Lok-Bolt[™]



MECHANICAL

Lok-Bolt[™] Sleeve Expansion Anchor

PRODUCT DESCRIPTION

The Lok-Bolt is a pre-assembled single unit sleeve anchor available in carbon steel and stainless steel which can be used in concrete, block, brick, and stone. The Lok-Bolt is designed to draw the fixture into full bearing against the base material through the action of its unique and flexible compression ring. This helps to increase the resistance of the anchor to loosening when subjected to vibratory loads. As the anchor is being tightened, the nylon compression ring will compress if necessary, so that the fixture is tightly secured against the face of the base material. Under load, the specially tapered plow bolt is drawn further into the expansion sleeve to develop increased locking action against the walls of the hole. Extension sleeves are added for longer lengths.

GENERAL APPLICATIONS AND USES

- Door and Window Frame Installations
- Shelving and StorageMasonry Applications
- Mounting fixtures on wallsMounting of Handrails and Fencing
- Electrical and Mechanical Attachments

FEATURES AND BENEFITS

- Multiple head styles for multiple applications and finished appearance
- Fits standard fixture holes No need to undersize anchors for proper fit
- Immediate Loading Minimizes downtime
- Sleeve has 360° contact area and reduces concrete stress
- Versatile and ideal for concrete, or masonry
- Available in carbon steel and Type 304 stainless steel

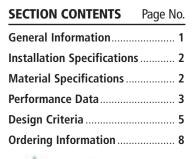
APPROVALS AND LISTINGS

Factory Mutual Research Corporation (FM Approvals) Serial No. 26692, J.I. OJ8A1.AH, J.I. OJ9A9.AH

Underwriters Laboratory (UL Listed) File No. EX 1289 (N) See listing for applicable sizes and styles.

GUIDE SPECIFICATIONS

CSI Divisions: 03151-Concrete Anchoring, 04081-Masonry Anchorage and 05090-Metal Fastenings. Sleeve Anchors shall be Lok-Bolt anchors as supplied by Powers Fasteners, Inc., Brewster, NY.





HEAD STYLES

Hex Head Acorn Nut Round Head Combo Flat Head Threshold Flat Head Rod Hanger Tie-Wire

ANCHOR MATERIALS

Zinc Plated Carbon Steel Type 304 Stainless Steel

ANCHOR SIZE RANGE (TYP.)

1/4" diameter x 5/8" length to 3/4" diameter x 7-1/2" length

SUITABLE BASE MATERIALS

Normal-Weight Concrete Structural Lightweight Concrete Grouted Concrete Masonry Hollow Concrete Masonry

Canada: (905) 673-7295 or (514) 631-4216

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(b)



Lok-Bolt[™]

INSTALLATION SPECIFICATIONS

Acorn Nut and Hex Head Lok-Bolt

	Anchor Size, d					
Dimension	1/4"	5/16"	3/8"	1/2"	5/8"	3/4"
ANSI Drill Bit Size, <i>d</i> _{bit} (in.)	1/4	5/16	3/8	1/2	5/8	3/4
Fixture Clearance Hole, <i>d_h</i> (in.)	5/16	3/8	7/16	9/16	11/16	15/16
Plow Bolt Size (UNC)	10-24	1/4-20	5/16-18	3/8-16	1/2-13	5/8-11
Nut Height (in.)	3/16	7/32	17/64	21/64	7/16	35/64
Washer O.D., <i>d</i> _w (in.)	1/2	5/8	13/16	1	1 3/8	1 3/4
Wrench Size (in.)	3/8	7/16	1/2	9/16	3/4	15/16

Round Head Lok-Bolt

		Anchor Size, d						
Dimension	1/4"	5/16"	3/8"					
ANSI Drill Bit Size, d _{bit} (in.)	1/4	5/16	3/8					
Fixture Clearance Hole, <i>d_h</i> (in.)	5/16	3/8	7/16					
Plow Bolt Size (UNC)	10-24	1/4-20	5/16-18					
Head Height (in.)	11/64	13/64	15/64					
Head Width, <i>d</i> _{hd} (in.)	29/64	9/16	43/64					

Combo Flat Head Lok-Bolt

		Anchor Size, d	
Dimension	1/4"	5/16"	3/8"
ANSI Drill Bit Size, <i>d</i> _{bit} (in.)	1/4	5/16	3/8
Fixture Clearance Hole, <i>d_h</i> (in.)	5/16	3/8	7/16
Plow Bolt Size (UNC)	10-24	1/4-20	5/16-18
Head Height (in.)	5/32	3/16	15/64
Head Width, <i>d_{hd}</i> (in.)	1/2	5/8	3/4

Installation Guidelines

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 head is firmly seated against the fixture. Be sure the anchor is driven to the required embedment depth.

Tighten the anchor by turning the nut of head 3 to 5 turns past finger tight or by applying the quide installation

torque from the finger tight position.



