Wedge-Bolt® *Screw Anchor*

Carbon Steel OT and 410 Stainless Steel

PRODUCT DESCRIPTION

The Wedge-Bolt anchor is a one piece, heavy duty screw anchor with a finished hex head. It is simple to install, easy to identify, fully removable and vibration resistant. The Wedge-Bolt has many unique features and benefits that make it well suited for many applications in a variety of base materials. Optimum performance is obtained using a combination of patented design concepts. The steel threads along the anchor body self tap into the hole during installation and provide positive keyed engagement.

The benefit to the designer is higher load capacities, while the benefit to the user is ease of installation. The Wedge-Bolt can be installed with either a powered impact wrench or conventional hand socket.

Wedge-Bolt OT – The Wedge-Bolt OT is specifically engineered for use in fixture clearance holes sized a minimum of 1/8" over nominal. The Wedge-Bolt OT must be installed with an ANSI rotary drill bit.

410 Stainless Steel Wedge-Bolt – Wedge-Bolt screw anchors are designed to be used with a matched tolerance Wedge-Bit for optimum performance. The 410 Stainless Steel Wedge-Bolt works in fixture clearance holes that are 1/16" over nominal, which is typical of standard fixture holes used in steel fabrication.

GENERAL APPLICATIONS AND USES

- Racking and Shelving
- Support Ledgers
- Fencing
- Maintenance
- Material Handling
- Storage Facilities
- Repairs
- Retrofits

FEATURES AND BENEFITS

+ One-piece design eliminates possibility of lost anchor parts or improper assembly
+ Can be installed with an impact wrench or conventional hand socket
+ Fast installation and immediate loading minimizes downtime
+ High load capacities and full contact along thread length
+ Diameter and length ID stamped on head of each hex head anchor for easy inspection
+ Finished hex head provides attractive appearance and eliminates tripping hazard
+ Can be installed closer to the edge than traditional expansion anchors
+ Versatile installation in concrete, block and brick masonry
+ Ratchet teeth on underside of hex washer head lock against the fixture
+ Removable and will not leave components in the hole

TESTING, APPROVALS AND LISTINGS

Tested in accordance with ASTM E488 and AC106 criteria

GUIDE SPECIFICATIONS

CSI Divisions: *03151-Concrete Anchoring, 04081-Masonry Anchorage* and *05090-Metal Fastenings.* Screw anchors shall be Wedge-Bolt OT or 410 Stainless Steel Wedge-Bolt as supplied by Powers Fasteners, Inc., Brewster, NY.

SECTION CONTENTS

Carbon Steel Wedge-Bolt OT (ANSI)

410 Stainless Steel Wege-Bolt (Blue Tip)

HEAD STYLES

Hex Head

ANCHOR MATERIALS

Zinc Plated Carbon Steel
Type 410 Stainless Steel

ANCHOR SIZE RANGE (TYP.)

1/4" through 3/4" diameter

SUITABLE BASE MATERIALS

Normal-weight Concrete
Structural Lightweight Concrete
Grouted Concrete Masonry (CMU)
Brick Masonry

f

INSTALLATION SPECIFICATIONS

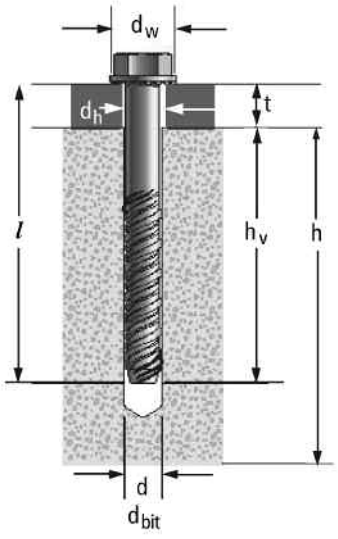
Carbon Steel Wedge-Bolt OT (Orange Tip)

Dimension	Nominal Anchor Diameter, *d*				
	1/4"	3/8"	1/2"	5/8"	3/4"
ANSI Drill Bit Size, d_{bit} (in.)	1/4	3/8	1/2	5/8	3/4
ANSI Drill Bit Size Range (in.)	0.260-0.268	0.390-0.398	0.520-0.530	0.650-0.660	0.775-0.787
Fixture Clearance Hole, d_h (in.)	3/8	1/2	5/8	3/4	7/8
Head Washer Height (in.)	7/32	21/64	7/16	1/2	19/32
Washer O.D., d_w (in.)	9/16	47/64	1	1-3/16	1-13/32
Wrench/Socket Size (in.)	7/16	9/16	3/4	15/16	1-1/8

410 Stainless Steel Wedge-Bolt (Blue Tip)

Dimension	Nominal Anchor Diameter, *d*		
	1/4"	3/8"	1/2"
Wedge-Bit Size, d_{bit} (in.)	1/4	3/8	1/2
Wedge-Bit Size Range (in.)	0.255-0.259	0.385-0.389	0.490-0.495
Fixture Clearance Hole, d_h (in.)	5/16	7/16	9/16
Head Washer Height (in.)	7/32	21/64	7/16
Washer O.D., d_w (in.)	9/16	47/64	1
Wrench/Socket Size (in.)	7/16	9/16	3/4

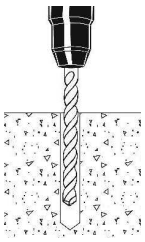
Must be used with a matched-tolerance Wedge-Bit.



Nomenclature

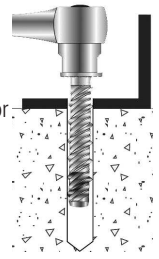
- d = Nominal diameter of anchor
- d_{bit} = Diameter of drill bit
- d_h = Diameter of fixture clearance hole
- d_w = Diameter of washer
- h = Base material thickness. The minimum value of h should be $1.5h_v$ or 3" minimum (whichever is greater)
- h_v = Minimum embedment depth
- l = Length of anchor
- t = Fixture thickness

Installation Procedure

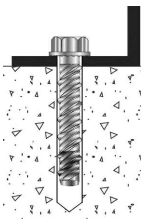


Select the proper diameter Wedge-Bit for 410 Stainless Steel Wedge-Bolt installations ***or*** proper diameter ANSI drill bit for Wedge-Bolt OT installations. ANSI drill bits must meet the requirements of ANSI Standard B212.15.

Using the proper drill bit, drill a hole into the base material to a depth of at least one anchor diameter deeper than the embedment required.



Insert the anchor through the fixture into the anchor hole. Begin tightening the anchor with socket wrench by rotating clockwise and applying pressure in toward the base material. A powered impact wrench may also be used. This will engage the first few threads as the anchor begins to advance.



Continue tightening the anchor until the head is firmly seated against the fixture while achieving the required embedment depth.

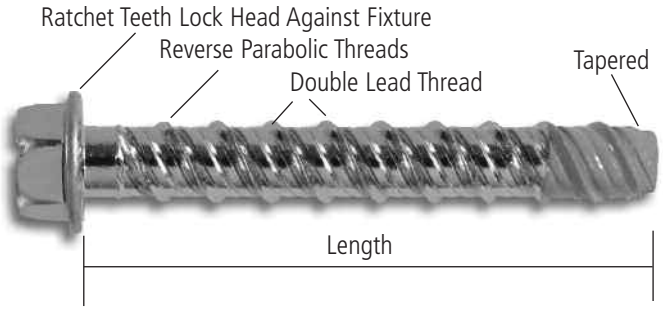
INSTALLATION SPECIFICATIONS

Maximum Clamping Torque (ft.-lbs.)

Base Material	Anchor Diameter				
	1/4"	3/8"	1/2"	5/8"	3/4"
2,000 psi Concrete	5	30	45	75	150
4,000 psi Concrete	10	40	60	95	200
6,000 psi Concrete	10	40	60	95	200
3,000 psi Lightweight Concrete	10	15	40	60	70
Grout Filled Block	10	15	40	60	70
Solid Red Brick	10	30	45	75	100

OT Carbon Steel

410 Stainless Steel



MATERIAL SPECIFICATIONS

Carbon Steel Wedge-Bolt OT

Anchor Component	Component Material
Anchor Body	Case Hardened Carbon Steel
Zinc Plating	ASTM B633, SC1, Type III (Fe/Zn 5) Mimimum plating requirement for Mild Service Condition

410 Stainless Steel Wedge-Bolt

Anchor Component	Component Material
Anchor Body	Heat Treated 410 Stainless Steel
Coating	Class 4 Sealcoat (1500 hour rating for ASTM B 117 salt spray test, 20 hour rating for DIN 50018 2.0 S kesternich test undamaged coating reference).

