Tie-Wire

Zinc plate only

Wedge-All

The Wedge-All is a non-bottom bearing, wedge style expansion anchor for use in solid concrete or grout filled masonry. A one-piece clip ensures uniform holding capacity that increases as tension is applied. A threaded stud version is available in nine diameters and several lengths. A single size tie-wire version is available for wire supported fixtures. Threaded studs are set by tightening the nut. Tie-wire anchors are set with the claw end of a hammer.

WEDGE-ALL SPECIAL FEATURES:

- One piece wrap around clip.
- Threaded end is chamfered for ease of starting nut.

MATERIAL: Carbon steel; stainless steel.

FINISH: Carbon steel anchors are available in zinc plated or mechanically galvanized.

INSTALLATION: • Hole in steel or metal fixtures to be mounted should exceed anchor diameter by 1/16" for 1/4" thru 5/8" diameter bolts, and 1/8" for all other diameters.

Caution: It is important to use the proper drill bit size. Oversized holes will make it difficult to set the anchor and will lower the anchor's load capacity.

Threaded studs:

- Drill a hole in the base material using a carbide tipped bit the same diameter as the anchor to be installed. The hole should be at least 1/2" deeper than the embedment required.
- Blow the hole clean using compressed air.
- Assemble the anchor with nut and washer so the top of the nut is flush with the top of the anchor. Place the anchor in the fixture and drive into the hole until washer and nut are tight against fixture.
- Tighten nut finger tight. Tighten to required torque setting.

Tie-Wire:

- Drill a hole at least 1 1/2" deep using a 1/4" carbide tipped bit.
- Drive the anchor into the hole until the head is seated against the base material.
- Set the anchor by prying/pulling with the claw end of the hammer.

CODES: ICBO ER 3631; SBCCI 9706; City of L.A. RR24682; Dade County 95-0511.04; Factory Mutual 1M6A0.AH; Underwriters Laboratories File Ex3605; Meets requirements of Federal Specifications A-A-1923A, Type 4. **The Load Tables list values based upon results from the most recent testing and may not reflect those in the current ICBO and City of L.A. reports. Where these code jurisdictions apply, consult the current reports for applicable load values.**

Wedge-All Product Data

Size (in)	Model No.	Thread Length (in)	Quantity Box	Quantity Ctn
1/4 x 1 1/2	TWD25112	Eye dia is 9/32	100	500
1/4 x 1 3/4	WA25134	15/16	100	500
1/4 x 2 1/4	WA25214	1 7/16	100	500
1/4 x 3 1/4	WA25314	2 7/16	100	500
3/8 x 2 1/4	WA37214	1 1/8	50	250
3/8 x 2 3/4	WA37234	1 5/8	50	250
3/8 x 3	WA37300	1 7/8	50	250
3/8 x 3 3/4	WA37334	2 5/8	50	250
3/8 x 5	WA37500	3 7/8	50	200
3/8 x 7	WA37700	1 1/4	50	200
1/2 x 2 3/4	WA50234	1 5/8	25	125
1/2 x 3 3/4	WA50334	2 5/8	25	125
1/2 x 4 1/4	WA50414	2 13/16	25	100
1/2 x 5 1/2	WA50512	4 1/16	25	100
1/2 x 7	WA50700	5 5/16	25	100
1/2 x 8 1/2	WA50812	6	25	50
1/2 x 10	WA50100	6	25	50
1/2 x 12	WA50120	6	25	50
5/8 x 3 1/2	WA62312	1 7/8	20	80
5/8 x 4 1/2	WA62412	2 7/8	20	80
5/8 x 5	WA62500	3 3/8	20	80
5/8 x 6	WA62600	4 3/8	20	80
5/8 x 7	WA62700	5 3/8	20	80
5/8 x 8 1/2	WA62812	6	20	40
5/8 x 10	WA62100	6	10	20
5/8 x 12	WA62120	6	10	20
3/4 x 4 1/2	WA75414	2 3/8	10	40
3/4 x 4 3/4	WA75434	2 7/8	10	40
3/4 x 5 1/2	WA75512	3 5/8	10	40
3/4 x 6 1/4	WA75614	4 3/8	10	40
3/4 x 7	WA75700	5 1/8	10	40
3/4 x 8 1/2	WA75812	6	10	20
3/4 x 10	WA75100	6	10	20
3/4 x 12	WA75120	6	5	10
7/8 x 6	WA87600	2 1/8	5	20
7/8 x 8	WA87800	2 1/8	5	10
7/8 x 10	WA87100	2 1/8	5	10
7/8 x 12	WA87120	2 1/8	5	10
1 x 6	WA16000	2 1/4	5	20
1 x 9	WA19000	2 1/4	5	10
1 x 12	WA11200	2 1/4	5	10
1 1/4 x 9	WA12590	2 3/4	5	10
1 1/4 x 12	WA12512	2 3/4	5	10
1 1/2 x 12	WA15012	3 1/4	5	10