Rod Hanger Lok-Bolt

Dimension	1/4"	3/8"	1/2"			
ANSI Drill Bit Size, d _{bit} (in.)	1/4	3/8	1/2			
Plow Bolt Size (UNC)	1/4-20	5/16-18	3/8-16			
Coupling Height (in.)	7/8	1	1 1/4			
Washer O.D., <i>d</i> _w (in.)	5/8	13/16	1			
Coupling Wrench Size (in.)	7/16	1/2	11/16			

Component Material

Stainless Steel

Type 18-8 SS

Type 304 SS

Type 304 SS

Nylon

N/A

Threshold Lok-Bolt

Anchor Component

Plow Bolt

Expansion Sleeve

Extension Sleeve

Compression Ring

Zinc Plating

	Anchor Size, d
Dimension	1/4"
ANSI Drill Bit Size, <i>d</i> _{bit} (in.)	1/4
Fixture Clearance Hole, <i>d_h</i> (in.)	5/16
Plow Bolt Size (UNC)	10-24
Head Height (in.)	5/64
Head Width, <i>d</i> _{hd} (in.)	23/64

MATERIAL SPECIFICATIONS General Lok-Bolt Components

Tire-Wire Lok-Bolt

Anchor Size, d

	Anchor Size, d
Dimension	5/16"
ANSI Drill Bit Size, <i>d</i> _{bit} (in.)	5/16
Fixture Clearance Hole, <i>d_h</i> (in.)	1/4
Plow Bolt Size (UNC)	1/4-20
Head Height (in.)	1 9/16
Head Width, <i>d</i> _{hd} (in.)	31/64

Lok-Bolt Head Components

Anchor	Componen	t Material							
Component	Carbon Steel	Stainless Steel							
Hex Nut	ASTM A 563, Grade A	Type 304 SS							
Acorn Nut	AISI 1010 / 1018	Type 304 SS							
Washer	ASTM F 844	Type 18-8 SS							
Round Head	AISI 1010 / 1018	Type 304 SS							
Flat Head	AISI 1010 / 1018	Type 304 SS							
Rod Coupling	AISI 12L14	Type 18-8 SS							
Threshold	AISI 1010 / 1018	N/A							
Tie-Wire	AISI 1010 / 1018	N/A							
Zinc Plating	ASTM B 633, SC1, Type III (Fe/Zn 5)	N/A							

MECHANICA ANCHORS

Carbon Steel

AISI 1010 / 1018

AISI 1010 / 1020

AISI 1010 / 1020

Nylon ASTM B633, SC1, Type III (Fe/Zn 5) MECHANICAL ANCHORS

PERFORMANCE DATA

Ultimate Load Capacities for Carbon and Stainless Steel Lok-Bolt in Normal-Weight Concrete¹

Anchor	Minimum		mum		Minimum Concrete Com			rength (f' _c)	
Diameter	Embed. Depth		ening que	2,000 psi	(13.8 MPa)	4,000 psi	(27.6 MPa)	6,000 psi	(41.4 MPa)
d in.	\dot{h}_{v} in.	<i>Т</i> , ft	nax Ibs.	Tension Ibs.	Shear lbs.	Tension lbs.	Shear Ibs.	Tension lbs.	Shear lbs.
(mm) 1/4	(mm) 5/8 (15.9)	Carbon	Stainless	(kN) 540 (2.4)	(kN) 1,000 (4.5)	(kN) 620 (2.8)	(kN) 1,200 (5.4)	(kN) 680 (3.1)	(kN) 1,200 (5.4)
(6.4)	1 1/8 (28.6)	3-4	2-3	1,000 (4.5)	1,520 (6.8)	1,150 (5.1)	1,520 (6.8)	1,150 (5.1)	1,520 (6.8)
5/16 (7.9)	1 1/2 (38.1)	6-8	-	2,000 (8.9)	1,520 (6.8)	2,040 (9.0)	1,520 (6.8)	2,040 (9.0)	1,520 (6.8)
3/8 (9.5)	1 5/8 (41.3)	12-16	8-11	2,450 (11.1)	2,440 (11.0)	2,680 (12.1)	2,440 (11.0)	2,700 (12.2)	2,440 (11.0)
1/2 (12.7)	2 1/4 (57.2)	20-28	15-20	4,770 (21.5)	4,210 (19.0)	5,015 (22.6)	4,220 (19.0)	5,275 (23.7)	4,210 (19.0)
5/8	2 1/4 (57.2)	45-60	30-40	3,270 (14.7)	7,200 (32.4)	5,860 (26.4)	7,200 (32.4)	6,250 (28.1)	7,200 (32.4)
(15.9)	2 3/4 (69.9)	45 00	5040	6,060 (27.3)	7,820 (35.2)	6,620 (29.8)	7,820 (35.2)	6,800 (30.6)	7,810 (35.2)
3/4	2 1/4 (57.2)	70-90	45-60	4,480 (20.2)	9,840 (44.3)	8,420 (37.9)	11,670 (52.5)	8,940 (40.2)	11,670 (52.5)
(19.1)	3 3/8 (85.7)	70-50	-500	6,790 (30.6)	12,600 (56.7)	8,720 (39.2)	12,600 (56.7)	8,940 (40.2)	12,600 (56.7)

1. The values listed above are ultimate load capacities which should be reduced by a minimum safety factor of 4.0 or greater to determine the allowable working load. Consideration of safety factors of 10 or higher may be necessary depending on the application, such as life safety or overhead.