PERFORMANCE DATA

Ultimate Load Capacities for Wedge-Bolt OT installed in Normal-Weight Concrete at Critical Spacing and Edge Distances[1,2,3]

Nominal Anchor Diameter d in. (mm)	Minimum Embedment Depth h_v in. (mm)	Minimum Concrete Compressive Strength (f'_c)					
		2,000 psi (13.8 MPa)		**4,000 psi** (27.6 MPa)		**6,000 psi** (41.4 MPa)	
		Tension lbs. (kN)	Shear lbs. (kN)	Tension lbs. (kN)	Shear lbs. (kN)	Tension lbs. (kN)	Shear lbs. (kN)
1/4 (6.4)	1 (25.4)	720 (3.2)	920 (4.0)	1,340 (6.0)	1,880 (8.3)	1,660 (7.5)	2,160 (9.6)
	1 1/2 (38.1)	1,440 (6.5)	2,000 (8.8)	2,140 (9.6)	2,080 (9.2)	2,480 (11.2)	2,260 (10.0)
	2 (50.8)	2,400 (10.8)	2,000 (8.8)	3,940 (17.7)	2,080 (9.2)	4,980 (22.4)	2,680 (11.9)
	2 1/2 (63.5)	3,520 (15.8)	2,000 (8.8)	4,660 (21.0)	2,080 (9.2)	5,260 (23.7)	2,680 (11.9)
3/8 (9.5)	1 1/2 (38.1)	1,900 (8.6)	2,760 (12.2)	2,520 (11.3)	3,440 (15.3)	3,040 (13.7)	5,600 (24.9)
	2 (50.8)	3,000 (13.5)	3,100 (13.7)	3,920 (17.6)	3,440 (15.3)	5,200 (23.4)	5,600 (24.9)
	2 1/2 (63.5)	4,100 (18.5)	3,440 (15.3)	5,320 (23.9)	3,440 (15.3)	7,340 (33.0)	5,600 (24.9)
	3 (76.2)	5,800 (26.1)	4,120 (18.3)	7,740 (34.8)	4,320 (19.2)	9,900 (44.6)	5,600 (24.9)
	3 1/2 (88.9)	7,500 (33.8)	4,820 (21.4)	10,140 (45.6)	5,200 (23.1)	12,440 (56.0)	5,600 (33.8)
1/2 (12.7)	2 (50.8)	2,860 (12.9)	4,960 (22.0)	3,940 (17.7)	5,680 (25.2)	4,780 (21.5)	7,600 (33.8)
	2 1/2 (63.5)	4,100 (18.5)	5,800 (25.8)	5,200 (23.4)	6,480 (28.8)	6,480 (29.2)	7,960 (35.4)
	3 (76.2)	5,920 (26.6)	6,200 (27.5)	7,800 (35.1)	7,240 (32.2)	9,380 (42.2)	7,960 (35.4)
	3 1/2 (88.9)	6,060 (27.3)	8,020 (35.6)	8,480 (38.2)	8,160 (36.2)	11,900 (53.6)	8,600 (38.2)
	4 (101.6)	7,560 (34.0)	8,660 (39.0)	12,620 (56.8)	9,080 (40.9)	12,620 (56.8)	9,600 (43.2)
5/8 (15.9)	2 1/2 (63.5)	3,420 (15.4)	7,200 (32.4)	4,720 (21.2)	10,240 (45.5)	6,900 (31.1)	10,180 (45.2)
	3 (76.2)	4,560 (20.5)	7,920 (35.2)	7,380 (33.2)	10,240 (45.5)	8,960 (40.3)	11,400 (50.7)
	3 1/2 (88.9)	5,720 (25.7)	8,640 (38.4)	10,040 (45.2)	10,240 (45.5)	11,040 (49.7)	11,400 (50.7)
	4 (101.6)	8,240 (37.1)	9,540 (42.4)	12,760 (57.4)	11,140 (49.5)	14,320 (64.4)	12,020 (53.7)
	4 1/2 (114.3)	10,780 (48.5)	10,460 (46.5)	15,500 (69.9)	12,040 (53.5)	17,600 (79.2)	12,760 (56.7)
	5 (127.0)	13,300 (59.9)	11,360 (50.5)	18,220 (82.0)	12,960 (57.6)	20,860 (93.9)	13,480 (59.9)
3/4 (19.1)	3 (76.2)	4,320 (19.4)	9,480 (42.1)	6,480 (29.2)	12,120 (53.9)	8,700 (39.2)	14,800 (65.8)
	3 1/2 (88.9)	5,720 (25.7)	10,460 (46.5)	9,320 (41.9)	14,820 (65.9)	11,360 (51.1)	16,400 (72.9)
	4 (101.6)	7,120 (32.0)	11,460 (50.9)	12,140 (54.6)	17,520 (77.9)	14,020 (63.1)	18,000 (80.0)
	4 1/2 (114.3)	9,240 (41.6)	13,120 (58.3)	13,580 (61.1)	18,660 (83.0)	16,720 (75.2)	19,840 (88.2)
	5 (127.0)	11,340 (51.0)	14,780 (65.7)	15,020 (67.6)	19,740 (87.8)	19,400 (87.3)	21,700 (96.5)
	5 1/2 (139.7)	13,440 (60.5)	16,640 (74.0)	16,460 (74.1)	20,840 (92.7)	22,080 (99.4)	23,560 (104.8)
	6 (152.4)	15,540 (69.9)	18,120 (80.6)	17,900 (80.6)	21,960 (97.6)	24,760 (111.4)	25,420 (113.0)

1. Tabulated load values are applicable for carbon steel anchors.
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 Ultimate load capacities must be reduced by a minimum safety factor of 4.0 or greater to determine allowable working load. Consideration of safety factors of 10 or higher may be necessary depending upon the application such as life safety, or overhead.

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PERFORMANCE DATA

Allowable Load Capacities for Wedge-Bolt OT installed in Normal-Weight Concrete at Critical Spacing and Edge Distances[1,2,3,4]

Nominal Anchor Diameter *d* in. (mm)	Minimum Embedment Depth h_v in. (mm)	Minimum Concrete Compressive Strength (f'_c)					
		2,000 psi (13.8 MPa)		**4,000 psi** (27.6 MPa)		**6,000 psi** (41.4 MPa)	
		Tension lbs. (kN)	Shear lbs. (kN)	Tension lbs. (kN)	Shear lbs. (kN)	Tension lbs. (kN)	Shear lbs. (kN)
1/4 (6.4)	1 (25.4)	180 (0.8)	230 (1.0)	335 (1.5)	470 (2.0)	415 (1.9)	540 (2.4)
	1 1/2 (38.1)	360 (1.6)	500 (2.2)	535 (2.4)	520 (2.3)	620 (2.8)	565 (2.5)
	2 (50.8)	600 (2.7)	500 (2.2)	985 (4.4)	520 (2.3)	1,245 (5.6)	670 (2.9)
	2 1/2 (63.5)	880 (4.0)	500 (2.2)	1,165 (5.2)	520 (2.3)	1,315 (5.9)	670 (2.9)
3/8 (9.5)	1 1/2 (38.1)	475 (2.1)	690 (3.0)	630 (2.8)	860 (3.8)	760 (3.4)	1,400 (6.2)
	2 (50.8)	750 (3.4)	775 (3.4)	980 (4.4)	860 (3.8)	1,300 (5.9)	1,400 (6.2)
	2 1/2 (63.5)	1,025 (4.6)	860 (3.8)	1,330 (6.0)	860 (3.8)	1,835 (8.3)	1,400 (6.2)
	3 (76.2)	1,450 (6.5)	1,030 (4.5)	1,935 (8.7)	1,080 (4.8)	2,475 (11.1)	1,400 (6.2)
	3 1/2 (88.9)	1,875 (8.4)	1,205 (5.3)	2,535 (11.4)	1,300 (5.7)	3,110 (14.0)	1,400 (6.2)
1/2 (12.7)	2 (50.8)	715 (3.2)	1,240 (5.5)	985 (4.4)	1,420 (6.3)	1,195 (5.4)	1,900 (8.4)
	2 1/2 (63.5)	1,025 (4.6)	1,450 (6.4)	1,300 (5.9)	1,620 (7.2)	1,620 (7.3)	1,990 (8.8)
	3 (76.2)	1,480 (6.7)	1,550 (6.8)	1,950 (8.8)	1,810 (8.0)	2,345 (10.6)	1,990 (8.8)
	3 1/2 (88.9)	1,515 (6.8)	2,005 (8.9)	2,120 (9.5)	2,040 (9.0)	2,975 (13.4)	2,150 (9.5)
	4 (101.6)	1,890 (8.5)	2,165 (9.7)	3,155 (14.2)	2,270 (10.2)	3,155 (14.2)	2,400 (10.8)
5/8 (15.9)	2 1/2 (63.5)	855 (3.8)	1,800 (8.1)	1,180 (5.3)	2,560 (11.3)	1,725 (7.8)	2,545 (11.3)
	3 (76.2)	1,140 (5.1)	1,980 (8.8)	1,845 (8.3)	2,560 (11.3)	2,240 (10.1)	2,850 (12.6)
	3 1/2 (88.9)	1,430 (6.4)	2,160 (9.6)	2,510 (11.3)	2,560 (11.3)	2,760 (12.4)	2,850 (12.6)
	4 (101.6)	2,060 (9.3)	2,385 (10.6)	3,190 (14.4)	2,785 (12.3)	3,580 (16.1)	3,020 (13.4)
	4 1/2 (114.3)	2,695 (12.1)	2,615 (11.6)	3,875 (17.4)	3,010 (13.4)	4,400 (19.8)	3,190 (14.2)
	5 (127.0)	3,325 (15.0)	2,840 (12.6)	4,555 (20.5)	3,240 (14.4)	5,215 (23.5)	3,370 (14.9)
3/4 (19.1)	3 (76.2)	1,080 (4.9)	2,370 (10.5)	1,620 (7.3)	3,030 (13.4)	2,175 (9.8)	3,700 (16.4)
	3 1/2 (88.9)	1,430 (6.4)	2,615 (11.6)	2,330 (10.5)	3,705 (21.1)	2,840 (12.8)	4,100 (18.2)
	4 (101.6)	1,780 (8.0)	2,865 (12.7)	3,035 (13.7)	4,380 (19.4)	3,505 (15.8)	4,500 (20.0)
	4 1/2 (114.3)	2,310 (10.4)	3,280 (14.5)	3,395 (15.3)	4,665 (20.8)	4,180 (18.8)	4,960 (22.0)
	5 (127.0)	2,835 (12.8)	3,695 (16.4)	3,755 (16.9)	4,935 (21.9)	4,850 (21.8)	5,425 (24.4)
	5 1/2 (139.7)	3,360 (15.1)	4,160 (18.5)	4,115 (18.5)	5,210 (23.1)	5,520 (24.8)	5,890 (26.2)
	6 (152.4)	3,885 (17.5)	4,530 (20.1)	4,475 (20.1)	5,490 (24.4)	6,190 (27.9)	6,355 (28.2)

