,855	12,320	11,460	12,320
5/8	2-3/4	80 - 100	6,560	9,960	8,440	14,965	9,250	15,005
5/8	3	80 - 100	6,665	10,980	9,905	16,580	11,135	17,065
5/8	4	80 - 100	7,085	14,065	10,950	19,290	13,110	20,540
5/8	6	80 - 100	10,200	19,545	13,665	20,895	16,955	22,055
3/4	3	95 - 120	10,460	18,170	10,475	20,140	10,780	20,140
3/4	4	95 - 120	11,545	22,935	12,345	26,525	12,840	29,795
3/4	4-1/2	95 - 120	12,075	24,055	13,575	27,615	17,330	30,350
3/4	5	95 - 120	12,610	25,175	15,700	28,705	18,050	30,905
3/4	7	95 - 120	14,170	29,725	18,210	33,125	24,070	33,155
1"	4-1/4	185 - 200	14,800	30,000	20,400	35,600	25,500	40,800
1"	5	185 - 200	16,200	35,200	21,800	38,400	26,900	42,000
1"	6	185 - 200	18,300	37,000	24,200	40,000	28,600	42,000
1-1/4	6	350 - 375	24,600	53,200	33,800	63,400	43,800	74,800
1-1/4	7	350 - 375	27,440	57,800	35,500	66,800	45,600	77,000
1-1/4	8	350 - 375	30,000	60,000	38,000	70,000	48,120	77,000

### ULTIMATE LOAD CAPACITIES - CONCRETE - STAINLESS STEEL

ANCHOR SIZE (IN)	EMBED. DEPTH (IN)	GUIDE TORQUE (FT.-LBS)	2,000 PSI CONCRETE TENSION (LBS)	2,000 PSI CONCRETE SHEAR (LBS)	4,000 PSI CONCRETE TENSION (LBS)	4,000 PSI CONCRETE SHEAR (LBS)	6,000 PSI CONCRETE TENSION (LBS)	6,000 PSI CONCRETE SHEAR (LBS)
1/4	7/8	3 - 4	1,275	1,480	1,445	1,690	1,650	1,690
1/4	1-1/4	3 - 4	1,760	2,070	1,760	2,130	1,760	2,130
1/4	1-3/4	3 - 4	1,760	2,110	1,760	2,540	1,760	2,540
1/4	2	3 - 4	1,760	2,110	1,760	2,825	1,760	2,825
1/4	2-1/2	3 - 4	1,975	2,110	1,975	3,385	1,975	3,385
3/8	2	15 - 20	3,895	4,980	4,585	6,425	5,920	7,875
3/8	2-1/2	15 - 20	4,200	4,980	4,870	7,160	6,670	7,960
3/8	3-1/2	15 - 20	4,400	4,980	6,150	8,660	6,900	8,770
1/2	2-1/2	25 - 35	5,380	8,545	7,325	9,675	7,485	9,675
1/2	3	25 - 35	7,325	10,150	9,480	10,690	9,480	10,690
1/2	3-1/2	25 - 35	7,745	10,150	10,245	10,690	10,775	12,005
1/2	4-1/4	25 - 35	7,900	11,040	10,550	11,505	11,115	12,160
5/8	2-3/4	45 - 60	6,560	9,960	8,440	14,965	9,250	15,005
5/8	3	45 - 60	6,665	10,980	9,905	16,580	11,135	17,065
5/8	4	45 - 60	7,085	14,065	10,950	19,290	13,110	20,540
5/8	6	45 - 60	10,200	19,545	13,470	20,895	15,000	22,055
3/4	3	70 - 90	10,460	18,170	10,475	20,140	10,780	20,140
3/4	4	70 - 90	11,545	22,935	12,345	26,525	12,840	26,525
3/4	4-1/2	70 - 90	12,075	24,055	13,575	27,615	14,570	27,615
3/4	5	70 - 90	12,610	25,175	14,680	28,705	16,300	28,705
3/4	7	70 - 90	14,170	29,040	16,540	29,040	20,120	29,040

NOTE: The values listed above are ultimate load capacities which should be reduced by a minimum safety factor of 4 or greater to determine the allowable working load.