Allowable Load Capacities for Carbon and Stainless Steel Lok-Bolt in Normal-Weight Concrete^{1,2}

Anchor	Minimum		imum	Minimum Concrete Compressive Strength (f'c)							
Diameter	Embed. Depth		ening que	2,000 psi	(13.8 MPa)	4,000 psi	(27.6 MPa)	6,000 psi (41.4 MPa)		
d in.	\dot{h}_{v} in.	<i>T</i> , ft	nax Ibs.	Tension lbs.	Shear Ibs.	Tension lbs.	Shear Ibs.	Tension Ibs.	Shear lbs.		
(mm) 1/4	(mm) 5/8 (15.9)	Carbon	Stainless	(kN) 135 (0.6)	(kN) 250 (1.1)	(kN) 155 (0.7)	(kN) 300 (1.4)	(kN) 170 (0.8)	(kN) 300 (1.4)		
(6.4)	1 1/8 (28.6)	3-4	2-3	250 (1.0)	380 (1.7)	285 (1.3)	380 (1.7)	285 (1.8)	380 (1.7)		
5/16 (7.9)	1 1/2 (38.1)	6-8	_	500 (2.2)	380 (1.7)	510 (2.2)	380 (1.7)	510 (2.2)	380 (1.7)		
3/8 (9.5)	1 5/8 (41.3)	12-16	8-11	615 (2.2)	610 (2.7)	670 (3.0)	610 (2.7)	675 (3.0)	610 (2.7)		
1/2 (12.7)	2 1/4 (57.2)	20-28	15-20	1,195 (5.4)	1,055 (4.7)	1,255 (5.6)	1,055 (4.7)	1,320 (5.9)	1,055 (4.7)		
5/8	2 1/4 (57.2)	45-60	30-40	818 (3.7)	1,800 (8.1)	1,465 (6.6)	1,800 (8.1)	1,565 (7.0)	1,800 (8.1)		
(15.9)	2 3/4 (69.9)	45-00	30-40	1,515 (6.8)	1,955 (8.8)	1,655 (7.4)	1,955 (8.8)	1,700 (7.7)	1,955 (8.8)		
3/4	2 1/4 (57.2)	70-90	40-60	1,120 (5.0)	2,460 (11.1)	2,105 (9.5)	2,918 (13.1)	2,235 (10.1)	2,920 (13.1)		
(19.1) 3 3/8 (85.7)		70-90	40-00	1,700 (7.7)	3,150 (14.2)	2,180 (9.8)	3,150 (14.2)	2,235 (10.1)	3,150 (14.2)		

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 application, such as life safety or overhead.

wers STENERS

PERFORMANCE DATA

Ultimate and Allowable Load Capacities for Carbon and Stainless Steel Lok-Bolt in Structural Lightweight Concrete^{1,2}

			Minimum Concrete Compressive Strength							
Anchor	Min.	Maximum	i	f _c = 3,000 p	si (20.7 MPa)		:	f _c = 5,000 p	si (34.5 MPa)	
Dia.	Embed.	Tightening	Ultima	te Load	Allowat	ole Load	Ultimat	e Load	Allowab	ole Load
d in. (mm)	Depth <i>h</i> _v in. (mm)	Torque T _{max} ftIbs.	Tension Ibs. (kN)	Shear Ibs. (kN)	Tension Ibs. (kN)	Shear Ibs. (kN)	Tension Ibs. (kN)	Shear Ibs. (kN)	Tension Ibs. (kN)	Shear Ibs. (kN)
1/4	1/4	2-3	1,040	1,160	260	290	1,240	1,160	310	290
(6.4)	(6.4)		(4.7)	(5.2)	(1.2)	(1.3)	(5.6)	(5.2)	(1.4)	(1.3)
5/16	5/16	5-6	1,140	1,560	285	390	1,720	1,560	430	390
(7.9)	(7.9)		(5.1)	(7.0)	(1.3)	(1.8)	(7.7)	(7.0)	(1.9)	(1.8)
3/8	3/8	8-11	1,180	2,600	295	650	1,720	2,600	430	650
(9.5)	(9.5)		(5.3)	(11.7)	(1.3)	(2.9)	(7.7)	(11.7)	(1.9)	(2.9)
1/2	1/2	15-20	2,400	4,020	600	1,005	3,780	4,020	945	1,005
(12.7)	(12.7)		(10.8)	(18.1)	(2.7)	(4.5)	(17.0)	(18.1)	(4.3)	(4.5)
5/8	5/8	30-40	3,740	6,420	935	1,605	4,640	6,420	1,160	1,605
(15.9)	(15.9)		(16.8)	(28.9)	(4.2)	(7.2)	(20.9)	(28.9)	(5.2)	(7.2)
3/4	3/4	40-60	3,740	10,440	935	2,610	4,640	10,440	1,160	2,610
(19.1)	(19.1)		(16.8)	(47.0)	(4.2)	(11.7)	(20.9)	(47.0)	(5.2)	(11.7)