1. Tabulated load values are applicable for carbon steel anchors.
2. 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.
3. Critical and minimum spacing and edge distances as well as reduction factors for intermediate spacing and edge distances are listed in the Design Criteria section.
4. Linear interpolation may be used to determine allowable loads for intermediate embedments and compressive strengths.

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PERFORMANCE DATA

Ultimate Load Capacities for Wedge-Bolt OT installed in Normal-Weight Concrete at 16 Diameters Spacing and Edge Distances[1,2,3]

Nominal Anchor Diameter *d* in. (mm)	Minimum Embed. Depth h_v in. (mm)	Spacing and Edge Distance at 16*d* in. (mm)	Minimum Concrete Compressive Strength (f'_c)					
			2,000 psi (13.8 MPa)		**4,000 psi** (27.6 MPa)		**6,000 psi** (41.4 MPa)	
			Tension lbs. (kN)	**Shear** lbs. (kN)	**Tension** lbs. (kN)	**Shear** lbs. (kN)	**Tension** lbs. (kN)	**Shear** lbs. (kN)
1/4 (6.4)	1 (25.4)	4 (101.6)	920 (4.1)	920 (4.0)	1,520 (6.8)	1,900 (8.4)	1,650 (7.4)	2,220 (9.8)
	1 1/2 (38.1)		1,760 (7.9)	2,340 (10.4)	2,360 (10.6)	2,520 (11.2)	2,480 (11.2)	2,440 (10.8)
	2 (50.8)		2,800 (12.6)	2,520 (11.2)	4,230 (19.0)	2,520 (11.2)	4,980 (22.4)	3,058 (13.6)
	2 1/2 (63.5)		4,220 (19.0)	2,800 (12.4)	4,900 (22.1)	2,800 (12.4)	5,260 (23.7)	3,330 (14.8)
3/8 (9.5)	1 1/2 (38.1)	6 (152.4)	2,140 (9.6)	2,940 (13.1)	2,660 (12.0)	3,990 (17.7)	3,030 (13.6)	6,018 (26.7)
	2 (50.8)		3,300 (14.9)	3,700 (16.4)	4,120 (18.5)	4,515 (20.0)	5,185 (23.3)	6,018 (26.7)
	2 1/2 (63.5)		4,460 (20.1)	4,460 (19.8)	5,550 (25.0)	5,045 (22.4)	7,340 (33.0)	6,018 (26.7)
	3 (76.2)		6,180 (27.8)	5,200 (23.1)	7,970 (35.9)	5,570 (24.7)	9,890 (44.5)	6,125 (27.2)
	3 1/2 (88.9)		7,900 (35.6)	5,960 (26.5)	10,390 (46.8)	6,100 (27.1)	12,440 (56.0)	6,240 (27.7)
1/2 (12.7)	2 (50.8)	8 (203.2)	2,960 (13.3)	5,700 (25.4)	3,930 (17.7)	6,450 (28.6)	4,780 (21.5)	7,830 (34.8)
	2 1/2 (63.5)		4,100 (18.5)	6,450 (28.6)	5,200 (23.4)	6,940 (30.8)	6,480 (29.2)	8,440 (37.5)
	3 (76.2)		5,910 (26.6)	6,690 (29.7)	7,800 (35.1)	7,595 (33.7)	9,380 (42.2)	8,440 (37.5)
	3 1/2 (88.9)		6,060 (27.3)	7,670 (34.1)	8,480 (38.2)	8,400 (37.3)	11,890 (53.5)	8,595 (38.2)
	4 (101.6)		7,620 (34.3)	8,650 (38.4)	13,260 (59.7)	8,400 (37.3)	13,260 (59.7)	9,600 (43.2)
5/8 (15.9)	2 1/2 (63.5)	10 (254.0)	3,420 (15.4)	7,790 (35.1)	4,720 (21.2)	10,760 (47.8)	6,900 (31.1)	10,340 (45.9)
	3 (76.2)		4,560 (20.5)	8,590 (38.2)	7,380 (33.2)	10,760 (47.8)	8,960 (40.3)	10,870 (48.3)
	3 1/2 (88.9)		5,720 (25.7)	9,390 (41.7)	10,040 (45.2)	10,760 (47.8)	11,040 (49.7)	11,400 (50.7)
	4 (101.6)		8,280 (37.3)	11,430 (50.8)	12,760 (57.4)	11,700 (52.0)	14,320 (64.4)	12,095 (53.8)
	4 1/2 (114.3)		10,860 (48.9)	11,470 (51.0)	15,500 (69.8)	12,640 (56.2)	17,600 (79.2)	12,790 (56.9)
	5 (127.0)		13,440 (60.5)	12,520 (55.6)	18,220 (82.0)	13,580 (60.4)	20,860 (93.9)	13,490 (60.0)
3/4 (19.1)	3 (76.2)	12 (304.8)	4,320 (19.4)	9,690 (43.1)	6,480 (29.2)	12,245 (54.4)	10,260 (46.2)	14,825 (65.9)
	3 1/2 (88.9)		5,760 (25.9)	11,010 (48.9)	9,320 (41.9)	14,225 (63.1)	12,140 (54.6)	16,590 (73.8)
	4 (101.6)		7,200 (32.4)	12,330 (54.8)	12,140 (54.6)	18,175 (80.8)	14,020 (63.1)	18,025 (80.1)
	4 1/2 (114.3)		9,800 (44.1)	14,780 (65.7)	13,640 (61.4)	19,660 (87,4)	16,720 (75.2)	19,870 (88.4)
	5 (127.0)		12,400 (55.8)	17,230 (76.6)	15,120 (68.0)	21,150 (94,0)	19,400 (87.3)	21,720 (96.6)
	5 1/2 (139.7)		15,000 (67.5)	19,680 (87.5)	16,600 (74.7)	22,640 (100.7)	22,080 (99.4)	23,570 (104.8)
	6 (152.4)		17,570 (79.1)	22,140 (98.4)	18,080 (81.4)	24,130 (107.3)	24,760 (111.4)	25,420 (113.0)

1. Tabulated load values are applicable for carbon steel anchors.
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 Ultimate load capacities must be reduced by a minimum safety factor of 4.0 or greater to determine allowable working load. Consideration of safety factors of 10 or higher may be necessary depending upon the application such as life safety, or overhead.