1. The published length is the overall length of the anchor. Allow one anchor diameter for the nut and washer thickness plus the fixture thickness when selecting a length.
2. Some anchors shown are also available in mechanically galvanized, 303, 304 and 316 stainless steel. Call for availability.
3. Special lengths are available on request. Load values apply as long as minimum embedment depths are satisfied.

Material Specifications

Anchor Component	Component Material: Zinc Plated Carbon Steel[1]	Mechanically Galvanized[2]	Stainless Steel	Stainless Steel
Anchor Body	Material meets minimum 70,000 psi tensile	Material meets minimum 70,000 psi tensile	Type 303/304	Type 316
Nut	Carbon Steel, ASTM A 563, Grade A	Carbon Steel, ASTM A 563, Grade A	Type 18-8	Type 316
Washer	Carbon Steel	Carbon Steel	Type 18-8	Type 316
Clip	Carbon Steel	Carbon Steel	Type 304	Type 304

1. Zinc Plated meets ASTM B 633, Class SC 1 (Fe / Zn 5), Type III.
2. Mechanically galvanized meets ASTM B, Class 65, Type I.

Length Identification Head Marks on Wedge-Alls (corresponds to length of anchor – inches).

Mark	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z
From	1 1/2	2	2 1/2	3	3 1/2	4	4 1/2	5	5 1/2	6	6 1/2	7	7 1/2	8	8 1/2	9	9 1/2	10	11	12	13	14	15	16	17	18
UpTo But Not Including	2	2 1/2	3	3 1/2	4	4 1/2	5	5 1/2	6	6 1/2	7	7 1/2	8	8 1/2	9	9 1/2	10	11	12	13	14	15	16	17	18	19