### ULTIMATE LOAD CAPACITIES - LIGHTWEIGHT CONCRETE

ANCHOR SIZE	EMBED. DEPTH	GUIDE TORQUE (FT.-LBS)	2000 PSI LIGHTWEIGHT CONCRETE TENSION (LBS)	2000 PSI LIGHTWEIGHT CONCRETE SHEAR (LBS)
1/4"	1-1/4"	4	1,190	1,480
1/4"	2"	4	1,510	1,540
3/8"	2"	20	2,920	3,830
3/8"	3-1/2"	20	4,200	4,980
1/2"	2-1/2"	35	3,280	7,120
1/2"	5"	35	5,540	8,730
5/8"	2-3/4"	60	4,830	11,300
5/8"	6"	60	6,730	14,340
3/4"	3"	85	7,320	13,790
3/4"	7"	85	9,860	19,740

NOTE: The values listed above are ultimate load capacities for both the carbon and stainless steel Power-Bolt anchors which should be reduced by a minimum safety factor of 4 or greater to determine the allowable working load.



### ULTIMATE LOAD CAPACITIES - C-90 BLOCK AND BRICK

ANCHOR SIZE	EMBED. DEPTH	GUIDE TORQUE (FT.-LBS.)	C-90 HOLLOW BLOCK	
			TENSION (LBS.)	SHEAR (LBS.)
1/4"	7/8"	4	1,030	1,320
1/4"	1-1/2"	4	1,410	1,540
3/8"	1-1/2"	20	1,840	3,250
1/2"	1-1/2"	35	2,530	4,230

ANCHOR SIZE	EMBED. DEPTH	GUIDE TORQUE (FT.-LBS.)	SOLID RED BRICK	
			TENSION (LBS.)	SHEAR (LBS.)
1/4"	7/8"	5	1,360	1,450
1/4"	1-1/2"	5	1,820	1,580
3/8"	2"	30	2,520	4,570
1/2"	2-1/2"	50	3,890	5,730
5/8"	2-3/4"	80	5,670	6,840
3/4"	3"	100	7,410	8,460

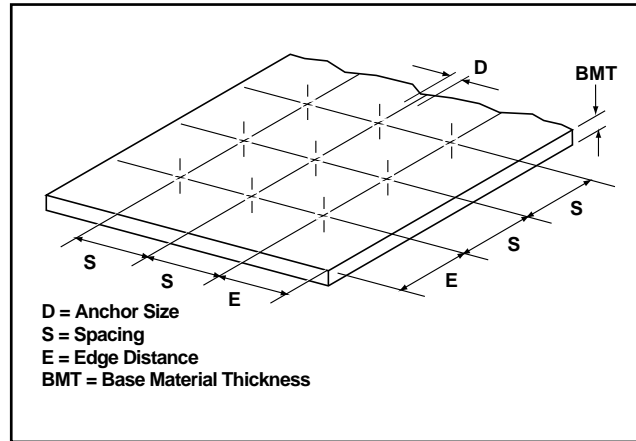
NOTE: The values listed above are ultimate load capacities for both the carbon steel and stainless steel Power-Bolt anchors. Depending upon anchor application and governing building code, ultimate load capacities should be reduced by a minimum safety factor of 4 or greater to determine the allowable working load. The design professional familiar with the actual product installation should be consulted. Please refer to the general section entitled Evaluation of Test Data that appears earlier in this manual for current industry standards. The consistency of hollow block or brick varies greatly. The load capacities listed above should be used as guidelines only. Job site tests should be conducted to verify base material consistency, proper installation torque values and actual anchor performance. The 1/2" size will consistently fail hollow block. The 5/8" or 3/4" sizes can be used, but the ultimate capacities will be no higher than those for the 1/2" size.