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PERFORMANCE DATA

Allowable Load Capacities for Wedge-Bolt OT installed in Normal-Weight Concrete at 16 Diameters Spacing and Edge Distances[1,2,3,4]

Nominal Anchor Diameter *d* in. (mm)	Minimum Embed. Depth h_v in. (mm)	Spacing and Edge Distance at 16*d* in. (mm)	Minimum Concrete Compressive Strength (f'_c)					
			2,000 psi (13.8 MPa)		**4,000 psi** (27.6 MPa)		**6,000 psi** (41.4 MPa)	
			Tension lbs. (kN)	Shear lbs. (kN)	Tension lbs. (kN)	Shear lbs. (kN)	Tension lbs. (kN)	Shear lbs. (kN)
1/4 (6.4)	1 (25.4)	4 (101.6)	230 (1.0)	230 (1.0)	380 (1.7)	475 (2.1)	415 (1.9)	555 (2.4)
	1 1/2 (38.1)		440 (2.0)	585 (2.6)	590 (2.7)	630 (2.8)	620 (2.8)	610 (2.7)
	2 (50.8)		700 (3.2)	630 (2.8)	1,060 (4.8)	630 (2.8)	1,245 (5.6)	765 (3.4)
	2 1/2 (63.5)		1,055 (4.7)	701 (3.1)	1,225 (5.5)	700 (3.1)	1,315 (5.9)	835 (3.7)
3/8 (9.5)	1 1/2 (38.1)	6 (152.4)	535 (2.4)	735 (3.2)	665 (3.0)	998 (4.3)	760 (3.4)	1,505 (6.6)
	2 (50.8)		825 (3.7)	925 (4.1)	1,030 (4.6)	1,130 (5.0)	1,300 (5.9)	1,505 (6.6)
	2 1/2 (63.5)		1,115 (5.0)	1,115 (4.9)	1,390 (6.3)	1,265 (5.6)	1,835 (8.3)	1,505 (6.6)
	3 (76.2)		1,545 (7.0)	1,300 (5.7)	1,995 (9.0)	1,395 (6.2)	2,475 (11.1)	1,535 (6.8)
	3 1/2 (88.9)		1,975 (8.9)	1,490 (6.6)	2,600 (11.7)	1,525 (6.7)	3,110 (14.0)	1,560 (6.9)
1/2 (12.7)	2 (50.8)	8 (203.2)	740 (3.3)	1,425 (6.3)	985 (4.4)	1,615 (7.1)	1,195 (5.4)	1,960 (8.7)
	2 1/2 (63.5)		1,025 (4.6)	1,615 (7.1)	1,300 (5.9)	1,735 (7.7)	1,620 (7.3)	2,110 (9.3)
	3 (76.2)		1,480 (6.7)	1,675 (7.4)	1,950 (8.8)	1,900 (8.4)	2,345 (10.6)	2,110 (9.3)
	3 1/2 (88.9)		1,515 (6.8)	1,920 (8.5)	2,120 (9.5)	2,100 (9.3)	2,975 (13.4)	2,150 (9.5)
	4 (101.6)		1,905 (8.6)	2,165 (9.7)	3,315 (14.9)	2,100 (9.3)	3,315 (14.9)	2,400 (10.8)
5/8 (15.9)	2 1/2 (63.5)	10 (254.0)	855 (3.8)	1,950 (8.8)	1,180 (5.3)	2,690 (11.9)	1,725 (7.8)	2,585 (11.4)
	3 (76.2)		1,140 (5.1)	2,150 (9.5)	1,845 (8.3)	2,690 (11.9)	2,240 (10.1)	2,720 (12.0)
	3 1/2 (88.9)		1,430 (6.4)	2,350 (10.4)	2,510 (11.3)	2,690 (11.9)	2,760 (12.4)	2,850 (12.6)
	4 (101.6)		2,070 (9.3)	2,610 (11.6)	3,190 (14.4)	2,925 (13.0)	3,580 (16.1)	3,025 (13.4)
	4 1/2 (114.3)		2,715 (12.2)	2,870 (12.7)	3,875 (17.4)	3,160 (14.0)	4,400 (19.8)	3,200 (14.2)
	5 (127.0)		3,360 (15.1)	3,130 (13.9)	4,555 (20.5)	3,395 (15.1)	5,215 (23.5)	3,375 (15.0)
3/4 (19.1)	3 (76.2)	12 (304.8)	1,080 (4.9)	2,425 (10.7)	1,620 (7.3)	3,065 (13.6)	2,565 (11.5)	3,710 (16.5)
	3 1/2 (88.9)		1,440 (6.5)	2,755 (12.2)	2,330 (10.5)	3,560 (15.8)	3,035 (13.7)	4,150 (18.4)
	4 (101.6)		1,800 (8.1)	3,085 (13.7)	3,035 (13.7)	4,545 (20.2)	3,505 (15.8)	4,510 (20.0)
	4 1/2 (114.3)		2,450 (11.0)	3,695 (16.4)	3,410 (15.3)	4,915 (21.8)	4,180 (18.8)	4,970 (22.1)
	5 (127.0)		3,100 (14.0)	4,310 (19.1)	3,780 (17.0)	5,290 (23.5)	4,850 (21.8)	5,430 (24.1)
	5 1/2 (139.7)		3,750 (16.9)	4,920 (21.8)	4,150 (18.7)	5,660 (25.1)	5,520 (24.8)	5,895 (26.2)
	6 (152.4)		4,395 (19.8)	5,535 (24.6)	4,520 (20.3)	6,030 (26.8)	6,190 (27.9)	6,355 (28.2)

1. Tabulated load values are applicable for carbon steel anchors.
2. 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.
3. Linear interpolation may be used to determine allowable loads for intermediate embedments and compressive strengths.
4. Tabular loads are for anchors installed at a minimum spacing distance between anchors and an edge distance of 16 times the anchor diameter.

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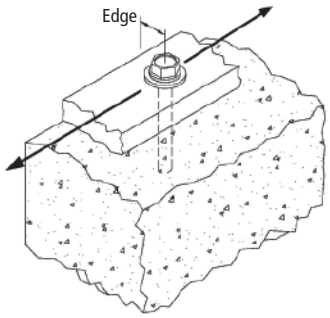
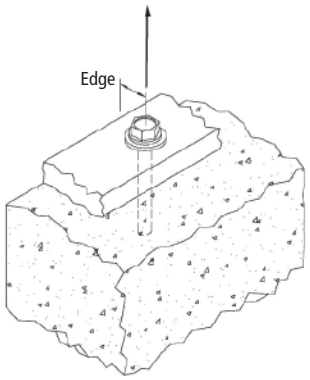
PERFORMANCE DATA



Ultimate and Allowable Shear Load Capacities for Wedge-Bolt OT at 1-3/4" Edge of Normal-Weight Concrete[1,2,3]

Nominal Anchor Diameter *d* in. (mm)	Minimum Embedment Depth h_v in. (mm)	Minimum Edge Distance in. (mm)	$f'_c \geq$ **2,000 psi** (13.8 MPa) Parallel to the Free Edge	
			Ultimate Shear lbs. (kN)	Allowable Shear lbs. (kN)
1/2 (12.7)	3 3/8 (85.7)	1 3/4 (44.5)	5,020 (22.6)	1,255 (5.6)
5/8 (15.9)	3 3/8 (85.7)	1 3/4 (44.5)	5,420 (24.4)	1,355 (6.1)
3/4 (19.1)	3 3/8 (85.7)	1 3/4 (44.5)	5,660 (25.5)	1,415 (6.4)

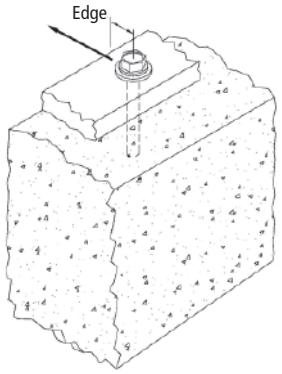
1. Tabulated load values are applicable to carbon steel anchors.
2. Allowable load capacities are calculated using an applied safety factor of 4.0. Consideration of safety factors of 10 or higher may be necessary depending on the application, such as life safety or overhead.
3. Tabulated load values are for anchors installed in concrete. Concrete compressive strength must be at the specified minimum at the time of installation.



Ultimate and Allowable Tension Load Capacities for Wedge-Bolt OT Installed at the Edge of Normal-Weight Concrete[1,2,3]

Nominal Anchor Dia. *d* in. (mm)	Min. Embed. Depth h_v in. (mm)	Min. Edge Distance in. (mm)	Minimum Concrete Compressive Strength (f'_c)					
			2,500 psi (17.2 MPa)		**3,000 psi** (20.7 MPa)		**4,000 psi** (27.6 MPa)	
			Ultimate lbs. (kN)	Allow. lbs. (kN)	Ultimate lbs. (kN)	Allow. lbs. (kN)	Ultimate lbs. (kN)	Allow. lbs. (kN)
5/8 (15.9)	8 (203.2)	1-3/4 (44.5)	15,630 (70.3)	3,910 (17.6)	16,630 (74.8)	4,160 (18.7)	18,150 (81.7)	4,540 (20.4)
	9 (228.6)		16,995 (76.5)	4,250 (19.1)	18,185 (81.8)	4,545 (20.5)	19,820 (89.2)	4,955 (22.3)

1. 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.
2. Linear interpolation may be used to determine allowable loads for intermediate embedments and compressive strength.
3. Tabulated load values are for anchors installed in concrete. Concrete compressive strength must be at the specified minimum at the time of installation.