Tension and Shear Loads for Wedge-All Anchors in Normal-Weight Concrete

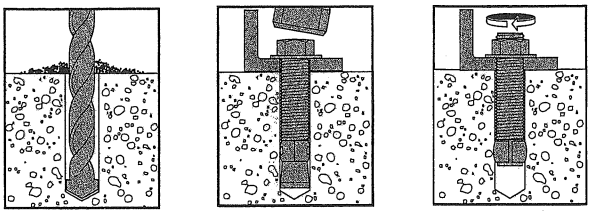
Size in. (mm)	Embed. Depth in. (mm)	Critical Spacing in. (mm)	Tension Load						Shear Load			Install. Torque ft-lbs (N-m)
			f'c >= 2000 psi (13.8 MPa) Concrete			f'c >= 4000 psi (27.6 MPa) Concrete			f'c >= 2000 psi (13.8 MPa) Concrete			
			Ultimate lbs. (kN)	Std. Dev. lbs. (kN)	Allow. lbs. (kN)	Ultimate lbs. (kN)	Std. Dev. lbs. (kN)	Allow. lbs. (kN)	Ultimate lbs. (kN)	Std. Dev. lbs. (kN)	Allow. lbs. (kN)	
1/4 (6.4)	1 1/8 (28.6)	4 1/2 (114.3)	680 (3.0)	167 (0.7)	170 (0.8)	960 (4.3)	233 (1.0)	240 (1.1)	920 (4.1)	47 (0.2)	230 (1.0)	8 (10.8)
	2 1/4 (57.2)	9 (228.6)	1,920 (8.5)	286 (1.3)	480 (2.1)	2,320 (10.3)	105 (0.5)	580 (2.6)	•	•	230 (1.0)	
3/8 (9.5)	1 3/4 (44.5)	7 (177.8)	1,560 (6.9)	261 (1.2)	390 (1.7)	2,880 (12.8)	588 (2.6)	720 (3.2)	2,280 (10.1)	96 (0.4)	570 (2.5)	30 (40.7)
	2 5/8 (66.7)	10 1/2 (266.7)	3,360 (14.9)	464 (2.1)	840 (3.7)	5,440 (24.2)	553 (2.5)	1,360 (6.0)	4,220 (18.8)	384 (1.7)	1,055 (4.7)	
	3 3/8 (85.7)	13 1/2 (342.9)	3,680 (16.4)	585 (2.6)	920 (4.1)	5,440 (24.2)	318 (1.4)	1,360 (6.0)	•	•	1,055 (4.7)	
1/2 (12.7)	2 1/4 (57.2)	9 (228.6)	3,280 (14.6)	871 (3.9)	820 (3.6)	5,280 (23.5)	849 (3.8)	1,320 (5.9)	6,560 (29.2)	850 (3.8)	1,640 (7.3)	60 (81.3)
	3 3/8 (85.7)	13 1/2 (342.9)	6,040 (26.9)	654 (2.9)	1,510 (6.7)	9,840 (43.8)	1,303 (5.8)	2,460 (10.9)	8,160 (36.3)	880 (3.9)	2,040 (9.1)	
	4 1/2 (114.3)	18 (457.2)	6,960 (31.0)	839 (3.7)	1,740 (7.7)	11,840 (52.7)	2,462 (11.0)	2,960 (13.2)	•	•	2,040 (9.1)	
5/8 (15.9)	2 3/4 (69.9)	11 (279.4)	4,520 (20.1)	120 (0.5)	1,130 (5.0)	8,600 (38.3)	729 (3.2)	2,150 (9.6)	8,720 (38.8)	1,699 (7.6)	2,180 (9.7)	90 (122.0)
	4 1/2 (114.3)	18 (457.2)	8,200 (36.5)	612 (2.7)	2,050 (9.1)	15,720 (69.9)	1,224 (5.4)	3,930 (17.5)	12,570 (55.9)	396 (1.8)	3,140 (14.0)	
	5 1/2 (139.7)	22 (558.8)	8,200 (36.5)	639 (2.8)	2,050 (9.1)	15,720 (69.9)	1,116 (5.0)	3,930 (17.5)	•	•	3,140 (14.0)	
3/4 (19.1)	3 3/8 (85.7)	13 1/2 (342.9)	6,760 (30.1)	1,452 (6.5)	1,690 (7.5)	9,960 (44.3)	1,324 (5.9)	2,490 (11.1)	11,360 (50.5)	792 (3.5)	2,840 (12.6)	150 (203.4)
	5 (127.0)	20 (508.0)	10,040 (44.7)	544 (2.4)	2,510 (11.2)	15,760 (70.1)	1,550 (6.9)	3,940 (17.5)	18,430 (82.0)	1,921 (8.5)	4,605 (20.5)	
	6 3/4 (171.5)	27 (685.8)	10,040 (44.7)	1,588 (7.1)	2,510 (11.2)	17,000 (75.6)	1,668 (7.4)	4,250 (18.9)	•	•	4,605 (20.5)	
7/8 (22.2)	3 7/8 (98.4)	15 1/2 (393.7)	7,480 (33.3)	821 (3.7)	1,870 (8.3)	10,720 (47.7)	1,253 (5.6)	2,680 (11.9)	13,760 (61.2)	2,059 (9.2)	3,440 (15.3)	200 (271.2)
	7 7/8 (200.0)	31 1/2 (800.1)	17,040 (75.8)	1,566 (7.0)	4,260 (18.9)	20,320 (90.4)	2,401 (10.7)	5,080 (22.6)	22,300 (99.2)	477 (2.1)	5,575 (24.8)	
1 (25.4)	4 1/2 (114.3)	18 (457.2)	15,400 (68.5)	2,440 (10.9)	3,850 (17.1)	15,680 (69.7)	1,876 (8.3)	3,920 (17.4)	22,519 (100.2)	1,156 (5.1)	5,630 (25.0)	300 (406.7)
	9 (228.6)	36 (914.4)	20,760 (92.3)	3,116 (13.9)	5,190 (23.1)	30,080 (133.8)	1,612 (7.2)	7,520 (33.5)	25,380 (112.9)	729 (3.2)	6,345 (28.2)	
1 1/4 (31.8)	5 5/8 (142.9)	22 1/2 (571.5)	15,160 (67.4)	1,346 (6.0)	3,790 (16.9)	24,760 (110.1)	625 (2.8)	6,190 (27.5)	29,320 (130.4)	2,099 (9.3)	7,330 (32.6)	400 (542.3)
	9 1/2 (241.3)	38 (965.2)	20,160 (89.7)	3,250 (14.5)	5,040 (22.4)	48,920 (217.6)	1,693 (7.5)	12,230 (54.4)	•	•	7,330 (32.6)	
1 1/2 (38.1)	9 1/2 (241.3)	38 (965.2)	•	•	5,040 (22.4)	•	•	12,230 (54.4)	•	•	7,330 (32.6)	400 (542.3)

1. The allowable loads listed are based on a safety factor of 4.0.
2. Allowable loads may be increased by 33⅓% for short term loading due to wind or seismic forces.
3. Refer to pages 50 & 51 for allowable load adjustment factors for spacing and edge distance.
4. Drill bit used in base material to be same diameter as anchor.
5. Hole to be ½" deeper than required embedment.
6. Allowable tension load may be interpolated for concrete compressive strengths between 2000 psi and 4000 psi.
7. ¼" loads apply to Tie-Wire and Wedge-All.