### ULTIMATE LOAD CAPACITIES - GROUT FILLED C-90 HOLLOW BLOCK

ANCHOR SIZE	EMBED. DEPTH	GUIDE TORQUE (FT.-LBS.)	GROUT FILLED BLOCK TENSION (LBS.)	SHEAR (LBS.)
1/4"	1-1/8"	4	1,520	1,480
1/4"	2-1/2"	4	2,200	1,480
3/8"	2"	20	2,480	3,830
3/8"	3-1/2"	20	2,650	3,830
1/2"	2-1/2"	35	3,045	7,060
1/2"	4"	35	3,360	7,060
5/8"	2-3/4"	60	3,200	11,250
5/8"	5"	60	3,720	11,250
3/4"	3"	85	4,180	12,340
3/4"	5"	85	5,310	12,340

NOTE: The values listed above are ultimate load capacities for both the carbon and stainless steel Power-Bolt anchor. Depending upon anchor application and governing building code, ultimate load capacities should be reduced by a minimum safety factor of 4 or greater to determine the allowable working load. The design professional familiar with the actual product installation should be consulted. Please refer to the general section entitled Evaluation of Test Data that appears earlier in this manual for current industry standards. The consistency of grout filled block varies greatly. The load capacities listed above should be used as guidelines only. Job site tests should be conducted to verify base material consistency, proper installation torque values and actual anchor performance.

### DESIGN CRITERIA



### BASE MATERIAL THICKNESS

The minimum recommended thickness of solid base material, BMT, when using the Power-Bolt anchor is 125% of the embedment to be used. For example, when installing an anchor to a depth of 4", the base material thickness should be 5". This does not apply to the thickness of the face shell in a hollow block wall.

### SPACING BETWEEN ANCHORS

To obtain the maximum load in tension or shear, a spacing, S, of 10 anchor diameters (10D) or greater should be used. The minimum recommended anchor spacing, S, is 5 anchor diameters (5D) at which point the load should be reduced by 50%. Anchor spacing closer or less than 5 diameters (5D) needs to be field tested. Actual base material conditions will determine any applicable reduction factor. The following table lists the load reduction factor, Rs, for each anchor diameter, D, based on the center to center anchor spacing.

ANCHOR SIZE D	ANCHOR SPACING, S (INCHES) TENSION AND SHEAR					
	10D	9D	8D	7D	6D	5D
1/4	2-1/2	2-1/4	2	1-3/4	1-1/2	1-1/4
5/16	3-1/8	2-7/8	2-1/2	2-1/4	1-7/8	1-5/8
3/8	3-3/4	3-3/8	3	2-5/8	2-1/4	1-7/8
1/2	5	4-1/2	4	3-1/2	3	2-1/2
5/8	6-1/4	5-5/8	5	4-3/8	3-3/4	3-1/8
3/4	7-1/2	6-3/4	6	5-1/4	4-1/2	3-3/4
1	10	9	8	7	6	5
1-1/4	12-1/2	11-1/4	9	8-3/4	7-1/2	6-1/4
<b>Rs</b>	<b>1.00</b>	<b>0.90</b>	<b>0.80</b>	<b>0.70</b>	<b>0.60</b>	<b>0.50</b>

### EDGE DISTANCE - TENSION

For tension loads, an edge distance, E, of 12 diameters (12D) or greater should be used to obtain the maximum tension load. The minimum recommended edge distance, E, is 5 diameters (5D) at which point the tension load should be reduced by 20%. Edge distances closer or less than 5 diameters (5D) need to be field tested. Actual base material conditions will determine any applicable

reduction factor. The following table lists the load reduction factor, Re, for each anchor diameter, D, based on the anchor center to edge distance.

ANCHOR SIZE D	EDGE DISTANCE, E (INCHES)							
	TENSION ONLY							
	12D	11D	10D	9D	8D	7D	6D	5D
1/4	3	2-3/4	2-1/2	2-1/4	2	1-3/4	1-1/2	1-1/4
5/16	3-3/4	3-1/2	3-1/8	2-7/8	2-1/2	2-1/4	1-7/8	1-5/8
3/8	4-1/2	4-1/8	3-3/4	3-3/8	3	2-5/8	2-1/4	1-7/8
1/2	6	5-1/2	5	4-1/2	4	3-1/2	3	2-1/2
5/8	7-1/2	6-7/8	6-1/4	5-5/8	5	4-3/8	3-3/4	3-1/8
3/4	9	8-1/4	7-1/2	6-3/4	6	5-1/4	4-1/2	3-3/4
1	12	11	10	9	8	7	6	5
1-1/4	15	13-1/4	12-1/2	11-1/4	9	8-3/4	7-1/2	6-1/4
<b>Re</b>	<b>1.00</b>	<b>0.97</b>	<b>0.94</b>	<b>0.91</b>	<b>0.89</b>	<b>0.86</b>	<b>0.83</b>	<b>0.80</b>