Allowable Load Capacities for Wedge-Bolt OT Installed at 1-3/4" Edge of Normal-Weight Concrete Stem Walls[1,2,3,4]

Nominal Anchor Diameter *d* in. (mm)	Minimum Embedment Depth h_v in. (mm)	Minimum Edge Distance in. (mm)	$f'_c \geq$ **2,500 psi** (17.2 MPa)		
			Tension lbs. (kN)	Parallel to the Free Edge Shear lbs. (kN)	Towards the Free Edge Shear lbs. (kN)
1/2 (12.7)	4 (101.6)	1 3/4 (44.5)	1,270 (5.7)	1,425 (6.4)	470 (2.1)
5/8 (15.9)	2 1/2 (63.5)	1 3/4 (44.5)	610 (2.7)	1,155 (5.2)	380 (1.7)
	3 3/4 (95.3)		1,310 (5.9)	1,330 (6.0)	490 (2.2)
	5 (127.0)		2,015 (9.1)	1,505 (6.8)	600 (2.7)

1. Tabulated load values are applicable to carbon steel anchors.
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.
3. Allowable load capacities may also be applied to conditions at the edge of normal-weight concrete slabs.
4. Tabulated load values are for anchors installed in concrete. Concrete compressive strength must be at the specified minimum at the time of installation.

PERFORMANCE DATA

Ultimate and Allowable Load Capacities for Wedge-Bolt OT installed in Structural Lightweight Concrete[1,2,3,4,5]

Nominal Anchor Diameter d in. (mm)	Minimum Embedment Depth h_v in. (mm)	Minimum Concrete Compressive Strength $f'_c \geq$ 3,000 psi (20.7 MPa)			
		Ultimate Load		Allowable Load	
		Tension lbs. (kN)	Shear lbs. (kN)	Tension lbs. (kN)	Shear lbs. (kN)
1/4 (6.4)	2 (50.8)	3,320 (14.9)	2,720 (12.1)	830 (3.7)	680 (3.0)
3/8 (9.5)	1 1/2 (38.1)	2,220 (10.0)	2,200 (9.9)	555 (2.5)	550 (2.5)
	2 1/4 (57.2)	3,760 (16.9)	3,240 (14.4)	940 (4.2)	810 (3.6)
	3 (76.2)	5,280 (23.8)	4,660 (20.7)	1,320 (5.9)	1,165 (5.1)
1/2 (12.7)	2 (50.8)	2,920 (13.1)	5,360 (23.6)	730 (3.3)	1,340 (5.9)
	3 (76.2)	5,320 (23.9)	7,320 (32.5)	1,330 (6.0)	1,830 (8.1)
	4 (101.6)	7,720 (34.7)	9,260 (41.1)	1,930 (8.7)	2,315 (10.2)
5/8 (15.9)	2 1/2 (63.5)	3,720 (16.7)	9,240 (41.6)	930 (4.2)	2,310 (10.4)
	3 3/4 (95.3)	7,940 (35.7)	10,960 (48.7)	1,985 (8.9)	2,740 (12.1)
	5 (127.0)	12,160 (54.7)	14,940 (66.4)	3,040 (13.7)	3,735 (16.6)
3/4 (19.1)	5 1/4 (133.4)	13,320 (59.9)	17,780 (79.0)	3,330 (15.0)	4,445 (19.7)

1. Tabulated load values are for anchors installed in sand-lightweight concrete. Concrete compressive strength must be at the specified minimum at the time of installation.
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.
3. Critical and minimum spacing and edge distances as well as reduction factors for intermediate spacing and edge distances are listed in the Design Criteria section.
4. Linear interpolation for allowable loads for anchors at intermediate embedment depths may also be used.
5. Tabulated load values are applicable to carbon steel anchors.

PERFORMANCE DATA

Ultimate Load Capacities for 410 Stainless Steel Wedge-Bolt in Normal-Weight Concrete[1,2]

Nominal Anchor Diameter *d* in. (mm)	Minimum Embedment Depth h_v in. (mm)	Minimum Concrete Compressive Strength (f'_c)			
		2,500 psi (17.3 MPa)		3,000 psi (20.7 MPa)	
		Tension lbs. (kN)	Shear lbs. (kN)	Tension lbs. (kN)	Shear lbs. (kN)
1/4 (6.3)	1 (25.4)	880 (3.9)	1,535 (6.8)	960 (4.3)	1,680 (7.5)
3/8 (9.5)	1 1/2 (38.1)	1,615 (7.3)	3,590 (16.2)	1,770 (8.0)	3,930 (17.7)
	2 1/8 (54.0)	3,400 (15.3)	4,584 (20.7)	3,725 (18.0)	5,025 (22.6)
1/2 (12.7)	2 1/2 (63.5)	3,650 (16.4)	7,335 (33.0)	4,000 (18.0)	8,035 (36.2)
	3 1/2 (88.9)	7,495 (33.8)	9,880 (44.5)	8,210 (37.0)	10,825 (48.8)

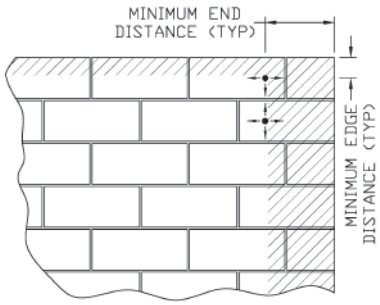
1. Tabulated load values are for anchors installed in concrete. Concrete compressive strength must be at the specified minimum at the time of installation.
2. The values listed above are ultimate load capacities which should be reduced by a minimum safety factor of 4.0 to determine the allowable working 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 410 Stainless Steel Wedge-Bolt in Normal-Weight Concrete[1,2]

Nominal Anchor Diameter *d* in. (mm)	Minimum Embedment Depth h_v in. (mm)	Minimum Concrete Compressive Strength (f'_c)			
		2,500 psi (17.3 MPa)		3,000 psi (20.7 MPa)	
		Tension lbs. (kN)	Shear lbs. (kN)	Tension lbs. (kN)	Shear lbs. (kN)
1/4 (6.3)	1 (25.4)	220 (1.0)	380 (1.7)	240 (1.1)	420 (1.9)
3/8 (9.5)	1 1/2 (38.1)	405 (1.8)	900 (4.1)	445 (2.0)	985 (4.4)
	2 1/8 (54.0)	850 (3.8)	1,145 (5.2)	930 (4.2)	1,255 (5.7)
1/2 (12.7)	2 1/2 (63.5)	915 (4.1)	1,835 (8.3)	1,000 (4.5)	2,010 (9.1)
	3 1/2 (88.9)	1,875 (8.4)	2,470 (11.1)	2,055 (9.3)	2,705 (12.2)

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.
2. Linear interpolation may be used to determine ultimate loads for intermediate embedments and compressive strengths.

PERFORMANCE DATA



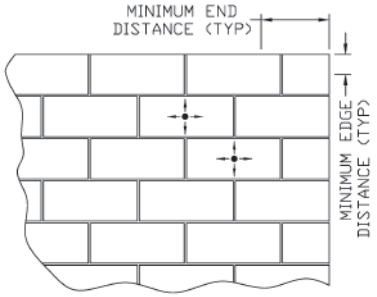
Face Shell
(Grouted Cell)
Permissible Anchor Locations
(Unshaded Area)

Allowable Load Capacities for Wedge-Bolt OT Anchors Installed in Grout-Filled Concrete Masonry[1,2,3,4,5,6]