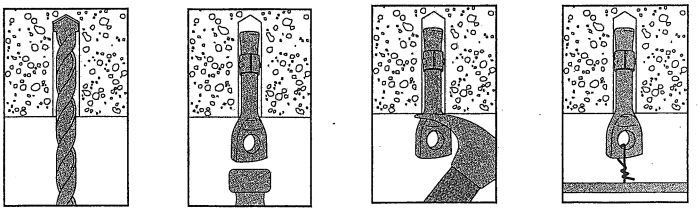
Wedge-All Installation Data

Wedge-All Dia (in)	¼	⅜	½	⅝	¾	⅞	1	1¼	1½
Bit Size (in)	¼	⅜	½	⅝	¾	⅞	1	1¼	1½
Fixture Hole (in)	5/16	7/16	9/16	11/16	⅞	1	1⅛	1⅜	1⅝
Wrench Size (in)	7/16	9/16	¾	15/16	1⅛	1 5/16	1½	1⅞	2¼

Wedge-All Installation Sequence



Tie-Wire Installation Sequence

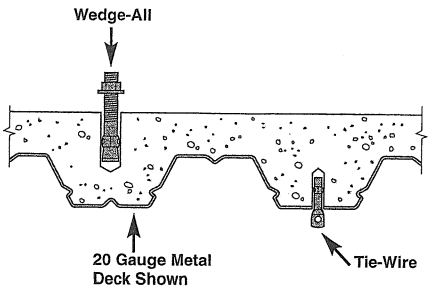


Tension Loads for Wedge-All (and Tie-Wire) Anchors in Lightweight Concrete on Metal Deck

Size in. (mm)	Embed. Depth in. (mm)	Tension Load (Install in Concrete) f'c >= 3000 psi (20.7 MPa) Concrete Ultimate lbs. (kN)	Std. Dev. lbs. (kN)	Allow. lbs. (kN)	Tension Load (Install through Metal Deck) f'c >= 3000 psi (20.7 MPa) Concrete Ultimate lbs. (kN)	Std. Dev. lbs. (kN)	Allow. lbs. (kN)	Install. Torque ft-lbs (N-m)
1/4 (TWD) (6.4)	1 1/2 (38.1)	•	•	•	1,440 (6.4)	167 (0.7)	360 (1.6)	•
1/2 (12.7)	2 1/4 (57.2)	3,880 (17.3)	228 (1.0)	970 (4.3)	3,860 (17.2)	564 (2.5)	965 (4.3)	60 (81.3)
	3 3/8 (85.7)	5,520 (24.6)	766 (3.4)	1,380 (6.1)	4,100 (18.2)	718 (3.2)	1,025 (4.6)	
5/8 (15.9)	2 3/4 (69.9)	5,920 (26.3)	239 (1.1)	1,480 (6.6)	5,220 (23.2)	370 (1.6)	1,305 (5.8)	90 (122.0)
3/4 (19.1)	3 3/8 (85.7)	7,140 (31.8)	537 (2.4)	1,785 (7.9)	6,600 (29.4)	903 (4.0)	1,650 (7.3)	150 (203.4)

See notes below

Lightweight Concrete On Metal Deck



Shear Loads for Wedge-All (and Tie-Wire) Anchors in Lightweight Concrete on Metal Deck