#### EDGE DISTANCE - SHEAR

For shear loads, an edge distance, E, of 12 anchor diameters (12D) or greater should be used to obtain the maximum load. The minimum recommended edge distance, E, is 5 anchor diameters (5D) at which point the shear load should be reduced by 50%. Edge distances closer or less than 5 diameters (5D) need to be field tested. Actual base material conditions will determine any applicable reduction factor. The following table lists the load reduction factor, Re, for each anchor diameter, D, based on the anchor center to edge distance.

ANCHOR SIZE D	EDGE DISTANCE, E (INCHES)							
	SHEAR ONLY							
	12D	11D	10D	9D	8D	7D	6D	5D
1/4	3	2-3/4	2-1/2	2-1/4	2	1-3/4	1-1/2	1-1/4
5/16	3-3/4	3-1/2	3-1/8	2-7/8	2-1/2	2-1/4	1-7/8	1-5/8
3/8	4-1/2	4-1/8	3-3/4	3-3/8	3	2-5/8	2-1/4	1-7/8
1/2	6	5-1/2	5	4-1/2	4	3-1/2	3	2-1/2
5/8	7-1/2	6-7/8	6-1/4	5-5/8	5	4-3/8	3-3/4	3-1/8
3/4	9	8-1/4	7-1/2	6-3/4	6	5-1/4	4-1/2	3-3/4
1	12	11	10	9	8	7	6	5
1-1/4	15	13-1/4	12-1/2	11-1/4	9	8-3/4	7-1/2	6-1/4
<b>Re</b>	<b>1.00</b>	<b>0.93</b>	<b>0.86</b>	<b>0.79</b>	<b>0.71</b>	<b>0.64</b>	<b>0.57</b>	<b>0.50</b>

#### APPROVALS AND LISTINGS

The following approvals and listings are for reference purposes. They should be reviewed by the design professional responsible for the product installation to verify approved base materials, sizes, and compliance with local codes.

ICBO ES Evaluation Report No. 5225

COLA Research Report No. 24960

SBCCI Report No. 9943

Factory Mutual Research Corporation J.I. 1K8A3.AH

Underwriters Laboratories File No. EX 1289 (N)

Metro-Dade pending

Federal Specification

Meets the proof load requirements of FF-S-325C,

Group II, Type 3, Class 3 (superceded)

#### SUGGESTED SPECIFICATIONS

##### CARBON STEEL HEX HEAD POWER-BOLT

Carbon steel expansion anchors shall be a pre-assembled heavy duty sleeve style, self-undercutting anchor with a Grade 5 hex head internal bolt. The anchors shall have a nylon compression ring and an expansion cone with an oversized annular ring which expands to undercut the base material. Carbon steel components shall be plated according to ASTM Specification B 633, SC1, Type III (Fe/Zn 5). Power-Bolt anchors shall be as dimensioned and supplied by Powers Fasteners Inc.

##### CARBON STEEL FLAT HEAD POWER-BOLT

Carbon steel expansion anchors shall be a pre-assembled heavy duty sleeve style, self-undercutting anchor with a Grade 5 flat head internal bolt. The anchors shall have a nylon compression ring and an expansion cone with an oversized annular ring which expands to undercut the base material. Carbon steel components shall be plated according to ASTM Specification B 633, SC1, Type III (Fe/Zn 5). Power-Bolt anchors shall be as dimensioned and supplied by Powers Fasteners Inc.

##### STAINLESS STEEL POWER-BOLT

Stainless steel expansion anchors shall be a pre-assembled heavy duty sleeve style, self-undercutting anchor with an internal hex head meeting the requirements of ASTM Specification F 593. The anchors shall have a nylon compression ring and an expansion cone with an oversized annular ring which expands to undercut the base material. The steel components shall be manufactured from Type 303 or 304 stainless steel. Power-Bolt anchors shall be as dimensioned and supplied by Powers Fasteners Inc.