1. The values listed above are ultimate and allowable load capacities for anchors in sand-lightweight concrete.

2. Allowable load capacities 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.

Ultimate and Allowable Load Capacities for Carbon and Stainless Steel Lok-Bolt Installed Through Metal Deck into Structural Lightweight Concrete^{1,2,3,4}

			Lightweight Concrete Over Minimum 20 Ga. Metal Deck $f'_c \ge 3,000$ (20.7 MPa							' MPa)
Anchor	Min.	Maximum	Mi	nimum 1-1/	2" Wide De	eck	Mi	nimum 4-1	/2" Wide De	eck
Dia.	Embed.	Tightening	Ultima	te Load	Allowa	ole Load	Ultimat	e Load	Allowak	ole Load
d in. (mm)	Depth <i>h</i> _v in. (mm)	Torque <i>T_{max}</i> ftIbs.	Tension Ibs. (kN)	Shear Ibs. (kN)	Tension Ibs. (kN)	Shear Ibs. (kN)	Tension Ibs. (kN)	Shear Ibs. (kN)	Tension Ibs. (kN)	Shear Ibs. (kN)
1/4 (6.4)	1 1/4 (31.8)	2-3	1,080 (4.9)	1,920 (8.6)	270 (1.2)	480 (2.2)	1,080 (4.9)	1,920 (8.6)	270 (1.2)	480 (2.2)
5/16 (7.9)	1 1/2 (38.1)	5-6	1,080 (4.9)	1,920 (8.6)	270 (1.2)	480 (2.2)	1,080 (4.9)	1,920 (8.6)	270 (1.2)	480 (2.2)
3/8 (9.5)	2 (50.8)	8-11	1,080 (4.9)	2,480 (11.2)	270 (1.2)	620 (2.8)	1,080 (4.9)	1,920 (8.6)	270 (1.2)	480 (2.2)
1/2 (12.7)	2 1/2 (63.5)	15-20	1,940 (8.7)	2,480 (11.2)	485 (2.2)	620 (2.8)	2,840 (12.8)	4,640 (20.9)	710 (3.2)	1,160 (5.2)
5/8 (15.9)	2 3/4 (69.9)	30-40	-	-	-	-	2,840 (12.8)	4,640 (20.9)	710 (3.2)	1,160 (5.2)
3/4 (19.1)	3 (76.2)	40-60	_	_	-	_	4,440 (20.0)	9,060 (40.8)	1,110 (5.0)	2,265 (10.2)

 The values listed above are ultimate and allowable load capacities for anchors in sand-lightweight concrete over metal deck.
 Allowable loads capacities 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.

Jabulated load values are for anchors installed in the center of the flute. Spacing distances shall be in accordance with the spacing lightweight concrete table listed in the Design Criteria section.
 Anchors are permitted to be installed in the lower or upper flute of the metal deck provided the proper installed procedures are maintained.

Lok-Bolt[™]

or Solid Concrete Masonry^{1,2,3,4,5,6}

Maximum

Tightening

Torque

T_{max}

ft.-lbs.

1-3

1-3

4-6

8-11

16-20

Maximum

Tightening

Torque

T_{max} ft.-lbs.

1-3

1-3

4-6

8-11

16-20

or Solid Clay Brick Masonry^{1,2,3,4}

Min.

Embed.

Depth

 h_v

in.

(mm)

5/8 (15.9)

1 1/8 (28.6)

1 1/2 (38.1)

1 1/2 (38.1)

1 1/2 (38.1)

Min.

Embed.

Depth

 h_v

in.

(mm)

5/8 (15.9)

11/8

1 1/2 (38.1)

1 1/2 (38.1)

1 1/2 (38.1)

Anchor

Dia.

d

in.

(mm)

1/4(6.4)

5/16 (7.9)

3/8 (9.5)

1/2 (12.7)

Anchor

Dia.

d

in.

(mm)

1/4(6.4)

5/16 (7.9)

3/8 (9.5)

1/2

(12.7)

Ultimate and Allowable Load Capacities for Lok-Bolt in Hollow

Min.

End

Dist.

in.

(mm)

3 3/4

(95.3)

8

(203.2)

8

(203.2)

12

(304.8)

12

(304.8)

Min.

End

Dist.

in.

(mm)

4

(101.6)

8

(203.2)

Min.

Edge

Dist.

in.

(mm)

3 3/4

(95.3)

3 3/4

(95.3)

3 3/4

(95.3)

12

(304.8)

12

(304.8)

Min.

Edge

Dist.

in.

(mm)

4

(101.6)

8

(203.2)

Ultimate and Allowable Load Capacities for Lok-Bolt in Hollow



Allowable Load

Shear

lbs. (kN)

200

(0.9)

255

(1.1)

395

(1.8)

435

(2.0)

570

(2.6)

Shear

lbs.