Size in. (mm)	Embed. Depth in. (mm)	Shear Load (Install in Concrete) f'c >= 3000 psi (20.7 MPa) Concrete Ultimate lbs. (kN)	Std. Dev. lbs. (kN)	Allow. lbs. (kN)	Shear Load (Install through Metal Deck) f'c >= 3000 psi (20.7 MPa) Concrete Ultimate lbs. (kN)	Std. Dev. lbs. (kN)	Allow. lbs. (kN)	Install. Torque ft-lbs (N-m)
1/4 (TWD) (6.4)	1 1/2 (38.1)	•	•	•	1,660 (7.4)	627 (2.8)	415 (1.8)	•
1/2 (12.7)	2 1/4 (57.2)	5,575 (24.8)	377 (1.7)	1,395 (6.2)	7,600 (33.8)	100 (0.4)	1,900 (8.5)	60 (81.3)
5/8 (15.9)	2 3/4 (69.9)	8,900 (39.6)	742 (3.3)	2,225 (9.9)	8,560 (38.1)	114 (0.5)	2,140 (9.5)	90 (122.0)
3/4 (19.1)	3 3/8 (85.7)	10,400 (46.3)	495 (2.2)	2,600 (11.6)	11,040 (49.1)	321 (1.4)	2,760 (12.3)	150 (203.4)

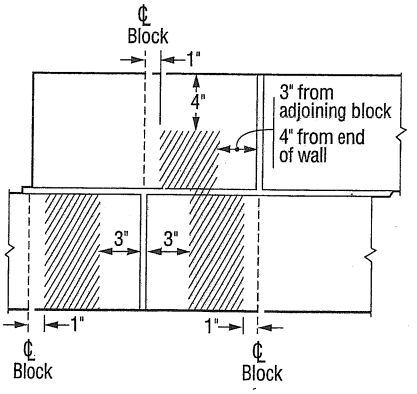
1. The allowable loads listed are based on a safety factor of 4.0.
2. Refer to pages 50 & 51 for allowable load adjustment factors for spacing and edge distance.
3. Drill bit used in base material to be same diameter as anchor.
4. Hole to be ½" deeper than required embedment.
5. Concrete deck thickness must be minimum 1.5 x anchor embedment depth.

Tension and Shear Loads for Wedge-All Anchors in Grout Filled CMU (Anchor Installed in Horizontal Mortar Joint or Face Shell)

Size in. (mm)	Embed. Depth in. (mm)	Min. End Dist. in. (mm)	Tension Load Ultimate lbs. (kN)	Tension Load Allow. lbs. (kN)	Shear Load Ultimate lbs. (kN)	Shear Load Allow. lbs. (kN)	Install. Torque ft-lbs (N-m)
3/8 (9.5)	2 1/2 (63.5)	3 (76.2)	2,239 (10.0)	560 (2.5)	3,418 (15.2)	855 (3.8)	30 (40.7)
1/2 (12.7)	3 1/2 (88.9)	3 (76.2)	3,660 (16.3)	915 (4.1)	8,778 (39.0)	2,195 (9.8)	60 (81.3)
5/8 (15.9)	4 (101.6)	3 (76.2)	5,110 (22.7)	1,275 (5.7)	7,924 (35.2)	1,980 (8.8)	90 (122.0)
3/4 (19.1)	4 3/4 (120.7)	3 (76.2)	6,400 (28.5)	1,600 (7.1)	7,540 (33.5)	1,885 (8.4)	150 (203.4)

1. The allowable loads listed are based on a safety factor of 4.0.
2. Listed loads may be applied to installations through a face shell with the following placement guidelines:
   - Minimum 4" from top of wall or end of wall.
   - Minimum 3" from vertical mortal joint.
   - Minimum 1" from vertical cell centerline.
3. Values for 6 and 8 inch wide Grade N, Type II, lightweight, medium weight and normal weight concrete masonry units conforming to ASTM C90 and UBC Standard 21-4. Masonry units are to be fully grouted with course grout conforming to ASTM C476 with a minimum compressive strength of 2000 psi. Mortar and grout shall comply with section 2104 of the UBC.
4. Embedment depth is measured from the outside face of the concrete masonry unit.
5. Drill bit used in base material to be same diameter as anchor.
6. Hole to be ½" deeper than required embedment.

Horizontal Mortar Joint/Face Shell Installation



Allowable anchor placement in grout filled CMU shown by shaded areas.

SUGGESTED SPECIFICATIONS:

Wedge anchors shall be a threaded stud with an integral cone expander and a single piece expansion clip. The stud shall be carbon steel with a minimum 70,000 psi tensile strength, type 18-8 or 316 stainless steel, as called for on the drawings. Anchors shall meet Federal Specification A-A-1923A, Type 4. Anchors shall be Wedge-Alls from Simpson-Strong Tie, Pleasanton, CA. Anchors shall be installed following Simpson Strong-Tie's instructions for Wedge-Alls.