Anchor Installed Through Face Shell Into Grouted Cell					
Nominal Anchor Diameter *d* in. (mm)	Minimum Embed. Depth h_v in. (mm)	Minimum Edge Distance in. (mm)	Minimum End Distance in. (mm)	Tension lbs. (kN)	Shear lbs. (kN)
1/4 (6.4)	1 (25.4)	3 3/4 (95.3)	3 3/4 (95.3)	80 (0.4)	150 (0.7)
	2 (50.8)			340 (1.5)	310 (1.4)
3/8 (9.5)	1 1/2 (38.1)	2 (50.8)	3 3/4 (95.3)	210 (0.9)	340 (1.5)
	1 1/2 (38.1)	3 3/4 (95.3)	12 (304.8)	210 (0.9)	400 (1.8)
	2 1/2 (63.5)	2 (50.8)	3 3/4 (95.3)	670 (3.0)	340 (1.5)
	2 1/2 (63.5)	7 7/8 (200.0)	12 (304.8)	750 (3.4)	655 (2.9)
	3 1/2 (88.9)	12 (304.8)		1,290 (5.8)	910 (4.0)
1/2 (12.7)	2 (50.8)	3 3/4 (95.3)	12 (304.8)	335 (1.5)	720 (3.2)
	3 (76.2)	7 7/8 (200.0)		930 (4.2)	900 (4.0)
	4 (101.6)	12 (304.8)		1,525 (6.9)	1,085 (4.8)
5/8 (15.9)	2 1/2 (63.5)	3 3/4 (95.3)	12 (304.8)	455 (2.0)	1,085 (4.8)
	3 1/4 (82.6)	7 7/8 (200.0)		885 (4.0)	1,085 (4.8)
	4 (101.6)	12 (304.8)		1,310 (5.9)	1,085 (4.8)
	5 (127.0)			1,940 (8.7)	1,255 (5.6)
3/4 (19.1)	3 (76.2)	3 3/4 (95.3)	12 (304.8)	615 (2.8)	750 (3.4)
		12 (304.8)		615 (2.8)	1,320 (5.9)
	3 1/2 (88.9)	7 7/8 (200.0)		1,035 (4.7)	1,265 (5.7)
	4 (101.6)	12 (304.8)		1,455 (6.5)	1,320 (5.9)
	5 (127.0)			1,680 (7.6)	1,775 (7.9)

1. Tabulated load values are for anchors installed in minimum 6-inch wide, minimum Grade N, Type II, lightweight, medium-weight or normal-weight concrete masonry units conforming to ASTM C 90. Mortar must be minimum Type N. Masonry compressive strength must be at the specified minimum at the time of installation ($f'm \geq$ 1,500 psi).
2. Allowable load capacities listed 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.
3. Tabulated load values are applicable for screw anchors installed at a critical spacing between anchors of 16 times the anchor diameter. Reduce the tabulated load capacities by 50 percent when anchors are installed at minimum spacing between anchors of 8 times the screw anchor diameter. Linear interpolation may be used for intermediate spacing distances.
4. Linear interpolation for allowable loads for anchors at intermediate embedment depths may be used.
5. Allowable shear loads for 1/4" and 3/8" diameter anchor installations into the face shell of a masonry wall may be applied in any direction. Allowable shear loads for anchor diameters 1/2" and greater installed into the face shell may be applied in any direction provided the location is a minimum of 12" from the edge and end of the wall. For anchors diameters 1/2" and greater installed with an edge distance less than 12" the allowable shear loads may be applied in any direction except upward vertically.
6. Tabulated load values are applicable to carbon steel anchors.

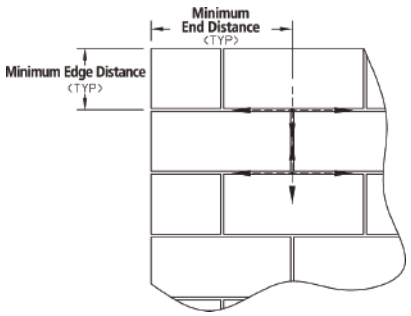
PERFORMANCE DATA



Face Shell
(Cell Web)

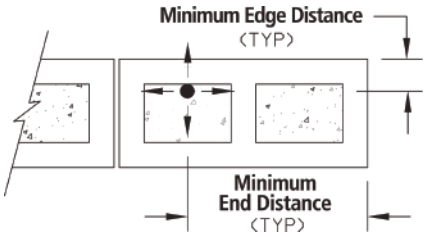
Allowable Load Capacities for Wedge-Bolt OT Anchors Installed in Grout-Filled Concrete Masonry[1,2,3,4]

Anchor Installed Through Face Shell Into Cell Web[5]					
Nominal Anchor Diameter *d* in. (mm)	Minimum Embed. Depth h_v in. (mm)	Minimum Edge Distance in. (mm)	Minimum End Distance in. (mm)	Tension lbs. (kN)	Shear lbs. (kN)
3/8 (9.5)	3 1/2 (25.4)	16 (406.4)	16 (406.4)	870 (3.9)	910 (4.0)
1/2 (12.7)	4 (101.6)			1,110 (5.0)	1,085 (4.8)
5/8 (15.9)	4 (101.6)			1,205 (5.4)	1,085 (4.8)
3/4 (19.1)	4 (101.6)			1,310 (5.9)	1,320 (5.9)



T-Joints
Permissible Anchor Locations

Anchor Installed In Joint[6,7]					
Nominal Anchor Diameter *d* in. (mm)	Minimum Embed. Depth h_v in. (mm)	Minimum Edge Distance in. (mm)	Minimum End Distance in. (mm)	Tension lbs. (kN)	Shear lbs. (kN)
3/8 (9.5)	1 1/2 (38.1)	16 (406.4)	16 (406.4)	–	510 (2.3)
	3 1/2 (88.9)			830 (3.7)	
1/2 (12.7)	4 (101.6)			1,090 (4.9)	
5/8 (15.9)	4 (101.6)			840 (3.8)	1,225 (5.5)
3/4 (19.1)	2 1/2 (63.5)			–	
	4 (101.6)			890 (4.0)	



Top of Wall

Anchor Installed in Cell Opening (Top of Wall)				
Nominal Anchor Diameter *d* in. (mm)	Minimum Embed. Depth h_v in. (mm)	Minimum Edge Distance in. (mm)	Tension lbs. (kN)	Shear lbs. (kN)
3/8 (9.5)	2 1/2 (63.5)	1 1/2 (38.1)	300 (1.6)	240 (1.1)
	1 1/2 (38.1)	2 (50.8)	–	350 (1.6)
	2 1/2 (63.5)		570 (2.5)	380 (1.7)

1. Tabulated load values are for anchors installed in minimum 6-inch wide, minimum Grade N, Type II, lightweight, medium-weight or normal-weight concrete masonry units conforming to ASTM C 90. Mortar must be minimum Type N. Masonry compressive strength must be at the specified minimum at the time of installation ($f'_m \geq 1{,}500$ psi).
2. Allowable load capacities listed 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.
3. Tabulated load values are applicable for screw anchors installed at a critical spacing between screw anchors of 16 times the screw anchor diameter. Reduce the tabulated load capacities by 50 percent when anchors are installed at minimum spacing between anchors of 8 times the screw anchor diameter. Linear interpolation may be used for intermediate spacing distances.
4. Linear interpolation for allowable loads for anchors at intermediate embedment depths may be used.
5. Allowable shear loads for anchor installations into the cell web may be applied in any direction.
6. Allowable shear loads for anchor installation into the horizontal and vertical mortar joints may be applied in any direction provided the anchor location is a minimum of 16" from the edge and end of the wall. For anchor installations with an edge distance less than 16" the allowable shear loads may be applied in any direction except upward vertically.
7. Allowable tension load values for anchors installed into horizontal mortar (bed) joint locations may be increased by 35 percent.
8. Tabulated load values are applicable to carbon steel anchors.

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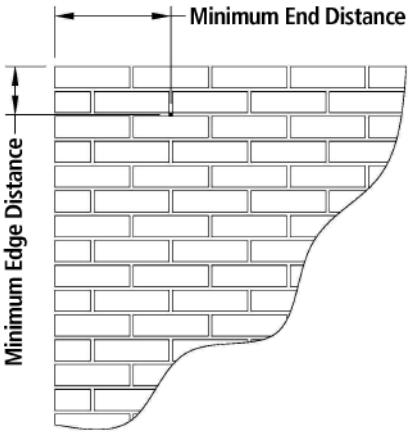
PERFORMANCE DATA



Ultimate and Allowable Load Capacities for Wedge-Bolt OT Anchors Installed in Multiple Wythe Brick Masonry[1,2,3]

Nominal Anchor Diameter *d* in. (mm)	Minimum Embed. Depth h_v in. (mm)	Minimum Edge and End Distance in. (mm)	Minimum Spacing Distance in. (mm)	Structural Brick Masonry $f'_m \geq$ 1,500 psi (10.4 MPa)			
				Ultimate Load		Allowable Load	
				Tension lbs. (kN)	Shear lbs. (kN)	Tension lbs. (kN)	Shear lbs. (kN)
1/4 (6.4)	2 1/2 (63.5)	4 (101.6)	4 (101.6)	2,280 (10.3)	1,480 (6.7)	455 (2.0)	295 (1.3)
3/8 (9.5)	3 1/2 (88.9)	6 (152.4)	6 (152.4)	3,390 (15.3)	3,830 (17.2)	680 (3.1)	765 (3.4)
1/2 (12.7)	4 (101.6)	8 (203.2)	8 (203.2)	4,800 (21.6)	7,060 (31.8)	960 (4.3)	1,410 (6.3)
5/8 (15.9)	4 (101.6)	10 (254.0)	12 (304.8)	6,120 (27.5)	11,250 (50.6)	1,225 (5.5)	2,250 (10.1)
3/4 (19.1)	4 (101.6)	12 (304.8)	16 (406.4)	8,580 (29.6)	12,340 (55.5)	1,315 (5.9)	2,470 (11.1)

1. Tabulated load values are for anchors installed in multiple wythe, minimum Grade SW, solid clay brick masonry walls conforming to ASTM C 62. Mortar must be minimum Type N. Masonry compressive strength must be at the specified minimum at the time of installation ($f'm \geq$ 1,500 psi).
2. Allowable load capacities listed are calculated using and applied safety factor of 5.0. Consideration of safety factors of 10 or higher may be necessary depending upon the application such as life safety or overhead.
3. Tabulated load values are applicable to carbon steel anchors.