(kN)

225

(1.0)

225

(1.0)

225

(1.0)

250

(1.1)

800

(3.6)

Allowable Load

Tension

lbs

(kN)

45

(0.2)

240

(1.1)

285

(1.3)

340

(1.5)

490

(2.2)

Tension

lbs.

(kN)

160

(0.7)

190

(0.9)

245

(1.1)

370

(1.7)

705

(3.2)

f′*m* ≥ **1,500 psi** (10.4 MPa)

f'_m ≥ 1,500 psi (10.4 MPa)

Ultimate Load

Shear

Ibs. (kN)

1,000

(4.5)

1,270

(5.7)

1,970

(8.9)

2,180

(9.8)

2.840

(12.8)

Shear

lbs.

(kN)

1,120 (5.0)

1,120

(5.0)

1,120

(5.0)

1,260

(5.7)

4.010

(18.0)

Ultimate Load

Tension

lbs

(kN)

230

(1.0)

1,200

(5.4)

1,430

(6.4)

1,700

(7.7)

2,460

(11.1)

Tension

lbs

(kN)

800

(3.6)

950

(4.3)

1,230

(5.5)

1,860

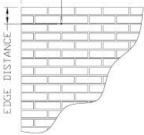
(8.4)

3,520

(15.8)

PERFORMANCE DATA

- 1. Tabulated load values are for carbon and stainless steel anchors installed in minimum 6-inch wide, Grade N, Type II, medium and normal-weight concrete masonry units. Mortar must be minimum Type N. Masonry prism compressive strength must be 1,500 psi minimum at the time of installation.
- 2. Allowable loads are for carbon and stainless steel anchors and are based on average ultimate values using a safety factor of 5.0. Consideration of safety baing a safety factor of 0.0 or bioleration of safety factors of 10 or higher may be necessary depending on the application, such as life safety or overhead. Linear interpolation may be used for allowable loads for intermediate embedment depths.
- The tabulated values are for anchors installed at a minimum of 12 anchor diameters on center for 100 percent capacity. Spacing distances may be reduced to 6 anchor diameters on center provided the capacities are reduced by 50 percent. Linear interpolation may be
- used for intermediate spacings. Anchors with diameters of 1/2" and larger installed in hollow concrete masonry units are limited to one 5. anchor per unit cell.
- 6. Anchors shall be of suitable length for the masonry wall thickness and attachment
 - END DISTANCE



- 1. Tabulated load values are for carbon and stainless steel
- Trabulated Toda values are conclusion and statilizes steel anchors installed in Grade SW multiple wythe, solid brick masony conforming to ASTM C62.
 Allowable loads 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.
- The tabulated values are for anchors installed at a minimum of 12 anchor diameters on center for 100 percent capacity. Spacing distances may be reduced to 6 anchor diameters on center provided the capacities are reduces by 50 percent. Linear interpolation may be used for intermediate spacings.
- 4. Anchors length shall be of suitable length for the concrete masonry wall thickness and attachment.

DESIGN CRITERIA

Combined Loading

For anchors loaded in both shear and tension, the combination of loads should be proportioned as follows:

$$\left(\frac{N_u}{N_n}\right)^{\frac{5}{3}} + \left(\frac{V_u}{V_n}\right)^{\frac{5}{3}} \le 1 \quad \text{OR} \quad \left(\frac{N_u}{N_n}\right) + \left(\frac{V_u}{V_n}\right) \le 1$$

- Where: N_u = Applied Service Tension Load
 - N_n = Allowable Tension Load
 - V_u = Applied Service Shear Load
 - V_n = Allowable Shear Load

Load Adjustment Factors for Spacing and Edge Distances

	Anchor Installed in Normal-Weight Concrete												
AnchorCritical DistanceCriticalMinimum DistanceMinimumDimensionLoad Type(Full Anchor Capacity)Load Factor(Reduced Capacity)Load Factor													
Spacing (s)	Tension and Shear	$S_{cr} = 3.0 h_V$	$F_N = F_V = 1.0$	$S_{min} = 1.5 h_V$	$F_N = F_V = 0.50$								
Edge Distance (c)	Tension	c _{cr} = 12 d	$F_{N} = 1.0$	c _{min} = 5d	$F_N = 0.70$								
Euge Distance (c)	Shear	$c_{cr} = 12 d$	$F_{V} = 1.0$	c _{min} = 5d	$F_V = 0.45$								

	Anchor Installed in Lightweight Concrete									
Anchor Dimension	Load Type			Minimum Distance (Reduced Capacity)	Minimum Load Factor					
Spacing (s)	Tension and Shear	$S_{cr} = 3.0 h_V$	$F_N = F_V = 1.0$	$S_{min} = 1.5 h_V$	$F_N = F_V = 0.50$					
Edge Distance (<i>c</i>)	Tension	c _{cr} = 12 d	$F_{N} = 1.0$	c _{min} = 5d	$F_N = 0.85$					
Euge Distance (C)	Shear	c _{cr} = 12 d	$F_V = 1.0$	Cmin = 5d	$F_V = 0.40$					