Example Calculation for a Group of two (2) Wedge-All Anchors:

Design a connection comprised of two (2) ¾" diameter Wedge-All WA75614 anchors installed in f'_c = 2000 psi normal weight concrete as shown. The anchor group has an applied tension load of 1500 lbs. and an applied shear load of 2400 lbs. acting simultaneously.

Additional Data:

- Embedment depth = 5" (medium embedment).
- Spacing = S_{act} = S1 = 10".
- Critical spacing for ¾" dia. anchor at medium embedment = S_{cr} = 20".
- $S_{act} < S_{cr}$ (reduction for spacing must be applied).
- Critical edge distance for ¾" dia. anchor = C_{cr} = 7 ½".
- Edge distance = C_{act} = C1 = C2 = 6".
- $C_{act} < C_{cr}$ (reduction for edge distance must be applied).

SOLUTION:

TENSION: Determine Uninfluenced Allowable Tension load in f'_c = 2000 psi normal wt. concrete:

Uninfluenced Allowable Tension = 2510 lbs.

Determine tension load adjustment factor for Spacing at medium embedment:

Embedment = 5"

S_{act} = S1 = 10"

f_{sS1} = 0.95 = Load Adjustment Factor

Determine tension load adjustment factor for Edge Distance:

C_{act} = C1 = C2 = 6"

f_{cC1} = 0.90 = Load Adjustment Factor

f_{cC2} = 0.90 = Load Adjustment Factor

Calculate Allowable Tension load per anchor:

Allowable Tension=(Uninfluenced Allowable Tension) $(f_{sS1})(f_{cC1})(f_{cC2})$

Allowable Tension=(2510 lbs.)(0.95)(0.90)(0.90)=1931 lbs per anchor

SHEAR: Determine Uninfluenced Allowable Shear load in f'_c = 2000 psi normal wt. concrete:

Uninfluenced Allowable Shear = 4605 lbs.

Determine shear load adjustment factor for Spacing at medium embedment:

Embedment = 5"

S_{act} = S1 = 10"

f_{sS1} = 1.00 = Load Adjustment Factor

Determine shear load adjustment factor for Edge Distance:

C_{act} = C1 = C2 = 6"

f_{cC1} = 0.77 = Load Adjustment Factor

f_{cC2} = 0.77 = Load Adjustment Factor

Calculate Allowable Shear load per anchor:

Allowable Shear = (Uninfluenced Allowable Shear)$(f_{sS1})(f_{cC1})(f_{cC2})$

Allowable Shear = (4605 lbs.)(1.00)(0.77)(0.77) = 2730 lbs. per anchor

Check Anchor for Combined Tension and Shear:

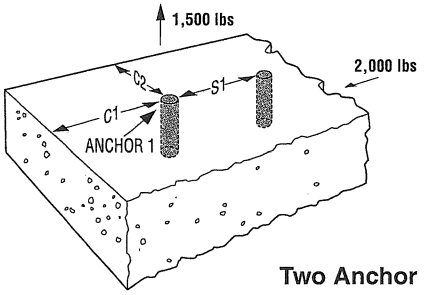
Unity Check:

(Applied Tension/Allowable Tension)+(Applied Shear/Allowable Shear)<=1.00

Allowable Tension = 1931 lbs. x 2 = 3862 lbs. (two (2) anchors)

Allowable Shear = 2730 lbs. x 2 = 5460 lbs. (two (2) anchors)

(1500 / 3862) + (2400 / 5460) = 0.83 <= 1.00 ok



Two Anchor Layout

The allowable tension (or shear) value for a group of anchors is equal to the lowest (minimum) tension (or shear) value for a single anchor within the group multiplied by the number of anchors within the group.

Load Adjustment Factors

Load Adjustment Factors for minimum spacing have been determined by testing for shallow and deep embedment and by linear interpolation for medium embedment.

How to use these charts:

1. Locate the anchor size to be used for either a tension and/or shear load application.
2. Locate the edge distance and/or spacing at which the anchor is to be installed.
3. The load adjustment factor(s) will be the intersection of the row and column.
4. Multiply allowable load by applicable load adjustment factor(s).
5. Multiple adjustment factors for reduced edges and/or reduced spacing are multiplied together.