DESIGN CRITERIA (ALLOWABLE STRESS DESIGN)

Combined Loading

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

$$\left(\frac{N_u}{N_n}\right) + \left(\frac{V_u}{V_n}\right) \leq 1$$

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[1]

Anchor Installed in Normal-Weight Concrete					
Anchor Dimension	**Load Type**	**Critical Distance (Full Anchor Capacity)**	**Critical Load Factor**	**Minimum Distance (Reduced Capacity)**	**Minimum Load Factor**
Spacing (*s*)	Tension	$s_{cr} = 12d$	$F_{N_S} = 1.0$	$s_{min} = 4d$	$F_{N_S} = 0.50$
	Shear	$s_{cr} = 12d$	$F_{V_S} = 1.0$	$s_{min} = 4d$	$F_{V_S} = 0.75$
Edge Distance (*c*)	Tension	$c_{cr} = 8d$	$F_{N_C} = 1.0$	$c_{min} = 3d$	$F_{N_C} = 0.70$
	Shear	$c_{cr} = 12d$	$F_{V_C} = 1.0$	$c_{min} = 3d$	$F_{V_C} = 0.15$

Anchor Installed in Structural Lightweight Concrete					
Anchor Dimension	**Load Type**	**Critical Distance (Full Anchor Capacity)**	**Critical Load Factor**	**Minimum Distance (Reduced Capacity)**	**Minimum Load Factor**
Spacing (*s*)	Tension	$s_{cr} = 14.1d$	$F_{N_S} = 1.0$	$s_{min} = 4.7d$	$F_{N_S} = 0.50$
	Shear	$s_{cr} = 14.1d$	$F_{V_S} = 1.0$	$s_{min} = 4.7d$	$F_{V_S} = 0.75$
Edge Distance (*c*)	Tension	$c_{cr} = 9.4d$	$F_{N_C} = 1.0$	$c_{min} = 3.5d$	$F_{N_C} = 0.70$
	Shear	$c_{cr} = 14.1d$	$F_{V_C} = 1.0$	$c_{min} = 3.5d$	$F_{V_C} = 0.15$

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.

DESIGN CRITERIA (ALLOWABLE STRESS DESIGN)

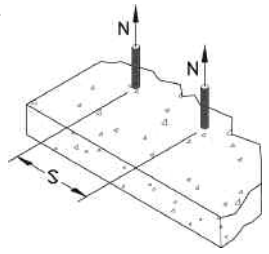
Load Adjustment Factors for Normal-Weight Concrete

Spacing, Tension (F_{NS})

Dia. (in.)		1/4	3/8	1/2	5/8	3/4
s_{cr} (in.)		3	4 1/2	6	7 1/2	9
s_{min} (in.)		1	1 1/2	2	2 1/2	3
Spacing, s (inches)	1	0.50				
	1 1/2	0.63	0.50			
	2	0.75	0.58	0.50		
	2 1/2	0.88	0.67	0.56	0.50	
	3	1.00	0.75	0.63	0.55	0.50
	4 1/2		1.00	0.81	0.70	0.63
	6			1.00	0.85	0.75
	7 1/2				1.00	0.88
	9					1.00

Notes: For anchors loaded in tension, the critical spacing (s_{cr}) is equal to 12 anchor diameters (12d) at which the anchor achieves 100% of load.

Minimum spacing (s_{min}) is equal to 4 anchor diameters (4d) at which the anchor achieves 50% of load.

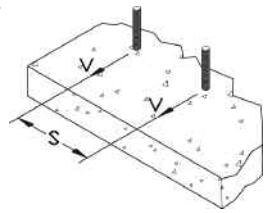


Spacing, Shear (F_{VS})

Dia. (in.)		1/4	3/8	1/2	5/8	3/4
s_{cr} (in.)		3	4 1/2	6	7 1/2	9
s_{min} (in.)		1	1 1/2	2	2 1/2	3
Spacing, s (inches)	1	0.75				
	1 1/2	0.81	0.75			
	2	0.88	0.79	0.75		
	2 1/2	0.94	0.83	0.78	0.75	
	3	1.00	0.88	0.81	0.78	0.75
	4 1/2		1.00	0.91	0.85	0.81
	6			1.00	0.93	0.88
	7 1/2				1.00	0.94
	9					1.00

Notes: For anchors loaded in shear, the critical spacing (s_{cr}) is equal to 12 anchor diameters (12d) at which the anchor achieves 100% of load.

Minimum spacing (s_{min}) is equal to 4 anchor diameters (4d) at which the anchor achieves 75% of load.

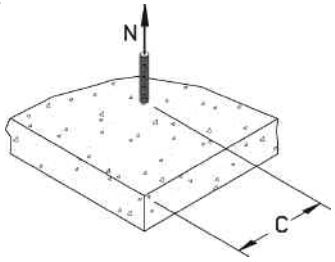


Edge Distance, Tension (F_{NC})

Dia. (in.)		1/4	3/8	1/2	5/8	3/4
c_{cr} (in.)		2	3	4	5	6
c_{min} (in.)		3/4	1 1/8	1 1/2	1 7/8	2 1/4
Edge Distance, c (in.)	3/4	0.70				
	1 1/8	0.79	0.70			
	1 1/2	0.88	0.76	0.70		
	1 7/8	0.97	0.82	0.75	0.70	
	2	1.00	0.84	0.76	0.71	
	2 1/4		0.88	0.79	0.74	0.70
	3		1.00	0.88	0.81	0.76
	4			1.00	0.90	0.84
	5				1.00	0.92
	6					1.00

Notes: For anchors loaded in tension, the critical edge distance (c_{cr}) is equal to 8 anchor diameters (8d) at which the anchor achieves 100% of load.

Minimum edge distance (c_{min}) is equal to 3 anchor diameters (3d) at which the anchor achieves 70% of load.

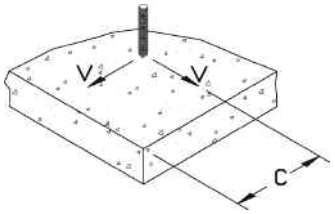


Edge Distance, Shear (F_{VC})

Dia. (in.)		1/4	3/8	1/2	5/8	3/4
c_{cr} (in.)		3	4 1/2	6	7 1/2	9
c_{min} (in.)		3/4	1 1/8	1 1/2	1 7/8	2 1/4
Edge Distance, c (in.)	3/4	0.15				
	1 1/8	0.29	0.15			
	1 1/2	0.43	0.24	0.15		
	1 7/8	0.58	0.34	0.22	0.15	
	2 1/4	0.72	0.43	0.29	0.21	0.15
	3	1.00	0.62	0.43	0.32	0.24
	4 1/2		1.00	0.72	0.55	0.43
	6			1.00	0.77	0.62
	7 1/2				1.00	0.81
	9					1.00

Notes: For anchors loaded in shear, 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 3 anchor diameters (3d) at which the anchor achieves 15% of load



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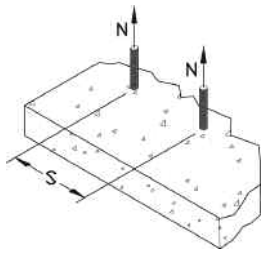
DESIGN CRITERIA (ALLOWABLE STRESS DESIGN)

Load Adjustment Factors for Lightweight Concrete

Spacing, Tension (F_{NS})

	Dia. (in.)	1/4	3/8	1/2	5/8	3/4
	s_{cr} (in.)	3 1/2	5 1/4	7	8 7/8	10 1/2
	s_{min} (in.)	1 1/4	1 3/4	2 3/8	3	3 1/2
Spacing, s (inches)	1 1/4	0.50				
	1 3/4	0.61	0.50			
	2 3/8	0.75	0.59	0.50		
	3	0.89	0.67	0.57	0.50	
	3 1/2	1.00	0.74	0.62	0.54	0.50
	5 1/4		1.00	0.82	0.70	0.63
	7			1.00	0.84	0.75
	8 7/8				1.00	0.88
	10 1/2					1.00

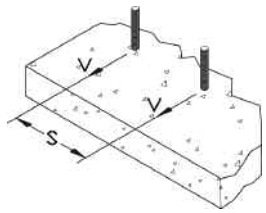
Notes: For anchors loaded in tension, the critical spacing (s_{cr}) is equal to 14.1 anchor diameters (14.1d) at which the anchor achieves 100% of load. Minimum spacing (s_{min}) is equal to 4.7 anchor diameters (4.7d) at which the anchor achieves 50% of load.