1. Allowable load values found in the performance data tables are multiplied by reduction factors when anchor spacing or edge distances are less than critical distances. Linear interpolation is allowed for intermediate anchor spacing and edge distances between critical and minimum distances. When an anchor is affected by both reduced spacing and edge distance, the spacing and edge reduction factors must be combined (multiplied). Multiple reduction factors for anchor spacing and edge distance may be required depending on the anchor group configuration. (b)

ANCHORS

FASTENERS

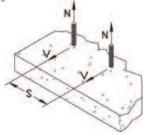
MECHANICA

DESIGN CRITERIA

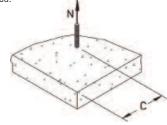
Load Adjustment Factors for Normal-Weight Concrete

			Spacing, T	ension (F _N)	& Shear (F _v	·)	
Dia	. (in.)	1/4	5/16	3/8	1/2	5/8	3/4
	in.))	1 1/4	1 1/2	2	2 1/2	2 3/4	3
<i>s_{cr}</i> (in.)		3 3/4	4 1/2	6	7 1/2	8 1/4	9
S _{mi}	n (in.)	1 7/8	2 1/4	3	3 3/4	4 1/8	4 1/2
	1 7/8	0.50					
	2 1/4	0.56	0.50				
(inches)	3	0.80	0.67	0.50			
L S	3 3/4	1.00	0.83	0.63	0.50		
Ŀ.	4		0.89	0.67	0.53		
S.	4 1/8		0.92	0.69	0.55	0.50	
ng	4 1/2		1.00	0.75	0.60	0.55	0.50
Spacing,	6			1.00	0.80	0.73	0.67
S l	7 1/2				1.00	0.91	0.83
	8 1/4					1.00	0.92
	9						1.00

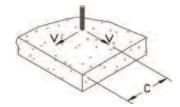
Notes: For anchors loaded in tension and shear, the critical spacing (s_{cr}) is equal to 3 embedment depths $(3 h_V)$ at which the anchor achieves 100% of load. Minimum spacing (s_{min}) is equal to 1.5 embedment depths $(1.5 h_V)$ at which the anchor achieves 50% of load



Notes: For anchors loaded in tension, the critical edge distance (c_{cr}) is equal to 12 anchor diameters (12d) at which the anchor achieves 100% of load. Minimum edge distance (c_{min}) is equal to 5 anchor diameters (5d) at which the anchor achieves 70% of load.



Notes: For anchors loaded in shear, the critical edge distance (c_{cr}) is equal to 12 anchor diameters (12*d*) at which the anchor achieves 100% of load. Minimum edge distance (c_{min}) is equal to 5 anchor diameters (5*d*) at which the anchor achieves 45% of load.



			Edge D	istance, Ter	ision (F _N)		
Dia. (in.)		1/4	5/16	3/8	1/2	5/8	3/4
Ccr	(in.)	3	3 3/4	4 1/2	6	7 1/2	9
C _{mi}	in (in.)	1 1/4	1 5/8	1 7/8	2 1/2	3 1/8	3 3/4
	1 1/4	0.70					
(inches)	1 5/8	0.76	0.70				
뉟	1 7/8	0.81	0.74	0.70			
	2 1/2	0.91	0.83	0.77	0.70		
U di	3	1.00	0.90	0.83	0.74		
۳ ۳	3 1/8		0.91	0.84	0.75	0.70	
tar	3 3/4		1.00	0.91	0.81	0.74	0.70
Distance,	4 1/2			1.00	0.87	0.79	0.74
	6				1.00	0.90	0.81
Edge	7 1/2					1.00	0.84
ш	9						1.00

			Edge I	Distance, Sh	near (<i>F_V</i>)		
Dia	. (in.)	1/4	5/16	3/8	1/2	5/8	3/4
Ccr	(in.)	3	3 3/4	4 1/2	6	7 1/2	9
C _{mi}	in (in.)	1 1/4	1 5/8	1 7/8	2 1/2	3 1/8	3 3/4
	1 1/4	0.45					
(inches)	1 5/8	0.57	0.45				
1 2	1 7/8	0.65	0.53	0.45			
	2 1/2	0.84	0.69	0.58	0.45		
U aŭ	3	1.00	0.81	0.69	0.53		
stance,	3 1/8		0.84	0.71	0.55	0.45	
tai	3 3/4		1.00	0.84	0.65	0.53	0.45
Dis	4 1/2			1.00	0.76	0.62	0.53
e la	6				1.00	0.81	0.69
Edg	7 1/2					1.00	0.84
	9						1.00

ANCHO

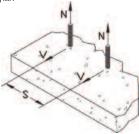


DESIGN CRITERIA

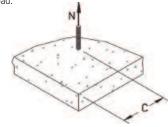
Load Adjustment Factors for Lightweight Concrete