Load Adjustment Factors for Reduced Edge Distance for Wedge-All Anchors in Concrete

f_c – Edge Distance Tension

Edge Dist.	Size	1/4	3/8	1/2	5/8	3/4	7/8	1	1 1/4	1 1/2
C_{act}	C_{cr}	2 1/2	3 3/4	5	6 1/4	7 1/2	8 3/4	10	12 1/2	15
	C_{min}	1	1 1/2	2	2 1/2	3	3 1/2	4	5	6
(in)	f_{cmin}	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70
1		0.70								
1 1/2		0.80	0.70							
2		0.90	0.77	0.70						
2 1/2		1.00	0.83	0.75	0.70					
3			0.90	0.80	0.74	0.70				
3 1/2			0.97	0.85	0.78	0.73	0.70			
3 3/4			1.00	0.88	0.80	0.75	0.71			
4				0.90	0.82	0.77	0.73	0.70		
4 1/2				0.95	0.86	0.80	0.76	0.73		
5				1.00	0.90	0.83	0.79	0.75	0.70	
5 1/2					0.94	0.87	0.81	0.78	0.72	
6					0.98	0.90	0.84	0.80	0.74	0.70
6 1/4					1.00	0.92	0.86	0.81	0.75	0.71
6 1/2						0.93	0.87	0.83	0.76	0.72
7						0.97	0.90	0.85	0.78	0.73
7 1/2						1.00	0.93	0.88	0.80	0.75
8							0.96	0.90	0.82	0.77
8 1/2							0.99	0.93	0.84	0.78
8 3/4							1.00	0.94	0.85	0.79
10								1.00	0.90	0.83
12 1/2									1.00	0.92
15										1.00

f_c – Edge Distance Shear

Edge Dist.	Size	1/4	3/8	1/2	5/8	3/4	7/8	1	1 1/4	1 1/2
C_{act}	C_{cr}	2 1/2	3 3/4	5	6 1/4	7 1/2	8 3/4	10	12 1/2	15
	C_{min}	1	1 1/2	2	2 1/2	3	3 1/2	4	5	6
(in)	f_{cmin}	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30
1		0.30								
1 1/2		0.53	0.30							
2		0.77	0.46	0.30						
2 1/2		1.00	0.61	0.42	0.30					
3			0.77	0.53	0.39	0.30				
3 1/2			0.92	0.65	0.49	0.38	0.30			
3 3/4			1.00	0.71	0.53	0.42	0.33			
4				0.77	0.58	0.46	0.37	0.30		
4 1/2				0.88	0.67	0.53	0.43	0.36		
5				1.00	0.77	0.61	0.50	0.42	0.30	
5 1/2					0.86	0.69	0.57	0.48	0.35	
6					0.95	0.77	0.63	0.53	0.39	0.30
6 1/4					1.00	0.81	0.67	0.56	0.42	0.32
6 1/2						0.84	0.70	0.59	0.44	0.34
7						0.92	0.77	0.65	0.49	0.38
7 1/2						1.00	0.83	0.71	0.53	0.42
8							0.90	0.77	0.58	0.46
8 1/2							0.97	0.83	0.63	0.49
8 3/4							1.00	0.85	0.65	0.51
10								1.00	0.77	0.61
12 1/2									1.00	0.81
15										1.00

1. C_{act} = actual edge distance at which anchor is installed.
2. C_{cr} = critical edge distance for 100% load.
3. C_{min} = minimum edge distance for reduced load.
4. f_c = percent of allowable load at actual edge distance.
5. f_{ccr} = percent of allowable load at critical edge distance. f_{ccr} is always = 1.00.
6. f_{cmin} = percent of allowable load at minimum edge distance.
7. $f_c = f_{cmin} + [(1 - f_{cmin}) (C_{act} - C_{min}) / (C_{cr} - C_{min})]$.

How to use these charts:

1. Locate the anchor size to be used for either a tension and/or shear load application.
2. Locate the edge distance and/or spacing at which the anchor is to be installed.
3. The load adjustment factor(s) will be the intersection of the row and column.
4. Multiply allowable load by applicable load adjustment factor(s).
5. Multiple adjustment factors for reduced edge and/or reduced spacing are multiplied together.