Spacing, Shear (F_{VS})

	Dia. (in.)	1/4	3/8	1/2	5/8	3/4
	s_{cr} (in.)	3 1/2	5 1/4	7	8 7/8	10 1/2
	s_{min} (in.)	1 1/4	1 3/4	2 3/8	3	3 1/2
Spacing, s (inches)	1 1/4	0.75				
	1 3/4	0.81	0.75			
	2 3/8	0.88	0.79	0.75		
	3	0.94	0.84	0.78	0.75	
	3 1/2	1.00	0.87	0.81	0.77	0.75
	5 1/4		1.00	0.91	0.85	0.82
	7			1.00	0.92	0.88
	8 7/8				1.00	0.94
	10 1/2					1.00

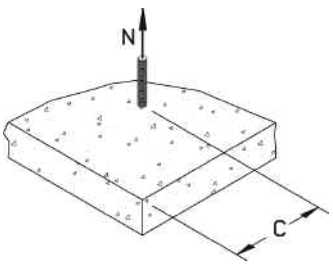
Notes: For anchors loaded in shear, the critical spacing (s_{cr}) is equal to 14.1 anchor diameters (14.1d) at which the anchor achieves 100% of load. Minimum spacing (s_{min}) is equal to 4.7 anchor diameters (4.7d) at which the anchor achieves 75% of load.



Edge Distance, Tension (F_{NC})

	Dia. (in.)	1/4	3/8	1/2	5/8	3/4
	c_{cr} (in.)	2 3/8	3 1/2	4 3/4	5 7/8	7
	c_{min} (in.)	7/8	1 3/8	1 3/4	2 1/4	2 5/8
Edge Distance, c (in.)	7/8	0.70				
	1 3/8	0.80	0.70			
	1 3/4	0.88	0.76	0.70		
	2 1/4	0.98	0.83	0.75	0.70	
	2 3/8	1.00	0.84	0.76	0.72	
	2 5/8		0.88	0.79	0.74	0.70
	3 1/2		1.00	0.88	0.81	0.76
	4 3/4			1.00	0.91	0.84
	5 7/8				1.00	0.92
	7					1.00

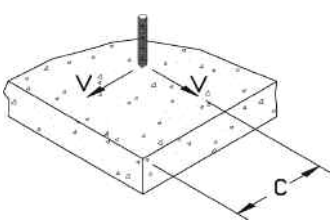
Notes: For anchors loaded in tension, the critical edge distance (c_{cr}) is equal to 9.4 anchor diameters (9.4d) at which the anchor achieves 100% of load. Minimum edge distance (c_{min}) is equal to 3.5 anchor diameters (3.5d) at which the anchor achieves 70% of load.



Edge Distance, Shear (F_{VC})

	Dia. (in.)	1/4	3/8	1/2	5/8	3/4
	c_{cr} (in.)	3 1/2	5 1/4	7	8 7/8	10 1/2
	c_{min} (in.)	7/8	1 3/8	1 3/4	2 1/4	2 5/8
Edge Distance, c (in.)	7/8	0.15				
	1 3/8	0.31	0.15			
	1 3/4	0.43	0.24	0.15		
	2 1/4	0.59	0.35	0.23	0.15	
	2 5/8	1.00	0.43	0.29	0.21	
	3 1/2		0.62	0.43	0.32	0.15
	5 1/4		1.00	0.71	0.54	0.43
	7			1.00	0.77	0.62
	8 7/8				1.00	0.82
	10 1/2					1.00

Notes: For anchors loaded in shear, the critical edge distance (c_{cr}) is equal to 14.1 anchor diameters (14.1d) at which the anchor achieves 100% of load. Minimum edge distance (c_{min}) is equal to 3.5 anchor diameters (3.5d) at which the anchor achieves 15% of load.



ORDERING INFORMATION

Carbon Steel Wedge-Bolt OT

Catalog Number	Size	Drill Bit Diameter	Clearance Hole Diameter	Minimum Embedment	Thread Length	Standard Box	Standard Carton
7215	1/4" x 3"	1/4"	3/8"	1"	2 3/4"	100	500
7216	3/8" x 4"	3/8"	1/2"	1 1/2"	3 3/4"	50	250
7217	1/2" x 4"	1/2"	5/8"	1 3/4"	3 3/4"	50	150
7218	1/2" x 5"	1/2"	5/8"	1 3/4"	3 3/4"	25	100
7214	1/2" x 6"	1/2"	5/8"	1 3/4"	3 3/4"	25	75
7233	1/2" x 6 1/2"	1/2″	5/8″	1 3/4″	3 3/4"	25	75
7219	5/8" x 4"	5/8"	3/4"	2 1/2"	3 3/4"	25	100
7221	5/8" x 5"	5/8"	3/4"	2 1/2"	3 3/4"	25	75
7227	5/8" x 6"	5/8"	3/4"	2 1/2"	3 3/4"	25	75
7229	5/8" x 7"	5/8"	3/4"	2 1/2"	3 3/4"	25	75
7231	3/4" x 6"	3/4″	7/8″	2 1/2″	4 1/2″	20	60
7232	3/4" x 8"	3/4″	7/8″	2 1/2″	6	10	40

Installation is recommended with the use of an ANSI bit.

410 Stainless Steel Wedge-Bolt

Catalog Number	Size	Wedge Bit Diameter	Clearance Hole Diameter	Minimum Embedment	Thread Length	Standard Box	Standard Carton
7701N	1/4" x 1 3/4"	1/4"	5/16"	1"	1 5/8"	100	500
7702N	3/8" x 1 3/4"	3/8"	5/16"	1"	1 5/8"	50	300
7705N	3/8" x 2 1/2"	3/8"	7/16"	1 1/2"	2 1/4"	50	250
7706N	3/8" x 3"	3/8"	7/16"	1 1/2"	2 3/4"	50	250
7707N	3/8″ x 4″	3/8"	7/16"	1 1/2"	3 3/4"	50	250
7708N	3/8″ x 5″	3/8"	7/16"	1 1/2"	3 3/4"	50	150
7710N	1/2" x 3"	1/2"	9/16"	1 3/4"	2 3/4"	50	150
7711N	1/2" x 4"	1/2"	9/16"	1 3/4"	3 3/4"	50	150
7712N	1/2" x 5"	1/2"	9/16"	1 3/4"	3 3/4"	50	150

A Wedge-Bit is required for installation.

ORDERING INFORMATION

SDS-Plus Wedge-Bit

Catalog Number	Size	Usable Length Inches	Overall Length Inches	Standard Pouch
1312	1/4" SDS-Plus Wedge-Bit	2	4	1
1314	1/4" SDS-Plus Wedge-Bit	4	6	1
1316	3/8" SDS-Plus Wedge-Bit	4	6	1
1318	3/8" SDS-Plus Wedge-Bit	6	8	1
1332	3/8" SDS-Plus Wedge-Bit	10	12	1
1320	1/2" SDS-Plus Wedge-Bit	4	6	1
1322	1/2" SDS-Plus Wedge-Bit	8	10	1
1334	1/2" SDS-Plus Wedge-Bit	10	12	1

Heavy Duty Straight Shank Wedge-Bit

Catalog Number	Size	Usable Length Inches	Overall Length Inches	Standard Pouch
1370	1/4" Heavy Duty Straight Shank	2 3/4	4	1
1372	1/4" Heavy Duty Straight Shank	4	6	1
1380	3/8" Heavy Duty Straight Shank	4	6	1
1384	3/8" Heavy Duty Straight Shank	11	13	1
1390	1/2" Heavy Duty Straight Shank	4	6	1
1394	1/2" Heavy Duty Straight Shank	11	13	1

Spline Wedge-Bit

Catalog Number	Size	Usable Length Inches	Overall Length Inches	Standard Pouch
1340	1/2" Spline Wedge-Bit	8	13	1
1342	1/2" Spline Wedge-Bit	11	16	1

SDS-Max Wedge-Bit

Catalog Number	Size	Usable Length Inches	Overall Length Inches	Standard Pouch
1354	1/2" SDS-Max Wedge-Bit	8	13	1