			Spacing, T	ension (F _N)	& Shear (<i>F</i> _v	·)	
Dia	. (in.)	1/4	5/16	3/8	1/2	5/8	3/4
h _v (1 1/4	1 1/2	2	2 1/2	2 3/4	3
S _{cr} (in.)		3 3/4	4 1/2	6	7 1/2	8 1/4	9
S _{min} (in.)		1 7/8	2 1/4	3	3 3/4	4 1/8	4 1/2
	1 7/8	0.50					
	2 1/4	0.56	0.50				
(inches)	3	0.80	0.67	0.50			
L S	3 3/4	1.00	0.83	0.63	0.50		
i.	4		0.89	0.67	0.53		
s,	4 1/8		0.92	0.69	0.55	0.50	
ng	4 1/2		1.00	0.75	0.60	0.55	0.50
aci	6			1.00	0.80	0.73	0.67
Spacing,	7 1/2				1.00	0.91	0.83
	8 1/4					1.00	0.92
	9						1.00

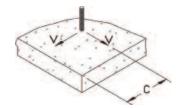
Notes: For anchors loaded in tension and shear, the critical spacing (s_{cr}) is equal to 3 embedment depths $(3h_V)$ at which the anchor achieves 100% of load. Minimum spacing (s_{min}) is equal to 1.5 embedment depths $(1.5h_V)$ at which the anchor achieves 50% of load



Notes: For anchors loaded in tension, the critical edge distance (c_{cr}) is equal to 12 anchor diameters (12 *d*) at which the anchor achieves 100% of load. Minimum edge distance (c_{min}) is equal to 5 anchor diameters (5 *d*) at which the anchor achieves 85% of load.



Notes: For anchors loaded in shear, the critical edge distance (c_{cr}) is equal to 12 anchor diameters (12*d*) at which the anchor achieves 100% of load. Minimum edge distance (c_{min}) is equal to 5 anchor diameters (5*d*) at which the anchor achieves 40% of load.



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	Edge Distance, Tension (<i>F_N</i>)												
Dia	. (in.)	1/4	5/16	3/8	1/2	5/8	3/4						
C _{cr} (in.) C _{min} (in.)		3	3 3/4	4 1/2	6	7 1/2	9						
		1 1/4	1 5/8	1 7/8	2 1/2	3 1/8	3 3/4						
	1 1/4	0.85											
(inches)	1 5/8	0.88	0.85										
뉟	1 7/8	0.90	0.87	0.85									
	2 1/2	0.96	0.91	0.89	0.85								
U	3	1.00	0.95	0.91	0.87								
۳ ۲	3 1/8		0.96	0.92	0.88	0.85							
tai	3 3/4		1.00	0.96	0.90	0.87	0.85						
Distance,	4 1/2			1.00	0.94	0.90	0.87						
	6				1.00	0.95	0.91						
dge	7 1/2					1.00	0.92						
ū	9						1.00						

			Edge I	Distance, Sh	near (<i>F_V</i>)		
Dia	. (in.)	1/4	5/16	3/8	1/2	5/8	3/4
Ccr	(in.)	3	3 3/4	4 1/2	6	7 1/2	9
C _{mi}	n (in.)	1 1/4	1 5/8	1 7/8	2 1/2	3 1/8	3 3/4
	1 1/4	0.40					
(inches)	1 5/8	0.53	0.40				
	1 7/8	0.61	0.49	0.40			
	2 1/2	0.83	0.66	0.54	0.40		
U S	3	1.00	0.79	0.66	0.49		
۳ ۳	3 1/8		0.83	0.69	0.51	0.40	
Distance,	3 3/4		1.00	0.83	0.61	0.49	0.40
Si	4 1/2			1.00	0.74	0.59	0.49
ge [6				1.00	0.79	0.66
	7 1/2					1.00	0.83
Ē	9						1.00

PRODUCT INFORMATION

Lok-Bolt[™]

ORDERING INFORMATION

Hex Nut Lok-Bolt

Catalog	Number		Bolt	Drill	Minimum	Standard	Standard	Wt./
Carbon	Stainless	Size	Length	Diameter	Embed.	Box	Carton	100
5005	-	5/16" x 1-1/2"	1 13/16"	5/16"	1 3/8"	100	1,000	4 1/4
5010	-	5/16" x 2 3/8"	2 11/16"	5/16"	1 1/2"	100	500	5 3/4
5015	6152	3/8" x 1 7/8"	2 3/16"	3/8"	1 5/8"	50	500	7
5020	6153	3/8" x 3"	3 5/16"	3/8"	1 5/8"	50	500	10
5022	-	3/8" x 4"	4 5/16"	3/8"	1 5/8"	50	500	16
5025	6156	1/2" x 2 1/4"	2 7/8"	1/2"	2 1/8"	25	250	14
5030	6157	1/2" x 3"	3 3/8"	1/2"	2 1/4"	25	250	17 1/4
5034	6160	1/2" x 4"	4 3/8"	1/2"	2 1/4"	25	125	22
5033	-	1/2" x 5 1/4"	6 1/8"	1/2"	2 1/4"	25	125	27
5032	-	1/2" x 6"	6 3/4"	1/2"	2 1/4"	10	100	35
5035	-	5/8" x 2 1/4"	3 3/16"	5/8"	2 1/8"	25	125	25 1/2
5038	-	5/8" x 3"	3 3/4"	5/8"	2 3/4"	25	125	34
5040	6164	5/8" x 4 1/4"	5"	5/8"	2 3/4"	10	100	41
5045	-	5/8" x 6"	6 1/4"	5/8"	2 3/4"	10	100	49
5050	-	3/4" x 2 3/4"	3 5/8"	3/4"	2 1/8"	10	100	46
5055	6168	3/4" x 4 1/4"	5 1/8"	3/4"	3 3/8"	10	40	70
5060	-	3/4" x 6 1/4"	7 1/8"	3/4"	3 3/8"	10	30	90
5065	-	3/4" x 8 1/4"	9"	3/4"	3 3/8"	10	30	115

The published minimum length is measured from below the washer to the end of the anchor. Actual anchor lengths may be slightly longer.