Load Adjustment Factors for Reduced Spacing for Wedge-All Anchors in Concrete

f_s – Spacing Tension Shallow Embedment

S_{act} (in)	Size	1/4	3/8	1/2	5/8	3/4	7/8	1	1 1/4	1 1/2
	Embed	1 1/8	1 3/4	2 1/4	2 3/4	3 3/8	3 7/8	4 1/2	5 5/8	6 3/4
	S_{cr}	4 1/2	7	9	11	13 1/2	15 1/2	18	22 1/2	27
	S_{min}	1 5/8	2 1/2	3 1/4	3 7/8	4 3/4	5 1/2	6 3/8	7 3/4	7 7/8
	f_{smin}	1.00	0.86	0.86	0.86	0.86	0.84	0.84	0.84	0.84
1 5/8		1.00								
2		1.00								
2 1/2		1.00	0.86							
3		1.00	0.88							
3 1/2		1.00	0.89	0.86						
4		1.00	0.91	0.87	0.86					
4 1/2		1.00	0.92	0.89	0.87					
5			0.94	0.90	0.88	0.86				
5 1/2			0.95	0.91	0.89	0.87	0.84			
6			0.97	0.92	0.90	0.88	0.85			
6 1/2			0.98	0.94	0.91	0.88	0.86	0.84		
7			1.00	0.95	0.92	0.89	0.86	0.85		
7 1/2				0.96	0.93	0.90	0.87	0.85		
8				0.97	0.94	0.91	0.88	0.86	0.84	0.84
9				1.00	0.96	0.92	0.89	0.87	0.85	0.85
10					0.98	0.94	0.91	0.89	0.86	0.86
11					1.00	0.95	0.92	0.90	0.87	0.87
12						0.97	0.94	0.92	0.88	0.87
14						1.00	0.97	0.94	0.91	0.89
16							1.00	0.97	0.93	0.91
18								1.00	0.95	0.92
20									0.97	0.94
22 1/2									1.00	0.96
24										0.97
27										1.00

f_s – Spacing Tension Medium Embedment

S_{act} (in)	Size	3/8	1/2	5/8	3/4
	Embed	2 5/8	3 3/8	4 1/2	5
	S_{cr}	10 1/2	13 1/2	18	20
	S_{min}	3 3/4	4 3/4	6 3/8	7
	f_{smin}	0.93	0.93	0.93	0.93
3 3/4		0.93			
4		0.93			
4 1/2		0.94			
5		0.94	0.93		
5 1/2		0.95	0.93		
6		0.95	0.94		
6 1/2		0.96	0.94	0.93	
7		0.96	0.95	0.93	0.93
8		0.97	0.95	0.94	0.94
9		0.98	0.96	0.95	0.94
10		0.99	0.97	0.95	0.95
11		1.00	0.98	0.96	0.95
12			0.98	0.96	0.96
13			0.99	0.97	0.96
14			1.00	0.98	0.97
16				0.99	0.98
18				1.00	0.99
20					1.00

f_s – Spacing Tension Deep Embedment

S_{act} (in)	Size	1/4	3/8	1/2	5/8	3/4	7/8	1	1 1/4	1 1/2
	Embed	2 1/4	3 3/8	4 1/2	5 1/2	6 3/4	7 7/8	9	9 1/2	13 1/2
	S_{cr}	9	13 1/2	18	22	27	31 1/2	36	38	54
	S_{min}	3 1/4	4 3/4	6 3/8	7 3/4	9 5/8	11 1/8	12 5/8	13 1/2	19
	f_{smin}	1.00	1.00	1.00	1.00	1.00	0.96	0.96	0.96	0.96
3 1/4		1.00								
4		1.00								
5		1.00	1.00							
6		1.00	1.00							
7		1.00	1.00	1.00						
8		1.00	1.00	1.00	1.00					
9		1.00	1.00	1.00	1.00					
10			1.00	1.00	1.00	1.00				
11			1.00	1.00	1.00	1.00				
12			1.00	1.00	1.00	1.00	0.96			
13			1.00	1.00	1.00	1.00	0.96	0.96		
14			1.00	1.00	1.00	1.00	0.96	0.96	0.96	
16				1.00	1.00	1.00	0.97	0.97	0.96	
18				1.00	1.00	1.00	0.97	0.97	0.97	
20					1.00	1.00	0.98	0.97	0.97	0.96
24					1.00	1.00	0.98	0.98	0.98	0.96
28						1.00	0.99	0.99	0.98	0.97
32							1.00	0.99	0.99	0.97
36								1.00	1.00	0.98
38									1.00	0.98
54										1.00

1. S_{act} = actual spacing at which anchors are installed.
2. S_{cr} = critical spacing for 100% load.
3. S_{min} = minimum spacing for reduced load.
4. f_s = percent of allowable load at actual spacing.
5. f_{scr} = percent of allowable load at critical spacing. f_{scr} is always = 1.00.
6. f_{smin} = percent of allowable load at minimum spacing.
7. $f_s = f_{smin} + [(1 - f_{smin}) (S_{act} - S_{min}) / (S_{cr} - S_{min})]$.
8. f_s = 1.00 for shear (shallow, medium and deep embedments).