Acorn Nut Lok-Bolt

Catalog	Catalog Number		Bolt	Drill	Minimum	Standard	Standard	Wt./
Carbon	Stainless	Size	Length	Diameter	Embed.	Box	Carton	100
*5125	-	1/4" x 5/8"	1 1/32"	1/4"	1/2 "	100	1,000	2
5150	6150	1/4" x 1 3/8"	1 21/32"	1/4"	1 1/8"	100	1,000	2 3/4
5175	-	1/4" x 2 1/4"	2 9/16"	1/4"	1 1/8"	100	1,000	3 1/4

The published minimum length is measured from below the washer to the end of the anchor. Actual anchor lengths may be slightly longer. *This size does not have a compression ring.

Round Head Lok-Bolt, Slotted

Catalog	Number		Drill	Minimum	Standard	Standard	Wt./
Carbon	Stainless	Size	Diameter	Embed.	Box	Carton	100
*5205	-	1/4" x 1 1/8"	5/16"	1 3/8"	100	1,000	4 1/4
5210	6180	1/4" x 2"	5/16"	1 1/2"	100	500	5 3/4
5215	-	1/4" x 2 3/4"	3/8"	1 5/8"	50	500	7
5235	-	3/8" x 2 1/2"	1/2"	2 1/4"	25	250	17 1/4
5240	-	3/8" x 3 3/4"	1/2"	2 1/4"	25	125	22



The published length is measured from below the head to the end of the anchor. * This size does not have a compression ring.



ORDERING INFORMATION

Combo Flat Head Lok-Bolt

Catalog	Number		Drill	Minimum	Standard	Standard	Wt./
Carbon	Stainless	Size	Diameter	Embed.	Вох	Carton	100
5305	-	1/4" x 1 1/8"	1/4"	1"	100	1,000	2
5310	6170	1/4" x 2"	1/4"	1 1/8"	100	1,000	2 3/4
5315	6172	1/4" x 3"	1/4"	1 1/8"	100	1,000	3 3/4
5320	-	1/4" x 4"	1/4"	1 1/8"	100	500	4 1/2
5325	-	1/4" x 5 1/4"	1/4"	1 1/8"	100	500	6 1/2
5330	-	5/16" x 2 1/2"	5/16"	1 1/2"	100	1,000	4 1/2
5340	-	3/8" x 2 3/4"	3/8"	1 5/8"	50	500	7 1/2
5345	6174	3/8" x 4"	3/8"	1 5/8"	50	250	10 3/4
5350	6175	3/8" x 5"	3/8"	1 5/8"	50	250	14
5360	6176	3/8" x 6"	3/8"	1 5/8"	50	250	16



The published length is the minimum overall length of the anchor. Combo Flat Head Lok-Bolts do not have a compression ring.

Threshold Flat Head Lok-Bolt, Slotted

Catalog	Number		Drill	Minimum	Standard	Standard	Wt./
Carbon	Stainless	Size	Diameter	Embed.	Box	Carton	100
5500	-	1/4" x 2"	1/4"	1 1/8"	100	1,000	2 1/2

The published length is the minimum overall length of the anchor. Threshold Flat Head Lok-Bolts do not have a compression ring.

Rod Hanger Lok-Bolt

Catalog Number			Drill	Minimum	Standard	Standard	Wt./
Carbon	Stainless	Size	Diameter	Embed.	Box	Carton	100
5810	-	1/4" x 1 1/2"	5/16"	1 1/2"	50	250	5 1/2
5815	-	3/8" x 1 7/8"	3/8"	1 5/8"	50	250	9
5825	_	1/2" x 2 1/4"	1/2"	2 1/4"	25	125	21

The published length is measured from below the washer to the end of the anchor. Rod Hanger Lok-Bolts do not have a compression ring.

Tie-Wire Lok-Bolt

Catalog Number			Drill	Minimum	Standard	Standard	Wt./
Carbon	Stainless	Size	Diameter	Embed.	Вох	Carton	100
5700	-	5/16" x 1 1/2"	5/16"	1 1/2"	100	1,000	5 1/4

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

Lok-Bolt Extenders

Catalog Number			Drill	Minimum	Standard	Standard	Wt./
Carbon	Stainless	Size	Diameter	Embed.	Вох	Carton	100
5684	5689	3/8" x 1"	3/8"	1 5/8"	50	500	3

Extenders are used for added length on all head styles.



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